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## Touchscreen

This page is a documentation of my dealings with various touchscreen devices I've encountered. In my experience, most modern devices work out of the box with both 10.04 LTS or 12.04 LTS, but lack the proper calibration or configuration. Some older devices, especially those embedded in laptops such as GD Itronix line of rugged computers, use serial interfaces which lack the configuration to work in Linux. The methods documented here should work with other distros as well.

## Global Dynamics Itronix GoBook XR-1

This is a rugged laptop I picked up from ebay for a good price, which the seller wiped with Ubuntu 10.04 due to the expense of Microsoft's Windows relicensing fee. The device has an integrated serial touchscreen, and the manufacturer is notorious for hiding any and all documentation on legacy devices such as this one. With a little trial and error however, it's relatively simple to configure this and similar devices. This method should work for most GD products, including the newer GD8000 which replaced this device. Skip to the section for configuring serial devices for these machines.

## Checking for touchscreen connectivity

When encountering a new device, the first order of business is to determine how the touchscreen is connected to your computer. If the touchscreen produces no events out of the box, check to see if it's an USB device or not:

```
lsusb
```

### USB connection

Check the output for any reference to a touchscreen. If your touchscreen has an USB interface, and it isn't working, then you may need to blacklist the usbtouchscreen driver for it to work:

```
sudo modprobe -r usbtouchscreen
```

If your touchscreen begins to produce events, then you can permanently blacklist the usbtouchscreen driver:

```
echo "blacklist usbtouchscreen" | sudo tee -a /etc/modprobe.d/blacklist.conf
```

Some touchscreens might already have good or perfect calibrations, otherwise you'll need to continue to the calibration section.

### Serial connection

If there is no reference to a touchscreen device in your lsusb output, the connection is most likely through one of your serial ports. The actual IRQ mapping varies between manufacturers. In the case of Itronix devices, the default is /dev/ttyS3. A simple way to check for connections is to check each one for events:

```
screen /dev/ttyS0
```

Touch anywhere on your screen to check for any character output. If nothing happens, quit screen by pressing Ctrl+A and then the 'q' key to quit. Continue with /dev/ttyS1, etc. until you get a response. Once you've determined the device, we can try a few different drivers. In the case of Itronix (and most other devices using the Touchkit driver), the correct driver is touchit213.

```
sudo inputattach --touchit213 /dev/ttyS3
```

Will work for most touchkit screens. The calibration or one or more axes may be swapped, but if the calibration is approximate then it's probably the correct driver. Press Ctrl+C to try a new mode. inputattach supports any of the following modes, which includes external touchscreens which may attach through a physical serial port:

--h3600ts	--ipaq	Ipaq h3600 touchscreend
--elotouch	--elo	ELO touchscreen, 10-byte mode
--elo4002	--elo6b	ELO touchscreen, 6-byte mode
--elo271-140	--elo4b	ELO touchscreen, 4-byte mode
--elo261-280	--elo3b	ELO Touchscreen, 3-byte mode

--mtouch	-mtouch	MicroTouch (3M) touchscreen
--touchit213	-t213	Sahara Touch-iT213 Tablet PC
--touchright	-tr	Touchright serial touchscreen
--touchwin	-tw	Touchwindow serial touchscreen
--penmount	-pm	Penmount touchscreen
--fujitsu	-fjt	Fujitsu serial touchscreen

If your device is built into a laptop, you'll have the best luck with the `mtouch`, `touchright`, `touchwin`, or `touchit213` drivers. Likewise, non-Elo external touchscreens will most likely use `touchit213`. If your device is a tablet with stylus-only input, `fujitsu` is a popular maker of embedded tablet devices.

To attach the touchscreen at startup, edit your `/etc/rc.local` to look like the following:

```
/usr/bin/inputattach --daemon --always -t213 /dev/ttyS3
exit 0
```

Replace `-t213` with your appropriate driver and `/dev/ttyS3` with the correct device.

Again, don't worry if the calibration isn't perfect, or if an axis is inverted or reversed - this will be addressed in the calibration section.

## Calibration

Thanks to the wonderful work of the freedesktop.org developers, calibration is no longer a black art in Linux. The calibration utility is included in Ubuntu 12.04 and later:

```
sudo apt-get install xinput_calibrator
```

And for 10.04, there's a ppa available:

```
sudo add-apt-repository ppa:tias/xinput-calibrator-ppa
sudo apt-get update && sudo apt-get install xinput_calibrator
```

Packages and source files are available for other distros [here](#).

The use is pretty straight forward. I had issues getting it to work properly with HAL, however this will work regardless:

```
xinput_calibrator --output-type xinput
```

Follow the instructions pressing each target, and the calibration output will be printed to the terminal. The calibration will be set immediately, but will not survive reboots. If you're using GDM, you can put the calibration command in your `/etc/gdm/Init/Default`. I placed calibration values for my XR-1 in both GDM and as a gnome startup script, since it uses automatic login:

```
/usr/bin/xinput set-prop "Sahara Touch-iT213 Serial TouchScreen" "Evdev Axis Inversion" 0 1
/usr/bin/xinput set-int-prop "Sahara Touch-iT213 Serial TouchScreen" "Evdev Axis Calibration" 32 27 2027 39 1977
```

## Inverted/reversed axes

If your axes are swapped or reversed with the calibration output from `xinput_calibrator` (after a reboot or X restart), you may need to invert them explicitly, as I did with the XR-1.

```
xinput set-prop "Sahara Touch-iT213 Serial TouchScreen" "Evdev Axis Inversion" 0 1
```

The 0 and 1 in the above command enables axis inversion for the x or y axis (0=normal, 1=invert).

If your x and y axis are swapped, use the "Evdev Axis Swap" 1 verb:

```
xinput set-prop "Sahara Touch-iT213 Serial TouchScreen" "Evdev Axis Swap" 1
```

When you're satisfied with the result, you may need to perform calibration again with `xinput_calibrator`.

## Troubleshooting

Different modes and drivers accept different `xinput` options. To get your touchscreen's device name, use `xinput list`. Individual driver options can be obtained by using `xinput list-props <device name>`, where `<device name>` is either the device name as a string or the id= number.

CategoryHardware

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