LCD MODULE SPECIFICATION

Products Name:APAX T13A4
33.8CM(13.3 INCH) XGA(1024x768)
262K COLOR TFT LCD MODULE
3.3V

● **Preliminary Specification**

This technical specification is tentative and it will be changed without notice.

進金生實業股份有限公司

台北市內湖區瑞光路76巷39號4樓

Tel:02- **Fax:02-**

Version. 1.0

ii Record of Revision

Version and Date	Page	Description
1. '99/7/9	All	First Edition for Customer
2. '99/8/12	4	Revise weight spec : 480g max. -> 490g typ.
3. '99/8/16	4	Revise Avg. White Luminance 150 cd/m2 -> 120 cd/m2 (Note 1)
	7	Revise Viewing Angle Spec
	14	Revise Avg. White Luminance 150 cd/m2 -> 120 cd/m2 (D.P.-1)
4. '99/10/21	4	Revise Avg. White Luminance 120 cd/m2 -> 145 cd/m2
	4	Add Luminance Uniformity Spec
	8	Add Contrast Ratio Min. Value
	8	Add Color Chromaticity Spec
	8	Revise Avg. White Luminance Min. and Typ. Value
	15	Revise Avg. White Luminance Min. and D.P.-1 Value

1.0 Handling Precautions

1) Since front polarizer is easily damaged, pay attention not to scratch it.
2) Be sure to turn off power supply when inserting or disconnecting from input connector.
3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
4) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
7) Do not open nor modify the Module Assembly.
8) Do not press the reflector sheet at the back of the module to any directions.
9) In case if a Module has to be put back into the packing container slot after once it was taken out from the container, do not press the center of the CFL Reflector edge.
   Instead, press at the far ends of the CFL Reflector edge softly. Otherwise the TFT Module may be damaged.
10) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
11) After installation of the TFT Module into an enclosure (Notebook PC Bezel, for example), do not twist nor bent the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.

2.0 General Description

This specification applies to the 13.3 inch Color TFT/LCD Module .

This module is designed for a display unit of notebook style personal computer.

The screen format is intended to support the XGA (1024(H) x 768(V)) screen and 262,144 colors (RGB 6-bit data driver).

All input signals are LVDS interface compatible.

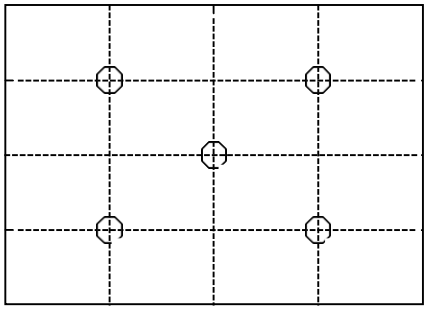
This module does not contain an inverter card for backlight.

2.1 Characteristics

The following items are characteristics summary on the table under 25 condition:

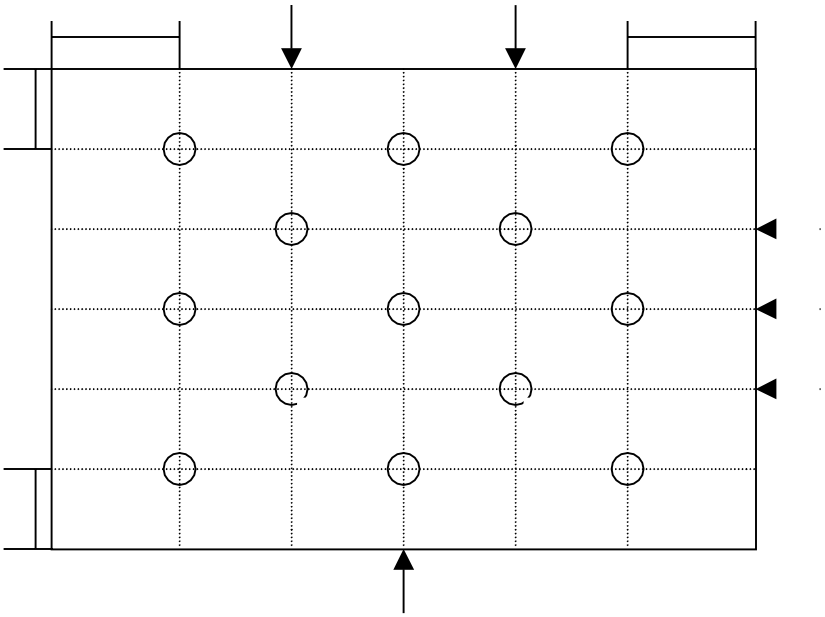
ITEMS	SPECIFICATIONS
Screen Diagonal [mm]	338(13.3")
Active Area [mm]	270.336(H) x 202.752(V)
Pixels H x V	1024(x3) x 768
Pixel Pitch [mm]	0.264(per one triad) x 0.264
Pixel Arrangement	R.G.B. Vertical Stripe
Display Mode	Normally White
Average White Luminance [cd/]	145 @ 6.0 mA (Note : 1)
Luminance Uniformity	1.25 max. (5 points) 1.65 max. (13 points) (Note : 2)
Contrast Ratio	200 : 1 Typ.
Optical Rise Time/Fall Time [msec]	30 Typ., 50 Max.
Nominal Input Voltage [Volt] VDD	 +3.3 V
Typical Power Consumption [watt] (VDD line + VCFL line)	 5.0(w/o Inverter, All Black Pattern)
Weight [grams]	490 typ.
Physical Size [mm]	284(W) x 214.3(H) x 6.1(D) typ., 6.4(D) max.
Electrical Interface	R/G/B Data, 3 Sync. Signals, Clock (4 pairs LVDS)
Support Color	Native 262,144 colors (RGB 6-bit data driver)
Temperature Range ( ) Operating Storage (Shipping)	 0 to +50 -20 to +60

Note 1 : Definition of Average White Luminance



Average White Luminance = (L1+L2+L3+L4+L5)/5

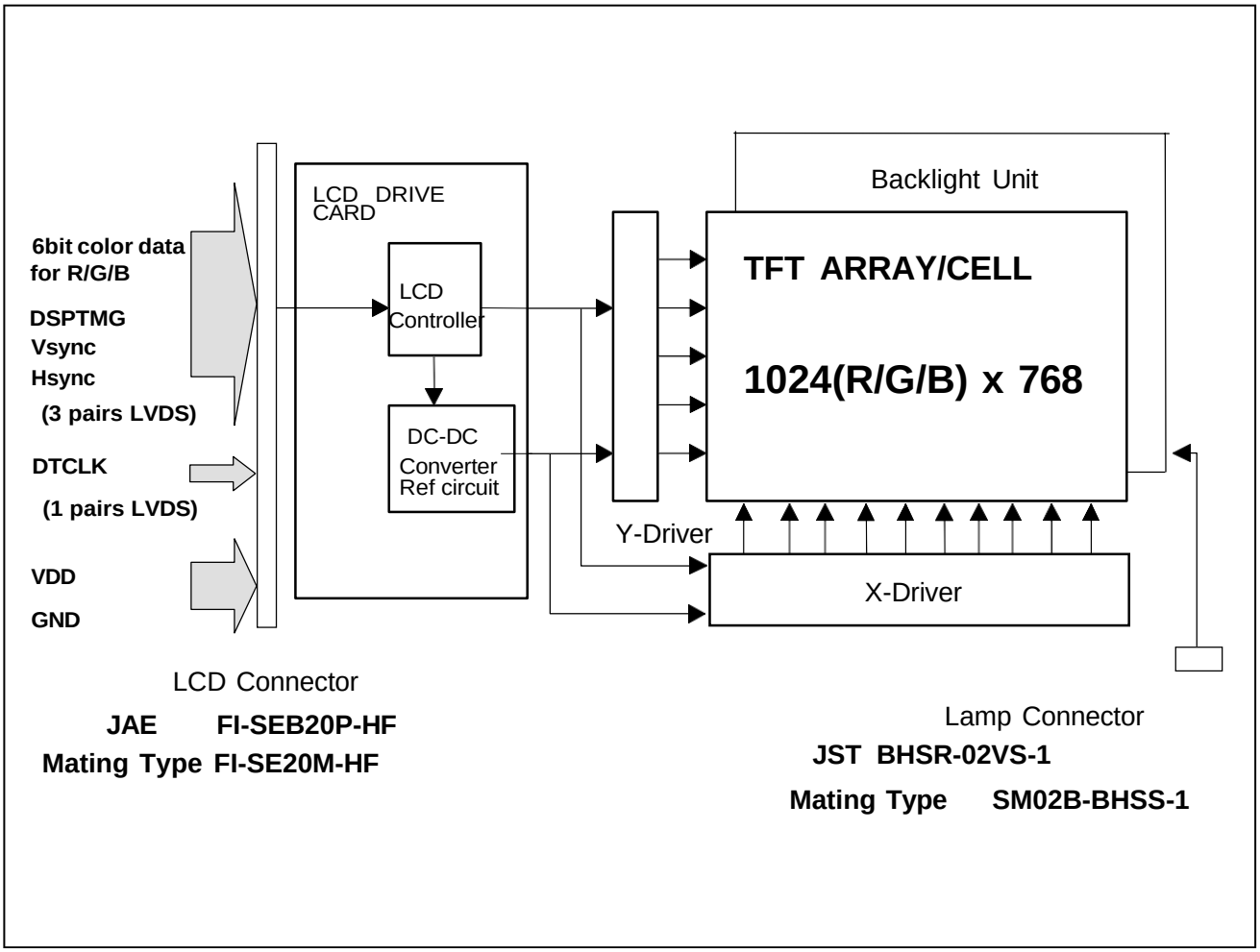
Note : 2 Definition of Luminance Uniformity



Luminance Uniformity (5 points) = Max. of (L1,L2,L3,L4,L5) / Min. of (L1,L2,L3,L4,L5)
Luminance Uniformity (13 points) = Max. of the brightness of 13 points / Min. of the brightness of 13 points

2.2 Functional Block Diagram

The following diagram shows the functional block of the 13.3 inches Color TFT/LCD Module:



3.0 Absolute Maximum Ratings

Absolute maximum ratings of the module is as follows :

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	VDD	Vss-0.3	+4.0	V	
CFL Inrush current	ICFLL		20	mA	Note 2
CFL Current	ICFL	2.0	7.5	mA rms	
Operating Temperature	TOP	0	+50		Note 1
Operating Humidity	HOP	8	95	%RH	Note 1
Storage Temperature	TST	-20	+60		Note 1
Storage Humidity	HST	8	95	%RH	Note 1

Note 1 : Maximum Wet-Bulb should be 39 and No condensation.

Note 2 : Duration=50 msec.

4.0 Optical Characteristics

The optical characteristics are measured under stable conditions as follows under 25 condition:

Item	Conditions	Min.	Typ.	Max.
Viewing Angle (Degrees) K: Contrast Ratio	Horizontal (Right) K 10 (Left) Vertical (Upper) K 10 (Lower)	40 40 10 30	-- --	-- --
Contrast ratio		100	200	
Response Time (ms)	Rising		30	50
	Falling		30	50
Color Chromaticity (CIE)	Red x	0.537	0.577	0.617
	Red y	0.308	0.338	0.368
	Green x	0.280	0.310	0.340
	Green y	0.524	0.554	0.584
	Blue x	0.128	0.158	0.188
	Blue y	0.084	0.124	0.164
	White x	0.283	0.313	0.343
	White y	0.299	0.329	0.359
Average White Luminance(cd/)		115	145	

5.0 Signal Interface

5.1 Connectors

Physical interface is described as for the connector on module.

These connectors are capable of accommodating the following signals and will be following components.

Connector Name / Designation	For Signal Connector
Manufacturer	JAE
Type / Part Number	FI-SEB20P-HF
Mating Housing/Part Number	FI-SE20M-HF

Connector Name / Designation	For Lamp Connector
Manufacturer	JST
Type / Part Number	BHSR-02VS-1
Mating Type / Part Number	SM02B-BHSS-1

5.2 Signal Pin

Pin#	**Signal Name**	**Pin#**	**Signal Name**
1	VDD	2	VDD
3	GND	4	GND
5	Rxin0-	6	Rxin0+
7	GND	8	Rxin1-
9	Rxin1+	10	GND
11	Rxin2-	12	Rxin2+
13	GND	14	Rxclk-
15	Rxclk+	16	GND
17	NC	18	Reserved
19	GND	20	GND

5.3 Signal Description

The module using a LVDS receiver SN75LVDS86DGG(Texas Instruments) or compatible. LVDS is a differential signal technology for LCD interface and high speed data transfer device. Transmitter shall be SN75LVDS84DGG(negative edge sampling) or compatible**.**

PIN#	SIGNAL NAME	Description
1	VDD	+3.3V Power Supply
2	VDD	+3.3V Power Supply
3	GND	Ground
4	GND	Ground
5	Rxin0-	Negative LVDS differential data input (R0-R5, G0)
6	Rxin0+	Positive LVDS differential data input (R0-R5, G0)
7	GND	Ground
8	Rxin1-	Negative LVDS differential data input (G1-G5, B0-B1)
9	Rxin1+	Positive LVDS differential data input (G1-G5, B0-B1)
10	GND	Ground
11	Rxin2-	Negative LVDS differential data input (B2-B5, HSYNC,VSYNC,DSPTMG)
12	Rxin2+	Positive LVDS differential data input (B2-B5, HSYNC,VSYNC,DSPTMG)
13	GND	Ground
14	Rxclk-	Negative LVDS differential clock input
15	Rxclk+	Positive LVDS differential clock input
16	GND	Ground
17	NC	Reserved for future use
18	Reserved	Reserved for LVDS MFG Test
19	GND	Ground
20	GND	Ground