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                    Elo Touchscreen Linux Driver – MT–USB

         Intel i686 (32 bit) or AMD64/Intel (64 bit) or ARM v7l (32 bit)

                  Installation/Calibration/Uninstallation Instructions

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                                  Version 2.5.0
                               February 23, 2018
                                Elo Touch Solutions


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Elo Linux MT USB Driver package contains userspace Linux drivers designed for
Linux kernel 4.x, 3.x and 2.6.x (single touch only) and video alignment utility
for Elo touchmonitors. This driver requires the presence of libusb-1.0 shared
library on the target system for its operation. The standard driver supports
a single touchscreen and single videoscreen setup only(multiple
videoscreens with mirroring will work).

This readme file is organized as follows:

   1. Supported Touchmonitors and Elo Touchscreen Controllers
   2. System Requirements
   3. Installing the Elo Touchscreen USB Driver
   4. Calibrating the Touchscreen
   5. Uninstalling the Elo Touchscreen USB Driver
   6. Troubleshooting
   7. Contacting Elo Touch Solutions


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1. Supported Touchmonitors and Elo Touchscreen Controllers
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 – Elo Multi Touch(MT) USB Controllers
    TouchPro PCAP controllers,
    IntelliTouch Plus/iTouch Plus 2515–07(non HID), 2521, 2515–00, 3200XX,
    Multi Touch IR controllers

 – Elo Single Touch(ST) USB Controllers
    IntelliTouch(R) 2701, 2700, 2600, 2500U,
    CarrollTouch(R) 4501, 4500U, 4000U,
    Accutouch(R) 2218, 2216, 3000U,
    Surface Capacitive 5020, 5010, 5000,
    Accoustic Pulse Recognition(APR) Smartset 7010
    and other Elo Smartset ST USB controllers


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2. System Requirements
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Visit the Linux downloads section at www.elotouch.com to download the driver
package for your 32 bit Intel, 64 bit AMD/Intel or 32 bit ARM v7l Linux.

 – 32 bit Intel i686 (x86) platform (or)

    64 bit AMD/Intel x86_64 platform (or)
    32 bit ARM v7l platform

 – Kernels supported:
    Kernel version 4.x.x

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      Kernel version 3.x.x
      Kernel version 2.6.x (GCC version 4.0.0 and later)

  - Xorg Xwindows version supported:
      Xorg version 6.8.2 - 7.2
      Xorg Xserver version 1.3 and newer

  - Motif versions supported:
      Motif version 3.0 (libXm.so.3)

  - libusb versions supported:
      libusb version 1.0.9 or later




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3. Installing the Elo Touchscreen USB Driver
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Important:
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a.) Must have administrator access rights on the Linux machine to
     install the Elo Touchscreen USB Driver.

b.) Ensure all earlier Elo drivers are uninstalled from the system.
     Follow the uninstallation steps from the old driver's readme.txt
     file to remove the old driver completely.

c.) The Elo Touchscreen driver components now require new libusb-1.0
     library support (older libusb-0.1 library will not work). Most
     newer Linux distributions have started shipping this library
     (update to the popular libusb-0.1 library) as a part of their
     standard release. Customers can also download and compile the
     libusb-1.0 library from source (requires gcc v4.0.0 or later)
     available at libusb website. This driver will NOT work with
     the older libusb-0.1 library.

d.) Do not extract the downloaded binary package on a Windows system.

e.) Motif 3.0 (libXm.so.3) library is required to use the Graphic User
     Interface (GUI) based control panel (/etc/opt/elo-mt-usb/cpl).
     Openmotif or lesstif installation packages provide the required
     libXm.so.3 library.




Step I:
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Copy the elo driver files from the binary folder to the default elo folder.
Change the permissions for all the elo driver files. These broad
permissions are provided to suit most systems. Please change them to tailor
it to your access control policy and for specific groups or users.

   a.) Copy the driver files to /etc/opt/elo-mt-usb folder location.

         # cp -r ./bin-mt-usb/  /etc/opt/elo-mt-usb


   b.) Use the chmod command to set full permissions for all the
        users for the /etc/opt/elo-mt-usb folder (read/write/execute).
        These broad permissions are provided to suit most systems.
        Please change them to tailor it to your access control
        policy and for specific groups or users.

         # cd /etc/opt/elo-mt-usb
         # chmod 777 *
         # chmod 444 *.txt
```

```
    c.) Copy the udev rules file to /etc/udev/rules.d/ folder location.
        Please edit touchscreen device permissions to tailor it to your
        access control policy and for specific groups or users.

         # cp /etc/opt/elo-mt-usb/99-elotouch.rules /etc/udev/rules.d
```

Step II:

Check if the kernel version for the elo_mt_input_mod kernel module (see the
kernel version listed in the kernel module name) matches your current
system's kernel version. If the kernel versions match, skip Step III and
proceed to Step IV.

```
   [ List your current kernel version ]
   # uname -r
   [ List the kernel module name that contains the kernel version ]
   # ls -l /etc/opt/elo-mt-usb/*.ko
```

Step III:

Compile and build a new kernel module (elo_mt_input_mod.ko) for your system
kernel if required. The kernel module source is present in the
/etc/opt/elo-mt-usb/elo_mt_input_mod_src folder. Kernel source or header
files, gcc, make and other development tools are needed to build a kernel
module. Type "make install" to copy the kernel module to the
/etc/opt/elo-mt-usb/ folder or use the cp command to manually copy the new
kernel module to the /etc/opt/elo-mt-usb/ folder and rename it with your
current kernel version.

To report only Single Touch events(primary touch) to a multitouch capable Linux
kernel (2.6.38 or 3.x.x or 4.x.x) as mouse events, use the FORCE_SINGLE_TOUCH
option. The primary touch events will only be reported to the system, while the
other touches are discarded. Enable this capability by uncommenting the code
that defines FORCE_SINGLE_TOUCH in elo_mt_input.c kernel module source code,
build and install the kernel module.

This single touch reporting feature is very useful if some components in the
software stack do not process multitouch events properly or the applications
do not want multitouch events/gestures or to ensure compatibility with legacy
applications that require mouse events.

```
   # cd /etc/opt/elo-mt-usb/elo_mt_input_mod_src
   # make

   # make install
   (or)
   # cp ./elo_mt_input_mod.ko ../elo_mt_input_mod_`uname -r`.ko
```

Step IV: [Linux distributions with systemd init system]

Install a script to invoke Elo service through systemd init at system startup.
Check if systemd init is being used in your Linux distribution and then proceed
with this installation step. If systemd init is not active, proceed with Step V
of the installation.

Check for active systemd init process.

```
 # ps -eaf | grep [s]ystemd
 # ps -eaf | grep init
 # ls -l /sbin/init
```

```
# ls -l /sbin/init
```

If systemd init system is active, copy and enable the elo.service systemd
script to load the elo driver at startup. Proceed to Step VI of the
installation.

```
 # cp /etc/opt/elo-mt-usb/elo.service /etc/systemd/system/
 # systemctl enable elo.service
 # systemctl status elo.service
```

Step V: [Linux distributions with sysvinit or Upstart or older init system]

Install a script to invoke Elo service on older init systems (non systemd) at
system startup.

Redhat, Fedora, Mandrake, Slackware, Mint, Debian and Ubuntu systems:
- -

Add the following line at the end of daemon configuration script in
"/etc/rc.local" file.

[rc.local file might also be at location /etc/rc.d/rc.local. Use the
"# find /etc -name rc.local" command to locate the rc.local file.]

   /etc/opt/elo-mt-usb/loadEloMultiTouchUSB.sh

SUSE Systems:
- - - - - - -

Add the following line at the end of the configuration script in
"/etc/init.d/boot.local" file.

   /etc/opt/elo-mt-usb/loadEloMultiTouchUSB.sh

Step VI:

Plug in the USB touchscreen and reboot the system to complete the driver
installation process.

   # shutdown -r now

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4. Calibrating the Touchscreen
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Important:
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Users must have read and write access to "/dev/elo-mt-usb" directory to
perform the touchscreen calibration. All long command line options in elova
calibration utility use the "--" format. (example: "--help")

Type "# /etc/opt/elo-mt-usb/elova --help" for available command line
parameters and usage.
```

```
Step I:
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Run the calibration utility from a command window in X Windows from the
/etc/opt/elo-mt-usb directory for a single or multiple video setup
(supports Xorg Xinerama, Xorg non-Xinerama and Nvidia Twinview options).

   # cd /etc/opt/elo-mt-usb
   # ./elova


In a multiple video setup, the calibration target(s) will be shown on the
first video screen and switch to the next video screen after a 30 second
default timeout for each target or screen. Once the touchscreen is
calibrated the data is stored in a configuration file on the hard disk. To
display the calibration targets on just one specific video
screen(example:videoscreen[1]) use the command shown below.

   # cd /etc/opt/elo-mt-usb
   # ./elova --videoscreen=1


To change or disable the default calibration timeout for each target or
screen, use the command shown below. [Timeout Range: Min=0 (no timeout),
Max=300 secs, Default=30 secs]

   # cd /etc/opt/elo-mt-usb
   # ./elova --caltargettimeout=0      [Disable the calibration timeout for all targets and
videoscreens]
   # ./elova --caltargettimeout=45     [Modify the calibration timeout to 45 seconds]


To view a list of video and USB touch devices available for calibration,
use the command shown below.

   # cd /etc/opt/elo-mt-usb
   # ./elova --viewdevices


To view all the available options and specific usage for elova calibration
program, use the command shown below.

   # cd /etc/opt/elo-mt-usb
   # ./elova --help


Step II:
--------

Touch the target(s) from a position of normal use. The calibration data is
written to the driver at the end of calibration.




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5. Uninstalling the Elo Touchscreen USB Driver
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Important:
==========
Must have administrator access rights on the Linux machine to uninstall the
Elo Touchscreen USB Driver.


Step I:
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Delete the script or commands that invoke Elo service at startup.
```

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Linux with Systemd init system:
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Disable and remove the elo.service startup script registered with systemd init
system in Step IV of Installation section.

   # systemctl status elo.service
   # systemctl stop elo.service
   # systemctl disable elo.service
   # systemctl status elo.service
   # rm -rf /etc/systemd/system/elo.service


Linux with sysvinit or Upstart or older init system:
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SUSE systems:
- - - - - - -
Remove the following entry created in Step V of Installation section from
the configuration script in"/etc/init.d/boot.local" file.

   /etc/opt/elo-mt-usb/loadEloMultiTouchUSB.sh


Redhat, Fedora, Mandrake, Slackware, Mint, Debian and Ubuntu systems:
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Remove the following entry created in Step V of Installation section from
the configuration script in "/etc/rc.local" file. (or "/etc/rc.d/rc.local"
file)

   /etc/opt/elo-mt-usb/loadEloMultiTouchUSB.sh



Step II:
--------

Delete all the elo driver files from the system.

   a.) Delete the main elo driver folder.

        # rm -rf /etc/opt/elo-mt-usb


   b.) Delete the elo related device folder and files.

        # rm -rf /dev/elo-mt-usb
        # rm -rf /etc/udev/rules.d/99-elotouch.rules



Step III:
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Reboot the system to complete the driver uninstallation process.

   # shutdown -r now



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6. Troubleshooting
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A. Make sure libusb-1.0 library is installed on the target Linux
   system. The driver will NOT work with the older libusb-0.1
   library. Most Linux distributions come with the newer
   libusb-1.0 library installed by default. It can also be
```

installed by downloading and compiling the library source
(requires gcc v4.0.0 or later) from the libusb-1.0 website.

B. If touch is not working, check if the elomtusbd driver is loaded
   and currently available in memory. Some Xorg Xserver versions
   terminate the touchscreen driver upon user logout. The current
   workaround in this situation is to startup the driver from
   Xwindows startup script or reboot the system.

       # ps -e |grep elo

   Check the driver log file for any errors that have been reported.

       # gedit /var/log/elo-mt-usb/EloUsbErrorLog.txt

   If the driver is not present then load the driver again. Root access
   is needed to load the driver manually. Normal users will have to
   restart the system so that the elomtusbd daemon is loaded again during
   system startup. Normal users may be able to load the driver manually
   depending on access control and file permissions that are setup.

       # /etc/opt/elo-mt-usb/elomtusbd

C. If starting the Elo touchscreen driver from the normal startup
   locations like rc.local or boot.local does not work, first test
   if the touchscreen is working by manually launching the driver
   from a terminal window within XWindows GUI.

       # /etc/opt/elo-mt-usb/loadEloMultiTouchUSB.sh

   If the touchscreen works when the driver is launched manually,
   try to add the touchscreen driver startup line to the end of
   one of the XWindows startup scripts. The Xwindows startup scripts
   are located usually in the following path /etc/X11/xinit/xinitrc.d/.
   Running the touchscreen driver from the Xwindows startup script
   will provide touch input ONLY after the user has logged in
   successfully at the GUI Login screen.

D. While trying to load the driver manually, if you get an error
   "Error opening USB_ERROR_LOG_FILE", check the file permissions for
   the /var/log/elo-mt-usb/EloUsbErrorLog.txt file. The user needs to have
   read and write access to this log file to launch the driver.

E. In a multi video setup, the touchscreen can be mapped to just one
   videoscreen. First find the name of the video port (example: VGA-1, HDMI-0,
   DVI-0) that connects to the desired videoscreen, using the xrandr command in
   a terminal window.

       # xrandr

   Next, find the device ID (id=xx) of the Xinput pointer device "Elo
   MultiTouch(MT) Device Input Module" using the xinput command in a terminal
   window.

       # xinput

   Finally, map the touchscreen device ID to the desired video port using the
   xinput command's --map-to-output option.

       # xinput --map-to-output 22 VGA-1   [Map input device ID 22 to VGA-1 port]

   The input device ID and video port name are stable across system reboots.
   The above mapping command can be added to a startup script to perform the
   mapping at every boot after the Elo MTUSB driver have been loaded.

F. In some Linux distributions (example: Ubuntu 12.04) the desktop does not
   respond to clicks after some time, while the pointer still follows the touch
   input. This is a know bug in Xwindows which has been fixed on newer versions.

To solve this issue, either upgrade to newer version of Xwindows or download
the bug fix, patch and recompile current version of Xserver.

G. The default mode of the touch driver is multitouch mode with the primary
   touch events duplicated as mouse events to support applications that listen
   to mouse events only. The touch driver's kernel module code(elo_mt_input.c)
   detects if the target system's kernel supports Multitouch Protocol (Linux
   kernel version 2.6.38 or 3.x.x) and then enables the _MULTITOUCH_KERNEL_ flag
   to report multitouch events to the kernel. On older Linux kernels the driver
   reports only the primary touch events(as mouse events) and discards the other
   touches.

   On multitouch capable kernels(2.6.38, 3.x.x, 4.x.x), enabling the
   FORCE_SINGLE_TOUCH flag in the kernel module code, rebuilding and installing
   a modified kernel module will force the driver to send mouse events(single
   touch events) based on primary touch information, similar to the behavior
   described above for old Linux kernels.

   If the target application or system (example: POS system) does not require
   multitouch events or gestures on a multitouch capable kernel, forcing the
   driver to send mouse events might provide better results.

H. Newer Linux distributions are starting to switch to the new systemd init
   system startup mechanism. If the addition of the Elo startup script
   loadEloMultiTouchUSB.sh to rc.local or boot.local scripts does not load the
   elo driver on reboot, check if systemd init system is active. If systemd
   init is active then register and enable the elo.service systemd startup
   script as per instructions in Step IV of the Installation section.

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7. Contacting Elo Touch Solutions
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Website: http://www.elotouch.com

E-mail: customerservice@elotouch.com

Mailing Address:

   Elo Touch Solutions Inc,
   670 N. McCarthy Blvd,
   Milpitas, CA 95035
   USA

   Phone: (800) 557-1458
             (408) 597-8000

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