

Capacitive Multi-Touch Display 7”

Capacitive Multi-Touch Display 10”

Getting Started



Revision History

Date	Doc. Rev.	Board Version	Changes
21-Mar-14	Rev. 1.0		Initial
07-Jun-14	Rev. 1.1		Drawings Clobri and Apalis Evaluation Board corrected
16-Jun-14	Rev. 1.2		Overview drawings all JW jumper wires deleted
22-Sep-15	Rev. 1.3		Added Bringing up the Touch Pane section

Contents

1. Introduction	4
2. Getting Started	4
3. Using a Display 10"	6
4. Using a Display 7"	7
5. Using an Iris Carrier Board	8
5.1. <i>Connecting the Iris Carrier Board</i>	9
5.1.1 Wiring for the Iris Carrier Board	9
6. Using an Viola Carrier Board	10
6.1. <i>Connecting the Viola Carrier Board</i>	11
6.1.1 Wiring for the Viola Carrier Board	11
7. Using a Colibri Evaluation Board	12
7.1. <i>Connecting the Colibri Evaluation Board</i>	13
7.1.1 Wiring for the Colibri Evaluation Board	13
8. Using an Ixora Carrier Board	14
8.1. <i>Connecting the Ixora Carrier Board</i>	15
8.1.1 Wiring for the Ixora Carrier Board	15
9. Using Apalis Evaluation Board	16
9.1. <i>Connecting the Apalis Evaluation Board</i>	17
9.1.1 Wiring for the Apalis Evaluation Board	17
10. Install the Multi-Touch Solution	18
10.1. <i>Reinstall the Multi-Touch Solution</i>	20
11. Install a Single Touch Driver	20
12. Bringing up the Touch Panel	21
13. Capacitive Multi-Touch Adapter, Assembly Drawing	22

Reference Documents

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

- [1] **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)
- [2] **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"
- [3] **Iris Carrier Board, Design Guides and Application Notes**
This document can be found on our website
<http://developer.toradex.com/product-selector/iris-carrier-board>
see "Design Guides and Application Notes"
- [4] **Viola, Design Guides and Application Notes**
<http://developer.toradex.com/product-selector/viola-carrier-board>
see "Design Guides and Application Notes"
- [5] **Colibri Evaluation Board, Design Guides and Application Notes**
<http://developer.toradex.com/product-selector/colibri-evaluation-board>
see "Design Guides and Application Notes"
- [6] **Ixora Carrier Board, Design Guides and Application Notes**
<http://developer.toradex.com/product-selector/ixora-carrier-board>
see "Design Guides and Application Notes"
- [7] **Apalis Evaluation Board, Design Guides and Application Notes**
<http://developer.toradex.com/product-selector/apalis-evaluation-board>
see "Design Guides and Application Notes"
- [8] **Multi Touch Solution**
<http://developer.toradex.com/product-selector/capacitive-multi-touch-display>
see "Using the Capacitive Multi-Touch Solution"
- [9] **Single Touch Driver**
<http://developer.toradex.com/product-selector/capacitive-multi-touch-display>
see "Using a Single Touch Driver"

1. Introduction

The two sets ‘Capacitive Multi-Touch Display 7” ‘ and ‘Capacitive Multi-Touch Display 10” ‘ are display kits consisting of a Fusion 7 Display Touch and Fusion 10 Display Touch respectively and a Capacitive Multi-Touch Adapter. Cables are included with the kit so as to enable easy connection to different Toradex Evaluation Boards. On the software side, these kits are supported with drivers for Windows CE and Linux along with detailed descriptions on the Toradex Developer Center.

Using WinCE see:

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

Using Linux see:

[http://developer.toradex.com/knowledge-base/capacitive-multi-touch-display-\(linux\)](http://developer.toradex.com/knowledge-base/capacitive-multi-touch-display-(linux))

This document describes how to setup the hardware (wiring) and install the necessary WinCE drivers for a Multi-Touch or Single-Touch demo.

The Document “Addendum” (see [1]) contains additional information related to the Capacitive Multi-Touch Display 7” and Capacitive Multi-Touch Display 10”.

2. Getting Started

Choose one of the displays:

- Multi-Touch Display 7” (see chapter 3, Using a Display 10”)
- Multi-Touch Display 10” (see chapter 4, Using a Display 7”)

The photos in the chapter 3 and 4 are helpful for an overview but parts can change over the time (color etc.). In case of ambiguity, please consider the schematics and assembly drawing (see [2]).

Choose one of the Carrier Boards:

- Iris Carrier Board (see chapter 5, Using an Iris Carrier Board)
- Viola Carrier Board (see chapter 6, Using an Viola Carrier Board)
- Colibri Evaluation Board (see chapter 7, Using a Colibri Evaluation Board)
- Ixora Carrier Board (see chapter 8, Using an Ixora Carrier Board)
- Apalis Evaluation Board (see chapter 9, Using Apalis Evaluation Board)

Connect the chosen display and carrier board to the Multi-Touch Adapter according to the corresponding chapters.

Attention:

X3 and X6 are the same kind of plugs for FCC cable.

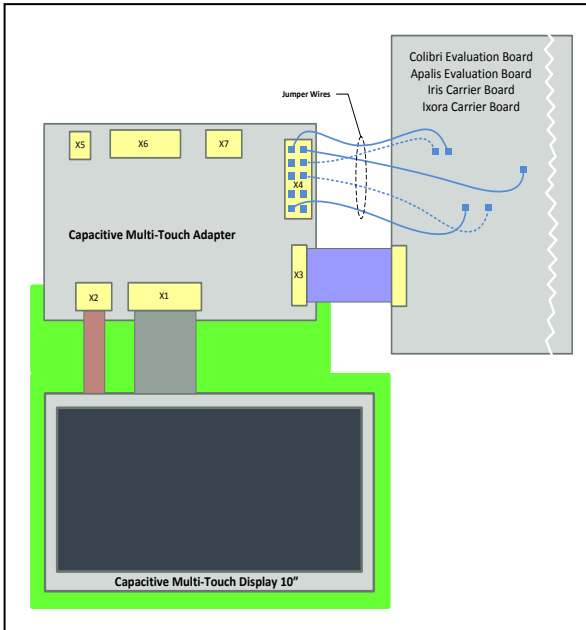
Do not connect the flat cable from the carrier board to the X6.

If this happen either the Adapter or the Carrier Board will be damaged!!!

Install one of the following Drivers:

- Multi-Touch Solution (see chapter 10, Install the Multi-Touch Solution)
- Single Touch Driver (Mouse emulation) (see chapter 11, Install a Single Touch Driver)

3. Using a Display 10"



This chapter describes how to connect the Capacitive Multi-Touch Display 10" to the Capacitive Touch Adapter (green background).

The LVDS LCD interface of the Display 10" can be connected on plug X1 using the LVDS cable. The small flat cable for the touch controller can be connected direct into plug X2 (see the drawing below).

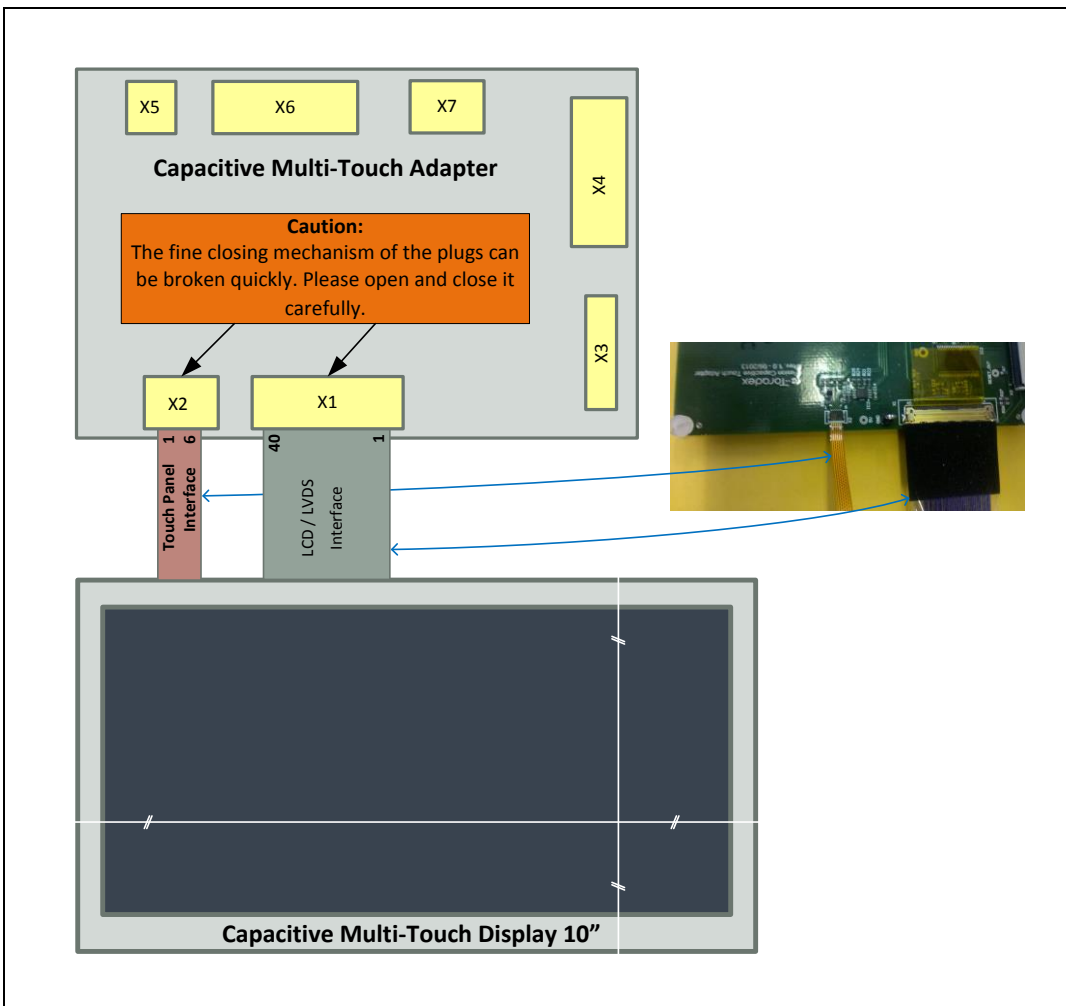
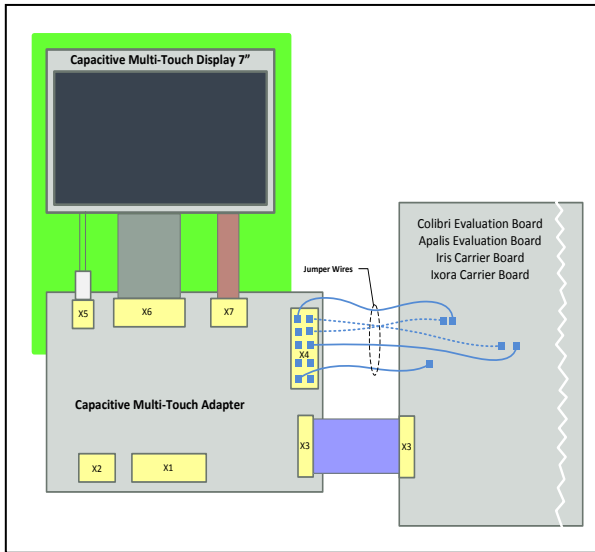


Figure 1: Connection Capacitive Multi-Touch Display 10"

4. Using a Display 7"



This chapter describes how to connect the Capacitive Multi-Touch Display 7" to the Capacitive Touch Adapter (green background).

The LCD interface of the Display 7" can be connected on plug X6 using the FCC cable. The small flat cable for the touch controller can be connected direct into plug X7 (see the drawing below).

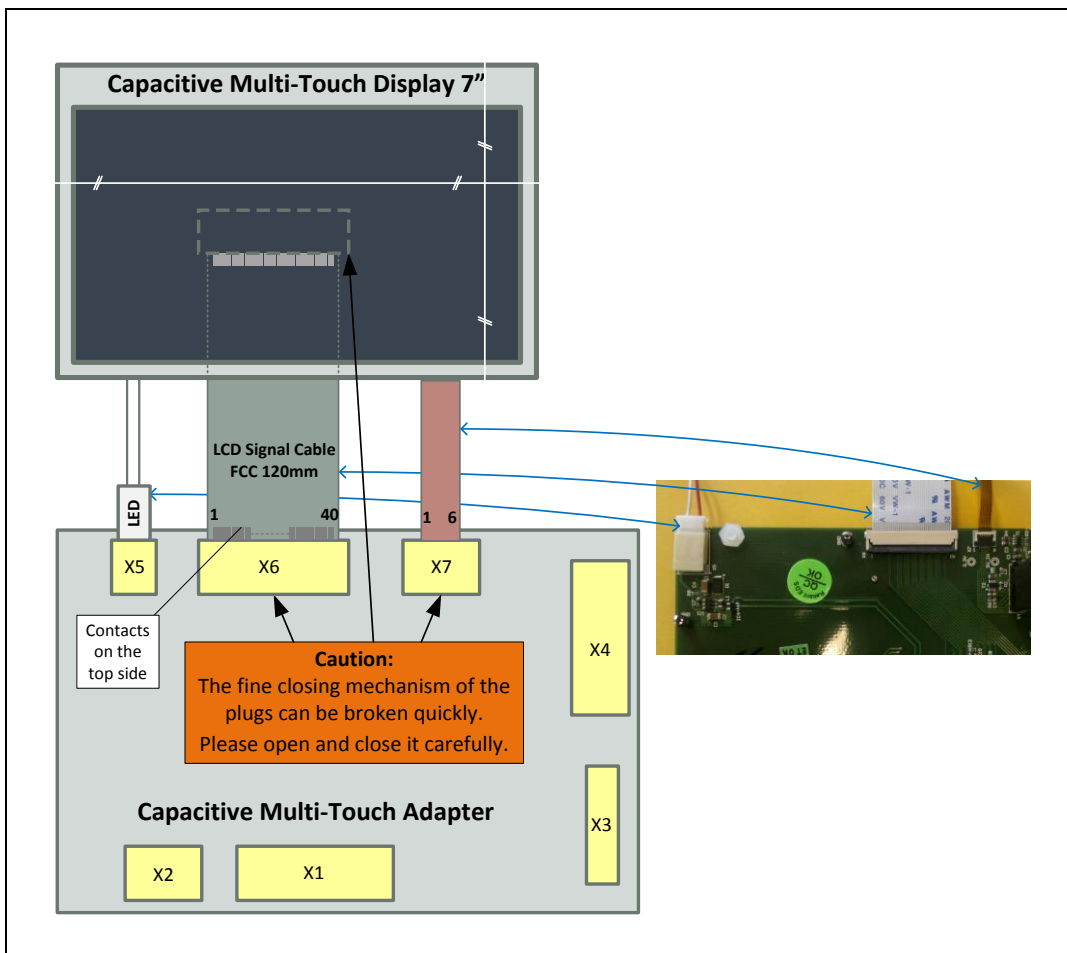
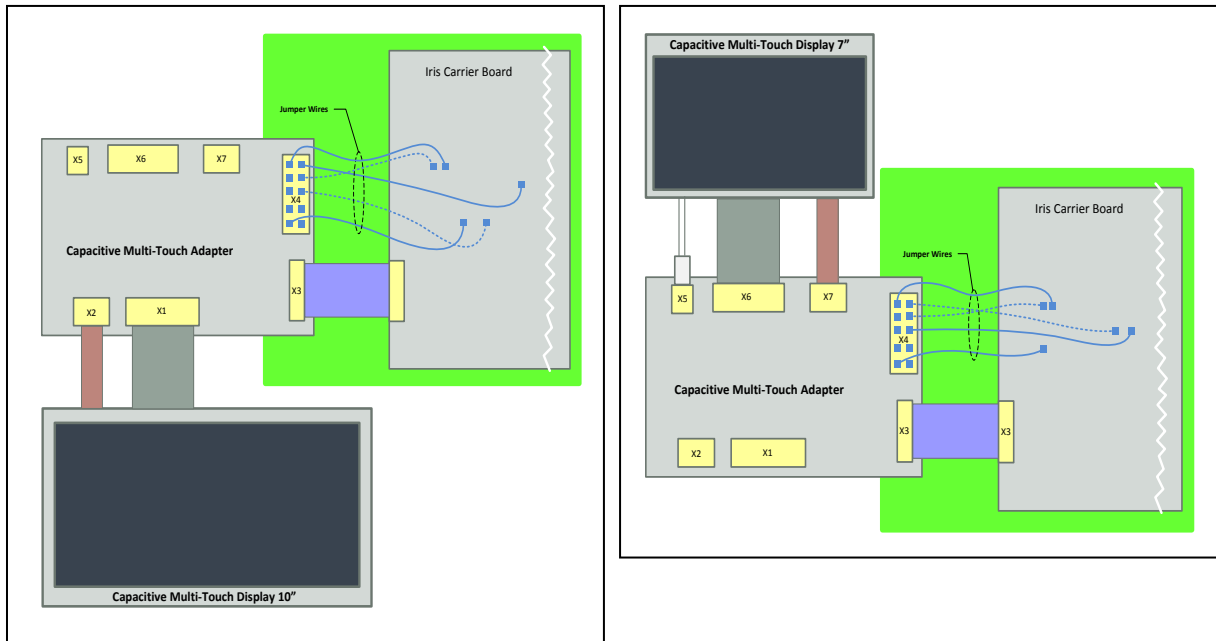


Figure 2: Connection Capacitive Multi-Touch Display 7"

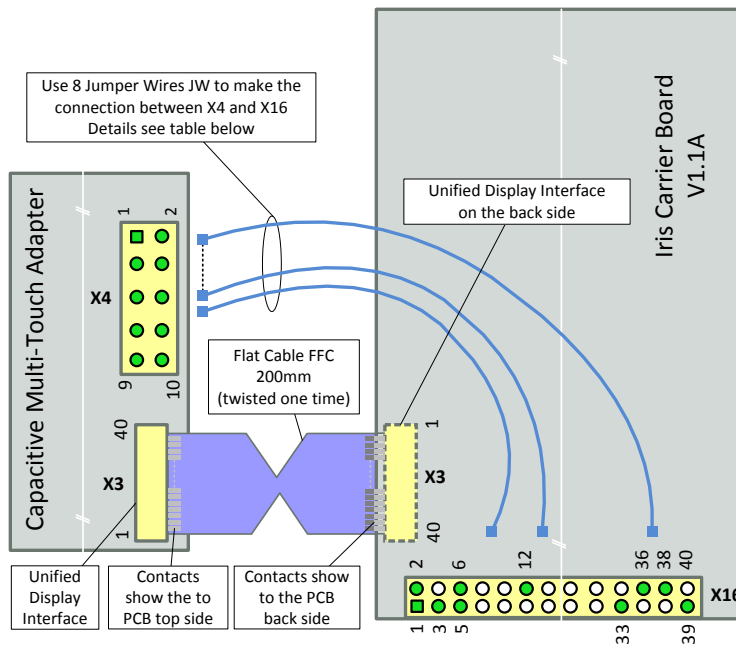
5. Using an Iris Carrier Board

This chapter describes how to connect the Iris Carrier Board to the Capacitive Multi-Touch Adapter (green background).

The connection to the Iris Carrier Board is independent from the used Display.



5.1. Connecting the Iris Carrier Board



The adjacent drawing is a rough overview to see where the plugs are located and the wires needed.

The exact details are shown on the assembly drawing of the Iris Carrier Board (see [3]) and the Capacitive Multi-Touch Adapter (see [2]) and in the table chapter 5.1.1 below.

Figure 3: Boards connection rough overview

5.1.1 Wiring for the Iris Carrier Board

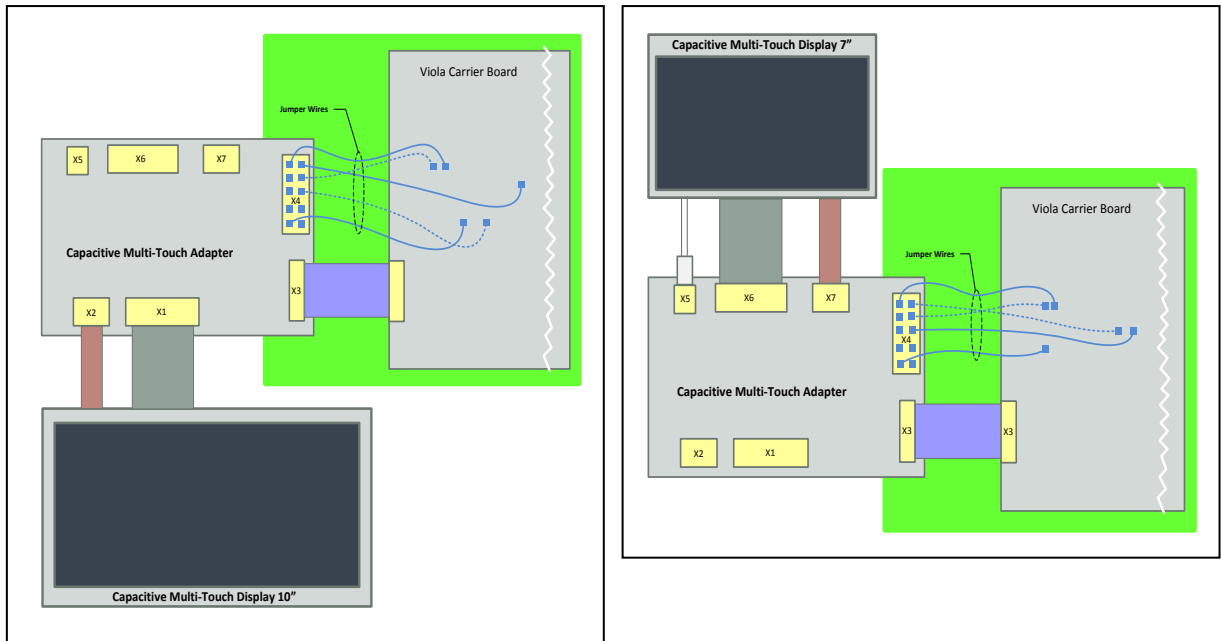
Adapter	Iris Carrier Board	Cable/Jumper Wire
X3	X3 (on the back side)	FCC 200mm
X4/1 (GND)	not connected	
X4/2 (3V3_IN)	X16/33 (3.3V)	JW female to female
X4/3 (5V_IN)	X16/12 (5V)	JW female to female
X4/4 (GND)	X16/3 (GND)	JW female to female
X4/5 (DISP_ON)	not connected 1)	
X4/6 (TOUCH_I2C_SCL_3.3V)	X16/6 (SODIMM_196)	JW female to female
X4/7 (TOUCH_I2C_SDA_3.3V)	X16/5 (SODIMM_194)	JW female to female
X4/8 (TOUCH_INT_3.3V)	X16/38 (SODIMM_28)	JW female to female
X4/9 (TOUCH_RESET_3.3V)	X16/39 (SODIMM_30)	JW female to female
X4/10 (GND)	X16/36 (GND)	JW female to female

1) Display is on by default

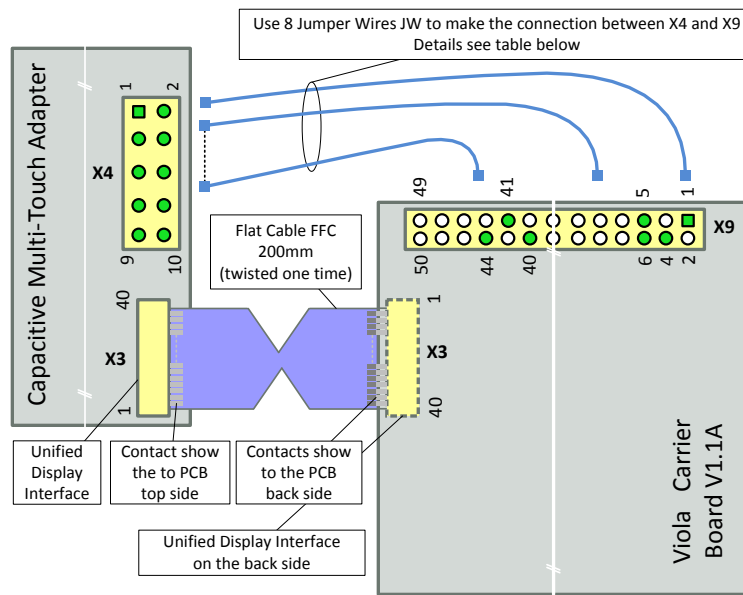
6. Using an Viola Carrier Board

This document describes how to connect the Viola Carrier Board to the Capacitive Multi-Touch Adapter (green background).

The connection to the Viola Carrier Board is independent of the used Display.



6.1. Connecting the Viola Carrier Board



The adjacent drawing is a rough overview to see where the plugs are located and the wires needed.

The exact details are shown on the assembly drawing of the Viola Carrier Board (see [4]) and the Capacitive Multi-Touch Adapter (see [2]) and in the table chapter 6.1.1 below.

Figure 4: Boards connection rough overview

6.1.1 Wiring for the Viola Carrier Board

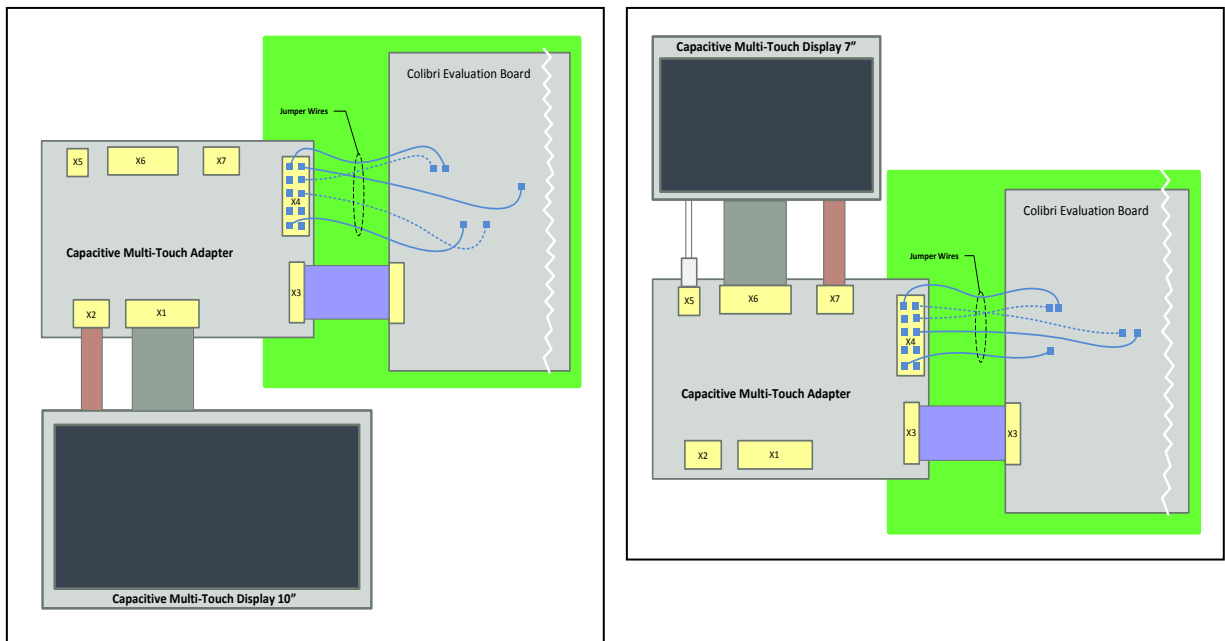
Adapter	Iris Carrier Board	Cable/Jumper Wire
X3	X7 (on the back side)	FCC 200mm
X4/1 (GND)	not connected	
X4/2 (3V3_IN)	X9/4 (3.3V)	JW female to female
X4/3 (5V_IN)	X9/1 (5V)	JW female to female
X4/4 (GND)	X9/7 (GND)	JW female to female
X4/5 (DISP_ON)	not connected 1)	
X4/6 (TOUCH_I2C_SCL_3.3V)	X9/5 (SODIMM_196)	JW female to female
X4/7 (TOUCH_I2C_SDA_3.3V)	X9/6 (SODIMM_194)	JW female to female
X4/8 (TOUCH_INT_3.3V)	X9/44 (SODIMM_28)	JW female to female
X4/9 (TOUCH_RESET_3.3V)	X9/41 (SODIMM_30)	JW female to female
X4/10 (GND)	X9/40 (GND)	JW female to female

1) Display is on by default

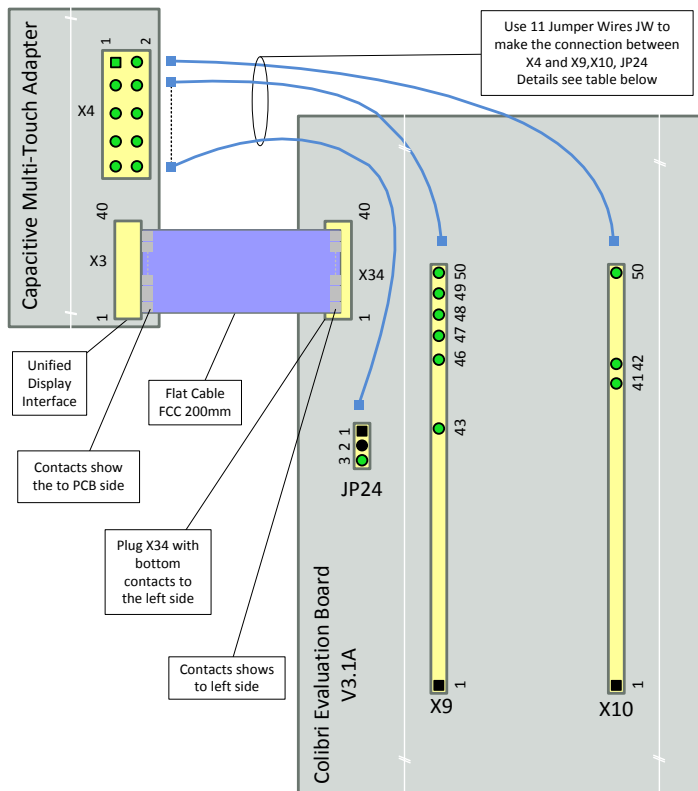
7. Using a Colibri Evaluation Board

This document describes how to connect the Colibri Evaluation Board to the Capacitive Multi-Touch Adapter (green background).

The connection to the Colibri Evaluation Board is independent from the used Display.



7.1. Connecting the Colibri Evaluation Board



The adjacent drawing is a rough overview to see where the plugs are located and the wires needed.

The exact details are shown on the assembly drawing of the Colibri Evaluation Board (see [5]) and the Capacitive Multi-Touch Adapter (see [2]) and in the table chapter 7.1.1 below.

Figure 5: Boards connection rough overview

7.1.1 Wiring for the Colibri Evaluation Board

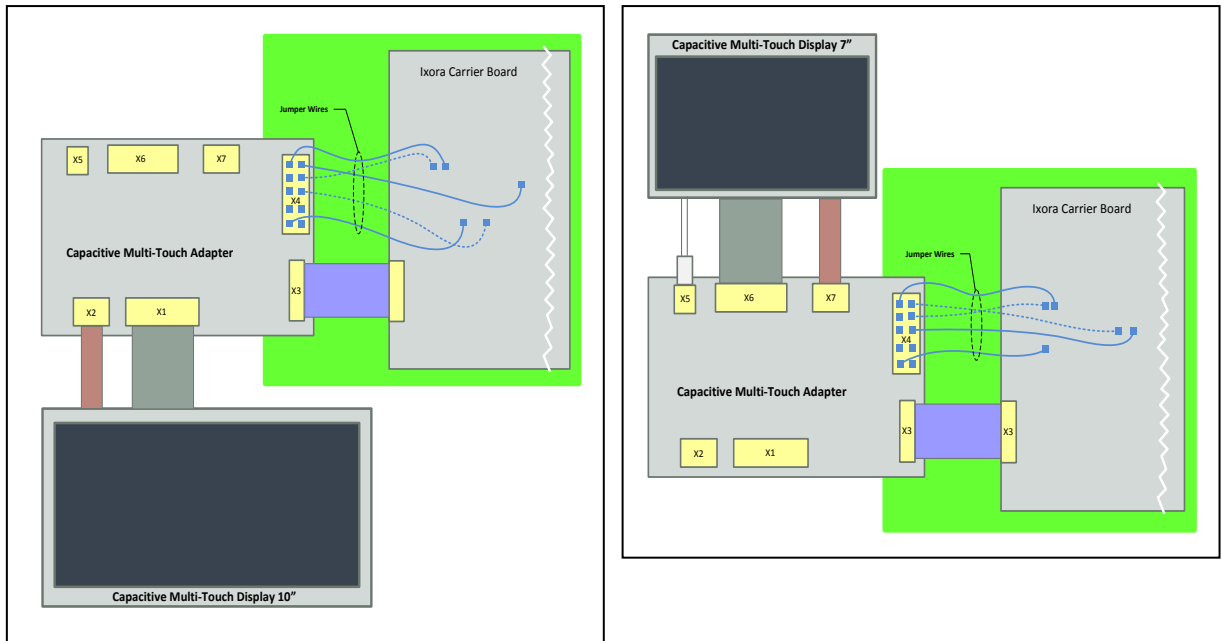
Adapter	Colibri Evaluation Board	Cable/Jumper Wire
X3	X34	FCC 200mm
X4/1 (GND)	not connected	
X4/2 (3V3_IN)	X9/43 (3.3V)	JW male to female
X4/3 (5V_IN)	JP24/3 (5V)	JW female to female
X4/4 (GND)	X9/49(GND)	JW male to female
X4/5 (DISP_ON)	not connected 1)	
X4/6 (TOUCH_I2C_SCL_3.3V)	X9/48(SODIMM_196)	JW male to female
X4/7 (TOUCH_I2C_SDA_3.3V)	X9/47(SODIMM_194)	JW male to female
X4/8 (TOUCH_INT_3.3V)	X10/41 (SODIMM_133)	2x JW male to female
X4/9 (TOUCH_RESET_3.3V)	X10/42 (SODIMM_127)	2x JW male to female
X4/10 (GND)	X10/50 (GND)	2x JW male to female

1) Displays on by default

8. Using an Ixora Carrier Board

This document describes how to connect the Ixora Carrier Board to the Capacitive Multi-Touch Adapter (green background).

The connection to the Ixora Carrier Board is independent of the used Display.



8.1. Connecting the Ixora Carrier Board

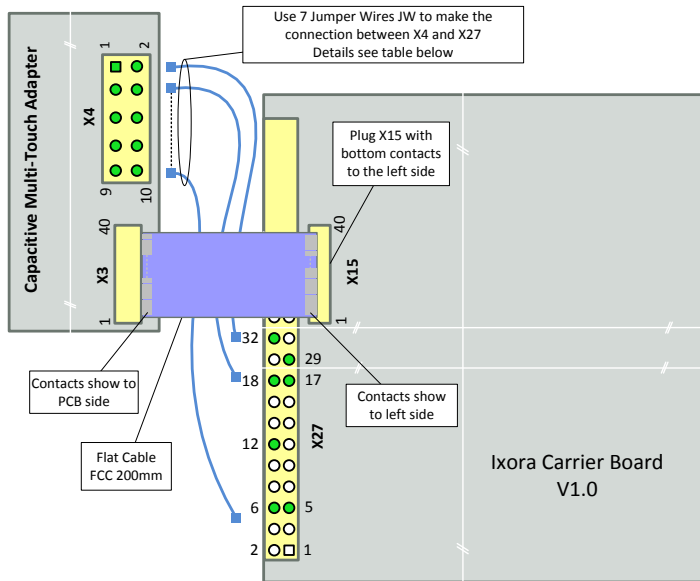


Figure 6: Boards connection rough overview

The adjacent drawing is a rough overview to see where the plugs are located and the wires needed.

The exact details are shown on the assembly drawing of the Ixora Carrier Board (see [6]) and the Capacitive Multi-Touch Adapter (see [2]) and in the table chapter 8.1.1 below.

8.1.1 Wiring for the Ixora Carrier Board

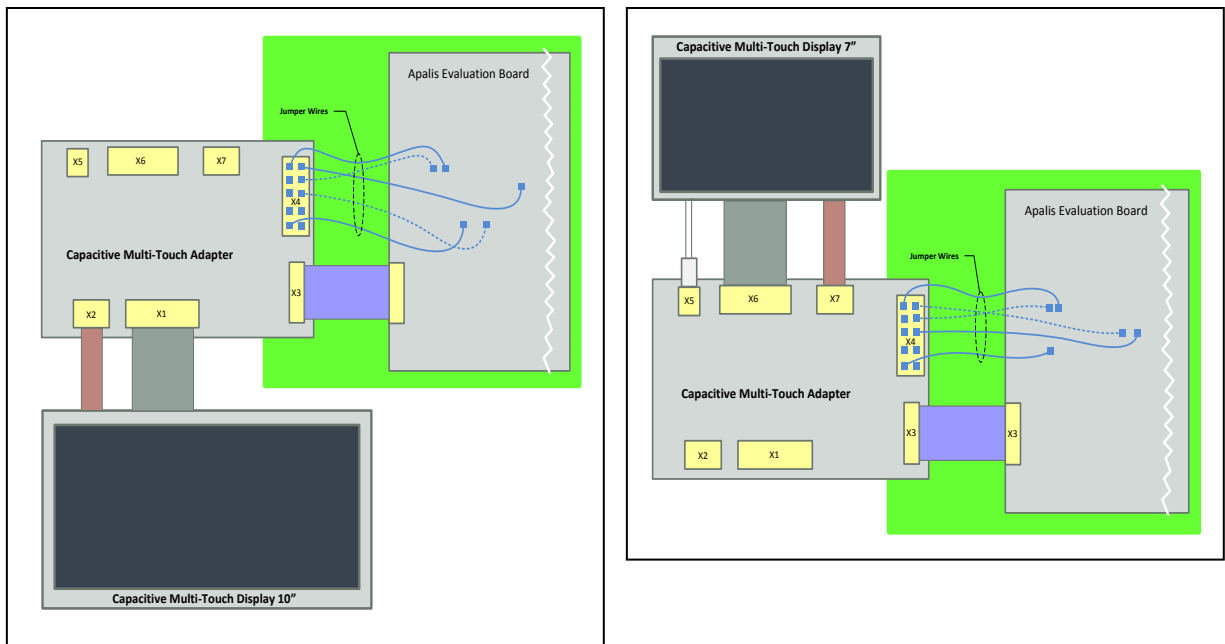
Adapter	Ixora Carrier Board	Cable/Jumper Wire
X3	X15	FCC 200mm
X4/1 (GND)	not connected	
X4/2 (3V3_IN)	X27/29 (3.3V)	JW female to female
X4/3 (5V_IN)	X27/12 (5V)	JW female to female
X4/4 (GND)	X27/32(GND)	JW female to female
X4/5 (DISP_ON)	not connected 1)	
X4/6 (TOUCH_I2C_SCL_3.3V)	X27/6(I2C1_SCL)	JW female to female
X4/7 (TOUCH_I2C_SDA_3.3V)	X27/5(I2C1_SDA)	JW female to female
X4/8 (TOUCH_INT_3.3V)	X27/17 (GPIO5)	JW female to female
X4/9 (TOUCH_RESET_3.3V)	X27/18 (GPIO6)	JW female to female
X4/10 (GND)	not connected	

1) Displays on by default

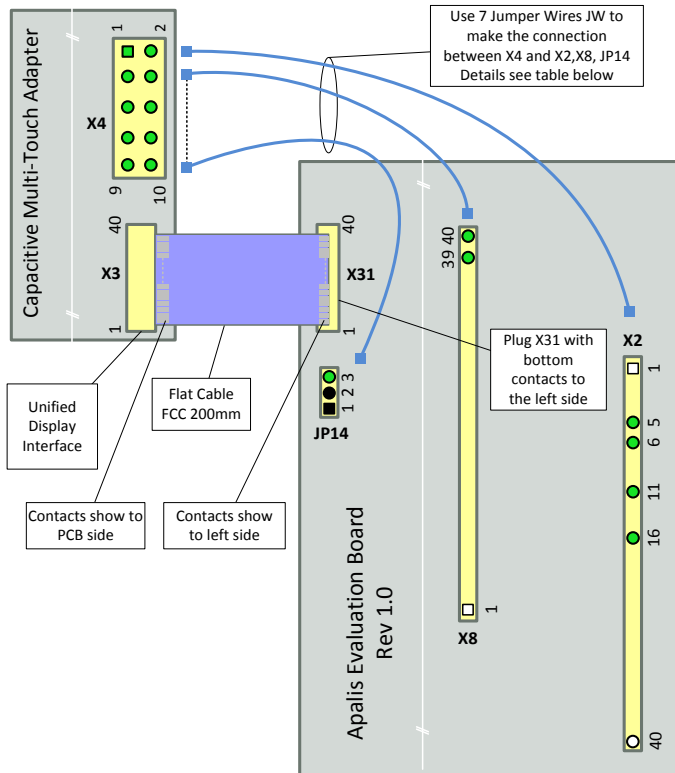
9. Using Apalis Evaluation Board

This document describes how to connect the Apalis Evaluation Board to the Capacitive Multi-Touch Adapter (green background).

The connection to the Apalis Evaluation Board is independent of the used Display.



9.1. Connecting the Apalis Evaluation Board



The adjacent drawing is a rough overview to see where the plugs are located and the wires needed.

The exact details are shown on the assembly drawing of the Apalis Evaluation Board (see [7]) and the Capacitive Multi-Touch Adapter (see [2]) and in the table chapter 9.1.1 below.

Figure 7: Boards connection rough overview

9.1.1 Wiring for the Apalis Evaluation Board

Adapter	Apalis Evaluation Board	Cable/Jumper Wire
X3	X31	FCC 200mm
X4/1 (GND)	not connected	
X4/2 (3V3_IN)	X2/16 (3.3V)	JW male to female
X4/3 (5V_IN)	JP14/3 (5V)	JW female to female
X4/4 (GND)	X2/11 (GND)	JW male to female
X4/5 (DISP_ON)	not connected 1)	
X4/6 (TOUCH_I2C_SCL_3.3V)	X8/39(I2C1_SCL/MXM3_211)	JW male to female
X4/7 (TOUCH_I2C_SDA_3.3V)	X8/40(I2C1_SDA/MXM3_209)	JW male to female
X4/8 (TOUCH_INT_3.3V)	X2/6 (GPIO5/MXM3_11)	JW male to female
X4/9 (TOUCH_RESET_3.3V)	X2/5 (GPIO6/MXM3_13)	JW male to female
X4/10 (GND)	not connected	

1) Display is on by default

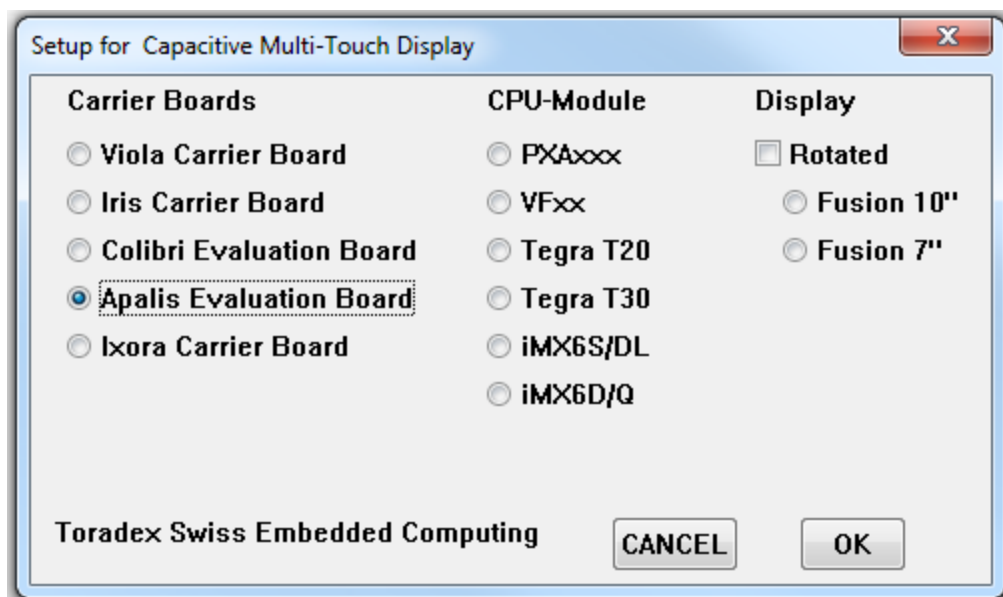
10. Install the Multi-Touch Solution

After the wiring is done, choose one of the following Colibri/Apalis module and Windows:

Module	Win CE5	Win CE6	Win CE 7	WEC 2013
Colibri T20	---	ok	ok	
Colibri T30	---	---	ok	ok
Colibri Apalis T30	---	---	ok	ok
Colibri VF50	---	ok	ok	ok
Colibri VF61	---	ok	ok	ok
Colibri iMX6	---	---	ok	ok
Apalis iMX6	---	---	ok	ok
PXA 270	---	ok	---	---
PXA 310	---	ok	---	---
PXA 320	---	ok	---	---

Use one of the CPU-Module which fit to the chosen carrier board,

Copy the CAB-File "CapacitiveTchSln_CE6_CE7.cab" or "CapacitiveTchSln_WEC2013.cab" to a temporary directory on the Module and execute it.



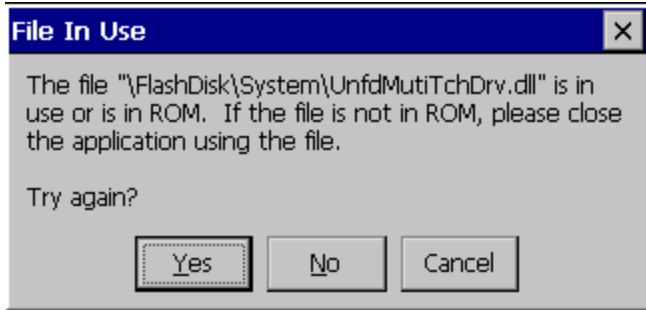
Mark the used display, carrier boards and the CPU-Module VF50 or VF61 (if necessary) and start the installation with "OK".

At the end a similar windows shows the chosen option and a status message.

For download the file "CapacitiveTchSIn_CE6_CE7.cab" or "CapacitiveTchSIn_WEC2013.cab" please see [8],

10.1. Reinstall the Multi-Touch Solution

It is possible to reinstall the Multi-touch solution with other option. Because some files are already installed and in use one or more windows like below pop up



Choose "No" to continue with the installation.

If the options are changed between Tegra T20/T30 Module and VF50/VF61 Module then the directory "\\FlashDisk\\Autorun\\" must be cleaned (rename it and restart, afterwards the directory or the containing files can be deleted).

11. Install a Single Touch Driver

After the wiring is choose one of the following Colibri module and Windows:

Module	Win CE5	Win CE6	Win CE 7
Colibri PXA270	ok	ok	ok
Colibri PXA300	ok	ok	ok
Colibri PXA320	ok	ok	ok
Colibri T20		ok	ok

Contrary to the Multi-Touch Solution, the whole setup for a Single Touch Driver is made in one package. For this reason every combination of display, carrier board and module has its own prepared package:

- 'Display 7", Iris Carrier Board, Colibri PXA270'
- 'Display 7", Iris Carrier Board, Colibri PXA300'
- 'Display 7", Iris Carrier Board, Colibri PXA320'
- 'Display 7", Iris Carrier Board, Colibri T20'
- 'Display 10", Iris Carrier Board, Colibri PXA270'
- 'Display 10", Iris Carrier Board, Colibri PXA300'
- 'Display 10", Iris Carrier Board, Colibri PXA320'
- 'Display 10", Iris Carrier Board, Colibri T20'
- 'Display 7", Colibri Evaluation Board, Colibri PXA270'
- 'Display 7", Colibri Evaluation Board, Colibri PXA300'
- 'Display 7", Colibri Evaluation Board, Colibri PXA320'

'Display 7", Colibri Evaluation Board, Colibri T20'
'Display 10", Colibri Evaluation Board, Colibri PXA270'
'Display 10", Colibri Evaluation Board, Colibri PXA300'
'Display 10", Colibri Evaluation Board, Colibri PXA320'
'Display 10", Colibri Evaluation Board, Colibri T20'

For downloading one of these packages please see [9].

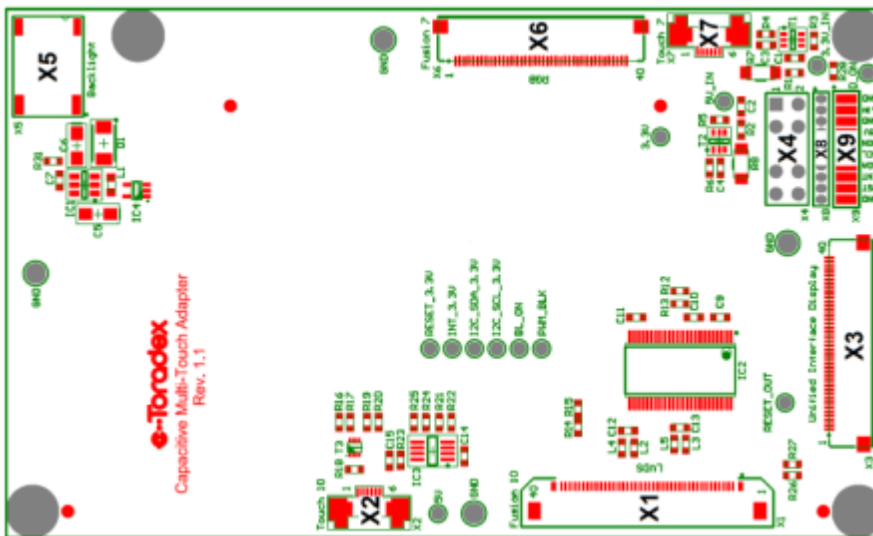
12. Bringing up the Touch Panel

After the Hardware connection is setup the following steps and tools help 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.

13. Capacitive Multi-Touch Adapter, Assembly Drawing



Disclaimer:

Copyright © Toradex AG. All rights reserved. All data is for information purposes only and not guaranteed for legal purposes. Information has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. Brand and product names are trademarks or registered trademarks of their respective owners. Specifications are subject to change without notice.

Trademark Acknowledgement:

Brand and product names are trademarks or registered trademarks of their respective owners.