Touch Panel Integration Guide

This integration guide is for reference only

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ABOUT THE INTEGRATION GUIDE

This document is intended to provide guidance and cautions related to integrating an Analog Resistive Touch Screen into an enclosure.

The topics and suggestions contained within this document are taken from experience of years working with touch screens. Remember: each situation is different and you may need to adjust some of the following suggestions to best fit your particular application and environment.

Definitions and examples are provided to help illustrate good design practices.

This document does not cover all of the possible methods of touch screen integration, but the general practices apply. Clearances and tolerances are typical with all HantouchUSA touch screens; see individual spec sheets for variances.

GLOSSARY OF TERMS AND DEFINITIONS

Activation force
Force required to push the layers of a touch screen together and register a touch.

Active area
Area on a touch screen where a touch will be accurately detected. It is usually smaller than the viewing area.

Anti-Newton Rings (ANR) Technology
Top film type that eliminates unsightly Newton Rings (see Newton Rings).

Backing panel
Rigid substrate for a touch screen, usually glass, can be made of acrylic, etc.

Buffer layer
Additional protective layer that is laminated to the top circuit layer to increase durabilty.

Buss bar
Silver ink circuits along the edges of the touch screen. Connects the ITO sensing area to the touch screen tail

EMI Shielding
An extra layer of conductive material used to reduce electromagnetic interference (EMI) from passing through the touch screen. Commonly attached to the rear of the touch screen.

Gasket
A die-cut layer that is made of polyester, adhesive, foam, or combinations of these materials. A gasket is typically used to seal a touch screen to a bezel, display or both.

Flat Flex or FPC Circuit (tail)
A circuit board made of a copper-clad flexible substrate, usually polyamide. Excess copper is etched away, leaving behind the desired circuit. The result is a circuit board that is durable and very flexible. HantouchUSA uses FPC circuits for touch screen tails.

ITO
Indium Tin Oxide. A transparent, conductive coating applied to the inside surfaces of touch screen layers.

Linearity
A measure of how well a touch screen reproduces a straight line which has been drawn on it.

Newton Rings
Optical effects that typically resemble an oil film on water. Caused by light interference that occurs when two or more transparent surfaces are close together.

Optical Adhesive
Used to laminate transparent materials such as glass or PET films. Improves optical characteristics of the laminate by removing air gap between the layers. The air gap is where many problems such as glare occur.

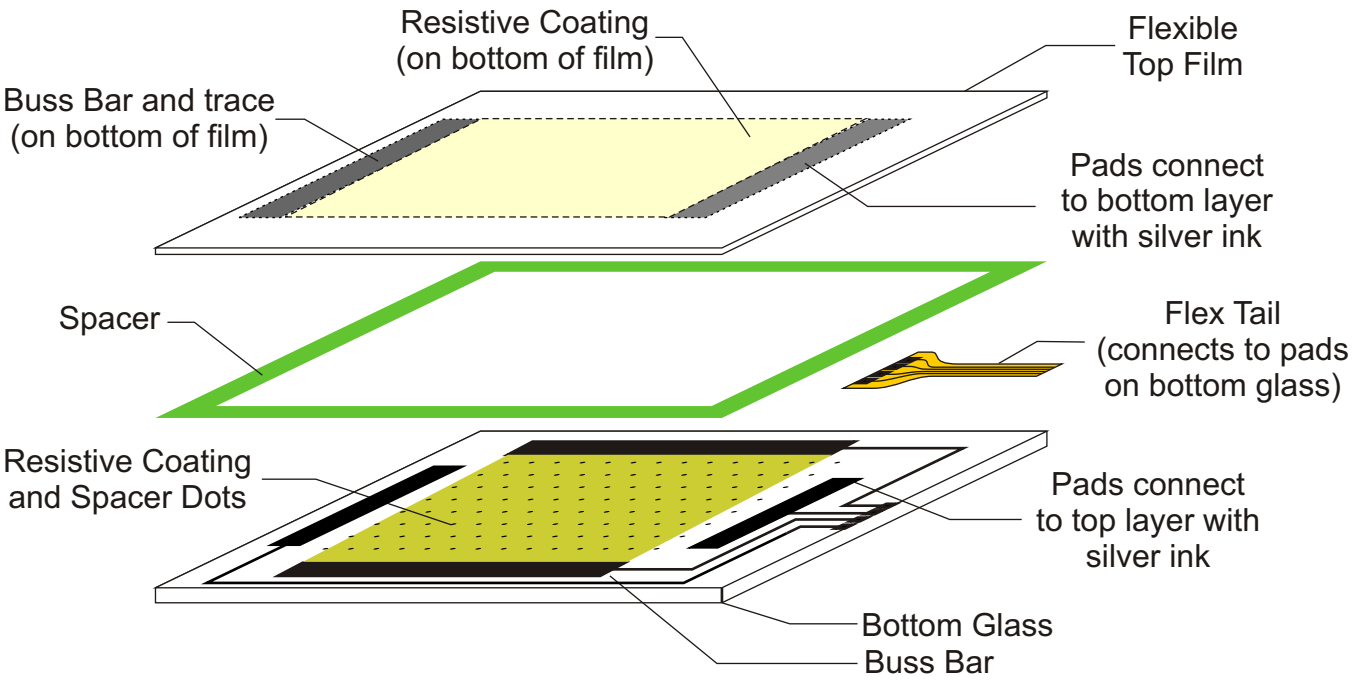
PET (polyester)
PolyEthylene Terephthalate. A highly durable, flexible material used for the top layer in touch screen construction.

Pillowing
A puffiness or bagginess between touch screen layers. Caused by excessive air trapped between layers.

Spacer dots
Small, round dots of transparent insulating material that are used to separate the conductive layers in a touch screen until pressed together by a finger or stylus.

Viewing area
Area of a touch screen that is clear and can be viewed through. Usually larger than the active area.

Typical Analog Touch Screen Construction

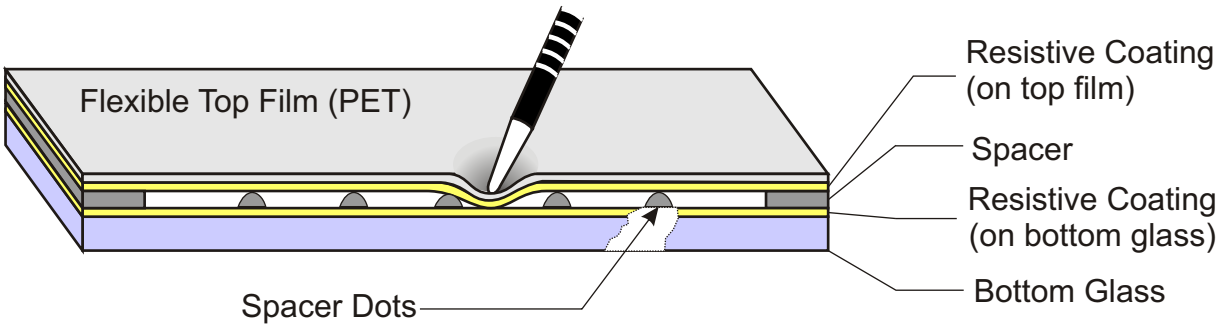


A resistive touch panel is constructed of 2 sheets of material separated slightly by a spacer. A common construction is a sheet of glass providing a stable bottom layer and a sheet of Polyethylene (PET) as a flexible top layer. The spacer may have openings to allow venting.

The two sheets are coated with a resistive substance, usually a metal compound called Indium Tin Oxide (ITO). The ITO is thinly and uniformly sputtered onto both the glass and the PET layer. Nearly invisible bumps called spacer dots are then added to the bottom layer, on top of the resistive ITO coating. The bumps keep the PET film from sagging, causing an accidental or false touch. The amount of pressure needed to cause a “touch event” is largely determined by the size and spacing of the spacer dots.

The Buss Bars and Traces, made of conductive silver ink, connect the ITO layer to the flex tail. The connection may be made with silver ink or a process similar to soldering called heat-seal. Silver ink is again used to connect the top traces to the bottom traces, as needed.

When the PET film is pressed down, the two resistive surfaces meet. The position of this meeting (a touch) can be read by a touch screen controller circuit.



Attaching Touch Screen to the (LCD) Display.

Rear Adhesives

To help prevent dust and moisture, we recommend using a rear adhsive between the touch screen and the display.

Our HantouchUSA rear adhesive uses a strong-bonding adhesive on the touch screen side and on the display side. We can ship the touchscreen with the rear adhesive pre-installed.

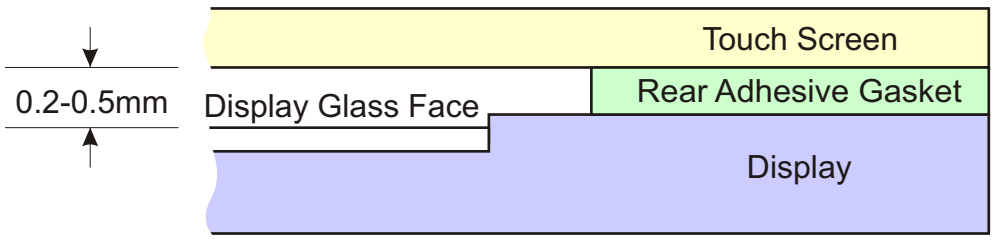
If you should choose to use your own gasket keep the following in mind.

For optimum viewing and to avoid 'Newton Rings', spacing between the touch screen and the display glass should be 0.2 - 0.5mm. Remember to take into account the thickness of the display's metal housing, if applicable.

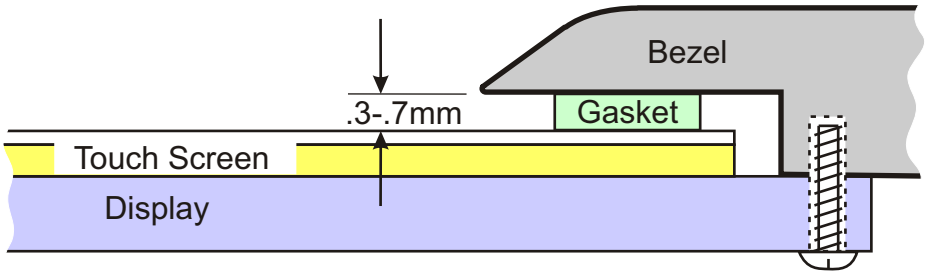
Mounting the Touch Screen to the Display

Attaching the touch screen to the display must be done in a dust-free environment (class 1000 clean-room) to prevent visible particles from becoming trapped between the touch screen and the display. The light from the display can make dust particles glow brightly.

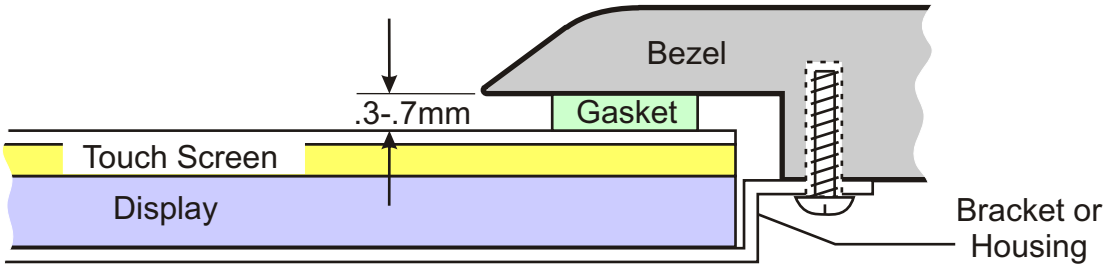
If you do not have clean-room capabilities, HantouchUSA is happy to suggest service providers to perform this work for you.



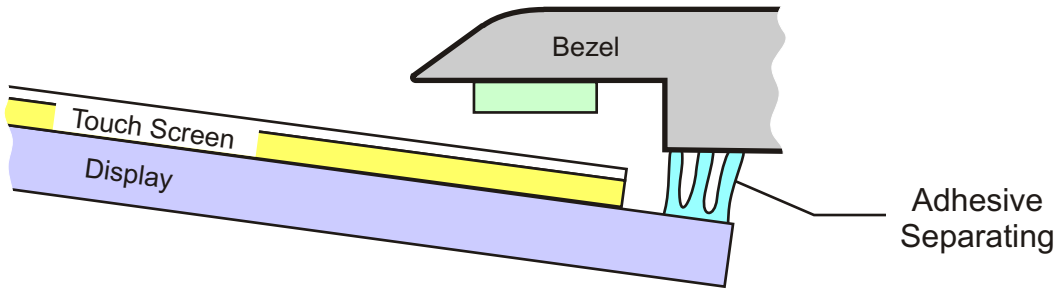
MOUNTING TOUCH SCREEN TO HOUSING BEZEL



If the LCD has mounting holes and the touch screen does not block these holes, the simplest method is to mount the LCD directly to the front bezel.



If the LCD has no mounting holes or if they holes are blocked by the touchscreen, it is recommended that a bracket be added to the LCD for mounting.



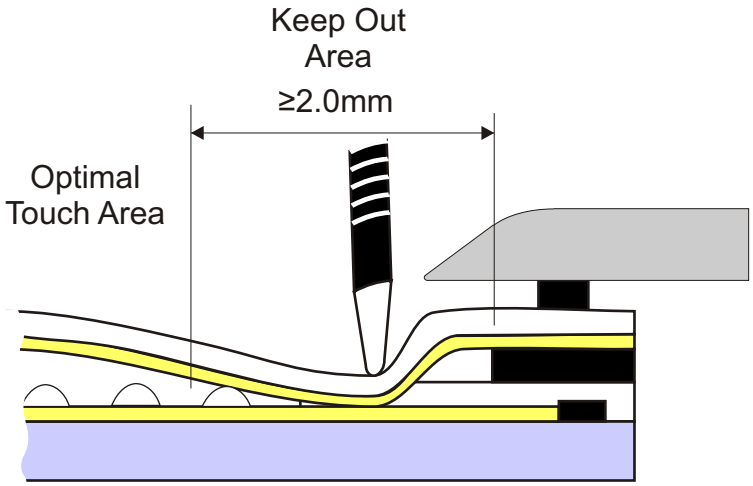
Screws, a clam shell capture arrangement, or other positive locking methods are recommended to insure touch panel stays in place after repeated use. Mounting by adhesive alone is NOT recommended.

Note in the 2 mounting examples, the distance between the touch screen and bezel is determined by a “hard stop” between the LCD panel (or bracket) and the bezel. DO NOT use gaskets or spacers on the front of the touch panel to regulate this gap. The gasket is there ONLY for appearance and to keep out dust and liquids. A large amount of pressure on the touch screen face may result in touch screen failure or inaccurate touches.

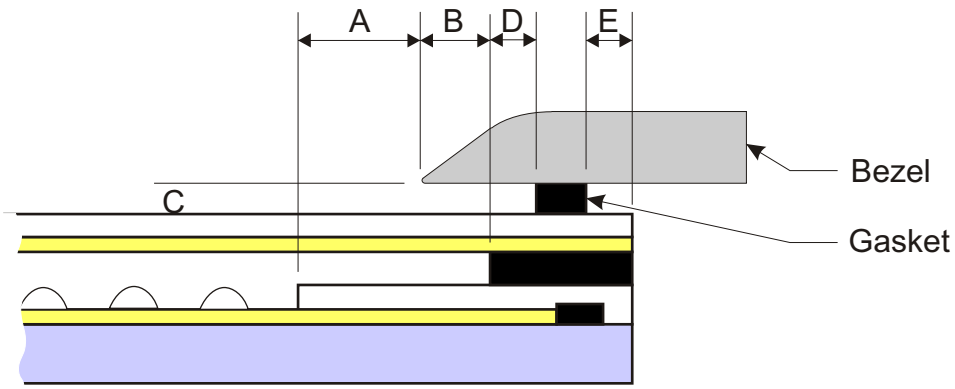
We highly recommend using a foam gasket to prevent dirt or water from entering the enclosure.

Even if you chose not to use a gasket, you must maintain the .3-.7mm spacing between the face of the touchscreen and the inner face of the bezel. Failure to keep this clearance may result in damage to the touch screen.

CAUTIONS AND TOLERANCES



The above figure illustrates how touches close to the internal spacer can cause the top layer to flex at a sharp angle, cracking the top layer's resistive coating. This cracking may result in reduced touch sensitivity or changes in linearity. Avoid putting buttons or other touch features within 2mm of the internal spacer. Preferably, design your system in such a way that a touch right next to the bezel is 2mm or more from the internal spacer. If this not possible, HantouchUSA offers a special film option to help correct the problem.



A: Bezel Edge to Active Area	1.0mm (min)
B: Bezel Edge to Viewable Area	.8mm (min)
C: Bezel Inner face to Touch Screen Top Layer	.3-.7mm
D: Inner Gasket Edge to Viewable Area	1.0mm min*
E: Outer Gasket Edge to Edge of Touch Screen Top Layer	0.5mm min*

*may need to increase to take into account gasket thickness, compression ratio and tolerance due to assembly limitations

NOTES ON DIMENSIONS:
A: Prevents false touches due to bezel flexing, dirt accumulation, etc
B: Provides a cosmetically pleasing bezel design
C: Prevents touch screen from flexing or twisting due to imperfections in bezel inner face
D: Prevents false touches due to gasket pressing on flexible area of touch screen
E: Prevents electrical shorting due to gasket rolling over outer edge of touch screen

Tail Considerations and Cautions

Tail Handling Precautions

The tail, while not fragile, can be damaged by improper usage and handling.

Never Pick up the Touch Screen by Its Tail.
This includes when removing the touch screen from its packaging. Holding by the tail can cause a lot of pressure on the junction of the tail and the touch screen and cause the touch screen to fail.

Avoid Twisting the Tail
Twisting the tail can place considerable stress where the tail meets the touch screen.

Avoid Touching the Tail Conductors
Touching the tail conductors may contaminate them. This could result in reduced sensitivity or even corrosion.

Tail Design Considerations

Tail Bend and Twist
Tail bend radius is 3mm minimum. Design the system to avoid creasing the tail. Avoid twisting the tail. While the tails are very durable, bends and twists can put considerable pressure on the tail and the tail-touch screen junction.

Strain Relief
No strain relief is required as long as the bend radius at the touch screen is 3mm. The tail should not place any tension on the top film layer.

Noise
Try to avoid routing the tail near any electrically noisy areas such as backlights, high energy coils, etc. The tail could act as an antenna and the noise may reduce sensitivity or give inaccurate touch results.