# Capacitive Multi-Touch Solution

# Multi-Touch Hardware Adaption Executable file for Fusion

# Revision History

| Date | Doc. Rev. | Program Version | Changes |
|---|---|---|---|
| 10-Mar-14 | Rev. 1.0 | | Initial Version |
| 11-Apr-14 | Rev. 1.1 | | Review |
| 24-Jun-14 | Rev. 1.2 | | Reference Documents changed |

# Contents

# Reference Documents

For detailed technical information, please refer to the documents listed below.

**[1]  Capacitive Multi-Touch Solution, General Functionality**

This document can be found on our website
http://developer.toradex.com/knowledge-base/capacitive-multi-touch-solution

see "Documents, General Functionality", (Toradex_MultiTch_Solution.pdf)

**[2]  Capacitive Multi-Touch Solution,  Unified Multi-Touch Driver**

Description of the Unified Driver for Fusion
http://developer.toradex.com/knowledge-base/capacitive-multi-touch-solution

see "Documents, Unified Multi-Touch Driver" , (Toradex_UnfdMutiTchDrv.pdf)

**[3]  Capacitive Multi-Touch Display 7"/10", Getting Started"**

This document can be found on our website
http://developer.toradex.com/product-selector/capacitive-multi-touch-display

see "Getting Started", (Toradex_MultTchDsp_GettingStarted.pdf)

**[4]  Capacitive Multi-Touch Display, Addendum**

This document can be found on our website
http://developer.toradex.com/product-selector/capacitive-multi-touch-display

see "Manual", (Toradex_MultTchDsp_Addendum.pdf)

# 1. Introduction

This document describes the function and installation process of the Hardware Adaption Fusion.
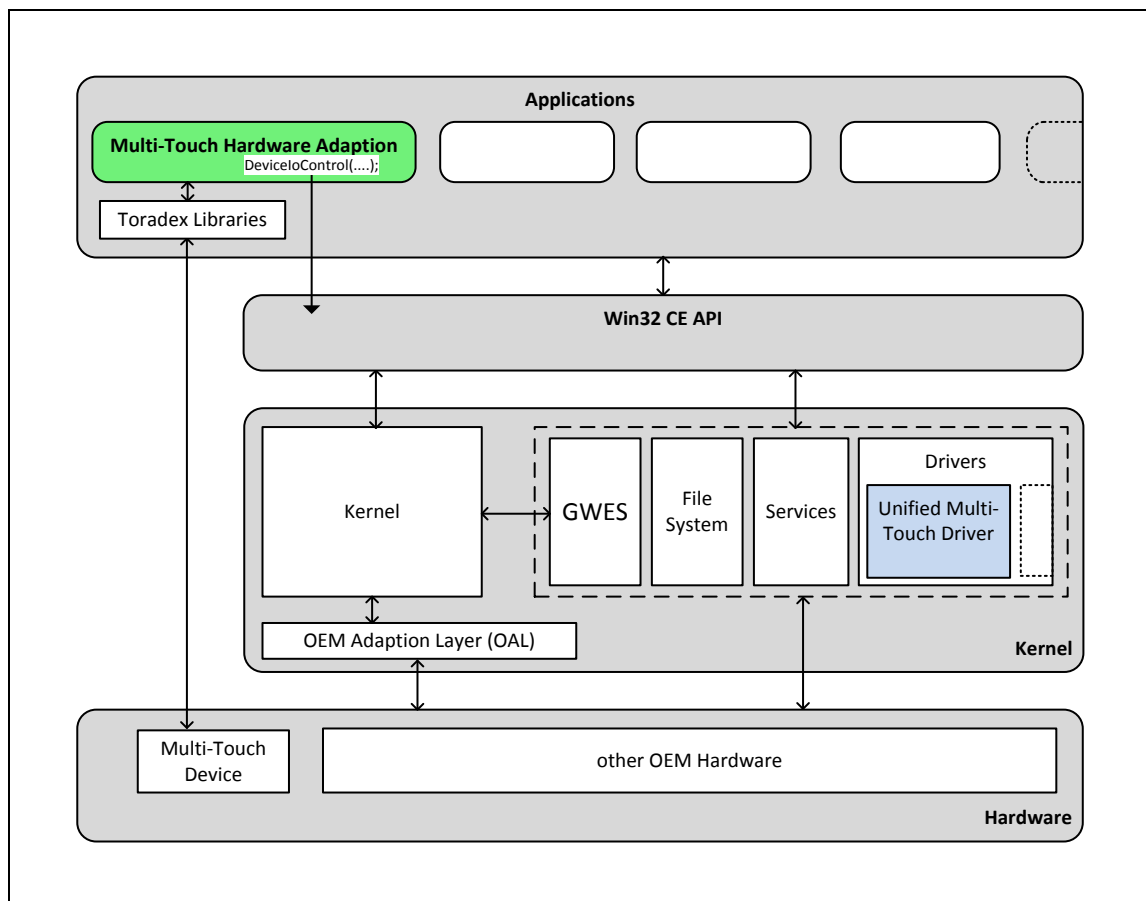
# 2. General Functionality



Figure 1: Overview Capacitive Multi-Touch Solution

The overview is described in "Capacitive Multi-Touch Solution, General" (see [1]).

The "Unified Multi-Touch Driver" is part of the Kernel. Opposite to most of the other drivers, the "Unified Multi-Touch Driver" makes no hardware access to the "Multi-Touch Device". Besides, I/O control codes (IOCTLs) are used for communication between Applications and Drivers.

The "Multi-Touch Hardware Adaption" gets a touch event from the "Multi-Touch Device" and sends it as an IOCTL to the "Unified Multi-Touch Driver" by calling the DeviceIoControl(..) function.
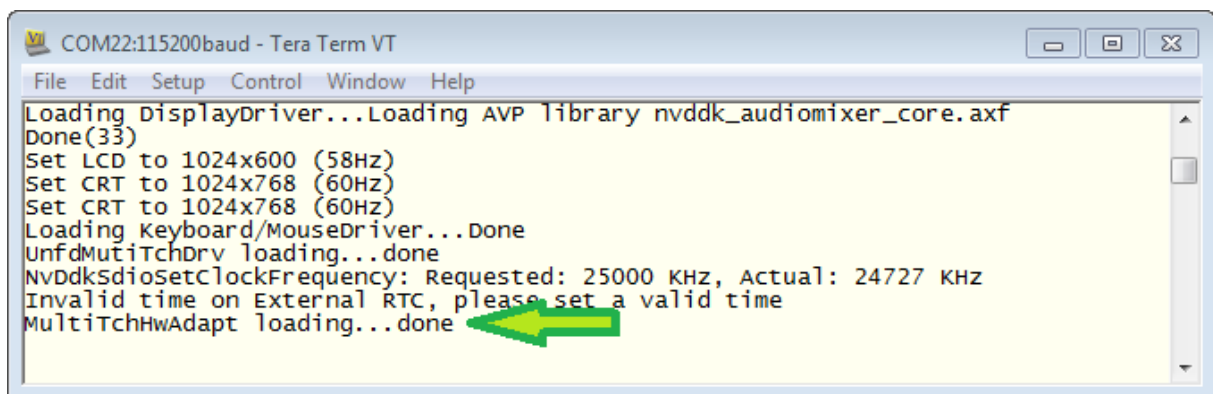
# 3. Starting the "Hardware Adaption Fusion"

The "Hardware Adaption" is a normal application which can be started manually or automatically after booting. The pre-condition is that the "Unified Multi-Touch Driver" is installed and run (see [2]).

## 3.1. Check

The "Hardware Adaption" sends messages to the debug output port. To see them, a terminal must be connected to the debug output port and debug output must be enabled in the boot loader. More information can be found at:

http://developer.toradex.com/knowledge-base/change-bootloader-output-port
http://developer.toradex.com/knowledge-base/bootloader-menu



After starting the "Hardware Adaption", a message (see above) is printed to the debug port:

"MultiTchHwAdapt `loading…done`"

"`done`" indicates that the hardware adaption runs correct. If "`done`" is missing or replaced with an error message, then the hardware adaption has stopped working.

# 4. Register Settings

The wiring between a "Capacitive Multi-Touch Display" and the Colibri or Apalis Module is dependent on the used Base Board (see [3]).

This registry setting allows configuring the "Hardware Adaption" according to the wiring.

| | |
|---|---|
| [HKEY_LOCAL_MACHINE\Software\Toradex\MultiTchHwAdapt] | |
| Int_Pin | SODIMM [1] or MXM3 [2] pin number of the interrupt signal |
| Int_Signal_Inv | Interrupt signal inverted [3] |
| Reset_Pin | SODIMM [1] or MXM3 [2] pin number of the reset signal |
| Reset_Post_Delay | Delay after the Reset Signal passive and the start of the initiation sequence |
| Reset_Line_Inv | Reset signal inverted [3] |
| I2CSpeed | I2C speed 1 = 100kB, 2 = 400kB |
| I2CAddress | I2C address of the touch controller |
| HwAdaptPriority | Priority of the Hardware Adaptation process |

[1]   Pin number of the Colibri modules

[2]   Pin number of the Apalis modules

[3]   0  => SODIMM or MXM3 pin is direct connect to according pin of the touch controller

>0=>  The signal is inverted between the SODIMM or MXM3 pin and the according pin of the touch controller.

If a registry entry is missing, the "Hardware Adaption" uses the following default value:

| | | |
|---|---|---|
| Int_Pin | = | 133 |
| Int_Signal_Inv | = | 0 |
| Reset_Pin | = | 127 |
| Reset_Post_Delay | = | 300 |
| Reset_Line_Inv | = | 0 |
| I2CSpeed | = | 2 ( 400kB) |
| I2CAddress | = | 16 (0x10) |
| HwAdaptPriority | = | THREAD_PRIORITY_ABOVE_NORMAL |

### 4.1. Example of registry entries

This example shoes the setting to connect "Capacitive Multi-Touch Display Fusion" to a "Colibri Evaluation Board" (see [4]).

HKEY_LOCAL_MACHINE\Software\Toradex\MultiTchHwAdapt]

```
"Int_Pin"=dword:00000085
"Int_Signal_Inv"=dword:00000000
"Reset_Pin"=dword:0000007F
"Reset_Post_Delay"=dword:00000064
"Reset_Line_Inv"=dword:00000000
"I2CSpeed"=dword:00000002
"I2CAddress"=dword:00000010
"HwAdaptPriority"=dword:00000028
```

# 5. Auto run the Application "Hardware Adaption Fusion"

To auto run the application "Hardware Adaption Fusion", copy the file "`Adapt_Fusion.exe`" in the directory "`\FlashDisk\AutoRun`". For more information see

http://developer.toradex.com/knowledge-base/autorun

# 6. Setup and wiring for Carrier Boards

The prepared package "Setup_MutiTchDisp.cab" installs the Multi-Touch Solution which includes the installation of the Hardware Adaption Fusion (see chapter 5) and the registry settings for the chosen Carrier Boards.

The prepared package "Setup_MutiTchDisp.cab" can be found at:

http://developer.toradex.com/product-selector/capacitive-multi-touch-display

For more information see [3] and [4].

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