

# **HidTouch Suite**

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**User manual**

*David Sporn*

# Content

<b>Introduction.....</b>	<b>4</b>
Warning about compiling.....	4
Manual Overview.....	4
Licence.....	4
Changelog.....	5
Version 10.05.23.....	5
Version 10.05.18.....	5
Version 9.04.04.....	5
Version 8.11.01.....	5
Known bug.....	5
<b>Environnement prerequisites.....</b>	<b>6</b>
Preparing the computer for compiling.....	6
udev rule.....	6
<i>Why a custom rule is needed</i> .....	6
<i>Finding information to identify the touchscreen device</i> .....	6
<i>Sample rule for the TC4UM TouchScreen of ET&amp;T</i> .....	7
<b>hidDeviceDump.....</b>	<b>8</b>
Compiling and installing.....	8
Running.....	8
Sample output.....	8
<b>HidTouch.....</b>	<b>10</b>
Compiling and installing.....	10
<i>./configure --prefix=/usr</i> .....	10
Collecting data with hidDeviceDump.....	10
<i>Determining « Opcode »</i> .....	10
<i>Collecting touchscreen coordinate</i> .....	10
Setting up xorg.....	11
<i>Xorg parameters</i> .....	11
<i>Xorg options</i> .....	11
<i>Driver options</i> .....	11
<i>Sample</i> .....	12
<b>Calibrating Sheet.....</b>	<b>14</b>
Opcodes.....	14
Min-Max calibration.....	14
Four-Corners calibration.....	14
<b>GNU GPLv3.....</b>	<b>15</b>
Preamble.....	15
TERMS AND CONDITIONS.....	16
0. Definitions.....	16
1. Source Code.....	16
2. Basic Permissions.....	17
3. Protecting Users' Legal Rights From Anti-Circumvention Law.....	17
4. Conveying Verbatim Copies.....	17
5. Conveying Modified Source Versions.....	18
6. Conveying Non-Source Forms.....	18
7. Additional Terms.....	19
8. Termination.....	20
9. Acceptance Not Required for Having Copies.....	21
10. Automatic Licensing of Downstream Recipients.....	21

11. Patents.....	21
12. No Surrender of Others' Freedom.....	22
13. Use with the GNU Affero General Public License.....	22
14. Revised Versions of this License.....	22
15. Disclaimer of Warranty.....	23
16. Limitation of Liability.....	23
17. Interpretation of Sections 15 and 16.....	23
How to Apply These Terms to Your New Programs.....	23

# Introduction

HidTouch Suite is a collection of software including HidTouch, a xorg input device driver that allow to use USB touchscreens that are seen as hid devices by the linux kernel. It includes the following software :

- HidTouch, the xorg input device driver.
- hidDeviceDump, a command-line utility to collect data send by an usb-hid device to calibrate the driver.

## Warning about compiling

In order to use HidTouch Suite, you must be comfortable with the process of compiling source code.

In the best scenario, it involves invoking the usual sequence « configure.sh », « make » and « make install ». But when the process fails you will have to find out the reason why.

Usually, « configure.sh » will tell if there is something missing on your computer in order to complete the process.

It is also known that the driver does not evolve at the same pace as the X.org Xserver, and over time, the driver cannot be compiled without modifying the code to comply with the last API modifications.

## Manual Overview

First there will be some hint about how to prepare the computer for compiling, and how to build a udev rule to make it easier to identify the device to use.

Then there will be the procedure to compile and use hidDeviceDump to collect data.

Finally, there will be the procedure to compile and set up HidTouch

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Some files (some autotools input files) are not licenced under the GNU General Public licence but are freely redistributable.

## **Changelog**

### **Version 10.05.23**

- This version supports X.Org v1.7.6.

### **Version 10.05.18**

- Added screen rotation detection
- Added new parameter to be compatible with some multitouch devices

### **Version 9.04.04**

- Added a new positioning process that is more accurate
- Added a console tool to collect calibration data

### **Version 8.11.01**

- Fixed the button event problem.
- Removed debugging logs.

## **Known bug**

1. There is no support for xrandr extension.

# **Environnement prerequisites**

## **Preparing the computer for compiling**

*I use Ubuntu 8.04, so the following directive must be adapted to your environnement.*

In order to be able to compile the driver, the following packages must be present :

- build-essential
- autotools-dev
- autoconf
- automake
- xserver-xorg-dev
- pkg-config
- libtool

If this is not enough, the following packages might be mandatory (please send me confirmation about that) :

- libX11-dev
- libxext-dev
- libxtst-dev

## **udev rule**

Udev is the system that, among other things, create in the file system an access point to any device plugged on the computer.

## **Why a custom rule is needed**

By default, HID type usb devices will have an access point in /dev/usb, named « hiddevN », « N » being a number. Depending of the list of devices (e.g. if there is one or more joypads plugged) and the order of detection, this name may change from time to time

This is not a good thing, because one has to know for sure the path of the device to configure hidtouch. Thus, one has to create a custom rule to instruct udev to create an alias that will be always the same.

## **Finding information to identify the touchscreen device**

The « lshal » command list all the devices connected to the computer with a lot of data describing each device. Create a text file containing all this description :

```
lshal > lshal.txt
```

Then open the text file in a text editor, and find the devices that has the line :

```
info.linux.driver = 'usbhid' (string)
```

Note the hexadecimal value for the product id and vendor id of each device found. For each device, the device just before is almost the same, but the *info.product* value is more meaningful than « *USB HID Interface* » (e.g. one might have « *USB Game Controllers* »), thus one can skip a device if it obvious that it is not the touchscreen.

For each device, create a rule like the sample given below. (On Debian and Ubuntu systems, the rule should be put in */etc/udev/rules.d/10-local.rules*).

Restart the computer, and check that the new access point is available.

### ***Sample rule for the TC4UM TouchScreen of ET&T***

This rule creates a symlink that use a fixed vendor name as prefix and the product name.

```
SUBSYSTEM=="usb", ATTRS{idVendor}=="0664", ATTRS{idProduct}=="0306",  
SYMLINK+="ETandT- $\text{attr}\{\text{product}\}$ "
```

This rule creates a symlink with the name « *myTouchScreen* ».

```
SUBSYSTEM=="usb", ATTRS{idVendor}=="0664", ATTRS{idProduct}=="0306",  
SYMLINK+="myTouchScreen"
```

# hidDeviceDump

This command line tool opens the specified usb hid device and output the value read from this device. This tool allows to collect data for the setup of the driver.

## Compiling and installing

This package use autotools. Extract the files in a temporary directory, then in this directory , invoke the following commands :

```
./configure
make
sudo make install
```

## Running

```
sudo hidDeviceDump [device] [packet_count]
```

Sudo is mandatory to have the permission to open a connection to the device.

Once started, touch the screen. If the device specified is correct, it will display the data received by the specified device, and displays a few hid reports on each line. The number of report per line is packet\_count (6 by default)

For each report, **the type is displayed in hexadecimal form, the value in decimal form.**

Note that to set up the driver, *the type code will have to be converted back to decimal form* (see the sample).

## Sample output

I obtain the following with the ET&T TC4UM:

```
d0042 1 d0045 0 d0045 0 d0045 0 10030 1275 10031 1040
d0042 1 d0045 0 d0045 0 d0045 0 10030 1275 10031 1040
d0042 1 d0045 0 d0045 0 d0045 0 10030 1275 10031 1040
d0042 1 d0045 0 d0045 0 d0045 0 10030 1275 10031 1040
d0042 1 d0045 0 d0045 0 d0045 0 10030 1275 10031 1040
d0042 1 d0045 0 d0045 0 d0045 0 10030 1272 10031 1039
d0042 1 d0045 0 d0045 0 d0045 0 10030 1272 10031 1039
d0042 0 d0045 0 d0045 0 d0045 0 10030 1272 10031 1039
d0042 0 d0045 0 d0045 0 d0045 0 10030 1272 10031 1039
d0042 1 d0045 0 d0045 0 d0045 0 10030 1072 10031 1228
d0042 1 d0045 0 d0045 0 d0045 0 10030 1072 10031 1228
d0042 1 d0045 0 d0045 0 d0045 0 10030 1072 10031 1228
d0042 1 d0045 0 d0045 0 d0045 0 10030 1072 10031 1228
d0042 1 d0045 0 d0045 0 d0045 0 10030 1072 10031 1228
d0042 1 d0045 0 d0045 0 d0045 0 10030 1072 10031 1228
d0042 1 d0045 0 d0045 0 d0045 0 10030 1072 10031 1228
```

Moving my stylus, I find the parameter for the driver (opcode parameter value are



converted to decimal values) :

Option	"PacketCount"	"6"
Option	"OpcodePressure"	"852034" #d0042
Option	"OpcodeX"	"65584" #10030
Option	"OpcodeY"	"65585" #10031
Option	"MinX"	"89"
Option	"MinY"	"174"
Option	"MaxX"	"1846"
Option	"MaxY"	"1696" #

# HidTouch

## Compiling and installing

This package use autotools. Extract the files in a temporary directory, then in this directory , invoke the following commands :

```
./configure --prefix=/usr  
make  
sudo make install
```

### ***./configure --prefix=/usr***

Since HidTouch is a device driver for xorg, it must be installed at the location where the driver are stored. As a consequences, the invocation of « configure » will use the « --prefix » switch.

The prefix parameter is set to "/usr" so that make install put the driver in the correct location in the case of a standard installation of xorg in /usr.

## Collecting data with hidDeviceDump

Launch hidDeviceDump to monitor the touch screen in a command line. Then touch the screen using the stylus provided with the touchscreen and collect needed data as following.

### ***Determining « Opcode »***

Touch and release the screen without moving. The touchscreen should send several reports where the only difference will be on the report containing the contact change states. The code of the report is the value for « OpcodePressure ».

Touch and move the screen horizontally to find the code of the report containing the X coordinate. This will be the report code for « OpcodeX ».

Touch and move the screen vertically to find the code of the report containing the Y coordinate. This will be the report code for « OpcodeY ».

### ***Collecting touchscreen coordinate***

Depending of the positioning mode, the data to collect are different.

#### ***Min-Max mode***

Move the stylus along each border to find the lowest or highest value for each coordinate.

#### ***Four corners mode***

Touch each corner of the screen to get the coordinate.

## Setting up xorg

### Xorg parameters

Parameter	Value	Description
Identifier	String	Identify the input device configuration
Driver	« hidtouch »	Driver to configure

### Xorg options

Option name	Value	Description
SendCoreEvents		Activate the option to send core events
ReportingMode	« Raw »	Set the reporting mode to raw
Device	String	path to the device

### Driver options

Option name	Value	Description
PacketCount	Integer	Number of HID reports to monitor in a row 6 by default
PacketManagement_ HasSubgroup	Integer	Enable the management of subgroup of HID reports, to be compatible with multitouch devices. 0 : Disabled (default) 1 : Enabled
PacketManagement_ SubgroupPacketCount	Integer	Number of HID reports in a subgroup (must be less or equal than the value for <i>PacketCount</i> ).
PacketManagement_ Strategy	Integer	The strategy to use for handling subgroup. 0 : Only take into account the first subgroup (default)
OpcodePressure	Integer	Code of the HID report that contains the pressure value
OpcodeX	Integer	Code of the HID report that contains the X coordinate
OpcodeY	Integer	Code of the HID report that contains the Y coordinate

Option name	Value	Description
CalibrationModel	Integer	Choose the model to use to compute the position. The calibration data to provide depends on this value.  0 : Min-Max positionning 1 : Four corner positionning
MinX	Integer	Lowest value for the X coordinate. <i>Used if CalibrationModel = 0</i>
MinY	Integer	Lowest value for the Y coordinate. <i>Used if CalibrationModel = 0</i>
MaxX	Integer	Highest value for the X coordinate. <i>Used if CalibrationModel = 0</i>
MaxY	Integer	Highest value for the X coordinate. <i>Used if CalibrationModel = 0</i>
CornerTopLeftX CornerTopLeftY CornerTopRightX CornerTopRightY CornerBottomLeftX CornerBottomLeftY CornerBottomRightX CornerBottomRightY	Integer	Coordinates of each corner <i>Used if CalibrationModel = 1</i>
CornerScreenWidth	Integer	Width of the screen in pixels <i>Used if CalibrationModel = 1</i>
CornerScreenHeight	Integer	Height of the screen in pixels <i>Used if CalibrationModel = 1</i>

## Sample

This is the configuration of my touchscreen in my xorg.conf :

```
#####
```

```
#Sample configuration
```

```
#
```

```
Section "InputDevice"
```

```
    Identifier      "ETT Touch Panel"
```

```
    Driver          "hidtouch"
```

```
    Option          "SendCoreEvents"
```

```
    Option          "ReportingMode"      "Raw"
```

```
    Option          "Device"              "/dev/ETandT-TC4UM"
```

```
    Option          "PacketCount"         "6"
```

```
Option    "OpcodePressure"    "852034"
Option    "OpcodeX"           "65584"
Option    "OpcodeY"           "65585"

#
# Parameters for CalibrationModel 0
# (default positionning 'Min Max', not accurate)
#

Option    "MinX"               "89"
Option    "MinY"               "174"
Option    "MaxX"               "1846"
Option    "MaxY"               "1696"

#
# Parameters for CalibrationModel 1
# (accurate positionning 'Four corners')
#

Option    "CalibrationModel" "1"

Option    "CornerTopLeftX"     "88"
Option    "CornerTopLeftY"     "172"
Option    "CornerTopRightX"    "1847"
Option    "CornerTopRightY"    "181"
Option    "CornerBottomLeftX"  "89"
Option    "CornerBottomLeftY"  "1696"
Option    "CornerBottomRightX" "1838"
Option    "CornerBottomRightY" "1671"

Option    "CornerScreenWidth"  "1280"
Option    "CornerScreenHeight" "800"
EndSection
```

# Calibrating Sheet

Print this sheet, then use it to note calibration data collected with hidDeviceDump.

## Opcodes

	OpcodePressure	OpcodeX	OpcodeY
hidDeviceDump display			
Conversion to decimal base			

## Min-Max calibration

	MinY =	
MinX =		MaxX =
	MaxY =	

## Four-Corners calibration

CornerTopLeftX =		CornerTopRightX =
CornerTopLeftY =		CornerTopRightY =
CornerBottomLeftX =		CornerBottomRightX =
CornerBottomLeftY =		CornerBottomRightY =

# GNU GPLv3

Version 3, 29 June 2007

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