



SPECIFICATION



easyTOUCH DISPLAY – STARTER KIT

5.0“ - WVGA – eMotion ST1:3

Version: 1.0

Date: 21.09.2020

Note: This specification is subject to change without prior notice

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ADVANCED LEVEL

5.0 inch (12.7cm)

Part-No. 12041096 eTD050W2105-ORF-A
12025084 incl.easyTOUCH 12033152

Display

Panel Type	Toppan COM0505H01ULC 12025084
Resolution (pixel) / format	800 x 480 / wide
Brightness (typical)	400 cd/m ²
Display Mode	Wide-view, Blanview
Customer Interface Display	LVDS
Contrast ratio (typical)	900:1
Backlight	LED 100k lifetime

Glass and Touch

Cover glass	1.1mm glare glass, chemically strengthened, no treatment Printing RAL9005 organic, light-tight Dimensions according to outline drawing
Touch sensor type	eTP050W2102-CS 12033152
Active area touch sensor (W x H)	111.82 (h) x 67.52 (w)
Optical Specification	according to DATA MODUL Outgoing Specification 12005964
Touch Interface	I2C mXT640T

Assembling

Glass to touch	Optically bonded
Glass/Touch assembly to display	Optically Bonded with LOCA (Liquid Optical Clear Adhesive)

Accessories

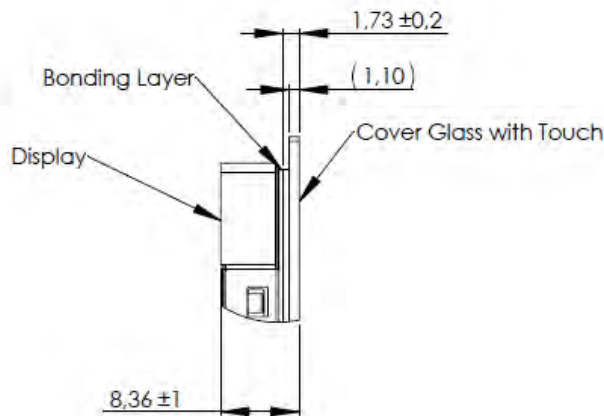
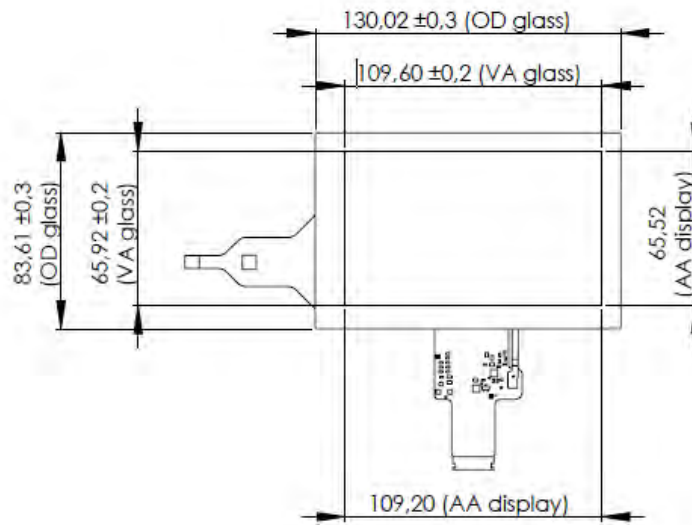
Touch Controller	easyTOUCH mXT640T I2C Controller Chip-on-Flex
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Environmental conditions

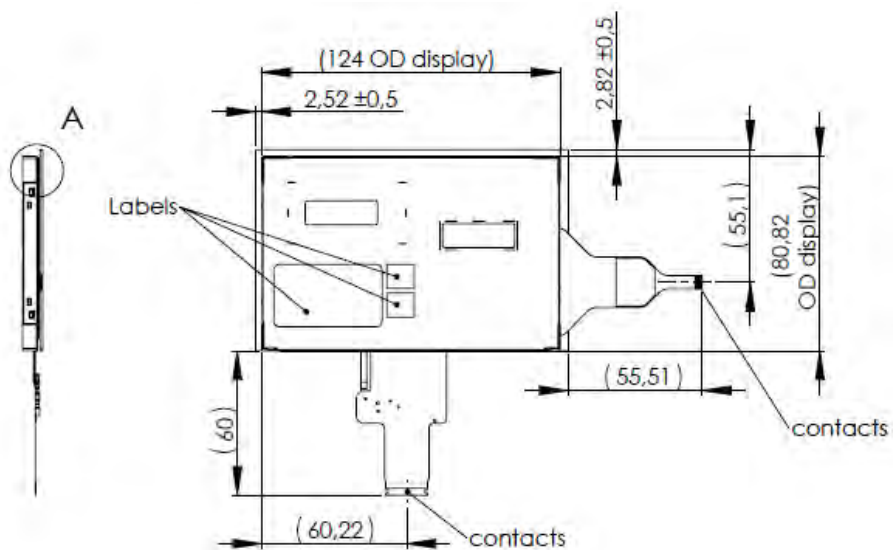
Temperature (operating)	-20 – 70°C
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Mechanical dimensions

Outline dimensions (W x H x T)	130.02 (w) x 83.61 (h) x 8.36 (d) Detailed dimensions according to outline drawing
Weight	approx. 0.15 kg



A (2 : 1)



easyTOUCH DISPLAY
STARTERKIT

QUICK START GUIDE

DATA MODUL

THE DISPLAY EXPERTS

INTRO

THANK YOU for choosing
our easyTOUCH STARTERKIT!

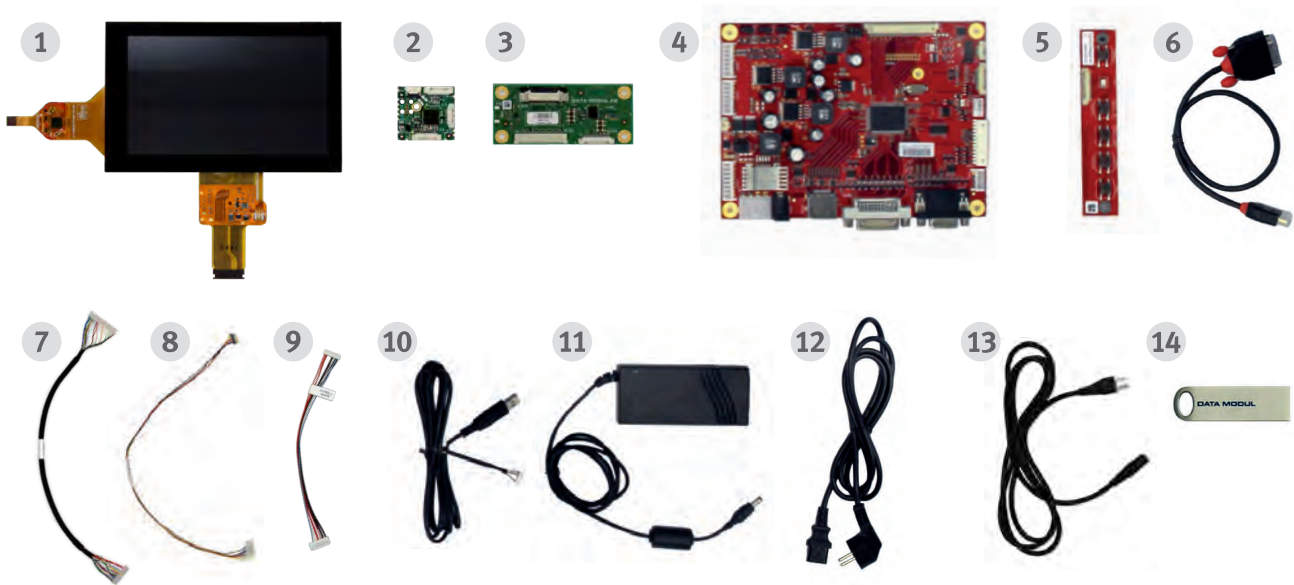


This kit provides you with all the necessary components to bring our touch-display solution to full operation. The components can be assembled together in just a few steps using our guidelines! The perfect combination of our in-house developed easyTOUCH Display and eMotion board enable you to evaluate our PCAP and display performance. Further PCAP tuning and debugging is possible using the easyANALYZER software developed by our engineers for our easyTOUCH solutions. If you have any questions or challenges, do not hesitate to contact us!

Do you need more details or do you need support for a special project?

Contact us for further information or individual project support: touch@data-modul.com

SCOPE OF DELIVERY



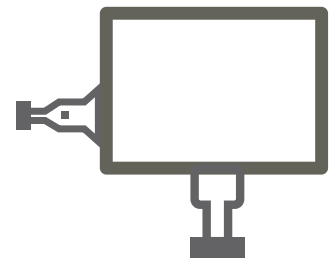
- 1 easyTOUCH Display
- 2 I2C-to-USB adaptor
- 3 Dispcon board
- 4 eMotion board*
- 5 OSD board
- 6 DVI/HDMI cable
- 7 LVDS cable
- 8 LED cable
- 9 OSD cable
- 10 USB cable
- 11 +12V power supply
- 12 Power cord (EU)
- 13 Power cord (US)
- 14 easyANALYZER software (USB stick)

*Connector numberings (CN) can be found on the front of the eMotion board.
Connector descriptions can be found on the back of the eMotion board.

INSTALLATION GUIDE

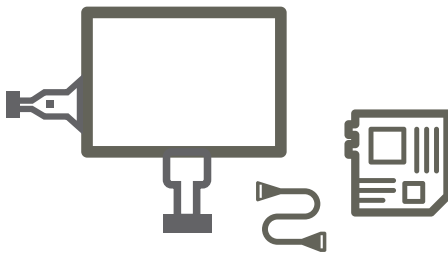
1

Connect easyTOUCH Display 1 PCAP flex tail with I2C-to-USB adaptor board 2 (CN X1).
Connect easyTOUCH Display 1 LCD flex tail to the Dispcn board 3 (CN X300).



2

Connect Dispcn board 3 (CN X100) to eMotion board 4 (CN105) using LVDS cable 7.
Connect Dispcn board 3 (CN X200) to eMotion board 4 (CN108) using LED cable 8.



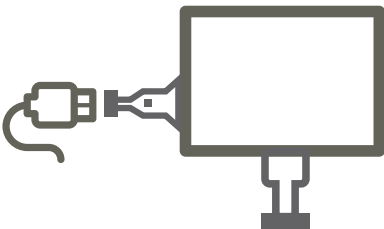
3

Connect OSB board 5 with eMotion board 4 (CN112) using OSD cable 9.



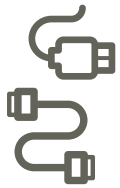
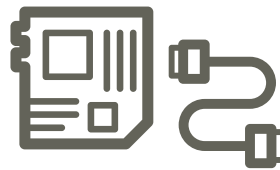
4

Connect USB cable 10 with I2C-to-USB adaptor board 2 (CN X4).



5

Connect DVI cable 6 with eMotion board 4 (CN100).



6

Connect HDMI 6 and USB cable 10 to your host system

7

After all other connections have been made, supply +12V power 11 to emotion board 4 (CN103). Plug in power cord 12 (EU)/ 13 (US)



8

Optional: Install easyANALYZER software 14 on your host system (for Windows and Linux)

Specifications for

Blanview TFT-LCD Monitor **(5.0" WVGA 800 x RGB x 480 Landscape)**

Version 1.0

(Please be sure to check the specifications latest version.)

MODEL COM50H5N01ULC

Customer's Approval

Signature:

Name:

Section:

Title:

Date:

ORTUSTECH

ORTUS TECHNOLOGY CO., LTD.

Approved by

_____ *Y. Nakajima*



Checked by

_____ *R. Kurokuma*

Prepared by

_____ *M. Shibamoto*

 Version History

Ver.	Date	Page	Description	
0.0	Oct. 6, 2016	-	-	Tentative issue
 ×15	Oct. 18, 2017	P4	add	Specifications
		P6	add	Dimensions
		P8	add	SERIAL LABEL (S-LABEL)
		P10	add	Absolute Maxmam Rating
		P10	add	DC Characteristiuics
		P11	add	Back Light
		P17	change	Power ON/OFF sequences
		P19	add	Optical Characteristics
		P20	add	White Chromaticity Range, Temperature Characteristics
		P23	add	Reliability Test
		P24	add	Reliability Criteria
		P28	add	Maximum piling up
		P29	add	Precautions for Peeling off the Protective film
		P30	change	Measurement Condition
P31	change	Measurement Condition		
 ×17	Feb. 1, 2018	-	-	First issue
		P2	change	Location of version history
		P3	change	Contents
		P9	correction	SERIAL LABEL (S-LABEL)
		P10	change	Pin Assignment
		P11	change	Absolute Maximum Rating
		P11	change	Recommended Operating Conditions
		P11	change	DC Characteristiuics
		P12	change	Back Light
		P13	change	number change
		P14	change	number change
		P15	change	number change
		P16	change	number change
		P17	change	number change
		P19	change	Back Light , Center brightness
		P20	change	Back Light
		P21	change	Back Light
P25	add	Packing Specifications		
P30	change	Back Light		

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1. Application

This Specification is applicable to 127.3mm (5.0 inch) Blanview TFT-LCD monitor for non-military use.

- ◎ ORTUS TECHNOLOGY makes no warranty or assume no liability that use of this Product and/or any information including drawings in this Specification by Purchaser is not infringing any patent or other intellectual property rights owned by third parties, and ORTUS TECHNOLOGY shall not grant to Purchaser any right to use any patent or other intellectual property rights owned by third parties. Since this Specification contains ORTUS TECHNOLOGY's confidential information and copy right, Purchaser shall use them with high degree of care to prevent any unauthorized use, disclosure, duplication, publication or dissemination of ORTUS TECHNOLOGY'S confidential information and copy right.
- ◎ If Purchaser intends to use this Products for an application which requires higher level of reliability and/or safety in functionality and/or accuracy such as transport equipment (aircraft, train, automobile, etc.), disaster-prevention/security equipment or various safety equipment, Purchaser shall consult ORTUS TECHNOLOGY on such use in advance.
- ◎ This Product shall not be used for application which requires extremely higher level of reliability and/or safety such as aerospace equipment, telecommunication equipment for trunk lines, control equipment for nuclear facilities or life-support medical equipment.
- ◎ It must be noted as an mechanical design manner, especial attention in housing design to prevent arcuation/flexure or caused by stress to the LCD module shall be considered.
- ◎ ORTUS TECHNOLOGY assumes no liability for any damage resulting from misuse, abuse, and/or miss-operation of the Product deviating from the operating conditions and precautions described in the Specification.
- ◎ It shall be mutually conferred if nonconforming defect which result from unspecified cause in this specification arises.
- ◎ If any issue arises as to information provided in this Specification or any other information, ORTUS TECHNOLOGY and Purchaser shall discuss them in good faith and seek solution.
- ◎ ORTUS TECHNOLOGY assumes no liability for defects such as electrostatic discharge failure occurred during peeling off the protective film or Purchaser's assembly process.
- ◎ This Product is compatible for RoHS directive.

Object substance	Maximum content [ppm]
Cadmium and its compound	100
Hexavalent Chromium Compound	1000
Lead & Lead compound	1000
Mercury & Mercury compound	1000
Polybrominated biphenyl series (PBB series)	1000
Polybrominated biphenyl ether series (PBDE series)	1000

2. Outline Specifications

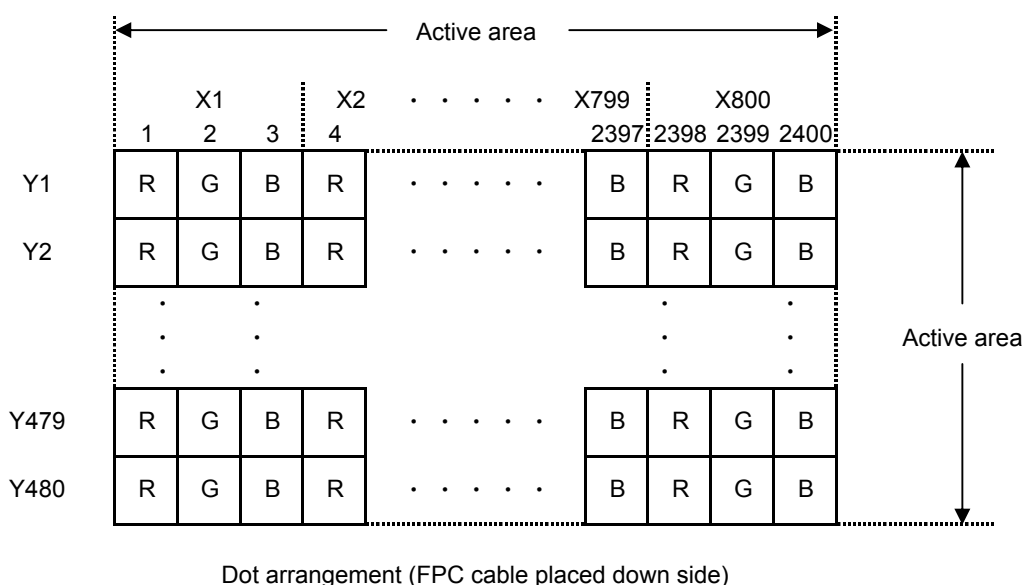
2.1 Features of the Product

- 5.0 inch diagonal display, 800 x RGB [H] x 480 [V] dots.
- 16.7 M colors (8-bit) / 262 K colors (6-bit).
- 3.3V voltage single power source.
- Timing generator [TG], Counter-electrode driving circuitry, Built-in power supply circuit.
- Long life & High bright white LED back-light.
- Blanview TFT-LCD, improved outdoor readability.

	Indoor		Outdoor	
	Readability	Power Efficiency (Battery Life)	Readability	Power Efficiency (Battery Life)
Transmissive	Good	Good	Fair	Poor
Transflective	Fair	Poor	Good	Good
Blanview	Good	Good	Good	Good

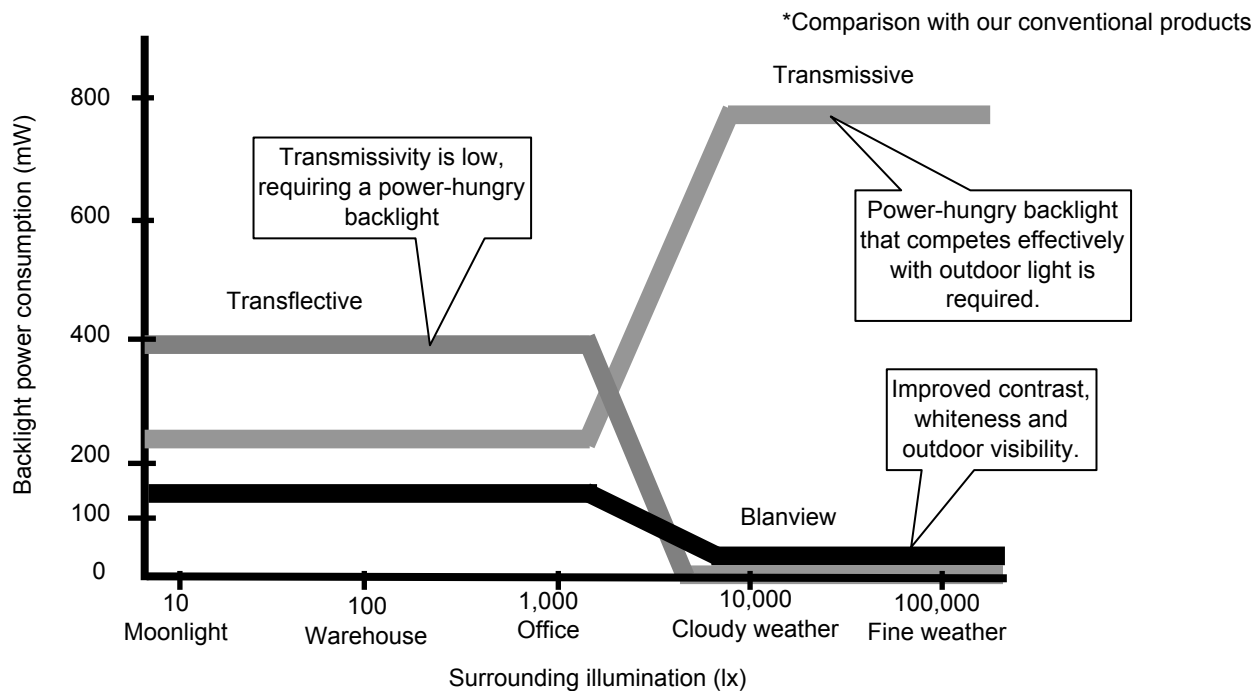
2.2 Display Method

Items	Specifications	Remarks
Display type	VA 16.7 M colors. / 262 K colors. Blanview, Normally black.	
Driving method	a-Si TFT Active matrix. Line-scanning, Non-interlace.	
Dot arrangement	RGB stripe arrangement.	Refer to "Dot arrangement"
Signal input method	8-bit / 6-bit LVDS interface (VESA format)	
Backlight type	Long life & High bright white LED.	
NTSC ratio	50%	



<Features of Blanview>

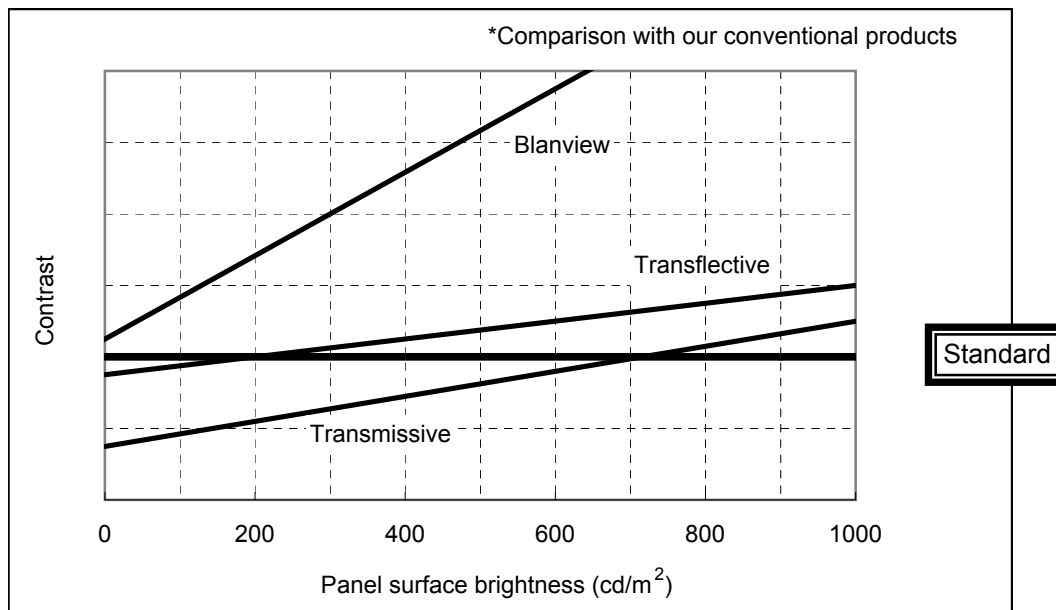
- Backlight power consumption required to assure visibility. (equivalent to 3.5"QVGA)



- Contrast characteristics under 100,000lx. (same condition as direct sunlight.)

With better contrast (higher contrast ratio), Blanview TFT-LCD has the best outdoor readability in three different types of TFT-LCD.

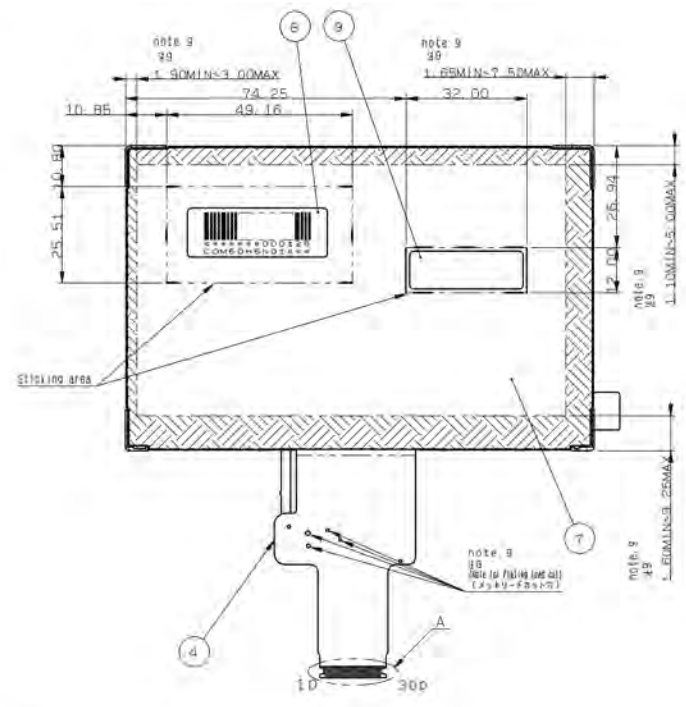
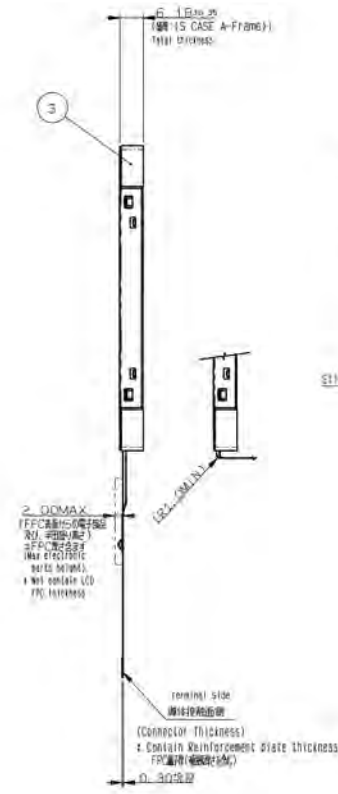
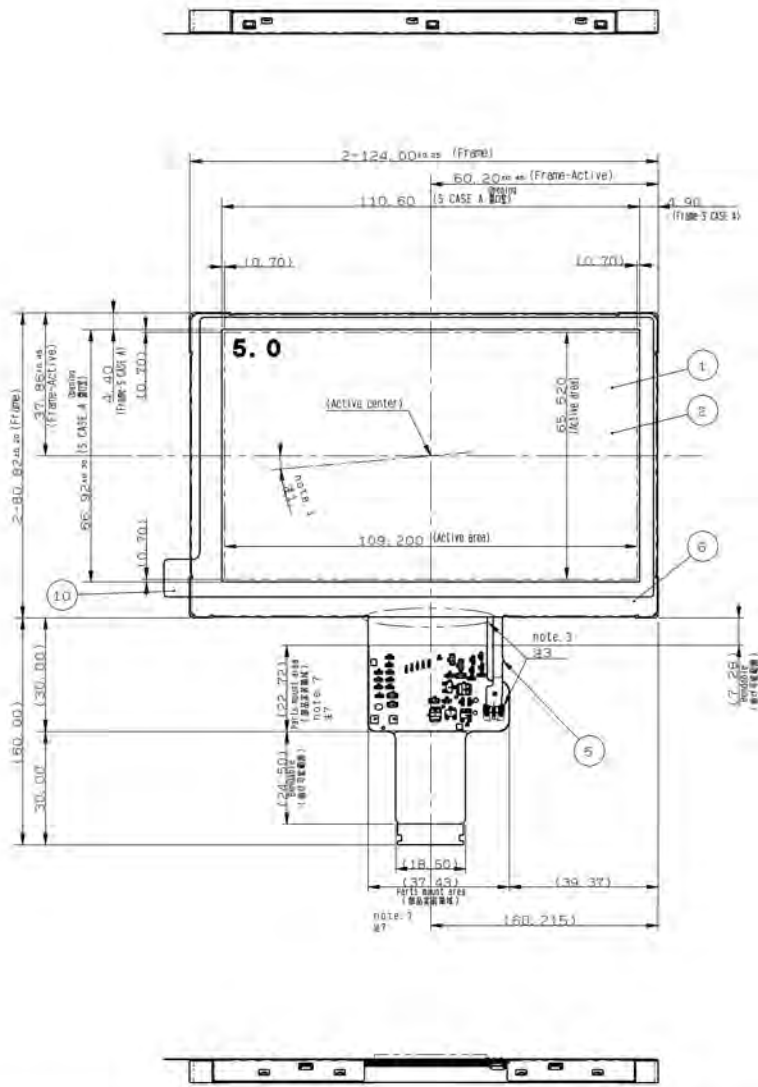
Below chart shows contrast value against panel surface brightness. (Horizontal: Panel surface brightness/ Vertical: Contrast value) LCD panel has enough outdoor readability above our Standard line. (ORTUS TECHNOLOGY criteria)



3. Dimensions and Outward Form

3.1 Dimensions

Items	Specifications	Unit	Remarks
Outline dimensions	124.00[H] × 80.82[V] × 6.18[D]	mm	Exclude FPC cable and parts on FPC.
Active area	109.20[H] × 65.52[V]	mm	127.3mm diagonal
Number of dots	2400[H] × 480[V]	dot	
Dot pitch	45.5[H] × 136.5[V]	um	
Surface hardness of the polarizer	2	H	Load:2.94N
Weight	88	g	Include FPC cable



Angular deviation of LCD cell from the TFT-LCD monitor's reference axis shall be less than 0.5°.

注1. TFT-LCD PANELの両面をAは、モニター部を軸とし1±50°以内とする。

Protective film is affixed on front surface of the screen.
保護膜は前面側に貼られる。

2. 保護膜がモニター部からは剥がされないように注意する。
保護膜はモニター部からは剥がされないように注意する。

Don't stress to FPC bonding area & the solder area.
FPCの接着部及び半田付け部には負荷が加わらないように注意する。

Recommended FPC connectors
1) ISD/MSA-9699S-30A-GFN1(下向き) 7
2) FPCの接続コネクタの規格を下記に示す。
イソ電子工業 : 9699S Ser 19S (IMSA-9699S-30A-GFN1(下向き) 7)

A SERIAL LABEL is affixed the area as shown in the drawing.
The thickness of SERIAL LABEL will be equal to that of UNIT'S CASE C'S UNITARY.

5. SERIAL LABELの貼付位置は図面に示されています。
SはAに厚さが同等の厚さ(S CASE C)から1.0mm厚さになります。

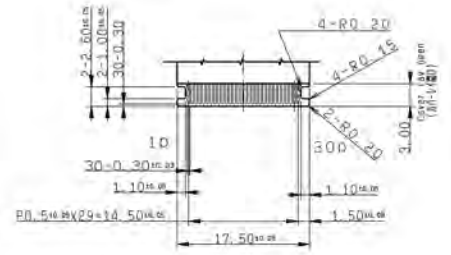
Burns direction of S CASE is opposite (error size is less than 0.1mm).

6. S CASEの方向は逆向きにします。(MAX. 0.1mm)

Don't touch any conductive material to conductive area.
導電性部には導電性部品との接触を避けてください。

Don't touch any conductive material to plating out area.
A. X-Y-Zの位置は導電性部との接触を避けてください。
In case 177-120 monitor is related to the case of 177 product.
It is recommended that monitor is fixed in to area.

9. E-Cは 範囲内で固定することをお勧めいたします。



DETAIL A note. 4
(S=2/1) 34

Protective film	10		
LABEL	9	For BL unit	(30x10x0.08mm)
S LABEL	8	Barcode(CODE39)	For Monitor
S CASE C	7	SUS (t=0.20)	(37x13x0.075t)
S CASE A	6	SUS (t=0.15)	
FPC B	5		Use of LED
FPC A	4	Adhesive	AU/Ni/A
Frame	3	PC	Use of LCD
Polarizer	2		
TFT-LCD PANEL	1	Glass thickness: 0.50mm 30T	

APPROVED	GENERAL TOLERANCE ±0.5	SCALE 1/1	UNIT mm
CHECKED	ISSUE 177:10:07 <td>MODEL COM60-F5N01</td> <td></td>	MODEL COM60-F5N01	
CHECKED	NAME		
DESIGN			
DRAW			

ORTUSTECH ORTUS TECHNOLOGY CO., LTD. DO NOT DUPLICATE, CONFIDENTIAL AND PROPRIETARY	
DRAWING No.	RJD5290470201
REV	SHEET 8/8

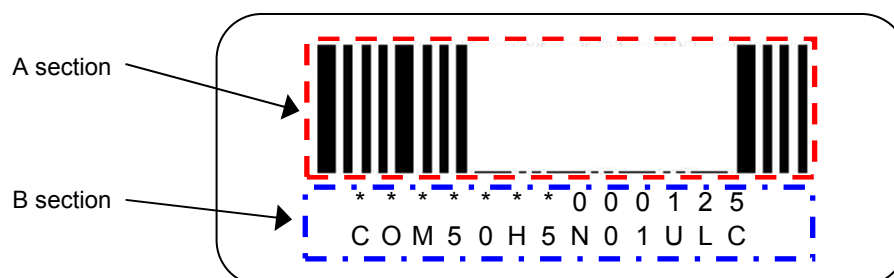
OUTLINE-D5N01

3.3 SERIAL LABEL (S-LABEL)

1) Display Items

A section : Bar code

B section : Combination of a character



Details of B section

Upper column: It indicates The least significant digit of manufacture year (1 digit),
 manufacture month with below alphabet (1letter), model code (5characters),
 serial number (6digits).

*	*	*****	*****
—	—	—	—
a	b	c	d

Contents of display													
a	The least significant digit of manufacture year												
b	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 12.5%;">Jan-A</td> <td style="width: 12.5%;">Mar-C</td> <td style="width: 12.5%;">May-E</td> <td style="width: 12.5%;">Jul-G</td> <td style="width: 12.5%;">Sep-I</td> <td style="width: 12.5%;">Nov-K</td> </tr> <tr> <td>Feb-B</td> <td>Apr-D</td> <td>Jun-F</td> <td>Aug-H</td> <td>Oct-J</td> <td>Dec-L</td> </tr> </table>	Jan-A	Mar-C	May-E	Jul-G	Sep-I	Nov-K	Feb-B	Apr-D	Jun-F	Aug-H	Oct-J	Dec-L
Jan-A	Mar-C	May-E	Jul-G	Sep-I	Nov-K								
Feb-B	Apr-D	Jun-F	Aug-H	Oct-J	Dec-L								
c	Model code 50BRC (Made in Japan) 50BSC (Made in Malaysia)												
d	Serial number												

* Example of indication of Serial label (S-label)

•Made in Japan

8J50BRC000125

means "manufactured in October 2018, 5.0" BR type,
 C specifications, serial number 000125"



•Made in Malaysia

8J50BSC000125

means "manufactured in October 2018, 5.0" BS type,
 C specifications, serial number 000125"

Lower column: Model (13characters)

2) Location of Serial Label (S-label)

Refer to 3.2 "Outward Form".

2) Others

Bar code readability is excluded from quality assurance coverage.

 4. Pin Assignment

No.	Symbol	Function	I/O
1	BLH	LED drive power source. (Anode side)	P
2	BLL2	LED drive power source . (Cathode side 2)	P
3	BLL1	LED drive power source . (Cathode side 1)	P
4	GND	Ground	P
5	VDD	Power supply input.	P
6	VDD	Power supply input.	P
7	TEST1	TEST input (Connect to VDD)	I
8	TEST2	TEST input (Connect to GND)	I
9	TEST3	TEST input (Connect to GND)	I
10	NC	No connection	-
11	UL/DR	Up & Left / Down & Right switching terminal (Low : DR , High or NC : UL)	I
12	IM	6 / 8 bit (based on VESA) switching terminal (Low : 6bit , High or NC : 8bit)	I
13	STBYB	Standby signal (Low:Standby operation,High:Normal operation)	I
14	GND	Ground	P
15	R0-	LVDS DATA0(-)	I
16	R0+	LVDS DATA0(+)	I
17	GND	Ground	P
18	R1-	LVDS DATA1(-)	I
19	R1+	LVDS DATA1(+)	I
20	GND	Ground	P
21	CLK-	LVDS CLK(-)	I
22	CLK+	LVDS CLK(+)	I
23	GND	Ground	P
24	R2-	LVDS DATA2(-)	I
25	R2+	LVDS DATA2(+)	I
26	GND	Ground	P
27	R3-	LVDS DATA3(-)	I
28	R3+	LVDS DATA3(+)	I
29	GND	Ground	P
30	NC	No connection	-

- Recommended connector : IRISO ELECTRONICS 9699 series [IMSA-9699S-30A-GFN1]
- Please make sure to check a consistency between pin assignment in "3.2 Outward Form" and your connector pin assignment when designing your circuit.
Inconsistency in input signal assignment may cause a malfunction.
- Since FPC cable has gold plated terminals, gilt finish contact shoe connector is recommended.

5. Absolute Maximum Rating

GND=0V

B	Item	Symbol	Condition	Rating		Unit	Applicable terminal
				MIN	MAX		
	Supply voltage	VDD		-0.3	3.9	V	VDD
	Input voltage for logic	VI		-0.3	VDD+0.3	V	UL/DR , IM , STBYB
	Forward current	IL		--	70.0	mA	BLH-BLL1/BLL2
	Storage temperature range	Tstg		-40	95	°C	

6. Recommended Operating Conditions

GND=0V

B	Item	Symbol	Condition	Rating			Unit	Applicable terminal
				MIN	TYP	MAX		
	Supply voltage	VDD		3.0	3.3	3.6	V	VDD
	Input voltage for logic	VI		0	--	VDD	V	UL/DR , IM , STBYB
	Operational temperature range	Top	Note1	-30	25	85	°C	Panel surface temperature

Note1: This monitor is operatable in this temperature range. With regard to optical characteristics, refer to Item 9."CHARACTERISTICS".

7. Electrical Characteristics

7.1 DC Characteristics

(Unless otherwise noted, Ta=25 °C, VDD=3.3V, GND=0V)

B	Item	Symbol	Condition	Rating			Unit	Applicable terminal
				MIN	TYP	MAX		
	High Level Input Voltage	VIH		0.7VDD	—	VDD	V	UL/DR, IM, STBYB
	Low Level Input Voltage	VIL		0	—	0.3VDD	V	
	Pull up/down resistor	RI		200	350	850	kΩ	Pull up : IM , STBYB
				100	175	425	kΩ	Pull up : UL/DR
	Operating Current	IDD	Color Bar fclk = 27.2 MHz	—	34.1	68.2	mA	VDD



(Back Light)

Item	Symbol	Condition	Rating			Unit	Applicable terminal
			MIN	TYP	MAX		
Forward current	IL	Ta=25 °C	--	20.0	70.0	mA	BLH - BLL1 / BLL2
Forward voltage	VL	Ta=25 °C IL=20.0 mA Note1	--	13.7	14.9	V	
Estimated Life of LED	LL	Ta=25 °C IL=20.0 mA Note2	--	100000	--	hrs	

Note1: - Reference value

Note2: - The lifetime of the LED is defined as a period till the brightness of the LED decreases to the half of its initial value.

- This figure is given as a reference purpose only, and not as a guarantee.
 - This figure is estimated for an LED operating alone.
- As the performance of an LED may differ when assembled as a monitor together with a TFT panel due to different environmental temperature.
- Estimated lifetime could vary on a different temperature and usually higher temperature could reduce the life significantly.

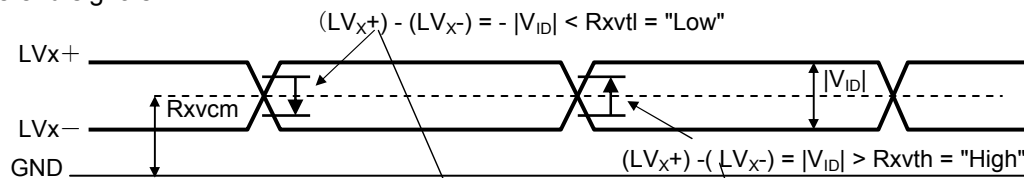
7.2 LVDS interface

7.2.1 LVDS DC Characteristics

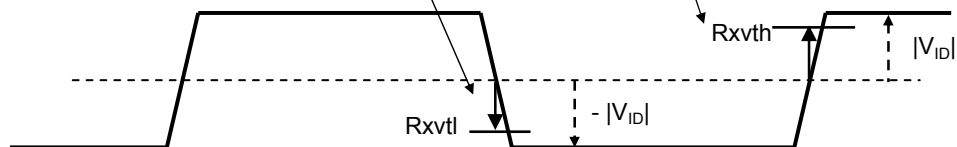
(Unless otherwise noted, $T_a=25\text{ }^\circ\text{C}$, $V_{DD}=3.3\text{V}$, $GND=0\text{V}$)

Item	Symbol	Condition	Rating			Unit	Applicable terminal
			MIN	TYP	MAX		
Differential input high threshold voltage	Rxvth	$R_{xvcm}=1.2\text{V}$	-	-	0.1	V	CLK+, CLK- R0+, R0-, R1+, R1- R2+, R2-, R3+, R3-
Differential input low threshold voltage	Rxvtl		-0.1	-	-	V	
Differential input common Mode voltage	Rxvcm		1.0	1.2	1.4	V	
Differential input voltage	$ V_{ID} $		0.2	-	0.6	V	
Differential input leakage current	$R_{V_{leak}}$		-10	-	+10	μA	

Single end signals



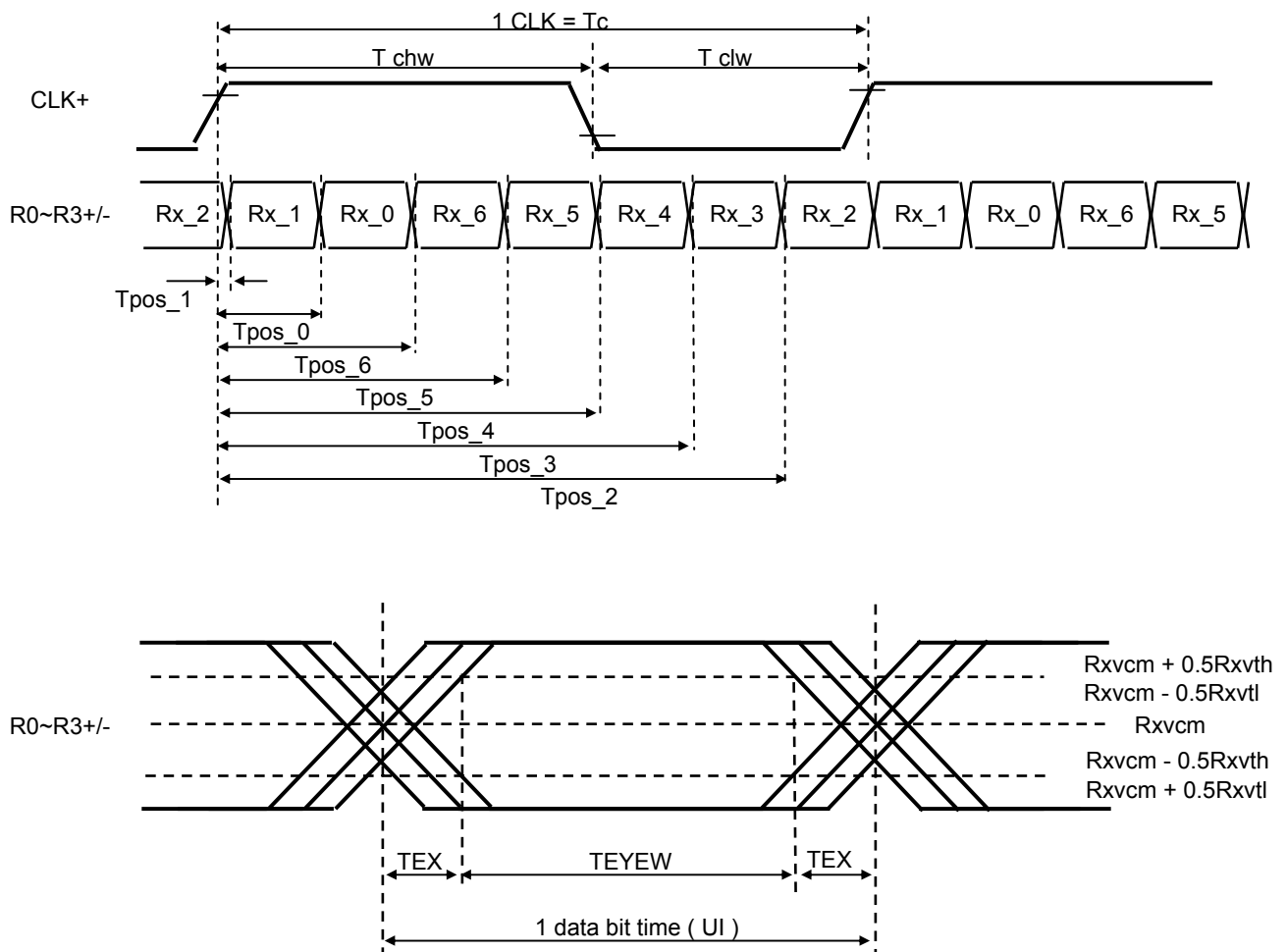
Differential signals



7.2.2 LVDS AC Characteristics

(Unless otherwise noted, $T_a=25^\circ\text{C}$, $V_{DD}=3.3\text{V}$, $GND=0\text{V}$)

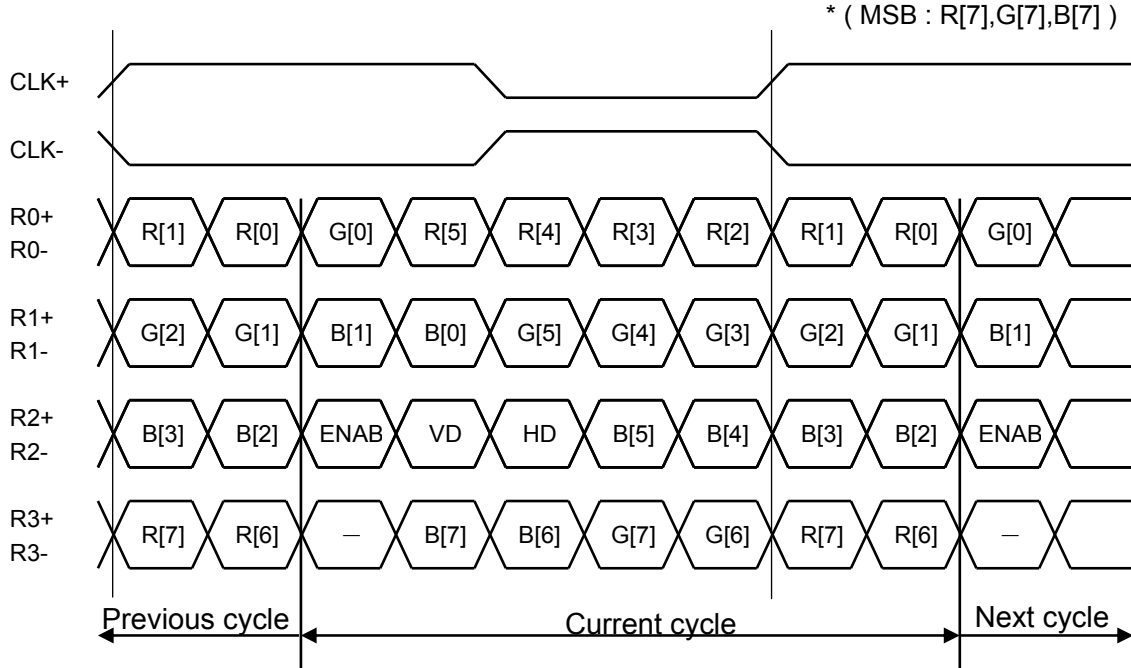
Item	Symbol	Rating			Unit
		MIN	TYP	MAX	
CLK Frequency	f clk	25.2	27.2	30.5	MHz
Clock period	Tc	32.8	36.8	39.7	ns
1 data bit time	UI	-	1/7	-	Tc
CLK High level Width	T chw	2.9	4	4.1	UI
CLK Low level Width	T clw	2.9	3	4.1	UI
Position 1	Tpos_1	-0.2	0	0.2	UI
Position 0	Tpos_0	0.8	1	1.2	UI
Position 6	Tpos_6	1.8	2	2.2	UI
Position 5	Tpos_5	2.8	3	3.2	UI
Position 4	Tpos_4	3.8	4	4.2	UI
Position 3	Tpos_3	4.8	5	5.2	UI
Position 2	Tpos_2	5.8	6	6.2	UI
Reciever Strobe Position 7	TEYEW	0.6	-	-	UI
Reciever Strobe Position 8	TEX	-	-	0.2	UI



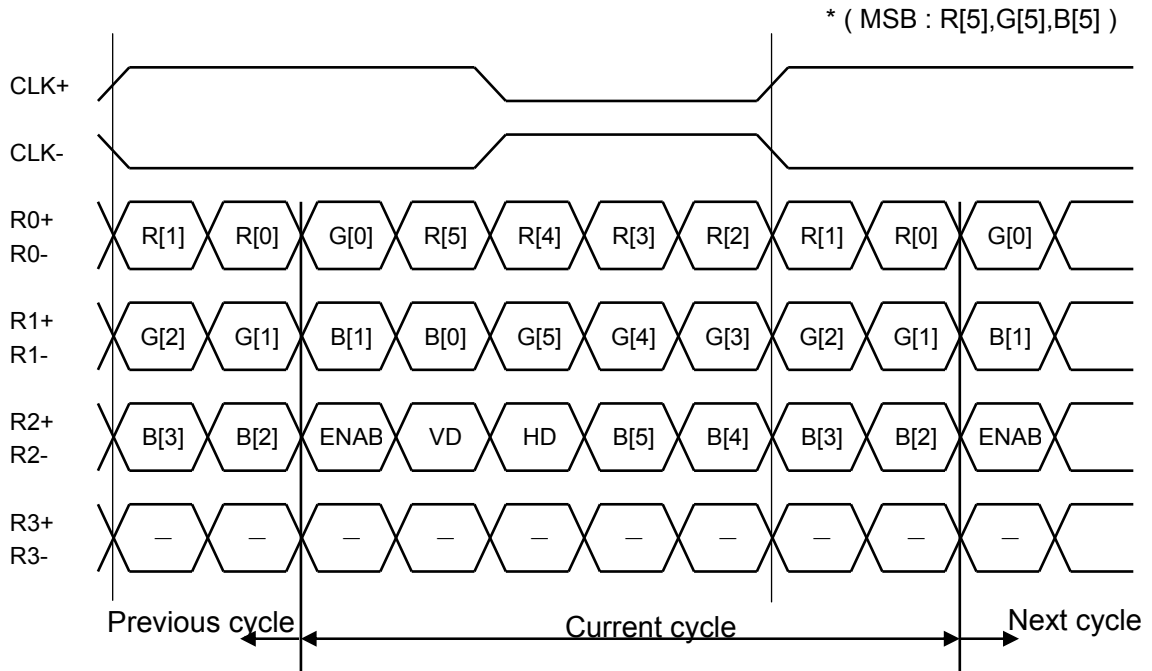


7.2.3 LVDS Data Format

VESA Format 8bit



VESA Format 6bit

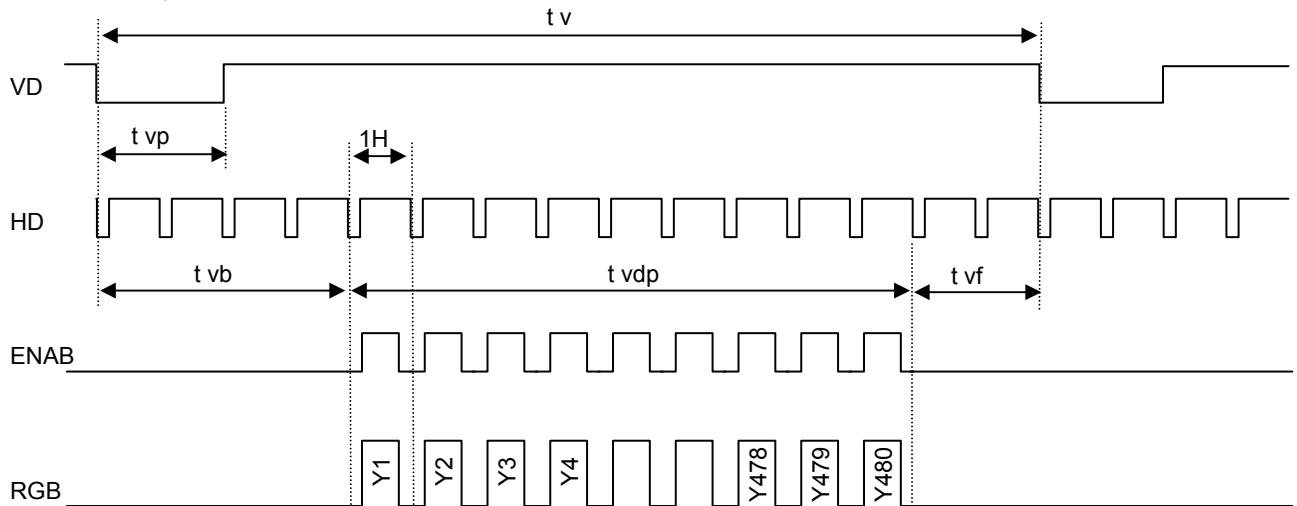


7.3 Input timing

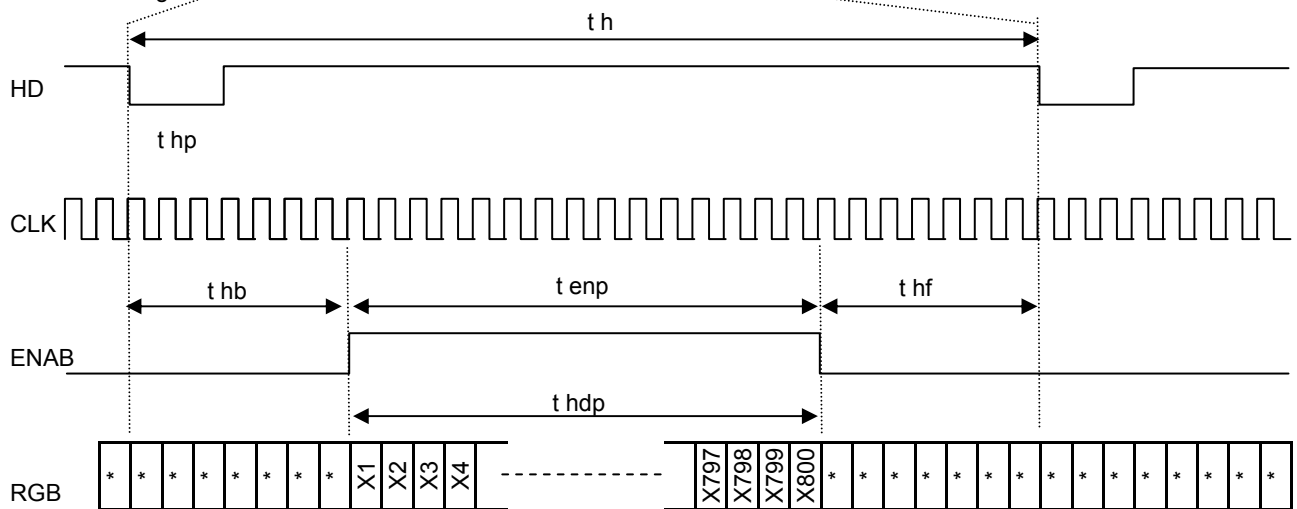
Item	Symbol	Rating			Unit	Signal (*)
		MIN	TYP	MAX		
CLK frequency	fCLK	25.2	27.2	30.5	MHz	CLK
VD frequency	fVD		60		Hz	VD
1 vertical field	tv	490	528	552	H	
VD pulse width	tvp	1	2	66	H	
VD back porch	tvb	5	10	67	H	VD,HD,ENAB
VD front porch	tvf	5	38	67	H	R[7:0],G[7:0],B[7:0]
Vertical valid data	tvdp		480		H	
HD frequency	fHD		28.8		kHz	HD
1 horizontal field	th	856	860	920	CLK	
HD pulse width	thp	1	2	100	CLK	
HD back porch	thb	5	16	101	CLK	CLK,HD,ENAB
HD front porch	thf	19	44	115	CLK	R[7:0],G[7:0],B[7:0]
ENAB pulse width	tenp		800		CLK	
Horizontal valid data	thdp		800		CLK	

(*) Input terminals are (R0+/- , R1+/- , R2+/- , R3+/- , CLK+/-).

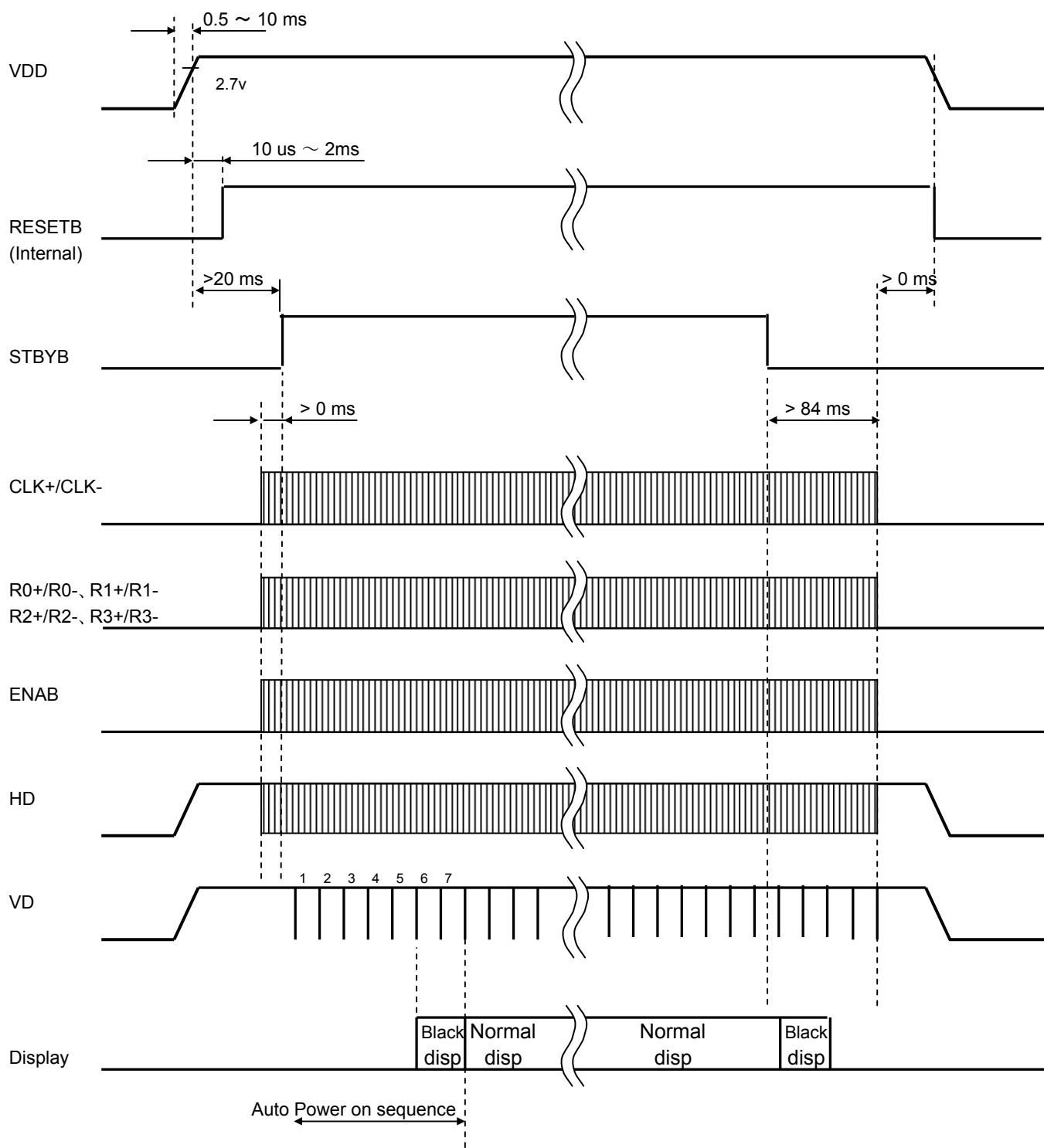
<Vertical timing>



<Horizontal timing>

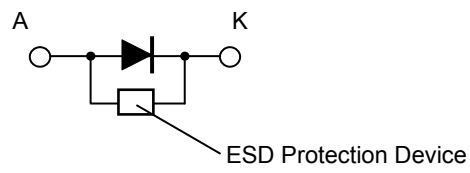
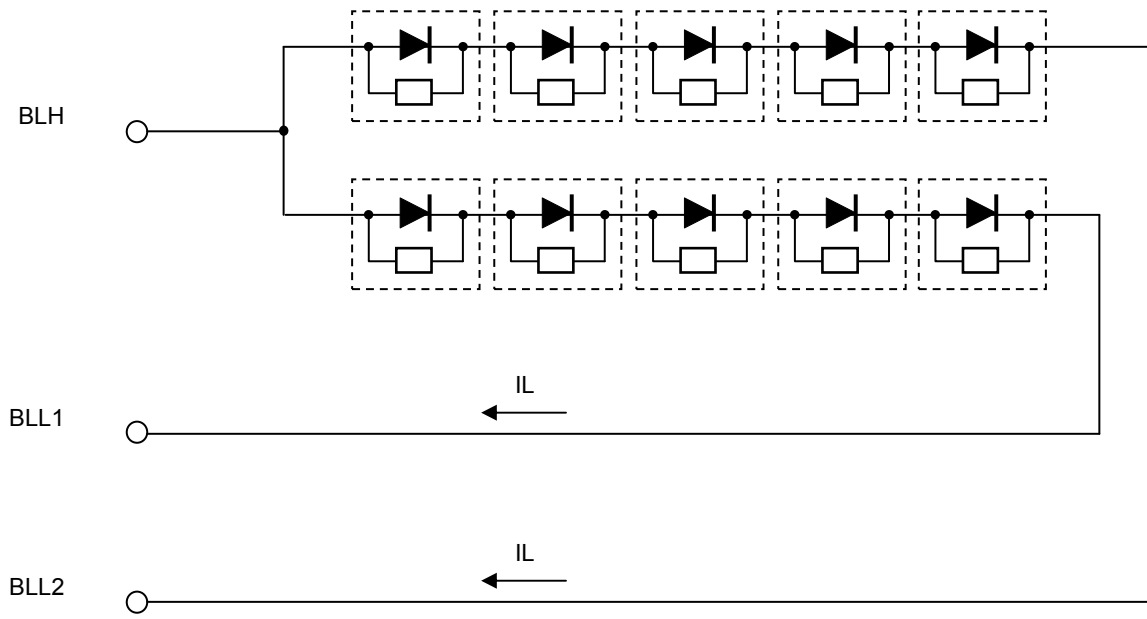


B 7.4 Power ON/OFF sequence



Note: ENAB, HD and VD are included in the R2 + / R2- terminals.

8. LED Circuit




9. Characteristics

9.1 Optical Characteristics

< Measurement Condition >

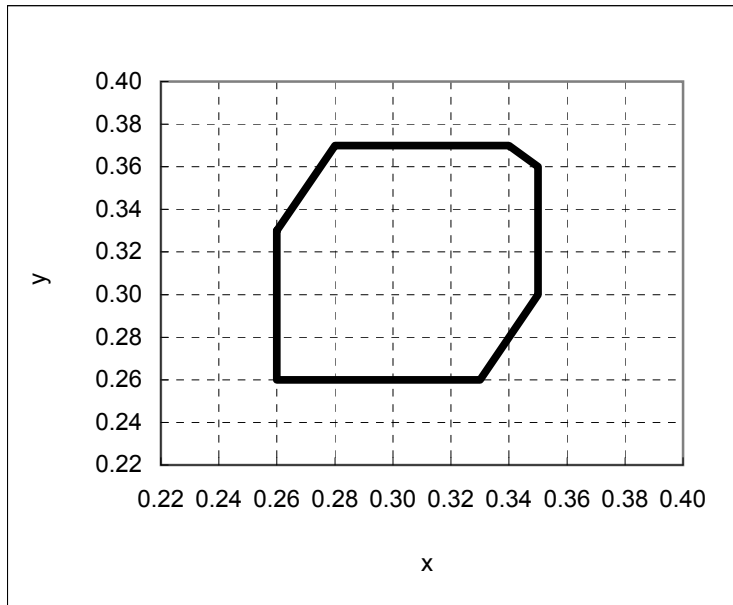
Measuring instruments: CS2000 (KONICA MINOLTA) , LCD7200(OTSUKA ELECTRONICS) ,
EZcontrast160D (ELDIM)

Driving condition: VDD = 3.3V, VSS = 0V
Optimized VCOMDC

 Backlight: IL=20.0mA
Measured temperature: Ta=25° C

Item		Symbol	Condition	MIN	TYP	MAX	Unit	Note No.	Remark
Response time	Rise time	TON	[Data]= 00h→FFh	—	—	60	ms	1	
	Fall time	TOFF	[Data]= FFh→00h	—	—	40	ms		
Contrast ratio	Backlight ON	CR	[Data]= FFh / 00h	540	900	—		2	
	Backlight OFF			—	2.5	—			
Viewing angle	Left	θL	[Data]= FFh / 00h CR ≥ 10	80	—	—	deg	3	
	Right	θR		80	—	—	deg		
	Up	φU		80	—	—	deg		
	Down	φD		80	—	—	deg		
White Chromaticity	x		[Data]=FFh	White chromaticity range				4	
	y								
Burn-in				No noticeable burn-in image shall be observed after 2 hours of window pattern display.				5	
Center brightness			[Data]=FFh	—	830	—	cd/m ²	6	ILED=40mA
				245	430				ILED=20mA
Brightness distribution			[Data]=FFh	70	75	—	%	7	

* Note number 1 to 7: Refer to the APPENDIX of "Reference Method for Measuring Optical Characteristics".



White Chromaticity Range

【White Chromaticity Range】

x	y
0.26	0.33
0.26	0.26
0.33	0.26
0.35	0.30
0.35	0.36
0.34	0.37
0.28	0.37

9.2 Temperature Characteristics

< Measurement Condition >

Measuring instruments: CS2000 (KONICA MINOLTA) , LCD7200(OTSUKA ELECTRONICS)

Driving condition: VDD = 3.3V, VSS = 0V

Optimized VCOMDC



Backlight: IL=20.0mA

Item		Specification		Remark
		Ta=-20°C	Ta=70°C	
Contrast ratio	CR	200 or more	200 or more	Backlight ON
Response time	Rise time	TON	200 msec or less	30 msec or less
	Fall time	TOFF	300 msec or less	50 msec or less
Display Quality		No noticeable display defect or ununiformity should be observed.		

10. Criteria of Judgment

10.1 Defective Display and Screen Quality

Test Condition: Observed TFT-LCD monitor from front during operation with the following conditions

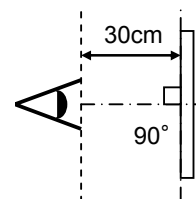
Driving Signal Raster Patter (RGB, white, black)

Signal condition [Data]:00h, A8h, FFh (3steps)

Observation distance 30 cm

Illuminance 200 to 350 lx

Backlight IL=20.0mA



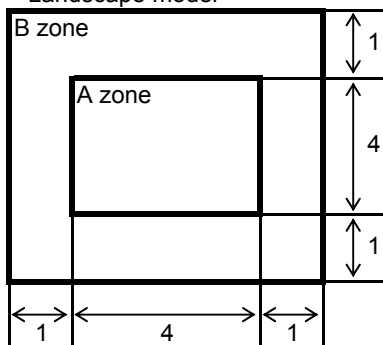
Defect item	Defect content		Criteria	
Display Quality	Line defect	Black, white or color line, 3 or more neighboring defective dots	Not exists	
	Dot defect	Uneven brightness on dot-by-dot base due to defective TFT or CF, or dust is counted as dot defect (brighter dot, darker dot)	Refer to table 1	
		High bright dot: Visible through 2% ND filter at [Data]=00h	Acceptable	
		Low bright dot: Visible through 5% ND filter at [Data]=00h Dark dot: Appear dark through white display at [Data]=A8h Invisible through 5% ND filter at [Data]=00h		
Screen Quality	Dirt	Uneven brightness (white stain, black stain etc)	Invisible through 5% ND filter at Black screen. Invisible through 1% ND filter at other screen.	
	Foreign particle	Point-like	$0.25\text{mm} < \varphi$	N=0
			$0.20\text{mm} < \varphi \leq 0.25\text{mm}$	$N \leq 3$
			$\varphi \leq 0.20\text{mm}$	Acceptable
		Liner	$3.0\text{mm} < \text{length and } 0.08\text{mm} < \text{width}$	N=0
		$\text{length} \leq 3.0\text{mm or width} \leq 0.08\text{mm}$	Acceptable	
Others		Use boundary sample for judgment when necessary		

φ (mm): Average diameter = (major axis + minor axis)/2
Permissible number: N

Table 1

Area	High bright dot	Low bright dot	Dark dot	Total	Criteria
A	0	2	2	3	Permissible distance between same color bright dots (includes neighboring dots): 3 mm or more Permissible distance between same color high bright dots (includes neighboring dots): 5 mm or more
B	2	4	4	6	
Total	2	4	4	7	

<Landscape model>



Division of A and B areas
B area: Active area
Dimensional ratio between A and B areas: 1: 4: 1
(Refer to the left figure)

10.2 Screen and Other Appearance

Testing conditions

Observation distance	30cm
Illuminance	1200~2000 lx

Item		Criteria	Remark
Polarizer	Flaw	Ignore invisible defect when the backlight is on.	Applicable area: Active area only (Refer to the section 3.2 "Outward form")
	Stain		
	Bubble		
	Dust		
	Dent		
S-case		No functional defect occurs	
FPC cable		No functional defect occurs	

11. Reliability Test

Test item		Test condition		number of failures /number of examinations
Durability test	High temperature storage	Ta=95° C	240hrs	0/3
	Low temperature storage	Ta=-40° C	240hrs	0/3
	High temperature & high humidity storage	Ta=60° C, RH=90% non condensing	240hrs	0/3
	High temperature operation	Tp=85° C	240hrs	0/3
	Low temperature operation	Tp=-30° C	240hrs	0/3
	High temp & humid operation	Tp=40° C, RH=90% non condensing	240hrs	0/3
	Thermal shock storage	-40←→95° C(30min/30min)	100 cycles	0/3
Mechanical environmental test	Electrostatic discharge test (Non operation)	Confirms to EIAJ ED-4701/300 C=200pF,R=0Ω,V=±200V Each 3 times of discharge on and power supply and other terminals.		0/3
	Surface discharge test (Non operation)	C=250pF, R=100Ω, V=±12kV Each 5 times of discharge in both polarities on the center of screen with the case grounded.		0/3
	FPC tension test	Pull the FPC with the force of 3N for 10 sec. in the direction - 90-degree to its original direction.		0/3
	FPC bend test	Pull the FPC with the force of 3N for 10 sec. in the direction -180-degree to its original direction. Reciprocate it 3 times.		0/3
	Vibration test	Total amplitude 1.5mm, f=10~55Hz, X,Y,Z directions for each 2 hours		0/3
	Impact test	Use ORTUS TECHNOLOGY original jig (see next page)and make an impact with peak acceleration of 1000m/s ² for 6 msec with half sine-curve at 3 times to each X, Y, Z directions in conformance with JIS C 60068-2-27-2011.		0/3
Packing test	Packing vibration-proof test	Acceleration of 19.6m/s ² with frequency of 10→55→10Hz, X,Y, Zdirection for each 30 minutes		0/1 Packing
	Packing drop test	Drop from 75cm high. 1 time to each 6 surfaces, 3 edges, 1 corner		0/1 Packing

Note: Ta=ambient temperature Tp=Panel temperature

※ The profile of high temperature/humidity storage and High Temperature/humidity operation
(Pure water of over 10MΩ·cm shall be used.)

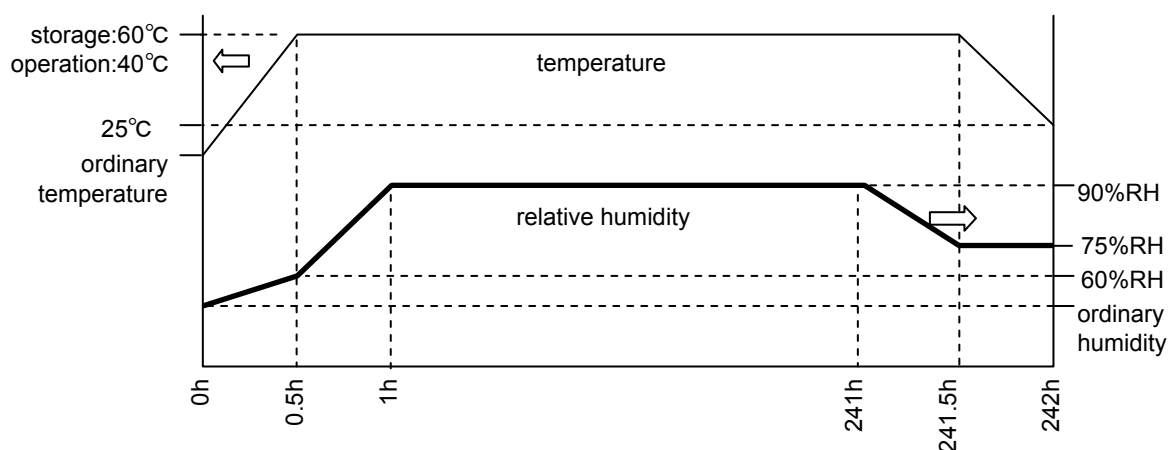
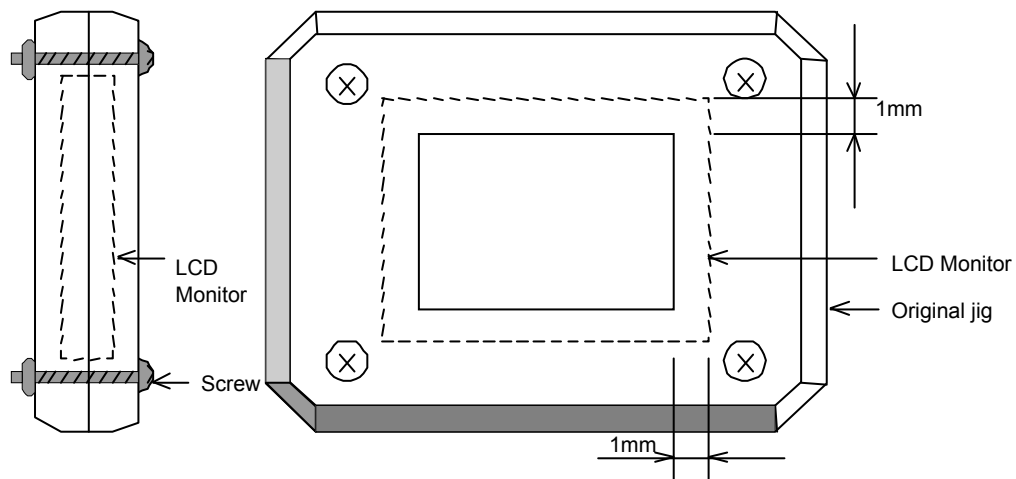


Table2.Reliability Criteria

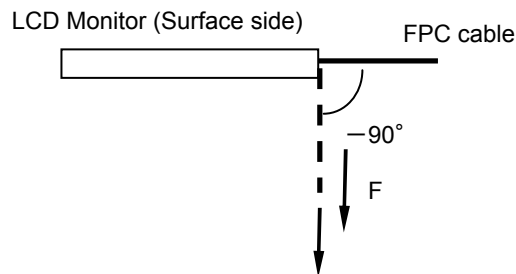
The parameters should be measured after leaving the monitor at the ordinary temperature for 24 hours or more after the test completion.

item	Standard	Remarks
Display quality	No visible abnormality shall be seen. (Except for unevenness by PoI deterioration.)	
Contrast ratio	200 or more	Backlight ON

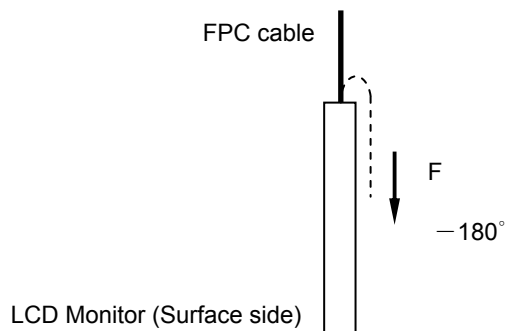
ORTUS TECHNOLOGY Original Jig



Tension Test Method for FPC cable



Bend Test Method for FPC cable



13. Handling Instruction

13.1 Cautions for Handling LCD panels

**Caution**

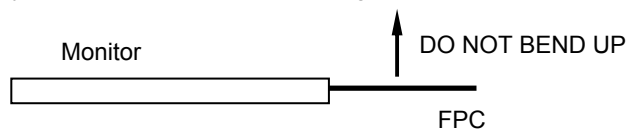
- (1) Do not make an impact on the LCD panel glass because it may break and you may get injured from it.
- (2) If the glass breaks, do not touch it with bare hands.
(Fragment of broken glass may stick you or you cut yourself on it.)
- (3) If you get injured, receive adequate first aid and consult a medial doctor.
- (4) Do not let liquid crystal get into your mouth.
(If the LCD panel glass breaks, try not let liquid crystal get into your mouth even toxic property of liquid crystal has not been confirmed.)
- (5) If liquid crystal adheres, rinse it out thoroughly.
(If liquid crystal adheres to your cloth or skin, wipe it off with rubbing alcohol or wash it thoroughly with soap. If liquid crystal gets into eyes, rinse it with clean water for at least 15 minutes and consult an eye doctor.)
- (6) If you scrap this products, follow a disposal standard of industrial waste that is legally valid in the community, country or territory where you reside.
- (7) Do not connect or disconnect this product while its application products is powered on.
- (8) Do not attempt to disassemble or modify this product as it is precision component.
- (9) If a part of soldering part has been exposed, and avoid contact (short-circuit) with a metallic part of the case etc. about FPC of this model, please.
Please insulate it with the insulating tape etc. if necessary.
The defective operation is caused, and there is a possibility to generation of heat and the ignition.
- (10) Since excess current protection circuit is not built in this TFT module, there is the possibility that LCD module or peripheral circuit become feverish and burned in case abnormal operation is generated.
We recommend you to add excess current protection circuit to power supply.
- (11) The devices on the FPC are damageable to electrostatic discharge, because the terminals of the devices are exposed.
Wear grounded wrist-straps and use electrostatic neutralization blowers to prevent static charge and discharge when handling the TFT monitors.
Designate an appropriate operating area, and set equipment, tools, and machines properly when handling this product.



Caution This mark is used to indicate a precaution or an instruction which, if not correctly observed, may result in bodily injury, or material damages alone.

13.2 Precautions for Handling

- 1) Wear finger tips at incoming inspection and for handling the TFT monitors to keep display quality and keep the working area clean.
Do not touch the surface of the monitor as it is easily scratched.
- 2) Wear grounded wrist-straps and use electrostatic neutralization blowers to prevent static charge and discharge when handling the TFT monitors as the LED in this TFT monitors is damageable to electrostatic discharge. Designate an appropriate operating area, and set equipment, tools, and machines properly when handling this product.
- 3) Avoid strong mechanical shock including knocking, hitting or dropping to the TFT monitors for protecting their glass parts. Do not use the TFT monitors that have been experienced dropping or strong mechanical shock.
- 4) Do not use or storage the TFT monitors at high temperature and high humidity environment. Particularly, never use or storage the TFT monitors at a location where condensation builds up.
- 5) Avoid using and storing TFT monitors at a location where they are exposed to direct sunlight or ultraviolet rays to prevent the LCD panels from deterioration by ultraviolet rays.
- 6) Do not stain or damage the contacts of the FPC cable .
FPC cable needs to be inserted until it can reach to the end of connector slot.
During insertion, make sure to keep the cable in a horizontal position to avoid an oblique insertion.
Otherwise, it may cause poor contact or deteriorate reliability of the FPC cable.
- 7) Do not bend or pull the FPC cable or carry the TFT monitor by holding the FPC cable.
Especially, it will cause mechanical damage or critical defect if FPC is pull up or bent up to short of display.



- 8) Peel off the protective film on the TFT monitors during mounting process.
Refer to the section 13.5 on how to peel off the protective film.
We are not responsible for electrostatic discharge failures or other defects occur when peeling off the protective film.

13.3 Precautions for Operation

- 1) Since this TFT monitors are not equipped with light shielding for the driver IC, do not expose the driver IC to strong lights during operation as it may cause functional failures.
- 2) In case of powering up or powering off this LCD module, be sure to comply the sequence as instructed in this specification.
- 3) Do not plug in or out the FPC cable while power supply is switch on.
Plug the FPC cable in and out while power supply is switched off.
- 4) Do not operate the TFT monitors in the strong magnetic field. It may break the TFT monitors.
- 5) Do not display a fixed image on the screen for a long time.
Use a screen-saver or other measures to avoid a fixed image displayed on the screen for a long time.
Otherwise, it may cause burn-in image on the screen due the characteristics of liquid crystal.

13.4 Storage Condition for Shipping Cartons

Storage environment

- Temperature 0 to 40° C
- Humidity 60%RH or less
No-condensing occurs under low temperature with high humidity condition.
- Atmosphere No poisonous gas that can erode electronic components and/or wiring materials should be detected.
- Time period 1 year
- Unpacking To prevent damages caused by static electricity, anti-static precautionary measures (e.g. earthing, anti-static mat) should be implemented.
After unpack, keep product in the appropriate condition, otherwise bubble seal of Protective film may be printed on Polarizer.
- Maximum piling up 7 cartons

*Conditions to storage after unpacking

Storage environment

- Temperature 0 to 40° C
- Humidity 60%RH or less
No-condensing occurs under low temperature with high humidity condition.
- Atmosphere No poisonous gas that can erode electronic components and/or wiring materials should be detected.
- Time period 1 year (Shelf life)
- Others Keep/ store away from direct sunlight
Storage goods on original tray made by ORTUS.

APPENDIX

Reference Method for Measuring Optical Characteristics and Performance

1. Measurement Condition (Backlight ON)

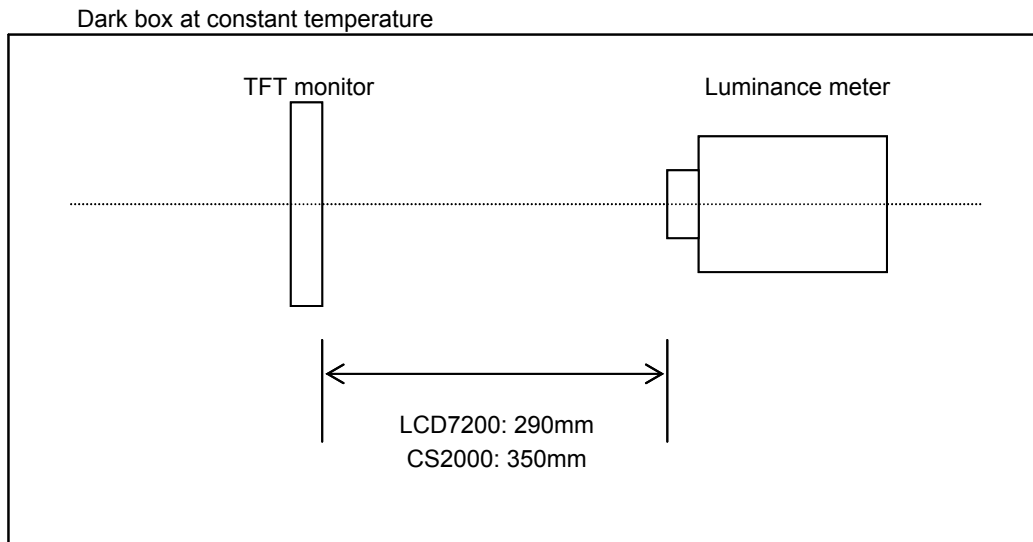
Measuring instruments: CS2000 (KONICA MINOLTA) , LCD7200(OTSUKA ELECTRONICS) ,EZcontrast160D (ELDIM)

Driving condition: Refer to the section "Optical Characteristics"

Measured temperature: 25° C unless specified

Measurement system: See the chart below. The luminance meter is placed on the normal line of measurement system.

Measurement point: At the center of the screen unless otherwise specified

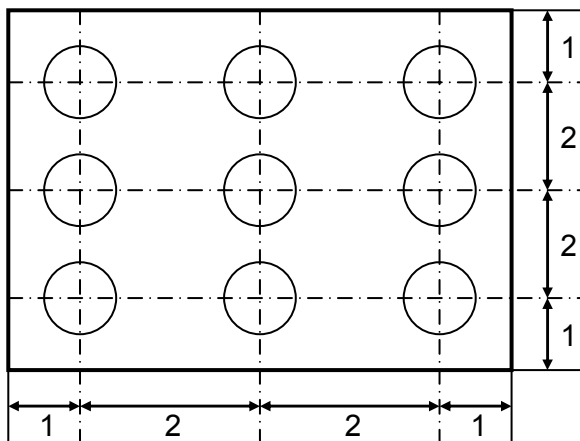


Measurement is made after 30 minutes of lighting of the backlight.

Measurement point: At the center point of the screen

Brightness distribution: 9 points shown in the following drawing.

<Landscape model>



Dimensional ratio of active area

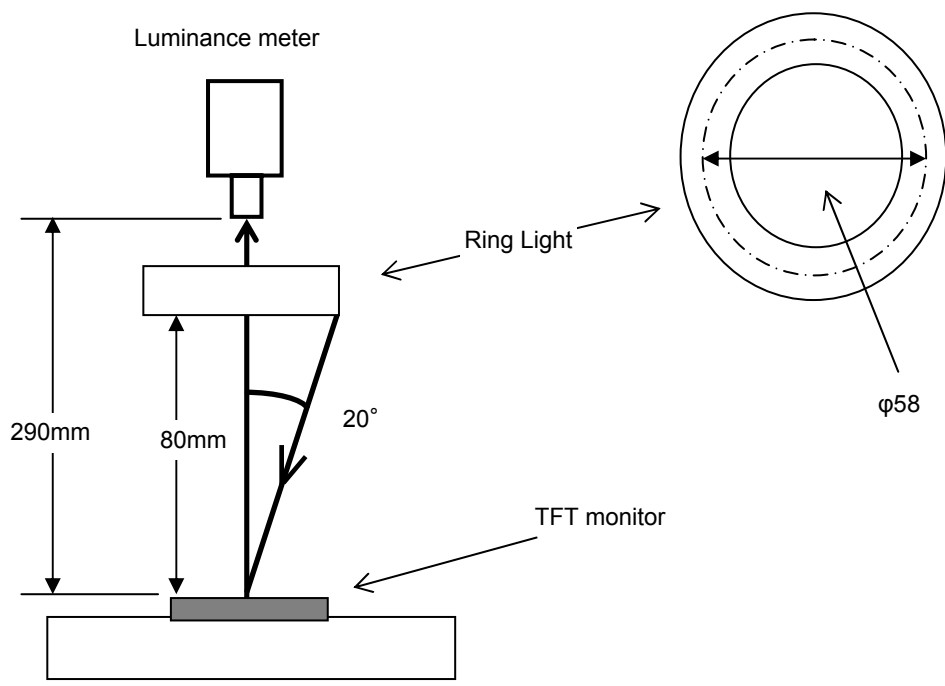


Backlight

IL=20.0mA

Measurement Condition (Contrast ratio Backlight OFF only)

- Measuring instruments: LCD7200(OTSUKA ELECTRONICS),Ring Light(40,000 lx,φ58)
- Driving condition: Refer to the section "Optical Characteristics"
- Measured temperature: 25° C unless specified
- Measurement system: See the chart below.
- Measurement point: At the center of the screen.



2. Test Method

Notice	Item	Test method	Measuring instrument	Remark
1	Response time	<p>Measure output signal waveform by the luminance meter when raster of window pattern is changed from white to black and from black to white.</p> <p style="text-align: center;">Black White Black</p> <p>White brightness</p> <p>100%</p> <p>90%</p> <p>10%</p> <p>0%</p> <p>Black brightness</p> <p>TON</p> <p>TOFF</p>	LCD7200	<p>Black display [Data]=00h</p> <p>White display [Data]=FFh</p> <p>TON</p> <p>Rise time</p> <p>TOFF</p> <p>Fall time</p>
2	Contrast ratio	<p>Measure maximum luminance Y1([Data]=FFh) and minimum luminance Y2([Data]=00h) at the center of the screen by displaying raster or window pattern. Then calculate the ratio between these two values.</p> <p>Contrast ratio = Y1/Y2</p> <p>Diameter of measuring point: 1mmφ(CS2000)</p> <p>Diameter of measuring point: 3mmφ(LCD7200)</p>	CS2000 LCD7200	Backlight ON Backlight OFF
3	Viewing angle Horizontalθ Verticalφ	Move the luminance meter from right to left and up and down and determine the angles where contrast ratio is 10.	EZcontrast160D	
4	White chromaticity	<p>Measure chromaticity coordinates x and y of CIE1931 colorimetric system at [Data] = FFh</p> <p>Color matching function: 2°view</p>	CS2000	
5	Burn-in	Visually check burn-in image on the screen after 2 hours of "window display" ([Data]=00h/FFh).		At optimized VCOMDC
6	Center brightness	Measure the brightness at the center of the screen.	CS2000	
7	Brightness distribution	<p>(Brightness distribution) = 100 x B/A %</p> <p>A : max. brightness of the 9 points</p> <p>B : min. brightness of the 9 points</p>	CS2000	



**5.0" PCAP Solution
12033152**

Date: 10.07.2018

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1 Scope

DATA MODUL's PCAP solution 12033152 consists of a 5.0" capacitive touch screen. Please note that this is only a sub-assembly of the final product. The specification of the final end product might differ from this specification.

2 Touch Sensor and Cover Glass

2.1 Technical Parameters

Screen size	5.0 inch /12.7 cm
Format	Wide
Composite	Glass / Film / Film
Outline dimensions	130.02 x 83.61 x 1.73 mm (WxHxT)
Active area	111.82 x 67.52 mm (WxH)
Carrier glass	1.1 mm
Bending radius of tail	R = 5mm recommended
Transmissivity	85% (min.)
Haze	3% (max.)
Operating temperature and humidity	-20 to +70°C, 20 to 85 % RH
Storage temperature and humidity	-40 to +80°C, 20 to 90 % RH
Tail connector	Omron XF3M-1015-1B

* Note 1: When the ambient temperature is above 65°C, the humidity has to be below 50%RH

2.2 Reliability Tests

Low Temperature Storage Test	-30°C for 72h
High Temperature Storage Test	70°C for 72h
High Temperature / High Humidity Test	60°C, 85% RH for 250h
Cycle test	-20°C / 60°C, 2 h / cycle, 36 cycles

3 Touch Controller (640T I²C)

The touch controller IC is provided as a COF (chip on flex) assembly.

3.1 Electrical specification

Power supply	3.3V ± 5%
Vin ripple	40 mV peak-peak max.
On board voltage	3.3 and 6.6V max. (subject to configuration)
Power consumption	40 mW max. (subject to configuration)

3.2 Interface specification

Protocol	I ² C version 6.0	
Touch report	16 fingers simultaneously max.	
Resolution	4096 x 4096 (x/y)	
I ² C address	0x4A or 0x4B	
HID-I ² C vendor ID / product ID	0x03EB (Atmel) / 0x214D (mXT640T)	
Required pull-up resistance	Standard mode (100 kHz)	1k to 10k
	Fast mode (400 kHz)	1k to 3k
	Fast+ mode (1 MHz)	0.7k max.
	High-Speed mode (3.4 MHz)	0.5k to 0.75k
Low input logic level	SDA, SCL RES, GPIO	-0.3V to 0.3x VddIO
High input logic level	SDA, SCL RES, GPIO	0.7 x VddIO to VddIO 0.85 VddIO to VddIO
Low output logic level	CHG, GPIO	0V to 0.2 x VddIO
High output logic level	CHG, GPIO	0.8 x VddIO to VddIO

3.3 Pin Configuration

Pin	Signal	Description
1	VDD	Power Supply
2	CHG	Change, need Pull Up
3	SDA	I ² C Data, need Pull Up
4	SCL	I ² C Clock, need Pull Up
5	RES	Reset, active low
6	-	<i>Do not connect</i>
7	-	<i>Do not connect</i>
8	ADDSEL	I ² C address selection (<i>GND for 0x4A, pull up to VddIO select 0x4B</i>)
9	I ² CM	I ² C mode selection (<i>GND to select HID-I²C mode, pull up to VddIO to select I²C mode</i>)
10	GND	Ground

4 Optical Inspection Criteria and Handling Recommendations

4.1 Optical Inspection Criteria

For details on the optical inspection criteria, please refer to DATA MODULs Outgoing Spec or ask your local DATA MODUL sales representative.

4.2 Handling Recommendations

Precautions for operation

- Do not put a heavy, hard or sharp object on the product
- Do not bend the product in order to assure the reliability
- Do not put one product on the other. Otherwise, it may cause the product to be scratched
- Don't use any organic solvent acid or alkali solution.

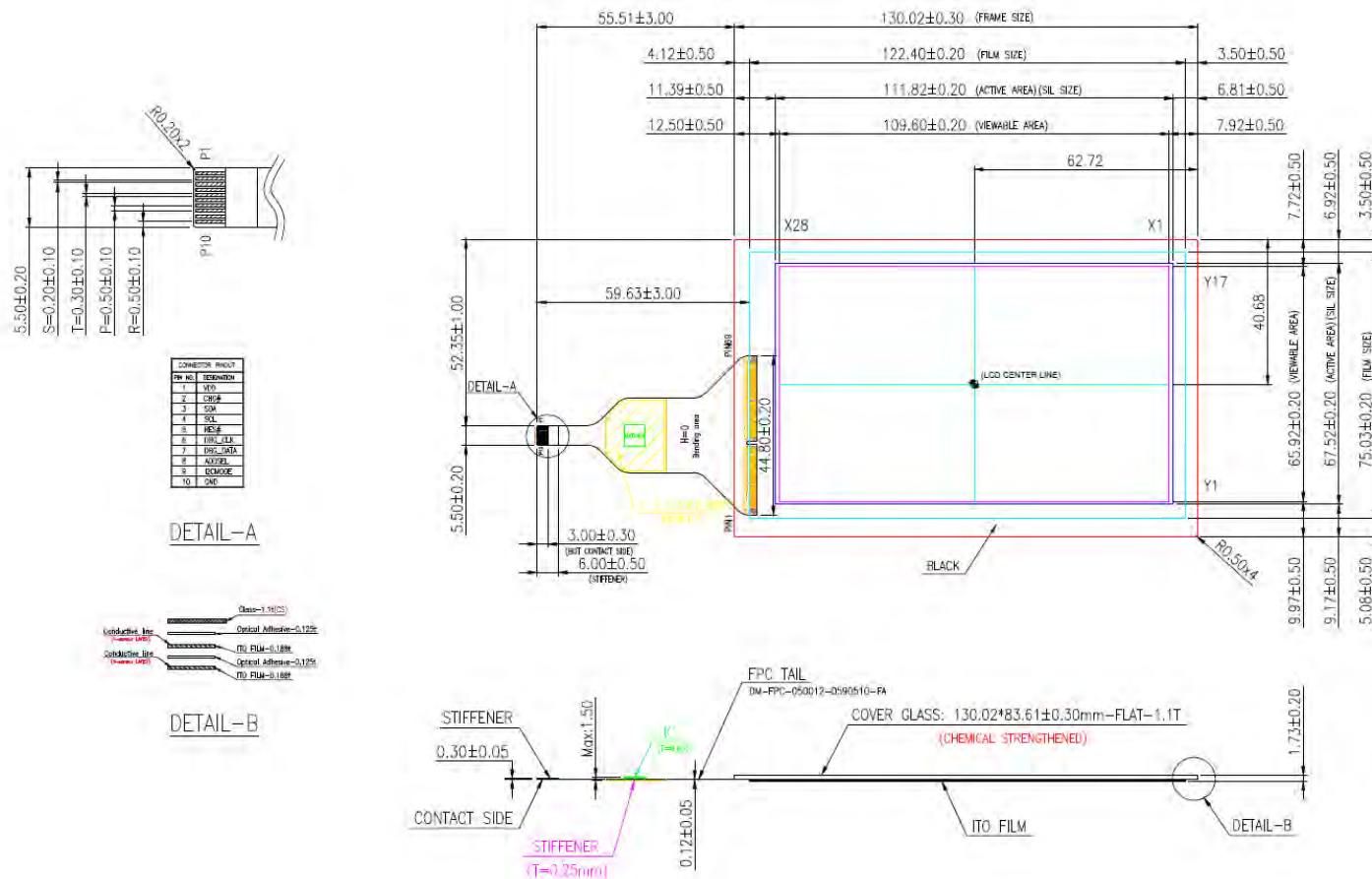
Precautions for mounting

- The panel should be mounted using a configuration that either holds the panel by all four corners or by all four sides
- The bezel edge must be positioned outside the active area. The bezel may cause false activation if the edge overlaps the active area
- Any mounting configuration should ensure that there is no twisting force applied to the panel
- 1mm distance between TFT screen and touch panel is recommended

Precautions for tail

- The flex tail in general can be bent with a min. radius of about 1mm
- In order to avoid damaging and malfunction of the sensor, please don't bend the FPC area next to the panel
- Excess or repeated bending of the FPC connector should also be avoided

5 Appendix A: Technical Drawing





easyTOUCH I²C to USB STAMP MASTER

12022089

Revision: 000

Date: 2020-09-07

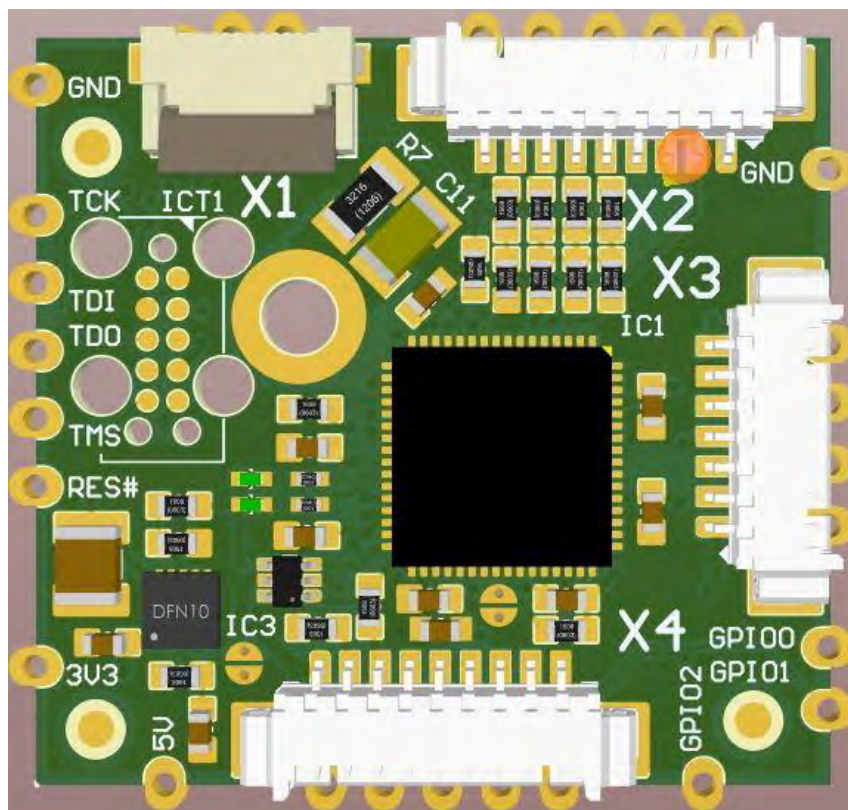
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1 Introduction

The easyMaxTouch Stamp Master developed by Data Modul is a capacitive touch USB controller board. It offers the possibility to connect one side an Atmel projective capacitive touch Sensor (MaxTouch) via I2C interface, the other side the USB port to standard computers or embedded systems. Customers can choose a cable or soldering pads for connecting.

Data Modul provides the Master include the Driverless firmware 4.0, which works as a HID (Human Interface Device) without an external driver in most popular operating systems like Windows 7, Windows 8, Windows 10, Windows CE5/6/7 and Linux.¹ For more information about our driverless firmware and settings fine-tuning please refer to the *Driverless Controller User Guide*.²



¹ On WinCE5/6/7 a patch to be integrated in the systems BSP

² http://www.data-modul.com/tl_files/images/Downloads/Driverless_Controller_User_Guide.pdf

2 Modul Specification

2.1 Mechanical features

Size	33 x 31 mm
Height	1.1 mm (soldering pads) or 4.6 mm (with connector)
Operating temperature	-20 to +75 °C
Storage temperature	-25 to +85 °C
Temperature slew rate	10 °C /minute (max.)
Relative humidity	95 % at 60 °C no condensation
RoHS compliant	Yes

2.2 Electrical features

Power supply	5.0 V ± 5%
V _{in} ripple	± 50 mV peak-peak (max.)
On board voltage	3.3 V (subject to configuration)
Supply Current	50 mA

2 Signals

2.1 Connector X1 – COFs

Molex, 12505WR-09

Pin	Name	Description	Remarks
1	GND	Ground	
2	I ² CM	I ² C mode selection	<i>low to select HID-I²C mode, high to select I²C mode, floating for automatic mode selection</i>
3	CSEL		connect to Ground for I ² C
4	DBG_DATA	Debug Data	
5	DBG_CLK	Debug Clock	
6	SWRES#	Software Reset	3.3V tolerance
7	SCL	I ² C – Serial Clock	3.3V tolerance
8	SDA	I ² C – Serial Data	3.3V tolerance
9	CHG#	I ² C – Change	3.3V tolerance
10	VDD_3V3		3.3V tolerance

2.2 Connector X2 – I²C to DMO Stamp

Omron, XF2M-1015-1A

Pin	Name	Description	Remarks
1	GND	Ground	
2	I ² CM	Communication select	connect to Ground for I ² C
3	DBG_DATA	Debug Data	
4	DBG_CLK	Debug Clock	
5	SWRES#	Software Reset	3.3V tolerance
6	CHG#	I ² C – Change	3.3V tolerance
7	SCL	I ² C – Serial Clock	3.3V tolerance
8	SDA	I ² C – Serial Data	3.3V tolerance
9	VDD_3V3		3.3V tolerance

2.3 Connector X3 – Debug GPIOs

Molex, 12505WR-07

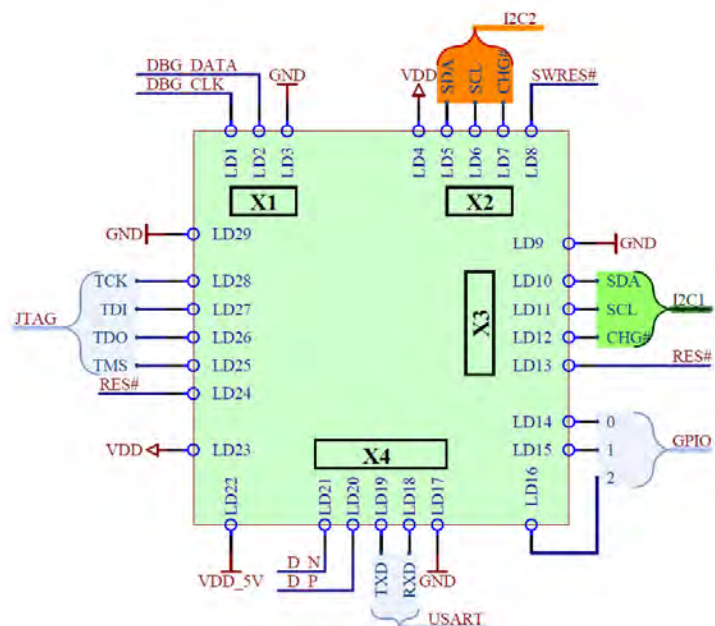
Pin	Name	Description	Remarks
1	VDD_5V	Power Supply	Standard USB power supply
2	SDA	I ² C – Serial Data	3.3V tolerance
3	SCL	I ² C – Serial Clock	3.3V tolerance
4	RES#	Reset	3.3V tolerance
5	CHG#	I ² C – Change	3.3V tolerance
6	GND	Ground	
7	VDD_3V3	Power Supply	Alternative power supply
8	N/C	N/C	Do not use
9	N/C	N/C	Do not use

2.4 Connector X4 – HOST (USB/USART)

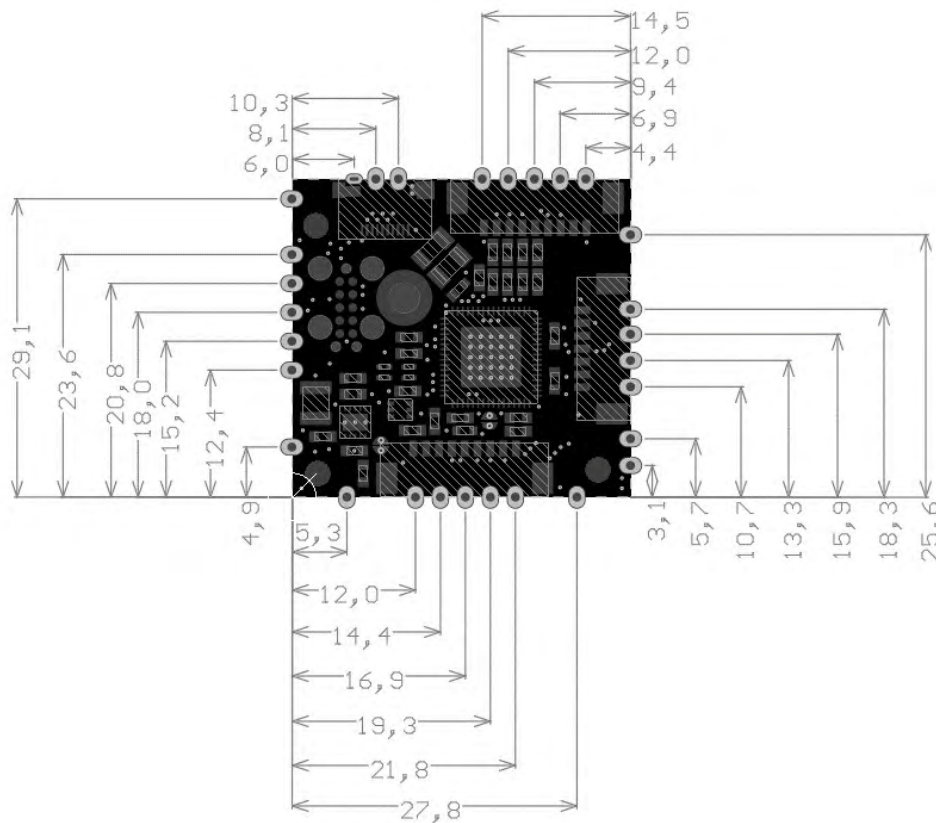
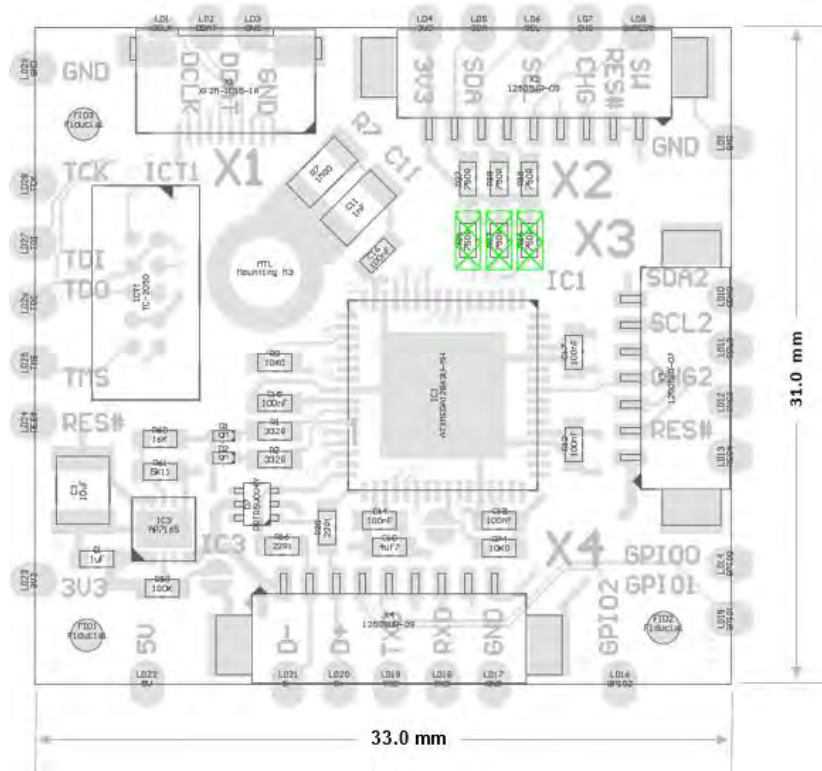
Molex, 12505WR-09

Pin	Name	Description	Remarks
1	VDD_5V	Power Supply	Standard USB power supply
2	D-	USB signal –	AT90usb646 pin
3	D+	USB signal +	AT90usb646 pin
4	GPIO.0	GPIO	Do not use
5	GPIO.1	GPIO	Do not use
6	TXD	USART1 Transmit Pin	Do not use
7	TXR	USART1 Receive Pin	Do not use
8	GPIO.2	GPIO	Do not use
9	GND	Ground	

2.5 Soldering Pads



3 Mechanical drawing



all Dimensions in mm (Tolerance +/- 0,3 mm)

eMotionST1:3



Final Specification

Hardware Revision 05

This document might be changed without prior notice

Revision	1.3
Date	16.01.2015
Name	M. Schmidt

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1. Revision History

Rev.	Date	Chapter	Description	by
1.0	24.03.2012	All	First draft	MS
1.1	30.07.2012	All	Cosmetic changes	MS
1.2	04.04.2014	9.4 OSD Status LED 9.5 OSD Structure	LED state power off changed Color menu changed	MS
1.3	15.01.2015	7. Overview of connectors and jumpers	CN104 connector family corrected	MS

2. General Description

The eMotionST1:3 is an advanced TFT-LCD controller board to connect LCDs standard VGA, DVI, and DisplayPort sources. All necessary timings and voltages to support the connected display and backlight are generated on the eMotionST1:3.

3. Features

Scaler	STMicroelectronics STDP6036
Input resolution	Up to WUXGA (1920x1200@60Hz)
Output resolution	VGA up to WUXGA
Colors	16.7M
Power Supply	Single power supply +12V / +24V DC
Operating temperature	0 ...60 °C
Inputs	VGA, DVI, DisplayPort 1.1a
Panel voltage	3.3V, 5.0V, 12.0V (selectable with jumpers)
LVDS output	JEIDA or VESA mapping selectable by panel file
Backlight support	Analog & PWM dimming
Power safe mode	VESA DPMS compatible
DDC CI	Support of DDC / CI
Remote Control	RS232 remote control
Software update	- RS232 - Smart ISP - VGA-input using VGA to DDC adapter

4. Electrical Specification of inputs and outputs

4.1 Power Supply voltage

The eMotionST1:3 can handle 12V or 24V DC input voltage. The board is designed for a single power supply. All other supply voltages are generated on the eMotionST1:3. If the input supply voltage is used for backlight supply (jumper CN202, CN203, CN204 position 2-3) then the input voltage of the board must fit with the backlight supply voltage.

An additional SMPS on the eMotionST1:3 is used to generate +12V supply voltage for the backlight inverter. Therefore the jumper CN202, CN203 and CN204 have to be placed in position 1-2. In this position the max. backlight current is limited to 3A.

Supply voltage	Nominal value	Regulation	Ripple & noise	Comment
+12V	+12.0V	+/-10%	0.3V	
+24V	+24.0V	+/-10%	0.3V	

4.2 Panel supply voltage

The panel supply voltage is generated on the eMotionST1:3. The eMotionST1:3 can generate 3.3V, 5.0V or 12.0V panel supply voltage. The max current is limited to 3.0A. Select the panel supply voltage with jumper CN200.

Note: 12.0V panel supply can only be used if the supply voltage of the board is 24V.

Panel supply voltage	Nominal value	Regulation	max Current	Comment
+ 3.3V	+3.3V	+/-5%	3.0 A	CN200 Pin 1-2 closed
+ 5.0V	+5.0V	+/-5%	3.0 A	CN200 PIN 3-4 closed
+12.0V	+12.0V	+/-5%	3.0 A	CN200 PIN 5-6 closed

4.3 LVDS

PARAMETER	MIN	TYP	MAX	UNIT	Remark
Differential Output Voltage	300	500	700	mV	
Common Mode Voltage		1.25		V	
Clock Frequency			100 90	MHz	Single Channel Dual Channel
Bits per Color	6		8	bit	6/8bit selectable in panel file

4.4 Backlight

The backlight supply voltage can be selected by the jumper CN202, CN203, CN204. All three jumpers must be set in the same position.

In position 2-3 the backlight supply voltage is equal the input voltage of the board. The max. backlight current is limited to 6A.

In position 1-2 the backlight supply voltage is generated by a 12V SMPS on the board (do only use it with 24V board supply voltage). Using this configuration, the max. backlight current is limited to 3A.

Signal	Description
V dimm A	Analog dimming voltage 0 to 5.0V / 0 to 3.3V selectable with jumper CN600
V dimm PWM	3,3V / 5.0V level selectable with jumper CN600
Enable	3,3V / 5,0V level selectable with jumper CN601, polarity selectable with jumper CN602
VDD	Operating voltage of the backlight. Jumper CN202-204 in position 2-3: The backlight voltage is the same as board supply

	voltage Max current is limited to 6A. Jumper CN202-204 in position 1-2: The backlight voltage is set to +12V. Use it only with +24V board supply voltage. The max backlight current is limited to 3A.
--	--

4.5 DVI input

TMDS receiver compliant with DDWG DVI 1.0 specification

PARAMETER	MIN	TYP	MAX	UNIT	Remark
Differential Input Voltage	150		1200	mV	
Input Common Mode Voltage	-300		-37	mV	
Input Clockfrequency	20		165	MHz	

4.6 DisplayPort Input

DisplayPort 1.1a compliant receiver. 4-lane DisplayPort input

PARAMETER	MIN	TYP	MAX	UNIT	Remark
Peak-to-peak input differential voltage	0.12		1.4	V _{pp}	
Rx DC Common Mode Voltage	0		V _{DD}	V	
R _t Termination Resistance	45	50	55	Ω	

4.7 VGA input

PARAMETER	MIN	TYP	MAX	UNIT	Remark
Conversion rate	10		205	MHz	
ADC resolution	8		10	bit	Up to 165MHz sample rate 10 bits per color are used, up to 205MHz sample rate 8 bits per color are used
Input levelrange	0,64	0,7	0,9	V _{pp}	at 75R
Band width	9		290	MHz	
SOG level		0,3		V	at 75R

5. Qualifications

5.1 Environmental conditions

Parameter	Min	Max
Operating Temperature	0°C	+60°C
Storage Temperature	-20°C	+80°C
Relative humidity		80%
Tolerable air-pressure	708 hPa (approx. Altitude 2000m)	

5.2 EMI Standards

		Criteria
EMI/EMC:	EN55022-B (appendix A1:2007 from Oct., 1 st 2011 on), highest internal frequency on the board is below 400MHz (DDR data lines).	D
ESD:	EN61000-4-2 contact discharge 4kV EN61000-4-2 air discharge 8kV	B
Radiated RF (80-1000MHz):	EN61000-4-3 (20V/m 80% modulation level from 80 – 1000MHz)	A
Conducted disturbances induced by RF fields:	EN61000-4-6 (10Veff, AM 80%, 1kHz from 150kHz – 80MHz)	A
Radiated RF:	EN50204:1995; 900MHz, 20V/m, pulse 50%	A

Note: To ensure that the board meets the standard mentioned above, an adequate shielding cover must be added. Alternatively the housing of the monitor must act as shielding cover (e.g. aluminium enclosure).

5.3 Safety

- EN60950-1: Latest edition
- Designed to meet UL60950-1

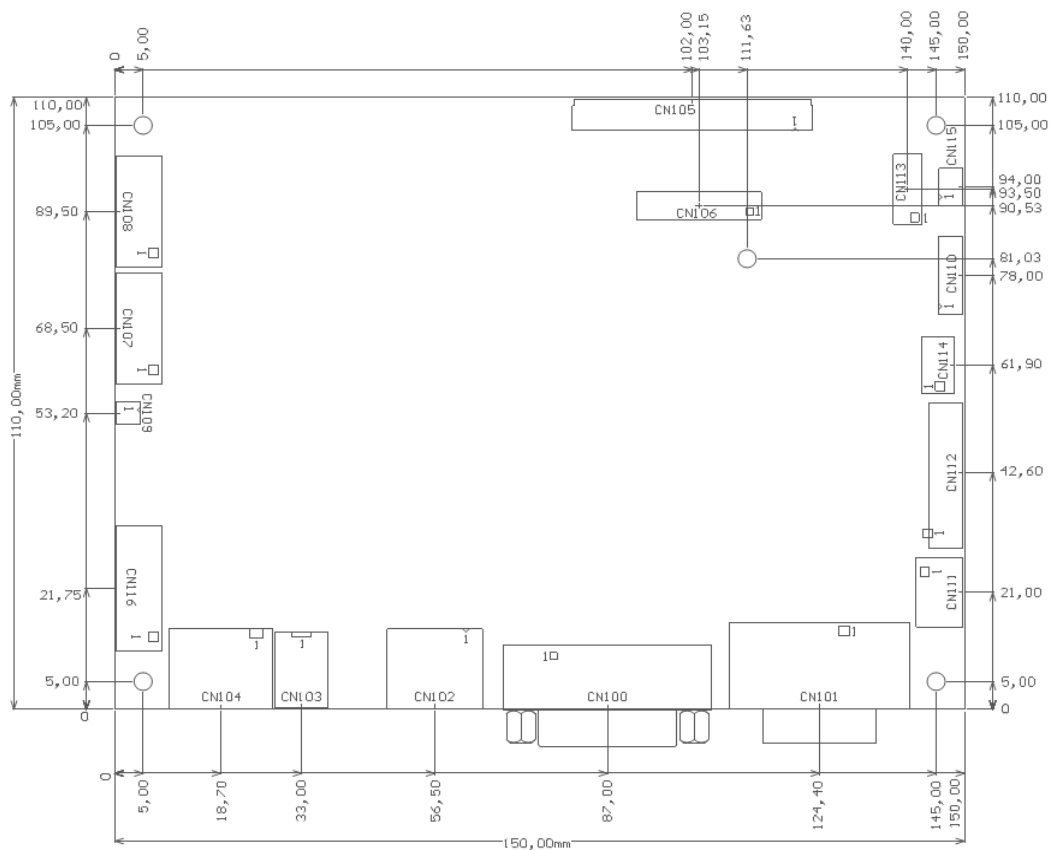
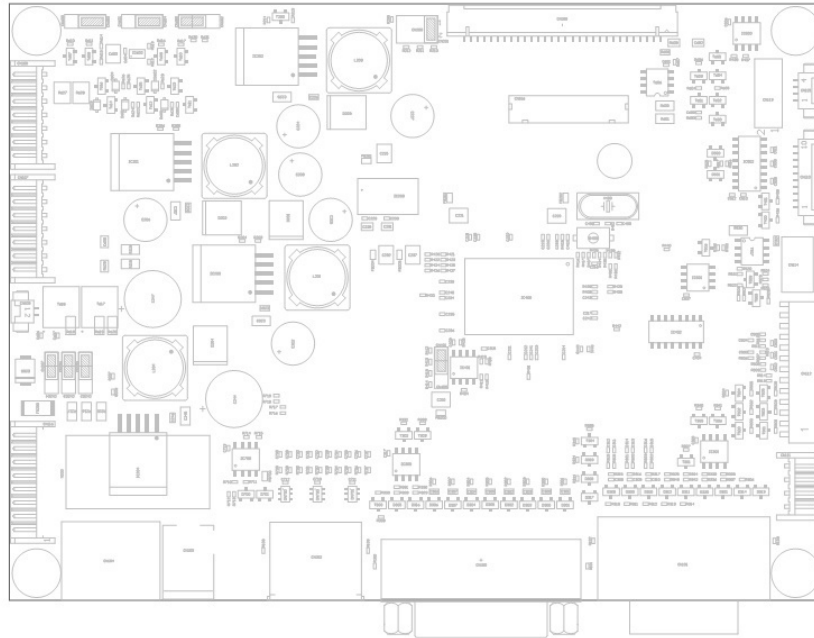
5.4 Shock and Vibration

MECHANICAL STRESS

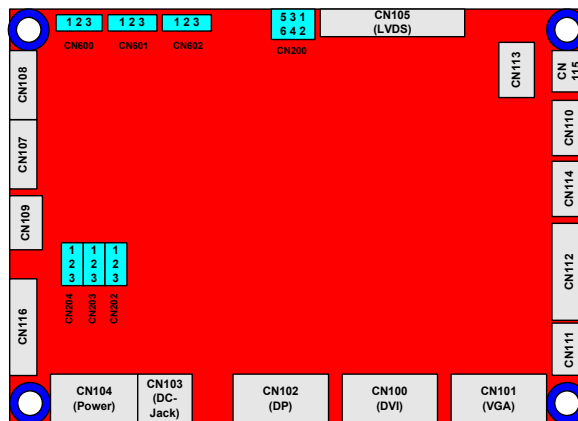
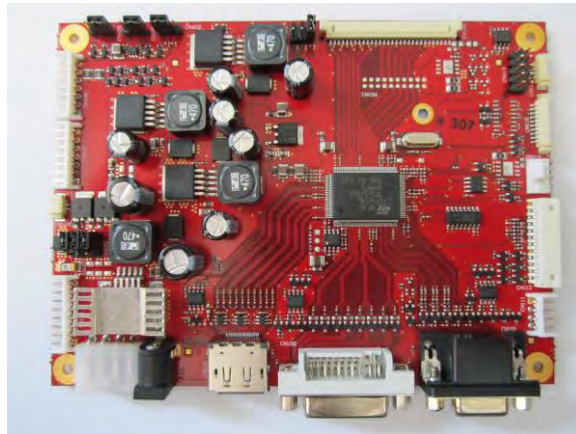
Shock:	20G, 11ms, half sine (x/y direction)
	15G, 11ms, half sine (z direction)
Vibration:	1.2G, 10 – 55Hz, sinus
Sweep:	1 minute/octave
Amplitude:	0.35mmp-p (x-direction)
	0.35mmp-p (y direction)
	0.175mmp-p (z-direction)
Time :	30 minutes
Standard:	Conform to EN60605

6. Outline dimensions

Dimensions: 150mm (L) x 110 mm (W) x 17mm (H)



7. Overview of Connectors and Jumpers



Item	Description	Remarks
CN103	Power	DC-Jack 2.5mm
CN104	Power	Molex Series 5569
CN116	Power (internal)	JST S8B-EH
CN100	DVI input	24 pin DVI-D connector, female
CN101	VGA input	15 pin HD-Sub connector, female
CN102	DP input	DisplayPort connector
CN105	LVDS Dual link output	Hirose DF14-30P-1.25H
CN107	Backlight connector	JST S7B-EH
CN108	Backlight connector	JST S7B-EH
CN109	Inverter Switch	Inverter switch signal
CN110	GPIO connector	10pin multi functions connector
CN111	Systembus	JST S4B-EH
CN112	OSD	Molex 53015-1210
CN113	RS232	10 pin double row connector RS232 LVTTTL Signal
CN114	FAN	Fan connector
CN115	RS232	RS232 LVTTTL Signal (MOLEX 53261-0471)
CN200	Jumper Block for Panel VCC	6pin double row connector
CN202	Jumper block for Backlight supply voltage	6pin double row connector
CN203		Note: Same position must be set for all three jumpers.
CN204		
CN600	Backlight PWM voltage select	3pin row connector
CN601	Backlight EN voltage select	3pin row connector
CN602	Backlight EN polarity	3pin row connector

7.1 Power Input Connector

Connector: CN104 - MOLEX 0039303045

Pin No.	Signal	Description
1	GND	Ground
2	GND	Ground
3	+12V / +24V DC	VDD / max 4A per pin
4	+12V / +24V DC	VDD / max 4A per pin

Connector: J101 - 2.5mm DC Jack

Pin No.	Signal	Description
1	+12V / +24V DC	VDD / max 5A
2	GND	Ground

Connector: CN116 - JST S8B-EH

Pin No.	Signal	Description
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	GND	Ground
5	+12V / +24V DC	VDD / max 3A per pin
6	+12V / +24V DC	VDD / max 3A per pin
7	+12V / +24V DC	VDD / max 3A per pin
8	+12V / +24V DC	VDD / max 3A per pin

7.2 VGA Input Connector

Connector: CN101 - 15pin HD-Sub, female

Pin No.	Signal	Description
1	Red	Red analog input
2	Green	Green analog input
3	Blue	Blue analog input
4	NC	Not connected (GND)
5	GND (Red)	Ground
6	GND (Green)	Ground
7	GND (Blue)	Ground
8	GND	Ground
9	VGA 5V	+5V DC
10	GND	Ground
11	NC	Not connected
12	SD	Serial Data Line for DDC
13	HSYNC	Horizontal Sync
14	VSNC	Vertical Sync
15	SCL	Serial clock input for DDC

7.3 DVI Input Connector

Connector: CN100 - DVI-D24P

Pin No.	Signal	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	Not connected
5	NC	Not connected
6	DDC Clock	Clock DDC Interface
7	DDC Data	Data DDC Interface
8	NC	Not connected
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	Not connected
13	NC	Not connected
14	+5V Power	+5V for EDID (un-powered monitor)
15	GND (for +5V)	Ground
16	HPD	Hot Plug Detect
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	Not connected
21	NC	Not connected
22	TMDS Clock Shield	Shield for TMDS clock
23	TMDS CLOCK+	TMDS Clock Differential positive signal
24	TMDS CLOCK-	TMDS Clock Differential negative signal

7.4 DisplayPort Input Connector

Connector: CN102 – W+P: 8470-2-2-1-80-TR

Pin No.	Signal	Description
1	ML_L3N	Main Link Ch. 3 Differential Input negative
2	GND	Ground
3	ML_L3P	Main Link Ch. 3 Differential Input positive
4	ML_L2N	Main Link Ch. 2 Differential Input negative
5	GND	Ground
6	ML_L2P	Main Link Ch. 2 Differential Input positive
7	ML_L1N	Main Link Ch. 1 Differential Input negative
8	GND	Ground
9	ML_LN1P	Main Link Ch. 1 Differential Input positive
10	ML_LN0N	Main Link Ch. 0 Differential Input negative
11	GND	Ground
12	ML_LN0P	Main Link Ch. 0 Differential Input positive
13	Config 1	Config Pin1, connect to GND with 1M
14	Config 2	Config Pin2, connect to GND with 1M
15	AUXP	Auxiliary Ch. Differential Input positive
16	GND	Ground
17	AUXN	Auxiliary Ch. Differential Input negative
18	HPD	Hot Plug Detect
19	POR	Connected to Ground
20	PO	Not Connected to internal circuits

7.5 LVDS Output

Connector: CN105 - Hirose DF14-30P-1.25H

Pin No.	Signal	Description
1	VCC	Panel VCC *
2	VCC	Panel VCC*
3	VCC	Panel VCC*
4	VCC	Panel VCC*
5	GND	Ground
6	3.3V	3.3V permanent for LVDS select
7	GND	Ground
8	TX3+O	TX3 odd positive
9	TX3-O	TX3 odd negative
10	TXCLK+O	Clock odd positive
11	TXCLK-O	Clock odd negative
12	TX2+O	TX2 odd positive
13	TX2-O	TX2 odd negative
14	GND	Ground
15	TX1+O	TX1 odd positive
16	TX1-O	TX1 odd negative
17	TX0+O	TX0 odd positive
18	TX0-O	TX0 odd negative
19	GND	Ground
20	TX3+E	TX3 even positive
21	TX3-E	TX3 even negative
22	TXCLK+E	Clock even positive
23	TXCLK-E	Clock even negative
24	TX2+E	TX2 even positive
25	TX2-E	TX2 even negative
26	GND	Ground
27	TX1+E	TX1 even positive
28	TX1-E	TX1 even negative
29	TX0+E	TX0 even positive
30	TX0-E	TX0 even negative

* Note: Pin1, 2, 3, 4: Output voltage 3.3V / 5.0V / 12.0V - selectable with jumper CN200

7.6 Inverter / Backlight

Connector: CN107, CN108 – JST S7B-EH

Pin No.	Signal	Description
1	V dimm A	Analog dimming voltage Analog dimming range is selectable with jumper CN600
2	V dimm PWM	PWM diming output Signal level is selectable with jumper CN601
3	Enable	ON/OFF Polarity is selectable with jumper CN602
4	VDD	Operating voltage +12V / +24V VDD is selectable with the jumpers CN202, CN203, CN204. All jumpers must be set in the same position!
5	VDD	Operating voltage +12V / +24V VDD is selectable with the jumpers CN202, CN203, CN204. All jumpers must be set in the same position!
6	GND	Ground
7	GND	Ground

7.7 OSD Connector

Connector: CN112 – Molex 53015-1210

Pin No.	Signal	Description
1	LED1	LED Green
2	LED2	LED RED
3	IR /n.c.	IR remote / not connected
4	3.3V	
5	GND	Ground
6	SW3	Button3 (UP)
7	SW2	Button2 (DOWN)
8	SW4	Button4 (SELECT)
9	SW6	Button6 (POWER)
10	SW1	Button1 (MENU)
11	n.c.	Not connected
12	GND	Ground

7.8 GPIO Connector

Connector: CN110 – Molex 53261-1071

Pin No.	Signal	Description
1	3.3V	3.3V (max 200mA)
2	5.0V	5.0V (max 200mA)
3	FAN PWM	PWM signal for FAN speed
4	FAN Tacho	N.C
5	FAN VCC	
6	GPIO34	GPIO from STDP6036 (LVTTL)
7	GPIO45	GPIO from STDP6036 (LVTTL)
8	SCL	I2C SCL (5V level)
9	SDA	I2C SDA (5V level)
10	GND	Ground

Signals on the GPIO connector are not used at the moment. Reserved for custom options!

7.9 Systembus

Connector: CN111 – JST S4B-EH

Pin No.	Signal	Description
1	GND	Ground
2	SCL	I2C SCL (5V level)
3	SDA	I2C SDA (5V level)
4	5V	5.0V (max 200mA)

7.10 RS232 Connector

Connector: CN115 – MOLEX 53261-0471

Pin No.	Signal	Description
1	3.3V	3.3V (max 200mA)
2	TxD	Transmit Data (LVTTL)
3	RxD	Receive Data (LVTTL)
4	GND	Ground

Connector: CN113 – 10pin double row

Pin No.	Signal	Description
1	NC	
2	NC	
3	RxD	Receive Data (LVTTTL)
4	NC	
5	TxD	Transmit Data (LVTTTL)
6	NC	
7	NC	
8	NC	
9	GND	Ground
10	NC	

7.11 Fan Connector

Connector: CN114 – MOLEX 47053-1000

Pin No.	Signal	Description
1	GND	Ground
2	Fan VCC	Fan Supply (same as board supply voltage)
3	Fan Tacho	NC
4	Fan PWM	PWM Signal for Fan speed

7.12 Inverter Switch

Connector: CN109 – MOLEX 53261-0271

Pin No.	Signal	Description
1	Inverter Switch	Inverter ON / OFF
2	GND	Ground

8. Jumper settings and configuration

WARNING! Do not change the jumper settings and configuration of the board! Changing the jumpers and configuration may cause fatal damage to the board and to the connected display or cause malfunction.

8.1. Panel supply voltage (CN200)

The supply voltage of the panel can be selected with the Jumper CN200.

Note: Do only use one jumper cab at the same time. Combinations of jumper cabs are not allowed.

	CN200		
Panel Voltage	1-2	3-4	5-6
3.3V	closed	open	open
5.0V	open	closed	open
12.0V	open	open	closed

Table 1: Panel power supply

8.2. Backlight Power Supply (CN202, CN203, CN204)

Select the backlight supply voltage with the jumper CN202 to CN204.

Note: All jumper cabs of the jumper CN202-CN204 must be set in the same position!

CN202 CN203 CN204	Backlight supply voltage (CN107 and CN108 Pin4 and Pin5)	Comment
1-2	+12V / max 3A	Use this setting if the input voltage of the board does not match the backlight supply voltage.
2-3	Equal to board supply voltage / max 6A	This setting should be used if the input voltage of the board matches with the backlight supply voltage. The max backlight current is limited to 6A.

8.3. Backlight Dimming (CN600)

The range of the analog dimming voltage and the signal high level of the digital PWM dimming signal can be selected with the jumper CN600.

CN600	Analog Dimming (CN107 und CN108 Pin1)	Digital Dimming (CN107 and CN108 Pin 2)
1-2	0V – 5.0V	High level: 5.0V
2-3	0V - 3.3V	High level 3.3V

Note: Signal polarity can be changed in the panel file.

8.4. Backlight Enable Signal (CN601, CN602)

Select the level of the backlight enable signal (CN107 and CN108 Pin3) with the jumper CN601.

CN601	Backlight enable signal (CN107 und CN108 Pin3)
1-2	High level 5.0V
2-3	High level 3.3V

Select the polarity of the enable signal with jumper CN602.

CN602	Backlight enable signal (CN107 und CN108 Pin3)
1-2	High active
2-3	Low active

8.5. Panel file configuration

The panel timing is defined in a panel file. To modify the panel file you have to use the Data Modul BoardProgrammer.exe.

The board is shipped out with the correct panel and inverter configuration.

9. OSD (On Screen Display)

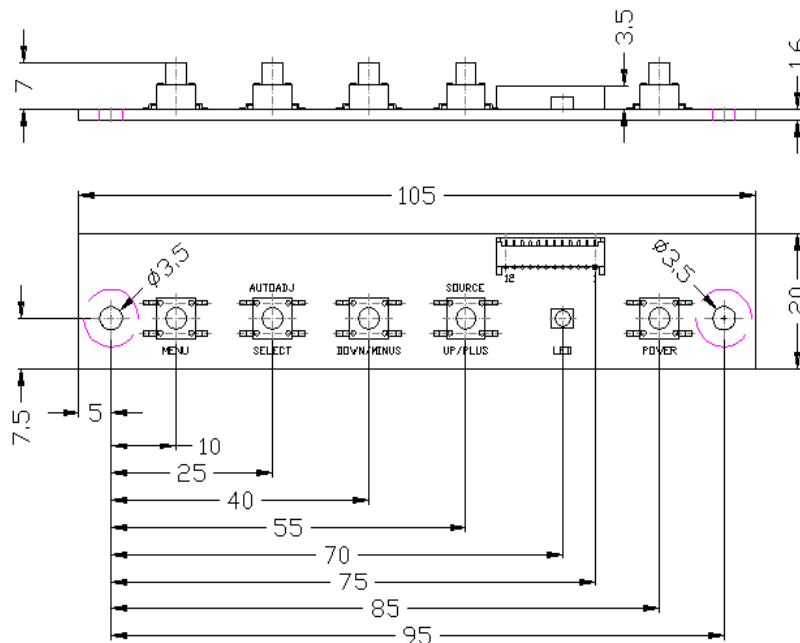
The eMotionST1:3 can operate with an external OSD board (optional item).

Generally the OSD offers the user various possibilities of customizing the appearance of the TFT display. By using the OSD board, brightness, contrast, input selection, OSD appearance and much more can be adjusted easily.

The eMotionST1:3 supports a 5 button OSD. Other customized OSDs (4button/6button) may be realized upon request.

9.1. Mechanical dimensions OSD board (CU70008, incl. input cable)

OSD connector CN112: Molex 53015-1210



9.2. Operation & buttons

Item	Description
Menu	Enter OSD main menu Leave sub menu Leave OSD main menu
Select	Navigate down in menu
Down / Minus	Navigate left in main menu Decrease value
Up / Plus	Navigate up in main menu Increase value
Power	Turn power on/off
2 color LED	RED / GREEN

9.3. Hotkeys

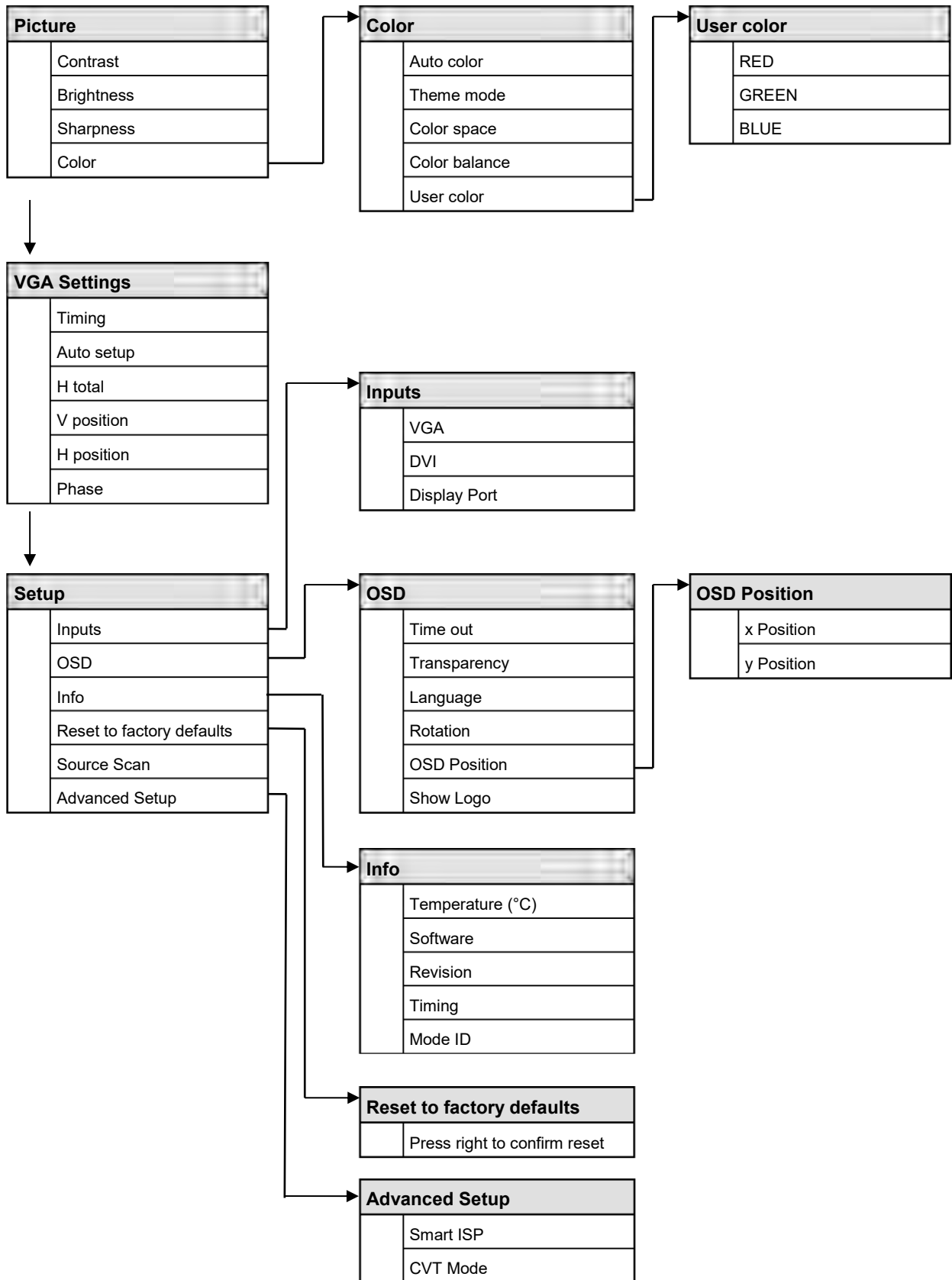
The OSD offers hot key functions. To access these functions the user must not open the OSD via <Menu>. The hotkey functions offer a direct access to the equivalent function.

Button	Direct access
Up / Plus	Source select, switch to next input source
Down / Minus	Brightness
Select	Auto adjust


9.4. OSD Status LED

Condition	Description
Amber flashing	Stand by (searching input)
Green flashing	Searching display mode (source)
Green ON	OK (displaying signal)
Red ON	Power off


9.5. OSD Structure



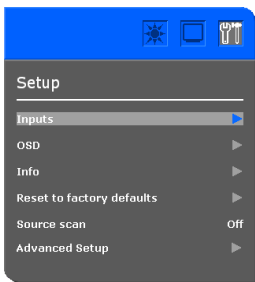
9.5.1 Picture Menu

	Picture	Contrast
		Brightness
		Sharpness
		Color

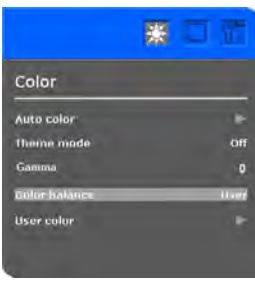
9.5.2 VGA Settings Menu

	VGA Settings	Timing
		Auto setup
		H total
		V position
		H position
		Phase

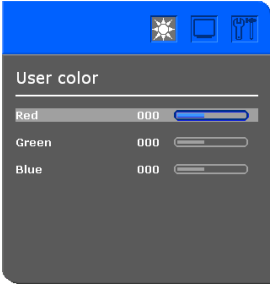
9.5.3 Setup Menu

	Setup	Inputs
		OSD
		Info
		Reset to factory defaults
		Source scan
		Advanced Setup


9.5.4 Color Menu

	Color	Auto color
		Theme mode
		Gamma
		Color balance
		User color


9.5.5 User Color Menu

	User color	RED
		GREEN
		BLUE

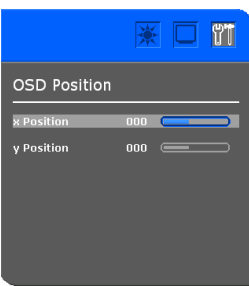
9.5.6 Inputs Menu

	Inputs	VGA
		DVI
		DisplayPort

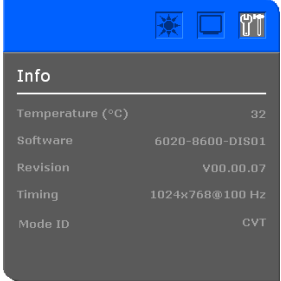
9.5.7 OSD Menu

	OSD	Time out
		Transparency
		Language
		Rotation
		OSD Position
		Show logo

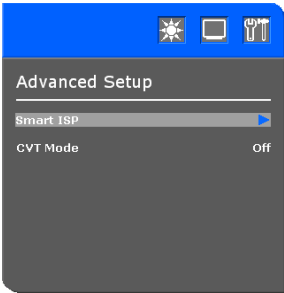
9.5.8 OSD Position Menu

	OSD Position	x Position
		y Position

9.5.9 Info Menu

	Info	Temperature (°C)
		Software
		Revision
		Timing
		Mode ID

9.5.10 Advanced Setup Menu

	Advanced Setup	Smart ISP
		CVT Mode

10. Serial Control RS232

The eMotionST3:1 can be controlled by a serial command set using the RS232. For using the RS232 a level converter from LVTTTL to RS232 level must be used. Detailed information about the RS232 protocol are provided on request!

11. DDC/CI Interface

The eMotionST1:3 can be controlled by DDC/CI. Detailed information are provided on request!

Dispcon Ortustech

Product Specification

This document might be changed without prior notice

12038821 Dispcon Ortustech 5“

12038925 Dispcon Ortustech 7“

Revision: 001

Date: 2019-12-17

Revision History

Rev.	Date	Author	Modifications
000	08.04.2019	M. Mühleck	Initial revision
001	17.12.2019	M. Mühleck	Update due to improved version of dispcn

Change History (Optional)

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1. Preamble

1.1. Purpose of this document

The purpose of this document is the definition of the technical parameters, the electrical connections and the mechanical dimensions of the Dispcn board for Ortustech panels.

1.2. Abbreviations

EMI	ELECTRO MAGNETIC INTERFERENCE
EMC	ELECTRO MAGNETIC COMPATIBILITY
EN	EUROPEAN NORM
ESD	ELECTRO STATIC DISCHARGE
UL	UNDERWRITER LAB
PCB	PRINTED CIRCUIT BOARD
SMT	SURFACE MOUNT TECHNOLOGY
ROHS	RESTRICTION FOR THE USE OF HAZARDOUS SUBSTANCES
NC	NOT CONNECTED
T.B.D.	TO BE DEFINED
TMDS	TRANSITION MINIMIZED DIFFERENTIAL SIGNALING
VESA	VIDEO ELECTRONICS STANDARDS ASSOCIATION

2. Product description

2.1. *Functionally description of the product*

The Dispcon for Ortustech panels enables the eMotionST and eMotionNT scaler boards to control Ortustech COM50H5N01ULC and COM70H7M24ULC panels. With the on-board LED-driver the backlight can be powered with a single 12 V or 24 V supply provided by eMotion boards.

2.2. *Special features*

- Works with eMotionNT and eMotionST scaler boards
- PWM backlight brightness control
- Backlight enable input
- LED current control, LED fault detection
- Resistor-Jumpers for 6/8 bit and Up-Left/Down-Right selection (assembly option, on request)

2.3. *Variants of Dispcon*

Due to different maximum forward voltage of the LED backlight, an assembly option for each panel is necessary:

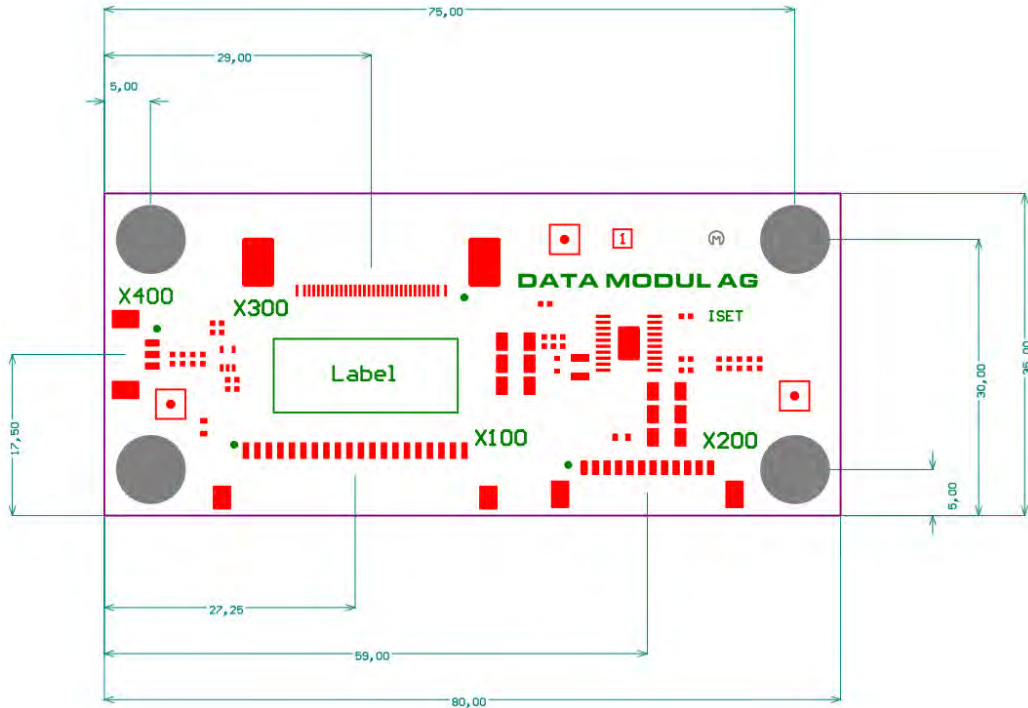
Panel	Forward Voltage	DATA MODUL P/N	Remark
COM50H5N01ULC	13.7 V	12038821	$I_F = 21.9 \text{ mA}$, $V_{\text{BOOST,Max}} = 16.3 \text{ V}$
COM70H7M24ULC	21.9 V	12038925	$I_F = 21.9 \text{ mA}$, $V_{\text{BOOST,Max}} = 24 \text{ V}$

Both variants differ in terms of V_{BOOST} voltage in order to meet the specification of the panel. See chapter 4.4 “Backlight signals” for more information.

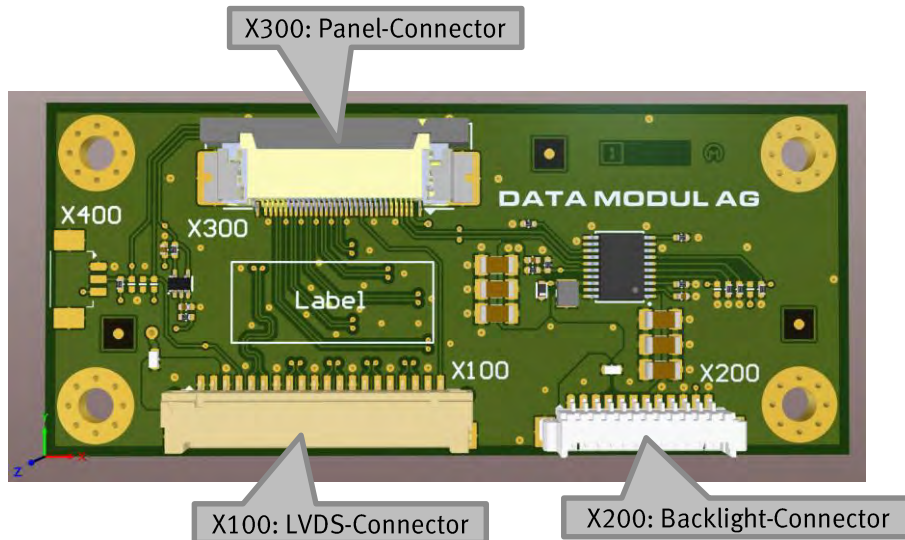
3. PCB description

3.1. Dimensions

The dimensions of both variants: 80 mm (L) x 35 mm (W) x 7 mm (H). The diameter of each of the four mounting holes is 3.5 mm.



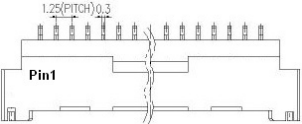

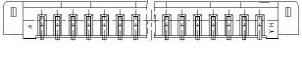
3.2. Connector overview



Item	Description	Remark
X100	LVDS-Connector	20 pin LVDS connector, connects to scaler board
X200	Backlight-Connector	12 pin connector, connects to scaler board
X300	Panel-Connector	30 pin connector, display interface connector

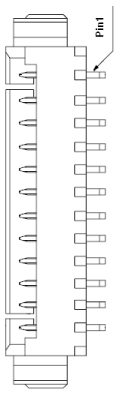
3.3. LVDS-input, X100

Type: Hirose-Ref.No. DF14-20P-1.25H, (YEON-HO 12507WR-20), pitch 1.0 mm, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 <p>Top-View</p>  <p>Front-View</p>  <p>Rear-View</p>	1	Panel_Vcc	I	Panel Power Supply
	2	Panel_Vcc	I	Panel Power Supply
	3	GND	I/O	GND
	4	SEL_68_BIT	I	Select 6 Bit or 8 Bit operation
	5	TX0-	I	LVDS TX0 negative
	6	TX0+	I	LVDS TX0 positive
	7	GND	I/O	GND
	8	TX1-	I	LVDS TX1 negative
	9	TX1+	I	LVDS TX1 positive
	10	GND	I/O	GND
	11	TX2-	I	LVDS TX2 negative
	12	TX2+	I	LVDS TX2 positive
	13	GND	I/O	GND
	14	TXCLK-	I	LVDS Clock negative
	15	TXCLK+	I	LVDS Clock positive
	16	n.c.		Not connected
	17	TX3-	I	LVDS TX3 negative
	18	TX3+	I	LVDS TX3 positive
	19	n.c.		Not connected
	20	Rotate_CFG	I	Digital in (3V3 or 0V)

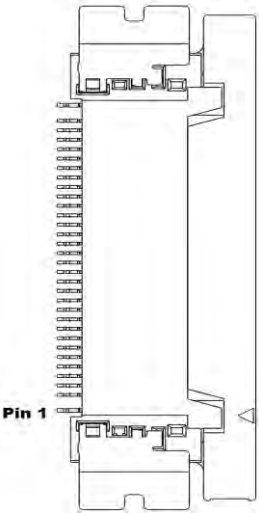
3.4. Backlight-connector, X200

Type: Molex: 53261-1271 or YEONHO: 12505WR-07, SMT Side entry type, 7 pin, pitch 1.25 mm, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
	1	V_BL	I	Backlight Power Supply
	2	V_BL	I	Backlight Power Supply
	3	V_BL	I	Backlight Power Supply
	4,5,6	n.c.		Not connected
	7	GND	I/O	GND
	8	GND	I/O	GND
	9	B_EN	I	Backlight Enable Signal
	10	GND	I/O	GND
	11	B_PWM	I	Backlight PWM Dimming Signal
	12	GND	I/O	GND

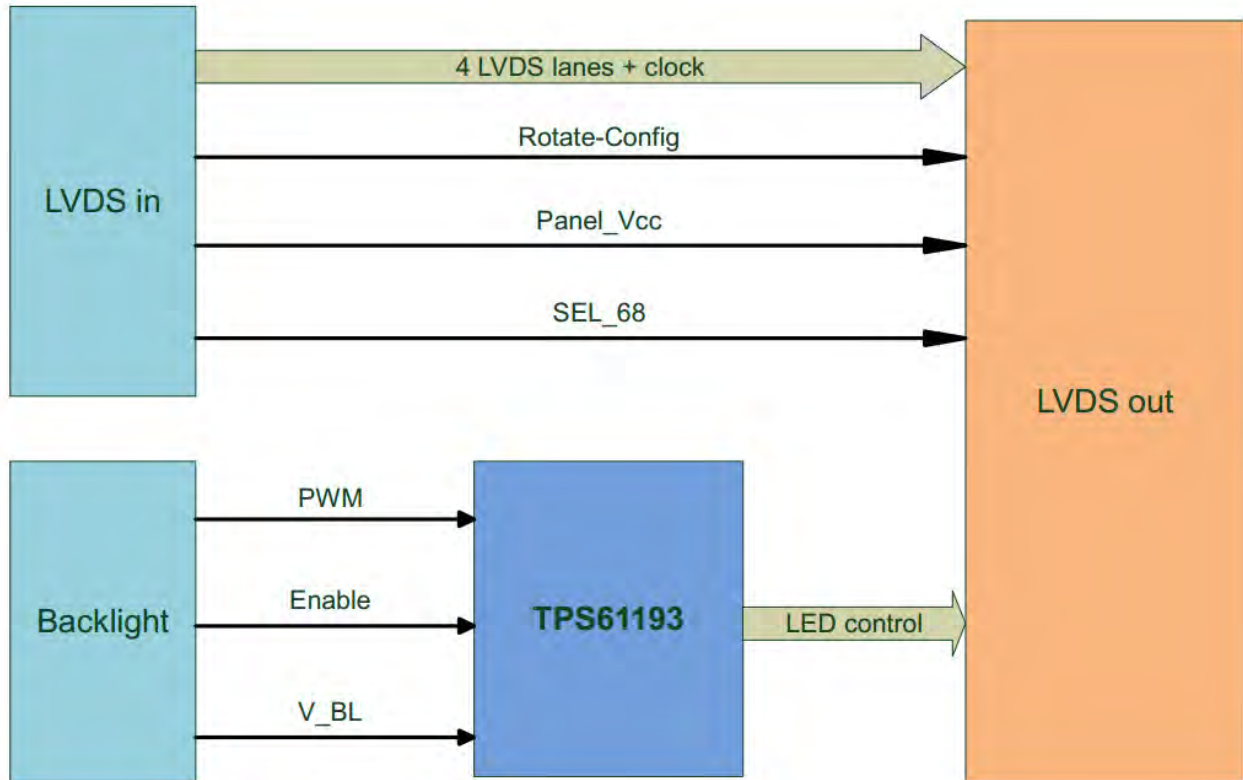
3.5. Panel-connector, X300

Type: Iriso: IMSA-9699S-30Y, pitch 0.5 mm, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
	1	V_BOOST	O	LED Common Anode
	2	LED2	I	LED Cathode 2
	3	LED1	I	LED Cathode 1
	4	GND	I/O	GND
	5	Panel_Vcc	O	Panel Power Supply
	6	Panel_Vcc	O	Panel Power Supply
	7	Panel_Vcc	O	Panel Power Supply
	8	GND	I/O	GND
	9	GND	I/O	GND
	10	NC	-	Not Connected
	11	Rotate_CFG	O	Digital out (3V3 or 0V)
	12	SEL_68	O	6 Bit / 8 Bit Select output
	13	STANDBY	O	Standby Signal
	14	GND	I/O	GND
	15	TX0-	O	LVDS TX0 negative
	16	TX0+	O	LVDS TX0 positive
	17	GND	I/O	GND
	18	TX1-	O	LVDS TX1 negative
	19	TX1+	O	LVDS TX1 positive
	20	GND	I/O	GND
	21	TXCLK-	O	LVDS Clock negative
	22	TXCLK+	O	LVDS Clock positive
	23	GND	I/O	GND
	24	TX2-	O	LVDS TX2 negative
	25	TX2+	O	LVDS TX2 positive
	26	GND	I/O	GND
	27	TX3-	O	LVDS TX3 negative
	28	TX3+	O	LVDS TX3 positive
	29	GND	I/O	GND
	30	NC	-	Not Connected

4. Technical Details

4.1. Block diagram



Dispcon Block Diagram

4.2. Supply voltages and current consumption

The Dispcon can handle a wide range of input voltage. The board is designed to be supplied by the scaler board only. All other voltages are generated on the Dispcon itself.

Parameter	Min.	Typ.	Max.	Unit	Remark
Backlight voltage V_{BL}	10	12	28	V	
Panel Supply Voltage Panel_Vcc	3.0	3.3	3.6	V	According to panel specifications
Supply current LED-driver I_Q		5	20*	mA	Current consumption, driver only

* max. supply current may be increased if higher LED current is implemented (assembly option, on request)

4.3. Configuration options on the Dispcon board

The Dispcon board can connect the following panels to the eMotion-series scaler boards:

- Ortustech COM50H5N01ULC
- Ortustech COM70H7M24ULC

The correct variant has to be chosen. See chapter 2.3 “Variants of Dispcon” for detailed information. In addition, 6 bit or 8 bit color can be configured by assembly option (on request). By default, 8 bit color is selected. External switch for rotate configuration signal can be connected to optional connector (assembly option, on request).

4.4. Backlight signals

Parameter	Min.	Typ.	Max.	Unit	Remark
PWM frequency	0.1	-	20	kHz	
Backlight output current	-	21.9*	100**	mA	Per LED channel
V _{BOOST} voltage	4.1	-	16.3	V	For COM50H5N01ULC only
	5.6	-	24	V	For COM70H7M24ULC only
Backlight enable levels	-	-	0.4	V	Input-Low Voltage V _{IL}
	-	5.0	5.25	V	Input-High Voltage V _{IH}
PWM levels	-	-	1.0	V	Input-Low Voltage V _{IL}
	4.0	5.0	-	V	Input-High Voltage V _{IH}

* default output current can be increased to 40.3 mA (assembly option, on request)

** maximum output current capability of LED-driver, per channel

5. Qualification

5.1. Environmental conditions

Parameter	Min.	Max .
Operating temperature	0°C	+60°C
Storage temperature	-20°C	+80°C
Relative humidity		80%
Tolerable air-pressure	708 hPa (approx. Altitude 3000 m)	

5.2. EMI-Standards

Designed to meet EMC (Electro-Magnetic Compatibility): Immunity for industrial environments, according to EN 61000-6-2:

Description	Requirements	Test parameter	Criteria
Electrostatic discharge immunity test	EN 61000-4-2	±4 kV contact discharge, ±8 kV air discharge	criteria B
Radiated, radio frequency, electromagnetic field immunity test	EN 61000-4-3	80-1000 MHz 10 V/m, 1.4-2 GHz 3 V/m 2-2.7 GHz 1 V/m 80% AM (1 kHz)	criteria A
Electrical fast transient/burst immunity test	EN 61000-4-4	±1 kV on I/O lines	criteria B
Immunity to conducted disturbance, induced by radio-frequency fields	EN 61000-4-6	0.15 – 80 MHz 10 V _{rms} 80% AM (1 kHz)	criteria A

Note: To ensure that the board meets the standard mentioned above, an adequate shielding cover must be added. Alternatively the housing of the monitor must act as shielding cover (e.g. aluminium enclosure).

5.3. Safety

- Designed to meet IEC 62368-1
- Designed to meet UL 62368-1

5.4. Shock and Vibration

MECHANICAL STRESS

Description	Parameter
Shock	20 G, 11 ms, half sine (x/y direction)
	15 G, 11 ms, half sine (z direction)
Vibration	1.2 G, 10 – 55 Hz, sinus
Sweep	1 minute/octave
Amplitude	0.35 mm _{p-p} (x-direction)
	0.35 mm _{p-p} (y direction)
	0.175 mm _{p-p} (z-direction)
Time	30 minutes
Standard	Conform to EN60605

5.5. Reliability, MTBF

- min. 500.000 h at Ta = 40°C, determined according to Telcordia SR-332

6. Warranty, Quality and Environmentalism

6.1. Warranty

- Manufacturer warranty: 12 month after delivery

6.2. Quality

The producing process of the board is aligned with the guideline according to the DIN ISO 9001 certification.

Workmanship standard: IPC-A-610D Class2

6.3. Environmentalism

The list of used materials is based on the parts list, which is available at DATA MODUL ERP-system

The PCB is produced under lead free soldering conditions.

All components are produced according to European RoHS (RoHS-1 = 2002/95/EU, RoHS-2 = 2011/65/EU) and REACH (2006/1907/EU) regulations. The board is designed and manufactured to meet ISO 14001.

The packing complies to directive 1994/62/EU.

7. Label and package

7.1. *Label and material number*

The following points are visible on the label of the Dispcon board:

- Material number
- Serial- and Revision-number
- Manufacturing date

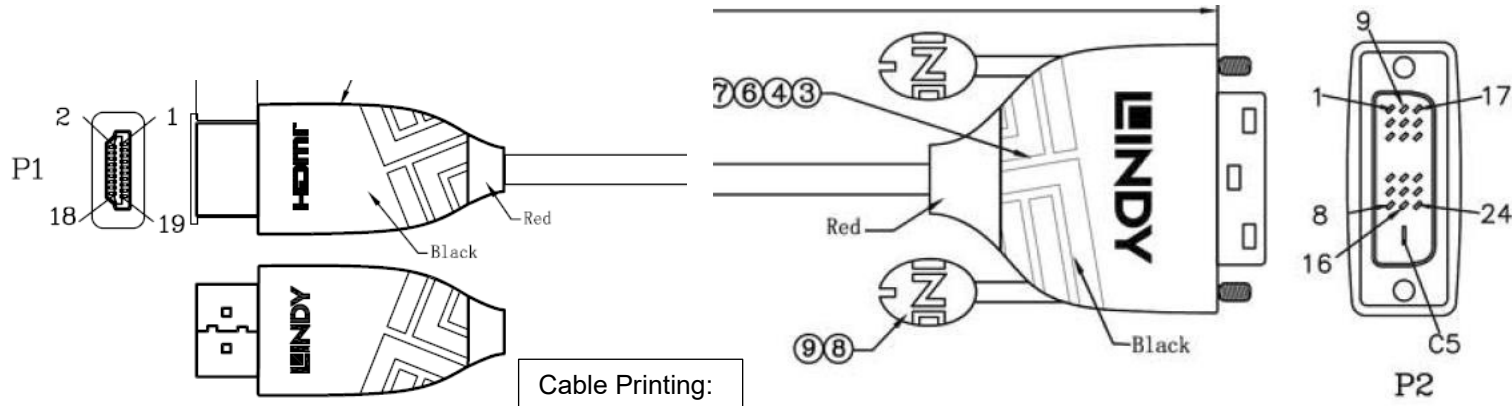
7.2. *Marking of PCB*

The following points are visible on the PCB of the Dispcon board:

- DATA MODUL Logo
- UL-Sign
- E-File-No. of PCB manufacturer

LINDY PRODUCT SPECIFICATION (1 OF 1)

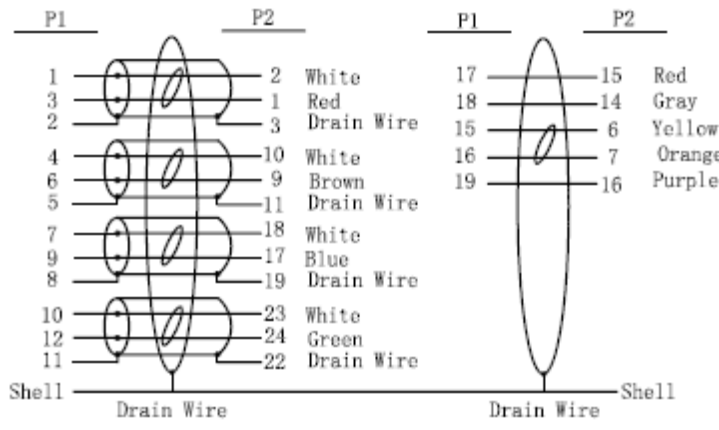
Length	Polybag Size	Label Size	Product Number
0.5m	FP2	LBS	36270
1m	FP2	LBS	36271
2m	FP3	LBM	36272
3m	FP3	LBM	36273
5m	FP3	LBM	36274



LINDY Black Line DVI Cable lindy.com RoHS E342987 AWM STYLE 20276 80°C 30V VW-1

- Electrical Test:**
- 100%Test(Open ,short ,miss wire)
 - Contact Resistance: 5 ohm max.
 - Insulation Resistance: 10M ohm min.
 - Hi-pot:300V DC/10ms

Pin Assignment



Description: HDMI to DVI Cable, Black Line

- Connectors: HDMI Type A male to DVI-D (18+1) male, gold plated
- Cable: UL 20276 30AWG (7/0.1TC), 85% AL-Braid, OD: 5.5mm, PVC, black / red screws/SR: Pantone 2035C
- RoHS & Reach compliant, UL certified

Packaging: Lindy polybag and label as above

Alterations	Issue	Date	BY	GB	DE
	0	23.05.17	ML	AI	
Cable printing changed	1	08.08.17	ML		ML
Packaging Info update	2	16.11.17	ML		ML
Red Pantone No. 2035C added	3	01.12.17	ML	AI	

Drawn By: ML 23.05.17

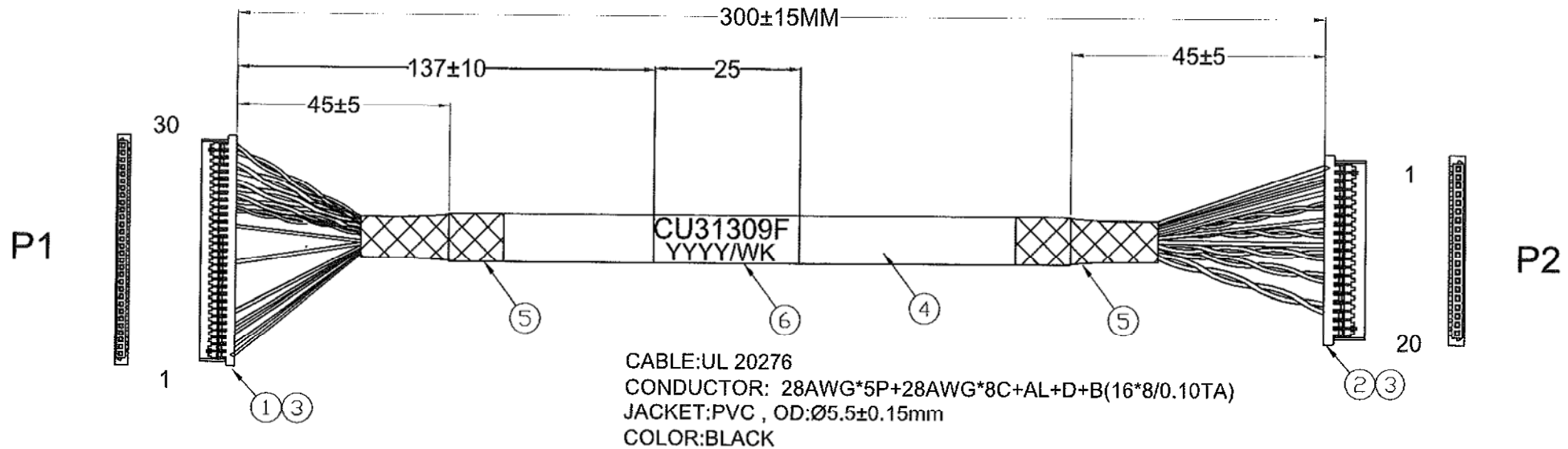
All connectors viewed from front

The following tolerances apply to overall dimensions -0% +10%

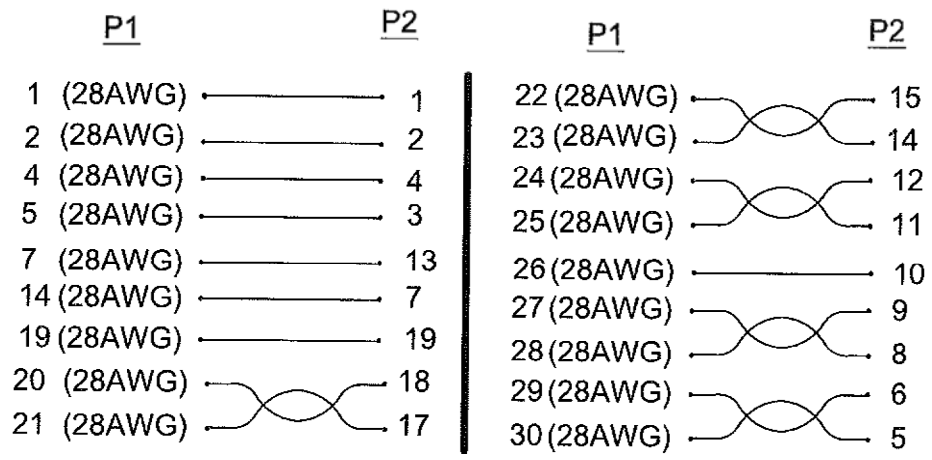
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 Fax: +44 1642-754027 | Fax: +49 621-47-005-990





WIRING DIAGRAM



NOTE	DESCRIPTION
1	XY P/N : KB912-30P PITCH 1.25*30P HOUSING
2	XY P/N : KB912-20P PITCH 1.25*20P HOUSING
3	XY P/N : KB912-T TERMINAL
4	UL20276 5P*28AWG+8C*28AWG+AL+D+B CABLE
5	UL TYPE RSFR-H Ø6.0*25mm SHRINK TUBE*2PCS
6	UL TYPE TL-SM25 Lable + tube (Meet UL requirement)

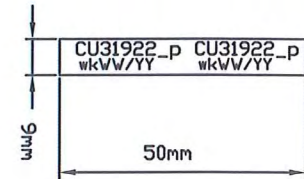
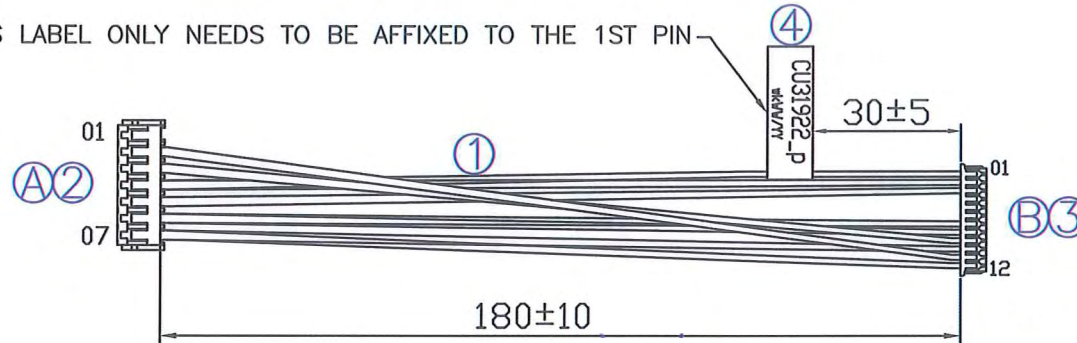
UL FILE NO	Q'TY
REF.SPEC	1 PCS
REF.SPEC	1PCS
REF.SPEC	36PCS
E119932	1PCS
E203950	2PCS
MH30090	1PCS

DRAWN	DAW NO	FT - C345 -135	TITLE:				
CHECK	PART NO	CU31309F	Displaycable 8-bit eMotion to AUO G121SN01 V.3				
APPROVED	DATE	2014 . 03 . 10	UNIT	m m	SCALE	SHEET	
					NON	1 OF 1	

Customer Approved

ROHS

THIS LABEL ONLY NEEDS TO BE AFFIXED TO THE 1ST PIN

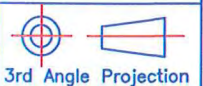


PIN ASSIGNMENT

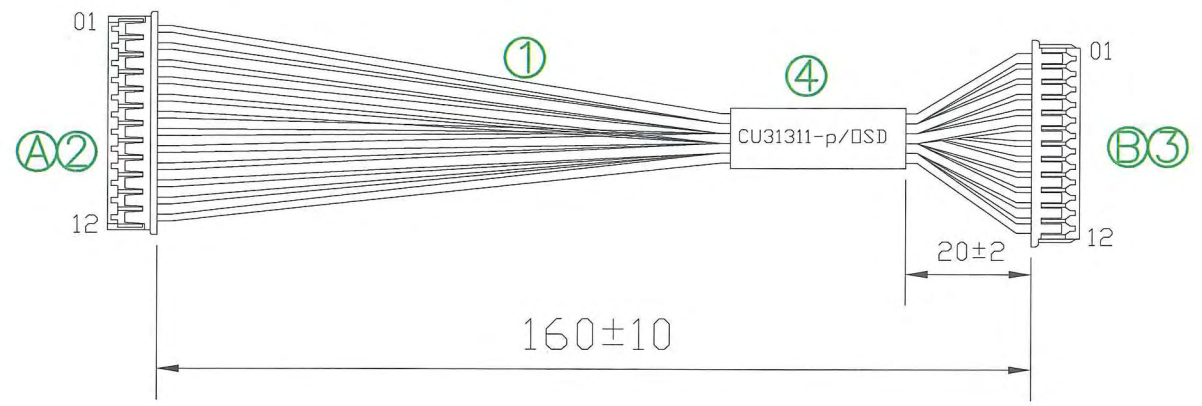
A	B	COLOR
4	1	RED
	2	RED
5	3	RED
6	7	BLACK
	8	BLACK
3	9	WHITE
7	10	BLACK
	12	BLACK
2	11	BLUE

4	LABEL PRINTING" CU31922_p" wkWW/YY	MH46613
3	HOUSING: MOLEX 51021-1200 TERMINAL: MOLEX 50058-8000	E29179
2	HOUSING: JMT JP24188-07 (EH-07) TERMINAL: JMT J24188PS-2 (EH)	E127691
1	UL1571 28AWG	E203736 E41396
ITEM	MATERIAL	UL FILE

Rev.	Date	Description	Approved	Part no	CU31922
			Checked	Item	
			Drawing	Drawing no	PDED_CU31922
			Customer	EU0137	Unit:mm
			Date	JUN/5/2018	Sheet:1/1



PIN ASSIGNMENT		
A	B	COLOR
1	12	RED
2	11	BLACK
3	10	WHITE
4	9	RED
5	8	BLACK
6	7	WHITE
7	6	RED
8	5	BLACK
9	4	WHITE
10	3	RED
11	2	BLACK
12	1	WHITE

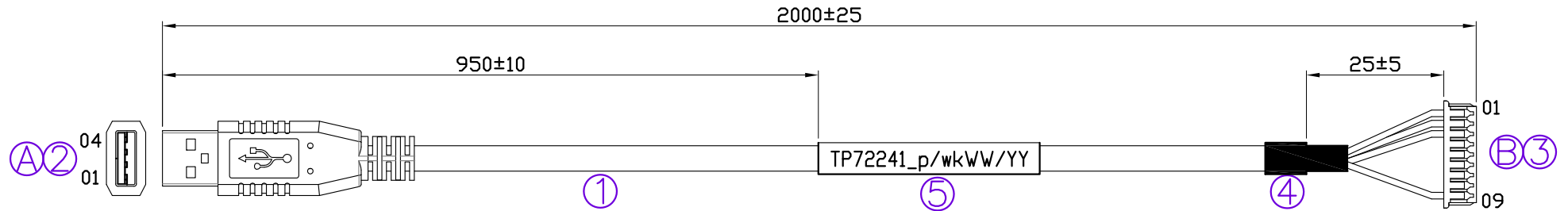


4	LABEL "CU31311-p/OSD"		
3	HOUSING: MOLEX 51021-1200 TERMINAL: MOLEX 50058-8000		E29179
2	HOUSING: TYU U2002HNO-12(51004-12) TERMINAL: MOLEX 50011-8000		E191023 E29179
1	UL1571 28AWG		E41396
ITEM	MATERIAL		UL FILE

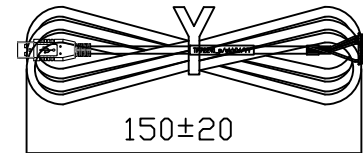
Rev.	Date	Description	Approved	Part no	CU31311		
			Checked	Item			
			Drawing	Drawing no	PDED_CU31311		
				Customer	EU0137	Unit:mm	 3rd Angle Projection
				Date	APR/20/2016	Sheet:1/1	

Customer Approved

ROHS



PACKING:



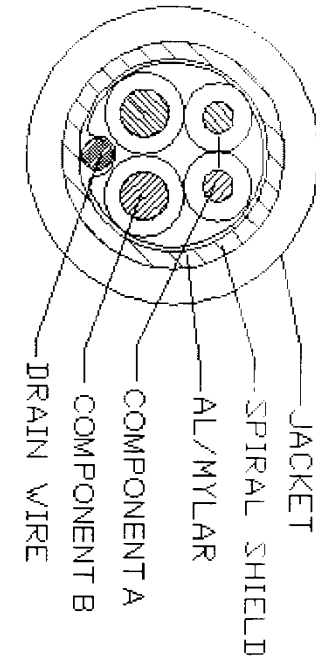
PIN ASSIGNMENT		
A	B	COLOR
1	1	RED
2	2	WHITE
3	3	GREEN
4	9	BLACK
SHELL		DRAIN

5	WHITE HEAT SHRINK TUBE UL 4ø*50MM PRINTING "TP72241_p/wkWW/YY"	E255532 E180908
4	BLACK HEAT SHRINK TUBE F34 UL 4ø*25MM	E75077 E364978
3	HOUSING: MOLEX 51021-0900 TERMINAL: MOLEX 50058-8000	E29179
2	USB A MALE ,MOLDING:BLACK	E237064 E363107
1	UL2725 28AWG*2C ,28AWG*1P ,ABE JACKET:BLACK ,OD : 3.5±0.15mm	E138961 E257034
ITEM	MATERIAL	UL FILE

Rev.	Date	Description	Approved	Part no
				TP72241
	AUG/28/2018	INCREASE HEAT SHRINK TUBE UL AND WIRE UL	Checked	Item AS50000670A
			Drawing	Drawing no PDED_TP72241

Customer	EU0137	Unit:mm	
Date	APR/13/2018	Sheet:1/1	

COMPONENT		UNIT	#28AWGX1P+#28AWGX2C+AL/MYLAR+E+SPIRAL
NO OF PAIR		EACH	1
COMPONENT A TWISTED PAIR	CONDUCTOR	CONSTITUTION	28AWG 7/0.127±0.008
		MATERIAL	TINNED COPPER STRANDED
		OD	MM 0.38 (REF)
	INSULATION	MATERIAL	HD-PE
		THICKNESS	MM 0.23 (REF)
		O D.	MM 0.85±0.05
COLOR		WHITE&GREEN	
NO OF WIRE		2	
COMPONENT B SINGLE WIRE	CONDUCTOR	CONSTITUTION	28AWG 7/0.127±0.008
		MATERIAL	TINNED COPPER STRANDED
		OD	MM 0.38 (REF)
INSULATION	MATERIAL	SR-PVC	
	THICKNESS	MM 0.23 (REF)	
	O D.	MM 0.85±0.05	
	COLOR	1.RED 2.BALCK	
AL/MYLAR(AL. FACE OUTSIDE)	COVERAGE	%	100
	OVERLAP	%	25
DRAIN WIRE		28AWG 7/0.127±0.008 TINNED COPPER STRANDED	
SPIRAL SHIELD	CONSTITUTION	40±3/0.12±0.008	
	MATERIAL	TINNED COPPER WIRE	
JACKET	MATERIAL	FR-PVC	
	THICKNESS	MM	0.45 (REF)
	HARDNESS	HA	75±5
	O. D.	MM	3.5±0.15
	COLOR	BLACK (FREEWAY COLOR CODE 140C)	
UL		UL 2725	
TEMPERATURE		°C	80
VOLTAGE RATING		V	30
DIELECTRIC STRENGTH		AC-500V/1 MIN	
INSULATION RESISTANCE		SR-PVC 50 M OHM/KM MIN. AT 20°C HD-PE 100 M OHM/KM MIN. AT 20°C	
CONDUCTOR RESISTANCE		28AWG 237 OHM/KM MAX. AT 20°C 24AWG 93 OHM/KM MAX. AT 20°C	
SPARK TEST		AC-2KV IN AIR	
JACKET MARKING		元 AWM E257034 FREEWAY STYLE 2725 80°C 30V VW-1 28AWG/1P+28AWG/2C USB 2.0 CABLE	



東莞富偉電線有限公司 FREWAY ELECTRONIC WIRE & CABLE (DONGGUAN) CO., LTD			
CUSTOMER	晶泰	VERSION	A
APPD		SHEET NO.	N11019-A
CHKD		PART NO.	
DR		DATE	2011/06/24

65 Watts

- Energy Efficiency Level VI
- CoC Tier 2
- Limited Power Source Approved
- <0.15 W Standby Power
- Optional Inlet Connector
- China Compulsory Certification (CCC) Qualified
- 0 °C to 60 °C Operation
- High Power Density
- Low Cost



Dimensions:

VEC65:

4.58 x 2.06 x 1.23" (116.3 x 52.4 x 31.3 mm)

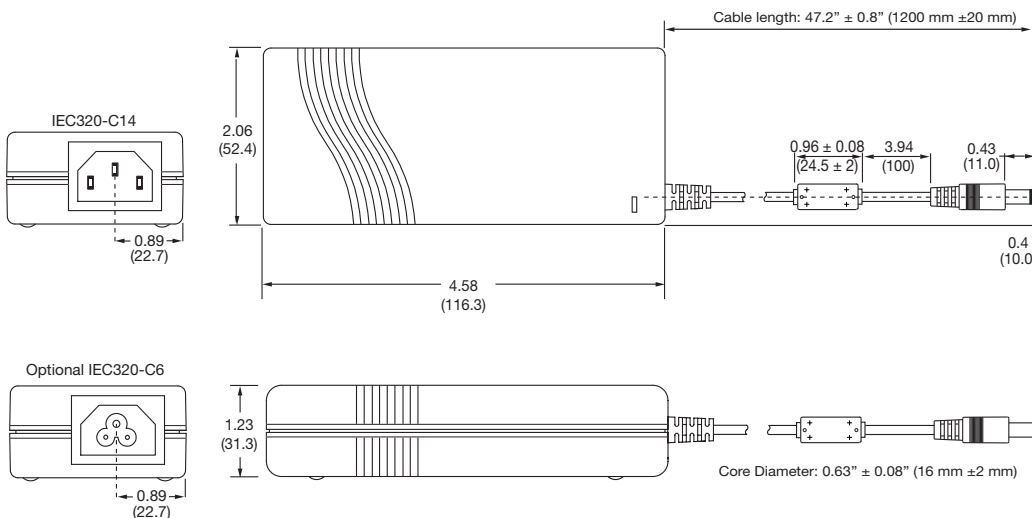
Models & Ratings

Output Power	Output Voltage	Output Current	Total Regulation	Efficiency ⁽¹⁾	Model Number
65 W	12.0V	5.41 A	±5%	89%	VEC65US12
	19.0V	3.42 A		89%	VEC65US19
	24.0V	2.71 A		89%	VEC65US24

Notes

1. Typical average of efficiencies measured at 25%, 50%, 75% and 100% load and 230 VAC input.

Mechanical Details



Power Cord for C14 inlet, Order

Part:

UK - UK-MAINS-IEC

European - EU-MAINS-IEC

US - US-MAINS-IEC

Power Cord for C6 inlet, Order Part:

UK - UK-MAINS-5

European - EU-MAINS-5

US - US-MAINS-5

Notes

1. All dimensions are shown in inches (mm), Tolerance is 0.04" (±1.0) max except output lead.

2. Weight: 0.6 lbs (270 g) approx.

3. Output connector is barrel type with 11 mm length, 5.5 mm dia. outer, 2.5 mm dia. inner with center + and outer shell - polarity.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	90		264	VAC	
Input Frequency	47		63	Hz	
Input Current		1.3/0.9		A	Measured at 115/230 VAC
Inrush Current			70	A	230 VAC, cold start at 25 °C
Power Factor					EN61000-3-2 Class A
Earth Leakage Current			0.7	mA	264 VAC, 60 Hz
No Load Input Power			0.15	W	
Input Protection	T3.15A/250VAC internal fuse in line				

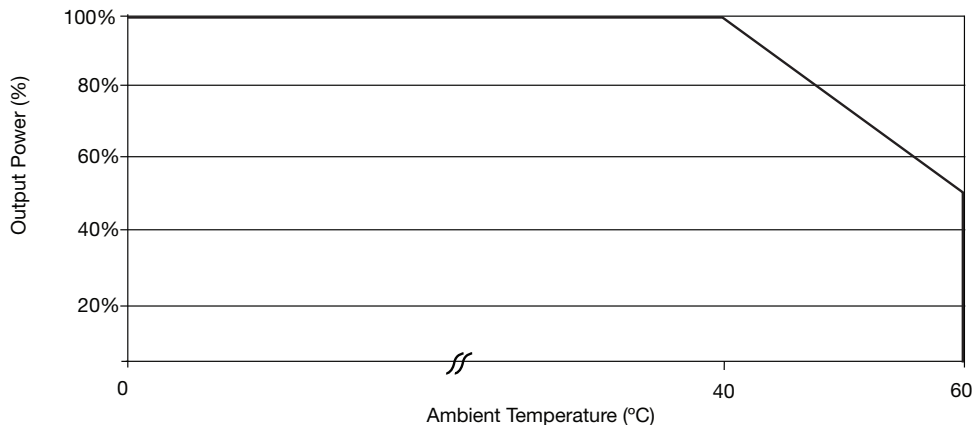
Output

Characteristic	Min.	Typ.	Max.	Units	Notes & Conditions
Output Voltage	12		24	VDC	See Models and Ratings table
Minimum Load					No minimum load required
Start Up Delay			3	s	
Start Up Rise Time		8		ms	
Hold Up Time	8			ms	Full load and 115 VAC
Line Regulation			±0.5	%	
Total Regulation			±5	%	Including initial set accuracy
Transient Response			4	%	Maximum deviation, recovering to less than 1% within 500 µs for 25% step load
Ripple and Noise			240	mV pk-pk	Measured with 20 MHz Bandwidth and 22 µF electrolytic in parallel with 0.1 µF ceramic capacitor.
Overshoot		5		%	At turn on / turn off
Overload Protection	110		170	%	
Overvoltage Protection		150		%	Recycle mains to reset
Short Circuit Protection	Trip and restart (hiccup), auto resetting				
Temperature Coefficient		±0.04		%/°C	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	0		+60	°C	Derate from 100% load at 40 °C to 50% load at 60 °C
Cooling	Natural convection				
Operating Humidity	5		90	%RH	Non-condensing
Storage Temperature	-20		+85	°C	
Operating Altitude			5000	m	
Shock	IEC68-2-27, 30 g, 11 ms half sine, 3 times in each of 6 axes				
Vibration	IEC68-2-6, 10-500 Hz, 2 g 10 mins/sweep, 60 mins for each of 3 axes				

Derating Curve

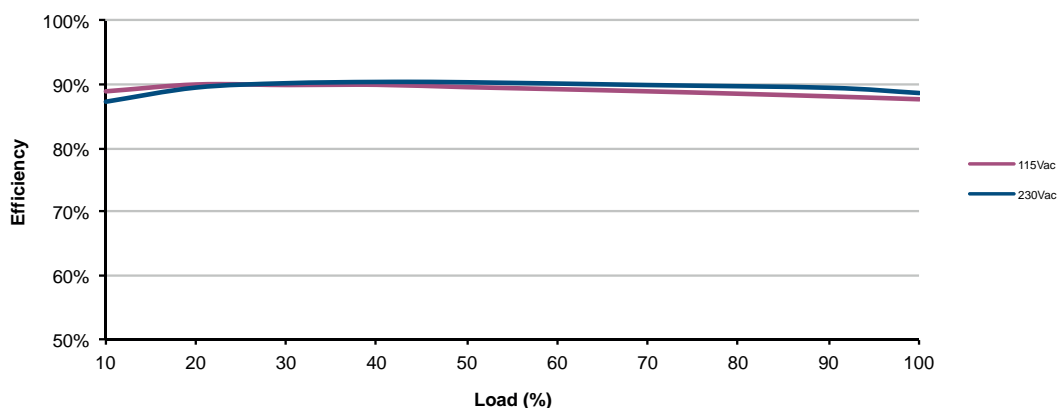


General

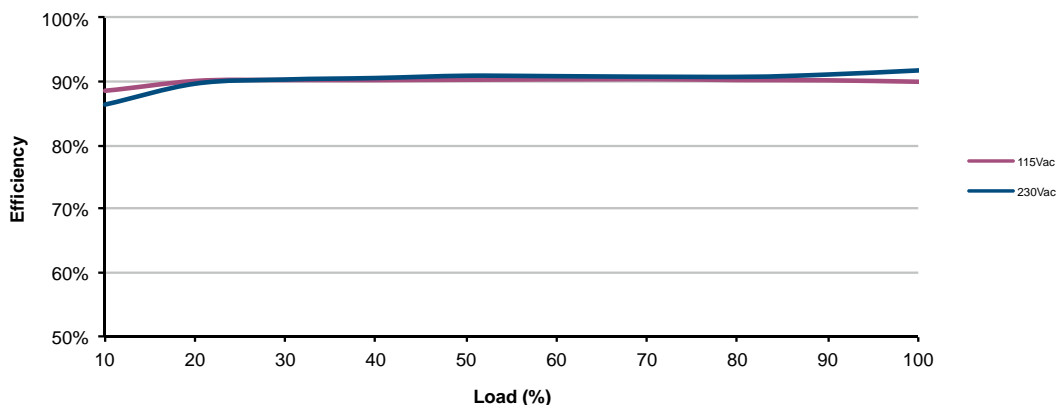
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		90		%	See Models and Ratings table and curves.
Isolation: Input to Output Input to Ground Output to Ground			3000	VAC	
			1500	VAC	
					Negative output is connected to ground
Switching Frequency		65		kHz	±10 kHz
Power Density			5.6	W/in ³	
Mean Time Between Failure		>200		kHrs	MIL-HDBK-217F at 25 °C GB
Weight		0.6 (270)		lb (g)	

Efficiency Curves

VEC65US12



VEC65US24



EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Emissions	EN55022	Level B	Conducted & Radiated
Harmonic Current	EN61000-3-2	Class A	
Voltage Flicker	EN61000-3-3		

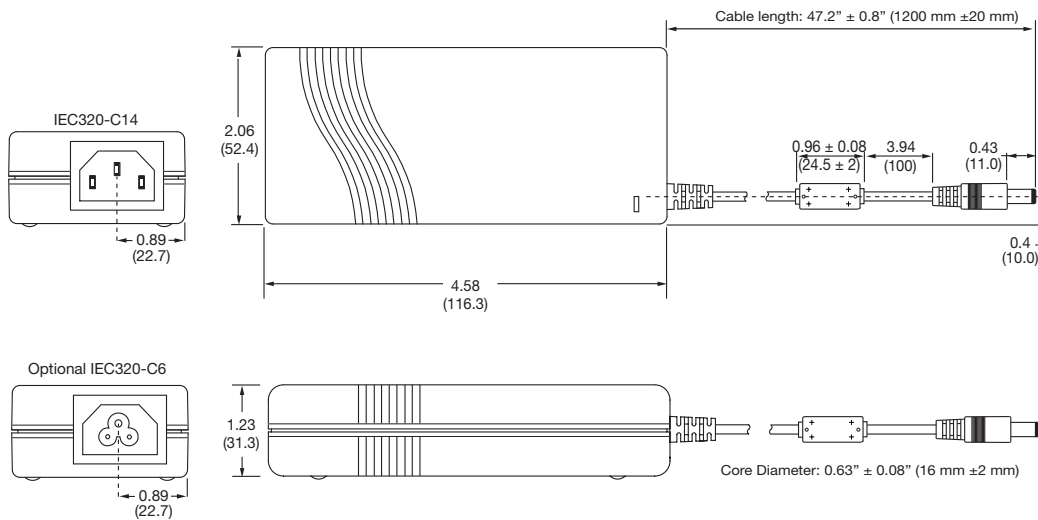
EMC: Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	±8 kV Air, ±4 kV contact	A	
Radiated	EN61000-4-3	3 V/m	A	
EFT/Burst	EN61000-4-4	3	A	
Surge	EN61000-4-5	Installation Class 3	A	
Conducted	EN61000-4-6	3 V	A	
Magnetic Fields	EN61000-4-8	3 A/m	A	
Dips and Interruptions	EN61000-4-11	Dip: 30% 500 ms	A/B	High Line/Low Line
		Dip: 60% 200 ms	A/B	High Line/Low Line
		Int: 100% 5000 ms	B	

Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
UL/CSA	cUL60950-1	Approved at Limited Power Source (LPS)
TUV	EN60950-1	
CB	IEC60950-1	
CCC	China Compulsory Certification (CCC)	

Mechanical Details



Power Cord for C14 inlet, Order Part:
 UK - UK-MAINS-IEC
 European - EU-MAINS-IEC
 US - US-MAINS-IEC






















Power Cord for C6 inlet, Order Part:
 UK - UK-MAINS-5
 European - EU-MAINS-5
 US - US-MAINS-5

Notes






















- All dimensions are shown in inches (mm), Tolerance is 0.04" (±1.0) max except output lead.
- Weight: 0.6 lbs (270 g) approx.
- Output connector is barrel type with 11 mm length, 5.5 mm dia. outer, 2.5 mm dia. inner with center + and outer shell - polarity.

Description	Power Cord	
Manufacturer / Type	Taiwan Line Tek Electronic Co., Ltd.	<input type="checkbox"/> UL category code ELBZ listed, number:
Supplier / Type	Elektrosil GmbH / DK06214 NK-01.8	
Ratings	10A / 250VAC	
Length / Colour	1.8m / black	





















Plug

Kind of construction	LP-33 (DIN 49441-R2)									
Manufacturer / Type	Longwell Company									
Ratings	10A / 250VAC									
Required approval marks / certificates 	<input type="checkbox"/> or:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	 Europe	 Germany	 Norway	 Sweden	 Denmark	 Finland	 Belgium	 Russia	 U.S.A	 Canada
	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	 United Kingdom	 British Stand	 Swiss	 Austria	 France	 Italy	 Netherl.	 Japan	 China	 South Africa


Appliance Connector

Kind of construction	LS-13 (IEC 60320 C13)									
Manufacturer / Type	Longwell Company									
Ratings	10A / 250VAC									
Required approval marks / certificates 	<input type="checkbox"/> or:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	 Europe	 Germany	 Norway	 Sweden	 Denmark	 Finland	 Belgium	 Russia	 U.S.A	 Canada
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	 United Kingdom	 British Stand	 Swiss	 Austria	 France	 Italy	 Netherl.	 Japan	 China	 South Africa

Cable





















Kind of construction	H05VV-F 3G 0.75mm ²									
Manufacturer / Type	Longwell Company									
Ratings	10A, 250VAC									
Required approval marks / certificates	<input type="checkbox"/> or:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	 Europe	 Germany	 Norway	 Sweden	 Denmark	 Finland	 Belgium	 Russia	 U.S.A	 Canada
	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	 United Kingdom	 British Stand	 Swiss	 Austria	 France	 Italy	 Netherl.	 Japan	 China	 South Africa

03					
02					
01					
00	01.06.2011	Dietrich		Dietrich	New
Rev	DATE	DRWN.BY	CHKD.BY	E D V	MODIFICATION / DESCRIPTION





















Voltage_Spec AC Power Cord_Rev00	DRGW. TITLE		 DRAWING NUMBER 2215-11A0-1800	
	Power Cord Set			
			SIZE ISO A 4	SHEET 1 OF 1

Description	Power cord set, North America type	
Manufacturer / Type	Feller 498G-SJT3X18AWG-C13	<input checked="" type="checkbox"/> UL category code ELBZ listed, number: E42003
Supplier / Type		
Ratings	10 A, 125 Vac,	
Length / Colour	2,50m / black	




















Plug

Kind of construction	PVC 3-pole, 180 degree, NEMA 5-15									
Manufacturer / Type	Feller / 498G									
Ratings	15A / 125 Vac									
Required approval marks / certificates	<input type="checkbox"/> or:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		 Europe	 Germany	 Norway	 Sweden	 Denmark	 Finland	 Belgium	 Russia	 U.S.A
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	 United Kingdom	 British Stand	 Swiss	 Austria	 France	 Italy	 Netherl.	 Japan	 China	 South Africa


Appliance Connector

Kind of construction	PVC 2-pole with earthing contact, 180 degrees, IEC 60320 / C13, UL 817									
Manufacturer / Type	Feller / C13									
Ratings	12 A/250 Vac (USA, Canada), 7 A/125 Vac (Japan), 10 A/250 Vac									
Required approval marks / certificates	<input checked="" type="checkbox"/> or:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		 Europe	 Germany	 Norway	 Sweden	 Denmark	 Finland	 Belgium	 Russia	 U.S.A
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	 United Kingdom	 British Stand	 Swiss	 Austria	 France	 Italy	 Netherl.	 Japan	 China	 South Africa

Cable

Kind of construction	SJT3X18AWG									
Manufacturer / Type	Feller									
Ratings										
Required approval marks / certificates	<input type="checkbox"/> or:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		 Europe	 Germany	 Norway	 Sweden	 Denmark	 Finland	 Belgium	 Russia	 U.S.A
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	 United Kingdom	 British Stand	 Swiss	 Austria	 France	 Italy	 Netherl.	 Japan	 China	 South Africa

03					
02	10.12.2012	S.Dietrich			Schurter power cord is no longer available
01	22.03.2010	J. Popp			
00	22.03.2010	J. Popp			

Rev	DATE	DRWN.BY	CHKD.BY	E D V	MODIFICATION / DESCRIPTION
	DRGW. TITLE				 CONRAC High Performance Displays DRAWING NUMBER 2215-1140-2500
	Power Cord Set North America Type				
					SIZE ISO A 4 SHEET 1 OF 1



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