

Sharp Zaurus SL-5500  
June 29, 2002 Colug Presentation  
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## 1 Specifications

- 206 MHz Strong Arm processor, 64 MB memory, 16MB Flash ROM
- 240x320 resolution 65,536 color 3.5" Reflective TFT Front-Lit Display
- CF and SD/MMC expansions slots
- stereo headphone/microphone jack
- slide out keyboard
- IR (can beam data between devices and Palm Pilot)
- cradle with USB plug
- rechargeable, replaceable lithium-ion battery
- AC adapter plugs into unit or cradle
- application and cursor buttons
- stylus & touch screen
- originally retailed for \$499 and available in the \$425-\$450 range, but now retails for \$399

## 2 System Software

- embedded version of Linux  
2.4.6-rmk1-np2-embedix  
<http://www.lineo.com>
- Qtopia for Embedix Plus PDA  
<http://www.trolltech.com>
- Insignia Jeode JVM  
<http://www.insignia.com>
- Opera Browser  
<http://www.opera.com>

### 3 Applications

- calendar, address book, todo list, email
- Hancorn Word (read/write MS Word), Sheet (read/write Excel), Presenter (PowerPoint viewer)
- Image Viewer (PNG, JPEG, possibly others)
- Media Player (MPEG, MP3, buy Ogg player separately)
- Voice Recorder
- calculator, clock/stop watch, etc.
- terminal (shell) available for free on web (and I think on CD)
- many others available for free download or minimal cost
- DrawPad, NeoCal, Today, VNC server, Tab Manager

## 4 Games

- Asteroids
- Go
- Mindbreaker (Mastermind)
- Mine Hunt
- Patience (Solitaire)
- Snake
- Word Game (Scrabble)

## 5 Java Demos

- Personal Java - a “standard” defined by Sun - doesn’t include all the features of regular Java
- two graphical applet demos come with the Zaurus
- 2D only, although one appears to be 3D (decompiled it to check)
- a friend of mine wanted to see if a Java rendering applet worked <http://mrl.nyu.edu/~perlin/car/Car.html>
- it apparently is written in Java 1.0 to make it as portable as possible; the idea was for the students to be able to modify the renderer Personal Java “verifier” complained, but it works

```
cd ~/java
evm -appletviewer car.html
```

## 6 Settings

- Backup/Restore (tar)
- Network & Sync
- Light & Power
- Others

## 7 Sync Software

- sync done using ftp (Zaurus uses port 4242 for ftp)
- sync with Outlook (haven't tried it)
- CD contains Windows version of Qtopia Desktop
- Linux and Windows version of Qtopia Desktop available from <http://www.trolltech.com/developer/download/qtopia.html>
- no Mac support available yet, although it is in development; issue appears to be Ethernet over USB drivers for Mac since the sync is done using ftp
- address book, todo list, calendar are currently XML files (plan to switch to a common database in future versions) found on desktop in: `~/ .palmtopcenter/` and on Zaurus in: `/home/root/Applications`

## 8 Syncing with Linux

- easy way - get a CF network card, give it a IP address on your network (may need to be a 192.168 address)
- cheaper way - use experimental “Ethernet over USB” on your desktop
- apparent stability issues with this driver - reports of lockups if stay telnet’ed in to the Zaurus for long periods of time
- HOWTO at:  
<http://www.ruault.com/Zaurus/ethernet-over-usb-howto.html>
- get patch
- apply patch (doesn’t apply cleanly, can use `-fuzz` or edit by hand)
- I hand applied it to a Red Hat 2.4.17-0.6 kernel from RawHide on a Red Hat 7.2 system

```
make xconfig
load config file from RedHat and modify:
Code Maturity - development/experimental
```

```
USB support: USB Network Adapters,
module: USBD Network (Encapsulated) Host-to Host Link
No for: CONFIG_USB_CDCETHER
save config file
```

```
make dep
make clean
make bzImage
make modules
```

```
make modules_install
```

```
cp arch/i386/boot/bzImage /boot/vmlinuz-2.4.17-0.6-zaurus
```

```
edit grub.conf file
```

```
reboot
```

- to allow internet access for Zaurus, setup NAT on desktop (where 192.168.1.5 is desktop IP)

```
iptables -t nat -F
```

```
iptables -t nat -A POSTROUTING -j SNAT -o eth0 \  
  --to 192.168.1.5
```

```
echo 1 > /proc/sys/net/ipv4/ip_forward
```

- on Zaurus

```
route add -host 192.168.129.200 usbd0
```

```
route delete -net 192.169.129.0/24 usbd0
```

```
route add default gw 192.168.129.200
```

- edit /etc/resolv.conf on Zaurus and specify your nameserver

## 9 Remote Access

- telnet built-in, just need to turn on the server; initially root has no password; I set one and there are claims that it causes sync problems but I haven't found any
- openssh available
- VNC
- NFS - the following `/etc/exports` on desktop/laptop allows rw access to `/home` on my desktop/laptop with my desktop username as file owner

```
/home 192.168.1.0/255.255.255.0(rw,all_squash,  
anonuid=500,anongid=500)
```

## 10 Cross Compiler

- HOWTO at:  
[http://www.zauruszone.com/howtos/linux\\_compiler\\_setup\\_howto.shtml](http://www.zauruszone.com/howtos/linux_compiler_setup_howto.shtml)
- binutils-cross-arm-2.11.2-0.i386.rpm  
gcc-cross-sa1100-2.95.2-0.i386.rpm  
glibc-arm-2.2.2-0.i386.rpm  
linux-headers-arm-sa1100-2.4.6-3.i386.rpm  
qtopia-free-1.5.0-1.i386.rpm

- environment variables

```
setenv QTDIR /opt/Qtopia
setenv TMAKEPATH /opt/Qtopia/tmake/lib/linux-g++
```

- /bin/x86.sh

```
#!/bin/csh
setenv CROSSCOMPILE /opt/Embedix/tools
setenv QPEDIR /opt/Qtopia
setenv QTDIR /opt/Qtopia
set path = ($QTDIR/bin $QPEDIR/bin $path /opt/Embedix/tools/bin)
setenv TMAKEPATH /opt/Qtopia/tmake/lib/qws/linux-x86-g++
setenv LD_LIBRARY_PATH $QTDIR/lib:$LD_LIBRARY_PATH
echo "Altered environment for xx86 development"
```

- /bin/arm.sh

```
#!/bin/csh
setenv CROSSCOMPILE /opt/Embedix/tools
setenv QPEDIR /opt/Qtopia/sharp
setenv QTDIR /opt/Qtopia/sharp
setenv PATH $QTDIR/bin:$QPEDIR/bin:$CROSSCOMPILE/bin:$QPEDIR/bin:$PATH
setenv TMAKEPATH /opt/Qtopia/tmake/lib/qws/linux-sharp-g++/
setenv LD_LIBRARY_PATH $QTDIR/lib:$LD_LIBRARY_PATH
echo "Altered environment for ARM Development"
```

- example

```
cp /opt/Qtopia/example/* .
source ~/bin/x86.sh
tmake example.pro > Makefile
make
/opt/Qtopia/bin/qvfb &
./example -qws
make clean
source ~/bin/arm.sh
tmake example.pro > Makefile
make
(run on Zaurus via NFS)
```

## 11 Python

- Python and PyQt packages for Zaurus available at:  
<http://www.riverbankcomputing.co.uk/>
- Python split into a number of separate packages so you can only install the modules you need
- again, development on desktop and running on Zaurus via VNC and NFS makes for fast development
- attendance program
- program icons are 28x32 PNG files
- tab icons are 13x13 PNG files
- tab manager program allows you to set icons, add tabs, and move programs between tabs

## 12 IPK

- the packaging system is basically a compressed tar file and I believe I read it was compatible with Debian's packaging system
- HOWTO  
[http://www.zauruszone.com/howtos/ipkg\\_howto.shtml](http://www.zauruszone.com/howtos/ipkg_howto.shtml)
- attendance\_1.0.0\_arm.ipk

```
# tar ztf attendance_1.0.0_arm.ipk
./debian-binary
./data.tar.gz
./control.tar.gz

# tar ztf data.tar.gz
./
./opt/
./opt/QtPalmtop/
./opt/QtPalmtop/bin/
./opt/QtPalmtop/bin/AttData.py
./opt/QtPalmtop/bin/AttendApp.py
./opt/QtPalmtop/bin/QtUtil.py
./opt/QtPalmtop/bin/attend.py
./opt/QtPalmtop/bin/check-attend.py
./opt/QtPalmtop/apps/
./opt/QtPalmtop/apps/Applications/
./opt/QtPalmtop/apps/Applications/Attendance.desktop
./opt/QtPalmtop/pics/
./opt/QtPalmtop/pics/Attendance.png
./IPKG_BUILD.6217/
./IPKG_BUILD.6217/data.tar.gz
```

```
# tar ztf control.tar.gz
./
./control

# cat control
Package: attendance
Priority: optional
Version: 1.0.0
Architecture: arm
Section: qpe/applications
Maintainer: Dave Reed
Depends: python, PyQt
Description: Attendance program

# cat debian binary
2.0
```

- script to build ipkg:  
<http://www.zauruszone.com/howtos/downloads/ipkg-build>
- in a build directory create a directory **CONTROL** containing the **control** file; in the build directory create the **opt** directory and all the contents of the **opt** directory listed in the above **data.tar.gz** file, execute: **ipkg .** and it will create the **attendance\_1.0.0\_arm.ipk** file

## 13 Annoyances

- everything is done as “root”
- sync software occasionally is flaky - appeared to have lost my address book once; recovered by copying xml file from my CDRW backup
- deleting a “repeating” calendar event sometimes deletes another repeatable event (read that it only happens if there’s no “Notes” for the event)
- Documents file structure and use of .desktop files
- any .txt, .png file on SD/CF card shows up in Documents tab (annoying if you install an application on the card instead of memory); solution: use Unix hidden files (any file or entire directory that starts with a period is ignored)

## 14 Conclusion

- applications are not as full-featured as Palm Pilot applications that have been around longer (many people complain that calendar is missing features: remind days in advance of events like birthday, all events must have a time - can't just have a date, etc.)
- reviews indicate it's not as "polished" as Palm Pilot, but it's definitely usable by the Unix illiterate as a PDA, but probably not worth the cost for them
- however, if you know Linux and like to "tinker" and write your own software, you'll want one
- since it's Linux based, there are lots of developers writing software so better applications will likely come along; from what I understand Trolltech is going to make updates freely available
- ROM is flashable and people are developing their own ROMs and software applications

## 15 Resources

- TrollTech's Qtopia files  
<http://www.trolltech.com/developer/download/qtopia.html>
- Sharp site with software, tips, news, etc.  
<http://www.myzaurus.com>
- Ethernet over USB HowTo  
<http://www.ruault.com/Zaurus/ethernet-over-usb-howto.html>
- SourceForge site with mailing lists and software for download  
<http://zaurus.sourceforge.net/>
- HOWTO's including cross compiler  
<http://www.zauruszone.com/howtos>
- software links (comprehensive, but slow - hosted over someone's DSL line)  
<http://www.killefiz.de/zaurus/>
- Python and PyQt  
<http://www.riverbankcomputing.co.uk/>
- software links  
<http://www.zaurusoft.com/>
- ipkg HOWTO  
[http://www.zauruszone.com/howtos/ipkg\\_howto.shtml](http://www.zauruszone.com/howtos/ipkg_howto.shtml)
- Open Zaurus  
<http://sourceforge.net/projects/openzaurus>