Pi Touch Display Kit User Guide

September 2019

Revision 001

SPTM20XP *Strato Pi Mini Touch Display Kit*
SPTB21XP *Strato Pi Base Touch Display Kit*
SPTU21XP *Strato Pi UPS Touch Display Kit*
IPTB13RP *Iono Pi Touch Display Kit*

SFERALABS

Safety information	3
Qualified personnel	3
Hazard levels	3
Safety instructions	4
General safety instructions	4
Battery and external rechargeable battery	4
Introduction	6
Kit Components	7
Features	8
Usage and connections	9
Hardware installation	9
microSD installation	9
Power supply	10
Wiring and GPIO operations	10
Replacing the RTC backup battery	10
Software installation	11
Technical specifications	12
Dimensions	13
Disposal	14
Installation and use restrictions	14
Standards and regulations	14
Safety instructions	14
Set-up	14
Conformity Information	15

Be sure to always remove the power supply before handling the kit. Don't touch any components on the Raspberry Pi card or other cards while the device is on.

Follow all applicable electrical safety standards, guidelines, specifications and regulations for installation, wiring and operations of the Pi Touch Display Kit.

Carefully and fully read this user guide before installation.

The Pi Touch Display Kit is not authorised for use in safety-critical applications where a failure of the product would reasonably be expected to cause personal injury or death. Safety-critical applications include, without limitation, life support devices and systems, equipment or systems for the operation of nuclear facilities and weapons systems. The kit is neither designed nor intended for use in critical military or aerospace applications or environments and for automotive applications or environment. Customer acknowledges and agrees that any such use of the Pi Touch Display Kit is solely at Customer's risk, and that Customer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

Sfera Labs S.r.l. may make changes to specifications and product descriptions at any time, without notice. The product information on the web site or materials is subject to change without notice.

Please download and read the Terms and Conditions document available at:

http://www.sferalabs.cc

Strato, Iono and Sfera Labs are trademarks of Sfera Labs S.r.l. Other brands and names may be claimed as the property of others.

Copyright © 2019 Sfera Labs S.r.l. All rights reserved.

Safety information

Carefully and fully read this user guide before installation and retain it for future reference.

Qualified personnel

The product described in this manual must be operated only by personnel qualified for the specific task and installation environment, in accordance with all relevant documentation and safety instructions. A qualified person should be capable of fully identifying all installation and operation risks and avoid potential hazards when working with this product.

Hazard levels

This manual contains information you must observe to ensure your personal safety and prevent damage to property. Safety information in this manual are highlighted by the safety symbols below, graded according to the degree of danger.

DANGER

Indicates a hazardous situation which, if not avoided, **will** result in death or serious personal injury.

WARNING

Indicates a hazardous situation which, if not avoided, **may** result in death or serious personal injury.

CAUTION

Indicates a hazardous situation which, if not avoided, can result in minor or moderate personal injury.

NOTICE

Indicates a situation which, if not avoided, can result in damage of property.

Safety instructions

General safety instructions

Protect the unit against moisture, dirt and any kind of damage during transport, storage and operation. Do not operate the unit outside the specified technical data.

Never open the housing. If not otherwise specified, install in closed housing (e.g. distribution cabinet). Earth the unit at the terminals provided, if existing, for this purpose. Do not obstruct cooling of the unit. Keep out of the reach of children.

WARNING

Life threatening voltages are present within and around an open control cabinet.

When installing this product in a control cabinet or any other areas where dangerous voltages are present, always switch off the power supply to the cabinet or equipment.

WARNING

Risk of fire if not installed and operated properly.

Follow all applicable electrical safety standards, guidelines, specifications and regulations for installation, wiring and operations of this product.

The Raspberry Pi board could generate a substantial amount of heat when the software forces the CPU and/or GPU to operate at high load levels. Ensure that the product is properly installed and ventilated to prevent overheat.

NOTICE

The connection of expansion devices to this product may damage the product and other connected systems, and may violate safety rules and regulations regarding radio interference and electromagnetic compatibility.

Use only appropriate tools when installing this product. Using excessive force with tools may damage the product, alter its characteristics or degrade its safety.

Battery and external rechargeable battery

This product uses a small lithium non-rechargeable battery to power its internal real time clock (RTC). It also optionally uses an external rechargeable lead-acid battery for the uninterruptible power supply.

WARNING

Improper handling of lithium and lead-acid batteries can result in an explosion of the batteries and/or release of harmful substances.

Worn-out or defective batteries can compromise the function of this product.

Replace the RTC lithium battery before it is completely discharged. The lithium battery must be replaced only with an identical battery. See the "Replacing the RTC backup battery" section for instructions.

Do not throw lithium batteries into fire, do not solder on the cell body, do not recharge, do not open, do not short-circuit, do not reverse polarity, do not heat above 100°C and protect from direct sunlight, moisture and condensation.

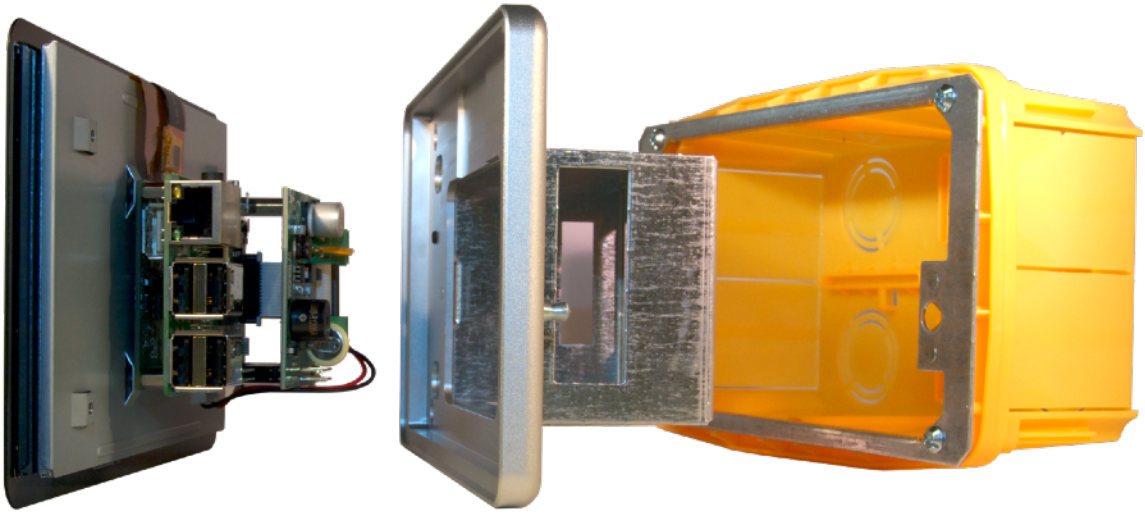
Only use a lead-acid battery with electrical ratings recommended in the technical specifications for this product.

Follow the battery manufacturer's instructions when installing the external UPS battery (not provided).

Dispose of used batteries according to local regulations and the battery manufacturer's instructions.

Introduction

The Pi Touch Display Kit is a factory-assembled touch panel computer kit based on the Raspberry Pi computer board, the Raspberry Pi 7” Touch Display and the Strato Pi board (Mini, Base or UPS version) or the Iono Pi board, enclosed in a rugged, high-quality aluminium and steel chassis, that can be installed in-wall with its optional back-box mount.



Kit Components

The kit is composed of:

- Pi Touch Display Mechanical Kit (XPTM10X)
- Raspberry Pi version 3 model B+
- Raspberry Pi Touch Display
- Strato Pi board (SPBM20X, SPBB21X, or SPBU21X) or Iono Pi board (IPBB13R)
- Optional Wall Mount Back Box (XPTB10X).

Features

With Strato Pi Mini board:

- ✓ 12-28Vdc power supply, with surge and reverse polarity protection
- ✓ power supply on a screw terminal block
- ✓ on-board power supply LED indicator
- ✓ real time clock with replaceable CR1025 Lithium / Manganese Dioxide back-up battery.

With Strato Pi Base board:

- ✓ all features of Strato Pi Mini board
- ✓ standard RS-232 and RS-485 interfaces to the Raspberry Pi serial line, with opto-isolator and electrostatic discharge protection
- ✓ on-board LEDs for serial line activity
- ✓ serial connections on a screw terminal block
- ✓ hardware watchdog implemented in the Strato Pi board, fully independent from the Raspberry Pi, controlled via GPIO
- ✓ on-board buzzer, connected to an I/O pin of the Raspberry Pi board, for acoustic feedback.

With Strato Pi UPS board:

- ✓ all features of Strato Pi Base board
- ✓ integrated uninterruptible power supply, with external lead-acid 12V battery
- ✓ simple UPS status and control via the I/O pins of the Raspberry Pi board
- ✓ on-board LED for battery operations status.

With Iono Pi board:

- ✓ all features of Strato Pi Mini board
- ✓ 4 power relay outputs rated for 6A at 250V
- ✓ 2 analog voltage inputs 0÷30V
- ✓ 2 analog voltage inputs 0÷3V on internal pin-headers
- ✓ 7 configurable digital input/output pins
- ✓ 1-Wire and Wiegand support
- ✓ GPIO-controlled on-board LED.

Usage and connections

Hardware installation

The Pi Touch Display Kit is shipped fully assembled. You will only have to access the Raspberry Pi board to install your microSD card, and connect the power and other optional cables.

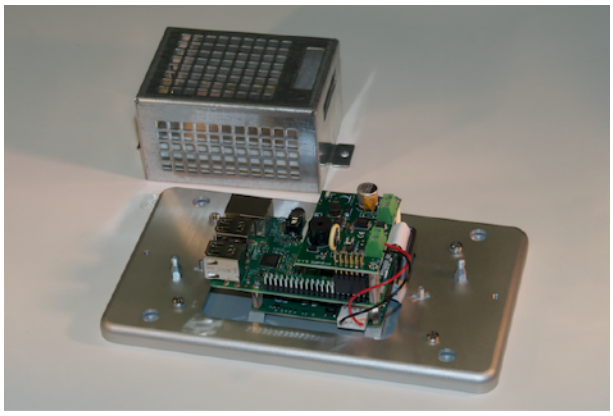
Two M4 threaded holes in the back of the display panel are available to screw the display directly to a panel board. A optional back box is also available for in-wall installations.

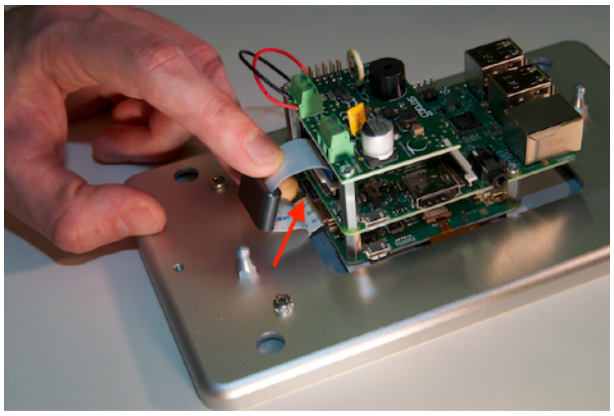
NOTICE

Before opening the case, disconnect all power sources, any connection to external devices, including USB cables, and disconnect the UPS external battery.

microSD installation

As the microSD socket is behind the flat cable that connects the Pi board with the display control board, there is no direct access to the microSD socket when the kit is assembled. You will need to remove the back steel cradle to expose the electronic boards to insert and extract the microSD card.





1. Remove power and disconnect all other connections to the Pi Touch Display Kit
2. Lay the Pi Touch Display Kit face down on a soft surface to avoid scratching
3. Unscrew the two lock nuts to free the back cradle from the aluminium display frame
4. Gently lift the cradle; pay attention not to damage the boards and connectors
5. Locate the microSD card socket, on the Raspberry Pi board, directly behind the white flat cable. The flat cable has a large ferrite toroid around it. It is not a problem if the toroid slides up or down, but never remove the toroid
6. Gently move the cable to have enough room to insert the microSD card in its socket; the card should be inserted with its contacts facing up (toward the back of the unit)
7. Once the card is installed, check that the flat cable is still firmly connected on both sides; if not, gently lift the connector's locks, replace the cable and push the locks back in position
8. Ensure that the toroid is not directly in contact with the microSD card, to avoid damage to the card when the cradle is re-installed
9. Gently place the cradle back, aligning the mounting screws on the sides; pay attention not to damage the boards, connectors, and internal cables
10. Screw the two lock nuts.

Power supply

The Pi Touch Display Kit can be powered with DC voltage only through the terminal block of the installed Strato Pi or Iono Pi board:

✓ DC: nominal voltage range 12V to 28V.

Respect the correct polarity shown in the schematic diagram (+ -) of the board. The power supply circuit implements reverse polarity protection using an auto resetting fuse and surge protection.

Never connect the Raspberry Pi micro-USB power plug.

Refer to the user guide of the installed Strato Pi or Iono Pi board for more details.

Wiring and GPIO operations

Refer to the appropriate Strato Pi or Iono Pi board user guide for detailed instructions.

Replacing the RTC backup battery

Both the Strato Pi and the Iono Pi boards have a hardware real time clock with a dedicated long-life non-rechargeable back-up battery.

The battery is only used to power the RTC chip when power is not available (when the Raspberry Pi is off). Depending on operating conditions it should last up to two years if not powered, more if the board receives external power.

Refer to the appropriate Strato Pi or Iono Pi board user guide for detailed instructions on replacing the RTC backup battery.

WARNING

Improper handling of lithium batteries can result in an explosion of the batteries and/or release of harmful substances.

Worn-out or defective batteries can compromise the function of this product.

KEEP OUT OF REACH OF CHILDREN. Swallowing may lead to serious injury or death in as little as 2 hours due to chemical burns and potential perforation of the esophagus. Immediately see doctor.

Replace the RTC lithium battery before it is completely discharged. Replace the battery every 5 years even if the battery is still working properly. The lithium battery must be replaced only with an identical **CR1025** Lithium / Manganese Dioxide (Li/MnO2) battery.

Do not throw lithium batteries into fire, do not solder on the cell body, do not recharge, do not open, do not short-circuit, do not reverse polarity, do not heat above 100°C and protect from direct sunlight, moisture and condensation.

Dispose of used batteries according to local regulations and the battery manufacturer's instructions.

NOTICE

Before opening the case, disconnect all power sources, any connection to external devices, including USB cables, and disconnect the UPS external battery.

Use a non-conductive pin or small tool to help extract the battery from its holder. Insert the new battery with a gentle push. You don't need tools to insert the battery. The battery is held into place by a spring contact.

Be sure to insert the battery so that the positive (+) terminal of the battery is in contact with the outer body of the battery holder, and the negative (-) terminal is in contact with the contact pad of the circuit board.

Reversing the battery polarity may damage the product.

The real time clock will reset its time immediately when the RTC backup battery is disconnected.

Software installation

Refer to the software installation section of the Strato Pi or Iono Pi user guide for detailed software installation and troubleshooting instructions.

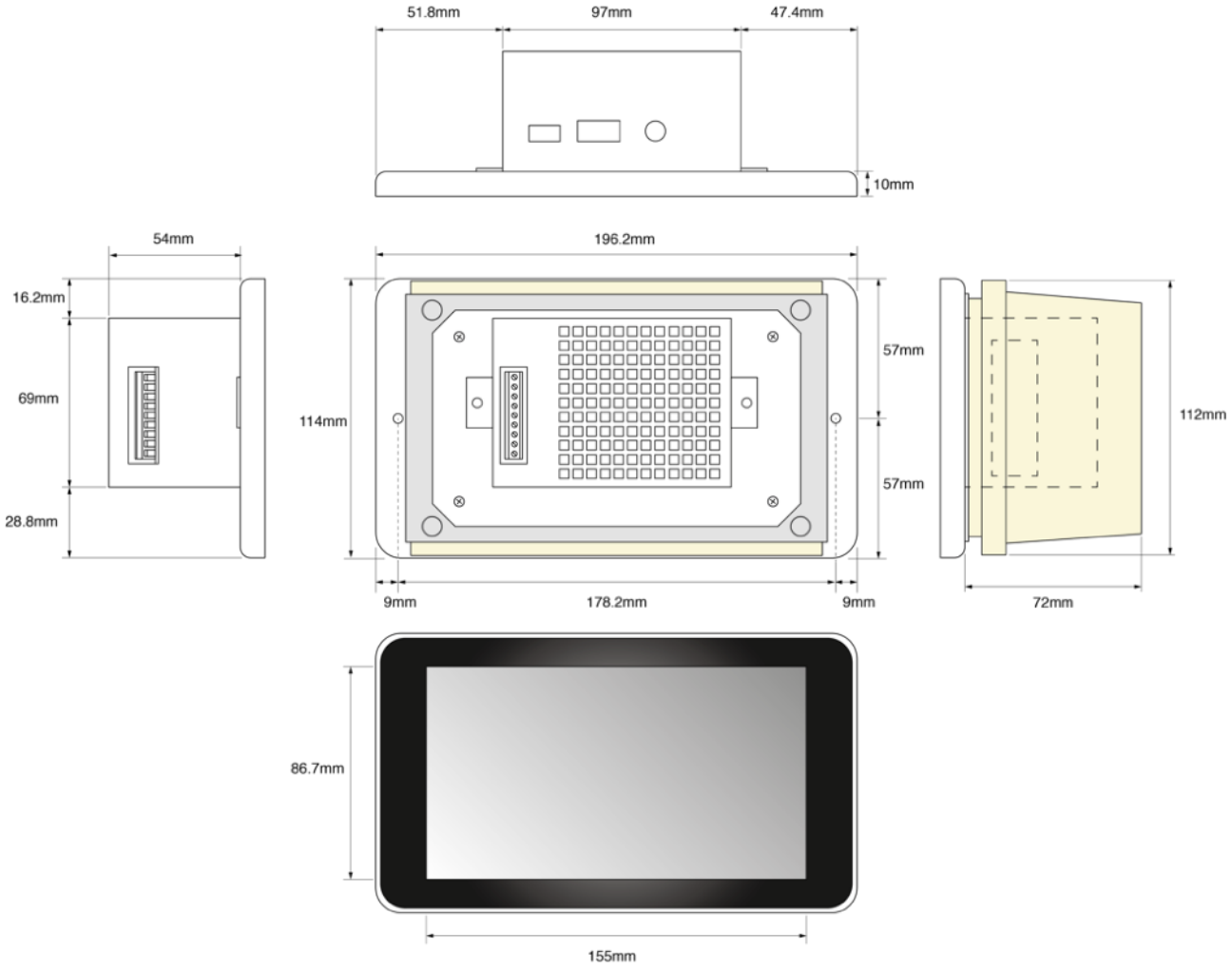
The display and touch sensor unit used in Strato Pi Touch Display is the original 7” touch display developed by the Raspberry Pi Foundation. Refer to the raspberrypi.org website for additional software installation instructions.

Technical specifications

Power supply	12...28V⎓ (VDC) Reverse polarity protection with auto resetting fuse. Surge protection up to ±500V/2ohms 1.2/50µs
5Vcc maximum output current (Ta 22 °C)	1.8 A @ 12V PS 2.0 A @ 24V PS
Typical current consumption at VS+=12V⎓ including Raspberry Pi 3 current, with low CPU/GPU load and no USB devices connected	530mA w/o Ethernet and battery 550mA with Ethernet and battery Actual current consumption may vary based on working conditions
Typical current consumption at VS+=24V⎓ including Raspberry Pi 3 current, with low CPU/GPU load and no USB devices connected	300mA w/o Ethernet and battery 310mA with Ethernet and battery Actual current consumption may vary based on working conditions
Raspberry platform compatibility	Pi 3 Model B/B+
Raspberry Touch Display	display size: 7” diagonal resolution: 800 x 400 touch panel: 10-finger multi-touch
Operating temperature	0…+50 °C
Storage temperature	-20…+70 °C
Protection degree	IP20

Refer to the user guide of the installed Strato Pi or Iono Pi board for the relative technical specifications.

Dimensions


51.8mm
97mm
47.4mm
10mm
54mm
16.2mm
69mm
28.8mm
196.2mm
114mm
57mm
57mm
9mm
178.2mm
9mm
112mm
72mm
86.7mm
155mm

Disposal

Waste Electrical & Electronic Equipment

(Applicable in the European Union and other European countries with separate collection systems). This marking on the product, accessories or literature indicates that the product should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources. Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

The Pi Touch Display Kit contains a small non rechargeable manganese dioxide lithium coin battery. The battery is not accessible from the outside. You should first remove the back steel cradle to gain access to the circuit board. Always remove the battery before disposing of this product.

Installation and use restrictions

Standards and regulations

The design and the setting up of electrical systems must be performed according to the relevant standards, guidelines, specifications and regulations of the relevant country. The installation, configuration and programming of the devices must be carried out by trained personnel.

The installation and wiring of connected devices must be performed according to the recommendations of the manufacturers (reported on the specific data sheet of the product) and according to the applicable standards.

All the relevant safety regulations, e.g. accident prevention regulations, law on technical work equipment, must also be observed.

Safety instructions

Carefully read the safety information section at the beginning of this document.

Set-up

For the first installation of the device proceed according to the following procedure:

- ✓ make sure all power supplies and the external battery are disconnected
- ✓ install and wire the device according to the schematic diagrams on the specific product user guide
- ✓ after completing the previous steps, switch on the power supply and other related circuits.

Conformity Information

The Pi Touch Display Mechanical Kit (XPTM10X) and the Wall Mount Back Box (XPTB10X) comply with the essential requirements of the 2011/65/EU and 2015/863/EU (RoHS) directives and harmonised standard.

The declaration of conformity is available on the Internet at the following address: https://dev.sferalabs.cc/pi-touch-display

Refer to the documentation of the additional components for the relative conformity information.