T Panel
ID208048MC-070ABF
Datasheet

VERSION:1.00 JUNE, 2022



Immense Oak Technologies

Represented by:

first FC components

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Revision History

Table 1. Revision History

Revision	Description	Release Date
1.00	Initial release	June, 2022

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1 Introduction

T Panel product line provides total solutions for HMI. These solutions include TouchGFX (provided by STMicroelectronics), control board and LCM. This datasheet is intended to describe the hardware part of the solutions. This document covers the following product:

Table 2. T Panel Product Line

Part Number	Resolution	Panel Size	Touch Type
ID208048MC-070ABF	800x480	7.0”	CTP

Note: CTP = Capacitive Touch Panel

The product complies with TouchGFX. The LCMs are sourced from our partners. For more details on the LCMs, please contact sales@iot-hmi.com or our local distributors.

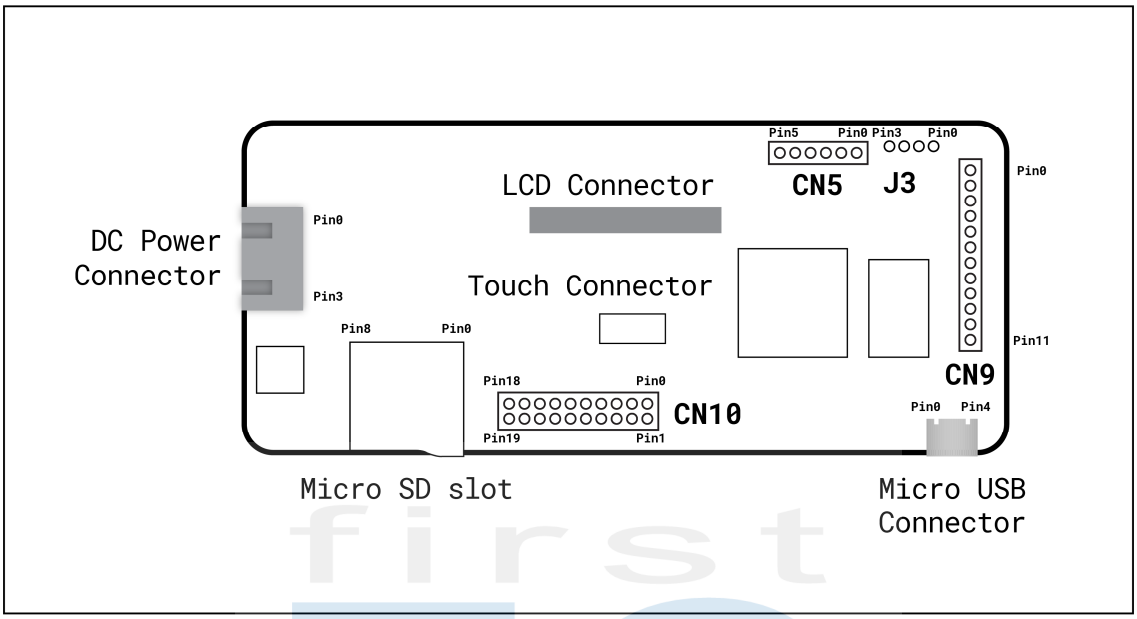
1.1 Features

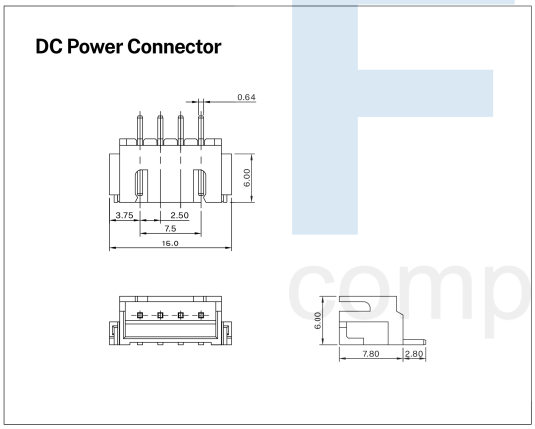
- Comply with TouchGFX for delivering the Smart HMI total solution
- STM32H750 with 32MB DRAM
- Built-in 2Gb (256MB) Flash memory for storage
- Support ARGB888 (16,777,216 colors) with 256 levels of transparency
- Support LCM backlight control
- Support touch control (CTP)
- Support GPIO, PWM, Input-Capture, UART, ADC, DAC, I2S, I2C, SPI and SWD functions based on MCU pin definition (See STM32H750 for details)
- Support RTC and LSE
- Support Micro USB slot and SD card slot

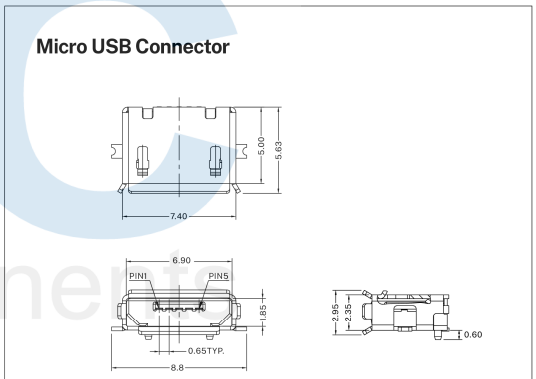
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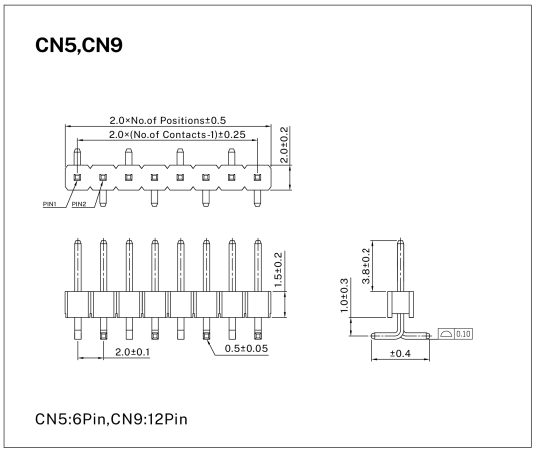
2 Interface Description

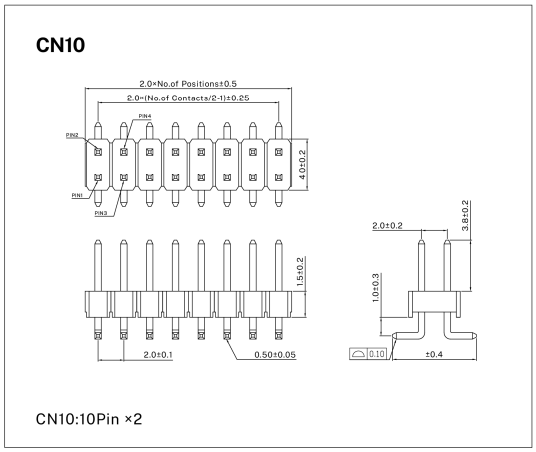
Figure 1. Control Board Outline











2.1 Connector 10 (CN10) Pin Definition

Figure 2. CN10 Pin Definition

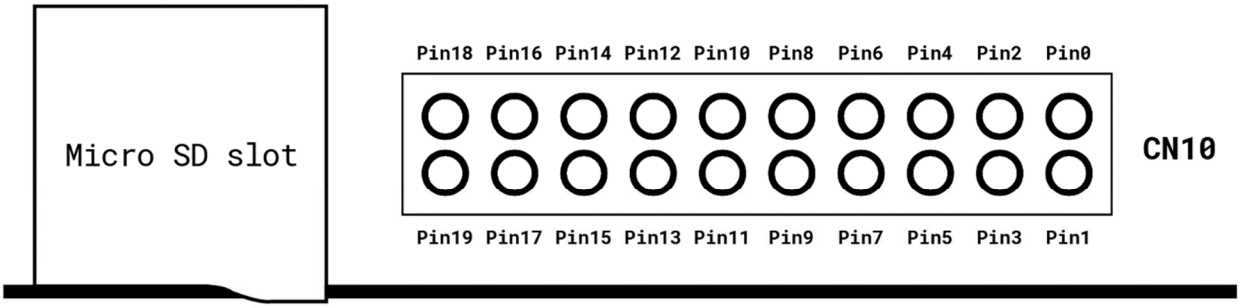


Table 3. CN10 Pin Definition

Pin Number	MCU Pin Name	Name	I/O	Description
0	-	DC5V	P	DC 5V output.
1	-	GND	P	Supply Ground.
2	-	DC3.3V	P	DC 3.3V output.
3	PD11	GPIO1	I/O	General Purpose Input/Output, 3.3V Level - 5V Tolerant.
4	PA15	PWM3	N/A	This pin offers two different functions: GPIO and PWM.
5	PD12	GPIO2	I/O	General Purpose Input/Output, 3.3V Level - 5V Tolerant.
6	PB3	PWM4	I/O	This pin offers two different functions: GPIO and PWM.
7	PD13	GPIO3	I/O	General Purpose Input/Output, 3.3V Level - 5V Tolerant.
8	PH6	PWM5	I/O	This pin shares the same functionality as that of PWM4. Please refer to PWM4 description for details.
9	PA3	GPIO4	I/O	General Purpose Input/Output, 3.3V Level - 5V Tolerant.
10	PC7	PWM6	I/O	This pin shares the same functionality as that of PWM4. Please refer to PWM4 description for details.
11	PD4	GPIO5	I/O	General Purpose Input/Output, 3.3V Level - 5V Tolerant.
12	-	GND	P	Supply Ground.
13				
14	PC2	ADC0	I/O	General Purpose I/O pin with Analog Capability. This pin has a range of 0-3.3V when used as an Analog Input, and is 3.3V tolerant only.

Pin Number	MCU Pin Name	Name	I/O	Description
15	PA6	ADC1	I/O	General Purpose I/O pin with Analog Capability. This pin has a range of 0-3.3V when used as an Analog Input, and is 3.3V tolerant only.
16	PC4	ADC2	I/O	General Purpose I/O pin with Analog Capability. This pin has a range of 0-3.3V when used as an Analog Input, and is 3.3V tolerant only.
17	PB1	ADC3	I/O	General Purpose I/O pin with Analog Capability. This pin has a range of 0-3.3V when used as an Analog Input, and is 3.3V tolerant only.
18	PC0	ADC4	I/O	General Purpose I/O pin with Analog Capability. This pin has a range of 0-3.3V when used as an Analog Input, and is 3.3V tolerant only.
19	PC1	ADC5	I/O	General Purpose I/O pin with Analog Capability. This pin has a range of 0-3.3V when used as an Analog Input, and is 3.3V tolerant only.

Note: I = Input, O = Output, P = Power

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2.2 Connector 9 (CN9) Pin Definition

Figure 3. CN9 Pin Definition

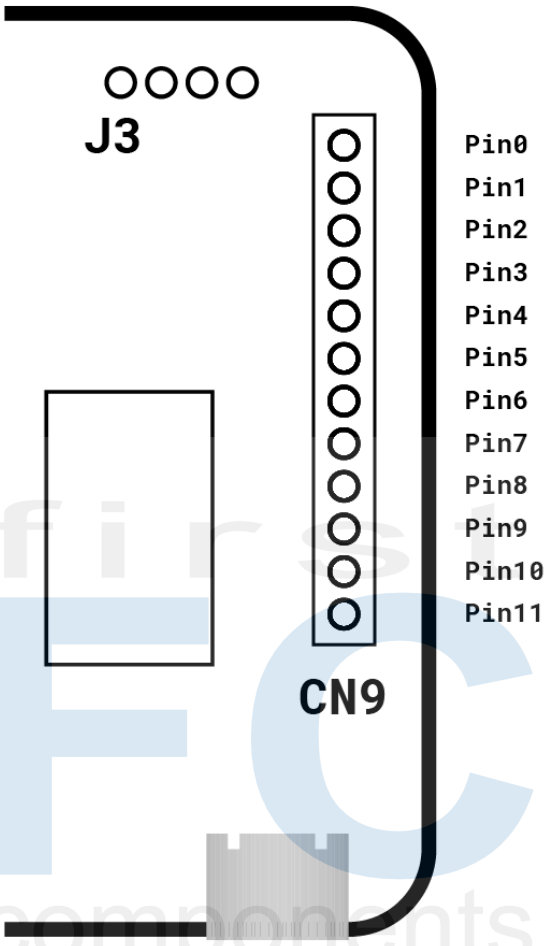


Table 4. CN9 Pin Definition

Pin Number	MCU Pin Name	Name	I/O	Description
0	-	DC5V	P	DC 5V output.
1	-	DC3.3V	P	DC 3.3V output.
2	-	GND	P	Supply Ground.
3	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	I	Reset signal. Active low.
4	PH4	I2C_SCL	O	I2C Clock signal.
5	PH5	I2C_SDA	I/O	I2C Data signal.
6	PF7	UART7_TX	I/O	TX for UART Asynchronous Serial Transmit pin, TTL level. Connect this pin to the Receive (Rx) signal of other serial devices. Used in conjunction with the UART_RX pin for communication with external MCU. This pin is tolerant up to 5.0V levels.

Pin Number	MCU Pin Name	Name	I/O	Description
7	PA8	UART7_RX	I/O	RX for UART Asynchronous Serial Receive pin, TTL level. Connect this pin to the Transmit (Tx) signal of other serial devices. Used in conjunction with the UART_TX pin for communication with external MCU. This pin is tolerant up to 5.0V levels.
8	PJ8	UART8_TX	I/O	TX for UART Asynchronous Serial Transmit pin, TTL level. Connect this pin to the Receive (Rx) signal of other serial devices. Used in conjunction with the UART_RX pin for communication with external MCU. This pin is tolerant up to 5.0V levels.
9	PJ9	UART8_RX	I/O	RX for UART Asynchronous Serial Receive pin, TTL level. Connect this pin to the Transmit (Tx) signal of other serial devices. Used in conjunction with the UART_TX pin for communication with external MCU. This pin is tolerant up to 5.0V levels.
10	PA2	PWM1_IC	I/O	This pin offers three different functions: GPIO, PWM and Input-capture.
11	PB0	PWM2_IC	I/O	This pin shares the same functionality as that of PWM1_IC. Please refer to PWM1_IC description for details.

Note: I = Input, O = Output, P = Power

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2.3 DC Power Connector Pin Definition

Figure 4. DC Power Connector Pin Definition

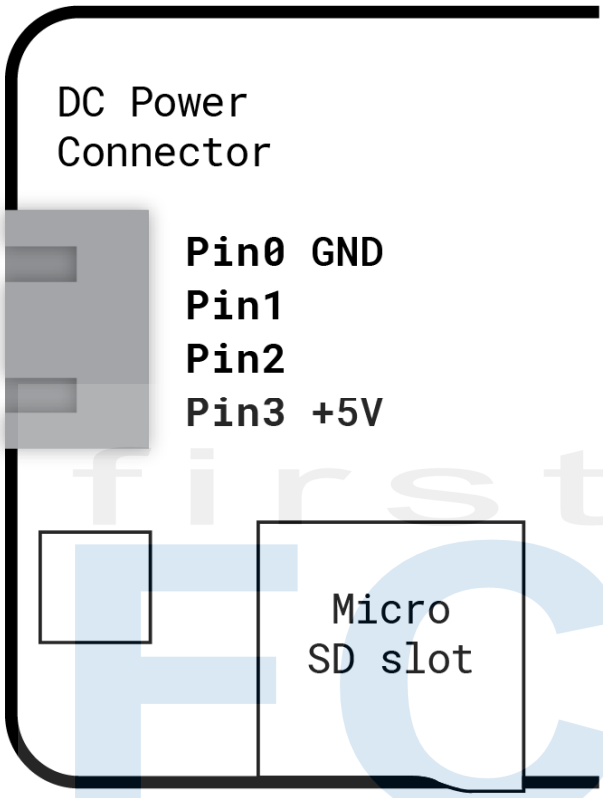


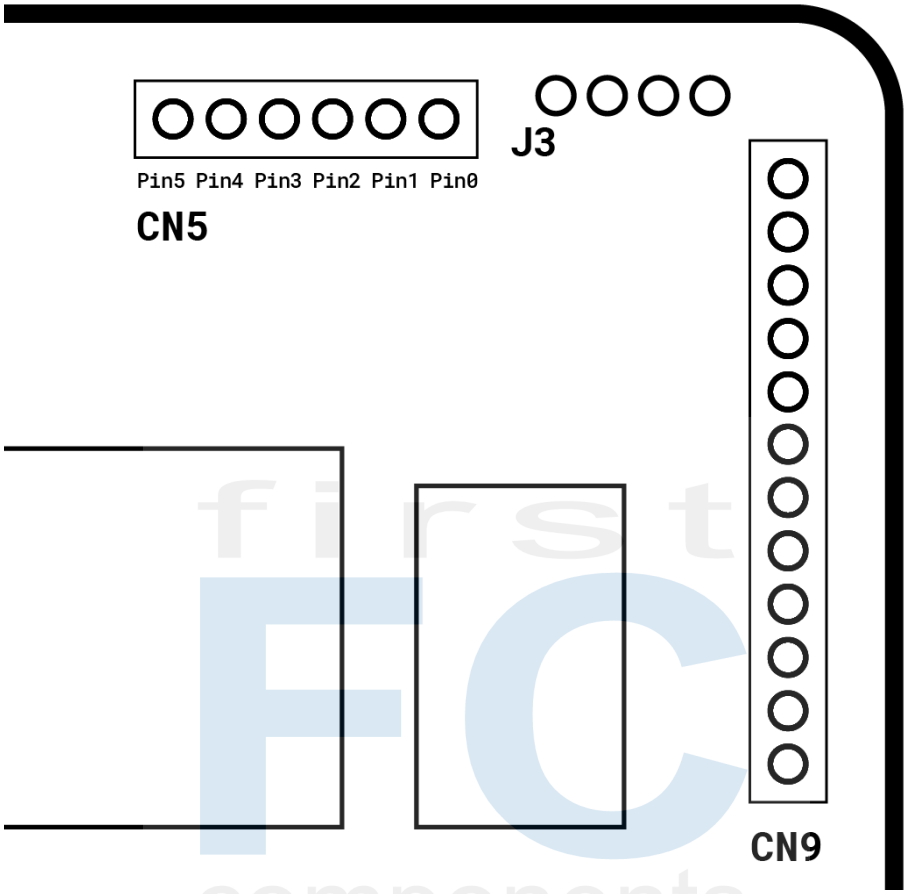
Table 5. DC Power Connector Pin Definition

Pin Number	MCU Pin Name	Name	I/O	Description
0	-	GND	P	Supply Ground.
1	PB12	UART5_RX	I/O	RX for UART Asynchronous Serial Receive pin, TTL level. Connect this pin to the Transmit (Tx) signal of other serial devices. Used in conjunction with the UART_TX pin for communication with external MCU. This pin is tolerant up to 5.0V levels.
2	PB13	UART5_TX	I/O	TX for UART Asynchronous Serial Transmit pin, TTL level. Connect this pin to the Receive (Rx) signal of other serial devices. Used in conjunction with the UART_RX pin for communication with external MCU. This pin is tolerant up to 5.0V levels.
3	-	+5V	P	DC 5V input.

Note: I = Input, O = Output, P = Power

2.4 Connector 5 (CN5) Pin Definition

Figure 5. CN5 Pin Definition



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Table 6. CN5 Pin Definition

Pin Number	MCU Pin Name	Name	I/O	Description
0	-	DC3.3V	P	DC 3.3V output.
1	PG10	SPI_CS	O	Serial enable pin. Active low
2	PA5	SPI_CLK	O	Serial Peripheral Interface clock.
3	PB5	SPI_MOSI	I/O	Serial data input/output.
4	PG9	SPI_MISO	I/O	Serial data input/output.
5	-	GND	P	Supply Ground.

Note: I = Input, O = Output, P = Power

2.5 Connector 3 (J3) Serial Wire Debug (SWD) Pin Definition

Figure 6. J3 Pin Definition

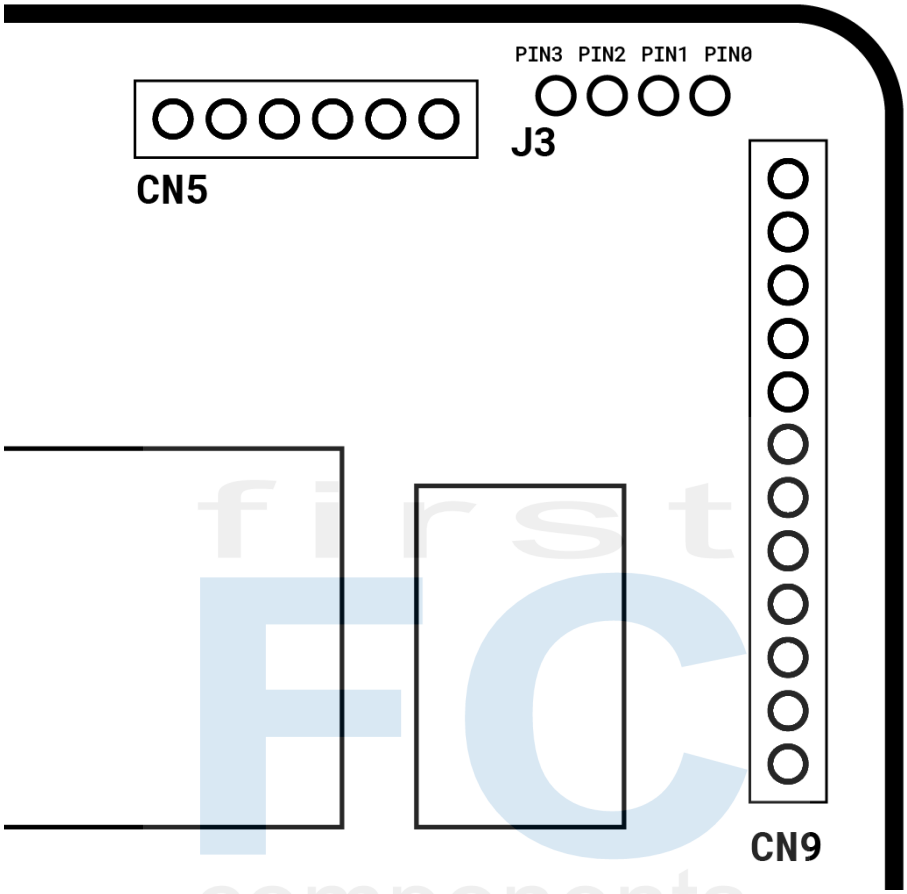


Table 7. J3 Pin Definition

Pin Number	MCU Pin Name	Name	I/O	Description
0	DC3.3V	DC3.3V	P	DC 3.3V input.
1	SWCLK	SWCLK	I	Serial wire clock.
2	GND	GND	P	Supply Ground.
3	SWDIO	SWDIO	I/O	Serial wire date in/out.

Note: I = Input, O = Output, P = Power

2.6 Micro USB Connector (OTG-CN) Pin Definition

Table 8. OTG-CN Pin Definition

Pin Number	MCU Pin Name	Name	I/O	Description
0	-	+5V	-	-
1	PA11	DM	-	-
2	PA12	DP	-	-
3	PA10	ID	-	-
4	GND	GND	-	-

Note: I = Input, O = Output, P = Power

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2.7 SD card connector (CN2) Pin Definition

Table 9. CN2 Pin Definition

Pin Number	MCU Pin Name	Name	I/O	Description
0	PC10	SDIO1-D2	-	-
1	PC11	SDIO1-D3	-	-
2	PD2	SDIO1-CMD	-	-
3	-	DC3.3V	-	-
4	PC12	SDIO1-CLK	-	-
5	GND	GND	-	-
6	PC8	SDIO1-D0	-	-
7	PC9	SDIO1-D1	-	-
8	PG14	SDIO1-CD	-	-

Note: I = Input, O = Output, P = Power

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3 Absolute Maximum Ratings

Table 10. Absolute Maximum Ratings

Item	Minimum	Maximum	Unit
Storage temperature	-30	+80	°C
Operating ambient temperature	-20	+70	°C
Input supply voltage with respect to GND	+4.75	+5.5	V
IO voltage with respect to GND	+3.3V (± 10%)	+5.0	V

Note: IO Voltage is specified under the no-pull configuration.

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4 Electrical Characteristics

4.1 DC Characteristics

The following table is measured when the control board is driving a 7" LCM @850cd/m^2.

Table 11. DC Characteristic

Symbol	Item	Minimum	Typical	Maximum	Unit
V_{IN}	Input power voltage	4.75	5.0	5.5	V
V_{DD}	Internal working voltage	3.0	3.3	3.5	V
	Operating current @100% backlight	920	950	–	mA
	Operating current @50% backlight	610	630	–	mA
	Operating current with backlight turned off	290	300	–	mA
V_{IH}	I/O input high level	$0.7V_{DD}$	–	5.0	V
V_{IL}	I/O input low level	0	–	$0.3V_{DD}$	V
V_{OH}	I/O output high level	V_{DD}-0.4	–	V_{DD}	V
V_{OL}	I/O output low level	0	–	$0.3V_{DD}$	V

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5 Mechanical Drawing

Figure 7. Mechanical Drawing for ID208048MC-070ABF with LCM from Vendor A

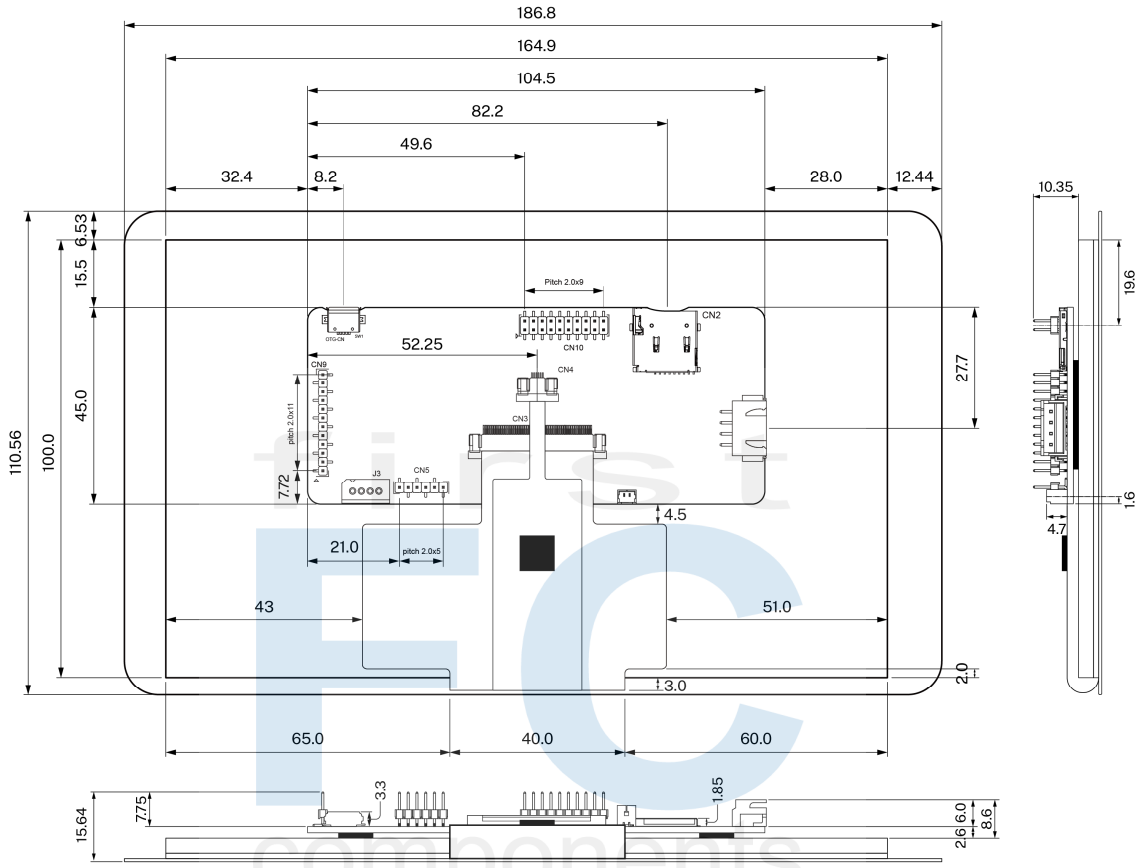
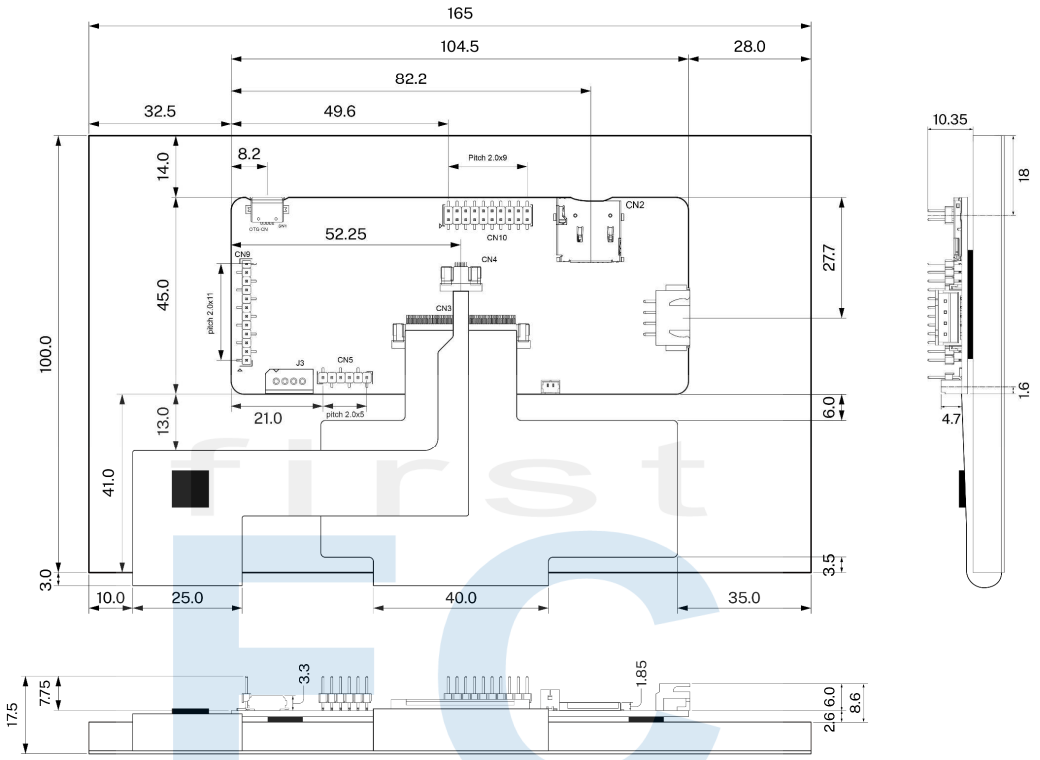


Figure 8. Mechanical Drawing for ID208048MC-070ABF with LCM from Vendor B



Note: We offer the LCMs from two different vendors for mitigating the supply constraint. When customers request samples or press orders, please contact our local distributor or sales@iot-hmi.com for discussing selection of the LCM.

6 IOT Product Nomenclature

This section describes IOT's product naming rule.

Table 12. IOT Product Naming Rule

Field	1	2	3	4	5	6	7	8	9	10	11	12	13	14
# of digits	1	2	3	2	1	1	1	1	3	1	1	1	1	1
Example	I	D2	080	48	M	C	X	-	070	A	B	F	-	X

Table 13. IOT Product Nomenclature

Field	# of digits	Description
1	1	I: Representing Immense Oak Technologies' company name.
2	2	D#: Product Line Name. The first digit is an alphabet and the second is a number.
3	3	Supported horizontal resolution with ones digit dropped.
4	2	The higher two digits of the supported vertical resolution.
5	1	Product offering type. M: PCB + TFT LCM P: PCB C: Chipset
6	1	Touch panel type. R: RTP C: CTP N: No touch control.
7	1	Reserved functional identifier. Can be omitted if not needed.
8	1	Separation hyphen.
9	3	TFT LCM dimensional information. 3 digits represent the tens, ones and tenths digit of the LCM diagonal domination in inches. For examples, 10.1" => 101, 4.7" => 047
10	1	Reserved for product serial number or functional identifier.
11	1	Backlight type. S: Viewable under the sun (> 1000cd/m^2) B: Bright backlight (< 1000cd/m^2, > 600cd/m^2) W: Regular backlight (< 600cd/m^2, > 300cd/m^2)
12	1	LCD type and its characteristics. Please refer to Table 14 for details.
13	1	Separation hyphen.
14	1	Reserved.

Note: For the control board part number, Field 7 and beyond are omitted.

Table 14. Field 12 of IOT Product Nomenclature

Transmissive	Panel Type and View Angle		Working Temperature
A	TN	6H	Commercial Grade -10°C ~ 60°C
B		12H	
C		O-film	
D	IPS		
E	VA		
F	TN	6H	Industrial Grade -20°C ~ 70°C
G		12H	
H		O-film	
J	IPS		
K	VA		
L	TN	6H	Automobile Grade -30°C ~ 80°C
M		12H	
N		O-film	
P	IPS		
Q	VA		

Note: TN = Twisted Nematic Panel, IPS = In-Plane Switching Panel, VA = Vertical Alignment Panel

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