



# Capacitive Multi Touch Drivers

## Setup and Installation

Touch Controller:

OEM Fusion

Touch Panel/Display:

Touch Revolution / fusion™ TOUCH DISPLAY

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## Related Documentation

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- [1] Video “Compact 7 Multi–Touch Driver and Gesture”  
<http://www.microsoft.com/en-us/showcase/detailsfb.aspx?uuid=508dba11-4955-437f-abc0-3fef8ccd0b5b>
- [2] Article “Touch Gestures (Windows Embedded Compact 7)”  
<http://msdn.microsoft.com/en-us/library/ee499124.aspx>
- [3] Article “Touch Drivers (Windows Embedded Compact 7)”  
<http://msdn.microsoft.com/en-us/library/gg159253.aspx>
- [4] Product description “Capacitive Multi Touch Display”  
<http://developer.toradex.com/product-selector/capacitive-multi-touch-display>
- [5] Manual “Capacitive Single Touch Drivers” (CapacitiveTouch/SnglTchDrv\_Fusion.pdf)  
<http://developer.toradex.com/knowledge-base/capacitive-single-touch-driver>
- [6] Fusion™ 10, PRODUCT SPECIFICATION, P/N: F10A–0102  
Note (not available from Toradex, Please ask Touch Revolution)
- [7] Fusion™ 7, PRODUCT SPECIFICATION, P/N: F07A–0102  
Note (not available from Toradex, Please ask Touch Revolution)
- [8] Fusion™ FUSION LCD DISPLAY TIMING  
Note (not available from Toradex, Please ask Touch Revolution)

## 1. Introduction

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This document describes the setup and test of the hardware interface to the capacitive touch panel Fusion™ TOUCH DISPLAY containing the touch controller fusion from Touch Revolution.

## 2. General Functionality

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Windows Embedded Compact 7 offers a new advanced support for multi-touch and gesture on specialized devices. You can get more information from here:

- Video “Compact 7 Multi-Touch Driver and Gesture”, see [1]
- Article “Touch Gestures (Windows Embedded Compact 7)”, see [2]
- Article “Touch Drivers (Windows Embedded Compact 7)”, see [3]

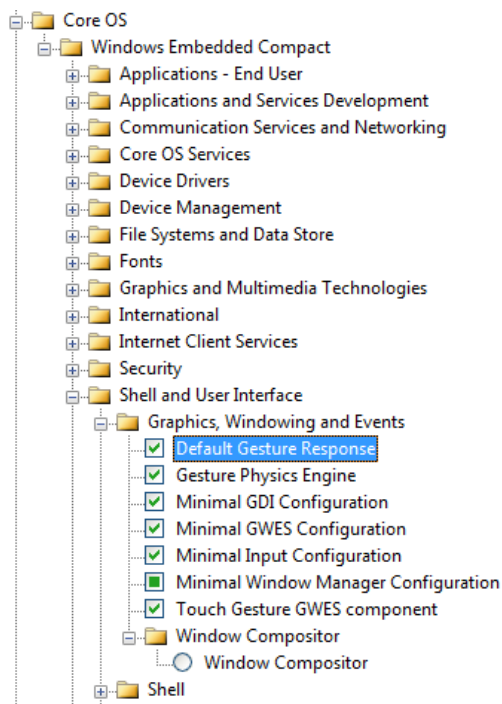
The plug-in gesture recognizer supports PAN, SCROLL, SELECT, DOUBLESELECT and HOLD. With a plug-in gesture recognizer additional gesture like ZOOM, ROTATE are possible. At the moment only additional gestures are not supported.

In contrast to the single touch solution multi touch solution also requires extra effort in the application itself.

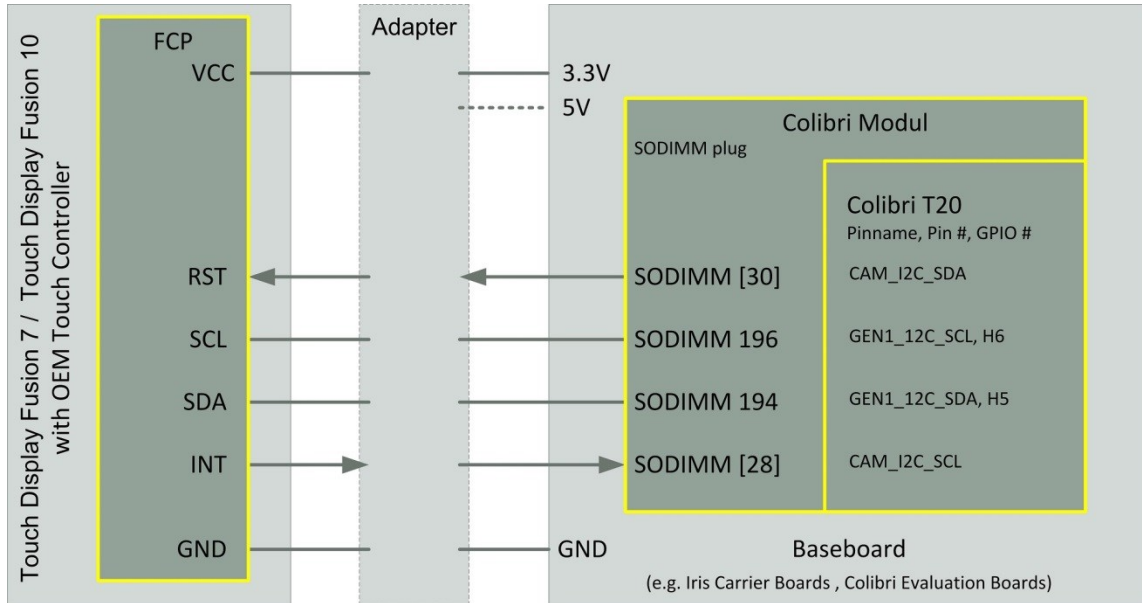
Gesture features are enabled in the following Toradex standard images:

- **Windows Embedded Compact 7 BSP for Colibri T20, Version 1.2 Beta 2 and above**

If you build your own image then these features must be enabled in the Platformbuilder catalog as follow:



### 3. Hardware Connection



**Figure 1 Interface to Capacitive Touch Panel Fusion™**

The driver communicates use an I2C interface to communicate with the touch controller (FCP) on the Fusion Touch Display.

Beside the I2C bus connection the touch panel needs the line RST to reset the touch panel and the line INT to signal an interrupt the touch driver.

It is not possible to connect a Fusion 7 Display or Fusion 10 Display direct to a Toradex Baseboards (different levels on I2C, additional drivers for backlight etc.).

Toradex offers an Adapter which allows setup a system with Fusion Display easily.

This Adapter is includes in the Kit “Capacitive Multi-Touch Display”

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

## 4. Register Settings

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The SODIMM Pins of the Colibri Modules for the two lines RST and INT (see Figure 1) can be defined in the registry.

### 4.1. Driver specific settings for the hardware interface

The Toradex Multi Touch Driver has same additional settings to setup the hardware interface

All these settings are defined with the registry key:

```
[HKEY_LOCAL_MACHINE\Drivers\Touch]
```

The following additional values can be used:

<b>dwI2C_INT_SODIMMPin</b>	Defines the SODIMM Pin# for the INT signal from the Fusion.
<b>dwI2C_RESET_SODIMMPin</b>	Defines the SODIMM Pin # for the RST signal to the Fusion. Another way to use this signal is to switch the power of the Fusion on and off (maybe in case of EMC issues, power off and on is a better way than a reset signal).
<b>dwI2C_Speed</b>	Speed of the I2c communication 1=100KB, 2= 400KB.
<b>dwI2C_Adr</b>	IC2 address of the Fusion controller.

The following default values are use if the value is missing in the registry:

<b>dwI2C_INT_SODIMMPin</b>	[135]
<b>dwI2C_RESET_SODIMMPin</b>	[133]
<b>dwI2C_Speed</b>	[0]
<b>dwI2C_Adr</b>	[16]

## 4.2. Common multi touch driver settings

A detailed description for the following settings can be found at Microsoft.

[HKEY\_LOCAL\_MACHINE\Drivers\Touch]

<b>DriverName</b>	Defines for loading the multi touch driver
<b>Prefix</b>	
<b>Dll</b>	
<b>Flags</b>	
<b>Index</b>	
<b>Order</b>	
<b>IClass</b>	IClass for touch driver class
<b>Priority256</b>	Priority
Below values are not used; kept just to keep the Touch BVT passing!	
<b>SampleRate</b>	Samples per second
<b>InitialSamplesDropped</b>	Dropped samples after pen down detection
<b>PenUpDebounceMS</b>	PenUp debounce time in MS, 0 disable debounce
<b>SysIntr</b>	

[HKEY\_LOCAL\_MACHINE\HARDWARE\DEVICEMAP\TOUCH]

<b>CalibrationData</b>	Set by the Calibration Utility
<b>MaxCalError</b>	
<b>DriverName</b>	Additional Driver for the demo and debug utilities
<b>DriverExName</b>	Proxy Driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\GWE\TouchProxy]

<b>DriverLoadTimeoutMs</b>	how long touch proxy will wait for touch driver to load
----------------------------	---------------------------------------------------------

[HKEY\_CURRENT\_USER\ControlPanel\Pen]

<b>DbITapDist</b>	For double-tap default setting
<b>DbITapTime</b>	

### 4.3. Example of for registry entries

This is an example for a Colibri T20 module runs on an Iris Carrier Board using Fuson 10" Touch Display. The Fusion 10" is connected to the Iris bay using the touch adapter of the Kit "Capacitive Multi-Touch Display".

The example contains the display setting also.

#### [HKEY\_LOCAL\_MACHINE\SOFTWARE\NVIDIA Corporation\NVDDI]

```
"DesktopHeight"=dword:00000258
"DesktopWidth"=dword:00000400
"MainPanelBpp"=dword:00000020
"HwCursor"=dword:00000000
```

#### [HKEY\_LOCAL\_MACHINE\SOFTWARE\NVIDIA Corporation\NVDDI\LCD]

```
"bfbw"=dword:00000006
"acb"=dword:000000FD
"oep"=dword:00000000
"pcp"=dword:00000000
"vsp"=dword:00000001
"hsp"=dword:00000001
"efw"=dword:00000006
"vsw"=dword:00000002
"elw"=dword:00000044
"blw"=dword:00000044
"hsw"=dword:00000002
"pclk"=dword:027AC400
"Ldds"=dword:00000012
"CyScreen"=dword:00000258
"CxScreen"=dword:00000400
"Bpp"=dword:00000010
"Dual"=dword:00000000
"Color"=dword:00000001
"Type"=dword:00000001
"BL_GPIO"=dword:0000009C
"BL_POL"=dword:00000001
"DISP_GPIO"=dword:0000000C
"DISP_POL"=dword:00000001
```

**[HKEY\_LOCAL\_MACHINE\SYSTEM\GDI\ROTATION]**

```
"Angle"=dword:000000B4;  
"BootupAngle"=dword:000000B4;
```

**[HKEY\_LOCAL\_MACHINE\Drivers\Touch]**

```
"DriverName"="multitchdrv_Fusion.dll"  
"Prefix"="TCH"  
"Dll"="multitchdrv_Fusion.dll"  
"Flags"=dword:8 ; DEVFLAGS_NAKEDENTRIES  
"Index"=dword:1  
"Order"=dword:25  
; IClass = touch driver class & power managed device  
"IClass"=multi_sz:"{25121442-08CA-48dd-91CC-BFC9F790027C}",  
 "{7119776D-9F23-4e4e-9D9B-9AE962733770}"  
  
"Priority256"=dword:6D ; touch ist priority = 109  
  
;Below values are not used  
; Kept just to keep the Touch BVT passing!  
"SampleRate"=dword:C8 ; samples per second, default is  
200  
"InitialSamplesDropped"=dword:2 ; Number of samples to be dropped  
; after pen down detection  
  
"dwI2C_INT_SODIMMPin"=dword:0000001C  
"dwI2C_RESET_SODIMMPin"=dword:0000001E  
"dwI2C_Adr"=dword:10 ; I2c address  
"dwI2C_Speed"=dword:1 ; I2c speed (1/2)  
  
"PenUpDebounceMS"=dword:28 ; PenUp debounce time in MS, 0 to  
; disable debounce process  
  
"SysIntr"=dword:0
```

**[HKEY\_LOCAL\_MACHINE\HARDWARE\DEVICEMAP\TOUCH]**

```
"CalibrationData" ="1137,637 226,127 226,1147 2048,1147 2048,127"  
"MaxCalError"="6"
```



**[HKEY\_LOCAL\_MACHINE\HARDWARE\DEVICEMAP\TOUCH]**

```
"DriverName"="CETouchFilter.dll"
"DriverExName"="tchproxy.dll"
```

**[HKEY\_LOCAL\_MACHINE\SYSTEM\GWE\TouchProxy]**

```
; how long touch proxy will wait for touch driver to load
"DriverLoadTimeoutMs"=dword:1388 ; 5 seconds
```

**[HKEY\_CURRENT\_USER\ControlPanel\Pen]**

```
; For double-tap default setting
"DblTapDist"=dword:18
"DblTapTime"=dword:637
```

The file

```
MultTchDrv_Fusion10_Iris_T20.reg
```

contains this example.

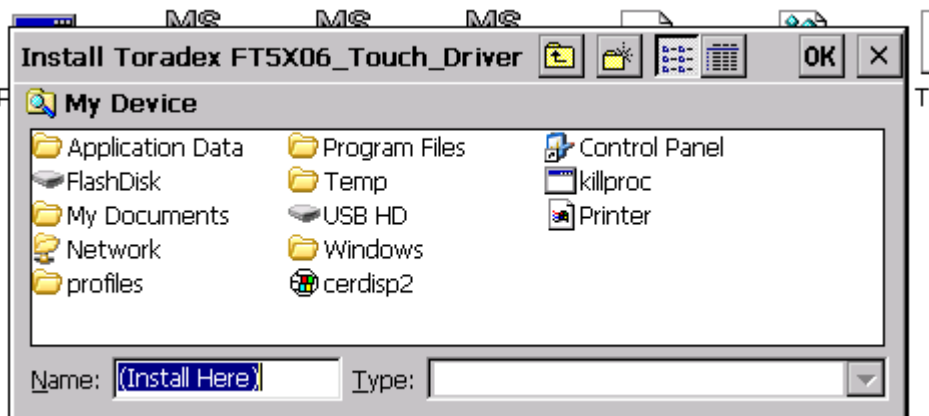
## 5. Install the Multi Touch Driver

Before installing this driver no other Touch Driver (single or multi) should be installed (see chapter 6).

To Install the driver copy the File "Toradex\_MutiTchDrv\_Fusion10\_Iris\_T20.cab" \*) to a Colibri (Desktop, Temp folder etc.) and execute it.

\*) the cab file name is depend on the used module and basboard

The following screen is popping up.



After confirm (OK button) the driver files “multitchdrv\_Fusion.dll” and “CETouchFilter.dll” are copied to “\FlashDisk\System “ and all necessary entries in the registry are made.

Save the registry before reboot (Start->ColibriTools->SaveReg).

**Remark:** Install or reinstall the driver overrides only the settings for loading the driver (see blue line in chapter 4.3). The other registry entries are not changed or must be adapted to your display/touch and interface.

## 6. Uninstall the Multi Touch Driver

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To uninstall the driver use:

“Start->Settings->Control Panel->Remove Program”.

**Remark:** If you reinstall the driver the settings for load the driver are removed (see blue line in chapter 4.3).

The other register settings are unchanged and must be removed manual with a registry editor if needed.

## 7. Gesture and Multi Touch Demo Tool

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If the multi touch driver is installed with the help of the CAB file (see chapter 5) the following two tools are installed in the directory “\FlashDisk\Tool “:

- |                    |                                                                                                                                                                                                                                                                                                                                                |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| “CETouchView.exe “ | A tool from Microsoft to test a multi touch driver.<br>This tool can be configured to display debug information like events created from the driver, raw data from the lowest driver layer etc. The tool is helpful for developing own application with capacitive touches.<br>More information and the source code can be found at Microsoft. |
| “CETouchDemo.exe “ | A demo tool base on “CETouchView.exe“ which shows the events detected.<br>If two fingers are used a circle with the size of the finger distance is shown and updating top the finger movement.<br>If one or both finger is lift up the circles stays until the display is touched again.                                                       |

Both tools can be run with a double click on it.

## 8. Bring up the Touch Panel

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The best way to bring up the Hardware is to use the tools of the single touch driver.

The single touch driver and tools for the Fusion Touch Display can be found on

<http://developer.toradex.com/knowledge-base/capacitive-single-touch-driver>.

Do use these tools the multi touch driver must be removed first (see chapter 6).

After that, bring up the system can be made according to the chapter “Bring up the Touch Panel” of the documentation for the single touch driver [5].

If the tool “Fusion\_DriverTest.exe” runs then the hardware connection an the registry settings are tested.

Please check the register settings for the multi touch driver according to the settings made for for this test tool (please consider that the registry entries for the INT and RST signal have different names).

If any things in line the multi touch driver should run.

### Revision History

Date	Changes
25.Sept-13	Initial release
9-Oct-13	Reworked some chapters

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