

Product Specification

Part Name: 10. 4inch Capacitive Touch Panel Customer Part ID: Topovision Part ID: Ver: A

Approved by

From: Topovision Technology Co., Ltd.

Approved by

Notes:

- 1. Please contact Topovision Technology Co., Ltd. before assigning your product based on this module specification
- 2. The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by Topovision Technology Co., Ltd. for any intellectual property claims or other problems that may result from application based on the module described herein.



Revise Records

Rev.	Date	Contents	Written	Approved
А	2013/08/27	Preliminary Specification	Kevin	Wang

Special Notes

Note1.	



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1. GENERAL SPECIFICATIONS

Composition: 10.4inch Capacitive Touch Panel (CTP). Interface: I^2C for the CTP.

ltem	Specification	Unit
Туре	Transparent type projected capacitive touch panel	
Input mode	Human's finger	
Finger	10	
Outline Dimension	228.4(W) x 175.4(H) x 1.775 (D)	mm
Sensor Active area	213.2(W) x 160.95(H)	mm
Transparency	≧85%	%
Haze	≦5.0%	%
Hardness	7H (typ.) [by JIS K5400]	Pencil hardness
Weight	T.B.D	g
Report rate	200(Max)	Points/sec
Response time	11(Max)	ms
Origin Point	The upper left corner	
Point hitting life time	1,000,000 times min.	Note 1

Note 1: Use 8 mm diameter silicon rubber/force 3N to knock on central point twice per second

(no-operating), function pass after test.



2. ABSOLUTE MAXIMUM RATINGS

Symbol	Description	Min	Тур.	Max	Unit	Notes
VCC	Power Supply voltage	-0.3	-	+5.5	V	
Vio	I/O input voltage	-0.3	-	VCC+0.3	V	

3. ELECTRICAL CHARACTERISTICS

Symbol	Description	Min	Тур.	Max	Unit	Notes
VCC	Power Supply voltage	2.7	-	5.5	V	
GND	Power Ground	-0.3	-	-	V	
Inormal	Normal operation mode	-	30	-	mA	At VCC=3.3V
Isleep	Sleep Mode	-	15	-	uA	
Vih	Input H voltage	0.4VCC	-	VCC+0.5	V	
VIL	Input L voltage	-0.3	-	0.2VCC	V	



4. TIMING SPECIFICATIONS

4.1 Figure4-1 is the waveform of I2C fast mode timing



Figure4-1 I2C Waveform

Table is the	timing	characteristic	of I2C fast	mode nlus
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Deremeter	Symbol	Specification						
Farameter	Symbol	MIN.	TYP.	MAX.	UNIT			
SCL clock frequency	fSCL	0	-	1000	kHz			
Low period of the SCL clock	tLOW	0.5	-	-	us			
High period of the SCL clock	tHIGH	0.26	-	-	us			
Set up time for a repeated START condition	tSU_STA	0.26	-	-	us			
Hold time for a repeated START condition. After this period, the first clock pulse is generated	tHD_STA	0.26	-	-	us			
Data set up time	tSU DAT	50	-	-	ns			
Data hold time	tHD DAT	0	-	-	us			
Signal falling time of SDA and SCL	tf	-	-	120	ns			
Signal rising time of SDA and SCL	tr	-	-	120	ns			
Data set up time	tSU DAT	100	-		ns			
Data hold time	tHD DAT	0	-	0.9	us			
Set up time for STOP condition	tSU_STO	0.26	-	-	us			
Bus free time between a STOP and START condition	tBUF	0.5	-	-	us			
Capacitive load for each bus line	Cb	-	-	550	pF			

Conditions: VCC=3.3V, GND=0V, T_{OP}=25



4.2 I2C Interface Protocol

4.2.1 Default I2C Address

The default I2C Address of NCB30x1 is 0x55 (7-bit address)

4.2.2 Register Read

For reading the registers value from NCB30x1, the I2C host has to tell the NCB30x1 the "start register address" before reading the corresponding register value.

I2C	I2C	Start Reg.	Start Reg.	I2C	I2C	I2C	Value of	Value of	Value of	I2C
Start	Addr(W)	Addr.LB(a)	Addr.HB(a)	Stop	Start	Addr(R)	Reg(a)	Reg(a+1)	 Reg(a+n)	Stop

4.2.3 Register Write

For writing the registers of NCB30x1, the host has to tell the NCB30x1 the "start register address". Register value would be written to the register with address starting from the "start register address"

I2C	I2C	Start Reg.	Start Reg.	Value of	Value of		Value of	I2C
Start	Addr(W)	Addr.LB(a)	Addr.HB(a)	Reg(a)	Reg(a+1)	•••	Reg(a+n)	Stop

4.3 Register Definitions

NCB30x1 provides an register interface for host to configure device attributes and

retrieve information. The registers are listed bellow.

Register Addr	Name	Attribute	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	
0x00F9	ReportID	R	ReportID for								
0x00FA	Message1	R		Message							
0x00FB	Message2	R				Μ	essage				
0x00FC	Message3	R				Μ	essage				
0x00FD	Message4	R				Μ	essage				
0x00FE	Message5	R				Μ	essage				
0x00FF	Message6	R				Μ	essage				
0x0100	Message7	R				Μ	essage				
0x0101	Reserved	Reserved	Reser								
0x0102	Reset	R/W					Re				
0x0103	BackUpNV	R/W				Ba	ekup				
0x0104	Calibrate	R/W					Calibr				
0x0105	ReportAll	R/W				Repor	t Curren	t			
0x0106	Reserved	Reserved					Reser				
0x0107	Diagnostic	R/W				Diagnosti	c Debug	Command			
0x0108	IdleAcqInt	R/W				Idle Ac	quisition				
0x0109	ActAcqInt	R/W				Active A	cquisitio	n			
0x010A	Reserved	Reserved					Reser				
0x010B	Orient	R/W		F	leserved			InvertY	InvertX	Switch	
0x010C	XRangeLsB	R/W				X Reso	lution L	ow			
0x010D	XRangeMsB	R/W	X Resolution High								
0x010E	YRangeLsB	R/W				Y Reso	lution L	ow			
0x010F	YRangeMsB	R/W				Y Reso	lution H	igh			



5. PIN CONNECTIONS

No.	Name	I/O	Description
1	VCC	Р	Power; VCC=3.3V(typ.)
2	GND	Р	Power ground
3	RST	-	Active Low global reset signal input. Normally pull high.
4	SCL	I	Clock; 100KHz
5	SDA	I/O	Serial data access
6	ATTB	0	Active low when data output from touch panel
7	NC	-	No connect
8	NC	-	No connect

6. BLOCK DIAGRA



Note : 1. USE APPROPRIATE RESISTOR VALUE DURING HIGH SPEED SCL CLOCK. SUGGESTION : RESISTOR RECOMMENDATION : 2.2K ohm.



7. Appearance Specification 7.1 Inspection condition

- - 7.1.1 Inspection conditions
 - 7.1.1.1 Inspection Distance : 30 ± 5 cm
 - 7.1.1.2 View Angle :
 - (1) Inspection that light pervious to the product: $90\pm15^{\circ}$
 - (2) Inspection that light reflects on the product: 90±15°





7.1.2 Environment conditions :

Ambient Temperature :	25±5°C
Ambient Humidity :	30~75%RH
Ambient Illumination	600~800 lux

7.2 Inspection Parameters

Appearance inspection standard (D: diameter, L: length; W: width, Z: height, T: glass thickness)

Inspection item	Inspection standard	Description		
	SPEC (unit: mm)	Acceptable		
Foreign material	D≦0.5	Ignored		
in dot shape	0.5 <d≦0.8, distance="">5</d≦0.8,>	n≦3		
	D>0.8	0	D= (L + W) / 2	
	SPEC	Acceptable	1 . V	
	W ${\leq} 0.05$ and L ${\leq} 7$	Ignored	L	
Foreign material	0.05 <w≦0.08, distance="" l≦7,="">5</w≦0.08,>	n≦3		
in line shape	W>0.08 or L>7	0	W# ?	
			L : Long W : Width	
Contamination	It is acceptable if the dirt can be w			



	SPEC	Acceptable		
	W≦0.05 and L≦7	Ignored	~~	
	0.05 <w≦0.08, distance="" l≦7,="">5</w≦0.08,>	n≦3	\sim	
Scratch	0.08 <w≦0.1, distance="" l≦7,="">5</w≦0.1,>	n≦2	L	
	W>0.1 or L>7	0		
Inspection item	SPEC SPEC (unit: mm) Acceptable		Description	
	SPEC (unit: mm)	Acceptable		
	D≦0.2	Ignored	0	
	Non visible area	Ignored		
Bubble	0.2 <d≦0.3, distance="">5 n≦</d≦0.3,>		D= (L + W) / 2	
	D>0.3 0			
Cover & Sensor Crack	Prohibited			
	SPEC (unit: mm)	Acceptable	т	
	Side/Bottom Ignored			
Cover angle missing	It is prohibited if the defect appears on the front.		x z T	
Inspection item	SPEC		Description	
	SPEC (unit: mm)	Acceptable	-727 Ex-1	
Cover edge	$X \leq 2.0, Y \leq 2.0, Z \leq T$	Ignored		
break	X>2.0, Y>2.0, Z>T	0		



Sensor angle	SPEC (unit: mm)	Acceptable		
missing/edge break	Damage circuit or function.	0		
	It can be seen from the front of cover visible area.	0		
Sensor flange	SPEC (unit: mm) Acceptable Do not affect assembly. Ignored			
			Y	
Ink	SPEC (unit: mm)	Acceptable		
	word unclear, inverted, mistake, break line	0		
Bubble under	SPEC (unit: mm)	Accentable		
protection film	NA			
Function	Prohibited			

7.3 Sampling Condition Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model. Sampling type: normal inspection, single sampling Sampling table: MIL-STD-105E

Inspection level: Level II

	Definition				
Class of defects	Major	AQL 0.65%	It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.		
	Minor	AQL 1.5%	It is a defect that will not result in functioning problem with deviation classified.		



8. QUALITY ASSURANCE 8.1 Test Condition

8.1.1 Temperature and Humidity(Ambient Temperature)

Temperature	:	$25\pm5^{\circ}C$
Humidity	:	$65\pm\mathbf{5\%}$

8.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

8.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

8.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

	Reliability Test Item & Level	Test Level	Remark
No.	Test Item		
1	High Temperature Storage Test	Ta=80°C,240hrs	IEC68-2-2
2	Low Temperature Storage Test	Ta=-30°C,240hrs	IEC68-2-1
3	High Temperature Operation Test	Ta=70°C ,240hrs	IEC68-2-2
4	Low Temperature Operation Test	Ta=-20℃,240hrs	IEC68-2-1
5	High Temperature and High Humidity Operation Test	Ta=70℃,80%RH,240hrs	IEC68-2-3
6	ESD TEST	150pF, 330 Ω , \pm 6KV(Contact)/ \pm 8KV(Air),	IEC-61000-4-2
7	Thermal Cycling Test (No operation)	-20° C → $+25^{\circ}$ C → 70° C, 100 Cycles (Dry) 30 min 5 min 30 min	IEC68-2-14
8	Vibration Test (No operation)	Sine wave, 10~500Hz, 1.5G, 0.37oct/min 3axis, 1 hour/axis	IEC68-2-6

8.1.5 Test Method



9. PRECAUTIONS IN USE CTP

1. ASSEMBLY PRECAUTIONS

- Since Touch Panel is consist of glass, please be careful your hands to be injured during handing. You must wear gloves during handing.
- (2) Do not touch, push or rub the exposed touch panel, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- (3) Do not stack the touch panels together. Do not put heavy objects on touch panel.
- (4) Please do not take a CTP to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
- (5) Please excessive force or strain to the panel or tail is prohibited, Do not lift touch panel by cable(FPC).
- (6) Use clean sacks or glove to prevent fingerprints and/or stains left on the panel. Extra attention and carefulness should be taken while handling the glass edge.
- (7) Please pay attention for the matters stated below at mounting design of touch panel enclosure. Enclosure support to fix touch panel must be out of active area.(do not design enclosure presses the active area to protect from miss put)
- 2. OPERATING PRECAUTIONS
 - (1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
 - (2) Please do not change variable resistance settings in CTP. They are adjusted to the most suitable value. If they are changed, it might happen CTP does not satisfy the characteristics specification
 - (3) Be careful for condensation at sudden temperature change. Condensation makes damage to sensor or electrical contacted parts.
 - (4) CTP has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
 - (5) Touch the panel with your finger or stylus only to assure normal operation. Any sharp edged or hard objects are prohibited.
 - (6) Operate the panel in a steady environment. Abrupt variation on temperature and humidity may cause malfunction of the panel.
- 3. ELECTROSTATIC DISCHARGE CONTROL
 - (1) The operator should be grounded whenever he/she comes into contact with the CTP. Never touch any of the conductive parts such the copper leads on the FPC and the interface terminals with any parts of the human body.

- (2) The CTP should be kept in antistatic bags or other containers resistant to static for storage.
- (3) Only properly grounded soldering irons should be used.
- (4) If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
- (5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended
- (6) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

STORAGE PRECAUTIONS

- (1) When you store touch panel for a long time, it is recommended to keep the temperature between $0^{\circ}C-40^{\circ}C$ without the exposure of sunlight and to keep the humidity less than 90%RH.
- (2) Please do not leave touch panel in the environment of high humidity and high temperature such as 60°C 90%RH
- (3) Please do not leave touch panel in the environment of low temperature; below -20°C.

5. OTHERS

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6.

- For the packaging box, please pay attention to the followings: (1) Please do not pile them up more than 5 boxes. (They are not
- designed so.) And please do not turn over.
- (2) Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
- (3) Packing box and inner case for CTP are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

LIMITED WARRANTY

Unless otherwise agreed between Topovision and customer, Topovision will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with Topovision acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of Topovision is limited to repair and/or replacement on the terms set forth above. Topovision will not responsible for any subsequent or consequential events.



13. OUTLINE DRAWING

