NEWHAVEN DISPLAY INTERNATIONAL

Product Specification

NHD-5.0-HDMI-N-RTXL-xxx

TFT Liquid Crystal Display

NHD-	Newhaven Display
5.0-	5" Diagonal
HDMI-	HDMI Interface
N-	800x480 Resolution
RTXL-	Premium (MVA) Display
xxx-	N/A - No Touch, CTU - Capacitive USB-HID, Resistive USB-HID

Newhaven Display International, Inc.
2661 Galvin Court, Elgin, IL 60124 USA

Ph: 847.844.8795 | Fx: 847.844.8796
www.newhavendisplay.com

REACH Compliant

RoHS Compliant

NEWHAVEN DISPLAY INTERNATIONAL

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Additional Resources

- **Support Forum:** http://www.nhdforum.newhavendisplay.com
- **Github:** https://github.com/newhavendisplay
- **Example Code:** https://www.newhavendisplay.com/example_code.html
- **Knowledge Center:** https://www.newhavendisplay.com/knowledge_center.html
- **Quality Center:** https://www.newhavendisplay.com/quality_center.html
- **Precautions for using LCDs/LCMs:** https://www.newhavendisplay.com/specs/precautions.pdf
- **Warranty / Terms & Conditions:** https://www.newhavendisplay.com/terms.html

Document Revision History

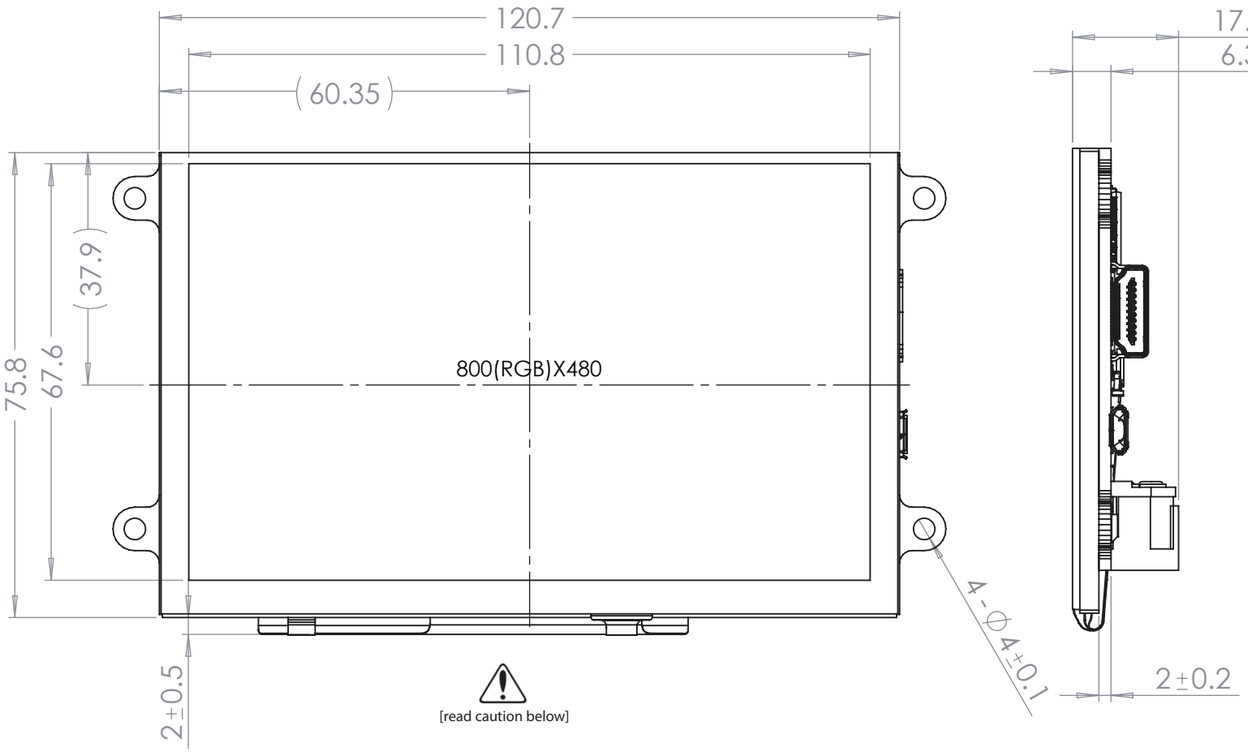
Revision	Date	Description	Changed By
0	04/22/2021	Initial Release	ZP

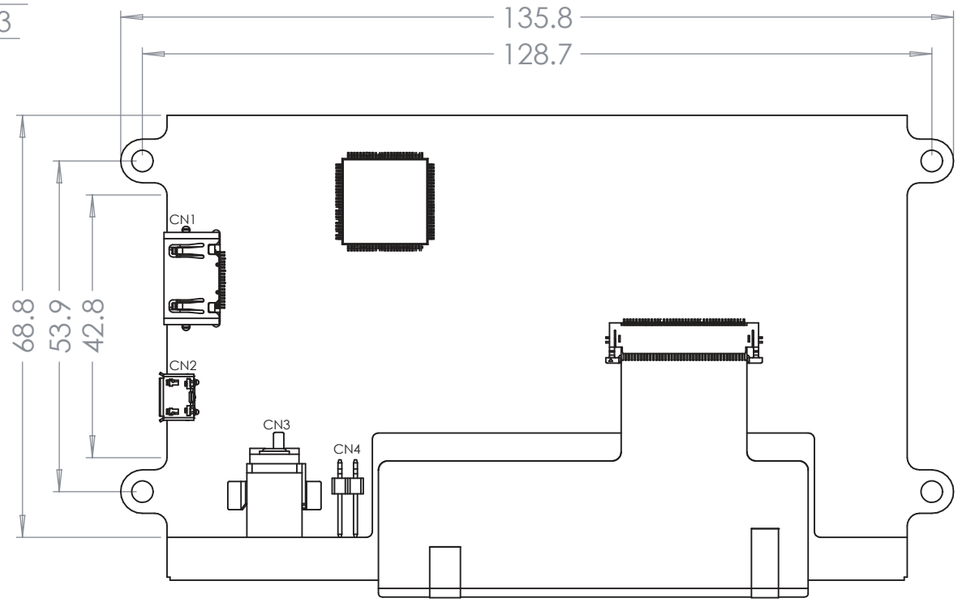
Functions and Features

- **5.0” HDMI TFT Module w/ USB-HID Capacitive or Resistive Touch options**
- **On-board Texas Instruments TFP401A HDMI/DVI Receiver**
- **HDMI (Type-A) Input**
- **Compatible with PC (Windows/Linux)**
- **Compatible with Linux based SBCs such as Raspberry Pi, BeagleBone, etc.**
- **Plug-and-play USB-HID Touch, no external driver installation required**
- **24-bit True Color, 800x480 Resolution (WVGA)**
- **On-board Texas Instruments TPS61165 High Brightness LED Driver w/ PWM**
- **70° Viewing Angles all sides**
- **4 x 3.5mm Mounting Holes Enabling Standard M3 or #6-32 Screws**
- **Open-Source Hardware, Engineered in Elgin, IL (USA)**

Mechanical Drawing

SYMBOL	REVISION	DATE





NOTES:

1. 5.0” Premium HDMI TFT Module w/ USB-HID Resistive Touch
2. On-board Texas Instruments TFP401A HDMI/DVI Receiver
3. Optimal Viewing Direction: Full View
4. Display Mode: Transmissive / Normally White / Anti-Glare
5. Luminance: 480 cd/m²
6. 3M Brightness Enhancement Film
7. Touch Panel: Resistive
8. On-board Texas Instruments TPS61165 High Brightness LED Driver w/ PWM

⚠ Improper handling of the FPC connections at the bottom edge of this module may cause damage resulting in display or touch failure. Take special care when handling this area of the display module to make sure these connections are never strained nor creased.

STANDARD TOLERANCE: (UNLESS OTHERWISE SPECIFIED) LINEAR: ±0.3mm	NEWHAVEN DISPLAY INTERNATIONAL		
	DRAWING/PART NUMBER: NHD-5.0-HDMI-N-RTXL-RTU		REVISION: 1.2
UNLESS OTHERWISE SPECIFIED: - DIMENSIONS ARE IN MILLIMETERS - THIRD ANGLE PROJECTION	DRAWN BY: A. Shah	APPROVED BY: A. Shah	SIZE: A3
	DRAWN DATE: 5/8/20	APPROVED DATE: 5/8/20	SCALE: 1:2
	DO NOT SCALE DRAWING		SHEET 1 OF 1

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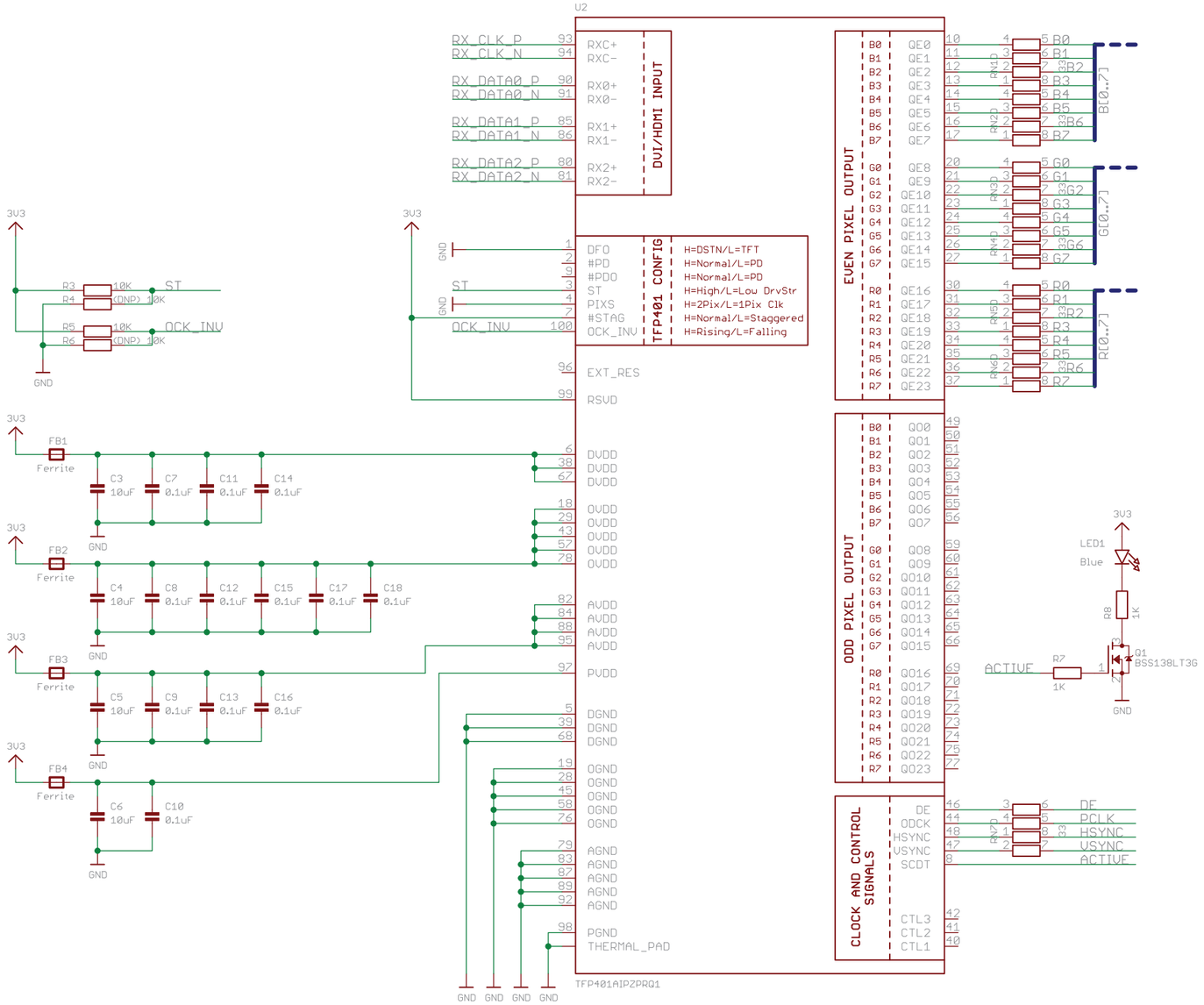
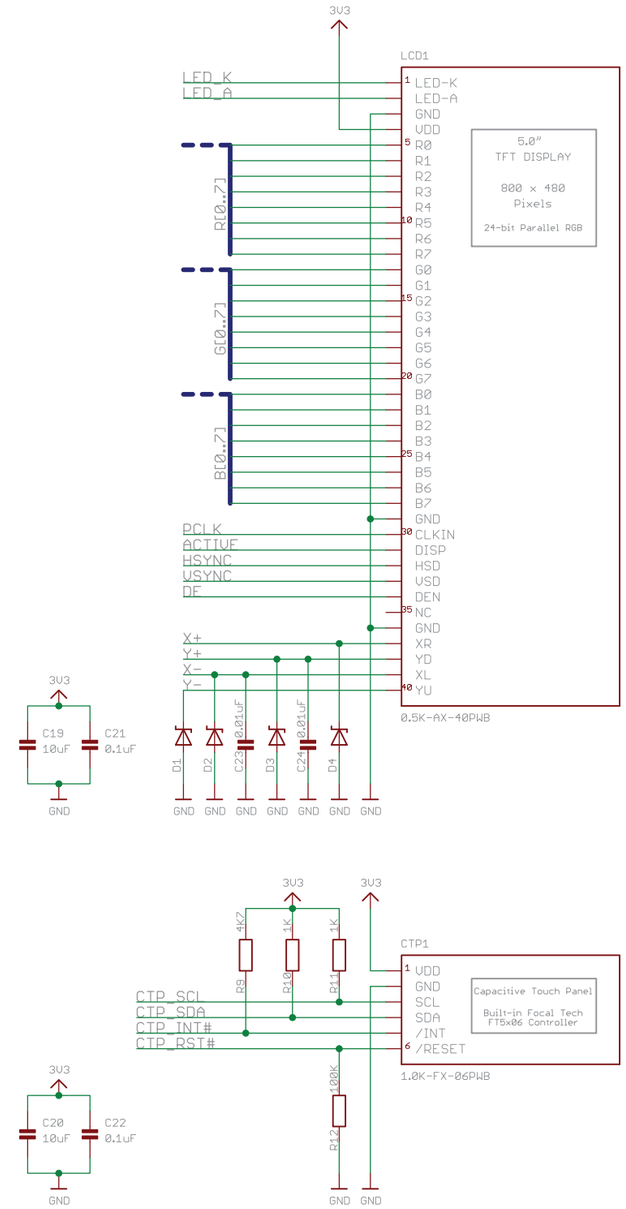
TFP401 (DVI/HDMI Decoder)



LCD Interface



NEWHAVEN DISPLAY INTERNATIONAL	
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DRAWN BY: P. Bartek	CHECKED BY: M. LaVine — SIZE: A3
DRAWN DATE: 06/01/17	CHECKED DATE: 06/02/17 — SHEET: 1 of 3

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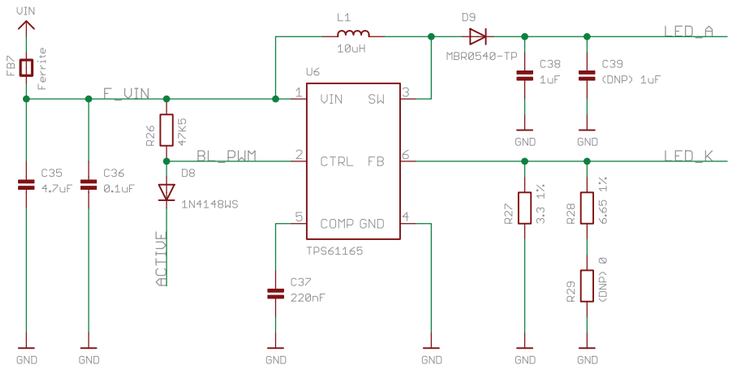
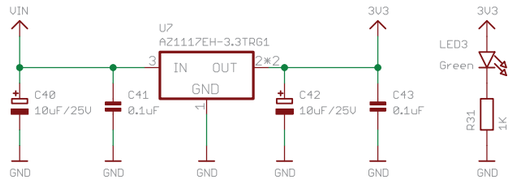
Backlight



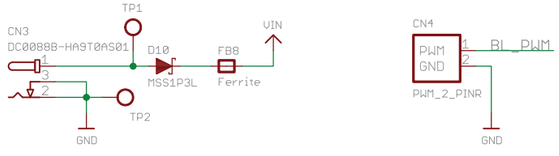
Backlight Configuration		
Current	R29	Display
(Default) ~60mA	Open	ATXL#
~90mA	Close	ASXV#, ASXN#

HDMI-A

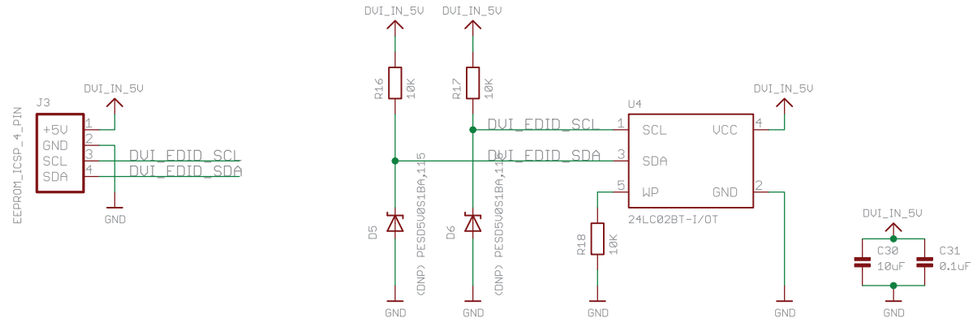
3.3V Regulator 800mA



VIN / PWM



EEPROM



NEWHAVEN DISPLAY INTERNATIONAL		
SCHEMATIC/PART NUMBER: NHD-5.0-HDMI-N		REVISION: 1.1
DRAWN BY: P. Bartek	CHECKED BY: M. LaVine	SIZE: A3
DRAWN DATE: 06/01/17	CHECKED DATE: 06/02/17	SHEET: 2 of 3

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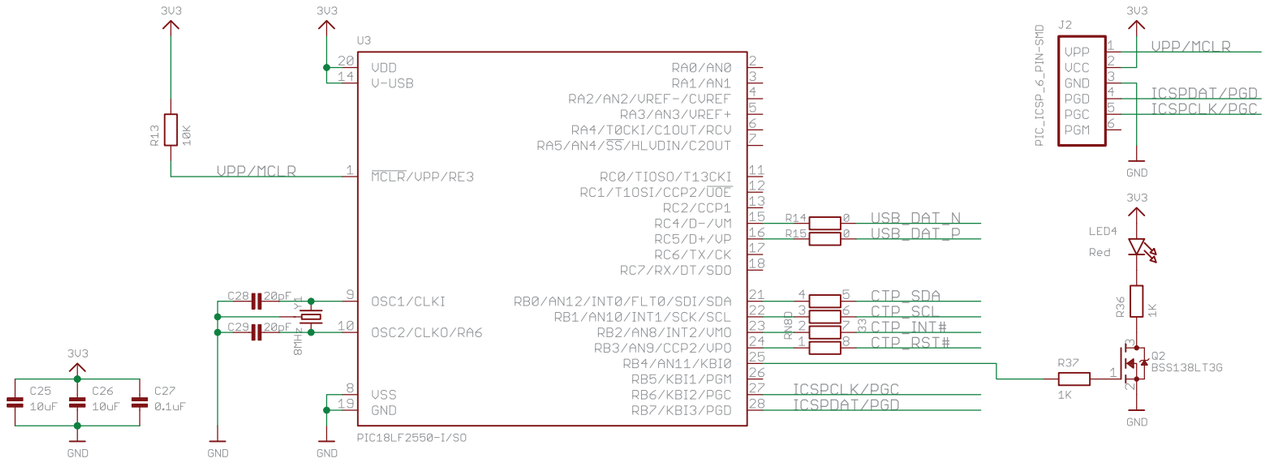
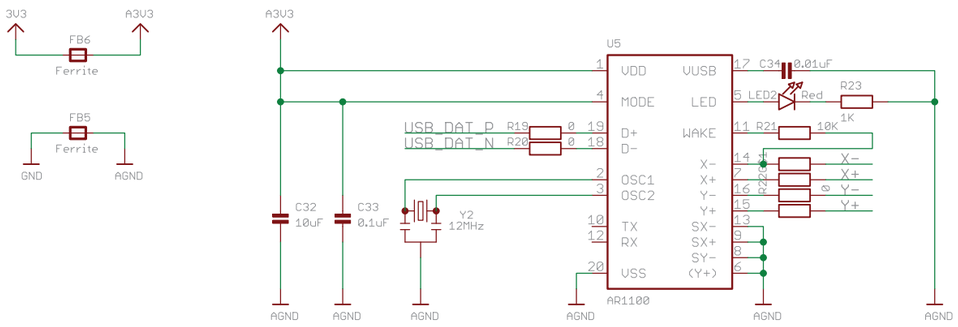
PIC18LF2550 / Capacitive Touch Screen Controller



Resistive Touch Screen Controller



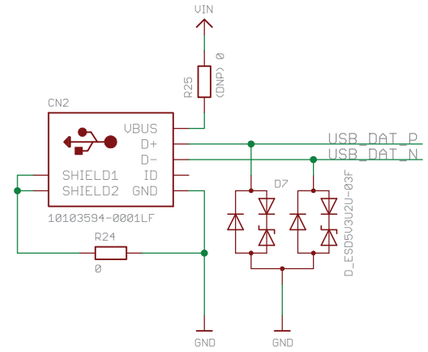
BOARD VERSIONS

RTU Version: (DNP) - C1, C20, C25, C26, C2, C22, C27, C28, C29, C39, CTP1, D1, D2, D3, D4, D5, D6, LED4, Q2, R4, R6, R13, R9, R10, R11, R36, R37, R12, R14, R15, R25, R29, R32, R33, R34, R35, RN8, U1, U3, Y1

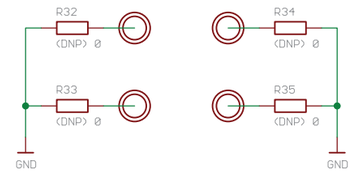
CTU Version: (DNP) - C1, C32, C2, C33, C23, C24, C34, C39, D1, D2, D3, D4, D5, D6, FB5, FB6, LED2, R4, R6, R21, R19, R20, R25, R29, R22, R23, R32, R33, R34, R35, U1, U5, Y2

Non-Touch Version: (DNP) - C1, C20, C25, C26, C32, C2, C22, C27, C33, C23, C24, C34, C28, C29, C39, CN2, CTP1, D1, D2, D3, D4, D5, D6, D7, FB5, FB6, LED2, LED4, Q2, R4, R6, R13, R21, R9, R10, R11, R23, R36, R37, R12, R14, R15, R19, R20, R24, R25, R29, R22, R32, R33, R34, R35, RN8, U1, U3, U5, Y1, Y2

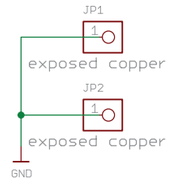
Micro-B USB



Mounting Holes 3.5mm Plated



Exposed Pads to Ground TFT Bezel



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DRAWN DATE: 06/01/17	CHECKED DATE: 06/02/17
	SIZE: A3
	SHEET: 3 of 3

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Electrical Characteristics

Item	Symbol	Condition	Min.	Typical	Max.	Unit
Operating Temperature Range	T_{OP}	Absolute Max	-20	-	+70	°C
Storage Temperature Range	T_{ST}	Absolute Max	-30	-	+80	°C
Backlight PWM Voltage	V_{PWM}	-	2.5	3.3	5.5	V
Backlight PWM Frequency	f_{PWM}	V_{PWM} = 3.3V	5	-	100	kHz
Module Supply Voltage	V_{DD}	-	5.0	-	7.0	V
Module Supply Current	I_{DD}	V_{DD} = 5V	-	1.2	1.5	A
		V_{DD} = 7V	-	0.9	1.2	A

HDMI Receiver Information

On-board Texas Instruments TFP401A Receiver. To view the full TFP401A specification, please download it by accessing the link: http://www.ti.com/lit/ds/slds190a/slds190a.pdf

Technical Resource

3D Model	TFT Panel Used	Display Type	Luminance Rating	Optimal Viewing Angle	Touch Panel
NHD-5.0-HDMI-N-RTXL	NHD-5.0-800480TF-ATXL#	Premium MVA	620 cd/m²	70° all angles	No Touch
NHD-5.0-HDMI-N-RTXL-CTU	NHD-5.0-800480TF-ATXL#-CTP	Premium MVA	500 cd/m²	70° all angles	PCAP (USB-HID)
NHD-5.0-HDMI-N-RTXL-RTU	NHD-5.0-800480TF-ATXL#-T	Premium MVA	480 cd/m²	70° all angles	4-Wire Resistive (USB-HID)

EDID Array

```
const unsigned char NHD_HDMI5[] = {
0x00, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0x00, 0x39, 0x04, 0x3B, 0x07, 0x00, 0x00, 0x00, 0x00,
0x01, 0x11, 0x01, 0x03, 0x80, 0x0B, 0x07, 0x00, 0x0A, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x01,
0x01, 0x01, 0x01, 0x01, 0x01, 0x01, 0x80, 0x0C, 0x20, 0x80, 0x30, 0xE0, 0x2D, 0x10, 0x28, 0x30,
0xD3, 0x00, 0x6C, 0x41, 0x00, 0x00, 0x00, 0x18, 0x00, 0x00, 0x00, 0xFC, 0x00, 0x4E, 0x48, 0x44,
0x2D, 0x35, 0x2E, 0x30, 0x20, 0x48, 0x44, 0x4D, 0x49, 0x0A, 0x00, 0x00, 0x00, 0x10, 0x00, 0x00,
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};
```
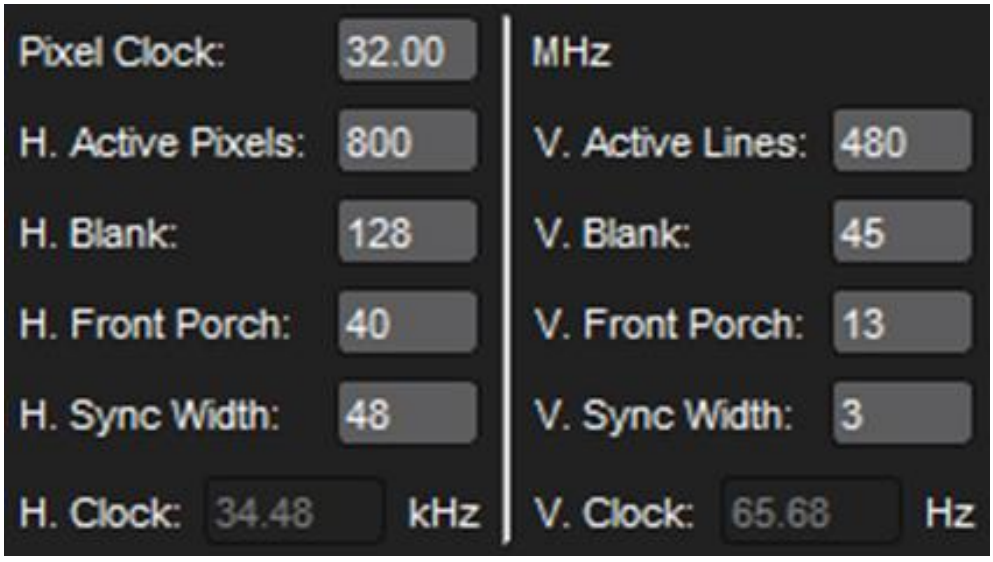

EDID Timing



Quality Information

Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	+80°C, 96 hrs.	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C, 96 hrs.	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+70°C, 96 hrs.	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	-20°C, 96 hrs.	1,2
High Temperature / Humidity Operation	Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time.	+60°C, 90% RH, 96 hrs.	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	-20°C, 30min->25°C, 5min -> 70°C, 30min = 1 Cycle 10 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-55Hz, 15mm amplitude. 60 sec in each of 3 directions X,Y,Z For 15 minutes	3
Static electricity test	Endurance test applying electric static discharge.	Air: V_S=±8KV, Contact: V_S=±4KV 10 Times	

Note 1: No condensation to be observed.
Note 2: Conducted after 4 hours of storage at 25°C, 0%RH.
Note 3: Test performed on product itself, not inside a container.