LCDK121CTL1ARH01

Evaluation kit for 7″ FALD LCD121

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

111 Corning Road, Suite 116 • Cary, NC 27518

©2022 All rights reserved.

Approvals	
Model Number	LCDK121CTL1ARH01
Datasheet Revision	1.0
Drawing Revision	A

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

Table of Contents

Document Revision History 4
Ordering information 4
Product Description 5
Compatibility 5
General Specification 6
Pictorial – PCB-L0043 7
Connectors 8
Pin Out – USB-C 9
Pin Out – HDMI 9
Pin Out – Power Jack 9
Pin Out – 24VIN 10
Pin Out – 24VOUT 10
Pin Out – LCD FFC 10
Pin Out – FALD FFC 12
EDID 14
    7" WUXGA 14
Absolute Max Ratings 15
Electrical Characteristics 15
Use Case 16
Warnings 17
Appendix 1: Mechanical Drawing 18

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

Document Revision History

Date	Version #	Description	Created by	Checked by	Approved by
10/21/2022	1.0	Customer release	DA	AJ	JH

Ordering information

LTS Part #	Part Number	Description
LCDK121CTL1ARH01R2.0	PCB-L0043R2.0	HDMI to MIPI-DSI and FALD Driver (7 Inch WUXGA FALD Driver)
	LCD121-070CTL1ARNTTR2.0	LCD121 (7" 360 zone FALD WG w/ LTS FOG and in-cell touch)
	CAB2-LCD121R1.0	Power Cable (Cable Jumper 2Pos 2mm 6")
	0151660429[1]	LCD FFC (Cable FFC 40Pos 0.5mm 3")
	0151660215[1]	FALD FFC (Cable FFC 20Pos 0.5mm 12")
	JVN-24V-2A-BK[1]	Power Supply (24V 2A)

Note 1: these part numbers are subject to change and may be replaced with equivalent parts.

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

Product Description

LCDK121 is the HDMI to MIPI-DSI FALD kit supporting LCD121. LCD121 is a 7" high-brightness WUXGA display with FALD (Full Array Local Dimming) backlight offering exceptional contrast ratio. LCD121 supports multiple industry standard interfaces (MIPI, I2C, Backlight Driver, and various regulated voltages) as well as FALD data generated from the video stream. PCB-L0043 generates the FALD data used to dynamically dim the backlight by interpreting the incoming video stream from the user's system.

Compatibility

High resolution MIPI panels are most commonly native portrait orientation. The resolution supported by this LCD is WUXGA (1200x1920). The user is expected to provide standard HDMI video. It is expected the HDMI video source can satisfy the timing requirements defined in the EDID section below. Most Windows OS systems can output the native timing requirements and are also able to rotate and flip the screen. There are dozens of Linux based platforms that are compatible as well. It must be noted that if your application is only designed for landscape mode, the GUI or capable hardware block must buffer and transpose from landscape to portrait, as LCDK121 has no frame buffering capability. USB HID touch is supported with the USB-C connector on board.

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

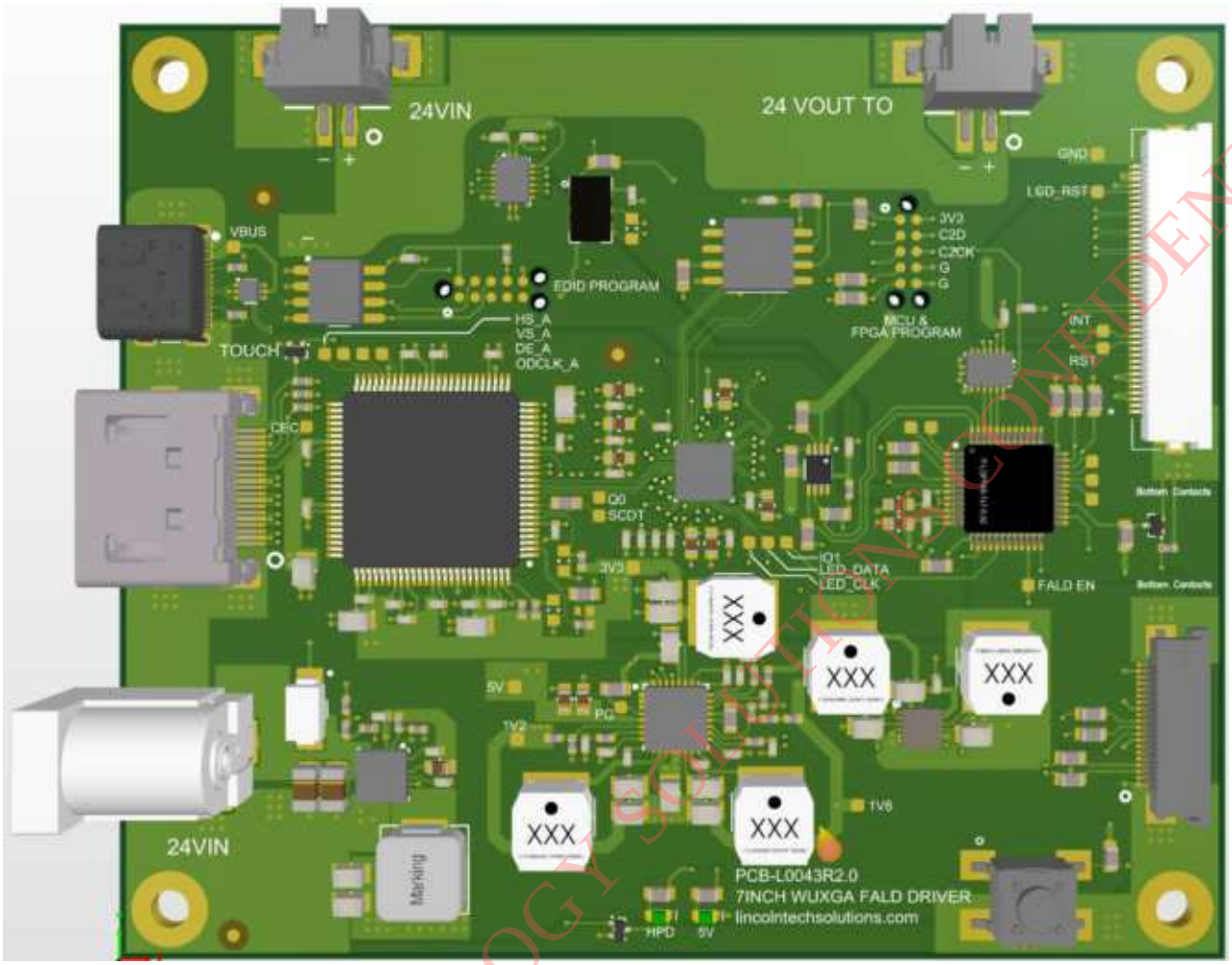
General Specification

Item	Specification	Unit
Outline Dimensions – FALD Driver	74.5(W) x 88(L) x 15(H)	mm
Outline Dimensions – LCD121	104(W) x 207(L) x 16(H)	mm
Outline Dimensions – Overall, Maximum	104(W) x 361(L) x 16(H)	mm
Adapted Display	LCD121	-
Display Size	7.02	inches
Backlight	FALD – 360 zones	-
Touchscreen	Capacitive	-

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

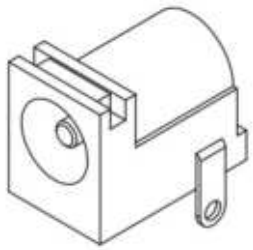
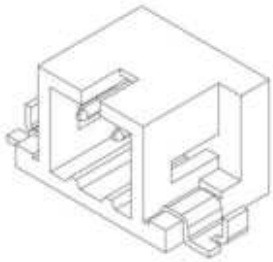
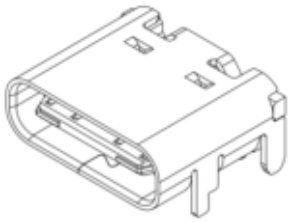
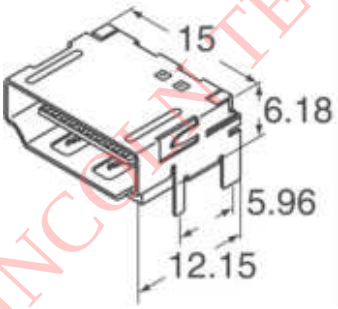
Pictorial – PCB-L0043



LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

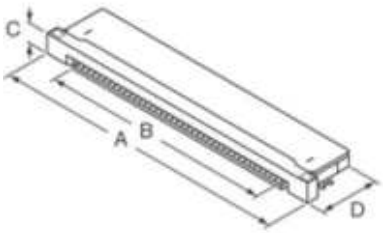
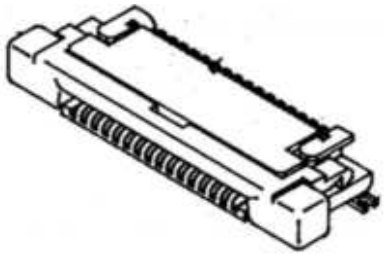
©2022 All rights reserved.

Connectors

Connector Type	MPN	Description
Power Jack 	54-00166	Power input (VCC) 2.10mm ID (0.083") 5.50mm OD (0.217") 24V/2A input
2 POS Connectors 	DF3EA-2P-2H(21)	24VIN: Alternate power input connector 24VOUT: Output power connector to LCD121
USB Type C 	TYPE-C-31-M-12	Touchscreen output USB-C 16 position
HDMI 	0471510001	Video input Standard Type A 19 position

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

LCD FFC 	62684-401100ALF	40 position Bottom Contacts 0.50mm Pitch 0.30mm FFC Thickness
FALD FFC 	SFV20R-1STE1HLF	20 position Bottom Contacts 0.50mm Pitch 0.30mm FFC Thickness

Pin Out – USB-C

The USB-C is a standard USB connector supporting a connection between the FALD Driver and a USB Host (i.e. PC). The onboard MCU translates the in-cell touchscreen data from I2C to USB-HID at full speed data rates.

Pin Out – HDMI

The HDMI connector is a standard type A. It is plug and play with most systems including Windows. The user's system must be capable of providing a WUGXA portrait image (1200x1920). There is onboard I2C flash memory containing the EDID table that communicates with user equipment via HDMI specifying timing and display size.

Pin Out – Power Jack

Number	Pin Name	Description
1	VCC	24V power supply input
2	GND	Ground
3	GND	Ground

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

Pin Out – 24VIN

Number	Pin Name	Description
1	VCC	24V power supply input
2	GND	Ground

Pin Out – 24VOUT

Number	Pin Name	Description
1	VCC	24V power supply output for 7'' FALD backlight
2	GND	Ground

Pin Out – LCD FFC

Number	Pin Name	Description
1	NC	Leave unconnected
2	NC	Leave unconnected
3	VSP	Analog supply positive voltage +5.5V
4	VSP	Analog supply positive voltage +5.5V
5	NC	Leave unconnected
6	VSN	Analog supply negative voltage -5.5V
7	VSN	Analog supply negative voltage -5.5V
8	NC	Leave unconnected
9	NC	Leave unconnected
10	NC	Leave unconnected

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

11	GND	Ground
12	TP_RST	Touch panel reset 1.8V
13	TP_INT	Touch panel interrupt 1.8V
14	NC	Leave unconnected
15	NC	Leave unconnected
16	GND	Ground
17	TP_SDA	TP I2C data signal 1.8V
18	TP_SCL	TP I2C clock signal 1.8V
19	GND	Ground
20	MIPI_3P	MIPI Positive data inputs
21	MIPI_3N	MIPI Negative data inputs
22	GND	Ground
23	MIPI_2P	MIPI Positive data inputs
24	MIPI_2N	MIPI Negative data inputs
25	GND	Ground
26	MIPI_CKP	MIPI Positive clock inputs
27	MIPI_CKN	MIPI Negative clock inputs
28	GND	Ground
29	MIPI_1P	MIPI Positive data inputs
30	MIPI_1N	MIPI Negative data inputs
31	GND	Ground
32	MIPI_0P	MIPI Positive data inputs
33	MIPI_0N	MIPI Negative data inputs

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

34	GND	Ground
35	NC	Leave unconnected
36	LCD_RST	LCD reset 1.8V
37	GND	Ground
38	VDDI	Digital supply voltage, VDDI 1.8V
39	VDDI	Digital supply voltage, VDDI 1.8V
40	NC	Leave unconnected

Pin Out – FALD FFC

Number	Pin Name	Description
1	GND	Ground
2	NC	Leave unconnected
3	TEMP_DATA	Temperature data 1.8V
4	TEMP_CLK	Temperature clock 1.8V
5	NC	Leave unconnected
6	NC	Leave unconnected
7	NC	Leave unconnected
8	GND	Ground
9	FALD_EN	FALD enable
10	LED_CLK	LED clock 1.8V
11	LED_DATA	LED data 1.8V
12	NC	Leave unconnected
13	GND	Ground

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

14	NC	Leave unconnected
15	NC	Leave unconnected
16	NC	Leave unconnected
17	NC	Leave unconnected
18	NC	Leave unconnected
19	GND	Ground
20	NC	Leave unconnected

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

EDID

Below is the EDID stored on the SODIMM. This is communicated over the HDMI DDC bus to the host. The host must be capable of generating timing based on these parameters. In the absence of EDID communication, it is expected the host is capable of video output using these timing specifications.

7" WUXGA

Native Portrait 1200x1920

EDID BYTES:

0x 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

---

00 | 00 FF FF FF FF FF FF 00 32 8D 00 00 00 00 00 00

01 | 2D 1B 01 04 80 58 32 78 22 EE 91 A3 54 4C 99 26

02 | 0F 50 54 00 00 00 01 01 01 01 01 01 01 01 01 01

03 | 01 01 01 01 01 01 98 3A B0 B4 40 80 50 70 5A 08

04 | 44 00 C4 8E 21 00 00 1E 00 00 00 10 00 00 00 00

05 | 00 00 00 00 00 00 00 00 00 00 00 00 00 FD 00 3C

06 | 3C 3C 50 08 00 00 00 00 00 00 00 00 00 00 00 FC

07 | 00 31 32 30 30 06 35 08 32 30 0A 20 20 20 00 3E

08 | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

09 | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

0A | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

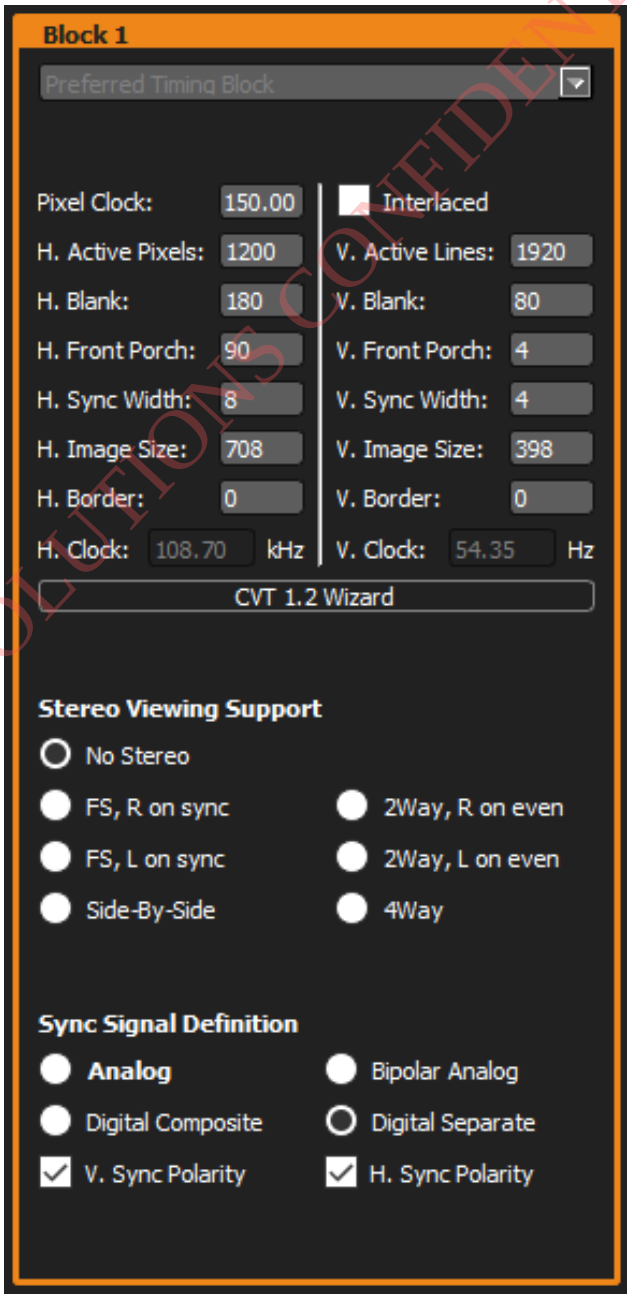
0B | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

0C | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

0D | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

0E | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

0F | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00



LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

Absolute Max Ratings

Item	Symbol	Value		Unit
		Min.	Max.	
Power Supply Voltage	VCC	-0.3	28	V
Operating Temperature	T_{OPR}	-10	50	°C
Storage Temperature	T_{STG}	-20	70	°C

Electrical Characteristics

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Supply Voltage	VCC	22	24	26	V	
Total Power	P_{TOT}		23		W	Room Temperature, White Image
Backlight Power	P_{BL}		20		W	Room Temperature, White Image

NOTE: LCDK121 backlight power varies based on the video content. Operating LCDK121 with video content that generates high backlight power 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 (active or passive) to prevent further temperature increase.

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

Use Case

1. Use the LCD FFC to connect PCB-L0043 to LCD121. Note that the flex cable should be oriented so that the flex contacts are facing "down" (toward the surface to which the connector is mounted).
2. Use the FALD FFC to connect PCB-L0043to LCD121. Note that the flex cable should be oriented so that the flex contacts are facing "down" (toward the surface to which the connector is mounted).
3. Use 2-pin power cable (CAB2-LCD121R1.0) connect PCB-L0043 to LCD121.
4. Use an HDMI cable to connect PCB-L0043 to a video source.
5. Use a USB cable to connect PCB-L0043 to a USB host to receive touchscreen data.
6. Use the Power Supply to apply power to PCB-L0043.

NOTE: Once power is applied, maintain the positions of PCB-L0043 and LCD121 to avoid any possible shorting between the two.

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.

Warnings

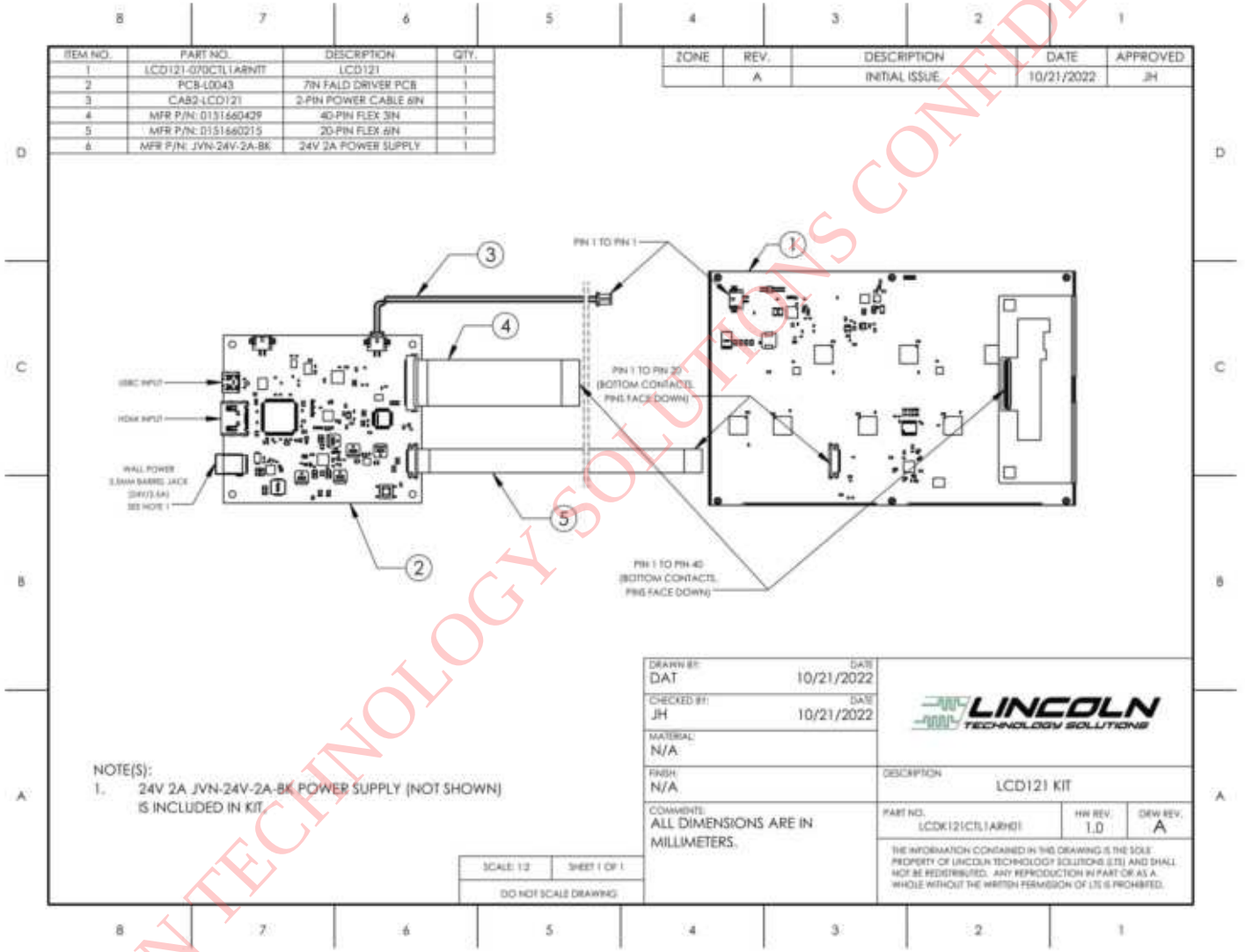
1. Connect LCD121 and the FALD Driver before applying power.

2. Removing LCD121 with power applied to the FALD Driver may cause permanent damage to LCD121.

3. LTS does not guarantee other timing parameters will function with the display. Do not overwrite the onboard flash memory or specify timing parameters as listed in this document.

LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

Appendix 1: Mechanical Drawing



LINCOLN TECHNOLOGY SOLUTIONS CONFIDENTIAL

©2022 All rights reserved.