	S-CD925	SPECIFICATION	
Issue Date	May 10, 2001		

1. Title LED Outdoor Dot Matrix Display Module □160

2. Item number RLU 160 D - 1[illegible]

① ② ③ ⑤ ⑥

① Series Name
② Display area (160x160mm)
③ Included with driver (D)
④ Dot matrix: 16(Vertical) x 16(Horizontal) dot
⑤ Emitted color: R(Red)/ G(Green)
⑥ Specific symbol

3. Specification

3a. Absolute Maximum Ratings

Item	Symbol	Rating	Unit	Remark
Logic Voltage	V_{CC}	-0.3~+6.0	V	
LED Voltage	V_{LED}	-0.3~+4.7	V	
Input Voltage	V_I	-0.3~V_{CC}+0.3	V	
Operating Temp.	$T_{opr}1$	-20~+40	°C	100% when illuminated (each color)
	$T_{opr}2$	-20~+60	°C	50% when illuminated (each color)
	$T_{opr}3$	-20~+70	°C	25% when illuminated (each color)
Storage Temp.	T_{stg}	-25~+85	°C	
Humidity Range		30~90		

3b. Mechanical Rating

Item	Rating	Unit
Displayed Color	Red, Yellow Green, Orange (red, yellow and green illuminate same time)	
Dot Dimension	7.4 x 5.9	mm
Dot-to-Dot Pitch	9.9 ± 0.3	mm
Number of dots	16 x 16 (256)	dot
Display area dimension	159.4 x 159.4 ± 0.5	mm
Drive method	1/4 Dynamic illumination	
Number of modules connected	Max 32	Module
Module Weight	600 ± 50	g

3c. Electrical Specifications

Item	Symbol	Rating			Unit	Remark
		MIN.	TYP	MAX		
LogicVoltage	V_{CC}	4.5	5.0	5.5	V	
LED Voltage	V_{LED}	4.3	4.5	4.7	V	
Input Voltage	V_{IL}	0.0	-	1.3	V	
	V_{IH}	3.9	-	VCC		
Input Current	I_{IL}	-	-	1.3	mA	
	I_{IH}	-	-	0.2	µA	
Current Comsumption	I_{CC}	-	-	150	mA	
	I_{LED}	-	-	7.5	A	
Operating Frequency	f_{CLK}	-	-	5	MHz	

3d. Optical Characteristics (TA=25°C, V_{CC}=5.0V, V_{LED}=4.5V)

Item		Symbol	Rating			Unit	Remark
			MIN	TYP	MAX		
Luminous Intensity		I_V	-	2,000	-	cd/m²	*1
Dominant Wavelength	Red	λ_d	-	632	-	nm	
	Yellow, Green		-	571	-		
Half Angle Luminous Intensity	Horizontal	2θ 1/2	-	70	-	Degree	
	Vertical	2θ 1/2	-	30	-		
Luminous Intensity (Factory setting)	Red	I_{VR}	1,120	1,400	1,680	cd/m²	*2
	Yellow, Green	I_{VG}	1,120	1,400	1,680		
Variation of luminous intensity between the dot			within 1.5 times				
Variation of luminous intensity between the unit			within 1.5 times				

*1: Conditions- The intensity with both Red and Green active.
*2: Conditions- Ta=25+3°C, V_{CC}=5.0V, V_{LED}=4.5V Average luminous intensity including non-emitting part immediately after adjustment.

3e. Life Expectancy (VCC=5.0V, VLED=4.5V)

Item	Conditions	Rating	Unit
Life expectancy	Red and Green both active Topr=25°C	40,000 Hr. min. (Time to half-life of initial luminous intensity)	Hr

4. Description of Signals

4-a. Power Supply (CN1: The side of the main body: B6P-VH : JST)

Item	Terminal Number	Functions	Remark
V_{LED}	1, 2	for logic	
V_{CC}	3	for LED	
GND	4, 5, 6	Power supply ground	

4-b. Input Signal (CN2: The side of the main body: B10B-XH-A : JST)

Item	Terminal Number	Functions	Remark
A1	1	Row address selection signal	
A0	2		
$\overline{\text{LATCH}}$	3	Latch signal of display data. Display data at shift register is transferred by low level and latched by high level	
Red Data	4	Display data input of red LED. H: ON, L: OFF (shift from 1 to 64)	
Green Data	5	Display data input of yellow, green LED. H: ON, L: OFF (shift from 1 to 64)	
Shift Clock	6	Data shifting clock of the shift register. Start-up of the clock: ddata shifting by changing from L to H.	
$\overline{\text{Red Enable}}$	7	Control signal of turning on/off of red LED. H: Turn Off, L: Turn On	
Green Enable	8	Control signal of turning on/off of yellow, green LED. H: Turn Off, L: Turn On	
NC	9		
GND	10	Signal ground (internal connection of power supply ground and signal ground)	

4c. Output Signal (CN3: The side of the main body : B10B-XH-A : JST)

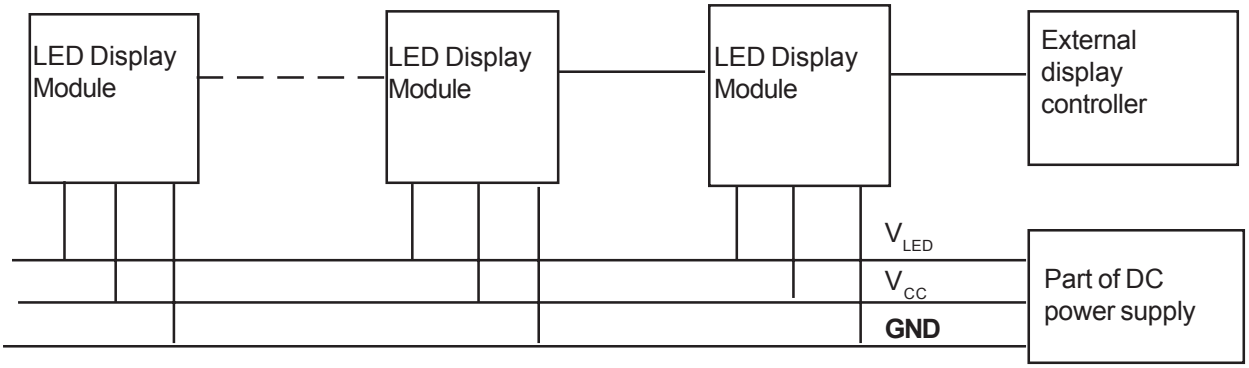
Output each input signal through buffer. Attaches to the input connector for the next row.

Item	Terminal Number	Functions	Remark
A1	1	Outputs the input signal through buffer	
A0	2	Outputs the input signal through buffer	
$\overline{\text{Latch}}$	3	Outputs the input signal through buffer	
Red Data	4	Outputs the input signal through buffer 64-bit shift register and buffer	
Green Data	5	Outputs the input signal through buffer 64-bit shift register and buffer	
Shift Clock	6	Outputs the input signal through buffer	
$\overline{\text{Red Enable}}$	7	Outputs the input signal through buffer	
$\overline{\text{Green Enable}}$	8	Outputs the input signal through buffer	
NC	9		
GND	10	Signal ground (internal connection of power supply ground and signal ground)	

5. Interface

5a. Connection

The display module requires a display controller and DC power supply for proper operation.



5b. Input method of Display Data

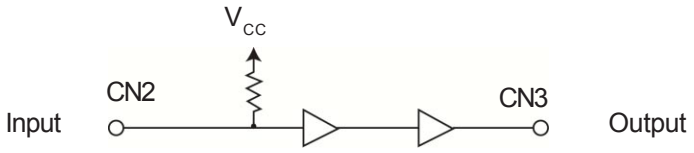
The display data is entered by selecting the red or green data for the 64 pixels starting at the upper right of the screen.

The following table shows display row and row address selection signal (A1, A0).

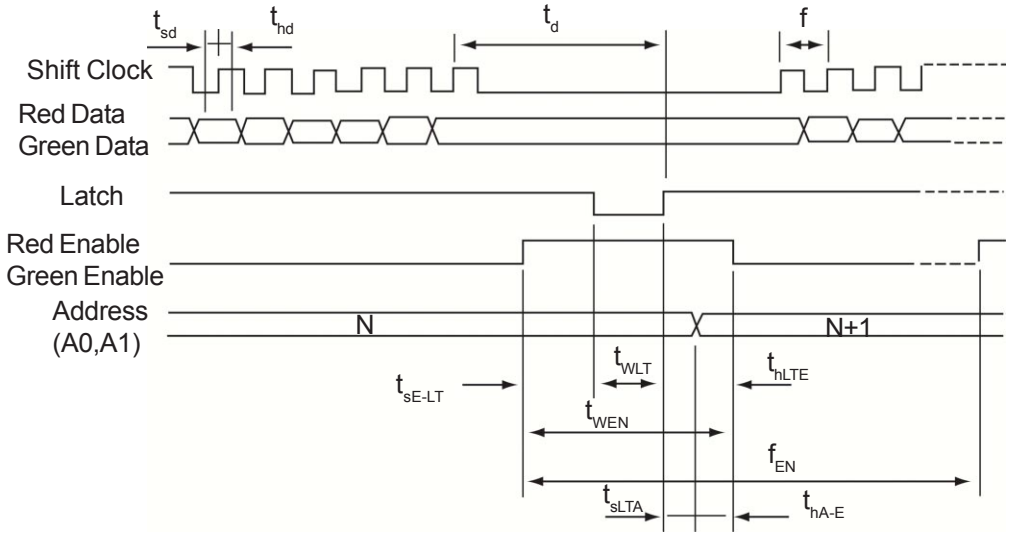
Front look of LED display surface

																Row address A1	Row address A0
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	0
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	0	1
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	1	0
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	1	1
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	0	0
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	0	1
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	1	0
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	1	1
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	0	0
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	0	1
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	1	0
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	1	1
64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	0	0
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	0	1
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	1	0
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	1	1

5c. Input-output circuit



5d. Timing chart



Item	Symbol	Rating			Unit	Remark
		MIN	TYP	MAX		
Clock Frequency	f	-	-	5	MHz	
Data set-up time	t_{sd}	100	-	-	ns	
Data hold time	t_{hd}	100	-	-	ns	
Clock - latch time	t_d	200	-	-	ns	
Latch pulse width	t_{WLT}	200	-	-	ns	
Enable pulse width	t_{WEN}	11	-	-	µs	
Enable latch width	t_{sE-LT}	200	-	-	ns	
Latch-enable time	t_{hLT-E}	11	-	-	µs	
Latch-address time	t_{sLT-A}	500	-	-	ns	
Address-enable time	t_{hA-E}	10	-	-	µs	
Prohibition enable frequency	f_{EN}	$f_{OSC}/10$	-	$10f_{OSC}$	KHz	
Enable internal oscilation frequency	f_{OSC}	-	25	-	KHz	

6. Rank division contents

Rank setting in terms of the current value.

		R color	
		1400mA~1799mA	1800mA~2300mA
G color	1400mA~1800mA	A	B
	1000mA~1399mA	C	D

7. Product marking specifications

Marking example) RLU160D-1616-RG-01 A9 A

① ② ③

① Part number

② Rank of LED display module used

③ Rank applied after luminous intensity of the unit has bee adjusted

8. Handling

8a. Installation

i. Securely mount using the specified torque (5 Kgf/cm).

ii. The module spacing should be greater than 160mm.

iii. To insure proper water seal, care must be taken that where the plate and waterproof packing material are bonded remains free from deformation or penetration of foreign material.

ix. Make sure that water proof packing material does not stick out of the frame when installing the modules.

8b. Heat

Using a large number of modules can cause degradation due to heat radiation. Care should be taken to prevent the temperature over the case's surface from exceeding 65C. The use of fans or reduction of illumination intensity may be required for heat control. Fig. 1 shows the ratio of illumination to ambient temperature.

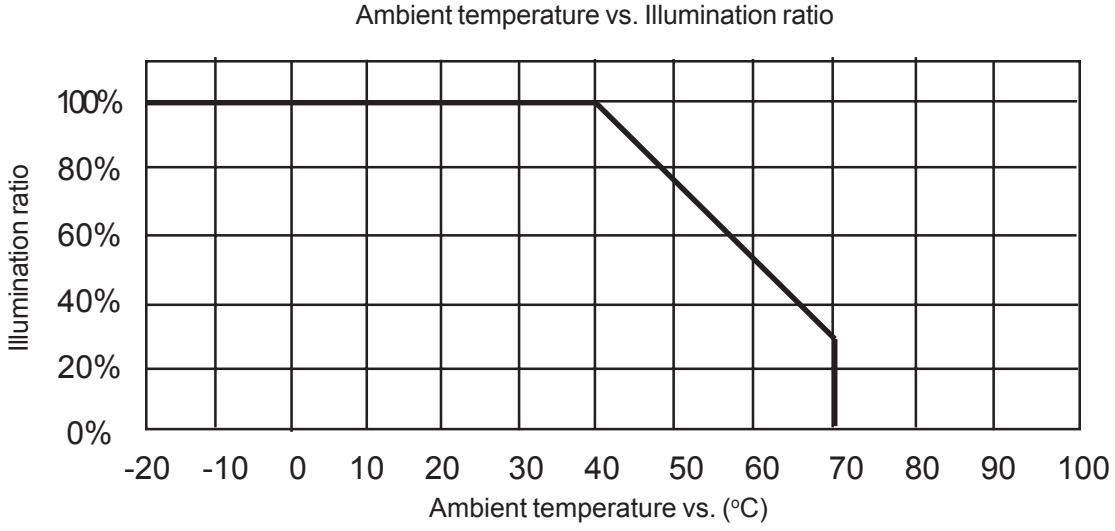


Fig.1

8c. Chemical and abrasion withstand capability

To clean the surface of the module, use a soft cloth and a neutral detergent.

8d. Static

These modules contain static sensitive CMOS-IC circuitry. Antistatic measures must be followed during assembly or testing to prevent damage to the electronics.

8e. Connecting Cable

To make electrical connection to the modules use only the provided or specified connectors. Use extreme caution to prevent damage when attaching or detaching the connectors.

8f. Others

i. Do not attempt to adjust the pre-set resistor used for luminous intensity adjustment.
ii. Take care to avoid electromagnetic interface when assembling and installing the modules.
iii. Be sure to disconnect power when installing or disassembling the module.
ix. Caution: excessive ambient electrical noise may cause modules to malfunction.

9. Included Parts (refer to the figure 11a and 11b)

Number		
1	Power cable	1
2	Signal cable	1

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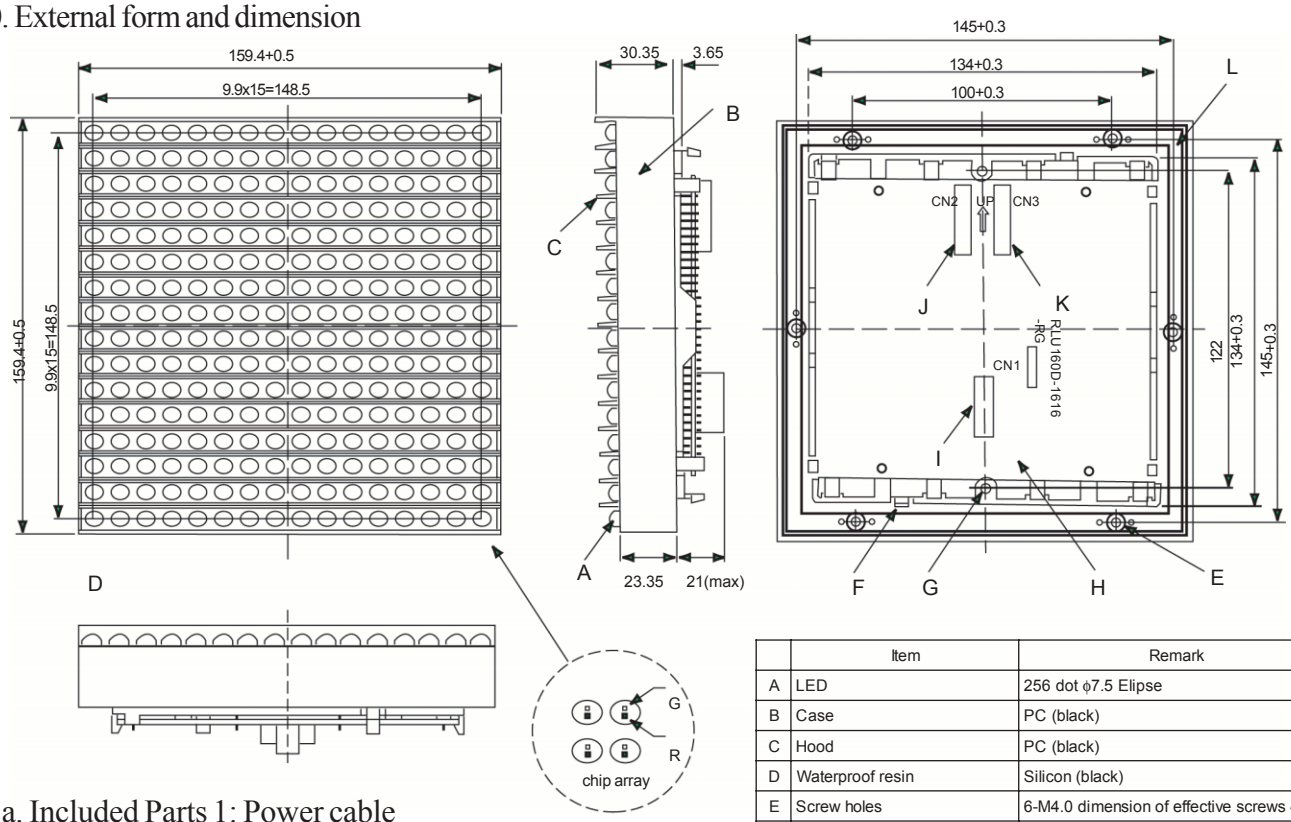
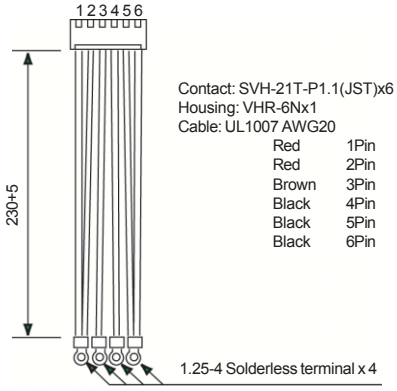
10. External form and dimension

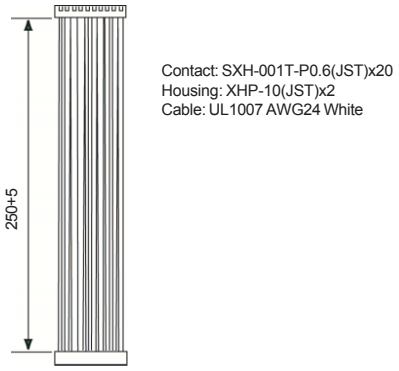


	Item	Remark
A	LED	256 dot ϕ7.5 Elipse
B	Case	PC (black)
C	Hood	PC (black)
D	Waterproof resin	Silicon (black)
E	Screw holes	6-M4.0 dimension of effective screws 4.5
F	Nails for preventing drop	Two nails, top and bottom
G	Hole for hanging	Two holes, top and bottom ϕ4.0
H	Driver board	FR4
I	Connector 1	Plug-in connecting power supply cable
J	Connector 2	Plug-in coneecting signal cable (at input)
K	Connector3	Plug-in connecting signal cable (at output)
L	Water resistance rubber packing	Silicon (gray)

11a. Included Parts 1: Power cable

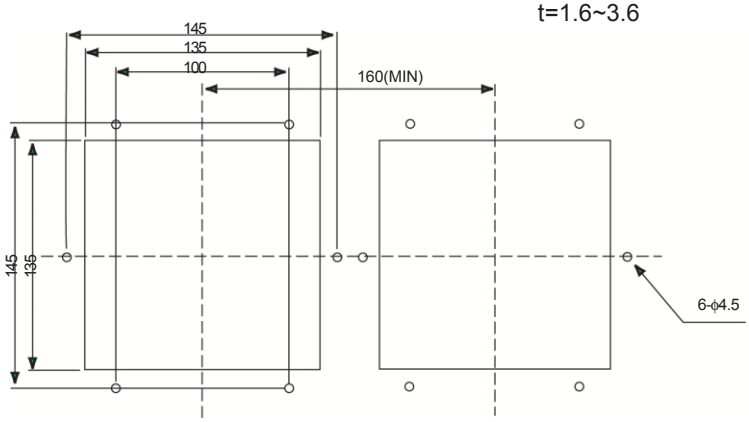


11b. Included Parts 2: Signal cable



12. Dimensions of Display Panel Cutting

Tolerance: +0.2
t=1.6~3.6



(Unit: mm)

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