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1 Introduction

I recently purchased an ASUS Eee PC S101 (Windows XP) and decided that I would like to install Windows 7 (Home Premium) before starting to use it properly.

Whilst investigating whether the machine would be capable of running Windows 7 and what might be involved, I learned quite a lot about the S101. Whilst making notes for my own benefit, I began to realise that they could also be of interest to others. Hopefully they will prove useful to you and help save some time when upgrading your own machine.

If you are feeling particularly adventurous you will probably be able to find newer drivers on the manufacturer websites. However, you should consider the possibility that newer drivers may not have any benefits on your hardware and may even cause problems. For this reason, I have gone for the “safe” approach of using drivers from the ASUS website.

Also included in this guide are details about how you can create a bootable USB stick or SD card, useful if you do not have an external DVD drive that connects via USB. I also describe how you can use the ASUS XP Support DVD to restore your machine to the original Windows XP image and how to use the embedded copy of Symantec Ghost 11.0 to make backups of your SSD.

All of the preparation was done on my Dell Inspiron 1520 with Windows XP installed.

Finally, these instructions may also apply to other models in the ASUS Eee PC range but you may need to find alternative drivers from the ASUS support website.

The latest version of this guide is available from my home page:

http://www.mikeg.me.uk/guides/asus_eee_pc_s101.pdf

2 Creating a Bootable USB Stick or SD Card

2.1 Choosing between USB Stick or SD Card

It is possible to create a bootable USB stick or a bootable SD card:

- Creating a bootable USB stick is usually pretty straightforward.
- Creating a bootable SD card is also possible but it must be connected via a USB device. Internal SD card slots are not always recognised by the required tools.

2.2 Choosing a File System

When formatting your USB stick or SD card you need to choose a suitable file system:

- FAT for small devices <= 2GB
- FAT32 for medium devices <= 32GB
- NTFS for larger devices or the contents of the Windows 7 DVD

Generally speaking, it doesn't matter which file system you choose, unless installing Windows 7 which must be done from NTFS (AFAIK). If you have trouble booting from a FAT32 device larger than 2GB you may have more success with NTFS.

2.3 Formatting

Depending on the file system that you desire, you may need a special formatting tool:

- FAT – Windows (maybe) or HP USB Disk Storage Format Tool (see below)
- FAT32 – Windows (maybe) or HP USB Disk Storage Format Tool (see below)
- NTFS – HP USB Disk Storage Format Tool

You can find the “HP USB Disk Storage Format Tool v2.1.8” with a Google search,

Once the device has been formatted, you usually need to mark the primary partition as “active” (see below). If you formatted the USB device using Windows and it won't boot (e.g. “Disk error. Press any key to restart”), try the HP USB Disk Storage Format Tool.

Note: The HP USB Disk Storage Format Tool will only format USB storage devices and may not recognise your internal SD card slot. For example, the internal SD slot in my Dell Inspiron 1520 is not recognised by the HP tool but the internal SD slot in my Eee PC S101 is recognised by the HP tool. If your internal SD slot is not recognised then you will need to find a USB device for your SD card or format it on another machine.

2.4 Marking the Device “Active”

Having formatted the disk, you must mark the primary partition as “active”. An easy way to do this is using a tool called MBRWizard, available from <http://mbrwizard.com/>:

Open a command prompt and issue the following commands:

- `mbrwiz /list` list disks that are currently attached
- `mbrwiz /active=1 /disk=1` mark primary partition of disk as active

Be careful when using the “mbrwiz” command and be sure to specify the correct device!

Once marked as “active”, you must specify the appropriate boot manager (see below).

Note: Marking a partition “active” is also possible with the command “diskpart.exe” but only when using Windows Vista and Windows 7, not Windows XP.

2.5 NTLDR or BOOTMGR?

You need to determine whether the device should boot using NTLDR or BOOTMGR:

- NTLDR (NT52) is for Windows XP (e.g. XP Support and Symantec Ghost 11.0)
- BOOTMGR (NT60) is for Windows 7

Note: Formatting a device under Windows XP will generally set the MBR to “NTLDR”.

To set up the device for the Windows 7 installation files (BOOTMGR):

- Copy “bootsect.exe” from the “boot” folder of your Windows 7 DVD
- Open a command prompt and issue the following command:
- `bootsect /nt60 f:` (replacing f: with the USB stick / SD card device letter)

Note: Do not be tempted to run “bootsect.exe” from the device that you are modifying as it may not work properly. Run it from somewhere else, such as from your C: drive.

You can also switch the device back to Windows XP (NTLDR) using this procedure:

- Follow the procedure as above but specify “nt52” instead of “nt60”

Note: The bootsect.exe command may not recognise your internal SD slot. For example, the internal SD slot in my Dell Inspiron 1520 is not recognised by bootsect.exe but the internal SD slot in my Eee PC S101 is recognised by bootsect.exe. If your internal SD slot is not recognised then you will need to find a USB device for your SD card or issue the command on another machine.

3 Restoring Windows XP from USB Stick or SD Card

3.1 Preparing Symantec Ghost 11.0 and Windows XP

- Create a USB stick / SD card containing WINPE + Symantec Ghost:
 - Needs to be at least 256MB in size
 - Format the device using any of the file systems (FAT, FAT32 or NTFS)
 - Make the device bootable using mbrwiz.exe and bootsect.exe (NT52)
 - Extract WINPE.ISO (WINPE + Ghost 11.0) onto it using WinRAR
 - Rename the \I386 folder to \MININT
 - Copy \MININT\SETUPLDR.BIN to \NTLDR (i.e. copy then rename)
 - Copy \MININT\NTDETECT.COM to \NTDETECT.COM
- Copy Recovery\EEEEPC.GHO (Win XP ~2.24GB) to a USB stick / SD card

Note: The above actions can also be performed using a tool called PeToUSB but I think that it is nice to know exactly what is going on under the covers!

3.2 Booting Symantec Ghost 11.0 from USB Stick or SD Card

- Switch on your S101 and tap the F2 key for a few seconds
- When the grey Eee PC screen appears, press escape to select the boot device
- Select the USB stick or SD card containing WINPE and Symantec Ghost
- WINPE (Windows Pre-installation Environment) will then load Symantec Ghost

3.3 Recovering Windows XP from USB Stick or SD Card

- Once Symantec Ghost has been loaded, you can begin the actual restore
- Select Local -> Disk -> From Image
- Select EEEPC.GHO from the appropriate drive (i.e. USB stick or SD card)
- Select Drive 1 as the destination (i.e. SSD)
- Accept the Destination Drive Details
- Confirm that you want to overwrite the existing data on the disk
- The SSD will then be overwritten with a fresh image of Windows XP

3.4 Symantec Ghost - Backup to USB Stick or SD Card

By now, you may have twigged that Symantec Ghost is fully functional and you can potentially use it to back up your SSD to a file on your USB stick or SD card. Simply load Symantec Ghost 11.0 as described in this guide and away you go!

4 Installing Windows 7 from USB Stick or SD Card

4.1 Update your BIOS

It is important to update the BIOS of your S101 before installing Windows 7:

- BIOS 1003 was the original version installed on my S101, immediately replaced!
- BIOS 1402 (2009-06-19) will not work with all of the latest Windows 7 drivers.
- BIOS 1504 (2009-09-29, currently the latest version) works fine with Windows 7

The S101 BIOS updates can be found at the following URL:

<http://support.asus.com/download/download.aspx>

Product: Eee Family -> Eee PC -> Eee PC **S101/XP**, OS: **WinXP**

Important: Do not use the BIOS from another model of Eee PC, no matter how similar it may appear to be to the S101 (e.g. do not use BIOS from the S101H).

4.2 Backup Windows XP to USB Stick or SD Card

To backup your entire SSD before upgrading to Windows 7, use Symantec Ghost 11.0

Note: You don't have to make a backup of your SSD but it makes sense to, especially when Symantec Ghost 11.0 is included on your ASUS XP Support DVD (see above).

4.3 Copy Windows 7 to USB Stick or SD Card

Create a USB stick or SD card containing the Windows 7 DVD:

- The device needs to be at least 4GB in capacity. Windows 7 files are ~3.5GB
- Format the device using NTFS (mandatory), not FAT or FAT32
- Make the device bootable using mbrwiz.exe and bootsect.exe (NT60) – see above
- Copy the entire contents of the Windows 7 DVD onto the device

4.4 Install Windows 7 from USB Stick or SD Card

- Switch on your S101 and tap the F2 key for a few seconds
- When the grey Eee PC screen appears, press escape to select the boot device
- Select the USB stick or SD card containing the contents of the Windows 7 DVD
- The Windows 7 installer will run as if it were booted from the original DVD
- There are some automatic reboots during the installation but they will be fine
- Overall, the installation of Windows 7 takes slightly over 30 minutes

4.5 Windows 7 – Up and Running

Out of the box, almost everything appears to be working correctly:

- Windows 7 – seems fine
- Audio – sounds are produced as expected
- Video – connected my Dell 2001FP monitor and extended my Windows desktop
- LAN – connected to my wired home network
- Wireless networking – connected to my wireless network, WPA-PSK security
- Bluetooth – connected my Microsoft Bluetooth mouse but didn't try anything else
- Function hotkeys – standby, wireless on/off and screen brightness work fine

A few features do not work because they have not been installed yet:

- Hotkeys – video output, task manager, audio controls and suchlike do not work
- Elantech Smart-Pad – two-finger zooming and scrolling do not work
- Super Hybrid Engine – not installed since it is an ASUS utility

4.6 Windows 7 – Recommended Updates

Once Windows has been installed, it makes sense to perform the following tasks first:

- Run Windows Update:
 - There are ~20 updates at this time and no doubt more in the future
 - They include an Intel driver for the Mobile Intel(R) 945GSE Chipset
 - They also include an Atheros driver for the AR928x wireless adapter
- Switch off Hibernation, thus saving some space on the SSD:
 - Open a command prompt, running as administrator
 - Type the following command: `powercfg -h off`
- Switch off Virtual Memory, if you have upgraded to 2GB of RAM:
 - Advanced System Properties -> Performance -> Settings -> Advanced -> Virtual Memory

Note: It may be worth running the Windows 7 “Problem Report Utility” at this point.

4.7 Driver Updates – Recommended

Although Windows 7 works out of the box, various driver updates are recommended.

There are no Windows 7 drivers listed on the ASUS support website for the Eee PC S101 so the safest alternative (perhaps the most obvious) is to download the Windows 7 Drivers for the ASUS Eee PC S101H. The S101H is exactly the same machine as the S101 but it contains an HDD instead of a SSD.

The S101H drivers and utilities can be found at the following URL:

<http://support.asus.com/download/download.aspx>

Product: Eee Family -> Eee PC -> Eee PC **S101H/XP**, OS: **Windows 7**

4.7.1 Chipset – S101H

The S101 and S101H contain the Intel(R) ICH7-M Family Chipset:

- Windows 7 ships with a **Microsoft** driver, version **6.1.7600.16385 (2006-06-21)**
- You can safely upgrade to the **Intel** driver, version **9.1.1.1016 (2009-08-05)**
- Find it at <http://support.asus.com/> (Eee Family -> Eee PC -> S101H/XP -> Win 7)

You must install this from your SSD because it temporarily disconnects USB devices.

The Intel(R) ICH7-M devices show up in “Device Manager”, under the sections “IDE / ATA ATAPI controllers”, “System devices” and “Universal Serial Bus controllers”.

4.7.2 Display (VGA) – Windows Update

The S101 and S101H contain the Mobile Intel(R) 945GSE Express Chipset:

- Windows 7 ships with the **Intel** driver, 8.15.10.1749 (2009-05-06)
- Windows Update will install a newer **Intel** driver, 8.15.10.1912 (2009-09-11)

The “Intel(R) Graphics Media Accelerator Driver” will show up under “Programs and Features”, “Control Panel” and the right-hand corner of the Windows bar. It will also appear as the “Mobile Intel(R) 945 Express Chipset Family” in “Device Manager”, under “Display adapters”.

Note: Intel version numbers are sometimes referred to such as 15.12.75.2.1867 but the consistent part of the version number is the last 4 digits (e.g. **1749**, **1867** or **1912**).

4.7.3 Audio – S101H

The S101 and S101H contain Realtek High Definition Audio:

- Windows 7 ships with a **Microsoft** driver, version **6.1.7600.16385 (2009-07-13)**
- You can safely upgrade to the **Realtek** driver, version **6.0.1.5948 (2009-09-29)**
- Find it at <http://support.asus.com/> (Eee Family -> Eee PC -> S101H/XP -> Win 7)

The “Realtek High Definition Audio Driver” and “SRS Premium Sound Control Panel” will show up under “Programs and Features”. The “Realtek HD Audio Manager” will also show up under “Control Panel” and the right-hand corner of the Windows bar. The “Realtek High Definition Audio” device will also appear in “Device Manager” (under “Sound, video and game controllers”).

4.7.4 LAN – S101H

The S101 and S101H contain the Atheros AR81xx PCI-E Fast Ethernet adapter:

- Windows 7 ships with a **Microsoft** driver, version **1.0.0.15 (2009-06-11)**
- You can safely upgrade to the **Atheros** driver, version **1.0.0.18 (2009-08-23)**
- Find it at <http://support.asus.com/> (Eee Family -> Eee PC -> S101H/XP -> Win 7)

The “Atheros Communications Inc.(R) AR8121/AR8113/AR8114 Gigabit/Fast Ethernet Driver” shows up under “Programs and Features” and in “Device Manager” (under “Network adapters”).

4.7.5 Wireless – Windows Update

The S101 and S101H contain the Atheros AR9281 Wireless adapter:

- Windows 7 ships with a **Microsoft** driver, version **2.0.0.74 (2009-06-09)**
- Windows Update will install the **Atheros** driver **8.0.0.238 (2009-10-05)**

The “Atheros AR928X Wireless Network Adapter” appears in “Device Manager”, under “Network adapters”.

4.7.6 Bluetooth – S101H

The S101 and S101H contain the Broadcom (aka WIDCOMM) AzureWave BT-253:

- Windows 7 ships with a **Microsoft** driver, version **6.1.7600.16385 (2009-07-21)**
- You can safely upgrade to **WIDCOMM** driver, version **6.1.7100.0 (2009-05-27)**
- Find it at <http://support.asus.com/> (Eee Family -> Eee PC -> S101H/XP -> Win 7)

The “WIDCOMM Bluetooth Software” shows up under “Programs and Features”. The “BT-253”, “Bluetooth Remote Control” and “Bluetooth Hands-free Audio” all show up in “Device Manager” (under “Bluetooth Radios”, “Human Interface Devices” and “Sound, video and game controllers”).

4.7.7 Touchpad – S101H

The Elantech Smart-Pad provides features such as two-finger zooming and scrolling:

- Windows 7 does not have a Smart-Pad driver installed
- You can safely install **ETD Ware PS/2-x86**, version **7.0.5.7 (2009-07-30)**
- Find it at <http://support.asus.com/> (Eee Family -> Eee PC -> S101H/XP -> Win 7)

Note: There appears to be no need for the “Synaptics Touchpad”, version 13.2.6.1

“EDTWare PS/2-x86 WHQL” shows up under “Programs and Features”. The “ELAN PS/2 Port Input Device” shows up in “Device Manager” under “Mice and other pointing devices” (replacing the “PS/2 Compatible Mouse”). “Elan Smart-Pad” also appears in the right-hand corner of the Windows bar and “Multi-finger” can be found in “Control Panel”.

4.7.8 Keyboard Filter – S101H, under Utilities

It’s not clear what this device does but ASUS provide it for the S101H with Windows 7:

- Windows 7 does not have the KB Filter installed
- You can safely install the **ASUSTek KB Filter**, version **1.0.0.3.32 (2009-07-20)**
- Find it at <http://support.asus.com/> (Eee Family -> Eee PC -> S101H/XP -> Win 7)

When installed, the “Keyboard Device Filter” shows up in “Device Manager”, under “Keyboards” (replacing the “Standard PS/2 Keyboard”).

4.7.9 Hotkey Service (supersedes ACPI) – S101H

The “ASUS Hotkey Service Utility” supersedes the ATK ACPI drivers (ASUS Tool Key of Advanced Configuration and Power Interface) and allows the OS to communicate with the BIOS, managing power configuration. It also enables the function key shortcuts for switching devices on + off as well as changing things like volume and screen brightness:

- You can safely install **ASUSTek** Hotkey Service, version **1.11.01 (2009-09-15)**
- Find it at <http://support.asus.com/> (Eee Family -> Eee PC -> S101H/XP -> Win 7)

N.B. You need to run “setup.exe” from within the “Seven” folder

The “Hotkey Service” shows up under “Programs and Features” and the “ASUS Launcher Service” shows up under “Services”.

Note: The HotKey Service will report an error on start-up if the TouchPad Drivers (Elantech Smart-Pad) have not been installed.

4.7.10 Webcam – Microsoft

The S101 and S101H contain a 0.3 Megapixel UVC compatible Webcam:

- Windows 7 ships with a generic USB2.0 UVC Webcam driver
- I suspect that it is no need for a replacement driver, ASUS do not provide one

The “USB2.0 0.3M UVC WebCam” device appears in “Device Manager”, under “Imaging Devices”.

4.8 ASUS Utilities - Recommended

In addition to the driver updates, there are a couple of ASUS utilities that are strongly recommended; Super Hybrid Engine and ASUS Update.

4.8.1 Super Hybrid Engine – S101H

The ASUS Super Hybrid Engine controls CPU and FSB clock speeds, thus increasing battery life. It requires the Hotkey Service (ACPI) to be installed if it is to work properly:

- You can safely install the **ASUS Super Hybrid Engine**, version **2.09 (2009-09-09)**
- Find it at <http://support.asus.com/> (Eee Family -> Eee PC -> S101H/XP -> Win 7)

The “Super Hybrid Engine” shows up under “Programs and Features”. The “Eee Super Hybrid Engine” also shows up in the “Start Menu” and in the right-hand corner of the Windows bar.

4.8.2 ASUS Update – S101H

ASUS Update for Eee PC is used to update the BIOS:

- You can safely install **ASUS Update for Eee PC**, version **1.03.04 (2009-09-30)**
- Find it at <http://support.asus.com/> (Eee Family -> Eee PC -> S101H/XP -> Win 7)

The “ASUS Update for Eee PC” will show up under “Programs and Features” and under the “Start Menu”.

Note: It is advisable to upgrade your BIOS to 1504 before upgrading to Windows 7.

4.8.3 Other ASUS Utilities

A number of the ASUS utilities do not appear to have official Windows 7 versions but the original Windows XP versions may work correctly. They are as follows:

- Intervideo WinDVD – not created by ASUS but available on the recovery DVD
- Eee Storage – available on the recovery DVD and online (ASUS support)
- ASUS OS Cleaner – available on the recovery DVD and online (ASUS support)
- Eee PC LAN Utility – available on the recovery DVD and online (ASUS support)
- Eee PC Tray Utility – pre-installed but not on the recover DVD or online

I haven't installed any of these on my S101 whilst running Windows 7.