



§ SPECIFICATION APPROVAL SHEET §

Fdt Tech Module No **Lx04513Pxx-FDR**

Description: **4.5" Analogue TFT-LCD Module**

SPEC No.: **SAS-0611004**

Version: **1.3**

Issue Date: **October 29 2007**

※ This approval sheet contains 19 pages including the cover and appendix.

Customer:	APPROVED BY:
Date: / / 07	

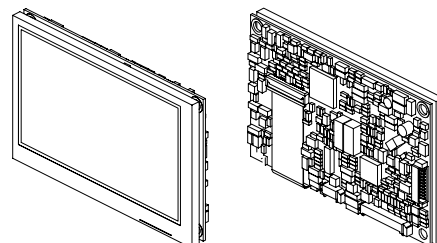
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FLAT DISPLAY TECHNOLOGY

TFT LCD Analog Interface Module

- LD04513P~~xx~~-FDR
- LM04513P~~xx~~-FDR
- LP04513P~~xx~~-FDR



1. General Description

1.1 Features

- Fit PRIME VIEW PW045XS1 TFT-LCD
- Ultra Compact
- DC/DC DC/AC Video Decoder All In One
- NTSC/PAL Video System Auto Switch
- 16:9 and 4:3 Screen Mode (Option)
- Up/Down · Left/Right Display Reverse
- Composite Video / RGB Mode Switchable
- Single Operation Voltage +12V

1.2 Applications

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

A1.3 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.

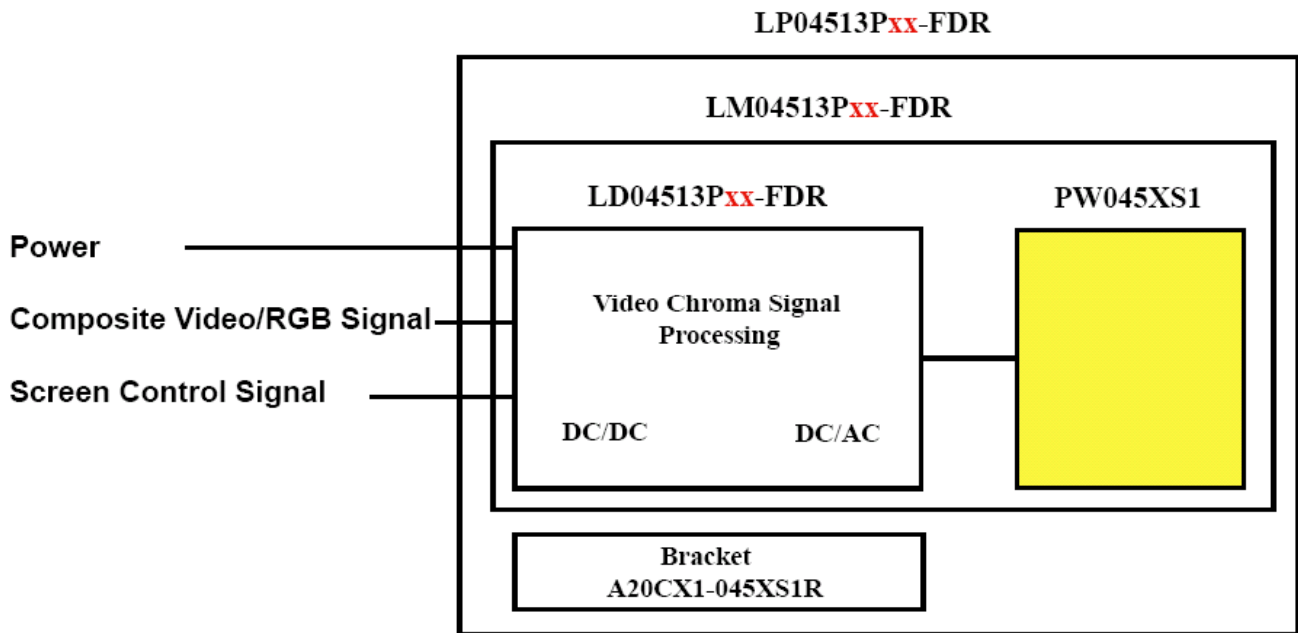
The other application that demands high reliability and functionality should first contact a sales representative.

2. Contents

Contents	Page
1. General Description.....	1
1.1 Features	1
1.2 Applications	1
1.3 Application Precautions	1
2. Contents Index.....	2
3. Block Diagram.....	3
3.1 Block Diagram	3
4. TFT-LCD Information.....	4
4.1 TFT-LCD Mechanical Specifications	4
4.2 TFT-LCD Optical Characteristics	4
5. Order Information.....	5-7
4.1 Board	5
4.2 Module	6
4.3 Unit	7
6. Dimension Information.....	8-10
6.1 Driver Board	8
6.2 Module	9
6.3 Unit	10
7. Pin Description.....	11-13
7.1 J301A(J301B) : LCD Panel I/O Terminals(FPC 30 Pin Pitch 0.5mm Below Contact Type)	11
7.2 J203: Pin Assignment Of Signal Input (Pitch 1.25mm 15P ,Side Entry Type)	12
7.3 J201: Pin Assignment Of Zoom Mode (Pitch 1.25mm 4P ,Side Entry Type)(Option)	12
7.4 Zoom Mode Table	13
7.5 J101: Pin Assignment Of RGB Mode(Pitch 1.25mm 10P ,Side Entry Type)(Option)	13
8 Absolute Maximum Ratings.....	14
8.1 Absolute Maximum Ratings	14
9. Recommended Operating Conditions.....	15-16
9.1 Electrical Characteristics	15
9.2 Panel Lamp Data	15
9.3 Panel Lamp Test Data	16
9.4 Sample Test Data	16
10. Accessory.....	17-18
10.1 Application Circuit	17
10.2 RGB Application Block	18

3. Block Diagram

3.1 Block Diagram



4. TFT-LCD Information

4.1 TFT-LCD Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	4.5 (diagonal)	inch
Display Format	320 x (R.G.B) x 234	dot
Active Area	99.36 (H) x 56 (V)	mm
Pixel Pitch	0.3105 (H) x 0.2395 (V)	mm
Pixel Configuration	Stripe	
Outline Dimension	111.5 (W) x 69.5 (H) x 6.6 (D) (Typ.)	mm
Weight	84±5	g
Surface Treatment	Anti-Glare	

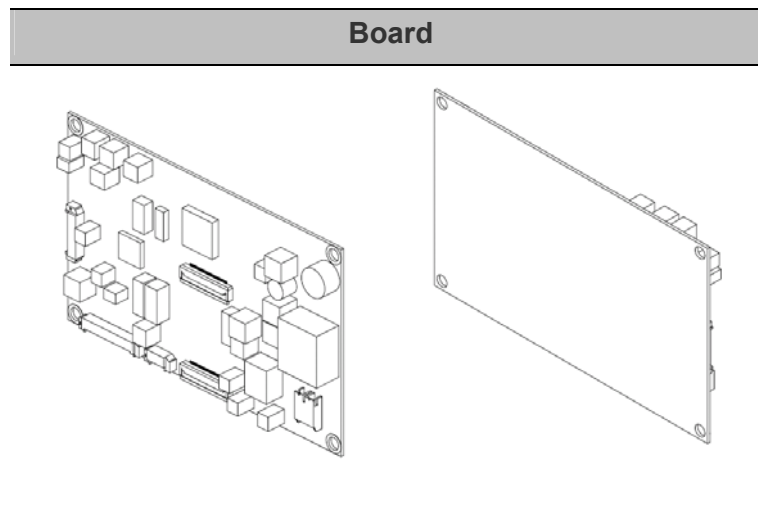
Note : About TFT-LCD Panel detail information please refer PVI's PW045XS1 specification.

4.2 TFT-LCD Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Left	45	50	---	deg	
		Right	45	50	---	deg	
	Vertical	Top	10	15	---	deg	
		Bottom	30	35	---	deg	
Contrast Ratio	CR	At optimized Viewing angle	200	350	---		
Response time	Rise Fall	Tr	---	15	30	ms	
		Tf	---	30	50	ms	
Uniformity	U		70	85	---	%	
Brightness			350	400	---	Cd/m ²	
White Chromaticity	x	$\theta = 0^\circ$	0.27	0.30	0.33		
	y	$\theta = 0^\circ$	0.28	0.31	0.34		
Lamp Life Time		Ta=+25°C		30000		Hr	

5. Order Information

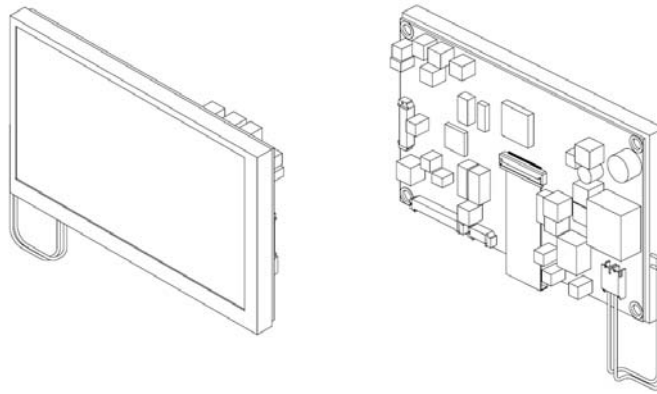
5.1 Board



Order Part Number	NTSC	PAL	NTSC/PAL Auto Switch	Zoom Mode	Master RGB MODE	Slave RGB MODE
LD04513PN0-FDR	⊙					
LD04513PP0-FDR		⊙				
LD04513PS0-FDR			⊙			
LD04513PN2-FDR	⊙			⊙		
LD04513PP2-FDR		⊙		⊙		
LD04513PS2-FDR			⊙	⊙		
LD04513PN3-FDR	⊙				⊙	
LD04513PP3-FDR		⊙			⊙	
LD04513PS3-FDR			⊙		⊙	
LD04513PN4-FDR	⊙			⊙	⊙	
LD04513PP4-FDR		⊙		⊙	⊙	
LD04513PS4-FDR			⊙	⊙	⊙	

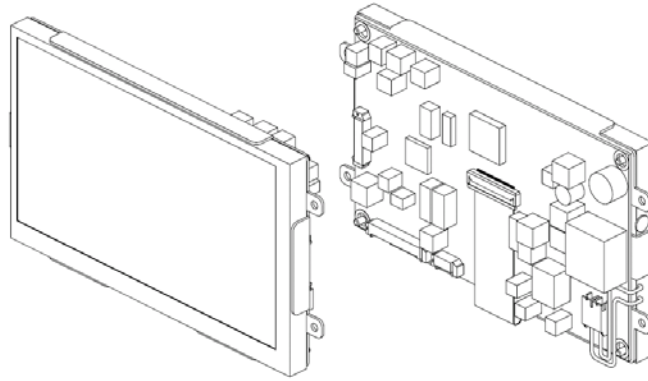
5.2 *Module*

Module



Order Part Number	NTSC	PAL	NTSC/PAL Switch	Zoom Mode	Master RGB MODE	Slave RGB MODE	TFT-LCD Panel PW045XS1
LM04513PN0-FDR	⊙						⊙
LM04513PP0-FDR		⊙					⊙
LM04513PS0-FDR			⊙				⊙
LM04513PN2-FDR	⊙			⊙			⊙
LM04513PP2-FDR		⊙		⊙			⊙
LM04513PS2-FDR			⊙	⊙			⊙
LM04513PN3-FDR	⊙				⊙		⊙
LM04513PP3-FDR		⊙			⊙		⊙
LM04513PS3-FDR			⊙		⊙		⊙
LM04513PN4-FDR	⊙			⊙	⊙		⊙
LM04513PP4-FDR		⊙		⊙	⊙		⊙
LM04513PS4-FDR			⊙	⊙	⊙		⊙

Unit



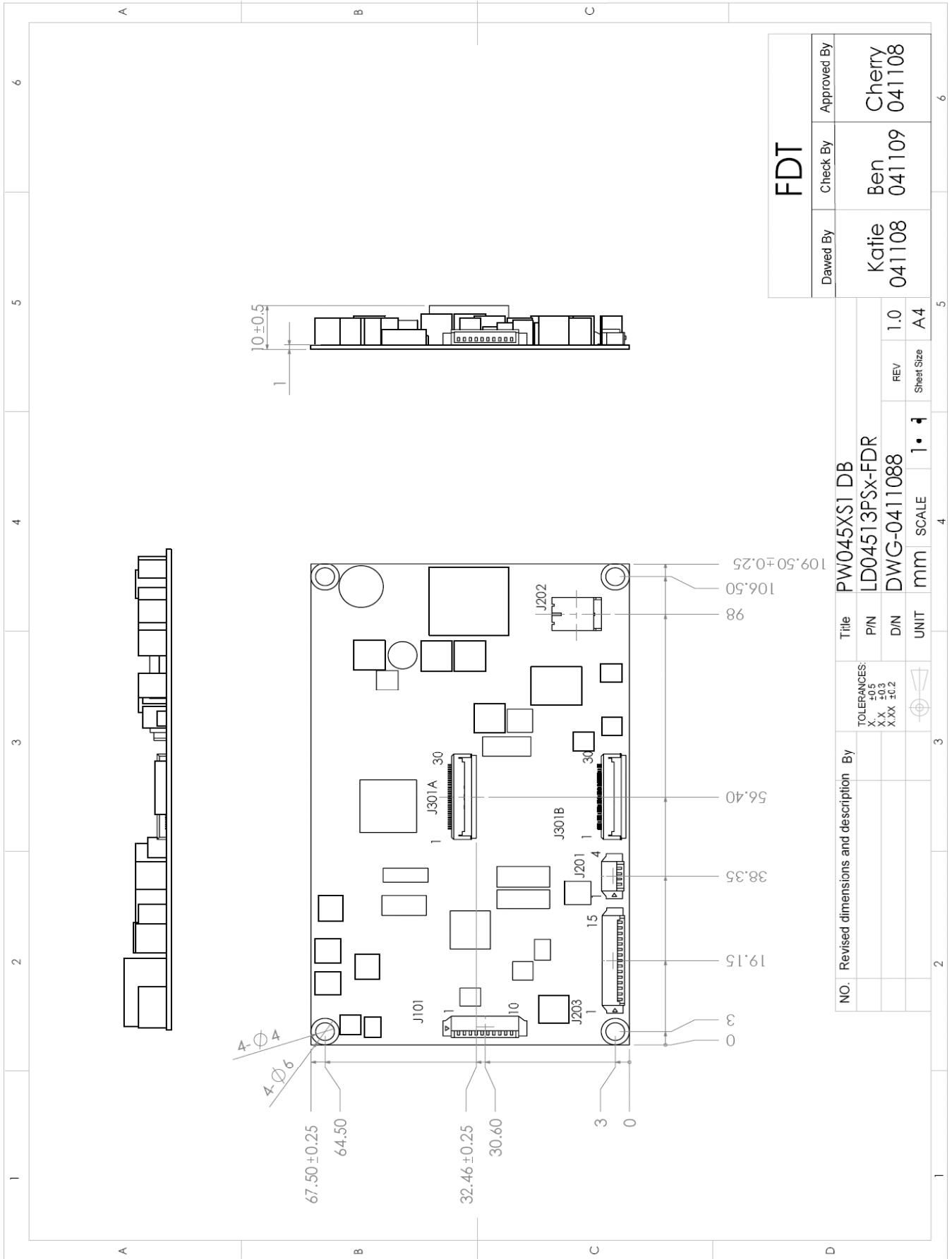
Order Part Number	NTSC	PAL	NTSC/PAL Switch	Zoom Mode	Master RGB MODE	Slave RGB MODE	TFT-LCD Panel PW045XS1	Bracket A20CX1-045XS1R
LP04513PN0-FDR	☉						☉	☉
LP04513PP0-FDR		☉					☉	☉
LP04513PS0-FDR			☉				☉	☉
LP04513PN2-FDR	☉			☉			☉	☉
LP04513PP2-FDR		☉		☉			☉	☉
LP04513PS2-FDR			☉	☉			☉	☉
LP04513PN3-FDR	☉				☉		☉	☉
LP04513PP3-FDR		☉			☉		☉	☉
LP04513PS3-FDR			☉		☉		☉	☉
LP04513PN4-FDR	☉			☉	☉		☉	☉
LP04513PP4-FDR		☉		☉	☉		☉	☉
LP04513PS4-FDR			☉	☉	☉		☉	☉

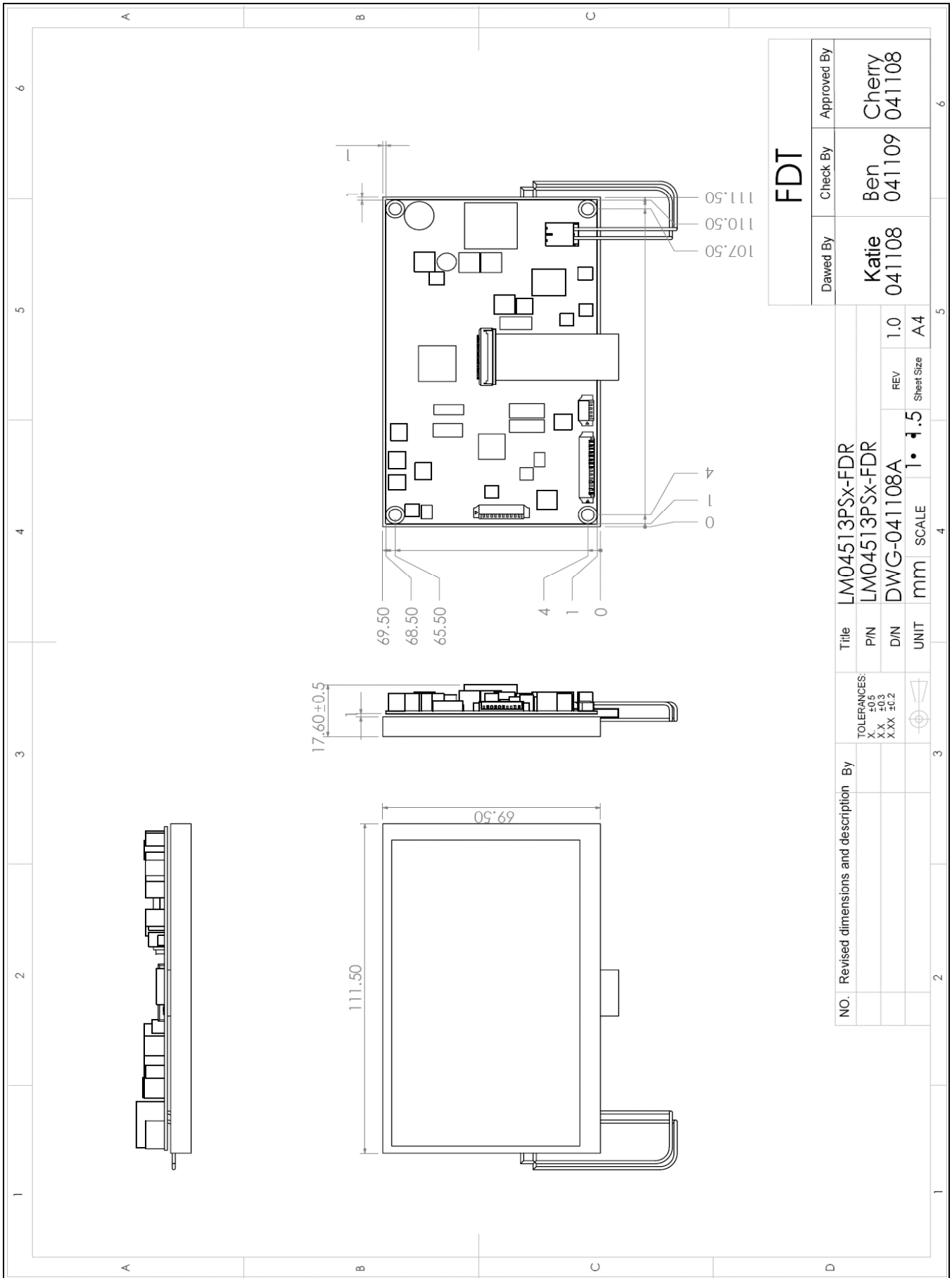
The tape in back of the bracket is to avoid the panel falling from the unit in delivery.

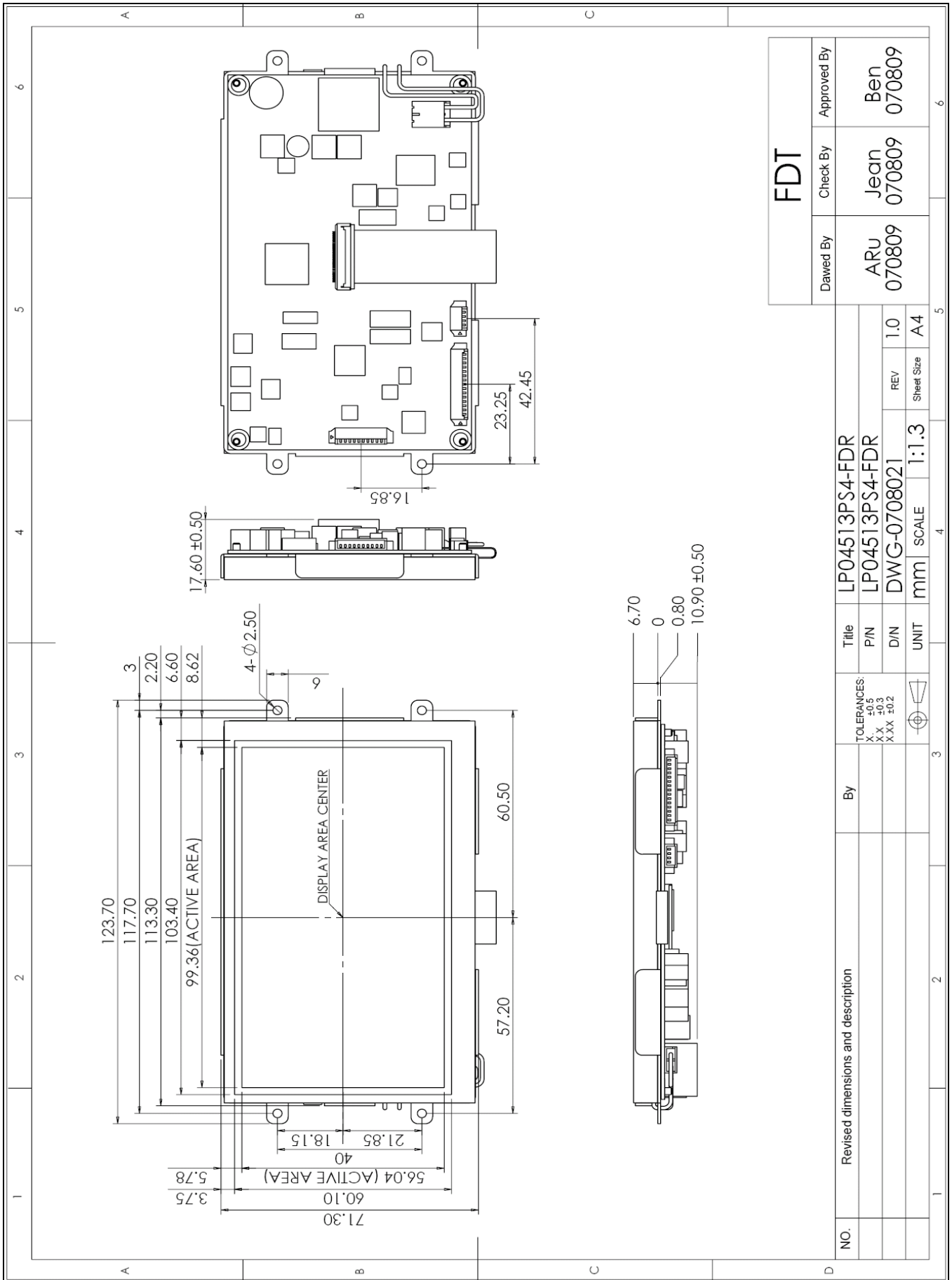
It's just a temporary adhesion.

6. Dimension Information

6.1 Driver Board







7. Pin Description

7.1 J301A(J301B) : LCD Panel I/O Terminals(FPC 30 Pin Pitch 0.5mm Below Contact Type)

Pin No	Symbol	I/O	Description	Remark
1	GND	-	Ground For Logic Circuit	
2	Vcc	I	Logic Power For Gate Driver	
3	NC	-	No Connection	
4	V _{EE}	I	Negative Power For Gate Driver	
5	NC	-	No Connection	
6	V _{GH}	I	Positive Power For Gate Driver	
7	NC	-	No Connection	
8	DIO1	I/O	Vertical Start Pulse	
9	DIO2	I/O	Vertical Start Pulse	
10	CPV	I	Shift Clock For Gate Driver	
11	U/D	I	Up/Down Control For Gate Driver	
12	XOE3	I	Output Enable For Gate Driver	
13	XOE2	I	Output Enable For Gate Driver	
14	XOE1	I	Output Enable For Gate Driver	
15	V _{COM}	I	Common Electrode Voltage	
16	STH1	I/O	Start Pulse For Source Driver	
17	V _{SS2}	-	Ground For Analog Circuit	
18	V _R	I	Video Input R	
19	V _G	I	Video Input G	
20	V _B	I	Video Input B	
21	V _{SS1}	-	Ground For Digital Circuit	
22	V _{DD2}	I	Supply Power For Analog Circuit	
23	CPH1	I	Sampling And Shift Clock For Source Driver	
24	CPH2	I	Sampling And Shift Clock For Source Driver	
25	CPH3	I	Sampling And Shift Clock For Source Driver	
26	V _{DD1}	I	Supply Power For Digital Circuit	
27	R/L	I	Left/Right Control For Source Driver	
28	NC	-	No Connection	
29	OEH	I	Output Enable For Source Driver	
30	STH2	I/O	Start Pulse For Source Driver	

Note : About TFT-LCD Panel detail information please refer PVI's PW045XS1 specification.

7.2 J203 : Pin Assignment Of Signal Input(Pitch 1.25mm 15P ,Side Entry Type)

Pin No	Symbol	I/O	Description	Remark
1	Vin	I	DC Power Input	
2	GND	-	Power Ground	
3	GND	-	Power Ground	
4	GND	-	Signal Ground	
5	Video/SVHS-Y	I	Video input(1Vp-p/75Ω)	
6	+5V	O	+5Voltage DC Output	Note1
7	Bright	I	Brightness Control	
8	Contrast	I	Contrast Control	
9	Color	I	Color Control	
10	Tint	I	Tint Control	Note2
11	NTSC/PAL	O	System Auto Detect Output	Note3
12	LRC	I	Screen Left / Right Reverse	Note4
13	UDC	I	Screen Up / Down Reverse	Note4
14	Dimmer	I	LED Backlight Brightness control	
15	Enable	I	Backlight On/Off	Note5

Note1 : The +5V DC supply external control circuit.(Max. output is 10mA)

Note2 : The TINT is only operating in NTSC system.

Note3 : The output High level for NTSC mode and Low level for PAL mode.

Note4 : Default +3.3V or floating is normal scanning and 0V is for reversed scanning.

Note5 : The floating is power on and 0V is power off.

7.3 J201: Pin Assignment Of Zoom Mode (Pitch 1.25mm 4P ,Side Entry Type)(Option)

Pin No	Symbol	I/O	Description	Remark
1	Zoom Mode1	-	Zoom Mode Control 1	Note1
2	Zoom Mode2	-	Zoom Mode Control 2	Note1
3	Zoom Mode3	-	Zoom Mode Control 3	Note1
4	GND	-	Ground	

➤ This function is for Lx04513Px2-FDR 、Lx04513Px4-FDR.

Note : The zoom mode is default full mode when zoom function is disable.

If zoom function is enable that those pins are normally PULL-UP.

About zoom mode detail information please to refer PVI's PVI1004D specification.

7.4 Zoom Mode Table

Mode 1	Mode 2	Mode 3	Description
L	L	L	Full Mode
H	L	L	Normal Center Mode
L	H	L	Normal Wide Mode
H	H	L	Zoom1 Mode
L	L	H	Zoom2 Mode
H	L	H	Normal Left Mode
L	H	H	Normal Right Mode
H	H	H	Zoom3 Mode

7.5 J101: Pin Assignment Of RGB Mode Pitch 1.25mm 10P ,Side Entry Type)(Option)

Pin No	Symbol	I/O	Description	Remark
1	EXT. R	I	External R Signal Input (0.7Vp-p/75Ω)	
2	EXT. G	I	External G Signal Input (0.7Vp-p/75Ω)	
3	EXT. B	I	External B Signal Input (0.7Vp-p/75Ω)	
4	EXT-SW	I	Switch Video (low) / R.G.B (High) mode	Note1
5	CSYI	I	Composite Sync. Input	Note2
6	INT-VIDEO-CSY	O	Internal Composite Positive Sync. Output	Note3
7	HSY	O	Horizontal Negative Sync. Output	Note4
8	VSY	O	Vertical Negative Sync. Output	Note4
9	GND	-	Ground	
10	SVHS-C	I	Chroma Signal Input	Note5

➤ This function is for Lx04513Px3-FDR 、Lx04513Px4-FDR.

Note1 : EXT-SW is High for external R.G.B. input(15.75Khz),Low is Composite video input

Note2 : CSYI must be positive sync. signal input.

Note3 : If EXT-SW is low the INT-VIDEO-CSY switch to CSYI.

CSYI is composite sync of RGB mode when EXT-SW is high(Master Mode).

Note4 : HSY and VSY is negative sync. Signal output for On Screen Display(OSD).

CSYI connect with INT-VIDEO-CSY when external RGB signal synchronize video sync(Slave Mode).

Note5 : SVHS-C is option

This is optional . If you use S-Video function.

Please contact FDT to modify some components of the interface board.

8. Absolute Maximum Ratings

8.1 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Remark
Input Voltage	Vin	+8	+16	V	
Video Input Signal	Video in	0.5	2.0	Vp-p	@75Ω
Digital Input Signal	TTL	+0.3	+5.3	V	
Operating Temperature		0	+60	°C	
Storage Temperature		-10	+70	°C	

9. Recommended operating conditions

9.1 Electrical Characteristics

Parameter	Symbol	I/O	Min	Typ	Max	Unit	Note
Input Voltage	V _{in}	I	+10	+12	+14	V	
Total Current	I _{in}	I		389.6		mA	
Power Consumption		I		4.68		W	@+12V
Video Input Signal	Video in	I		1.0		Vp-p	@75Ω
Output Voltage	+5V	O		+5V		V	
Brightness Adjust	Bright	I	+1.13	+1.3	+1.43	V	
Contrast Adjust	Contrast	I	+2.08	+2.53	+2.95	V	
Color Adjust	Color	I	+2.30	+2.88	+3.56	V	
Tint Adjust	Tint (NTSC only)	I	+1.5	+3.1	+4.6	V	
Video Auto Detect	NTSC/PAL	O	0	TTL	3.3	V	Note 1
Screen Reverse	Left/ Right	I	0	TTL	3.3	V	Note2
Screen Reverse	Up / Down	I	0	TTL	3.3	V	Note2
Dimmer Adjust	Dimmer	I	+0	+1.55	+5.0	V	
Power Enable	Enable		0		-	V	Note3

Note1 : NTSC is output high level , PAL is low level

Note2 : +3.3V or floating is normal mode , so 0V is reverse.

Note3 : floating is enable , so 0V is disable.

9.2 Panel Lamp Data

Parameter	Symbol	Min	Typ	Max	Unit	Note
Lamp Voltage	V _L	350	371	400	V _{rms}	I _L =6mA
Lamp current	I _L	3	6	7	mA	

Note : About TFT-LCD Panel detail information please refer PVI's PW045XS1 specification.

9.3 Panel Lamp Test Data

Parameter	Symbol	Min	Typ	Max	Unit	Note
Lamp Voltage	VL	370	379	472	Vrms	IL = 6.1mA, ($\pm 10\%$)
Lamp Current	IL	1.83	6.1	7.24	mA	

Note : Ta= 25°C @+12V

9.4 Optics Sample Test Data

Parameter	White Window	Red	Green	Blue	Remark
S/N : 001 x	0.297	0.568	0.313	0.152	$\pm 15\%$
.y	0.312	0.333	0.515	0.127	
L(cd/m ²)	430	-	-	-	
TC(°K)	7703				

Note : 1. Luminance Meter : BM-7 FAST(TOPCON)

2. Video Pattern Generator: FLUKE PM54200

3. Measurement Distance : 500mm \pm 50mm

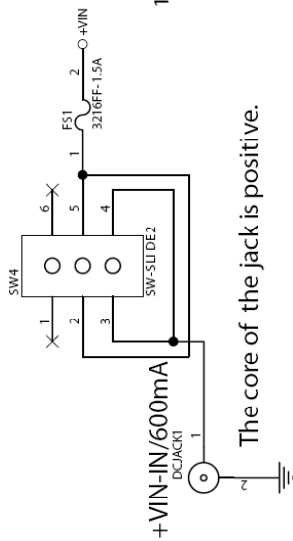
4. TOPCON BM-7 Luminance Meter 2° filed of view is used in the testing

(After 10min ~20min operation)

10. Accessory

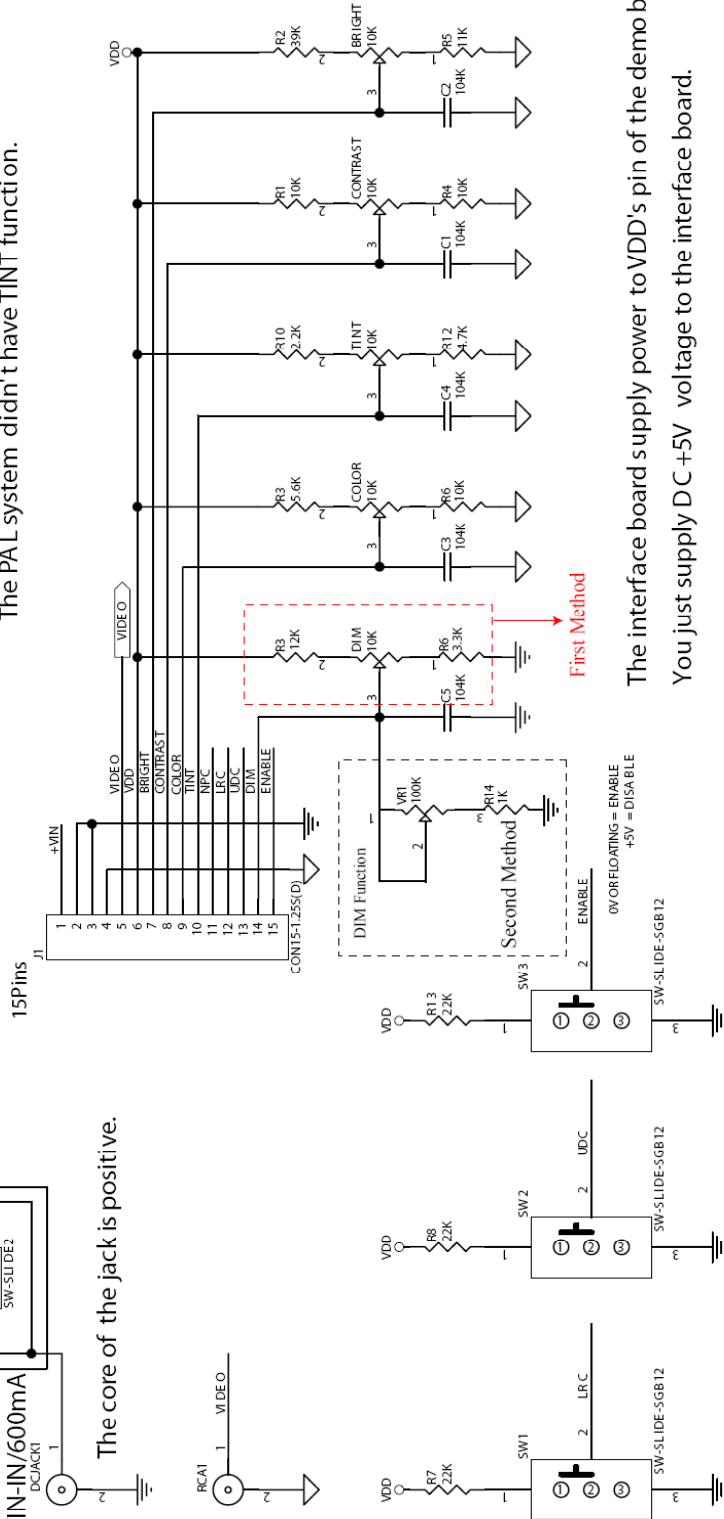
10.1 Application Circuit

Application Circuit



The core of the jack is positive.

The PAL system didn't have TINT function.



The interface board supply power to VDD's pin of the demo board.
You just supply DC +5V voltage to the interface board.

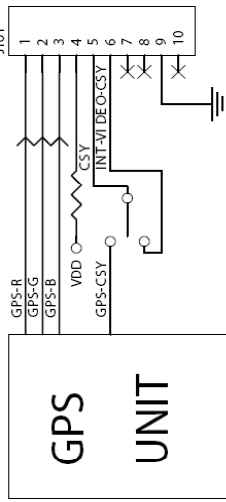
FDT		Approved by	Checked by	Drawn by
		Ben	Jean	Cherry
REV	1.0	07.10.26	07.10.26	07.10.26
SHEET SIZE	A4	SCALE	MM	Sheet size

NO.	Revised dimensions and description	By	Title	
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		TOLERANCES:	P/N	
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		XX ± 0.3	D/N	REV
		XXX ± 0.2	SSCH-0411001	1.0
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			MM	

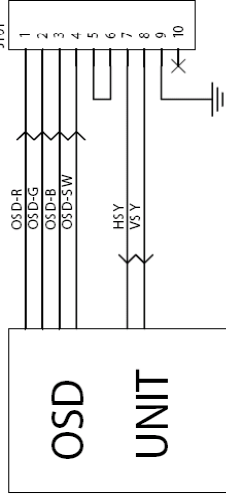
R.G.B Function Application Block

SLAVE MODE

GPS R.G.B



MASTER MODE



EXT-SW :

- 0: DISPLAY VI DEO S GREEN
- 1: DISPLAY GPS SCREEN

CSY:

- CSY CONNECTOR WITH GPS - CSY IS DISPLAY GPS SCREEN
- CSY CONNECTOR WITH INT-VIDEO-CSY IS DISPLAY VIDEO

NO.	Revised dimensions and description	By NICOLE	TOLERANCES: X. . . ± 0.5 XX . . . ± 0.3 XXX . . . ± 0.2	Title P/N D/N UNIT	FDT PVI PW045(SI) LD04513PXX-FDR SSCH-04I2002	MM	SCALE 4	REV 1.0	Sheet size A4	Approved by	Check by	Drawn by
										BEN	JEAN	CHERRY
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