LINUX ON STONE MINI NOTEBOOK COMPUTER

Re-badged Clevo W515LU

Using Fedora 25 from April 2017,
F27 From Feb 2018; F28 from June 2019
(with Windows-10 Home--Updated 2018, 2019)
Using Fedora XFCE installation and Ctwm window manager.

Aaron Sloman

http://www.cs.bham.ac.uk/~axs

School of Computer Science, University of Birmingham UK

This is Part of my linux laptop web site: http://www.cs.bham.ac.uk/~axs/laptop

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The Stonebook Mini occupies a niche where there does not seem to be any competition:

> 11.6", 1.2Kg, 4 core Celeron N3160, 8GB Ram, 500GB SSD, 1366 x 768 matte screen, VGA, hdmi, 1x USB 3, 2xUSB 2, SD card reader, wifi, ethernet replaceable battery. Mine runs linux: Fedora 25/27, and Windows 10 home (Updated 1 Oct 2018) for occasional use.
> WD Hard Drive replaced with Samsung 500GB SSD 850 EVO Series 2.5.
> Significantly improved battery life and speed (Jan 2018)

Comparable or better performing machines of similar weight and size all cost a great deal more than this, without 5 year warranty. Most have fewer ports.
Note: Replacing HD with SSD required removing back and keyboard. Details in PDF service manual available here:
http://sualaptop365.edu.vn/threads/clevo-w510lu-w515lu-service-manual.1956/

Updates: 1 Oct 2018: Windows 10 updated.
21 Mar 2018: Fedora Kernel 4.15.10-300.fc27.x86_64 fixed problems using keyboard and mousepad, reported here: https://bugzilla.redhat.com/show_bug.cgi?id=1551373#c10
11 Feb 2018: Upgrading Fedora to V27, kernel 4.14.16-300.fc27.x86_64, provided much improved screen handling. But problems about losing access to the laptop keypad and trackpad were not fixed till 21 March.
1 Feb 2018: Replacing HD with SSD required the service manual, available here http://sualaptop365.edu.vn/threads/clevo-w510lu-w515lu-service-manual.1956 (PDF)

14 May 2017; 6 Sep 2017
Explained how to use extra buttons on wireless mouse to invoke PageDown or PageUp.

CONTENTS

-- STONEBOOK MINI PURCHASED APRIL 2017

This document is available in two formats
    http://www.cs.bham.ac.uk/~axs/laptop/stone-mini.html
    http://www.cs.bham.ac.uk/~axs/laptop/stone-mini.pdf

This machine was supplied by Stone Computers Ltd, the main computer supplier
for my university. https://www.stonegroup.co.uk/

Online specification:
https://www.stonegroup.co.uk/hardware/notebooks/stonebook-mini/
    Small print on the back of the machine indicates that it was made for Stone
    by Clevo Co, in Taiwan.

Overall I am very pleased with it, despite several niggles mentioned below. I
spent a considerable amount of time looking at alternatives and could not find
anything that matched the key features of this specification (including the
5 year on-site warranty), and did not cost over twice as much, e.g. the
outstanding Dell XPS13 (width 13.3 inch, with higher resolution screen, and
more powerful CPU), but smaller storage.

-- SPECIFICATIONS

Specifications of the Stonebook Mini, based mainly on:
https://www.stonegroup.co.uk/app/uploads/2016/02/Stonebook-Mini-Datasheet.pdf

(The datasheet, but not the web page, erroneously states that there are two USB 3 ports instead of only one. The pictures make the actual configuration clear.)

Operating System Supplied		Up to Windows. 10 Pro

(Although I use linux almost all of the time, I ordered Home Windows-10 in a 100GB partition --probably over generous-- for occasional use, and for diagnosis in case of a warranty claim for a hardware fault.)

Processor		Intel. Celeron N3160 Processor (4cpu) Processor Base Frequency 1.60 GHz Burst Frequency 2.24 GHz Cache 2 MB L2 (Listed as Celeron N3150, on Stone Datasheet)
Memory	System Memory	8GB Single Channel DDR3L 1600MHz
	Memory Slot	1 x Slot SODIMM
Display	LCD	11.6" HD (1366 x 768) Display (Matte surface, low reflectance)
	Graphics Processor	Intel. HD Graphics
	Graphics Memory	Intel. Dynamic Video Memory Technology
Storage	Hard Drive	Western Digital Blue 500GB 7200RPM SATA 3.6Gbs Possible alternatives include Up to 1TB 7200rpm Hard Disk Drive or 512GB Solid State Drive
	Optical	Optional External DVDRW (Not in my package)
Communication	Wired LAN (RJ45)	10/100/1000Mb Ethernet LAN
	Wireless LAN	Intel Dual Band Wireless-AC 8260
	WWAN	Optional HSDPA Module (Not in my package)
	Bluetooth	BluetoothTM 4.2 + EDR (optional with wireless card)
Multimedia	Sound	HD (High Definition) Audio
	Speakers	2 x built-in speakers
	Integrated Camera	1 Mega Pixel HD webcam
Others	I/O Ports	LEFT side VGA, HDMI, Phone-out, Mic-in, 1 USB 3.0 (Data sheet wrongly says 2 x USB 3.0) RIGHT 2 x USB 2.0, 9 in 1 Card Reader Power socket
	Input	Touch Pad (Multi-Gesture, Scroll Scope, Flat Type) (With Left/Right 'rocker' key) QWERTY Keyboard, UK layout
	Security	Stone Recovery Solution, BIOS Boot Up Password / HDD Password, Kensington Lock Port, TPM
	AC Adapter/charger	40W AC 100-240V 50-60Hz, DC Output 19V 2.1A
	Battery	Removable 4 Cell Lithium-Ion 31WH [[I also bought a spare battery and charger]]
	Dimensions (WxDxH)	292.4(W) x 210.5(D) x 22.7(H)mm (height excludes battery area)
	Weight	1.2 kg
Warranty		5 Year On-site Warranty

APPROXIMATE COST:
The price will fluctuate with exchange rates, etc. I paid a reduced price as

part of an arrangement between Stone Computers and the University. So these figures (April 2017) should be regarded as approximate guides:

Stonebook Mini without operating system: (including 5 year on site warranty)	GBP 315 + VAT
My options:	
Microsoft windows 10 home edition (Pre-installed in 100GB partition)	GBP 68 + VAT
Spare battery:	GBP 40 + VAT
Spare charger:	GBP 30 + VAT
TOTAL	GBP 453 + 20% VAT

No competitors?

While trying to decide what to buy I looked at lightweight offerings from all the main suppliers, e.g. Acer, Asus, Dell, HP, Lenovo and some others and found no real competitor that could meet my requirements. Nothing else came with a five year on site warranty, for example.

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-- OPERATING SYSTEM

As I am a minimal Windows user, I asked for the Home Windows 10, in a 100GB partition, leaving the rest free. I suspect 100GB was too generous. But the machine boots off a usb stick with Gparted "live" so I can shrink the windows space later if required. See my complaint about Windows 10 update, below

I prepared a Live XFCE Fedora 25 memory stick and booted from that to run Gparted to set up boot and swap partitions a root partition, a spare root partition for future upgrade, a small partition for encrypted stuff and a large partition for /home, with /usr/local mounted on that partition.

After preparing the required partitions it installed Fedora 25, though as usual it was a minimal system and I had to use the standard facilities for updating the operating system and downloading many packages that I use regularly.

Fedora 25 was installed in a 14GB root partition (which is larger than necessary, but allows a lot of temporary stuff to be saved in /var/tmp).

Fedora 25 plus the CTWM window manager, works very well on this machine, though I had to do some experiments to find ideal settings (e.g. font sizes and default xterm window sizes for a smaller screen than I am used to).

For a while I had an obscure text 'smearing' problem in xterm windows and some other contexts, but that was (mostly) fixed by putting the line

```
    Option      "TearFree" "true"
```

in /etc/X11/xorg.conf.d/20-intel.conf, which was already there by default in my desktop PC running Linux 24. That seems to fix a problem in the XWindow intel graphics driver for linux.
At present (Jan 2018) this is what I have in that file

```
Section "Device"
   Identifier  "Intel Graphics"
   Driver      "intel"
   Option      "AccelMethod" "blt"
#   Option      "AccelMethod" "uxa"
#   Option      "AccelMethod" "sna"
#   Option      "TearFree" "true"
   Option      "DRI" "true"
EndSection
```

I have not done much testing using windows: I've never liked windows and need it only occasionally. But it may be useful for testing if a suspected hardware

fault develops under warranty. I find that shutting down after running Linux gives me the option at next boot to run either linux or windows. But windows is not so generous and after running it I sometimes have to reset the boot options to run linux. (Perhaps I shut down in the wrong way, being unfamiliar with Windows 10)

I have never had that problem on previous machines with both windows and linux installed. I assume it has something to do with the UEFI system now used at boot time.

I also have the impression that things are significantly slower on Windows than Linux -- e.g. starting up and shutting down. But I am a very naive windows user and may have set some default incorrectly.

-- CTWM Window Manager

For details on the window manager I use, CTWM, see:
    New home page:
    https://launchpad.net/ctwm

    Old home page
    https://www.ctwm.org/index.html

-- OVERALL

I don't think any other 11.6" Laptop/Notebook computer is available in the UK with comparable or better specifications, including weight and computing power, at or around the price I paid -- which may be out of date now. For a quotation contact

    www.stonegroup.co.uk

The following review is based on about 8 months of use (not full time!).

-- SPEED

Unsurprisingly, the machine is slightly slower than the Dell (with Core i5 CPU).

Surprisingly it is not *much* slower most of the time, and most of the time I don't notice the speed difference (perhaps partly because my Stone has double the amount of Ram, and I think the hard drives are comparable in speed -- I put a new 1TB WD drive in the Dell a couple of years ago).

Managing a display with fewer pixels (1400*900 = 1,260,000 on the Dell and 1366*768 = 1,049,088 on the Stonebook) may also slightly reduce CPU load.

For the kind of work I do most of the time, which involves very little 'number crunching' but a lot of reading and writing files (e.g. running Latex to generate PDF, and fetching and displaying internet files) many of the speed constraints are not much affected by CPU speed limits. I suspect there are many laptop users for whom that is true.

Ignoring the reduced screen size and reduced maximum number of pixels, Web browsing on the Stone is very much like web browsing on the Dell, apart from the annoyance of a missing middle mouse button, which I use frequently to open a new link in a new tab.

Wifi download speed on the Stone (measured by speedtest.net running google-chrome) is significantly higher than the Dell's download speed, using our VirginMedia 100Mbps cable service, or the even faster wifi service on campus.

The Stonebook's extra download speed compared with the Dell is useful for installing new packages and updates, though processing the updates after downloading is slower than on the Dell. I have not tried to measure that. I have

not yet encountered intolerable delays installing packages or updates.

Compiling the latest version of the ctwm window manager on the Stone, the Dell, and my desktop PC gives the following results:

```
 Stonebook Mini: Total elapsed time 25.41 secs
      (user)  (system) (elapsed)
     15.387u 6.288s  0:25.41 85.2%    0+0k 63536+12528io 243pf+0w

 Dell E6410:     Total elapsed time 13.63 secs
      (user)  (system)  (elapsed)
     7.024u  2.552s   0:13.63 70.2%     0+0k 66104+12576io 248pf+0w

Desktop PC:      Total elapsed time 6.57 seconds.
       (user) (system)  (elapsed)
       5.064u 1.439s 0:06.57 98.7%     0+0k 0+12584io 0pf+0w
```

For a small task, the difference between 25.4 seconds and 13.6 seconds may go unnoticed. For bigger tasks the time difference will increase. But I don't intend to use the Stone for complex, high CPU tasks!

For my purposes (mostly web browsing, text processing, giving presentations, and occasional small amounts of programming), the speed of the machine is fine. The reduced speed is very noticeable when creating or converting videos, however.

Some things take longer to start up than on the Dell, but I have not done systematic comparisons.

-- WEAK POINTS:

The Stone user manual seems to have out of date instructions regarding treatment of the battery. All the information I have found warns against repeated artificial recycling of charge, and deliberately draining all charge regularly on a Lithium Ion battery. The instructions recommending regular full drain and recharge are probably a relic of an older model with a nickel-cadmium battery?

An earlier draft of this review included:

> On the other hand the warning in the manual about possibly harmful radiation with wifi on is very good. More manufacturers should do this.

However, a colleague informs me that the harmful effects have never been reliably established. Compare

> https://www.howtogeek.com/234817/dont-worry-wi-fi-isnt-dangerous/
> http://www.who.int/peh-emf/publications/facts/fs304/en/

-- TOUCH PAD:

I really miss the 3-button touch-pad that was provided on the Dell E6410 laptop, since 2010 my 'workhorse' computer when travelling or giving talks.

> http://www.cs.bham.ac.uk/~axs/laptop

On linux I use the middle button many times every hour (it's the quickest way to paste text on linux, in many contexts). But the Stonebook mini does not have a middle mouse button.

On machines with two buttons, the effect of a middle button can be achieved in linux by pressing the two buttons simultaneously. But this machine has a slightly flexible rocker instead of two buttons, so the effect of middle button requires pressing both ends of the rocker. This needs far more effort than pressing two adjacent buttons using one finger.

I can partly compensate by attaching a small three button mouse, which the Dell doesn't need. (The mouse increases battery drain by a small amount, as well as requiring additional table space.)

I don't find two-finger cursor motion control on the touch pad quite as comfortable on the Stone as on the Dell (with Alps touch pad), but I have learnt to accommodate, when a mouse is not available.

-- PAGE HOME/END UP/DOWN BUTTON EMULATION

As on many laptops the keyboard does not include space for separate keys for HOME, END, PageUP and PageDown, so they are 'emulated' by using the Fn key in combination with other keys. Despite the (unusual) provision of a second Fn key on the right, I found the need to use two keys uncomfortable for PageUp and PageDown, so I used linux facilities to map keys onto the functions I required, as explained below.

I use PageUp/Down a lot (e.g. reading Web pages, PDF and text documents, and program files) and I miss having separate keys. The Stonebook mini maps Page Up and Down to Fn+Up and Fn+Down. But I use Page Up and Down a lot, and found that double key press annoying.

So I used the Linux xmodmap function to set the PrtSc and Pause keys in the top row to do PageUp and PageDown, which works perfectly in most contexts.

I also miss the Home and End keys, used less often. Fn+Left emulates the Home key, and Fn+Right emulates End. Fortunately that has been made slightly more tolerable by provision of a second Fn key on the right. I could live with that mainly because I don't use Home and End as frequently as PageUp/Down.

However, my text editor allows me to define alternative shortcuts, i.e. ESC followed by PrtSc for HOME, and ESC followed by Pause for END, which I find more comfortable than simultaneous use of the Fn key.
Summary:
    I use PrtSc alone for PageUp and preceded by ESC for PageDown
    I use PauseBreak alone for PageDown and preceded by ESC for END.

As a Unix/linux user, I often use the Linefeed key, which is not provided on most keyboards nowadays. But since I don't use the AltGr button to the right of the space bar, I set that to be the Linefeed key.

Different key codes may be needed on different machines. On my machine the file (which I have named 'keyspecs') read by xmodmap to achieve these settings contains:

```
    keycode 108 = Linefeed
    keycode 107 = Prior
    keycode 127 = Next
```

The linux 'xev' utility can be used to find the key codes associated with different physical keys.

The command to set this all up using xmodmap when my machine goes into graphics mode takes the form (in .xinitrc, by graphical mode startup file).

```
    xmodmap keyspecs
```

See also the alternative solution using a wireless mouse described below.

-- NO KEYBOARD BACKLIGHT

I miss the Dell's backlit keyboard in dim light, but I have a little usb powered LCD lamp that can clip on the top or side of the lid of the Stone. I don't know how its power consumption compares with a backlit keyboard, but it is much less convenient. (The extra drain recorded by the Linux battery monitor with the lamp plugged in seems to be about 0.26 amps, but I have not tested thoroughly.)

I don't know whether the extra cost of a back-lit keyboard would be higher than

the cost of the usb lamp, but it would certainly make the machine more attractive.

-- WINDOWS 10 UPDATE (with problems) 1 Oct 2018

Yesterday I was running Windows to check something and somehow inadvertently permitted an 'update' process. It said it might take over an hour, so I let it run. Eventually, at least eight hours later, it rebooted a few times and then left windows running.

I then found I could not boot linux without going into the UEFI menu and re-setting the options.

It then booted into F27 and everything seemed OK until I ran hibernate, since I normally shut the machine down with several things still open. It failed to hibernate despite the fact that there was a large swap partition as shown by 'top'.

After a lot of checking of contents of grub.cfg, /etc/fstab and other things, I discovered that Windows had created a new small partition, just after the last Windows partition, so all my linux partition numbers had been increased by 1. Most things worked, but because the 'resume' entry in grub.cfg used '/dev/sda5', hibernate failed: the swap partition had become /dev/sda6 instead of /dev/sda5.

(I know one should always use UUID partition names, but my choice was a result of something copied from somewhere, a long time ago and it had always worked, till Windows 10 updated itself!)

I think it is terrible that the windows update process does not produce a warning about partitions being changed. Microsoft arrogance? Stupidity? or deliberate punishment of linux users?

A colleague's answer: "All of them"!

-- MINOR NIGGLES

I don't have fat fingers, but I find the power button very fiddly to press because it is long and very narrow. The length really has no benefits.
A slightly shorter wider button would be more ergonomic, from my point of view.
Of course the power button is not used often, so this is a trivial point.

More importantly, I would prefer not to have to tilt the base up to see the LEDs there. Having them to the right of the power button, with more readable labels would be very much better -- but I don't know the internal constraints. At present the labels, stamped into the casing next to the LEDs, are too small to read and there is no space to increase their size.

I would also like to have a CAPS LOCK light. Occasionally CapsLock gets left on when it should not be, and the result can be unintended text being typed in or some command not working (e.g. a password fails). On windows 10 an obtrusive panel comes up whenever CapsLock is turned on, which is awful when CapsLock is on deliberately. That mechanism is no substitute for a CapsLock indicator.

-- RECORDMYDESKTOP

I can run 'recordmydesktop' in full-screen mode, including switching between workspaces with different contents, one of them displaying input from a usb video camera attached, run using the 'cheese' program.

[I may post an example recording here later.]

First tests with 'recordmydesktop' to record a full screen presentation switching between linux workspaces (virtual desks) with different content

(e.g. text files, images, web pages and a 'cheese' display of my face while talking, worked well, though processing of a recording to produce a usable video can take a very long time.

The fact that the display resolution is only 1366x768 is an advantage for use of recordmydesktop. On screens with more pixels I have to invoke recordmydesktop with tools that restrict the recording to part of the screen, which is a lot more fiddly.

-- LCD SCREEN

The screen on the Stonebook mini is excellent, with a matte surface and usable brightness in all the conditions I have tried, including outside in moderate sunlight, where I had to set screen brightness to maximum. This seems to be slightly better than my Dell's (2010 vintage) screen. Presumably screen technology has improved in the last seven years. (I don't know whether a display bought seven years ago will have deteriorated.)

The screen resolution (1366x768) seems to be standard across all cheaper and smaller laptops though the much more expensive 13.3" Dell XPS-13 provides full HD: 1920 x 1080 pixels (even more on the latest model?)

On the basis of my experience since acquiring the Stone machine, more pixels per inch would shrink the display size of all my standard fonts and I would have to use larger fonts, going back to fewer characters per line and lines per visible page. I think that for my intended use (not as a full time machine) this resolution is an acceptable compromise.

When needed I can connect an external display with much higher resolution, as reported below.

-- 'SNAP SHUT' HINGED LID

The lid uses friction hinges and is spring loaded to shut when only slightly open (a gap of about 2cm or less), so that it does not need a catch.

Consequently, when lifting the front edge of the lid I have to hold the base down, otherwise it comes up with the lid!

That spring-loading has the consequence that it is very easy to shut the lid unintentionally if carrying the machine slightly open, e.g. for use in another room. On my configuration shutting the lid causes the operating system to suspend, which can be useful for saving use of battery. But it may interfere with some pre-prepared demonstrations.

I have mapped invocations of the linux function brightnessctl to keyboard keys, for increasing and decreasing brightness.

-- WIFI and CABLE CONNECTIONS

Wifi download speed is very good -- better than the 7 year old Dell.

Cable (ethernet) communication works as expected.

-- EXTERNAL DISPLAYS

I have tested the Stone's VGA and HDMI ports on a projector in our department, and both ports work perfectly.

I also tried plugging in a 23" High definition 1920 x 1080 monitor using the VGA port and that worked perfectly for my purposes.

(The linux lxrandr tool works like magic with projectors and external monitors.)

We have many visitors and some colleagues with lightweight laptops that need adapters for VGA and HDMI. Often this can be a nuisance.
Having both built in is a great advantage.

-- KEYBOARD

Although the small size is slightly inconvenient the keyboard feels good and I am learning to adjust to it. The unusual angles for finger actions seem to produce the illusion that keys are slightly harder to press than on other keyboards, but only when touch-typing with both hands (in my case).

As usual on small laptops, the shortage of space for additional keys is compensated for by using the Fn Key to provide extra functionality. This can be very tedious for actions used often. On this keyboard that is somewhat mitigated by having a second Fn key on the right, as discussed above.

For a linux user there is further mitigation by re-mapping two of the unused top row keys to PageUp and PageDown (using xmodmap), also explained above. So I don't need to use Fn for those two frequently used keys.

As explained above, the keyboard emulates Home and End keys by combinations Fn+Left and F+Right, respectively. The provision of the second Fn key on right, adjacent to the Left and Right arrow keys makes this tolerable.

I don't know whether any other 11.6" laptop makes better use of the limited keyboard space.

A minor nuisance:
The four arrow keys and the second Fn key at the bottom right corner of the keyboard are slightly thinner than the main keys. At first I found that they did not always respond when tapped, and I thought they might have a fault.

Eventually I realised that as long as I tap the key on or below its centre it works. If I tap slightly above the center that seems to prevent the electrical contact working. It has been fairly easy to adjust my typing on those keys so that I no longer have the problem, but it could lead some users to report faulty keys.(Added 12 May 2017)

-- THE GENERAL CONSTRUCTION SEEMS TO BE VERY GOOD

Everything feels very solid and robust.

There are four small rubber tipped feet on the base, keeping the air vents clear, and preventing the speakers being muffled.

-- REMOVABLE BATTERY
A removable battery is a great advantage -- I have heard colleagues complain about laptops with inaccessible batteries that need replacing after a few years.

The ability to swap in a spare battery can sometimes also be very useful on long journeys or in long meetings without access to a charger. The spare battery is very much smaller and lighter than the spare battery for the Dell.

Removing a battery is easy: two sliders release the catches at either end, as on the Dell. But the Dell's batteries are much larger and heavier.

Alternating between two batteries bought with my Dell E6410 seems to have kept both of them highly functional (around 70% capacity) after 7 years -- though that is partly because the machine has external power when used at my desk.

Battery life from full charge will depend enormously on a combination of factors including screen brightness, wifi usage, disk usage, and cpu usage. My impression is that with screen close to lowest brightness and no 'heavy'

computation, and no attached mouse or other device, the machine could be used for editing and browsing for 7hours or more. It easily goes beyond 5 hours.

NOTE: 6 Sep 2017
I've installed the 'tlp' package for power management, including setting

```
DISK_SPINDOWN_TIMEOUT_ON_BAT="30"
```

in /etc/default/tlp as advised in the 'man' file. (Power down hard drive if unused for 30 secs). This seems to have extended battery life to about 7.5 hours with display on a low (indoors) setting, and not much cpu activity, though running firefox, wifi connected, and several windows open.

'upower --monitor-detail' now shows lower levels of discharge rate when inactive. Replacing hard drive with Samsung SSD further improved battery life.

-- CAMERA

I tried using both the built in camera and an external Logitek C270 usb camera, which is more flexible for recording lectures and discussions at meetings.

The 'cheese' program (for snapshots and videos) starts up within a few seconds when using only the Stone's built in Webcam. If I plug in the Logitek before running cheese, it takes much longer to start, then allows me to choose between the internal and external cameras.

I am fairly certain the machine would struggle if I used the full camera resolution for recording videos (the Dell E6410 also struggles), but I have not tried that on the Stone.

I have used both Skype and https://appear.in. I prefer the latter.

-- USB PORTS

Having the two usb sockets in the middle of the right edge is a disadvantage for a right-handed user when a mouse has been plugged in to one of them: the usb plug on my mouse cable sticks out about 3cm, and gets in the way of the mouse in situations with a restricted flat surface.

At first I solved that by plugging my mouse in on the opposite side, but that uses the only USB3 socket. An excellent alternative solution uses a wireless mouse with a tiny usb adapter.

-- USING A WIRELESS MOUSE
(Added: 14 May 2017. Modified 6 Sep 2017)

I bought a wireless mouse to avoid the problem of dealing with the mouse cable. The mouse I bought (Advent AMWLWH16 -- cost £7.50 at PCWorld) uses a tiny wireless dongle with a usb plug that hardly protrudes at all. The mouse has two extra buttons on the left side. Using the 'xev' command I identified them as Button 8 and Button 9. In order to get them to invoke PageUp and PageDown, I installed Fedora packages xbindkeys and xautomation.

To use the functionality, create a file .xbindkeysrc by running 'xbindkeys -d'

```
$ xbindkeys -d > ~/.xbindkeysrc
```

This file is used when xbindkeys starts up. After using Xev to find the labels for the extra mouse buttons (8 and 9 in my case) edit .xbindkeys at the end to invoke the 'xte' command, provided by the xautomation package, to create the two new bindings.

Each setting requires two lines in the .xbindkeysrc file. I used:

```
    "xte 'key Page_Down'"
        b:8

    "xte 'key Page_Up'"
        b:9

The first line of each xte command specifies the required functionality. The
second line specifies the mouse button to invoke it. After editing the file,
kill the xbindkeys process if it is already running (killall xbindkeys) then
restart it. It will then read your new .xbindkeysrc file.

If using .xinitrc to control the start up of graphics on your system, add a line
to invoke xbindkeys. Different start up files are likely to be required by
different window managers.

A side-benefit is that the wireless mouse can then be used during presentations
to operate the pointer and the screen and to invoke Next or Previous page.

For more information see
    http://dev-random.net/make-your-own-keybindings-in-linux-using-xbindkeys/

    TIP: On the Advent AMWL WH16, mouse resolution can be rotated through
    through 800, 1200 and 1600 DPI. To get next resolution press and hold
    Left mouse button and scroll wheel together for 3 seconds.

-- MAIN STRENGTHS

There does not seem to be any other 11.6" laptop on the market that is so well
configured at around this price or lower -- many are Chromebooks with much less
file storage and other disadvantages for linux -- e.g. simpler keyboards.

Dell has more sophisticated offerings, but at a much higher price (even with
less storage than this).

Much cheaper consumer-targeted 15 inch laptops are available at lower prices,
including a Dell Inspiron provided with linux pre-installed (Ubuntu).

But the price seems to go up as machine size goes down.

-- PROVISIONAL CONCLUSION

I could not find anything comparable in configuration, namely size, weight, RAM,
filespace, external ports (USBx3, SD card, VGA, HDMI, Ethernet, separate audio
in and out ports), plus high quality screen and exchangeable battery, for a
price that was less than twice as high. The machine also works well with linux
and has a 5 year on-site warranty. (This may depend on having a site-wide
arrangement with Stone.)

So I am pleased with the purchase. Stone sales staff were very helpful and
patient during the time I was undecided.

As far as I can tell this machine fills a niche that is ignored by other
manufacturers, and if it were on sale more visibly there could be many more
buyers. I studied offerings from several other manufacturers and inspected a
variety of examples at a PCWorld in Birmingham. I found nothing that came so
close to meeting my needs and constraints.
```

Maintained by
Aaron Sloman
http://www.cs.bham.ac.uk/~axs/
a.sloman [at] cs.bham.ac.uk

Created: 1 May 2017
Revised: Fedora Bugreport 15 Mar 2018; 21 Mar 2018
6 Sep 2017; 5 Jan 2018 (mostly reformatting); 1 Feb 2018 (Adding SSD)
8 May 2017; 9 May 2017; 12 May 2017; 14 May 2017; 26 May 2017