Hardware Documentation

LCD.10.LVDS.1

10” LVDS Display (1024 x 600 px)
with capacitive touch sensor

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About This Document

This document describes how to use the LCD.10.LVDS.1 (further named as display) with mechanical and electrical information. The latest version of this document can be found at: www.fs-net.de.

ESD Requirements

All F&S hardware products are electrostatic discharge (ESD) sensitive. All products are handled and packaged according to ESD guidelines. Please do not handle or store ESD sensitive material in ESD unsafe environments. Negligent handling will harm the product and warranty claims become void.

Review Service

F&S provide a schematic review service for your baseboard implementation. Please send your schematic as searchable PDF to support@fs-net.de.

History

Version/Date	Platform	Added (A) Removed (R) Modified (M)	Chapter	Description	Author
001/05.2024	-	-	All	Initial Version	SM
002/02.2025	-	-	1.2, 3.4, 7	New Template, modify list, change picture, add link	SM

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1 Overview

The LCD.10.LVDS.1 is a LCD display with capacitive touch including an adapter for the display and backlight voltages and an I2C IO expander for control signals.

1.1 General Parameter

Parameter	Description
Display Thickness	5.2 mm (10.8 mm with Adapter)
Weight	465g ±10g
Tolerance	±0.2 mm
Operating Temperature	-20 … +70°C
Resolution	1024 x 600 Pixel (RGB)
Active Area	222.8 x 125.4 mm
Surface Luminance	Typ. 425 cd/m²
Cover Material	Glass

Table 1: General parameter

1.2 Dimensions and Connectors

1.2.1 Technical Drawing

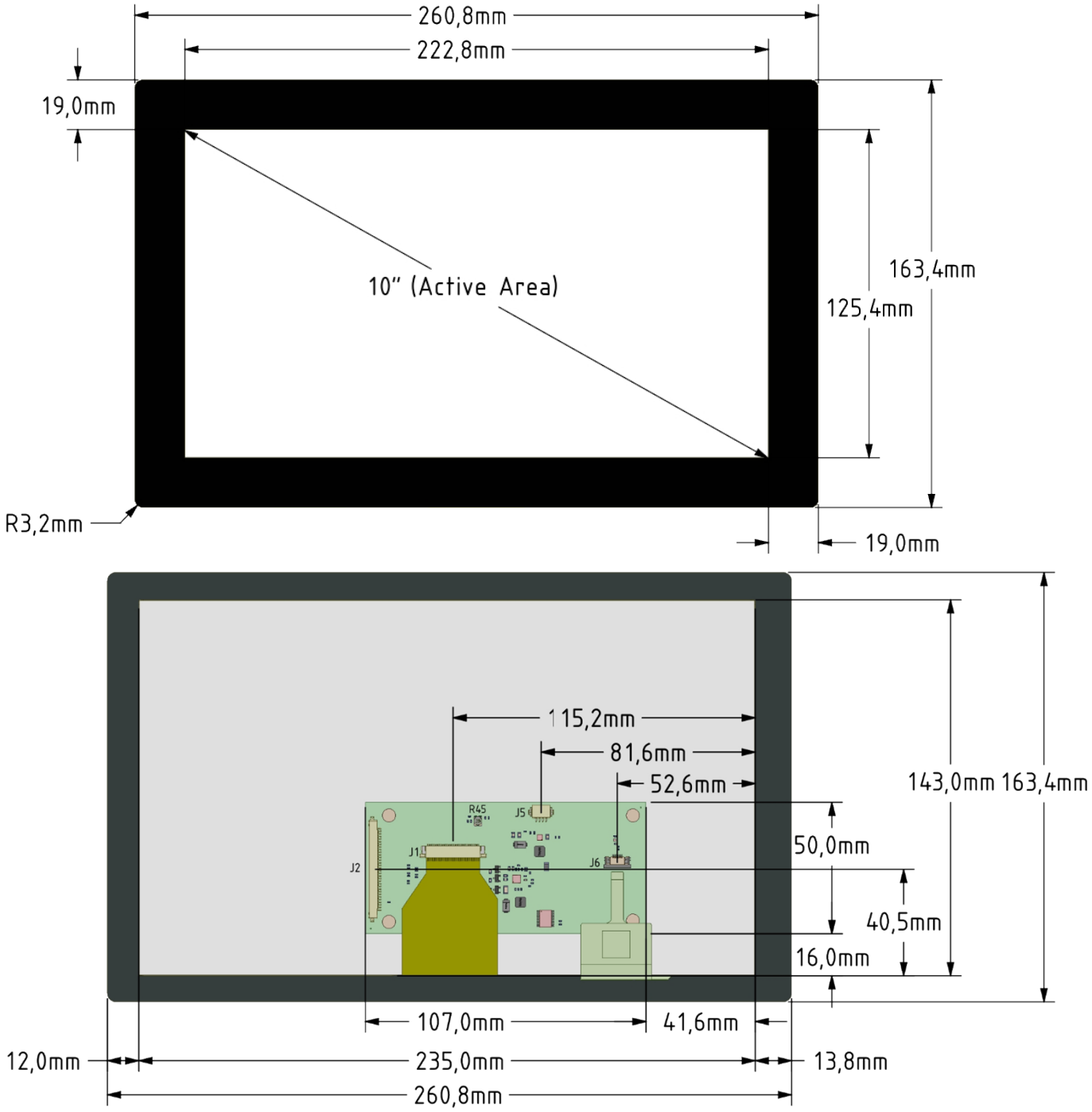

Figure 1: Technical drawing

1.2.2 Connectors

Ref.	Description	Connector Type	Counter Part
J2	LVDS & I²C In	Hirose, MDF76GW-30S-1H(55)	JAE, FI-X30H[1]
J5	Backlight Supply 5V	Hirose, DF13-4P-1.25H(20)	Hirose, DF13-4S-1.25C[1]

[1]Connectors and preassembled cables are available for purchase at www.fs-net.de.

Table 2: Connector description

2 Detailed Description

2.1 LVDS & I²C In Connector

The display uses the common F&S connector for LVDS signals. It is suitable to the LVDS/MIPI Adapter Cable (Part No. B.MKAB.44).

Pin	Signal Name	Description
1	DATA0 -	LVDS Data 0
2	DATA0 +	
3	DATA1 -	LVDS Data 1
4	DATA1 +	
5	DATA2 -	LVDS Data 2
6	DATA2 +	
7	GND	Ground
8	CLK -	LVDS Clock
9	CLK +	
10	DATA3 -	LVDS Data 3
11	DATA3 +	
12	n.c.	
13	n.c.	
14	GND	Ground
15	n.c.	
16	n.c.	
17	GND	Ground
18	n.c.	
19	n.c.	
20	n.c.	
21	n.c.	
22	n.c.	
23	n.c.	
24	GND	Ground
25	I²C SDA	I²C for touch and control signals
26	Touch IRQ	Interrupt output for touch events
27	I²C SCL	I²C for touch and control signals
28	DISPLAY RESET	Optional external input for display reset
29	V_{IN}	Power Supply
30	VIN	

Table 3: Connector description J2

2.2 Backlight Supply

The display uses a LED Backlight with the following electrical characteristics.

Parameter	Description	Min.	Typ.	Max.	Unit
I_F	Forward current backlight LED		0.26		A
V_F	Forward voltage backlight LED	8.10		9.90	V
t_{DUR}	Durability until 50% of initial brightness	30000.00[1]			h

[1] If the backlight is driven under high current, high ambient temperature and humidity conditions, the lifetime will be reduced.

Table 4: Electrical characteristics of the backlight

Pin	Signal Name	Description
1	$V_{BL\ IN}$	Supply input for backlight
2		
3	GND	Ground
4		

Table 5: Connector Pinout J5

A suitable cable can be purchased by F&S under the Part No.: B.MKAB.35

Note: Optional the backlight can be supplied by the LVDS & I²C In connector with a voltage of 3,3V and a max current of 100mA. For this option hardware modifications are needed.

2.3 Control Signals

An I²C IO expander is used to generate control signals for display, touch sensor and backlight. The used expander is a NXP PCA9634PW. The I²C Adress of the expander is 0x61. All pins must be configured as open drain. The PWM signal for the backlight brightness uses the group duty cycle register 0x0A of the chip, because of the lower frequency. Please see the datasheet of the chip for further information.

Pin	Signal Name	Description
6	BL ON	Turns the backlight on and off.
7	BL PWM	Control signal for brightness.
9	DISPLAY RESET	Reset signal for the display.
12	TOUCH RESET	Reset signal for the touch sensor.

Table 6: Pin and signal list IO expander

2.4 Display Configurations

The display can be configured with pull up and down resistors. The resistors are placed below the display FPC connector.

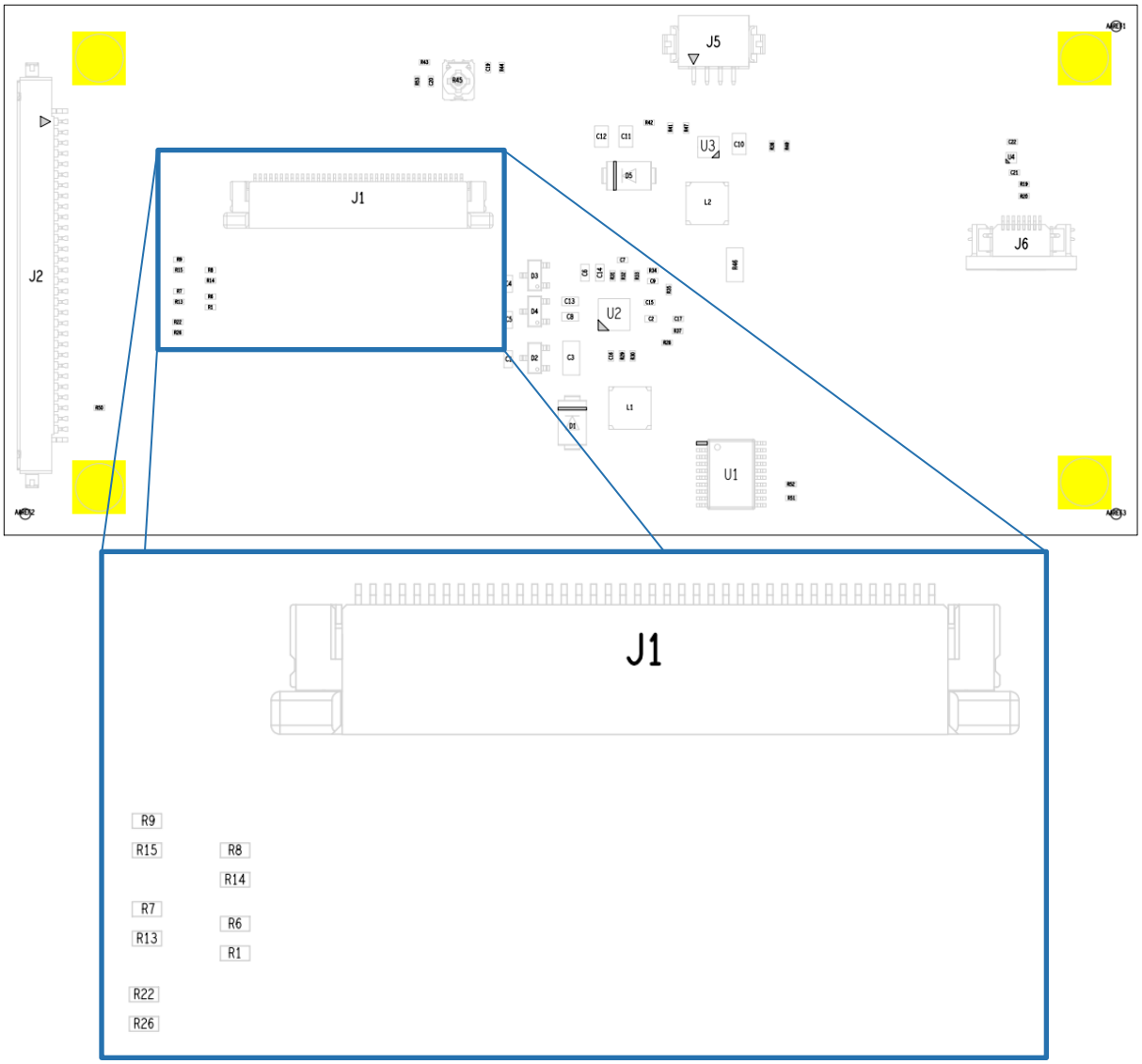

Figure 2: Config resistors position

Ref	Signal Name	Level	Description
R1	Standby Mode	HIGH	Normal operation
R6		LOW	Timing controller source driver will turn off, all outputs are HIGH-Z
R7	SELB	HIGH	6bit Mode
R13		LOW	8bit Mode
R8	Left/Right	HIGH	Left to right scan direction
R14		LOW	Right to left scan direction
R9	Up/Down	HIGH	Bottom to top scan direction
R15		LOW	Top to Bottom scan direction

Table 7: Display configurations

2.5 VCOM

R45 is used to set the VCOM voltage (Pixel reference voltage). It can be adjusted from 3.6V to 4.2V.

2.6 Software

Drivers for the F&S boards with an LVDS Interface are provided

3 Characteristics

3.1 Absolute Maximum Ratings

Description	Min	Max	Unit
Power Input			
Input voltage for the Display at J2	1.80	3.47	V
Input voltage for the Backlight at J5	0.00	10.20	V

Table 8: Absolute maximum ratings

3.2 Recommended Operating Conditions

Parameter	Description	Condition	Min	Typ	Max	Unit
General						
V_{IN}	Input voltage for the display at J2	3.00		3.30	V	V
P_{IN}	Power consumption Display, Touch & I²C IO Expander at 3,3V		0.65		W	V
$V_{BL\ IN}$	Input voltage for the Backlight at J5	3.30[1]	5.0	10.20	V	V
$P_{BL\ IN}$	Power consumption Backlight at 5V and PWM frequency at:	20% 50% 100%		0.60 1.30 2.50		W
$V_{I2C\ LOW}$	I²C SDA/SCL LOW-level input voltage	-0.30		$+0.25V_{IN}$	V	V
$V_{I2C\ HIGH}$	I²C SDA/SCL HIGH-level input voltage	$0.75V_{IN}$		$V_{IN}+0.30$	V	V
Storage						
T_{STORE}	Storage time	room temperature, no humidity control		6	months	
		t_{amb} = 25°C ± 5°C humidity max. 60%		12[2]	months	

[1] For full brightness a minimum of 5V is needed.

[2] For longer storage time, vacuum dry packs are recommended.

Table 9: Recommended operating conditions

4 Packaging & Labels

4.1 ESD

All F&S electrostatic discharge sensitive (ESDS) products are marked and will be shipped in ESD protective packaging.

4.2 Serial Number

All shipped F&S products are labeled with a matrix code sticker that includes the serial number. For product information visit www.fs-net.de/en/support/serial-number-info-and-rma/.

5 Appendix

5.1 Second source rules

The qualifications of products from a second source are done autonomously by F&S. This is necessary to guarantee delivery times and product life. A setup of release samples with released second sources is not possible. F&S does not use broker components without the consent of the customer.

5.2 RoHS and REACH statement

Please see the following webpage: https://www.fs-net.de/en/support/certifications/

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