Hardware Documentation

LCD.7.LVDS.1

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

for HW Revision 1.20

Version 005/02.2025

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About This Document

This document describes how to use the LCD.7-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
001/02.2024	All			Initial Version	SM
002/02.2024	All	M, A	1	Change title. Added resolution, active area, luminance and cover material	SM
003/04.2024	All	A, M	Title, 1	New title, add information	SM
004/02.2025	All	A, M	All	New template, changes for new revision	SM
005/02.2025	All	M	4.1	Change link	SM

Table of Content

Tables

Figures

1 Overview

The LCD.7.LVDS.1 is a LCD display with capacitive touch sensor including an adapter for the display and backlight voltages and an I2C IO expander for control signals.
The latest versions of the documents can be found on www.fs-net.de.

1.1 General Parameter

Parameter	Description
Dimension	165.0 mm x 100.0 mm x 7.5 mm (13.1 mm with Electronik)
Weight	≈ 215 g
Operating Temperature	-25.0 °C … +70.0 °C
Resolution	1024 x 600 Pixel (RGB)
Active Area	154.2 x 85.9 mm
Surface Luminance	450 – 500 cd/m²
Cover Materiel	Glass
Touch points	5

Table 1: General parameter

1.2 Dimensions and Connectors

1.2.1 Technical Drawing

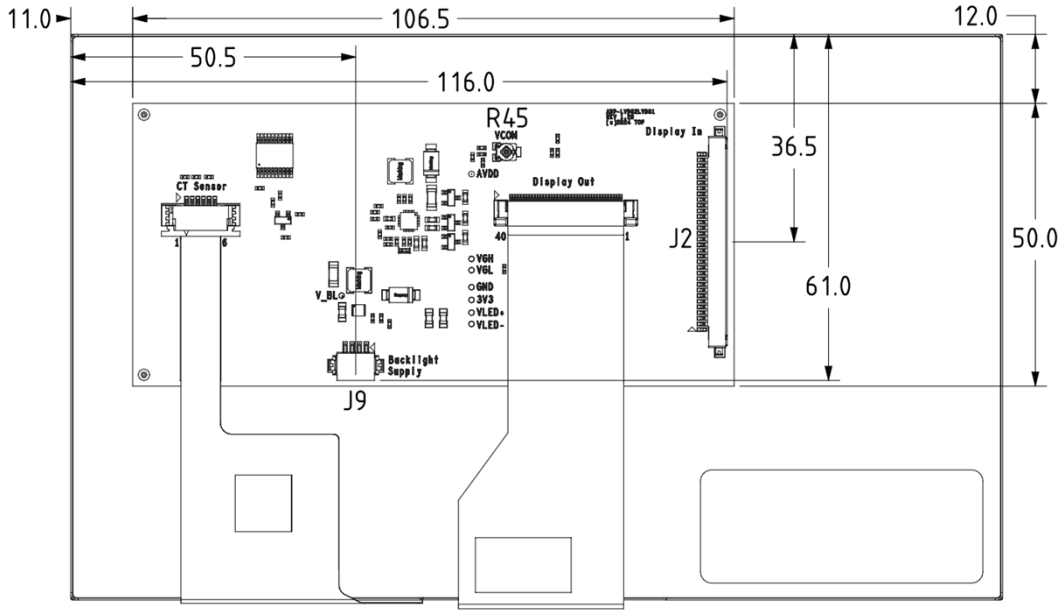

Figure 1: Back view, all dimensions in mm

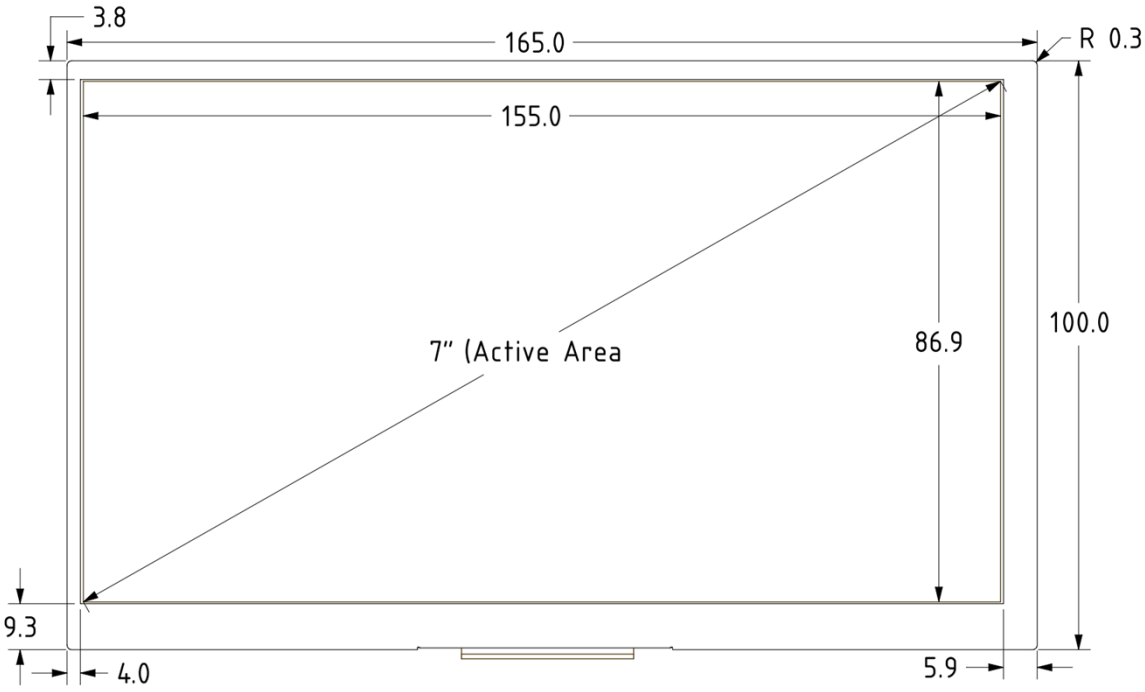

Figure 2: Top view, all dimensions in mm

1.2.2 Connectors

Ref.	Description	Connector Type	Counter Part
J2	LVDS & I2C In	Hirose, MDF76GW-30S-1H	JAE, FI-X30H[1]
J9	Backlight Connector	Hirose, DF13-04	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 J2

Pin	Signal Name	Voltage	Description
1	DATA0 -		LVDS Data 0
2	DATA0 +		
3	DATA1 -		LVDS Data 1
4	DATA1 +		
5	DATA2 -		LVDS Data 2
6	DATA2 +		
7	GND		
8	CLK		LVDS Clock
9	CLK		
10	DATA3 -		LVDS Data 3
11	DATA3 +		
12	n.c.		
13	n.c.		
14	GND		
15	n.c.		
16	n.c.		
17	GND		
18	n.c.		
19	n.c.		
20	n.c.		
21	n.c.		
22	n.c.		
23	n.c.		
24	GND		
25	I²C SDA	3.3 V	I²C for touch and control signals
26	Touch IRQ	3.3 V	Interrupt output for touch events, active low
27	I²C SCL	3.3 V	I²C for touch and control signals
28	DISPLAY RESET	3.3 V	Optional external input for display reset
29	V_{IN}	3.3 V	Power supply
30			

Table 3: J2 pin description

2.2 Backlight Supply Connector J5

Pin	Signal Name	Voltage	Description
1	V_{BL}	5.0 V	Backlight supply input
2			
3	GND		
4			

Table 4: J5 pin description

2.3 Touch Controller

The display uses an Ilitek ILI2130 touch controller. The controller is reachable over the I²C interface at J2. The I²C address is 0x41.

2.4 Control Signals

An I²C I/O 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	Controls backlight brightness
9	DISPLAY RESET	Default reset signal for the display
12	TOUCH RESET	Reset signal for the touch sensor
14	Reserved	Do not use

Table 5: Pin description I²C I/O expander

2.5 Display Configurations

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

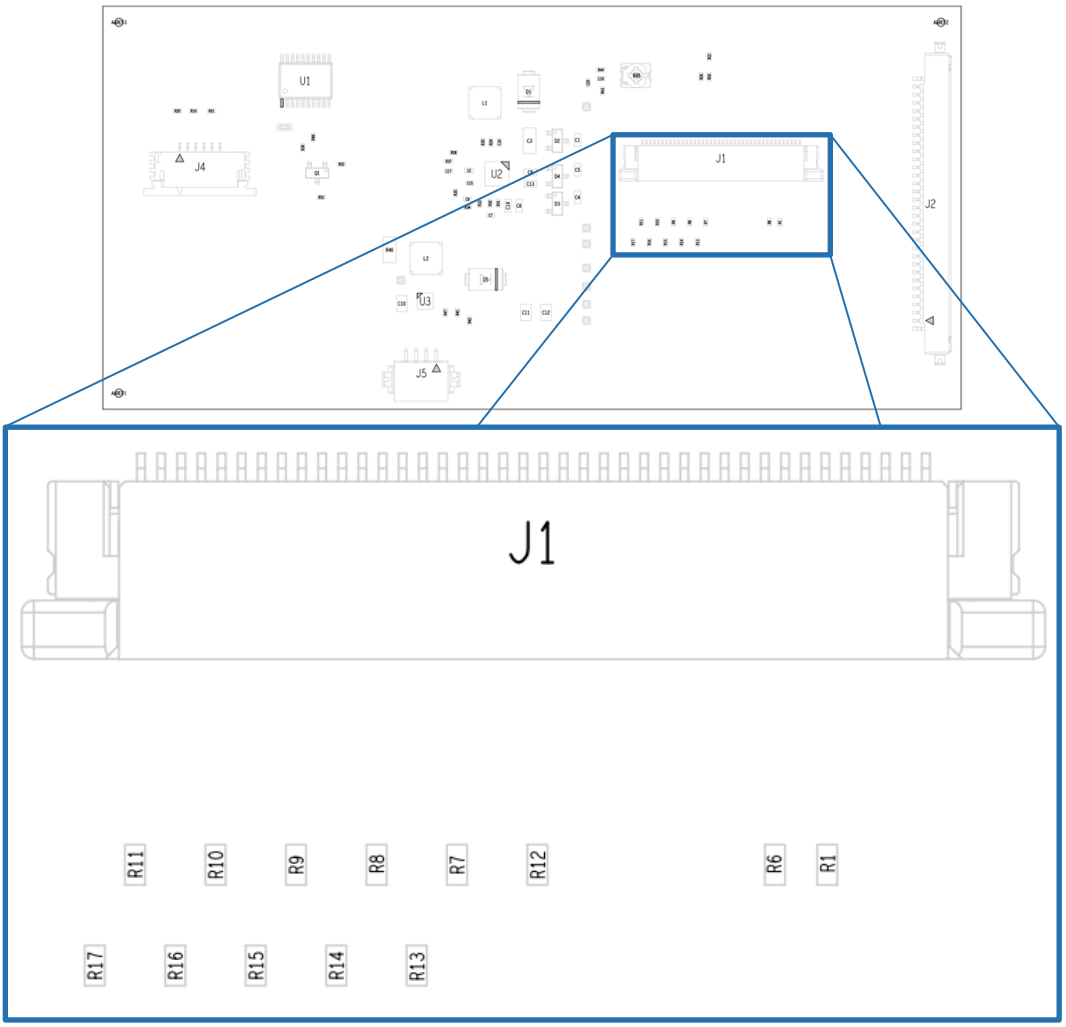

Figure 3: Config resistors positions

Pin	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
R10	CABC_EN[1]	HIGH	CABC_EN = 00, CABC off (default) CABC_EN = 01, user interface image CABC_EN = 10, still picture CABC_EN = 11, moving image
R16		LOW	
R11	CABC_EN[0]	HIGH	
R17		LOW	

Table 6: J2 pin description

2.6 VCOM

R45 is used to set the VCOM voltage (Pixel reference voltage). It can be adjusted from 2,8V to 3,5V.

2.7 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			
Supply voltage display input	-0.30	5.00	V
Supply voltage backlight	0.00	10.20	V

Table 7: Absolute maximum ratings

3.2 Recommended Operating Conditions

Parameter	Description	Condition	Min	Typ	Max	Unit
Display						
V_{IN}	Input voltage for the display at J2		3.00	3.30	3.60	V
P_{IN}	Power consumption Display, Touch & I²C IO Expander at 3,3V			0.65		W
Backlight						
V_{BL-IN}	Input voltage for the Backlight at J5		3.30[1]	5.0[1]	10.20	V
P_{BL-IN}	Power consumption Backlight at 5V and PWM frequency at:	20% 50% 100%		0.35 0.90 1.80		W
I_F	Forward current backlight LED			0.2		A
V_F	Forward voltage backlight LED		8.1		10.2	V
t_{DUR}	Durability until 50% of initial brightness			50000.0[2]		h
I²C						
$V_{I2C\ LOW}$	I²C SDA/SCL LOW-level input voltage		-0.50		$+0.30V_{IN}$	V
$V_{I2C\ HIGH}$	I²C SDA/SCL HIGH-level input voltage		$0.70V_{IN}$	3.30	5.50	V
Storage						
T_{STORE}	Storage time	room temperature, no humidity control		6		months
		t_{amb} = 25°C ± 5°C humidity max. 60%		12[3]		months

[1] 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] If the backlight is driven under high current, high ambient temperature and humidity conditions, the lifetime will be reduced.
[3] For longer storage time, vacuum dry packs are recommended

Table 8: 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/

5.3 Important Notice

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