VICTRONIX	Add:	Room 1405A, Building 1B, Hua qiang Idea Park, GuangMing District, Shenzhen, China		
	Tel:	+86-755-33265935	Fax:	+86-755-33265935

SPECIFICATION

VXT350MQHI-03C

☐ Preliminary Specification

☐ Final Specification

Approved By:
Date:

RECORD OF REVISION

Rev No.	Rev Date	Page	Contents	Editor
V00	2024/12/04		New issue.	Solon

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

TABLE OF CONTENTS

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

1. Scope

This specification defines general provisions as well as inspection standards for TFT module supplied by Victronix Tecenstar INT'L Co., LTD.

If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution.

2. General Specifications

2.1 LCD Parameter

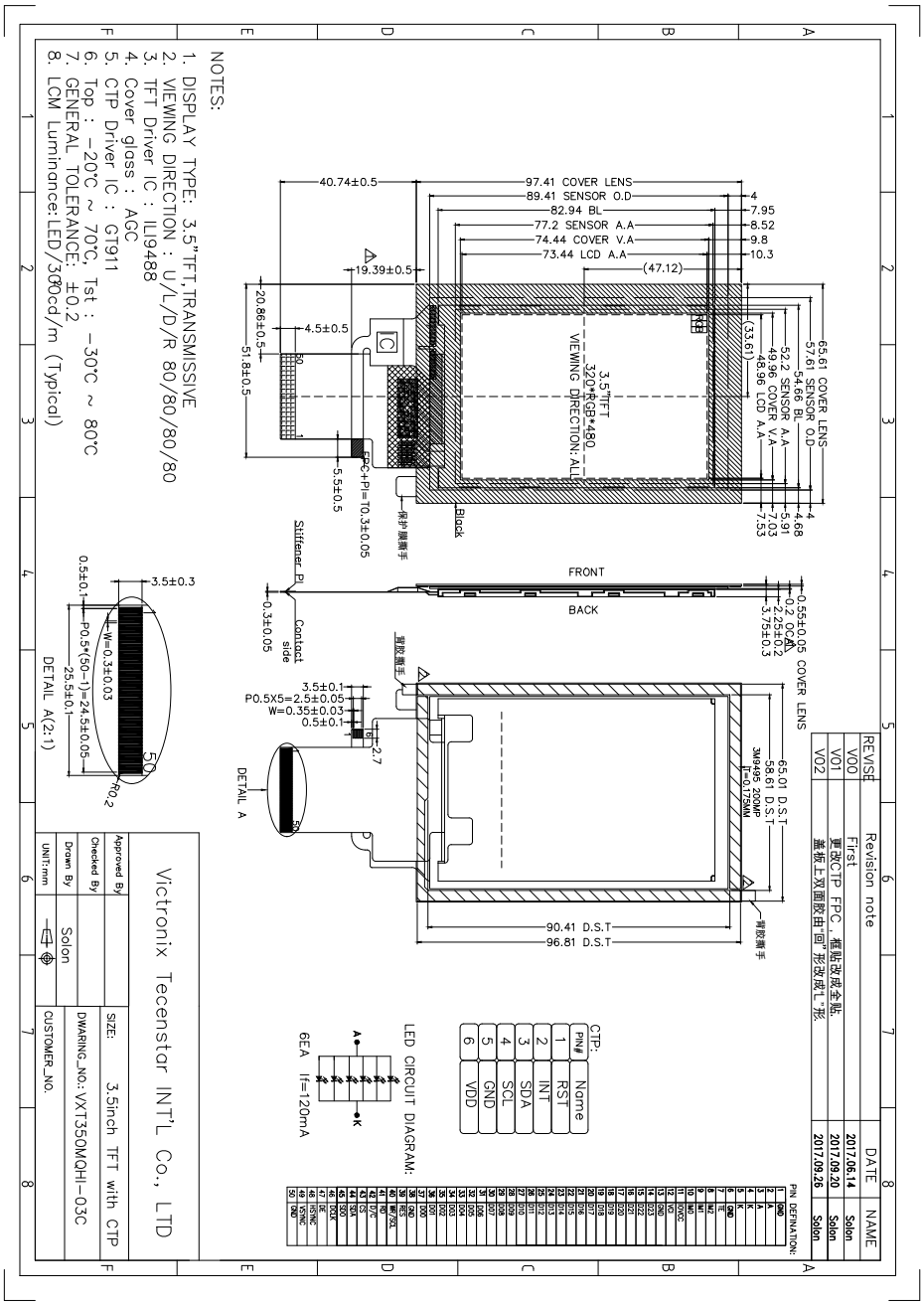
Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M		
Viewing Direction	ALL	O'Clock	
Grayscale inversion direction	-	O'Clock	
Operating temperature	-20~+70	℃	
Storage temperature	-30~+80	℃	
Module size	3.5	inch	
Active Area(W×H)	48.96x73.44	mm	
Number of Dots	320x480	dots	
Controller	ILI9488	-	
Power Supply Voltage	3.3	V	
Outline Dimensions	65.61x97.41x3.75	mm	
Backlight	1x6-LEDs (white)	pcs	
Weight	---	g	
Interface	RGB	-	

2.2 CTP Parameter

Item	Contents	Unit	Note
Cover View Area	49.96(H)x74.44(V)		
CTP Resolution	320x480	dots	
Interface Mode	IIC		
Touch Mode	5 Human fingers multi-touch	-	
Surface hardness	>=7H	-	
Transparency	>=85%	-	
Accuracy	Center +/-1.5mm,Edge +/-2.5mm	mm	
CTP Controller	GT911	-	
Power Supply Voltage	3.3	V	

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

3.Outline Drawing



4.Interface Description

4.1 LCD interface

<table>
<tr><th>Pin No.</th><th>Symbol</th><th>I/O</th><th>Function</th></tr>
<tr><td>1</td><td>GND</td><td>P</td><td>Ground.</td></tr>
<tr><td>2~3</td><td>A</td><td>P</td><td>LED back light(Anode)</td></tr>
<tr><td>4~5</td><td>K</td><td>P</td><td>LED back light(Cathode)</td></tr>
<tr><td>6</td><td>GND</td><td>P</td><td>Ground.</td></tr>
<tr><td>7</td><td>TE</td><td>O</td><td>Serve as a TE(Tearing effect) output signal</td></tr>
<tr><td>8</td><td>IM2</td><td>I</td><td rowspan="3">Select the interface mode
<table><tr><th>IM2</th><th>IM1</th><th>IM0</th><th>Interface</th></tr><tr><td>0</td><td>0</td><td>0</td><td>MIPI-DBI Type B 24-bit bus (DB_EN = 1)</td></tr><tr><td>0</td><td>0</td><td>0</td><td>MIPI-DBI Type B 18-bit bus (DB_EN = 0)</td></tr><tr><td>0</td><td>0</td><td>1</td><td>MIPI-DBI Type B 9-bit bus</td></tr><tr><td>0</td><td>1</td><td>0</td><td>MIPI-DBI Type B 16-bit bus</td></tr><tr><td>0</td><td>1</td><td>1</td><td>MIPI-DBI Type B 8-bit bus</td></tr><tr><td>1</td><td>0</td><td>1</td><td>MIPI-DBI Type C Option 1 (3-line SPI)</td></tr><tr><td>1</td><td>1</td><td>0</td><td>MIPI DSI</td></tr><tr><td>1</td><td>1</td><td>1</td><td>MIPI-DBI Type C Option 3 (4-line SPI)</td></tr></table></td></tr>
<tr><td>9</td><td>IM1</td><td>I</td></tr>
<tr><td>10</td><td>IM0</td><td>I</td></tr>
<tr><td>11</td><td>IOVCC</td><td>P</td><td>Digital IO Pad power supply(1.8V&2.8V)</td></tr>
<tr><td>12</td><td>VCI</td><td>P</td><td>Power supply (2.8V)</td></tr>
<tr><td>13</td><td>GND</td><td>P</td><td>Ground.</td></tr>
<tr><td>14-37</td><td>D23-D00</td><td>I</td><td>Data pin</td></tr>
<tr><td>38</td><td>GND</td><td>P</td><td>Ground.</td></tr>
<tr><td>39</td><td>RES</td><td>I</td><td>Reset the display</td></tr>
<tr><td>40</td><td>WR/SCL</td><td>I</td><td>Write enable pin I80 parallel bus system interface/Serial clock as</td></tr>
<tr><td>41</td><td>RD</td><td>I</td><td>Read signal.</td></tr>
<tr><td>42</td><td>D/C</td><td>I</td><td>Data/Command selection pin.</td></tr>
<tr><td>43</td><td>CS</td><td>I</td><td>Chip select signal</td></tr>
<tr><td>44</td><td>SDA</td><td>I</td><td>Serial Input data bus</td></tr>
<tr><td>45</td><td>SDO</td><td>I</td><td>Serial output data bus</td></tr>
<tr><td>46</td><td>DCLK</td><td>I</td><td>Data clock</td></tr>
<tr><td>47</td><td>DE</td><td>I</td><td>Data enable pin</td></tr>
<tr><td>48</td><td>HSYNC</td><td>I</td><td>Line sync signal</td></tr>
<tr><td>49</td><td>VSYNC</td><td>I</td><td>Frame sync signal</td></tr>
<tr><td>50</td><td>GND</td><td>P</td><td>Ground.</td></tr>
</table>

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

4.2 CTP pin

Pin No.	Symbol	I/O	Function
1	RST	I	Reset the display
2	INT	I	External Interrupt to the IC of CTP
3	SDA	I/O	Serial Input/output data bus
4	SCL	I	Serial clock
5	GND	P	Ground
6	VDD	P	CTP Power supply

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

5. Absolute Maximum Ratings(Ta=25℃)

5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25℃)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VCI	-0.3	3.3	V	1，2
	IOVCC				
	V_{GH}-V_{GL}	-	32		

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. V_{DD} >V_{SS} must be maintained.

5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30℃	80℃	-20℃	70℃	1,2
Humidity	-	-	-	-	3

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.

   The phenomenon is reversible.
3. Ta<=40℃:85%RH MAX.

   Ta>=40℃:Absolute humidity must be lower than the humidity of 85%RH at 40℃.

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

6. Electrical Specifications and Instruction Code

6.1 Electrical characteristics(Vss=0V ,Ta=25℃)

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VCI	Ta=25℃	2.5	2.8	3.3	V	-
		IOVCC		1.65	1.8	3.3		
Input voltage	'H'	V_{IH}	VDD=3.3V	0.7_{IOVCC}	-	IOVCC	V	-
	'L'	V_{IL}		-0.3	-	0.3IOVCC	V	-
Output voltage	'H'	V_{OH}	IOH= -1.0mA	0.8_{IOVCC}	-	IOVCC	V	-
	'L'	V_{OL}	IOL= +1.0mA	0	-	0.2IOVCC	V	-

Note:

1:When an optimum contrast is obtained in transmissive mode.

2: Tested in 1╳1 chessboard pattern.

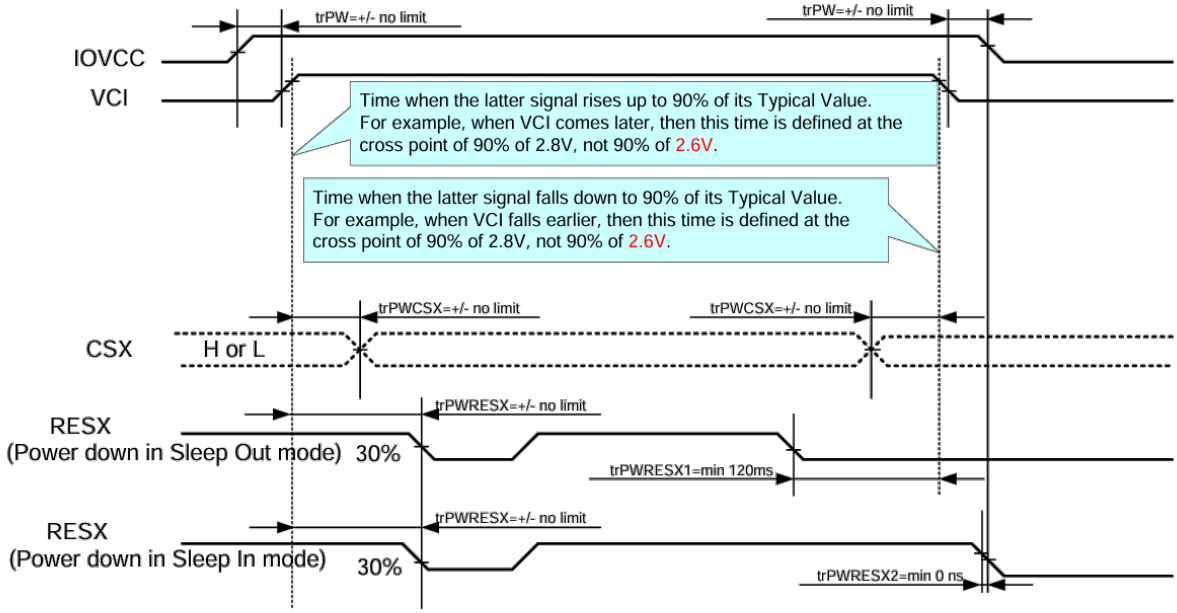
Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

7. Timing Characteristics

7.1 POWER ON/OFF SEQUENCE

7.1.1 Case 1 – RESX line is held high or unstable by host at power on:

If the RESX line is held High or unstable by the host during Power On, then Hardware Reset must be applied after both VCI and IOVCC have been applied. Otherwise, the correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.



trPWRESX1 is applied to RESX falling in the Sleep Out Mode

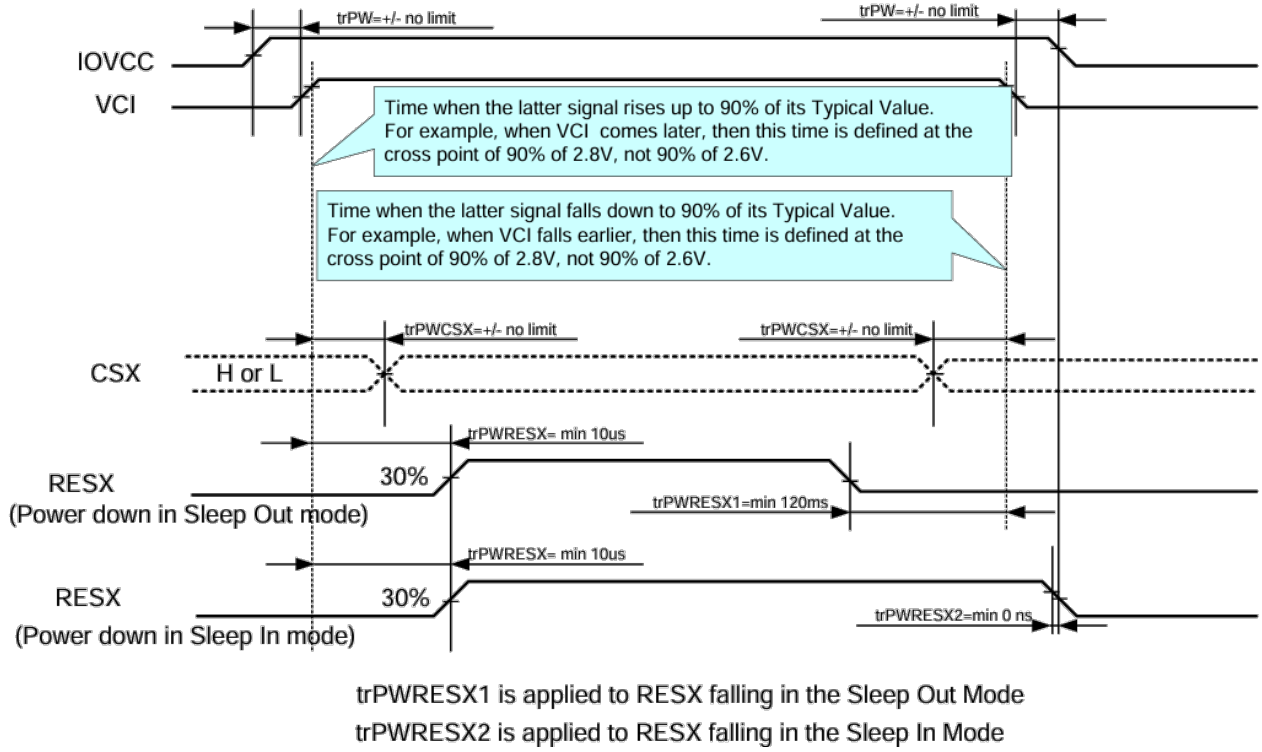
trPWRESX2 is applied to RESX falling in the Sleep In Mode

Note: Unless otherwise specified, timings herein show the cross point at 50% of the signal power level.

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

7.1.2 Case 2 – RESX line is held low or unstable by host at power on

If the RESX line is held Low (and stable) by the host during Power On, then the RESX must be held low for a minimum of 10µsec after both VCI and IOVCC have been applied.



trPWRESX1 is applied to RESX falling in the Sleep Out Mode
trPWRESX2 is applied to RESX falling in the Sleep In Mode

Note: Unless otherwise specified, timings herein show the cross point at 50% of the signal power level.

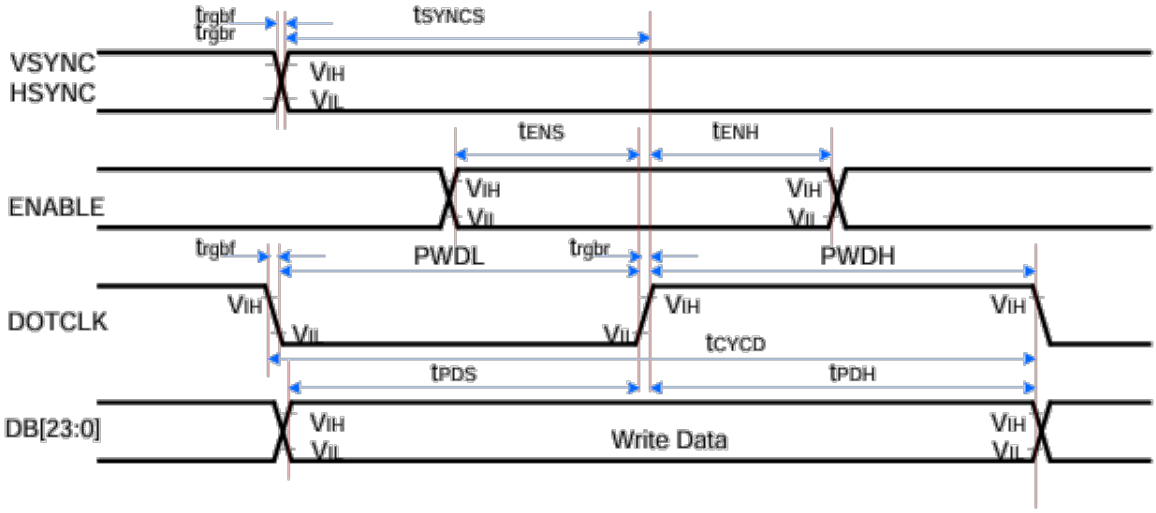
7.1.3 Uncontrolled Power Off

The Uncontrolled Power Off means the situation when a battery is removed without the controlled power of sequence. There wil not be any damages on the display module, or the display module will not cause any damages on the host or lines of the interface. At an uncontrolled power of event, the lLI9488 will force the display to become blank and will not cause any abnormal visible effects within 1 second on the display and remains blank until “Power On Sequence" powers it up.

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

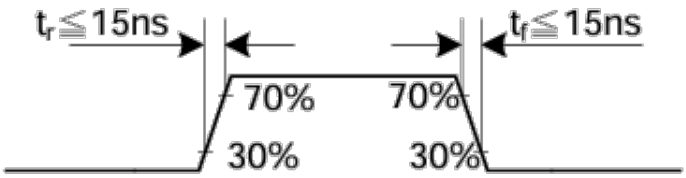
7.2 AC Characteristics

7.2.1 DPI (Display Parallel 16-/18-/24-bit interface) Timing Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
VSYNC/ HSYNC	t_{SYNCS}	VSYNC/HSYNC setup time	15	-	ns	16-/18-/24-bit bus RGB interface mode
	t_{SYNCH}	VSYNC/HSYNC hold time	15	-	ns	
ENABLE	t_{ENS}	ENABLE setup time	15	-	ns	
	t_{ENH}	ENABLE hold time	15	-	ns	
DB [23:0]	t_{PDS}	Data setup time	15	-	ns	
	t_{PDH}	Data hold time	15	-	ns	
DOTCLK	PWDH	DOTCLK high-level period	20	-	ns	
	PWDL	DOTCLK low-level period	20	-	ns	
	t_{CYCD}	DOTCLK cycle time	50	-	ns	
	t_{rgbr}, t_{rgbf}	DOTCLK,HSYNC,VSYNC rise/fall time	-	15	ns	

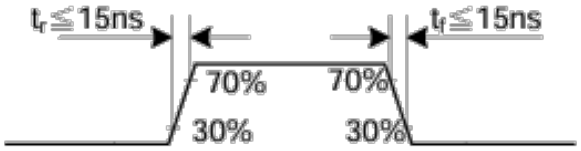
Note: Ta = -40 to 85 °C, IOVCC = 1.65V to 3.3V, VCI = 2.5V to 3.3V, AGND = DGND = 0V



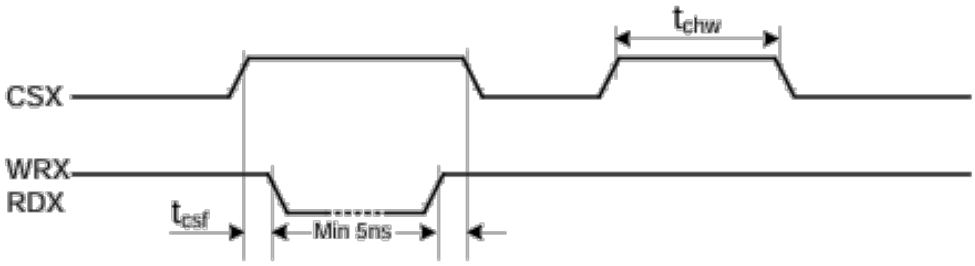
Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

Notes:

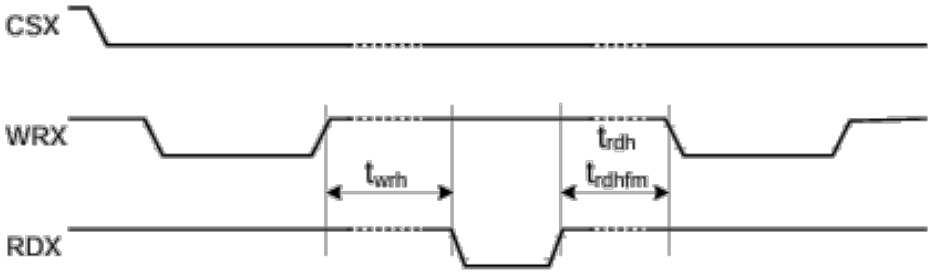
1. Ta = -40 to 85 °C, IOVCC = 1.65V to 3.3V, VCI = 2.5V to 3.3V, AGND = DGND = 0V
2. Logic high and low levels are specified as 30% and 70% of IOVCC for input signals.
3. Input signal rising time and falling time:



7. The CSX timing:

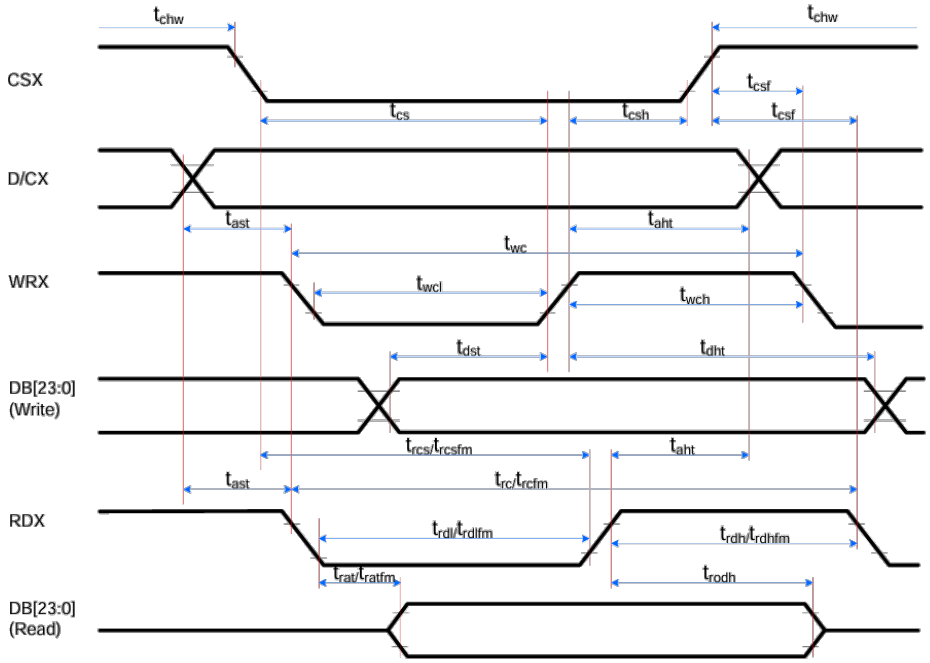


8. The Write to Read or the Read to Write timing:



Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

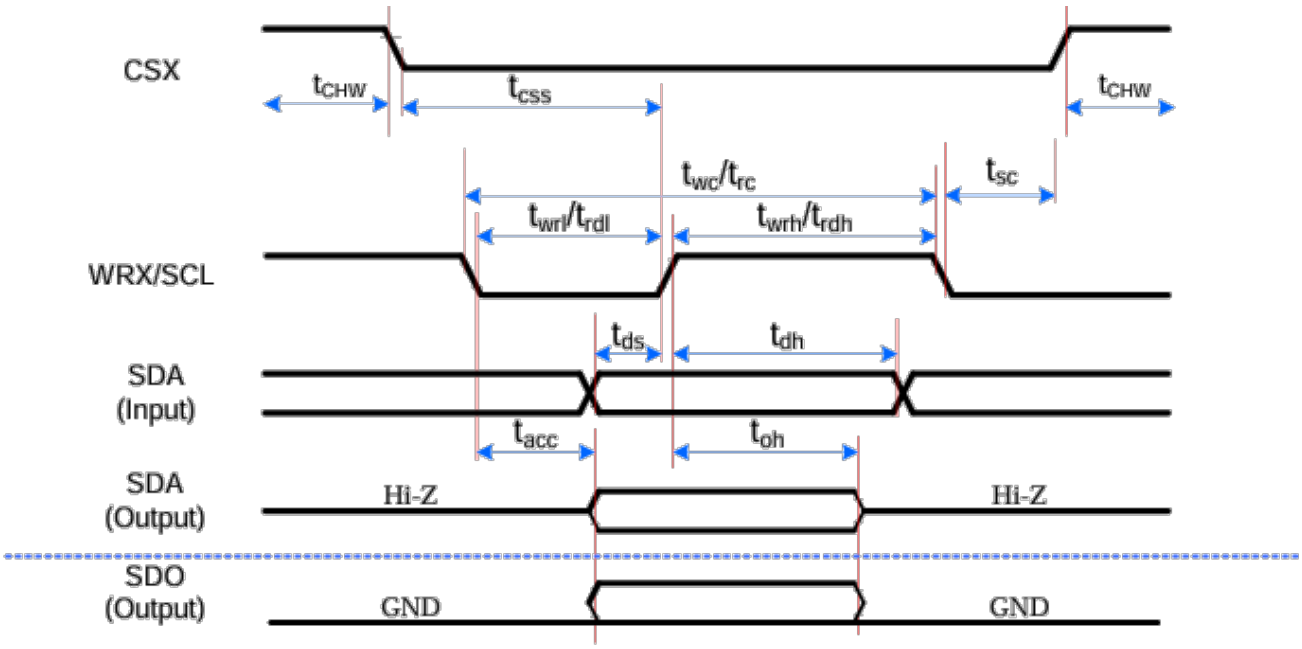
7.2.2 DBI Type B Timing Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	-
	taht	Address hold time (Write/Read)	0	-	ns	-
CSX	tchw	CSX "H" pulse width	0	-	ns	-
	tcs	Chip Select setup time (Write)	15	-	ns	-
	trcs	Chip Select setup time (Read ID)	45	-	ns	-
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	-
	tcsf	Chip Select Wait time (Write/Read)	0	-	ns	-
WRX	twc	Write cycle	40	-	ns	-
	twrh	Write Control pulse H duration	15	-	ns	-
	twrl	Write Control pulse L duration	15	-	ns	-
RDX (FM)	trcfm	Read Cycle (FM)	450	-	ns	When read from Frame Memory
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	When read ID data
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
DB [23:0], DB [17:0], DB [15:0], DB [8:0], DB [7:0]	tdst	Write data setup time	10	-	ns	For maximum, CL=30pF For minimum, CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

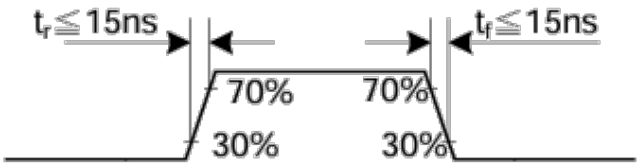
Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

7.2.3 DBI Type C Option 1(3-Line SPI System) Timing Characteristics



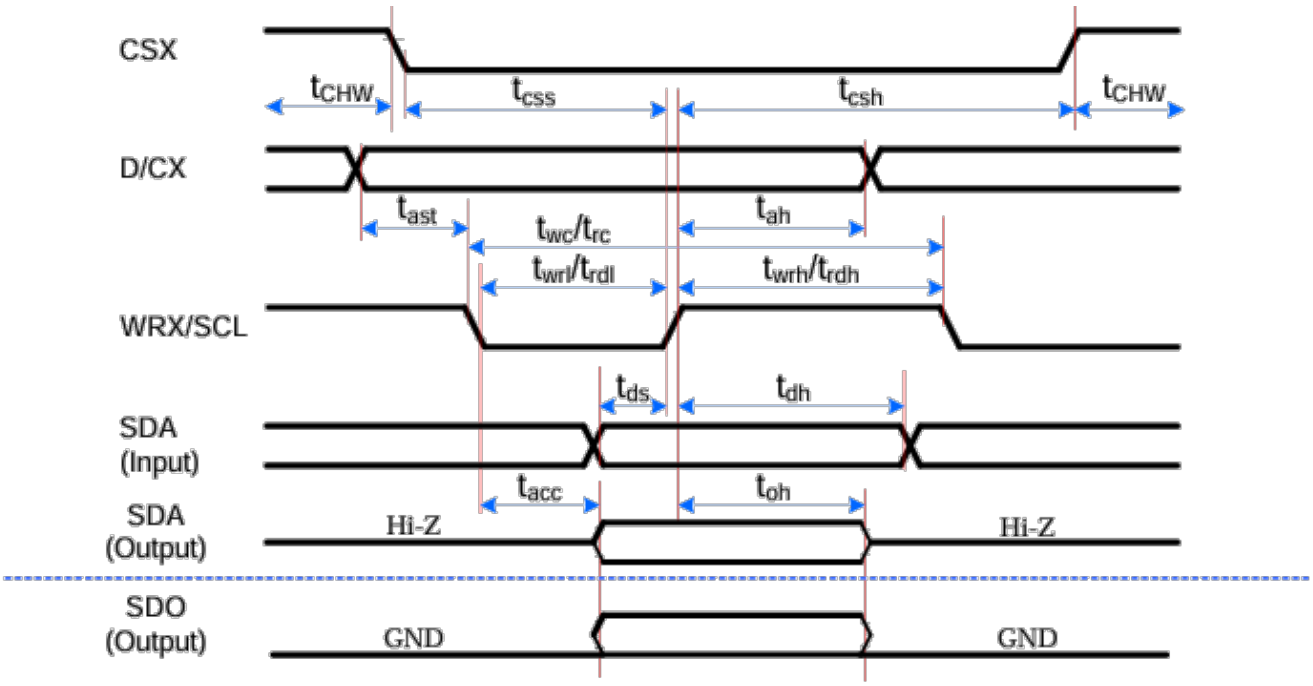
Signal	Symbol	Parameter	min	max	Unit	Description
CSX	tsc	SCL-CSX	15	-	ns	
	tchw	CSX H Pulse Width	40	-	ns	
	tcss	Chip select time (Write)	60	-	ns	
	tcsh	Chip select hold time (Read)	65	-	ns	
SCL	twc	Serial Clock Cycle (Write)	66	-	ns	
	twrh	SCL H Pulse Width (Write)	15	-	ns	
	twrl	SCL L Pulse Width (Write)	15	-	ns	
	trc	Serial Clock Cycle (Read)	150	-	ns	
	trdh	SCL H Pulse Width (Read)	60	-	ns	
	trdl	SCL L Pulse Width (Read)	60	-	ns	
SDA (Input)	tds	Data setup time (Write)	10	-	ns	
	tdh	Data hold time (Write)	10	-	ns	
SDA/SDO (Output)	tacc	Access time (Read)	10	50	ns	For maximum CL=30pF
	toh	Output disable time (Read)	15	50	ns	For minimum CL=8pF

Note: Ta = -40 to 85 °C, IOVCC = 1.65V to 3.3V, VCI = 2.5V to 3.3V, AGND = DGND = 0V, T = 10+/-0.5ns



Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

7.2.4 DBI Type C Option 3(4-Line SPI System) Timing Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
CSX	tcss	Chip select time (Write)	15	-	ns	
	tcsh	Chip select hold time (Read)	15	-	ns	
	tCHW	CS H pulse width	40	-	ns	
SCL	twc	Serial clock cycle (Write)	50	-	ns	
	twrh	SCL H pulse width (Write)	10	-	ns	
	twrl	SCL L pulse width (Write)	10	-	ns	
	trc	Serial clock cycle (Read)	150	-	ns	
	trdh	SCL H pulse width (Read)	60	-	ns	
	trdl	SCL L pulse width (Read)	60	-	ns	
D/CX	tas	D/CX setup time	10	-	ns	
	tah	D/CX hold time (Write/Read)	10	-	ns	
SDA (Input)	tds	Data setup time (Write)	10	-	ns	
	tdh	Data hold time (Write)	10	-	ns	
SDA/SDO (Output)	tacc	Access time (Read)	10	50	ns	For maximum CL=30pF For minimum CL=8pF
	tod	Output disable time (Read)	15	50	ns	

Notes:

3. Ta = -40 to 85 °C, IOVCC = 1.65V to 3.3V, VCI = 2.5V to 3.3V, AGND = DGND = 0V, T = 10+/-0.5ns.
2. Does not include signal rising and falling times.

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

7.3 **Reset timing characteristics**

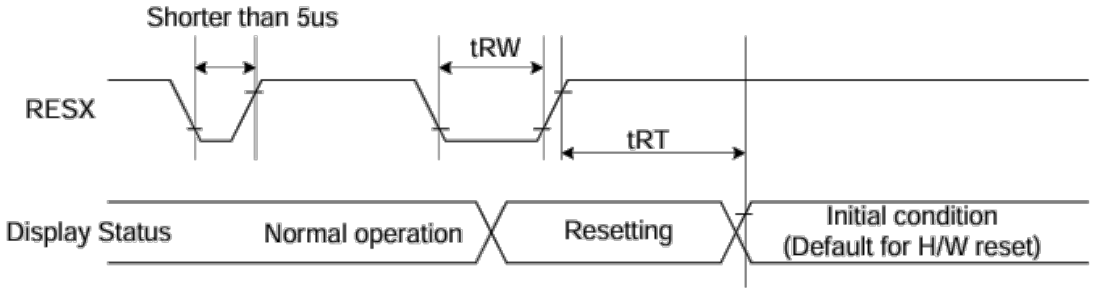


Table 39: Reset Timing

Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		uS
	tRT	Reset cancel		5 (note 1,5)	mS
				120 (note 1,6,7)	mS

Notes:

1. The reset cancel also includes the required time for loading ID bytes, VCOM setting and other settings from the EEPROM to registers. After a rising edge of RESX, this loading is done within 5 ms after the H/W reset cancel (tRT).
2. According to the Table 40, a spike due to an electrostatic discharge on the RESX line does not cause irregular system reset.

Table 40: Reset Description

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

3. During the Reset period, the display will be blanked (When Reset starts in the Sleep Out mode, the display will enter the blanking sequence in at least 120 ms. The display remains the blank state in the Sleep In mode.) and then return to the default condition for the Hardware Reset.
4. Spike Rejection can also be applied during a valid reset pulse, as shown below:

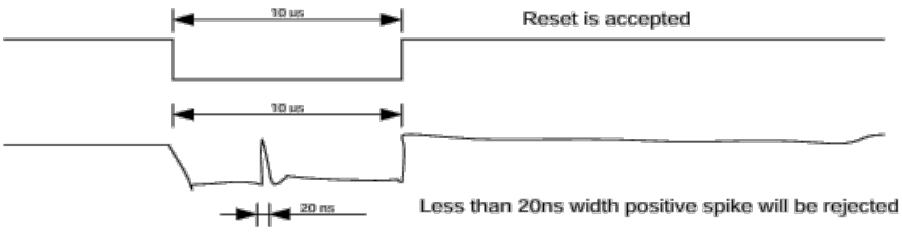
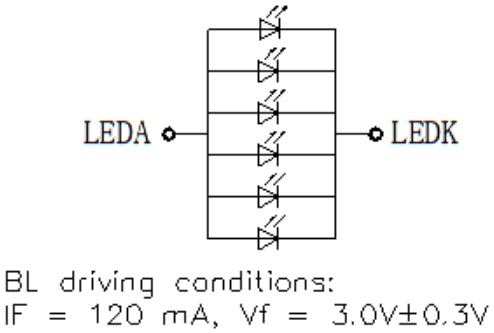


Figure 135: Positive Noise Pulse during Reset Low

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

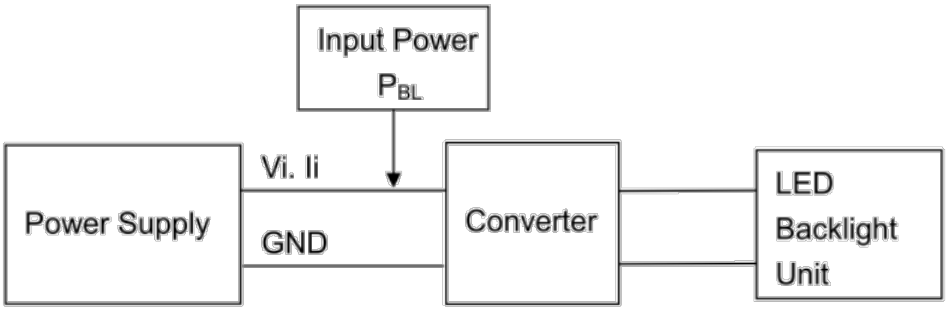
8.0 Backlight Characteristic



Item	Symbol	Min	Typ	Max	Unit	Test Condition
Supply Voltage	Vf	-	3.0	-	V	Note 1
Supply Current	If	-	120	-	mA	Note 2
Power dissipation	P_{BL}	-	360	-	mW	
Life Time	-	30000	-	-	Hr	Note 3,4
Backlight Color	White					

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and If =120mA.

Note 2: LED current is measured by utilizing a high frequency current meter as shown below:



Note 3: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and If =120mA. The LED lifetime could be decreased if operating If is larger than 120mA.

Note 4: LED light bar circuit:

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

9. Optical Characteristics

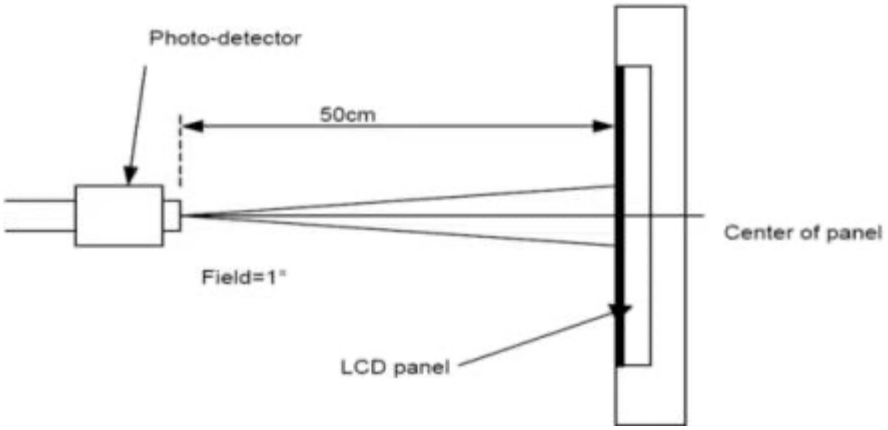
Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		If=120mA	250	300	-	Cd/m^2	1
Uniformity	⊿Bp			80	-	-	%	1,2
Viewing Angle	3:00		Cr≥10	-	80	-	Deg	1,2
	6:00			-	80	-		
	9:00			-	80	-		
	12:00			-	80	-		
Contrast Ratio	Cr		θ=0° Φ=0°	-	700	-	-	3,4
Response Time	T_r+T_f			-	30	-	ms	4,5
Color of CIE Coordinate	W	x	θ=0° Φ=0°	0.2253	0.2753	0.3253	-	1,6
		y		0.2402	0.2902	0.3402	-	
	R	x		0.5805	0.6305	0.6805	-	
		y		0.3018	0.3518	0.4018	-	
	G	x		0.2738	0.3238	0.3738	-	
		y		0.5268	0.5768	0.6268	-	
	B	x		0.0887	0.1387	0.1887	-	
		y		-	0.0410	0.0910	-	
NTSC Ratio	S			-	60	-	%	

*The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment CA310 Measuring condition:-Measuring surroundings: Dark room.-Measuring temperature: Ta=25℃.-Adjust operating voltage to get optimum contrast at the center of the display.

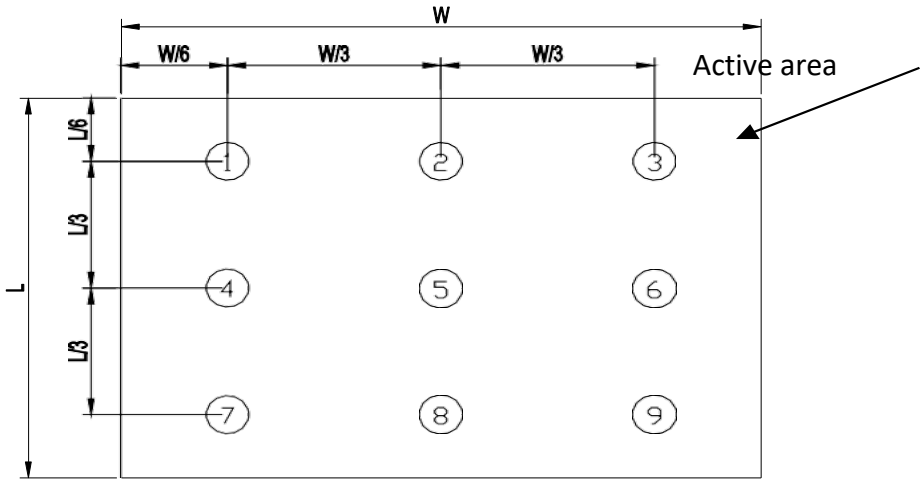
The measured value is more than 5 minutes at the center point of the LCD panel, and the backlight is turned on at the same time.

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

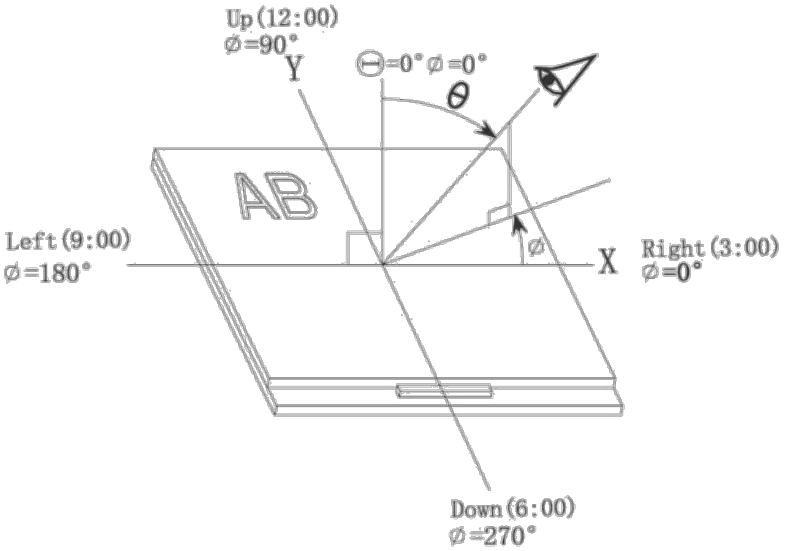


Note 2: The luminance uniformity is calculated by using following formula.

⊿Bp = Bp (Min.) / Bp (Max.)×100 (%);Bp (Max.) = Maximum brightness in 9 measured spots Bp (Min.) = Minimum brightness in 9 measured spots.



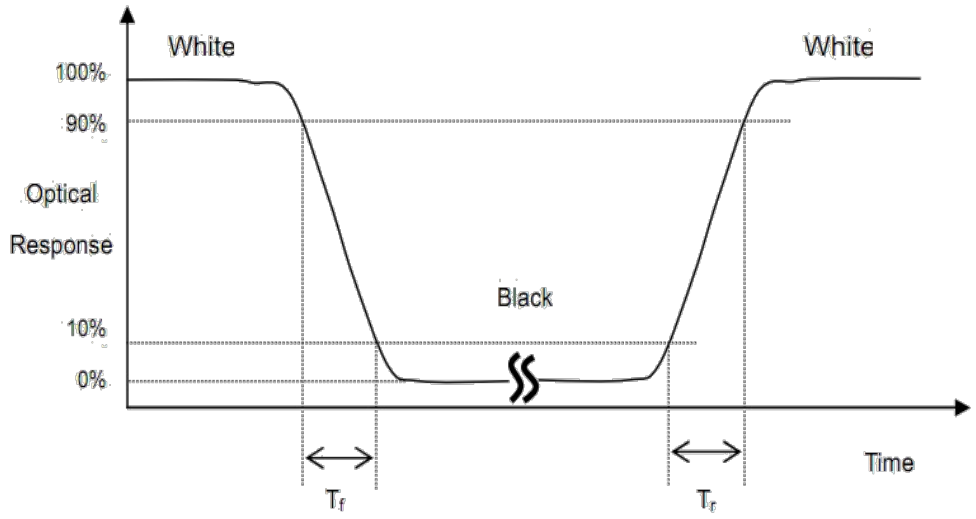
Note 3: The definition of viewing angle:Refer to the graph below marked by θ and Φ



Note 4: Definition of contrast ratio Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface.Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state.

$$\mathbf{CR} = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note 5: Definition of Response time The output signals of photo detector are measured when the input signals are changed from “white” to “black”(Tf) and from “black” to “white”(Tr), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

10. Reliability Test Conditions and Methods

No.	Test Items	Test Condition	Inspection After Test
①	High Temperature Storage	80°C±2°C×96Hours	Inspection after 2~4hours storage at room temperature, the samples should be free from defects: 1, Air bubble in the LCD. 2, Seal leak. 3, Non-display. 4, Missing segments. 5, Glass crack. 6, Current IDD is twice higher than initial value. 7, The surface shall be free from damage. 8, The electric characteristic requirements shall be satisfied. 9.Brightness reduction more than 50%.
②	Low Temperature Storage	-30°C±2°C×96Hours	
③	High Temperature Operating	70°C±2°C×96Hours	
④	Low Temperature Operating	-20°C±2°C×96Hours	
⑤	Temperature Cycle(Storage)	-30°C ⟺ 80°C (30min) (5min) (30min) 1cycle Total 10cycle.	
⑥	Damp Proof Test (Storage)	60°C±5°C×90%RH×96Hours	

REMARK:

1, The Test samples should be applied to only one test item.

2, Sample side for each test item is 5~10pcs.

3,For Damp Proof Test, Pure water(Resistance＞10MΩ)should be used.

4,In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.

5, EL evaluation should be accepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.

6, Failure Judgment Criterion: Basic Specification Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

11. Inspection Standard

11.1 Scope

Specifications contain
11.1.1 Display Quality Evaluation
11.1.2 Mechanics Specification

11.2 Sampling Plan

Unless there is other agreement, the sampling plan for incoming inspection shall follow MIL-STD-105E.
11.2.1 Lot size: Quantity per shipment as one lot (different model as different lot).
11.2.2 Sampling type: Normal inspection, single sampling.
11.2.3 Sampling level: Level II.
11.2.4 AQL: Acceptable Quality Level
Major defect: AQL=0.65
Minor defect: AQL=1.5

11.3 Panel Inspection Condition

11.3.1 Environment:
Room Temperature: 25±5°C.
Humidity: 65±5% RH.
Illumination: 300 ~ 700 Lux.

11.3.2 Inspection Distance:
35±5 cm

11.3.3 Inspection Angle:
The vision of inspector should be perpendicular to the surface of the Module.
11.3.4 Inspection time：
Perceptibility Test Time: 20 seconds max.

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

11.4 Inspection Plan

Class	Item	Judgment	Class
Packing & Indicate	1. Outside and inside package.	"MODEL NO.", "LOT NO." and "QUANTITY" should indicate on the package.	Minor
	2. Model mixed and quantity.	Other model mixed Quantity short or over	Major
	3. Product indication.	"MODEL NO." should indicate on the product.	Major
Assembly	4. Dimension, LCD glass scratch and scribe defect.	According to specification or drawing.	Major
Appearance	5. Viewing area.	Polarizer edge or LCD's sealing line is visible in the viewing area…….Rejected.	Minor
	6. Blemish, black spot, white spot in the LCD and LCD glass cracks.	According to standard of visual inspection.(inside viewing area)	Minor
	7. Blemish, black spot, white spot and scratch on the polarizer.	According to standard of visual inspection.(inside viewing area)	Minor
	8. Bubble in polarizer.	According to standard of visual inspection.(inside viewing area)	Minor
	9. LCD's rainbow color.	Strong deviation color (or newton ring) of LCD……..Rejected. Or according to limited sample.(if needed, and inside viewing area)	Minor
Electrical	10. Electrical and optical characteristics.(contrast Vop chromaticity….etc)	According to specification or drawing.(inside viewing area)	Major
	11. Missing line.	Missing dot line character	Major
	12.Short circuit. Wrong pattern display.	No display, wrong pattern display, current consumption. Out of specification	Major

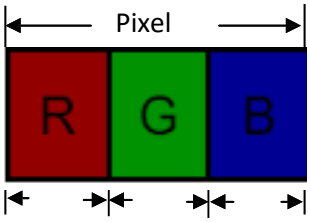
Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

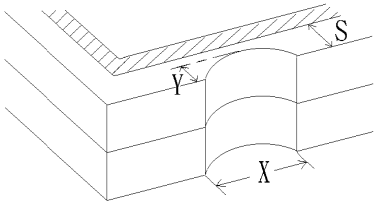
	13. Dot defect.(for color and TFT)	According to standard of visual Inspection.	Minor

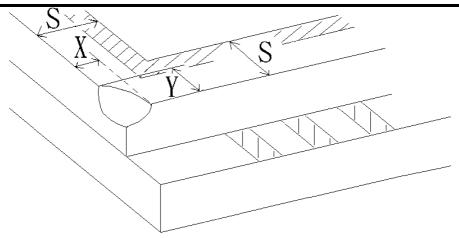
11.5 Standard Of Visual Inspection

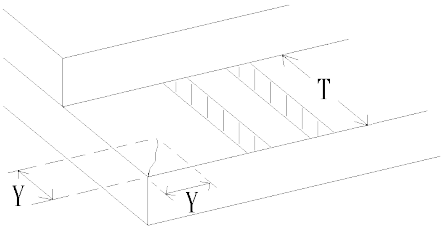
<table>
<tr><th>NO.</th><th>CLASS</th><th>ITEM</th><th>JUDGMENT</th></tr>
<tr><td>11.5.1</td><td>Minor</td><td>Black and white spot.
Foreign materiel.
Dust.
Blemish.
Scratch.</td><td>(A) Round type: Unit: mm
<table>
<tr><th>Diameter (mm.)</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ≦0.1</td><td>Disregard</td></tr>
<tr><td>0.1 < Φ≦0.25</td><td>2(Distance>10mm)</td></tr>
<tr><td>0.25 < Φ</td><td>0</td></tr>
</table>
Note: Φ = (length+width)/2
(B) Linear type: Unit: mm
<table>
<tr><th>Length</th><th>Width (mm.)</th><th>Acceptable Q'ty</th></tr>
<tr><td>--</td><td>W≦0.03</td><td>Disregard</td></tr>
<tr><td>L≦3.0</td><td>0.03< W≦0.05</td><td>1(Distance>10mm)</td></tr>
<tr><td>--</td><td>0.05 < W</td><td>Not allow</td></tr>
</table></td></tr>
<tr><td>11.5.2</td><td>Minor</td><td>Dent on polarizer.</td><td>Unit: mm.
<table>
<tr><th>Diameter</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ≦0.1</td><td>Disregard</td></tr>
<tr><td>0.1 < Φ≦0.25</td><td>2(Distance>10mm)</td></tr>
<tr><td>0.25 < Φ</td><td>0</td></tr>
</table></td></tr>
<tr><td>11.5.3</td><td>Minor</td><td>Bubble in polarizer.</td><td>Unit: mm.
<table>
<tr><th>Diameter</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ≦0.1</td><td>Disregard</td></tr>
<tr><td>0.1< Φ≦0.25</td><td>2(Distance>10mm)</td></tr>
<tr><td>0.25 < Φ</td><td>0</td></tr>
</table></td></tr>
</table>

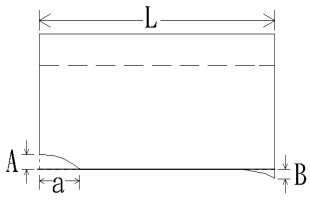
Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

<table>
<tr>
<td>11.5.4</td>
<td>Minor</td>
<td>Dot defect</td>
<td>
<table>
<tr><th>Items</th><th>Acceptable Q'ty</th></tr>
<tr><td>Bright dot</td><td>N ≦3</td></tr>
<tr><td>Dark dot</td><td>N ≦3</td></tr>
<tr><td>Total dot</td><td>N ≦6</td></tr>
</table>
Pixel define :


Dot Dot Dot
Note1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot.
Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.
Note 3: The bright dot defect must be visible through 2% ND filter
Note 4: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue
</td>
</tr>
<tr>
<td>11.5.5</td>
<td>Minor</td>
<td>LCD glass chipping.</td>
<td>


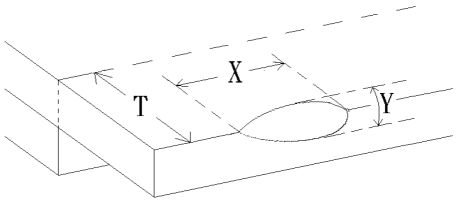
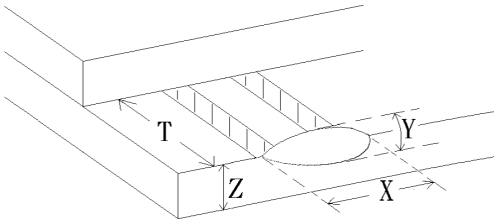
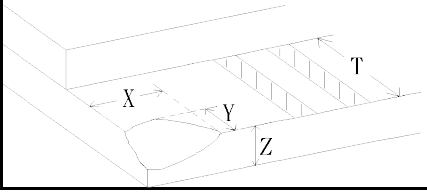
Y>S
Reject
</td>
</tr>
<tr>
<td>11.5.6</td>
<td>Minor</td>
<td>LCD glass chipping.</td>
<td>


X or Y>S
Reject
</td>
</tr>
<tr>
<td>11.5.7</td>
<td>Major</td>
<td>LCD glass crack.</td>
<td>


Y>(1/2) T
Reject
</td>
</tr>
<tr>
<td>11.5.8</td>
<td>Major</td>
<td>LCD glass scribe defect.</td>
<td>


1. a>L/3, A>1.5mm Reject
2. B : According to dimension
</td>
</tr>
</table>

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

11.5.9	Minor	LCD glass chipping. (on the terminal area)	 Φ = (x+y)/2>2.5mm Reject
11.5.10	Minor	LCD glass chipping. (on the terminal surface)	 Y>(1/3)T Reject
11.5.11	Minor	LCD glass chipping.	 Y>T Reject

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

12. Handling Precautions

12.1 Mounting method

This TFT module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

12.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent

[Recommended below] and wipe lightly.

- Isopropyl alcohol.
- Ethyl alcohol.

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.
Do not use the following solvent:

- Water.
- Aromatics.

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns
Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux.
- Chlorine (Cl) , Sulfur (S).

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (CI), Sulfur (S) from customer, Responsibility is on customer.

12.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to POWER or GROUND, do not input any signals before power is turned on, and ground your body, work/assembly areas, and assembly equipment to protect against static electricity.

12.4 packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity.

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

12.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electro chemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- Slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

12.6 storing

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.

[It is recommended to store them as they have been contained in the inner container at the time of delivery from us.

12.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water.

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com

13. Precaution for Use

13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to TFT , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

- END

Victronix Tecenstar INT'L Co., LTD Tel:86-755-33265935 Email:sales@victronix-tech.com