

Specification for Approval

PRODUCT NAME: RGS24128064YW001
PRODUCT NO.: 9909702000

CUSTOMER
APPROVED BY
DATE:

RITDISPLAY CORP. APPROVED

REVISION RECORD

REV.	REVISION DESCRIPTION	REV. DATE	REMARK
X01	INITIAL RELEASE	2005. 05. 25	
X02	■ Add warranty ■ Modify the dark room contrast ■ Modify the panel electrical specification ■ Add the function block diagram ■ Modify the panel layout diagram ■ Add the application circuit ■ Modify the external dimension	2005. 08. 15	Page 4, 8, 9, 13 & 15
X03	■ Modify life time definition ■ Modify pin header position	2005. 09. 16	Page 6 & 15
X04	■ Append module weight. ■ Modify lifetime test conditions ■ Modify panel electrical specification ■ Modify CIE coordination. ■ Modify typical brightness.	2005. 11. 22	Page 5, 6 & 8
A01	■ Transfer from X version ■ Modify maximum rating of operating temperature ■ Append packing specification	2005. 12. 06	Page 4, 6, 14 & 16

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1. SCOPE

The purpose of this specification is to define the general provisions and quality requirements that apply to the supply of display cells manufactured by RiTdisplay. This document, together with the Module Assembly Drawing, is the highest-level specification for this product. It describes the product, identifies supporting documents and contains specifications, which are either not addressed, or are exceptions to the supporting documents.

2. WARRANTY

RiTdisplay warrants that the products delivered pursuant to this specification (or order) will conform to the agreed specifications for twelve (12) months from the shipping date ("Warranty Period"). RiTdisplay is obligated to repair or replace the products which are found to be defective or inconsistent with the specifications during the Warranty Period without charge, on condition that the products are stored or used as the conditions specified in the specifications.

Nevertheless, RiTdisplay is not obligated to repair or replace the products without charge if the defects or inconsistency are caused by the force majeure or the reckless behaviors of the customer.

After the Warranty Period, all repairs or replacements of the products are subject to charge.

3. FEATURES

- Small Molecular Organic Light Emission Diode.
- Color : Yellow
- Panel matrix : 128*64
- Driver IC : SSD1303T10
- Excellent Quick response time : 10μs
- Extremely thin thickness for best mechanism design : 2.05 mm
- High contrast : 500:1
- Wide viewing angle : 160°
- Strong environmental resistance.
- Wide range of operating temperature : -40 to 85°C

4. MECHANICAL DATA

NO	ITEM	SPECIFICATION	UNIT
1	Dot Matrix	128 (W) x 64 (H)	dot
2	Dot Size	0.4 (W) x 0.4 (H)	mm ²
3	Dot Pitch	0.43 (W) x 0.43 (H)	mm ²
4	Aperture Rate	87	%
5	Active Area	55.01 (W) x 27.49 (H)	mm ²
6	Panel Size	65.5 (W) x 40.0 (H)	mm ²
7	Panel Thickness	2.05 ± 0.1	mm
8	Module Size	75.0 (W) x 52.7 (H) x 9.5 (D)	mm ³
9	Diagonal A/A size	2.4	inch
10	Module Weight	29.7 ± 10%	gram

5. MAXIMUM RATINGS

ITEM	MIN	MAX	UNIT	Condition	Remark
Supply Voltage (V_{DD})	-0.3	+3.5	V	Ta = 25 °C	
Supply Voltage(V_{CC})	8	16	V	Ta = 25 °C	
Operating Temp.	-40	85	°C		
Storage Temp	-40	85	°C		
Humidity		85	%		
Operating Life Time	10,000	-	Hrs	60 cd/m ² , 50% checkerboard	Note (1)
Operating Life Time	15,000	-	Hrs	50 cd/m ² , 50% checkerboard	Note (2)
Operating Life Time	20,000	-	Hrs	40 cd/m ² , 50% checkerboard	Note (3)
Storage Life Time	80,000	-	Hrs	Ta=25°C, 50% RH	

Note:

(A) Under VCC = 14 Volts, Ta = 25°C, 50% RH.

(B) Life time is defined the amount of time when the luminance has decayed to less than 50% of the initial measured luminance.

6. ELECTRICAL CHARACTERISTICS

6.1 D.C ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETERS	TEST CONDITION	MIN	TYP	MAX	UNIT
V_{CC}	Analog power supply (for OLED panel)	$T_a = -20^{\circ}\text{C}$ to $+70^{\circ}\text{C}$		14	15	V
V_{DD}	Digital power supply	$T_a = -20^{\circ}\text{C}$ to $+70^{\circ}\text{C}$	2.4	2.7	3.5	V
I_{DD}	Operating current for V_{DD} $V_{DD} = 2.7\text{V}$, $V_{CC} = 12\text{V}$, $I_{REF} = 10\mu\text{A}$ No loading, All Display ON	Contrast=FF	-	190	-	μA
I_{CC}	Operating current for V_{CC} $V_{DD} = 2.7\text{V}$, $V_{CC} = 12\text{V}$, $I_{REF} = 10\mu\text{A}$ All Display ON	Contrast=FF	-	550	-	μA
V_{IH}	Hi logic input level		$0.8 * V_{DD}$	-	V_{DD}	V
V_{IL}	Low logic input level		0	-	$0.2 * V_{DD}$	V
V_{OH}	Hi logic output level		$0.9 * V_{DD}$	-	V_{DD}	V
V_{OL}	Low logic output level		0	-	$0.1 * V_{DD}$	V
I_{SEG}	Segment on output current $V_{DD}=2.7\text{V}$, $V_{CC}=12\text{V}$, $I_{REF}=10\mu\text{A}$, Display on, Segment pin under test is connected with a 20K resistive load to VSS	Contrast=FF	-	-	300	μA
		Contrast=AF	-	220	-	μA
		Contrast=5F	-	120	-	μA
		Contrast=0F	-	20	-	μA

6.2 ELECTRO-OPTICAL CHARACTERISTICS

PANEL ELECTRICAL SPECIFICATIONS

PARAMETER	MIN	TYP.	MAX	UNITS	COMMENTS
Normal mode current		29	32	mA	All pixels on (1)
Standby mode current		3	5	mA	Standby mode 10% pixels on (2)
Normal mode power consumption		406	448	mW	All pixels on (1)
Standby mode power consumption		42	70	mW	Standby mode 10% pixels on (2)
Normal mode Luminance		50		cd/m ²	Display Average
Standby mode Luminance		20		cd/m ²	
CIE _x (Yellow)	0.45	0.49	0.53		x, y (CIE 1931)
CIE _y (Yellow)	0.45	0.49	0.53		
Dark Room Contrast	500:1				
Viewing Angle	160			degree	
Response Time		10		μs	

(1) Normal mode condition :

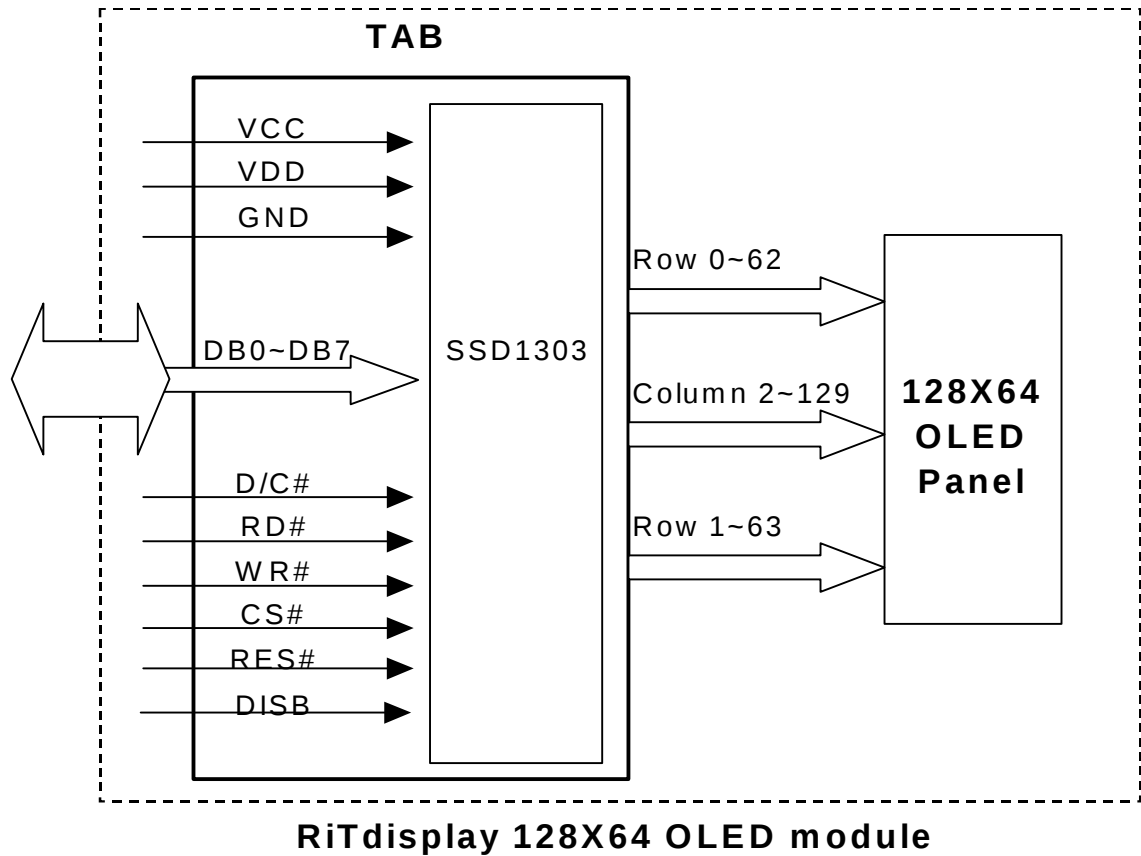
- Driving Voltage : 14V
- Contrast setting : 0x7FH
- Frame rate : 85Hz
- Duty setting : 1/64

(2) Standby mode condition :

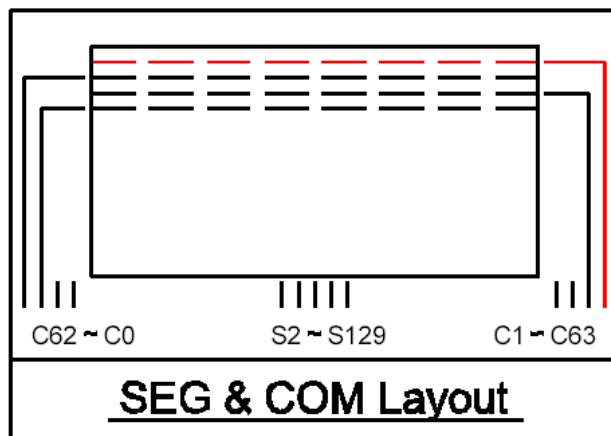
- Driving Voltage : 14V
- Contrast setting : 0x01H
- Frame rate : 85Hz
- Duty setting : 1/64

7. INTERFACE

7.1 FUNCTION BLOCK DIAGRAM



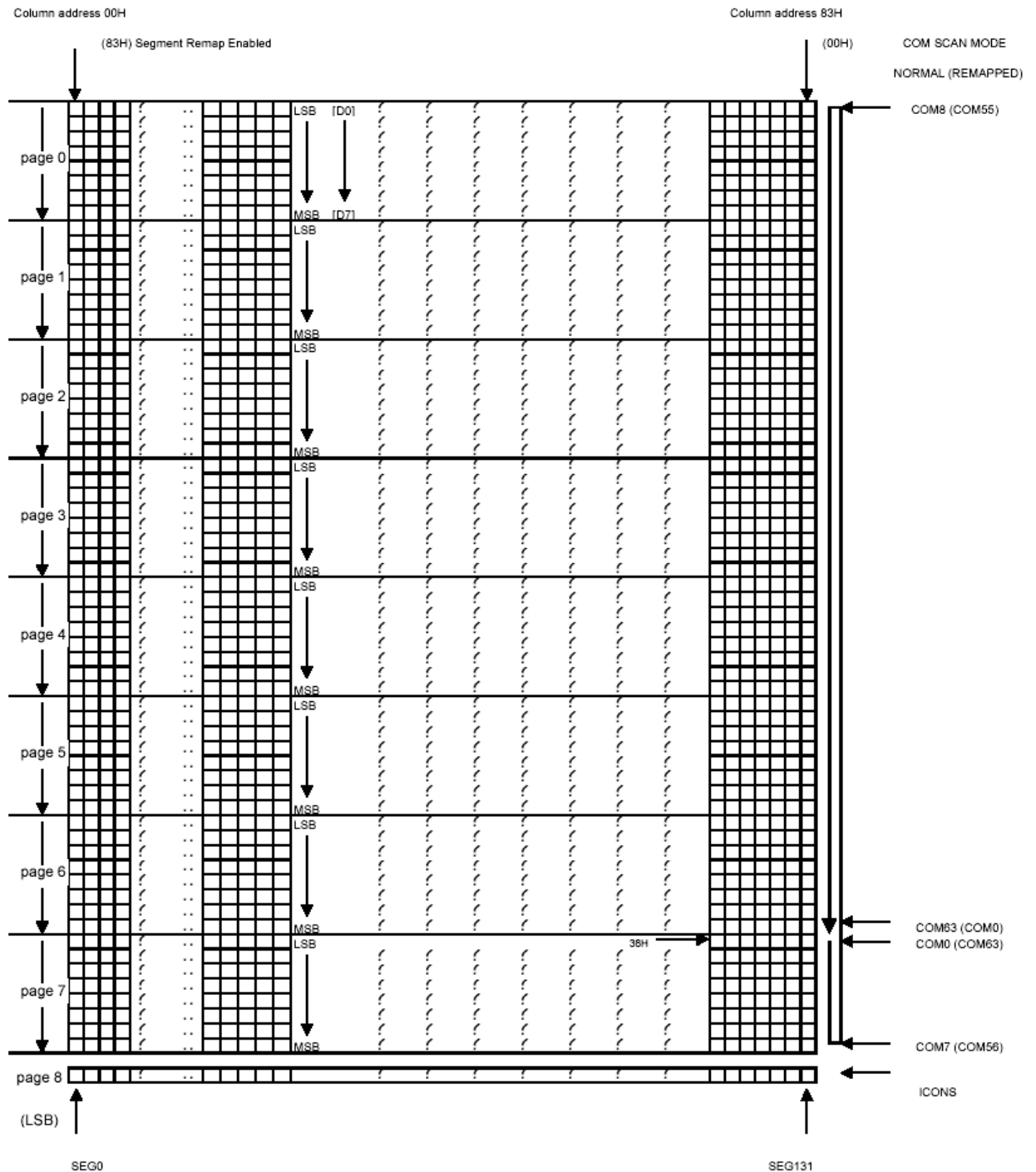
7.2 PANEL LAYOUT DIAGRAM



7.3 PIN ASSIGNMENTS

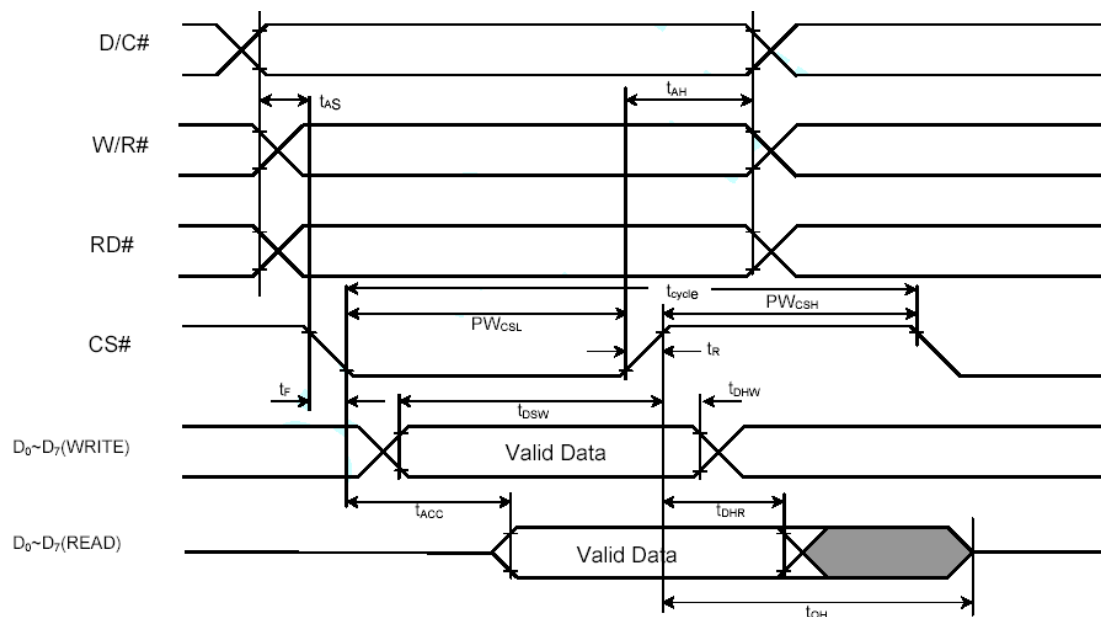
Pin Name	Pin No.	Type	Description
GND	1	I	Ground
VDD	2	I	Logic voltage power supply
VCC	3	I	High voltage power supply
D/C	4	I	This is a Data/Command control pin.
WR#	5	I	This pin is used to receive the Write Data signal.
RD#	6	I	This pin is used to receive the Read Data signal.
DB0	7	I/O	8 bit MCU interface
DB1	8		
DB2	9		
DB3	10		
DB4	11		
DB5	12		
DB6	13		
DB7	14		
CS#	15	I	Chip select
NC	16	-	No connection
RES#	17	I	Reset
NC	18	-	No connection
NC	19	-	No connection
DISB	20	I	For external DC-DC shut-down pin

7.4 GRAPHIC DISPLAY DATA RAM ADDRESS MAP



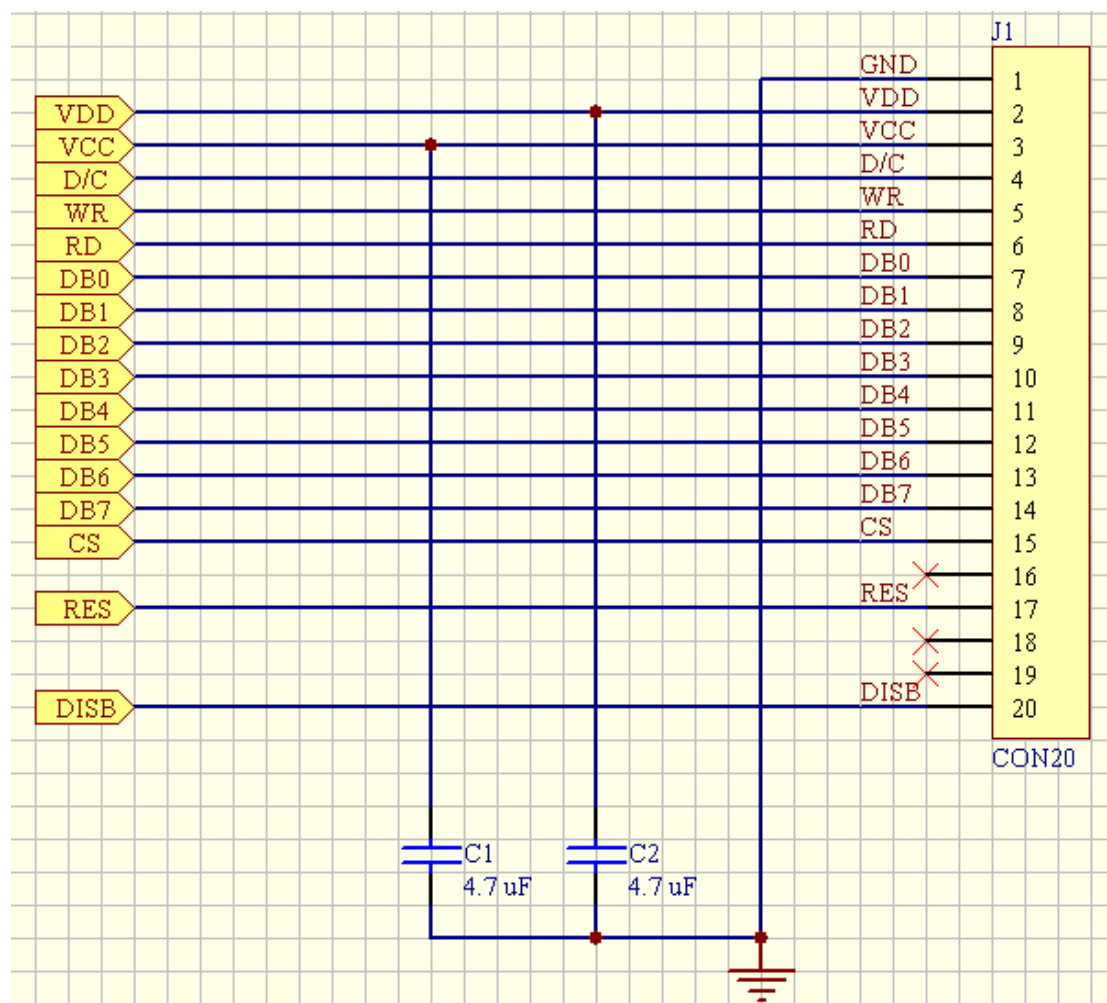
7.5 INTERFACE TIMING CHART

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	300	-	-	ns
t_{AS}	Address Setup Time	0	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DSW}	Write Data Setup Time	40	-	-	ns
t_{DHW}	Write Data Hold Time	15	-	-	ns
t_{DHR}	Read Data Hold Time	20	-	-	ns
t_{OH}	Output Disable Time	-	-	70	ns
t_{ACC}	Access Time	-	-	140	ns
PW_{CSL}	Chip Select Low Pulse Width (read) Chip Select Low Pulse Width (write)	120 60	-	-	ns
PW_{CSH}	Chip Select High Pulse Width (read) Chip Select High Pulse Width (write)	60 60	-	-	ns
t_R	Rise Time	-	-	15	ns
t_F	Fall Time	-	-	15	ns



8. APPLICATION CIRCUIT

8.1 APPLICATION CIRCUIT



Recommend component:

C1:4.7uF/25V, C2:4.7uF/25V

8.2 COMMAND TABLE

Refer to IC Spec.: SSD1303

9. RELIABILITY TEST CONDITIONS

No.	Items	Specification	Quantity
1	High temp. (Non-operation)	85°C, 240hrs	3
2	Low temp. (Non-operation)	-40°C, 240hrs	2
3	High temp. (Operation)	85°C, 120hrs	3
4	Low temp. (Operation)	-40°C, 120hrs	2
5	High temp. / High humidity (Non-operation)	85°C, 85%RH, 120hrs	5
6	High temp. / High humidity (Operation)	65°C, 90%RH, 120hrs	5
7	Thermal shock (Non-operation)	-40°C ~85°C (-40°C /30min; transit /3min; 85°C /30min; transit /3min) 1cycle: 66min, 100 cycles	2
8	OLB Peel strength (Non-operation)	500g/cm (Speed~ 50mm/min)	5
9	Vibration	Frequency : 5~50HZ, 0.5G Scan rate : 1 oct/min Time : 2 hrs/axis Test axis : X, Y, Z	1 Carton
10	Drop	Height: 120cm Sequence : 1 angle 、3 edges and 6 faces Cycles: 1	1 Carton
11	ESD (Non-operation)	Air discharge model, ±8kV, 10 times	5

Test and measurement conditions

1. All measurements shall not be started until the specimens attain to temperature stability.
2. All-pixels-on is used as operation test pattern.
3. The degradation of Polarizer are ignored for item 1, 5 & 6.

Evaluation criteria

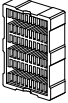
1. The function test is OK.
2. No observable defects.
3. Luminance: > 50% of initial value.
4. Current consumption: within $\pm$ 50% of initial value.

[illegible]

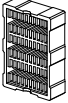
11. PACKING SPECIFICATION

Revision	Date	Note
A01	12/06/2005	Packing Instruction

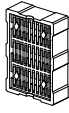
Antistatic Bag
318x215x87.5mm
P/N: 3001000001



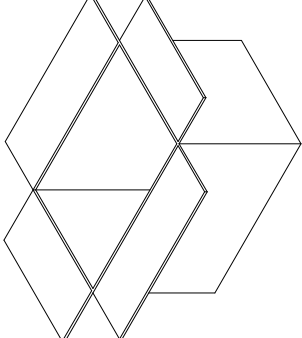
Packing Box, EPS
318x215x87.5mm
P/N: 3001000001



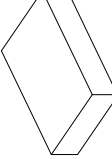
4G矽膠乾燥劑(不織布)
P/N: 3000000500



單色 Carton
448x335x375 mm
P/N: 3000000001



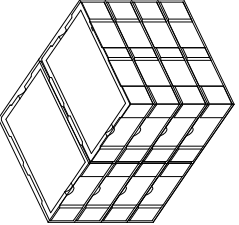
真空包裝袋 ONY/LDPE
225x85x500mmmm
P/N: 3000202300
抽真空6秒



EPE Cover Foam
288x185x10mm
P/N: 3005001100



x8



Item	Part No.	Description	QTY
1	9809702000	P9702 Module Ass'y	240
2	3003000010	Antistatic Bag 80x90x0.07mm	240
3	3001000001	Packing Box 318x215x87.5mm	8
4	3000000500	4G 矽膠乾燥劑(不織布)	32
5	3005001100	EPE Cover Foam 288x185x10mm	8
6	3000202300	真空包裝袋 225x85x500mm	8
7	3000000001	單色 Carton 448x335x375mm	1

General Tolerance		CONFIDENTIAL	Scale	Unit	Sheet	PROJECT CODE
Length (mm)	Tolerance(mm)	 M.E.: David Li E.E.: Paul Chang	1:20	mm	1/1	P09702
0 ~ 8	±0.1					
8 ~ 25	±0.2					
25 ~ 50	±0.3					

PART NAME	VERSION
Packing Instruction	01
PARTS NO.	VERSION
990 970 2000	01



RiTdisplay Corporation

12. APPENDIXES

APPENDIX 1: DEFINITIONS

A. DEFINITION OF CHROMATICITY COORDINATE

The chromaticity coordinate is defined as the coordinate value on the CIE 1931 color chart for R, G, B, W.

B. DEFINITION OF CONTRAST RATIO

The contrast ratio is defined as the following formula:

$$\text{Contrast Ratio} = \frac{\text{Luminance of all pixels on measurement}}{\text{Luminance of all pixels off measurement}}$$

C. DEFINITION OF RESPONSE TIME

The definition of turn-on response time T_r is the time interval between a pixel reaching 10% of steady state luminance and 90% of steady state luminance. The definition of turn-off response time T_f is the time interval between a pixel reaching 90% of steady state luminance and 10% of steady state luminance. It is shown in Figure 2.

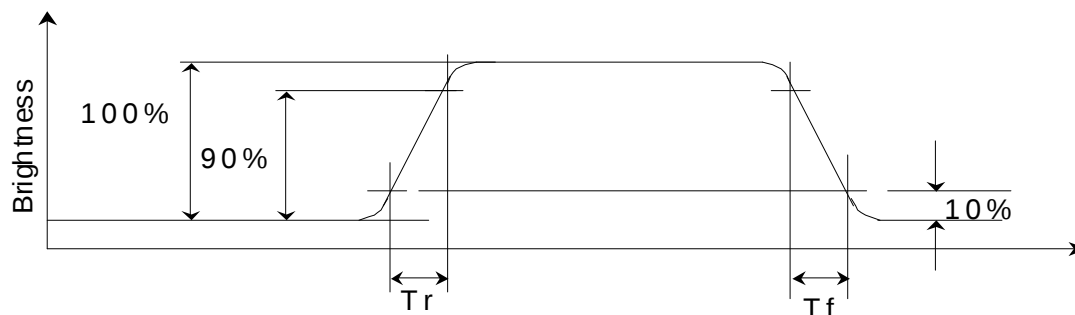


Figure 2 Response time

D. DEFINITION OF VIEWING ANGLE

The viewing angle is defined as Figure 3. Horizontal and vertical (H & V) angles are determined for viewing directions where luminance varies by 50% of the perpendicular value.

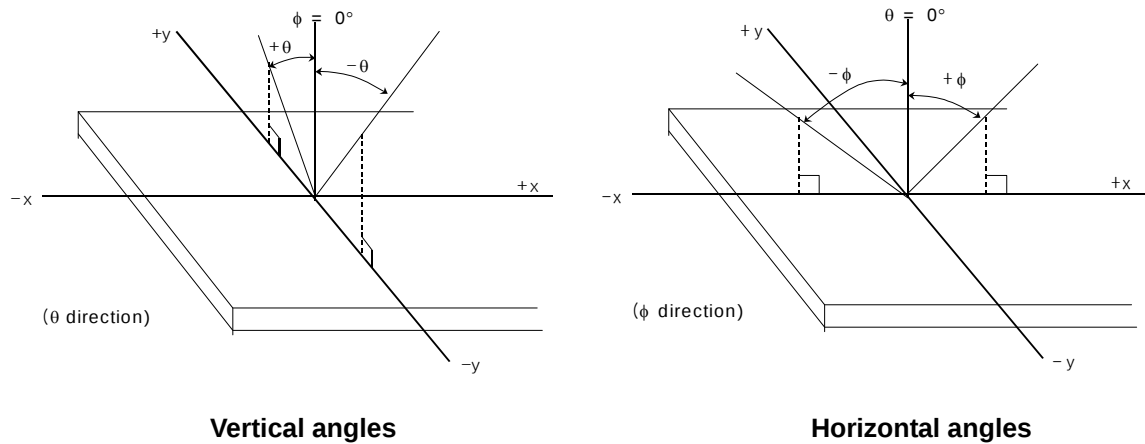
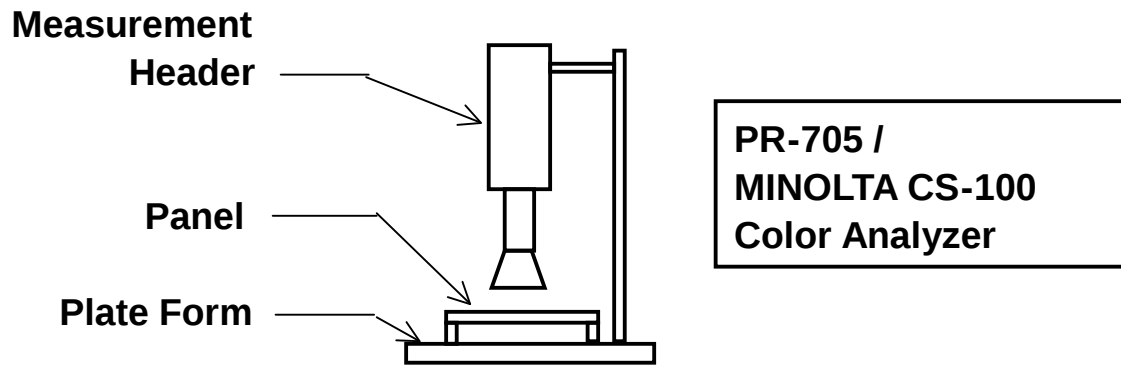


Figure 3 Viewing Angle

APPENDIX 2: MEASUREMENT APPARATUS

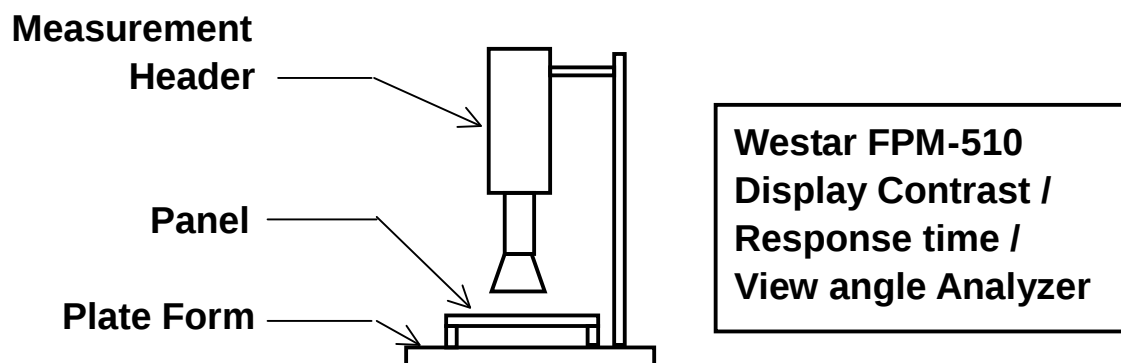
A. LUMINANCE/COLOR COORDINATE

PHOTO RESEARCH PR-705, MINOLTA CS-100

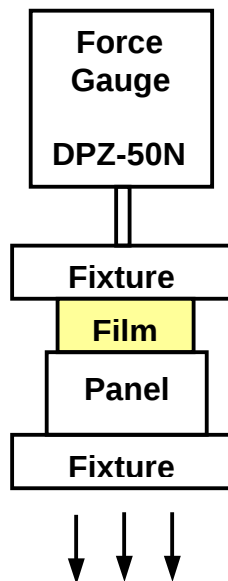


B. CONTRAST / RESPONSE TIME / VIEWING ANGLE

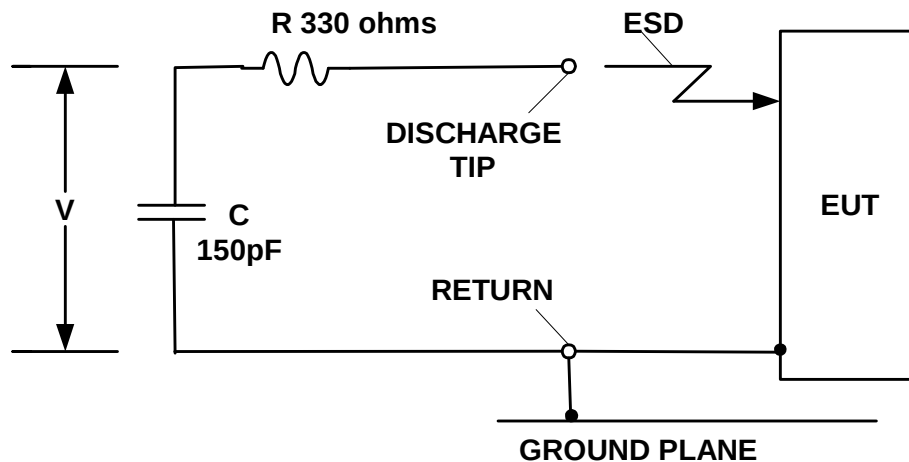
WESTAR CORPORATION FPM-510



C. PEEL STRENGTH



D. ESD ON AIR DISCHARGE MODE



APPENDIX 3: PRECAUTIONS

A. RESIDUE IMAGE

Because the pixels are lighted in different time, the luminance of active pixels may reduce or differ from inactive pixels. Therefore, the residue image will occur. To avoid the residue image, every pixel needs to be lighted up uniformly.