Tailorpixels

A Professional Manufacturer of Display

Manufacturer Certificated

Product Specification

Model: TTX177QVS-01

1.77″TFT Display Module (128*160)

This module uses RoHS material

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Contents

1 Record of Revision

Version	Revise Date	Content	Remark
1.0	2018/08/24	First Release.	

2 General Specifications

Feature		Spec
Characteristics	LCD Size	1.77 inch
	Display Format	128 (RGB) ×160
	Interface	4 SPI
	Color Depth	262 K
	Technology type	a-Si
	Display Spec.	-
	Display Mode	Normally White
	Driver IC	ST7735S
	Surface Treatment	HC
	Viewing Direction	6 O'clock
	Gray Viewing Direction	12 O'clock
Mechanical	LCM (W x H x D) (mm)	34(W) ×45.83(H)×2.3(T)
	Active Area(mm)	29.03(W) ×36.14(H) mm
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	2 LEDs

Note 1: Viewing direction is following the data which measured by optics equipment.
Note 2: Requirements on Environmental Protection: RoHS
Note 3: LCM weight tolerance: +/- 5%

3 Mechanical Drawing

PIN DEFINATION

No.	PIN NAME
1	NC
2	GND
3	LED-
4	LED+
5	GND
6	RESET
7	A0
8	SDA
9	SCK
10	VCC
11	IOVCC
12	CS
13	GND
14	NC

REV.	DATE	MODIFICATION
1.0	2018/08/29	First issue

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PART NO.	TTX177QVS-01
MODEL NAME	TFT Display Module
REV.	2.0
SHEET OF	1/1
DWN	Rich Liang
CHKD	Rich Liang
TOLERANCE UNLESS SPECIFIED	±0.3
PROJECTION	3RD ANGLE
UNIT	mm
SCALE	1:1

INTERFACE	SPI Interface
	FPC Connector
VIEWING DIRECTION	6 O'Clock
Gray Scale DIRECTION	12 O'clock

双面胶 T=0.05mm

2.3max

1.77" TFT
128 (RGB) *160
6 0' CLOCK

背光电路:

VF=2.7V~3.3V,IF=40MA

0.98
2.49
34
32.04
29.03
2.32
0.97
36.14
43.17
45.83
12.26
6.75
1.5
1
0.8
10.4

NOTE:
1. GENERAL TOLERANCE: ±0.2.
2. (...) IS REFERENCE DIMENSION.
3. ＊ CRITICAL DIMENSION
4. COMPLIABLY RoHS.

Display Type	TFT
Front Polarizer	NORMALLY WHITE TRANSMISSIVE
Operating Method	6 O'CLOCK
Viewing Angle	
LCD Driver IC	ST7735
Operating Voltage	VDD=2.8V
Operation Temperature	-20℃ TO 70℃
Storage Temperature	-30℃ TO 80℃
Interface	串口
Backlight	WHITE(3.2V,40mA)

4 Interface

引脚序号 PIN No.	引脚名称 Symbol	作用描述 Description	备注 Notes
1	NC	No connection （空脚）	
2	GND	Ground （接地脚）	
3	LED-	Cathode of Backlight （背光负极）	
4	LED+	Anode of Backlight (背光正极 3.0-3.4 伏供电)	
5	GND	Ground （接地脚）	
6	/RESET	LCM Reset pin. Signal is active low （显示屏复位脚，低电平复位）	
7	A0	Register select pin （指令/数据寄存器选择脚） RS='0': Display data. (RS='0':选择指令寄存器) RS='1': Display data. (RS='1':选择数据寄存器)	
8	SDA	Serial data input / output. （串口数据线）	
9	SCK	Serial clock pin. （串口时钟线）	
10	VCC	Power supply for LCM （显示屏电源供电脚 2.8-3.3V）	
11	IOVCC	Power supply for LCM （显示屏电源供电脚 1.8-3.3V）	
12	CS	Chip select pin ("Low" enable) （显示屏驱动芯片片选脚，低电平有效）	
13	GND	Ground （接地脚）	
14	NC	No connection （空脚）	

5 Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	VCI	-0.3	4.8	V	
Input Voltage	IOVCC	-0.3	4.6	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

6 Electrical Characteristics

6.1 Driving TFT LCD Panel

Ta = 25 °C

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Analog Supply Voltage		VCI	2.5	2.8	3.3	V	
Logic Signal Input /Output Voltage		IOVCC	1.65	1.8	3.3	V	
Input Signal Voltage	Low Level	V_{IL}	VSS	-	0.3x IOVCC	V	
	High Level	V_{IH}	0.7x IOVCC	-	IOVCC	V	

6.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	40	-	mA	
Forward Voltage	V_F	2.7	3.0	3.3	V	
LED Lifetime		20000	-	-	Hrs	

Note 1: Each LED: IF =20 mA/LED

Note 2: Optical performance should be evaluated at Ta=25℃ only.

Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The lifetime of LED will be reduced. Operating life means brightness goes down to 50% initial brightness.

Typical operating lifetime is estimated data.

6.3 AC Electrical Characteristics

Parameter	Symbol	Condition	Specification			Unit	Related Pins
			Min	Typ	Max		
Power & Operation Voltage							
System Voltage	VDD	Operating Voltage	2.5	2.75	4.8	V	
Interface Operation Voltage	VDDI	I/O Supply Voltage	1.65	1.8	3.7	V	
Gate Driver High Voltage	VGH		11		16	V	Note 4
Gate Driver Low Voltage	VGL		-13		-7.5	V	
Gate Driver Supply Voltage		| VGH-VGL |	18.5		29	V	Note 4
Input / Output							
Logic-High Input Voltage	VIH		0.7VDDI		VDDI	V	Note 1
Logic-Low Input Voltage	VIL		VSS		0.3VDDI	V	Note 1
Logic-High Output Voltage	VOH	IOH = -1.0mA	0.8VDDI		VDDI	V	Note 1
Logic-Low Output Voltage	VOL	IOL = +1.0mA	VSS		0.2VDDI	V	Note 1
Logic-High Input Current	IIH	VIN = VDDI			1	uA	Note 1
Logic-Low Input Current	IIL	VIN = VSS	-1			uA	Note 1
Input Leakage Current	IIL	IOH = -1.0mA	-0.1		+0.1	uA	Note 1
VCOM Voltage							
VCOM Amplitude	VCOM		-2		-0.425	V	
Source driver							
Source Output Range	Vsout		0.1		GVDD	V	
Gamma Reference Voltage	GVDD		3.15		4.7	V	
Source Output Settling Time	Tr	Below with 99% precision			20	us	Note 2
Output Offset Voltage	Voffset				35	mV	Note 3

Table 2 DC Characteristic

6.4 Timing chart

Serial Interface Characteristics (4-line Serial)
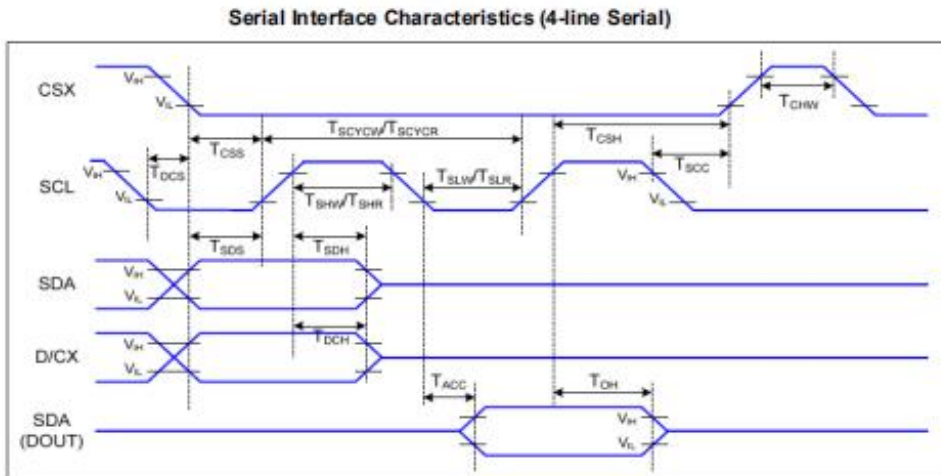
Ta=25 ℃, VDDI=1.65~3.7V, VDD=2.3~4.8V

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	TCSS	Chip Select Setup Time (Write)	TBD		ns	
	TCSH	Chip Select Hold Time (Write)	TBD		ns	
	TCSS	Chip Select Setup Time (Read)	TBD		ns	
	TSCC	Chip Select Hold Time (Read)	TBD		ns	
	TCHW	Chip Select "H" Pulse Width	TBD		ns	
SCL	TSCYCW	Serial Clock Cycle (Write)	TBD		ns	-Write Command & Data Ram
	TSHW	SCL "H" Pulse Width (Write)	TBD		ns	
	TSLW	SCL "L" Pulse Width (Write)	TBD		ns	
	TSCYCR	Serial Clock Cycle (Read)	TBD		ns	-Read Command & Data Ram
	TSHR	SCL "H" Pulse Width (Read)	TBD		ns	
	TSLR	SCL "L" Pulse Width (Read)	TBD		ns	
D/CX	TDCS	D/CX Setup Time	TBD		ns	
	TDCH	D/CX Hold Time	TBD		ns	
SDA (DIN) (DOUT)	TSDS	Data Setup Time	TBD		ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	TBD		ns	
	TACC	Access Time	TBD	TBD	ns	
	TOH	Output Disable Time	TBD	TBD	ns	

Table 7 4-line Serial Interface Characteristics

7 Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10		55	-	Degree.	Note2
		θ_B			45	-		
		θ_L			55	-		
		θ_R			55	-		
Contrast Ratio		CR	Θ =0	-	350	-	-	Note1, Note3
Response Time		T_{ON}	25°C	-	20	35	ms	Note1, Note4
		T_{OFF}		-	25	40		
Chromaticity	White	X_W	Backlight is on	0.282	0.312	0.342	-	Note1, Note5
		Y_W		0.319	0.349	0.379	-	
	Red	X_R		0.609	0.639	0.669	-	
		Y_R		0.314	0.344	0.374	-	
	Green	X_G		0.264	0.294	0.324	-	
		Y_G		0.557	0.587	0.617	-	
	Blue	X_B		0.102	0.132	0.162	-	
		Y_B		0.106	0.136	0.166	-	
Uniformity		U		80	-	-	%	Note1, Note6
NTSC					50		%	Note5
Luminance		L			200			Note1, Note7

Test Conditions:
1. IF= 20mA(one channel),the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 5 minutes operation, the optical Properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.

Item	Photo detector	Field
Contrast Ratio	BM-7A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	SR-3A	2°
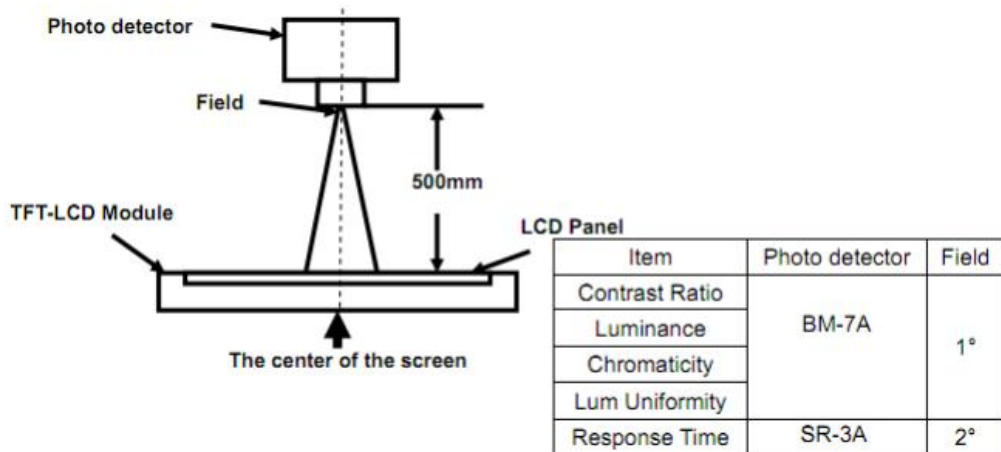
Note 2: Definition of viewing angle range and measurement system.
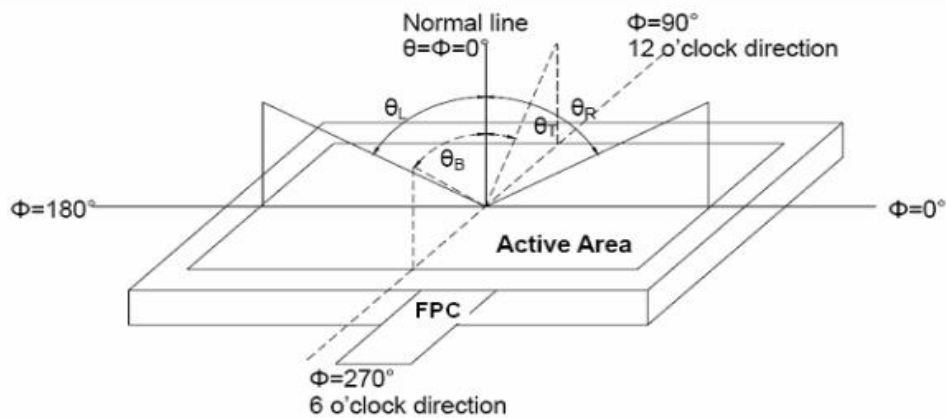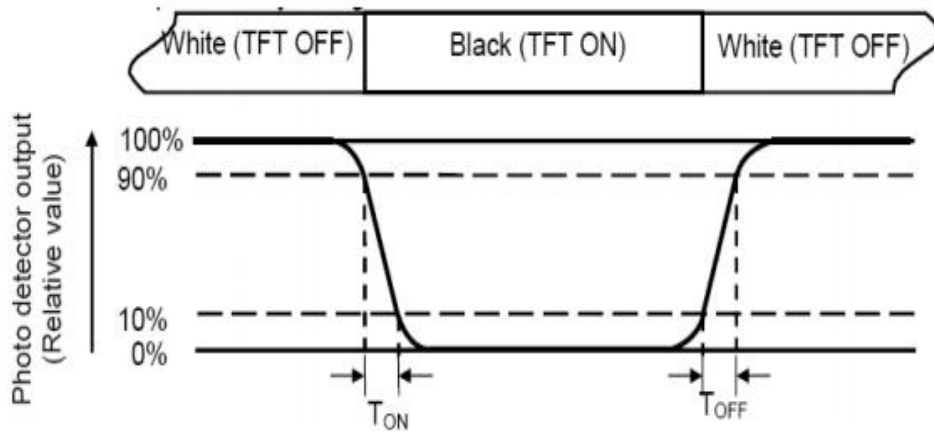Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

Note 4: Definition of Response time
   The response time is defined as the LCD optical switching time interval
   Between "White" state and "Black" state.   Rise time (TON) is the time between
   Photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is
   The time between photo detector output intensity changed from 10% to 90%

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the Center of each measuring area

Luminance Uniformity (U) = Lmin/ Lmax X100%

L-------Active area length W----- Active area width

Fig. 2 Definition of uniformity
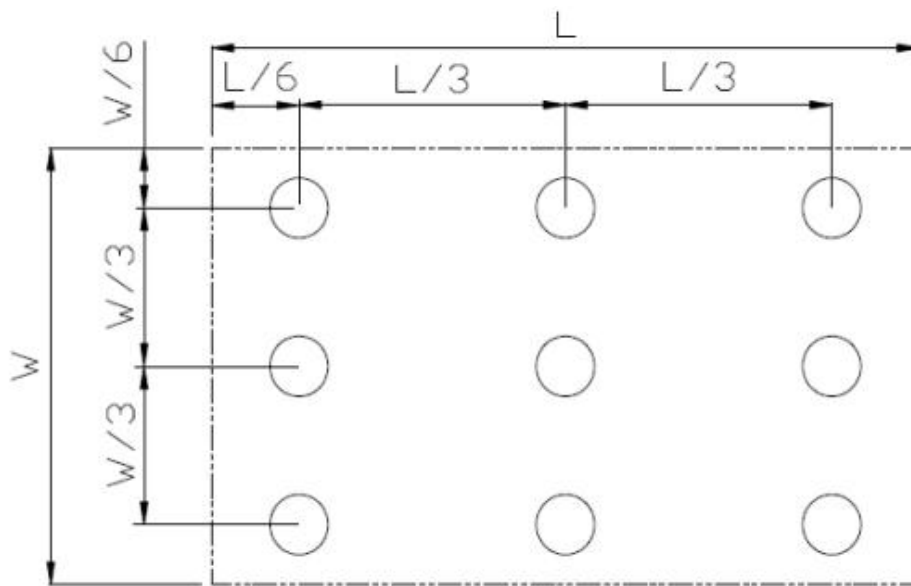
Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

8 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Operation)	C=150pF, R=330 Ω, 5 points/panel Air:±6KV, 5 times; Contact: ±2KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_S is the temperature of panel's surface.

2. Ta is the ambient temperature of sample.

9 Precautions For Use of LCD modules

9.1 Handling Precautions

9.1.1The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

9.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

9.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten the cloth with one of the following solvents:

－ Isopropyl alcohol

－ Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following: Water; Ketene; Aromatic solvents

9.1.6 Do not attempt to disassemble the LCD Module.

9.1.7 If the logic circuit power is off, do not apply the input signals.

9.1.8 To prevent the destruction of the elements by static electricity, be careful to maintain an optimum work environment.

9.1.8.1 Be sure to ground the body when handling the LCD Modules.

9.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

9.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

9.1.8.4The LCD Module is coated with a film to protect the display surface. Be careful when peeling off this protective film since static electricity may be generated.

9.2 Storage Precautions

9.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.2.2. The LCD modules should be stored under the storage temperature range If the LCD modules will be stored for a long time, the recommended condition is:

Temperature: 0℃ ～ 40℃, Relatively humidity: ≤80%

9.2.3 The LCD modules should be stored in the room without acid, alkali, and harmful gas.

9.3Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, dampness, and sunshine.