



TouchInternational

**MULTI-Touch
Projected Capacitive Touch Screen
Integration Guide**

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1.1	1-13	Revision/Logo/Etc.	Shaun Detmer	4/20/2014

1.0 Manual Introduction

1.1 Safety



This symbol indicates potential hazards that can harm personnel.



This symbol indicates potential hazards that can damage the product.

1.2 Terms

The following terms and abbreviations may be unfamiliar and may appear in the manual. As such, they are defined in Table 1.

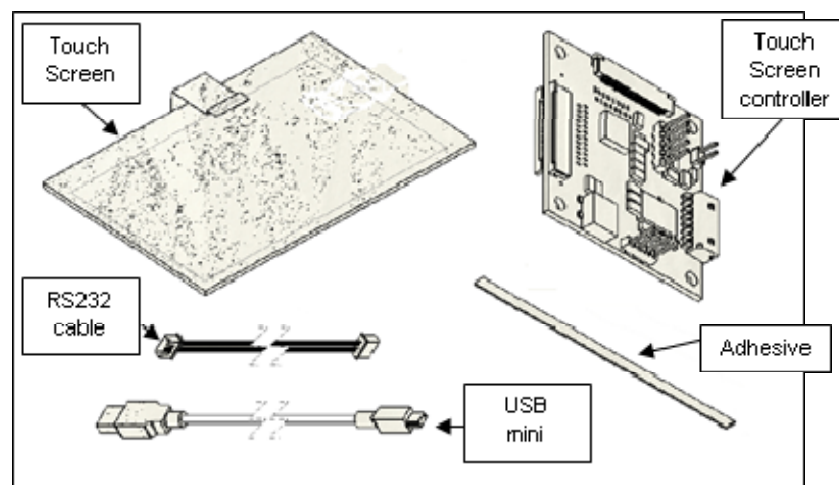
Viewing Area	This is the area of the Touch Screen that is visible after a bezel is mounted.
Active Area	This is the area of the Touch Screen that will recognize a touch event.
Underlay	A graphic to define keys and buttons for certain display applications.
ESD	This refers to electrostatic discharge.
VHB	This refers to a very high bond.
EMI	This refers to electro-magnetic interference.
RFI	This refers to radio frequency interference.

2.0 Touch Screen Kit

2.1 Components

- Touch Screen
- Touch Screen Controller
- USB Mini Cable and/or RS232 Communication Cable and Power Cable
- Adhesives

Figure 1: Multi-Touch Screen Kit Components



3.0 Touch Screen Maintenance

3.1 Cleaning the Touch Screen



Caution: Do not use any cleaners with chemicals that can corrode glass or damage the touch screen permanently. When cleaning the touch screen, use a soft, lint free cloth to prevent scratches and contamination. Avoid using sharp/hard objects.

Before integrating the touch screen, make certain it is properly cleaned. It is highly recommended that the installation of the touch screen is performed in a clean room to prevent any contamination.

1. Wear powder free gloves before handling the touch screen.
2. Wear a grounded wrist band to prevent any static damage to electronic components.
3. Clean both sides of the touch screen with a non-abrasive anti-static solution (lens cleaner).
4. Clean both sides of the touch screen again with rubbing alcohol.
5. Repeat steps 3 and 4 as needed until the touch screen is free of all contaminants, such as fingerprints or dust.
6. Allow the touch screen to fully dry before integrating.

4.0 Touch Screen Integration

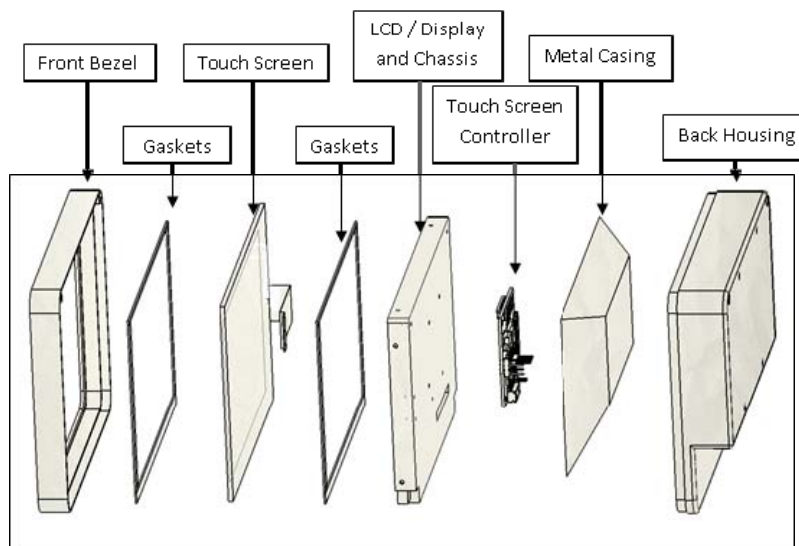
1.1 Integrating the Touch Screen



Caution: Practice safety while integrating touch screens, controllers, LCDs and all other components included in this document. Beware of sharp edges which can cut or harm people.

MulTI-Touch touch screens can be integrated in a variety of ways. The most general method of integrating the Touch Screen with a display is presented in Figure 2.

Figure 2: Touch Screen and Controller Integration



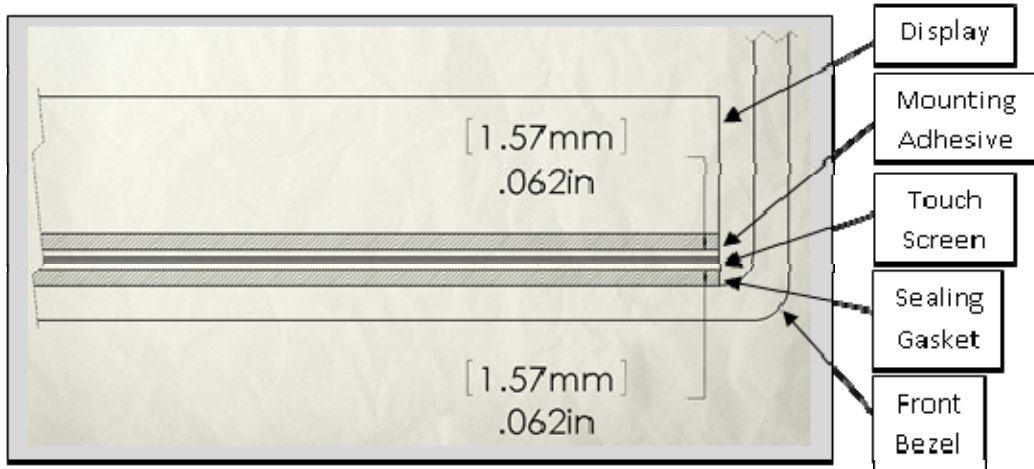
4.0 Touch Screen Integration (Continued)

4.2 Mounting the Touch Screen

The Projected Capacitive Touch Screen should be mounted to a display with an adhesive that is at least .062" thick. To mount a bezel onto the Touch Screen, an adhesive that is at least .062" thick should also be used.

The recommended adhesive is 3M 4956 VHB Tape. This adhesive can be provided by TI as P/N 1600136. Please refer to Figures 2 and 3, which illustrate the mounting process.

Figure 3: Touch Screen Mounting

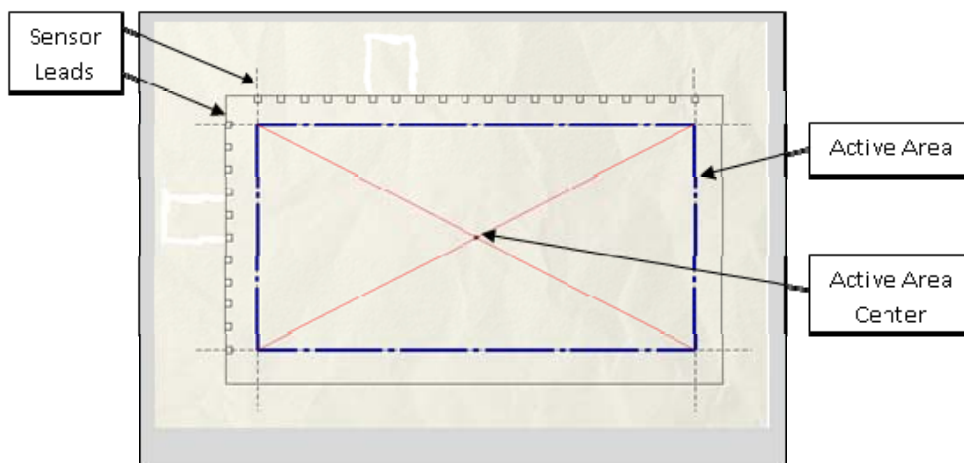


4.3 Touch Screen Placement and Alignment

When choosing a Multi-Touch touch screen, ensure that its active area will fit with the active area of your display. The active area of the sensor is enclosed by the edge sensor leads. Please see Figure 4 for more details.

Carefully align the active area of the touch screen to the active area of the display. To ensure accurate performance, the center X and Y points of the two active areas should be as close as possible to one another. Typical integrations align the centers within $\pm .5$ mm in both the X and Y positions. The better the alignment, the more accurate the touch will be. Please refer to Figure 5, which illustrates the alignment.

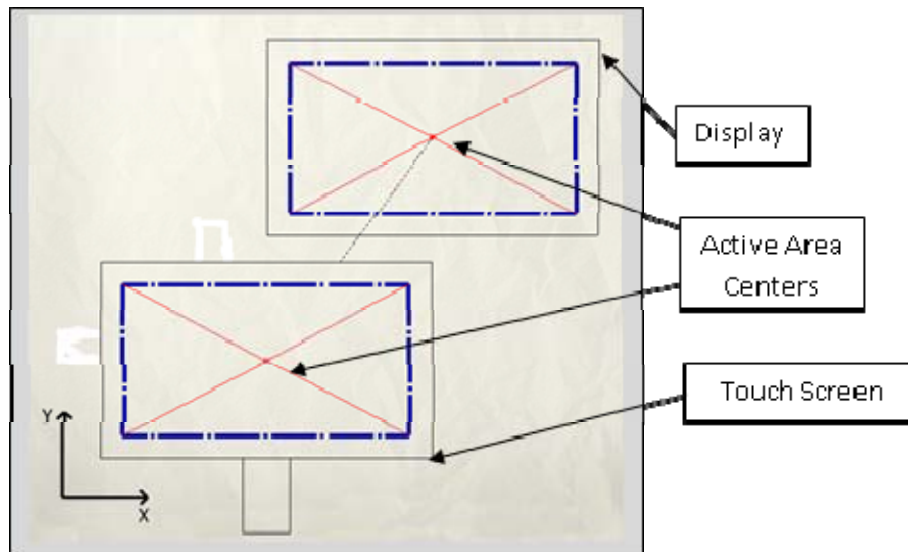
Figure 4: Active Area Definition



4.0 Touch Screen Integration (Continued)

4.3 Touch Screen Placement and Alignment

Figure 5: Aligning Active Areas When Mounting



4.4 Bezel and Gasket Restrictions

- A single perimeter sealing gasket is recommended to ensure a complete seal. Otherwise, liquids or other contaminants may enter the product.
- When desired, gasket strips may also be used.
- Bezels and gaskets should not be placed or mounted within the viewing area of the touch screen by more than 0.020 inches (0.5 mm). Doing so may adversely affect the performance of the touch screen.
- Non-conductive and non-porous gaskets should be used.

4.5 Electro-Magnetic Interference (EMI)

The touch screen and controller should be mounted away from components that create electro-magnetic or radio frequency interference. Refrain from mounting the controller near devices that generate signals in the range of 50 kHz to 100 kHz, as well as transformers and backlight inverters. Mounting near these devices can interfere with the performance of the touch screen and controller.

If a plastic bezel is utilized, metalizing and grounding the bezel will help minimize EMI and noise. If a metal bezel is employed, make sure it is properly grounded.

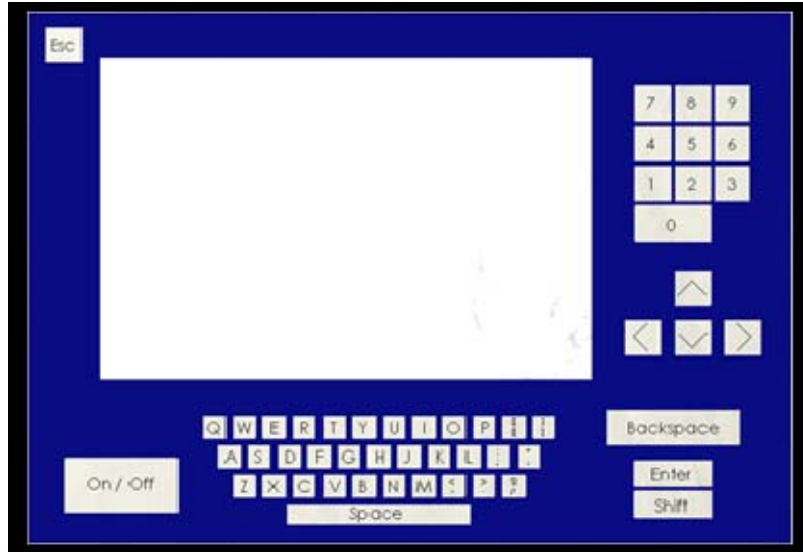
To shield components from the EMI generated by the touch screen and controller, cover the outer edges of the touch screen and its tails with copper tape. Ensure that the copper tape does not lie within the viewing or active area of the touch screen when covering the sensor's edges. The controller should be covered with three layers of tape. First, Kapton tape, then copper tape, then Kapton tape again. All copper tape needs to be properly grounded.

4.0 Touch Screen Integration (Continued)

4.5 Underlay

A graphic underlay may be placed between the display and the touch screen. This underlay may be useful in defining keys or buttons for special applications. An example is shown in Figure 6.

Figure 6: Graphic Underlay Example



5.0 Controller Integration

5.1 Mounting the Controller



Caution:

- The controller is ESD sensitive. Please wear a grounded wrist strap while handling the controller.
- Make sure that the controller is grounded to the display's casing or housing.
- Mount the controller as far as possible from components that produce signals from 50 kHz to 100 kHz, as well as transformers and backlight inverters.
- Nothing should contact the top and bottom sides of the controller; otherwise the controller may short out.

The controller can be mounted in two ways. (See figures 7 and 8 for further information.)

1. Stand-offs with at least one grounded to the casing or housing.
2. Wire / cable grounded to the casing or housing

5.0 Controller Integration (Continued)

5.1 Mounting the Controller

Figure 7: Grounded Stand-Off

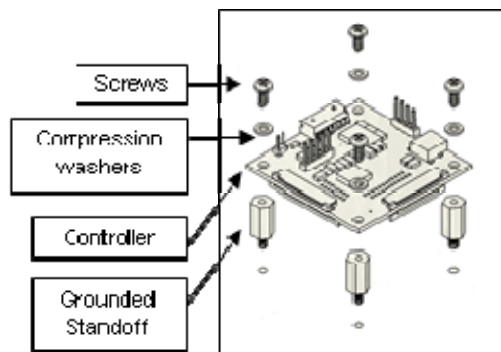
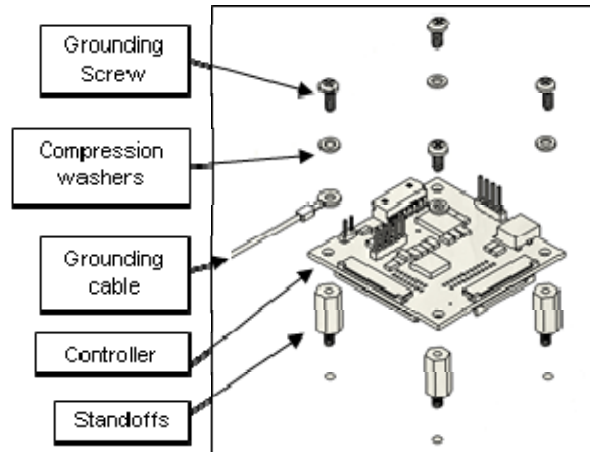
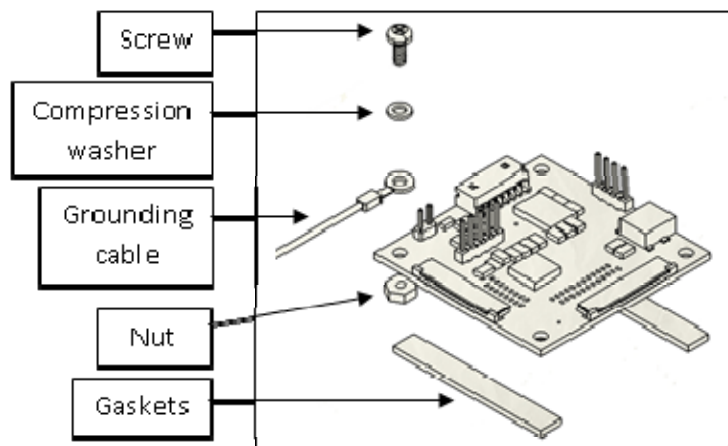


Figure 8: Grounded Cable



If height restrictions cannot accommodate the use of standoffs, thin gaskets may be used to mount the controller, as long as the controller is properly grounded with a cable. Please refer to Figure 9 for this set up.

Figure 9: Gasket Mounting with Grounded Cable



6.0 Touch Screen Tails

6.1 Tail Guidelines

- Keep touch screen tails away from components that create signals from 50kHz to 100kHz, as well as transformers and backlight inverters.
- Keep touch screen tails away from conductive materials if possible. Otherwise, the touch screen tails, or the conductive surfaces should be shielded and separated from one another by at least 0.1”.
- Shielding can be applied by placing Kapton or copper tape on the touch screen tails.
- The touch screen tails should not bend at a radius less than 0.125”, as seen in Figure 10.
- If the sensor tail runs through slots or around sharp edges, cushion the sharp edges to prevent damage to the sensor tails. Please refer to Figure 11.

Figure 10: Touch Screen Tail Minimum Bend Radius

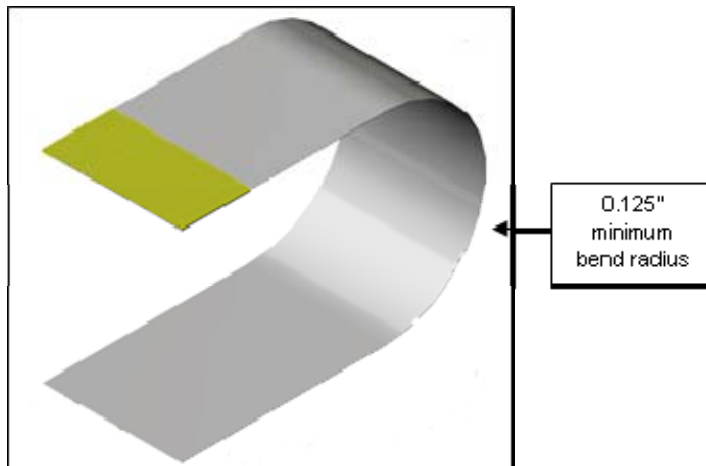
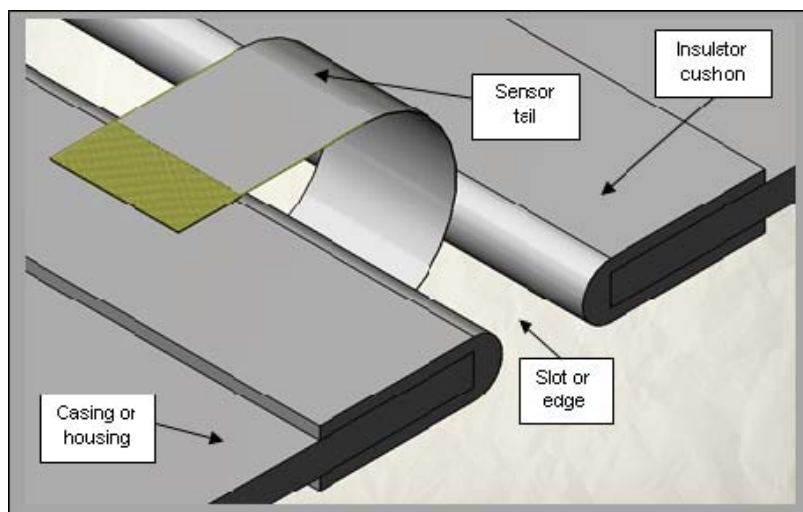


Figure 11: Cushion Edges Around the Touch Screen Tails



6.0 Touch Screen Tails (Continued)

6.1 Connecting the Tails to the Controller

1. To connect the Projected Capacitive Touch Screen tails to the controller, first pull out the connector clips on the control board, as indicated by the red arrows in Figure 12(a). After the clips have been pulled out, insert the sensor tails with the exposed copper wiring on top, as indicated by the blue arrows.
2. Once the sensor tails have been fully inserted into the connectors, close the connector clips to secure the sensor tails in place. Figure 12(b) illustrates this step.

Figure 12(a): Step 1

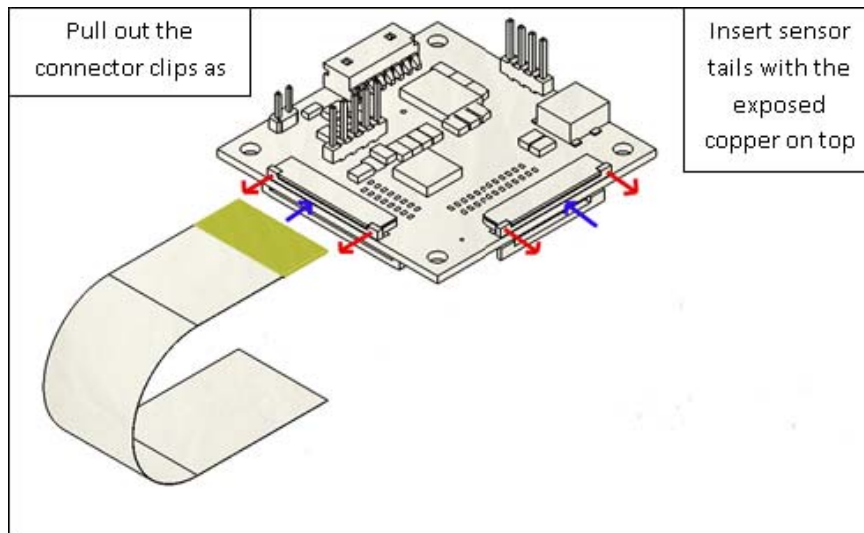
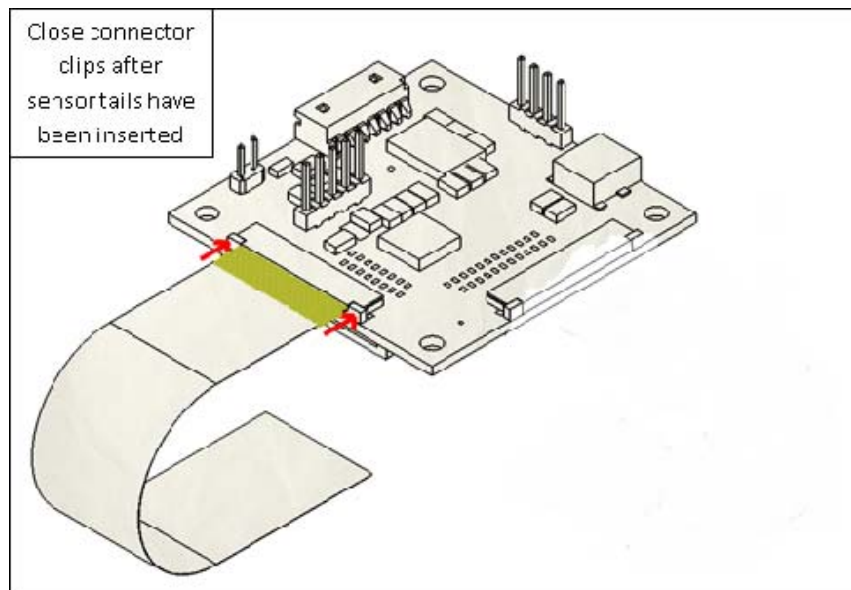


Figure 12(b): Step 2



7.0 Communication

7.1 Controller/Cable Connections

Projected Capacitive controller boards can use different communication cables. The common setups are detailed in this section. After attaching the appropriate cables, they should be secured or mounted to ensure steady power supply and data communication for the control board.

1. A Projected Capacitive controller can use a USB mini cable to both power the board and provide data communication. This is illustrated in Figure 14(a).
2. A Projected Capacitive controller can use a RS232 cable for data communication and a USB mini cable to power the board. Another option is to use the RS232 cable for data communication and a power cable. These different options are shown in Figure 14(b).

Figure 14(a): Connecting the USB Mini Cable

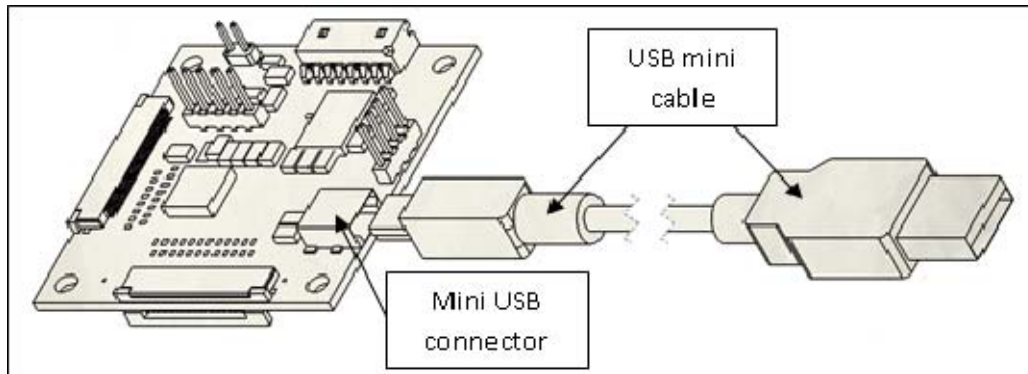
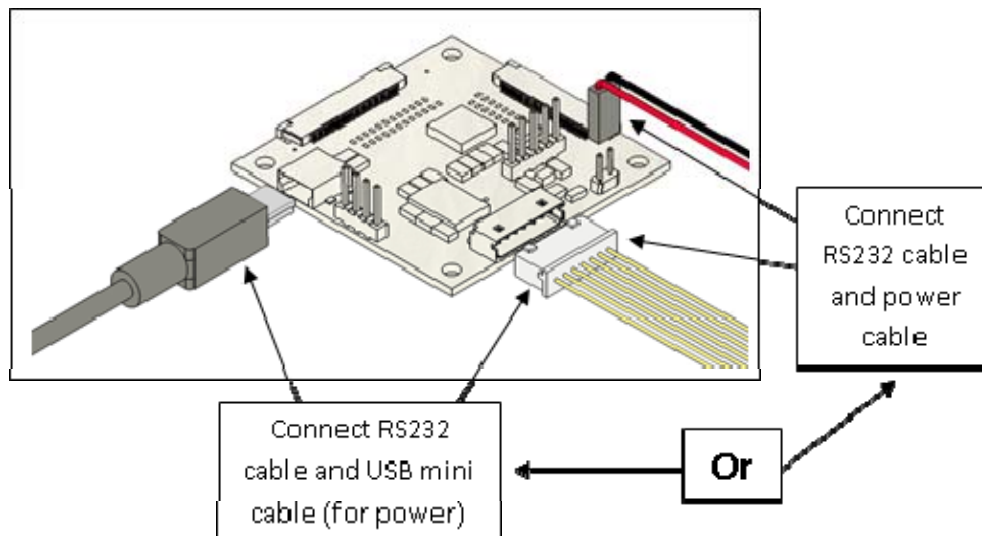


Figure 14(b): Connecting the RS232 Cable and Power



8.0 Troubleshooting

8.1 Checking All Connections

Make sure that the power cables and the communication cables are connected properly and firmly. Make sure that the sensor tails are firmly attached to the controller.

When the controller is connected through a USB port for the first time, windows will automatically install the driver for the controller.

8.2 Mounting the Touch Screen

Make sure to consider the following points while mounting the touch screen.

- The touch screen is securely mounted on the LCD and the tails are securely connected to the controller.
- The controller is firmly attached to the chassis and is grounded.
- The tail of the Touch Screen is connected in such a way that it is not touching any metal objects. Otherwise, utilize insulators between the tail and any metal objects it may contact. This will help reduce the noise level.

8.3 Interference

Projected Capacitive sensors and controllers can be influenced by EMI and RFI. Make sure that the controller is placed far from devices such as transformers and inverters. EMI and RFI can severely affect the performance of the touch screen. Grounding the controller will help reduce EMI and RFI.

9.0 Maintaining the Touch Screen



Caution: Do not use any cleaners with chemicals that can corrode glass or damage the touch screen permanently. When cleaning the touch screen, use a soft, lint free cloth to prevent scratches and contamination. Avoid using sharp/hard objects.

- Always wear a grounded wrist strap while handling the touch screen and controller.
- For high visual clarity, clean the touch screen periodically to remove fingerprints and foreign objects.
- Do not press the touch screen with extreme force.
- Avoid the use of sharp / hard objects on the touch screen.
- Keep sensor tails away from sharp objects and handle them with care.

Technical Support

If you require additional assistance, please contact our technical support team at support@touchintl.com.