

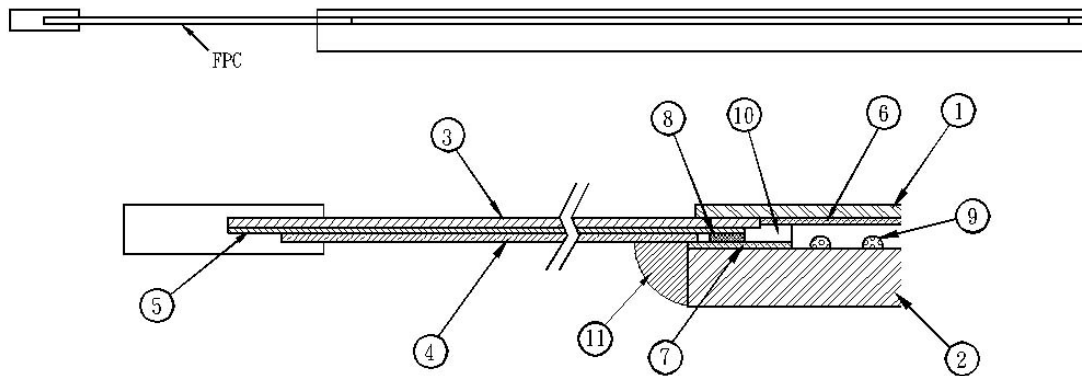
## Analog 4-wire PET-On-Glass Touch Screen Specification

### 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)	1.8mm ITO Glass	Resistance:300~600Ω/□
3	Tail Base	Kapton	Separated Tail
4	Tail cover lay	Kapton	
5	Connector	AMP compatible	2,54mm
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	Sealing	UV-Glue	

Touch screen side view:



*Changes that contribute to technical improvement are subject to alternations*

				2006	Datum	Name	<b>TOUCHSCREEN</b> <b>14,97", 4-Wire</b> AMT-09543-01 SPECIFICATIONS OF ANALOG RESISTIVE PET-ON-GLASS TOUCH SCREEN Manufactured by Apex Material Technology Corp.
				Bearb.	18.08.	Maurer	
				Gepr.	18.08.	Maurer	
				Vert.			
				<b>EDV-Datasheet</b> don't change manually			
				 ELECTRONIC COMPONENTS			
				D 79346 Endingen			
Zu	Änd.	Datum	Name				<b>H 1070.0472</b> page 1 of 5    Index: -

### 1.3 Input Method and Activation Force

Input Method	Average Activation Force
1.6mm Ø Delrin stylus	0,1 ~ 0,7N
16mm Ø Silicon "finger"	0,1 ~ 0,8 N

## 2. Typical Optical Characteristics

- 2.1 Visible Light Transmission: > 80%
- 2.2 Haze: < 13%

## 3. Electrical Specifications

- 3.1 Operating Voltage: 5.5V or less
- 3.2 Contact current: 20mA (maximum)
- 3.3 Circuit close resistance: X : 300 -1000Ω; Y : 200 -700Ω
- 3.4 Circuit open resistance: > 10MΩ at 25VDC
- 3.5 Contact bounce: < 10ms
- 3.6 Linear Test : < 1.5 %
- 3.7 Capacitance: 100nF(maximum)
- 3.8 Electrostatic Discharge Protection : (per EN 61000-4-2 ) The touch screen withstands of 15KV air discharge and 8KV contact discharge.


## 4. Linearity

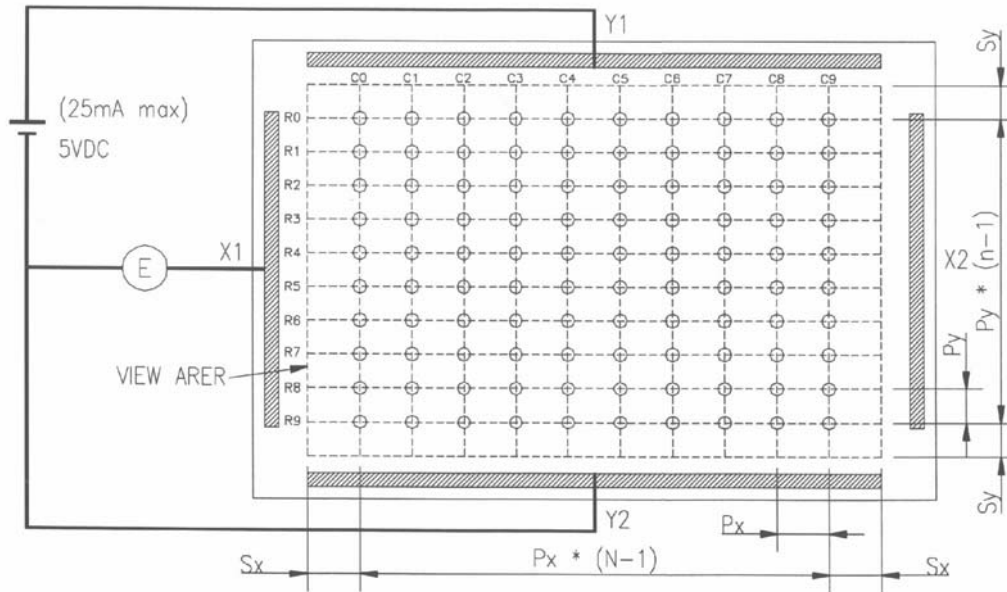
- 4.1 Linear Test Specification
  - Direction X: <1.5 %
  - Direction Y: <1.5 %

- 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.

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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

$$R0 \text{ linear1} = \left| R0 \text{ max} - R0 \text{ avg.} \right| \div R0 \text{ avg.} * 100\%$$

$$R0 \text{ linear2} = \left| R0 \text{ min} - R0 \text{ avg.} \right| \div R0 \text{ avg.} * 100\%$$

$$R0 \text{ linear} = \max ( R0 \text{ linear1}, R0 \text{ linear2} )$$

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

$$C0 \text{ linear1} = \left| C0 \text{ max} - C0 \text{ avg.} \right| \div C0 \text{ avg.} * 100\%$$

$$C0 \text{ linear2} = \left| C0 \text{ min} - C0 \text{ avg.} \right| \div C0 \text{ avg.} * 100\%$$

$$C0 \text{ linear} = \max ( C0 \text{ linear1}, C0 \text{ linear2} )$$

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## 5. Environment Specification

- |     |                       |                   |                           |
|-----|-----------------------|-------------------|---------------------------|
| 5.1 | Operating Temperature | - 10° C ~ + 60° C | Humidity less than 90% RH |
| 5.2 | Storage Temperature   | - 40° 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°C for 288 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 -40°C for 288 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°C, 90%RH for 288 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 -40°C for 30 minutes, and then 80°C 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

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## 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.

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

8.5 Others

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

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