Industrial Solutions Flatpanel Technology

DESIGN FOR TFT COLOR LCD MODULE

Design No.	doh244_70
Revision	i-sft ⇔ Rev. 01
Type	7” 1024 x 600
	SPECIFICATIONS
Version	**Internal Revision 0.1**
Date	09.06.2005
Preliminary ☒	
Final ☐	

This typical design can be used to manufacture dedicated products at i-sft according to the mentioned specification. Please send us a RFQ for this design and stating the number of displays to be build. We will send a formal quote including a final specification. With your formal order please also send a written approval of the final specification.
No further activities will start before formal order is processed and written approval of final specification is in!

1 DESCRIPTION

I-SFT doh244_70 is a color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses poly silicon TFT as switching devices. This model is composed of a TFT LCD panel, a driver circuit and a back-light system. The 7” display has a resolution of 1024 x 600 pixels and can display up to 256k colors.

2 FEATURES

7” for Highbright Applications
Long life lamp system
Color temperature 9000K

3 APPLICATIONS

Monitors for industrial use

4 STRUCTURE AND FUNCTIONS

A TFT color LCD module comprises a TFT LCD panel, LSIs for driving liquid crystal. The TFT LCD panel is composed of a TFT array glass substrate superimposed on a color filter glass substrate with liquid crystal filled in the narrow gap between two substrates.

RGB (Red, Green, Blue) data signals are sent to LCD panel drivers after modulation into suitable forms for active matrix addressing through signal processor.

Each of the liquid crystal cells acts as an electro-optical switch that controls the incident light transmission by a signal applied to a signal electrode through the TFT switch.

5 OUTLINE CHARACTERISTICS

ITEM	SPECIFICATION	UNIT	NOTE
Active area	90(H) x 153.6(V)(7 inch diagonal)	mm	
Driver element	p-Si TFT active matrix		
Display colors	256k		
Number of pixels	1280 x 600	pixel	
Luminance (typ.)	1000	cd/m^2	
Pixel arrangement	RGB vertical stripe		
Pixel pitch	0.15 (H) x 0.15(W)	mm	
Display Mode	Normally White		

6 SPECIFICATIONS

6-1 MECHANICAL INFORMATION

ITEM		TYP.	UNIT
Module size	Horizontal (H)	185.6	mm
	Vertical (V)	115.6	mm
	Depth (D)	22.7	mm
Weight		610	g

6-2 ELECTRICAL CHARACTERISTICS

INVERTER Ta=25±2°C

ITEM	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	V_{inv}	10.8	12	13.2	V	
Power Supply Current	I_{inv}		1		A	

6-3 INTERFACE PIN CONNECTION

Inverter
Connector: JST S8B-PH-SM3-TBc
Corresponding connector: housing JST PHR-8, contacts JST SPH-002T-P0.5S

PIN	Symbol	Function
1	V_{SS}	Power supply +12 V (1)
2	V_{SS}	Power supply +12 V (1)
3	NC	
4	PWM	PWM-Signal: 0 – 100%
5	NC	
6	NC	
7	GND	
8	GND	

Note
(1) for best connection use pin 1 and 2 parallel and pin 7 and 8 parallel

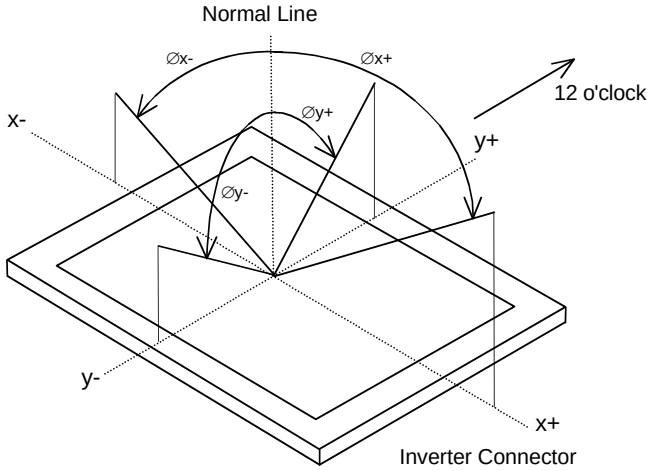
6-4 OPTICAL CHARACTERISTICS

Measuring equipment:
Luminance, Viewing Angle, Contrast: ELDIM EZContrast

Ta = 22°C ± 2°C

Parameter		Symbol	Condition	Min.	Typ.	Max.		Remark
Viewing Angle	Horizontal	∅x+	CR>10, ∅y = ±0°		45			(1), (4)
		∅x-	CR>10, ∅y = ±0°		45			
	Vertical	∅y+	CR>10, ∅x = ±0°		25			
		∅y-	CR>10, ∅x = ±0°		45			
Contrast ratio		CR	∅y=±0°, ∅x=±0°	-	400:1	-	-	(1), (2), (4)
Response time		T_R T_F	rising falling	- -	- -	50 50	ms	(1), (3)
Luminance (center of screen)		Lw	at center	-	1000	-		(1), (4)
Chromaticity	Red	Rx RY	at center	- -				
	Green	Gx Gy	at center	- -				
	Blue	Bx By	at center	- -				
	white	Wx Wy	at center	- -	0,295 0,349			

note (1): Definition of viewing angle



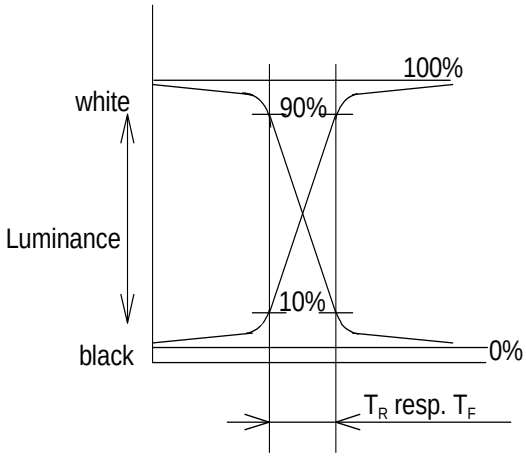
note (2): The contrast ratio is calculated by using the following formula:

$$\text{Contrast ratio} = \frac{\text{Brightness (Luminance) with all pixels in “White”}}{\text{Brightness(Luminance) with all pixels in “Black”}}$$

the brightness is measured in a darkroom.

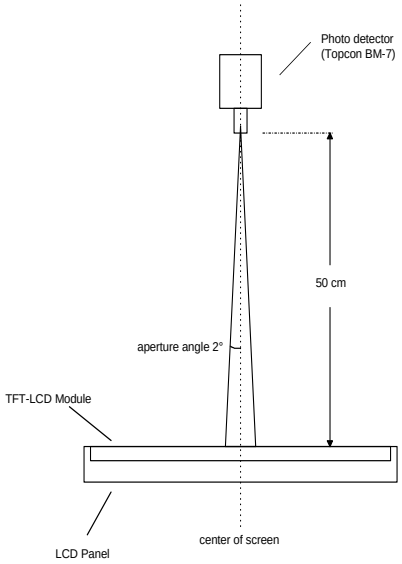
note (3): Definition of the response time:

Photodetector output signal is measured when the brightness changes from “white” to “black” or “black” to “white” respectively. The response time is the time between 10% and 90% of the photodetector output.

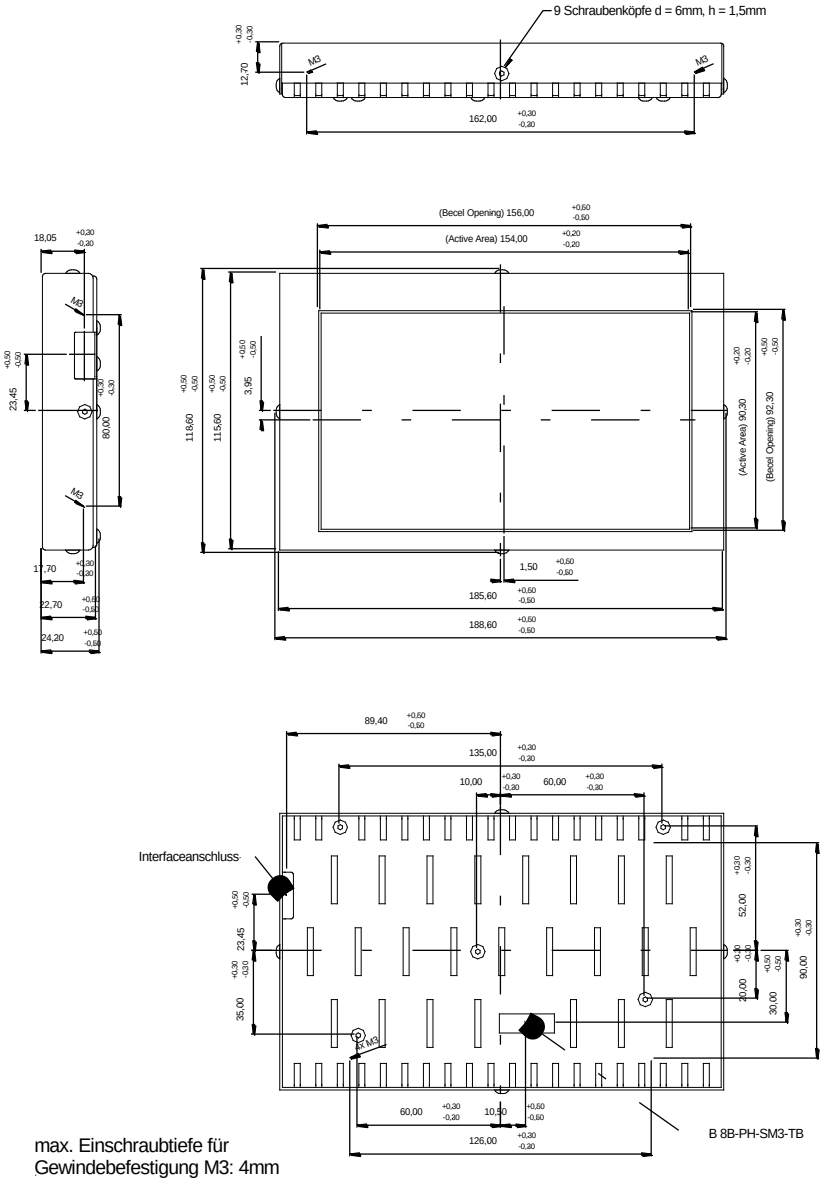


note (4): Brightness measurements setup

The measurement should be executed in a dark room 10 min. after lightning the backlight. Matrix: off state. The brightness is measured in the center of the screen.
Environment condition: T = 22 ± 2 °C, it has to be assured that a
sufficient heat flow / air circulation is given



6-5 OUTLINE DIMENSION



7 GENERAL PRECAUTIONS

7-1 HANDLING

(a) When the module is assembled, it should be attached to the system firmly using every mounting holes. Be careful not to twist and bend the modules.
Keep at least 8 mm space on back of display for air convection.

(b) Length of fixation screws for the housing should not exceed 4mm on the top and the bottom. Length of fixation screws on the sides and the backplate should not exceed 1 0mm.

(c) Refrain from strong mechanical shock and / or any force to the module. In addition to damage, this may cause improper operation or damage to the module and CCFT backlight.

(d) Note that polarizers are very fragile and could be easily damaged. Do not press or scratch the surface harder than a HB pencil lead.

(e) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.

(f) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(g) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.
Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might produce a permanent damage to the polarizer due to chemical reaction.

(h) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

(i) Protect the module from static, it may cause damage to the C-MOS Gate Array IC.

(j) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(k) Do not disassemble the module.

(l) Pins of I/F connector shall not be touched directly with bare hands.

7-2 STORAGE

(a) Do not store the TFT-LCD module in direct sunlight.

(b) The module shall be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during the store.

7-3 OPERATION

(a) Do not connect, disconnect the module in the “Power On” mode.

(b) Power supply should always be turned on/off by following item “ SUPPLY VOLTAGE SEQUENZE “.

(c) Module 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.

7-4 OTHERS

(a) Ultra-violet ray filter is necessary for outdoor operation.

(b) Avoid condensation of water. It may result in improper operation or disconnection of lectrode.

(c) Do not exceed the absolute maximum rating values (the supply voltage variation, input voltage variation, variation in part contents and environmental temperature, so on). Otherwise the module may be damaged.

(d) If the module displays the same pattern continuously for a long period of time, it can be the situation when the image “sticks” to the screen.

(e) This module has its circuitry PCB’s on the rear side and should be handled carefully in order not to be stressed.

7-5 DEFECT SPECIFICATIONS

a)Inspection conditions

Distance : the distance between the inspector's eye and the LCD panel is 20cm.

Luminance : the distance between a 20-W fluorescent lamp and the LCD panel is 25-30 cm.

Temperature: Room temperature is 25C°±5C°.

Viewing angle:

Display specifications : $-20° \le \theta x \le +20°$, $0° \le \varnothing y \le +20$

Appearance specifications: $-45° \le \theta x \le +45°$, $-45° \le \varnothing y \le +45°$

Measuring light conditions: for Cold Cathode Fluorescent Lamp

Chromaticity coordinates (x = 0.320, y = 0325) typ.

Luminance of backlight surface for inspection: 1200 cd/m²

b)Display specifications

Item	Specifications			
Line defect	Not allowed			
Luminous dots *1	Color	Brightness	Distance between same color dots	Quantity
	Red, Green	F + H	-	R + G ≤ 6
		F	-	R ≤ 6 , G ≤ 3
	Blue	F + H	-	≤ 6
		F	-	≤ 6
	Red, Green, Blue	F	≤ 6.5 mm *4	R, G, B ≤ 0
			Linked two or more dots *3	R, G, B ≤ 0
Dark dots *2	Color	Distance between dark dots		Quantity
	Black	-		R + G + B ≤ 16 R, G, B ≤ 7
		Linked two dots *3		≤ 1 pair
		Linked three or more dots *3		≤ 0
		≤ 6.5 mm *4		≤ 0

*1 F: Full luminous dots (Bright point independent of viewing angle)

H: Half luminous dots (Bright point dependent on viewing angle)

Luminous dots are measured while the screen is black.

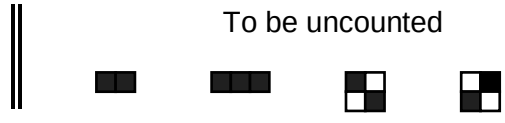
*2 Dark dots are measured while the screen is illuminated with Red, Green, or Blue.

*3 Linkage means linked two or more dots.

■(Luminous or Dark dot)

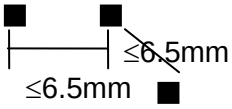
To be counted

To be uncounted



*4 ≤ 6.5 mm is considered with:

■ (:Luminous or Dark dot)



	To be counted	To be uncounted
Luminous dots	Same color	Different color
Dark dots	Same screen	Different screen

*5 The dot-amounts of linkage and <6.5 mm are counted when the dots are only full luminous.

c) Appearance specifications

Item	Specifications		
	Measurement criteria		Quantity
Other objects Stains Dust (dot shape)	Average diameter(∅) mm		Allowed value
	∅ ≤0.2		all allowed
	0.2< ∅ <0.3		≤10 points
	0.3< ∅ ≤0.5		≤ 3 points
	0.5< ∅ Linked other objects		0 point
Other objects Stains Dust (line shape)	Width(W) mm	Length(L) mm	
	W ≤ 0.05	-	all allowed
	0.05 ≤ W ≤ 0.1	L < 0.7	
		0.7 ≤ L ≤ 1.0	≤ 4 points
		1.0 < L	0 point
	0.1 < W	-	
Polarizer Bubbles	Average diameter(∅) mm		
Wrinkles Dent	∅ ≤ 0.5		< 2 points
Panel dent	∅ ≤ 0.5		< 2 points
Polarizer scratch	Remarkable scratches		0 point
Form	Specified labels and parts are put		

The relevant data for the values above are only valid under the conditions described in 7-9 “a”.