

MANUAL

Portable lab box
for international roaming & interconnect testing

Introduction | Components | Maintenance | Error detection | Support

Version 01/12/2024



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Portable lab box for international roaming and interconnect testing


Version: 01/12/2024


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HANDLE WITH
CARE
THIS WAY UP
FRAGILE

 QITASC
www.qitasc.com

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Introduction

The portable lab box is specifically designed to meet the needs of international roaming and interconnect testing. It can be deployed anywhere, eliminating the need for testers to be physically present in the lab.

Inside each portable lab box you'll find mobile phones, hardware developed by QiTASC for remote testing, 3D-printed components, a phone hub, a fan and commercially available elements such as sockets or cables.

Operating the box requires only a power source and a wired internet connection. The box does not emit any radiation.

This manual provides comprehensive instructions on how to handle and troubleshoot potential issues with the box and the technology inside. For more information, visit www.qitasc.com.

List of contents:

The package contains the following:

- ⇒ Portable lab box for IR testing
- ⇒ Power cable, 5 metres, black
- ⇒ LAN cable, 7.5 metres, red
- ⇒ Manual
- ⇒ Optional: Region-specific power adapters

Checking for damage

Before starting, check the box and its contents for visible damage. Ensure that the contents are complete. If a component is missing or damaged, contact the QiTASC team immediately for replacements. Do not use any device that appears to be damaged.

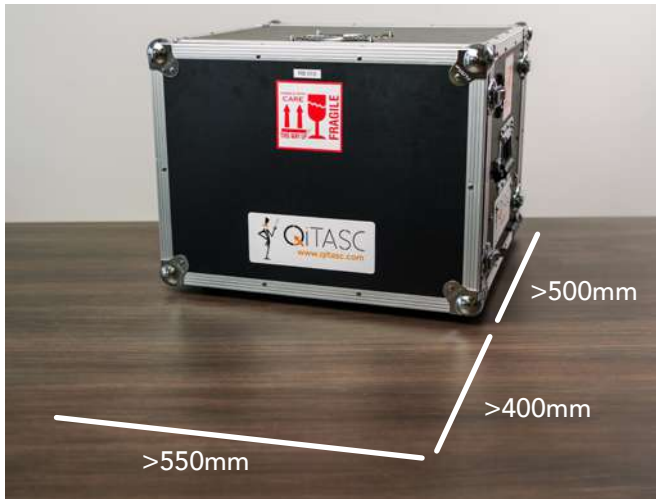
Getting started



- 1 Find a suitable spot with a power source and LAN: Find a dry, flat surface of at least 550 mm x 900 mm to place the box on. You'll need a power supply of 150 watts and a stable internet connection nearby.

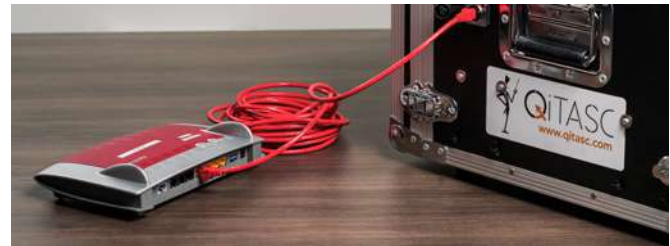


- 2 Unpack the box: Cut the tape at the top of the package, taking care not to cut too deep to avoid damaging the contents. Open the package and remove the packing material.



- 3 **Position the box:** Position the portable lab box where signal strength is at least -100 dBm for the relevant network operator. Make sure you leave at least 400 mm in front of the box to allow room to open the front cover and pull out the extendible drawer if needed.

QiTASC tip: Position the box on the floor to prevent anything from falling.



- 4 **Provide internet:** Use the LAN cable provided. Plug one end into your modem and the other end into the box's LAN port.



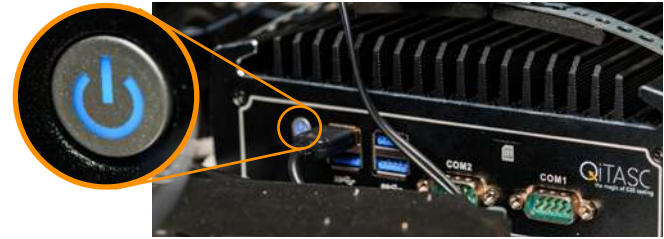
- 5 **Provide power to the box:** Use the power supply cable provided. Plug the cable into the box and the connector into a socket nearby. If your box has a power switch next to the power plug, switch it on. Now the components inside the box have power. You'll hear a beep from the IPS inside the box.



Socket strip is on: A bright green light signals that the strip is on. If there is no light, switch on the strip.



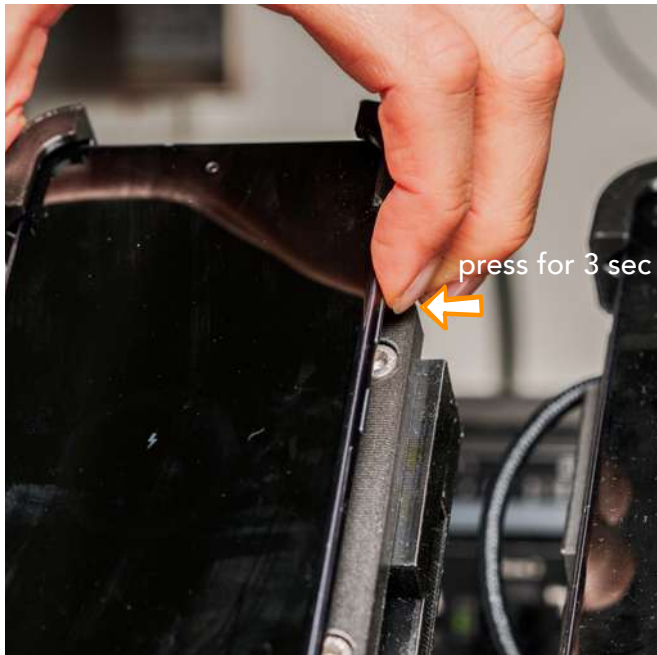
Circuit breaker has tripped: To reset the trip switch, press the orange button. If you accidentally touch the yellow switch, press the orange button again. You can feel and hear a click when the switches are pressed properly. A small, red light comes on.



IPS is on: Open the front cover of the box. Look inside. If the IPS is on, its power switch on the front shines blue.



Phone hub is running: The lights at the front of the phone hub are covered by the phones so you'll need to check the lights at the back. To see them, remove the back cover of the box or pull out the extendible drawer.

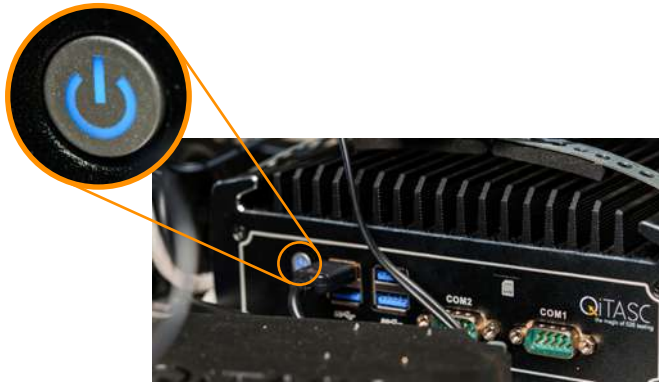


- 6 **Start the mobile phones:** Press the button on the right side of each phone for three seconds to switch them on. No other action is necessary. The phones are already connected when delivered.



- 7 **Confirm:** Confirm the setup and activation of the portable box at your location by email to internationalroaming@qitasc.com and give us the following information:
 - ⇒ Location of the portable lab box
 - ⇒ Power and internet are provided
 - ⇒ IPS and phone hub are runningWith the final confirmation from the QiTASC office, the box is active and part of the global remote QiTASC testing network.

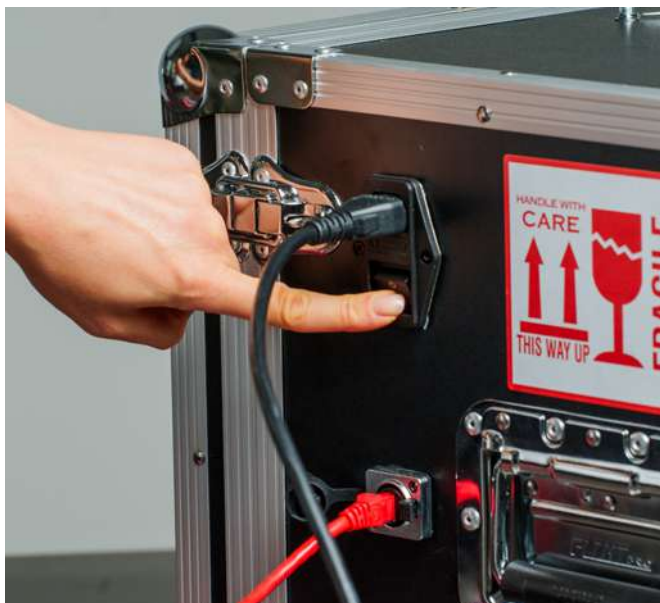
Restarting the box



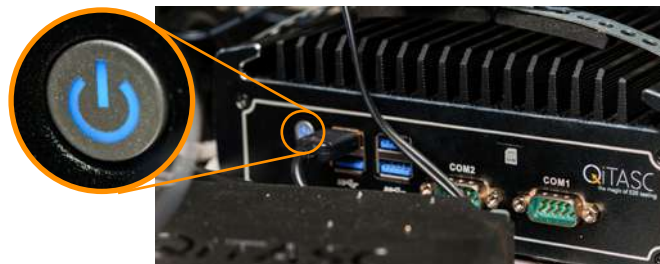
- 1 **Switch off the IPS:** Press the illuminated blue power switch of the IPS for three seconds. The blue light goes out. Wait for 30 seconds until the IPS has finished all operations and shut down.



- 2 **Disconnect the power supply:** If your box has a power switch, switch it off. Otherwise, unplug the connector from the socket. The hardware components of the box are now disconnected from the power supply.



- 3 **Power for restarting:** After disconnecting from the power supply, wait for 10 seconds. Then you can restart the box by plugging the connector into the socket. If your box has a power switch next to the power plug, switch it on.



- 4 **IPS is on:** Remove the front cover of the box. Look inside. When the IPS is on, its power switch at the front shines blue.



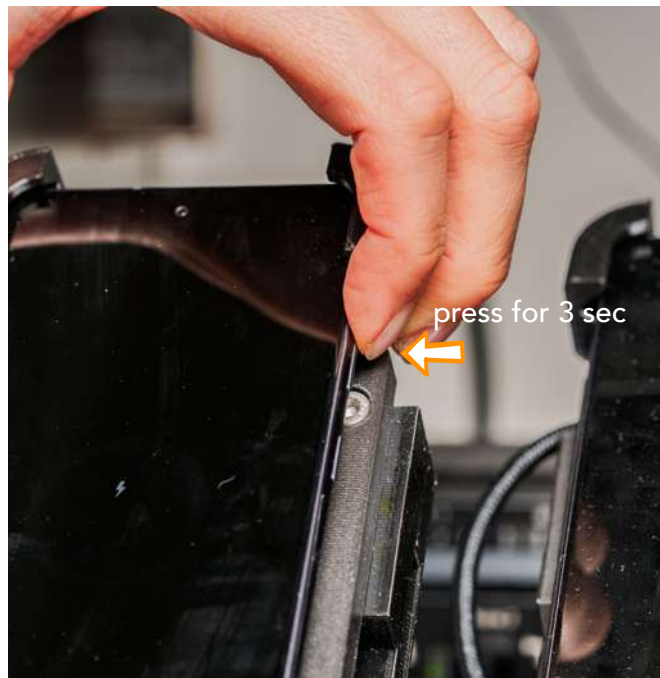
- Phone hub is running:** Either remove the back cover of the box or pull out the extendible drawer to check the status of the phone hub. The lights are on.



Socket strip is on: If you kept the socket switched on before disconnecting the power supply (step 2), it should be on now. A bright, green lamp signals that it is on. Otherwise, switch it on.

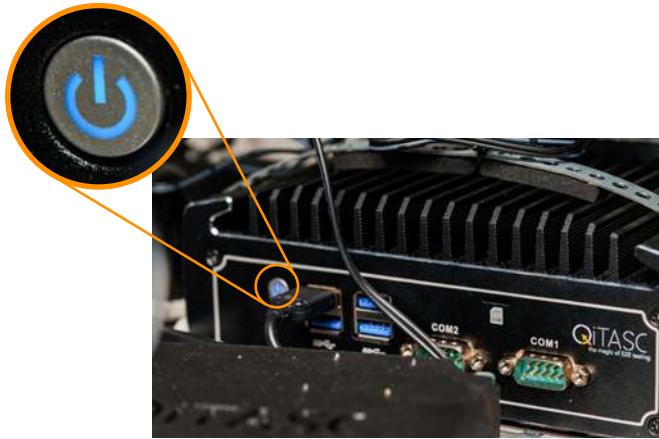


Circuit breaker has tripped: To reset, press the orange button of the trip switch. If you accidentally touch the yellow button, press the orange button again. A small, red lamp comes on.



- 5 **Start the mobile phones:** Press the button on the right side of each phone for three seconds to switch them on. The connection remains after the restart.

Returning the box



- 1 **Switch off the IPS:** Press the illuminated blue IPS power switch for three seconds. The blue light goes off. Wait for 30 seconds until the IPS has finished all operations and shuts down.



- 2 **Disconnect the power supply and LAN:** If your portable lab box has a power switch, switch it off. Unplug the connector from the socket. The components of the box are now disconnected from the power supply.



Unplug the LAN cable from the box and your modem. Roll up the cables and prepare them for packing.



- 3 Prepare packaging:** The package should measure at least 560 mm x 420 mm x 550 mm and contain the portable lab box and the cables. Prepare sufficient filling material to protect the contents against shock and vibration during shipment.

- 4 Closing the box:** Place all components inside the portable lab box and fix them so they move as little as possible. Fill it up with padding material to secure the hardware inside. Close the front and back covers. Make sure that the folding handles are folded flush and the clips on the sides are firmly closed.



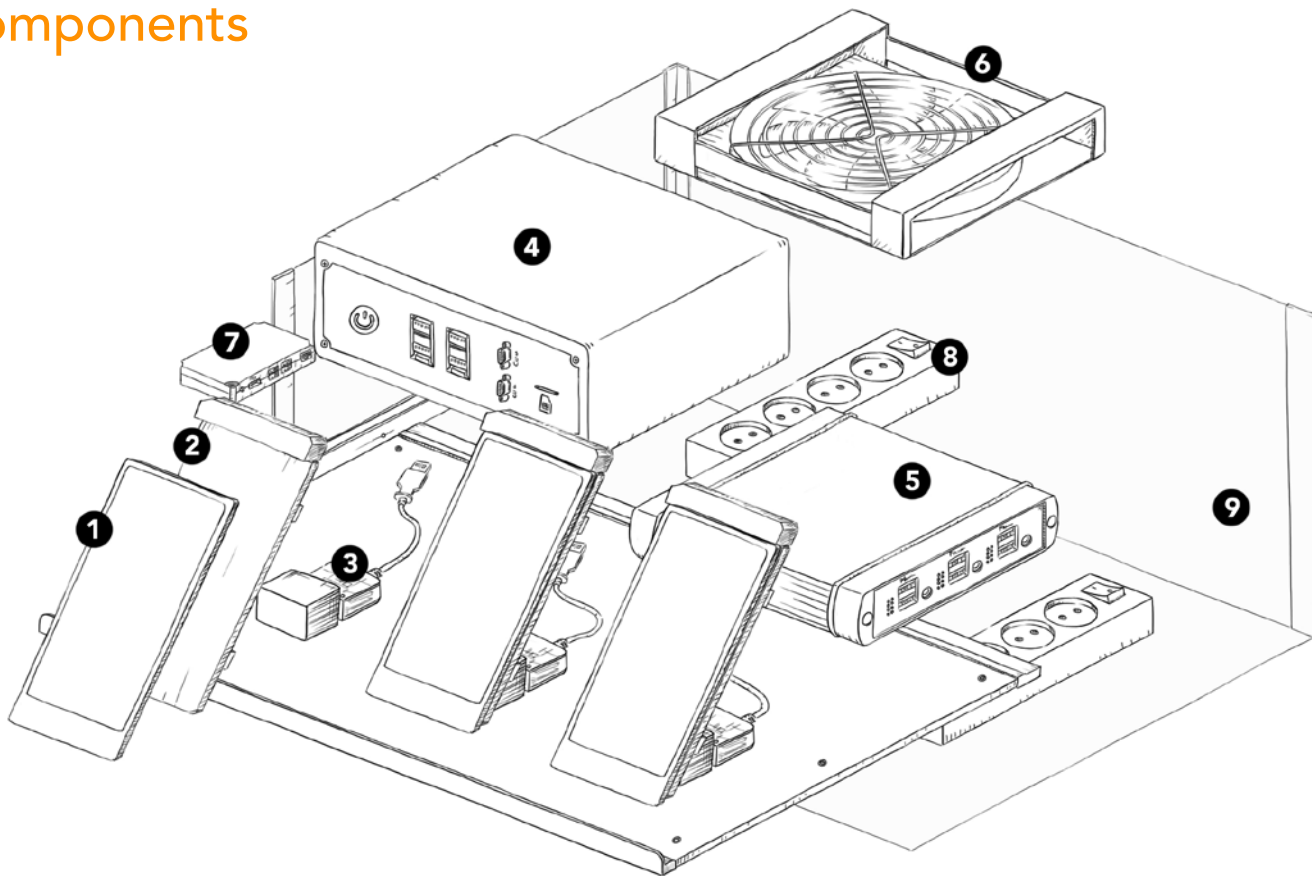
- 5 **Preparing the package:** Position the portable lab box inside the package. Add the LAN cable and power cable. Make sure that all components are inside the package by checking them against the list of contents in the INTRODUCTION.



- 6 **Finishing the package:** Fill up the package with padding material. Close it and fix the flaps with tape. Mark the package as fragile and send it to:

QiTASC GmbH
Wagenseilgasse 14/Top 1
1120 Vienna
Austria

Components



Hardware

The equipment inside the portable lab box is a combination of commercially available elements, such as mobile phones and cables, and newly developed hardware. At QiTASC, we develop and produce hardware elements for testing processes. This hardware also enables compact and clearly arranged storage of numerous devices when space is limited.

QiTASC tip: The individually designed hardware inside the portable lab box is just a small part of all the hardware we have developed so far. For a list of the latest hardware developments, visit www.qitasc.com/hardware.

Find out how to handle and maintain the portable lab box and the hardware components in MAINTENANCE. Find answers to questions that may indicate faults in ERROR DETECTION.

Inside the portable lab box:

You can remove the front and back covers of the portable lab box for service purposes. This reveals the technology and wiring inside. Get to know the hardware on the following pages.

- 1 2 Mobile devices & holders page 19
- 3 SIM connector, card reader page 20
- 4 IPS – intaQt phone service page 21
- 5 Phone hub v3 page 22
- 6 Fan page 23
- 7 Raspberry Pi KVM page 24
- 8 Socket strip page 24
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Mobile devices & holders

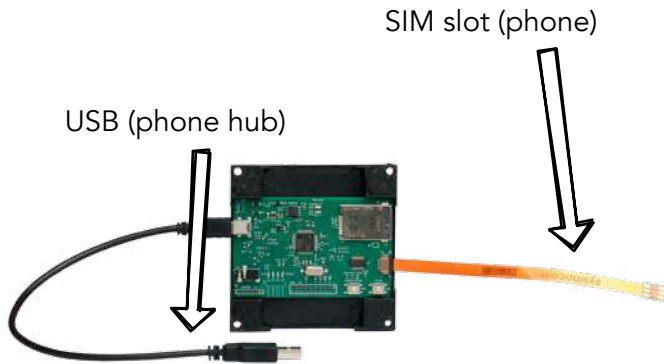
The portable lab box is delivered with a default setup of three mobile phones. These are positioned at the front of the extendible drawer. Two are Samsung 21 FE 5Gs and the third a Pixel 7. In some countries, the box contains four phones to maximize testing capabilities.

The delivered mobile devices can be replaced by other brands and run different OS versions. If you plan to change any of the phones, be sure not to interrupt any ongoing or planned testing activities. Contact the QiTASC team beforehand.

Each mobile phone is supported by a 3D-printed holder mounted on the extendible drawer. The holders have been developed by QiTASC and hold the phones like claws. Their design allows the size and format to be changed easily so they can hold various sizes and types of phones in case you need to change one.

The testing process, charging and software updates run automatically. To this end, each mobile phone has two cables plugged in. They enable the QiTASC team to perform updates and restarts remotely.

Please check the phones' activity from time to time. You can do this by ensuring that they are charging, as explained in ERROR DETECTION.



SIM connectors

Each phone has a SIM connector at the back. This is a small box with two cables connected. The black cable ends in a USB connection and is connected to the phone hub. The orange one is a SIM flex cable and is connected to the mobile phone the SIM connector is mounted on.

The SIM connectors are crucial for the remote testing process. Do not unplug them!



Card reader

In some countries, your portable lab box comes with a card reader. It is connected to the IPS via USB. It allows you to insert local SIM cards and execute regional tests. The inserted SIM card can be selected remotely by a tester and mapped to the phone of choice.

Do not remove any SIM card in the card reader while the portable lab box is active and without consulting the QiTASC team beforehand. Otherwise you may interrupt a testing process.



IPS – intaQt phone service

The IPS (intaQt phone service) is a mini Linux computer with a characteristic rippled top, mounted on the extendible drawer behind the phones. It serves as a connecting element between the hardware devices and the server running the testing software.

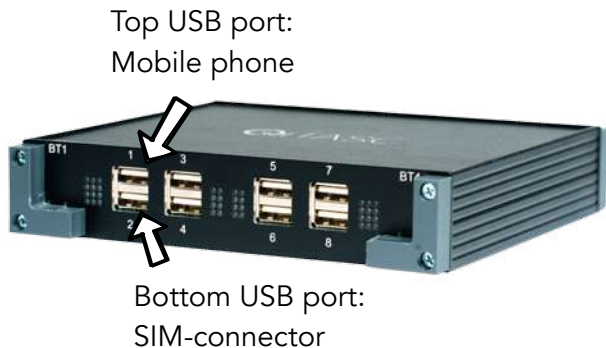
Via the phone hub, the IPS is connected to the phones to upload software updates to the phones or testing requests to the intaQt server.



On the front of the IPS, a blue light indicates that it is operational.



On the back, it is connected to the bottom layer for the internet connection and power supply.



Bright green lights next to a pair of USB ports indicate an active phone. If they are all red, please contact the QiTASC support team.

Phone hub v3

The phone hub version 3 establishes a connection between the mobile phones and the IPS. It is mounted on the extendible drawer behind the mobile phones.

On the front, each pair of USB ports is assigned to a phone and its SIM connector.



On the back of the phone hub, blue and yellow lights beside the word HOST are on. This indicates that the phone hub is connected and working correctly.



Fan

A fan is fitted in the upper section of the case. Its purpose is to keep the temperature cool inside the portable lab box. It draws in air through the grilles on the underside of the case so that air circulates around all the hardware elements inside the box. This is especially helpful for maximizing the lifespan of the mobile phones' batteries.

To keep the fan running, do not cover it or block the air from entering the grilles below the box. Keep the bottom part of the box clean and free from particles that could disturb the air circulation.



Raspberry Pi KVM

The Raspberry Pi KVM is a device to enable remote PC control. It is located on the extendible drawer, connected to the IPS.



Socket strip

Two power bars are mounted on the base of the box. One is internet-enabled and can be switched on and off remotely. It also has a reset button beside the LAN port. Do not press it unless expressly advised to do so by a member of the QiTASC team.



Suitcase box

The portable lab box comes in a case measuring 535 mm x 405 mm x 505 mm. It features sturdy aluminium profiles with ball corners, resulting in a robust case that protects the hardware and wiring inside.

The suitcase box has two covers that can be removed. You open and lock them by means of folding handles. When you open the front cover, you can pull out an extendible drawer containing hardware components, such as the mobile phones. Only remove a cover and pull out the extendible drawer for service reasons.

As mentioned in GETTING STARTED, make sure that the surface stays clean and dry and is large enough to accommodate the open suitcase. Pull out the extendible drawer with care to prevent the IR box from falling over.

See MAINTENANCE for more information about handling the suitcase.

Wiring

The portable lab box is delivered already wired. The following wiring schematic shows the cable connections and types of plugs used between the hardware components. It refers to the IR box version of this manual. Other versions may use the same hardware components and cables, but different wiring.

The following diagram shows the integration of three mobile phones. It does not include a card reader. The actual number of mobile phones may vary, depending on the network operator and tests to be run. The arrangement of the power sockets and 12V cable outlets is as shown in the diagram.

Deviations are possible.

For more information about the hardware components used, see **HARDWARE** or visit the QiTASC website at www.qitasc.com/hardware.

Stick to the wiring

No functionality can be guaranteed if the wiring in the case is modified independently. The wiring connects the components to ensure that the power supply, communication and operations within the box function correctly. Altering the wiring may cause problems in the testing process.

Fully plug in

In case of damage, e.g. if the portable lab box falls to the floor, please make sure that all plugs are fully connected.

If you notice any kind of defect in one of the cables, please contact us and replace it with an equivalent one. All cables can be purchased commercially.



Phone hub



Wi-Fi router TP-link



IPS – intaOt phone service



Raspberry Pi KVM



Mobile phone 1/2/3/4



SIM adapter 1/2/3/4



Trip switch



Fan



Internet-enabled socket strip



Socket strip



IEC plug 220V



RJ 45 LAN plug



Power supply unit: 12V with 220V cable



Earthing cable



LAN cable



Cable USB-A to USB-B



Cable USB-A to USB-C



HDMI cable



Input



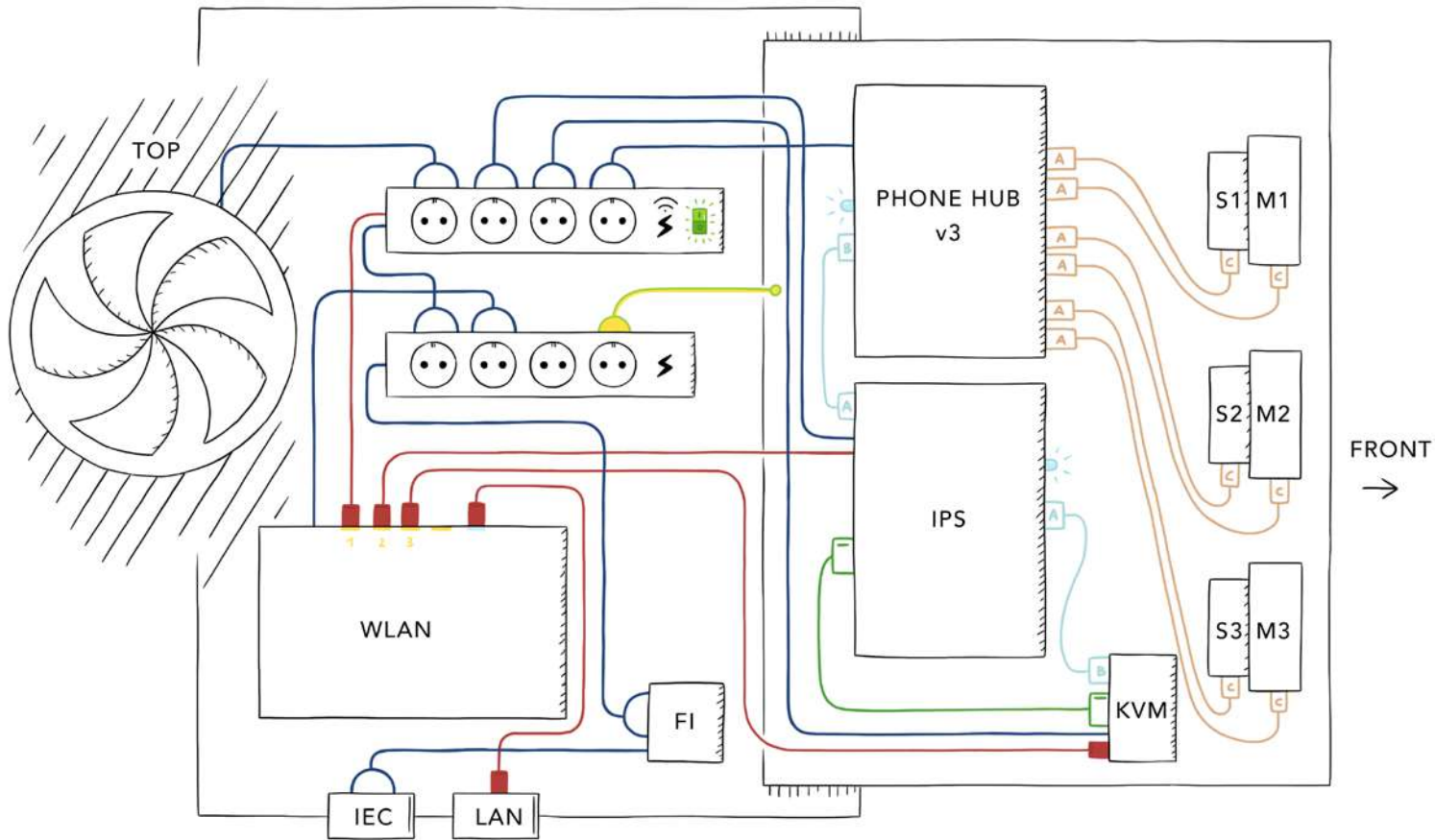
Light on = active state



Illuminated switch = active state

BOTTOM LEVEL

EXTENSIBLE DRAWER





Maintenance

Keep your portable lab box activated

Your portable lab box forms part of a global network for remote testing activities performed by QiTASC. Once you start your portable lab box, it must remain activated at its location to run global tests via the intaQt framework at QiTASC successfully. Please attend to any problems immediately and contact us. As long as your IR box is activated and connected, the QiTASC team has access for tests and monitoring the functionality of the components. This is vital for finding any errors immediately.

Position the box correctly

Position the portable lab box in a suitable environment, as described below, where it has access to a network signal of at least -100dBm.

When the network signal is established, place the box in a dry environment on a stable surface that measures at least 550 mm x 900 mm. Four large rubber feet on the bottom of the suitcase counteract slipping. The box itself is robust and should withstand a fall, but the components inside may not.

QiTASC tip: Position the box on the floor to prevent damage from falling. For more details, see GETTING STARTED.

Provide a net signal of at least -100dBm

For roaming testing, the mobile phones in the IR box need a network signal of -100dBm and more. This signal strength needs to be measured at the IR box's location with closed windows and for the relevant network operator and network type.

Ideally, the signal should be measured before the IR box is placed at its final location.

If the QiTASC team asks you to remeasure the network signal, you can use apps like *NetMonitor* *Cell Signal Logging* to measure the signal and *2G 3G 4G LTE Switcher* to change the network type.

QiTASC tip: Go to the QiTASC website for a step-by-step tutorial on how to measure the network signal.

Keep the top & bottom free for ventilation

Air is constantly circulating in the IR box to prevent overheating. This circulation must not be obstructed to avoid overheating and ensure that the mobile phones function correctly.

The fan at the top of the portable lab box circulates the air. Do not cover it!

At the bottom of the suitcase there is a ventilation grille. Keep the surface clean to enable fresh air to enter the box through the grille at all times. The gap created by the rubber feet is necessary for ventilation.

Pull out the extendible drawer with care

When delivered, the portable lab box is closed. Both covers are locked. Only open them for service reasons if instructed to do so by the QiTASC team.

If you do need to open it, position the box so that there is enough space to the front or behind the box. Open the snap locks to remove the cover as required.

Bear in mind that you can only pull out the extendible drawer to the front. Pull it out with care and make sure you do not interrupt any wire connections between the hardware components.

QiTASC tip: To prevent the box from falling over and to avoid any damage to the rail holding the drawer, only pull the drawer out halfway.

When you are finished, push the drawer back in completely. Replace the cover as before and snap all locks shut. Even if the snap locks warp slightly over time, they can still be closed.

Do not change the wiring

The wiring should not be changed. If, for any reason, you need to modify it, please contact the QiTASC team beforehand to make sure it is safe to do so. Make sure that no other hardware is disconnected. Every cable and hardware component serves a purpose and may currently be needed for the testing process. Stay in contact with the QiTASC team until you have finished your modification of the wiring.

If you happen to move the portable lab box unintentionally, interruptions may occur that affect the hardware inside. In this case, please consult the wiring diagram in WIRING and check that each plug is firmly plugged in and that no cable is loose.

Care of the portable lab box

Operate at room temperature. Avoid extreme cold, heat and high humidity.

To remove dust from the surface of the box, use a clean, smooth cloth, dry or damp. Do not make the cloth fully wet, because the suitcase is not waterproof. Do not use any chemicals. Exert only light pressure when cleaning.

There is no need to clean the hardware components or wiring inside. As long as the covers are closed and the box is running most of

the time, the components inside should not get dusty or dirty.

If, for any reason, you do need to clean them, switch off the box beforehand. Only clean when everything is switched off to avoid unintentional activation or deactivation of components. Before switching off the box, contact the QiTASC team. They will tell you when it is safe to switch off the box without disrupting the testing process. Do not switch off the box intentionally without prior consultation!

When cleaning the hardware, take care wiping the areas where buttons or contacts are located. After cleaning, make sure that the cables are still firmly connected. The mobile phone displays can be wiped if necessary. Handle them in the same way as standard devices.

Activate the box after you have finished cleaning. Inform the QiTASC team as soon as the box is reactivated.

To ensure air circulation, do not cover the fan in the top drawer. Keep the space below the box free and clean.

Minimize the risk of fire damage

The suitcase box is not fire resistant. For safety reasons, we recommend placing a small fire extinguisher next to the portable lab box. Make sure that the fire extinguisher is visible to anyone who approaches the box. Place instructions next to it. They should be easily understandable and visible without additional effort.

Fire extinguishers must be maintained and made ready for reuse after a fire or unintentional activation. The fire extinguisher must be refilled or replaced after two years even if it has not been used.

Please contact the QiTASC team if a fire has broken out near the box to discuss how to

proceed. The components may not have been able to withstand the heat.



Error detection

What happens if there is no stable internet connection?

An internet connection is essential for the portable lab box to work as part of the QiTASC global network. Without it, its location will not be available for international roaming testing because it will be invisible to the intaQt server and no tests can be executed remotely.

Furthermore, the QiTASC team will not be able to access the components remotely. Phone the QiTASC team to help analyse the error.

What happens if there is no power?

In case of power loss, restart the portable lab box as explained in GETTING STARTED as soon as the

power is restored. There is no need to inform the QiTASC team because the system notices such events automatically.

If power is not restored after a restart, please get in touch with the QiTASC team.

Can I break anything when cleaning?

The suitcase box itself is robust. You can wipe its surface from time to time, but there is no need to clean the hardware components inside. When running, the IR box is mainly closed, which prevents dust from entering and keeps the hardware components clean.

For detailed instructions about how to handle the suitcase when you want to clean it, see MAINTENANCE.

How do I find out if a component is faulty?

The QiTASC team usually notices if any components in the IR box are defective. They will contact you and guide you through a hardware check to find the reason. As an external user, you are not expected to deal with any changes yourself.

There are some obvious indications that you will have to check in order to confirm the active state of the hardware:

- IPS: Blue button on the front is on
- Phone hub: Various lights on both sides
- Socket: Bright green switch
- Trip switch: Press the orange button to restart

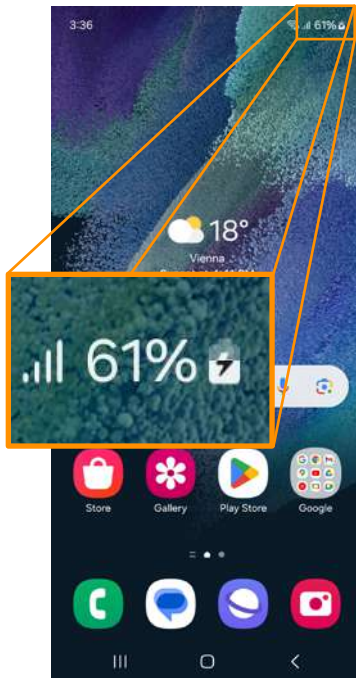
How to make sure that a phone is charging?

Here are three options for checking whether a phone is charging. Follow the following steps:

- 1 Activate the screen by pressing the button on the right side of the phone.
- 2 The battery bar on the Home screen shows the phone's charging status. The lightning bolt icon next to the battery bar indicates an active charging process. The icon should always be either charging, represented by a lightning bolt, or fully charged.
- 3 Unplug and plug in the USB cable. The screen should not appear, but you will see a reaction in the form of the charging symbol.



1 Press to activate the screen.



2 The battery icon in the upper corner shows the charging status.



3 Unplug and plug in again to see a charging symbol on the screen.

What do the noises from inside the portable lab box mean?

The portable lab box operates quietly but is not completely silent. You will become familiar with the noises coming from inside the portable lab box, since they go hand in hand with the testing process.

Since the fan is in continuous operation, a low whirring noise may be constantly audible. You may also hear a beep from the IPS during the starting process or when the phones receive messages. It is also common to hear short beeps, which acoustically represent processes of some of the hardware components.

If you turn up the volume of the mobile phones, bear in mind that the suitcase is not completely soundproof. The noise level of the box in operation will increase.

If you hear any suspicious noises, please contact the QiTASC team.

How to handle a defect fan?

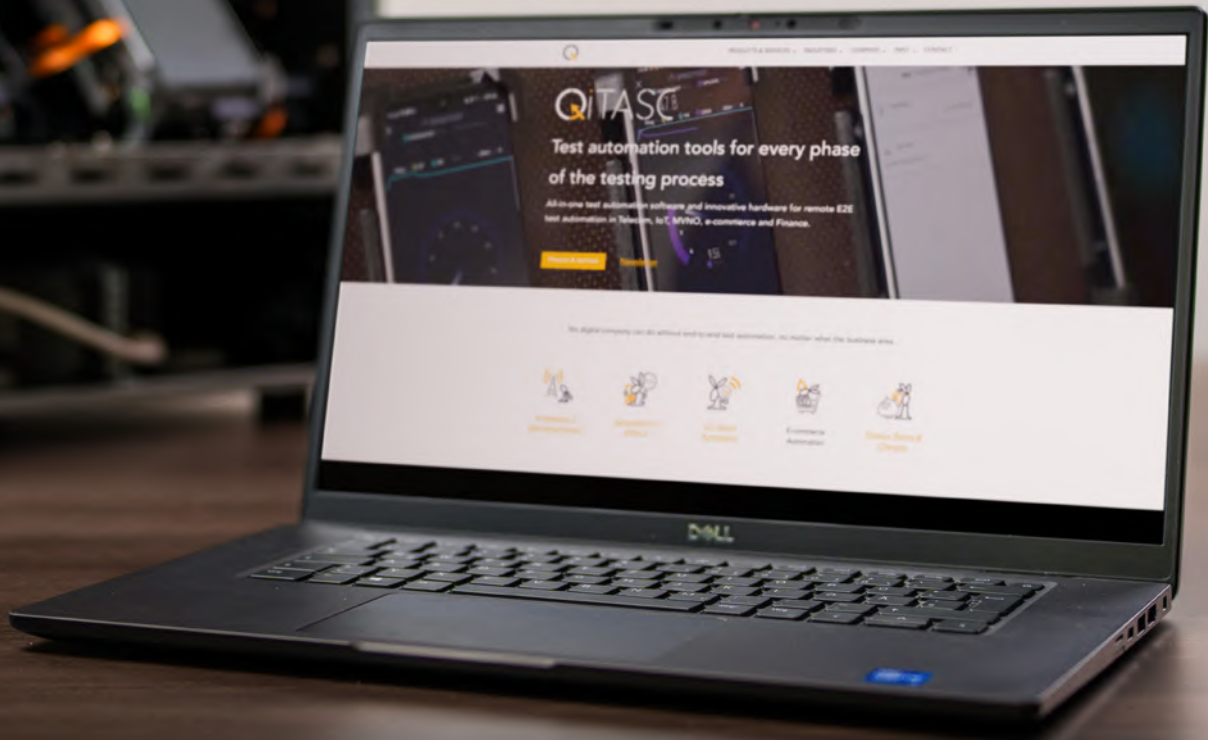
If the fan stops spinning, open the front cover. On the underside of the top, you can see the fan. Various thin, coloured jumper wires connect the fan with the hardware components inside the IR box.

Make sure that the wires are connected to each other. The following colours should match:

- Black male with black female
- Red male with red and orange female

After adjusting the wires, fix them more firmly with tape. Now see if the fan restarts.

If it remains inactive, contact the QiTASC team. As the fan is not part of the testing process, the portable lab box can continue operating without it. Nevertheless, the damage should be repaired promptly to minimize the risk of overheating due to the lack of air ventilation.



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Requirements Management



Test Case Management



Test Case Execution



Automated Test Case



Test Case Reporting



Support

QiTASC provides technical information online to assist you when you use our hardware and software products. If you need any support, please get in touch any time.

Use our integrated AI bot to find more information about portable labs and hardware developed by QiTASC, as well as informative documents to download.


For our testing software, we offer online documentation with helpful support, as well as tutorial videos on both our software and hardware products.


If you need any further information, you can also contact our support for help with getting your QiTASC box up and running.


 www.qitasc.com

 support@qitasc.com

 Online documentation at docs.qitasc.com

 Training videos on the QiTASC [YouTube channel](#) and the [website](#)

 AI assistant [QAIA](#): Integrated in the QiTASC website to support test case development

 On Teams or via phone:
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Germany: +49 211 158 04134