

TUT99(TM57FLA80) uTouch Sensor with LCD

Application Note

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Preliminary

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PRODUCT NAME

TUT-99

TITLE

uTouch Sensor with LCD

APPLICATION NOTE

1. Introduction to the product's functions

This is a product that is primarily a capacitive touch button device with a function that can also be used to control LCD to display time. It can also be used with a matching USB IC to connect and communicate with applications on the PC side through SPI or PARALLEL transmission mode and display the touch button function and its variation quantities on the computer application. It can allow developers to verify functions and variation rates easily as well as applying quickly.

2. Introduction to software and hardware functions

- 2.1 Introduction to hardware functions
 - 2.1.1 TUT-99 V2.1 Device



- (1) Design the LCD prototype to display time and the numerical number of the touch button.
- (2) Touch Slider and Function on/off Key

A slider on/off key, which is used mainly to switch between the function to set up the numerical number of the touch button to be displayed on the LCD and the function to display time on the LCD.

(3) Touch Number Key

Touch Number Key can be used not only to display the corresponding touch key number on the LCD but also to set the detail of time of the clock, such as begin setting up clock, set up the hours and minutes, and finish setting up clock etc., through switching Slider on/off Key to off state.

- (4) Slider and Sensor LED
 - 1. Slider LED will blend colors when a finger slides across it.
 - 2. Sensor LED will sense the light response when the finger closes to the touch key but does not touch it yet.
- (5) Switch Power Pin

JUMP can be used to switch the power supply of the device to use battery or the regulated 3.3V of USB.

- (6) Data transmission supporting SPI Pin
- (7) Adjusting the DIP Switch to ON and one can use PIN to burn TM57FLA80 at any time.



Advance Information

2.1.2 TUT-99 V1.21 Device



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(1) Touch Slider

Use the on/off key in the middle to turn on and off the sliding strip function.

(2) Touch Number Key

It can be designed into a style similar to the arrangement of a telephone keypad and display the corresponding LED lights on the hardware.

- (3) Slider and Sensor LED
 - 1. Slider LED will blend colors when a finger slides across it.
 - 2. Sensor LED will sense the light response when the finger closes to the touch key but does not touch it yet.
- (4) Switch Power Pin

JUMP can be used to switch the power supply of the device to use battery or the regulated 3.3V of USB.

- (5) Data transmission supporting Parallel Pin
- (6) Adjusting the DIP Switch to ON and one can use PIN to burn TM57FLA80 at any time.



2.2 Introduction to Software Function

Click on uTouchDashboard.exe to open the computer application. The interface is shown as follows:

U Touch		
1 2 3 4 5 6 7 8 9 * 0 #	Value change 200 100 100 50 0 Rate of change 50 50 50 50 50 50 50 50 50 50	
Realtime Value		
100 160 170 160 160 160 160 100 150 110 100 Value:122 Avg:121 Min:118 50 110 120 110 110 110 110 50 100 60 50 0 1 2 3 4 5 6 7 8 9 51 5	100 90 100 110 170 90 100 100 100 100 100 100 100 100 100 100	

Use the movement of the mouse cursor to select the button and can observe clearly the variation of the current, average, maximum, and minimum values for any touch button to facilitate the recording of their values.

3. Notes for circuit design

- (1). Please use the circuits suggested in the application circuit section as the basis for circuit design.
- (2). 10 mil trace width is recommended for touch button applications during circuit design (excluding power, ground, and CLK traces).
- (3). The wires to be used for power, ground, and CLK are recommended to be thicker than 20 mil during circuit design
- (4). The traces between PADs (induction copper foil) should be through the middle of the PCB board as much as possible (but not underneath the copper foils directly) or stay away from the edges of the PCB board to prevent malfunction.
- (5). The traces for touch buttons should be equal distanced or symmetric; the number of Via should not be more than 1 as much as possible; the distance between traces should be as far away as possible, at least 3 times of the trace width. In particular, stay away from the high-frequency signal lines as well. Do not run in parallel with high frequency signal lines; in worst case, try to run in vertical direction.
- (6). The interconnection between PADs(induction copper foil) should be on a different layout layer from PAD(induction copper foil). They can be connected through one Via. All component should be in a different layout layer from PAD(induction copper foil).
- (7). DP and DM should run in parallel with equal length; try not to use Via as much as possible.
- (8). Please use FR4 1.6mm for PCB board thickness, two ounces for copper foil thickness with chemical gold plating.
- (9). Large area of copper pour on PCB board is not recommended **on** the circuits **in** the touch control block of this product.
- (10). It is recommended to adopt mesh style copper pour on the edges of the PCB board as shown in Figure 1. When the setting is Hatched, Track width=0.178mm, and Grid size=0.89mm, the performance of rate of the variation can be improved.
- (11). The thickness of dielectric is recommended to be below 2mm.
- (12). The dielectric should stick tightly on top of touch control copper foils(using adhesive); it would be best if contains no air at all.
- (13). The shortest distance for the crisscross between the Slider key PAD(induction copper foil) and PAD(induction copper foil) is recommended to be at least 10mil; for the other parts is shown as in the rules in Figure 2.

(14). It is recommended to keep the distance between the Number key PAD(induction copper foil) and PAD(induction copper foil) as shown in the rules in Figure 3.



Figure 1. mesh style copper pour



Figure 1. Slider Key Design Rule

Figure 3 Number Key Design Rule

4 Circuit Application

4.1 TUT-99 V2.1



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tenx technology, inc. Rev 1.0, 2010/04/14

4.2 TUT-99 V1.21



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