SPECIFICATION APPROVAL SHEET

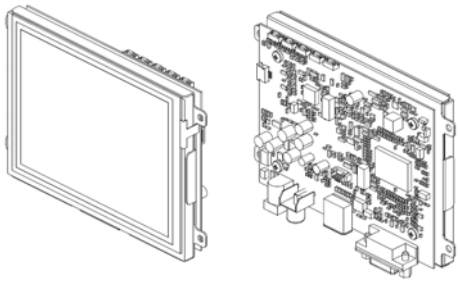
Open Frame 5" Digital TFT LCD, 640 x 480 250 nits, Aspect Ratio: 4:3, Ultra Compact, NTSC/PAL/SECAM Video Auto Switch, Single Operation Voltage +12V, CVBS / Analog RGB /VGA (PC Mode) Signal Input, All Functions can be controlled by UART, Built-in EDID Function, Operating -20~ +60°, W4 Resistive Touch, No cables, no accessories, no Power adapter.

MODEL: FCOP0500-TR

i-Tech Company LLC
TOLL FREE: (888) 483-2418 • EMAIL: info@itechlcd.com • WEB: www.iTechLCD.com

FLAT DISPLAY TECHNOLOGY

5” Digital TFT-LCD Module



1. General Descriptions

1.1 Features

- 5” Digital TFT LCD
- Aspect Ratio: 4:3
- Ultra Compact
- NTSC/PAL/SECAM Video Auto Switch
- Single Operation Voltage +12V
- CVBS / Analog RGB (PC Mode) Signal Input
- All Functions can be controlled by UART
- Support Touch Screen Function (Option)
- Built-in EDID Function

1.2 Applications

- Portable product
- Industrial
- Hand-held
- Security
- Instrument Display
- Office Electronics

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.

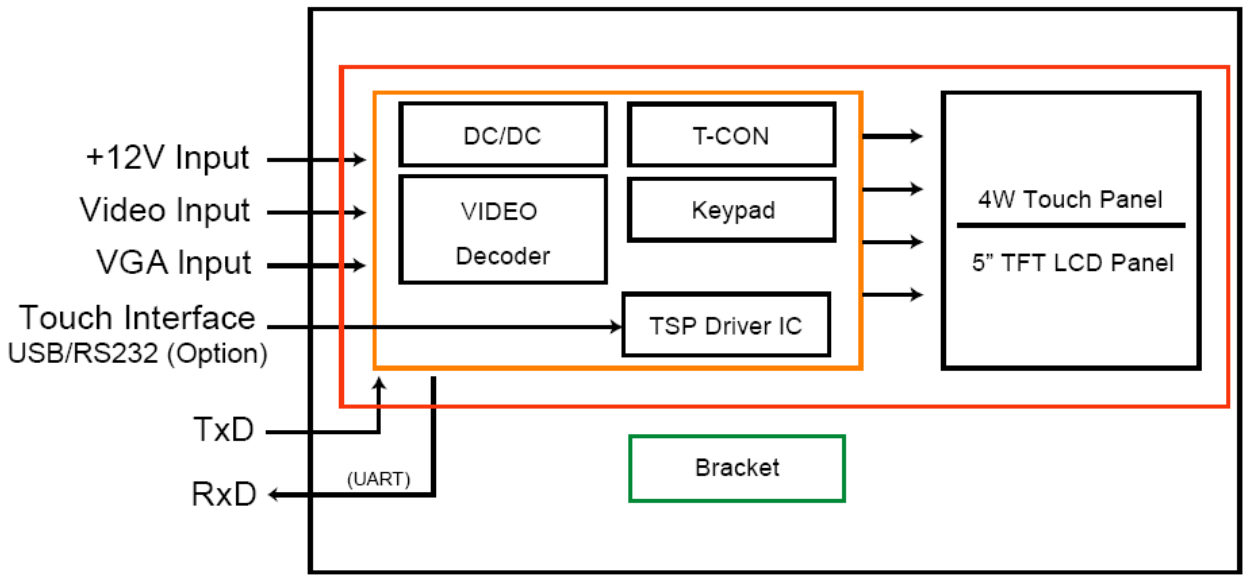
2. Contents

3. Specifications

Parameter	Specifications		
Panel Size	5”		
Resolution (Pixels)	640 x 480		
Luminance without TP	250 cd/㎡		
Luminance (RTP)	200 cd/㎡		
Contrast Ratio	500		
View Angle	70 / 70 / 50 / 70		
LED Life Time	15K (Min)		
Power Input (DC Jack 2.1 ϕ)	+12V DC		
Power Consumption@+12V	2.76 Watts		
Resistive Type	USB / RS232 Interface (Option)		
Resistive Type Support OS	Windows / Linux / DOS / Mac / QNX		
Input Signal System	CVBS / Analog RGB (VGA)		
Input Video System	NTSC / PAL		
Key	5 Buttons		
Serial Remote Control	UART / RS232 (Option)		
Temperature Range		Without TP	4W RTP
	Operating	-20~ +60℃	-10~ +60℃
	Storage	-20~ +70℃	-20~ +70℃
High Temperature & High Humidity (Non-condensing)	Operating	+40℃ / 90%	+40℃ / 90%

4. Block Diagram

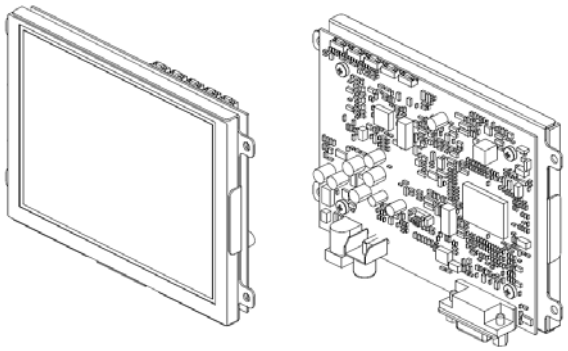
4.1 Block Diagram



5. Order Information

5.1 Unit (Video / VGA)

Unit



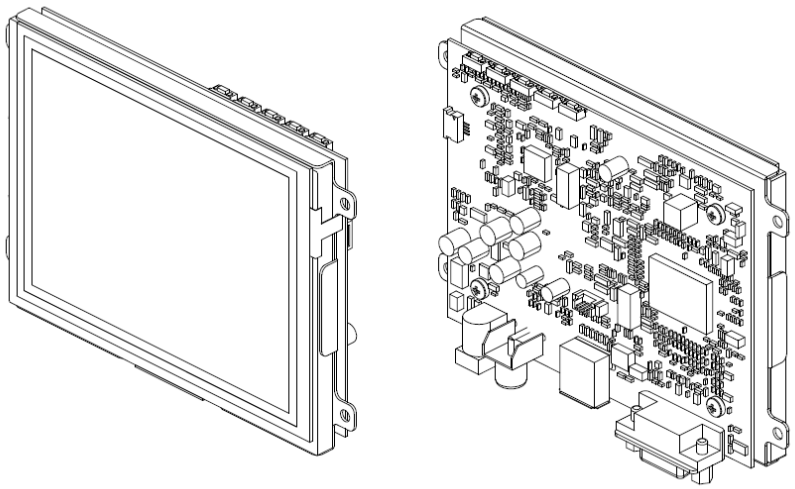
Parameter			FCOP0500	Unit	Remark
CVBS			1		
VGA (D-Sub15 / 2.0mm 14Pin)			D-Sub15		
Outline Dimension			132.65x90.23x23.1	mm	
AC to DC Adapter 12V/3.3A			◎		
Power Cord Plug Type B for USA			◎		
Video Cable			◎		
VGA Cable			◎		
Weight			179.5	g	±10%,Note2

Note: 1. The tape in back of the bracket is to avoid the panel falling from the unit in delivery.

2. It's just a temporary adhesion.

5.2 Unit (Video / VGA / 4W RTP)

Unit

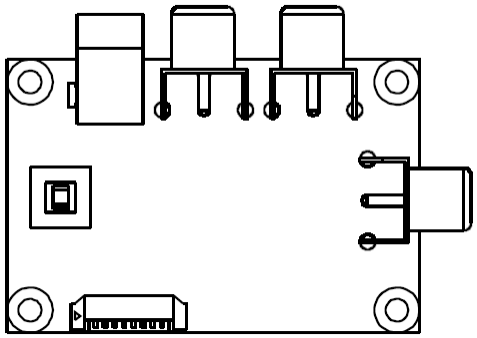


Parameter				FCOP0500-TR	Unit	Remark
CVBS				1		
VGA (D-Sub15 / 2.0mm 14Pin)				D-Sub15		
Touch Panel Type				4W Resistive		
Touch Screen Interface				USB		
Outline Dimension				132.65x90.23x24.45	mm	
AC to DC Adapter 12V/3.3A				◎		
Power Cord Plug Type B for USA				◎		
Video Cable				◎		
VGA Cable				◎		
USB Cable				◎		
RS-232 Cable				-		
Touch Screen Driver CD Disk				◎		
Weight				200	g	±10%,Note2

Note: 1. The tape in back of the bracket is to avoid the panel falling from the unit in delivery.

2. It's just a temporary adhesion.

5.3 Demo Board (Option)

Demo Board


6. Accessories (Option)

Before you begin installing the KIT, please make sure that the following materials have been shipped:

A.

B.

C.

D.

E.

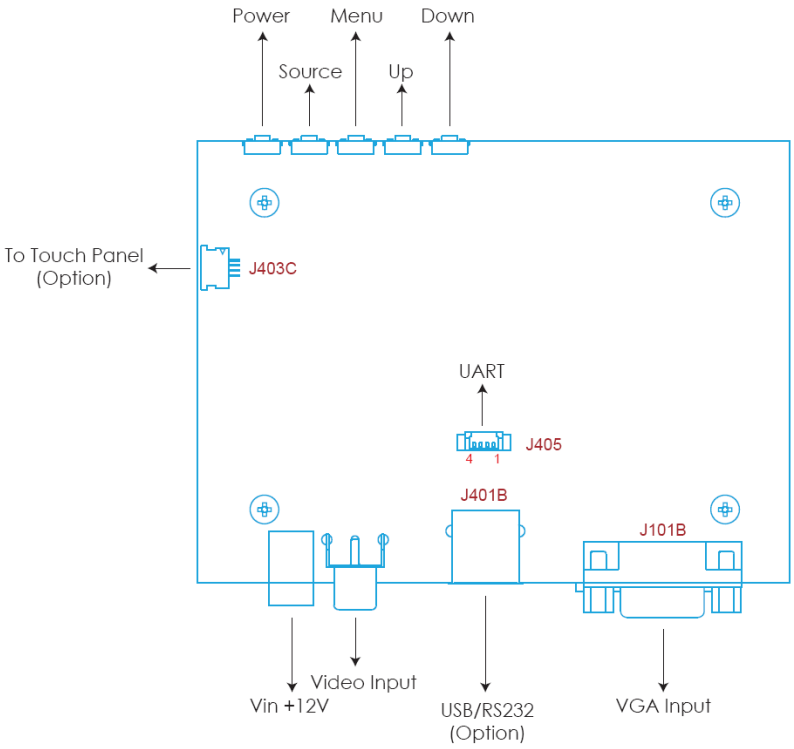
F.

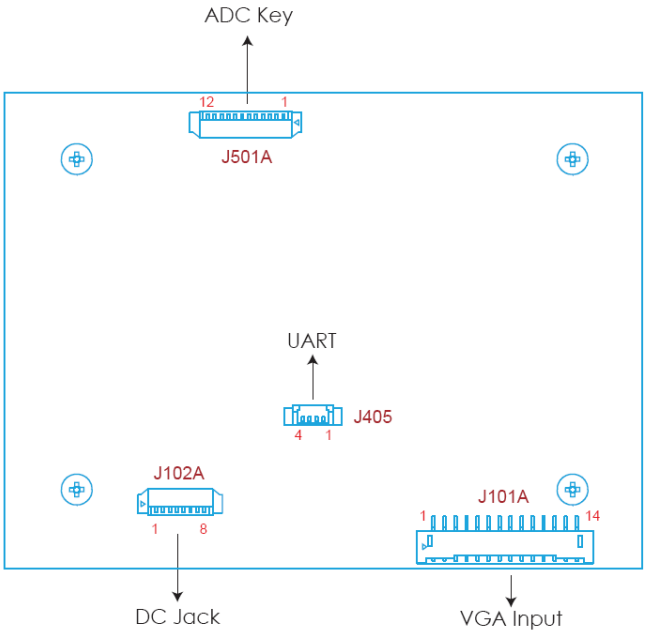
A. AC to DC Adapter (L:1500mm,100-240VAC 50-60Hz to +12VDC @ 3.3A)
B. Power Cord (L:1800mm, Plug Type B for USA)
C. Video Cable (L:1800mm)
D. VGA Cable (L:1800mm)
E. USB Cable (L:1800mm)
F. RS-232 Cable (L:1800mm)

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

7. Operation Manual

7.1 Driver Board Manual





8. Pin Description

8.1 J301：Panel I/O Terminals (FPC 50 Pin Pitch 0.5mm Down Contact Type)

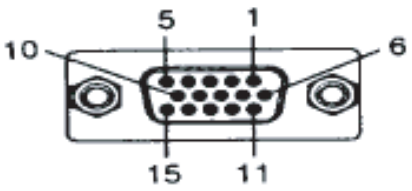
Pin No	Symbol	I/O	Description	Remark
1	VLED+		Power for LED Circuit	
2	VLED+		Power for LED Circuit	
3	VLED-		Power for LED Circuit	
4	VLED-		Power for LED Circuit	
5	GND		Power Ground	
6	VCOM		VCOM Input	
7	DVDD		Power for Digital Circuit	
8	MODE		DE or HV Mode Control	
9	DE		Data Enable	
10	VS		Vsync Signal Input	
11	HS		Hsync Signal Input	
12	B7		Blue data (MSB)	
13	B6		Blue data	
14	B5		Blue data	
15	B4		Blue data	
16	B3		Blue data	
17	B2		Blue data	
18	B1		Blue data	
19	B0		Blue data (LSB)	
20	G7		Green data (MSB)	
21	G6		Green data	
22	G5		Green data	
23	G4		Green data	
24	G3		Green data	
25	G2		Green data	
26	G1		Green data	
27	G0		Green data (LSB)	
28	R7		Red data (MSB)	
29	R6		Red data	
30	R5		Red data	
31	R4		Red data	
32	R3		Red data	
33	R2		Red data	
34	R1		Red data	
35	R0		Red data (LSB)	
36	GND		Power Ground	
37	DCLK		Sample Clock	
38	GND		Power Ground	
39	L/R		Select Left to Right Scanning Direction	
40	U/D		Select Up to Down Scanning Direction	

41	VGH	Positive Power for Scan Driver
42	VGL	Negative Power for Scan Driver
43	AVDD	Power for Analog Circuit
44	RESET	Reset
45	NC	No connection
46	VCOM	VCOM Input
47	NC	No connection
48	NC	No connection
49	NC	No connection
50	NC	No connection

8.2 J101B：Pin Assignment of Analog RGB Input (D-Sub 15Pin)

Pin No	Symbol	I/O	Description	Remark
1	RI+	I	Analog Red Signal	
2	GI+	I	Analog Green Signal	
3	BI+	I	Analog Blue Signal	
4	NC	-	No Connection	
5	GND	-	Ground	
6	AGND	-	Analog Ground	
7	AGND	-	Analog Ground	
8	AGND	-	Analog Ground	
9	NC	-	No Connection	
10	NC	-	No Connection	
11	NC	-	No Connection	
12	DDC_SDA	-	DDC2 Data	
13	HS_IN	I	TTL Horizontal sync	
14	VS_IN	I	TTL Vertical sync	
15	DDC_SCL	-	DDC2 Clock	

Note: Window 7/8/10 won't support resolution format 640*480. If users needs format 640*480, please check if graphic card can support 640*480 and then go to advanced setting to configure the resolution. Should users have questions still, pls contact sales representatives for assistance.



8.3 J101A：Pin Assignment of Analog RGB Input (Pitch 2.0mm 14Pin, Side Entry Type)(Option)

※ **Connector Part No.: MS242614R (STM) [Same as S14B-PH-SM4-TB (JST)] ;**

※ **Matching Connector Part No.: P242614 (STM) [Same as PHR-14 (JST)].** Pin No

Symbol		I/O	Description	Remark
1	NC	-	No Connect	
2	NC	-	No Connect	
3	NC	-	No Connect	
4	GND	-	Ground	
5	NC	-	No Connect	
6	VS_IN	I	TTL Vertical sync.	
7	HS_IN	I	TTL Horizontal sync.	
8	AGND	-	Analog Ground	
9	RI+	I	Analog Red Signal	
10	AGND	-	Analog Ground	
11	GI+	I	Analog Green Signal	
12	AGND	-	Analog Ground	
13	BI+	I	Analog Blue Signal	
14	GND	-	Ground	

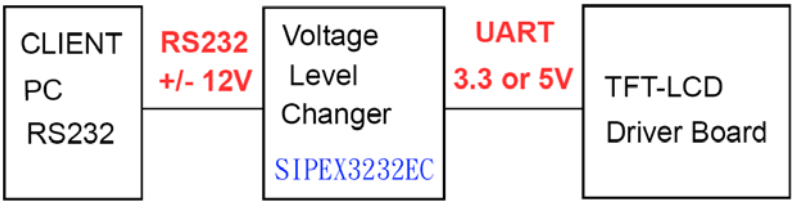
8.4 J405: Pin Assignment of UART (Pitch 1.25mm 4Pin, Top Entry Type)

※ **Connector Part No.: MS24014 (STM) [Same as 53398-0471 (MOLEX)];**

※ **Matching Connector Part No.: P24014 (STM) [Same as 51021-0400 (MOLEX)].**

Pin No	Symbol	I/O	Description	Remark
1	TX	O	UART Transmission Data	
2	RX	I	UART Receive Data	
3	GND	-	Ground	
4	+3.3VA	O	+3.3V Output Voltage	

Note: All Functions can be controlled by UART, About UART command list please contact iTech sales.



8.5 DC JACK: Pin Assignment of Power Input (Inside Diameter:2.1 ∅Outside Diameter:5.5 ∅Side Entry Type)

Pin No	Symbol	I/O	Description	Remark
1	VIN	I	+12V Input Voltage	
2	GND	-	Power Ground	

8.6 J102A: Pin Assignment of Power Input (Pitch 1.25mm 8Pin, Side Entry Type)

※ Connector Part No.: MS24018R (STM) [Same as 53261-0819 (MOLEX)] ;

※ Matching Connector Part No.: P24018 (STM) [Same as 51021-0800 (MOLEX)].

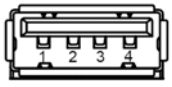
Pin No	Symbol	I/O	Description	Remark
1	VCC12V	-	+12V Input Voltage	
2	VCC12V	-	+12V Input Voltage	
3	GND_D	-	Ground	
4	GND_D	-	Ground	
5	VIDEO1	I	Video1 Input Signal	
6	GND_A	-	Ground For Video1	
7	VIDEO2	I	Video2 Input Signal	
8	GND_A	-	Ground For Video2	

8.7 RCA: Pin Assignment of Video Input (RCA JACK Yellow, Side Entry Type)

Pin No	Symbol	I/O	Description	Remark
1	Video	I	Video Input	
2	AGND	-	Analog Ground	

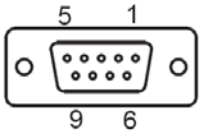
8.8 J401B：Pin Assignment of Touch USB (USBA-Female 2.0mm, Side Entry Type)(Option)

Pin No	Symbol	I/O	Description	Remark
1	VBUS	-	USB VCC	
2	D-	-	DATA (-)	
3	D+	-	DATA (+)	
4	DGND	-	Digital Ground	



8.9 J401C：Pin Assignment of Touch RS232 (D-SUB 9 FEMALE)(Option)

Pin No	Symbol	I/O	Description	Remark
1	NC	-	No Connection	
2	TXD	-	Transmit Data	
3	RXD	-	Receive Data	
4	NC	-	No Connection	
5	GND	-	Ground	
6	NC	-	No Connection	
7	NC	-	No Connection	
8	NC	-	No Connection	
9	NC	-	No Connection	



8.10 J501A：Pin Assignment of ADC Key (Pitch 1.25mm 12Pin, Side Entry Type)(Option)

※ Connector Part No.: MS240112R (STM) [Same as 53261-1219 (MOLEX)] ;

※ Matching Connector Part No.: P240112 (STM) [Same as 51021-1200 (MOLEX)].

Pin No	Symbol	I/O	Description	Remark
1	-	-	Don’t Connect	
2	SW5	I	EXIT	
3	SW4	I	DOWN	
4	SW3	I	UP	
5	SW2	I	MENU / S	
6	SW1	I	POWER / SOURCE	
7	GND	-	Ground	
8	VDDP	-	+3.3Vdc Output Voltage	
9	-	-	Don’t Connect	
10	RED	O	Indicator red LED for power off control	
11	GREEN	O	Indicator green LED for power on control	
12	GND	-	Ground	

9. Absolute Maximum Ratings

9.1 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
Analog RGB Input Signal	Analog RGB in	0.5	2.0	Vp-p	@75Ω
Digital Input Signal	TTL	+0.3	+3.6	V	
Operating Temperature		-20	+60	℃	
Storage Temperature		-20	+70	℃	
Operating Temperature With 4W RTP		-20	+60	℃	
Storage Temperature With 4W RTP		-20	+70	℃	
High Temperature & High Humidity (Non-condensing) With RTP		-	+40 / 90	℃ / %	
High Temperature & High Humidity (Non-condensing) Without RTP		-	+40 / 90	℃ / %	

10. Recommended Operating Conditions

10.1 Electrical Characteristics

Parameter	Symbol		I/O	Min	Typ	Max	Unit	Note
Input Voltage	Vin		I	+10	+12	+14	V	
Total Current	Iin (+12V)		I	278	230	200	mA	±15%
Power Consumption			I	2.78	2.76	2.80	W	±15%
Output Voltage	VDD		O	+3.2	+3.3	+3.4	V	I=10mA
Video Input Signal	Video in		I		1.0		Vp-p	@75Ω
Analog RGB Input Signal	Analog RGB in	RGB	I		0.7		Vp-p	@75Ω

10.2 VGA Mode Characteristics

Dots per inch	H	Unit	Polarity	V	Unit	Polarity	Note
640*480	31.469	KHz	Negative	59.941	Hz	Negative	
800*600	37.879	KHz	Positive	60.317	Hz	Positive	
1024*768	48.363	KHz	Negative	60.004	Hz	Negative	

11. 4W Resistance Touch Panel Characteristics

11.1 J403C: 4 Pin Assignment of RTP (Pitch 1.0mm 4Pin, Side Entry Type)

Pin No	Symbol	Description	Remark
1	X2	Lower Electrode X (Right Side)	
2	Y1	Upper Electrode Y (Upper Side)	
3	X1	Lower Electrode X (Left Side)	
4	Y2	Upper Electrode Y (Down Side)	

11.2 Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Terminal Resistance	X	90	-	820	Ω	
	Y	20	-	550	Ω	
Linearity		-	-	1.5	%	
Insulation Impedance		20	-	-	MΩ	DC 25V

11.3 Optical Performance

Parameter	Specifications
Transparency	≧82% Typ.
Haze	8.0% Max.

11.4 Mechanical Performance

Parameter	Specifications
Input Method	Finger or stylus pen
Operating Force	5gf~80gf
Surface Hardness	3H

11.5 Durability Performance

Parameter	Specifications
Hitting Durability	≧1Million times, with R8.0 mm silicon rubber,250g,5 Hz
Sliding Durability	≧30,000 times, with R0.8 mm polyacetal stylus, 250g, 210 mm / sec

11.6 Touch Screen Operation System Support

Driver Vender：EETI (eGalax_eMPIA Technology Inc.)

OS	Version	Interface
Windows	Windows XP Embedded Windows Vista, XP, 2000 Windows Embedded POSReady 2009 Windows Embedded 7, 8 Windows 7, 8, 8.1, 10	RS232/USB
Windows CE	Windows CE.Net (4.x / 5.0) Windows CE 6.0 Windows Embedded Compact 7 Windows Embedded Compact 2013	RS232/USB
Linux	Kernel 2.4.x (x86) Kernel 2.6.23 Downward (X86) Kernel 2.6.24 Upward and 3.x.x (X86 / ARM / MIPS)	USB
Android	Android Version 2.3.x upwards (X86 / ARM / MIPS)	USB
Mac OS	Mac OS X 10.5.3 Leopart (Power PC) Mac OS X 10.7.4 Earlier (32Bit) (Intel CPU) Mac OS X 10.7.4 Earlier (64Bit) (Intel CPU) Mac OS X 10.7.5 (32Bit) (Intel CPU) Mac OS X 10.7.5 (64bit) (Intel CPU) Mac OS X 10.8.x Mountain Lion (Intel CPU) Mac OS X 10.9.x Mavericks (Intel CPU) Mac OS X 10.10.x Yosemite (Intel CPU)	USB
QNX	QNX RTOS V6.3 QNX Neutrino RTOS V6.5/6.4	USB
DOS	DOS	PS2

Note: 1. How to use Touch Driver, please refer to Readme of Touch Screen Driver CD Disk.

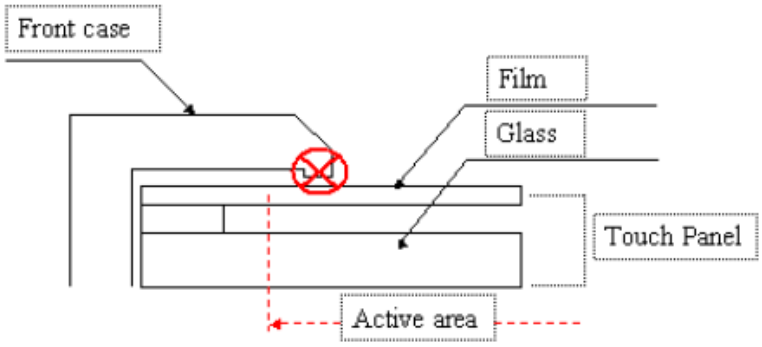
2. Please refer to the iTech website for the latest driver version and support operating system.

iTech website: http://www.itechlcd.com

11.7 Touch Screen Integration Design Guide

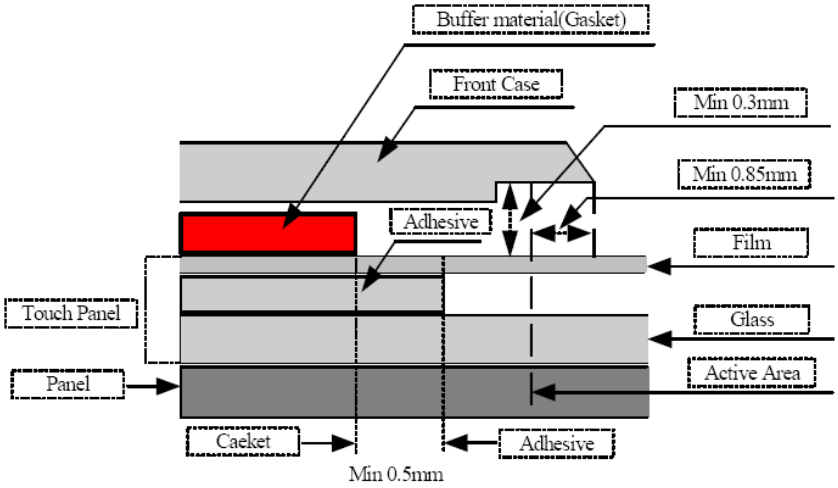
Avoid the design that Front-case overlap and press on the active area of the touch-panel.

Give enough gap (over 0.5mm at compressed) between the front case and touch-panel to protect wrong operating.



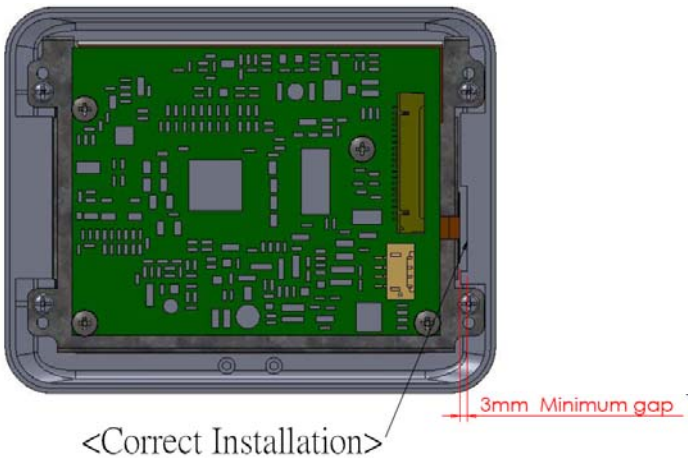
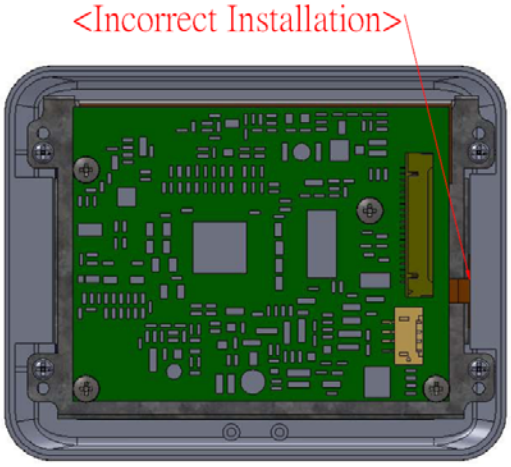
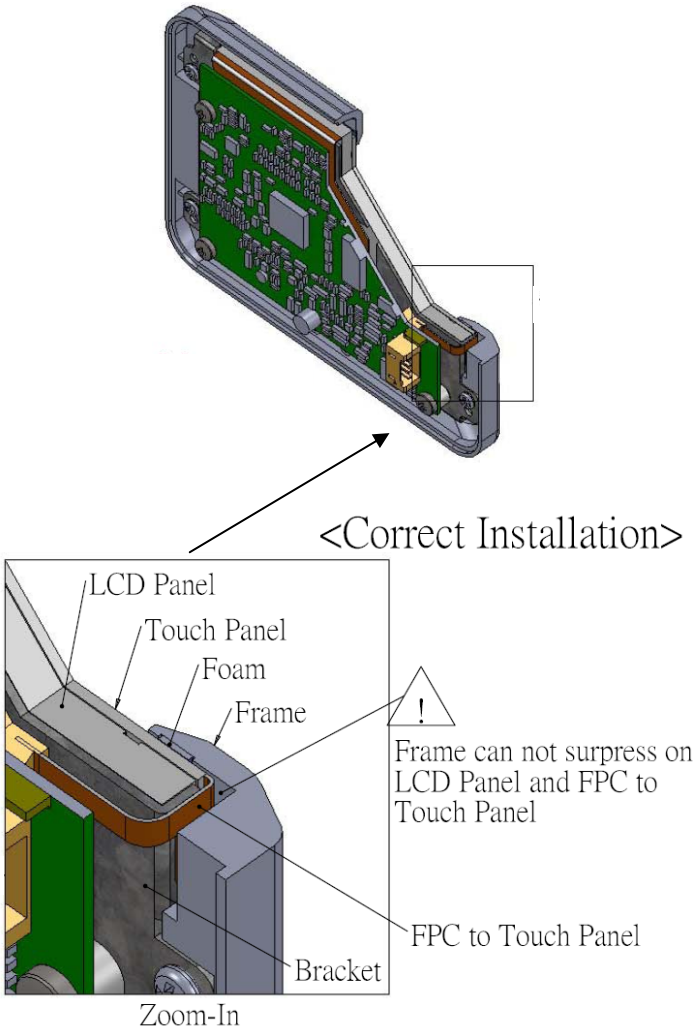
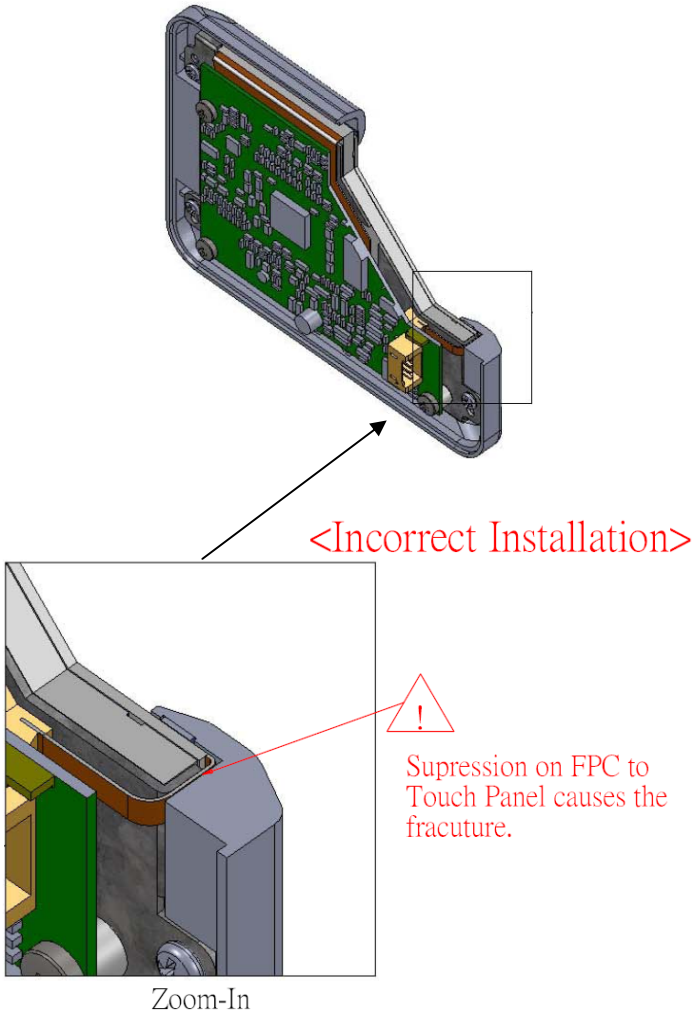
Use a buffer material (Gasket) between the touch-panel and front-case to protect damage andwrong operating.

Avoid the design that buffer material overlap and press on the inside of touch-panel viewing area.



Note: We strongly suggest to follow above design guide to avoid the linear defect happened on the touch panel.

11.8 Mechanical Design Notice For Touch Panel

Correct Installation	Incorrect Installation
	
	

12. Key Function by OSD

12.1 Menu Operation

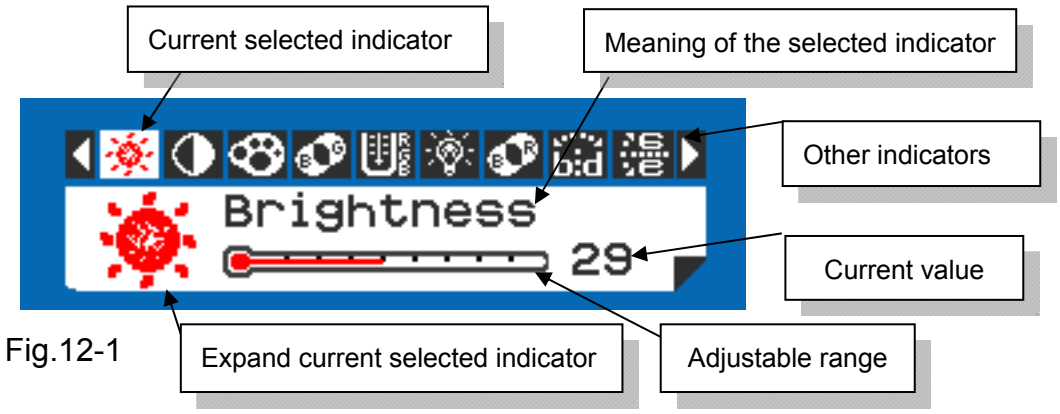
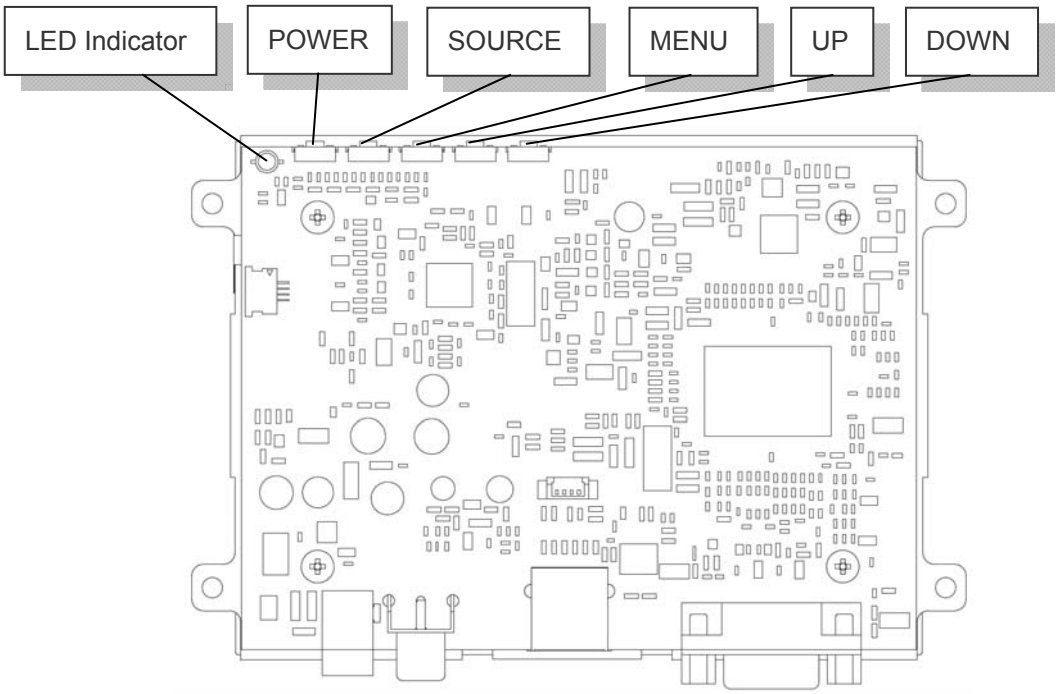


Fig.12-1



Operations of key board：

1. To navigate the menu, press [MENU]. (Fig.12-1)
2. The indicator lighting up in white color is the selected adjustment item.
3. To Next Item of the menu, press [MENU] again.
4. The operations below are only available when “Menu” is started.
5. Press [UP] / [DOWN] to adjust the value of the selected item.
6. LED Indicator
   - Waiting：Flickering Green
   - Power ON：Green
   - Power OFF：Red

Save OSD Setting:

1. EXIT MENU and settings will be saved automatically
2. Settings will be saved as well when MENU shuts down automatically

Overview of the menu：

Firmware Version must be≧VER 0.26

Indicator	Meaning	Adjustable range	For	Remark
	Brightness	0 ～ 64	AV / VGA	Adjust-Bar
	Contrast	0 ～ 64	AV / VGA	Adjust-Bar
	Color	0 ～ 64	AV	Adjust-Bar
	Tint	0 ～ 32	AV	Adjust-Bar
	Sharpness	0 ～ 16	AV	Adjust-Bar
	Dimmer	0 ～ 9	AV / VGA	
	Color Tone	Normal / Warm / Cool	AV / VGA	
	Mirror	OFF / ON	AV / VGA	
	Flip	OFF / ON	AV / VGA	
	H-Position	-25 ～ +25	AV / VGA	Balance-Bar
	V-Position	-10 ～ +10	AV / VGA	Balance-Bar
	Auto		VGA	
	Scan	Over Scan / Under Scan	AV	
	Information		AV / VGA	Fig.12-2
	Setup		AV / VGA	Fig.12-3
	Factory Set		AV / VGA	
	Exit		AV / VGA	

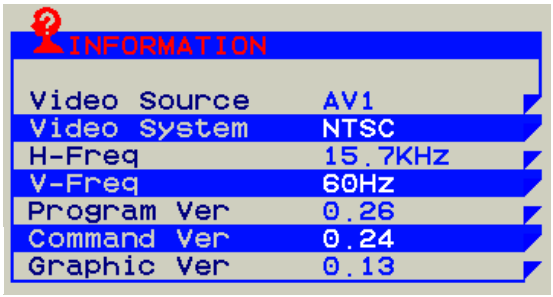


Fig.12-2

Setup Menu：

Fig.12-3

Indicator	Meaning	Adjustable range	Function	Remark
	Show Status	ON / OFF	Show signal status.	ON: Show OFF: Hidden
	Blue Screen	ON / OFF	If loss signal will put on the blue or black screen.	ON: Blue OFF: Black
	Auto Power On	ON / OFF	Power input module will be auto turn on.	ON: Auto OFF: Manual
	Auto Saving	OFF / 3s / 5s / 15s / 30s	If signal lost over setting times will be power off.	ON: Auto OFF: Normal
	Detect Source	ON / OFF	Auto detection which source is existence and change.	ON: Auto OFF: Normal
	Return			

Note: VGA only type don't have Detect Source function.

12.2 Operations

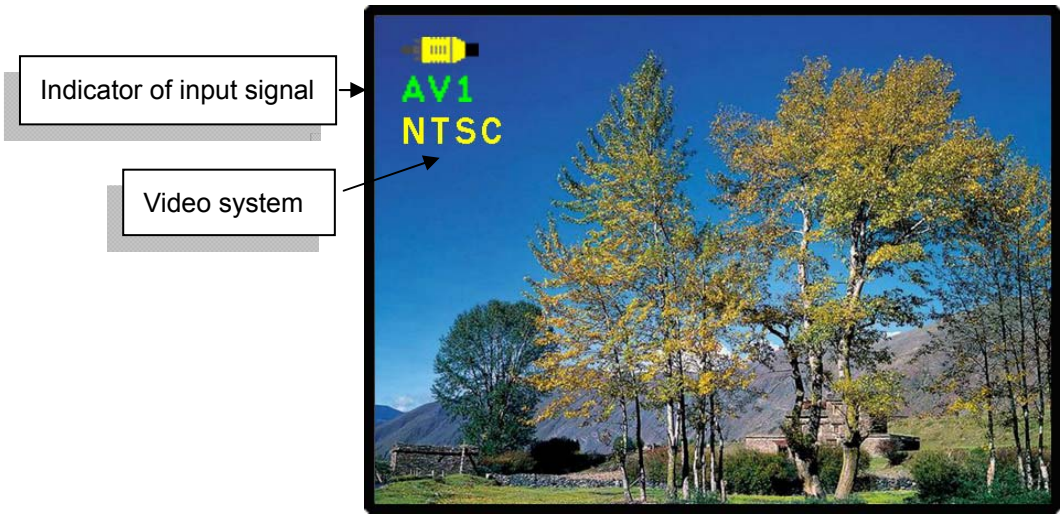


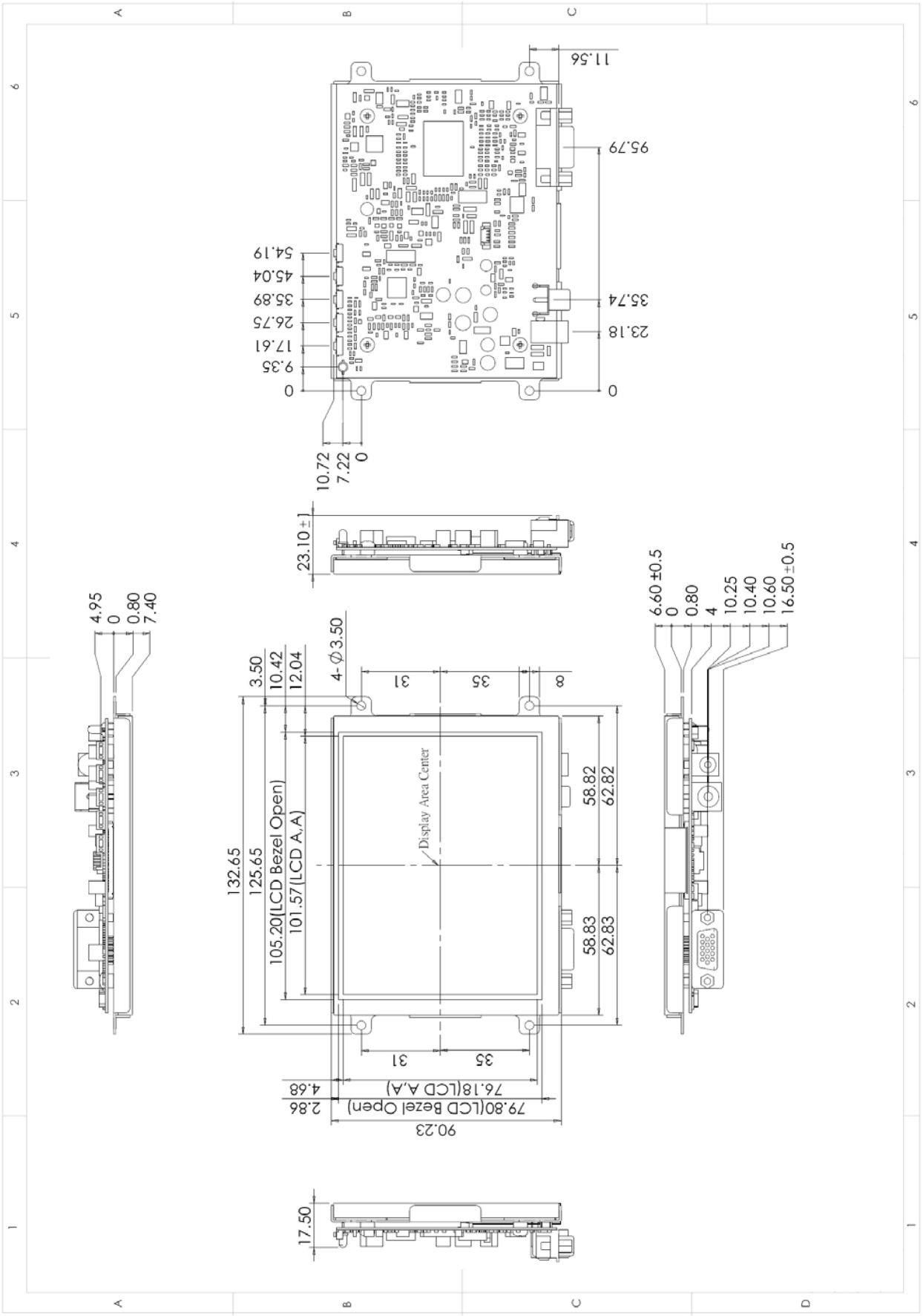
Fig.12-4

[Power] ：Monitor power on / off
[Source] ： Input signal switch

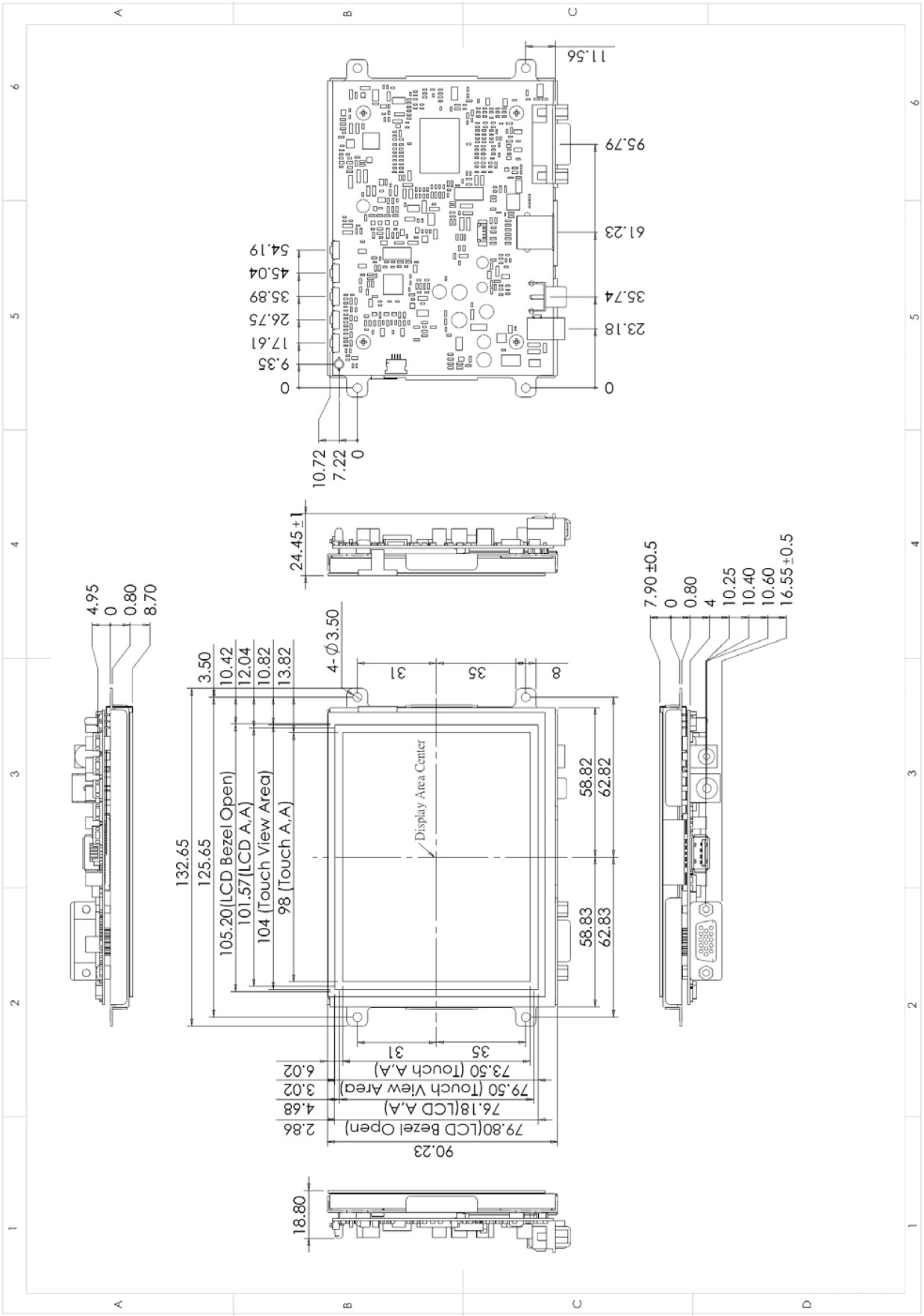
Overview of input signals：

Indicator	Input signal	Interface	Video system
AV1	AV1	Composite	NTSC / PAL / SECAM
PC	VGA	Analog RGB	640x480_60 / 800x600_60 / 1024x768_60

13.1 Unit (FCOP0500)



13.2 Unit (FCOP0500-TR)



14. TFT-LCD Information

14.1 TFT-LCD Mechanical Specifications

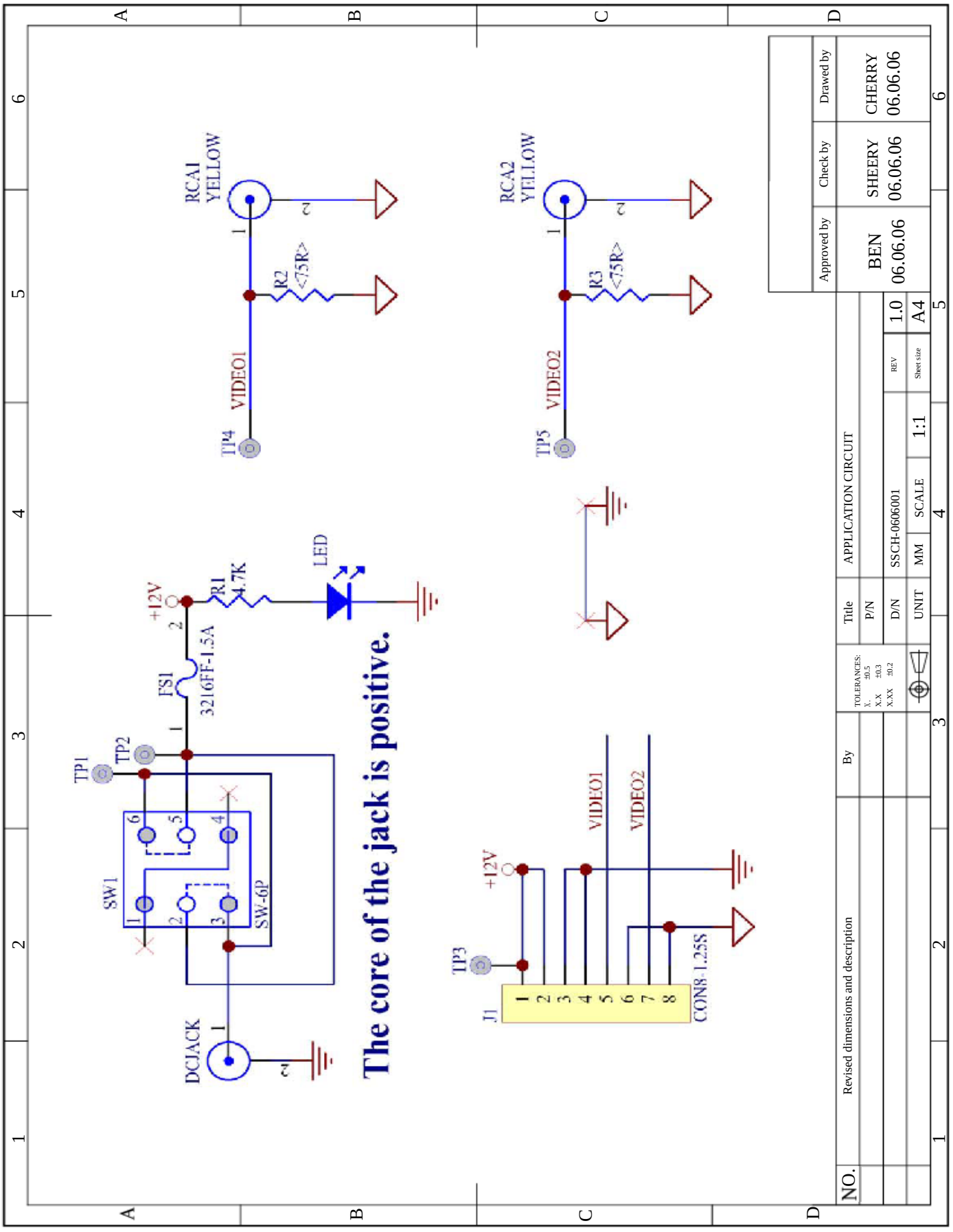
Parameter	Specifications	Unit
Screen Size	5 (diagonal)	inch
Display Format	640 x (R.G.B) x 480	dot
Active Area	101.57(W) x 76.18(H)	mm
Pixel Pitch	0.159(W) x 0.159(H)	mm
Display mode	Normally White, Transmissive	
Outline Dimension	117.65(W) x 88.43(H) x 5.7(D)	mm
Surface Treatment	Anti-Glare	

14.2 TFT-LCD Optical Characteristics

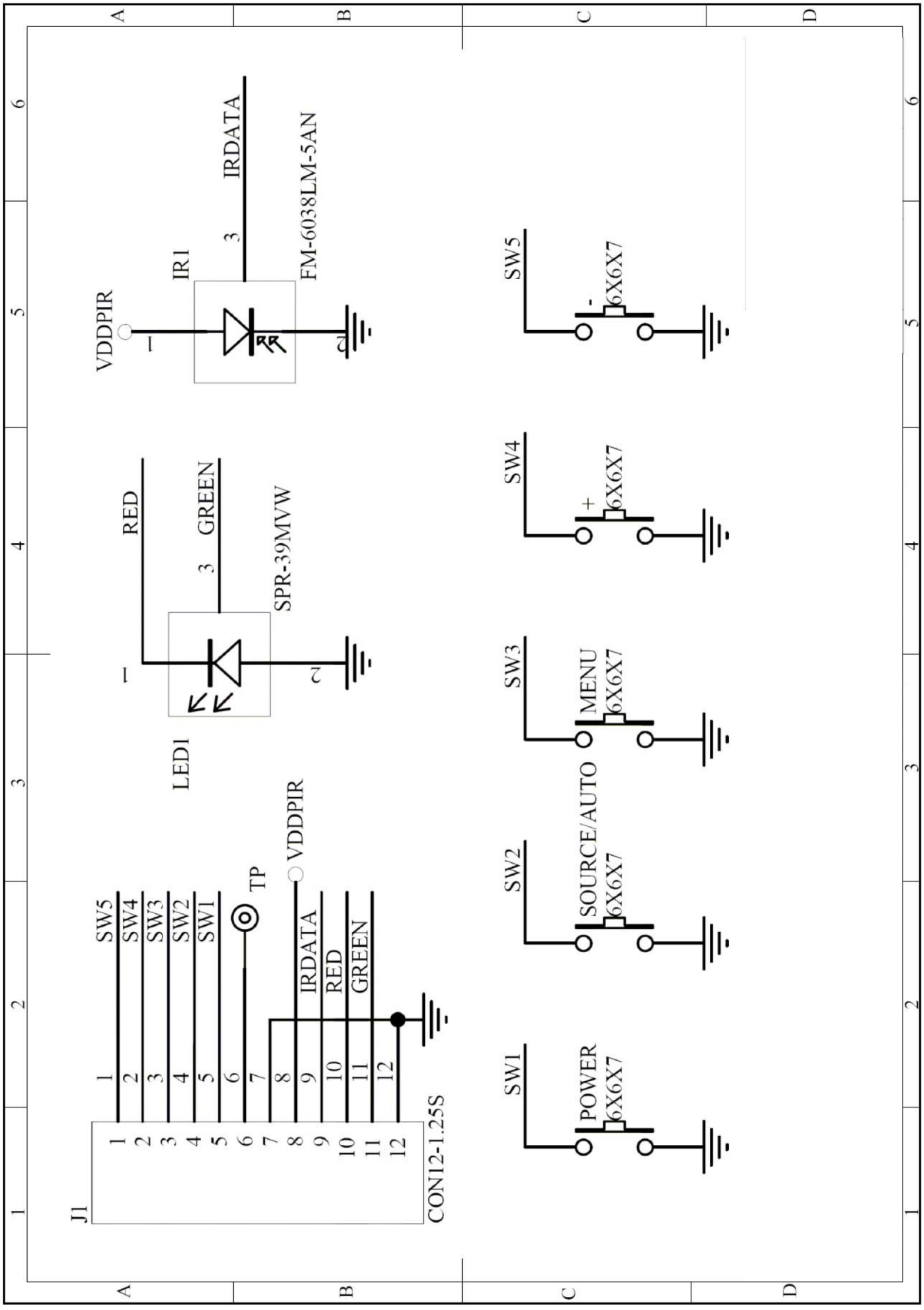
Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Left	CR >10	60	70	---	deg	
		Right		60	70	---	deg	
	Vertical	Top		40	50	---	deg	
		Bottom		60	70	---	deg	
Contrast Ratio		CR	Θ = 0°	400	500	---	---	
Response time	Rise Fall	Tr	Θ = 0°	---	10	20	ms	
		Tf		---	15	30	ms	
Uniformity		U	Θ = 0°	70	75	---	%	
Brightness		L	Θ = 0°	200	250	---	Cd/㎡	
White Chromaticity		x	Θ = 0°	0.26	0.31	0.36		
		y	Θ = 0°	0.28	0.33	0.38		
LED Life Time			Ta=25℃	15000	---	---	Hrs	Note

Note : The "LED Life Time" is defined as the module brightness decrease to 50% original

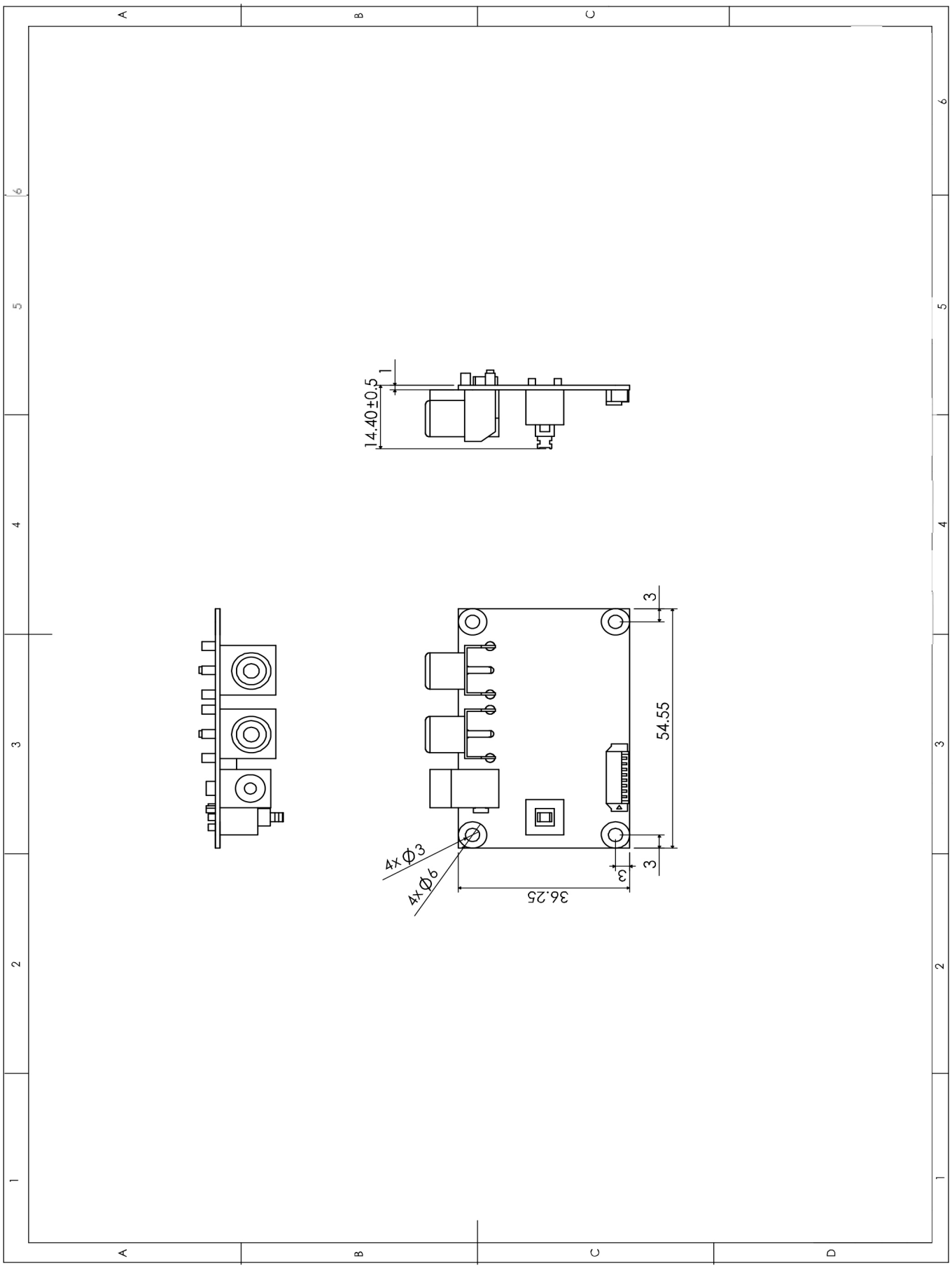
14.3 Application Circuit



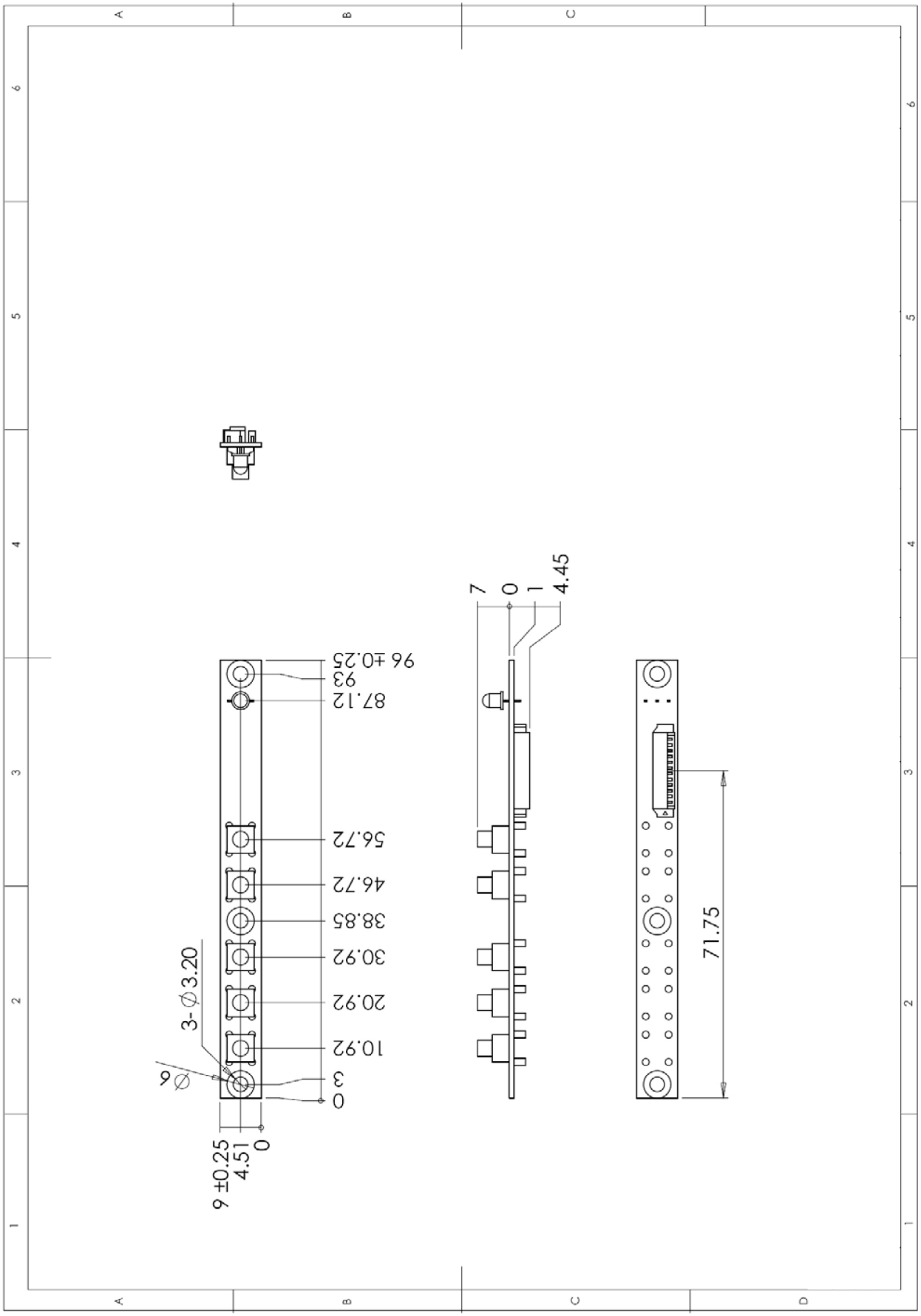
14.4 LK05K00004-FDR



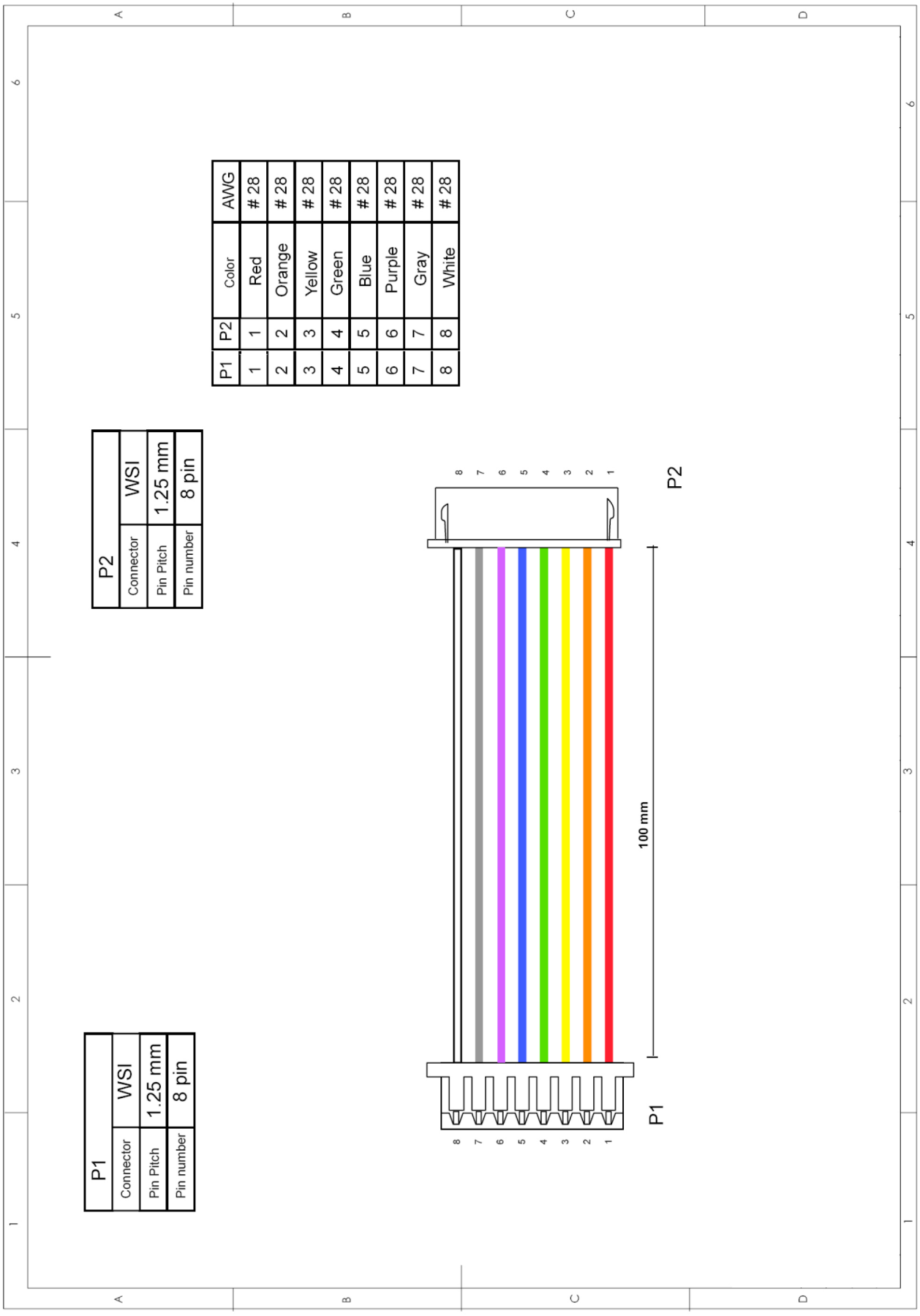
14.5 MDSM208000-FDR (Option)



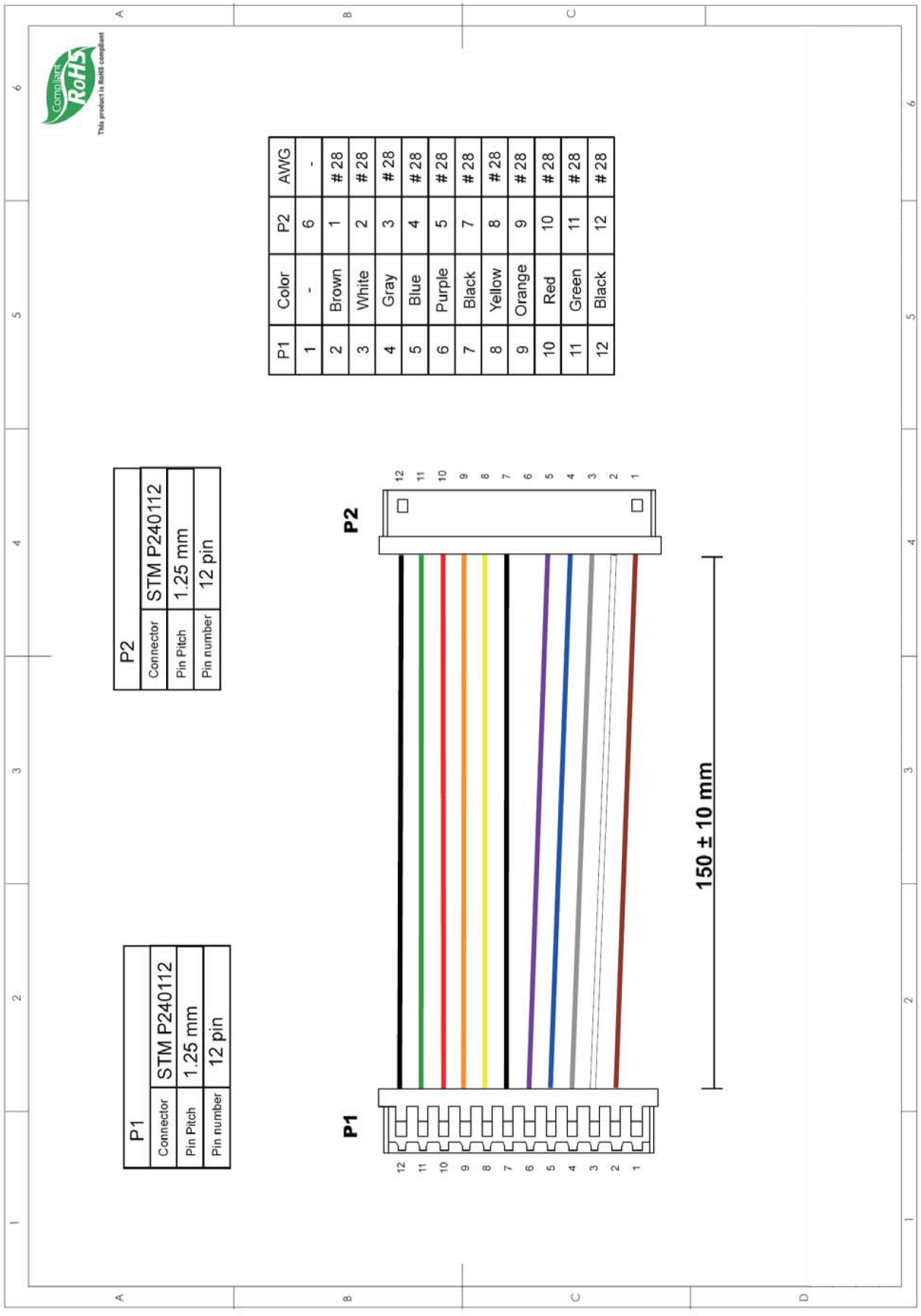
14.6 LK05K00004-FDR (Option)



14.7 Cable: 8P-8P 1.25mm L:100mm (Option)



14.8 Cable: 12P-12P 1.25mm L:150mm (Option)



15. Revision History

15.1 Record of Revision

NO.	Date	Description	Page	Note
1.0	January 31, 2018	· First draft	42	
1.1	March 5, 2018	· Without RTP modify TP	4	
		· 11.6 Touch Screen Operation System Support add Note 2	20	
		· Modify 13.8 Unit (LP050ZCIU2-FDR)	34	