

» Asus Eee PC Add a new version of Linux and keep your data safe

Eee PC: Add a

Part 2: Your Eee isn't limited to a single distribution. **Mike Saunders** shows you how to install another Linux flavour and back up your files.



Our expert

Mike Saunders snapped up an Eee PC back in November and has customised the software in every way imaginable. He loves his laptop like a tiny plastic child.

If you read our cover feature in **LXF106** and followed last month's tutorial, you'll by now be very familiar with the workings of your Eee's desktop, having added extra software and fine-tuned the interface. But if you've only just snapped up an Eee and haven't seen the previous guides, worry not – this tutorial

Part 1 Add a new distro

Right, let's get started. We're going to install a new distro on to the SD card, giving you a dual boot choice between Xandros and the new Linux installation. For this we'll use Breezy (<http://tinyurl.com/2e36u6>), a special version of the Puppy Linux mini distro that has been fine-tuned for the Eee's hardware. When you're finished, you can bring up a boot menu when starting your Eee, choosing between Xandros on the machine's internal drive or Breezy on the SD card. We'll be doing a bit of work at the command line – if that sounds terrifying, read the New to Linux guide in the Help section of the **LXFDVD**, and you'll soon feel a lot more confident.

Boot up your Eee without the SD card inserted, and if you have no way of getting files from the **LXFDVD** (an external DVD-ROM drive, for example), you'll need to connect to the internet. These are the files we're going to use:

- » **breezy.zip**
- » **syslinux-nomtools**

You can find these in the **Distros/Breezy** section of the DVD, or

stands on its own, so you don't need to have made the previous changes. Best of all, you don't need to worry about breaking your Eee's setup, as later on in this guide, we'll show you how to back up every file on your machine in one fell-swoop!

The default Xandros distro supplied with the Eee is excellent for basic office and browsing jobs, and you can beef it up with extra applications from the Xandros package repositories. But it's not the be-all and end-all of Linux: the Eee is a fully fledged PC, albeit very small, and is capable of running other Linux distros. In some cases, the Eee's hardware requires special drivers that aren't typically present in desktop distros, but thankfully we have lots of Eee-tailored distros to choose from.

This issue we'll show you how to install an extra distro on your Eee. But why would you want to do this?

» **Safety** If your Xandros installation won't boot, you can fire up a second distro and fix it.

» **Gaming** The Eee is surprisingly capable as a little Windows games box, running even *GTA: Vice City* very well. If you want to install Windows as the main operating system, you can still get your Linux fix easily.

» **Fun** It's always fascinating to try out new distros and explore more flavours of Linux.

For this tutorial, you'll need an 512MB minimum SD memory card that you can plug into your Eee (the slot is on the right-hand side). These cards are astoundingly cheap now: you can pick up a 2GB card for under £5 on the internet – see our Flash memory buyer's guide on page 87.

at www.linuxformat.co.uk/mag/breezy. Either way, save these files into your Eee's home directory and follow these steps.

Prepare the SD card

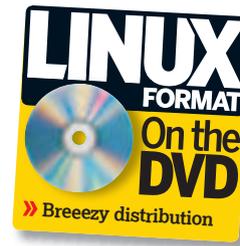
Insert your SD card, and if the Removable Device dialog box appears, just click Cancel – we're not interested in seeing the card in the file manager. Now open up a command line window by hitting Ctrl+Alt+T. Enter **ls** to list the files in your home directory, and along with the **breezy.zip** and **syslinux-nomtools** files that you grabbed before, you should also see a directory called **MMC-CD** for the SD card.

First, we need to reformat the SD card so that it has the correct filesystem for booting, called FAT16. (Back up any important data on your SD card beforehand, as we're going to erase it!) Enter **sudo bash** to switch to the root (administrator) user, then enter these commands:

```
umount /dev/sdb1
fdisk /dev/sdb
```

» **Last month** Adding extra software and enabling the KDE desktop.

new distro



```

user@eeepc-mike:~$ fdisk /dev/sdb1
Partition number (1-4): 1
First cylinder (1-1018, default 1):
Using default value 1
Last cylinder or +size or +sizeK (1-1018, default 1018):
Using default value 1018
Command (<n for help): t
Selected partition 1
Hex code (type L to list codes): e
Changed system type of partition 1 to e (MS FAT16 (LBA))
Command (<n for help): w
Partition number (1-4): 1
Command (<n for help): p
Disk /dev/sdb: 509 MB, 50905648 bytes
16 heads, 63 sectors/track, 1018 cylinders
Units = cylinders of 576 * 512 = 499712 bytes

   Device Boot      Start         End      Blocks   Id  System
   /dev/sdb1  *           1         1018     496752    e   MS FAT16 (LBA)
Command (<n for help):

```

» Use **fdisk** to set up a new partition on the SD card for Breezy.

This unmounts the SD card, giving us unrestricted access to it, and then starts a disk partition manager. At the prompt, enter **o**, which will create an empty partition table. Next, enter **n** (for a new partition), then **p** when prompted (for a primary partition) and **1** at the following prompt. You'll then be asked to specify which disk cylinders to use – just hit Enter twice to use the defaults. Finally, enter **p** to show the new partition details.

We need to change the new partition type to FAT16: enter **t**, and when prompted for the type, enter **e**. Also, we need to make this partition bootable: enter **a** (for activate), then **1** at the following prompt. Now you can enter **w** once more to see the new partition, and your results should be similar to the screenshot above. Finally, enter **w** to write the changes to the SD card and exit.

To create a new filesystem on the SD card, enter:

```
mkfs.vfat /dev/sdb1
```

Now we have the SD card fully prepped and we're ready to add the Breezy distro files. Enter **exit** to switch back to your normal user account.

Installing Breezy

Pop the SD card out and re-insert it, so that it's mounted again. (As before, click Cancel if the device manager dialog pops up.) Back in the command line window, enter:

```
cd MMC-SD/partition1/
```

Now we're in the main directory of the SD card, so we can extract the Breezy files like this:

```
unzip ~/breezy.zip
```

(You'll find the **~** tilde character by pressing Shift+#, on the right-hand side of your keyboard.) Don't worry if you see 'file attributes error' warnings – it's just because we're extracting Linux files on to a FAT16-formatted SD card. Enter **ls -lh** to view the new Breezy files, as in the screenshot.

We're almost there; we just need to add the *Syslinux* bootloader. Enter **cd** (on its own) to switch back into your home directory and then **sudo bash** to switch to the root user again. Now enter:

```
umount /dev/sdb1
chmod +x syslinux-nomtools
./syslinux-nomtools /dev/sdb1
```

Reboot your Eee with the SD card inserted. At the Asus boot screen, tap Esc repeatedly until you get a boot menu. You'll see two entries: the first is for the OS on the internal drive, Xandros, and the second (CardReader SDO) is for the SD card with Breezy. Hit the down cursor key and press Enter to boot the latter.

Using Breezy

After about a minute, you'll arrive at the Breezy desktop and hear a barking sound from the speakers (because it's based on Puppy Linux). A *Dillo* web browser window will pop up, giving you some hints and tips on using the distro, so read it through. You'll notice that there's no visible task bar at first – move the mouse pointer to the bottom of the screen to bring it up. You'll see that it's very much like *IceWM*, with a program menu on the left, virtual desktops and a task bar in the middle, and some stats (memory and battery) on the right.

Click the Menu button to open up the main list of supplied software. Breezy's father distro, Puppy Linux, is designed with older machines (the Pentium 166, for example) in mind, so you'll »

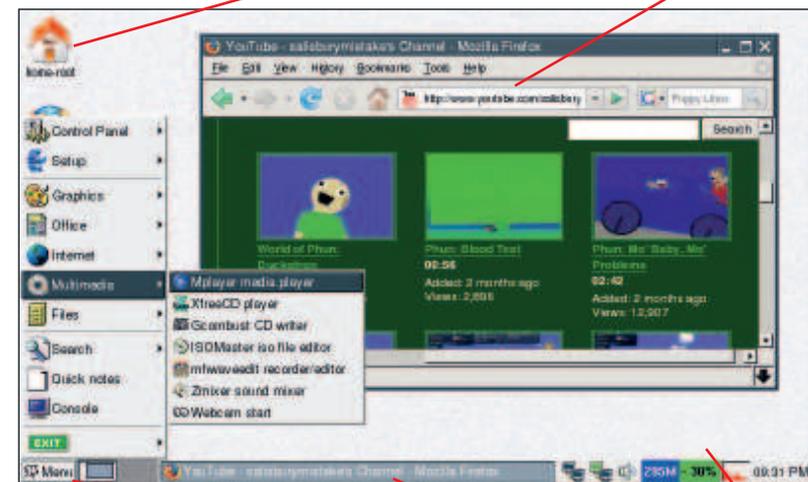
Exploring the Breezy desktop

Desktop

Here you'll find program launchers and access to your personal files.

Firefox

Breezy is well equipped for internet work with *Firefox 2.0.0.11*.



Menu

Click this button to bring up a list of the supplied software.

Task bar

Drag the mouse pointer to the bottom of the screen to make this visible.

Feedback

The blue number shows available RAM, while the green one shows battery power.

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» find that Breezy screams along on a reasonably powerful machine such as the Eee. The included programs are very fast and light; in particular, take a look at *MTPaint* in the graphics section for image editing and *TextMaker* in the Office section for working with documents.

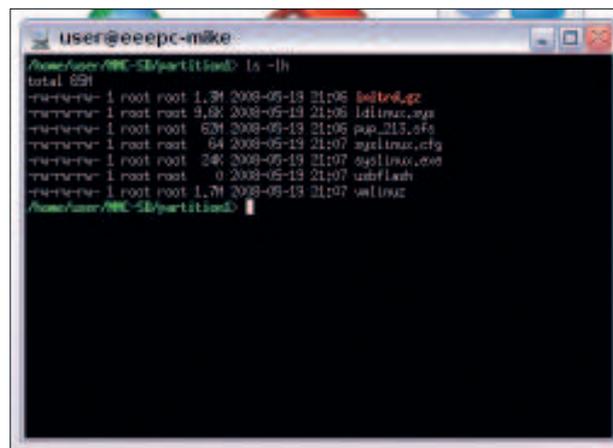
Quick tip

In Breezy, as with Xandros, you can move windows larger than the screen by holding down Alt and then clicking and dragging the window. This is useful for programs that are too large for the Eee's diminutive 800x480 resolution.

On the internet side, Breezy includes two browsers: the aforementioned *Dillo* and *Firefox*. *Dillo* is very fast but doesn't support many web features – if you try to use it with JavaScript-heavy sites, you won't get very far. So for a spot of Googling and getting lost in the fact labyrinth of Wikipedia, *Dillo* does a decent job, but you'll want to use *Firefox* for most tasks.

Breezy is well equipped on the media front: try *MPlayer* for opening a vast range of video and sound file formats and *MHWaveEdit* to record audio input from the microphone jack. To configure Breezy, navigate into the Setup menu, where you can get online via the Network wizard. Connecting to a Wi-Fi network is straightforward – click Wireless in the main network dialog and Scan at the bottom to choose your network. Then all you need to do is click Use This Profile and Auto DHCP to connect. You can now browse in *Firefox*.

Breezy is a great little distro and a fine alternative to the default Xandros OS. If you plan on installing another distro (or even Windows) on the internal drive, you can still keep Linux close to



» When you've extracted Breezy, enter `ls -lh`, to bring up this list of distribution files on the SD card.

hand with Breezy on your SD card. You can even add more software via Menu > Setup > Full package manager if you're online. To shut down Breezy, navigate to the Exit menu – it will prompt you to save changes.

Part 2 Backing up your Eee

Backups are often very fiddly jobs, which is why none of us make them as frequently as we should. Which files should I save? Should I try to back up my boot scripts? Do I have enough space on a DVD-R? The Eee's 4GB flash drive helps out here – sure, it's not very spacious, but it does mean that you can make multiple backups of your entire Eee without using up too much space. Each backup will weigh in at no more than 4GB, and with compression, usually a lot less.

The ability to make multiple backups is very handy. For instance, on our test Eee we have backups for the stock Xandros distro, a highly customised version of Xandros, and an installation of Syllable (www.syllable.org). When you've got your Eee exactly as you want it, with your ideal choice of software and settings, you can back up the machine in case a future update or software installation mucks things up. It also means you can easily try out other distros and OSes, restoring your Eee to its previous state when you want to return to normality.

We'll do this by making an exact clone – bit-for-bit – of the Eee's internal flash drive. Rather than trying to work out which OS files we need and how things fit together, we'll simply copy the whole lot over in one big lump. You'll need some form of external storage; in this guide we'll use an external USB hard drive, but if you have a USB flash key with 4GB or more free space, that'll work fine too. Install Breezy as per Section 1, boot it up and follow these steps.

Adding the external drive

Breezy doesn't auto-mount USB drives, but it's not difficult to do this manually. Plug in your hard drive or flash key and click the Menu button and Console to launch a command-line window. Then enter:

```
dmesg
```

This prints out a list of kernel messages, most of which are irrelevant to our job here. But if you look at the last few lines, you'll see some information on the drive that you just plugged in. Look



» Using the `dmesg` command we can identify the device name of an external drive so that we can mount it.

for something like this:

```
SCSI device sdb: 78140160 512-byte hdwr sectors (40008 MB)
sdb: Write Protect is off
sdb: Mode Sense: 53 00 00 08
```

You'll see many other lines beginning with `sdb`, or possibly `sdc` depending on whether you've inserted another drive before – see the screenshot for an example. The most important line is the one that tells us how many partitions are on the drive, like this:

```
sdb: sdb1
```

(Note that it's indented with a single space.) From this, we can determine that our external hard drive has been assigned the device name `sdb`, and it has one partition called `sdb1`. We'll add our Eee backup on to `sdb1`, but if you have a second partition with more space, you'll want to use `sdb2`.

Mounting the drive

Now we need to mount the drive on to the filesystem, so enter these commands:

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Flash memory buyer's guide

Flash memory, in both SD card and USB key format, is tumbling in price. A few years ago we were wooed by expensive 1GB devices – now you can pick up 4GB for less than £10, which would have been unbelievable even two years ago. However, there are a couple of things to be aware of. Firstly, flash memory has a limited lifespan: data can only be written to it a finite number of times.

Typically, manufacturers claim that the memory will fail after about 10,000 writes (file saves), which sounds huge, but generic unbranded memory is likely to fail a lot sooner. If you're

just looking to play around with other Linux distros, grab a generic flash key or card from EBuyer. If you need to save important data, go with a well-known brand such as Kingston. You'll pay a little more (typically £5 more for a 4GB SD card), but it's worth it.

Secondly, some Eee users are reporting problems with 16GB and larger SD cards. Many users are running them flawlessly, but before you splash out, pop by the forums at <http://forum.eeeuser.com> and search for the brand you're interested in – or post a message asking for advice.



› www.ebuyer.com is a great site for buying memory sticks and cards, whether you're opting for cheap, cheerful and unbranded, or costlier memory from the big names.

```
mkdir /usb
mount -t vfat /dev/sdb1 /usb
cd /usb
```

Here, the first command creates a new directory where we'll access the external drive, **/usb**. The second command is a normal mounting procedure – linking the device to the directory. Note that you'll need to change **sdb1** to **sdc1** or **sdb2** depending on the results you got before, and that this command is for FAT-formatted partitions, which is the norm with USB external drives. If you've reformatted your device as a Linux ext2/3 filesystem, you can omit the **-t vfat** part as it'll be recognised automatically.

The last command switches into the **/usb** directory. Enter **ls** and you'll see a list of files on your external drive (or nothing if it has been freshly formatted, of course!). Let's create a new directory for the Eee backup:

```
mkdir eee_backups
cd eee_backups
```

Making the backup

In Breezy, the device name given to the Eee's internal flash drive is **/dev/hdc**. You can confirm this by entering **dmesg | grep hdc** and reading the output, which shows you information about the drive. Note that Breezy uses a US keymap, so the middle pipe character of that command is available by pressing Shift+# (just above the Enter key).

As mentioned before, we're going to make an exact image of the Eee's internal drive. But we'll also compress it to save space and provide some protection against data corruption. Here's the command you need:

```
dd if=/dev/hdc | gzip -c5 > my_eee.gz
```

Let's step through this. **dd** is the Unix tool to copy and convert files, and we need to give it an input file (the **if** bit). As we saw before, the Eee's internal drive is assigned the device file **/dev/hdc**, so we can use that file to read the raw drive.

With the **dd** tool reading the data from the Eee's drive, we pipe (**|**) it through to the **gzip** utility to add compression. The **-c5** part states how much compression we want – it can go up to 9, but that's very slow, so we speed things up by opting for a middle value. Then the **>** character redirects the output to a file called **my_eee.gz**, and, of course, you can change that to any filename



Quick tip

The command-line window in Breezy can occasionally get a bit scrambled and illegible when lots of text is scrolling past. To clean it up, press **Ctrl+L**, which clears the screen and eliminates any errant pixels.

you want. The copying process could take 10 or 20 minutes, depending on how much data you have on your Eee.

So there we have it: your Eee's current installation is now safely stored on your external drive. Enter **cd / ; umount /usb** to unmount the drive so that you can remove it from your machine.

Restoring your backup

Restoring is the exact opposite of Step 3: we'll read the compressed file and use **dd** to send its output to the Eee's internal drive. For instance, let's say you want to restore a backup called **xandros.gz**. Plug in your external USB device, open a command-line window and mount it as per the previous three steps. Using **cd**, switch into the directory where your Eee backups are kept. Then enter this command:

```
gunzip -c xandros.gz | dd of=/dev/hdc
```

Here we use **gunzip** to extract our compressed backup file, then pipe it through to the **dd** utility. This time, **dd** expects an output file (**of**), which we specify as the Eee's internal drive, **/dev/hdc**. Note that this command can take up to an hour to complete – you'll see the drive light flashing as a constant reminder that it's busy. Now that you can make and restore backups, you can install other distros on to your Eee's internal drive, so stay tuned next month for a full guide! **LXF**

» **Next Month** Take your Eee to new heights with a full distro swap.