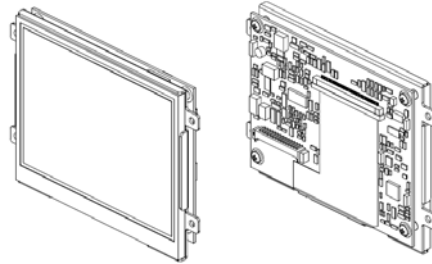


SPECIFICATION APPROVAL SHEET

MODEL: FCOP0350

3.5" Digital TFT-LCD Module



1. General Description

1.1 Features

- 3.5" Color TFT-LCD Panel
- Ultra Compact
- DC/DC, LED Driver, Video Decoder All In One
- NTSC/PAL Video input Auto Switching
- 4:3 Screen Mode
- Up/Down Reverse Screen
- Left/Right Reverse Screen
- Composite Video Input
- Single Operation Voltage +12V

1.2 Applications

- Security
- Video Game
- Door Phone
- Video Phone
- Instrument Display

1.3 Application Precautions

Do not use the products herein for the following equipment which demands extremely high performance in terms of functionality, reliability, or accuracy.

- Aerospace equipment
- Communication equipment for trunk lines.
- Control equipment for the nuclear power industry.
- Medical equipment related to life support, etc.

The other application that demands high reliability and functionality should first contact a sales representative.



2. Contents

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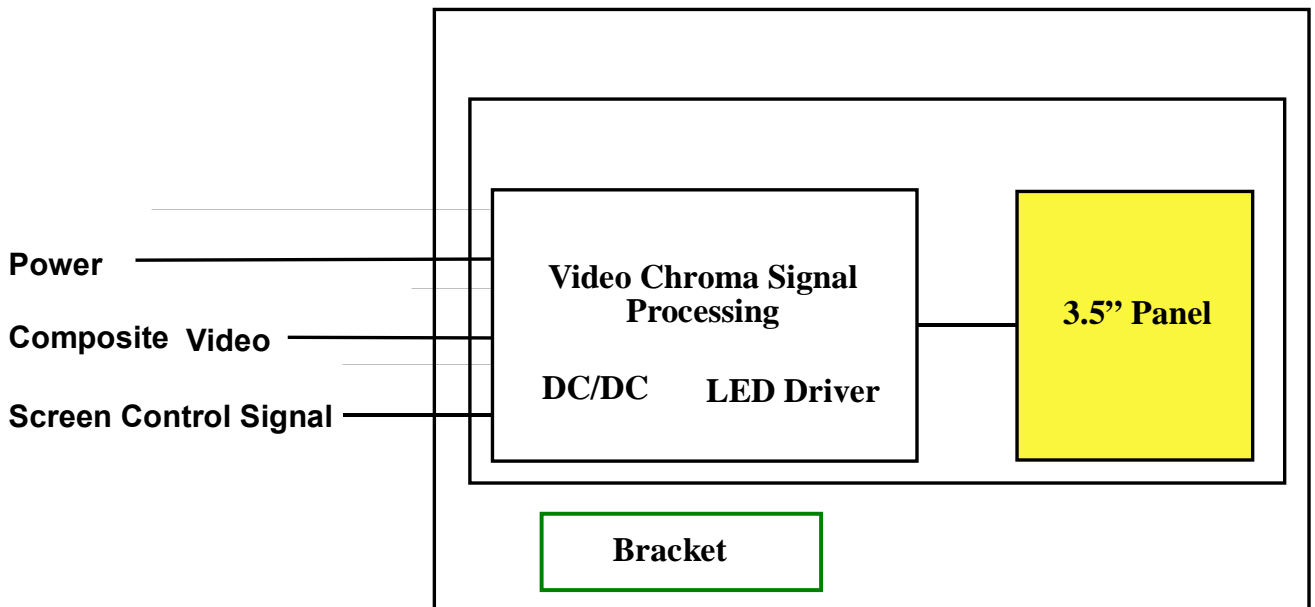


3. Specifications

Parameter	Specifications	
Panel Size	3.5"	
Resolution (Pixels)	320 x 240	
Luminance	300 cd/m ²	
Contrast Ratio	400	
View Angle	60 / 60 / 50 / 55	
LED Life Time	10K (Min.) hours	
Power Consumption@+12V	960 m Watts	
Input Signal System	CVBS	
Input Video System	NTSC / PAL	
Temperature Range	Operating	-20 ~ +70°C
	Storage	-30 ~ +80°C
High Temperature & High Humidity (Non-condensing)	Operating	+40°C / 90%

4. Block Diagram

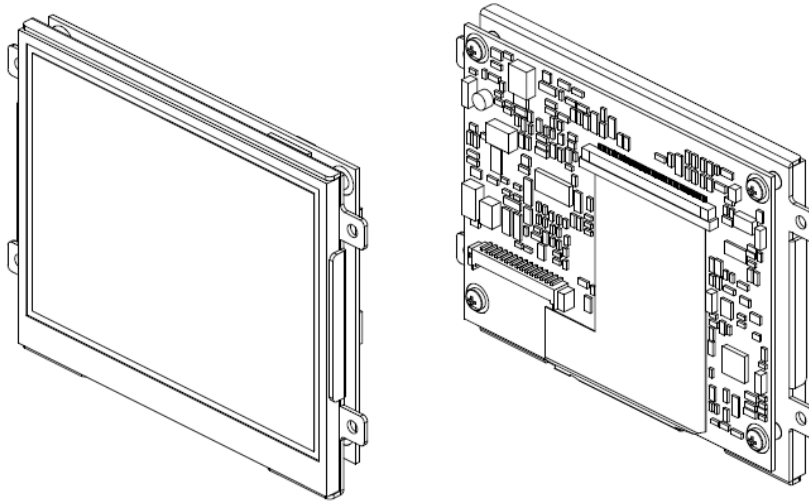
4.1 Block Diagram



5. Order Information

5.1 Unit

Unit



Parameter	LP035L2IS1-FDR	Unit	Remark
CVBS	⊙		
Outline Dimension (WxHxD)	88.9x65.7x11.76	mm	
Weight	84.5	g	±10%

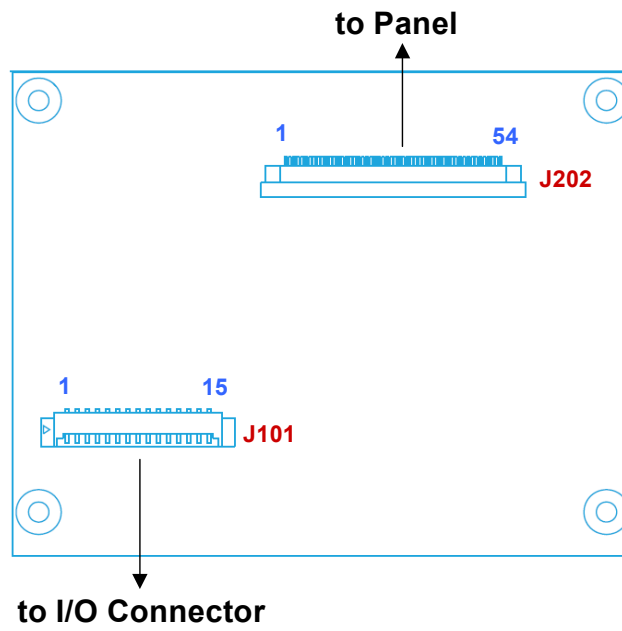
Note:

1. The assembling of panel and bracket is aimed for delivery, packaging and experiment. If the demand of shockproof and long-term fix, pls. have it into consideration of mechanism design.



6. Operation manual

6.1 Driver Board Manual



7. Pin Description

7.1 J202 : LCD Panel I/O Terminals(FPC 54 Pin Pitch 0.5mm Down Connect Type)

Pin No	Symbol	I/O	Description	Remark
1	LED-	I	Backlight LED Ground	
2	LED-	I	Backlight LED Ground	
3	LED+	I	Backlight LED Power	
4	LED+	I	Backlight LED Power	
5	NC	-	Don't Connect	
6	NC	-	Don't Connect	
7	NC	-	Don't Connect	
8	/RESET	-	Hardware Reset	
9	SPENA	I	SPI Interface Data Enable Signal	
10	SPCLK	I	SPI Interface Data Clock	
11	SPDAT	I	SPI Interface Data	
12	NC	-	Don't Connect	
13	NC	-	Don't Connect	
14	NC	-	Don't Connect	
15	NC	-	Don't Connect	
16	NC	-	Don't Connect	
17	NC	-	Don't Connect	
18	NC	-	Don't Connect	
19	NC	-	Don't Connect	
20	NC	-	Don't Connect	
21	NC	-	Don't Connect	
22	NC	-	Don't Connect	
23	NC	-	Don't Connect	
24	NC	-	Don't Connect	
25	NC	-	Don't Connect	
26	NC	-	Don't Connect	
27	NC	-	Don't Connect	
28	R0	I	DX0	
29	R1	I	DX1	
30	R2	I	DX2	
31	R3	I	DX3	
32	R4	I	DX4	
33	R5	I	DX5	
34	R6	I	DX6	
35	R7	I	DX7	
36	HSYNC	I	Horizontal Sync Input	
37	VSYNC	I	Vertical Sync Input	



38	DCLK	I	Dot Data Clock
39	NC	-	Don't Connect
40	NC	-	Don't Connect
41	V _{CC}	I	Digital Power
42	V _{CC}	I	Digital Power
43	NC	-	Don't Connect
44	NC	-	Don't Connect
45	NC	-	Don't Connect
46	NC	-	Don't Connect
47	NC	-	Don't Connect
48	SEL2	I	Control the Input Data Format/Floating
49	SEL1	I	Control the Input Data Format
50	SEL0	I	Control the Input Data Format
51	NC	-	Don't Connect
52	DE	I	Data Enable Input
53	DGND	I	Ground
54	AVSS	I	Ground

7.2 J101 : Pin Assignment Of Signal Input (Pitch 1.25mm 15P ,Side Entry Type)

※Connector Part No.: MS240115R (STM) [Same as 53261-1571(MOLEX)]

※Matching Connector Part No.: P240115 (STM) [Same as 51021-1500(MOLEX)]

Pin No	Symbol	I/O	Description	Remark
1	Vin	I	+ 12V Voltage Power supply	
2	GND	-	Power Ground	
3	GND	-	Power Ground	
4	GND	-	Signal Ground	
5	Video in	I	Video input(1Vp-p/75Ω)	
6	+3.3V	O	Voltage DC Output	Note 1
7	Bright	I	Brightness control	
8	Contrast	I	Contrast control	
9	Color	I	Color control	
10	Tint	I	Tint control	Note2
11	NC	-	Don't Connect	
12	LRC	I	Screen Left / Right reverse	Note 3
13	UDC	I	Screen Up / Down reverse	Note 3
14	Dimmer	I	Backlight brightness control	
15	Enable	I	Backlight On/Off	Note 4

Note 1 : The +3.3V power supply external control circuit.(Max. output is 10mA)

Note 2 : The TINT is only operating in NTSC system.

Note 3 : Default +3.0V or floating is normal scanning and 0V is for reversed scanning.

Note 4 : The floating or +3.0V is backlight on and 0V is backlight off.



8. Absolute Maximum Ratings

8.1 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Remark
Input Voltage	Vin	+9	+15	V	
Video Input Signal	Video in	0.5	2.0	Vp-p	@75Ω
Digital Input Signal	TTL	-0.3	+3.5	V	
Operating Temperature		-20	+70	°C	
Storage Temperature		-30	+80	°C	
High Temperature & High Humidity (Non-condensing)		-	+40 / 90	°C/HR%	

9. Recommended operating conditions

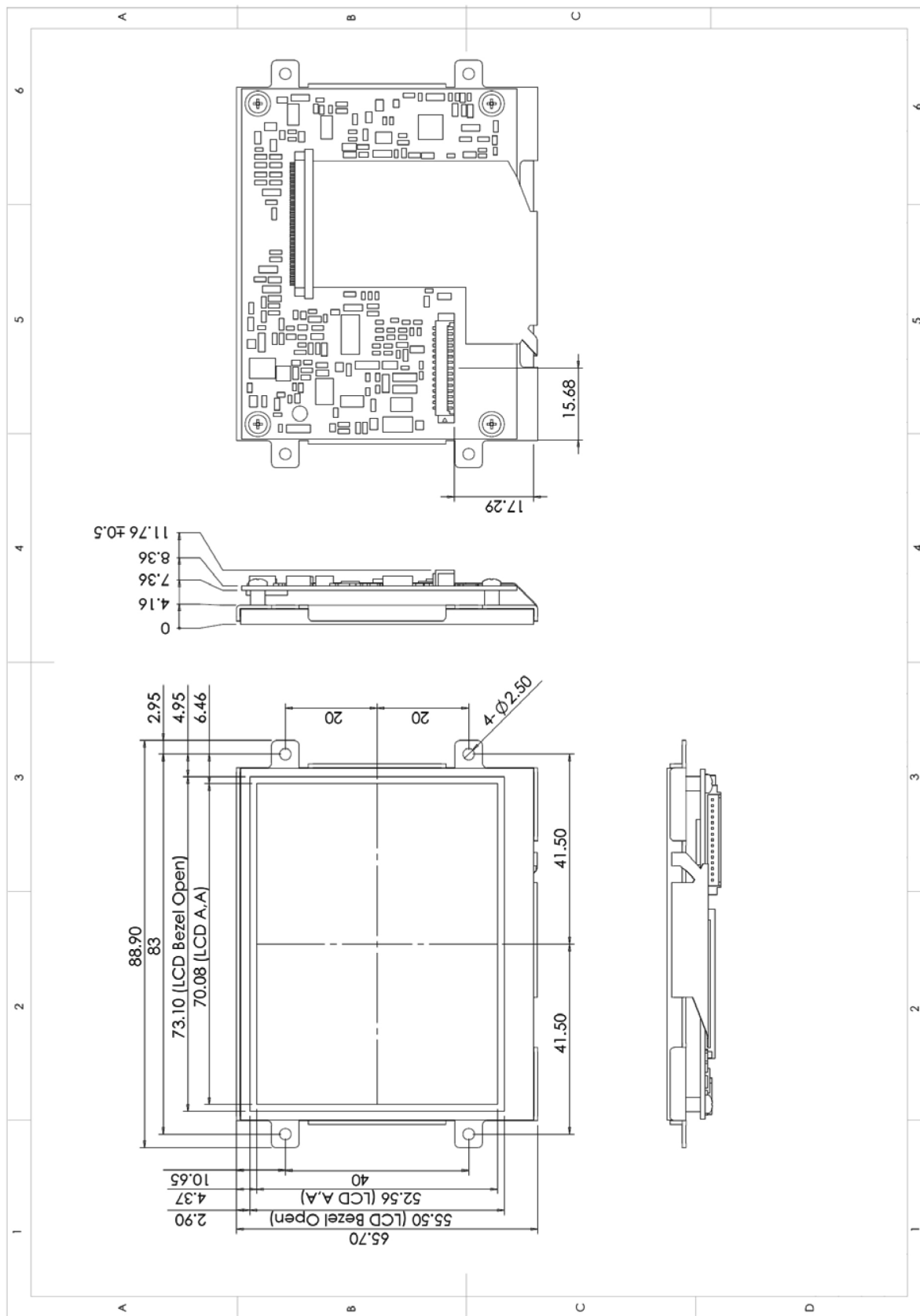
9.1 Electrical Characteristics

Parameter	Symbol	I/O	Min	Typ	Max	Unit	Remark
Input Voltage	Vin	I	+10	+12	+14	V	
Total Current	Iin (+12V)	I	-	80	-	mA	
Power Consumption		I	-	960	-	mW	±15% ,@+12V
Video Input Signal	Video in	I	-	1.0	-	Vp-p	@75Ω
Output Voltage	+3.3V	O	-	+3.3V	-	V	
Brightness Adjust	Bright	I	0.3	-	+3	V	
Contrast Adjust	Contrast	I	0.3	-	+3	V	
Color Adjust	Color	I	0.3	-	+3	V	
Tint Adjust	Tint (NTSC only)	I	0.3	-	+3	V	
Screen Reverse	Left / Right	I	0.3	-	+3	V	
Screen Reverse	Up / Down	I	0.3	-	+3	V	
Dimmer Adjust	Dimmer	I	0.3	-	+3	V	
Enable Backlight	Enable	I	0.4	-	+3	V	



10. Dimension Information

10.1 Unit (FCOP0350)



11. Appendix

11.1 TFT-LCD Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	3.5 (diagonal)	inch
Display Format	320 x (R.G.B) x 240	Dot
Active Area	70.08(H) x 52.56(V)	mm
Pixel Pitch	0.219 (H) x 0.219 (V)	mm
Pixel Arrangement	RGB stripe	
Bezel Opening Area	73.1x55.5 mm	mm
Outline Dimension (WxHxD)	76.9 (W) x 63.9 (H) x 3.26(D)	

11.2 TFT-LCD Optical Characteristics

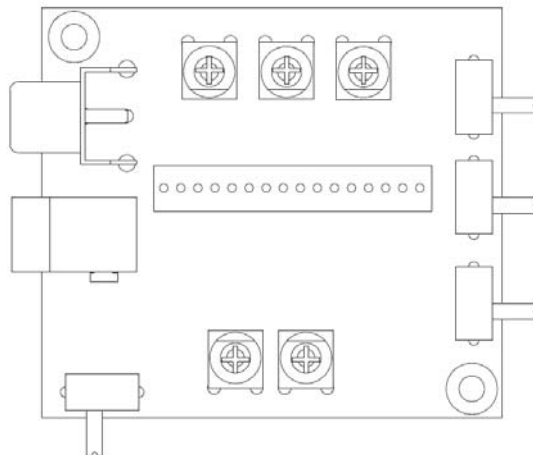
Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark	
Viewing Angle	Horizontal	Left	50	60	---	deg		
		Right	50	60	---			
	Vertical	Top	CR \geq 10	40	50	---	deg	
		Bottom		45	55	---	deg	
Contrast Ratio	CR	At optimized Viewing angle	300	400	---	---		
Response time	Rise Fall	Tr	---	10	20	ms		
		Tf	$\theta = 0^\circ$	---	15	30	ms	
Brightness	L		200	300	---	cd/m ²		
White Chromaticity	x	$\theta = 0^\circ$	0.26	0.31	0.36			
	y	$\theta = 0^\circ$	0.28	0.33	0.38			
LED Life Time		25°C	10000	---	---	Hr		



12. Demo Board

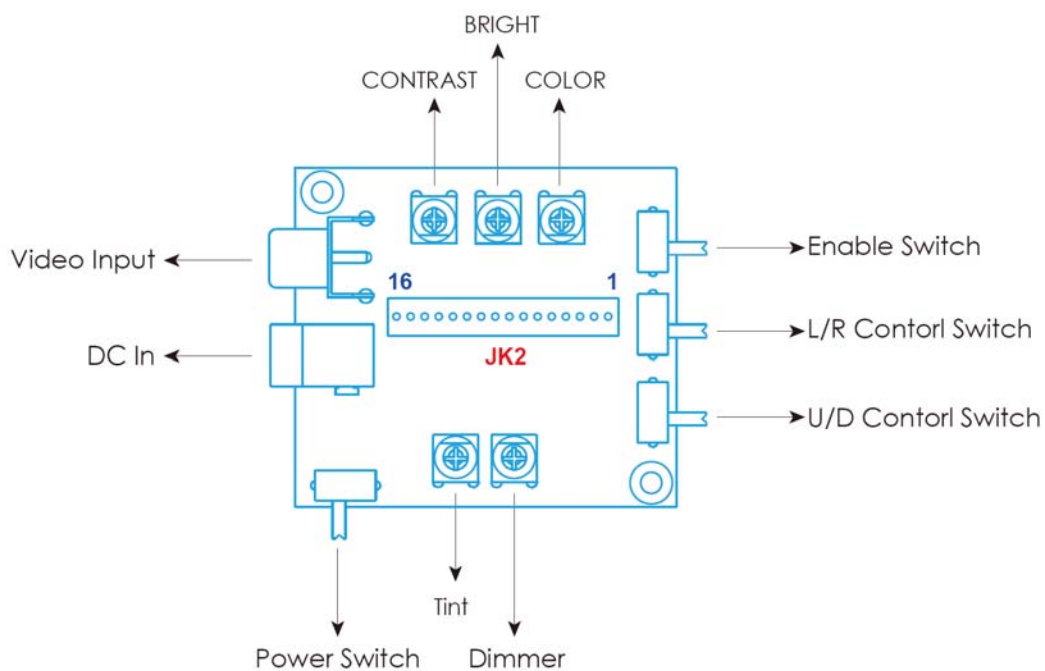
12.1 Demo Board (Option)

Demo Board



Order Part Number	Description with in cable	Remark
MD035L2I02-FDR	15P/Open 1.25mm L: 160mm	

12.2 Demo Board Manual (Option)



12.3 JK2 : Pin Assignment of Signal Input (Pitch 1.25mm 15Pin, Side Entry Type)

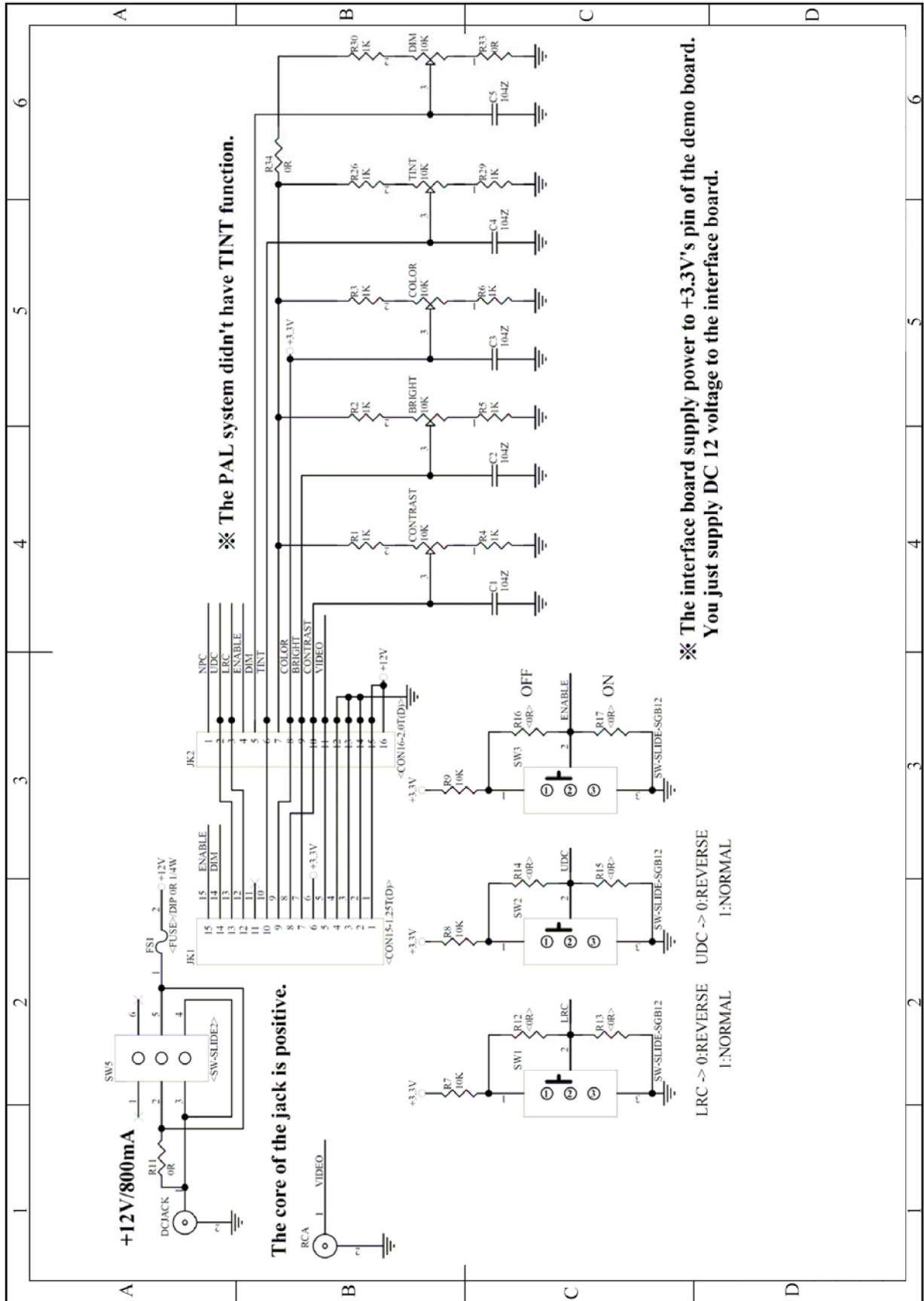
Pin No	Symbol	I/O	Description	Remark
1	GND	-	Power Ground	
2	UDC	O	Screen Up/Down Reverse	Note 2
3	LRC	O	Screen Left/Right Reverse	Note 2
4	Enable	O	Backlight On/Off	Note 3
5	-	-	-	
6	GND	-	Power Ground	
7	+3.3V	I	Voltage DC Input	Note 1
8	Color	-	Color Control	
9	Bright	-	Brightness Control	
10	Contrast	-	Contrast Control	
11	Video-IN	O	Video Input (1Vp-p/75Ω)	
12	GND	-	Signal Ground	
13	GND	-	Power Ground	
14	GND	-	Power Ground	
15	Vin	O	+12V Voltage Power Supply	
16	Vin	O	+12V Voltage Power Supply	

Note 1: The +3.3V power supply external control circuit.(Max. output is 10mA)

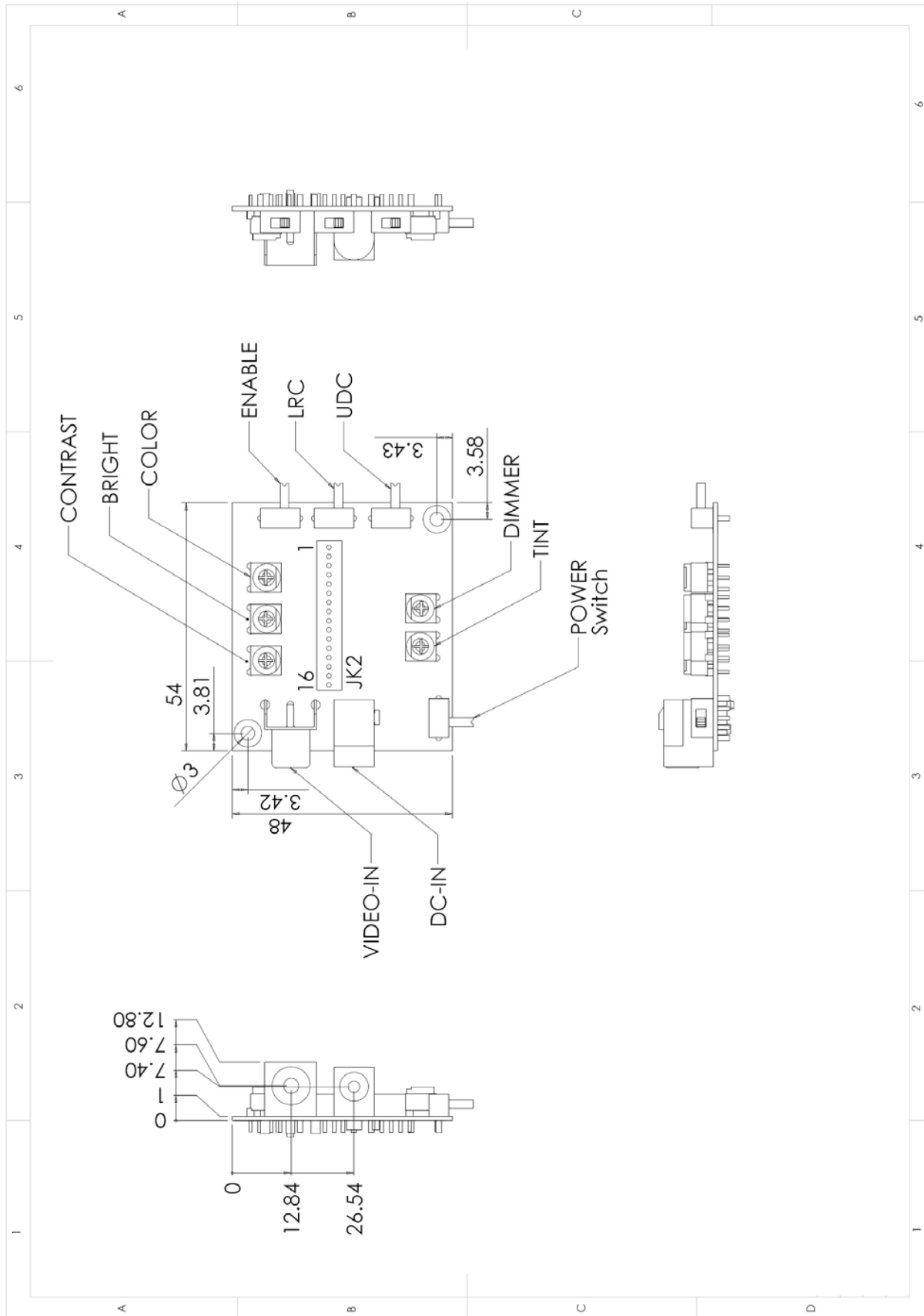
Note 2: Default +3.0V or floating is normal scanning and 0V is for reversed scanning.

Note 3: The floating or +3.0V is backlight on and 0V is backlight off.

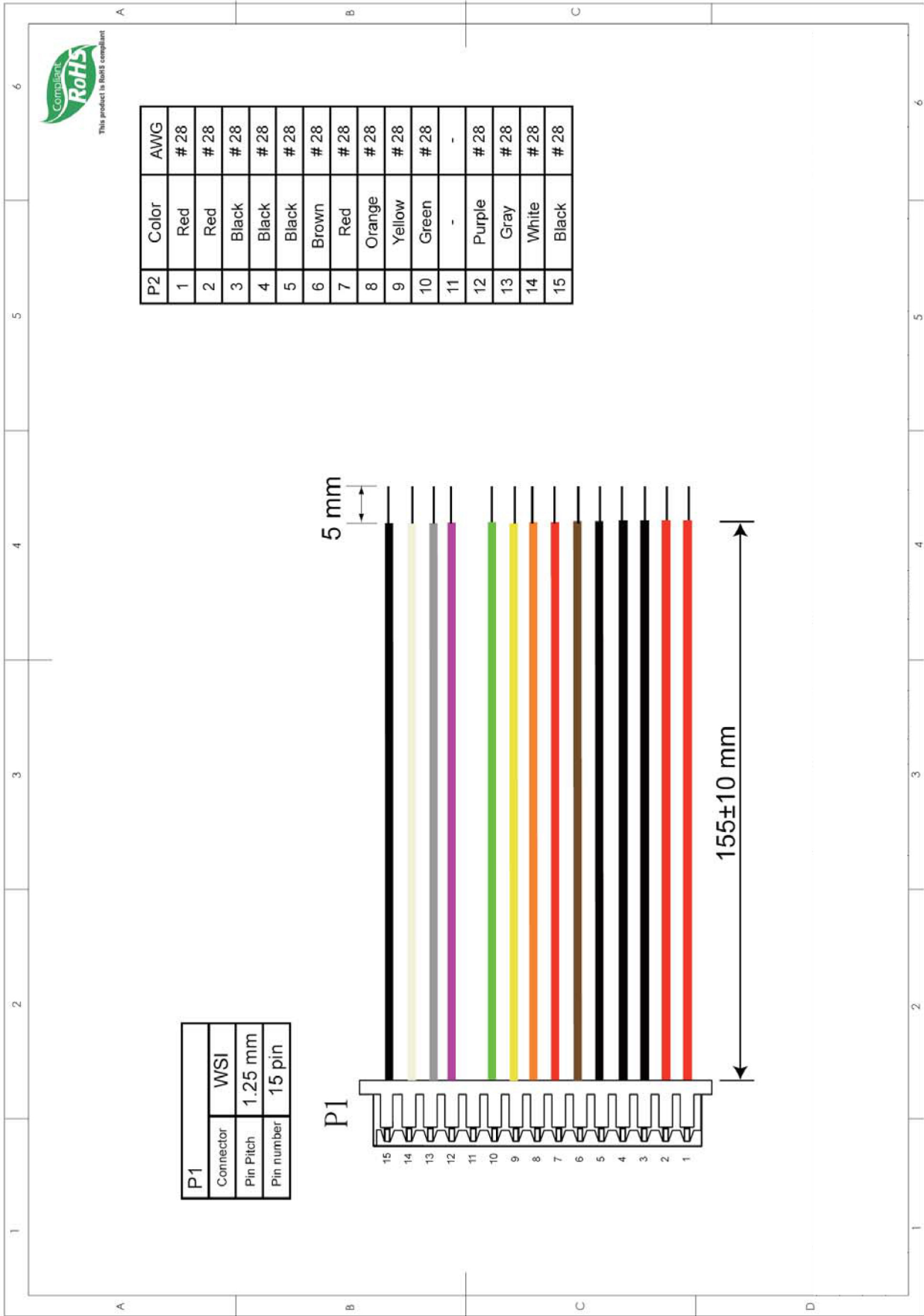




12.5 MD035L2102-FDR (Option)



12.6 Cable: 15P/OPEN 1.25mm L: 160mm (Option)



13. Revision History

13.1 Record of Revision

NO.	Date	Description	Page	Note
1.0	February 27, 2018	· First draft	15	

