

Analog 4-wire PET-On-Glass Touch Screen Specification

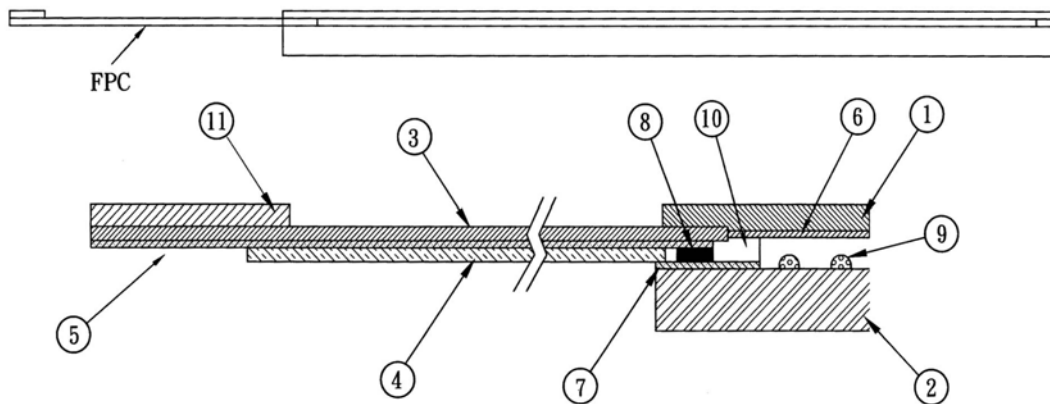
1. Mechanical Dimensions and Construction

1.1 General: Analog Resistive touch screen is laminated by ITO PET to ITO glass.

1.2 Construction :

Item	Description	Material	Remarks
1	ITO PET (Top layer)	0.188mm ITO PET Film	Antiglare coating Surface hardness: 3H Resistance:300~600Ω/□
2	ITO Patterned Glass (Bottom layer)	1.10mm ITO Glass	Resistance:300~600Ω/□
3	Tail Base	Kapton	Separated Tail
4	Tail Coverlay	Kapton	
5	Conductor	Copper	
6	Top layer circuit	Silver ink	
7	Bottom layer circuit	Silver ink	
8	Layer to layer contacted	Silver ink	
9	Dot spacer	UV Cure ink	
10	Isolation Layer	Isolation Adhesive	
11	Stiffener	PET Film	

Touch screen side view:



Changes that contribute to technical improvement are subject to alternations

				2002	Datum	Name	TOUCHSCREEN 10,4", 4-Wire SPECIFICATIONS OF ANALOG RESISTIVE PET-ON-GLASS TOUCH SCREEN Manufactured bei Apex Material Technology Corp.
				Bearb.	24.10.	Maurer	
				Gepr.	24.10.	Maurer	
				Vert.			
				EDV-Datasheet don't change manually			
				SCHURTER			H 1070.0432
Zu	Änd.	Datum	Name	D 79346 Eendingen			Blatt 1 von 5 Index: -

1.3 Input Method and Activation Force

Input Method	Average Activation Force
1.6mm dia. Delrin stylus	10~70 grams
16mm dia. Silicon "finger"	10~ 80 grams

2. Typical Optical Characteristics

- 2.1 Visible Light Transmission: >80%
- 2.2 Haze: 3~7% (JIS K-7105)


3. Electrical Specifications

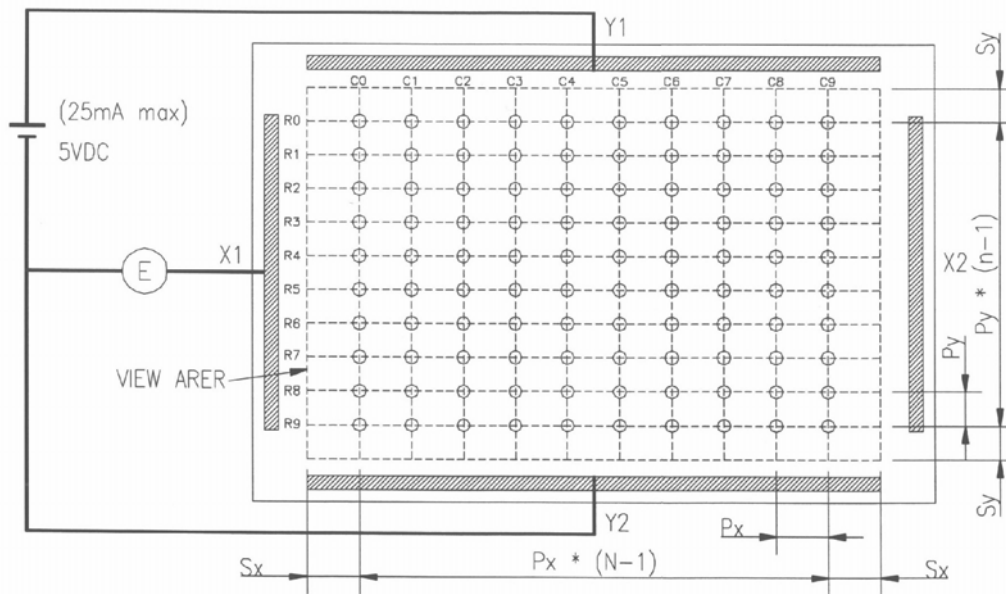
- 3.1 Operating Voltage: 5.5V or less
- 3.2 Contact current: 20mA (maximum)
- 3.3 Circuit close resistance: X : 400~1000Ω, Y : 200~650Ω
- 3.4 Circuit open resistance: > 10MΩ at 25VDC
- 3.5 Contact bounce: < 10ms
- 3.6 Linear Test : <1.5 %
- 3.7 Capacitance: 100nF(maximum)

4. Linearity

- 4.1 Linear Test Specification
 - Direction X: <1.5 %
 - Direction Y: <1.5 %
- 4.2 Line Test Circuit for Y Coordinate
 Add 5V between Y1 and Y2 touch the point C0R0 to C9R9 separately, and measure the voltage from X1 as the following drawing.

Changes that contribute to technical improvement are subject to alternations

				2002	Datum	Name	TOUCHSCREEN 10,4", 4-Wire SPECIFICATIONS OF ANALOG RESISTIVE PET-ON-GLASS TOUCH SCREEN Manufactured bei Apex Material Technology Corp.
				Bearb.	24.10.	Maurer	
				Gepr.	24.10.	Maurer	
				Vert.			
				EDV-Datasheet don't change manually			
				 SCHURTER			H 1070.0432
Zu	Änd.	Datum	Name	D 79346 Eendingen			Blatt 2 von 5 Index: -



4.3 Calculate Linearity : For the First Row0

$$R0_{avg} = (VC0 + VC1 + VC2 + \dots + VC9) \div 10$$

R0max = The maximum voltage in Row 0
R0min = The minimum voltage in Row 0
 $R0 \text{ linear1} = \left| R0 \text{ max} - R0 \text{ avg.} \right| \div R0 \text{ avg.} * 100\%$
 $R0 \text{ linear2} = \left| R0 \text{ min} - R0 \text{ avg.} \right| \div R0 \text{ avg.} * 100\%$
R0 linear = max (R0 linear1, R0 linear2)

4.4 For X Coordinate Test

Add 5 voltage between X1 and X2 touch the point C0R0 to C9R9 separately and measure the voltage from Y1 as the above drawing

4.5 Calculate Linearity : For the First Column0

$$C0_{avg} = (VR0 + VR1 + VR2 + \dots + VR9) \div 10$$

C0max = The maximum voltage in Column 0
C0min = The minimum voltage in Column 0
 $C0 \text{ linear1} = \left| C0 \text{ max} - C0 \text{ avg.} \right| \div C0 \text{ avg.} * 100\%$
 $C0 \text{ linear2} = \left| C0 \text{ min} - C0 \text{ avg.} \right| \div C0 \text{ avg.} * 100\%$
C0 linear = max (C0 linear1 , C0 linear2)

Changes that contribute to technical improvement are subject to alternations

				2002	Datum	Name	TOUCHSCREEN 10,4", 4-Wire SPECIFICATIONS OF ANALOG RESISTIVE PET-ON-GLASS TOUCH SCREEN Manufactured bei Apex Material Technology Corp.
				Bearb.	24.10.	Maurer	
				Gepr.	24.10.	Maurer	
				Vert.			
				EDV-Datasheet			
				don't change manually			
				SCHURTER			H 1070.0432
Zu	Änd.	Datum	Name	D 79346 Endingen			Blatt 3 von 5 Index: -

5. Environment Specification

5.1	Operating Temperature	- 10° C ~ + 60° C	Humidity less than 90% RH
5.2	Storage Temperature	- 20° C ~ + 80° C	at Ambient Humidity

6. Reliability Test

6.1 Exposure to high temperature

Touch panel is put into a test machine at the condition of 80° for 120 hours. Then it is left at the room temperature for 24 hours or more. The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

6.2 Exposure to low temperature

Touch panel is put into a test machine at the condition of -20° for 120 hours. Then it is left at the room temperature for 24 hours or more. The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

6.3 Exposure to constant temperature and humidity

Touch panel is put into a test machine at the condition of 60°, 90%RH for 120 hours. Then it is left at the room temperature for 24 hours or more. The measurement must satisfy the following:


- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

6.4 Thermal Shock

Touch panel is put into a test machine at the condition of -20° for 30 minutes, and then 80° for 30 minutes. The process is repeated by 10 cycles. Then it is left at the room temperature for 24 hours or more. The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

Changes that contribute to technical improvement are subject to alternations

				2002	Datum	Name	TOUCHSCREEN 10,4", 4-Wire SPECIFICATIONS OF ANALOG RESISTIVE PET-ON-GLASS TOUCH SCREEN Manufactured bei Apex Material Technology Corp.
				Bearb.	24.10.	Maurer	
				Gepr.	24.10.	Maurer	
				Vert.			
				EDV-Datasheet			
				don't change manually			
				 SCHURTER			H 1070.0432
Zu	Änd.	Datum	Name	D 79346 Eendingen			Blatt 4 von 5 Index: -

7. Durability test:

7.1 Finger touches

Touch panel is hit 10 millions times with a silicone rubber of R8 finger, hitting rate is by 250g at 2 times per second. The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

7.2 Stylus writing

Touch panel is drawn by R0.8 Derlin stylus pen, at 250g forces, repeat one inch by 100K times. The measurement must satisfy the following:

- Circuit close resistance: as Sec. 3.3
- Circuit open resistance: as Sec. 3.4
- Contact bounce: as Sec. 3.5
- Linearity test: as Sec. 3.6

8. Optical Performance

8.1 Optical inspection method and optical defect standards refer to document. A001-2, Touch Screen Optical Quality Standard. □

8.2 Outside to Viewing Area : any optical defected in this area need to be ignored if no effected to touch screen function.

8.3 Silver Bus Pattern defect : Voids in traces to be less than 50% of the trace width.

8.3.1 Silver Bus Pattern gap: >0.1mm

8.3.2 Silver Bus and Active area gap: No silver ink may project beyond the viewing area.

8.4 Glass defects such as edge chips and scratches refer to A001-2. □ Touch Screen Optical Quality Standard.


8.5 Others

8.5.1 Folding line should be avoided on the pressure sensitive adhesive.

8.5.2 Refer to document A001-2 Touch Screen Optical Quality Standard.

8.5.3 Always store the touch screen in its original shipping container under normal conditions (20~25°C, 65% RH)

Changes that contribute to technical improvement are subject to alternations

				2002	Datum	Name	TOUCHSCREEN 10,4", 4-Wire SPECIFICATIONS OF ANALOG RESISTIVE PET-ON-GLASS TOUCH SCREEN Manufactured bei Apex Material Technology Corp.
				Bearb.	24.10.	Maurer	
				Gepr.	24.10.	Maurer	
				Vert.			
				EDV-Datasheet don't change manually			
				 SCHURTER			H 1070.0432
Zu	Änd.	Datum	Name	D 79346 Endingen			Blatt 5 von 5 Index: -