

Technical Specification

iLCD JPro

DPP-FHx43
DPP-FHx50
DPP-Fx57
DPP-FHx70
DPP-Fx102
DPP-FHx101
Accessories

Version 4.6
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General Description

The iLCD modules are intelligent LCD panels which allow the user to carry out all graphic and font needs in a convenient way without having to deal with pixel addressing, low level functions or hardware details. Controlling the screen contents is done either via a serial port, I²C port, SPI port, USB or with an optional board via Ethernet.

DPP-FHx43

LCD

Item	DPP-FH43	DPP-FHT43	DPP-FHC43
Screen Size	4.3 inch		
Display Resolution	800 x RGB x 480 dots		
Active Area	95.04 (H) x 53.858 (V) mm		
Display Mode	Normally black / Transmissive		
Pixel Arrangement	RGB-Strip		
Display Color	16.7 M (Display) / 64k (Controller)		
Backlight ¹⁾	White LED, typical lifetime 20.000 hours		
Brightness typ.	1000 cd/m ²		
Contrast ratio typ.	1200		
Viewing Direction	ALL O'clock / IPS-Display		
Touch Screen	No	4-wire resistive	PCAP 5 Fingers

Note:

¹⁾ Brightness decreased to 50% of the initial value. Life time; mean time before failure at normal temperature (25°C) and normal humidity (60%)

Features

Item	DPP-FHC43
Connectivity	USB 2.0 / 1 x RS232 3.3V / I ² C / SPI / Ethernet with optional board
Keyboard	matrix scanning for up to 128 keys
Outputs	up to 16 outputs/LEDs (on/off/blink with user selectable blink frequency) ¹⁾
Inputs	up to 16 ¹⁾
ADC	up to 4 (12 bit with range of 0 .. 3.3V) ¹⁾
Relays/PWM	up to 2 ¹⁾
Real-Time Clock	Yes
Flash Memory	30 MByte for fonts, graphics, macros and text templates
RAM	32 MByte RAM for frame buffer and for screen saving
iLCD controller	DPM5050 operating at 528 MHz

Note:

¹⁾ Fully customizable assignments of inputs, outputs, ADCs, Relays, PWMs and keyboard columns

Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	3.2	5.0	5.25	V
Input Voltage H Level ¹⁾	V_{IH}	2.4	-	3.3	V
Input Voltage L Level ¹⁾	V_{IL}	0.0	-	0.8	V
Output current for digital outputs	I_{OUT}			3.5	mA
Vbatt current	I_{Vbatt}		1		μA
Current consumption display on, backlight off @ $V_{CC} = 5V$ ²⁾³⁾	I_{CC}		180		mA
Current consumption with display+backlight @ $V_{CC} = 5V$ ²⁾³⁾⁴⁾	I_{CC}		420		mA

Notes:

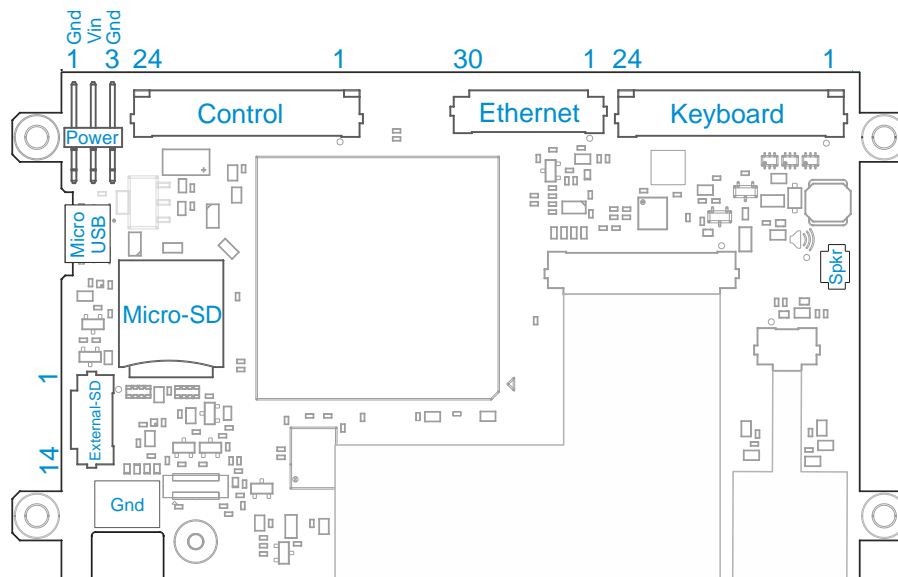
¹⁾ For digital inputs only

²⁾ No I/O ports active

³⁾ All pixel set to white color

⁴⁾ Backlight intensity 100%

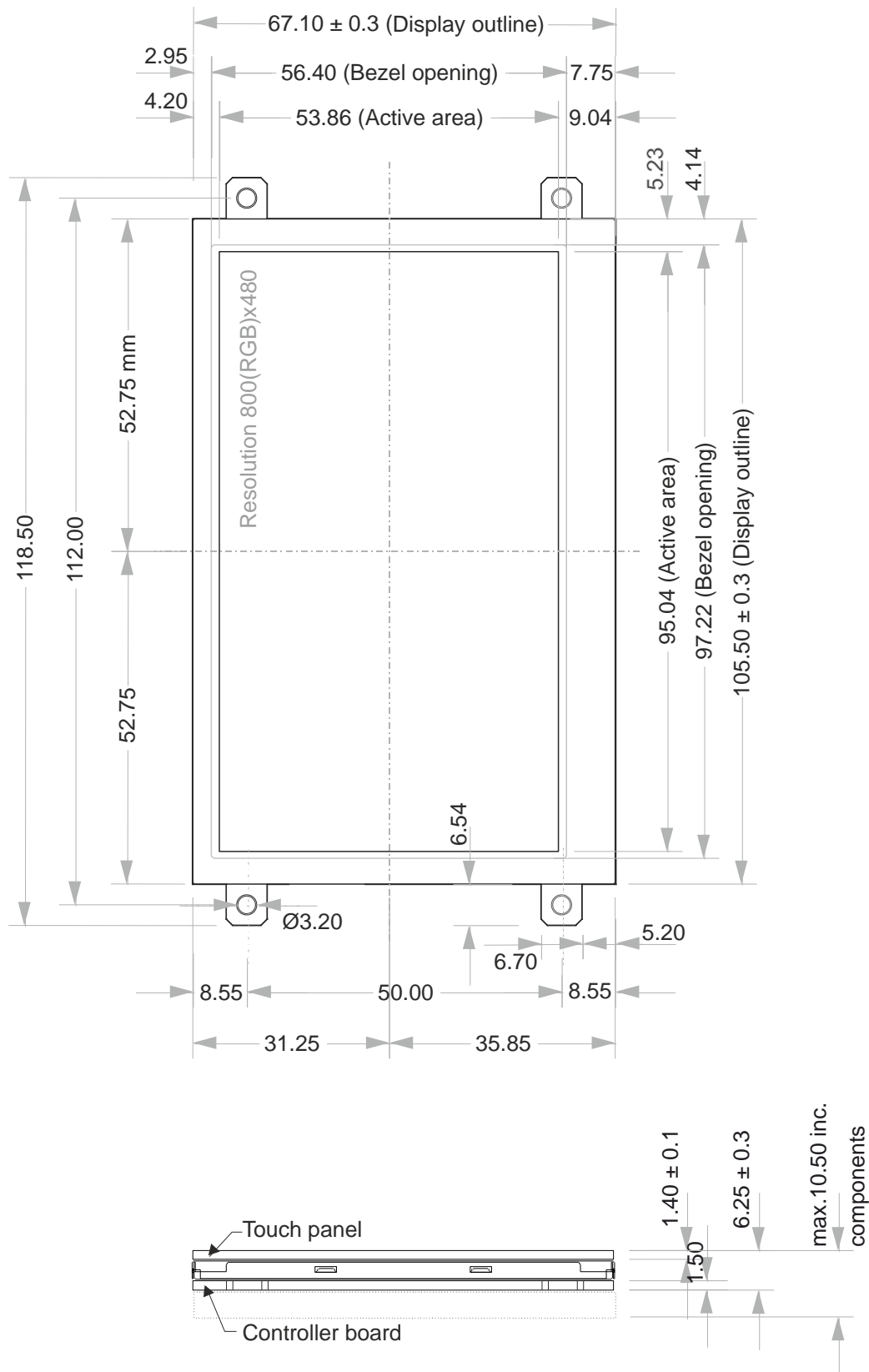
Circuit Board



DPP-FHC43 connections (view from PCB side) See [Pin Descriptions](#)

Mechanical Specification

Item	DPP-FHC43	Unit
Module Dimension (without mounting brackets)	105.5 x 67.1	mm
Module Dimension (incl. mounting brackets)	118.5 x 67.1	mm
Total Module Thickness	10.5	mm



Helpful examples of detailed touch screen integration guides can be found on the web via a search for "capacitive touch screen panel integration guide en pdf".

DPP-FHx50

LCD

Item	DPP-FH50	DPP-FHT50	DPP-FHC50
Screen Size	5.0 inch		
Display Resolution	800 x RGB x 480 dots		
Active Area	108.00 (H) x 64.80 (V) mm□		
Display Mode	Normally black / Transmissive		
Pixel Arrangement	RGB-Strip		
Display Color	16.7 M (Display) / 64k (Controller)		
Backlight ¹⁾	White LED, typical lifetime 20.000 hours		
Brightness typ.	1000 cd/m ²		
Contrast ratio typ.	800		
Viewing Direction	ALL O'clock		
Touch Screen	No	4-wire resistive	PCAP 5 Fingers

Note:

¹⁾ Brightness decreased to 50% of the initial value. Life time; mean time before failure at normal temperature (25°C) and normal humidity (60%)

Features

Item	DPP-FHx50
Connectivity	USB 2.0 / 1 x RS232 3.3V / I ² C / SPI / Ethernet with optional board
Keyboard	matrix scanning for up to 128 keys
Outputs	up to 16 outputs/LEDs (on/off/blink with user selectable blink frequency) ¹⁾
Inputs	up to 16 ¹⁾
ADC	up to 4 (12 bit with range of 0 .. 3.3V) ¹⁾
Relays/PWM	up to 2 ¹⁾
Real-Time Clock	Yes
Flash Memory	30 MByte for fonts, graphics, macros and text templates
RAM	32 MByte RAM for frame buffer and for screen saving
iLCD controller	DPM5050 operating at 528 MHz

Note:

¹⁾ Fully customizable assignments of inputs, outputs, ADCs, Relays, PWMs and keyboard columns

Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V _{CC}	3.2	5.0	5.25	V
Input Voltage H Level ¹⁾	V _{IH}	2.4	-	3.3	V
Input Voltage L Level ¹⁾	V _{IL}	0.0	-	0.8	V
Output current for digital outputs	I _{OUT}			3.5	mA
Vbatt current	I _{Vbatt}		1		μA
Current consumption display on, backlight off @ V _{CC} = 5V ²⁾³⁾	I _{CC}		225		mA
Current consumption with display+backlight @ V _{CC} = 5V ²⁾³⁾⁴⁾	I _{CC}		545		mA

Notes:

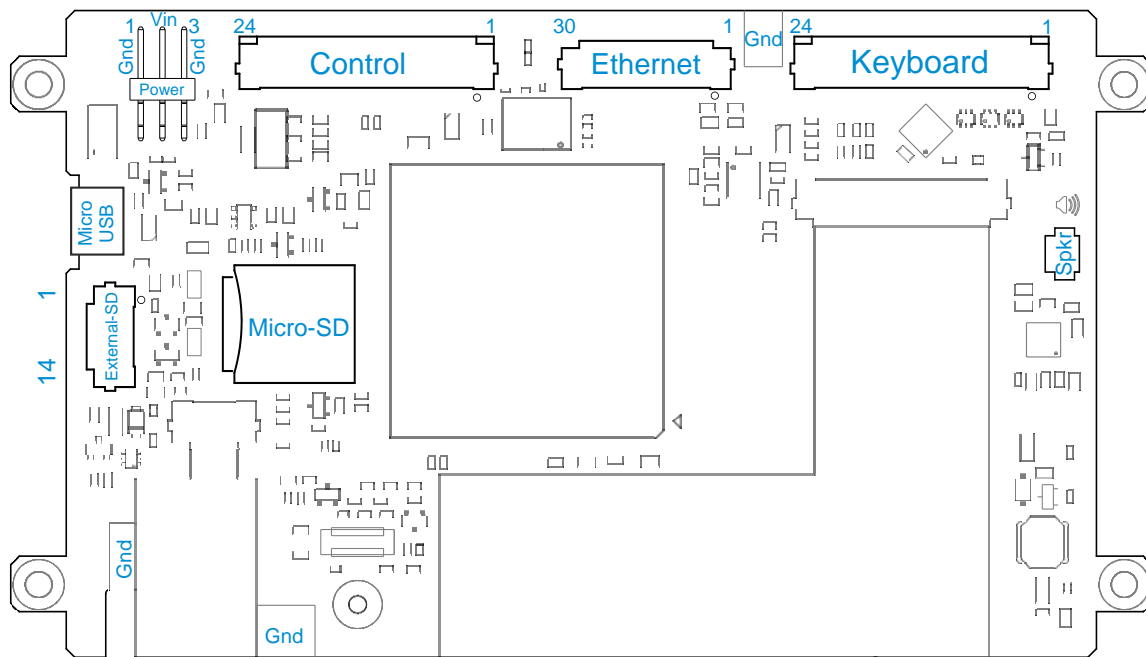
¹⁾ For digital inputs only

³⁾ All pixel set to white color

²⁾ No I/O ports active

⁴⁾ Backlight intensity 100%

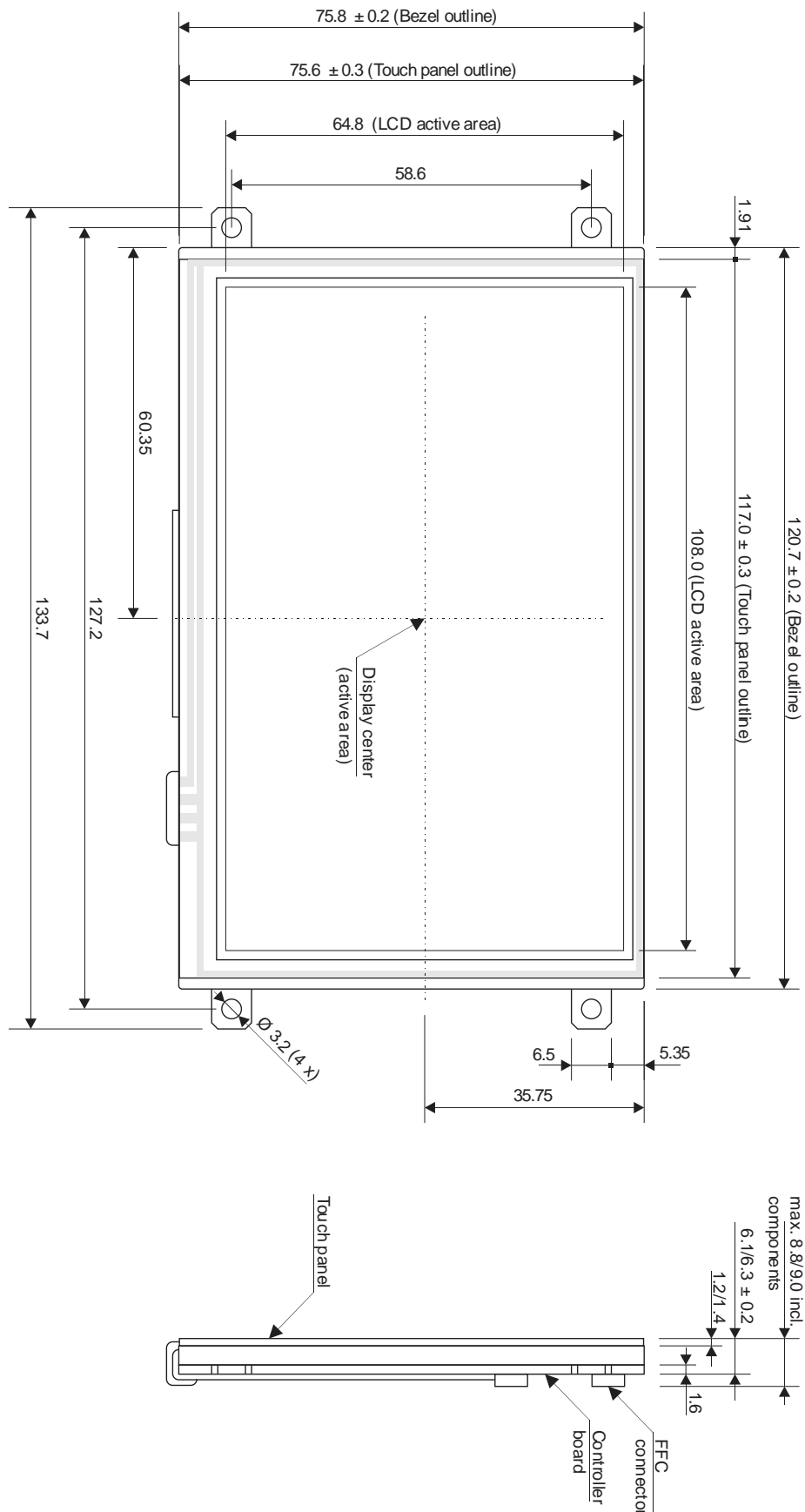
Circuit Board



DPP-FHx50 connections (view from PCB side), see [Pin Descriptions](#)

Mechanical Specification

Item	DPP-FHx50	Unit
Module Dimension (without mounting brackets)	120.7 x 75.8	mm
Module Dimension (incl. mounting brackets)	133.7 x 75.8	mm
Total Module Thickness	9.0	mm



DPP-Fx57

LCD

Item	DPP-F57	DPP-FT57	DPP-FC57
Screen Size	5.7 inch		
Display Resolution	640 x RGB x 480 dots		
Active Area	112.896 (H) x 84.672 (V) mm		
Display Mode	Normally white / Transmissive		
Pixel Arrangement	RGB-Strip		
Display Color	262 k (Display) / 64k (Controller)		
Backlight ¹⁾	White LED, typical lifetime 20.000 hours		
Brightness typ.	350 cd/m ²	300 cd/m ²	350 cd/m ²
Contrast ratio typ.	500		
Viewing Direction	6 O'clock		
Touch Screen	No	4-wire resistive	PCAP 5 Fingers

Note:

¹⁾ Brightness decreased to 50% of the initial value. Life time; mean time before failure at normal temperature (25°C) and normal humidity (60%)

Features

Item	DPP-Fx57
Connectivity	USB 2.0 / 1 x RS232 3.3V / I ² C / SPI / Ethernet with optional board
Keyboard	matrix scanning for up to 128 keys
Outputs	up to 16 outputs/LEDs (on/off/blink with user selectable blink frequency) ¹⁾
Inputs	up to 16 ¹⁾
ADC	up to 4 (12 bit with range of 0 .. 3.3V) ¹⁾
Relays/PWM	up to 2 ¹⁾
Real-Time Clock	Yes
Flash Memory	30 MByte for fonts, graphics, macros and text templates
RAM	32 MByte RAM for frame buffer and for screen saving
iLCD controller	DPM5050 operating at 528 MHz

Note:

¹⁾ Fully customizable assignments of inputs, outputs, ADCs, Relays, PWMs and keyboard columns

Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V _{CC}	3.2	5.0	5.25	V
Input Voltage H Level ¹⁾	V _{IH}	2.4	-	3.3	V
Input Voltage L Level ¹⁾	V _{IL}	0.0	-	0.8	V
Output current for digital outputs	I _{OUT}			3.5	mA
Vbatt current	I _{Vbatt}		1		μA
Current consumption display on, backlight off @ V _{CC} = 5V ²⁾³⁾	I _{CC}		305		mA
Current consumption with display+backlight @ V _{CC} = 5V ²⁾³⁾⁴⁾	I _{CC}		665		mA

Notes:

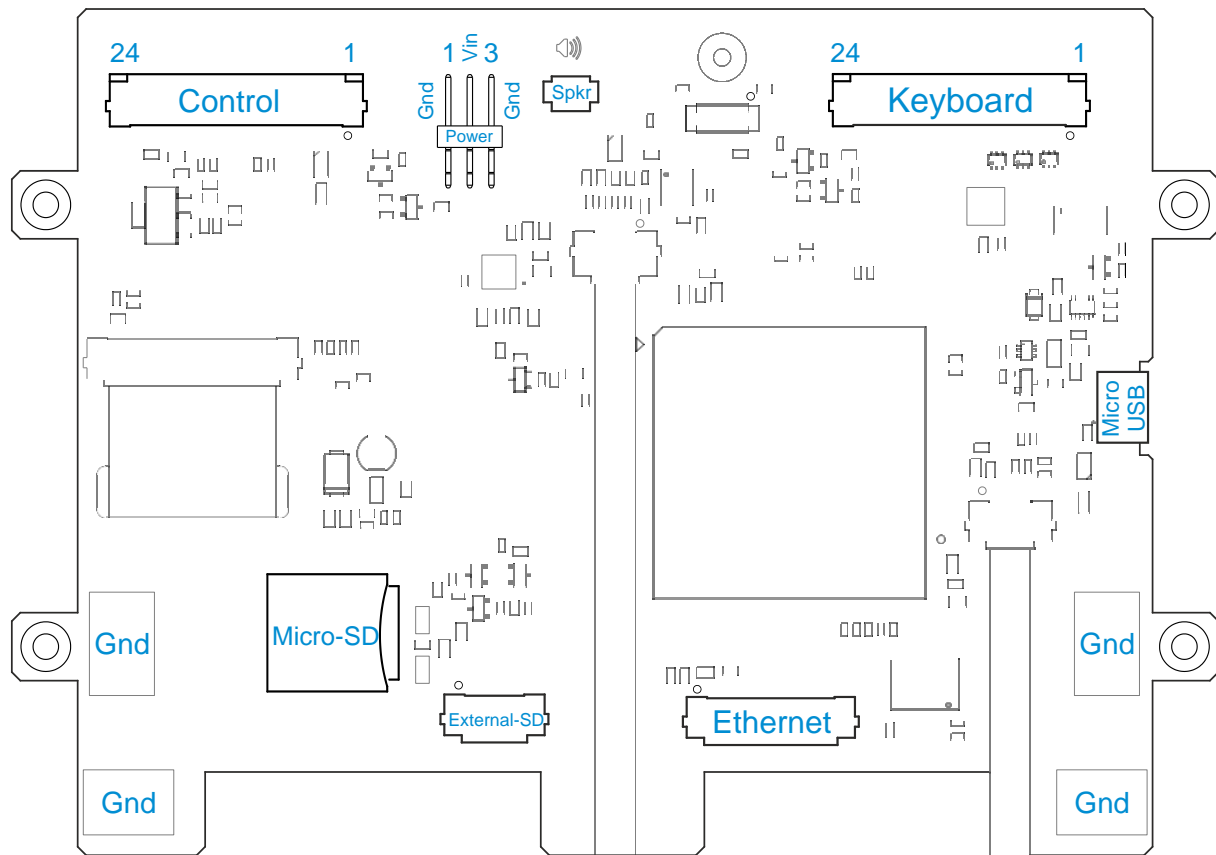
1) For digital inputs only

2) No I/O ports active

3) All pixel set to white color

4) Backlight intensity 100%

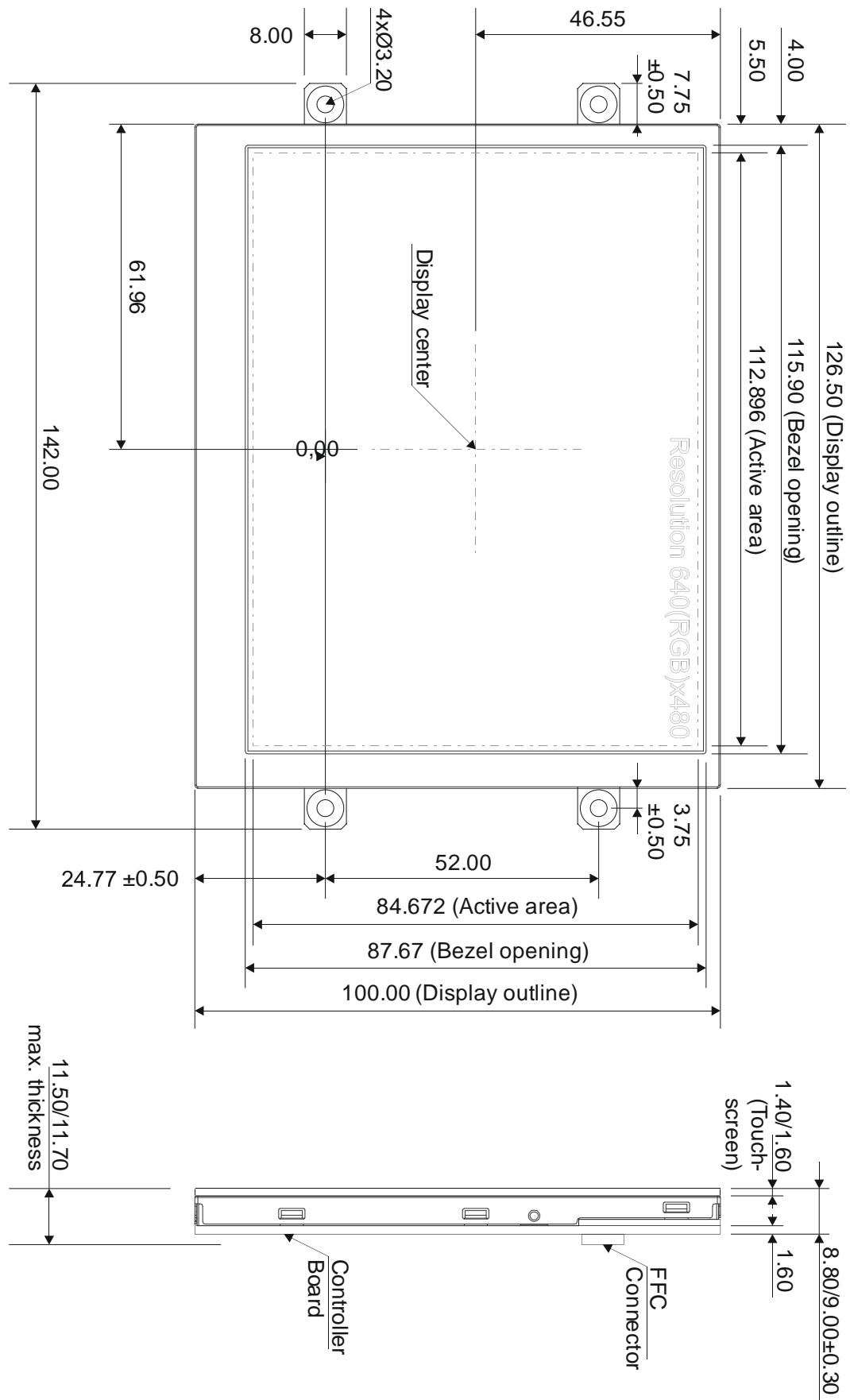
Circuit Board



DPP-Fx57 connections (view from PCB side), see [Pin Descriptions](#)

Mechanical Specification

Item	DPP-F57	Unit
Module Dimension (without mounting brackets)	126.5 x 100.0	mm
Module Dimension (incl. mounting brackets)	142.0 x 100.0	mm
Total Module Thickness	11.7	mm



DPP-FHx70

LCD

Item	DPP-FH70	DPP-FHC70
Screen Size	7.0 inch	
Display Resolution	1024 x RGB x 600 dots	
Active Area	154.2144 (H) x 85.92 (V) mm□	
Display Mode	Normally black / Transmissive	
Pixel Arrangement	RGB-Strip	
Display Color	16.7 M (Display) / 64k (Controller)	
Backlight ¹⁾	27 white LEDs, typical lifetime 50.000 hours	
Brightness typ.	600 cd/m ²	
Contrast ratio typ.	800	
Viewing Direction	ALL O'clock	
Touch Screen	No	PCAP 5 Fingers

Note:

¹⁾ Brightness decreased to 50% of the initial value. Life time; mean time before failure at normal temperature (25°C) and normal humidity (60%)

Features

Item	DPP-FHx70
Connectivity	USB 2.0 / 1 x RS232 3.3V / I ² C / SPI / Ethernet with optional board
Keyboard	matrix scanning for up to 128 keys
Outputs	up to 16 outputs/LEDs (on/off/blink with user selectable blink frequency) ¹⁾
Inputs	up to 16 ¹⁾
ADC	up to 4 (12 bit with range of 0 .. 3.3V) ¹⁾
Relays/PWM	up to 2 ¹⁾
Real-Time Clock	Yes
Flash Memory	30 MByte for fonts, graphics, macros and text templates
RAM	32 MByte RAM for frame buffer and for screen saving
iLCD controller	DPM5050 operating at 528 MHz

Note:

¹⁾ Fully customizable assignments of inputs, outputs, ADCs, Relays, PWMs and keyboard columns

Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V _{CC}	3.2	5.0	5.25	V
Input Voltage H Level ¹⁾	V _{IH}	2.4	-	3.3	V
Input Voltage L Level ¹⁾	V _{IL}	0.0	-	0.8	V
Output current for digital outputs	I _{OUT}			3.5	mA
Vbatt current	I _{Vbatt}		1		μA
Current consumption display on, backlight off @ V _{CC} = 5V ²⁾³⁾	I _{CC}		210		mA
Current consumption with display+backlight @ V _{CC} = 5V ²⁾³⁾⁴⁾	I _{CC}		800		mA

Notes:

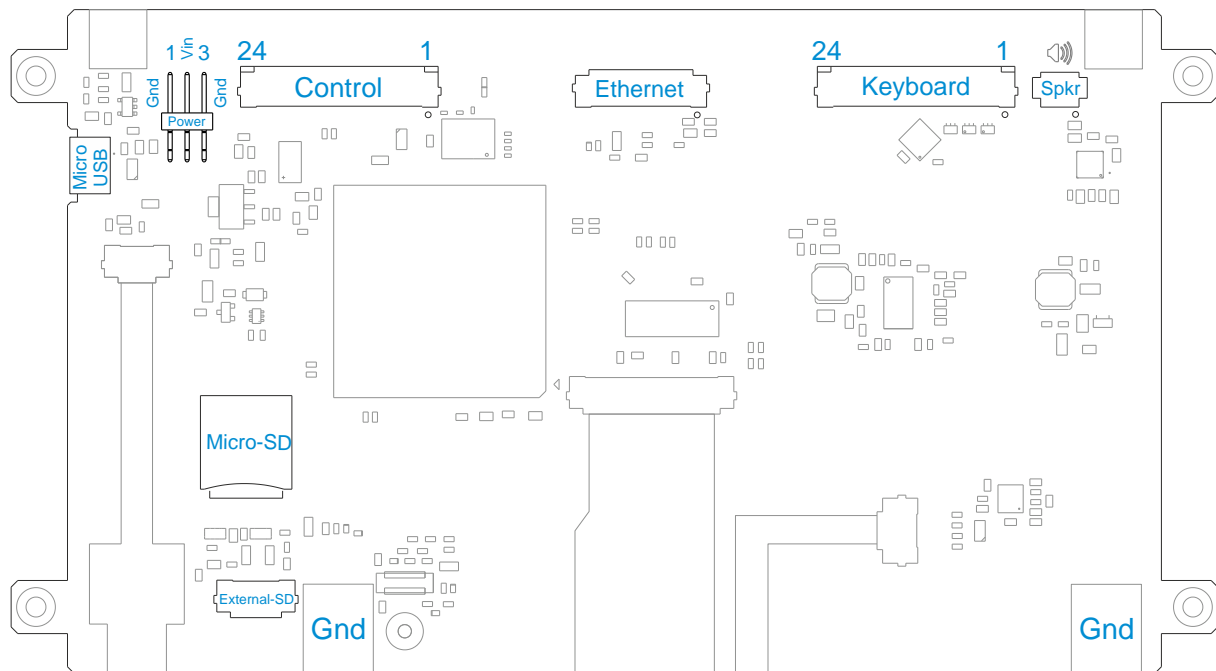
1) For digital inputs only

2) No I/O ports active

3) All pixel set to white color

4) Backlight intensity 100%

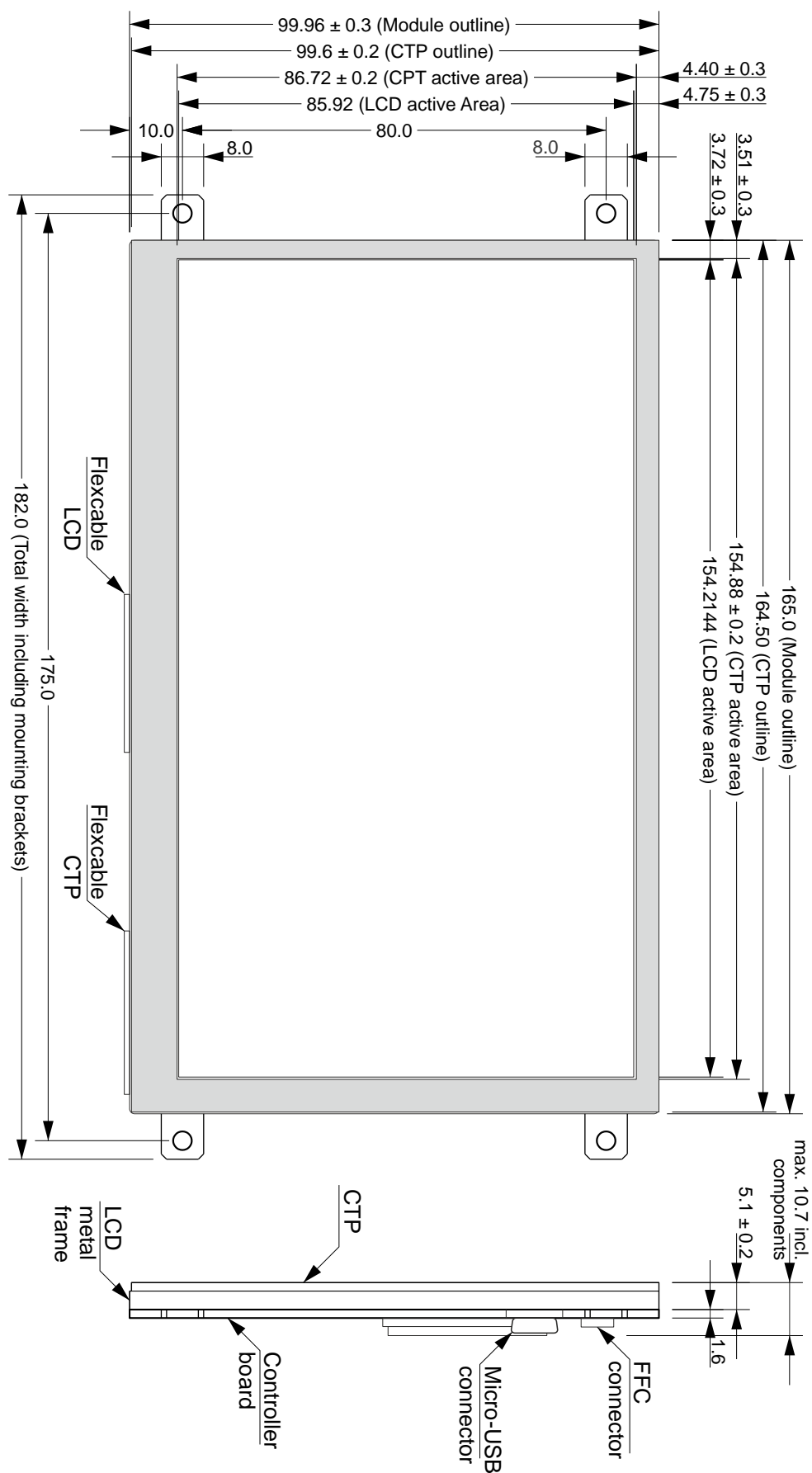
Circuit Board



DPP-FHx70 connections (view from PCB side), see [Pin Descriptions](#)

Mechanical Specification

Item	DPP-FHx70	Unit
Module Dimension (without mounting brackets)	165.0 x 99.96±0.3	mm
Module Dimension (incl. mounting brackets)	182.0 x 99.96±0.3	mm
Total Module Thickness	10.2	mm



DPP-Fx102

LCD

Item	DPP-F102	DPP-FT102	DPP-FC102
Screen Size	10.1 inch		
Display Resolution	1024 x RGB x 600 dots		
Active Area	222.72 (H) x 125.28 (V) mm□		
Display Mode	Normally black / Transmissive		
Pixel Arrangement	RGB-Strip		
Display Color	16.7 M (Display) / 64k (Controller)		
Backlight ¹⁾	42 white LEDs, typical lifetime 50.000 hours		
Brightness typ.	800 cd/m ²		
Contrast ratio typ.	800		
Viewing Direction	ALL O'clock		
Touch Screen	No	4-wire resistive	PCAP 5 Fingers

Note:

¹⁾ Brightness decreased to 50% of the initial value. Life time; mean time before failure at normal temperature (25°C) and normal humidity (60%)

Features

Item	DPP-Fx102
Connectivity	USB 2.0 / 1 x RS232 3.3V / I ² C / SPI / Ethernet with optional board
Keyboard	matrix scanning for up to 128 keys
Outputs	up to 16 outputs/LEDs (on/off/blink with user selectable blink frequency) ¹⁾
Inputs	up to 16 ¹⁾
ADC	up to 4 (12 bit with range of 0 .. 3.3V) ¹⁾
Relays/PWM	up to 2 ¹⁾
Real-Time Clock	Yes
Flash Memory	30 MByte for fonts, graphics, macros and text templates
RAM	32 MByte RAM for frame buffer and for screen saving
iLCD controller	DPM5050 operating at 528 MHz

Note:

¹⁾ Fully customizable assignments of inputs, outputs, ADCs, Relays, PWMs and keyboard columns

Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V _{CC}	3.2	5.0	5.25	V
Input Voltage H Level ¹⁾	V _{IH}	2.4	-	3.3	V
Input Voltage L Level ¹⁾	V _{IL}	0.0	-	0.8	V
Output current for digital outputs	I _{OUT}			3.5	mA
Vbatt current	I _{Vbatt}		1		μA
Current consumption display on, backlight off @ V _{CC} = 5V ²⁾³⁾	I _{CC}		280		mA
Current consumption with display+backlight @ V _{CC} = 5V ²⁾³⁾⁴⁾	I _{CC}		1.30		A

Notes:

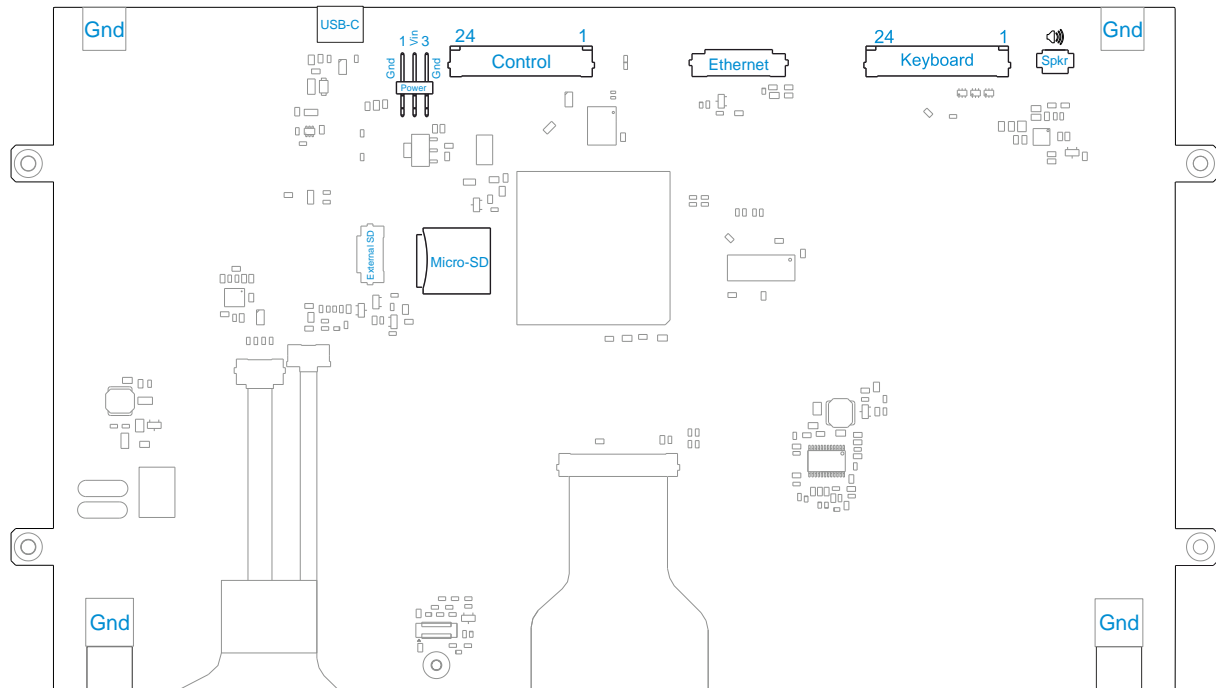
¹⁾ For digital inputs only

²⁾ No I/O ports active

³⁾ All pixel set to white color

⁴⁾ Backlight intensity 100%

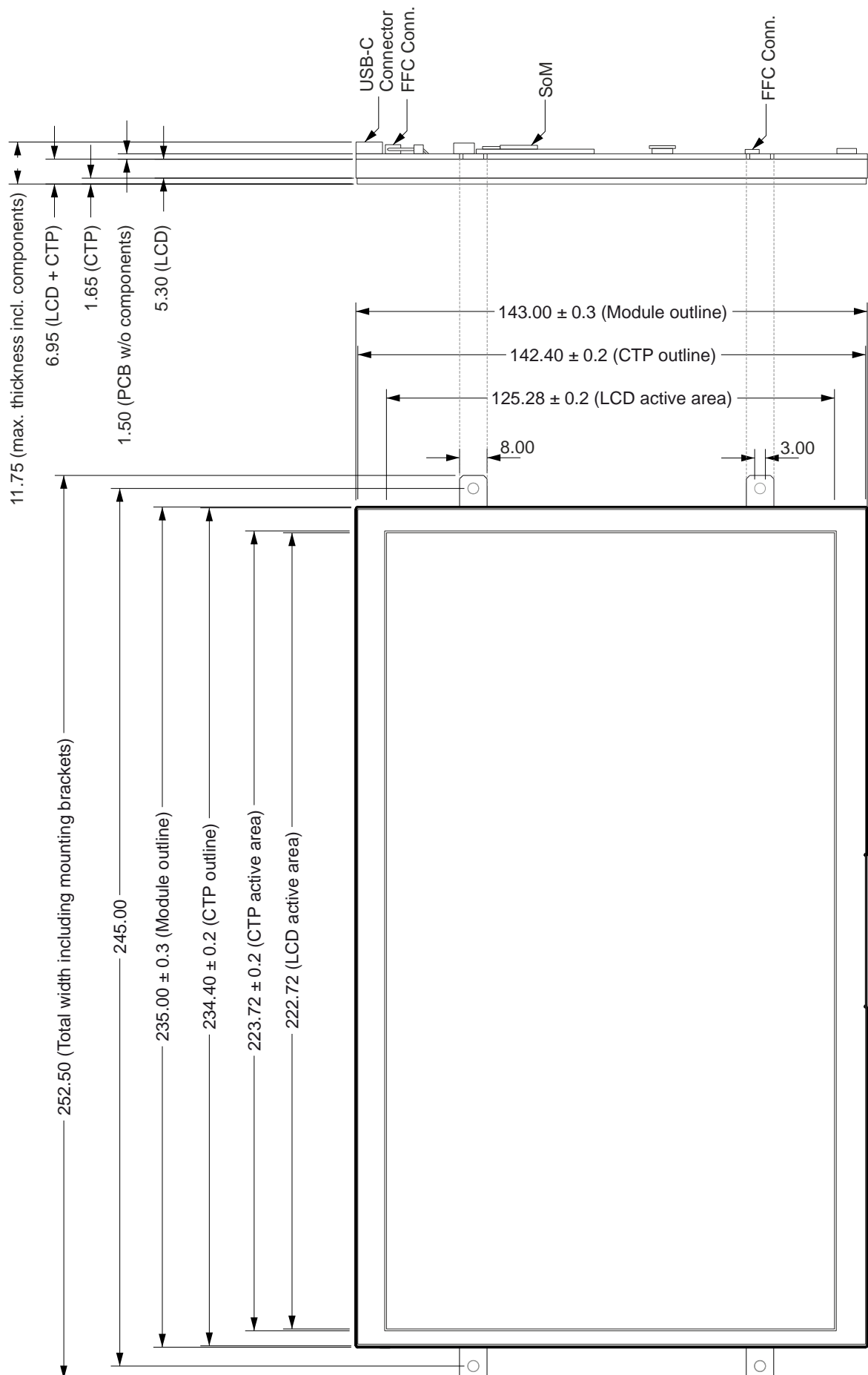
Circuit Board



DPP-Fx102 connections (view from PCB side), see [Pin Descriptions](#)

Mechanical Specification

Item	DPP-Fx102	Unit
Module Dimension (without mounting brackets)	235.0 x 142.6±0.3	mm
Module Dimension (incl. mounting brackets)	252.5 x 142.6±0.3	mm
Total Module Thickness	11.75	mm



DPP-FHx101

LCD

Item	DPP-FH101	DPP-FHT101	DPP-FHC101
Screen Size	10.1 inch		
Display Resolution	1280 x RGB x 800 dots		
Active Area	216.96 (H) x 135.60 (V) mm□		
Display Mode	Normally black / Transmissive		
Pixel Arrangement	RGB-Strip		
Display Color	16.7 M (Display) / 64k (Controller)		
Backlight ¹⁾	42 white LEDs, typical lifetime 50.000 hours		
Brightness typ.	1000 cd/m ²		
Contrast ratio typ.	1000		
Viewing Direction	ALL O'clock (80°)		
Touch Screen	No	4-wire resistive	PCAP 5 Fingers

Note:

¹⁾ Brightness decreased to 50% of the initial value. Life time; mean time before failure at normal temperature (25°C) and normal humidity (60%)

Features

Item	DPP-FHx101
Connectivity	USB 2.0 / 1 x RS232 3.3V / I ² C / SPI / Ethernet with optional board
Keyboard	matrix scanning for up to 128 keys
Outputs	up to 16 outputs/LEDs (on/off/blink with user selectable blink frequency) ¹⁾
Inputs	up to 16 ¹⁾
ADC	up to 4 (12 bit with range of 0 .. 3.3V) ¹⁾
Relays/PWM	up to 2 ¹⁾
Real-Time Clock	Yes
Flash Memory	30 MByte for fonts, graphics, macros and text templates
RAM	32 MByte RAM for frame buffer and for screen saving
iLCD controller	DPM5050 operating at 528 MHz

Note:

¹⁾ Fully customizable assignments of inputs, outputs, ADCs, Relays, PWMs and keyboard columns

Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V _{CC}	3.2	5.0	5.25	V
Input Voltage H Level ¹⁾	V _{IH}	2.4	-	3.3	V
Input Voltage L Level ¹⁾	V _{IL}	0.0	-	0.8	V
Output current for digital outputs	I _{OUT}			3.5	mA
Vbatt current	I _{Vbatt}		1		μA
Current consumption display on, backlight off @ V _{CC} = 5V ²⁾³⁾⁵⁾	I _{CC}		280 - 320		mA
Current consumption with display+backlight @ V _{CC} = 5V ²⁾³⁾⁴⁾⁵⁾	I _{CC}		1.90 – 2.10		A

Notes:

¹⁾ For digital inputs only

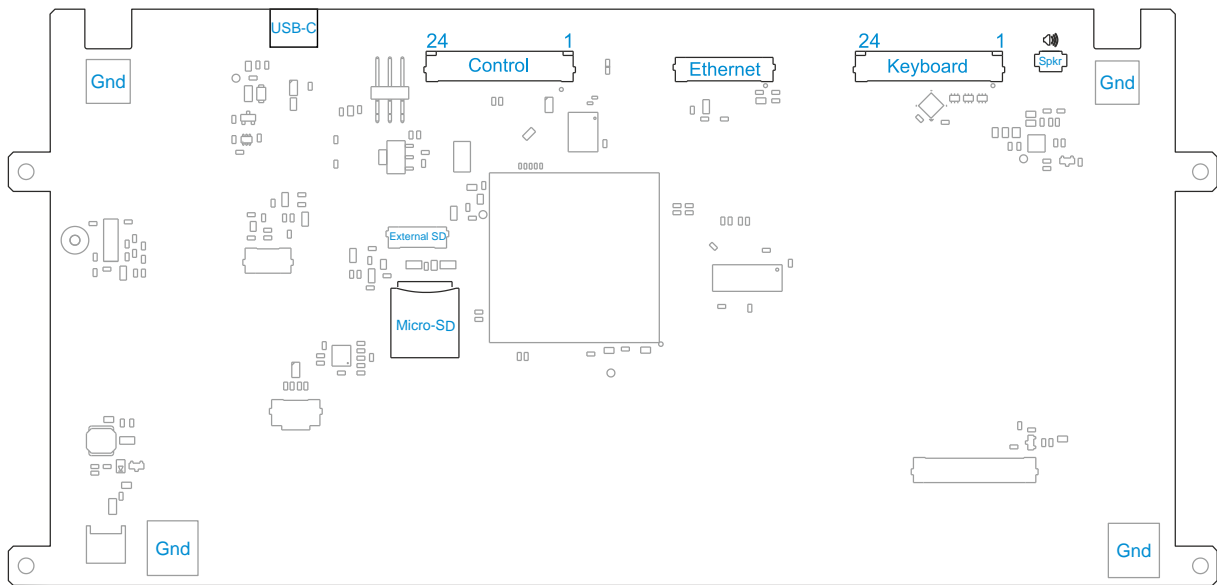
²⁾ No I/O ports active

³⁾ All pixel set to white color

⁴⁾ Backlight intensity 100%

⁵⁾ Needs to be re-evaluated

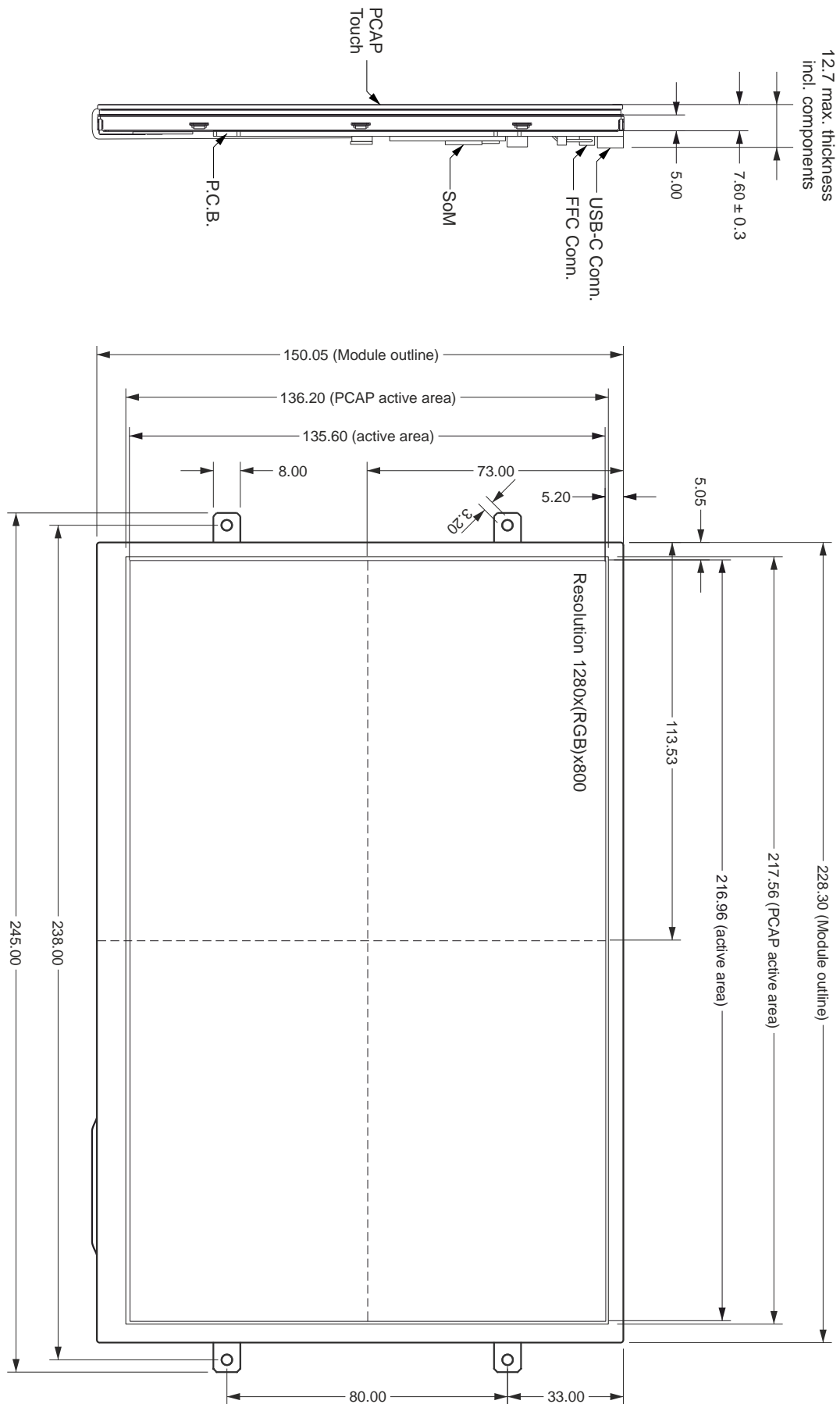
Circuit Board



DPP-Fx101 connections (view from PCB side), see [Pin Descriptions](#)

Mechanical Specification

Item	DPP-FHx101	Unit
Module Dimension (without mounting brackets)	228.30 x 150.05±0.3	mm
Module Dimension (incl. mounting brackets)	245.00 x 150.05±0.3	mm
Total Module Thickness	12.70	mm



Common Features

Maximum Ratings & Power Supply

Item	Symbol	Minimum	Maximum	Unit
Supply Voltage	V_{CC}	-0.3	5.5	V
Input Voltage	V_{IN}	-0.3	3.3	V
Operating Temperature ¹⁾	T_{OPR}	-20	70	°C
Storage Temperature	T_{STR}	-20	80	°C
Humidity ²⁾		10	90	%RH

Notes:

¹⁾ Lifetime of backlight LEDs will be decreased for temperatures $\geq 50^{\circ}\text{C}$

²⁾ Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX.

Temp. $\geq 60^{\circ}\text{C}$, absolute humidity shall be less than 90% RH at 60°C

The ground connection to the display should be as good as possible. Especially for iLCDs with projected capacitive touch panel the ground connection to the display and the power supply is crucial for a trouble-free function. If it is not possible or not wanted to connect the power supply with protective earth, this shall be done via a 20 nF capacitor.

Note: The mounting brackets on the iLCD panels are also connected with the PCB's GND plane.

Quality Standards

Dust Particles

The TFT display modules are assembled under clean room conditions. The following table specifies the allowed number and size of particles incorporated.

Dimension (Diameter D)	Acceptance (Qty N)
$D \leq 0.25 \text{ mm}$	Ignored
$0.25 \leq D \leq 0.50$	$N \leq 5$
$D \geq 0.50$	0
Total	$N \leq 5$

Pixel Failures

For our iLCD Panels we deploy A-grade TFT display modules. We accept a maximum of sub-pixel failures as follows:

Defect Type	Acceptance (Qty N)
Bright Dots	$N = 0$
Dark Dots	$N \leq 3$
Total	$N \leq 3$

Assembly

Treatment of the Touch Panel Tail

The touch panel is connected to the iLCD processor via an FPC tail. It is mounted already on iLCDs with touch functionality. In order to guarantee correct function and to prevent physical damages, please observe the following notes when taking out the iLCD panels from the package and during manufacturing:

- Do not exert lateral or shearing forces on the tail. This can happen when fitting the iLCD panel into a housing through a narrow aperture.
- Do not crease, twist or pull the tail.
- Do not touch the tail conductors.

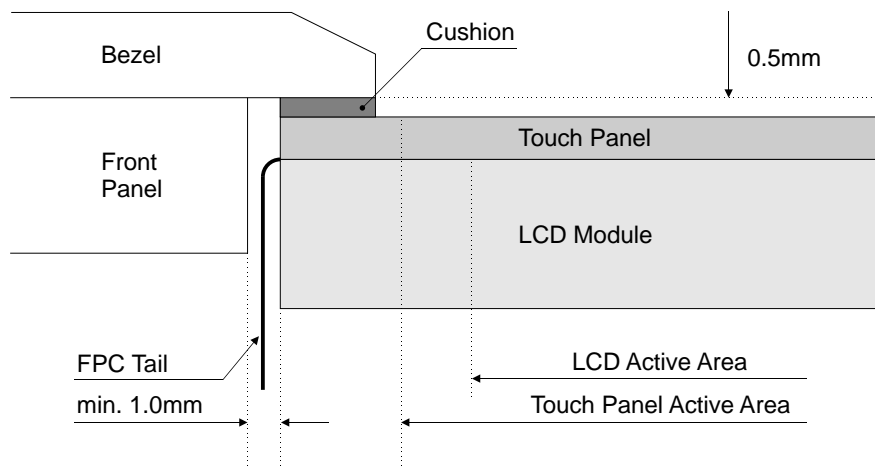
Treatment of the FFC Tail

The FFC cable connects the iLCD to the application electronics.

- The FFC cable bending radius must be ≥ 3 mm.
- Do not exert lateral or shearing forces on the FFC cable.
- Do not crease or twist the FFC cable.

iLCD Rear Mount Integration

One integration method is mounting the iLCD behind a bezel with a rectangular cut out. Rubber or foamed rubber gaskets (cushion) hereby ensure a balancing of tolerances and an environmental sealing. The bezel edge shall be positioned between the LCD Active Area and the View Area. If the bezel edge touches the LCD Active Area, it may press the resistive touch panel unintendedly and cause activation. A gap of approximately 0.5 mm is needed between the bezel and the top electrode. It may cause unexpected activation if the gap is too narrow. There shall be a distance from the panel edge of minimum 1.0 mm for TPC tail protection.



Compliance with EU Regulation

demmel products gmbh declares compliance with the applicable RoHS directive and REACH regulation:

- Restriction of the use of certain Hazardous Substances (RoHS), directive 2011/65/EU
- Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), regulation EC No 1907/2006

We provide the declarations of conformity for each of our products upon request – please contact us.

Module Function Description

Important Information about USB and Serial Ports

The above mentioned modules contain two USB ports, a micro USB connector on the PCB and another available on Pins 2 and 3 of the Control Port FFC connector. Only one USB port may be used at any given time. Power may be supplied via USB connector. When using the Micro-USB connector please note the current consumption of the module in use and make sure the USB outlet can supply enough power.

There are two 3.3V serial ports. As of the current series the Keyboard FFC connector has been expanded to 24 Pins allowing for simultaneous use of both a USB connector and Serial Port 0. Serial Port 0 is available on Pins 21 and 22 the Keyboard Port FFC connector. Serial Port 1 is available on Pins 5 and 6 the Control Port FFC connector. These are available by default and may be disabled in the iLCD Manager.

The USB port is implemented in two ways:

- HID device requiring no extra drivers, as all major operating systems use this system-driver for supporting mice and keyboards
- WinUSB device which requires an additional driver and is faster

Setting Baud rates deviating from 115200 Baud can be done via the “Set Baud Rate” command (see the iLCD Command Set documentation) for the serial port currently in use until the next power up or reboot of the iLCD panel. In order to permanently change the Baud rate, go to the iLCD Manager XE’s “Settings” page, check the “Hardware Settings” checkbox and set the Baud rate of Serial Port 1. After downloading this new setup data via the USB port to the iLCD panel, the Baud rate is changed automatically according to the new setting, a message box appears.

The Baud rate of Serial Port 0 can be set in the same way. In case of any misconfiguration possibly further disabling the communication via the serial port, the evaluation board’s “Erase” jumper can be set during power up (pulling the RX1 port low) to completely erase the flash user data. The default value of 115200 Baud is reset on both serial ports and the user data has to be re-written via the iLCD Manager XE.

General Information about Port Pins

Most port pins can be used as outputs (push/pull or pull down only outputs), as keyboard column outputs or as digital inputs besides of their primary function. The assignment of these port pins must be done once via the iLCD Manager XE under the “Settings page” after checking the “I/O Settings” checkbox. The names of the pins described below refer to the primary function only, the notes show the alternative functionality.

As the DPM5050 iLCD controller works with a power supply of 3.3V (a voltage-regulator for this voltage is on-board allowing the board to work with single 5V supply), push/pull outputs have a voltage swing of 0V ... 3.3V.

Outputs and digital inputs are not 5V tolerant.

Pin Descriptions

Power Connector (Power)

The iLCD panels can either be supplied via the Power Connector, via the Control Port or via the USB Port. If supplied via the 24-pin Control Port, all three GND pins must be connected and all three VCC pins must be connected to not exceed the maximum allowed current per pin of the FFC/FPC connector. Please note that if the iLCD panel is supplied via USB, its output current must at least fulfill the requirements listed in the electrical characteristics of the panel. Furthermore, ensure that the USB port delivers a stable and sufficient voltage level according to the iLCD specifications.

Pin #	Pin Name	Direction	Primary Function Description
1	GND ¹⁾	-	Ground pin
2	VCC ²⁾	-	5V power supply
3	GND ¹⁾	-	Ground pin

Note:

¹⁾ The GND pin is connected to pin 4, 23 and 24 of the Control Port FFC/FPC connector.

²⁾ The VCC pin is connected to pin 1, 21 and 22 of the Control Port FFC/FPC connector.

WARNING! Reversed power supply connections (Vcc and Gnd) made to the iLCD module or invalid power supply voltage greater than 5.5V will cause module damage.

Control Port (Control)

Connection to the control port is made via a 24-pin FFC/FPC cable with 1.0 mm pitch. The FFC/FPC connector on the board is a top-contact model.

If one wants to connect an evaluation kit of the former color iLCD panels to the 24-pin FFC/FPC connector, this can be done by using a 20-pin FFC/FPC cable, if the cable is orientated at pin 1 (pin 21 ~ 24 kept free then) and a 5V power supply is applied to the Power port then. The Vsel jumper of the evaluation board must be removed in this case!

Please note that the pin names of the serial port connections are seen from the driving PC / application side, which means a pin with name TX is in fact the output of the PC and an input of the iLCD panel. "Direction" is valid only when the primary function is enabled.

Pin #	Pin Name	Direction	Primary Function Description
1	VCC ¹⁰⁾	-	5V power supply
2	USB-	In/Out	USB-, can be directly connected to pin 2 of a USB-Jack B
3	USB+	In/Out	USB+, can be directly connected to pin 3 of a USB-Jack B
4	GND	-	Ground pin
5	TX1 ³⁾	In	Serial port 1, transmit line from PC, receive input of iLCD controller. Can be used for RS422/RS485 in conjunction with ALERT pin
6	RX1 ³⁾⁸⁾	Out	Serial port 1, receive line to PC, transmit output of iLCD controller. Can be used for RS422/RS485 in conjunction with ALERT pin
7	CTS	Out	Output to avoid input buffer overflow, connect to RS232 driver's CTS of the PC. Common for both serial ports.
8	SDA ⁴⁾⁷⁾	In/Out	I ² C data pin. Note, that there is no pull up resistor on the iLCD panel, so an external resistor may be necessary depending on the I ² C bus structure.

Pin #	Pin Name	Direction	Primary Function Description
9	SCL ⁴⁾⁷⁾	In/Out	I ² C clock pin. Note, that there is no pull up resistor on the iLCD panel, so an external resistor may be necessary depending on the I ² C bus structure.
10	ALERT ^{3) 12)}	Out	Output pin to indicate I ² C data availability (= low) to the I ² C master. When using the RS422/RS485 mode on the second serial port, pin goes low during data transmit.
11	SCK ³⁾	In	Clock for SPI
12	MISO ³⁾	Out	Serial output line for SPI
13	MOSI ³⁾	In	Serial input line for SPI
14	SSEL ³⁾⁶⁾	In/Out	Must be tied to GND when using SPI
15	REL0	Out	Relay output 0 / PWM0 output
16	REL1	Out	Relay output 1 / PWM1 output
17	GP0 ⁵⁾¹²⁾	In/Out	General purpose I/O pin 0. Use serial resistor when driving a LED.
18	GP1 ⁵⁾	In/Out	General purpose I/O pin 1. Use serial resistor when driving a LED.
19	I/O5 ³⁾⁹⁾ RESET	In/Out In/Out	Digital I/O pin /RESET – Pulling this pin low resets the iLCD module
20	Vbatt	-	Backup input voltage for real-time clock, should be between 2.5V and 3.3V
21	VCC ¹⁰⁾	-	5V power supply
22	VCC ¹⁰⁾	-	5V power supply
23	GND ¹¹⁾	-	Ground pin
24	GND ¹¹⁾	-	Ground pin

Pins configurable in the iLCD Manager XE I/O Settings are **bold**

Note:

- ³⁾ This pin can be used as a digital input, a push/pull or pull down output or a keyboard column output when the primary function is not enabled.
- ⁴⁾ This pin can be used as a digital input, a pull down output or keyboard column output when the primary function is not enabled.
- ⁵⁾ This pin can be used as a digital input, an analog input, a push/pull or pull down output or a keyboard column output. The voltage on this pin is not allowed to exceed 3.3V, even if it is used as a digital input or a pull-down output.
- ⁶⁾ When using SPI, this pin must be used as SSEL for selecting the SPI via attaching a low signal.
- ⁷⁾ When using the I²C port, this pin must be terminated with a resistor (usually 3k3) to 3.3V if the iLCD panel is the last device on the I²C bus. Please note, that the evaluation board has this pull-up resistor populated on the board.
- ⁸⁾ When pulling low this pin via a 1k resistor during power-up, the flash memory's user data is erased.
- ⁹⁾ The functionality of this pin depends on the setting of the jumpers for external RESET function. If configured as /RESET pin, the board's internal power up reset signal can be seen on this pin as well.
- ¹⁰⁾ Connect all VCC pins together in case you supply the iLCD panel via the FFC/FPC connector. VCC is connected to Pin 2 of the Power Connector as well.
- ¹¹⁾ Connect all GND pins together in case you supply the iLCD panel via the FFC/FPC connector. GND is connected to Pin 1 and 3 of the Power Connector as well.
- ¹²⁾ The ALERT Pin is connected to a 10k pull-up resistor. If used as a pull-down output or input, low impedance must be used.

WARNING! Reversed power supply connections (Vcc and Gnd) made to the iLCD module or invalid power supply voltage greater than 5.5V will cause module damage.

Keyboard Port (Keyboard)

Connection to the keyboard port is made via a 24-pin FFC/FPC cable with 1.0 mm pitch. The FFC/FPC connector on the board is a top-contact model.

If one wants to connect an evaluation kit of the former color iLCD panels to the 24-pin FFC/FPC connector, this can be done by using a 20-pin FFC/FPC cable, if the cable is orientated at pin 1 (pin 21 ~ 24 kept free then). All pins except TX0, RX0, Vout 3V3 and GND will be available.

Pin #	Pin Name	Direction	Primary Function Description
1	KBR0	In	Keyboard row 0
2	KBR1	In	Keyboard row 1
3	KBR2	In	Keyboard row 2
4	KBR3	In	Keyboard row 3
5	KBR4	In	Keyboard row 4
6	KBR5	In	Keyboard row 5
7	KBR6	In	Keyboard row 6
8	KBR7	In	Keyboard row 7
9	KBC0 ¹⁾	Out	Keyboard column 0, optionally I/O pin
10	KBC1 ¹⁾	Out	Keyboard column 1, optionally I/O pin
11	KBC2 ¹⁾	Out	Keyboard column 2, optionally I/O pin
12	KBC3 ¹⁾	Out	Keyboard column 3, optionally I/O pin
13	KBC4 ¹⁾	Out	Keyboard column 4, optionally I/O pin
14	KBC5 ¹⁾	Out	Keyboard column 5, optionally I/O pin
15	KBC6 ¹⁾	Out	Keyboard column 6, optionally I/O pin
16	KBC7 ¹⁾	Out	Keyboard column 7, optionally I/O pin
17	KBC8 ¹⁾	Out	Keyboard column 8, optionally I/O pin
18	GP2 ²⁾	In/Out	General purpose I/O pin 0. Use serial resistor when driving a LED.
19	GP3 ²⁾	In/Out	General purpose I/O pin 1. Use serial resistor when driving a LED.
20	I/O6 ¹⁾	In/Out	Digital I/O pin
21	TX0	In	Serial port 0, transmit line from PC, receive input of iLCD controller.
22	RX0	Out	Serial port 0, receive line to PC, transmit output of iLCD controller.
23	Vout 3V3	Out	3.3V limited to 100 mA
24	GND	-	Ground pin

Pins configurable in the iLCD Manager XE I/O Settings are **bold**

Note:

- ¹⁾ This pin can be used as a digital input, a push/pull or pull down output or a keyboard column output when the primary function is not enabled.
- ²⁾ This pin can be used as a digital input, an analog input, a push/pull or pull down output or a keyboard column output. The voltage on this pin is not allowed to exceed 3.3V, even if it is used as a digital input or a pull-down output.

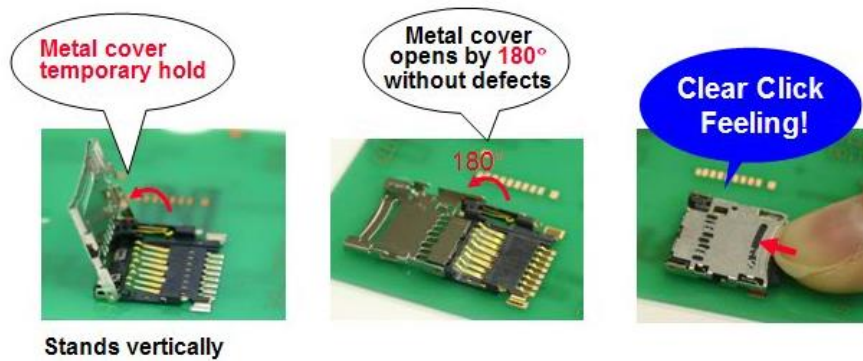
USB-Micro-B Port (Micro USB)

The iLCD panels can be connected via USB either via the onboard USB-Micro-B connector or via the control port's USB pins, limited to one connection at a time. Additionally, the iLCD panel can be supplied via USB, whereby its output current must at least fulfill the requirements listed in the electrical characteristics of the panel. Furthermore, ensure that the USB port delivers a stable and sufficient voltage level according to the iLCD specifications.

MicroSD Connector (Micro-SD)

All iLCD panels have a MicroSD card holder on-board. A MicroSD card with up to 32 GBytes may be inserted for memory extension. Please note that MicroSD and MicroSDHC are supported.

To insert a MicroSD card, slide the connector in the direction of the OPEN-arrow engraved in the metal plate and lift it. Insert the card with the contact area facing down, then fold the connector back in and push carefully in the direction of the LOCK-arrow until it makes a click sound.



External SD Card Connector (External SD)

The External SD Card Connector provides the option to connect a standard SD card to the iLCD display. demmel products' DPA-SD-EXT boards is available to interface to the External SD Card Connector.

Speaker Port (Spkr)

The speaker output may be connected directly to a 4 or 8 Ohm speaker to play sound files.

Jumpers for External Reset Function

If the external reset function is required, please contact demmel products to learn more about the option to use I/O5 pin as a reset pin instead of a normal I/O5 port.

Accessories

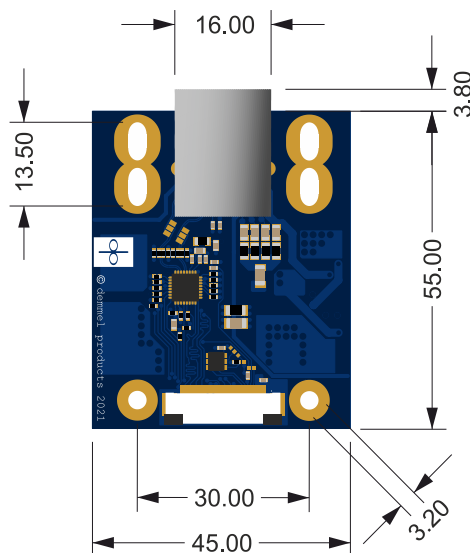
DPA-PCBRS232

This expansion board contains an RS232 connector for serial communication, a buzzer and a USB-B connector. Detailed information regarding the use and functionality of this expansion board including a schematic and explanatory diagrams may be found online under this link: [RS232 Specification](#) or by visiting our website and navigating to Service→Downloads and selecting the RS232 Specification.

DPA-ETH-F

This expansion board features an RJ45 connector that can be linked to the FFC Ethernet port on the iLCD module via a top to top Flex PCB. A complete guide to using Ethernet with the F-Series may be found online under this link: [Ethernet Application Note](#) or by visiting our website and navigating to Service→Downloads and selecting the Ethernet Application Note. Mounting angles and a set of screws and nuts are contained in every delivery.

The board is available as DPA-ETH-F-POE, which contains a transformer enabling power over Ethernet.



demmel products RJ45 board (DPA-ETH-F), dimensions in mm

DPA-RS485

This expansion board converts the UART signal from the iLCD Linux panel into half-duplex RS485 differential signaling over a twisted pair of wires. The board also provides access to the mounting holes for a 2 row 24 pin header of the Control Port ([Control](#)).

Specifications

Recommended Bitrate ¹⁾²⁾	Maximum Bitrate ²⁾	Isolation Voltage ³⁾	Supply Voltage (Pin 1)	Delay (Auto mode) ⁴⁾	ALERT on
115.2 kBit	125 kBit	1500 V	5 V	800 μ s	Logic high

¹⁾ This is the bitrate for which "Auto" mode is optimized.

²⁾ For volume orders this value may be adjusted.

³⁾ Two self-resetting fuses are tripped at higher voltages.

⁴⁾ In "Auto" mode TX is held in enabled mode for 800 μ s after entering going idle before it is disabled.

Modes

RX is enabled by default. Therefore in order to send data, TX must be actively enabled. There are two way of doing this, Auto and Manual (Pin10/Pin15). These modes are set via on-board jumpers according to the following table:

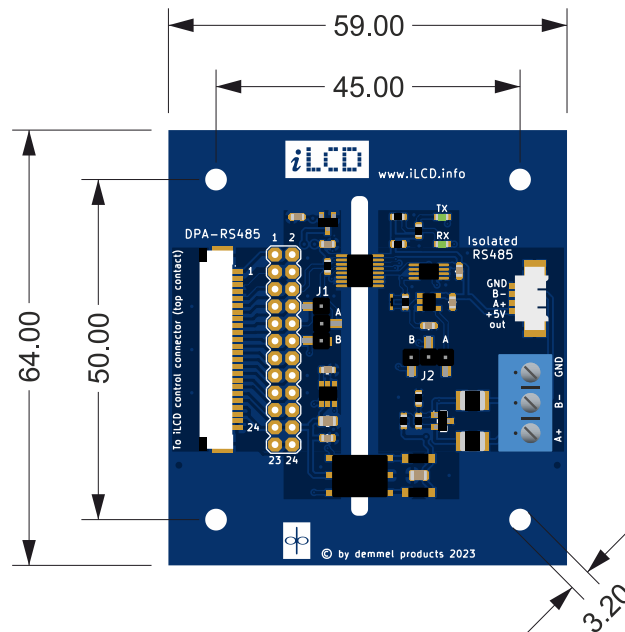
TX enable	J1 pos A	J1 pos B
J2 pos A	Auto	Auto
J2 pos B	Manual (Pin 10)	Manual (Pin 15)

Auto

By setting Jumper 2 to position A, the board runs in "Auto" mode. This means that TX is automatically enabled whenever a packet is transmitted. TX is disabled after the last bit is sent after a delay of 800 μ s as configured via an RC circuit. By default Auto mode is optimized for 115 kBit.

Manual (Pin10/Pin15)

By setting Jumper 2 to position B, TX can be tied to the corresponding pin (pins 10 or 15, depending on Jumper 1). In this mode TX can be enabled via software by setting the pin to logic high.



demmel products RS485 board (DPA-RS485), dimensions in mm

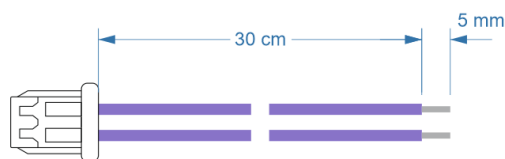
WARNING! Due to a production error Version 1 (DPA-RS485-V1) the silkscreen indicating positions A and B of Jumper 1 is reversed. Please ignore the indications on the silkscreen in V1 and instead refer to the positions indicated in this schematic.

5V Power Supply

We are happy to provide a 5V power supply suitable for iLCD JPro boards with a USB-C or Micro-USB cable.

DPA-C-SPKR

This custom-made Molex 53261-0271 connector fits the audio connector on the iLCD JPro modules. The two purple wires can be connected to any 4 to 8 Ohm speaker. The cables themselves are 28 AWG.



demmel products speaker connector (DPA-C-SPKR)

Revision History

Date	Rev. #	Revision Details
November 24, 2021	1.0	Initial release
November 30, 2021	2.0	Diagrams updated, proofreading
December 7, 2021	3.0	FHx70 specs added
March 8, 2022	4.0	Minor changes and corrections
May 2, 2022	4.1	FHC changed to FHx and added current consumption FHx70
August 31, 2022	4.2	Added Fx102
November 13, 2022	4.3	Added FHx102
August 21, 2023	4.4	Renamed FHx102 to FHx101
September 26, 2023	4.5	Added F-Series Accessories
December 6, 2023	4.6	Added DPA-RS485

If you find any errors in this document, please contact demmel products at support@demmel.com