



Capacitive Single Touch Drivers

Setup and Installation

Touch Controller:

OEM Fusion

Touch Panel/Display:

Touch Revolution / fusion™ TOUCH DISPLAY

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Related Documentation

- [1] Capacitive Single Touch Driver, General Functionality
- [2] Product description “Capacitive Multi Touch Display”
<http://developer.toradex.com/product-selector/capacitive-multi-touch-display>
- [3] GPIO Config Tool
<http://developer.toradex.com/knowledge-base/gpioconfig>
- [4] Fusion™ 10, PRODUCT SPECIFICATION, P/N: F10A-0102
Note (not available from Toradex, Please ask Touch Revolution)
- [5] Fusion™ 7, PRODUCT SPECIFICATION, P/N: F07A-0102
Note (not available from Toradex, Please ask Touch Revolution)
- [6] Fusion™ FUSION LCD DISPLAY TIMING

Note (not available from Toradex, Please ask Touch Revolution)

1. Introduction

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.

The General Functionality of the driver is described in [1].

2. Hardware Connection

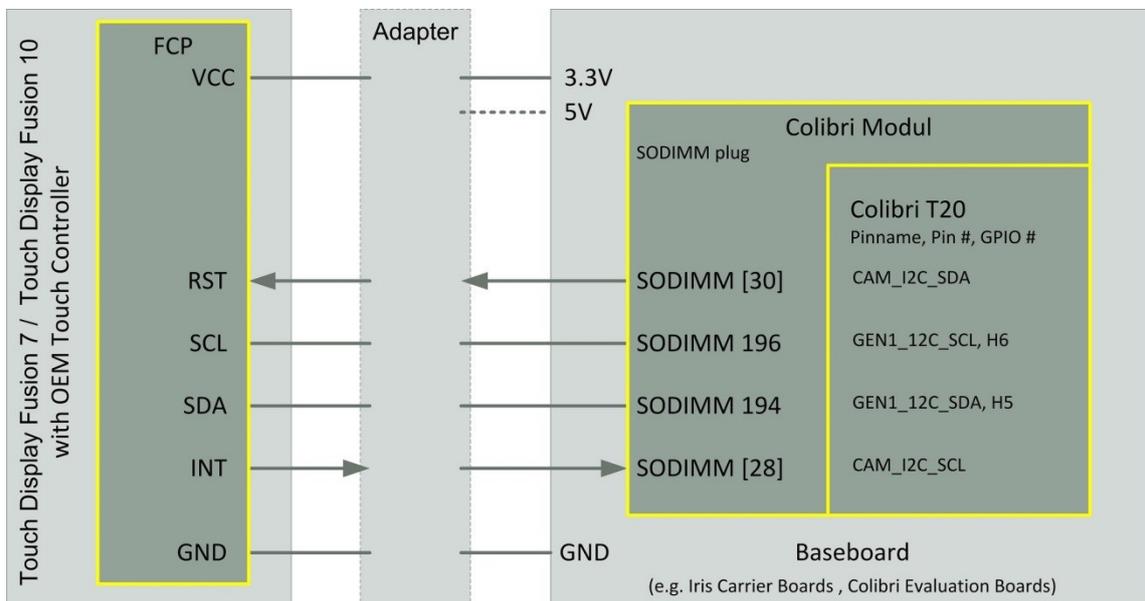


Figure 1 Interface to Capacitive Touch Panel Fusion™

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 Kit “Capacitive Multi–Touch Display”

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

3. Register Settings for the Interface

The SODIMM Pins of the Colibri Modules for the two lines RST and INT (see Figure 1) can be defined in the registry. Additionally the active level of these two signals and a delay can be defined too (to adapt some logic on the Baseboard which inverts the signals).

All these settings are defined with the registry key:

```
[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\Fusion]
```

The following values can be used:

Int_SODIMMPin	Defines the SODIMM Pin# for the INT signal from the Fusion.
Int_Signal_Inv	The active level of the INT signal is described in the datasheet of the touch panel. This value inverts the active level to adapt level shifter, amplifier etc. on the Baseboard. 0 = not inverted, 1 = inverted.
Reset_SODIMMPin	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).
Reset_Line_Inv	The active level of the RST signal is described in the datasheet of the touch panel. This value inverts the active level to adapt power switches etc. on the Baseboard. 0 = not inverted, 1 = inverted.
Reset_Post_Delay	This value can be used to define the delay between the end of the active RST signal and the first communication over the I2C bus. X = delay in ms
I2CSpeed	Speed of the I2c communication 1=100KB, 2= 400KB.
I2CAddress	I2C address of the Fusion controller.

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

Int_SODIMMPin	[103]
Int_Signal_Inv	[0]
Reset_SODIMMPin	[101]
Reset_Line_Inv	[0]
Reset_Post_Delay	[300]
I2CSpeed	[2]
I2CAddress	[0x10]

3.1. Example of all Registry entries

[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\SnglTchPanel]

```
"MouseEmulation"=dword:00000001
"TouchEmulation"=dword:00000000
"CapTouchMapping"="799,479,0,0,799,479,0"
"TouchButton0" = .....
```

[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\ Fusion]

```
"dll"="sngltchdrv_Fusion.dll"
"prefix"="TCH"
"index"=dword:00000001

"Int_SODIMMPin"=dword:0000001E
"Int_Signal_Inv"=dword:00000000
"Reset_SODIMMPin"=dword:0000001C
"Reset_Post_Delay"=dword:00000064
"Reset_Line_Inv"=dword:00000000
"I2CSpeed"=dword:00000002
"I2CAddress"=dword:00000010
```

- █ Red line: Values for the Panel Definition (see [1])
- █ Blue line: Values for loading the driver
- █ Green line: Values for the Interface setup

The file

`Fusion_ToolDrv.reg`

contains a base register setting without the values for loading the driver (blue line).

This file can be modified and imported in the registry (double click on the file).

These registry settings is used by

Capacitive Single Touch Driver

and partly by

All Capacitive Single Touch Driver Tools

The file

`Fusion_Drv.reg`

contains the setting loading the driver (blue line).

This file can be imported in the registry (double click on the file).

These registry settings is used by

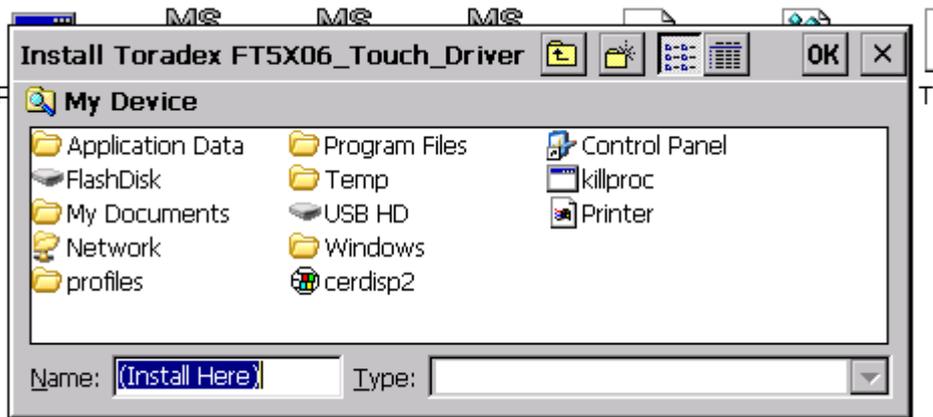
Capacitive Single Touch Driver

4. Install the Single Touch Driver

Before installing this driver no other Single Touch Driver should be installed (see chapter 5).

To Install the driver copy the File “SingleTouchDriverFusion.cab” to a Colibri (Desktop, Temp folder etc.) and execute it.

The following screen is popping up.



After confirm (OK button) the driver file “sngltchdrv_Fusion.dll” is 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 3.1). The other registry entries are not changed or must be adapted to your display/touch and interface.

5. Uninstall the Single Touch Driver

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 3.1).

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

6. Capacitive Touch Driver Tools

For testing the hardware and the registry settings are several tools available:

- `Fusion_I2CAdrScan.exe` Scan the I2C bus to detect all active device
- `Fusion_ContrlTest.exe` Show the RAW touch coordinates from the Touch Controller
- `Fusion_DriverTest.exe` Test all settings for the driver

All these tool runs as an application and can be started from the desktop without any installation. The tools use all or some settings of the registry which should be made in advanced (see below).

Remark:

It is not possible to run these tools together with Capacitive Single Touch Driver. In this case the driver must be uninstalled first (see chapter 5.)

If this tools are closed regular (ESC and or Enter) then the tools can be run again. Otherwise the Colibri Modul needs to be restarted.

6.1. Fusion_I2CAdrScan.exe

This tool reset the Touch Panel using the line `/RST` and the according settings in the registry. After the reset sequence the tool send out all I2C addresses and waits for a response. Addresses with a valid acknowledge are shown on the screen.

This tools use the registry settings for the interface (see green line in chapter 3.1).

6.2. Fusion_ContrlTest.exe

This tool is mainly used to test the interface and communication to the Fusion™ and check the panel settings.

The tool resets the Touch Panel using the line `/RST` according the settings in the registry. After the reset sequence the tool initialize the touch controller and waits until a finger touches the panel. If the touch controller signals an activity on the touch panel with the `/INT` line the the tool reads out the touch position and display it on the screen.

The displayed coordinates are in RAW format of the Fusion controller.

This tool show only one single touch and waits until the finger is released. Coordinates of a moving finger are not shown.

The tool is very helpful for comparing the register settings for the Panel definition (see [1]) with the RAW position of the touch panel.

This tool uses the registry settings for the interface and the adjustments (see green and grey lines in chapter 3.1).

6.3. Fusion_DriverTest.exe

With this tool the setting for the driver can be tested because it works with the same registry settings like the real driver does (except the values for loading the driver DLL).

After start the Driver Test Tool reads out the registry settings and prints out some status message on the same port like the Bootloader does (to connect to the Bootloader port you need: a Null Modem Cable a PC with a serial com port (RS232) a terminal application (e.g. HyperTerminal or TeraTerm).

On the standard display is no output from the Driver Test at all.

The Driver Test Tool reads out the touch data and generates the according mouse events. If mouse emulation is set in the registry the cursor on the display should follow a touching finger.

This tool uses the registry settings for the interface and adjustments (see green line in chapter 3.1) and the Panel definition (see red and grey lines in chapter 3.1).

7. Bring up the Touch Panel

After the Hardware connection is setup (I2C Bus, INT and RST are connected) the following steps and tools help to bring up the device:

- Set the register values for the Interface at least (see green line in chapter 3.1).
- Control the settings and wiring of the RST and INT lines.
 - With the help of the GPIO Config Tool [3] the chosen SODIMM pin can be monitored and set respectively.

- Run the Tool to scan the I2C addresses (`Fusion_I2CAdrScan.exe`).

The tool shows the I2C addresses of all devices on the I2C bus. One of these addresses should be the address of the touch controller.

Please note the shown addresses are the addresses of the devices on the I2C bus and not addresses set in the registry.

- Run the tool to test the touch controller (`Fusion_ContrlTest.exe`).

The tool establishes the communication to the touch controller. In case of an error the tool retries it.

If the communication is ok then the tools waits until a finger touches the panel and shows it position.

- The show position can be used set or verify the register settings for the Panel Definition (see red line in chapter 3.1).
- It is also possible to adjust the Fusion™ and test it with the Controller Test Tool (see grey line in chapter 3.1).
- Set the register values for the Panel Definition (see red line in chapter 3.1).
- Run the Driver Test Tool test the settings (`Fusion_DriverTest.exe`).
- If mouse events are enabled the cursor on the screen should jump to the position of touching finger. If the finger moves on the touch panel then the cursor should following it.
- If anything works the install the driver (see chapter 4).

Revision History

Date	Changes
8.Sept-13	Initial release
10-Oct-13	Few spelling corrections

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