



# SPECIFICATION FOR TFT MODULE

Part No.: TS8003B

Customer: \_\_\_\_\_

Rev: A

Issued Date: 2007-03-16

Approved by: _____
Signature: _____
Date: _____

Please sign the cover page of the spec for your approval and return it to us within a month after you receive the spec from Techstar Display. If we do not receive the signed spec even after one month later, we will consider that the spec was already accepted by your company.

Designed by: Engineering Dept.			QA Dept	Customer
Prepared	Checked	Approved	Approved	Approved



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## 1 General Specifications

Item	Standard Value	Unit
Display Pattern	<input checked="" type="checkbox"/> Graphic <input type="checkbox"/> Character <input type="checkbox"/> Segment <input type="checkbox"/> _____ <input type="checkbox"/> with ICON	/
Color	<input type="checkbox"/> Mono. <input type="checkbox"/> Grayscale <input checked="" type="checkbox"/> 262K	/
Module Dimension (W x H x T)	42.72(W) x 60.26 (H) x3.8 (T)	mm
Viewing Area (W x H)	\	mm
Active Area (W x H)	36.72(W)X48.96(H)	mm
Character Size (W x H)	\	mm
Character Pitch (W x H)	\	mm
Pixel Format	2.4" TFT 240(RGB)X320	/
Pixel pitch	\	mm
LCD Type	<input type="checkbox"/> TN, Positive <input type="checkbox"/> TN, Negative <input type="checkbox"/> HTN, Positive <input type="checkbox"/> HTN, Negative	/
	<input type="checkbox"/> STN, Yellow-Green <input type="checkbox"/> STN, Gray <input type="checkbox"/> STN, Blue <input type="checkbox"/> FSTN, Positive <input type="checkbox"/> FSTN, Negative	
	<input type="checkbox"/> _____ <input type="checkbox"/> FM LCD <input type="checkbox"/> Color STN <input checked="" type="checkbox"/> TFT	
Polarizer Type	<input type="checkbox"/> Transflective <input checked="" type="checkbox"/> Transmissive <input type="checkbox"/> Reflective <input type="checkbox"/> Anti-Glare	/
View Direction	<input checked="" type="checkbox"/> 6H <input type="checkbox"/> 12H	/
LCD Controller & Driver	ILI9320 (or Equivalent)	/
LCM with touch panel	4-line interface	
LCD Driving Method	\	/
Interface Type	Serial <input type="checkbox"/> I <sup>2</sup> C <input type="checkbox"/> 4-line SPI <input type="checkbox"/> 3-line SPI <input type="checkbox"/> _____	/
	Parallel <input type="checkbox"/> 6800 <input checked="" type="checkbox"/> 8080 <input type="checkbox"/> 4-bit <input type="checkbox"/> _____	
Backlight Type	<input checked="" type="checkbox"/> LED <input type="checkbox"/> Bottom <input checked="" type="checkbox"/> Single Side <input type="checkbox"/> Dual Side	/
	<input type="checkbox"/> _____ <input type="checkbox"/> EL <input type="checkbox"/> CCFL	
Backlight Color	<input type="checkbox"/> Yellow-Green <input checked="" type="checkbox"/> White <input type="checkbox"/> Amber <input type="checkbox"/> Blue <input type="checkbox"/> Red <input type="checkbox"/> _____	/
EL/CCFL Driver type	<input type="checkbox"/> Build-in <input type="checkbox"/> External	/
DC-DC Converter	<input checked="" type="checkbox"/> Build-in <input type="checkbox"/> External	/
Operation Temperature	OT= -20°C ~ +70°C	/
Storage Temperature	ST= -30°C ~ +80°C	/





### 3 I/O Terminal

#### 3.1 Pin Description(See Datasheet of LCD Driver for detail)

Pin NO.	Symbol	Function Description
1	NC	NC
2~3	VDD	Power supply. VDD = 2.7V ~ 2.9V
4	CS	Chip select signal. Low: chip can be accessed; High: chip cannot be accessed. Must be connected to GND if not in use.
5	RS	The signal for register index or register command select. Low: Register index or internal status (in read operation). High: Register command.
6	WR	Serves as a write signal and writes data at the rising edge in i80 system interface.
7	RD	Serves as a read signal and reads data at the low level in I80 system interface.
8	/RESET	Reset pin. Setting either pin low initializes the LSI. Must be reset after power is supplied..
9~24	DBD0~DBD15	The signal for register index or register command select. Low: Register index or internal status (in read operation). High: Register command.
25	NC	NC
26	Y-	Bottom electrode
27	X-	Right electrode
28	Y+	Top electrode
29	X+	Left electrode
30	LED_A	Power supply anode input for backlight.
31	LED_K1	Power supply cathode input for backlight.
32	LED_K2	Power supply cathode input for backlight.
33	LED_K3	Power supply cathode input for backlight.
34	LED_K4	Power supply cathode input for backlight.
35~36	GND	Ground pin, connected to 0 V
37	NC	NC



## 4 Electro-optical Specifications

### 4.1 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Supply voltage	VDD-GND	-0.3	4.6	V
Input voltage	V <sub>I</sub>	-0.3	VCC+0.3	V

### 4.2 Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	VDD-GND	2.7	2.8	2.9	V
Supply current	I <sub>VDD</sub>	-	-	TBD	mA
Input High Voltage	V <sub>IH</sub>	0.8VCC	-	VCC	V
Input Low Voltage	V <sub>IL</sub>	-0.3VCC	-	0.2VCC	V
Output High Voltage	V <sub>OH</sub>	0.8VCC	-	-	V
Output Low Voltage	V <sub>OL</sub>	-	-	0.2VCC	V

### 4.3 Optical Characteristics

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Transmittance		T	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	TBD			/	Ta = 25°C  All left side data are referred to the supplier of TFT-Panel
Contrast ratio		CR		TBD	TBD	-	/	
Response time		Tr		-	TBD	TBD	ms	
		Tf		-	TBD	TBD		
Chromaticity	White	X <sub>w</sub>		-	TBD	-	/	
		Y <sub>w</sub>		-	TBD	-	/	
	Red	X <sub>R</sub>		-	TBD	-	/	
		Y <sub>R</sub>		-	TBD	-	/	
	Green	X <sub>G</sub>		-	TBD	-	/	
		Y <sub>G</sub>		-	TBD	-	/	
Blue	X <sub>B</sub>	-	TBD	-	/			
	Y <sub>B</sub>	-	TBD	-	/			
Viewing Angle	Hor.	$\theta_{x+}$	Center CR≥10	-	TBD	-	deg.	
		$\theta_{x-}$		-	TBD	-		
	Ver.	$\theta_{y+}$		-	TBD	-		
		$\theta_{y-}$		-	TBD	-		

\*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L63 / L0$$

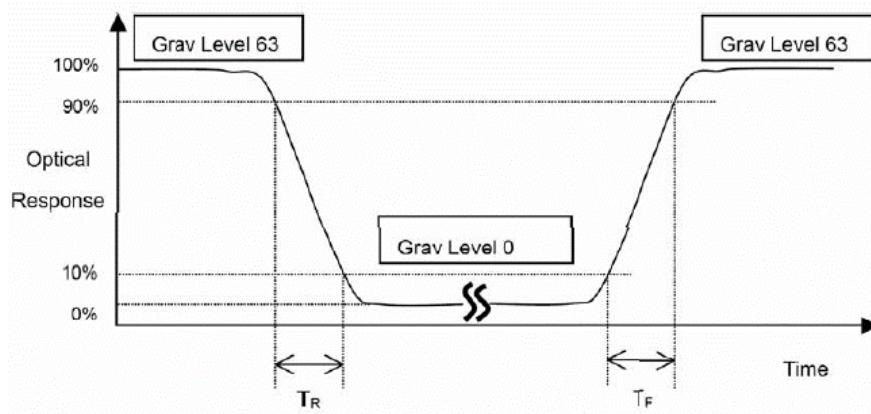
L63: Luminance of gray level 63

L0: Luminance of gray level 0

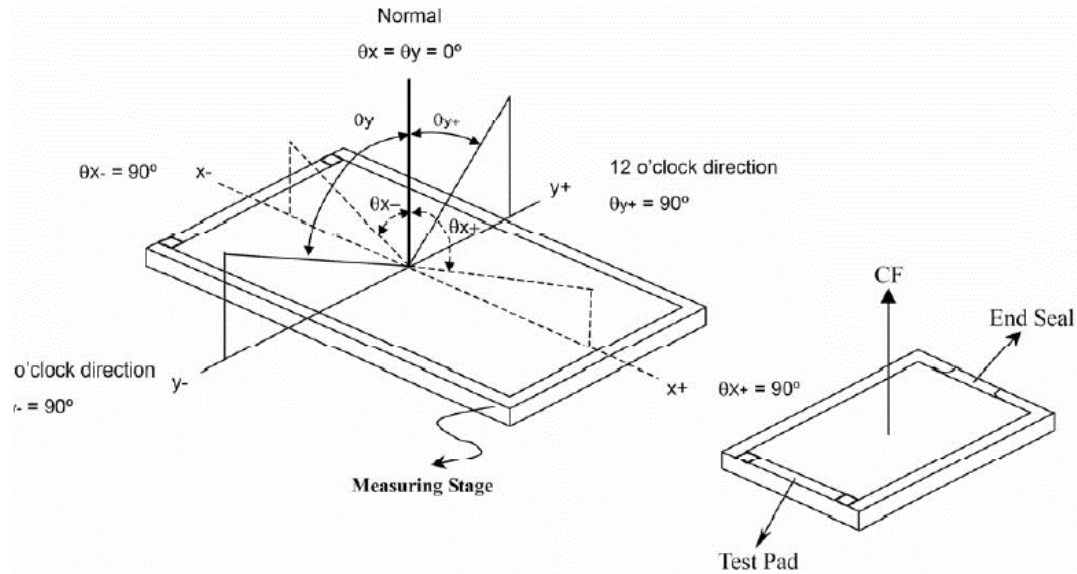
$$\text{CR} = \text{CR} (10)$$



\*Note (2) Definition of Response Time (TR, TF):

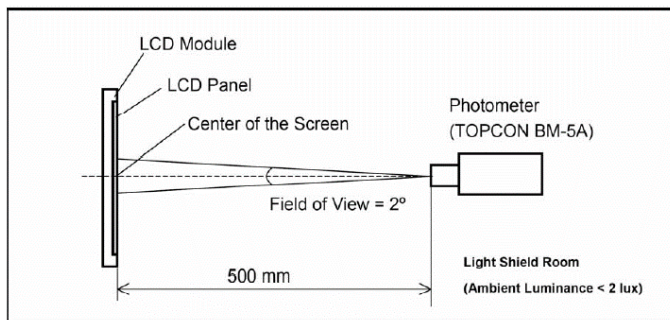


\*Note(3) Definition of Viewing Angle



\*Note (4) Measurement Set-Up:

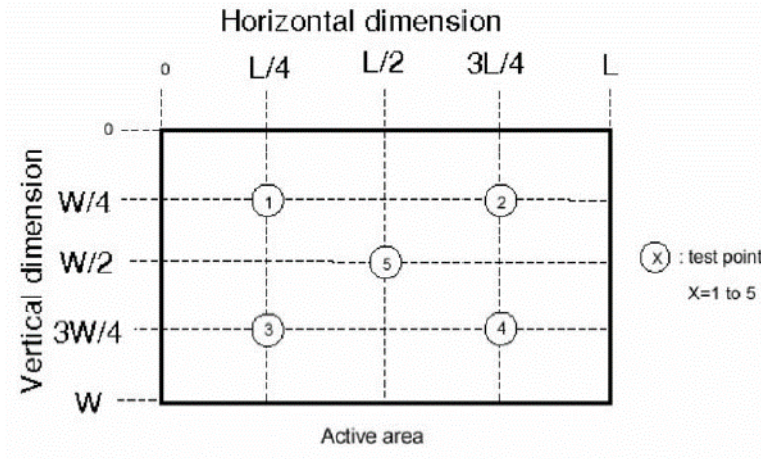
The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.







\*Note (5)



### 4.4 Timing Characteristics

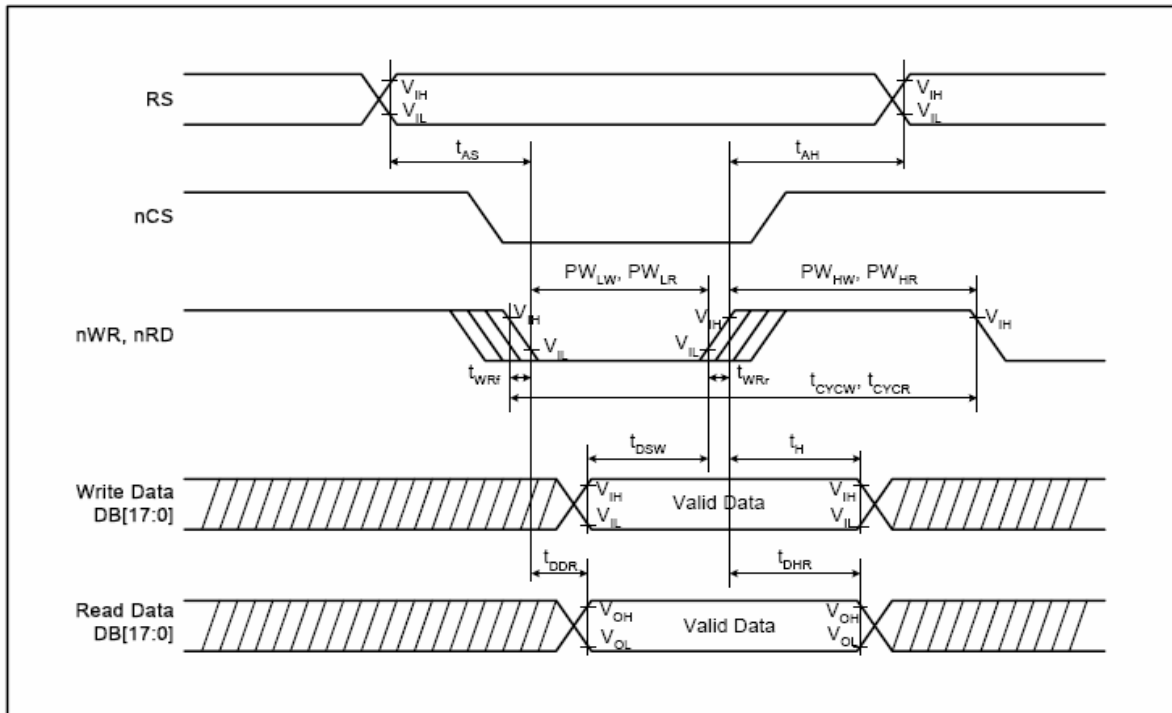


Figure 51 i80-System Bus Timing

## 5 Accessory

### 5.1 Quality Units

#### 5.1.1 Inspection Standard

See Data sheet of Inspection Standard for detail.



5.1.2 Reliability Test

5.1.2.1 Standard Specifications for Reliability

5.1.2.1.1 Test method

There should be no existing conspicuous failure of functions and appearance in LCD after the following tests.

NO	Item	Description
1	Low Temperature Operating	The sample should be allowed to stand at (-20±2) for 96 Hours under driving condition.
2	High Temperature Operating	The sample should be allowed to stand at (70±2) for 96 Hours under driving condition.
3	Low Temperature Storage	The sample should be allowed to stand at (-30±3) for 96 Hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 24 hours
4	High Temperature Storage	The sample should be allowed to stand at (80±2) for 96Hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 24 hours
5	Moisture resistance	The sample should be allowed to stand at (40±2) , (90±2)%RH for 96Hours under no-load condition excluding the polarizer, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours
6	Thermal Shock Resistance	The sample should be allowed to stand the following 5 cycles of operation: T <sub>STL</sub> for 30 minutes -> normal temperature for 5 minutes -> T <sub>STH</sub> for 30 minutes -> normal temperature for 5 minutes, as one cycle, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours

5.1.2.1.2 Testing Conditions and Inspection Criteria:

For the final test, the testing sample must be stored at room temperature for 24 hours, after the tests listed above; Standard specifications for Reliability have been executed in order to ensure stability.

NO	Item	Inspection Criteria
1	Current Consumption	The current consumption should be under double of initial test.
2	Contrast	The contrast must be larger than half of initial test.
3	Appearance	Appearance defects should not happen.

5.1.2.2 Life Time:

Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (25±10°C), normal humidity (45±20%RH), and in area not exposed to direct sunlight. Definition on the termination of life time is deterioration of contrast ratio by one fifth against initial value or human eyes can not recognize each dots.

5.2 Precautions For Use

5.2.1 Handling Precautions

- A. No mechanical SHOCK!
  - LCD may be broken because it is made of glass.
- B. DO NOT SCRATCH!



- Polarizer is a soft material and can easily be scratched.
- C. No DC VOLTAGE TO LCD!
- The electric characteristics of LCD deteriorates.
- Please control DC content inside driving circuits.
- D. Wash your hands or clothes if you touch liquid crystal.
- Liquid crystal may be leaked when LCD is broken.
- Never tastes it if your hands or clothes touch it, please immediately wash using soap.
- E. WEAR GLOVES while handling
- It is preferable to wear gloves to avoid damaging the LCD.
- Please do not touch electrodes with bare hands or make them dirty.
- F. SLOWLY PEEL OFF protective film!
- Static electricity may be charged.
- G. KEEP AWAY from extreme HEAT, HUMIDITY and direct SUNLIGHT!
- LCD deteriorates.

### 5.2.2 Installation Precautions

- A. The LCD shall be installed flat, without twisting or bending.
- B. The display window size should be the same as the effective viewing area.
- C. The LCD screen may be cleaned with a soft cloth or cotton pad. Methanol, or Isopropyl Alcohol may be used, but insure that all solvent residue is removed.

### 5.2.3 Operation Precautions

- A. The LCD shall be operated within the limits specified, or it will shorten the LCD's life, and/or harm display images.
- B. The driving conditions must be supply to optimize viewing angle and contrast.
- C. Operation of the LCD at temperature below the limit specified may cause image degradation and/or bubbles. It may also change the characteristics of the liquid crystal. This phenomenon may not recover. The LCD shall be operated within the temperature limits specified.
- D. Control DC content inside driving circuits or the LCD's life will shorten.

### 5.2.4 Storage Precautions

- A. The LCD shall be stored within the temperature and humidity limits specified.
- B. Store in a dark area, and protected the LCD from direct sunlight or fluorescent light.
- C. The LCD should be packaged to prevent damage.
- D. Water may cause damage or discoloration of the polarizer. Clean any condensation or moisture from any source immediately.

Always keep the LCD free from condensation during testing. Condensation may permanently spot or stain the polarizers.