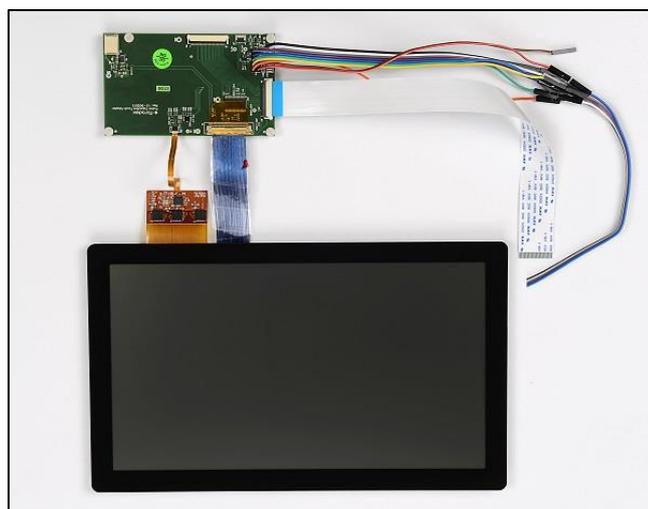
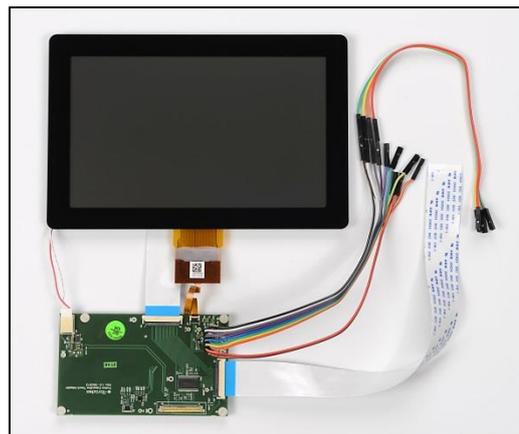


## Capacitive Multi-Touch Display 7”

## Capacitive Multi-Touch Display 10”

### Addendum



## Revision History

Date	Doc. Rev.	Board Version	Changes
21-Mar-14	Rev 1.0		Initial Release
09-Mar-15	Rev 1.1		Add Hint for the pixel clock polarity
22-Sep-15	Rev 1.2		Added Recommendations to evaluate touch on different COMs

## Inhalt

<b>1. Introduction</b>	<b>4</b>
<b>2. Kit Capacitive Multi-Touch Display 7"</b>	<b>5</b>
<b>3. Kit Capacitive Multi-Touch Display 10"</b>	<b>6</b>
<b>4. Capacitive Multi-Touch Adapter</b>	<b>7</b>
4.1. Features	7
4.2. Block Diagram	7
<b>5. Multi-Touch Solution</b>	<b>8</b>
5.1. Registry Settings	8
5.1.1 Display Settings	8
5.1.2 Display Rotation	8
5.1.3 Multi-Touch Hardware Adaption	8
5.1.4 Unified Multi-Touch Driver	9
5.1.5 Touch Calibration	9
<b>6. Capacitive Single Touch Drivers</b>	<b>9</b>
6.1. Registry Settings	9
6.1.1 Display Settings	9
6.1.2 Display Rotation	10
6.1.3 Capacitive Single Touch Driver, Hardware Adaption	10
6.1.4 Capacitive Single Touch Driver, Calibration and Emulation	10
<b>7. Bringing up the Touch Panel</b>	<b>11</b>

## Reference Documents

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

[1] **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\_MultiTchDsp\_GettingStarted.pdf)

[2] **Multi Touch Solution**

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

see "Using the Capacitive Multi-Touch Solution"

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

This document can be found on our website

<https://developer1.toradex.com/knowledge-base/capacitive-multi-touch-solution>

see "Documents, General Functionality", (Toradex\_MultiTch\_Solution.pdf)

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

Description of the Unified Driver

<https://developer1.toradex.com/knowledge-base/capacitive-multi-touch-solution>

see "Documents, Unified Multi-Touch Driver" , (Toradex\_UnfdMutiTchDrv.pdf)

[5] **Capacitive Multi-Touch Solution, Multi-Touch Hardware Adaption Fusion**

Description of the Hardware Adaption (executable) for Fusion

<https://developer1.toradex.com/knowledge-base/capacitive-multi-touch-solution>

see "Documents, Multi-Touch Hardware Adaption Fusion", (Toradex\_HwAdapt\_Fusion\_Run.pdf)

[6] **Single Touch Driver**

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

see "Using a Single Touch Driver"

[7] **Capacitive Single Touch Drivers, General Functionality**

This document can be found on our website

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

see "Capacitive Single Touch Drivers, General Functionality", (SnglTchDrv\_General.pdf)

- [8] **Capacitive Single Touch Drivers, Setup and Installation**  
Description of the Single Touch Drivers for Fusion  
<http://developer.toradex.com/knowledge-base/capacitive-single-touch-driver>  
see "Capacitive Single Touch Drivers Touch Revolution, Fusion 7" and Fusion 10",  
(SnglTchDrv\_Fusion.pdf)
- [9] **Design data Capacitive Multi-Touch Adapter**  
These documents can be found on our website  
<http://developer.toradex.com/product-selector/capacitive-multi-touch-display>  
see "Design data Capacitive Multi-Touch Adapter"
- [10] **Product Specification, Touch Revolution, Display 10, P/N: F10A-102**  
Detailed information can be found at the manufacturer "fusion" (<http://www.touchrev.com/>)  
Direct link: <http://www.touchrev.com/products/fusion/10-inch/>
- [11] **Product Specification, Touch Revolution, Fusion 7, P/N: F07A-102**  
Detailed information can be found at the manufacturer "fusion" (<http://www.touchrev.com/>)  
Direct link: <http://www.touchrev.com/products/fusion/7-inch/>

## 1. Introduction

---

The document "Getting Started" (see [1]) describes how to setup the hardware (wiring) and install the necessary Win CE drivers for a Multi-Touch or Single-Touch demo using one of the two kits Capacitive Multi-Touch Display 7" and 'Capacitive Multi-Touch Display 10". This document contains additional information to the chapters in "Getting Started".

## 2. Kit Capacitive Multi-Touch Display 7"

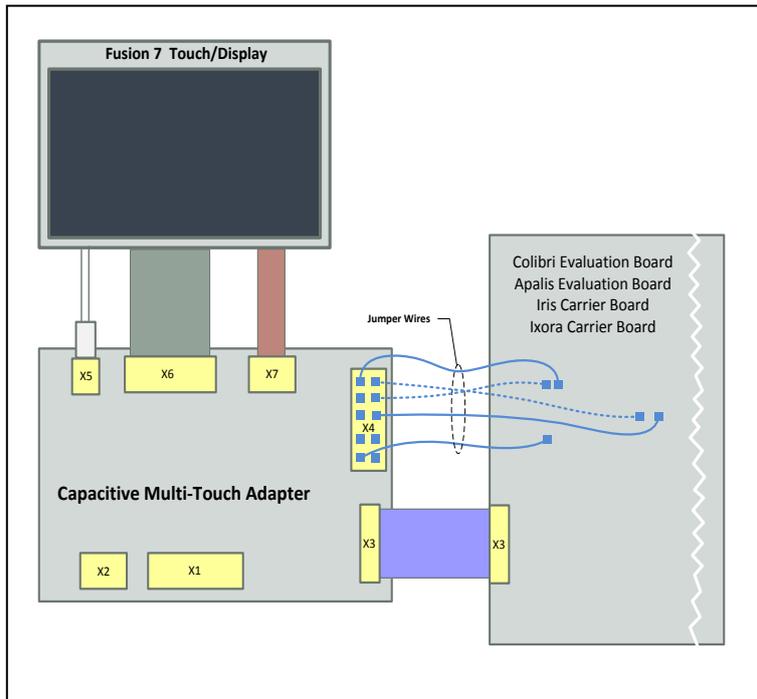


Figure 1: Kit Capacitive Multi-Touch Display 7"

The Kit Capacitive Multi-Touch Display 7" includes:

**1 psc Fusion 7 Touch Display P/N: F10A-0102**, for more information see [11].

Screen Size	7"
LCD Resolution	800 x 480
LCD Interface	TTL
Touch Resolution (points)	1500 x 900
Multi Touch	2 points with 15mm separation
Touch Interface	I2C (3.3V)

**1 psc Capacitive Multi-Touch Adapter**

For more information see [11].

**1 psc LCD Signal Cable**

FCC cable 0.5mm pitch, 40ways, 120mm length

**1 psc Unified Display Interface Cable**

FCC cable 0.5mm pitch, 40ways, 200mm length

**20 pcs Jumper Wires**

10 pcs female to female, 200mm length

10 pcs female to male, 200mm length

### 3. Kit Capacitive Multi-Touch Display 10"

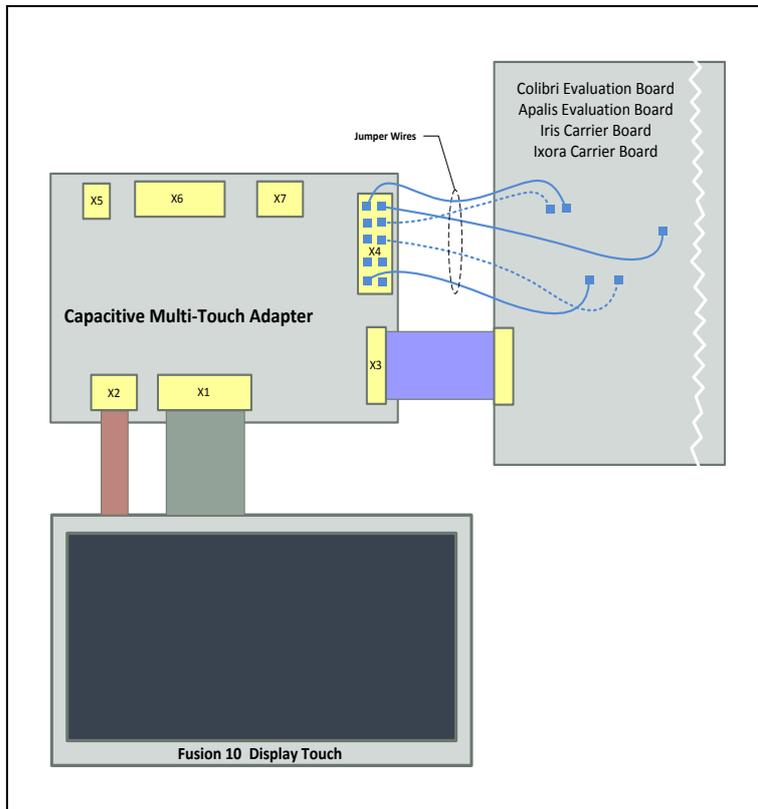


Figure 2: Capacitive Multi-Touch Display 10"

The Kit Capacitive Multi-Touch Display 10" includes:

**1 psc Fusion 10 Touch Display P/N: F07A-0102**, for more information see [10].

Screen Size	10.1"
LCD Resolution	1024 x 600
LCD Interface	1-channel LVDS
Touch Resolution (points)	2300 x 1350
Multi Touch	2 points with 15mm separation
Touch Interface	I2C (5.0V)
For more information see [2]	

**1 psc Capacitive Multi-Touch Adapter Board**

For more information see [11].

**1 psc LCD Signal Cable**

LVDS cable, 40ways, 100mm length

**1 psc Unified Display Interface Cable**

FCC cable 0.5mm pitch, 40ways, 200mm length

**1 pcs pcs Jumper Wires**

- 10 pcs female to female, 200mm length
- 10 pcs female to male, 200mm length

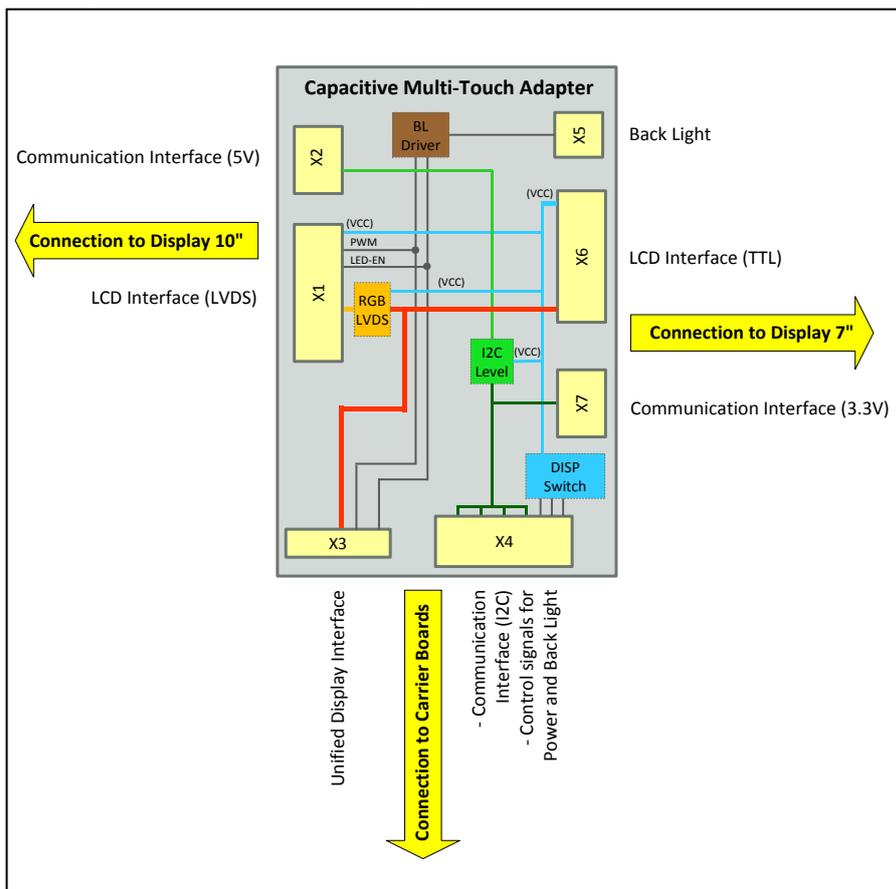
## 4. Capacitive Multi-Touch Adapter

### 4.1. Features

The Capacitive Multi-Touch Adapter allows you to connect the Display 10" or Display 7" to different Toradex Carrier Boards, so that the setup of a system with capacitive multi-touch and display can be made very easily. Connecting a Display 10" or Display 7" and one of the Carrier Boards please see [1].

### 4.2. Block Diagram

The Capacitive Multi-Touch Adapter has a size of 100 x 60 mm and contains the following



functionalities:

- LVDS converter for the Fusion 10 LCD interface (RGB/LVDS).
- Level Shifter for the I2C communication to the Fusion 10".
- Driver for the Fusion 7 back light (BL Driver).
- Power switches for the display's power and back lights (DISP Switches).

Figure 3: Functional Overview of the Adapter

For more detailed information see [9].

**Attention: It is not possible to connect a Display 7" and Display 10" at the same time.**

## 5. Multi-Touch Solution

---

More detailed information about the Multi-Touch Solution can be found in:

- General Functionality (see [3])
- Unified Multi-Touch Driver (see [4])  
Describes installation and configuration
- Multi-Touch Hardware Adaption Fusion (see [5])  
Describes installation and configuration of the executable Hardware Adaption.

### 5.1. Registry Settings

After installing the Multi-Touch Solution (see [1]) the current settings in the registry can be viewed, exported and edited with the registry editor on the Colibri module:

Start->Programs->ColibriTool->RegEdit

#### 5.1.1 Display Settings

The current display settings are stored at:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\NVIDIA Corporation\MDDI]  
[HKEY_LOCAL_MACHINE\SOFTWARE\NVIDIA Corporation\MDDI\LCD]
```

Information about the display settings can be found at:

<http://developer.toradex.com/knowledge-base/display-driver-registry-settings>

#### 5.1.2 Display Rotation

The current display rotation is stored at:

```
[HKEY_LOCAL_MACHINE\SYSTEM\GDI\ROTATION]
```

Information about the display rotation can be found at:

<http://www.developer.toradex.com/knowledge-base/display-rotation>

#### 5.1.3 Multi-Touch Hardware Adaption

The current hardware adaption (connection to the carrier board) are stored at

```
[HKEY_LOCAL_MACHINE\Software\Toradex\MultiTchHwAdapt]
```

Information about the registry setting of the hardware adaption can be found at [5].

### 5.1.4 Unified Multi-Touch Driver

The settings are stored at

```
[HKEY_LOCAL_MACHINE\Drivers\Touch]
[HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\TOUCH]
[HKEY_LOCAL_MACHINE\SYSTEM\GWE\TouchProxy]
```

The Unified Multi-Touch Driver is based on the example of a multi touch driver from Microsoft. Therefore information about the registry setting of the Unified Multi-Touch Driver can be found at [4] and the MSDN.

### 5.1.5 Touch Calibration

The Unified Multi-Touch Driver uses the calibration data generated by the standard calibration tool:

```
Start->Settings->ControlPanel->Settings
```

The calibration data are stored at:

```
[HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\TOUCH]
```

Information about the touch calibration can be found at the MSDN.

## 6. Capacitive Single Touch Drivers

---

More detailed information about the Single Touch Driver can be found in:

- General Functionality (see [7])
- Setup and Installation (see [8])

### 6.1. Registry Settings

After installing a Single Touch Driver (see [1]) the current settings in the registry can be viewed, exported and edited with the registry editor on the Colibri module:

```
Start->Programs->ColibriTool->RegEdit
```

#### 6.1.1 Display Settings

The current display settings are stored at:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\NVIDIA Corporation\MDDI]
[HKEY_LOCAL_MACHINE\SOFTWARE\NVIDIA Corporation\MDDI\LCD]
```

Information about the display settings can be found at:

<http://developer.toradex.com/knowledge-base/display-driver-registry-settings>

### 6.1.2 Display Rotation

The current display rotation is stored at:

```
[HKEY_LOCAL_MACHINE\SYSTEM\GDI\ROTATION]
```

Information about the display rotation can be found at:

<http://www.developer.toradex.com/knowledge-base/display-rotation>

### 6.1.3 Capacitive Single Touch Driver, Hardware Adaption

These settings to adapt the touch controller are stored at:

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

Information about the registry settings of a specific Capacitive Single Touch Driver can be found at [8].

### 6.1.4 Capacitive Single Touch Driver, Calibration and Emulation

The Capacitive Single Touch Drivers use its own system for calibration and emulation of keys etc. The settings are stored at:

```
[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\SngITchPanel]
```

Information about the general registry settings for all Capacitive Single Touch Drivers can be found at [7] and [8].

## 7. Bringing up the Touch Panel

---

After the Hardware connection is setup (see [1]), the following steps and tools helps to bring up the device:

- Install the Display settings and restart the module. The Display should show the Windows desktop without any border, flicker etc. More details are described in [3] and [5].  
In rare case the some text on the Touch Display 10" is not readable. Change the pixel clock polarity to zero, may help.  
[HKEY\_LOCAL\_MACHINE\SOFTWARE\NVIDIA Corporation\NVDDI\LCD]  
"pcp"=dword:00000000  
see <http://developer.toradex.com/knowledge-base/display-driver-registry-settings>
- In rare case, may experience I2C failures over Vybrid with connected touch. Maybe reducing pullup can help here. 1.8K pullup can give better result.
- Recommendation to evaluate touch on different COMs
  - a) PXA: Please hold touch device to RESET inactive state till booting. Please refer this [article](#) to do that. If Touch reset pin is connected with GPIO 26. Set GPIO direction as output and level as 0 by using [GPIO config block settings](#).
  - b) Tegra: If adapting another touch device, Please use V2.1 Windows CE library from [here](#).
  - c) Vybrid: Use V1.2 Image or newer images.
  - d) iMX6: Mouse cursor will be visible in Colibri and Apalis all WinCE Versions while touch events are detecting. Display rotation is not working on Apalis iMX6 WinCE.
- Control the wiring of the Reset and Interrupt lines.
  - With the help of the GPIO Config Tool, the chosen SODIMM or MXM3 pin for the Interrupt can be monitored and the Reset pin can be set to high and low. (see <http://developer.toradex.com/knowledge-base/gpioconfig>) .
- Control the wiring of the I2C Bus (SDA, SCL signals).
  - Run the tool to scan the I2C addresses (I2cAdrScan.exe) which is part of the packages for the Carrier Boards.  
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 that the shown addresses are the addresses of the devices on the I2C bus and not the address set in the registry.)
  - Please check that the Reset pin is inactive state (level is 0) so that the touch controller of the Display can run.
- Install the Unified Multi-Touch Driver and control, if the driver is loaded at startup of the module. More details are described in [15].

- Install the Hardware Adaption Fusion application and control, if the program is loaded at startup of the module. More details are described in [16].
- Check if the touch panel is working.

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