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ZTM140INXE5001-C

Final Product Specification

Rev. 0

深圳市正通仁禾科技有限公司

SPEC.NUMBER

PRODUCT GROUP
TFT-LCD

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1.0 GENERAL DESCRIPTION

1.1 Introduction

ZTM140INXE5001-C is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 14.0 inch diagonally measured active area with Full-HD resolutions (1920 horizontal by 1200 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.2M colors. The TFT-LCD panel used for this module is a low reflection and higher color type. Therefore, this module is suitable for Notebook PC. The LED driver for back-light driving is built in this model.

All input signals are eDP1.2 interface compatible.

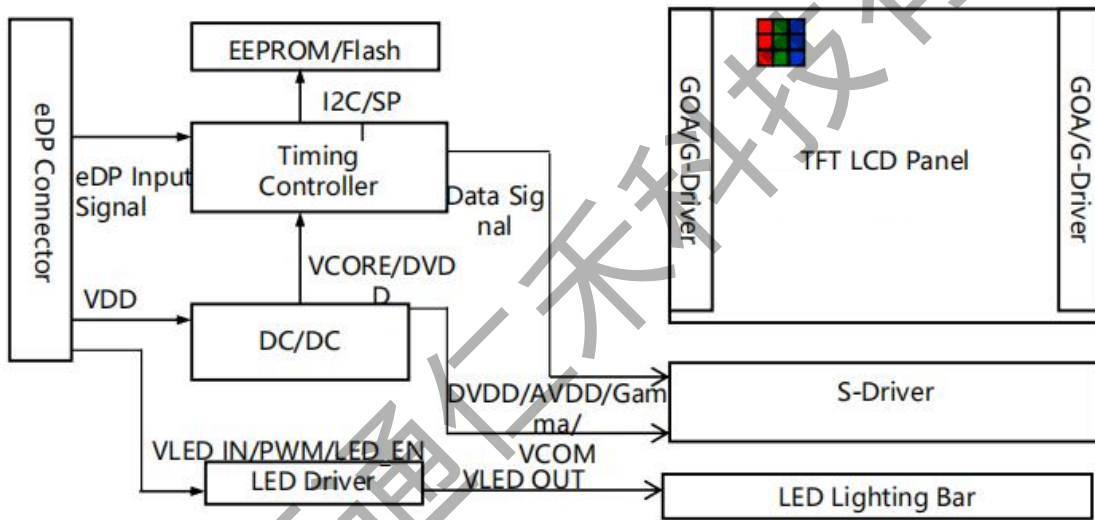


Figure 1. Drive Architecture

1.2 Features

- 2 lane eDP interface with 2.7Gbps link rates
- 16.2M color depth
- RoHS Compliant
- Data enable signal mode
- 16.7M
- On board LED driving circuit
- Low driving voltage and low power consumption
- On board EDID chip



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1.3 Application

- Notebook PC (Wide type)

1.4 General Specification

The followings are general specifications at the model ZTM140INXE5001-C(listed in Table 1)

<Table 1. General Specifications>

Parameter	Specification	Unit	Remarks
Active area	301.5936(H) x188.4960(V)	mm	
Number of pixels	1920 (H) x RGB(3) x1200 (V)	pixels	
Pixel pitch	52.36(H) x157.08(V)	um	
Pixel arrangement	RGB Vertical stripe		
Display colors	16.2M		
Color gamut	72%		Typ
Display mode	Normally Black		
Dimensional outline	306.594(H)*197.6(V) (w/o PCB)*2.6(D) 306.594(H)*205.396(V) (PCB)*2.6(D)	mm	
Weight	-(max)	g	
Surface treatment	Anti-Glare		
Surface hardness	3H		
Power consumption	P_D :-Max)	W	@Mosaic
	P_{BL} : 3.2(Max)	W	
	P_{Total} : -(Max)	W	@Mosaic

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2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. Absolute Maximum Ratings>

Ta=25+/-2° C

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V _{DD}	-0.5	4.0	V	Note 1
Logic Supply Voltage	V _{IN}	V _{SS} -0.3	V _{DD} +0.3	V	
Operating Temperature	T _{OP}	0	+50	° C	Note 2
Storage Temperature	T _{ST}	-10	+60	° C	

Notes :

1. Permanent damage to the device may occur if maximum values are exceeded functional operation should be restricted to the condition described under normal operating conditions.
2. Temperature and relative humidity range are shown in the figure below.
95 % RH Max. (40 ° C ≥ Ta) Maximum wet - bulb temperature at 39 ° C or less. (Ta > 40 ° C)
No condensation.

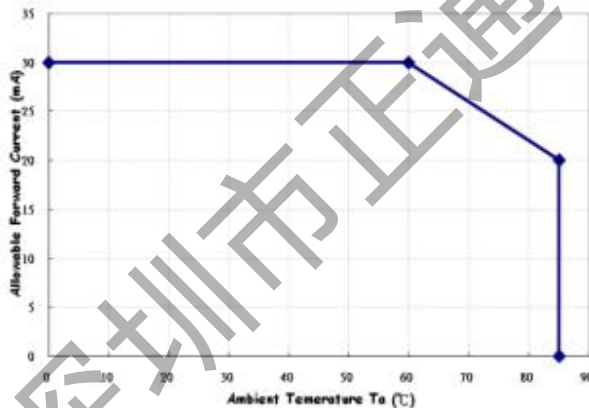


Figure 2. forward current vs ambient temperature

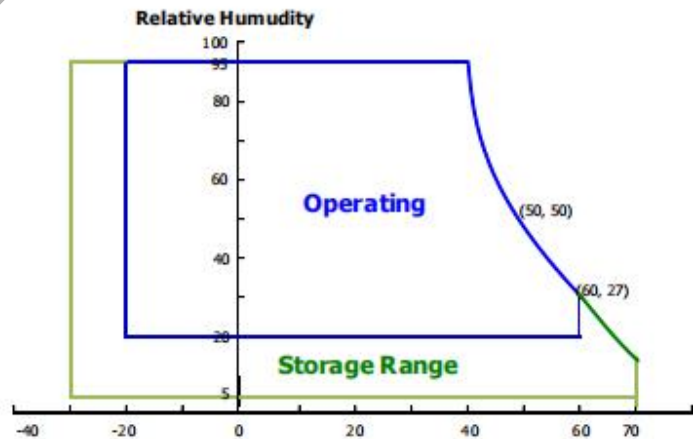


Figure 3. Operation temperature vs Humidity

3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

< Table 3. Electrical Specifications >

Ta=25+/-2° C

Parameter		Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V _{DD}	3.0	3.3	3.6	V	Note 1
Permissible Input Ripple Voltage	V _{RF}		-	100	mV	@ V _{DD} = 3.3V
BIST Control Level	High Level	2	-	3.6	V	@ V _{DD} = 3.3V
	Low Level	0	-	0.8	V	
Power Supply Current	I _{DD}	-	-	-	mA	Note 1
Power Supply Inrush Current	Inrush	-	-	1.5	A	Note 2
Power Consumption	P _D	-	-	-	W	Note 1
	P _{BL}	-	-	3.84	W	-
	P _{total}	-	-	-	W	Note 1

Notes :

1. The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for 3.3V at 25°C.

A) Typ:Mosaic pattern 8*8

B) Max:R/G/B patterns

2.Measure condition(Figure 4)

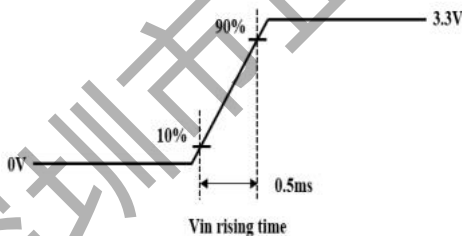


Figure 4. Inrush Measure Condition



3.2 Backlight Unit

< Table 4. LED Driving Guideline Specifications >

Ta=25+/-2° C

Parameter		Min.	Typ.	Max.	Unit	Remarks	
LED Forward Voltage		V _F	2.8	-	3.0	V	-
LED Forward Current		I _F	-	20	-	mA	-
LED Power Consumption		P _{LED}	-	-	3.2	W	Note 1
LED Life-Time		N/A	-	-	-	Hour	I _F = 20mA
Power Supply Voltage for LED Driver		V _{LED}	28	30	32	V	-
Power Supply Voltage for LED Driver Inrush		I _{led inrush}	-	-	1.5	A	Note 4
EN Control Level	Backlight On	V _{BL_EN}	1.5	-	-	V	-
	Backlight Off		-	-	0.8	V	-
PWM Control Level	High Level	V _{BL_PWM}	1.5	-	-	V	-
	Low Level		0	-	0.8	V	-
PWM Control Frequency		F _{PWM}	120	-	30,000	Hz	-
Duty Ratio			1	-	100	%	Note 3

Notes :

1. Power supply voltage 12V for LED driver.
 Calculator value for reference $I_F \times V_F \times 50 / \text{driver efficiency} = P_{LED}$
2. The LED life-time define as the estimated time to 50% degradation of initial luminous.
3. 1% duty cycle is achievable with a dimming frequency less than 2KHz.
4. Measure condition (Figure 5)

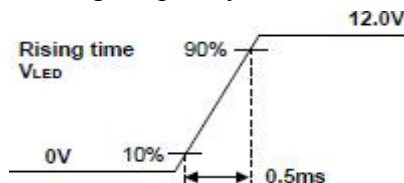


Figure 5. Inrush Measure Condition



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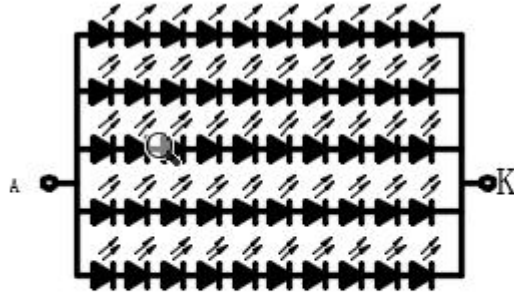
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3.3 LED Structure



10*5=50LED

VF: 28-32V, IF: 20*5=100mA

Backlight LED Circuit

Figure 6. LED Structure



4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = $25 \pm 2^\circ\text{C}$) with the equipment of luminance meter system (CA310) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0° . We refer to $\theta\Phi=0$ ($=\theta_3$) as the 3 o'clock direction (the "right"), $\theta\Phi=90$ ($=\theta_{12}$) as the 12 o'clock direction ("upward"), $\theta\Phi=180$ ($=\theta_9$) as the 9 o'clock direction ("left") and $\theta\Phi=270$ ($=\theta_6$) as the 6 o'clock direction ("bottom"). While scanning θ and/or Φ , the center of the measuring spot on the display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement. VDD shall be $3.3 \pm 0.3\text{V}$ at 25°C . Optimum viewing angle direction is 6 o'clock.

4.2 Optical Specifications

<Table 5. Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle Range	Horizontal	θ_3	CR > 10	75	80	-	Deg.	Note 1
		θ_9		75	80	-	Deg.	
	Vertical	θ_{12}		75	80	-	Deg.	
		θ_6		75	80	-	Deg.	
Luminance Contrast Ratio		CR	$\theta = 0^\circ$	1000	1200	-		Note 2
Luminance of White(centre)	5 Points	Y_w	$\theta = 0^\circ$ ILED = 20mA	220	250	-	cd/m ²	Note 3
White Luminance Uniformity	9 Points	ΔY_9		75	80	-	%	Note 4
	13 Points	ΔY_{13}		-	-	-	%	
White Chromaticity		W_x	$\theta = 0^\circ$	0.265	0.295	0.325	-	Note 5
		W_y		0.285	0.315	0.345	-	
Reproduction of Color	Red	R_x	$\theta = 0^\circ$	Typ.-0.02	0.634	Typ.+0.02	-	-
		R_y			0.336		-	-
	Green	G_x			0.328		-	-
		G_y			0.588		-	-
	Blue	B_x			0.133		-	-
		B_y			0.054		-	-
Color Gamut		-	-	67	72	-	%	NTSC
Response Time (Rising + Falling)		T_{RT}	Ta= 25°C $\theta = 0^\circ$	-	30	35	ms	Note 6



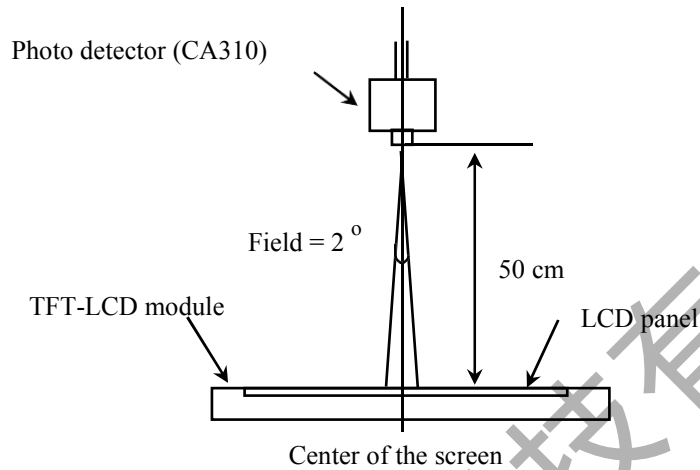
Notes :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see Figure 7).
2. Contrast measurements shall be made at viewing angle of $\Theta = 0$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see Figure 7) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center Luminance of white is defined as luminance values of 5 point average across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in Figure 8 for a total of the measurements per display.
4. The White luminance uniformity on LCD surface is then expressed as : $\Delta Y = \text{Minimum Luminance of 9(or 13) points} / \text{Maximum Luminance of 9(or 13) points.}$ (see Figure 8 and Figure 9).
5. The color chromaticity coordinates specified in Table 5 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
6. The electro-optical response time measurements shall be made as Figure 10 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_r , and 90% to 10% is T_f .
7. Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (YA) of a 10 ± 1 mm diameter area, with all display pixels set to gray 127(of 0 to 255), to the luminance (YB) of that same area when any adjacent area is driven dark. The luminance ratio shall not exceed 1:1.05 (See Figure 11).

4.3 Optical Measurements



Optical characteristics measurement setup

Figure 7. Measurement Set Up

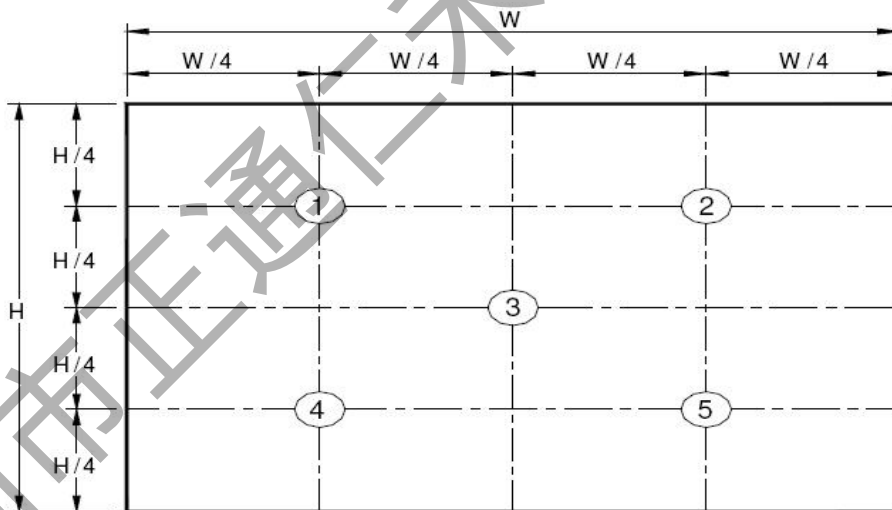


Figure 8. White Luminance and Uniformity Measurement Locations (5 points)

Center Luminance of white is defined as luminance values of center 5 points across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in Figure 7 for a total of the measurements per display.

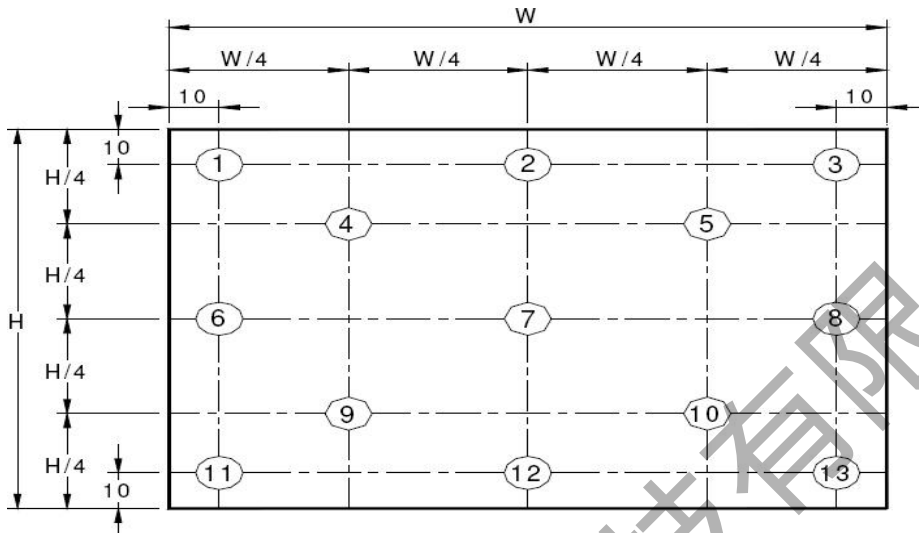


Figure 9. Uniformity Measurement Locations (13 points)

The White luminance uniformity on LCD surface is then expressed as : $\Delta Y5$ = Minimum Luminance of five points / Maximum Luminance of five points (see Figure 8) , $\Delta Y13$ = Minimum Luminance of 13 points /Maximum Luminance of 13 points (see Figure 9).

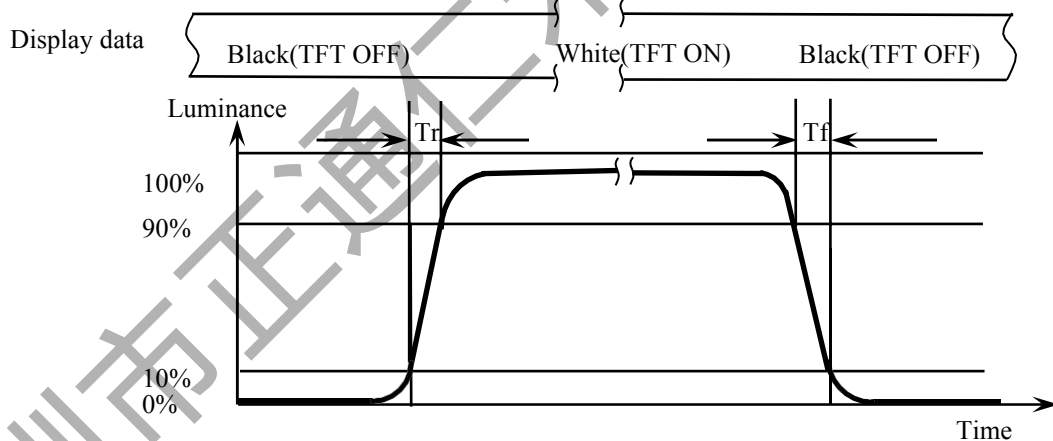
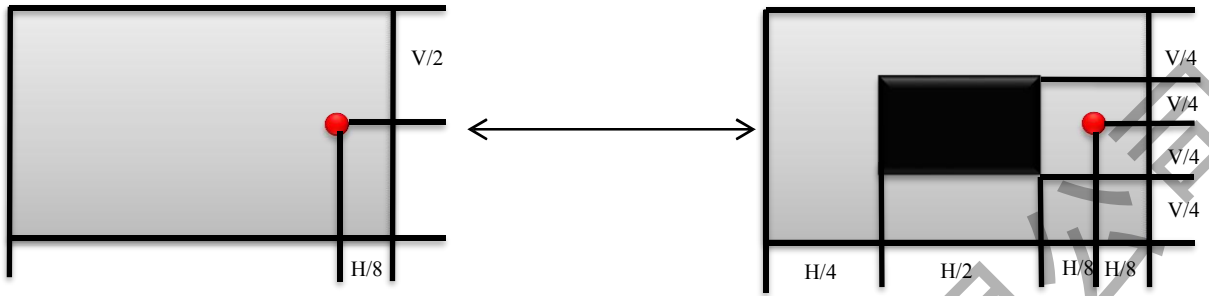


Figure 10. Response Time Testing

The electro-optical response time measurements shall be made as shown in Figure 10 by switching the “data” input signal ON and OFF. Tr: The luminance to change from 10% to 90% ,Tf: The luminance to change from 90% to 10% .

The test system : CA310



$$\text{Cross Talk (\%)} = \left| \frac{Y_B - Y_A}{Y_B} \right| \times 100$$

Figure 11. Cross Talk Modulation Test Description

Where:

Y_A = Initial luminance of measured area (cd/m^2)

Y_B = Subsequent luminance of measured area (cd/m^2)

The location measured will be exactly the same in both patterns. The test background gray is L127.

Cross Talk of one area of the LCD surface by another shall be measured by comparing the luminance (Y_A) of a $10 \pm 1\text{mm}$ diameter area, with all display pixels set to a gray level 127, to the luminance (Y_B) of that same area when any adjacent area is driven dark. (Refer to Figure 11)

The test system: CA310



5.0 INTERFACE CONNECTION

5.1 Electrical Interface Connection

The electronics interface connector is MSAK24025P30 or equivalent.

The connector interface pin assignments are listed in Table 6.

<Table 6. Pin Assignments for the Interface Connector>

Terminal	Symbol	Functions
Pin No.	Symbol	Description
1	NC	No Connection
2	H_GND	Ground
3	LANE1_N	eDP RX Channel 1 Negative
4	LANE1_P	eDP RX Channel 1 Positive
5	H_GND	Ground
6	LANE0_N	eDP RX Channel 0 Negative
7	LANE0_P	eDP RX Channel 0 Positive
8	H_GND	Ground
9	AUX_CH_P	eDP AUX CH Positive
10	AUX_CH_N	eDP AUX CH Negative
11	H_GND	Ground
12	LCD_VCC	Power Supply, 3.3V (typ.)
13	LCD_VCC	Power Supply, 3.3V (typ.)
14	BIST	Panel Self Test Enable
15	H_GND	Ground
16	H_GND	Ground
17	HPD	Hot Plug Detect Output
18	BL_GND	LED Ground
19	BL_GND	LED Ground
20	BL_GND	LED Ground
21	BL_GND	LED Ground
22	BL_ENABLE	LED Enable Pin(+3.3V Input)
23	BL_PWM	System PWM Signal Input
24	NC	No Connection
25	NC	No Connection
26	BL_POWER	LED Power Supply 5V-21V
27	BL_POWER	LED Power Supply 5V-21V
28	BL_POWER	LED Power Supply 5V-21V
29	BL_POWER	LED Power Supply 5V-21V
30	NC	No Connection

5.2 eDP Interface

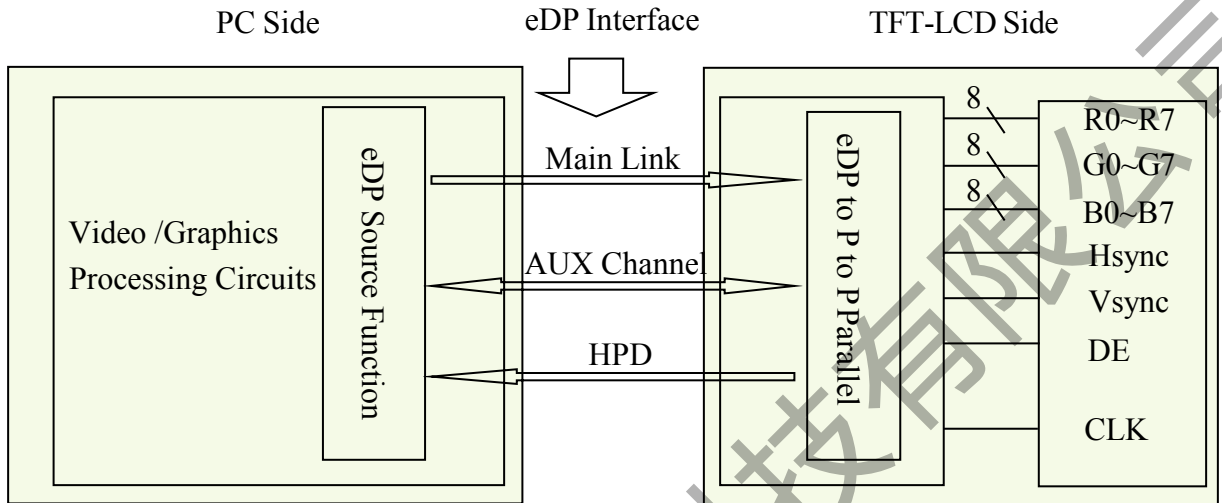


Figure 12. eDP Interface Architecture

Note:

Transmitter : RM81010 or equivalent .
 Transmitter is not contained in module.



5.3 Data Input Format

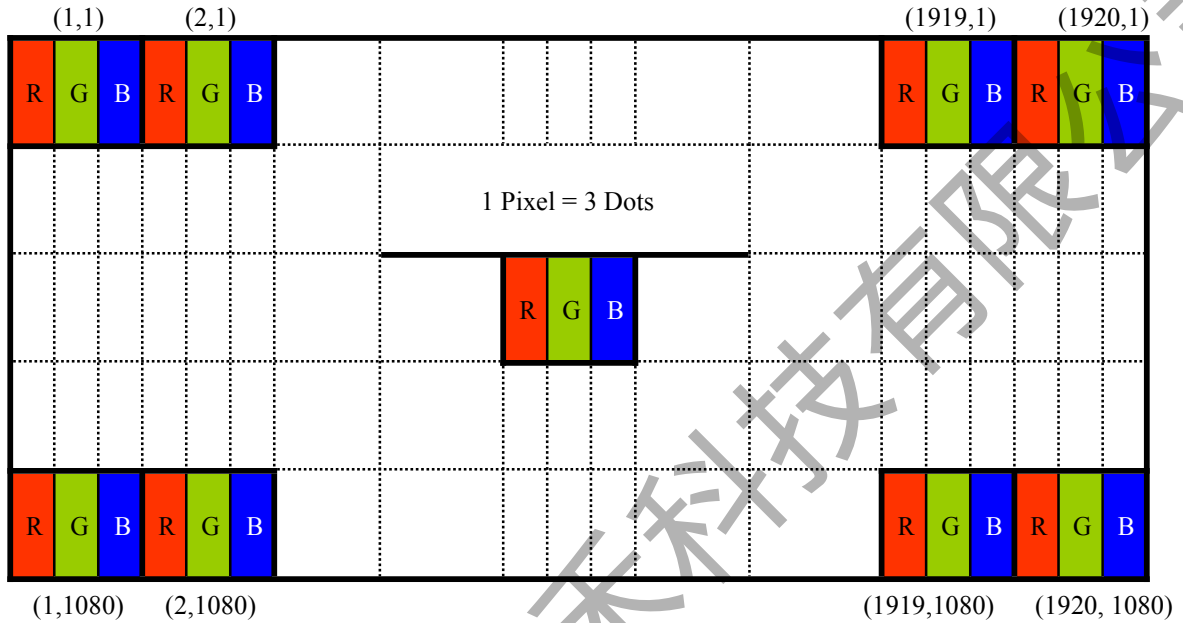


Figure 13. Display Position of Input Data (V-H)



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5.4 Back-light & LCM Interface Connection

BLU Interface Connector: -.

<Table 7. Pin Assignments for the BLU Connector>

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**6.0 SIGNAL TIMING SPECIFICATION****6.1 The ZTM140INXE5001-C Is Operated**

< Table 8. Signal Timing Specification >

Horizontal

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Active Time	HAT		1920		Pixels
Blanking Time	HBT	-	330	-	Pixels
Sync Offset	HSO	-	16	-	Pixels
Sync Pulse Width	HSPW	-	16	-	Pixels
Frequency	Fre		74		kHz

Vertical

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Active Time	HAT		1200		Lines
Blanking Time	HBT	-	36	-	Lines
Sync Offset	HSO	-	3	-	Lines
Sync Pulse Width	HSPW	-	14		Lines

Note : The above is as optimized setting.



6.2 eDP Rx Interface Timing Parameter

The specification of the eDP Rx interface timing parameter is shown in Table 9.

<Table 9. eDP Main-Link RX TP4 Package Pin Parameters>

Item	Symbol	Min	Typ	Max	Unit	Remark
Spread spectrum clock (Link clock down-spreading)	SSC	-	-	0.5	%	
Differential peak-to-peak input voltage at package pins	VRX-DIFFp-p	100	-	1200	mV	
Rx input DC common mode voltage	VRX_DC_CM	0	-	2	V	
Differential termination resistance	RRX-DIFF	80	-	120	Ω	
Single-ended termination resistance	RRX-SE	40	-	60	Ω	
Rx short circuit current limit	IRX_SHORT	-	-	50	mA	
Intra-pair skew at Rx package pins (HBR) RX intra-pair skew tolerance at HBR	LRX_SKEW INTRA_PAIR	-	-	60	ps	

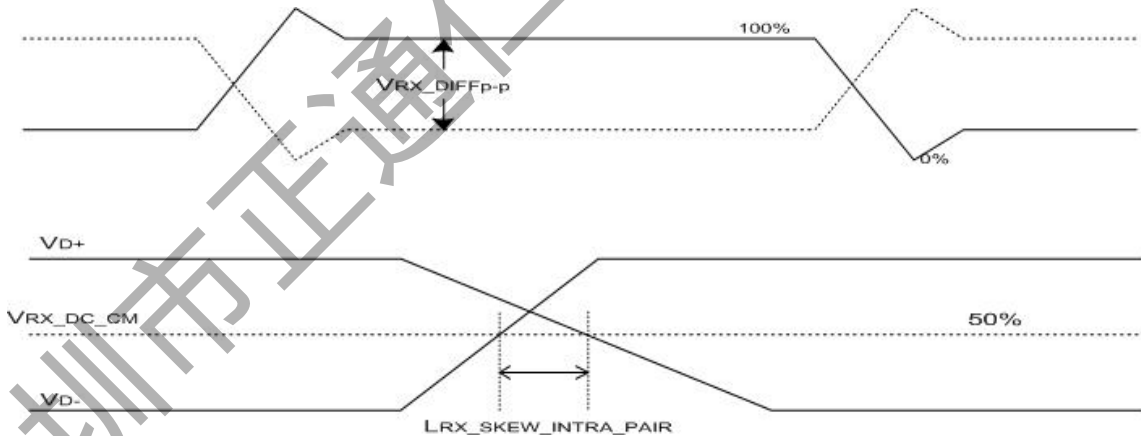


Figure 14. VRX-DIFFp-p & LRX_SKEW_INTRA_PAIR



7.0 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS

<Table 10. Input Signal & Basic Display Colors & Gray Scale of Colors >

	Colors & Grayscale	Data signal									
		R0 R1 R2 R3 R4 R5	G0 G1 G2 G3 G4 G5	B0 B1 B2 B3 B4 B5							
Basic colors	Black	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0							
	Blue	0 0 0 0 0	0 0 0 0 0	1 1 1 1 1 1							
	Green	0 0 0 0 0	1 1 1 1 1 1	0 0 0 0 0							
	Light Blue	0 0 0 0 0	1 1 1 1 1 1	1 1 1 1 1 1							
	Red	1 1 1 1 1 1	0 0 0 0 0	0 0 0 0 0							
	Purple	1 1 1 1 1 1	0 0 0 0 0	1 1 1 1 1 1							
	Yellow	1 1 1 1 1 1	1 1 1 1 1 1	0 0 0 0 0							
	White	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1							
Gray scale of Red	Black	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0							
	△ Darker	1 0 0 0 0	0 0 0 0 0	0 0 0 0 0							
	▽ Brighter	0 1 0 0 0	0 0 0 0 0	0 0 0 0 0							
	△	↑ ↓	↑ ↓	↑ ↓							
	▽	↑ ↓	↑ ↓	↑ ↓							
	Red	1 0 1 1 1 1	0 0 0 0 0	0 0 0 0 0							
Gray scale of Green	Black	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0							
	△ Darker	0 0 0 0 0	1 0 0 0 0	0 0 0 0 0							
	▽ Brighter	0 0 0 0 0	0 1 0 0 0	0 0 0 0 0							
	△	↑ ↓	↑ ↓	↑ ↓							
	▽	↑ ↓	↑ ↓	↑ ↓							
	Green	0 0 0 0 0	1 1 1 1 1 1	0 0 0 0 0							
Gray scale of Blue	Black	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0							
	△ Darker	0 0 0 0 0	0 0 0 0 0	1 0 0 0 0							
	▽ Brighter	0 0 0 0 0	0 0 0 0 0	0 1 0 0 0							
	△	↑ ↓	↑ ↓	↑ ↓							
	▽	↑ ↓	↑ ↓	↑ ↓							
	Blue	0 0 0 0 0	0 0 0 0 0	1 1 1 1 1 1							
Gray scale of White & Black	Black	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0							
	△ Darker	1 0 0 0 0	1 0 0 0 0	1 0 0 0 0							
	▽ Brighter	0 1 0 0 0	0 1 0 0 0	0 1 0 0 0							
	△	↑ ↓	↑ ↓	↑ ↓							
	▽	↑ ↓	↑ ↓	↑ ↓							
	White	1 0 1 1 1 1	1 0 1 1 1 1	1 0 1 1 1 1							
		0 1 1 1 1 1	0 1 1 1 1 1	0 1 1 1 1 1							
		1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1							



8.0 POWER SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below.

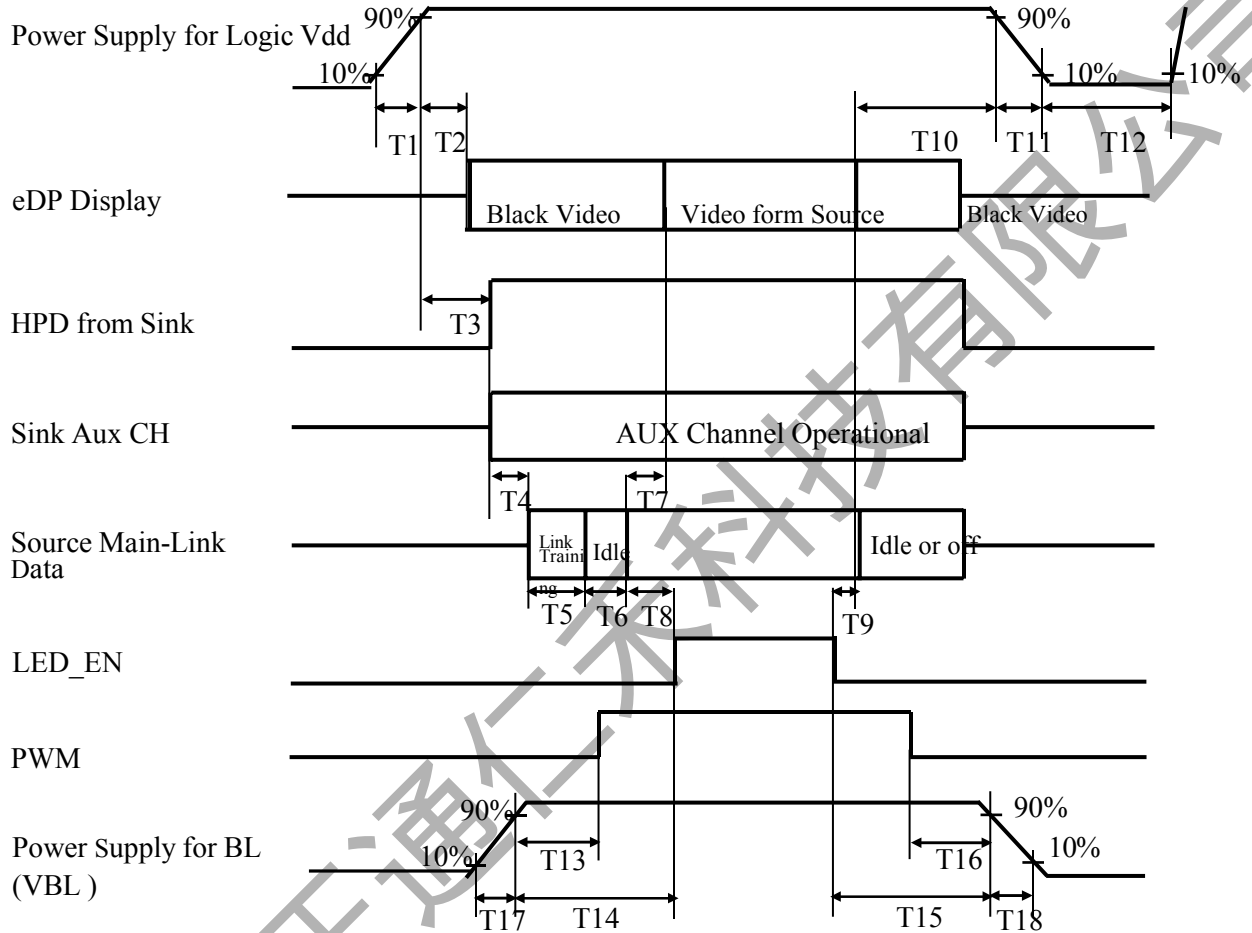


Figure 15. Power Sequence

- $0.5ms \leq T1 \leq 10 ms$
- $0ms < T2 \leq 200 ms$
- $0ms < T3 \leq 200 ms$
- $T3+T4+T5+T6+T8 > 200ms$
- $0ms < T7 \leq 50ms$
- $T7 < T8$
- $0ms < T9$
- $100ms < T10 < 500 ms$
- $0.5ms \leq T11 \leq 10 ms$
- $500ms \leq T12$
- $0ms < T13$
- $0ms < T14$
- $0ms < T15$
- $0ms < T16$
- $0.5ms \leq T17$
- $0.5ms \leq T18$

Notes:

- When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
- Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.



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9.0 Connector Description

Physical interface is described as for the connector on LCM.

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

9.1 TFT LCD Module

< Table 11. Signal Connector >

Connector Name /Description	For Signal Connector
Manufacturer	STM
Type/ Part Number	MSAK24025P30 or equivalent
Mating Housing/ Part Number	-



10.0 MECHANICAL CHARACTERISTICS

10.1 Dimensional Requirements

Figure 23 shows mechanical outlines for the model ZTM140INXE5001-C.
Other parameters are shown in Table 12.

<Table 12. Dimensional Parameters>

Parameter	Specification	Unit
Active Area	301.5936 (H) × 188.4960 (V)	mm
Number of pixels	1920 (H) X 1200 (V) (1 pixel = R + G + B dots)	pixels
Pixel pitch	52.36(H) X 157.08(V)	um
Pixel arrangement	RGB Vertical stripe	
Display colors	16.2M	
Display mode	Normally black	
Dimensional outline	306.594 (H)*205.396(V) (PCB)*2.6(D)	mm
Weight	-(Max)	g

10.2 Anti-Glare and Polarizer Hardness.

The surface of the LCD has an Anti-Glare coating to minimize reflection and to reduce scratching.
The polarizer hardness is 3H.

10.3 Light Leakage

There shall not be visible light from the back-lighting system around the edges of the screen as seen from a distance 50cm from the screen with an overhead light level of 350 lux.



PRODUCT GROUP

REV

ISSUE DATE

Customer Spec

Rev. 0

2023.08.10

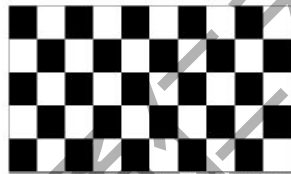
11.0 RELIABILITY TEST

11.1 TEMPERATURE AND HUMIDITY

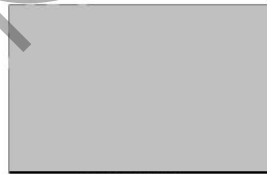
Test Item	Test Condition	Remark
High Temperature Storage	Ta=60°C; 240hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Storage	Ta=-20°C;240hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature Operation	Ta=50°C, 240Hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Operation	Ta=-0°C; 240hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=50°C, 80%RH, 240Hrs(no condensation)	IEC60068-2-78 : 2001 GB/T2423.3-2006
Thermal Shock	-20°C(0.5h) ~ 60°C(0.5h) / 100 cycles	Start with cold temperature , End with high temperature, IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25°C ; 0.5hrs	Note1

Note1:Condition of image sticking test :25°C±2°C

Operation with test pattern sustained for 1 hrs,then change to 127 gray pattern immediately.after 3 mins,the mura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

11.2 VIBRATION&SHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	686m/s ² , 1ms, ±x,y,z 3times for direction	IEC60068-2-27: 1987 GB/T2423.5-1995
Packing Vibration (non-operation)	Frequency range:10 HZ~50HZ Stroke:1.0mm,sweep:10 HZ ~50HZ x,y,z 2 hours for each direction	IEC60068-2-32: 1990 GB/T2423.8-1995

11.3 ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF, 330Ω, Contact:±4KV,Air:±8KV	1	Class C
	200pF, 0Ω, ±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins
3. ESD class C:some performance degradation allowed. Recoverable after restart.
No data lost,no hardware failures.

12.0 HANDLING & CAUTIONS

- (1) Cautions when taking out the module
 - Pick the pouch only, when taking out module from a shipping package.
- (2) Cautions for handling the module
 - As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
 - As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD module should be avoided.
 - As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
 - Do not pull the interface connector in or out while the LCD module is operating.
 - Put the module display side down on a flat horizontal plane.
 - Handle connectors and cables with care.
- (3) Cautions for the operation
 - When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
 - Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.
- (4) Cautions for the atmosphere
 - Dew drop atmosphere should be avoided.
 - Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.
- (5) Cautions for the module characteristics
 - Do not apply fixed pattern data signal to the LCD module at product aging.
 - Applying fixed pattern for a long time may cause image sticking.
- (6) Other cautions
 - Do not disassemble and/or re-assemble LCD module.
 - Do not re-adjust variable resistor or switch etc.
 - When returning the module for repair or etc. Please pack the module not to be broken. We recommend to use the original shipping packages.



15.0 EDID Table

1	Block 0 (EDID Base Block), Bytes 0 - 127, 128 BYTES OF EDID CODE:										
2											
3		0	1	2	3	4	5	6	7	8	9
4	000		00	FF	FF	FF	FF	FF	FF	00	25 D8
5	010		38	00	00	00	00	00	17	21	01 04
6	020		A5	1E	13	78	0B	FD	8C	A8	51 41
7	030		93	23	15	4A	4E	00	00	00	01 01
8	040		01	01	01	01	01	01	01	01	01 01
9	050		01	01	01	01	2C	41	80	4A	71 B0
10	060		24	40	10	10	3E	00	2E	BC	10 00
11	070		00	18	00	00	00	0F	00	00	00 00
12	080		00	00	00	00	00	00	00	00	20
13	090		00	00	00	FE	00	46	31	34	30 4A
14	100		35	32	2D	34	30	31	20	20	00 00
15	110		00	FE	00	46	31	34	30	4A	35 32
16	120		2D	34	30	31	20	20	00	92	
17											
18	(8-9)	ID Manufacture Name	: INX								
19	(10-11)	ID Product Code	: 0038								
20	(12-15)	ID Serial Number	: 0								
21	(16)	Week of Manufacture	: 23								
22	(17)	Year of Manufacture	: 2023								
23											
24	(18)	EDID Version Number	: 1								
25	(19)	EDID Revision Number	: 4								
26											
27	(20)	Video Input Definition	: Digital								
28		DFP 1.x Compatible									
29											
30	(21)	Maximum Horizontal Image Size	: 30 cm								
31	(22)	Maximum Vertical Image Size	: 19 cm								
32	(23)	Display Gamma	: 2.20								
33	(24)	Power Management and Supported Feature(s)	: RGB Color, Non-sRGB, Preferred Timing Mode, Default GTF Supported								
34											
35											
36	(25-34)	Color Characteristics									
37		Red Chromaticity	Rx = 0.659	Ry = 0.315							
38		Green Chromaticity	Gx = 0.253	Gy = 0.571							
39		Blue Chromaticity	Bx = 0.135	By = 0.078							
40		Default White Point	Wx = 0.292	Wy = 0.305							
41											
42	(35)	Established Timings I	(Not Used)								
43											
44	(36)	Established Timings II	(Not Used)								
45											
46	(37)	Manufacturer's Timings	(Not Used)								
47											
48	(38-53)	Standard Timings	(Not Used)								



50 (54-71) Detailed Descriptor #1: Preferred Detailed Timing (1920x1200 @ 60Hz)
51
52 Pixel Clock : 166.84 MHz
53 Horizontal Image Size : 302 mm
54 Vertical Image Size : 188 mm
55 Refresh Mode : Non-interlaced
56 Normal Display, No Stereo
57
58 Horizontal:
59 Active Time : 1920 Pixels
60 Blanking Time : 330 Pixels
61 Sync Offset : 16 Pixels
62 Sync Pulse Width: 16 Pixels
63 Border : 0 Pixels
64 Frequency : 74 kHz
65
66 Vertical:
67 Active Time : 1200 Lines
68 Blanking Time : 36 Lines
69 Sync Offset : 3 Lines
70 Sync Pulse Width: 14 Lines
71 Border : 0 Lines
72
73 Digital Separate, Horizontal Polarity (-), Vertical Polarity (-)
74
75 Modeline: "1920x1200" 166.840 1920 1936 1952 2250 1200 1203 1217 1236 -hsync -vsync
76
77 (72-89) Detailed Descriptor #2: Defined by Manufacturer
78
79 (90-107) Detailed Descriptor #3: ASCII String Data
80
81 ASCII String Descriptor: F140J52-401
82
83 (108-125) Detailed Descriptor #4: ASCII String Data
84
85 ASCII String Descriptor: F140J52-401
86
87 (126-127) Extension Flag and Checksum
88
89 Extension Block(s) : 0
90 Checksum Value : 146
91