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LCD Resources:

How to Choose a Connector for a TFT

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Most of Focus LCDs' TFT product lines utilize FPC (Flexible Printed Circuit) cables for interfacing with their respective LCD panel. Displays with FPC cables are great for compact assemblies because they reduce the area required by pins to interface with the display.

If you are planning to use a Focus LCDs TFT in your product, you will most likely require a connector for the FPC. This will allow the LCD to interact with other components within your assembly. In this article, we will discuss the key characteristics of an FPC cable to aid in finding the right connector for your assembly. Most Focus LCDs TFT specifications include a recommended connector in the pinout section, however, with this guide, you can find any connector that you see fit.

These characteristics can typically be found within the LCD's drawing. Below, *Figure 1* is an example of an FPC on a drawing. We will be assessing this same FPC throughout. For the full TFT specification, please see the following link: https://focuslcds.com/content/E35RA-FW280-CA_Spec.pdf

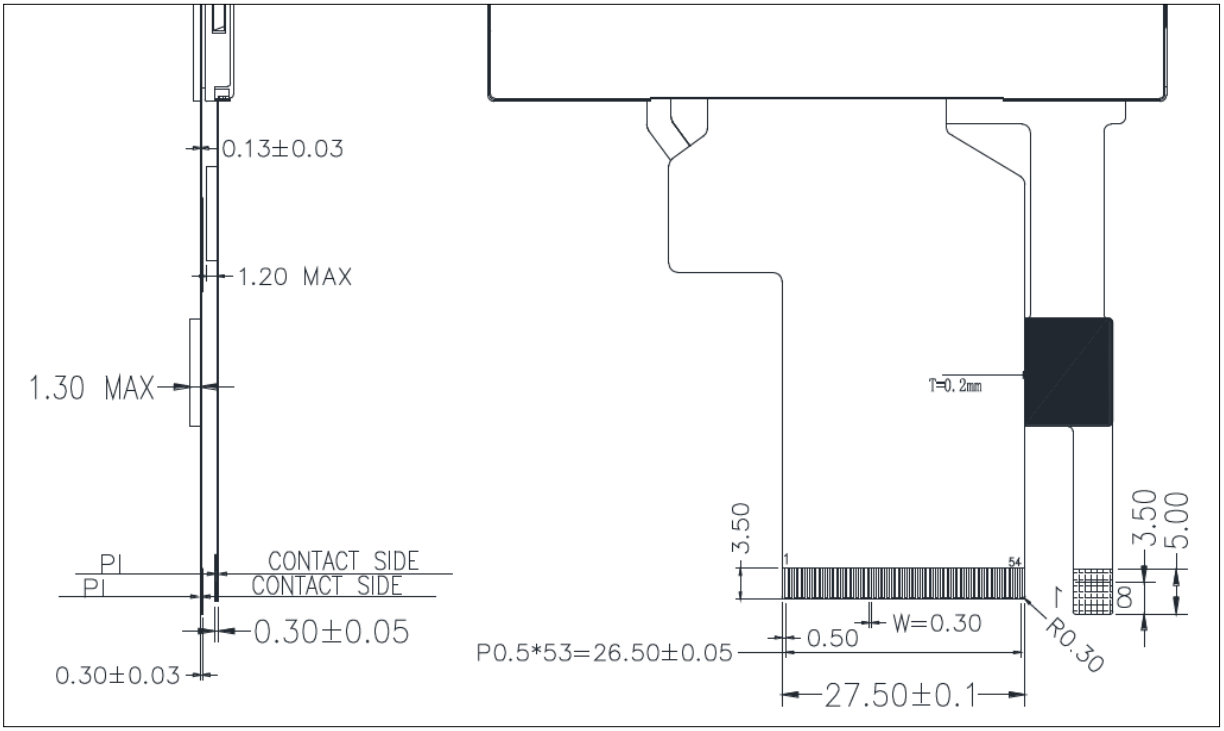

Figure 1

Positions

The number of positions on an FPC is essentially the number of pins. While you can visually count each individual pin, it is more practical to reference the numbers above the contacts.

In *Figure 2*, on the left side of the FPC above the contacts, there is a "1". This represents the first pin or position on the FPC. On the right side of the FPC above the contacts there should be a larger number. In *Figure 2*'s case, the larger number is 54. This means that the final pin or position is 54. Therefore, there are a total of 54 positions.

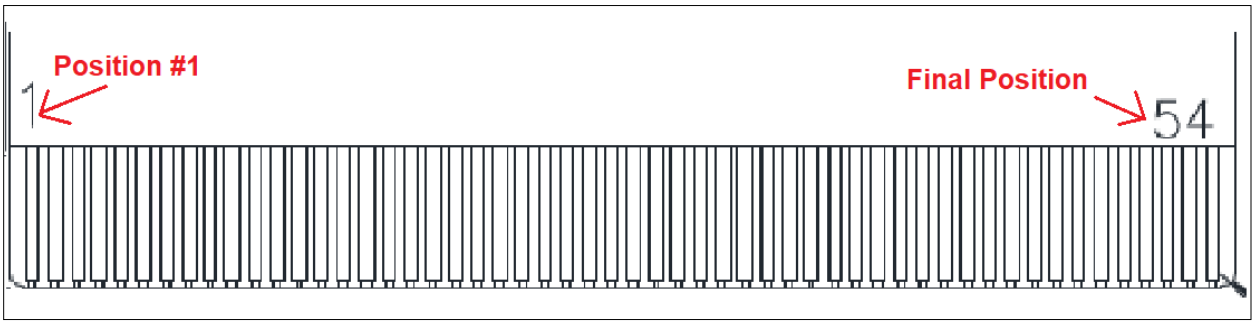

Figure 2: FPC Contact Positions

Pin Pitch

Pin pitch is defined as the distance between the center of one pin to the center of the next pin. (see *Figure 3*) On LCD drawings, the pin pitch is typically denoted within the following formula:

P[Pitch][# of Pins] = [Width of each pin + space between each pin] ± [Tolerance]*

In this example, it is written as: P0.5*53 = 26.5 ± 0.05. Therefore, the pin pitch is 0.5mm. *Figure 4* shows what this notation will look like on a typical LCD drawing.

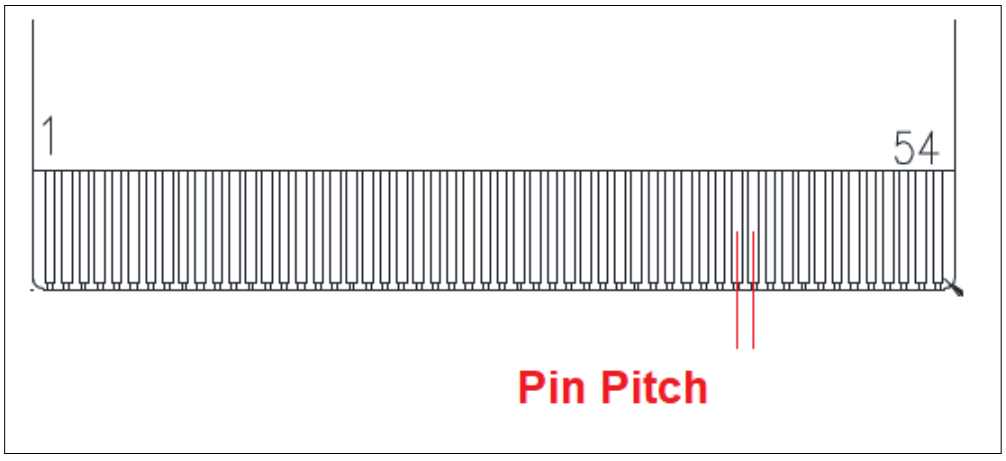

Figure 3: Pin Pitch Visualized

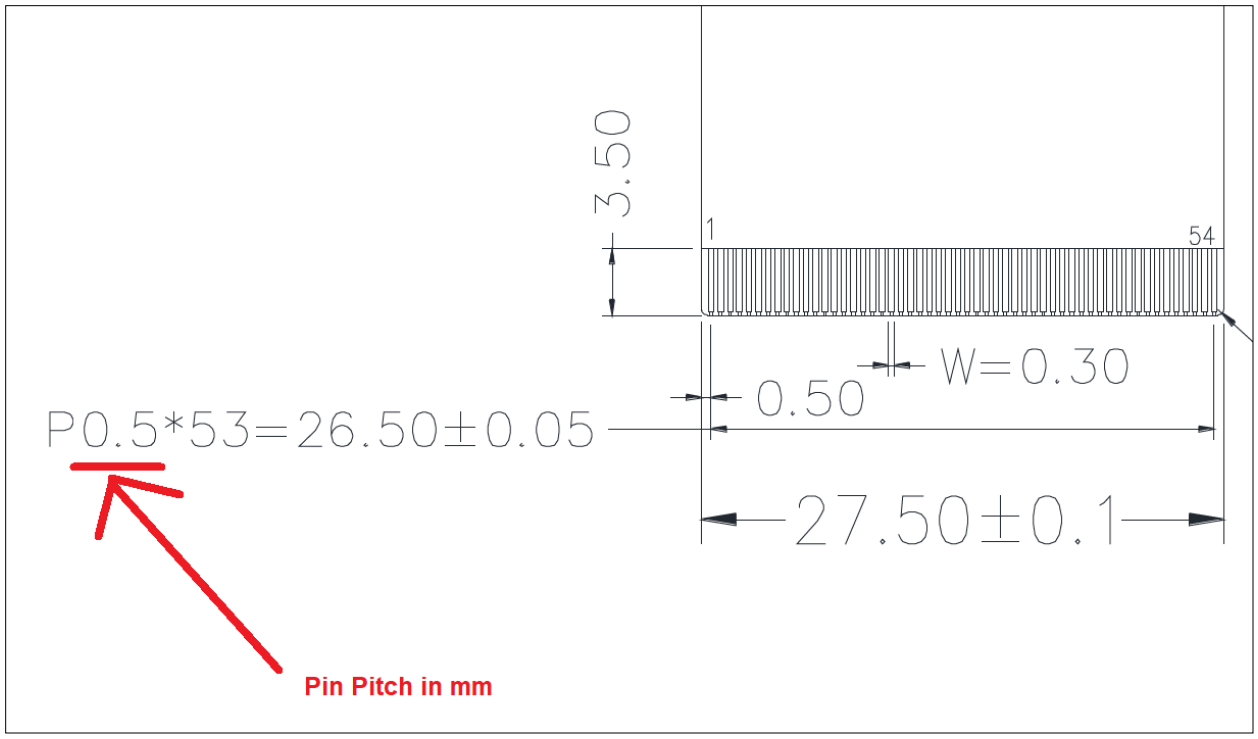

Figure 4: Pin Pitch Denotation

Thickness

Thickness is typically determined by the combined thickness of the FPC contacts, stiffener, and FPC. On your TFT's drawing, locate the side view of the LCD. There should be side view dimensions for the FPC in addition to the LCD.

My LCD drawing has 2 FPCs. How can I differentiate between them?

> If you are looking at a drawing for a TFT with a capacitive touch panel, there will most likely be two FPCs. When using the side view dimensions, you will want to ensure that you are still looking at the FPC you are trying to find a connector for. From the side view, it may seem difficult to differentiate between the two. While there are several ways to differentiate them, we have outlined the easiest method below:
>
> The touch panel FPC will be drawn coming out from under the touch panel/front glass. The LCD FPC will be drawn coming out from the bottom of the LCD and backlight assembly. *Figure 5* shows the side view of the FPC used in the aforementioned examples. The purple section is the LCD FPC, and the green section below the LCD module is the touch panel FPC.

Because we are currently determining the correct mating connector for the LCD FPC, we will use the combined LCD FPC, contacts, and stiffener thickness dimension of 0.3mm.

NOTE: While both thickness dimensions are 0.3mm in this example, this is not always the case with other LCDs utilizing multiple FPCs.

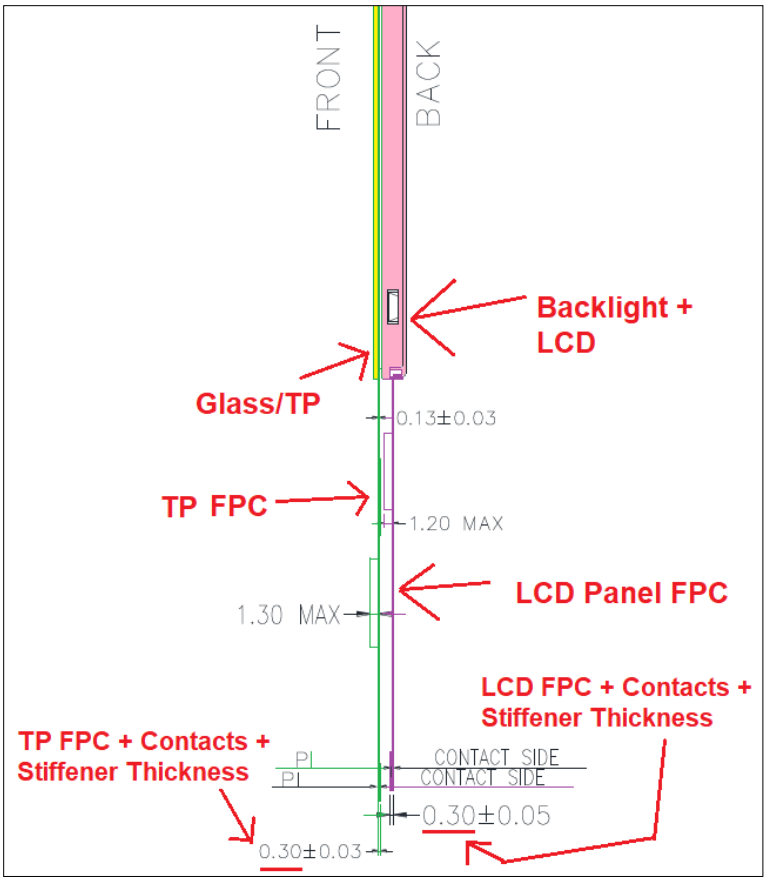

Figure 5: LCD FPC vs TP FPC

Other Considerations

There are many different specifications for an FPC connector. While you want to choose a connector that fits the FPC, you'll also want to consider certain characteristics in regard to your assembly. The most important characteristics are outlined below.

Contact Type

The three main types of contacts are the following:

1. Top – metal contacts are on the internal top side of the connector
2. Bottom – metal contacts are on the internal bottom side of the connector
3. Top and Bottom – metal contacts are on both the internal top and bottom sides of the connector

Depending on the display being used, the contacts could be on the same side as the front of the LCD, or on the back side. When you connect the display, you will need to determine whether top or bottom contacts will work best according to the displays position within your assembly.

For this example, if we wanted to have the LCD lie flat within the assembly without bending the FPC, we would choose the bottom contact type since the contacts are on the backside of the FPC.

Locking Feature or Actuator Type

There are several different types of locking features. If using a Focus LCDs TFT, we provide recommendations with a flip lock or slide lock locking feature.

Slide Lock

Requires the user to pull the actuator open, insert the FPC, then slide the actuator back down to lock the FPC in place.

Flip Lock

Requires the user to flip open the actuator, insert the FPC, then flip the actuator back down to firmly hold the FPC in place.

Both types of locking feature will achieve the same goal.

Choosing the Connector

The easiest way to find a connector for your display is by going to any large ecommerce electronics site that has product filtering such as Digi-Key or Mouser. In this example, we are using the Digi-Key. https://www.digikey.com/en/products/filter/ffc-fpc-flat-flexible-connectors/399

Go to the connectors for FFC and FPC category. Go through each filter and select the necessary information. We recommend selecting the filters based on the order of characteristics we've outlined within this article.

1. Number of positions: 54
2. Pitch: 0.5mm
3. Thickness: 0.3mm
4. Contact Type: Bottom
5. Actuator Type: Slide Lock

These filters should narrow down the choices enough so that you can choose a connector based on personal preference.

Based on the FPC characteristics, Focus LCDs would recommend Amphenol connector part number F32R-1A7H1-11054 for this display.

Still not sure which connector to choose for your Focus LCDs display? Contact us today for recommendations. Focus LCDs = LCDs Made Simple®

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Designer represents that, with respect to their applications, Designer has all the necessary expertise to create and implement safeguards that:

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(2) monitor failures and their consequences, and

(3) lessen the likelihood of failures that might cause harm and take appropriate actions.

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