AND Displays

AND-TFT-5TS

320 x 234 Pixels
LCD Color Monitor

The AND-TFT-5TS is a compact full color TFT LCD module, whose driving board is capable of converting composite video signals to the proper interface of LCD panel and is suitable for security, car TV, portable DVD and GPS applications. It can accept NTSC & ARGB video signal input.

This device consists of a twisted nematic (TN) liquid crystal cell, that incorporates a TFT-array that has 320 x 234 pixels on a 5 inch diagonal screen, X and Y drivers, an LSI controller, and a built-in CCFL backlight and inverter (with optional board.)

Features

- Ultra compact
- DC/DC DC/AC Video decoder all in one
- VGA Mode input
- NTSC/PAL System auto switching
- Up/Down display reverse
- Left/Right display reverse
- Single operation voltage +12V
- Applications: security, video game, door phone, video phone portable TV, GPS, instrument display and office electronics
- **RoHS complaint**

Application Precautions: Do not use the products herein for the following equipment which demands extremely high performance in terms of functionality, reliability, or accuracy. (Aerospace equipment, Communications equipment for trunk lines, control equipment for the nuclear power industry, and medical equipment relater to life support, etc. Contact us for other applications that demands high reliability and functionality.

Mechanical Characteristics

Item	Specification	Unit
Screen Size	5.0 inch (13 cm) diagonal	–
Display Format	320 x 234	dot
Active Area	102.72 (H) x 74.53 (V)	mm
Dot Pitch	0.107 (W) x 0.319 (H)	mm
Pixel Configuration	stripe	–
Outline Dimension	119.3 (W) x 91.4 (H) x 7.5 (D)	mm
Weight	124 ± 10	g
Contrast Ratio	150:1	–
View Angle	(V) + 15º / -35º (H) ± 55º	–
Color	Full Color	–
Brightness	350	cd/m^2

Absolute Maximum Rating (GND = 0V, Ta = 25°C)

Item	Symbol	Remarks	Absolute Maximum Rating		Unit
			Min.	Max.	
Input Voltage	Vin	–	+9	+15	V
Video Input Signal	Video in	@75 Ω	0.5	2.0	Vp-p
Digital Input Signal	TTL	–	+0.3	+5.3	V
Operating Temperature	–	–	-10	60	°C
Relative Humidity	–	–	5	90	%RH
Storage Temperature	–	–	-25	80	°C
Relative Humidity	–		0	90	%RH

Product specifications contained herein may be changed without prior notice.
It is therefore advisable to contact Purdy Electronics before proceeding with the design of equipment incorporating this product.

Electrical Characteristics

Item	Symbol	I/O	Min.	Typ.	Max.	Unit	Remark
Input Voltage	Vin	I	+10	+12	+14	V	
Total Current	Iin	I	490	470	450	mA	
Power Consumption	–	I	–	5.64	–	W	@ +12V
Video Input Signal	Video in	I	–	1.0	–	Vp-p	@75 Ω
Output Voltage	+5VA	O	–	+5V	–	V	
Brightness Adjust	Bright	I	2.31	2.10	1.90	V	
Contrast Adjust	Contrast	I	3.60	3.00	2.40	V	
Color Adjust	Color	I	2.10	3.00	3.90	V	
Picture	–	I	3.00	2.10	1.5	V	
Dimmer Adjust	DIM	I	5.00	1.50	0	V	
Screen Reverse	Left / Right	I	–	TTL	–	V	
Screen Reverse	Up ? Down	I	–	TTL	–	V	

Output for LCD Panel Backlight

Pin No.	Symbol	I/O	Function	Remark
1	HV+	O	High voltage terminal for backlight	Connect to pink wire
2	HV-	–	Return terminal for backlight	connect to white wire

Lamp Data Ta = 25ºC @ +12V

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Lamp Voltage	VL	–	430	–	Vrms	IL = 6.0 mA, (± 10%)
Lamp Current	IL	–	6.0	–	mA	

Sample Test Data

–	White Window	Red	Blue	Green	Remark
S/N : 001 x y L TC	0.315	–	–	–	± 15%
	0.341	–	–	–	
	400 cd/m^2	–	–	–	
	6487 ºK	–	–	–	

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

Note 2: Pattern Generator: FLUKE PM54200

Note 3: Measurement Distance: 500mm ± 50mm

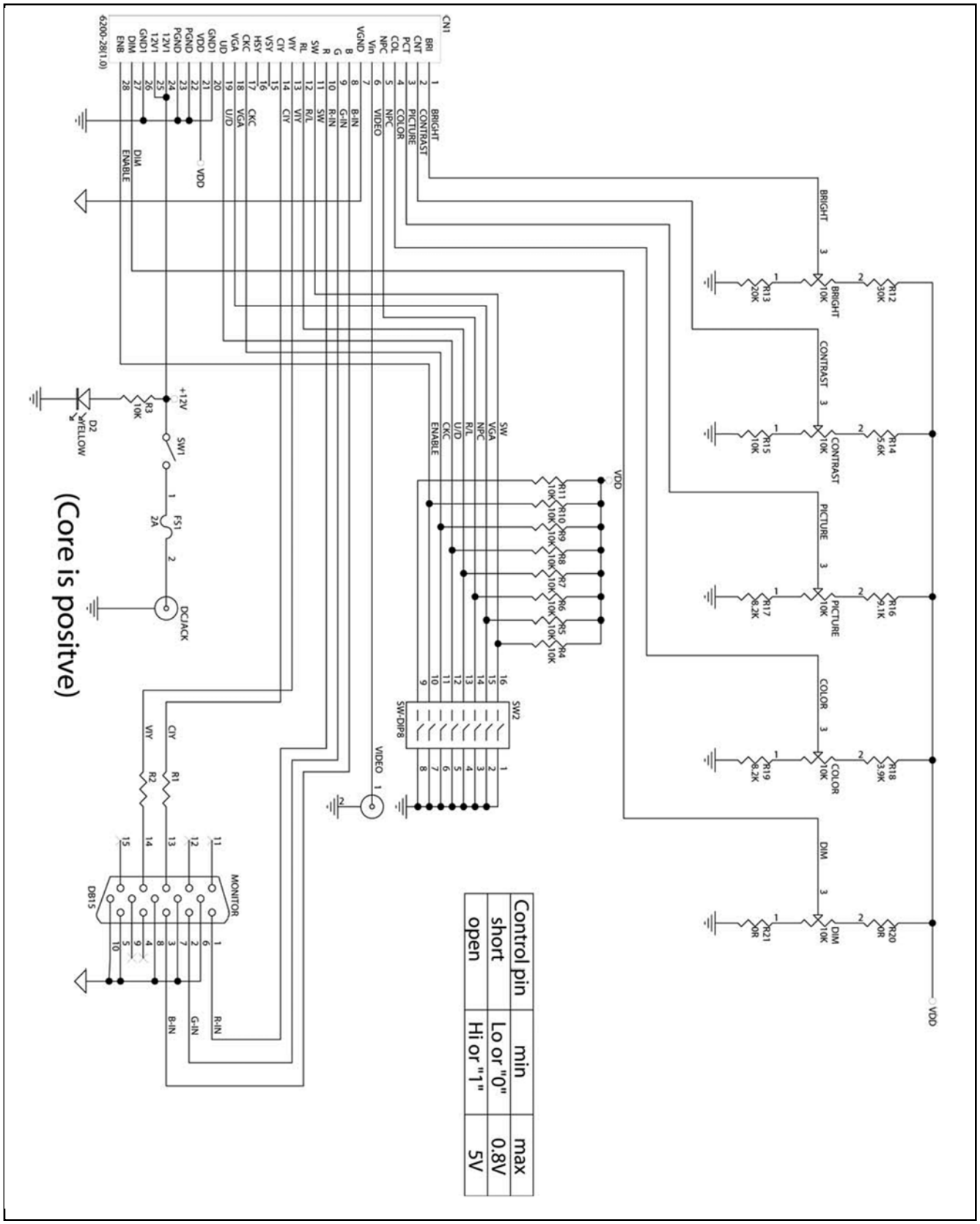
Note 4: TOPCON BM-7 Luminance Meter 2º field of view is used in the testing (After 10 min ~ 20 min Operation)

LCD Panel I/O Terminals (FPC 30-pin below contact type):

Pin #.	Symbol	I/O	Function
1	DIO1	I/O	Vertical start pulse
2	CPV	I	Shift clock for gate driver
3	VGL	I	Power for gate driver (AC voltage)
4	NC	–	No connection
5	VEE	I	Negative powe gate driver (DC voltage)
6	NC	–	No connection
7	XOE	I	Output enable for gate driver
8	VSS	I	Ground for digital circuit
9	VCC	I	Supply voltage for logic control circuit for gate driver
10	NC	–	No connection
11	VGH	I	Positive power for gate driver
12	NC	–	No connection
13	U/D	I	Up/Down control for gate driver
14	DIO2	I/O	Vertical Start pulse
15	VCOM	I	Common electrode voltage
16	STH1	I/O	Start pulse for source driver
17	VDD1	I	Supply power for digital circuit
18	VSS1	–	Ground for digital circuit
19	VDD2	I	Supply power for analog circuit
20	VSS2	–	Ground for analog circuit
21	R/L	I	Left/Right control for source driver
22	VR	I	Video input R
23	VG	I	Video input G
24	VB	I	Video input B
25	CPH1	I	Sampling and shift clock for source driver
26	CPH2	I	Samplling and shift clock for source driver
27	CPH3	I	Sampling and shift clock for source driver
28	STH2	I/O	Start pulse for source driver
29	OEH	I	Output enable for source driver
30	NC	–	No connection

Note: About TFT-LCD Panel detail, please refer to to Purdy Electronics' AND-TFT-5PA specification. **(????)**

Application Circuit

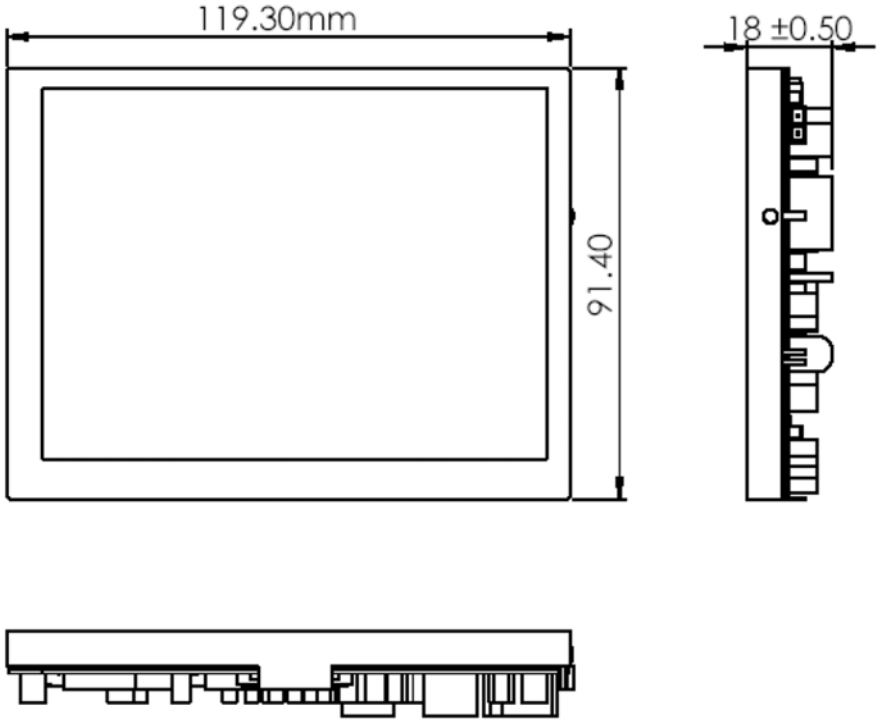


Control pin	min	max
short	Lo or "0"	0.8V
open	Hi or "1"	5V

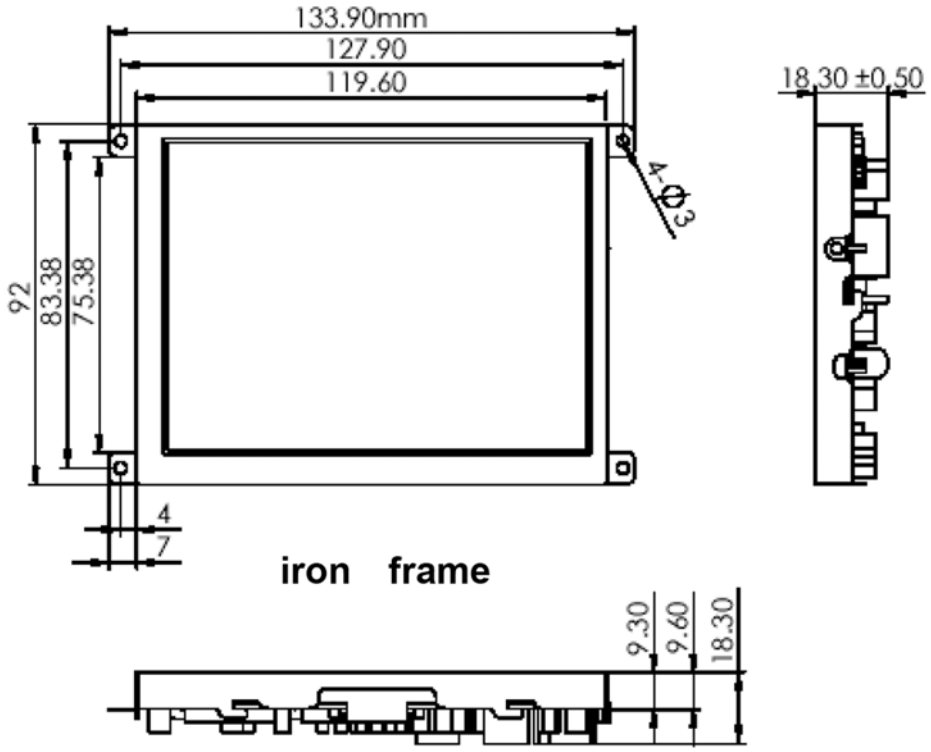
Dimensional Outline

General mechanical tolerance = 0.5mm

Module



Unit



Pin Assignment of Signal Input (Pitch 1.0mm, down conector type)

Pin No.	Symbol	I/O	Function	Remark
1	Bright	I	Brightness control	
2	Contrast	I	Contrast control	
3	Picture	I	Picture control	
4	Color	I	Color control	
5	NTSC/PAL	O	NTSC/PAL system switch	Note 1
6	Video in	I	Composite Video input	
7	GND	I	Signal Ground	
8	G-IN	I	Analog B signal input (Blue)	
9	G-IN	I	Analog G signal input (Green)	
10	R-IN	I	Analog R signal input (Red)	
11	SW	I	Composite video / RGB Switch control	
12	Left/Right	I	Left / Right revrerse control	Note 2
13	VIY	I	Vertical sync. input pin for sync (VGA mode)	
14	CIY	I	Horizontal sync. input pin for sync (VGA mode)	Note 3
15	VSY	I/O	Vertical synch. input / output	Note 3
16	HSY	I/O	Horizontal synch. input / output	Note 3
17	CKC	I	Control pin for select I/O signal	Note 3
18	VGA	–	VGA mode select pin	Note 4
19	Up/Down	I	Up / Down reverse control	Note 2
20	GND	–	Power ground	
21	VDD	O	+5V Voltage DC output	Note 5
22	GND	–	Power ground	
23	GND	–	Power ground	
24	VCC	–	Power input	
25	VCC	–	Power input	
26	GND	–	Power ground	
27	Dimmer	I	Backlight brightness control	Note 6
28	ENABLE	–	Enable signal for inverter	Note 7

Note 1: The output Hight for NTSC mode or Low for PAL mode.
Note 2: Default is normal scanning (Hight) and Low is for reversed scanning.
Note 3: CKC pin can select the function of pin 16, 15, 14 as following:

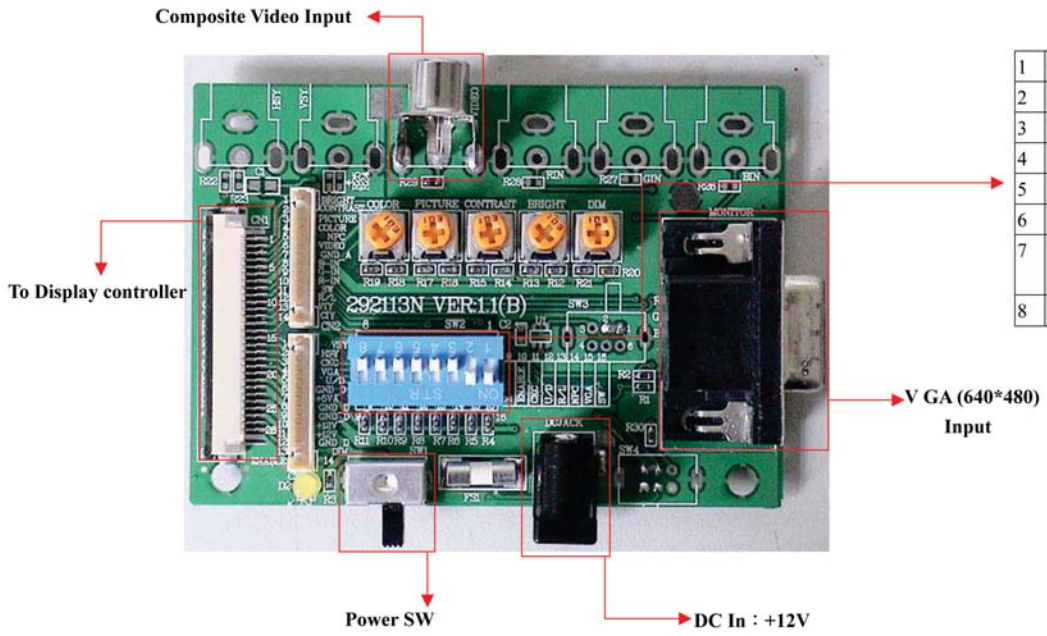
Pin 17 (CKC)	Pin 16 ($\overline{\text{HSY}}$)	Pin 15 ($\overline{\text{VSY}}$)	Pin 14 ($\overline{\text{VSY}}$)
Hi	$\overline{\text{HSY}}$ Output	$\overline{\text{VSY}}$ Output	CIY Input
Low	External H-Sync input	External V-Sync input	External clock input (18.9 MHz)

Note 4: Hi (+5V) for VGA input, Low (0V, default) for composite Video or RGB input. The relationship of SW pin & VGA is defined:

Input	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8
VGA	Off	Off	Off	Off	Off	Off	Off	Off
NTSC	On	On	Off	Off	Off	Off	Off	Off

Note 5: The +5V power supply external control circuit. (Max output is 5mA)
Note 6: This pin is floating that backlight is typical brightness.
Note 7: 0V to shunt down; 5V or floating to enable

User Interface Board



1	SW	ON ：Video IN
2	VGA	OFF：VGA IN
3	NPC	X
4	R/L	R/L REVERSE
5	U/D	U/D REVERSE
6	CKC	X
7	ENABLE	ON：Disable
		OFF：Enable
8	X	X