

## SPECIFICATION FOR APPROVAL

MODEL NAME: 150BTB1640

Revision	Date	History
V0.1	2012.11.28	Initial Release
V1.0	2013.03.26	Changed P-CAP Touch Screen NT-PC185(Bar)FF-10P --->DP185FS023AG065-13
V1.1	2015.10.26	Changed P-CAP Touch Screen DP185FS023AG065-13---> S-185-001-151016
V1.2	2015.12.03	Changed P-CAP Touch Screen S-185-001-151016---> DP185FS025CL092-20
V1.3	2016.10.27	Changed LCD Panel T164WH01-C01 --> JL185AT238-V0

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Approved : \_\_\_\_\_

Date : \_\_\_\_\_

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## 1. General Description

### 1.1 Overview

SUZOHAPP Open frame LCD Monitor 150BTB1640 is a high performance TFT LCD monitor providing high quality image from the analog RGB, DVI-D input. This monitor supports wide range signal input from VGA to WXGA resolution at vertical refresh rate of 60Hz.

It is designed for industrial use with Auto power on, up scaling performance adequate for low-resolution application and enhanced design margin for reliability.

It also gives versatile optional features like, Touch Screen and custom designed frame.

### 1.2 Reference table of characteristics

Panel	Size	16.4" Diagonal		
	Active Display Area	409.8 (H) x 71.4 (V) mm		
	Type No.	JL185AT238B-V0		
	Number of Pixels	1366 (H) x 238 (V)		
	Pixel Arrangement	RGB Vertical Stripe		
	Pixel Pitch	0.3mm (H) x 0.3mm (W)		
	Color Depth	16.7M		
	Surface Treatments	Anti-Glare 3H		
	Viewing Angle (CR>10)	Horizontal :	⊙ L	85 degrees
			⊙ R	85 degrees
		Vertical :	Φ H	80 degrees
			Φ L	80 degrees
	Contrast Ratio	1000 : 1		
	Response Time(Typ.)	5ms		
	Average Brightness	Typ. 320 cd/ m <sup>2</sup>		
	Frame Rate	Typ. 60Hz, Max. 75Hz		
	Panel Dimension(WHD)	431.8mm(H) x 95.6mm(V) x 14.6mm(D)		
Backlight	LED			
Environmental Conditions	Operating	Temperature : 0 to 50°C / Humidity : 10 to 90%		
	Storage	Temperature : -20 to 60°C / Humidity : 10 to 90%		
Resolution	Prime	1366 x 768 @ 60 Hz		
	Standard	720x400 @70 Hz, 640x480 @60/75 Hz 800x600 @56/60/72/75 Hz, 832x624 @75 Hz 1024x768@60/70/75Hz,1280x768@60Hz 1366x768@60Hz		
Input signal	DVI	24pin DVI-D Jack		
	RGB	15pin D-Sub		

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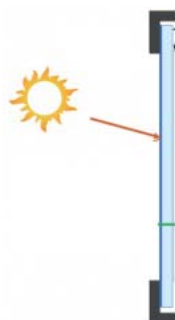
	Power Jack	2.5pai DC jack
PSU Power Spec	Input Voltage	AC 100 ~ 240V 50/60Hz
	Input Current	1.5A (Max)
	Output Voltage	DC 12V/5.0A
Scanning Frequency	Horizontal	31 ~ 80Khz
	Vertical	55 ~75Hz
OSD Control		Menu, Select, Up, Down, Power
Plug & Play		VESA DDC 2B Ver1.3
Touch Screen	Touch Panel	Projected Capacitive Touch : Inotouch DP185FS025CL092-20 (Clear Type)
	Controller	ITP-S4061-MB-4101C
	Controller Interface	USB Type
RoHS		RoHS Compliance



## Application Caution

### 1.Precautions for strong light exposure

**Strong light exposure causes degradation of polarizer and color filter.**

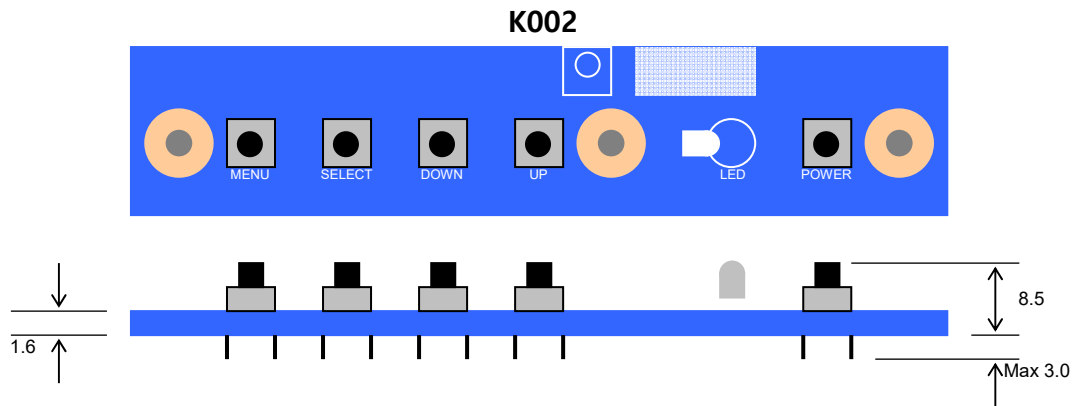


### 2. Using Conditions

- Temperature inside the cabinet should be controlled 'at room temp' (0 ~ 40°C) by cooler and fan.

## 2. User control & OSD

### 2.1 Key control board



Button	Function	Status	HOT Key
LED	Indicates operation status	Green : Normal State Red : Off Mode Amber : DPMS Mode	
POWER	Power on/off		
MENU	Enable MENU Window Disable MENU Window Exit from Sub function		
SELECT	Select function		No OSD Window, Input Source Change
DOWN	Move to Down or Left		No OSD Window, Auto Color
UP	Move to Up or Right		No OSD Window, Auto Configuration

## 2.2 OSD Control function

The chosen OSD settings will be stored in memory. The OSD menu can be cleared from the screen by pressing the **MENU** button otherwise it will be automatically cleared after a few second of non-use.

### OSD MAIN MENU

#### [PICTURE]

**PICTURE**

- Brightness  80
- Contrast  80
- Sharpness  80

#### [COLOR]

**COLOR**

- Color Status Management
  - ▶ NORMAL
- Red  80
- Green  80
- Blue  80
- Auto Color
  - ▶ To Start

#### [SCREEN]

**SCREEN**

- Auto Configure
  - ▶ To Start
- H Position  80
- V Position  80
- Clock  80
- Phase  80

#### [OSD]

**OSD**

- Language
  - ▶ English
- H Position  80
- V Position  80
- Transparency  80
- OSD Time  10

#### [SETUP]

**SETUP**

- Source
  - ▶ RGB
- Factory reset
  - ▶ To Start
- Aspect
  - ▶ Off

1024x768 60 Hz  
Version 1.05

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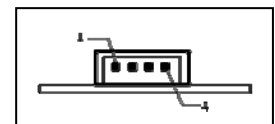
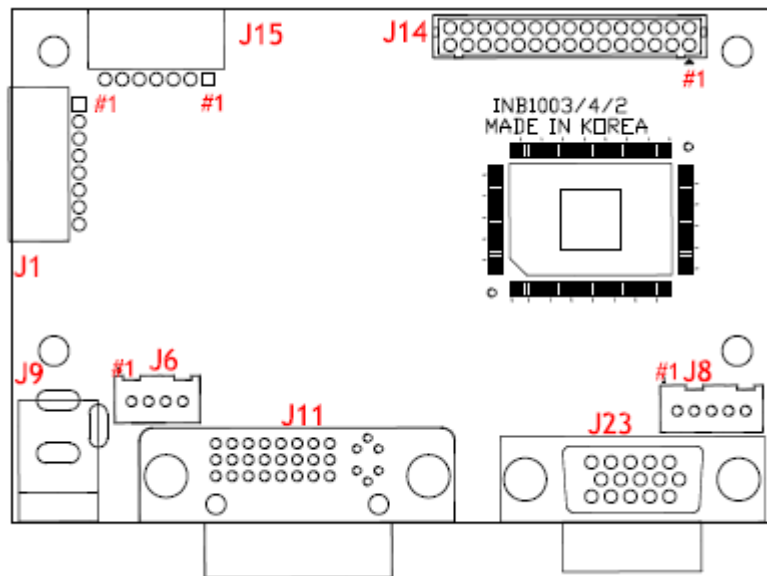
## 2.3 OSD GUI Control Table

MAIN MENU	SUB MENU	CONTROL	
Picture	Brightness	50(0~100)	
	Contrast	50(0~100)	
	Sharpness	2( 0 ~ 4)	
Color	Color Status Management	User(User, Warm, Normal, Cool)	
	Red	50(0~100)	PC ONLY
	Green	50(0~100)	
	Blue	50(0~100)	
	Auto Color	To Start	
SCREEN	Auto Configure	To start	
	H Position	50(0~100)	PC ONLY
	V Position	50(0~100)	
	Clock	50(0~100)	
	Phase	30(0~100)	
	WXGA Mode	Off (Off, 1024 x 768, 1280 x 768, 1360 x 768, 1366 x 768)	
OSD	Language	English(English, Deutsh, Francais, Italiano, Espanol, Korean)	
	H Position	50(0~100)	
	V Position	50(0~100)	
	Transparency	33 (0~100)	
	OSD Time	10(3~30)	
SETUP	Source	RGB, DVI, AUTO	
	Factory reset	To Start	
	Aspect	Off(On/Off)	

## 3. Connector Description

### 3.1 Summary

Reference	Item	Description	Type	Manufacture
J6	Connector	External 12V Power Input	20010WR-04	YEONHO
J1	Connector	Backlight Inverter Connector	SMAW200-08	YEONHO
J9	Jack	12V Input Dc power Jack	KPJ-4S-S	-
J11	Connector	DVI-D Input(TMDS) Connector	DVI-D24P	-
J23	Connector	Analog RGB Input Connector	15P D-SUB	-
J14	Connector	LCD Interface connector(2Ch LVDS)	12507WR-30	YEONHO
J15	Connector	OSD Board Connector	SMAW200-07	YEONHO
J8	Connector	RS-232C and Auto Dimming	SMW200-05	YEONHO



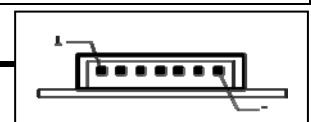
### 3.2 J6(J7) : 12V Power Input

Pin No.	Symbol	Description
1	Vcc	+12V
2	Vcc	+12V
3	GND	Ground
4	GND	Ground



### 3.3 J1 : Backlight Inverter connector

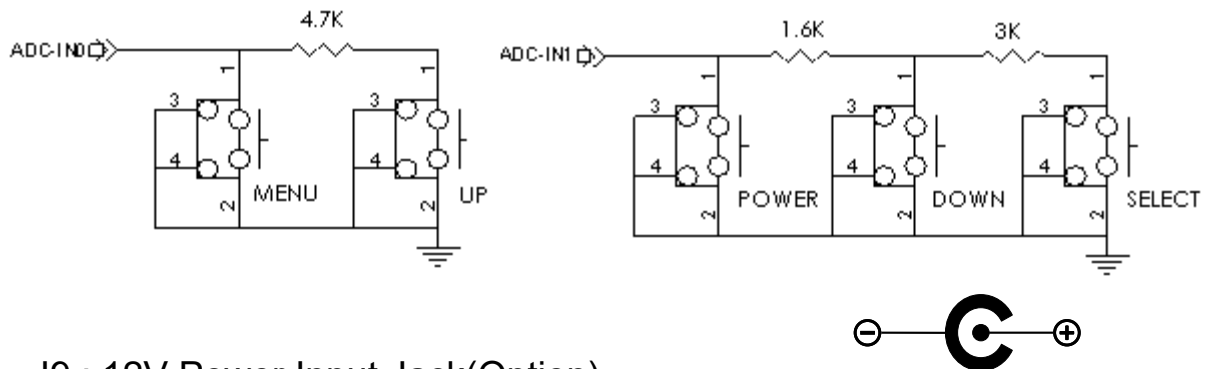
Pin No.	Symbol	Description
1	DIM-ADJ	DIM-adjustment analog dimming control signal * make sure inverter specification
2	ON/OFF	Inverter digital ON(3.3V)/OFF(0V) signal
3,4,5,6	GND	Ground
7,8,9,10	B+	B+(24V or 12V)





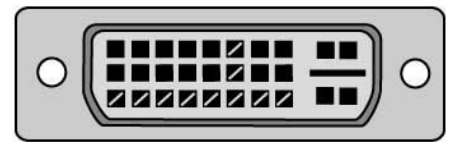
## 3.4 J15 : OSD Board connector

Pin No.	Symbol	Description
1	Vcc	+5V power for IR sensor
2	IRQ	Infrared rays signal line.
3	LED1	Green LED
4	LED2	Red LED
5	GND	Ground
6	ADC-IN0	Menu, Up
7	ADC-IN1	Power, Down, Up



## 3.5 J9 : 12V Power Input Jack(Optional)

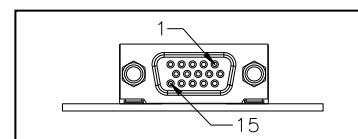
Pin No.	Symbol	Description
1	GND	Ground
2	NC	NC
3	VCC	VCC 12V



## 3.6 J11 : DVI-D Input(TMDS) Connector

Pin No.	Symbol	Description
1	TMDS DATA2-	TMDS DATA2 Differential Negative Signal
2	TMDS DATA2+	TMDS DATA2 Differential Positive Signal
3	TMDS DATA2 Shield	Shield for TMDS Channel #2
4	NC	No Connection
5	NC	No Connection
6	DDC Clock	The Data Line for the DDC Interface
7	DDC Data	The Clock Line for the DDC Interface
8	NC	No Connection
9	TMDS DATA1-	TMDS DATA1 Differential Negative Signal
10	TMDS DATA1+	TMDS DATA1 Differential Positive Signal
11	TMDS DATA1 Shield	Shield for TMDS Channel #1
12	NC	No Connection
13	NC	No Connection
14	+5V Power	+5 Volt signal for EDID (Un-powered Monitor)
15	GND(for +5V)	Ground for +5 Volt Power pin, Sync return
16	HPD	Identify the presence of a monitor
17	TMDS DATA0-	TMDS DATA0 Differential Negative Signal

18	TMDS DATA0+	TMDS DATA0 Differential Positive Signal
19	TMDS DATA0 Shield	Shield for TMDS Channel #0
20	NC	No Connection
21	NC	No Connection
22	TMDS CLOCK Shield	Shield for TMDS Clock differential Pair
23	TMDS CLOCK+	TMDS DATA0 Differential Positive Signal
24	TMDS CLOCK-	TMDS DATA0 Differential Negative Signal



### 3.7 J23 : Analog RGB Input Connector

Pin No.	Symbol	Description
1	Red1	Red analog input
2	Green1	Green analog input
3	Blue1	Blue analog input
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	NC	Not connected
10	GND	Ground
11	GND	Ground
12	DSDA	DDC-SDA
13	HSYNC	Horizontal Sync
14	VSYNC	Vertical Sync
15	DSCL	Serial Clock Input



## 3.8 J14 : LCD Interface connector(8bit 2Ch LVDS)

Pin No.	Symbol	Description
1	RxO0-	Negative LVDS differential data output (ODD data)
2	RxO0+	Positive LVDS differential data output (ODD data)
3	RxO1-	Negative LVDS differential data output (ODD data)
4	RxO1+	Positive LVDS differential data output (ODD data)
5	RxO2-	Negative LVDS differential data output (ODD data)
6	RxO2+	Positive LVDS differential data output (ODD data)
7	GND	Ground
8	RxOC-	Negative sampling Clock (ODD data)
9	RxOC+	Positive sampling Clock (ODD data)
10	RxO3-	Negative LVDS differential data output
11	RxO3+	Positive LVDS differential data output
12	RxE0-	Negative LVDS differential data output (EVEN data)
13	RxE0+	Positive LVDS differential data output (EVEN data)
14	GND	Ground
15	RxE1-	Negative LVDS differential data output (EVEN data)
16	RxE1+	Positive LVDS differential data output (EVEN data)
17	GND	Ground
18	RxE2-	Negative LVDS differential data output (EVEN data)
19	RxE2+	Positive LVDS differential data output (EVEN data)
20	RxEC-	Negative sampling Clock (EVEN data)
21	RxEC+	Positive sampling Clock (EVEN data)
22	RxE3-	Negative LVDS differential data output (EVEN data)
23	RxE3+	Positive LVDS differential data output (EVEN data)
24	GND	Ground
25	NC	CE (For LCD internal use only. Do not connect)
26	NC	CTL (For LCD internal use only. Do not connect)
27	NC	No connection(For LCD internal use only)
28	VCC	Power supply (5.0V Typ.)
29	VCC	Power supply (5.0V Typ.)
30	VCC	Power supply (5.0V Typ.)

## 4. STANDARD DISPLAY MODE

Spec Mode	Pixel Freq.	Horizontal Timing				Vertical Timing			
		Sync Polar	Freq.	Total	Active	SP	Freq.	Total	Active
	MHz		KHz	Pixel	Pixel		Hz	Line	Line
640*350@70Hz	25.144	P	31.430	800	640	N	70.000	449	350
640*400@70Hz	28.287	N	31.430	800	640	P	70.000	449	400
720*400@70Hz	28.287	N	31.430	900	720	P	70.000	449	400
640*480@60Hz	28.175	N	31.469	800	640	N	59.940	525	480
640*480@72Hz	31.500	N	37.861	832	640	N	72.809	520	480
640*480@75Hz	31.500	N	37.500	840	640	N	75.000	500	480
800*600@56 Hz	36.000	P	35.156	1024	800	P	56.250	625	600
800*600@60Hz	40.000	P	37.879	1056	800	P	60.317	628	600
800*600@72Hz	50.000	P	48.077	1040	800	P	72.188	666	600
800*600@75Hz	49.500	P	46.875	1056	800	P	75.000	625	600
1024*768@60Hz	65.000	N	48.363	1344	1024	N	60.005	806	768
1024*768@70Hz	75.000	N	56.476	1328	1024	P	70.070	806	768
1024*768@75Hz	78.750	P	60.023	1312	1024	P	75.030	800	768
1280*720@60Hz	74.500	P	44.772	1664	1280	P	59.855	748	720
1280*768@60Hz	68.250	P	47.396	1440	1280	N	59.995	790	768
1360*768@60Hz	84.75	P	47.72	1776	1360	P	59.799	798	768

## 5. LED Driver Spec

### 5.1 ELECTRICAL SPECIFICATION

Item	Symbol	Spec	Unit	Remarks
Input Voltage 1	Vin	11.4 ~13.8	V	
Input Voltage 2	ON / OFF	2.4 ~ 5.25	V	
Operating Temperature	TOP	0 ~ 50	°C	
Storage Temperature	Tstg	-20 ~60	°C	
Relative Humidity	RH	90	%	

### 5.2 Control Signal

Item	Symbol	Status	Action	Remarks
J2 #8	ON/OFF	HIGH	LAMP-ON	2.4 ~ 5.25V
		LOW	LAMP-OFF	0.8V Max

### 5.3 Output Characteristics

NO	Item	Symbol	Condition	Min.	Typ.	Max	Unit
1	Input Voltage	Vin	'-	11.4	12.0	13.8	V
2	Input Current	Iin	Vin=12V Dim=0V	-	-	3.0	A
3	Output Voltage	Vout	Vin=12V Dim=0V	-	31.0	32.0	Vdc
4	Output Current	Iout	Vin=12V Dim=0V	-	40.0	62.0	mA
5	Backlight On/Off Control	ON	'-	2.4		5.25	V
		OFF	'-	-0.3		0.8	V

### 5.4 Interface

#### 5.4.1 J2 Connector : SMW200-09(YeonHo) or EQ

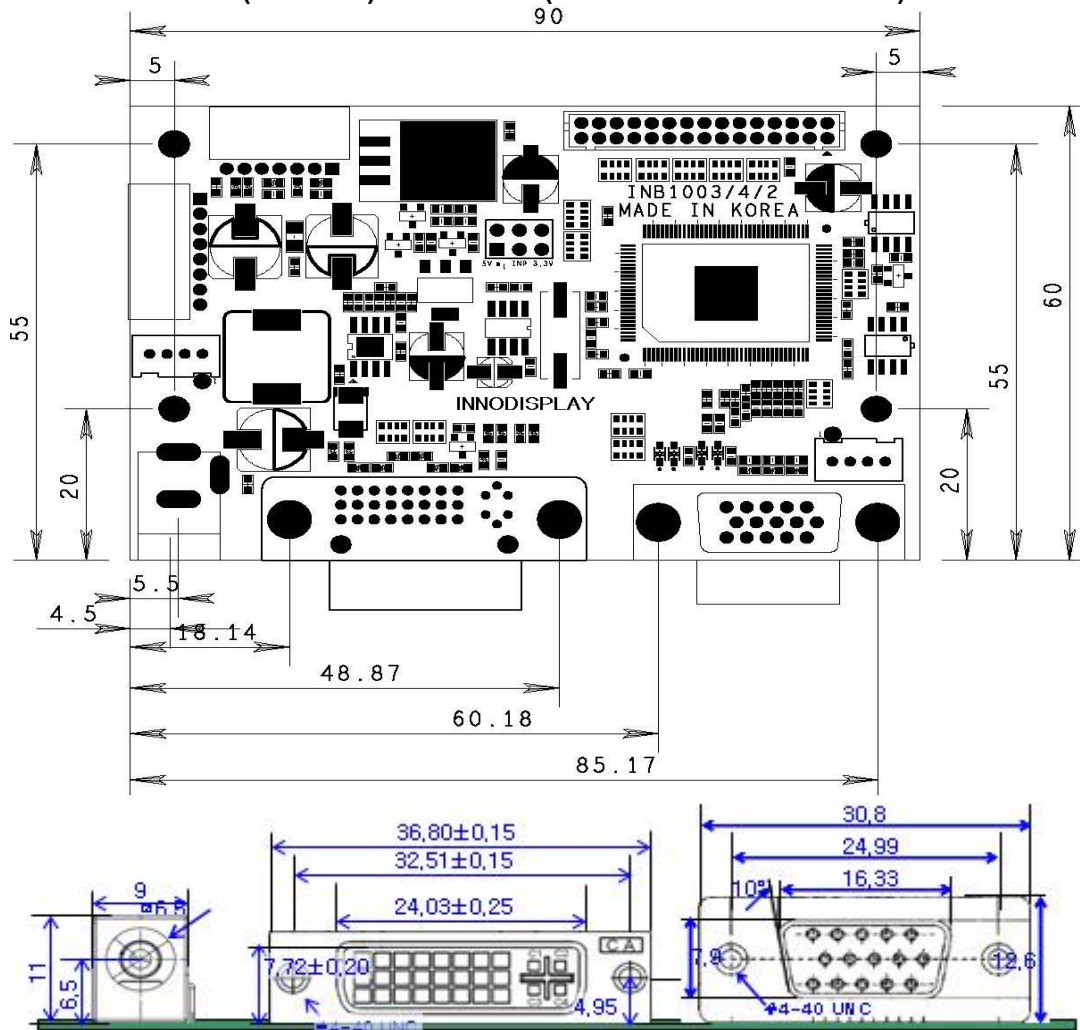
Pin No	Symbol	Remark
1,2,3	VIN	Voltage Input 12.0V
4	NC	NC
5,6,7	GND	GND
8	ON/OFF	LED Driver ON/OFF Signal
9	DIM	Diming Control

#### 5.4.2 J1 Connector : SMW200-08P(YeonHo) or EQ

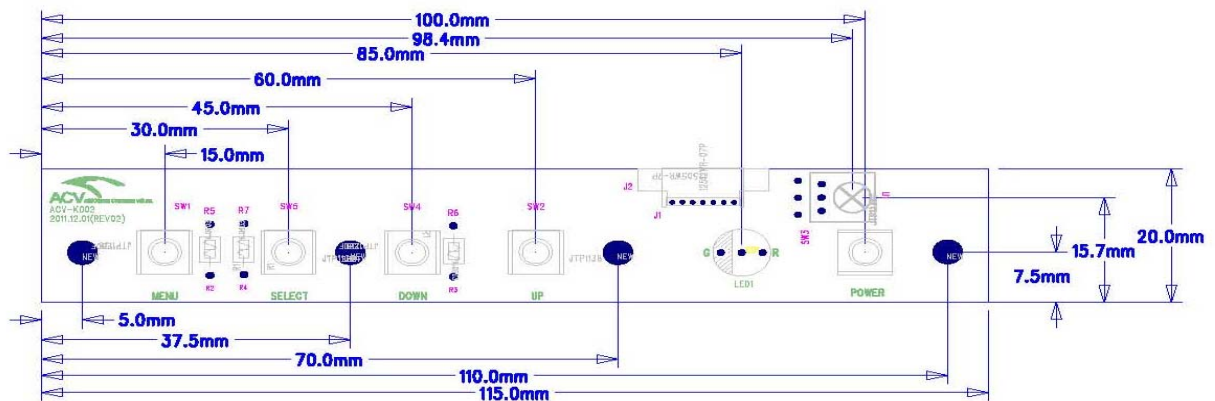
Pin No	Symbol	Remark
1,2,3,4	VLED	LED Output Voltage
5,6,7,8	RTN1,2,3,4	Feedback1,2,3,4 (Return 1,2,3,4)

## 6. Boards Dimension

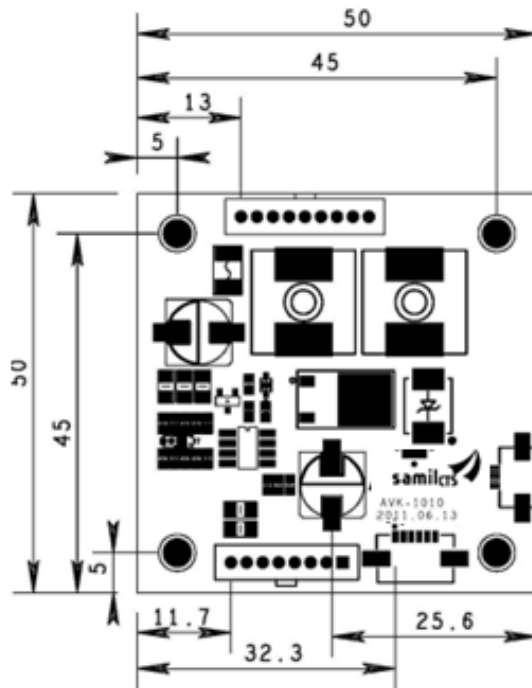
### 6.1 AD Board (INB1003) Dimension (90mm x 60mm x 14.5mm)



### 6.2 OSD Board (K002) Dimension (115mm x 20mm x 8.7mm)



## 6.3 LED Driver Board (AVK-1010) Dimension (50mm x 50mm x 10mm)



## 7. Projected Capacitive Touch Specification

### 7.1 Support Operation Systems

OS	Version	Interfaces
<b>Windows</b>	Windows 8(Need logo submission) Windows 7 Windows Vista, XP Windows XP Tablet PC edition - Partial	USB/I2C
<b>Linux</b>	<i>The new Linux driver supports most of the Linux distribution on 32/64 bit versions, including Kernel 2.4.x / 2.6.x with XFree86 4.X / Xorg 6.7 to 7.6 ( Up to X server 1.9.x)</i>  <i>CentOS, Debian, Fedora, Gentoo, Mandrake (Mandriva), Red Hat, Slackware, SuSE (OpenSuSE), Ubuntu (Xubuntu), Yellow Dog, Android and Meego etc.</i>	USB/I2C
<b>Mac</b>	Review required specifications	USB

<Linux support table>

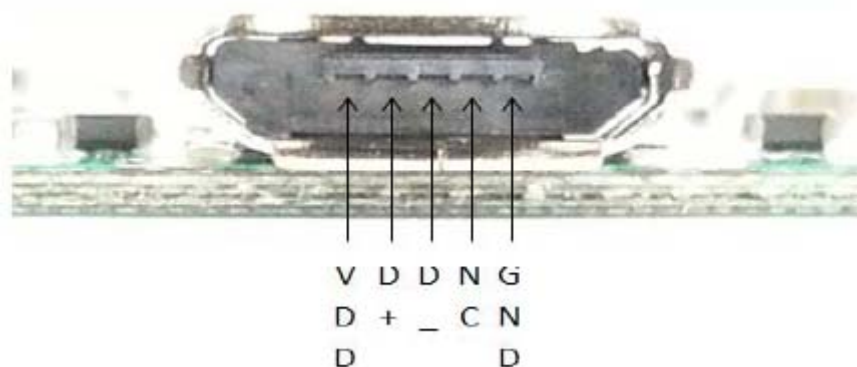
Kernel 2.4.X / 2.6.X with Xorg 6.7 ~7.6 (Up to X server 1.9.X)									
CentOS	Red Hat	Fedora	SlackWare	Yellow Dog	Gentoo	Mandriva	Ubuntu	OpenSuse	Debian
4.X	2.1	2.0	8.1	4.1	10.1	10.1	10.04LTS	10.2	4.X
5.X	3.X	3.0	9.0	5.0	11.0	10.2	10.1	10.3	5.X
6.X	4.X	4.0	9.1	5.0.1		2006		11.0	6.X
	5.X	5.0	10.0	5.0.2		2007		11.1	
	6.X	6.0	10.1	6.0		2008		11.2	
		7.0	10.2	6.1		2009		11.3	
		8.0	11.0	6.2		2010		11.4	
		9.0	12.0	6.2.1		2011			
		10.0	12.1	6.3					
		11.0	12.2	7.0					
		12.0	13.0						
		13.0	13.1						
		14.0	13.4						
		15.0							



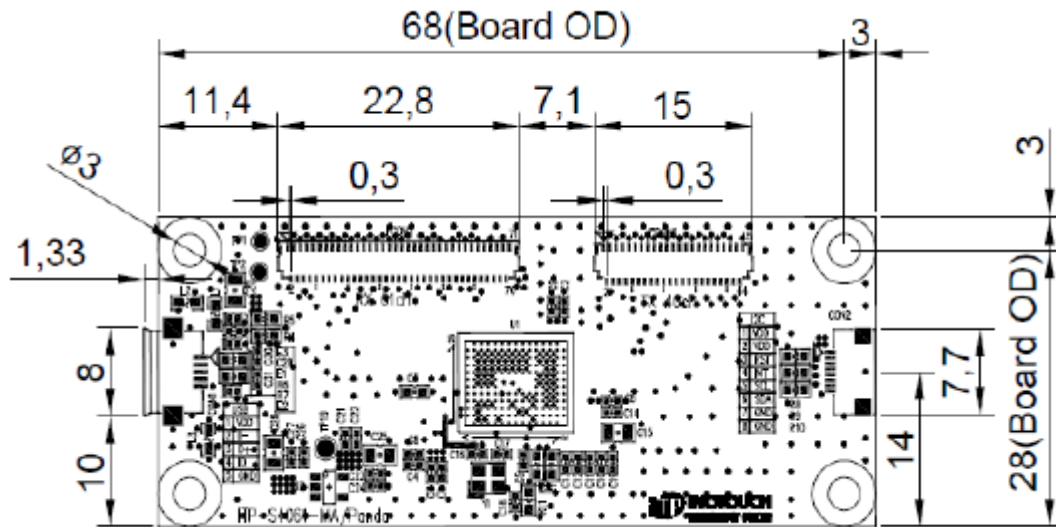
## 7.2 Specifications

<b>USB &amp; I2C Type Controller</b>	
Circuit Board Dimension	68mm x 28mm
Channels of Panel	Max. Tx:40 Rx:61 channels
Power Requirements	D.C.+5V (150mW Power supply)
Operating Temperature	-30 to 70 °C
Storage Temperature	-40 to 85 °C
Relative Humidity	95% at 60 °C, RH Non-condensing
Interface	USB : 2.0 Full Speed (12Mbit/s) I2C : 400kHz
Resolution	4096×4096 resolution
Report rate	Max. 100Hz(10 finger touch)
Pull force between FPC and Connector	Max. 1.2 kg/f

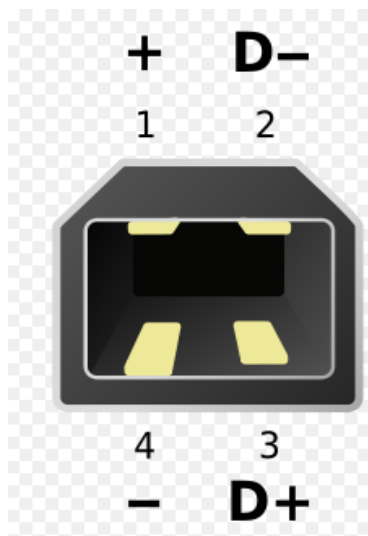
## 7.3 USB Interface Port



## 7.4 Touch Control Board Dimension (68mm x 28mm )



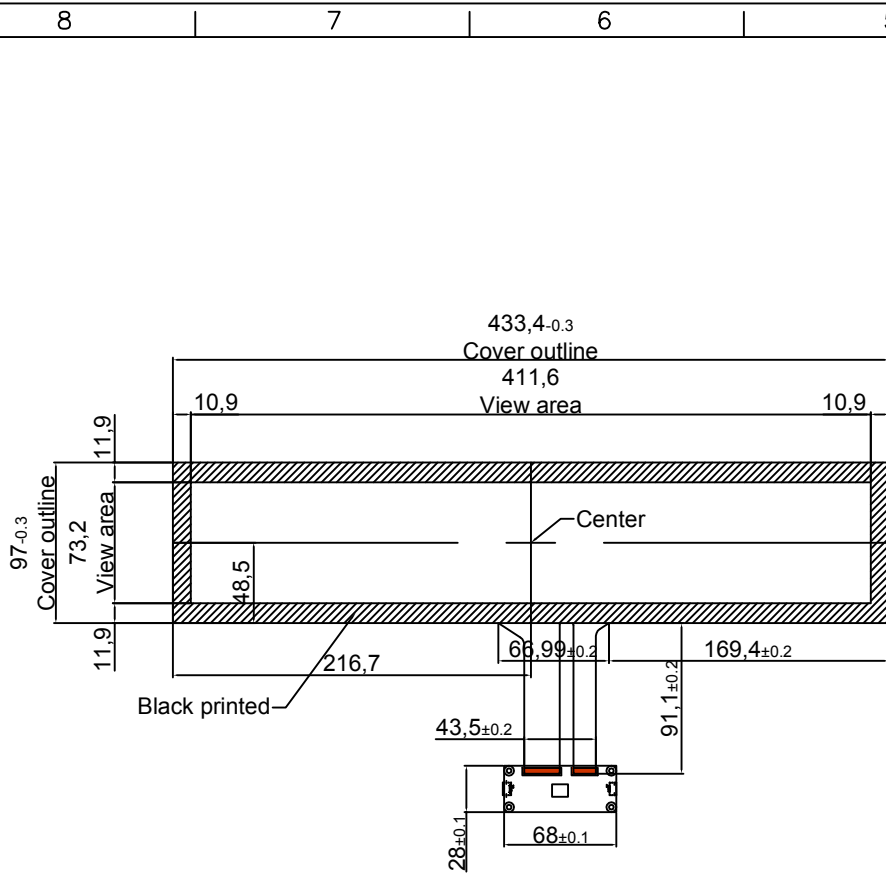
## 7.3 USB Interface Port



## 8. Packing Information

Item	Q'ty	Dimension (W x D x H)	Weight(Kg)	Remark
Open Frame	1Pcs	435.2mm x 98.8mm x41.85mm	TBD	
Box Packing		TBD	TBD	
Pallet Size		TBD	TBD	
Pallet Packing		TBD	TBD	

## 9. Mechanical structure



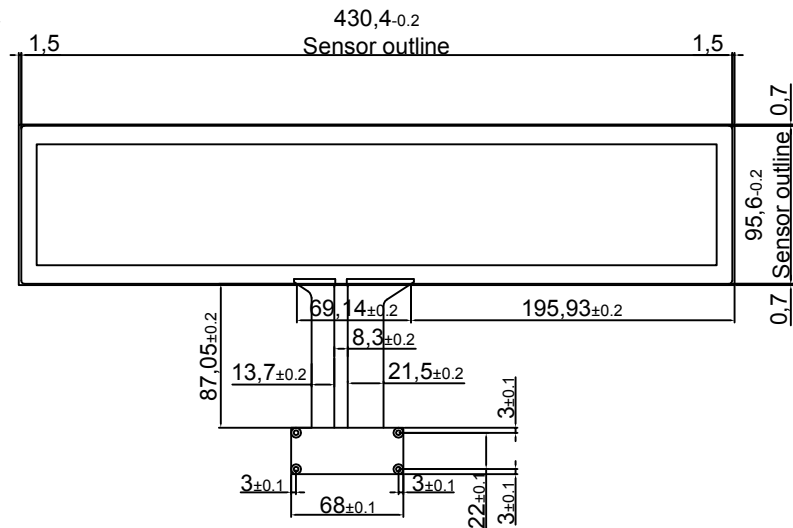
FRONT VIEW

Touch panel thickness 2,45

Cover glass thickness 2  
Sensor thickness 0,45

Rx Pin map	
P/N	CON1
1	GND
2	X1
3	X2
4	X3
5	X4
...	...
60	X59
61	X60
62	X61
63	GND
64	GND
65	GND
...	...
69	GND
70	GND
71	GND

Tx Pin map	
P/N	CON2
1	GND
2	Y1
3	Y2
4	Y3
5	Y4
...	...
10	Y9
11	Y10
12	Y11
13	NC
14	NC
15	NC
...	...
40	NC
41	NC
42	GND
43	GND
44	GND
45	GND



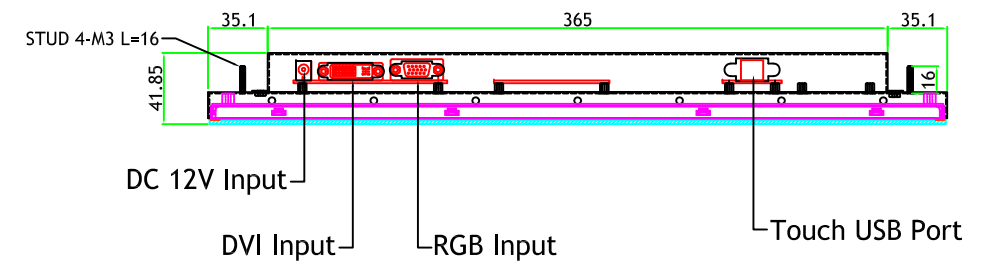
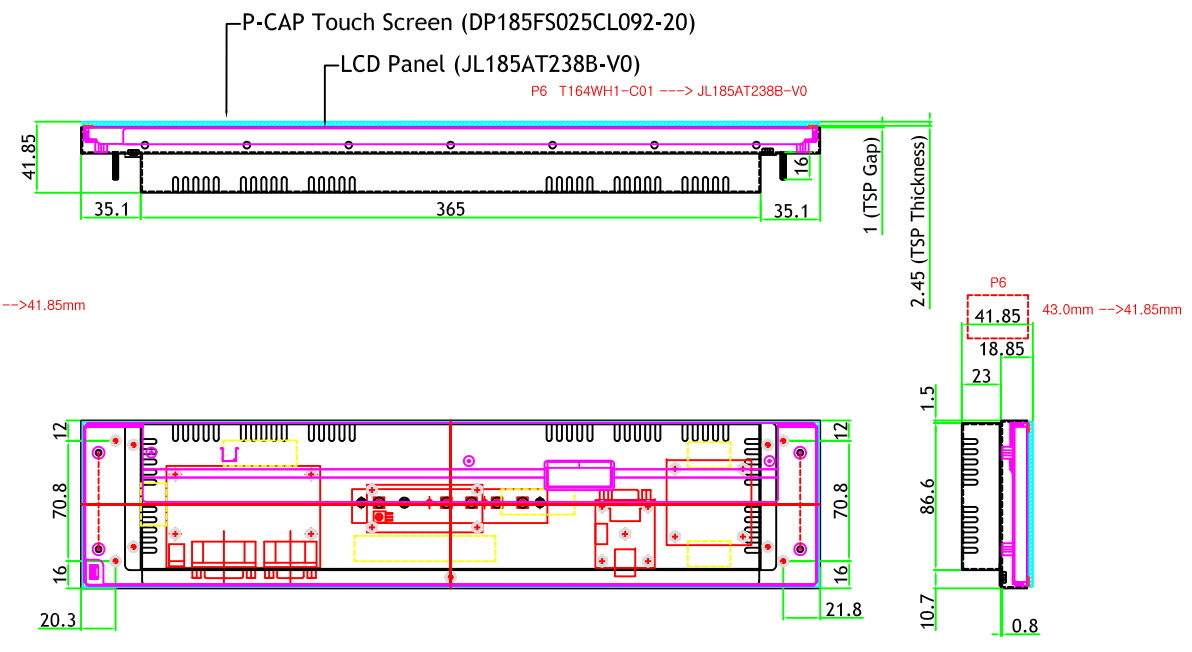
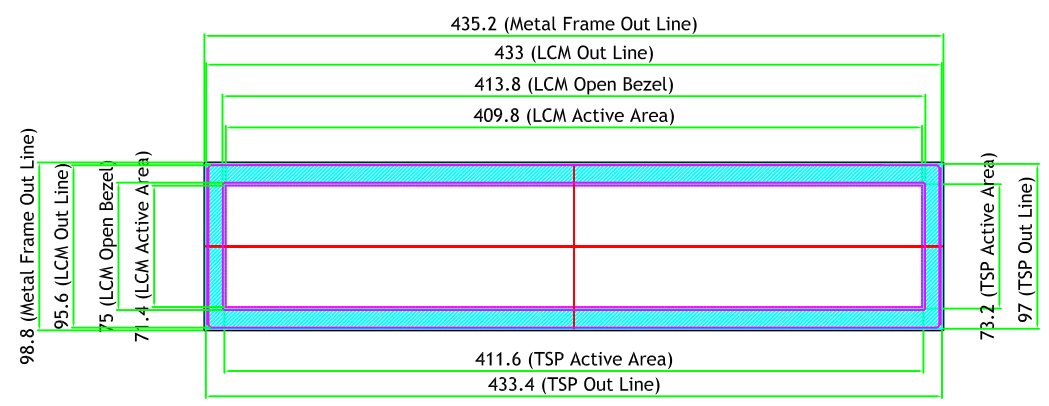
REAR VIEW

- TOUCH PANEL THICKNESS : 2.45mm±10%  
COVER GLASS THICKNESS : 2mm±10%  
SENSOR THICKNESS : 0.45mm±10%
- CONTROLLER : ITP-S4061-MB\_4101C
- TAIL : FPC STYLE (COPPER TRACE)
- MATERIAL : AG NANO WIRE FILM

No.	m/d/y	Rev.	Description
8			
7			
6			
5			
4			
3			
2			
1	11/18/15	001	First Release

APPROVED BY		
DESIG'D	J.W.A	
CHK'D	S.I.K	
DATE:	2015.11.18	DWG NO. DP185-20-001
SIZE	REF NO.	PDT NO.
A4	NULL	DP185FS025CL092-20
SCALE NULL	UNIT MM[INCH]	UNDEFINED TOL. ±0.3 SHEET NO. 1/1

Rev	AMEND	DATE	CHECK	APPR.
P1	Proto	2013.07.11	H.I.Woo	H.Y.Sohn
P2	Changed Model No INF-1853WPLAPC-U ----> INF-1643WPLAPC-U	2013.07.24	H.I.Woo	H.Y.Sohn
P3	Changed P-CAP Touch NT-PC185(Bar)FF-10P ----> DP185FS023AG065-13	2014.03.21	H.I.Woo	H.Y.Sohn
P4	Changed P-CAP Touch DP185FS023AG065-13 ----> S-185001-151016 Changed Back Cover thickness 46.0mm ----> 43.0mm	2015.10.26	H.I.Woo	H.Y.Sohn
P5	Changed P-CAP Touch S-185001-151016 ----> DP185FS025CL092-20	2015.12.03	H.I.Woo	H.Y.Sohn
P6	Changed LCD Panel T164WH1-C01 ----> JL185AT238B-V0 Changed Metal Frame thickness 43.0mm ----> 41.85mm	2013.07.24	H.I.Woo	H.Y.Sohn



<b>SUZOHAPP</b>		MODEL NO	150BTB1640	VIEW :	UNIT : mm	
		NAME	16.4" Open Frame	Q'ty	1	REV. P6
DRAWN	CHECKED	APPROVED	DWG. NO	4M1853003-05	SCALE	1 / 1
H.I.W		H.Y.S	MATERIAL / FINISH	GI T=0.8	DATE	2016.10.27