

**Product Specification**

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# NHD-5.0-HDMI-N-RTXL-xxx

## TFT Liquid Crystal Display

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

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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](https://www.newhavendisplay.com/example_code.html)
- **Knowledge Center:** [https://www.newhavendisplay.com/knowledge\\_center.html](https://www.newhavendisplay.com/knowledge_center.html)
- **Quality Center:** [https://www.newhavendisplay.com/quality\\_center.html](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

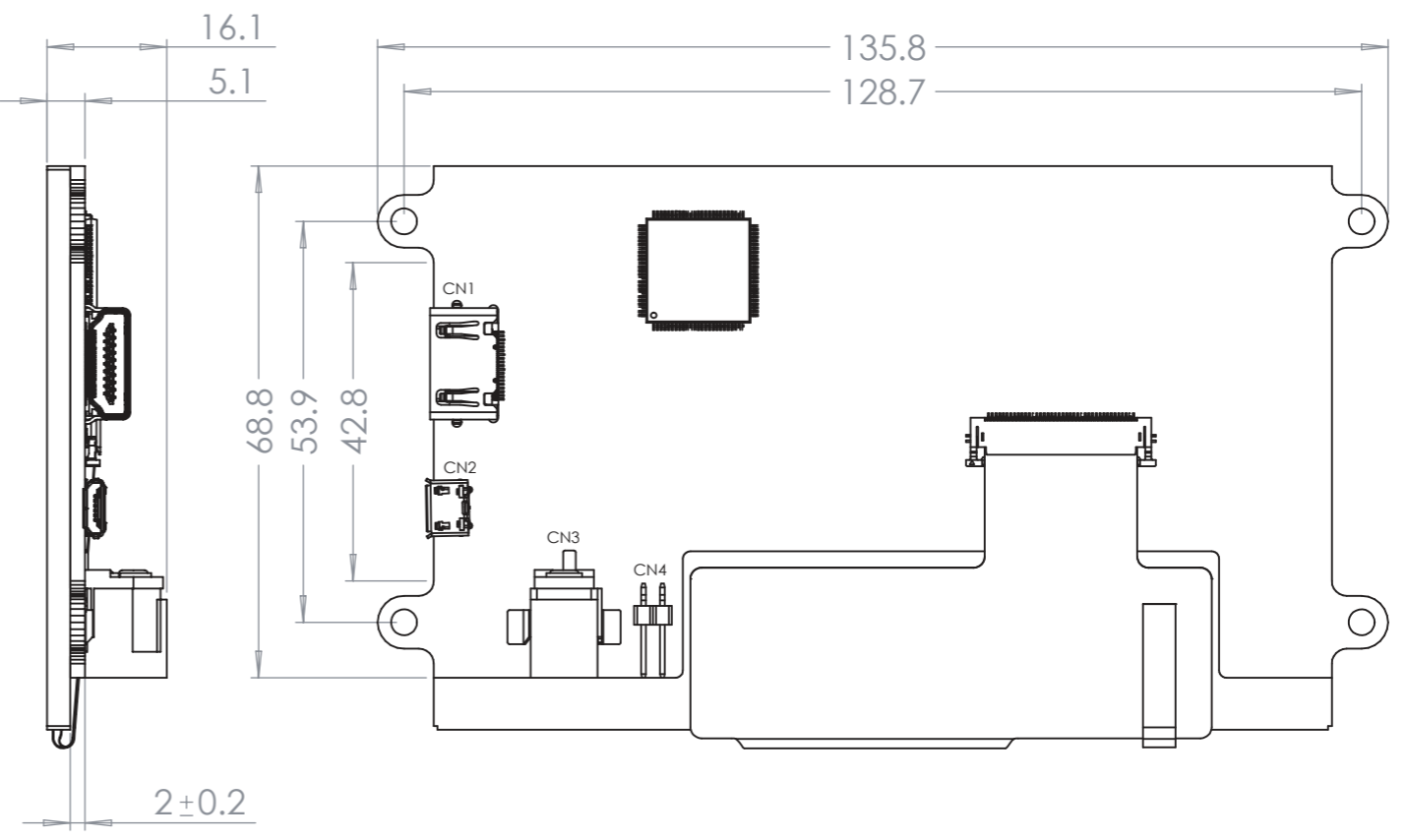
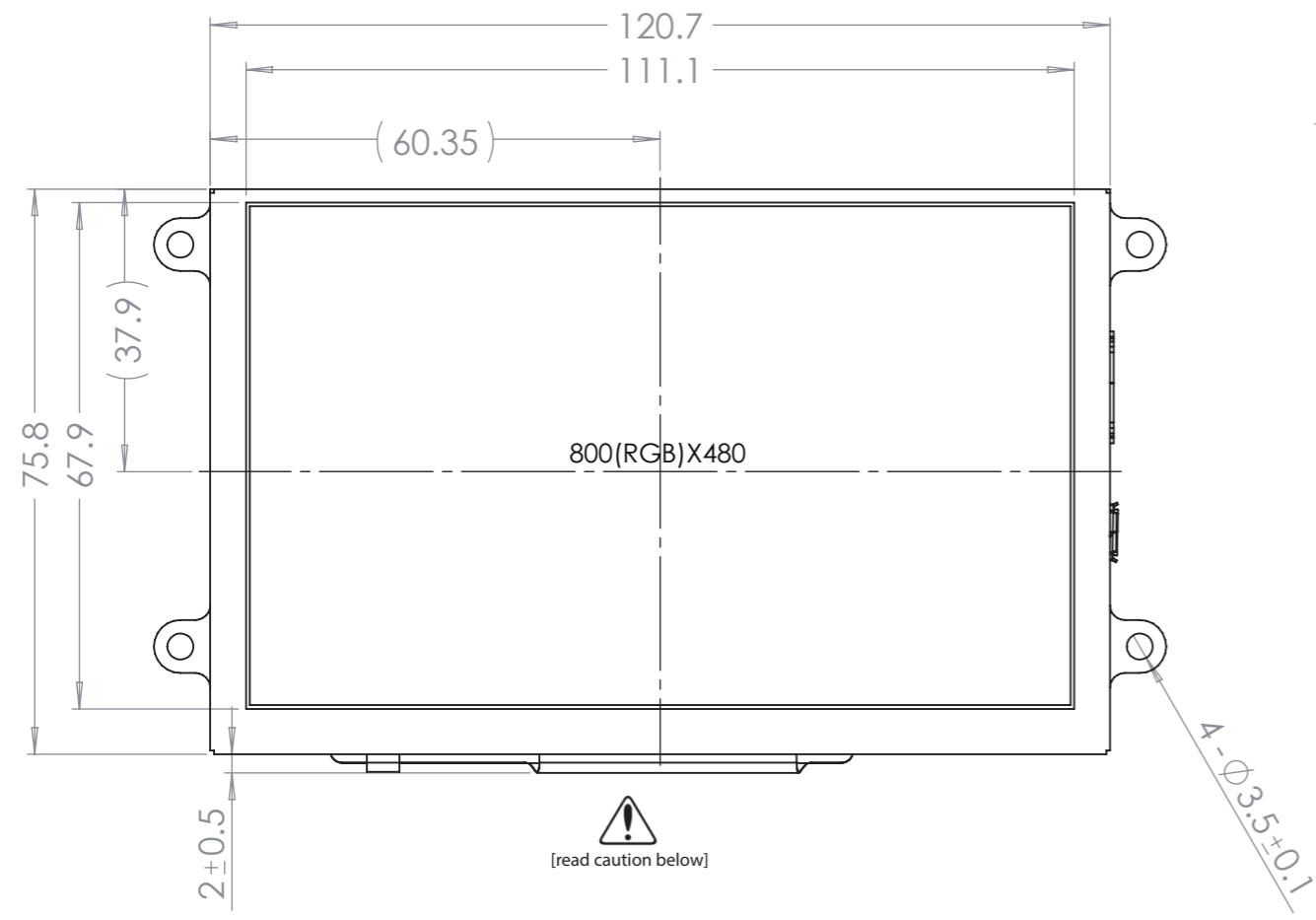
Revision	Date	Description	Changed By
0	04/22/2021	Initial Release	ZP

## 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



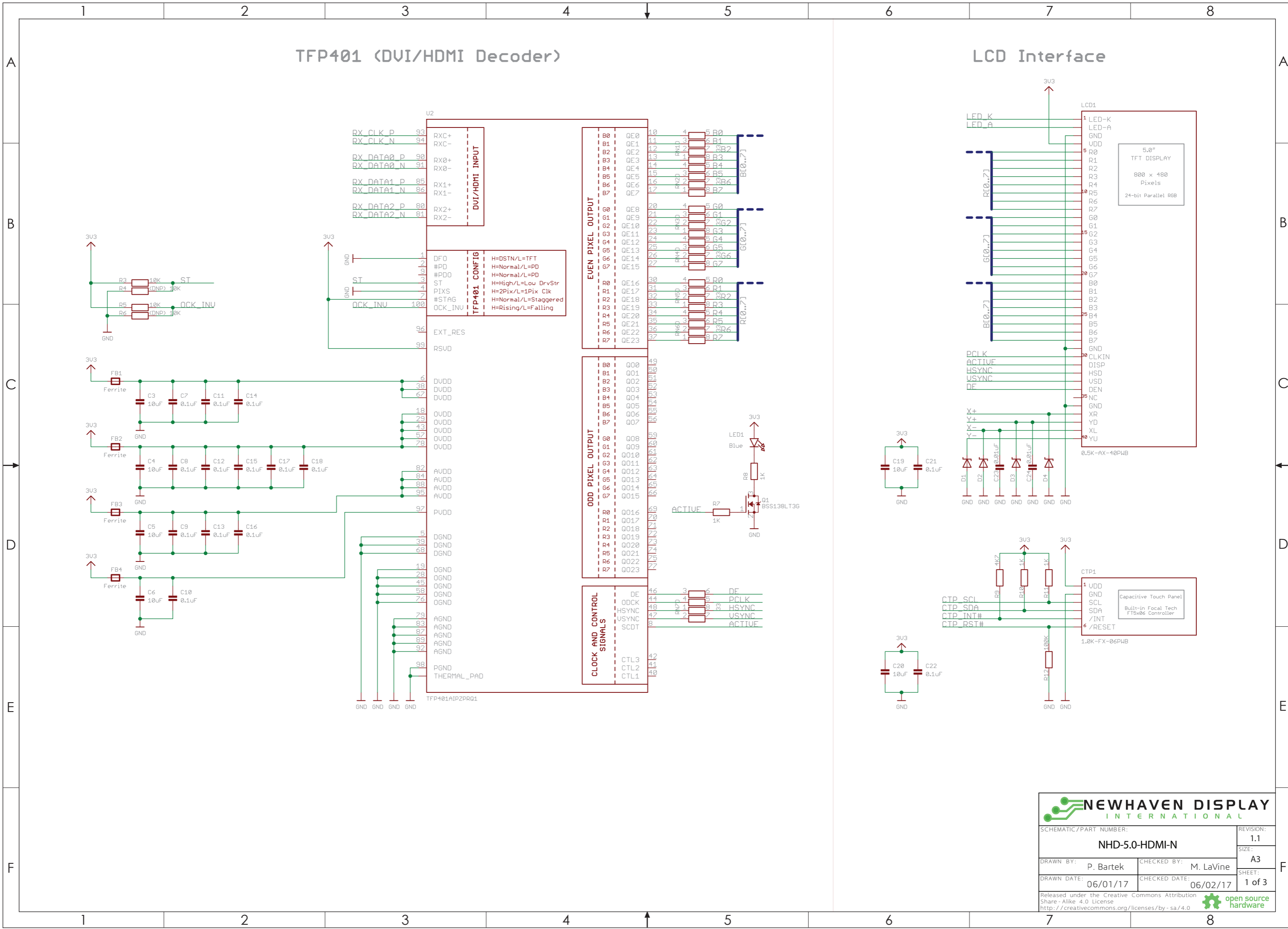
- NOTES:
1. 5.0" Premium HDMI TFT Module
  2. On-board Texas Instruments TFP401A HDMI/DVI Receiver
  3. Optimal Viewing Direction: Full View
  4. Display Mode: Transmissive / Normally White / Anti-Glare
  5. Luminance: 620 cd/m<sup>2</sup>
  6. 3M Brightness Enhancement Film
  7. On-board Texas Instruments TPS61165 High Brightness LED Driver w/ PWM

Improper handling of the FPC connection at the bottom edge of this module may cause damage resulting in display failure. Take special care when handling this area of the display module to make sure this connection is never strained nor creased.

STANDARD TOLERANCE: (UNLESS OTHERWISE SPECIFIED)			REVISION:
			1.2
LINEAR: ±0.3mm	DRAWING/PART NUMBER:		SIZE:
	NHD-5.0-HDMI-N-RTXL		A3
UNLESS OTHERWISE SPECIFIED: - DIMENSIONS ARE IN MILLIMETERS - THIRD ANGLE PROJECTION	DRAWN BY:	APPROVED BY:	SCALE:
	A. Shah	A. Shah	1:2
	DRAWN DATE:	APPROVED DATE:	
	5/8/20	5/8/20	
	DO NOT SCALE DRAWING		SHEET 1 OF 1
THIS DRAWING IS SOLELY THE PROPERTY OF NEWHAVEN DISPLAY INTERNATIONAL, INC. THE INFORMATION IT CONTAINS IS NOT TO BE DISCLOSED, REPRODUCED OR COPIED IN WHOLE OR PART WITHOUT WRITTEN APPROVAL FROM NEWHAVEN DISPLAY.			

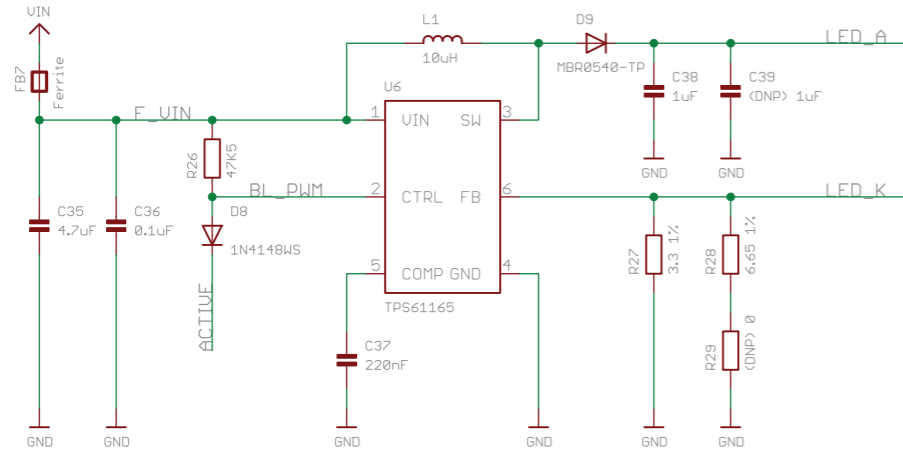
# TFP401 (DVI/HDMI Decoder)

# LCD Interface



SCHEMATIC/PART NUMBER: <b>NHD-5.0-HDMI-N</b>	
DRAWN BY: P. Bartek	CHECKED BY: M. LaVine
DRAWN DATE: 06/01/17	CHECKED DATE: 06/02/17
REVISION: 1.1 SIZE: A3 SHEET: 1 of 3	
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## Backlight

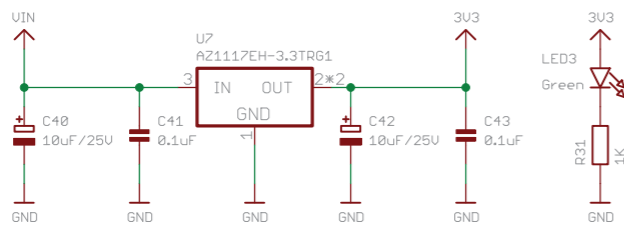


Backlight Configuration		
Current	R29	Display
(Default) ~60mA	Open	ATXL#
~90mA	Close	ASXU#, ASXN#

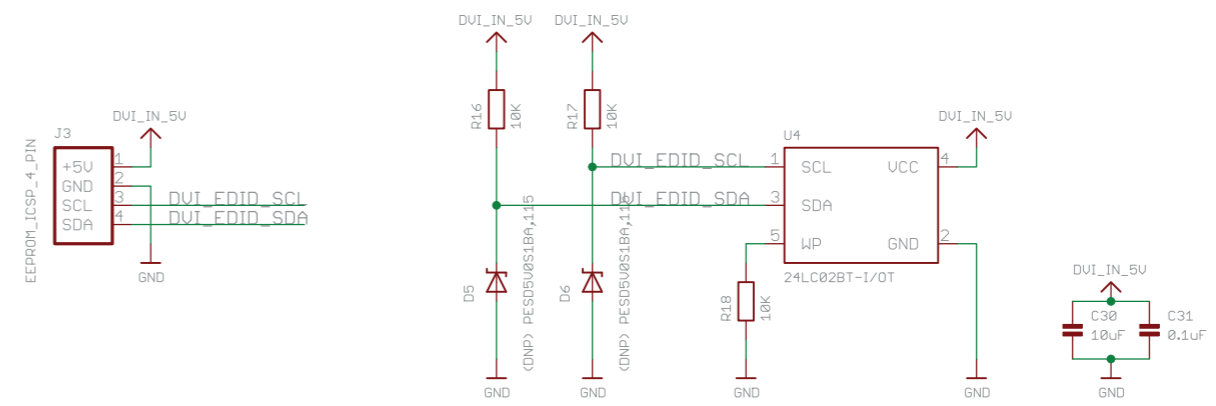
## HDMI-A



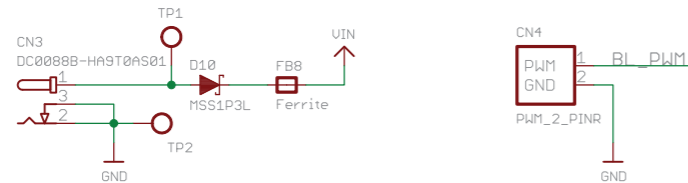
## 3.3V Regulator 800mA



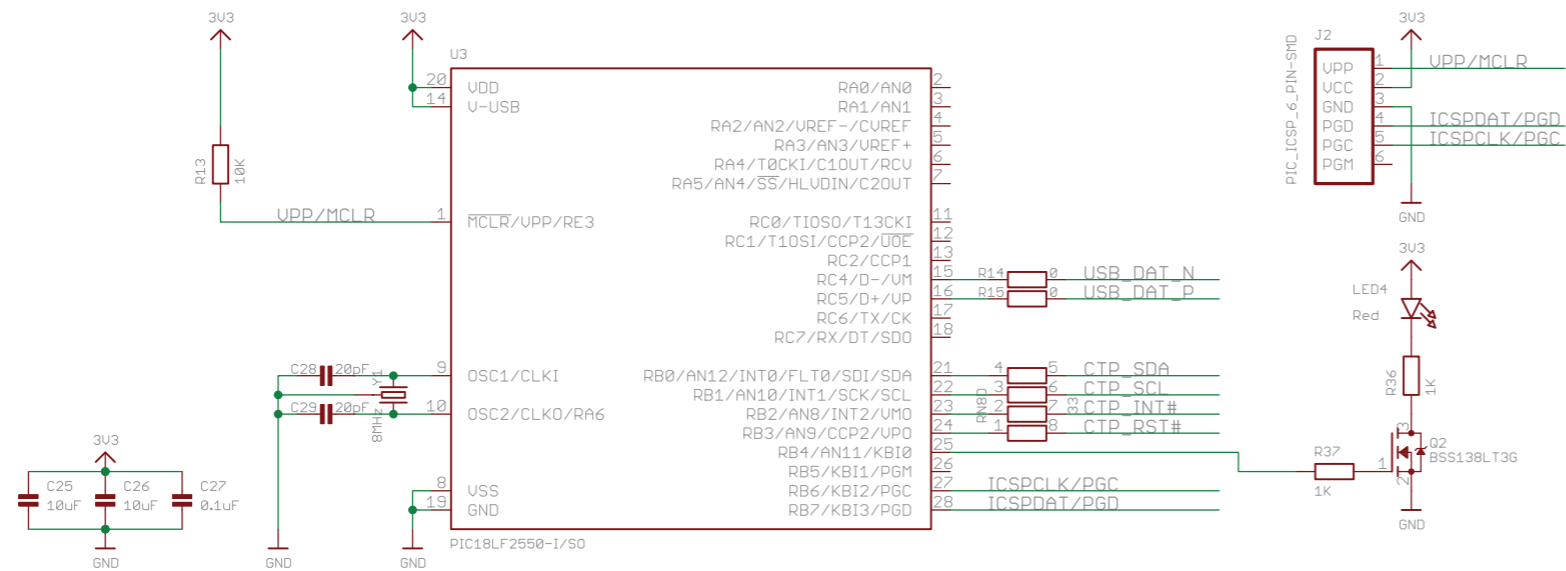
## EEPROM



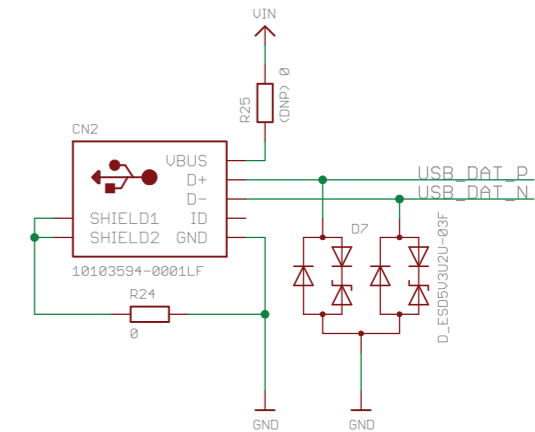
## UIN / PWM



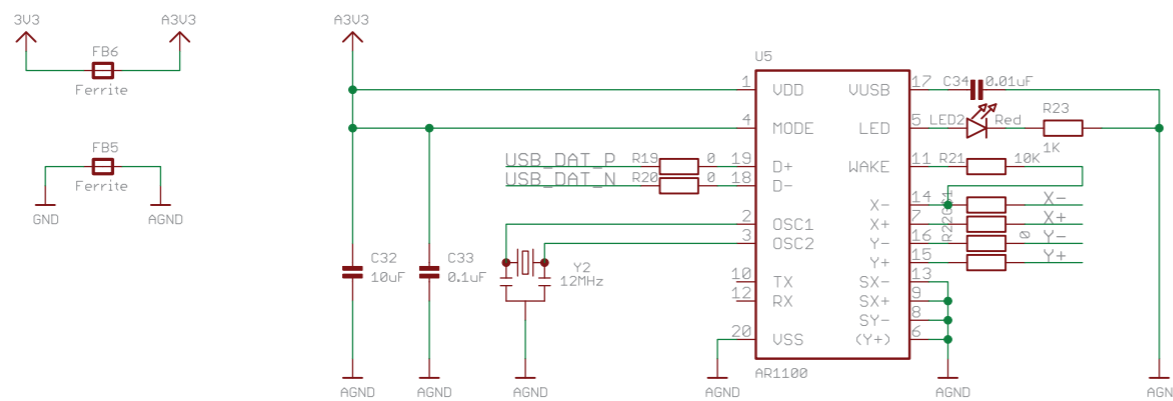
## PIC18LF2550 / Capacitive Touch Screen Controller



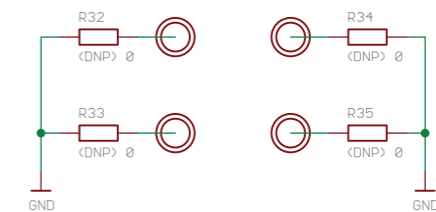
## Micro-B USB



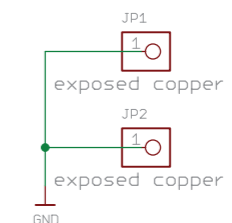
## Resistive Touch Screen Controller



## Mounting Holes 3.5mm Plated



## Exposed Pads to Ground TFT Bezel



## 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

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

## Electrical Characteristics

Item	Symbol	Condition	Min.	Typical	Max.	Unit
Operating Temperature Range	T <sub>OP</sub>	Absolute Max	-20	-	+70	°C
Storage Temperature Range	T <sub>ST</sub>	Absolute Max	-30	-	+80	°C
Backlight PWM Voltage	V <sub>PWM</sub>	-	2.5	3.3	5.5	V
Backlight PWM Frequency	f <sub>PWM</sub>	V <sub>PWM</sub> = 3.3V	5	-	100	kHz
Module Supply Voltage	V <sub>DD</sub>	-	5.0	-	7.0	V
Module Supply Current	I <sub>DD</sub>	V <sub>DD</sub> = 5V	-	1.2	1.5	A
		V <sub>DD</sub> = 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/slids190a/slids190a.pdf>

## Technical Resource

3D Model	TFT Panel Used	Display Type	Luminance Rating	Optimal Viewing Angle	Touch Panel
<a href="#">NHD-5.0-HDMI-N-RTXL</a>	<a href="#">NHD-5.0-800480TF-ATXL#</a>	Premium MVA	620 cd/m <sup>2</sup>	70° all angles	No Touch
<a href="#">NHD-5.0-HDMI-N-RTXL-CTU</a>	<a href="#">NHD-5.0-800480TF-ATXL#-CTP</a>	Premium MVA	500 cd/m <sup>2</sup>	70° all angles	PCAP (USB-HID)
<a href="#">NHD-5.0-HDMI-N-RTXL-RTU</a>	<a href="#">NHD-5.0-800480TF-ATXL#-T</a>	Premium MVA	480 cd/m <sup>2</sup>	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,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x10,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x5A,
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0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00
};
```

## EDID Timing

Pixel Clock:	32.00	MHz
H. Active Pixels:	800	V. Active Lines: 480
H. Blank:	128	V. Blank: 45
H. Front Porch:	40	V. Front Porch: 13
H. Sync Width:	48	V. Sync Width: 3
H. Clock:	34.48	kHz
V. Clock:	65.68	Hz

## 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 <sub>s</sub> =±8KV, Contact: V <sub>s</sub> =±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.