AZ DISPLAYS, INC.

COMPLETE LCD SOLUTIONS

SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY

PART NUMBER: **AGM1212N-T SERIES**
DATE: **APRIL 06, 2007**

1. FUNCTIONS & FEATURES

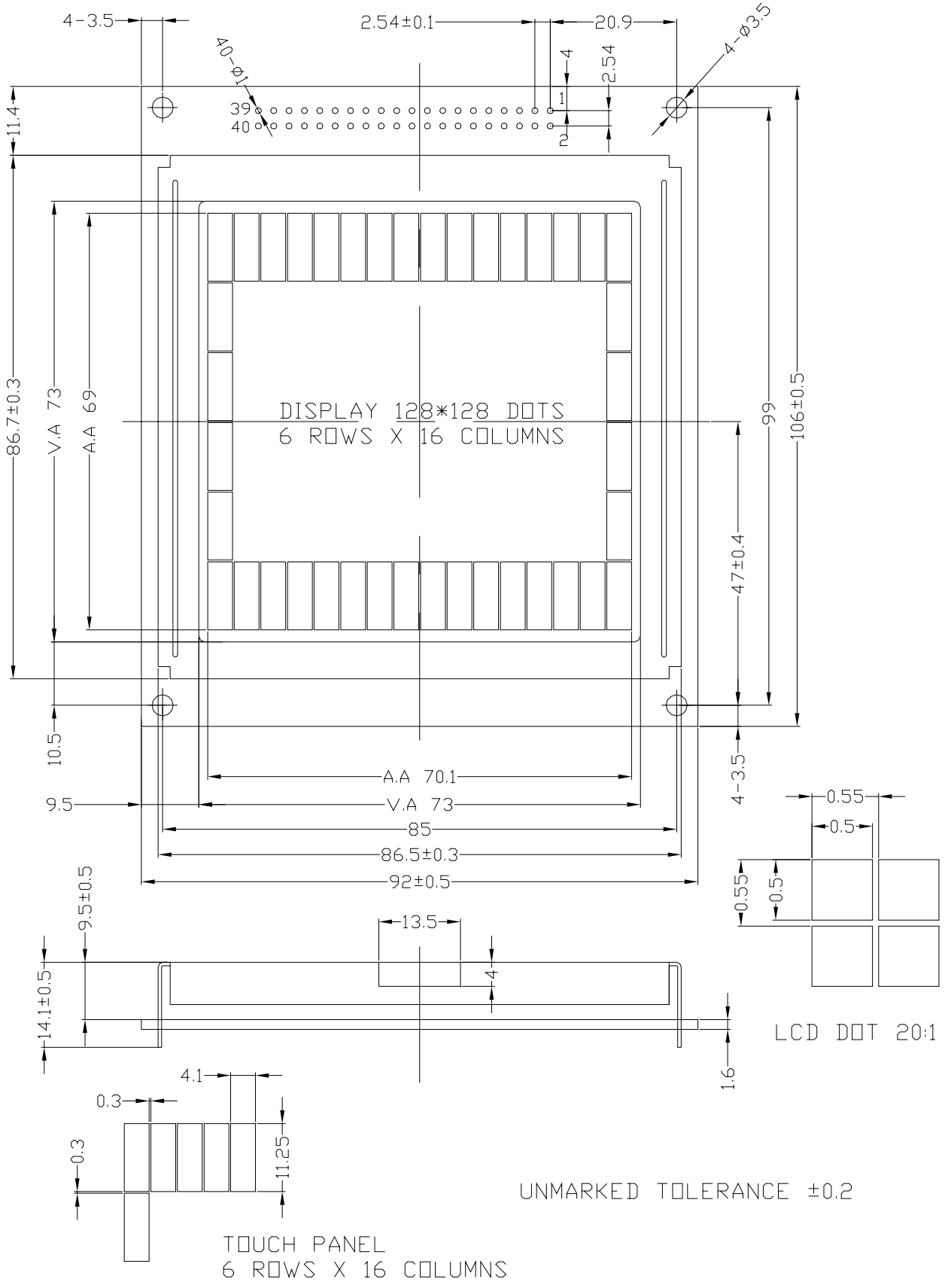
Glass Thickness	: 1.1mm
Viewing Direction	: 6 O'clock
Driving Scheme	: 1/128Duty, 1/12 Bias
Power Supply for logic	: 5.0V
Backlight Color	: White
Display Content	: 128*128 Dots
V_{LCD}	: 18.5V
Operation Temperature	:-20 to +70℃
Storage temperature	: -25 to +75℃
Driver IC	: S6B0086
Controller IC	: T6963C
With touch panel	

2. MODULE ARTWORK

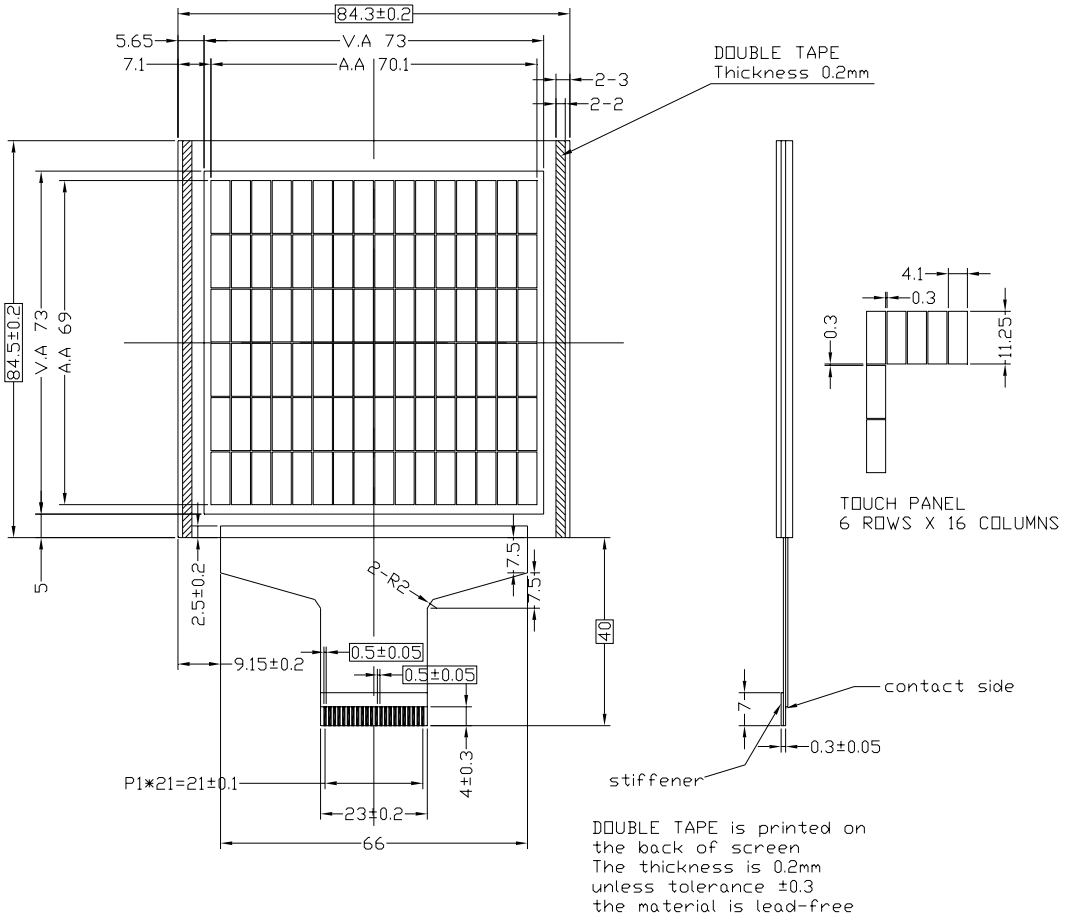
Module Size	: 92(L)* 106(W)*14.1(H)mm
Viewing Area	: 73(L)mm*73(W)mm(LCD or Touch Panel)
Active Area	: 70.35mm*70.35mm(LCD)
Active Area	: 70.1mm*69.0mm(Touch Panel)
Dot Pitch	: 0.55(W)mm*0.55(H)mm(LCD)
Dot Pitch	: 4.40(W)mm*11.55(H)mm(Touch Panel)
Dot Size	: 0.50(W)mm*0.50(H)mm(LCD)
Dot Size	: 4.10(W)mm*11.25(H)mm(Touch Panel)
Dot Gap	: 0.05 mm(LCD)
Dot Gap	: 0.3 mm(Touch Panel)

3. EXTERNAL DI MENSIONS

3.1 Module Draw ing

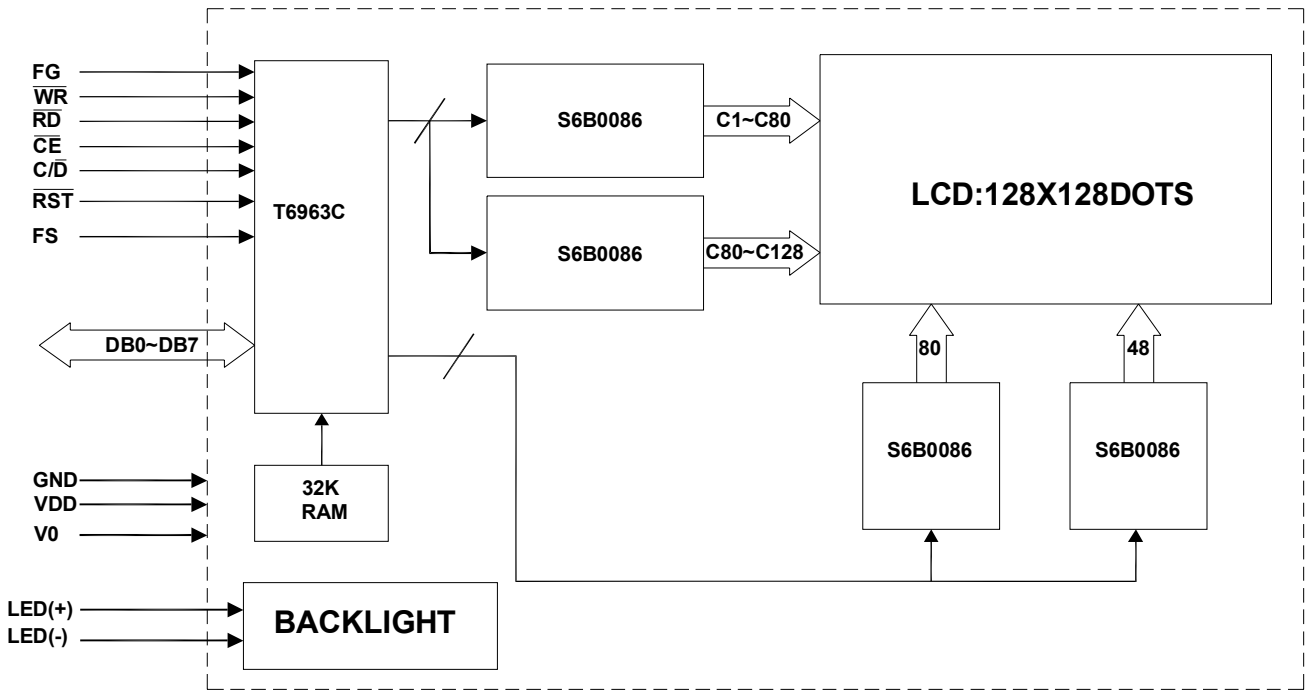


3.2 Touch Panel Draw ing

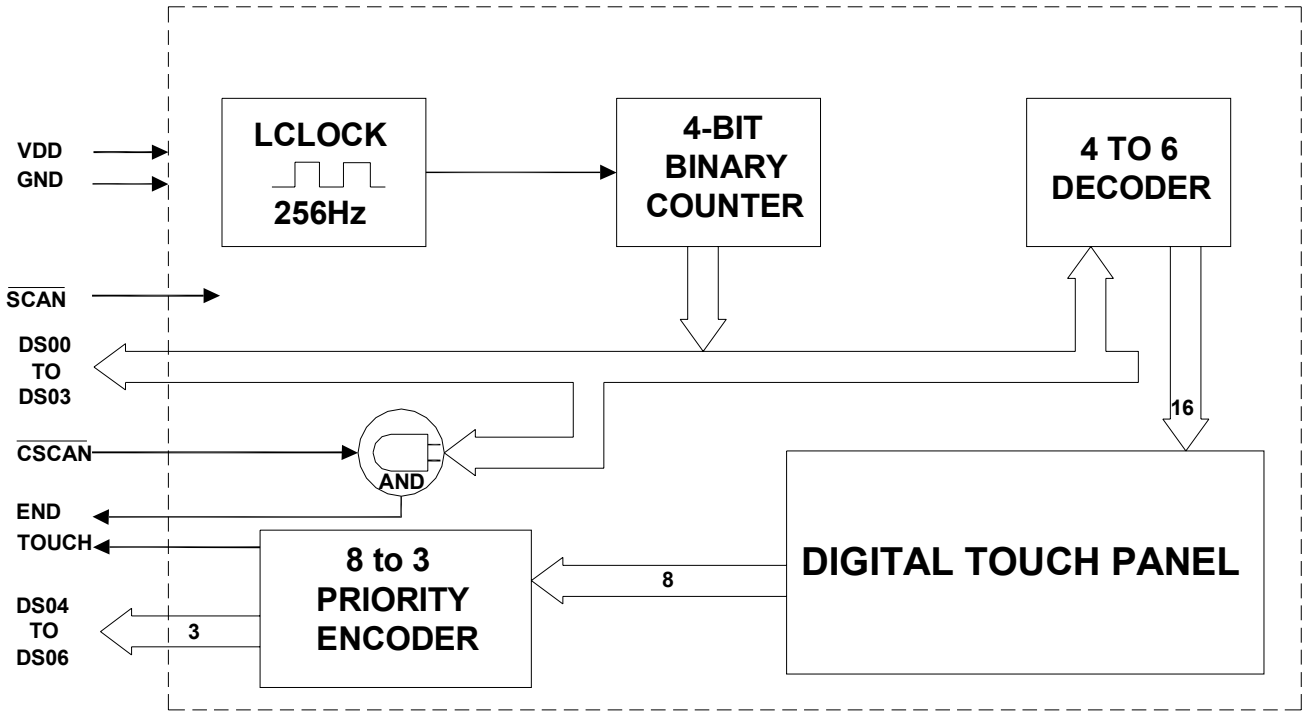


4. BLOCK DI AGRAM

4.1 Block D iagram Of LCD Module



4.2 Digital Touch Screen Auto-Scanning Block Diagram



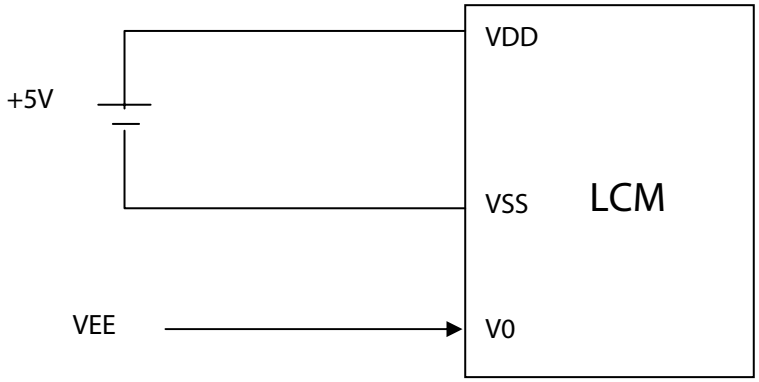
5. PIN ASSIGNMENT

NO.	SYMBOL	FUNCTION
1	FG	Frame ground(see note 1)
2	/CSCAN	Active LOW : Force column scan counter to run continuously in order to obtain a complete cycle
3 V	SS	Ground
4,6,8,10	D S00~DS03	4 bits to indicate the column being scanned: range 0 to 15 corresponding to COL1 to COL16, with DS00 as LSB. Output is latched at the most recently touched position. When read while "TOUCH" is positive, the touched column is identified.*
5	VDD	Power supply for logic(+5V)
7 V0		Power supply for LCD drive
9	/WR	Write Command or data to module when "L"
11	/RD	Read Command or data from module when "L"
12,14,16	D S04~DS06	3 bits to indicate the row being scanned: range 0 to 7 corresponding to ROW1 to ROW8 , with DS4 as LSB & DS6 as MSB. Output is latched at the most recently touched position. When read while "TOUCH" is positive, the touched column is identified.*
13	/CE	Enable LCD controller when "L"
15	C//D	Command/data select. "H" for command read/write. "L" for data read/write
17 /RST		LCD Controller reset. Controller initialize and DB00-DB7 are set to be high impedance when /RST is "L"
18 /SCA	N	Active LOW : Standby to scan. Scanning will begin when a touch is identified at any of the sensing position, and will continue until touch is removed.

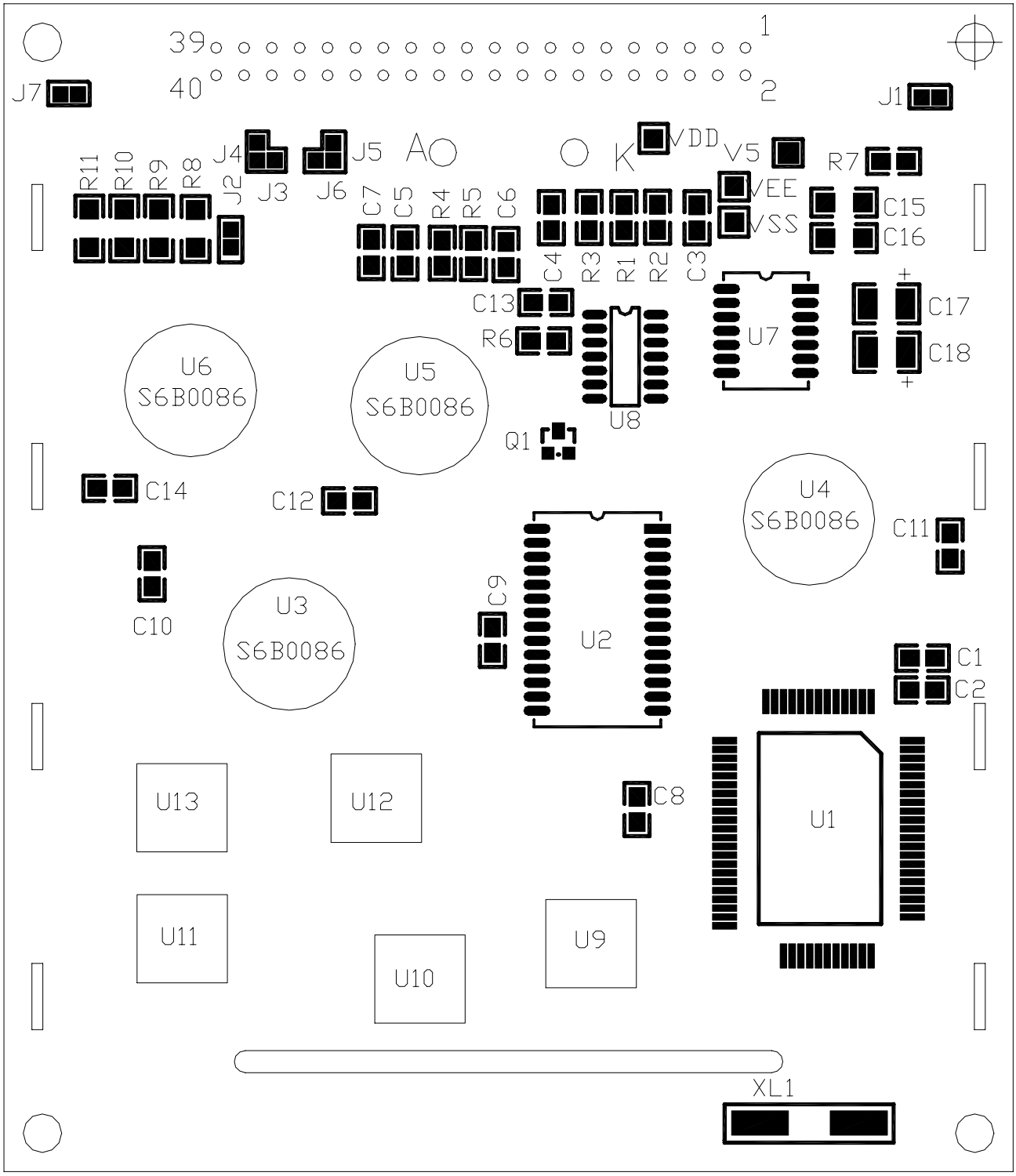
19,21,23,25, 27,29,31,33	DB0~DB7	LCD data input/output. DB0(pin11) is LSB and DB7(pin18) is MSB.
20	END	A 4ms positive pulse generated at the end of a complete scan cycle (Max cycle time: 64ms)
22	TOUCH	A 2ms positive pulse when scanning reaches an identified touch position. It can be used as an interrupt.
24,26,28,30,3 2,34,36,38,40	N.C.	No Connection
35	FS	Font select. "H" for 6x8 font & "L" for 8x8 font
37	LED +(A)	Anode of LED backlight
39	LED -(K)	Cathode of LED backlight

* If DS00 to DS06 is read at the "END, then the last touched position will be identified.

6. POWER SUPPLY



7.1 PCB DRA WING AND DESCRI PTION



Note: It is only a draft drawing to show the components on the PCB. We should update the drawing after the PCB sample is approved.

DESCRIPTION:

7-1-1.The polarity of the pin 37 and the pin 39:

symbol / state		J3,J5 J6,	J4	LED Polarity	
				37 Pin	39 Pin
J6,J4	Each solder-bridge	Each closed	Each open	Anode	Cathode
J3,J5	Each solder-bridge	Each open	Each closed	Cathode	Anode

Note: In application module, J3=J5 =J2=closed, J4=J6=open.

7-1-2. The J1 is metal-bezel GND to module GND and J7 is mountingholes GND to module GND.

Note: In application module, J1=closed, J7=closed

7-1-3.The LED resistor should be bridged when J2 is closed

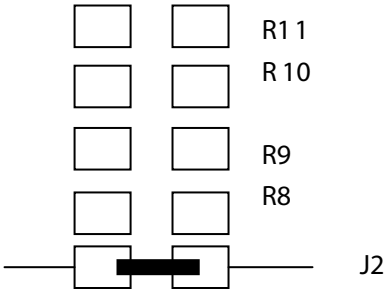
Note: In application module, J2=closed

7-1-4.The R8 and the R9, R10, R11 are the LED resistor.

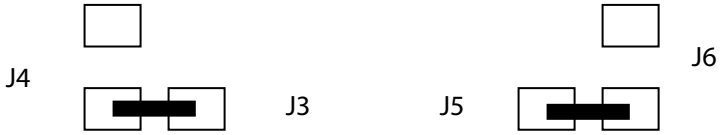
Note: In application module, R8 = R9= R10= R11=open

7.2 Example application

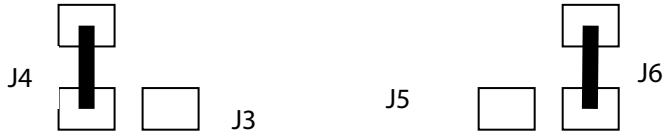
7-2-1. The LED resistor should be bridged as following.



7-2-2. The 37 pin is the anode and the 39 pin is the cathodeas following.



7-2-3.The 37 pin is the cathodeand the 39 pin is the anodeas following.



7-2-4. The metal-bezel is on ground as following.

8. ABSOLUTE MAXIMUM RATINGS (Vss=0V, Ta=25℃)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage (Logic)	V_{DD}	-0.3 to 7.0	V
Input voltage	V_{IN}	-0.3 to VDD +0.3	V
Operating Temperature	Topr	-20 to +70	℃
Storage Temperature	Tstg	-25 to +75	℃

9. ELECTRICAL CHARACTERISTICS

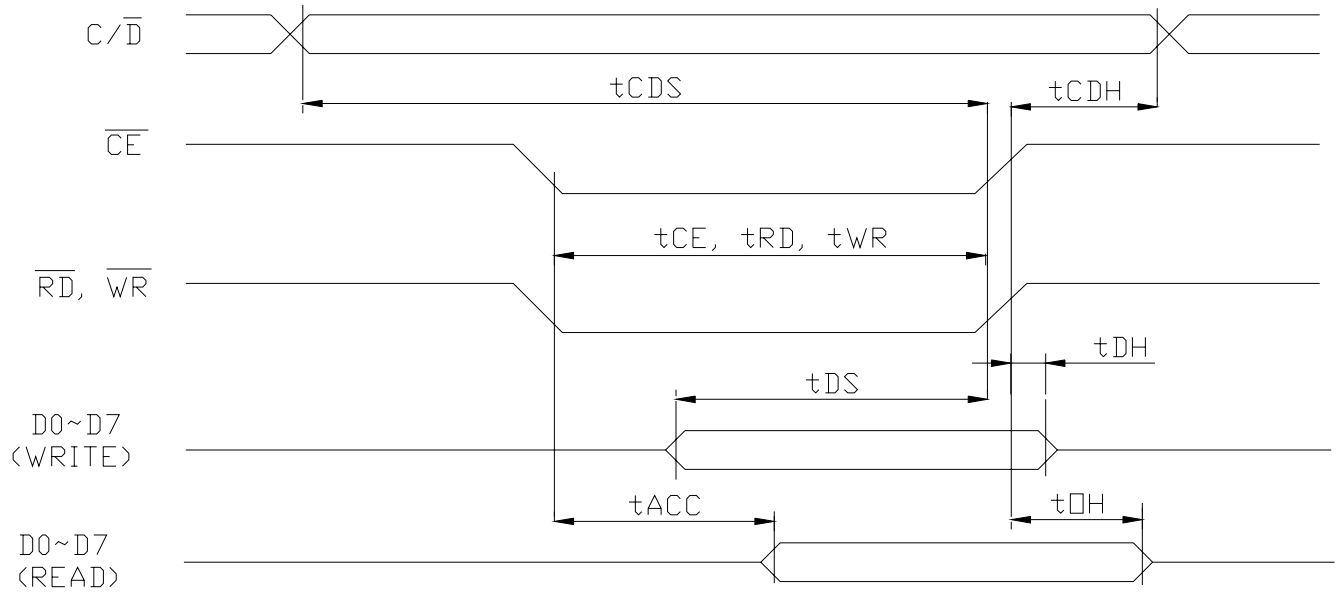
1). DC Characteristics

Ta=25℃, VSS=0V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply Voltage (Logic)	V_{DD}-V_{SS}	-	4.5	5.0	5.5	V
High Level Input Voltage	V_{IH}	V_{DD}=5.0V±10%	V_{DD}-2.2	-	V_{DD}	V
Low Level Input Voltage	V_{IL}	V_{DD}=5.0V±10%	0	-	0.8	V
High Level Output Voltage	V_{OH}	I_{OH}=0.75mA	V_{DD}-0.3	-	V_{DD}	V
Low Level Output Voltage	V_{OL}	I_{OL}=0.75mA	0	-	0.3	V
Current Consumption(Operating)	$I_{DD(1)}$	V_{DD}=5.0V f_{OSC} = 3.0 MHz	-	3.3	6.0	mA
Current Consumption(Halt)	$I_{DD(2)}$	V_{DD}=5.0V			3	uA

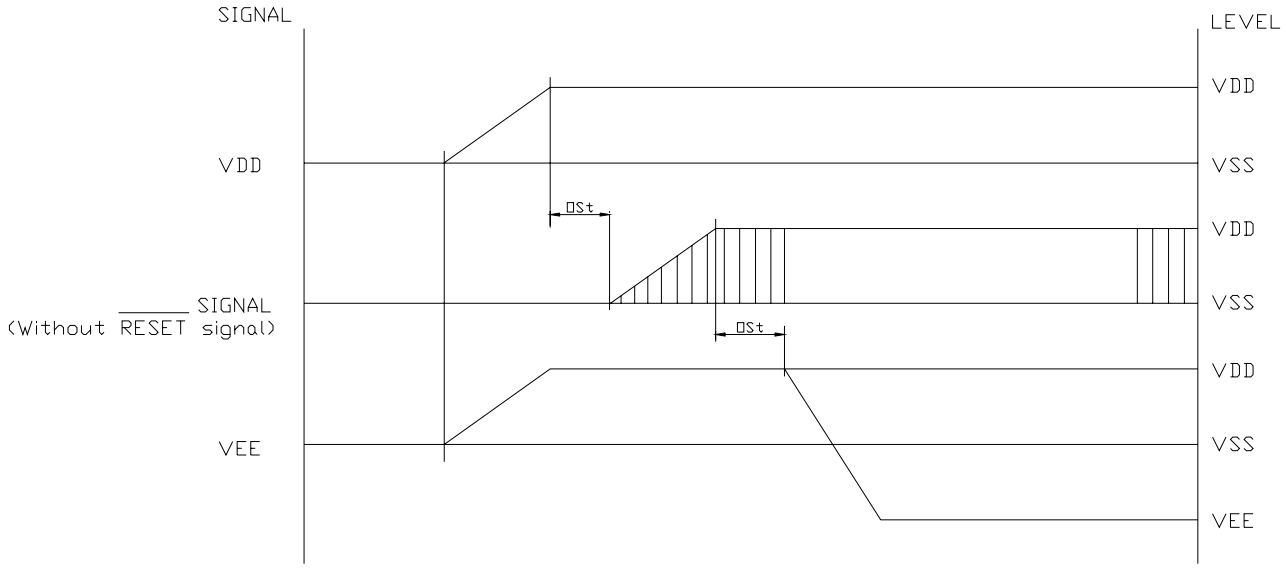
2). AC Characteristics

Parameter	Symbol		Min.	Max.	Units
C/D Setup Time	t_{CDS}	10	0	-	ns
C/D Hold Time	t_{CDH}	10		-	ns
CE, RD, WR Pulse Width	t_{CE}, t_{RD}, t_{WR}		80	-	ns
Data Setup Time	t_{DS}	80		-	ns
Data Hold Time	t_{DH}	40		-	ns
Access Time	t_{ACC}	-		150	ns
Output Hold Time	t_{OH}	10		50	ns

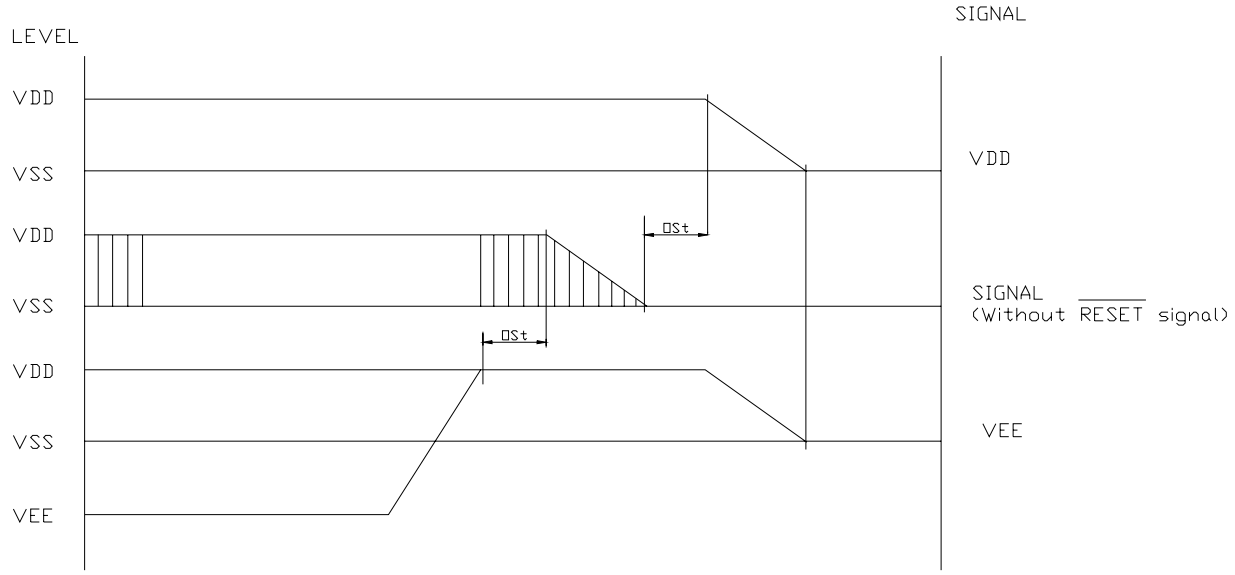


3). Pow er Supply ON/OFF Sequence

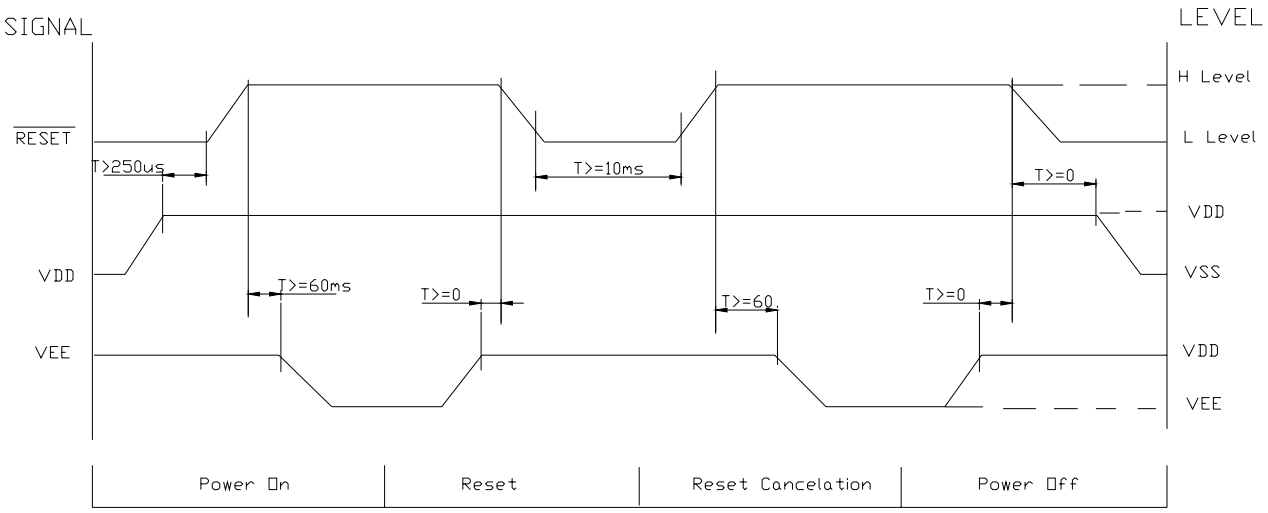
ON Sequence



OFF Sequence



Reset Sequence



Please maintain the above sequence when turning on and off the power supply of the module.
If VEE is supplied to the module while internal altemate signal for LCD driving (M) is unstable or RESET is active, DC componert will be supplied to the LCD panel. This may cause damage to the LCD module.

10. TOUCH PANEL SPECIFICATIONS

10.1 Electrical Characteristics of Digital Touch Panel

1). Max rating: DC. 10V, 1mA

2). Insulating resistance: More than 100meg-ohms at DC. 25 volts.

3). Contact resistance: 20K Ohms or less.

4). Contact bounce: Less than 15 msec (*Input by finger).

50. Withstand voltage: Withstanding an applied voltage of AC. 25 volts (50Hz, 0.5mA) each terminal for one minutes. Shall not be any mechanical or electrical failures.

10.2 Mechanical Characteristics of Digital Touch Panel

1). Activation force: 10~35 gf (Diagonal cross point except dot spacer).

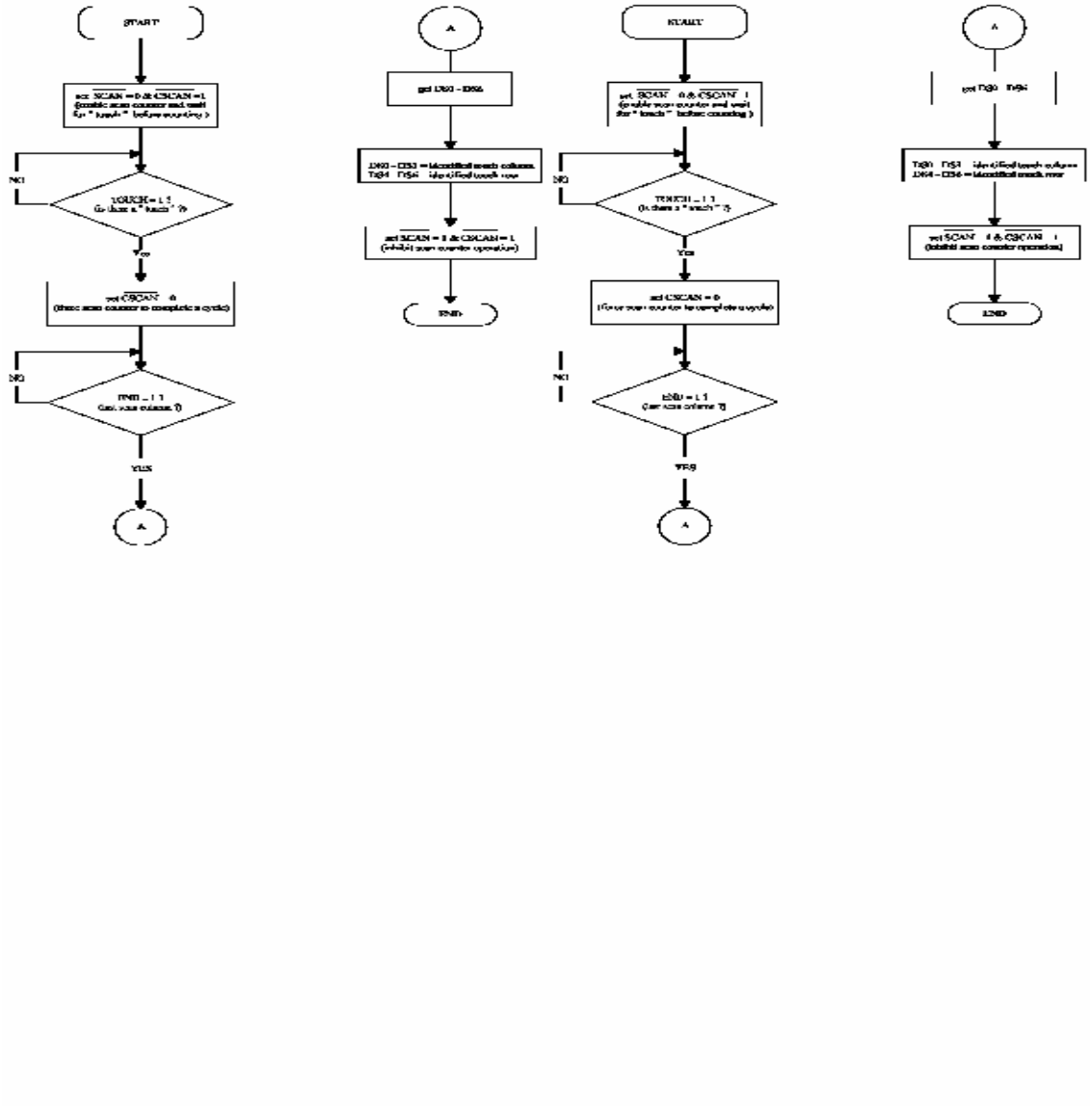
2). Using by the silicon finger, hardness test with=60^0 of R=10mm

3). Surface hardness: 2H (based on pencil hardness test with JIS K 5400).

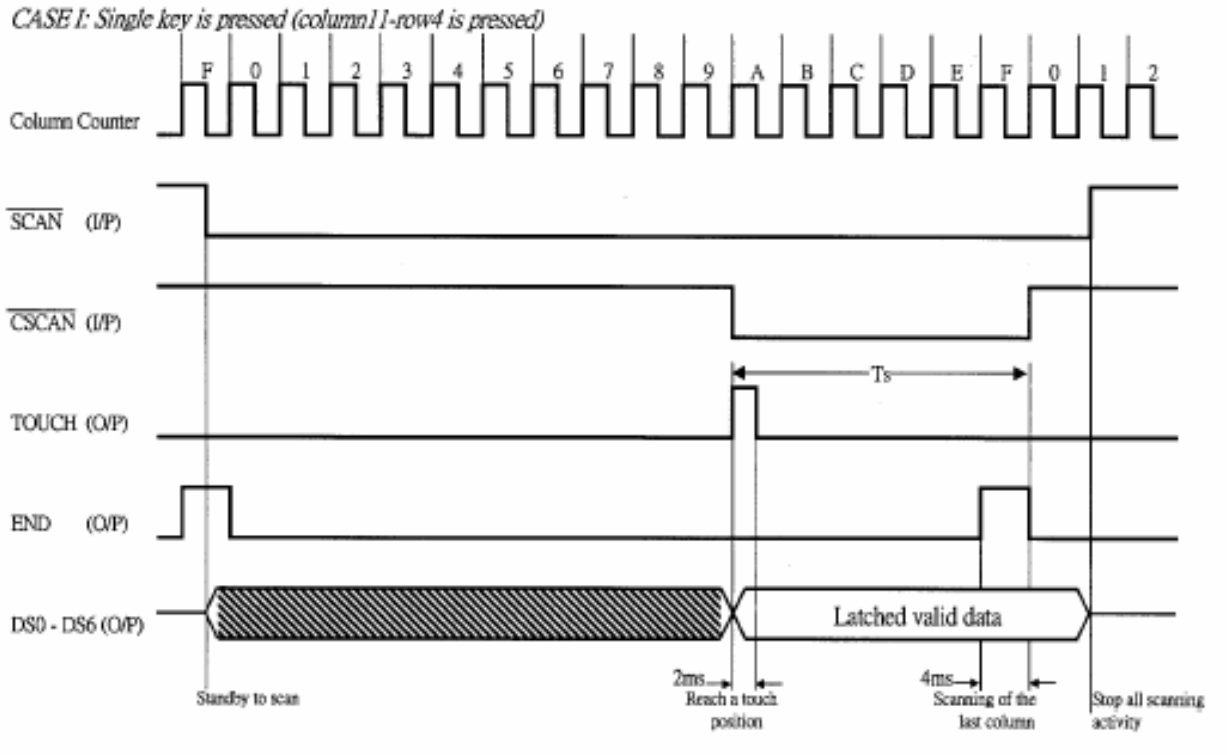
4). Total light transparency: 70% or more.

5). Transmission Haze: 6.0% (typical value).

10.3 Flow Chart of Touch Panel Programming

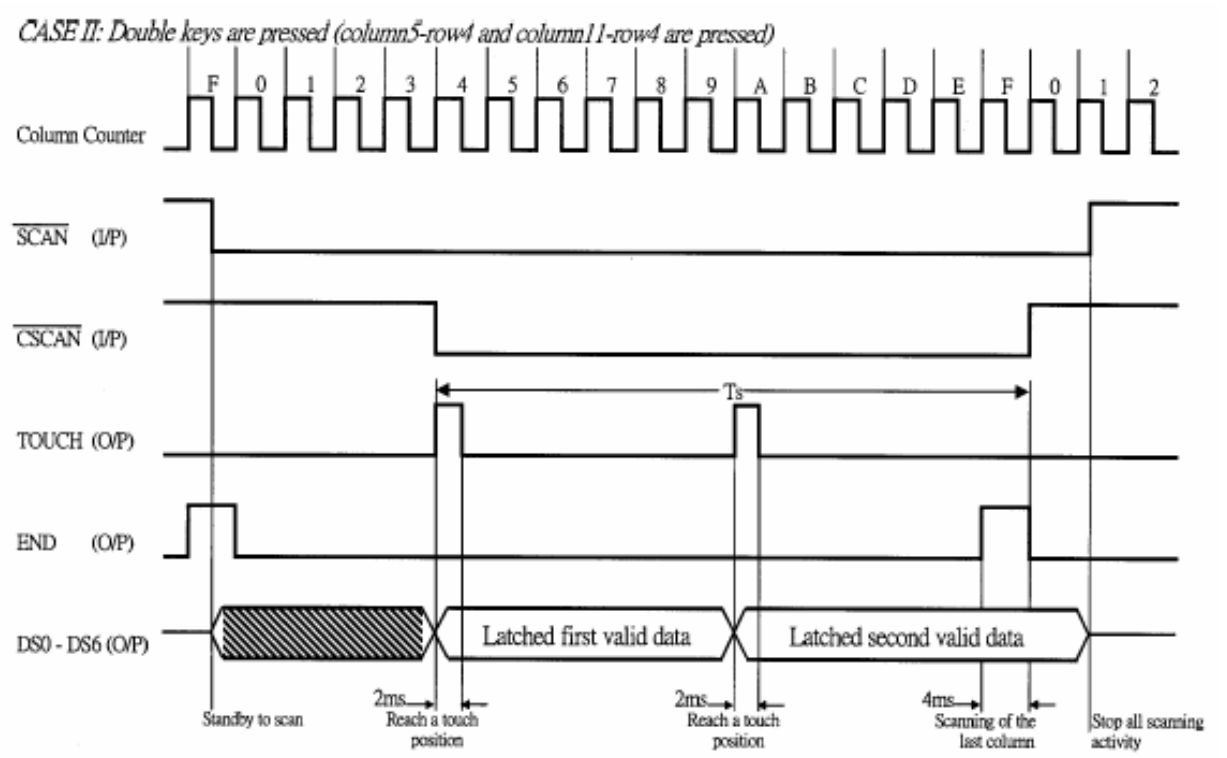


10.4 Timing Diagrams for Digital Touch Panel Auto-Scanning Mode



Remark: 1. Max. Ts=64ms (dependent on which key is pressed)

2. No. of TOUCH pulse=No. of key pressedat onetime



Remark: 1. Max. Ts= 64ms (dependent on which key is pressed.

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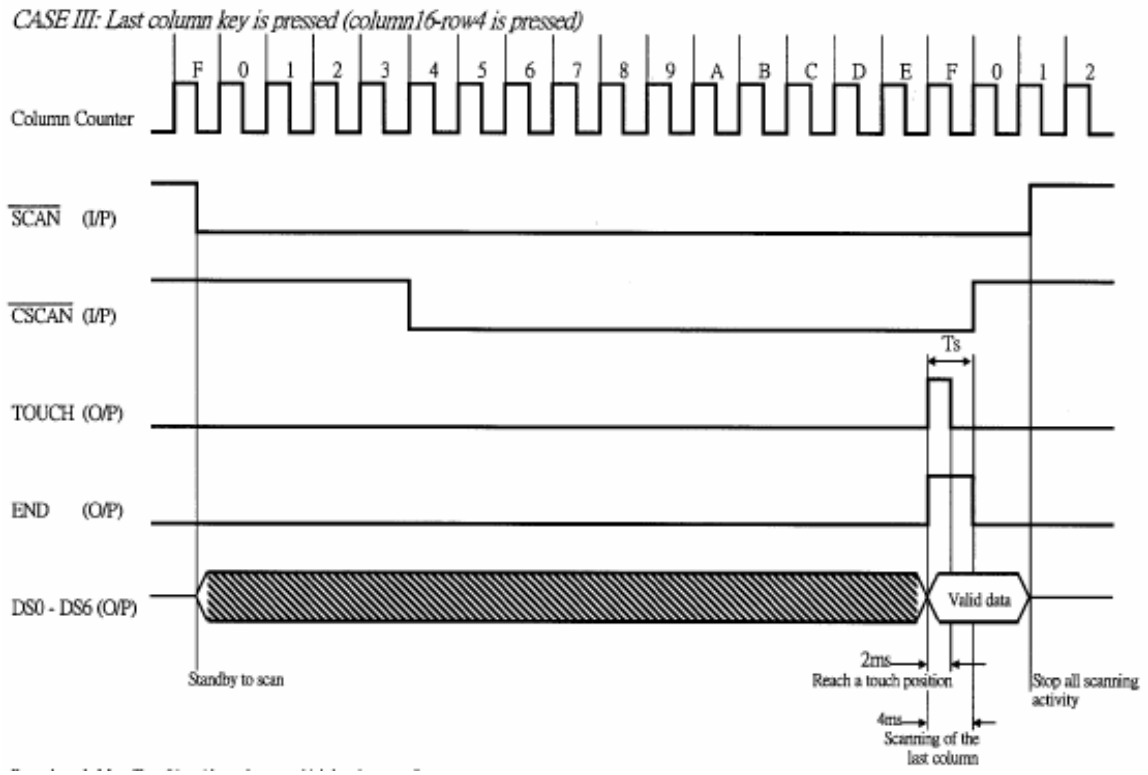
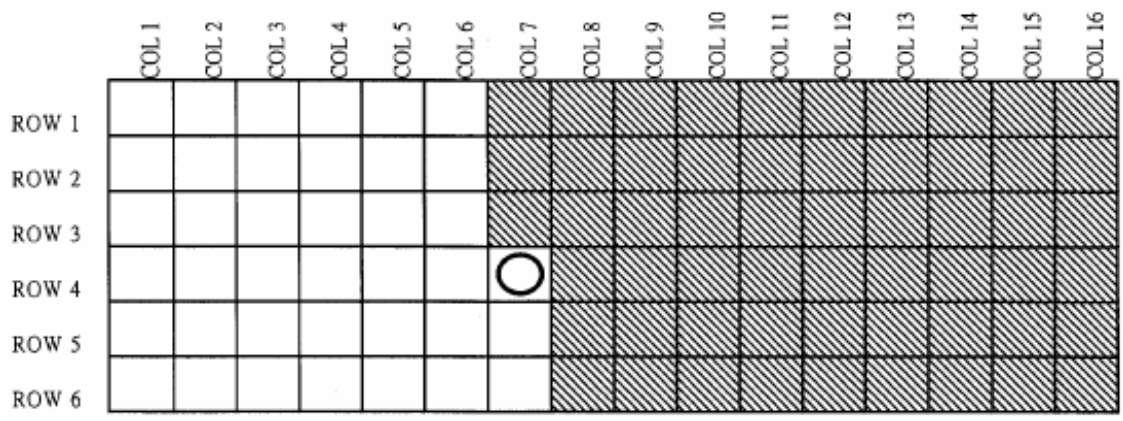


Remark: 1. Max. Ts= 64ms (dependent on which key is pressed.

2. No. of TOUCH pulse=No. of key pressedat onetime.

10.5 Multiple Touch Situat ion

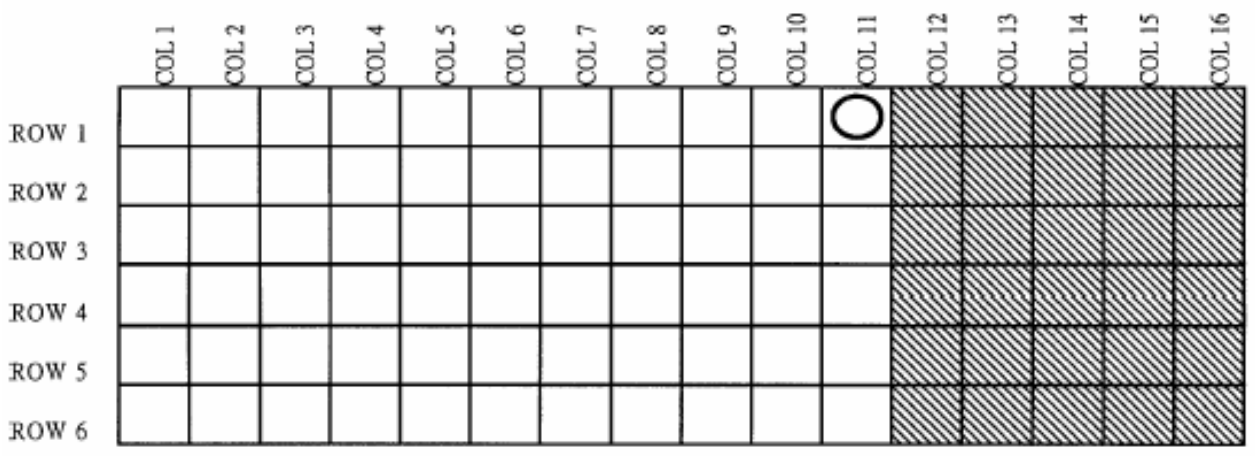


Column on the Right have higher priority than column on the Left.

Row on the Upperhave higher priority than row on the Lower.

Column have higher priority than Row.

The above demonstration is when you press column 7 - row 4 with another key at the same times, the keys insides gray area have higher priority than column 7 - row 4. However, when you press column 7 - row 4 with thekey insides white area, column 7 - row 4 have higher priority. For example, if you presscolumn 7 - row 4 with column 11 - row 2, the hardware will output column 11 - row 2. Another example, if you press coulmn 7 - row 4 with column 3 - row 1, thehardwarewill output column 7 - row 4.



This is another example. When user press on column 11 - row 1 with another key at the same time. Gray area means have higher priority than column 11 - row 1.

11. BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS

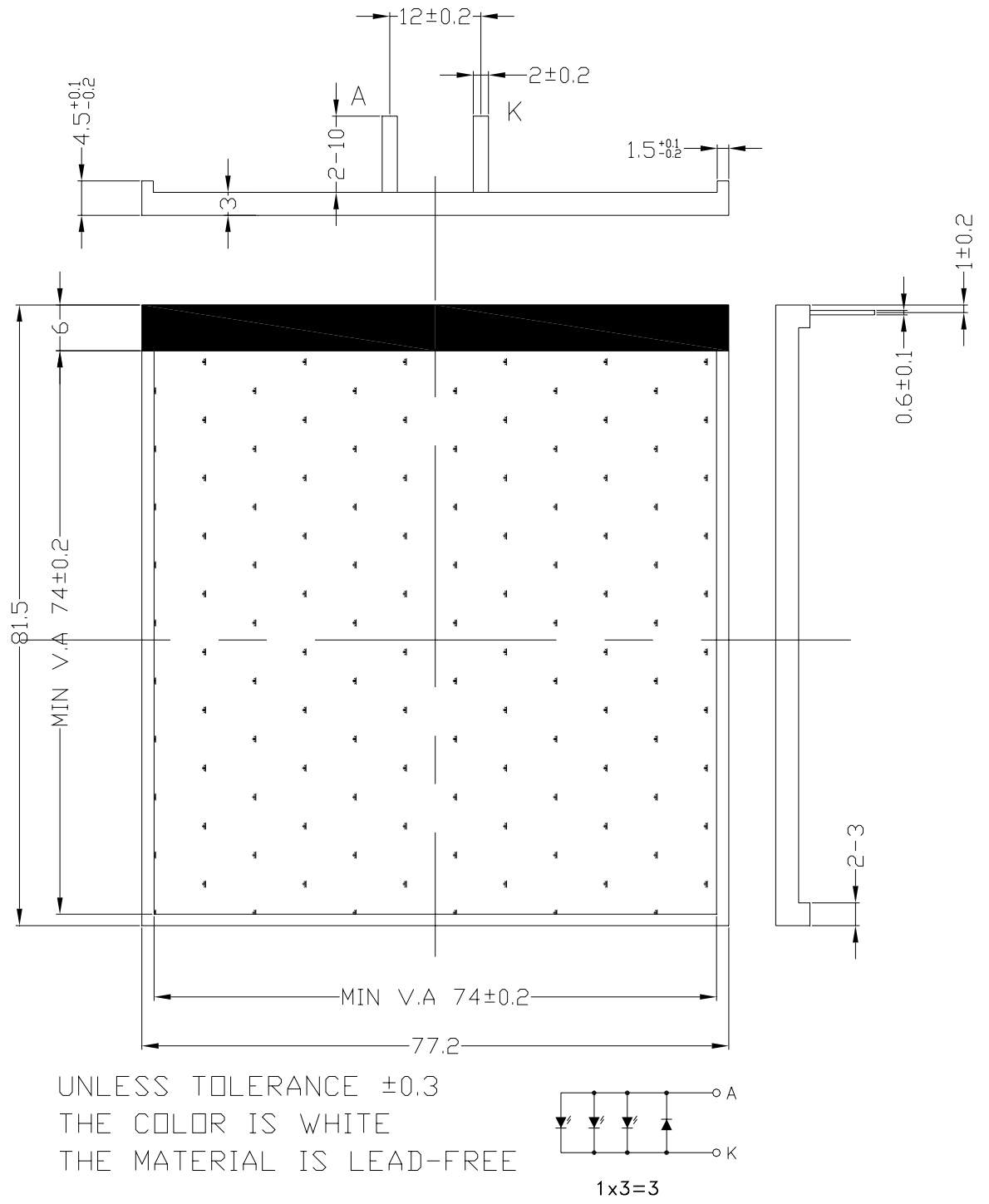
11.1 Absolute Maximum Ratings (Ta=25℃)

Item Symbol		Conditions	Rating	Unit
Absolute Maximum Forward Current	Ifm		75	mA
Peak Forward Current	Ifp	1 Msec Plus 10% Duty Cycle	180	mA
Reverse Voltage	Vr		1	V
Power Dissipation	Pd		225	mW

11.2 Backlight Electro/Optical Characteristics

Item Symbol		Min.	Typ.	Max.	Unit	Condifion
Forward Voltage	Vf	2.9	3.2 3.5		V	If=45mA
Reverse Current	Ir		30		uA	Vr=0.8V
Peak Wave Length	λ p				nm	
Spectral Line Half Width	$\Delta\lambda$				nm	
Luminance Lv			TBD		cd/m^2	If=45mA
Backlight Color	White					

11.3 Backlight Drawing



(2). Driving voltage should be kept within specified range; excess voltage shortens display life.

(3). Response time increases with decrease in temperature.

(4). Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear "fractured".

(5). Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured".

2.5 Storage

If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.

2.6 Limited Warranty

Unless otherwise agreed between DISPLAY and customer, DISPLAY will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DISPLAY 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 DISPLAY is limited to repair and/or replacement on the terms set forth above. DISPLAY will not responsible for any subsequent or consequential events.