



# **HDMI TFT Module Specification**

## MODEL: HA-101XIEBOGAO-V

- <>> PRELIMINARY SPECIFICATION
- <◆> APPROVAL SPECIFICATION

APPROVED BY

DATE:

DESIGNED	CHECKED	APPROVED
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## **RECORD OF REVISION**

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#### 1. GENERAL DESCRIPTION

#### 1.1 Description

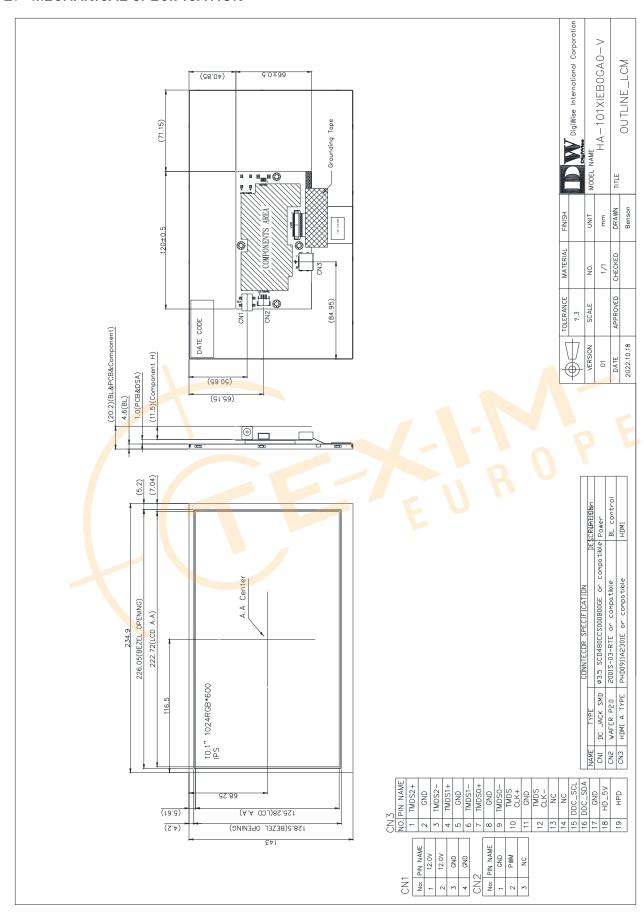
HA-101XIEB0GA0-V is a 10.1 (16:9) inch diagonally measured active display with high resolution WSVGA 1024x600 display and high brightness. This model is composed of a TFT LCD panel, backlight system and HDMI. It is designed to make Raspberry Pi usage easy. You can simply use this TFT display with your Raspberry Pi, or also you can use this as computer display with any device which has HDMI output. This 10.1" TFT model comes in 1024x600 resolution that would be great for embedded computing usage too.

#### 1.2 Features:

1.2 Teatures.				
No.	Item	Specification	Unit	
1	Panel Size	10.1″	Inch	
2	Number of Pixels	1024 (W) x RGB x 600 (H)	Pixels	
3	Active Area	222.72 (W) × 125.28 (H)	mm	
4	Pixel P <mark>itch</mark>	0.2175 (W) x 0.2088 (H)	mm	
5	Outline Dimension	234.9 (W) × 143 (H) × 20 <mark>.2 (T)</mark>	mm	
6	Number of Colors	16.7M	) - E	
7	Display Mode	IPS / Normally Black / Transmissive		
8	View Direction	F <mark>re</mark> e direction		
9	Display Format	RGB vertical stripe		
10	Surface Treatment	Anti-Glare (3H)		
11	Contrast Ratio	600 (Typ.)		
12	Luminance (cd/m^2)	600 (Typ.)	cd/m2	
13	Video Input Interface	HDMI		
13	Video Input Interface	(Compliance HDMI V1.4)		
14	Backlight	White LED		
15	Operation Temperature	-20 ~ 70	°C	
16	Storage Temperature	-30 ~ 80	°C	
17	Weight	(290)	g	



### 2. MECHANICAL SPECIFICATION





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#### 3. PIN DESCRIPTION

### 3.1 Power Input(CN1)

### [DC JACK:SCD480CCS000B00GE or compatible]

Pin No.	Symbol	1/0	Function	Note
1	12V	Р	Power Supply +12V	12.0V ————————————————————————————————————
2	GND	Р	Ground	

### 3.2 Back-light Control(CN2) WAFER P2.0mm:2001S-03-RTE or compatible]

Pin No.	Symbol	1/0	Function	Note
1	GND	Р	Ground	
2	PWM	ı	Back-light Dimming control (internal pull up to 3.3V)	*1
3	N.C.	-	N.C.	

<sup>\*1:</sup> When PWM not connected, back-light default is typical brightness.

### 3.3 HDMI (CN3)

## [HDMI A TYPE:PHD0911A2301E or compatible]

Pin No.	Symbol	1/0	Function	Note
1	TMDS 2+		TMDS Data2+	U,
2	GND	Р	TMDS Data2 Shield	
3	TMDS 2-	1	TMDS Data2-	
4	TMDS 1+	Ι	TMDS Data1+	
5	GND	Р	TMDS Data1 Shield	
6	TMDS 1-	7	TMDS Data1-	
7	TMDS 0+	I	TMDS Data0+	
8	GND	Р	TMDS Data0 Shield	
9	TMDS 0-		TMDS Data0-	
10	TMDS CLK+	1	TMDS Clock+	
11	GND	Р	TMDS Clock Shield	
12	TMDS CLK-	I	TMDS Clock-	
13	N.C.	ı	N.C.	
14	N.C.	ı	N.C.	
15	DDC_SCL	I	IIC SCL to EDID ROM	
16	DDC_SDA	1/0	IIC SDA to EDID ROM	
17	GND	Р	DDC/CEC Ground	
18	HD_5V	Р	+5V Power	
19	HPD	0	Hot Plug Detect	



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### 4. ABSOLUTE MAXIMUM RATINGS

- 4.1 Electrical Absolute Rating
- 4.1.1 HDMI TFT LCD Module

Itom	Symbol	Val	lues	Unit	Note
Item	Symbol	Min	Max.		
Power supply voltage	12V	10	14	V	

## 4.1.2 Environment Absolute Rating

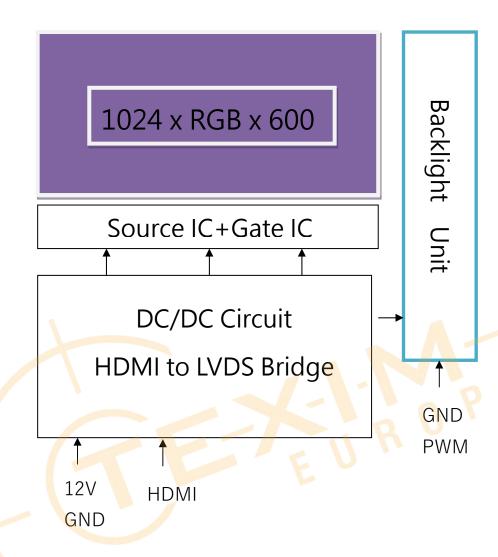
ltem	Symbol		Values	Unit	Noto	
item	Symbol	Min	Тур	Max.	Ullit	Note
Operating Temperature	Тор	-20	-	70	°C	Ambient
Storage Temperature	Tst	-30	-	80	°C	temperature





#### 5. BLOCK DIAGRAM

#### 5.1 TFT LCD Module





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### 6. ELECTRICAL CHARACTERISTICS

#### 6.1 HDMI TFT LCD Module

Item	Cumbal		Values	Unit	Note	
item	Symbol	Min	Тур.	Max.	Oiii	Note
Supply Voltage	12V	11	12	13	V	
PWM frequency		100	-	10K	Hz	
PWM Duty		17	-	100	%	<17%=OFF
PWM Dimming	<b>V</b> PWM-IH	3.3	-	8	V	
Voltage	V <sub>PWM-IL</sub>	-	0.3	-	V	
Supply Current	ICC(12V)	-	360	410	mA	
LED life time		40000	-	-	Hr	(1)

#### Note 1:

The "LED life time" is defined as the module brightness decrease to 50% original brightness that the ambient temperature is  $25^{\circ}$ C 60% RH.





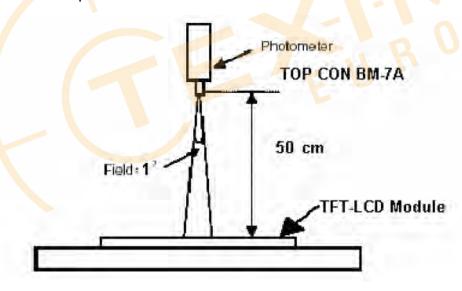
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#### 7. OPTICAL CHARACTERISTICS

Iter	n	Symbol	Condition	Min.	Тур.	Max.	Unit
Bright	Brightness			480	600		cd/m2
Unifor	mity	B-uni	Note1,	70	75	-	%
Contrast	Ratio	CR	Note 3,	500	600		
Response	Timo	Tr	$(\theta = 0^{\circ}, $ Normal	1	40		ms
Kesponse	e mine	Tf	Viewing		40		ms
Color	White	Wx	Angle)	0.260	0.310	0.360	
Chromaticity	Wille	Wy		0.280	0.330	0.380	
	Horizontal	heta x+		70	85		
Viow angle	Vertical	heta x-	Center	70	85		
View angle		$\theta$ Y+	CR≥10	70	85		
	vertical	heta Y-		70	85		

Note: The following optical specifications shall be measured in a darkroom or equivalent state(ambient luminance  $\leq 1$  lux, and at room temperature). The operation temperature is  $25^{\circ}C\pm2^{\circ}C$ . The measurement method is shown in Note1.

Note1: The method of optical measurement:



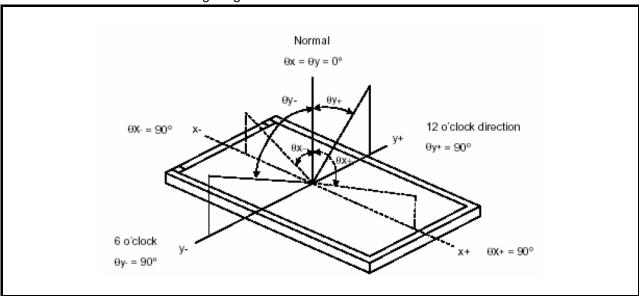
Note2: Measured at the center area of the panel and at the viewing angle of the  $\theta x = \theta y$ =0°

Note3: Definition of Contrast Ratio (CR):

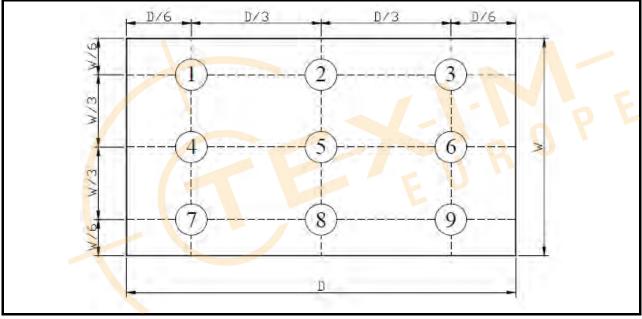
 $\label{eq:crossing} \text{CR = Luminance with all pixels in white state } \div \text{ Luminance with all pixels in Black state}$ 



Note 4: Definition of Viewing Angle:



Note 5: Definition of Brightness Uniformity (B-uni):



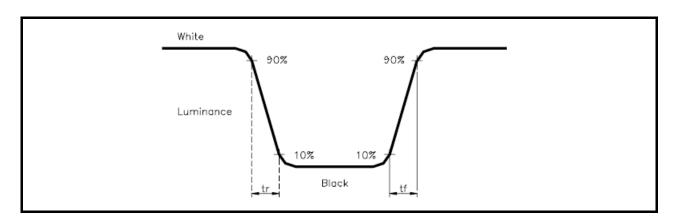
B-uni = (Minimum luminance of 9 points÷Maximum luminance of 9points)X100%



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Note 6: Definition of Response Time:

The Response Time is set initially by defining the "Rising Time (Tr)" and the "Falling Time (Tf)" respectively. Tr and Tf are defined as following figure



Note 7: Definition of Chromaticity:

The color coordinates (Wx,Wy),(Rx,Ry),(Gx,Gy),and (Bx,By) are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.





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#### 8. RELIABILITY

#### 8.1 Test Condition

8.1.1 Temperature and Humidity(Ambient Temperature)

Temperature :  $25 \pm 5^{\circ}$ C Humidity :  $65 \pm 5\%$ 

#### 8.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

#### 8.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

#### 8.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

#### 8.2 TESTS

No.	IT <mark>E</mark> M	CONDITION CRITERION
1	High Temperature Storage	80°C, 1 <mark>20</mark> hrs
2	Low Temperature Storage	-30°C, 120 hrs
3	High Temperature Operating	70°C, 120 hrs
4	Low Temperature Ope <mark>ra</mark> ting	-20°C, 120 hrs
5	High Temperature/Humidity Non-Operating	40°C, 90%RH, 120 hrs
6	Temperature Shock Non-Operating	-30°C ←→ $80$ °C (0.5hr each), 100 cycles
7	Vibration Test Non-Operating	Frequency:0 ~ 55 Hz Amplitude:1.5 mm Sweep Time:11min Test Period:6 Cycles for each Direction of X,Y,Z
8	Electro-static Discharge	$\pm$ 2KV, Human Body Mode, 100pF/1500 $\Omega$

Note1: The test sample have recovery time for 24 hours at room temperature before the function check. In the standard conditions, there is no any function NG issue occurred.



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#### 8.3 JUDGMENT STANDARD

The judgment of the above test should be made as follow:

Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.

Fail: No display image, obvious non-uniformity, or line defects.





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## 8.4 INCOMING INSPECTION STANDARDS

Display function: No Display malfunction (No Contrast ratio (Black, White):	/lajor)		
Description of the second seco	(Maine) (Nata 2)		
	Does not meet specified range in the spec. (Major) (Note:3)  Line Defect: No obvious Vertical and Horizontal line defect in bright,		
	dark and colored. (Major) (Note:1)		
Point Defect : Active area ≤ 5 dots (Minor)			
Acceptable number			
Item Active Area	Total		
Bright 2			
Dark 4	- 5		
Daix 7			
1 Operating			
i   Sportaining	(Minor)		
Non-uniformity: Visible through 5%ND filte Foreign material in Black or White spots s			
	ass ACI		
Acceptable	of AQL		
l humber	ects Level		
D> 0.5 0			
	nor 1.5		
D ≤ 0.3 *	1.0		
D = (Long + Short) / 2 * : Disrega	rd		
Foreign Material in Line or spiral shape (V			
Zone Acceptable	Class		
number	UT		
L (mm) vv(mm)	Defects Level		
L>5 W>0.1 0	Min and 4.5		
0.5 < L ≤ 5 0.03 < W≤0.1 5	Minor 1.5		
L ≤0.5 W≤0.03 * L : Length W : Width * : Disregar	<u> </u>		
L : Length W : Width * : Disregar  Dimension: Outline (Major)	u		
Bezel appearance: uneven (Minor)			
Scratch on the polarize: (Note:2)			
Zone Accepta C	ass AQL		
ble Of D	efects Level		
L (mm) W(mm) number			
	inor 1.5		
L ≤ 3   W≤0.1   3			
External Inspection L: Length W: Width *: Disregard			
2 (non-operating) Dent or bubble on the polarize (Note:2)  Zone Clas	,		
Acceptable of	AQL		
Dimension number Defect	ts Level		
D≤0.3 * Mina	. 15		
D≤0.5 Mino	r 1.5		
D = (Long + Short) / 2 * : D	sregard		



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			Definition	
Class of defects	Major		It is a defect that is likely to result in failure or to reduce materially the	
			usability of the product for the intended function.	
defects	Minor	AQL 1.5%	It is a defect that will not result in functioning problem with deviation	
			classified.	

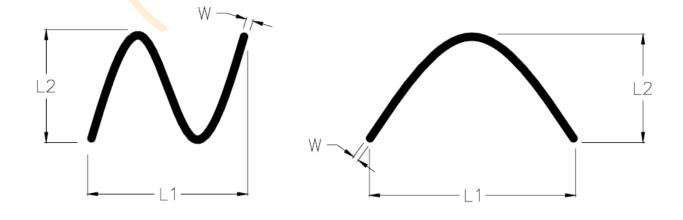
#### Note1:

- (a)Bright point defect is defined as point defect of R,G,B with area >1/2 pixel respectively (b)Dark point defect is defined as visible in full white pattern.
- (c)Definition of distribution of point defect is as follows:
  - -minimum separation between dark point defects should be larger than 5mm.
  - -minimum separation between bright point defects should be larger than 5mm.
- (d)Definition of joined bright point defect and joined dark point defect are as follows:
  - -Two or more joined bright point defects must be nil.
  - -Three joined dark point defects must be nil.
  - -Coupling of one dark and one bright point in junction is counted as one dark and bright spot with 1 pair maximum.
  - -Two Joined dark point is counted as two dark points with 2 pair maximum.

Note2: The external inspection should be conducted at the distance 30± 5cm between the eyes of inspector and the panel.

Note3: Luminance measurement for contrast ratio is at the distance 50± 5cm between the detective head and the panel with ambient luminance less than 1 lux. Contrast ratio is obtained at optimum view angle.

Note4: W-Width in mm, L-length of Max.(L1,L2) in mm.





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#### 8.5 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

Sampling type: normal inspection, single sampling

Sampling table: MIL-STD-105E

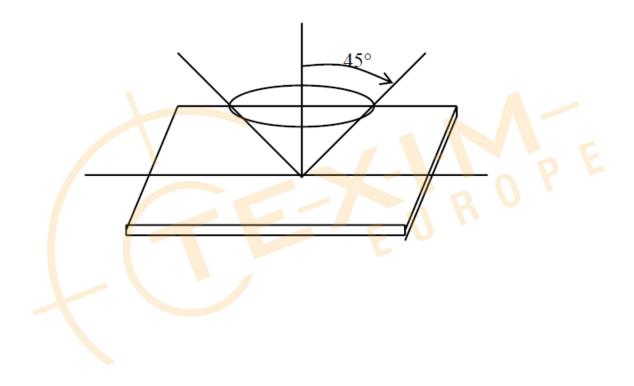
Inspection level: Level II

#### 8.6 Inspection conditions

The LCD shall be inspected under 40W white fluorescent light.

 $\theta \leq$  45° inspection under non-operating condition.

 $\theta \leq 5^{\circ}$  inspection under operating condition





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#### 9. PRECAUTION RELATING PRODUCT HANDLING

#### 9.1 SAFETY

- 9.1.1 If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.
- 9.1.2 If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

#### 9.2 HANDLING

- 9.2.1 Avoid any strong mechanical shock which can break the glass.
- 9.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.
- 9.2.3 Do not remove the panel or frame from the module.
- 9.2.4 The polarizing plate of the display is very fragile. So , please handle it very carefully, Do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)
- 9.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- 9.2.6 Do not touch the display area with bare hands, this will stain the display area.
- 9.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.
- 9.2.8 To control temperature and time of soldering is 280 ± 10°C and 3-5 sec.
- 9.2.9 To avoid liquid (include organic solvent) stained on LCM.

#### 9.3 STORAGE

- 9.3.1 Store the panel or module in a dark place where the temperature is 25°C ± 5°C and the humidity is below 65% RH.
- 9.3.2 Do not place the module near organics solvents or corrosive gases.
- 9.3.3 Do not crush, shake, or jolt the module.

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Please contact us if you have any questions about the contents of the datasheet.

This may not be the latest version of the datasheet. Please check with us if a later version is available.



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