

DISPLAY MODULE LCM2_ET057-TA-GLS-2

1. Features

- Landscape QVGA display
- LED backlight (temperature controlled LED current limit to increase lifetime)
- Resistive touch glass
- 16 bit Renesas H8S μ C with internal flash memory
- LCD controller (256 palette colors out of 262144)
- 256kByte S-RAM
- 2MByte additional flash memory (e.g. for pictures and fonts)
- Connector for an optical/mechanical encoder with trigger switch and 3,3V supply
- Connector for a keymatrix
- Piezo loudspeaker
- Temperatur sensor
- Single supply voltage 5V
- UART interface for communication 3.3V level (5V tolerant), autobauding
- Over 300 commands to design graphical user interface for various applications

2. Description

The display module allows to easily furnish existing devices or those being developed with an ergonomical graphical user interface. The display of this module is selected especially with respect to price sensitive applications. The module can be controlled by any hardware using a serial interface, even small 8-bit microcontrollers. Directly programming of the module is not required.

The LCM2 modules consist of two major blocks. These are the display, chosen for the application and the printed circuit board (PCB) for the controlling electronic circuit. The PCB is directly mounted on the back of the display, resulting in a very compact module.

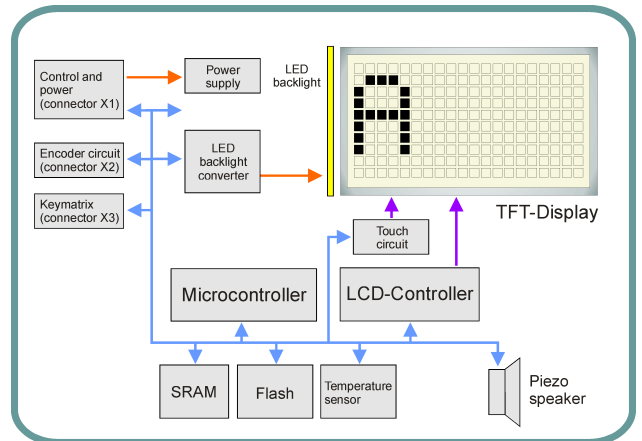


Figure 1: Block diagram

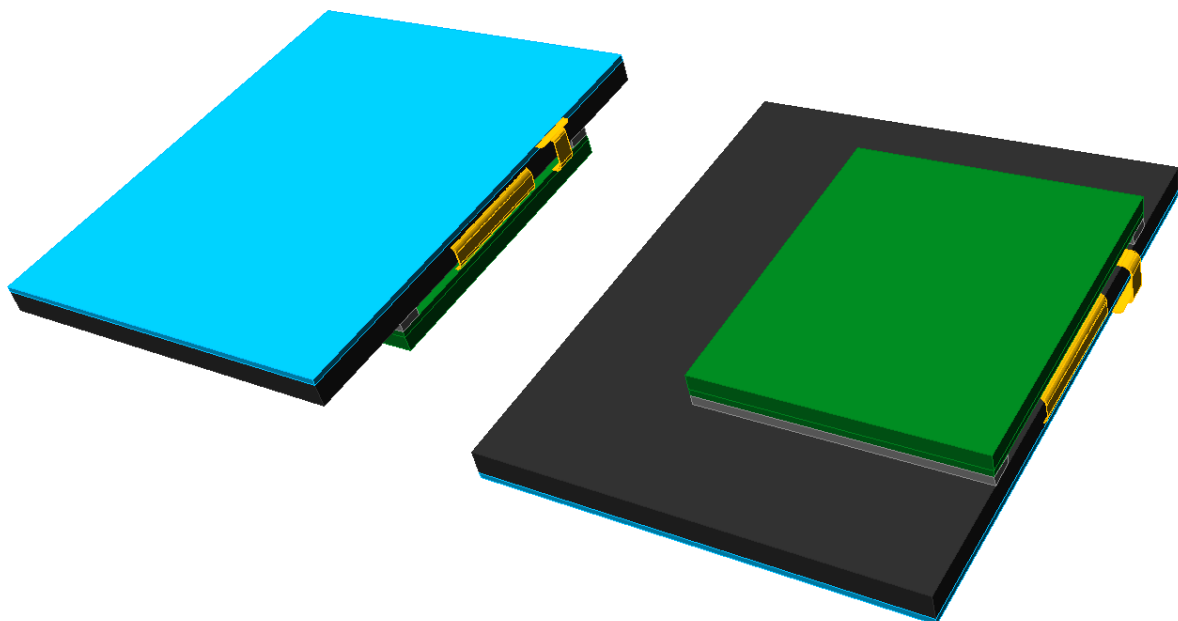


Figure 2: 3D view

3. Specification

Item	Specification	Unit	Comment
Display diagonal	144 (5,7)	mm (Inch)	
Display resolution	320 x 240	Pixel	
Outline dimensions: - Width - Height - Depth	124,7 100 11,4	mm mm mm	Display including PCB
Weight	187	g	Display including PCB
Number of colors	256 out of 262144	-	
Brightness	450	cd/m ²	
Operating temperature	-10 to +60	°C	
Software	Simplify Technologies GUI-Interpreter	-	
Startup time	500	ms	(from "power on"/"reset high" to "ready to operate")

4. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Comment
Supply voltage	V _{cc}	-	6	V	
Operating temperature	T _{op}	-10	60	°C	
Storage temperature	T _{store}	-20	70	°C	
Humidity	H	20	90	%RH	No condensation
Reset input	V _{res}	-0,3	3,5	V	See application details (section 9)
UART input	V _{rx}	-0,3	6	V	
Encoder inputs - if V _{cc} is not applied - if V _{cc} is applied	V _{enc}	-0,3 -0,3	0,3 3,5	V	
Keypad inputs - if V _{cc} is not applied - if V _{cc} is applied	V _{key}	-0,3 -0,3	0,3 3,5	V	

5. Operation Conditions

Item	Symbol	Min.	Typical	Max.	Unit	Comment
Operating temperature	T _{op}	-10	25	60	°C	
Supply voltage	V _{cc}	4,6	5	5,4	V	
Power consumption	P	0,38 ¹	1,75 ²	2	W	¹ : backlight switched off ² : backlight 100%
Current consumption at 5V supply voltage	I _{cc}	75 ¹	350 ²	400	mA	¹ : backlight switched off ² : backlight 100%
Humidity	H	20	-	90	%RH	No condensation
Transmission speed	S	9,6	-	115,2	kBits/s	Supported baud rates:

Item	Symbol	Min.	Typical	Max.	Unit	Comment
						9600, 19200, 38400, 57600, 115200

6. Electrical Characteristics

Item	Symbol	Min.	Typical	Max.	Unit	Comment
UART output (high level)	$V_{tx,high}$	2,1	3,3	3,5	V	Output current 1mA
UART output (low level)	$V_{tx,low}$	-	-	0,4	V	Output current 1mA
UART input (high level)	$V_{rx,high}$	2,1	-	5,5	V	
UART input (low level)	$V_{rx,low}$	-	0	0,6	V	
Reset input (low level)	$V_{res,low}$	-	0	0,4	V	See application details (section 9)
Reset pullup resistor	R_{res}	-	3,4	-	k Ω	
Encoder supply voltage	V_{enc}	3,14	3,3	3,47	V	
Encoder supply current	I_{enc}	-	-	50	mA	
Encoder inputs (high levels)	$V_{IOE,high}$	2,2	-	-	V	
Encoder inputs (low levels)	$V_{IOE,low}$	-	-	0,3	V	
Encoder pullup resistor	R_{enc}	-	10	-	k Ω	At encoder pins 1, 2, 3
Keypad inputs (high levels)	$V_{IK,high}$	2	-	-	V	
Keypad inputs (low levels)	$V_{IK,low}$	-	-	0,4	V	
Keypad outputs (high levels)	$V_{OK,high}$	2,6	-	-		Output current 1mA
Keypad outputs (low levels)	$V_{OK,low}$	-	-	0,5		Output current 1mA
Keypad pullup resistor	R_{key}	-	10	-	k Ω	At keypad input pins 1, 2, 3, 4

7. Connectors

"Power+Control" connector:

Pin	Signal	Description
1	Reserved	Do not connect
2	TX	UART output
3	GND	Ground
4	RX	UART input
5	Reserved	Do not connect
6	Reset	Input active low (open collector required, see application details in section 9)
7	Reserved	Do not connect
8	V _{CC}	Supply voltage

„Key matrix“ connector:

Pin	Signal	Description
1	Input 1	Input for key matrix (internal pullup resistor)
2	Input 2	Input for key matrix (internal pullup resistor)
3	Input 3	Input for key matrix (internal pullup resistor)
4	Input 4	Input for key matrix (internal pullup resistor)
5	Output 1	Output for key matrix
6	Output 2	Output for key matrix
7	Output 3	Output for key matrix

„Encoder“ connector:

Pin	Signal	Description
1	Axis 1b	Input B of the encoder
2	Axis 1a	Input A of the encoder
3	I/O	Input of the encoder switch
4	GND	Ground
5	V _{enc}	Supply voltage of the encoder

8. Mechanical Drawing

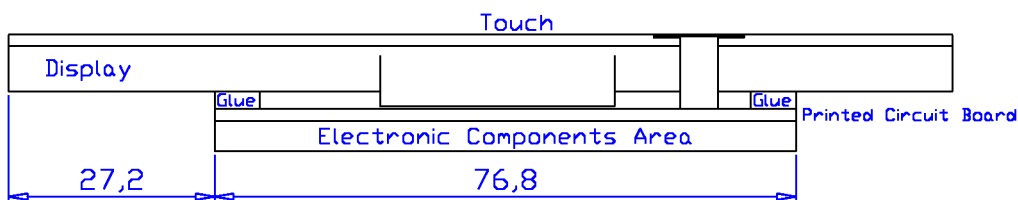


Figure 3: Frontview

Notes:

- "Electronics Components Area" is a reserved area for electronic components, placed on the PCB. Keep distance to conductive parts, like metal housing, to prevent short circuit.

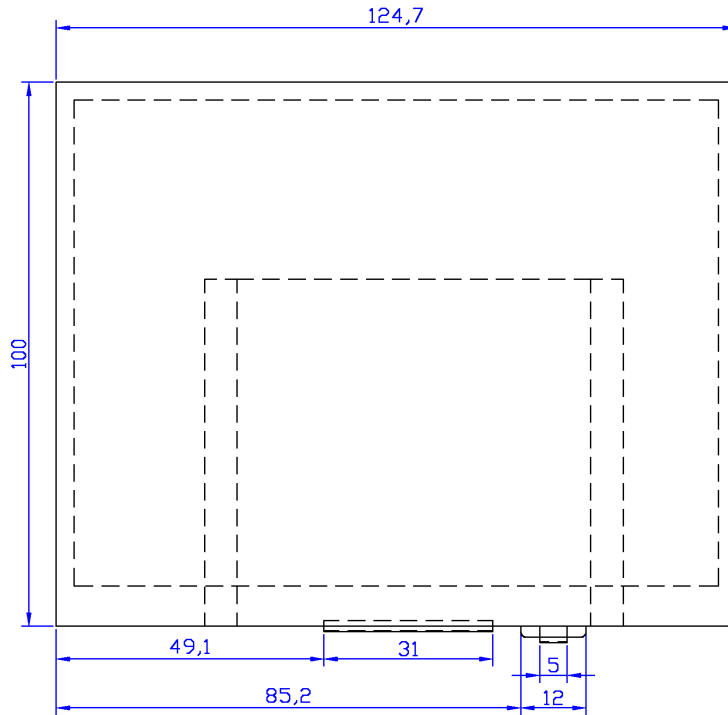


Figure 4: Topview

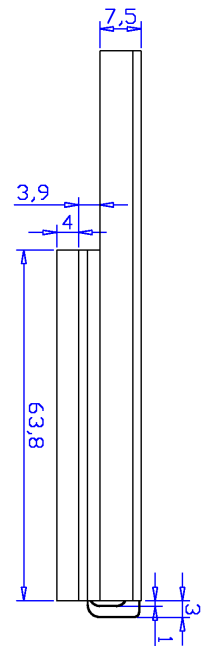


Figure 5: Sideview (left)

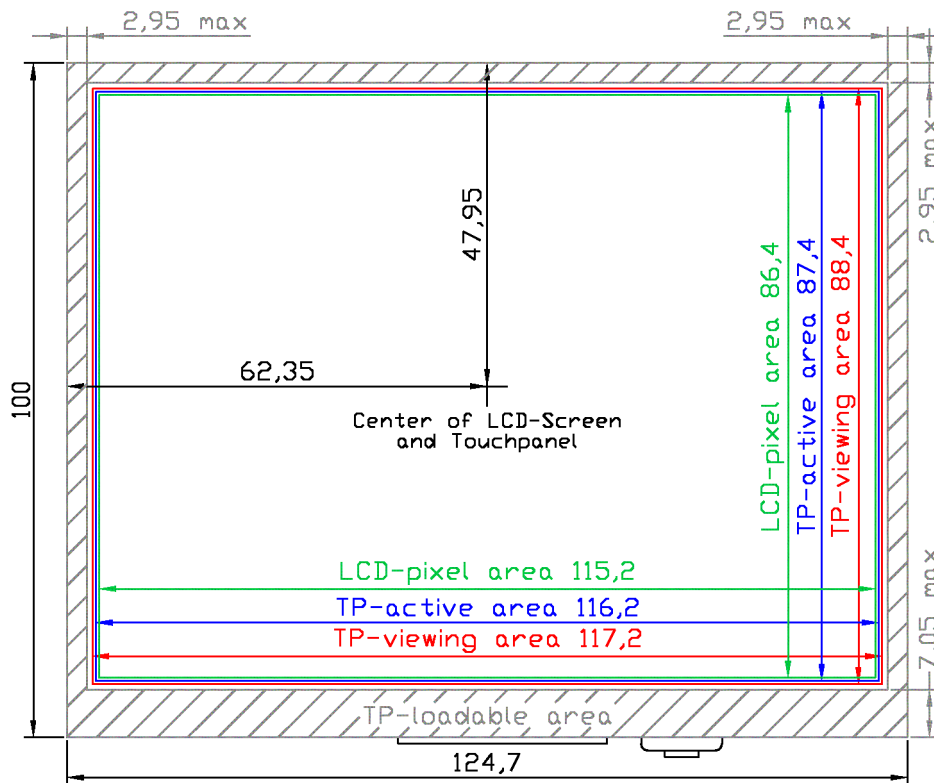


Figure 6: LCD-screen and touchpanel areas (top view)

Notes:

- For detailed mounting instructions refer to the "Mounting Touch Displays" application note.
- If not otherwise noted, LCD- and TP-dimensions are symmetrical to the "Center of LCD".

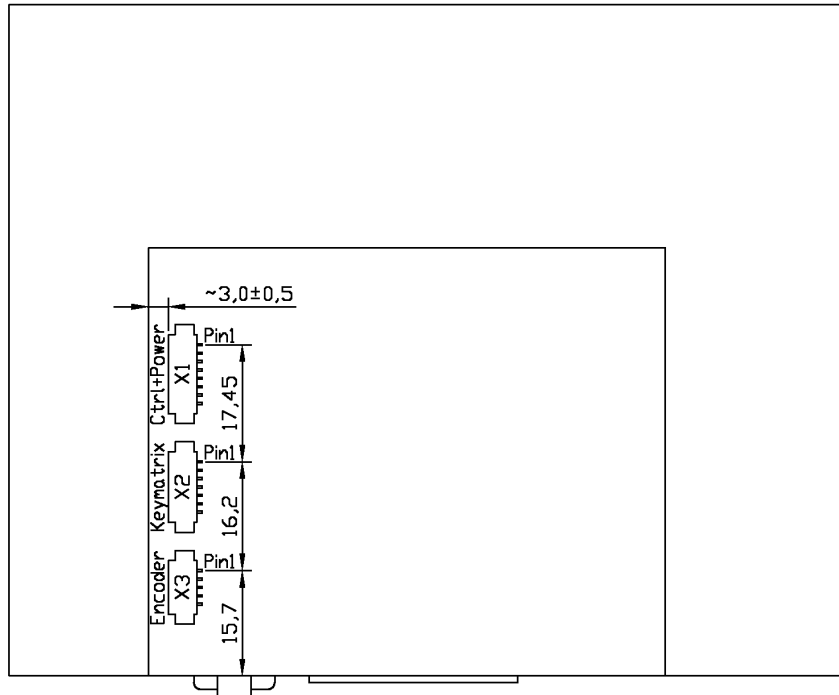


Figure 7: Connector positions (rear view)

9. Application Details

Application Schematic (tbd)

Reset circuit

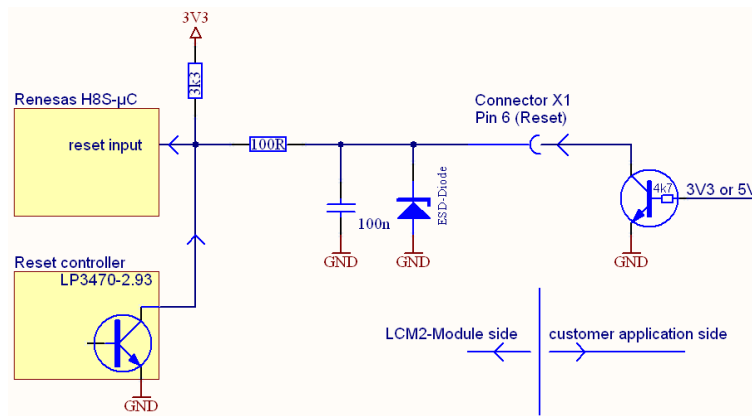


Figure 8: Reset circuit

Use only an open collector output without an additional pull up resistor to control the reset of the LCM2. Caution: Using a pull push stage may lead to malfunction or damage.

10. Handling and Operation Precautions

The protective foil on the display does only cover the viewing area of the display. Don't remove the foil with the help of a sharp tool to avoid scratches on the touch glass surface.

11. Ordering Information

One packing unit consists of 36 display modules.

12. Important Notice

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