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(Redirected from Tc1100)

The HP/Compaq **TC1100** is a Tablet PC. It has quite a few devices crammed into its small form factor. Getting them all to work in Linux can be quite a task, but the situation is constantly improving.

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General

Using a recently-updated distribution with a 2.6-series kernel is recommended. Ubuntu and Debian work pretty well. Wired ethernet, full-resolution graphics, sound, PCMCIA, USB and top-side buttons should work by

default. Wireless networking works by default on Ubuntu 7.10, but not on Debian due to missing firmware (see below). Most of the tablet's devices can be made to work, so installing Linux on it is feasible. There are no reports of keyboard position sensor working.

The following table summarizes the level of support for the TC1100's devices, in a desktop installation of Ubuntu 8.10. The situation is similar for Debian Etch.

- Green means that the device works by default with absolutely no configuration.
- Yellow means that packages may need to be installed and/or configuration files will need to be edited.
- Red means serious modifications are needed to get it to work, such as recompiling some packages.
- Black means that no one has written software to handle it.

Device	Note	Ubuntu 8.10	openSUSE
Graphics card	nVidia GeForce4 420 Go 32MB, equivalent to a GeForce 4 MX. The open source <code>nv</code> driver allows the nominal 1024x768 LCD resolution, but won't provide accelerated graphics.	ok	ok
Accelerated graphics	Binary-only drivers from nVidia are required. Fortunately, the installation can be simplified by using ready-made scripts.	driver install	driver install with yast
Video switch	This is the recessed button next to the power button. It has a glyph that resembles a monitor. It should swap the display(s) with an attached monitor. It emits keycode 151 when pressed, so it can be mapped to an arbitrary script using <code>xbindkeys</code> .	some config	not tested
VGA connector	It's below the wired ethernet jack, under the door. Can be used to hook up a secondary monitor or to give presentations with a projector.	some config	ok
ACPI: Screen brightness	The ability to adjust the screen brightness. This is implemented in the hardware in a very non-standard way.	ok	not by default
ACPI: Battery status	39960mWh Lithium Ion battery.	ok	unreliable
ACPI: Suspend to RAM	The ability to suspend the system to RAM.	some config	not by default
ACPI: Hibernate	The ability to suspend the system to the hard disk.	some config	not by default
ACPI: Thermal Zone	Thermal Zone is an ACPI feature to monitor CPU and motherboard temperatures.	ok	not tested
ACPI: Fan control	The ability to control fan speed. Not possible in Windows, probably the fans are controlled directly by BIOS.	unsupported	not tested
ACPI: Power button	This is the slider on the upper left corner of the display. It initiates a log-out/shutdown dialog in GNOME.	ok	not tested

Side buttons	They are labeled "Q", "tab", and "esc". They are next to the video switch. The "tab" and "esc" buttons work as expected, but the Q button won't do anything by default.	ok	not tested
Jog button	It's the rocker + depression button on top of the display, next to the side buttons. It causes scrolling when rocked, and is like pressing "enter" when pressed down.	ok	not tested
Wacom tablet buttons	These are three spots on the face of the tablet which can be activated with the stylus to perform certain functions. They are near the door that covers the ethernet and VGA connectors.	driver patch	not tested
Wacom tablet stylus	Using the stylus as an extended input device in XInput-aware applications like GIMP and Inkscape. The stylus needs to be configured in those applications.	ok	not tested
Wacom tablet pointer	Using the stylus as a pointer in X	some config	ok
Keyboard orientation	It's the sensor in the keyboard witch signals turning of the rotation disk.	****	not by default
Wired ethernet	Broadcom 440x 10/100 Its jack is below the modem jack, under the door.	ok	ok
Wireless ethernet	mostly Intel PRO/Wireless 2100 or 2200, some tablets have Atheros ABG	ok***	ok
Wireless power	Ability to turn the wireless card on and off. This also turns the Bluetooth adapter on and off.	ok	not tested
Bluetooth	Built-in Bluetooth adapter support. The adapter is turned on along with the wireless ethernet card.	ok	not tested
Infrared port	Fast IrDA port. It's located at the corner next to the power plug.	ok	not tested
Modem	Agere Systems AC'97 Modem. Its jack is below the USB ports, under the door.	should work**	not tested
USB ports	On the left side under the door.	ok	ok
PC card slot	Texas Instruments PCI-1620 CardBus Controller. It's on top of the left side, near the power button.	ok	not tested
SD Card reader	Texas Instruments PCI-1620 UltraMedia. It's above the little door, behind the PC card slot.	unsupported*	not by default
Sound	Conexant AC-Link Audio, detected and supported as Intel 8x0 AC'97. Jacks are on the right side of the display.	ok	ok

(*) The card reader is integrated with the PCMCIA controller, which is Texas Instruments PCI1620. Some people having the same controller in different machines have reported some success. The typical procedure involves ripping firmware from the Windows driver, decrypting it, and using unofficial drivers to load it.

(**) There are restricted drivers available for Ubuntu, which some people reported to work.

(***) The wireless adapter's firmware, being non-free software, is not included by default in Debian. See below for instructions on installing it. Power management of the WiFi interface will require the WMI driver.

(****) Attaching and detaching the keyboard seems to be interpreted as Thermal Zone events. It may be possible to correct this by tweaking acpid configuration files.

The devices

NVIDIA accelerated graphics

In Ubuntu 8.10, just use the Hardware Drivers utility to install the binary NVIDIA drivers which give you accelerated graphics. Note that the headers package (usually `linux-headers-generic`) must be installed, otherwise the automatic driver build on restart will fail. The installer will take care of setting up `xorg.conf` for you.

`sudo m-a get,build,install nvidia` should work on other Debian-based systems, provided you have the package `module-assistant` installed.

You can now configure X for the "nvidia" driver. For all features to work correctly, you must add two lines in the Device section of `xorg.conf`. Edit it using e.g. `gksu gedit /etc/X11/xorg.conf` and add the following two lines:

```
Section "Device"
    Identifier      "Configured Video Device"
    Driver          "nvidia"
    Option          "NoLogo"          "True"
    Option          "RandRRotation"    "True"
    Option          "NvAGP"            "1"
EndSection
```

The first will enable dynamic rotation, while the second will allow your computer to suspend properly.

WMI driver

The WMI functionality (turning the wireless card on/off and regulating the screen brightness) is supported in kernels 2.6.25 and later. Kernels before 2.6.23 have another legacy interface, while kernels 2.6.23 and 2.6.24 don't have this driver at all. This means that Ubuntu 8.04 can't use the WMI functionality unless a kernel upgrade is made. Ubuntu 8.10 works without further configuration.

For power management commands, see the Application Tips section.

Stylus

The stylus lets you use the TC1100 as a Wacom tablet. Recent Ubuntu and Debian distributions detect and enable the tablet out of the box. To make it usable as a pointer, there are some changes needed in the X configuration file.

First you will need to figure out the device file to which it is mapped. If the file `/dev/input/wacom` exists, this is the device file you are looking for. If it doesn't, type:

```
$ xxd /dev/ttyS0
```

in the terminal and then move the stylus over the screen. If cryptic numbers (a hex dump) start to appear, this means that you have found the device name - in this case `/dev/ttyS0`. If nothing happens, try other serial ports - `/dev/ttyS4` and `/dev/ttyS14` are good first tries. Sometimes, the `xxd` command may freeze the system. In that case, you have probably tried the right port.

Edit your X configuration file (usually `/etc/X11/xorg.conf`) and add this section anywhere in the file. This is necessary because the Wacom driver doesn't support hotplug. There are chances that some entries for the tablet already exist - in this case, modify the existing entries. Old versions of `wacomcpl`, the Wacom calibration utility, may assume that three types of devices are needed. Make sure that you have a recent version of the `wacom-tools` package, since old ones will crash with the new X server in Ubuntu 8.10.

```
Section "InputDevice"
    Identifier "stylus"
    Driver      "wacom"
    Option      "Type"          "stylus"
    Option      "Device"         "/dev/input/wacom" # put the device name here as found above
    Option      "ForceDevice"    "ISDV4" # This enables a special communication protocol
    Option      "Button2"        "3" # This is the line you need for the stylus button to right click
EndSection
```

If you want the stylus to function as a mouse, you will additionally need to add a "ServerLayout" section:

```
Section "ServerLayout"
    Identifier "Default Layout"
    Screen "Default Screen"
    InputDevice "stylus" "SendCoreEvents"
EndSection
```

Stylus buttons

The stylus-activated buttons on the left side of the display are not supported by the official driver. However, they can be made into mouse buttons using a small patch. The instructions below are for Ubuntu, but they should work on any Debian-based distribution - just execute the commands prefixed by `sudo` as root and without the `sudo` prefix.

- First, download the Linux Wacom drivers source. Download the build dependencies as well

```
cd /usr/src
adduser your_username src
chown -R root:src /usr/src
apt-get source wacom-tools
sudo apt-get build-dep wacom-tools
```

- Apply the TC1100 stylus buttons patch (which should be saved in your home directory with the filename "wacom.patch"), and build a modified Debian package, then install it.

```
cd /usr/src/wacom-tools-0.8.1.4/linuxwacom
patch -p1 < ~/wacom.patch
cd /usr/src/wacom-tools-0.8.1.4
debuild -uc -us -b
sudo dpkg -i ../wacom-tools_0.8.1.4-1_i386.deb
sudo dpkg -i ../xserver-xorg-input-wacom_0.8.1.4-0ubuntu3_i386.deb
```

patch should output something like "patching file src/xdrv/wcmISDV4.c". debuild will take care of configuring and building the modified package. After installing it, restart X by pressing Ctrl+Alt+Backspace.

- In a terminal, run the event testing program `xev`. Position the cursor over the small window and try pressing the stylus buttons. The terminal should indicate that there are `ButtonPress` and `ButtonRelease` events. The rotate button is mouse button 30, journal - mouse button 31 and input panel - mouse button 32.

See the section "Application Tips" for an explanation on how to make these buttons do something useful.

Display Features

Rotation

To support display rotation, do the following:

- Install `wacom-tools`. Ubuntu Gutsy and later has the required version in its repository. For Debian Etch you have to download a more recent version from the Linux Wacom Project's website. Also see the above section if you are interesten in making the stylus buttons work.
- Install the NVIDIA binary driver. Make sure you changed `xorg.conf` to enable dynamic rotation.

Once you are set up, rotation can be accomplished via these terminal commands:

```
xrandr -o left
xsetwacom set stylus rotate ccw
xsetwacom set cursor rotate ccw
```

To get back to normal:

```
xrandr -o normal
xsetwacom set stylus rotate none
xsetwacom set cursor rotate none
```

See the Application Tips section for information on how to bind these commands to the stylus-activated rotate button.

Brightness

You can turn on brightness regulation on and off with:

```
echo 0 > /sys/devices/platform/tcl100-wmi/jogdial
echo 1 > /sys/devices/platform/tcl100-wmi/jogdial
```

(Yes, 0 turns brightness regulation on). While brightness regulation is on, you can adjust it using the rocker button at the top of the tablet.

Display TwinView

The official nVidia drivers are capable of driving two monitors. One is the tablet's LCD, and the other is anything attached to the 15 pin external VGA port. By default this port is a mirror of the LCD, but it can be

used to create a larger desktop.

The best way to adjust the TwinView setup is to install the package `nvidia-settings`, which provides an easy to use GUI to adjust TwinView and Digital Vibrance settings.

Sound

The Intel sound card works out of the box with recent Debian and Ubuntu releases. The only confusing issue is that the built-in speakers are not turned off when a headphone jack is plugged in. This is because headphone volume is independent from master volume. To correct this in GNOME, do the following:

- Right-click on the volume control icon in the panel and click on Open Volume Control.
- From the menu choose Edit->Preferences.
- Tick the checkbox Headphone Jack Sense and close the menu.
- Go to the Switches tab and enable Headphone Jack Sense.

Now the speakers should turn off when you plug in a headphone jack.

Side buttons

There are several buttons on top of the tablet, labeled "Q", "tab", etc. The Esc and Tab buttons generate escape and tab keycodes, so their role is fixed, and it would require some tricks to remap them. The jog dial generates codes 99 (Prior, PgUp) for left, 105 (Next, PgDn) for right and 35 (Return) for press. The Q button generates the keycode 159 (0x9F). It can be assigned to run an arbitrary program or script using `xbindkeys`. By binding it to `xvkbd` invoked with the `-text` parameter, you can also emulate arbitrary keypresses - see the `xvkbd` manual for details. In GNOME, you can also use System->Preferences->Keyboard Shortcuts to assign the buttons to some common things. For an equivalent of the Q Menu on Windows, see Application Tips.

Hibernate and suspend to RAM

With Ubuntu 8.10 hibernate and suspend work out of the box. If you install the binary NVIDIA driver, you have to add the `NvAGP` option to `xorg.conf` (see the relevant section).

Other devices

The system reports temperature information from ACPI by default. To view it, use:

```
cat /proc/acpi/thermal_zone/THRM/temperature
```

In addition, special steps may need to be taken for the following:

- Infrared port - drivers are present in the stock kernel and load automatically, but it has to be enabled in BIOS. Application support is rather flimsy.
- Secure Digital card reader - This is based on the Texas Instruments PCI1620 chipset, and is very hard to get working. To date I had no success reading MMC cards with it. There are some guides though. The drawback is that it will only work in PIO0 mode for now, so it will be terribly slow. Cheap USB-based card readers will work without problems, so they are currently a better option.
- Modem - should be handled by `snd_intel8x0m`, there were also restricted drivers in Ubuntu.

Application Tips

Onscreen Keyboard at Login

Ubuntu users from 6.10 on can use the OnBoard virtual keyboard at the login prompt. It works better with Ubuntu 8.04 and later, because setting the keyboard's position and size at the command line is supported.

- Make sure that you are using the "plain" or "plain with face browser" (recommended) option from the System->Administration->Login Window menu item. Themed login windows will not work! You must also be sure that the title bar option is active.
- Edit the /etc/X11/gdm/Init/Default or /etc/gdm/Init/Default (whichever exists) and add "onboard &" between the last "fi" and "exit 0"

```
# sudo gedit /etc/X11/gdm/Init/Default
```

```
fi
fi
onboard -s 684x200 -x 170 -y 568 &
exit 0
```

These values will display the keyboard roughly two thirds of the screen wide at the bottom. Tweak the numbers to your liking. An alternative is to use xvkbd for this purpose. First install the package (unsurprisingly, it's named xvkbd). The relevant command to put in the gdm script is:

```
xvkbd -geometry 684x200+170+568 -no-keypad 2>/dev/null &
```

Finally, you can enable autologin in System->Administration->Login Window in Gnome.

Allowing GNOME gksu to use onscreen keyboards

GNOME's graphical su / sudo frontend, gksu, by default grabs the focus, keyboard and mouse to prevent malicious applications from automatically supplying the password. However, this also prevents onscreen keyboards from working at the gksu prompt. To allow this, Use the gconf-editor program (usually in Applications -> System Tools -> Configuration Editor). Find the key /apps/gksu/disable-grab and turn it on. This will prevent gksu from grabbing focus and all input. You can then input the password the normal way, using Xvkbd, GOK, OnBoard, etc.

Onscreen keyboard in GNOME screen unlock

GNOME screensaver locks the screen by default. However, when you want to log back in, there is no onscreen keyboard. Fortunately, gnome-screensaver supports embedding an onscreen keyboard widget into the screensaver using the XEmbed protocol. One of such keyboard widgets is the Matchbox desktop environment virtual keyboard. Here is how to set it up to display at GNOME screen unlock prompt:

- Install the package and dependencies: `sudo apt-get install matchbox-keyboard`
- Open gconf-editor. Find the key directory /apps/gnome-screensaver.
- Inside that directory, turn on the boolean key `embedded_keyboard_enabled`.
- Change the value of the key `embedded_keyboard_command` to `matchbox-keyboard --xid`

Now select System -> Quit... -> Lock Screen from the GNOME menu, and when you try to unlock, the keyboard will appear underneath the unlock prompt.

Matchbox keyboard seems to default to the UK keyboard layout. If you prefer the US layout, go to `/usr/share/matchbox-keyboard`. Copy the file `keyboard-us.xml` to `$HOME/.matchbox/keyboard.xml`. This file will override any default ones. You can tweak the copied file - it has a simple XML syntax. There are further notes in the README: SVN version of the Matchbox Keyboard readme (<http://svn.o-hand.com/view/matchbox/trunk/matchbox-keyboard/README?rev=1562&view=markup>)

Rotation control for GNOME

There is a handy GNOME panel applet, Grandr (<http://dekorte.homeip.net/download/grandr-applet/>) . Compile or install from the .deb then restart the GNOME Panel for it to show up in the applet selector

```
$ killall gnome-panel
```

It works well with TwinView setups too. Currently it does not rotate the stylus (this may be added to Grandr in future) but a small script can be run after login to periodically check the orientation and rotate the stylus accordingly.

- Create the following script

```
$ gedit ~/wacom-rotate.sh
```

```
#!/bin/sh
# Based on work from Patrick Coke & Tim Pope
# Modified for TC1100 by Francisco Athens
# Rewritten for current xsetwacom and xrandr versions by Krzysztof Kosiński

IFS=$'\n'
DEVS=`xsetwacom list dev | \
sed -e 's/ *$//g' -e 's/\(.*\) .*/\1/g' -e 's/ *$//g'`
# Rotate all detected wacom devices to the given direction.
function rotate_devices()
{
    for DEV in $DEVS; do
        xsetwacom set $DEV rotate $1
    done
}

while xset q >/dev/null 2>&1; do
    sleep 2 # Polling Interval, 2 seconds
    ROTATION=`xrandr --verbose --query | \
grep 'default connected' | \
sed -e 's/^.*(.) \(.*\) (.*).*$/\1/'`
    case $ROTATION in
        normal) rotate_devices none ;;
        left) rotate_devices ccw ;;
        right) rotate_devices cw ;;
        inverted) rotate_devices half ;;
        esac
done
```

- Make the script executable

```
$ chmod u+x ~/wacom-rotate.sh
```

- Open System->Preferences->Sessions and add the script to your startup.

Bindings for the Stylus Buttons

The stylus buttons can be made to work using a patch to the Wacom drivers. To assign them to the actions they were meant to, you need to install some programs:

```
sudo apt-get install xbindkeys xournal xvkbd
```

Additionally, you'll need this simple script that rotates the screen. See the Rotation section on how to configure the display for dynamic rotation.

```
#!/usr/bin/env bash
IFS=$'\n'
DEVS=`xsetwacom list dev | \
sed -e 's/ */$/g' -e 's/\(.*\) */\1/g' -e 's/ */$/g'`
ROTATION=`xrandr --verbose --query | \
grep 'default connected' | \
sed -e 's/^(.*) \(.*) (.*).*$/\1/'`

# Rotate all detected wacom devices to the given direction.
function rotate_devices()
{
    for DEV in $DEVS; do
        xsetwacom set $DEV rotate $1
    done
}

if [[ ! $ROTATION == "normal" ]]; then
    xrandr -o normal
    rotate_devices none
else
    xrandr -o left
    rotate_devices ccw
fi
exit 0
```

Name this script rotate.sh, make it executable and put it somewhere in your path (eg. /usr/bin).

Edit the file ~/.xbindkeysrc and put these lines in:

```
"rotate.sh"
    b:30
"xournal"
    b:31
"xvkbd"
    b:32
```

To activate the new bindings, execute xbinkeys in a terminal. Also, add xbindkeys to your startup programs in GNOME (System -> Preferences -> Sessions) to activate the bindings on system startup. You can substitute xvkbd with a different onscreen keyboard of your choice (onboard, gok, etc.).

Compiz Fusion

TC1100's graphics card is capable of running Compiz Fusion with decent performance. Desktop cube, wobbly windows, animations and window switchers work very well. Transparent cube or demanding animations (Burn, Beam Up, etc.) will cause slowdown.

All you need to do in Ubuntu 8.10 is to install the NVIDIA binary driver, then go to System -> Preferences -> Appearance, select the Visual Effects tab, and check the option of your choice. "Normal" works reasonably

well, while "Extra" is a little slow. For more detailed configuration, install `compizconfig-settings-manager` - you can then access Compiz settings under the "Custom" option in the Visual Effects tab.

If you need to regularly turn off Compiz from time to time, Fusion Icon will come in handy. Search in Ubuntu formus for a deb package.

External links

General

- Debian on tc1100 (<http://www.debianslashrules.org/Hacking/TabletPC.html>) (*debian/rules*)
- Debian on TC1100 (<http://groundstate.ca/TC1100>) (*The Groundstate*)
- Ubuntu on TC1100 (<http://www.darlug.org/Members/ahornby/tc1100>) (*DarLUG*)
- Ubuntu Nvidia Driver Suspend Guide (<https://help.ubuntu.com/community/NvidiaLaptopBinaryDriverSuspend>)
- Ubuntu Nvidia ACPI Support Bugtracker (<https://bugs.launchpad.net/ubuntu/+source/acpi-support/+bug/34043>) - May contain latest suspend issue developments
- TC1100 tablet (<http://changelog.complete.org/categories/28-tc1100-tablet>) (*The ChangeLog* - not very informative, but still)
- Linux on a TC1100 Tablet PC (<http://www.theory.bham.ac.uk/staff/schofield/linux/tc1100/>) (*Andy Schofield*)
- Debian on an HP/Compaq TC1100 tablet PC (<http://math.bu.edu/people/kayeats/computers/tc1100.html>) (*Shyish-person*)
- HP/Compaq TC1000/TC1100 Service and Maintenance Guide (<http://bizsupport2.austin.hp.com/bc/docs/support/SupportManual/c00681631/c00681631.pdf>) - very detailed hardware info with illustrations
- [1] (<http://satisfiedprogrammer.blogspot.com/2007/10/laptop-that-doesnt-get-hot-tc1100-is.html>) - introductory description of the TC1100.

Drivers and apps

The following list applies specifically to the tc1100. See Tablet PC for a more comprehensive list that applies to tablets in general.

- NVIDIA 96.43.05 drivers on Linux 2.6.25 (<http://www.nvnews.net/vbulletin/showthread.php?t=110088>) (*nvnews.net*)
- Intel® PRO/Wireless 2100 Driver for Linux (<http://ipw2100.sourceforge.net/>) (*ipw2100.sourceforge.net*)
- Tabatha (<http://groundstate.ca/tabatha>) (*groundstate.ca*)

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