

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

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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

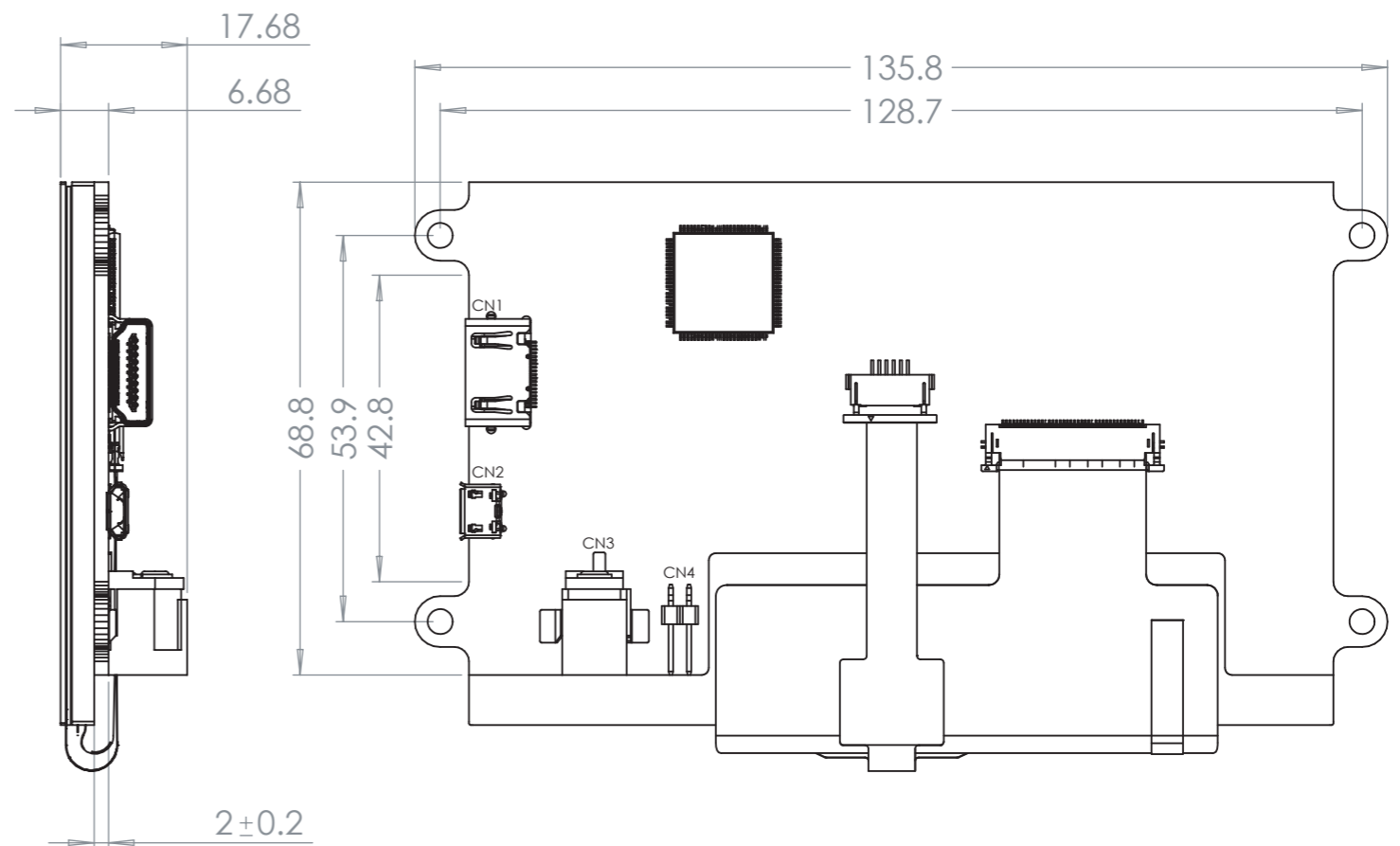
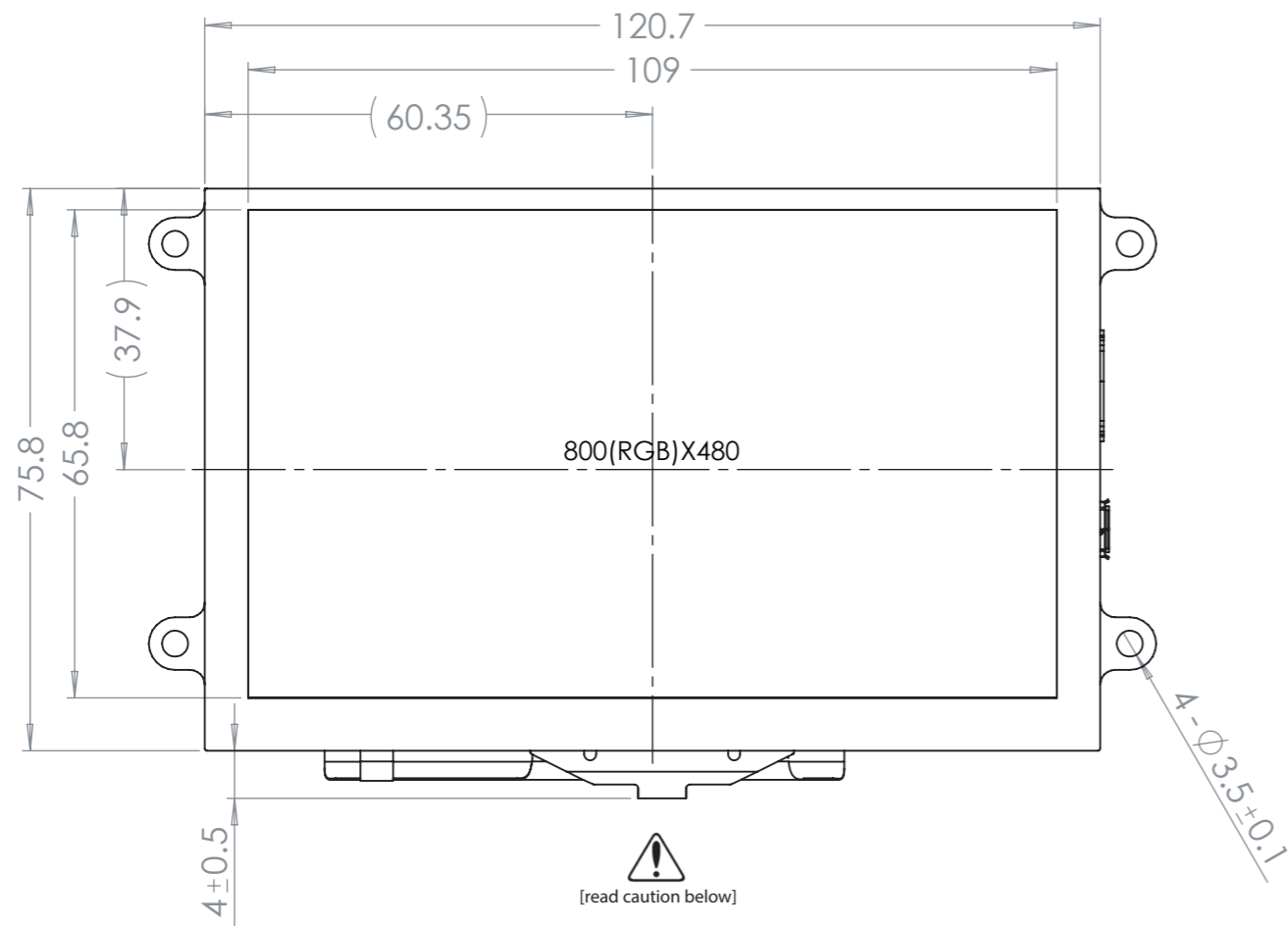
Revision	Date	Description	Changed By
0	04/22/2021	Initial Release	ZP

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:

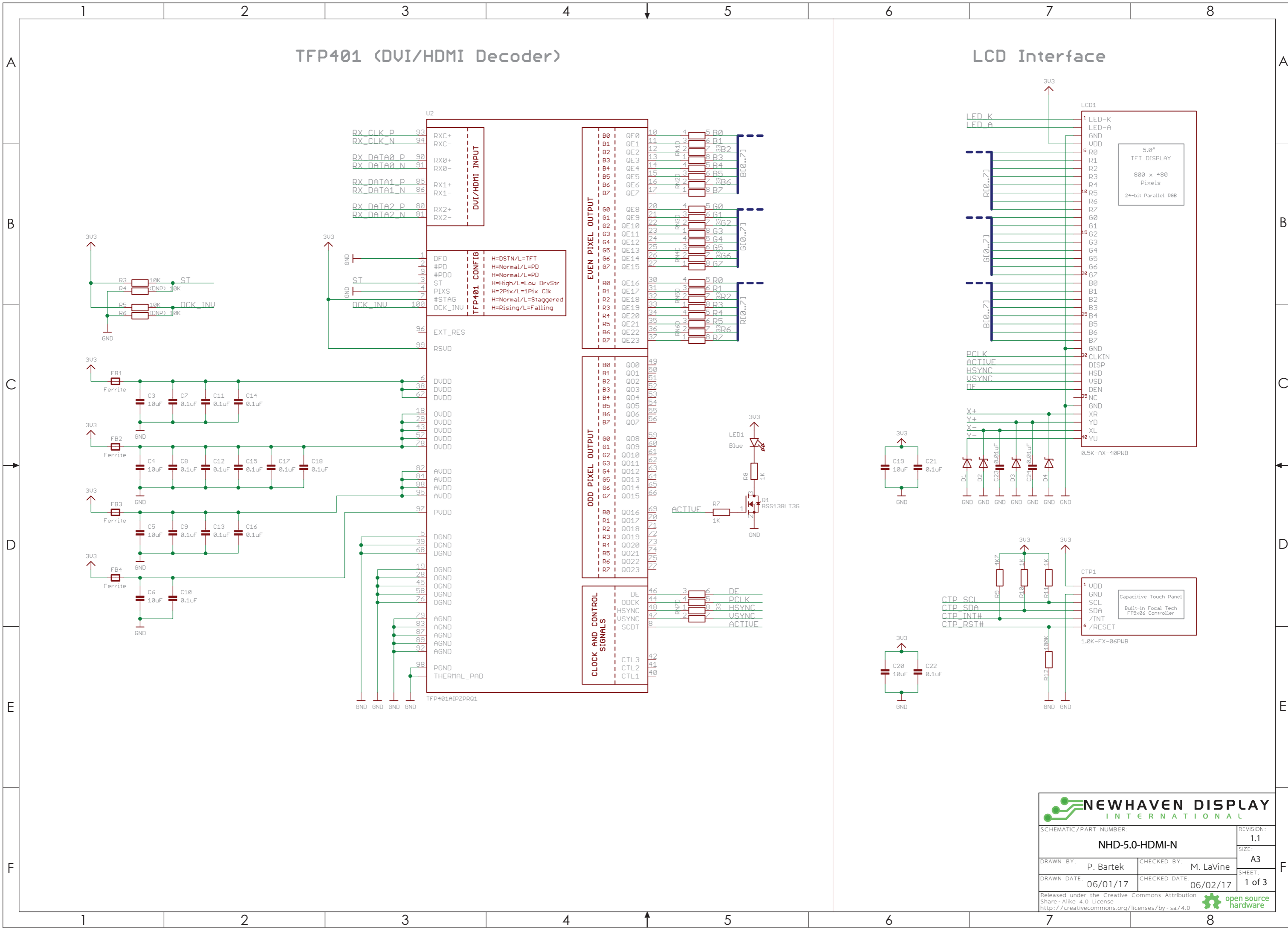
1. 5.0" Premium HDMI TFT Module w/ USB-HID Capacitive Touch
2. On-board Texas Instruments TFP401A HDMI/DVI Receiver
3. Optimal Viewing Direction: Full View
4. Display Mode: Transmissive / Normally White / Anti-Glare
5. Luminance: 500 cd/m²
6. 3M Brightness Enhancement Film
7. Touch Panel: Capacitive
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	DRAWING/PART NUMBER: NHD-5.0-HDMI-N-RTXL-CTU	REVISION: 1.2
UNLESS OTHERWISE SPECIFIED: - DIMENSIONS ARE IN MILLIMETERS - THIRD ANGLE PROJECTION	DRAWN BY: A. Shah	APPROVED BY: A. Shah
	DRAWN DATE: 5/8/20	APPROVED DATE: 5/8/20
	DO NOT SCALE DRAWING	SHEET 1 OF 1
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TFP401 (DVI/HDMI Decoder)

LCD Interface



RXC+	93	RXC-	94
RX_DATA0_P	90	RX0+	90
RX_DATA0_N	91	RX0-	91
RX_DATA1_P	85	RX1+	85
RX_DATA1_N	86	RX1-	86
RX_DATA2_P	80	RX2+	80
RX_DATA2_N	81	RX2-	81

DF0	1	H=DSTN/L=TFT
#PD	2	H=Normal/L=PD
#PDD	3	H=Normal/L=PD
ST	4	H=High/L=Low DrvStr
PIXS	5	H=2Pix/L=1Pix Clk
#STAG	6	H=Normal/L=Staggered
OCK_INV	7	H=Rising/L=Falling

B0	QE0	10	5 B0
B1	QE1	11	6 B1
B2	QE2	12	7 B2
B3	QE3	13	8 B3
B4	QE4	14	9 B4
B5	QE5	15	6 B5
B6	QE6	16	7 B6
B7	QE7	17	8 B7

B0	QE8	20	5 G0
B1	QE9	21	6 G1
B2	QE10	22	7 G2
B3	QE11	23	8 G3
B4	QE12	24	9 G4
B5	QE13	25	6 G5
B6	QE14	26	7 G6
B7	QE15	27	8 G7

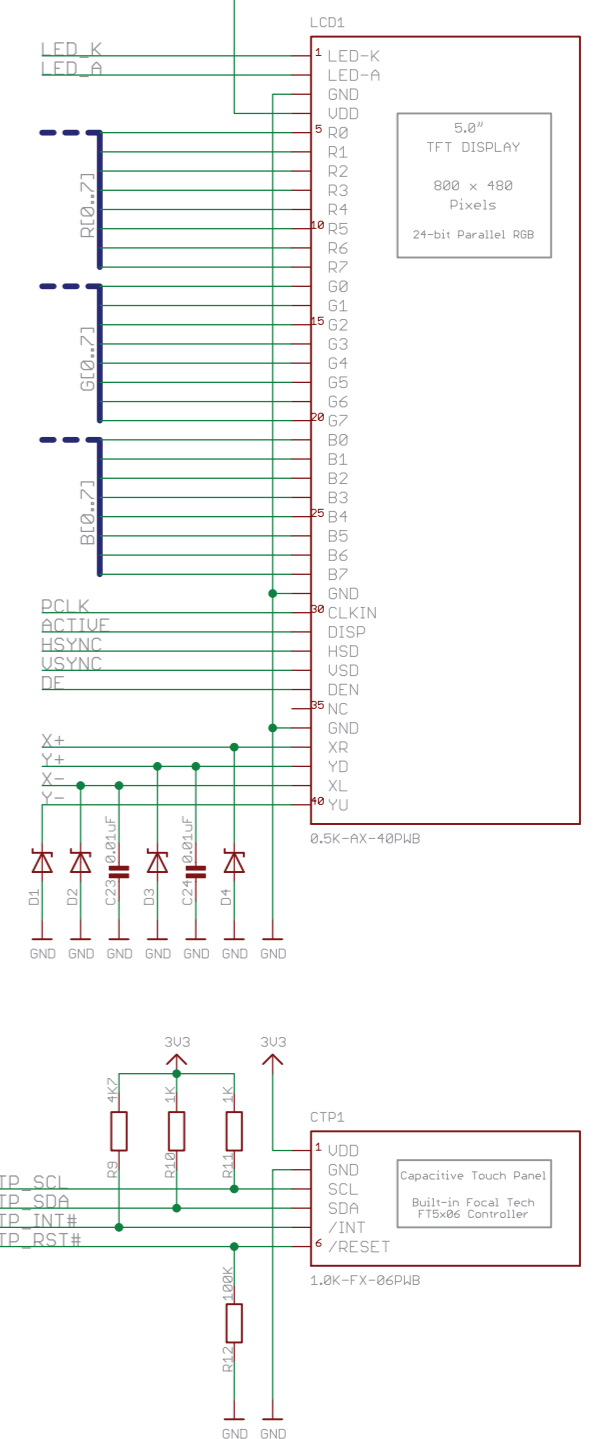
B0	QE16	30	5 R0
B1	QE17	31	6 R1
B2	QE18	32	7 R2
B3	QE19	33	8 R3
B4	QE20	34	9 R4
B5	QE21	35	6 R5
B6	QE22	36	7 R6
B7	QE23	37	8 R7

B0	Q00	49	59
B1	Q01	50	60
B2	Q02	51	61
B3	Q03	52	62
B4	Q04	53	63
B5	Q05	54	64
B6	Q06	55	65
B7	Q07	56	66

B0	Q08	69	79
B1	Q09	70	80
B2	Q10	71	81
B3	Q11	72	82
B4	Q12	73	83
B5	Q13	74	84
B6	Q14	75	85
B7	Q15	76	86

DE	46	DF	6
ODCK	44	CLK	5
HSYNC	48	HSYNC	8
USYNC	47	USYNC	7
SCDT	8	ACTIVE	7

CTL3	42
CTL2	41
CTL1	40

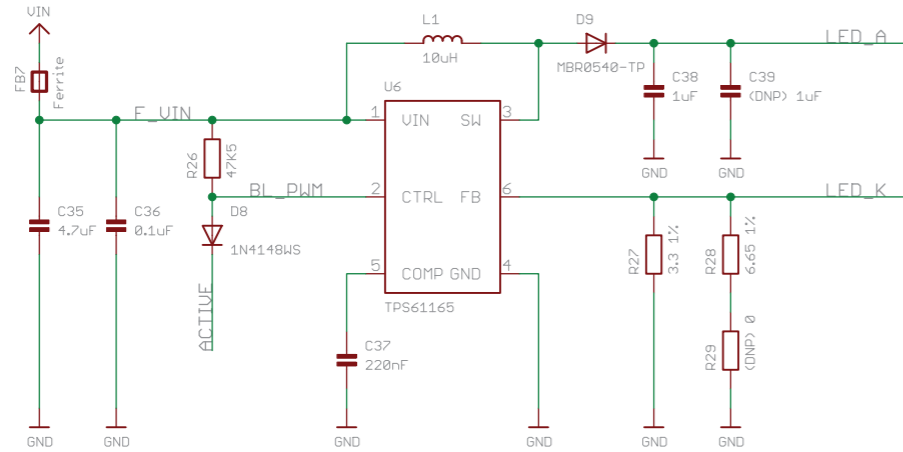


NEWHAVEN DISPLAY INTERNATIONAL

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

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Backlight

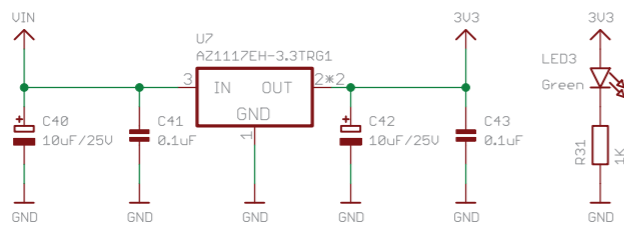


Backlight Configuration		
Current	R29	Display
(Default) ~60mA	Open	ATXL#
~90mA	Close	ASXU#, ASXN#

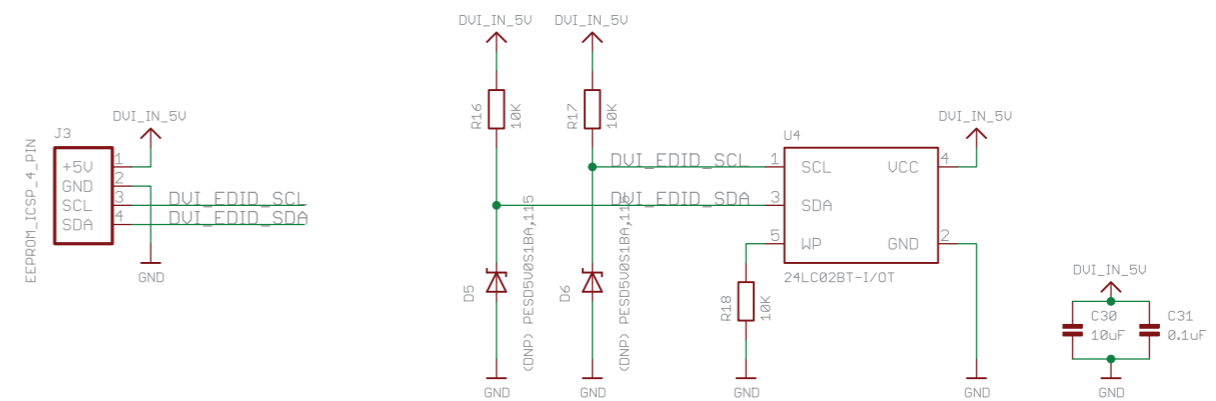
HDMI-A



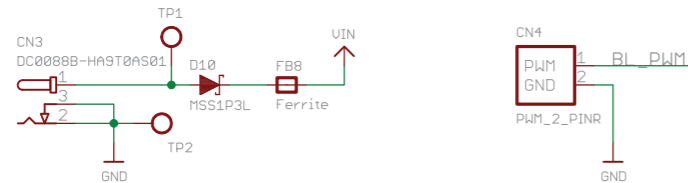
3.3V Regulator 800mA



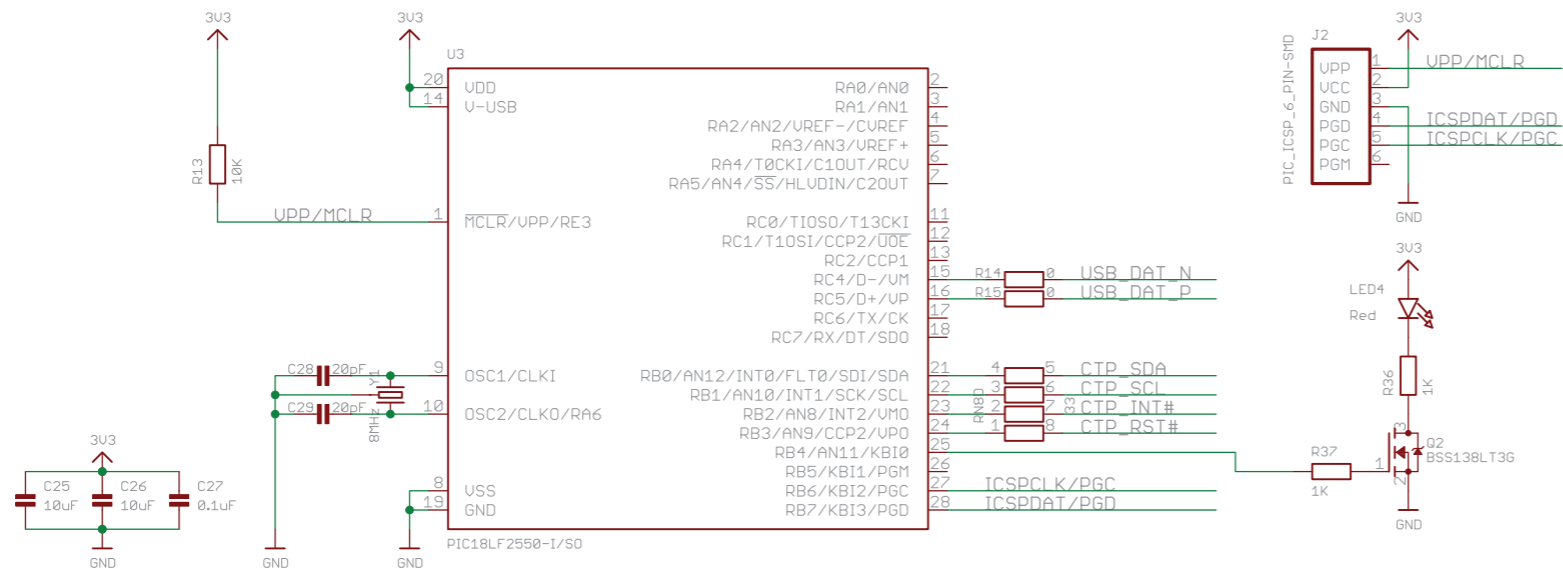
EEPROM



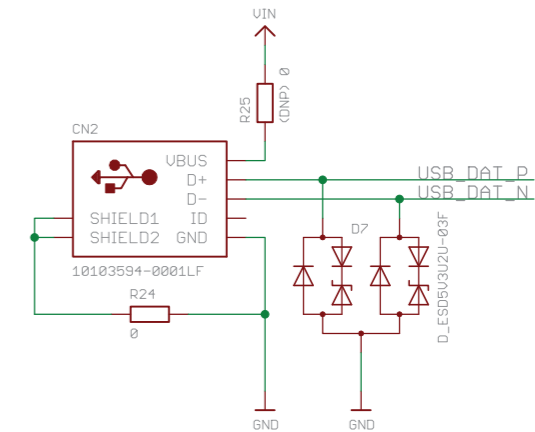
UIN / PWM



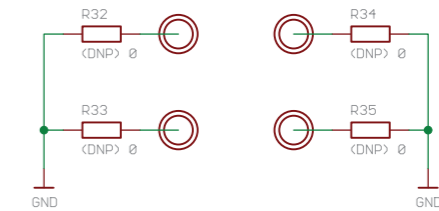
PIC18LF2550 / Capacitive Touch Screen Controller



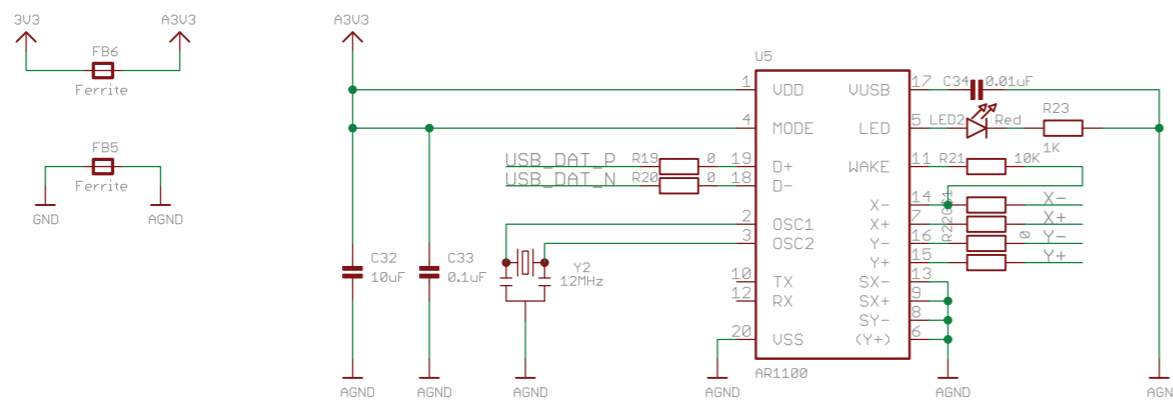
Micro-B USB



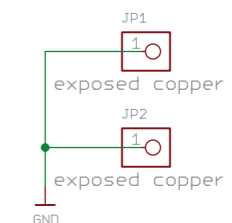
Mounting Holes 3.5mm Plated



Resistive Touch Screen Controller



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

SCHEMATIC/PART NUMBER: NHD-5.0-HDMI-N	
REVISION: 1.1	SIZE: A3
DRAWN BY: P. Bartek	CHECKED BY: M. LaVine
DRAWN DATE: 06/01/17	CHECKED DATE: 06/02/17
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/slids190a/slids190a.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/m ²	70° all angles	No Touch
NHD-5.0-HDMI-N-RTXL-CTU	NHD-5.0-800480TF-ATXL#-CTP	Premium MVA	500 cd/m ²	70° all angles	PCAP (USB-HID)
NHD-5.0-HDMI-N-RTXL-RTU	NHD-5.0-800480TF-ATXL#-T	Premium MVA	480 cd/m ²	70° all angles	4-Wire Resistive (USB-HID)

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.