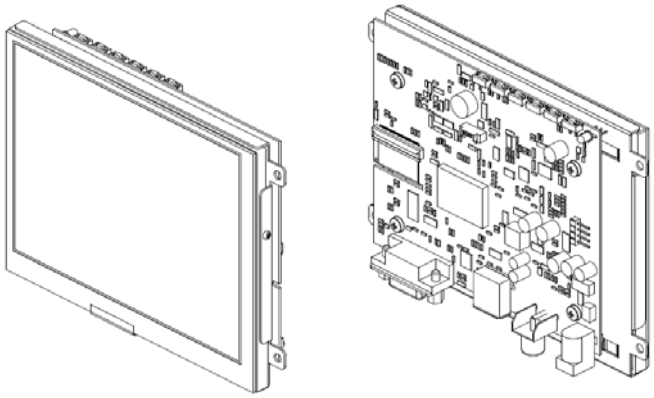
SPECIFICATION APPROVAL SHEET

5.6" TFT LOOSE KIT WITH FLANGES
640*480, 280NITS, VGA/ Video, No Touch

MODEL: FCOP560

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

5.6” Digital TFT-LCD Module



■ **FCOP560**

1. General Description

1.1 Features

- 5.6” Digital TFT LCD
- Aspect Ratio: 4:3
- Ultra Compact
- NTSC/PAL/SECAM Video Auto Switch
- Single Operation Voltage +12V
- CVBS / S-Video (Option) / Analog RGB (PC Mode) Signal Input
- All Functions can be controlled by UART
- 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.

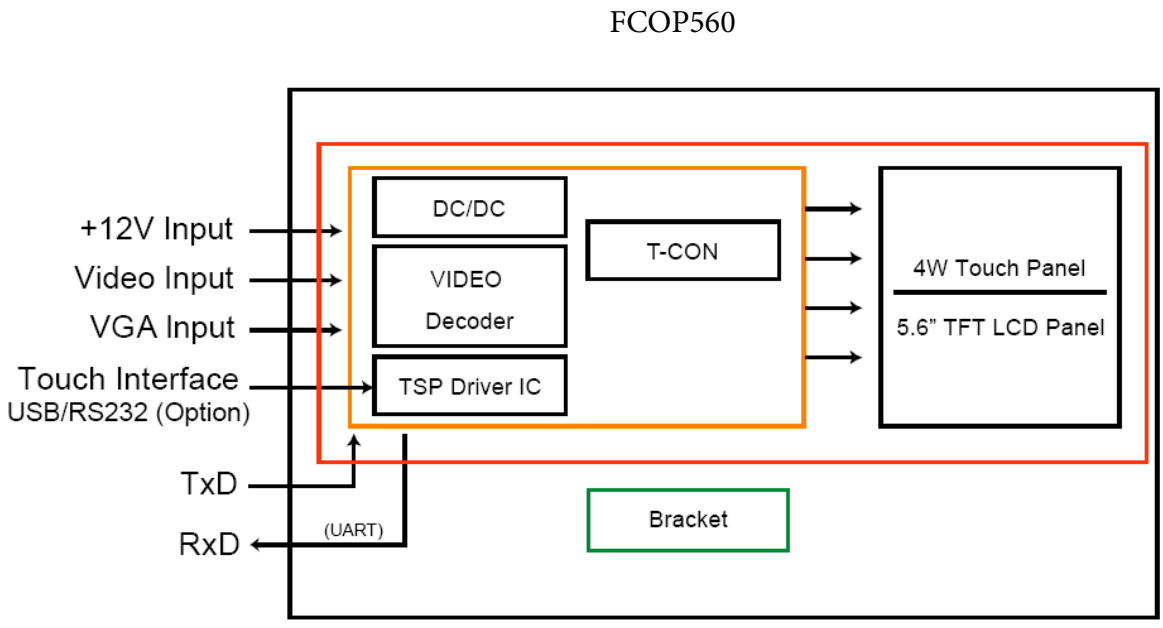
2. Contents

3. Specifications

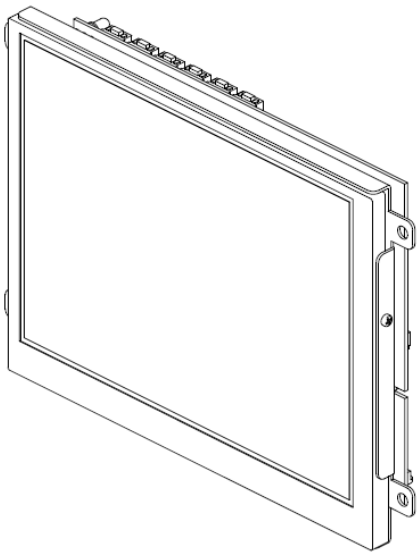
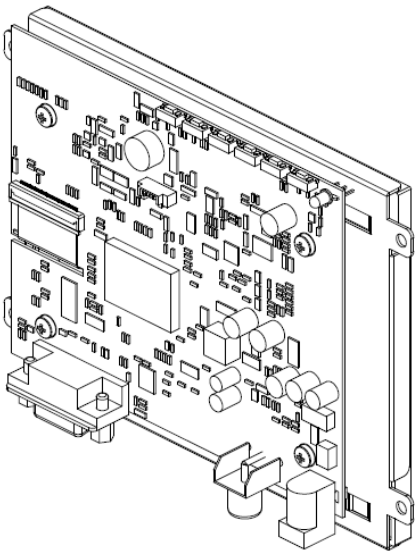
Parameter	Specifications		
Panel Size	5.6”		
Resolution (Pixels)	640 x 480		
Color	262K		
Luminance without RTP	350 cd/㎡		
Luminance (RTP)	280 cd/㎡		
Contrast Ratio	500		
View Angle	70 / 70 / 50 / 70		
LED Life Time	20K (Min)		
Power Input (DC Jack 2.1 ϕ)	+12V DC		
Power Consumption@+12V	4.32 Watts		
Resistive Type	USB / RS232 Interface		
Resistive Type Support OS	Windows / Linux / DOS / Mac / QNX		
Input Signal System	CVBS / Analog RGB (PC)		
Input Video System	NTSC / PAL		
Key	5 Buttons		
Serial Remote Control	UART / RS232 (Option)		
Temperature Range		Without TP	4W RTP
	Operating	-20~ +60℃	-20~ +60℃
	Storage	-20~ +70℃	-20~ +70℃
High Temperature & High Humidity (Non-condensing)	Operating	+40℃ / 90%	+40℃ / 90%

4. Block Diagram

4.1 Block Diagram



5.1 Unit (Video / VGA)

Unit	
	

Parameter		FCOP560	Unit	Remark
CVBS		-		
VGA (D-Sub15 / 2.0mm 14Pin)		D-Sub15		
Outline Dimension		141.5x101.6x24.4	mm	
AC to DC Adapter 12V/2.5A		-		
Power Cord Plug Type B for USA		-		
Video Cable		-		
VGA Cable		-		
Weight		230	g	±10%,Note2

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.

2. Weights do not include accessories.

6. Accessories

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

A.

B.

C.

D.

E.

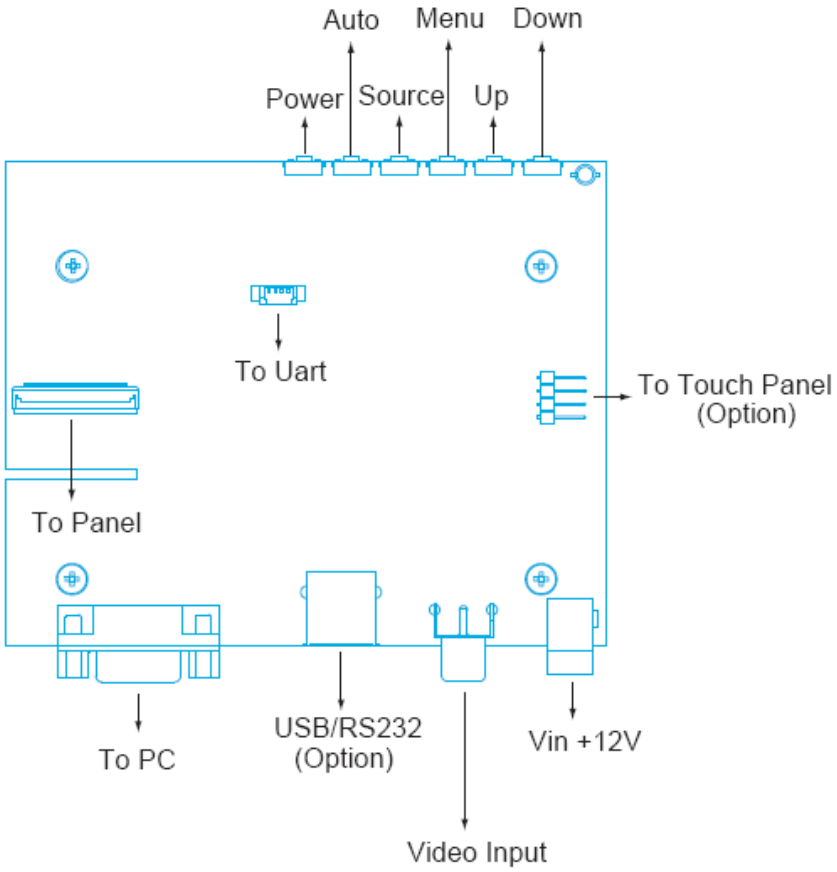
F.

A. AC to DC Adapter (100-240VAC 50-60Hz to +12VDC @ 2.5A)
B. Power Cord (L:1800mm, Plug Type B for USA)
C. Video Cable (L:1800mm)
D. VGA Cable (L:1600mm)
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 J302：LCD Panel I/O Terminals (FPC 40 Pin Below Contact Type)

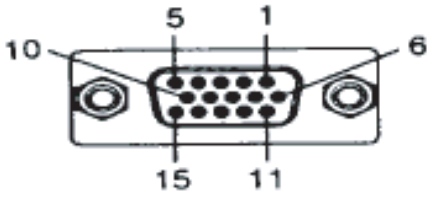
Pin No	Symbol	I/O	Description	Remark
1	VLED	P	Power voltage for LED circuit	
2	VLED	P	Power voltage for LED circuit	
3	ADJ	I	Adjust the LED brightness with PWM Pulse	
4	GLED	P	Ground for LED circuit	
5	GLED	P	Ground for LED circuit	
6	VCC	P	Power voltage for digital circuit	
7	VCC	P	Power voltage for digital circuit	
8	MODE	I	DE or HV mode control	
9	DE	I	Data enable	
10	VS	I	Vsync signal input	
11	HS	I	Hsync signal input	
12	GND	P	Power ground	
13	B5	I	Blue data input (MSB)	
14	B4	I	Blue data input	
15	B3	I	Blue data input	
16	GND	P	Power ground	
17	B2	I	Blue data input	
18	B1	I	Blue data input	
19	B0	I	Blue data input(LSB)	
20	GND	P	Power ground	
21	G5	I	Green data input(MSB)	
22	G4	I	Green data input	
23	G3	I	Green data input	
24	GND	P	Power ground	
25	G2	I	Green data input	
26	G1	I	Green data input	
27	G0	I	Green data input(LSB)	
28	GND	P	Power ground	
29	R5	I	Red data input(MSB)	
30	R4	I	Red data input	
31	R3	I	Red data input	
32	GND	P	Power ground	
33	R2	I	Red data input	
34	R1	I	Red data input	
35	R0	I	Red data input(LSB)	
36	GND	P	Power ground	
37	DCLK	I	Sample clock	

38	GND	P	Power ground	
39	L/R	I	Select left to right scanning direction	
40	U/D	I	Select up or down scanning direction	

8.2 J106B：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	VGA_SDA	-	DDC2 Data	
13	HS_IN	I	TTL Horizontal sync	
14	VS_IN	I	TTL Vertical sync	
15	VGA_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.



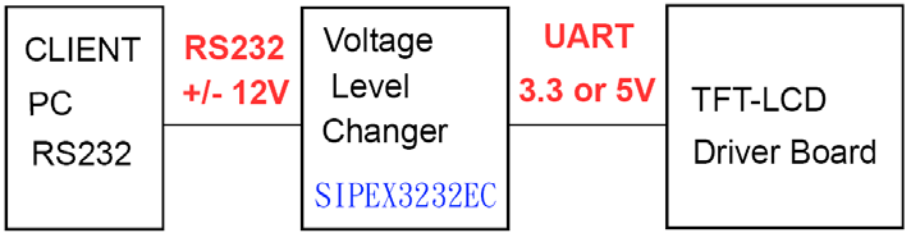
8.3 J104: Pin Assignment of UART (Pitch 1.25mm 4Pin, Top Entry Type)

※ **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	VDDP	O	+3.3V Output Voltage	

Note1: All Functions can be controlled by UART , About UART command list please contact iTech sales.



8.4 DC 101: Pin Assignment of Power Input (Inside Diameter:2.1 ∅Outside Diameter:5.5 ∅Side Entry Type)

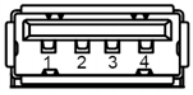
Pin No	Symbol	I/O	Description	Remark
1	VIN	I	+12V Input Voltage	
2	GND	-	Power Ground	

8.5 RCA 101: 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	

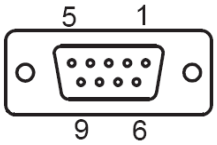
8.6 J404 ：Pin Assignment of Touch USB (USBA-Female 2.0mm, Side Entry Type)(Option)

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



8.7 DB401 ：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	



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
S-Video Input Signal	S-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 Without TSP		-20	+60	℃	
Operating Temperature With TSP		-20	+60	℃	
Storage Temperature Without TSP		-20	+70	℃	
Storage Temperature With TSP		-20	+70	℃	
High Temperature & High Humidity (Non-condensing) Without TP		-	+40 / 90	℃ / %	
High Temperature & High Humidity (Non-condensing) With 4W 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		315		mA	±15%
Power Consumption			I		3.7		W	@+12V
Output Voltage	VDD		O	+3.2	+3.3	+3.4	V	I=10mA
Video Input Signal	Video in		I		1.0		Vp-p	@75Ω
S-Video Input Signal	S-Video in	Y	I		0.7		Vp-p	@75Ω
		C	I		0.286		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	Hor.	Unit	Polarity	Ver.	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 Resistive Touch Panel Characteristics

11.1 Pin assignment (Pitch :1.0 mm)

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

11.2 Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Terminal Resistance	X	330	-	1100	Ω	
	Y	100	-	900	Ω	
Input Voltage	VT	-	-	7.0	V	
Linearity		-	-	1.5	%	
Insulation Impedance		25	-	-	MΩ	DC 25V

11.3 Optical Performance

Parameter	Specifications
Transmittance	≧80% Typ.
Haze	5.0% Typ.

11.4 Mechanical Performance

Parameter	Specifications
Input Method	Finger or stylus pen
Operating Force	Max: 80gf
Surface Hardness	3H or more

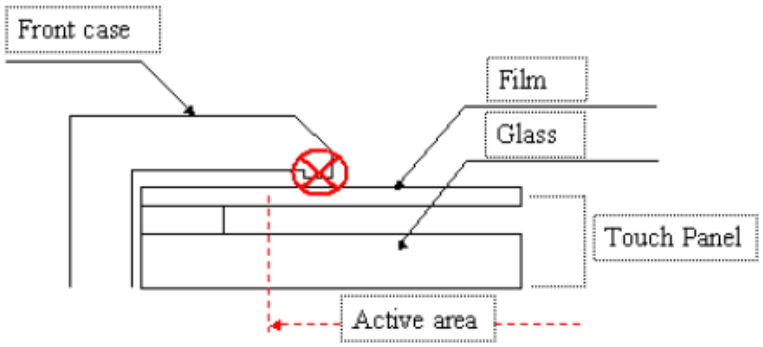
11.5 Durability Performance

Parameter	Specifications
Pen Sliding Durability	≧100000 words, with R0.8 mm polyacetal stylus, 250g, 60 mm / sec
Finger knocking Durability	≧1000000 times, with R8.0 mm silicon rubber,200g,5Hz

11.6 Touch Screen Integration Design Guide

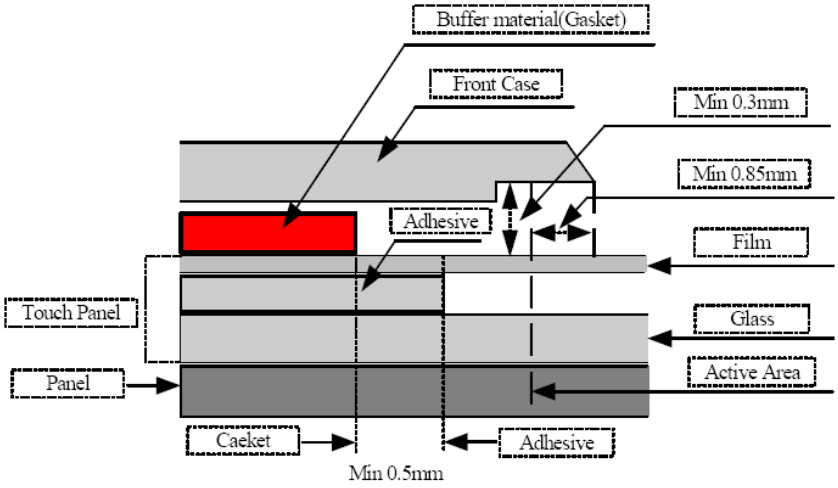
Avoid the design that Front-case overlap and press on the active area of the touch-panel.

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



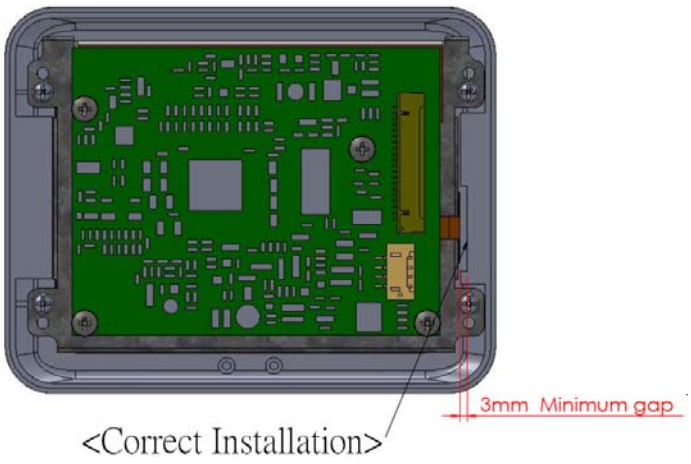
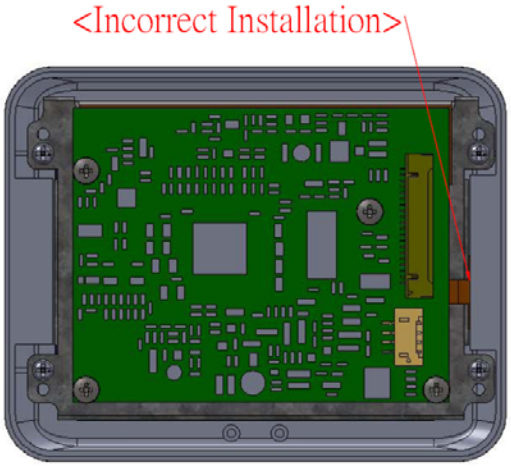
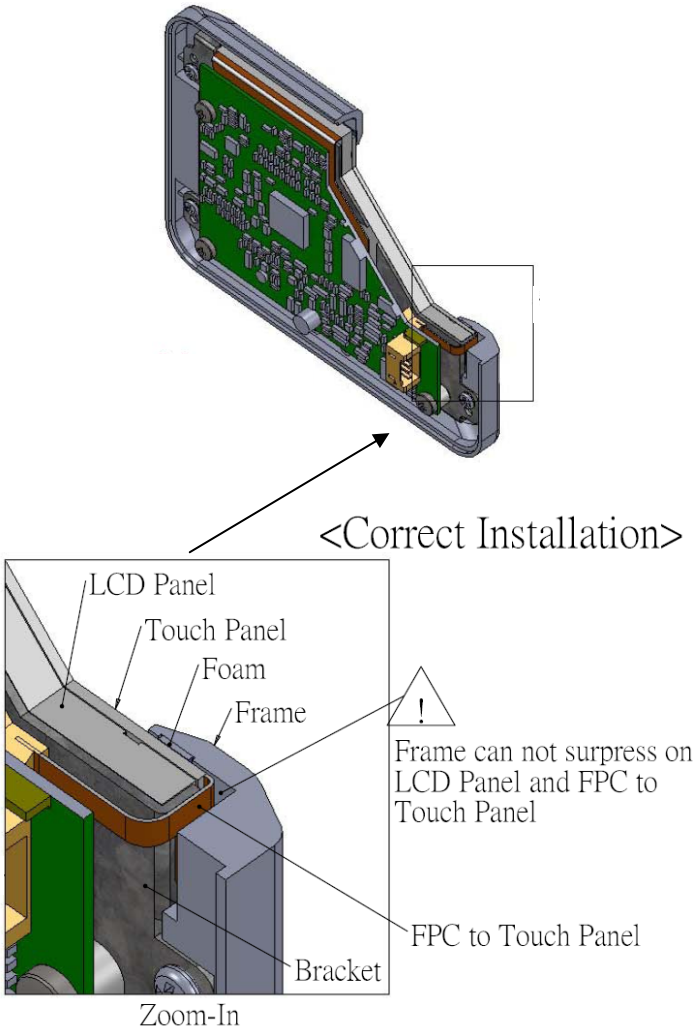
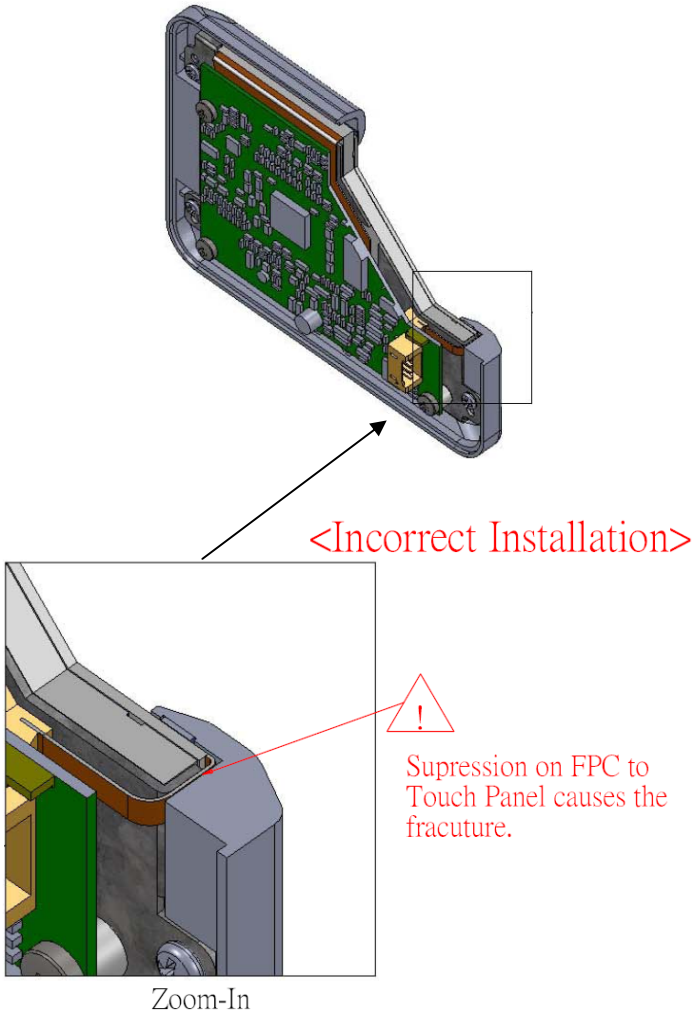
Use a buffer material (Gasket) between the touch-panel and front-case to protect damage andwrong operating.

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.

11.7 Mechanical Design Notice For Touch Panel

Correct Installation	Incorrect Installation
	
	

12. Key Function by OSD

12.1 Menu Operation

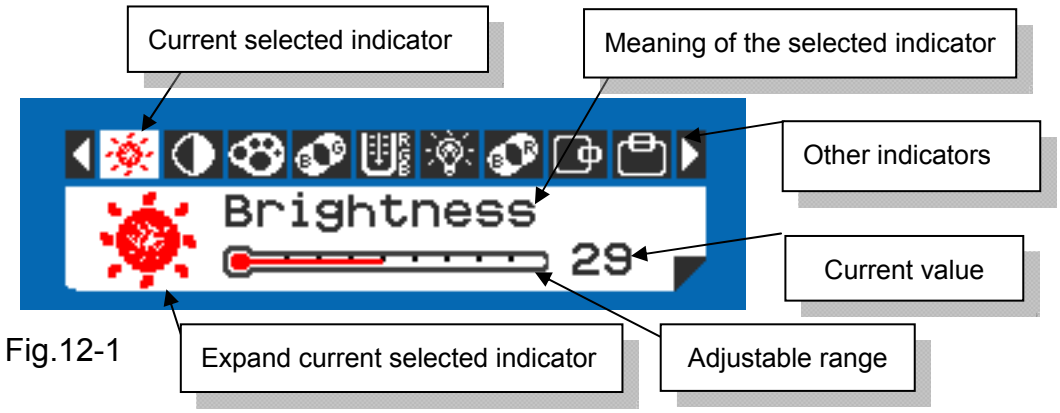
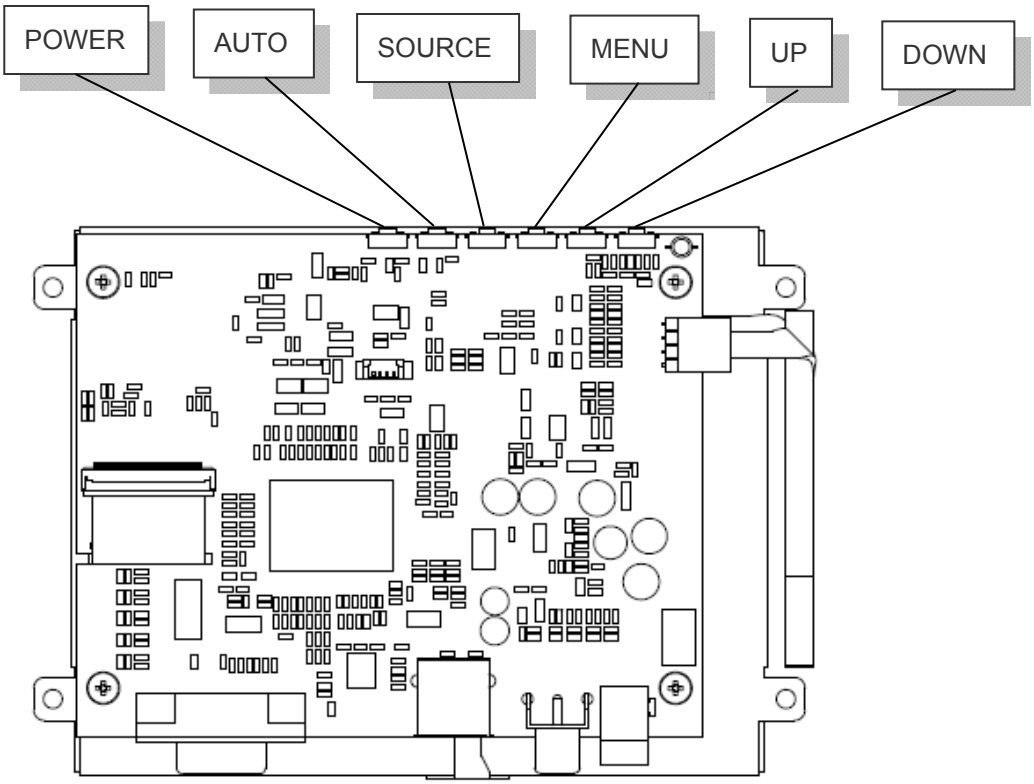


Fig.12-1



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

Overview of the menu：

Firmware 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	
	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	

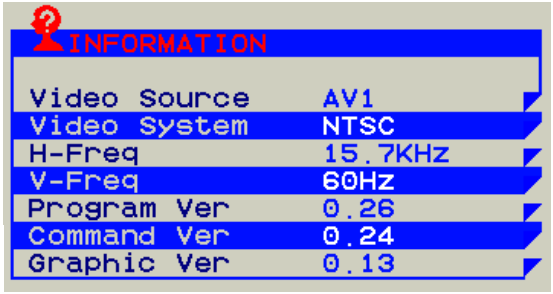


Fig.12-2

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

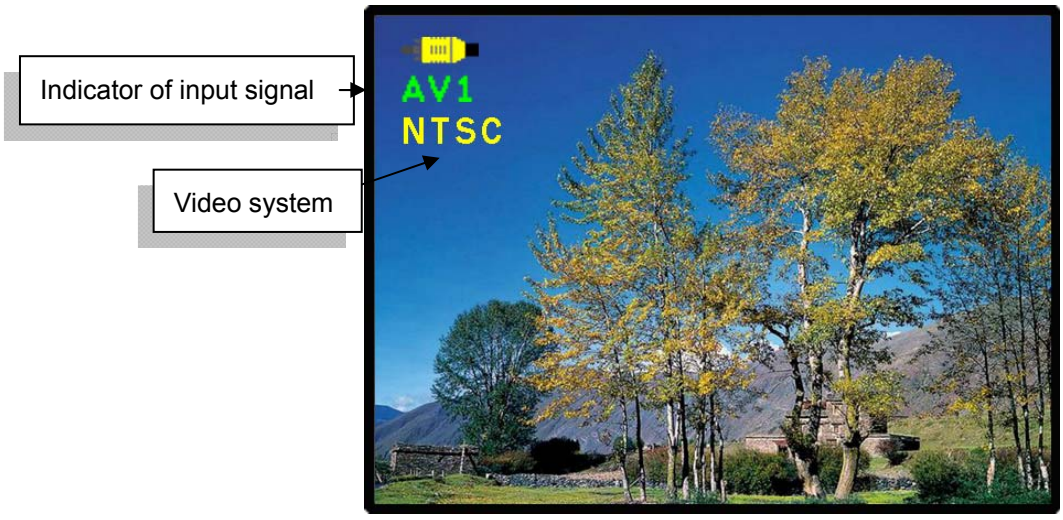


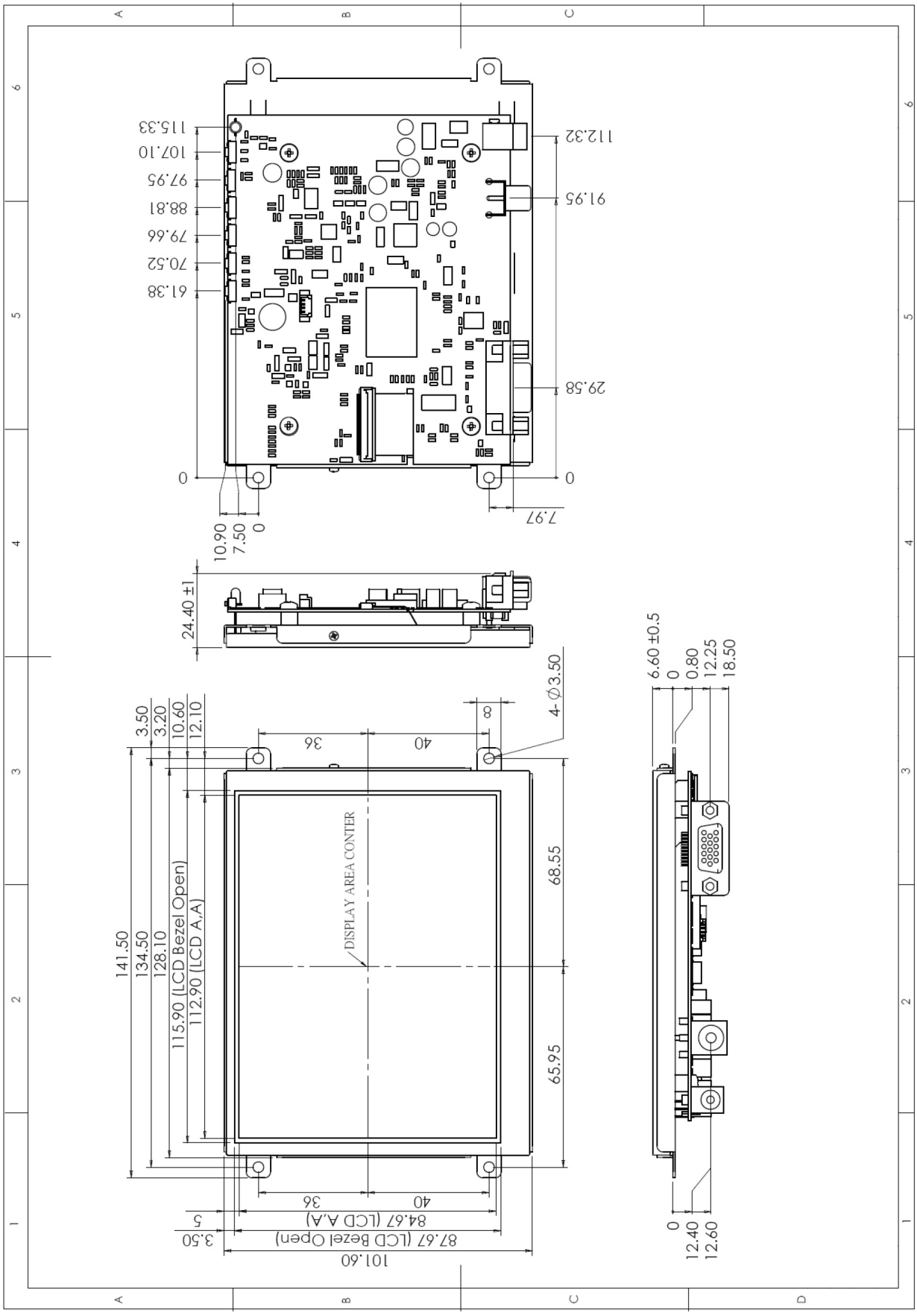
Fig.12-4

[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

13.3 Unit (FCOP560)



14. Appendix

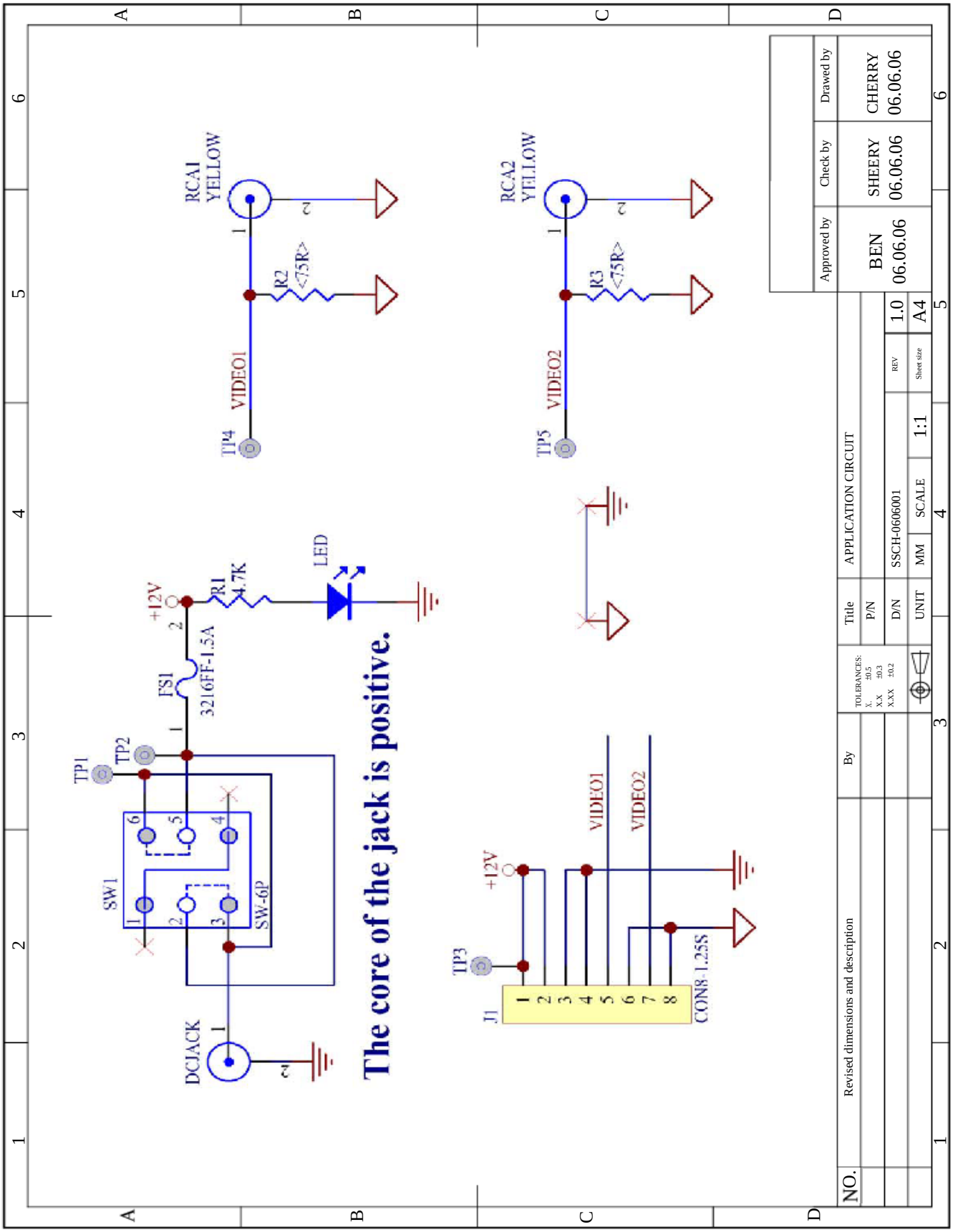
14.1 TFT-LCD Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	5.6 (diagonal)	inch
Display Format	640 x (R.G.B) x 480	dot
Active Area	112.896 (W) x 84.672 (H)	mm
Pixel Pitch	0.1764 (W) x 0.1764 (H)	mm
Pixel Configuration	Stripe	
Outline Dimension	126.5 (W) x 100 (H) x 5.7(D)	mm
Surface Treatment	Anti – Glare	
Weight	88	g
Display Mode	Normally White, Transmissive	

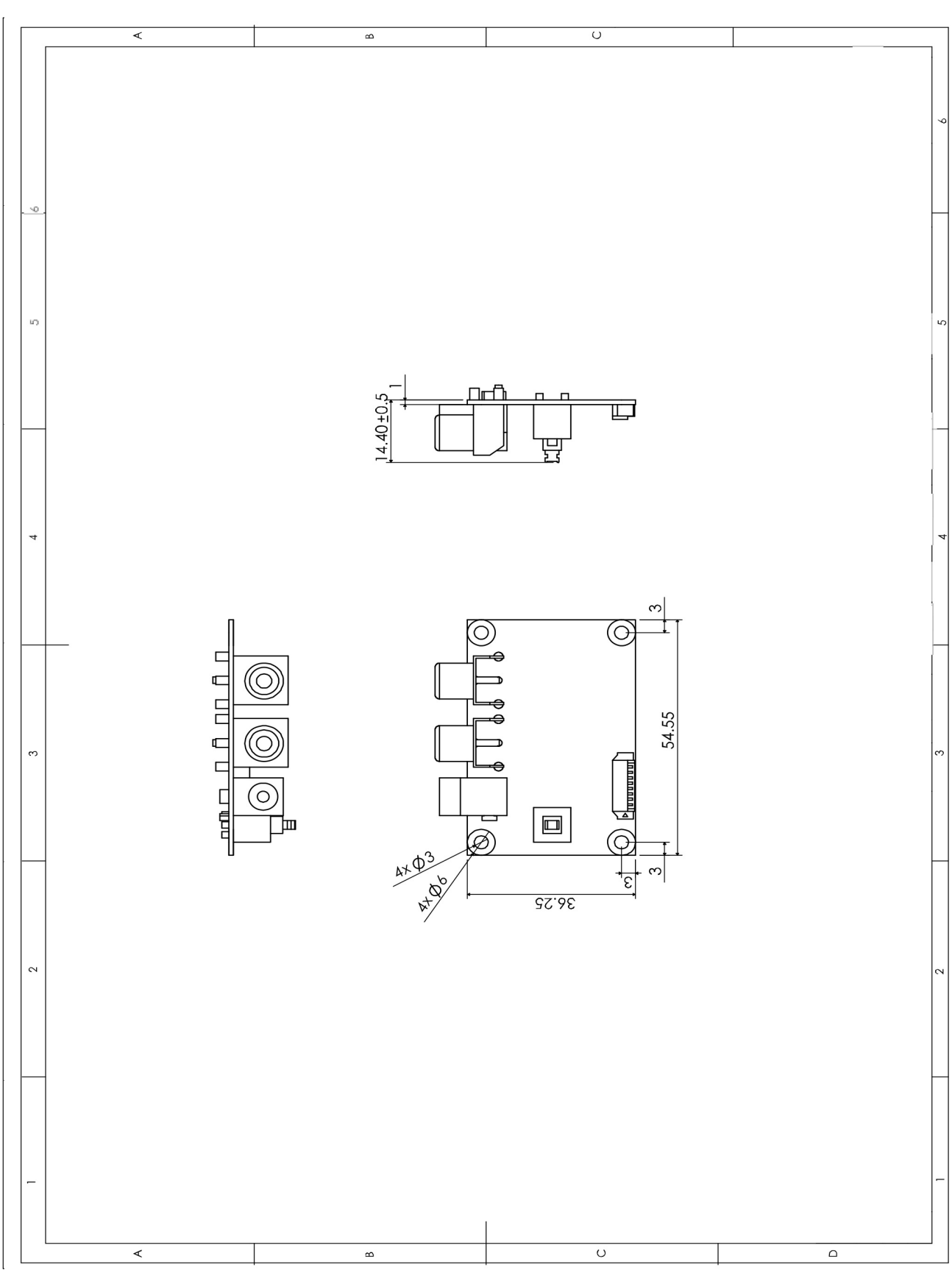
14.2 TFT-LCD Optical Characteristics

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Left	CR >10	60	70	---	deg	
		Right		60	70	---		
	Vertical	Top		40	50	---	deg	
		Bottom		60	70	---	deg	
Contrast Ratio		CR	At optimized Viewing angle	400	500	---	---	
Response time	Rise Fall	Tr	Θ = 0°	---	10	20	ms	
		Tf		---	15	30	ms	
Uniformity		U		70	75	---	%	
Brightness without TSP		L		300	350	---	cd/㎡	
Brightness with TSP		L		240	280	---	cd/㎡	
White Chromaticity		x	Θ = 0°	0.26	0.31	0.36		
		y	Θ = 0°	0.28	0.33	0.38		
LED Life Time			25℃	20000	---	---	Hr	

14.3 Application Circuit



14.4 MDSM208000-FDR (Option)



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