



INDUSTRIAL SHIELDS

USER GUIDE

TOUCH PANEL PC 10.1"



Panel 10.1” User Guide:

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1 TOUCHBERRY PI 10.1" (Raspberry Pi 4B)

1.1 Controller Specifications:

Panel PC based on Raspberry Pi board, encasing a 10.1" resistive Touch Screen for industrial environment using Linux (Raspbian).

PANEL PC
10,1"

LINUX
LINUX OPERATION
SYSTEM

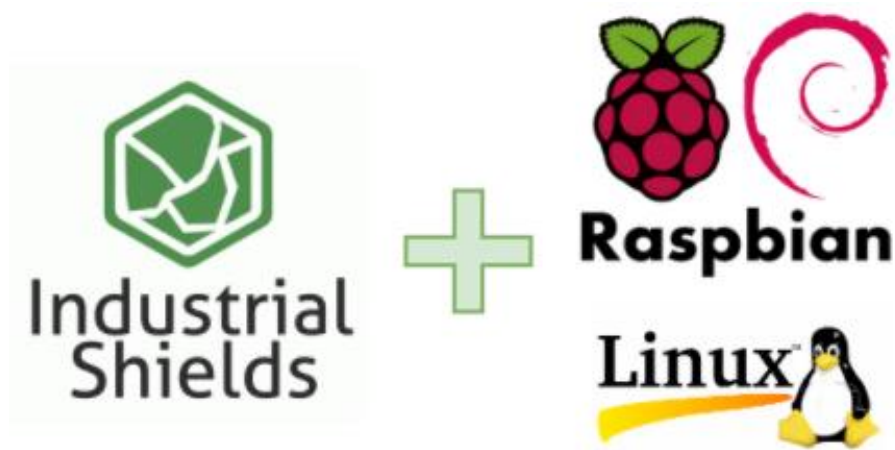
ARDUINO
Compatible with
Arduino IDE

COM
Industrial
Communications

| Board | Raspberry Pi 4B |
|------------------------|--|
| SoC | Broadcom BCM2837B0 |
| CPU | Quad core 64-bit ARM-Cortex A72 running at 1.5GHz |
| GPU | Broadcom VideoCore VI |
| USB | (2) x USB2 Ports + (2) x USB3 Ports |
| Storage | (1) x Micro SD / MMC / SDIO slot |
| Network Communication | 1x Gigabit Ethernet port (supports PoE with add-on PoE HAT) – (3) x TTL - SPI – I ² C |
| Wireless Communication | 802.11 b/g/n/ac Wireless LAN (2.4GHz and 5GHz) and Bluetooth 5.0 with BLE |
| Low level devices | 40-pin GPIO header, populated |
| IP Value | IP20 |
| GPIO Voltage | 3,3V |
| OS | Linux and Unix |



- This Panel PC is based on GNU/Linux OS installed on a SD card. It has many interfaces built in: Ethernet, USB, WiFi... Using the Ethernet port or WiFi network you can remotely control all parameters, data and inputs/outputs of your control system.
- Furthermore, Touchberry PI comprises enough I/Os to replace PLCs on simple automation applications.
- Open protocols not only allow communication with other Industrial Shields PLCs, but also third-party devices and machinery.
- In complex systems you can create a network between several TOUCHBERRY PI. Providing integral supervision and control solution for entire production plants and real-time data at hand.





1.2 Touchberry Pi 4 B I/Os Pinout

The Raspberry Pi 4 model B pinout:

Raspberry Pi 4 B J8 GPIO Header

| Pin# | NAME | | NAME | Pin# |
|------|---------------------------------|--|---------------------------------|------|
| 01 | 3.3v DC Power | | DC Power 5v | 02 |
| 03 | GPIO02 (SDA1, I ² C) | | DC Power 5v | 04 |
| 05 | GPIO03 (SCL1, I ² C) | | Ground | 06 |
| 07 | GPIO04 (GPCLK0) | | (TXD0, UART) GPIO14 | 08 |
| 09 | Ground | | (RXD0, UART) GPIO15 | 10 |
| 11 | GPIO17 | | (PWM0) GPIO18 | 12 |
| 13 | GPIO27 | | Ground | 14 |
| 15 | GPIO22 | | GPIO23 | 16 |
| 17 | 3.3v DC Power | | GPIO24 | 18 |
| 19 | GPIO10 (SPI0_MOSI) | | Ground | 20 |
| 21 | GPIO09 (SPI0_MISO) | | GPIO25 | 22 |
| 23 | GPIO11 (SPI0_CLK) | | (SPI0_CE0_N) GPIO08 | 24 |
| 25 | Ground | | (SPI0_CE1_N) GPIO07 | 26 |
| 27 | GPIO00 (SDA0, I ² C) | | (SCL0, I ² C) GPIO01 | 28 |
| 29 | GPIO05 | | Ground | 30 |
| 31 | GPIO06 | | (PWM0) GPIO12 | 32 |
| 33 | GPIO13 (PWM1) | | Ground | 34 |
| 35 | GPIO19 | | GPIO16 | 36 |
| 37 | GPIO26 | | GPIO20 | 38 |
| 39 | Ground | | GPIO21 | 40 |

Raspberry Pi 4 B J14 PoE Header

| | | | | |
|----|------|--|------|----|
| 01 | TR01 | | TR00 | 02 |
| 03 | TR03 | | TR02 | 04 |

Pinout Grouping Legend

| | | | |
|-------------------------------------|--|--|---|
| Inter-Integrated Circuit Serial Bus | | | Serial Peripheral Interface Bus |
| Ungrouped/Un-Allocated GPIO | | | Universal Asynchronous Receiver-Transmitter |
| Reserved for EEPROM | | | |

Rev. 2
19/06/2019 CGS

www.element14.com/RaspberryPi



Next it is showed a table connection between external DC-37 female connector Pinout and Raspberry Pi 4B Pinout:

| DC-37 | Raspberry Pi GPIO | DC-37 | Raspberry Pi GPIO | DC-37 | Raspberry Pi GPIO | DC-37 | Raspberry Pi GPIO | DC-37 | Raspberry Pi GPIO |
|--------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|
| 1 | 01 | 09 | 17 | 17 | 35 | 25 | 12 | 33 | 28 |
| 2 | 03 | 10 | 19 | 18 | 37 | 26 | 14 | 34 | 30 |
| 3 | 05 | 11 | 21 | 19 | 40 | 27 | 16 | 35 | 33 |
| 4 | 07 | 12 | 23 | 20 | 02 | 28 | 18 | 36 | 36 |
| 5 | 09 | 13 | 25 | 21 | 04 | 29 | 20 | 37 | 38 |
| 6 | 11 | 14 | 27 | 22 | 06 | 30 | 22 | 38 | - |
| 7 | 13 | 15 | 29 | 23 | 08 | 31 | 24 | 39 | - |
| 8 | 15 | 16 | 32 | 24 | 10 | 32 | 26 | 40 | - |



2 Tinker Touch S

2.1 Controller Specifications:

| Item | Tinker Board S |
|-------------------------------|-------------------------------------|
| CPU | Rockchip Quad-Core RK3288 processor |
| GPU | 2GB Dual Channel DDR3 |
| USB | 4x2.0 USB (1 is used for Touch) |
| Storage | Micro SD(TF) card slot |
| Network Communication | 10/100 Ethernet (RJ-45) |
| Wireless Communication | 802.11 b/g/n, Bluetooth V4.0 + EDR |
| Low level devices | 8x GPIO, SPI, I2C, UART |
| GPIO Voltage | 3,3V |
| OS | Linux Debian / Android |

PANEL PC
10,1"

LINUX
LINUX OPERATION SYSTEM

ARDUINO
Compatible with Arduino IDE

COM
Industrial Communications

- This Panel PC is based on GNU/Linux OS or on Android OS installed on a SD card. It has many interfaces built in: Ethernet, USB, UART....Using the Ethernet port network you can remotely control all parameters, data and inputs/outputs of your control system.
- Furthermore, Tinker Board S comprises enough I/Os to replace PLCs on simple automation applications.
- Open protocols not only allow communication with other Industrial Shields PLCs, but also third-party devices and machinery.
- In complex systems, you can create a network between several Tinker Board Touch S. Providing integral supervision and control solution for entire production plants and real-time data at hand.



ANDROID



debian



2.2 Tinker Board S I/Os Pinout

Tinker Board S pinout:

| GPIO.Setmode (GPIO.ASUS) | GPIO.Setmode (GPIO.BOARD) | Pinout | Physical Pin Number | Pinout | GPIO.Setmode (GPIO.BOARD) | GPIO.Setmode (GPIO.ASUS) |
|--------------------------|---------------------------|--------------------------|---------------------|--------------------|---------------------------|--------------------------|
| | 1 | VCC3.3V_IO | 1 2 | VCC5V_SYS | 2 | |
| 252 | 3 | GP8A4_I2C1_SDA | 3 4 | VCC5V_SYS | 4 | |
| 253 | 5 | GP8A5_I2C1_SCL | 5 6 | GND | 6 | |
| 17 | 7 | GPOC1_CLKOUT | 7 8 | GP5B1_UART1TX | 8 | 161 |
| | 9 | GND | 9 10 | GP5B0_UART1RX | 10 | 160 |
| 164 | 11 | GP5B4_SPI0CLK_UART4CTS | 11 12 | GP6A0_PCM/I2S_CLK | 12 | 184 |
| 166 | 13 | GP5B6_SPI0_TXD_UART4TX | 13 14 | GND | 14 | |
| 167 | 15 | GP5B7_SPI0_RXD_UART4RX | 15 16 | GP5B2_UART1CTS | 16 | 162 |
| | 17 | VCC33_IO | 17 18 | GP5B3_UART1RTSN | 18 | 163 |
| 257 | 19 | GP8B1_SPI2TXD | 19 20 | GND | 20 | |
| 256 | 21 | GP8B0_SPI2RXD | 21 22 | GP5C3 | 22 | 171 |
| 254 | 23 | GP8A6_SPI2CLK | 23 24 | GP8A7_SPI2CSN0 | 24 | 255 |
| | 25 | GND | 25 26 | GP8A3_SPI2CSN1 | 26 | 251 |
| 233 | 27 | GP7C1_I2C4_SDA | 27 28 | GP7C2_I2C4_SCL | 28 | 234 |
| 165 | 29 | GP5B5_SPI0CSN0_UART4RTSN | 29 30 | GND | 30 | |
| 168 | 31 | GP5C0_SPI0CSN1 | 31 32 | GP7C7_UART2TX_PWM3 | 32 | 239 |
| 238 | 33 | GP7C6_UART2RX_PWM2 | 33 34 | GND | 34 | |
| 185 | 35 | GP6A1_PCM/I2S_FS | 35 36 | GP7A7_UART3RX | 36 | 223 |
| 224 | 37 | GP7B0_UART3TX | 37 38 | GP6A3_PCM/I2S_SDI | 38 | 187 |
| | 39 | GND | 39 40 | GP6A4_PCM/I2S_SDO | 40 | 188 |

Next, a table connection between external DC-37 female connector Pinout and Tinker Board S Pinout is shown:

| Tinker Board S Pinout | External Pinout | DC-37 | External Pinout | DC-37 | External Pinout | DC-37 | External Pinout | DC-37 | External Pinout |
|-----------------------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|
| 1 | - | 09 | GND | 17 | - | 25 | GND | 33 | RS232RX |
| 2 | 5V+ | 10 | RXD | 18 | GPIO24 | 26 | CS1 | 34 | GND |
| 3 | SDA | 11 | RE | 19 | MOSI | 27 | - | 35 | GPIO19 |
| 4 | 5V+ | 12 | GPIO18 | 20 | GND | 28 | - | 36 | TTL RX |
| 5 | SCL | 13 | DE | 21 | MISO | 29 | GPIO05 | 37 | TTL TX |
| 6 | GND | 14 | GND | 22 | GPIO25 | 30 | GND | 38 | GPIO20 |
| 7 | GPIO4 | 15 | GPIO22 | 23 | SCLK | 31 | GPIO06 | 39 | GND |
| 8 | TXD | 16 | GPIO23 | 24 | CS0 | 32 | RS232TX | 40 | GPIO21 |



3 General Specifications

| Item | | Touch Panel 10.1" |
|---------------------------------|------------------------------|--|
| Power supply voltage | DC power supply | 12Vdc to 24Vdc |
| Power consumption | DC power supply | 22 VAC max. |
| External power supply | Power supply voltage | 12V (30W) // 24Vdc (30W) |
| | Power supply output capacity | 2.5A (12Vdc) // 1,25A (24Vdc) |
| Shock resistance | | 80m/s ² in the X, Y and Z direction 2 times each. |
| Ambient temperature (operating) | | 0° to 40°C |
| Ambient humidity (operating) | | 10% to 90% (no condensation) |
| Ambient environment (operating) | | With no corrosive gas |
| Ambient temperature (storage) | | -20° to 60°C |
| Power supply holding time | | 2ms min. |
| Weight | | 2.250 gr. |

4 Touch Screen Specifications

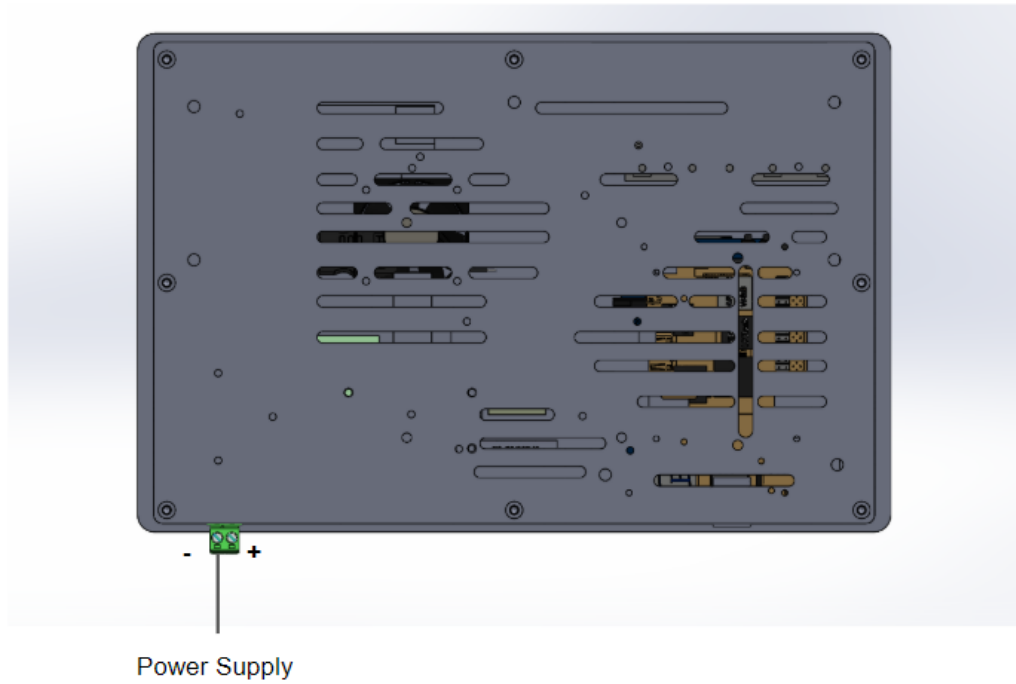
| Item | Touch Screen |
|------------------|---|
| Technology | Resistive Multitouch LVDS, 315 nits, 170° viewing angle |
| Image Resolution | 1280 x 720 |
| Format | 16:9 |
| Size | 10.1" |



5 Power Supply

DC Power Supply: 12V (30W) // 24Vdc (30W)

Current: 2.5A (12Vdc) // 1,25A (24Vdc)



Power supply: 12/24 Vdc

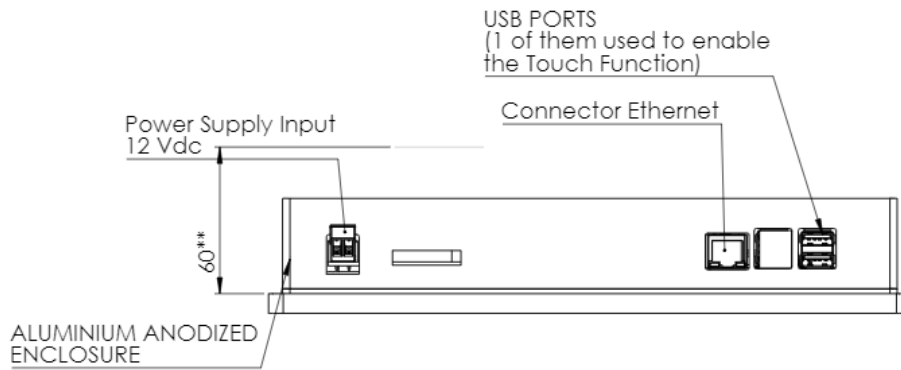


- Plug-in connector
- Pitch: 5,04 mm
- Two contact pins

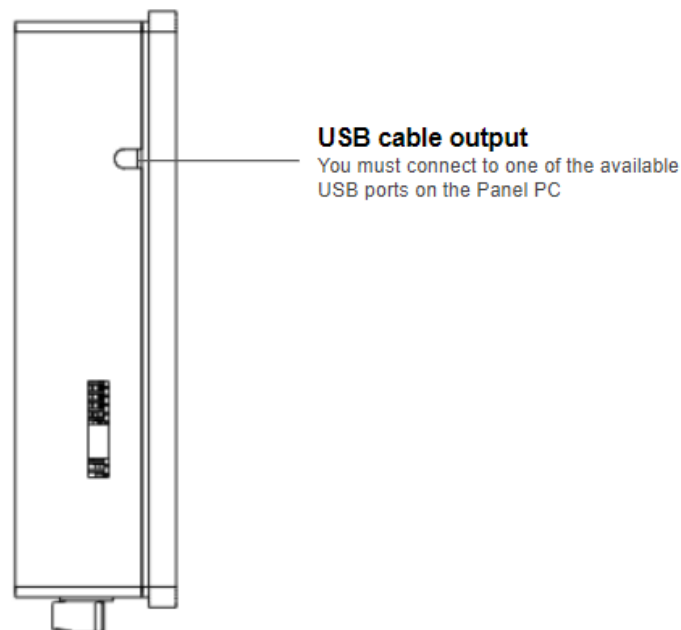


6 Communication Connections

The communication connections are located in the lower part of the panel, at the right part, as you can see in the image below:

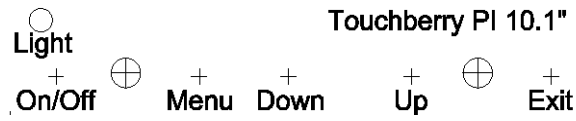


Ethernet and USB port connectors (One of the USB ports is connected in order to activate the attach function)





7 Screen configuration



Light: Operation indication led.

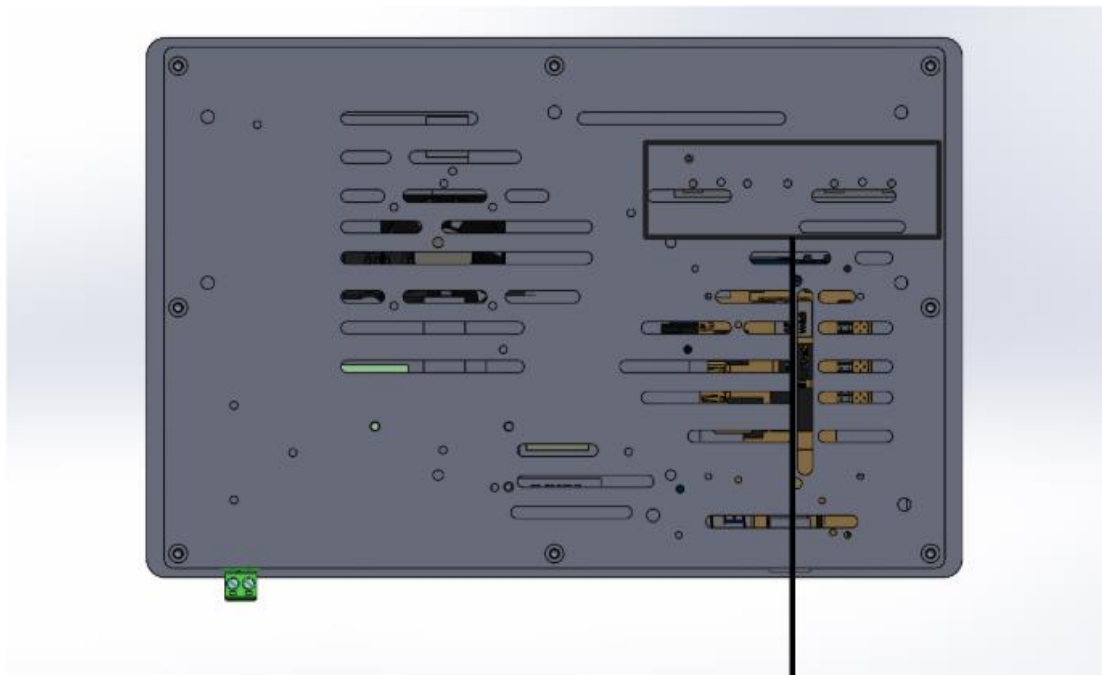
On/Off: Switch ON/OFF the device.

Menu: choose and select the configuration mode.

Down: move down on the configuration menu.

Up: move up on the configuration menu.

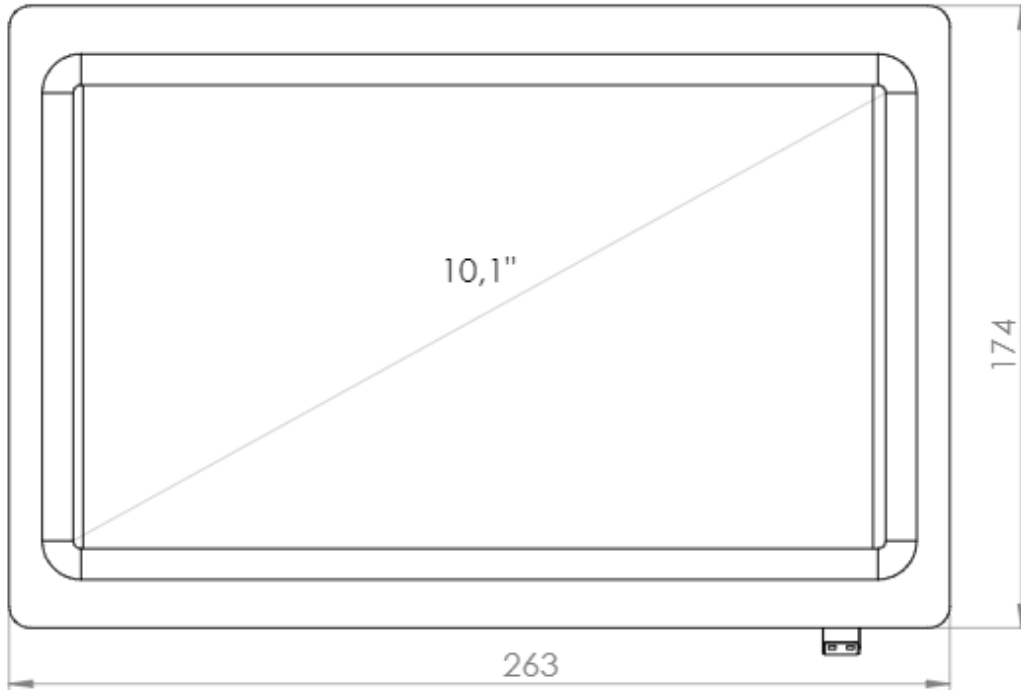
Exit: Select the screen operation mode (HDMI operation mode).

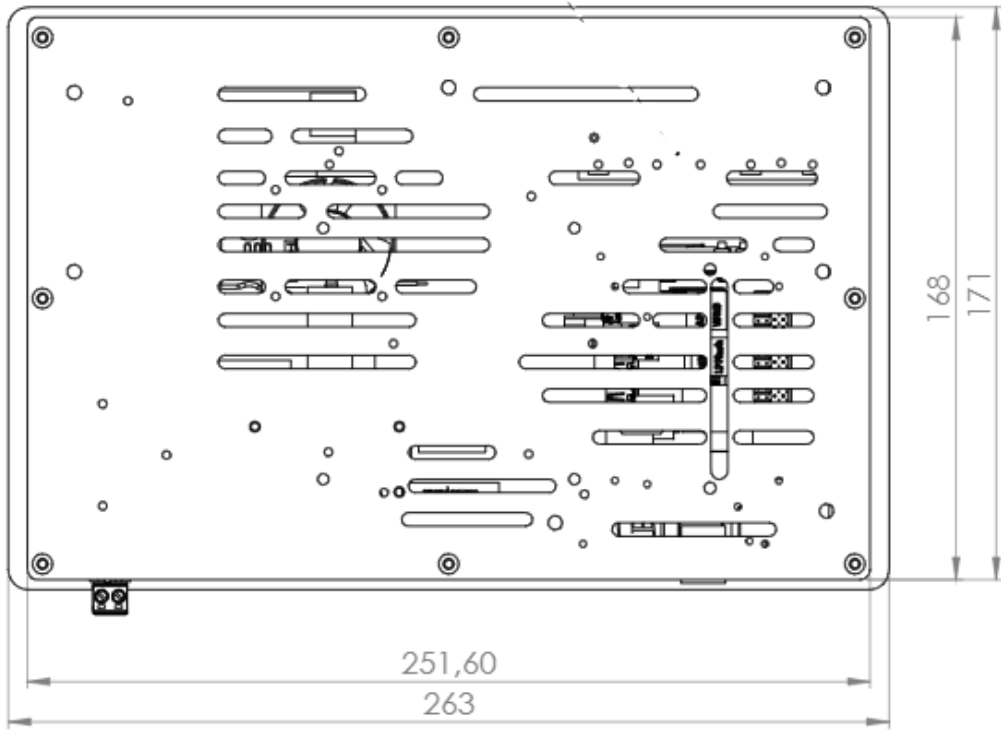


Screen menu
configuration buttons



8 Touch Panels PC 10.1" Size:







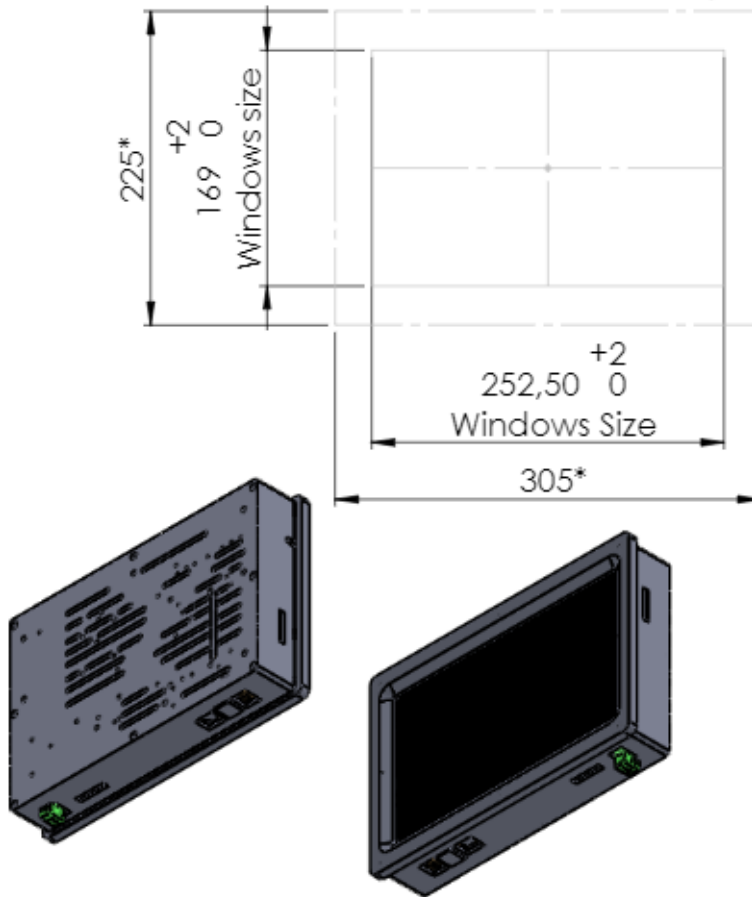
9 Mechanical assembly configuration:

9.1 Panel mounting

Mechanical assembly place (Dimensions in mm):

*NOTE: Space available for assembly. Free space of external elements.

**NOTE: See minimum depth required for right ventilation

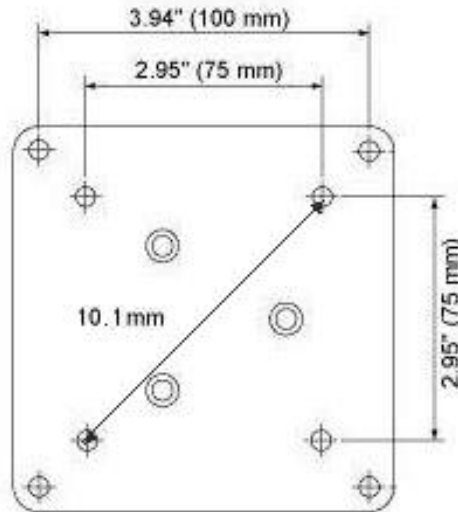




9.2 Standard VESA

Our panels are based on the VESA assembly standard (VESA 75 standard).

The VESA mount is not included with the device.



10 Operating System on Touch Panels

10.1 Debian

Debian is Unix-like computer operating system that is composed entirely of free software.



Raspbian, Bananian and Debian Jessie are shorts adaptations of Debian 8 for embedded systems. Debian has a long available row of packages. Also it is possible to develop your own applications, servers, web servers, etc. For example using Node Red, NodeJS, Qt libraries, DB SQL, Mongo DB, etc.

More information on: <https://www.debian.org/>

10.2 How to create apps

TouchBerry Pi:

These steps are based on how to download cross-compiler for Raspberry for your own applications.

* Qt, or text program compilations for Touchberry.

From a Linux PC, download "git" app.



From a console do:

```
$ yourpath> git clone https://github.com/raspberrypi/tools.git
```

Now, you have the cross-compiler for Raspberry. Export some variables, and add the compiler path to the environment path variable:

```
PATH=$PATH:<yourpath>/tools/arm-bcm2708/gcc-linaro-arm-linux-gnueabihf-  
raspbian/bin  
export ARCH=arm  
export CROSS_COMPILE=arm-linux-gnueabihf-
```

Now, you can compile your C++ program doing:

```
$> arm-linux-gnueabihf-g++ -o yourprogram yourprogram.cpp
```

If you want to create a project with Qt, you need compile the Qt sources for Raspberry. First, you will need to download for example:

<http://mirror.netcologne.de/qtproject/archive/qt/5.4/5.4.1/single/qt-everywhere-opensource-src-5.4.1.tar.gz>

Now with your arm-linux-... compiler, you can compile these sources for Raspberry. You can create a project with a Desktop Qt system. (Same as doing it for PC). Finally, you'll have to configure your Qt IDE in order to use the qt-everywhere sources compiled instead of the Desktop ones.

It'll result in a graphical program for the Touchberry Pi Model!

10.3 Other interesting available software

Also there are many software's available to run on Debian, next it is showed different link where you can see examples and how to use these software's, also on our blog there are interesting information regarding our Touch Panels:

Node JS: <http://blog.industrialshields.com/en/tcp-server-on-touchberry-pi-3-with-node-js/>

RapidScada: <http://blog.industrialshields.com/en/how-to-install-and-use-rapid-scada-on-touchberry-pi-and-bananatouch/>

Firmata: <http://blog.industrialshields.com/en/software-for-iot-solutions/>

Node-Red: <http://blog.industrialshields.com/en/software-for-iot-solutions/>



10.4 Android

Android is an Operating System Open Source developed by Google, based on Linux kernel and designed primarily for touchscreen mobile device such smartphones and tablets. Android on Industrial Shields Touch Panel PC's functionality is like an Android tablet.

Android software can only work on the TinkerTouch S Panel PC model, but it's not allowed on the Touchberry Pi 4B Model.

11 Kiosk Mode on Panel Touch 10.1”

On Raspbian / Linux:

Procedure

- 1- Locate the autostart file into `/home/pi/.config/lxsession/LXDE-pi/autostart`
- 2- Remove the content of the autostart file
- 3- Add a line to the autostart file with the browser command in kiosk mode prefixed by an @:
`@chromium-browser --kiosk --app= http://127.0.0.1:8080`
- 4- Reboot the rpi

Fast way

- 1- Execute the next line command:

```
echo "@chromium-browser --kiosk --app=http://127.0.0.1:8080" >
/home/pi/.config/lxsession/LXDE-pi/autostart
```



12 Revision Table

| Revision Number | Date | Changes |
|-----------------|------------|---|
| 0 | 15/09/2019 | First implementation |
| 1 | 17/12/2019 | Touchberry PI: The internal Raspberry PI 3B+ has been changed for the Raspberry PI 4B model |
| 2 | 21/04/2022 | Tinker Board S model update |
| 3 | 09/09/2022 | Change on Section 9.2 |
| | | |
| | | |
| | | |