LCDK087NTL0NCH01

LCDK087CTL1ARH01

Kits to Interface with LCD087 over HDMI and USB

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Approvals	
Model Number	LCDK087NTL0NCH01R1.0 LCDK087CTL1ARH01R1.0
Datasheet Revision	1.0
Drawing Revision	A

Table of Contents

Revision History

Document Revision

Date	Version #	Description	Created By	Checked By	Approved By
10/25/2022	1.0	Customer Release	AJ	DA	JH

Hardware Revision

Date	Kit Number	Version #	Description
10/25/2022	LCDK087NTL0NCH01	1.0	LCD087 kit, no touch, no lens, no coating
10/25/2022	LCDK087CTL1ARH01	1.0	LCD087 kit, capacitive touch, cover lens, anti-reflective coating

Ordering Information

LTS Part #	Parts in Kit	Description
LCDK087NTL0NCH01R1.0	PCB-L0090R1.1	Carrier Board
	PCB-L0074R1.2	HDMI to MIPI SODIMM
	LCD087-050NTL0NCNTTR1.0	5" HBWG w/AR 1080 X 1920
	CS-0502000	5V, 2A Power Supply
LCDK087CTL1ARH01R1.0	PCB-L0090R1.1	Carrier Board
	PCB-L0074R1.2	HDMI to MIPI, USBC to I2C SODIMM
	LCD087-050CTL1ARNTTR4.0	5" HBWG w/PCAP w/AR 1080 X 1920
	CS-0502000	5V, 2A Power Supply

Product Description

The LCDK087 kits contain all the parts needed to connect LTS's series of 5-inch LCD087 displays to devices with a HDMI video output port. LCD087 is a high brightness and wide gamut LCD display with a native MIPI interface. Kit LCDK087CTL1ARH01 also supports capacitive touch over a USBC connection. The adapter board, SODIMM, and the LCD panel are powered via the included 5V, 2A power adapter. HDMI and USBC cables are not included in the kits.

Figure 2 and Figure 2 show the kits assembled apart from the power adapter. Figure 2 shows the LCD with the additional connection for touch support. The LCD has a QR code. Scanning the QR code will reveal the LCD part number followed by a date-serial number. The general LCD QR code is:

- <LCD part number> [<4-digit year><2-digit month><2-digit day>]-<serial number>

Figure 1 LCDK087NTL0NCH01 assembled

Figure 2 LCDK087CTL1ARH01 assembled

General Specification

Item	Specification	Unit
Outline Dimensions – Carrier Board + SODIMM	100(W) x 74(L) x 14(H)	mm
Adapted Displays	LCD087 series	-
Outline Dimensions – LCD087 series without cover lens	75.88(W) x 119.47(L) x 3(H)	mm
Outline Dimensions – LCD087 series with cover lens	75.88(W) x 119.47(L) x 4.20(H)	mm
Number of Dots – LCD087 series	1080 x 1920	-
LCD Type – LCD087 series	IPS 16.7M Display Color by 8bit	-
Backlight Type – LCD087 series	LED Wide Gamut	-
Luminance – LCD087 series	2000	cd/m^2
Display Size – LCD087 series	4.97	inches

Absolute Max Ratings

Item	Symbol	Value		Unit
		Min	Max	
Power Supply Voltage	VCC	-0.3	13	V
Operating Temperature	T_{OPR}	-10	50	°C
Storage Temperature	T_{STG}	-20	70	°C

Electrical Characteristics

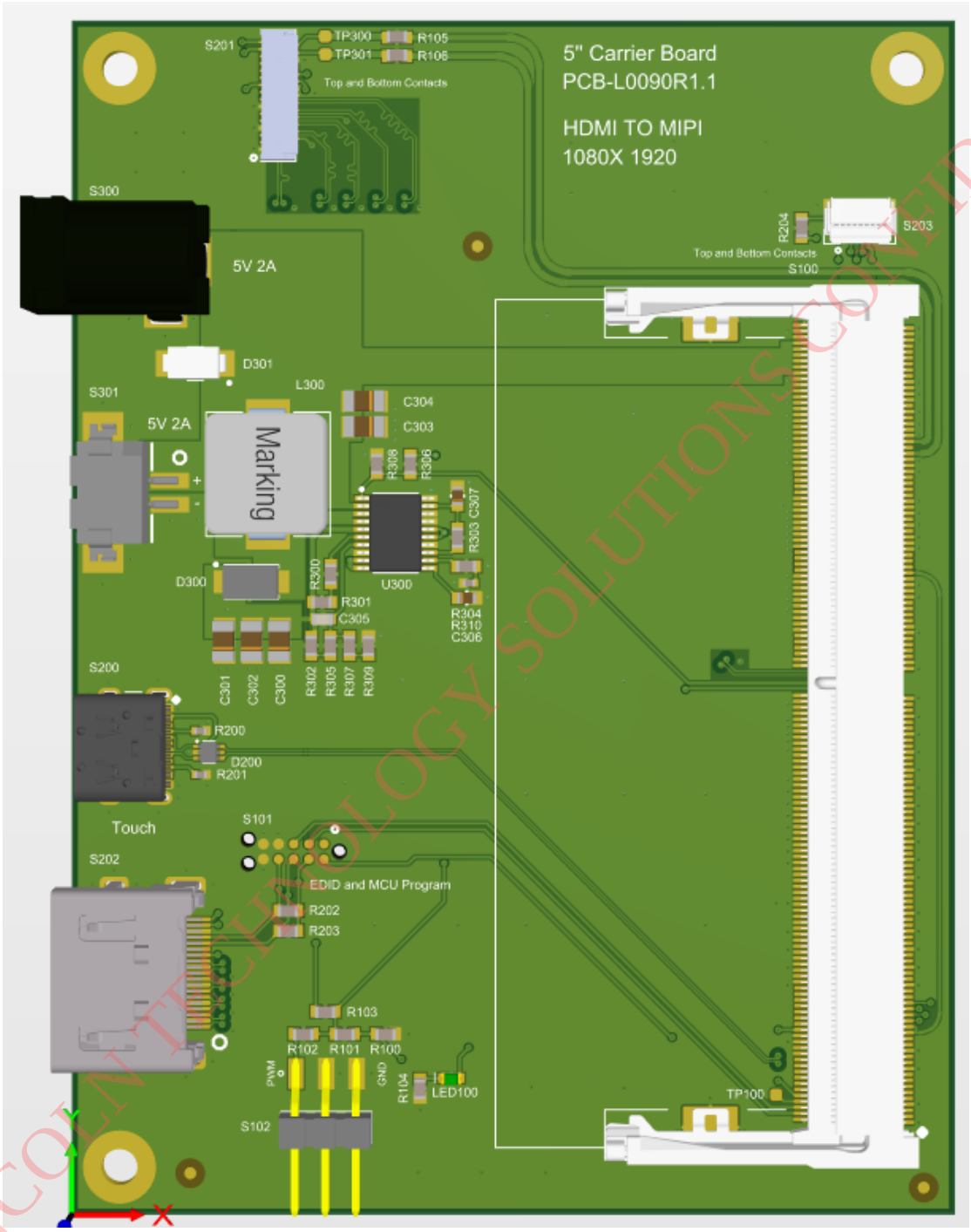
Total Power is for the SODIMM + Carrier Board + LCD087 with backlight. Backlight Power can be reduced by using the PWM signal on S102 pin 1 on the Carrier Board.

Item	Symbol	Value			Unit	Note
		Min	Typ	Max		
Supply Voltage	VCC	4.75	5.0	5.25	V	Ta = 25°C
Total Power	P_{TOT}	-	6.25	-	W	Ta = 25°C, PWM = 100%
Backlight Power	P_{BL}	-	4.8	-	W	Ta = 25°C, PWM = 100%

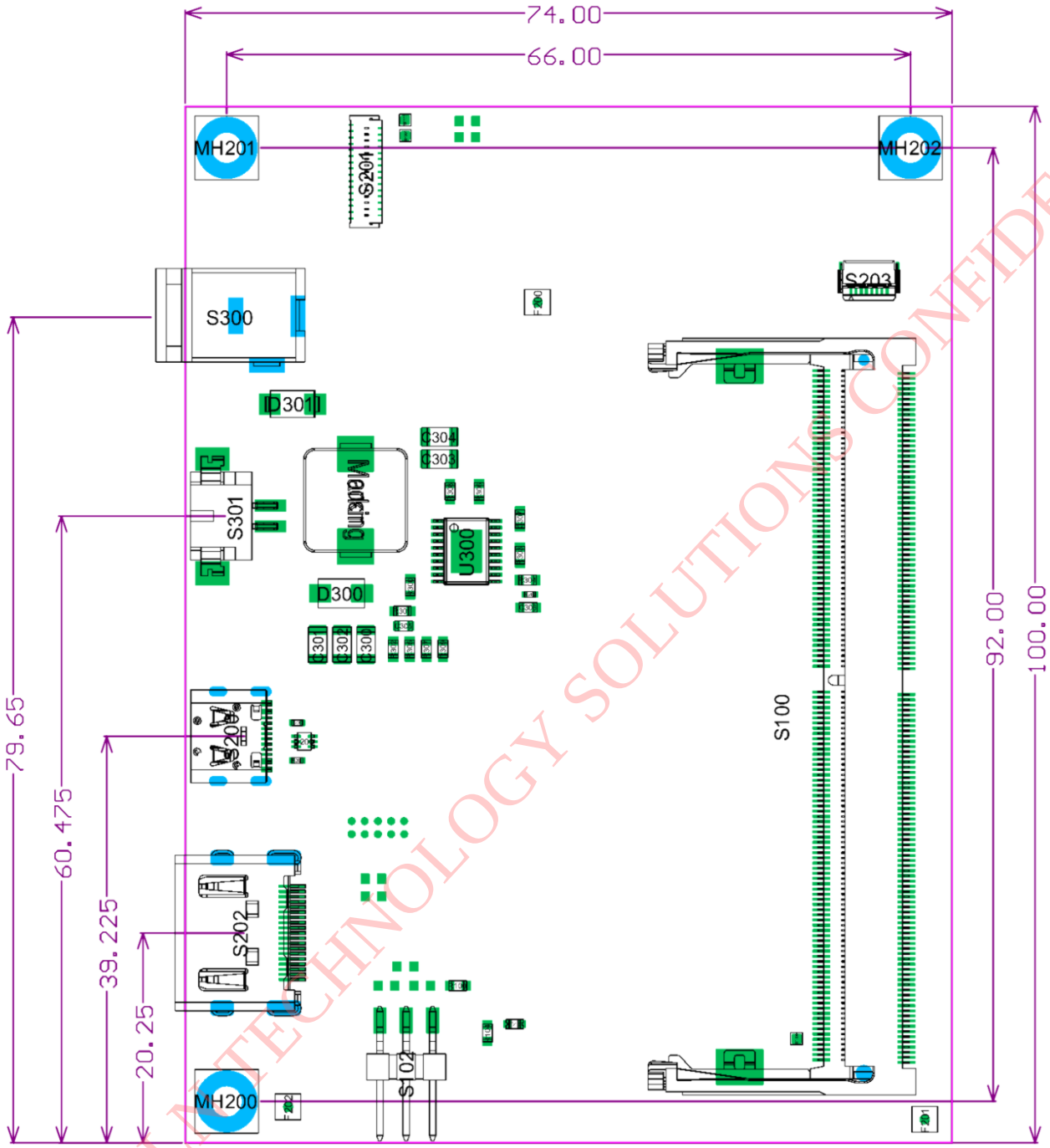
NOTE: Operating LCDK087 backlight at 100% brightness/PWM for extended periods and/or in enclosed spaces or high ambient temperatures can lead to thermal concerns. If any component surface temperature reaches 60°C, use some form of thermal management or use external PWM control to prevent further temperature increase.

Pictorial

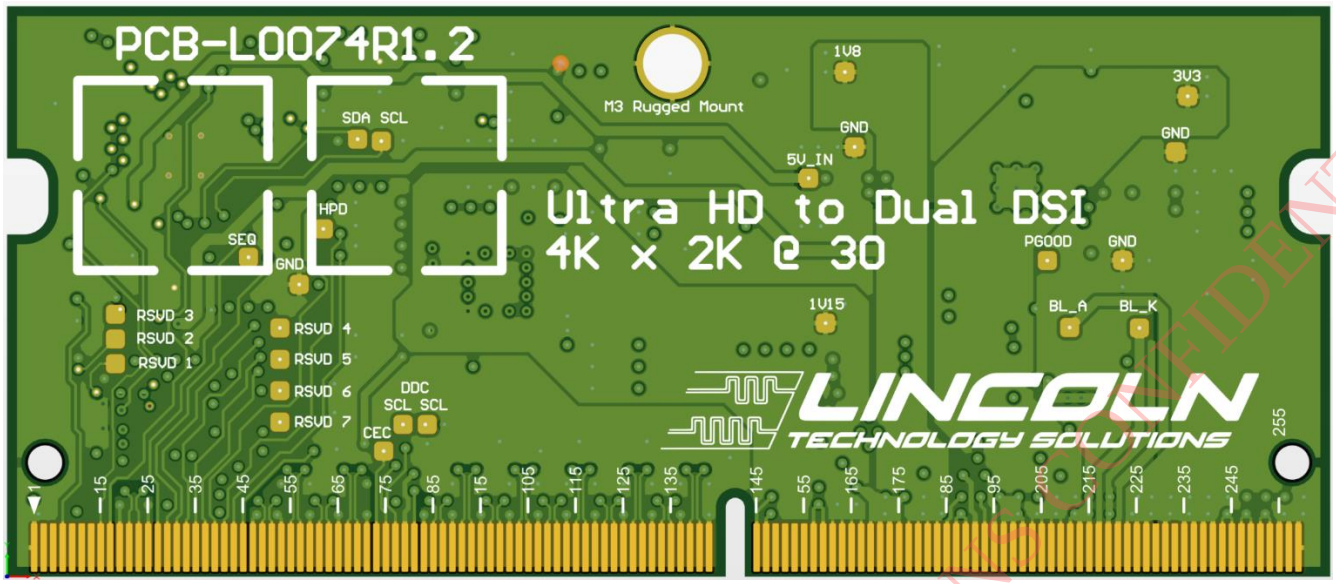
Carrier Board – 3D Rendering



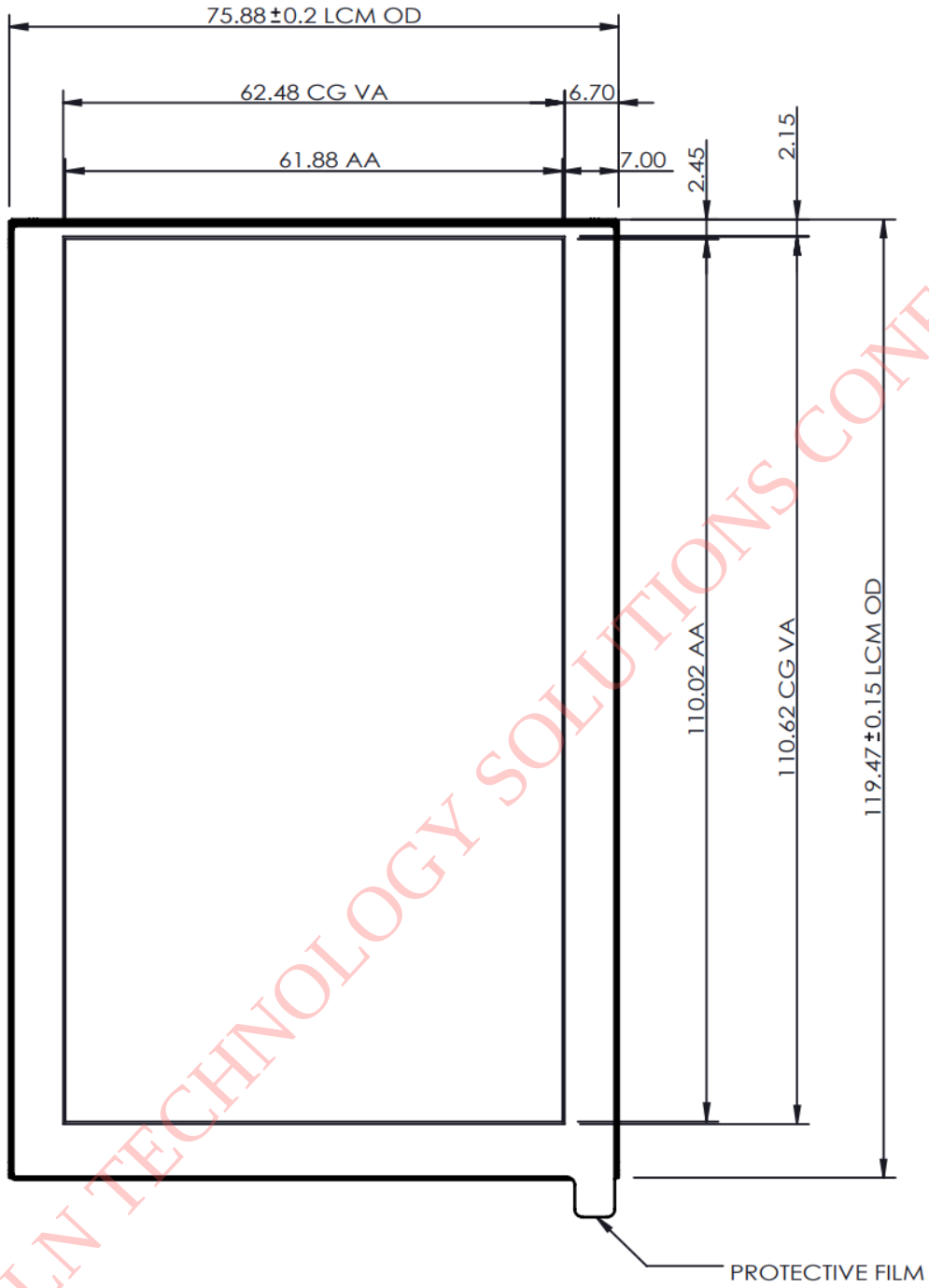
Carrier Board – Mechanical



SODIMM – 3D Rendering

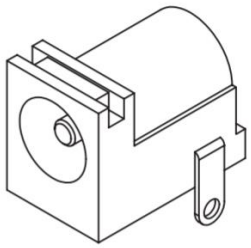
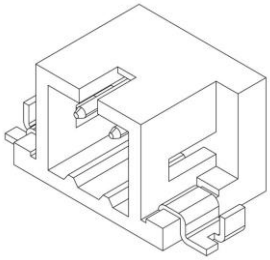
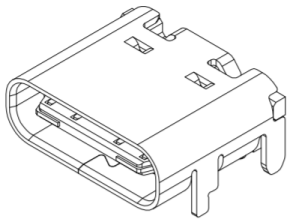
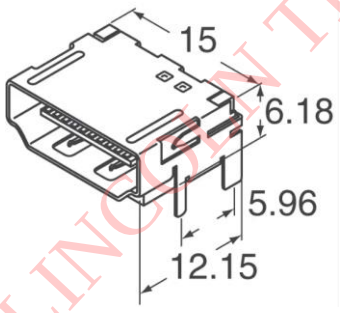


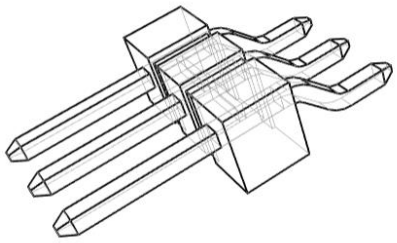
LCD mechanical



Note: Variant with cover lens is shown here.

Connectors

Connector Type	MPN	Description
Power Jack S300 	PJ-002AH	Power input (VCC) 2.10mm ID (0.083") 5.50mm OD (0.217") 5/2A input
2 POS Power Connector S301 	DF3EA-2P-2H(21)	Alternate power input connector 5V/2A input
USB Type C S200 	TYPE-C-31-M-12	Touch output USB-C 16 position
HDMI S202 	0471510001	Graphic input Standard Type A 19 position

Connector Type	MPN	Description
3 POS Header S102 	TSM-103-01-T-SH	3 position header for external PWM control

S300, Power Jack

Number	Pin Name	Description
1	VCC	5V power supply input
2	GND	Ground
3	GND	Ground

S301, 2 pin Power

Number	Pin Name	Description
1	VCC	5V power supply input
2	GND	Ground

S200, USB-C

The USB-C is a standard connector supporting USB connection between the Carrier Board and a USB Host. The SODIMM translates the in-cell touchscreen data from I2C to USB-HID at full speed data rates.

S202, HDMI

The HDMI connector is a standard type A. It is plug and play with standard equipment. The HDMI port must be capable of providing portrait display (1080 x 1920). There is an onboard EDID that communicates with user equipment specifying timing and display size.

S102, PWM

A 0.1" pitch header is provided as optional user flexibility. It is possible to provide an external PWM signal.

Number	Pin Name	Description
1	PWMO_EXT	External PWM control
2	GND	Ground
3	GND	Ground

The PWM signal is pulled high by default making the backlight fully on. There are three different ways to control PWM signal. Currently these 3 options are disabled on the carrier board.

1. PWM control by SODIMM.

2. PWM control by LCD.

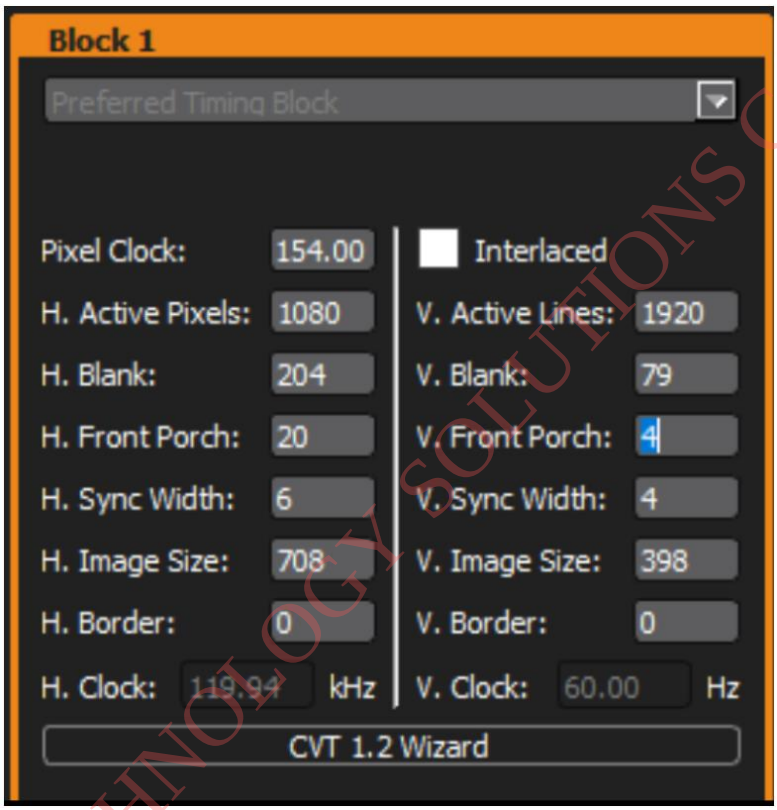
3. PWM control by external signal using the connector S102 pin 1.

Note: For more information on enabling PWM with this kit contact LTS.

HDMI

It is expected the host driving HDMI can satisfy the timing requirements as found in the EDID section below. Most Windows OS systems can output the native timing requirements and furthermore are able to rotate and flip the screen. There are dozens of Linux based platforms that are compatible as well.

EDID parameters



Use Case

1. Insert the SODIMM into the Carrier Board.

2. Connect the FFC from LCD087 to S201 and for the touch version of LCD087 connect the second FFC to S203 on the Carrier Board. The connectors on the carrier board have latches to secure the FFC cables.

3. To send video data to LCD087, connect an HDMI cable between a video source (e.g. PC) and the HDMI port at S202 on the Carrier Board.

4. To read touchscreen data, connect a USB cable between a PC and USB-C at S200 on the Carrier Board.

5. Connect power supply.

Warnings

1. Insert the SODIMM into the Carrier Board and connect LCD087 before applying power to the Carrier Board.

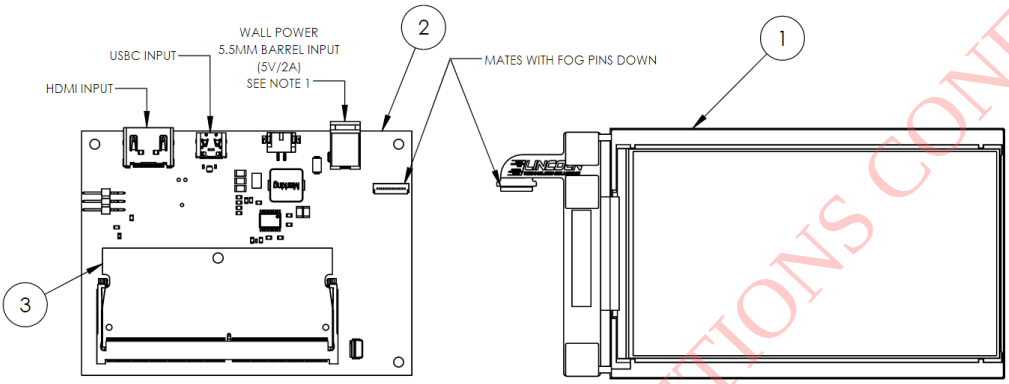
2. Removing the SODIMM with power connected may cause permanent damage to both the SODIMM and the Carrier Board.

Appendix 1: Mechanical Drawing

LCDK087NTL0NCH01 drawing

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	LCD087-050NTL0NCNTT	LCD087 WITHOUT TOUCH	1
2	PCB-L0090	DRIVER PCB	1
3	PCB-L0074	ADAPTER PCB	1
4	MFR P/N: CS-0502000	5V 2A POWER SUPPLY	1

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	INITIAL ISSUE.	10/26/2022	JH



NOTE(S):
1. 5V 2A CS-0502000 POWER SUPPLY (NOT SHOWN) IS INCLUDED IN KIT.

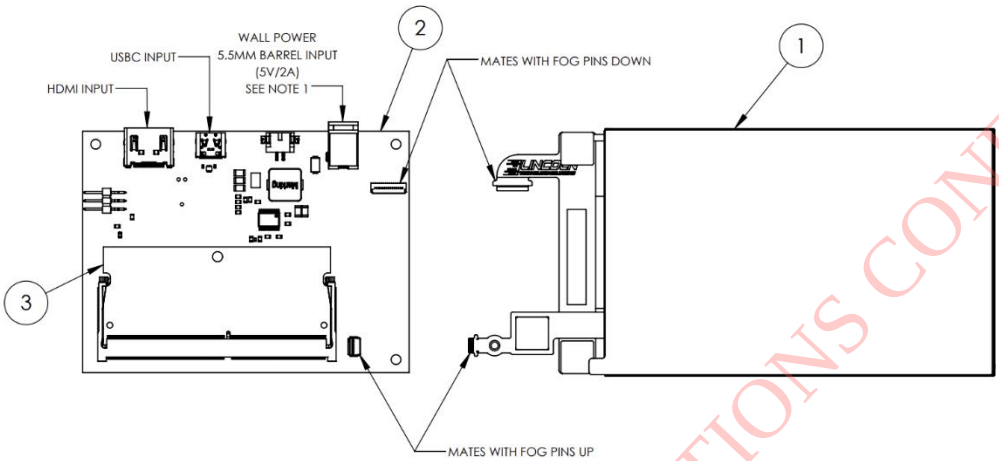
DRAWN BY: DAT	DATE: 10/26/2022
CHECKED BY: JH	DATE: 10/26/2022
MATERIAL: N/A	
FINISH: N/A	DESCRIPTION: LCD087 KIT WITHOUT TOUCH
COMMENTS: ALL DIMENSIONS ARE IN MILLIMETERS.	PART NO. LCDK087NTL0NCH01 / HW REV. 1.0 / DRW REV. A
SCALE: 1:1.5 / SHEET 1 OF 1	
DO NOT SCALE DRAWING	

LINCOLN TECHNOLOGY SOLUTIONS

LCDK087CTL1ARH01 drawing

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	LCD087-050CTL1 ARNTT	LCD087 WITH TOUCH	1
2	PCB-L0090	DRIVER PCB	1
3	PCB-L0074	ADAPTER PCB	1
4	MFR P/N: CS-0502000	5V 2A POWER SUPPLY	1

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	INITIAL ISSUE.	10/21/2022	JH



NOTE(S):
1. 5V 2A CS-0502000 POWER SUPPLY (NOT SHOWN) IS INCLUDED IN KIT.

DRAWN BY: DAT	DATE 10/21/2022
CHECKED BY: JH	DATE 10/21/2022
MATERIAL: N/A	
FINISH: N/A	DESCRIPTION: LCD087 KIT WITH TOUCH
COMMENTS: ALL DIMENSIONS ARE IN MILLIMETERS.	PART NO. LCDK087CTL1ARH01 / HW REV. 1.0 / DRW REV. A
SCALE: 1:1.5 / SHEET 1 OF 1	
DO NOT SCALE DRAWING	