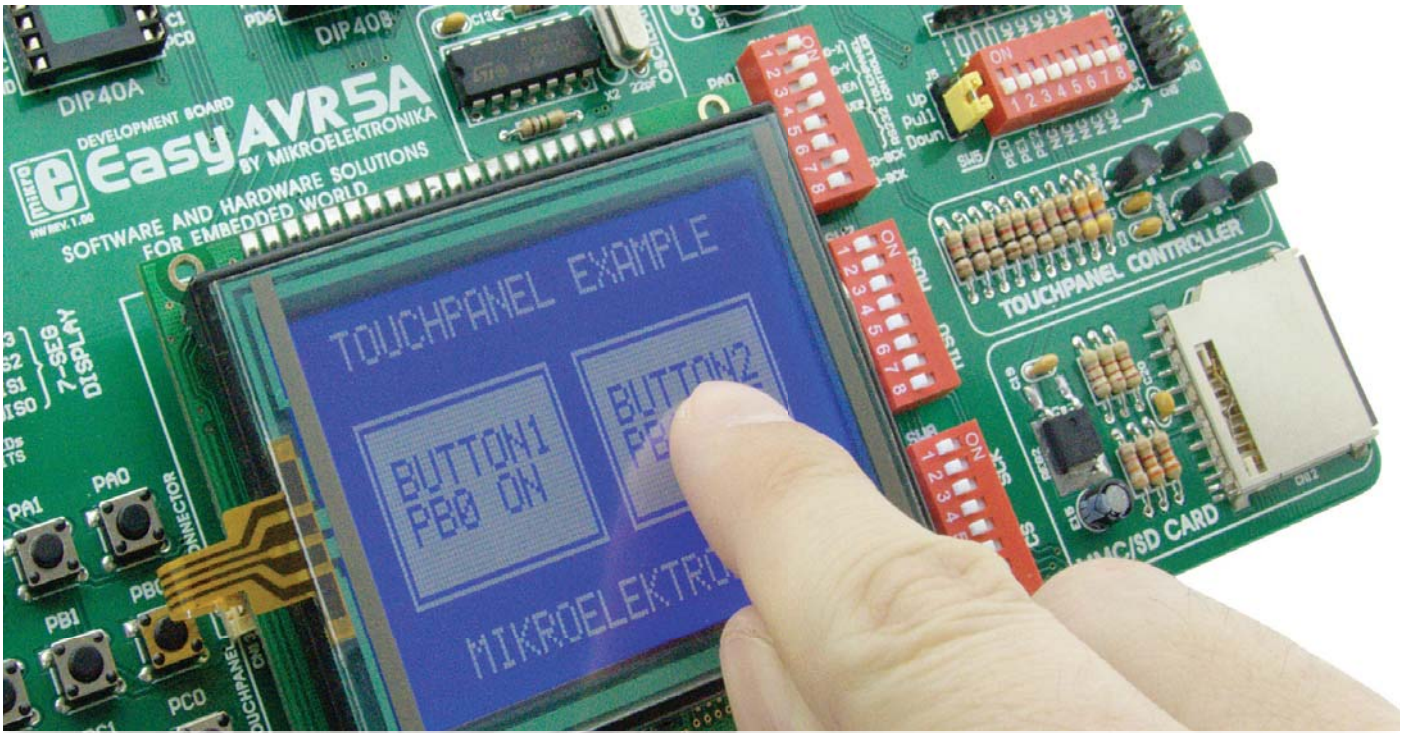


# OK. Now you need a... TOUCHSCREEN



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Do you want your new device to have a simple and intuitive interface? If the answer is YES, then a graphic LCD display with touch panel is the best choice because together they create a Touchscreen (Glcd + Touch Panel = Touchscreen). In that way, with a small number of electronic components you will be able to create an attractive and easy to use device.

What is a touch panel? A touch panel is a thin, self-adhesive transparent panel placed over the screen of a graphic LCD. It is very sensitive to pressure so that even a soft touch causes some changes on output signal. There are a few types of touch panel. The simplest one is the resistive touch panel which will be discussed here.

### Principle of operation

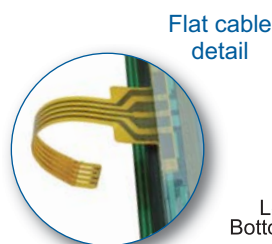
A resistive touch panel consists of two transparent rigid foils, forming a "sandwich" structure, that have resistive layers on their inner sides. The resistance of these layers usually does not exceed 1Kohm. The opposite sides of the foils have contacts available for use through a flat cable. The process of determining coordinates of the point in which the touch panel is pressed can be broken up into two steps. The first one is the determination of the X coordinate and the second one is the determination of the Y coordinate of the point. In order to determine the X coordinate, it is necessary to connect the left contact on the X surface to ground and the right contact to the power supply. This enables a voltage divider to be obtained by pressing the touch panel. The val-

ue of the divider is read on the bottom contact of the Y surface. Voltage can be in the range of 0V to the power supply and depends on the X coordinate. If the point is closer to the left contact of the X surface, the voltage will be closer to 0V. In order to determine the Y coordinate, it is necessary to connect the bottom contact on the Y surface to ground, and the upper contact to power supply.

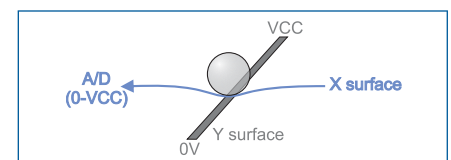
In this case, the voltage is read on the left contact of the X surface.

### Connecting to microcontroller

In order to connect a touch panel to the microcontroller it is necessary to create a circuit for touch panel control. By means of this circuit, the microcontroller connects appropriate contacts of the touch panel to ground and the power supply (as described above) in order to determine the X



Flat cable detail



Determination of Y coordinate

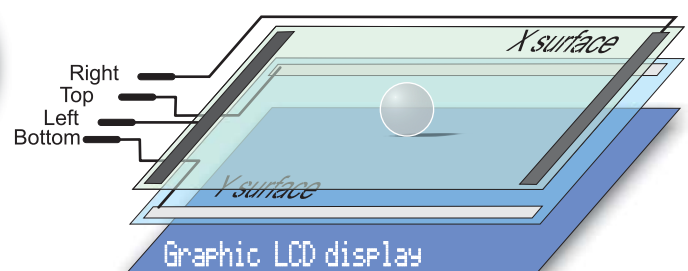


Figure 1. Touch panel internal structure

