

Three new Linux PDAs in test

Pocket Power

The first Yopys and the Zaurus were embraced by the Linux community, although there were some problems with the details. Now the second generation of these PDAs has reached the European market. Time for Linux Magazine to take a closer look at the new models. **BY NILS FAERBER**



Three new all-Linux PDAs, the Yopy YP-3500 and YP-3700 from G.Mate as well as the Zaurus SL-C750 from Sharp, are now available in Europe. All three have a back-lighted color display, ample memory, a lot of extensions, and a built-in keyboard. Here, the similarities end.

First Linux PDA

The Yopy was the first Linux PDA, even though the model that was presented at the CeBit 2000 expo was never released on the market. The first available model was the second series called YP-3000,

which was not released until the middle of 2002, and only after Agenda's VR3 and Sharp's Zaurus SL-000 had already captured the palmtop market.

The YP-3000 was especially plagued by a non-back-lighted display which had a reflective surface and was only legible with very good lighting. As for extensions, there was only one MMC slot available, and the CDMA plug-in for converting the model to a Smartphone was available solely on the Asian market.

Yopy, Take Three

With the third attempt, G.Mate stayed true to the concepts first used in the YP-3000 and ironed out some of its earlier deficiencies. The models YP-3500 and YP-3700 have good back-lighting and a standard QWERTY keyboard that replaces the divided keyboard on the YP-3000. Although it must be said that the keys are very small, due to the Yopy's portrait format display (see Figure 1).

Having said that, the keyboard does have a nice feel to it. The stylus pen is now located in the case, although it does appear overly flimsy for the YP-3500. The YP-3500 is about 2cm (3/4 inch)



Figure 1: The keyboard of the new Yopy YP-3500 and YP3700 has the standard QWERTY layout, which makes for very small keys

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Figure 2: The Yopy YP-3500 (center) is 2cm thick (3/4 in), much thicker than the YP-3000 (left). And with the Compact Flash slot, the YP3700 is just under 2.5 cm (1 in) thick

thick, which is about 5mm (1/4 in) thicker than its predecessor, the YP-3000. The YP-3700 with its extra Compact-Flash slot, comes in at just under 2.5cm (1 inch) (see Figure 2).

Both of the new Yopy models make a good impression. The plastic cases have a solid feel to them, the display contrast is high, and the keys are easily used. However, the hinge mechanism of the display panel is worrisome, in that the panel is pushed back to quite an alarming degree when using the pen.

Sharp's New Clothes

The design of the Sharp Zaurus SL-C750 has changed dramatically in comparison to that of the Zaurus SL-5000. The device is now divided into two halves. The metal top half houses a back-light color display and a fantastic resolution of 640x480 pixels at 200 dpi. The lower half of the device contains the new hard rubber keys, CPU, expansion slots and connection ports.

Sharp has adopted a double-tracked approach. The display has a landscape format display when opened, but if you wish, you can swivel it through 180° to have the standard portrait format for the stylus pen PDA (see Figure 4). The desk-top adjusts itself automatically, depending on the format you choose. The display was developed by Sharp and

based on the company's own Continuous Grain Silicon technology (CG Silicon).

This technology allowed Sharp to integrate the chips that drive the LCD directly into the glass substrate, instead of having to solder them on the edge of the display. The display itself is hard to beat when it comes to contrast, color brilliance and sharpness. One can only hope that this will become the standard for PDA displays.

PDA in Landscape Format

The keyboard is in landscape format, that allows for adequately sized keys in a QWERTY layout similar

to most PCs.. The keys themselves are hard rubber, stand out against the keyboard foil and have a noticeable pressure point. Whether you use it on your desk top or as a handheld, the Zaurus C750 is easy to use.

The case, however, detracts from the otherwise excellent impression that the model makes. The display is in a black metal casing that appears quite stable, although the choice of color is unfortunate as it shows every fingerprint from handling. But it was the lower half that caused us some headaches; being made of plastic, it doesn't create a very stable impression. For example, a gap opens up at the front edge of the panel when you use the pen. The display hinge also creaks alarmingly when opening or closing the device. Only time will tell if these will turn out to be the Sharp's weak points.

Under the hood

While Yopy's YP-3500 and YP-3700 use with Intel's Strong-ARM clocked at 206MHz, there is an Intel XScale PXA355 clocked at

400MHz in the Zaurus C750. The XScale is a second generation CPU and has a far higher capacity than the venerable Strong-ARM. Provided you optimize your software to the XScale code, you will have a very powerful computer in your palm, that should easily prove capable of playing videos, for example. The Yopys are well equipped with 128MB of RAM and 32MB of Flash memory. Although the new Zaurus only has 64MB memory, it comes with 64MB flash which leaves more room for applications.

When it comes to interfaces, all three contenders are level with infra-red, MMC card connector, headphone plug, loudspeakers, microphone, and a USB cradle to synchronize with Windows. The YP-3700 and the Zaurus C750 also have a Compact Flash Card interface (Type II, suitable for Micro-Drives) that can take a memory card as well as a WLAN-NG card [1].

Rechargeable Batteries

All three PDA models use a rechargeable Li-ion battery. Both the YP-3500 and the YP-3000 use a battery model with a 1300 mAh capacity, while the YP-3700 has one with 2300 mAh. This leaves the Sharp Zaurus well behind with a battery capacity of a mere 950 mAh, which should be enough for one day's use without recharging. You can change the



Figure 3: The high resolution display – 640 x 480 pixels at 200 DPI – of Sharp's Zaurus can be rotated through 90 degrees on its hinge

Zaurus' battery, unlike that of the Yopys. The Zaurus C750 comes with the Linux kernel 2.14.18-rmk7.

Two Software Concepts

G.Mate and Sharp use vastly different GUI approaches. While G.Mate opts for X11, the Zaurus uses the latest version of Q-Topia Ver. 1.5 from Trolltech [2]. Q-Topia, however, is only available in a localized Japanese version; remember that the Zaurus is officially only for sale in Japan. Fortunately, the Japanese GUI can be shut off, leaving you with an almost all English GUI.

Occasionally while working, the odd obscure character might appear. That is a result of there being no English character for a specific Japanese symbol. The GUI also sorts the address book in a very novel way. Fortunately, this hardly affects the operability of the device, and it won't be long before alternative software becomes available. The Open Source projects OPIE [3] and GPE [4] are already working on software support.

JFFS2 instead of CRAM-FS

Instead of the Flash filesystem CRAM-FS, all three models use the more modern JFFS2 (Journaled Flash File System V2 [5]), which makes it possible to install new applications without having to rein-



Figure 4: The Zaurus as a complete pen PDA for single handed use. The desktop software automatically rotates 90 degrees

stall the flash image of the operating system, as was the case with the YP-300 and the Zaurus SL-5000. You can install Hancm Mobile Office [6] on the Yopys. As Mobile Office is designed for use with QT embedded devices, it was divided up into QT libraries for X11 and the office software for the Yopys. Although Hancm Mobile Office requires 4.5 MB of Yopy Flash, almost one-sixth of the total, you get Word, Presenter and Sheet applications as a return on your investment.

This Hancm Mobile Office is by no means on a par with the version for the PC desktop and provides a very limited range of functions.. It is not worth your while installing the Presenter unless you

have added a Flash VGA card and plan to use an LCD projector to show your presentations. Unfortunately, driver availability is not good for the Yopy, when it comes to flash VGA cards like the Colographics [7].

Presenter is just what the name implies and is not capable of either creating or editing presentations. Only the spread sheet program Sheet offers almost all of the functions found in desktop versions.

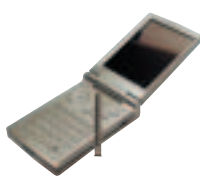
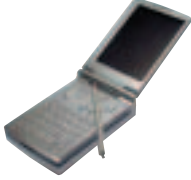

The Proxima Beamer application from Obex Code is responsible for managing the IrDA interface. This background program supports data transfer via IrDA/Obex (Object Exchange) calling cards in V-Card format, for example. Obex Code was co-founded by Dag Bratelli, who is responsible for the development of the Linux IrDA drivers.

The e-mail client is still an older version of Sylpheed. The Web browser is now Dillo, replacing Mosaic. The PDA application (PIM) has been expanded to use a MySQL back-end, which, in connection with the new Boa Web server, allows access to data in the PIM via a Web interface.

Zaurus Software

Hancm Mobile Office comes pre-installed on the Zaurus. The applications are much easier to use than on the Yopy

Table 1: Linux PDAs at a glance

			
Manufacturer	G.Mate	G.Mate	Sharp
Model	Yopy YP-3500	Yopy YP-3700	Zaurus SL-C750
Retailer	Yopy PDA UK	Yopy PDA UK	ShirtPocket
URL	www.yopypda.co.uk	www.yopypda.co.uk	www.shirtpocket.co.uk
CPU	Strong-ARM, 206 Mhz	Strong-ARM, 206 Mhz	XScale, 400MHz
Memory RAM/Flash	128MB/32/MB	128MB/32/MB	64MB/64MB
Display/Color	240x320, 16 bit	240x320, 16 bit	640x480, 16 bit
Cards, ports headphones	MMC, Irda, serial, USB, headphones	MMC, Irda, serial, Compact Flash	SD/MMC, Compact Flash, Irda, serial, USB,
Dimensions(WxHxT)	69x103x19 mm	69x103x24 mm	120x83x23 mm
Weight	150 g	290 g	225 g
Price	£285, US \$450, app. EUR 600	£341.50, US \$500, app. EUR 650	£489, US \$700, app. EUR 740

due to the higher display resolution and the superior keyboard. The spread sheet program Sheet in particular made a good impression.

Sharp uses version 3.0 of the Access Netfront Web browser [8]. In addition to excellent HTML rendering, the browser also supports frames, JavaScript and SSL. Sharp has replaced Insignias Jeode Java environment [9], which implemented an older Personal Java standard and was used for the Zaurus SL-5000, with a QT-embedded port of Sun's original Java 2 Micro Edition (J2ME) [10]. Sharp still remains true to its Java-PDA motto.

In addition to the usual applications, there is a pre-installed audio and video player. In contrast to the SL-5000 series, the new Zaurus has stereo output as well as built-in speakers and a microphone. The audio player is capable of playing both WAV and MP3 files right from the start, but refuses to play Ogg-Vorbis. Unfortunately, it was not possible to play clips in either MPEG-1/2 or Div-X format on the video player.

System requirements: Microsoft Windows

No matter how well both Sharp and G.Mate run with Linux, neither company has understood that a Linux-PDA should also be capable of interacting with a Linux desktop environment. Both Sharp and G.Mate have nothing to offer in the line of Linux synchronization, although this along with working applications, should be a basic feature of any PDA.

The user's manuals describe setting up Windows synchronization, but there is no trace of a similar setup for Linux. As long as the Zaurus can still run Q-Topia, at least a Q-Topia desktop for Linux will be available. But the only place to find any reference to this for the Sharp is the user forums. There is a lot left to be desired in the case of Linux synchronization.

Obtaining a Zaurus

Obtaining a new Zaurus SL-C705 is not an easy matter, as it was for the SL-5000. Sharp will not be placing the device on



Figure 5: Yopy YP-3500 is small and feels good in the hand, though it is somewhat chunky with its Compact Flash slot behind the display hinge

the European market. ShirtPocket www.shirt-pocket.co.uk [14] in the UK and MobilePlanet www.mobileplanet.com [15] in the USA have to import the devices directly from Japan. In mainland Europe the PDAs are available through Trisoft [11] and Werner Heuser from Xtops.de [12]. Werner was so kind as to supply us a device for this article – thank you.

Similarly, Yopy is also not available in your neighborhood hardware store. Only Claus Pflieger from Xact [13] is selling the Linux PDA in mainland Europe and sent us the YP-3000, YP-3500, and YP-3700 models that we tested here. For UK sales, try Yopy PDA UK [16]. In the USA, the Yopy is on sale from SDG Systems [17]. The lack of support for these devices in Europe means there is no support for localized versions.

Conclusion

Both G.Mate and Sharp have learned from their past mistakes with their YP-3000 and SL-5000 models respectively. They have improved their design a lot, except as we have seen, with regard to Linux synchronization.

The Yopy YP3500 and YP-3700 now have a standard QWERTY keyboard as well as back-lighted display. G.Mate has kept the handy form, and though the Yopy is fairly chunky with a height of 2.5 cm (1 inch), and a heavyweight at 200 grams (7 ounces), the Compact Flash slot more than compensates for the lack

of SD memory chip support for the MMC extension port.

The Sharp Zaurus SL-C750 came very close to fulfilling our idea of the perfect PDA. Two of the basic requirements for a good mobile computer are achieved with the high resolution display – 640x480 at 200 dpi – and the high quality QWERTY keyboard. You can use this device almost like any Linux terminal.

If you ignore the workmanship of the case, the fast CPU and the wide range of extension possibilities should suit most everyday requirements you will have for a PDA. Even the battery lifetime is acceptable, as anybody should be able to get

along using it for a whole day without recharging. ■

INFO

- [1] Linux-WLAN-NG driver: <http://www.linux-wlan.com/linux-wlan>
- [2] Trolltech, Q-Topia: <http://www.trolltech.com/products/qtopia>
- [3] OPIE: <http://opie.handhelds.org>
- [4] GPE: <http://gpe.handhelds.org>
- [5] Journaled Flash Filesystem V2, JFFS2: <http://sources.redhat.com/jffs2>
- [6] Hancom Mobile Office: <http://en.hancom.com/index.html>
- [7] Colorgraphics PCMCIA, Compact-Flash-VGA: http://www.colorgraphic.net/newsite/products/handheld_overview.asp
- [8] Access, Netfront-Web browser: <http://www.access.co.jp/english/products/nf.html>
- [9] Insignia Java: <http://www.insignia.com/content/products/jvmProducts.shtml>
- [10] Sun Java 2 Micro Edition (J2ME): <http://java.sun.com/j2me>
- [11] Trisoft, Fischer & Stephan OHG: <http://www.trisoft.de>
- [12] Werner Heuser, Xtops.de: <http://www.xtops.de>
- [13] Claus Pflieger, Xact: <http://www.yopy.at>
- [14] ShirtPocket: <http://www.shirt-pocket.co.uk>
- [15] MobilePlanet: www.mobileplanet.com
- [16] Yopy PDA UK: <http://www.yopypda.co.uk>
- [17] SDG Systems: <http://www.sdgsystems.com>