AMYUNI Technologies

DevTouch Pro

Windows/Linux Developer's Guide

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AMYUNI Consultants – AMYUNI Technologies
www.amyuni.com

Contents

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- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
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Acknowledgments

The Linux operating system provided with the device is based on the Open Source Linux Kernel. The source-code is provided by Amyuni upon request.

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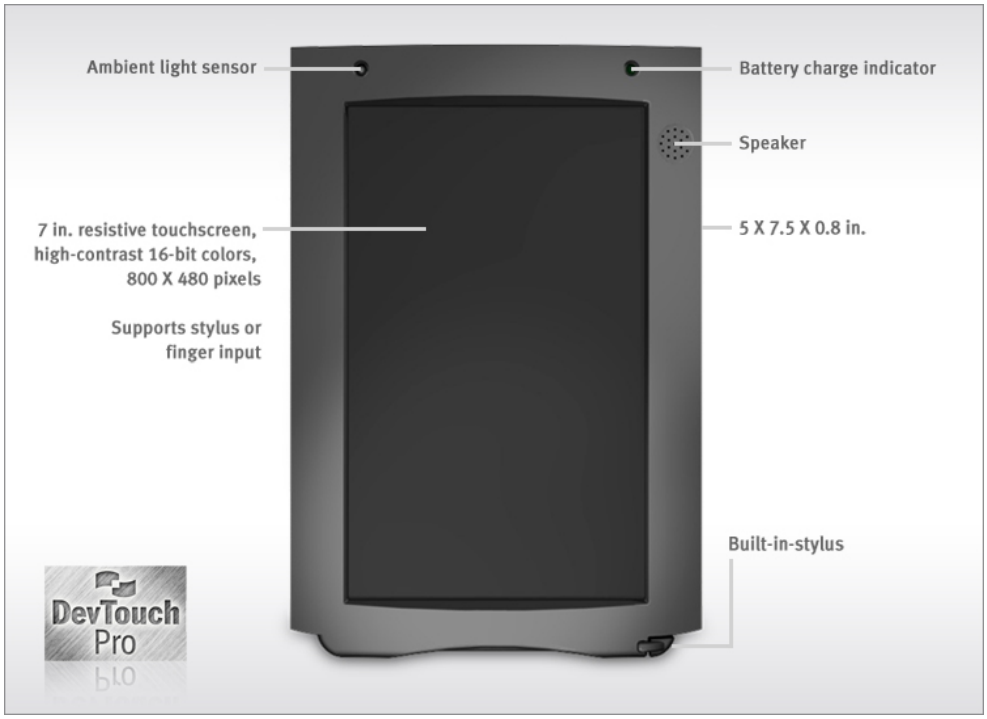
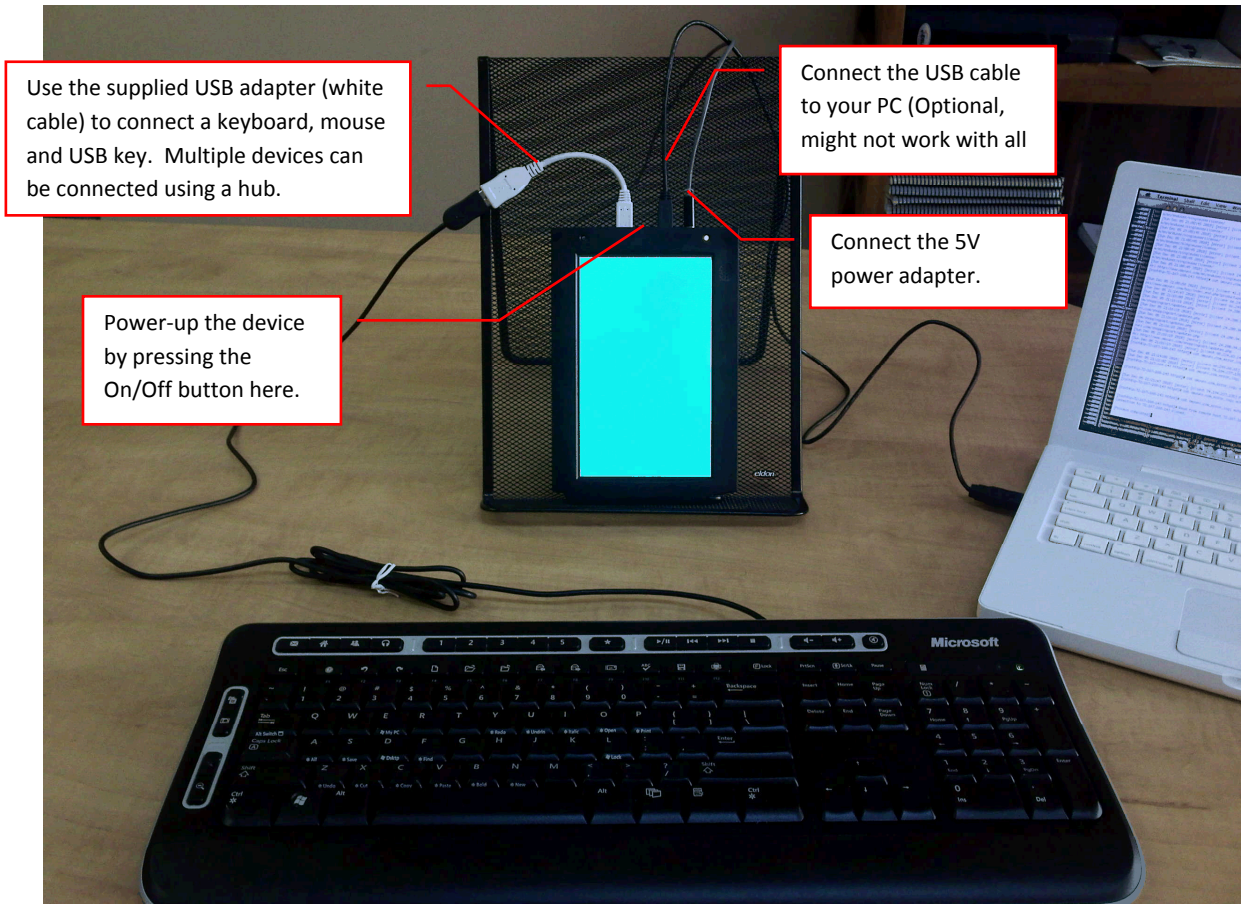
DevTouch Pro Front View



DevTouch Pro Connectors

Setting-Up the Development Workspace



Powering-Up the Device

The device goes through three stages during power-up:

1) The Open-Source U-Boot OS loader starts first

2) The Linux kernel or the Windows CE E-Boot is executed next

3) Linux, Windows CE OS or Android is started

The default Linux login is:
User name: root
Password: devtouch
The Debian filesystem can be started using the startx command.

The U-Boot loader can be interrupted by pressing any keyboard button as soon as the keyboard lights turn-on (the keyboard lights indicated that the USB port is powered.) When U-Boot is interrupted, the developer can enter any U-Boot command as described in the U-Boot documentation:
http://www.denx.de/wiki/view/DULG/UBootCommandLineInterface

A U-Boot quick reference, easier to read, can be found here:

http://cache.freescale.com/files/32bit/doc/quick_ref_guide/LITE5200BUBPG/LITE5200BUBPG.pdf

Although the U-Boot boot loader can be re-installed, replacing U-Boot is not supported nor covered by the Amyuni warranty. This is because replacing the U-Boot requires detailed knowledge of the hardware and frequently leads to the device being disabled. A disabled device cannot be fixed remotely and has to be replaced at the developer's cost.

The main U-Boot commands that can be useful for Devtouch developers (sll these commands are described in details in the above two links):

bootm [addr [arg ...]] - boot application image stored in memory passing arguments 'arg ...'; when booting a Linux kernel,'arg' can be the address of an initrd image

fsload - load binary file from a filesystem image
(fsload and bootm work together in order to start the Linux OS)
E.g.:
fsload; **bootm**;

fatload <interface> <dev[:part]> <addr> <filename> [bytes] - load binary file 'filename' from 'dev' on 'interface'to address 'addr' from dos filesystem
E.g.:
if **fatload** usb 0:1 80400000 amyuni_boot.img;then; autoscr 80400000; else; run bootcmd; fi

autoscr [addr] - run script starting at addr - A valid autoscr header must be present
E.g.:
if fatload usb 0:1 80400000 amyuni_boot.img;then; **autoscr** 80400000; else; run bootcmd; fi
The tool mkimage is needed to create scripts that can be executed using this command. Mkimage is available from devteam@amyuni.com for Windows and Linux upon request.

iminfo addr [addr ...] - print header information for application image starting at address 'addr' in memory; this includes verification of the image contents (magic number, header and payload checksums)

printenv - print values of all environment variables

printenv name - print value of environment variable 'name'
E.g.:
printenv bootcmd

run var [...] - run the commands in the environment variable(s) 'var'
E.g.:
setenv aboot "usb start; if fatload usb 0:1 80400000 amyuni_boot.img; then; autoscr 80400000; else; fsload; bootm; fi"
run aboot

setenv - set environment variables

saveenv - save environment variables to persistent storage
(all variables set using **setenv** will be lost upon reboot unless this command is called)

sleep - delay execution for some time
This instruction can come in handy when switching between a keyboard and a USB key, E.g.:
usb stop 1; **echo** Plug USB Key (10 secs); **sleep** 10; **usb** start; if **fatload** usb 0:1 80400000 amyuni_boot.img; then; **autoscr** 80400000;else;**run** eboot;fi

usb *start* - start USB controller
usb *reset* - reset (rescan) USB controller
usb *stop* 1 - stop USB 1=force stop
usb *info* [dev] - show available USB devices
usb *read* addr blk# cnt - read `cnt' blocks starting at block `blk#' to memory address `addr'
Important note: U-Boot only supports one device connected at the same time (no hubs!) and does not support plugging/unplugging devices on the fly. Call "usb stop 1" before unplugging a device and "usb start" after plugging another device. E.g.:
usb stop 1; **echo** Plug USB Key (10 secs); **sleep** 10; **usb** start;

Installing the Linux OS

Linux installation is done in three steps, first the kernel is loaded with a ramdisk based filesystem, then the kernel is installed into a JFFS2 formatted partition, then the file system is installed to a UBI partition. The DevTouch Pro comes preloaded with kernel 2.6.31 and a default Debian file system. All the needed binary files should be stored on a USB key and a USB keyboard is needed to enter the installation commands.

Booting the kernel with a basic ramdisk filesystem:

Enter the U-Boot command prompt while the device is booting. The screen should turn green with the "Devtouch:" prompt. At the prompt, enter:

load the kernel followed by from the USB key into memory:

fatload usb 0:1 80a00000 uImage; fatload usb 0:1 a0f00000 ramdisk.img;

configure the linux kernel parameters

setenv bootargs "root=/dev/ram0 ramdisk_size=12240 video=pxafb:mode:800x480-16,pixclock:30066,left:64,right:64,hsynclen:60,upper:19,lower:41,vsynclen:3,active,hsync:0,vsync:0,outputen:1,pixclockpol:0"

#start the linux kernel

bootm 80a00000 a0f00000

A few hints:

Because the USB key and the keyboard cannot be plugged-in together at the U-Boot command prompt, the developer should either use a script stored on the USB key and then run the script using the fatload and autoscr commands.

Using environment variables to store scripts and executing then using the run command is a powerful feature of U-Boot that can be very useful when installing/updating the OS, e.g.:

```
setenv aboot "usb stop 1;echo Plug USB Key (10 secs);sleep 10;usb start;if
fatload usb 0:1 80400000 amyuni_boot.img;then;autoscr 80400000;else;run
eboot;fi"
saveenv
run aboot
```

Here is a sample complete script:

```
# set the kernel boot arguments to be used after the Debian
filesystem is installed
setenv bootargs "ubi.mtd=5 root=ubi0:rootfs rootfstype=ubifs
console=ttyS2,38499 console=tty0 video=pxafb:mode:800x480-
16,pixclock:30066,left:64,right:64,hsynclen:60,upper:19,lower:41,vsynclen:
3,active,hsync:0,vsync:0,outputen:1,pixclockpol:0"

saveenv

echo ==== Launching Linux Updater ====
fatload usb 0:1 80a00000 uImage
fatload usb 0:1 a0f00000 ramdisk.img

usb stop 1; echo Plugin Keyboard (10 secs);sleep 10;

if iminfo 80a00000 && iminfo a0f00000
then
      # reboot under Linux
      setenv bootdelay 1
      setenv bootcmd "fsload;bootm;"
      saveenv

      # temporary bootargs to activate the ramdisk image
      setenv bootargs "root=/dev/ram0 ramdisk_size=12240
video=pxafb:mode:800x480-
16,pixclock:30066,left:64,right:64,hsynclen:60,upper:19,lower:41,vsynclen:
3,active,hsync:0,vsync:0,outputen:1,pixclockpol:0"
      bootm 80a00000 a0f00000
```

```
	else
		echo ********** No valid images found
		echo ********** Please put valid kernel.img and ramdisk.img
into USB flash drive
	fi
```

The sleep command can be used with the USB Stop/Start commands to switch between the keyboard and the USB key.

Login to the Angstrom Linux kernel using the root user (no password)

Flash the Linux kernel to the JFFS2 partition
At the Linux command prompt, enter:
flash_eraseall /dev/mtd4
nandwrite /dev/mtd4 /media/sda1/amyuni-kernel.jffs2

Note that under Linux, a hub can be used or the keyboard and memory key switched without stopping and restarting the USB interface, which make the developer's task easier.

Flash the Debian filesystem to a UBI formatted partition:
ubiformat /dev/mtd5 -y -f /media/sda1/debian-image.ubi

Reboot under the new OS

Calibrating the screen

Login as root and enter the following commands:

```
	export TSLIB_TSDEVICE=/dev/input/event0
	/usr/bin/ts_calibrate
```

Obtaining Technical Support

To obtain technical support, source-code or binaries, the Amyuni Development Team is available at devteam@amyuni.com.