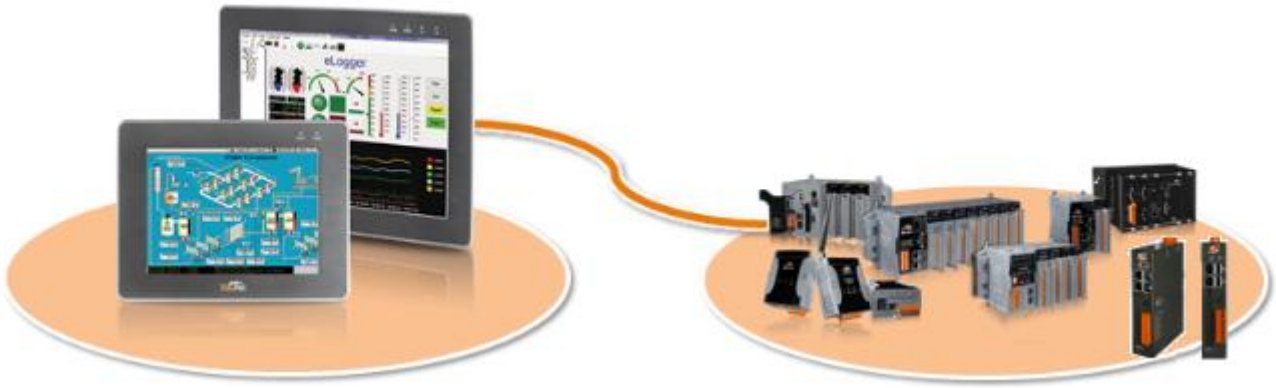
Touch Monitor user manual for LinPAC



Warranty

All products manufactured by ICP DAS Inc. are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

Warning

ICP DAS Inc. assume no liability for any damage consequent to the use of this product. ICP DAS Inc. reserves the right to change this manual at any time without notice. The information furnished by ICP DAS Inc. is believed to be accurate and reliable. However, no responsibility is assumed by ICP DAS Co., Ltd. for its use, nor for any infringements of patents or other rights of third parties resulting from its use.

Copyright

Trademark

Names are used for identification purposes only and maybe registered trademarks of their respective companies.

Contact US

If you have any problem, please feel free to contact us.

You can count on us for quick response.

Email: service@icpdas.com

Contents

The LinPAC embedded Controller provides support for both USB and Serial Touch Screen devices, each of which is discussed in more detail below:

Touch Panel								
Model	Size	Resolution	Brightness	Touch Panel	Backlight Life	Casing	USB Port	RS-232 (Combo)
TP-2070	7"	800 x 480	400 cd/m2	4-wire, analog resistive; light transmission: 80%	20,000 hours	Plastic	1 (Note)	1 (Note)
TP-3080	8.4"	800 x 600		5-wire, analog resistive; light transmission: 80%	50,000 hours			
TP-4100	10.4"							
TPM-4100				4-wire, analog resistive; light transmission: 80%		Aluminum		
TP-5120	12.1"			5-wire, analog resistive; light transmission: 80%		Plastic		
TP-6150	15"	1024 x 768						
TP-7170	17"	1280 x 1024	350 cd/m2					
Note: USB and RS-232 cannot be used simultaneously.								

More information about the latest selection guide, please visit to:
https://www.icpdas.com/en/product/guide+Panel__Products+Display+Touch__Monitor

1. LinPAC AM335X/x86/E38xx Series

1.1 Touch driver setup

An overview of the respective device drives and the installation location is provided below:

Linux PAC	Loadable kernel module to Install
LX-9000 (E38xx CPU)	① USB Touch driver Path: /lib/modules/4.14.12-rt10/kernel/drivers/input/touchscreen/usbtouchscreen.ko ② Series Touch driver Path: /lib/modules/4.14.12-rt10/kernel/drivers/input/touchscreen/penmount.ko
LX-8000 (X86 CPU)	① USB Touch driver Path: /lib/modules/3.2.84-rt122-RT/kernel/drivers/input/touchscreen/usbtouchscreen.ko ② Series Touch driver Path: /lib/modules/3.2.84-rt122-RT/kernel/drivers/input/touchscreen/penmount.ko
LP-8x21 LP-9x21 (AM335x CPU)	① USB Touch driver Path: /lib/modules/3.2.14-rt24/kernel/drivers/input/touchscreen/usbtouchscreen.ko ② Series Touch driver Path: /lib/modules/3.2.14-rt24/kernel/drivers/input/touchscreen/penmount.ko
LP-52x1 LP-22x1 (AM335x CPU)	① USB Touch driver Path: /lib/modules/3.2.14-rt24/kernel/drivers/input/touchscreen/usbtouchscreen.ko ② Series Touch driver ➔ It is already built-in to the kernel.

There are six steps involved in adjusting the calibration for a touch screen calibratied to an LP-8x21 via the serial or USB interface, as follows:

Step 1: Showing what kernel modules are currently loaded.

```
root@icpdas:~# lsmod
Module                  Size  Used by
penmount                1681  0
8250                   41925  2
8250_lp9k               3300  0
slot                   28492  0
irq_ipic                3223  1
joydev                  7254  0
pps_ldisc               1719  0
root@icpdas:~#
```

Fig. 1-1

Step 2: Loading TouchScreen driver manually.

① USB Touch driver

insmod /lib/modules/3.2.14-rt24/kernel/drivers/input/touchscreen/usbtouchscreen.ko

② Series Touch driver

insmod /lib/modules/3.2.14-rt24/kernel/drivers/input/touchscreen/penmount.ko

Note: User can modify **/APP/driver/driver_init.sh** file for auto run in LinPAC -- LP-8421 for example.

 # vi /APP/driver/driver_init.sh

① USB Touch driver

```
#for TouchScreen (Serial port)
#modprobe penmount
#inputattach --penmount /dev/ttyS34 --daemon

#for TouchScreen (USB port)
modprobe usbtouchscreen

exit 0
```

Fig. 1-2

② Series Touch driver

```
#for TouchScreen (Serial port)
modprobe penmount
inputattach --penmount /dev/ttyS34 --daemon

#for TouchScreen (USB port)
#modprobe usbtouchscreen

exit 0
```

Fig. 1-3

Step 3: At the Command Prompt, enter the command 'cat /proc/bus/input/devices' to view a list of devices that are currently connected and the associated device can be obtained.

① USB Touch driver

```
root@icpdas: ~
root@icpdas:~# cat /proc/bus/input/devices
I: Bus=0000 Vendor=0000 Product=0000 Version=0000
N: Name="ti-tsc-adcc"
P: Phys=
S: Sysfs=/devices/platform/tsc/input/input0
U: Uniq=
H: Handlers=mouse0 event0
B: PROP=0
B: EV=b
B: KEY=400 0 0 0 0 0 0 0 0 0 0
B: ABS=1000003

I: Bus=0003 Vendor=14e1 Product=6000 Version=0101
N: Name="DIALOGUE INC PenMount USB"
P: Phys=usb-musb-hdrc.1-1.2/input0
S: Sysfs=/devices/platform/omap/musb-ti81xx/musb-hdrc.1/usb2/2-1/2-1.2/2-1.2:1.0/input/input1
U: Uniq=
H: Handlers=mouse1 event1 js0
B: PROP=0
B: EV=1b
B: KEY=70000 0 0 0 0 0 0 0 0
B: ABS=3
B: MSC=10
```

Fig. 1-4

② Series Touch driver

```
COM1 - PuTTY
root@icpdas:~# cat /proc/bus/input/devices
I: Bus=0000 Vendor=0000 Product=0000 Version=0000
N: Name="ti-tsc-adcc"
P: Phys=
S: Sysfs=/devices/platform/tsc/input/input0
U: Uniq=
H: Handlers=mouse0 event0
B: PROP=0
B: EV=b
B: KEY=400 0 0 0 0 0 0 0 0 0 0
B: ABS=1000003

I: Bus=0013 Vendor=0031 Product=6000 Version=0100
N: Name="PenMount Serial TouchScreen"
P: Phys=ttyS34/serio0/input0
S: Sysfs=/devices/platform/serial8250.0/tty/ttyS34/serio0/input/input1
U: Uniq=
H: Handlers=mouse1 event1
B: PROP=0
B: EV=b
B: KEY=400 0 0 0 0 0 0 0 0 0 0
B: ABS=3
```

Fig. 1-5

Step 4: Calibrating the touchscreen

LinPAC are providing the calibration program to test and get the calibration data. After user type root and password icpdas to login, the local terminal would execute the XFCE desktop.

Clicking an '**Application Menu**' and select '**Terminal Emulator**" function, enter the following command:

(1) List the calibratable input devices. Command: **xinput_calibrator --list**

For example:

```
# xinput_calibrator --list
Device "DIALOGUE INC PenMount USB" id=9
```

(2) Select a specific device to calibrate; use --list to list the calibratable input devices.

Command: **xinput_calibrator --device ID**

For example:

```
# xinput_calibrator --device 9
```

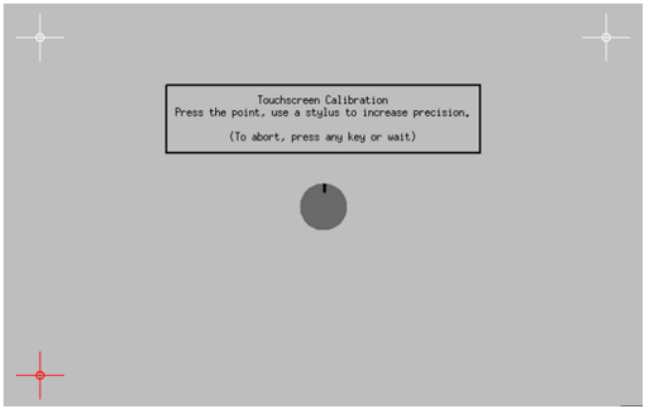


Fig. 1-6

The calibrator will present a simple full screen display with crosshairs that must be touched precisely.

If all goes well the tool will give a configuration snippet and a recommendation of which file to put it in.

Terminal output may look like this:

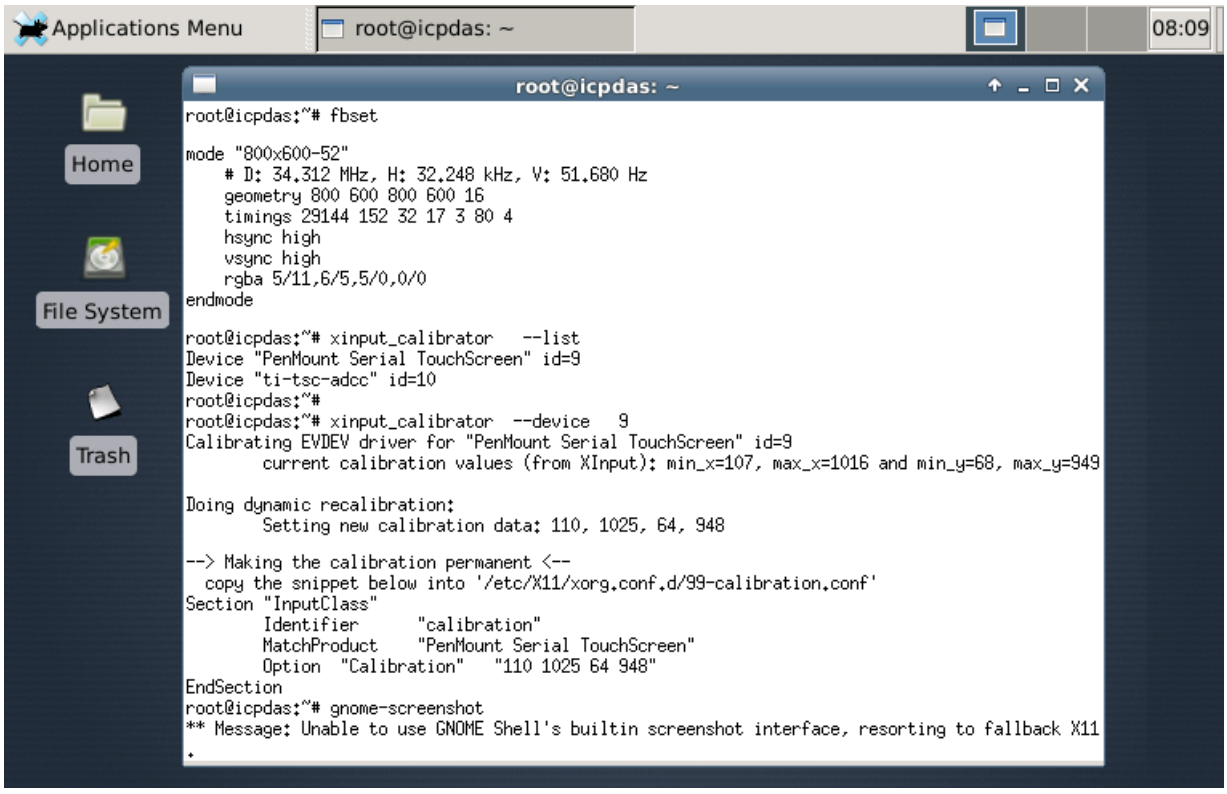


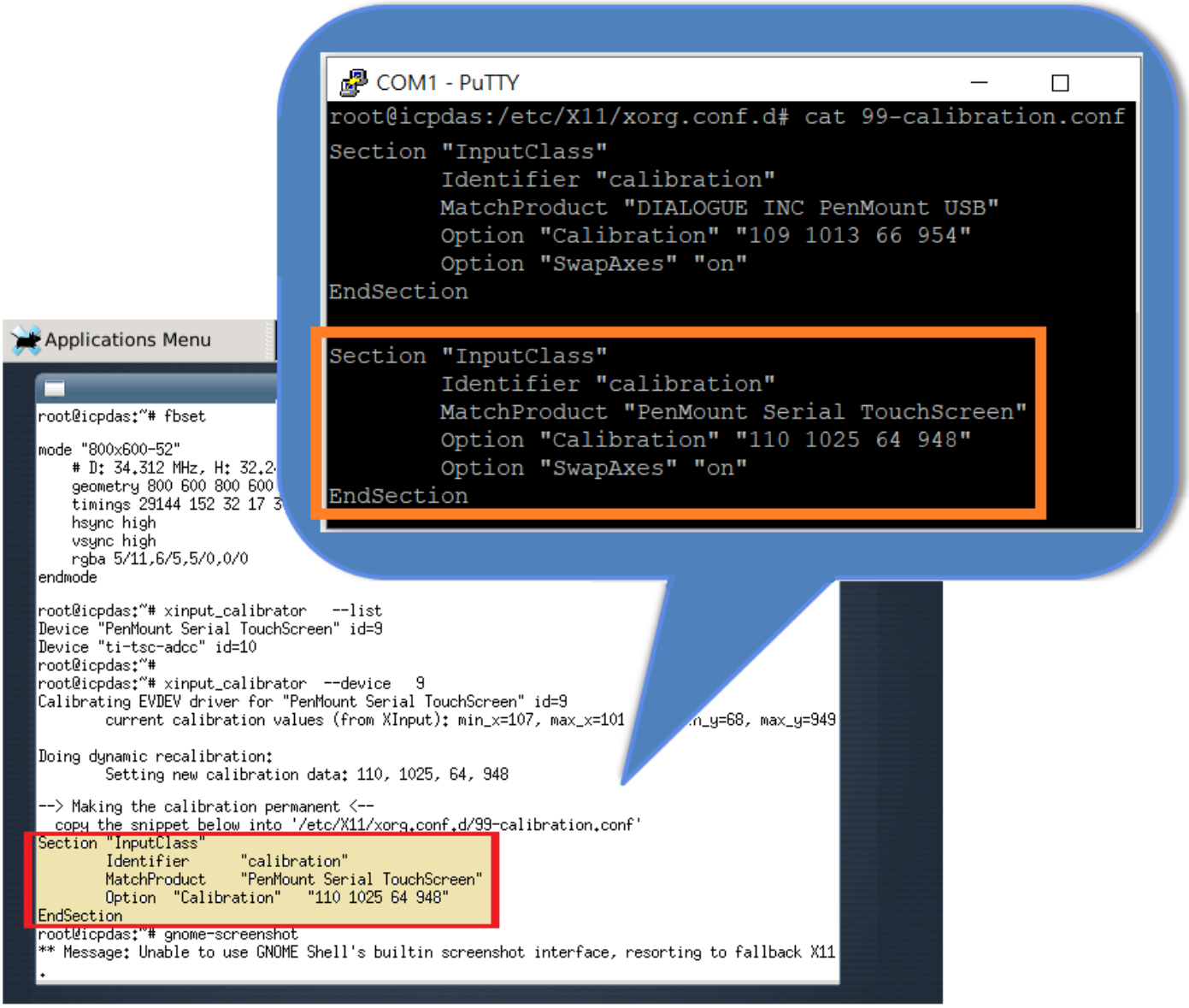
Fig. 1-7

Step 5: To create a file called /etc/X11/xorg.conf.d/99-calibration.conf in **/etc/X11/xorg.conf.d/ directory if it not exits and edit it.**

The snippet must be copied into a configuration file to make calibration persistent.

 # vi /etc/X11/xorg.conf.d/99-calibration.conf

Note: Do not add extra characters, white spaces or newlines to the snippet.



Copy the calibration permanent into '/etc/X11/xorg.conf.d/99-calibration.conf '

Fig. 1-8

Step 6: Rebooting the LinPAC to apply the new configuration.

1.2 Take a screenshoot

GNOME Screenshot is a small utility that takes a screenshot of the whole desktop.

Try in terminal : `gnome-screenshot`

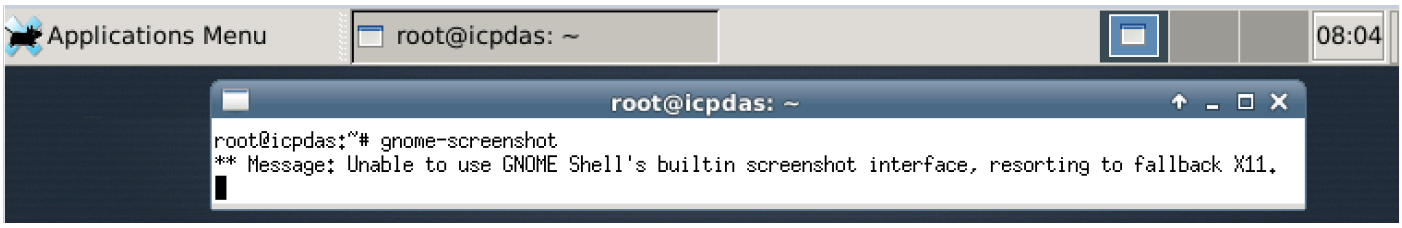


Fig. 1-9

It will be placed into your **Pictures** folder (/root/Pictures).

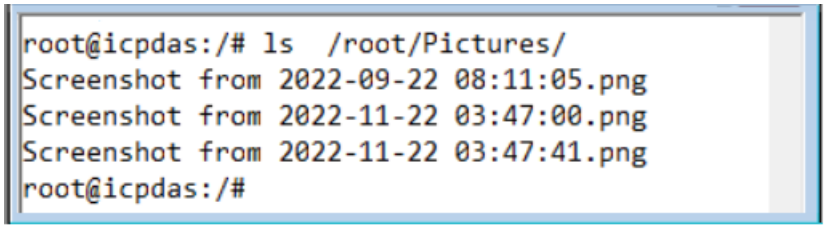


Fig. 1-10

1.3 Change the display resolution

User can modify '**/usr/share/X11/xorg.conf.d/10-monitor.conf**' file, and reboot LinPAC.

 # vi /usr/share/X11/xorg.conf.d/10-monitor.conf

```
root@icpdas: ~
Section "Monitor"
        Identifier "Monitor0"
        Modeline "640x480-60"      25.200  640 659 718 797  480 489 495 525 -hsync -vsync
        Modeline "640x480-72"      29.367  640 664 704 832  480 489 492 520 -hsync -vsync
        Modeline "640x480-75"      31.499  640 656 720 840  480 481 484 500 -hsync -vsync
        Modeline "800x600-56"      36.001  800 839 902 1063  600 601 604 627 +hsync +vsync
        Modeline "800x600-60"      34.312  800 832 912 1064  600 603 607 624 +hsync +vsync
        Modeline "800x600-70"      36.668  800 824 968 1008  600 609 621 636 +hsync -vsync
        Modeline "800x600-72"      43.478  800 856 976 1100  600 637 643 666 +hsync +vsync
        Modeline "800x600-75"      41.317  800 816 896 976  600 601 604 625 +hsync +vsync
        Modeline "1024x768-70"     72.005  1024 1042 1095 2343  768 771 777 806 -hsync -vsync
        Modeline "1024x768-72"     74.996  10224 10248 10384 10488  768 771 777 806 -hsync -vsync
        Modeline "1152x864-60"     68.966  1152 1216 1328 1456  864 870 875 916 +hsync +vsync
        Modeline "1152x864-70"     76.923  1152 1192 1344 1512  864 877 888 945 +hsync +vsync
        Modeline "1152x864-75"     76.388  1152 1176 1320 1464  864 909 917 1002 +hsync +vsync
        Modeline "1280x720-60"     74.250  1280 1389 1428 1647  720 725 730 749 -hsync -vsync
        Modeline "1280x1024-58"    82.142  1280 1328 1440 1688  1024 1025 1028 1066 +hsync +vsync
        Modeline "1600x1200-60"    155.982  1600 1632 1792 2048  1200 1210 1218 1270 -hsync -vsync
        Modeline "1600x1200-66"    171.999  1600 1640 1776 2080  1200 1203 1206 1253 -hsync -vsync
        Modeline "1920x1080-60"    148.500  1920 2008 2052 2200  1080 1084 1089 1125 -hsync -vsync
        Modeline "1920x1080-24"    59.759  1920 2008 2052 2200  1080 1084 1089 1125 -hsync -vsync
        Modeline "800x480-60"    29.5  800 816 896 992  480 481 484 497  -hsync -vsync
EndSection


Section "Device"
        Identifier "Device0"
EndSection


Section "Screen"
        Identifier "Screen0"
        Device "Device0"
        Monitor "Monitor0"
        DefaultDepth 16 #Choose the depth (16||24)
        SubSection "Display"
                Depth 16
                #Modes "800x480-60" #Choose the resolution, match the Modeline
                Modes "800x600-60" #Choose the resolution, match the Modeline
        EndSubSection
EndSection
```

Fig. 1-11

In addition, the contents of **/etc/fb.modes** are video mode lists that depend on which frame buffer you're using.

```
COM1 - PuTTY
root@icpdas:~# fbset

mode "800x600-52"
    # D: 34.312 MHz, H: 32.248 kHz, V: 51.680 Hz
    geometry 800 600 800 600 16
    timings 29144 152 32 17 3 80 4
    hsync high
    vsync high
    rgba 5/11,6/5,5/0,0/0
endmode
```

Fig. 1-12

2. PXA270 Series

An overview of the respective device drives and the installation location is provided below:

Linux PAC	Loadable kernel module to Install
LP-5x31/8x2x (PXA270 CPU)	① USB Touch driver : **usbtouchscreen.ko and tsdev.ko** Path: /lib/modules/2.6.19/ ② Series Touch driver : **pm9000.ko or pm6000.ko** Path: /lib/modules/2.6.19/

The LP-5x31/8x2x provides support for both USB and Serial Touch Screen devices, each of which is discussed in more detail below:

2.1 USB Touch Screen interface

Before a USB touch screen can be used, it must first be calibrated. There are six steps involved in adjusting the calibration for a touch screen connected to an LP-8x41 via the USB interface, as follows:

Step 1: Open a **"Xterm windows"** by clicking the Start button and then clicking Xterm. At the Command Prompt, ensure that the **usbtouchscreen.ko** and **tsdev.ko** files have been mounted, enter the command '**lsmod**' as illustrated in Fig. 10-11.

```
# lsmod
Module                  Size  Used by    Tainted: P
tsdev                  10024  0
usbtouchscreen          9284  0
8250                   29204  0
8250_linpac             2656  0 [permanent]
slot                   35788  0
pxamci                  8352  0
dm9000x                276180  0
#
```

Fig. 2-1

Step 2: At the Command Prompt, ensure that a microSD card has been mounted, enter the command '**mount**' as illustrated in Fig. 10-12.

```
# mount
rootfs on / type rootfs (rw)
/dev/root on / type jffs2 (rw)
proc on /proc type proc (rw)
sysfs on /sys type sysfs (rw)
tmpfs on /var type tmpfs (rw)
shmfs on /dev/shm type tmpfs (rw)
usbfs on /proc/bus/usb type usbfs (rw)
/dev/mmcblk0p1 on /mnt/hda type vfat (rw,fmask=0022,dmask=0022,codepage=cp437,
iocharset=iso8859-1)
/dev/ram0 on /mnt/ramfs type minix (rw)
#
```

Fig. 2-2

Step 3: At the Command Prompt, edit the **/etc/init.d/fbman** file by modifying the settings so that they are the same as below:

- After opening the file: **/etc/init.d/fbman**, users can see the following lines :

  /usr/sbin/fbset -n 640x480-60

  #/usr/sbin/fbset -n 800x600-70

  These lines indicate that the resolution is currently set to 640*480. The # character indicates that a setting is not currently being used.

- To change the resolution settings to **800*600**, remove the "#" character in line 2 and add the "#" character in line 1 as indicated below:

  #/usr/sbin/fbset -n 640x480-60

  /usr/sbin/fbset -n **800x600**-70

Step 4: At the Command Prompt, enter the command '**cat /proc/bus/input/devices**' to view a list of devices that are currently connected and the associated device can be obtained as illustrated in Fig. 10-13.

```
# cat /proc/bus/input/devices
I: Bus=0003 Vendor=04d9 Product=1702 Version=0101
N: Name="  USB Keyboard"
P: Phys=usb-pxa27x-1.1/input0
S: Sysfs=/class/input/input4
H: Handlers=kbd event0
B: EV=120003
B: KEY=10000 7 ff800000 7ff febeffdf f3cfffff ffffffff fffffffe
B: LED=7

I: Bus=0003 Vendor=04d9 Product=1702 Version=0101
N: Name="  USB Keyboard"
P: Phys=usb-pxa27x-1.1/input1
S: Sysfs=/class/input/input5
H: Handlers=kbd event1
B: EV=3
B: KEY=39fa d801d101 1e0000 0 0 0

I: Bus=0003 Vendor=14e1 Product=6000 Version=a4b4
N: Name="DIALOGUE INC PenMount USB"
P: Phys=usb-pxa27x-1.2/input0
S: Sysfs=/class/input/input6
H: Handlers=event2
B: EV=b
B: KEY=70000 0 0 0 0 0 0 0 0
B: ABS=3

I: Bus=0003 Vendor=15d9 Product=0a33 Version=0100
N: Name="USB Mouse"
P: Phys=usb-pxa27x-1.3/input0
S: Sysfs=/class/input/input7
H: Handlers=mouse0 event3 ts0
B: EV=7
B: KEY=70000 0 0 0 0 0 0 0 0
B: REL=103
#
```

Fig. 2-3

Step 5: We are providing the calibration program to test and get the calibration data. For example, open an '**Xterm** windows' and execute the command '**calibrator /dev/input/event2**', and then the calibration windows displayed as illustrated in Fig. 2-4)

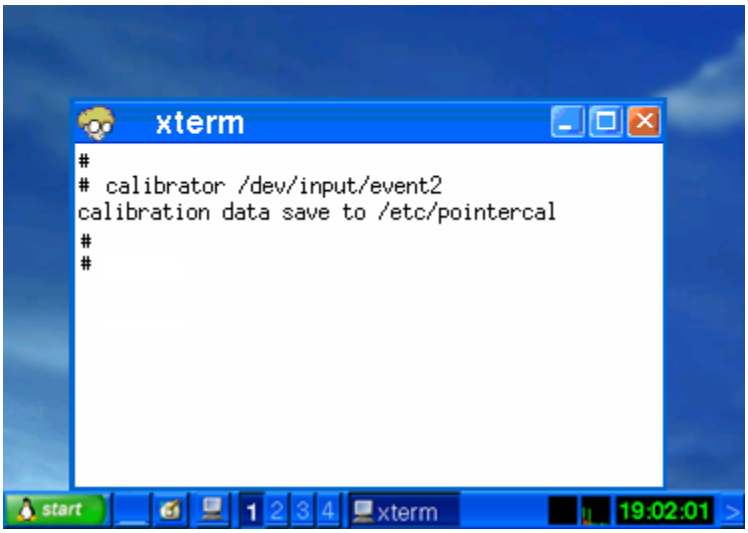


Fig. 2-4

Step 6: Rebooting the LP-8x4x to apply the new configuration.

2.2 Serial Touch Screen interface

There are three kinds of Touch Screen LCD monitor, so the relevant driver needs to be installed before it can be used. An overview of the respective device drives and the installation location is provided below:

Module	Loadable kernel module to Install
ADP-1080T	/lib/modules/2.6.19/**pm9000.ko**
TPM-4100 / TP-4100 / TP-6150 / TP-2070	/lib/modules/2.6.19/**pm6000.ko**

Before a Serial touch screen device an be used, it must first be calibrated. There are nine steps involved in adjusting the calibration for a touch screen calibratied to an LP-8x41 via the serial interface, as follows:

Step 1: Open a **"Xterm windows"** by clicking the Start button and then clicking Xterm. At the Command Prompt, enter the command '**cat /etc/init.d/penmount_serial**' to check that the penmount serial driver has been mounted from **/etc/init.d/penmount_serial**, as illustrated in Fig. 2-5.

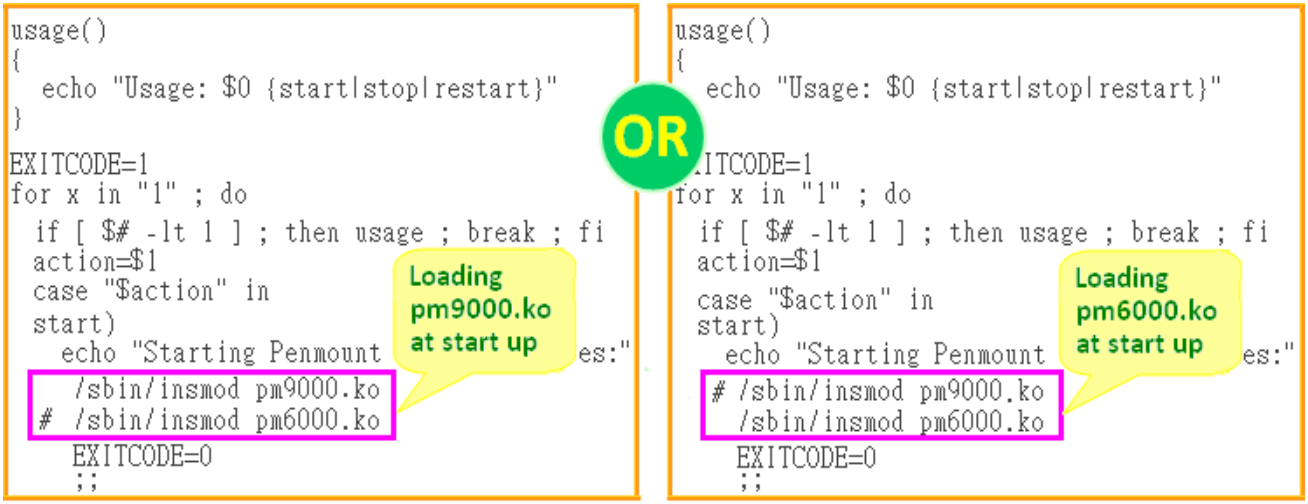


Fig. 2-5

Step 2: Edit the **/etc/init.d/tsdev_serial** script to modify the device mode. By default, serial interface is COM4 port, and device mode is ttyS34, as illustrated in Fig. 2-6.

```
EXITCODE=1
for x in "1" ; do
  if [ $# -lt 1 ] ; then usage ; break ; fi
  action=$1
  case "$action" in
  start)
    echo "Starting Touch Device services: "
    /opt/bin/inputattach --penmount /dev/ttyS34 --daemon
    EXITCODE=0
    ;;
  stop)
    echo -n "Shutting down Touch Device services: "
    /usr/bin/killall inputattach
    echo "done."
    EXITCODE=0
    ;;
  restart)
    $0 stop
    $0 start
    EXITCODE=$?
    ;;
  *)
    usage
    ;;
  esac
done
```

COM 4

Fig. 2-6

Step 3: Configure the script to be executed at startup and shutdown.

- By default, the scripts for serial touch screens are disabled at startup. The '**mv**' command can be used to rename the files in **/etc/rc2.d**, which is the file containing instructions used to start processes. The file will be automatically executed when LP-8x4x is rebooted, as illustrated in Fig. 2-7.

```
# cd /etc/rc2.d
# ls
S04sd                  S70slot                S98Xserver
S11ifupdown            S71Serial              S99rmnologin
S20ssh                 S72Ramdriver           old
S40inetd               S80hwclock             xS88penmount_serial
S50apache              S90tsdev_usb           xS91tsdev_serial
S60snmp                S97fbman
# mv S90tsdev_usb xS90tsdev_usb
# mv xS88penmount_serial  S88penmount_serial
# mv xS91tsdev_serial   S91tsdev_serial
#
# ls
S04sd                  S70slot                S97fbman
S11ifupdown            S71Serial              S98Xserver
S20ssh                 S72Ramdriver           S99rmnologin
S40inetd               S80hwclock             old
S50apache              S88penmount_serial     xS90tsdev_usb
S60snmp                S91tsdev_serial
#
```

Fig. 2-7

Step 4: At the Command Prompt, enter the command '**lsmod**' to check that the **pm9000.ko** or **pm6000.ko** have been mounted, as illustrated in Fig. 2-8.

```
# lsmod
Module          Size  Used by    Tainted: PF
pm9000          2912  0
8250           29204  2
8250_linpac     2656  0 [permanent]
slot           35788  0
pxamci          8352  0
dm9000x       276180  0
#
```

```
# lsmod
Module          Size  Used by    Tainted: PF
pm6000          2912  0
8250           29204  2
8250_linpac     2656  0 [permanent]
slot           35788  0
pxamci          8352  0
dm9000x       276180  0
#
```

Fig. 2-8

Step 5: At the Command Prompt, enter the command '**mount | grep mmc**' and '**ls /mmt/had**' to check the microSD card has been mounted, as illustrated in Fig. 2-9 and 2-10.

```
# mount  | grep mmc
/dev/mmcblk0p1 on /mnt/hda type vfat (rw,fmask=0022,dmask=0022,
codepage=cp437,iocharset=iso8859-1)
#
```

Fig. 2-9

```
# ls  /mnt/hda
boot     opt
#
```

Fig. 2-10

Step 6: At the Command Prompt, enter the command '**vi /etc/init.d/fbman**' to edit the **/etc/init.d/fbman** file by modifying the setting so that that are the same as below:

- After opening the file locate the following lines:

  #/usr/sbin/fbset -n 640x480-60

  /usr/sbin/fbset -n **800x600**-70

  These lines indicate that the resolution is currently set to 640*480. The # character indicates that a setting is not currently being used.

- To change the resolution setting to be **640*480**, remove the "#" character in line 1 and add it to line 2, as indicated below:

  /usr/sbin/fbset -n 640x480-60

  #/usr/sbin/fbset -n 800x600-70

Step 7: At the Command Prompt, enter the command '**cat /proc/bus/input/devices**' to view a list of devices that are currently connected and the associated device can be obtained, as illustrated in Fig. 2-11.

```
# cat /proc/bus/input/devices
I: Bus=0003 Vendor=04d9 Product=1702 Version=0101
N: Name="  USB Keyboard"
P: Phys=usb-pxa27x-1.3/input0
S: Sysfs=/class/input/input0
H: Handlers=kbd event0
B: EV=120003
B: KEY=10000 7 ff800000 7ff febeffdf f3cfffff ffffffff fffffffe
B: LED=7

I: Bus=0003 Vendor=04d9 Product=1702 Version=0101
N: Name="  USB Keyboard"
P: Phys=usb-pxa27x-1.3/input1
S: Sysfs=/class/input/input1
H: Handlers=kbd event1
B: EV=3
B: KEY=39fa d801d101 1e0000 0 0 0

I: Bus=0003 Vendor=15ca Product=00c3 Version=0512
N: Name="USB Optical Mouse"
P: Phys=usb-pxa27x-1.4/input0
S: Sysfs=/class/input/input2
H: Handlers=mouse0 event2
B: EV=7
B: KEY=70000 0 0 0 0 0 0 0 0
B: REL=103

I: Bus=0013 Vendor=0031 Product=0000 Version=0100
N: Name="Penmount Serial TouchScreen"
P: Phys=ttyS34/serio0/input0
S: Sysfs=/class/input/input3
H: Handlers=mouse1 event3
B: EV=b
B: KEY=400 0 10000 0 0 0 0 0 0 0 0
B: ABS=3
#
```

Fig. 2-11

Step 8: We are providing the calibration program to test and get the calibration data, as illustrated in Fig. 2-12. For example, open an '**Xterm**' windows and execute the command '**calibrator /dev/input/event3**', and then the calibration windows will be displayed, correct 4 point locations on screen with the panel, as illustrated in Fig. 2-13.

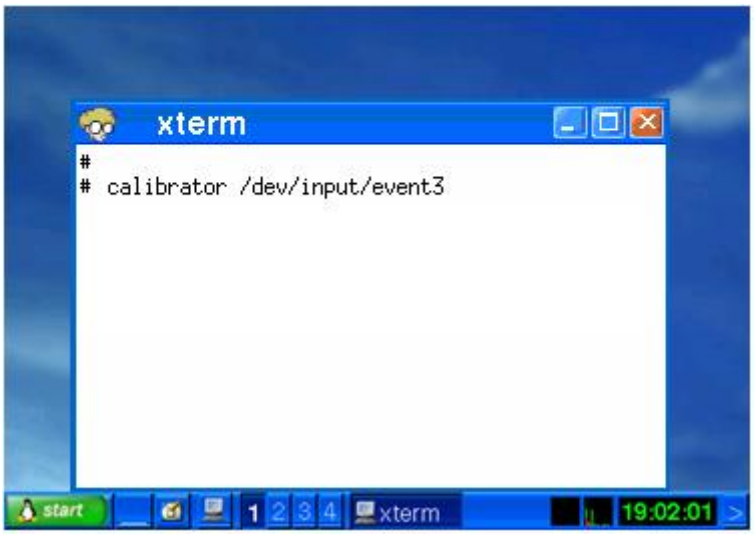


Fig. 2-12

Fig. 2-13

Step 9: Reboot the LP-8x4x to apply the new configuration.