

FUJITSU USB Port Replicators

Fujitsu Technology Solutions GmbH offers a wide range of port replicators, reaching from cradles and mechanical port replicators to USB 3.1/USB-C Port Replicators. Every kind of port replicator has its advantages over the others. These advantages will be described in this technical White Paper.

When to use universal USB Port Replicators

The universal USB port replicators are the perfect solution for shared-desk environments. They connect your notebook to all of your peripherals with a single USB plug. The universal USB Port Replicators from Fujitsu are coming with a DisplayLink chipset within. Therefore, a driver needs to be installed on the client. Anyhow, this driver makes it possible for the customer to run a multivendor strategy. For administrators of companies there is also a centralized distributable driver.

When to use Snap-In Port Replicators

Simply snap your notebook into the Fujitsu Port Replicator to transform it into a practical work computer. The replicator interconnects your notebook with all your peripherals, displays, fast data network and the power supply, to charge the battery for fieldwork. With the Snap-In Port Replicators you can wake up your end device via LAN to run updates at night, when the notebook is snapped in and there are absolutely no problems with MAC Spoofing. Snap-In Port Replicators are designed for dedicated workplace environments.

What is USB Type-C

USB Type-C has a new, tiny physical connector – roughly at the size of a micro USB connector. The USB-C connector itself can support exciting new features for the USB standard, like USB 3.1 and USB power delivery (USB PD).

USB-Type C is reversible, so you'll no longer have to flip the connector around a minimum of three times looking for the correct orientation. It's a single USB connector shape that all devices should adopt, so you won't have to keep loads of different USB cables with different connector shapes for your various devices. This is perfect for the design of modern systems: Due to reduced space in tiny notebooks the number of interfaces will decrease.

USB Type-C ports can also support a variety of different protocols using "alternate modes," which allows you to have adapters that can output DisplayPort, HDMI, DVI, VGA, or other types of connections from that single USB port. The mess of USB, DisplayPort, HDMI, DVI, VGA and power ports on typical notebooks can be streamlined into a single type of port.

The USB PD specification is embedded in USB Type-C specification. USB PD delivers up to 100W via the USB-C upstream port. The power can be transferred at the same time the device is transmitting data across the connection. This kind of power delivery could even let you charge a notebook, which usually requires up to about 60 watts. You could plug your laptop into an external display or port replicator connected to a power cable, and that external device would charge your laptop – all via the one little USB Type-C connection.

There is one remark regarding USB-C. Just because a device or cable supports USB-C does not necessarily mean it also supports USB PD. So, you'll need to make sure that the devices and cables you buy support both USB-C and USB PD.

USB 3.1 Gen1's theoretical bandwidth is 5 Gbit/s, while USB 3.1 Gen2's is 10 Gbit/s. That's double the bandwidth – as fast as a first-generation Thunderbolt connector. USB Type-C isn't the same thing as USB 3.1, though. USB Type-C is just a connector shape, and the underlying technology could just be USB 2.0 or USB 3.0. When buying devices, you'll just need to keep your eye on the details and make sure you're buying devices (and cables) that support USB 3.1.

The physical USB-C connector isn't backwards compatible, but the underlying USB standard is. You can't plug older USB devices into a modern, tiny USB-C port, nor can you connect a USB-C connector into an older, larger USB port. But that doesn't mean you have to discard all your old peripherals. USB 3.1 is still backwards-compatible with older versions of USB, so you just need a physical adapter with a USB-C connector on one end and a larger, older-style USB port on the other end (The data transfer rate in this scenario depends on the used USB Type-A to USB Type-C Adapter and the USB Type-A port it is connected to). You can then plug your older devices directly into a USB Type-C port. Furthermore the cable length of USB Type-C is limited to 1m, in order to obtain the maximum bandwidth of 10 Gbit/s. If you deploy cables longer than 1m, you might have to live with lower data transfer rates.

What is the USB-C Alternate Mode

The Alternate Mode belongs to the specifications of USB Type-C. "DP Alt mode" was established by the VESA (Video Electronics Standard Association) and comes with USB Type-C. The so called Alt Mode ensures that many functions are consolidated in a USB Type-C plug. This means that a USB Type-C connection can transmit data, send signals for audio/video (e.g. DisplayPort) and it is able to charge mobile devices with up to 100W. Using Alternate Mode it is possible to have 1, 2 or 4 data lanes for other signals or protocols. Devices, which are able to operate the Alternate Mode, identify the connected device and negotiate about the connection.

What is Thunderbolt 3

Thunderbolt 3 is the upcoming version of the Thunderbolt interface. Thunderbolt 3 lets you transfer data at up to 40 Gbit/s (in best case). That's four times as fast as the 10 Gbit/s of USB-C and the original Thunderbolt interface. Thunderbolt 3 lets you connect speedy hard drives, various displays (including 4K and 5K resolutions), and other peripherals, like PCIe Gen 3 expansion cages, to your desktop or laptop. The big news, however, is the fact that Thunderbolt 3 is designed to work in the same-shaped port as USB-C and is compatible with USB-C cables and devices.

What happens when I plug USB-C devices into a Thunderbolt 3 Port

All USB-C devices can be plugged into, and will work in, a Thunderbolt 3 port, but it will transfer data at the slower USB-C speed. An easy thing to remember is that Thunderbolt 3 ports are technically backward-compatible with USB-C devices.

If you plug a USB Type-C device into a Thunderbolt 3 port, it will definitely work but won't support Thunderbolt features. But the other way around does not necessarily need to work, because not every USB Type-C port supports Thunderbolt 3.

Mac Address Pass Through (MAPT) with FUJITSU USB Port Replicator PR09

What is MAC Address Pass Through?

FUJITSU has implemented a feature called MAC Address Pass Through that uses a system-unique MAC Address entered in the system BIOS, which is then used to override the dock MAC Address every time it's connected to the network. This way the network sees the system-unique MAC address. FUJITSU LIFEBOOKS using the FUJITSU USB Port Replicator PR09 will now have a constant MAC Address shown to the network.

FUJITSU USB Port Replicator PR09 has its own MAC Address built into its chipsets. When the Port Replicator is connected to a FUJITSU LIFEBOOK system that supports MAPT, and the DisplayLink driver 9.0M1 or newer is installed on the system, the Port Replicator's specific MAC Address will be overridden by the system specific MAC address from the BIOS. This way the network consistently sees and uses the system specific MAC Address.

Things to remember:

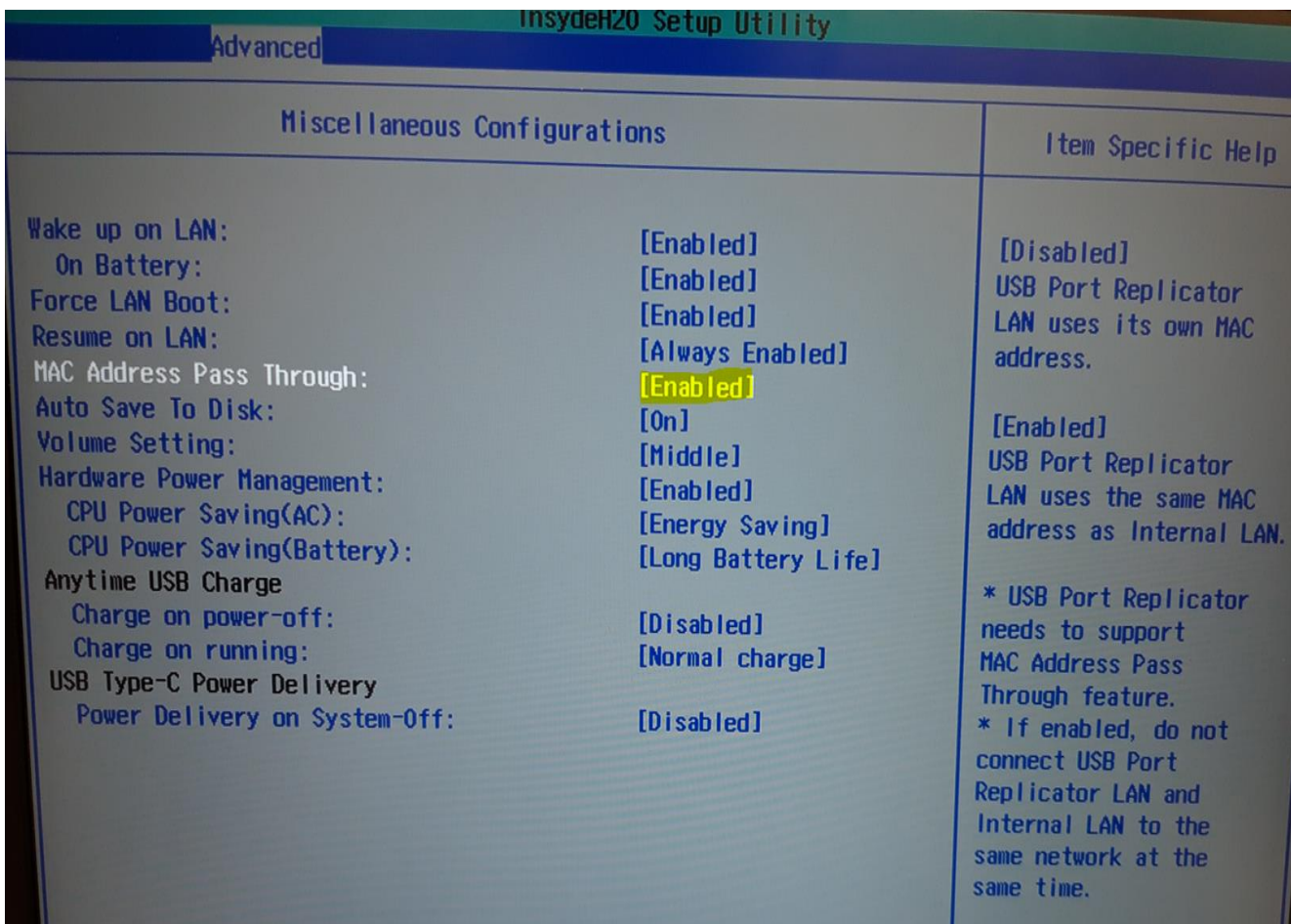
- This MAPT feature is enabled using the BIOS and DisplayLink driver that is embedded in the operating system (Windows, Linux etc.).
- MAPT does function before booting to the operating system and in the Preboot eXecution Environment (PXE) boot process.
- The system specific BIOS MAC address is listed in the BIOS, so customers can view the MAC Address without being in Windows.
- If LIFEBOOKS or Port Replicators are used with NON-FUJITSU systems (Port Replicators or Notebooks), MAPT is not available and the device will use the MAC Address of the Port Replicator only.

Supported LIFEBOOKS for MAPT (All listed products + all upcoming generations)

- E449, E459
- E548, E558
- U728, U748, U758
- E448, E458
- U938
- P728
- S938
- T938

MAPT functionality with FUJITSU LIFEBOOKS

1. Requirement: Set MAPT from "Disabled" (Default) to "Enabled":



2. MAPT is NOT enabled in BIOS or DisplayLink Driver 9.0M1 or newer is NOT installed

If MAPT is not enabled in BIOS or DisplayLink Driver 9.0M1 or newer is not installed, MAPT will not be available. In this case the network connections are showing two Ethernet Connections as listed below.

"Ethernet 2" shows the connection of the LIFEBOOK with its physical MAC address (e.g. 38-AF-D7-AA-49-1E).

"FCA.SP" shows the FUJITSU USB Port Replicator PR09 LAN MAC address (e.g. 00-0F-9D-BB-36-2F).

So you can see in either way there is not pass through or overwriting of the MAC address possible in this scenario.

Ethernet 2

Metered connection

If you have a limited data plan and want more control over data usage, make this connection a metered network. Some apps might work differently to reduce data usage when you're connected to this network.

Set as metered connection



If you set a data limit, Windows will set the metered connection setting for you to help you stay under your limit.

[Set a data limit to help control data usage on this network](#)

Properties

Primary DNS suffix:	FCA.SP
Manufacturer:	Intel
Description:	Intel(R) Ethernet Connection (4) I219-LM
Driver version:	12.17.10.7
Physical address (MAC):	38-AF-D7-AA-49-1E

FCA.SP

Set as metered connection



If you set a data limit, Windows will set the metered connection setting for you to help you stay under your limit.

[Set a data limit to help control data usage on this network](#)

Properties

Link-local IPv6 address:	fe80::cc73:b4f0:e0ff:3d27%4
IPv4 address:	10.0.1.132
IPv4 DNS servers:	10.0.0.11 10.0.0.13 10.0.0.10
Primary DNS suffix:	FCA.SP
Manufacturer:	DisplayLink
Description:	USB Giga Ethernet
Driver version:	9.0.1558.0
Physical address (MAC):	00-0F-9D-BB-36-2F

3. MAPT enabled in BIOS and DisplayLink Driver 9.0M1 or newer is installed

If MAPT is enabled in BIOS and the DisplayLink Driver is installed you will see in network connections that the physical MAC address of your attached LIFEBOOK has overwritten the MAC Address of the Port Replicator. Now MAPT is finally working.

🏠 Unidentified network

Metered connection

If you have a limited data plan and want more control over data usage make this connection a metered network. Some apps might work differently to reduce data usage when you're connected to this network.

Set as metered connection

Off

If you set a data limit, Windows will set the metered connection setting for you to help you stay under your limit.

[Set a data limit to help control data usage on this network](#)

Properties

Link-local IPv6 address:	fe80::e543:cbc3:fde7:bacf%45
IPv6 DNS servers:	fec0:0:0:ffff::1%1 fec0:0:0:ffff::2%1 fec0:0:0:ffff::3%1
Manufacturer:	DisplayLink
Description:	USB Giga Ethernet
Driver version:	9.0.1558.0
Physical address (MAC):	38-AF-D7-AA-49-1E

Fujitsu's products offering USB Type-C for standard mobile systems



FUJITSU Accessory USB Port Replicator PR09

The new FUJITSU Accessory USB Port Replicator PR09 is the perfect solution for shared desk environments (BYOD) within a hyperconnected world. It connects any mobile system, which is able to run the DisplayLink Software to your main peripherals with a single USB plug. This Port Replicator is equipped with the most powerful DisplayLink chipset supporting high performance video streaming with Dualhead-DisplayPort.

Highest data throughput is guaranteed due to an USB Type-C based Gen2 Hub-Controller enabling up to 10 Gbit/s data streaming. The latest version of USB Power Delivery chipset (PD3.0) provides powerful charging during your workday.

<http://www.fujitsu.com/global/products/computing/peripheral/accessories/connectivity/usb-port-replicator-pr09.html>



FUJITSU Accessory USB Type-C Port Replicator

The FUJITSU Accessory USB Type-C Port Replicator is the perfect solution for connecting dedicated FUJITSU mobile clients with a single USB Type-C plug. It allows you to charge and transfer data at the same time via only one cable in order to support your first steps towards a clean desk environment. High speed data transfer through USB 3.1 and Gigabit LAN make it possible to be more flexible and work faster. Power Delivery enabled for end devices from Fujitsu which are compatible with USB PD. With the USB Type-C Port Replicator you can wake up dedicated Fujitsu Clients from S3, S4 and S5 status.

<http://www.fujitsu.com/global/products/computing/peripheral/accessories/connectivity/usb-type-c-port-replicator.html>



FUJITSU Display P24-9 TE

The FUJITSU Display P24-9 TE with ultra-thin bezel is made for intensive office work. The future oriented USB Type-C interface allows connections to mobile PC's with only 1 cable to a tidy shared workplace - with up to 2 displays due to DaisyChain support. Integrated USB Hub for connection of keyboard and mouse as well as other USB devices like headset - no matter if with Type A or Type C connector - make the FUJITSU Display P24-9 TE to the center of modern workplaces.

The display is optimized for shared desk applications with USB Type-C based docking functionality and dual monitor support. The FUJITSU Display P24-9 TE with integrated USB Type-C Docking Station is perfect for small budget starters as it enables the connections with client computers but does not have any LAN connection & functions. With this integrated Port Replicator you can gain display resolutions of up to FHD.

<https://sp.ts.fujitsu.com/dmsp/Publications/public/ds-display-p24-9-te.pdf>

Fujitsu's universal USB 3.0 Port Replicators



FUJITSU Accessory USB 3.0 Port Replicator PR08

The FUJITSU USB 3.0 Port Replicator PR08 is the perfect solution for hot-desk environments. It connects your notebook to all of your peripherals with a single USB 3.0 plug. The highlight is the internal powerful Display Link chipset that offers an excellent graphic performance.

<http://www.fujitsu.com/global/products/computing/peripheral/accessories/connectivity/port-replicator-pr08.html#a02>



FUJITSU Accessory USB Port Replicator PR8.1

The FUJITSU USB Port Replicator PR8.1 is the perfect solution for shared desktop (BYOD) environments. It connects your mobile system to your main peripherals with a single USB plug. This USB Port Replicator generates dual head graphics (4k resolution on DP or HDMI) and additional DVI-I video performance, enabling your system to run up to four screens independently at your workplace.

<http://www.fujitsu.com/global/products/computing/peripheral/accessories/notebook/port-replicators/port-replicator-pr8.1.html>

Fujitsu's products offering USB Type-C for mobile Workstations



Thunderbolt 3 Port-Replicator

Take advantage of the USB Type-C™ connector offering more speed (40 Gbps), more protocols and charging capabilities.

Thunderbolt 3 lets you connect speedy hard drives, various displays (including 4K and 5K resolutions), and other peripherals, like PCIe Gen 3 expansion cages, to your desktop or laptop. The big news, however, is the fact that Thunderbolt 3 is designed to work in the same-shaped port as USB-C and is compatible with USB-C cables and devices.

Compatibility Overview Notebooks (Port Replicator & Client Portfolio)

Product	PR8.1	PR08	USB Type-C Port Replicator	PR09	Mechanical Replicator	Cradle
LIFEBOOK U7x8	☑	☑	☑ ¹	☑ ¹	☒	-
LIFEBOOK U7x7	☑	☑	☑ ¹	☑ ¹	☒	-
LIFEBOOK U727	☑	☑	☑ ²	☑ ²	-	-
LIFEBOOK U938	☑	☑	☑ ¹	☑ ¹	-	-
LIFEBOOK U937	☑	☑	☑ ¹	☑ ¹	-	-
LIFEBOOK U745	☑	☑	☑ ³	☑ ³	☒	-
LIFEBOOK E7x6	☑	☑	☑ ³	☑ ³	☒	-
LIFEBOOK E5x8	☑	☑	☑ ¹	☑ ¹	☒	-
LIFEBOOK E5x7	☑	☑	☑ ³	☑ ³	☒	-
LIFEBOOK E5x6	☑	☑	☑ ³	☑ ³	☒	-
LIFEBOOK E4x9	☑	☑	☑ ¹	☑ ¹	-	-
LIFEBOOK E4x8	☑	☑	☑ ²	☑ ²	☒	-
LIFEBOOK A55x	☑	☑	☑ ³	☑ ³	-	-
LIFEBOOK A357	☑	☑	☑ ³	☑ ³	-	-
LIFEBOOK S938	☑	☑	☑ ¹	☑ ¹	-	-
LIFEBOOK S937	☑	☑	☑ ¹	☑ ¹	-	-
LIFEBOOK S936	☑	☑	☑ ³	☑ ³	-	-
LIFEBOOK T938	☑	☑	☑ ¹	☑ ¹	-	-
LIFEBOOK T937	☑	☑	☑ ¹	☑ ¹	☒	-
LIFEBOOK T936	☑	☑	☑ ³	☑ ³	☒	-
LIFEBOOK P728	☑	☑	☑ ¹	☑ ¹	-	-
LIFEBOOK P727	☑	☑	☑ ¹	☑ ¹	-	-
STYLISTIC R726/R727	☑	☑	☑ ³	☑ ³	-	☒
STYLISTIC Q738	☑	☑	☑ ¹	☑ ¹	-	☒
STYLISTIC Q736	☑	☑	☑ ³	☑ ³	-	☒
STYLISTIC Q616	☑	☑	☑ ³	☑ ³	-	☒
STYLISTIC V727	☑	☑	☑ ¹	☑ ¹	-	☒
STYLISTIC V535	☑	☑	☑ ³	☑ ³	-	☒

¹ (USB Type-C with PD)

² (USB Type-C without PD)

³ (Via USB-A to USB-C Adapter without USB PD)

Compatibility Overview Workstations (Port Replicator & Workstation Portfolio)

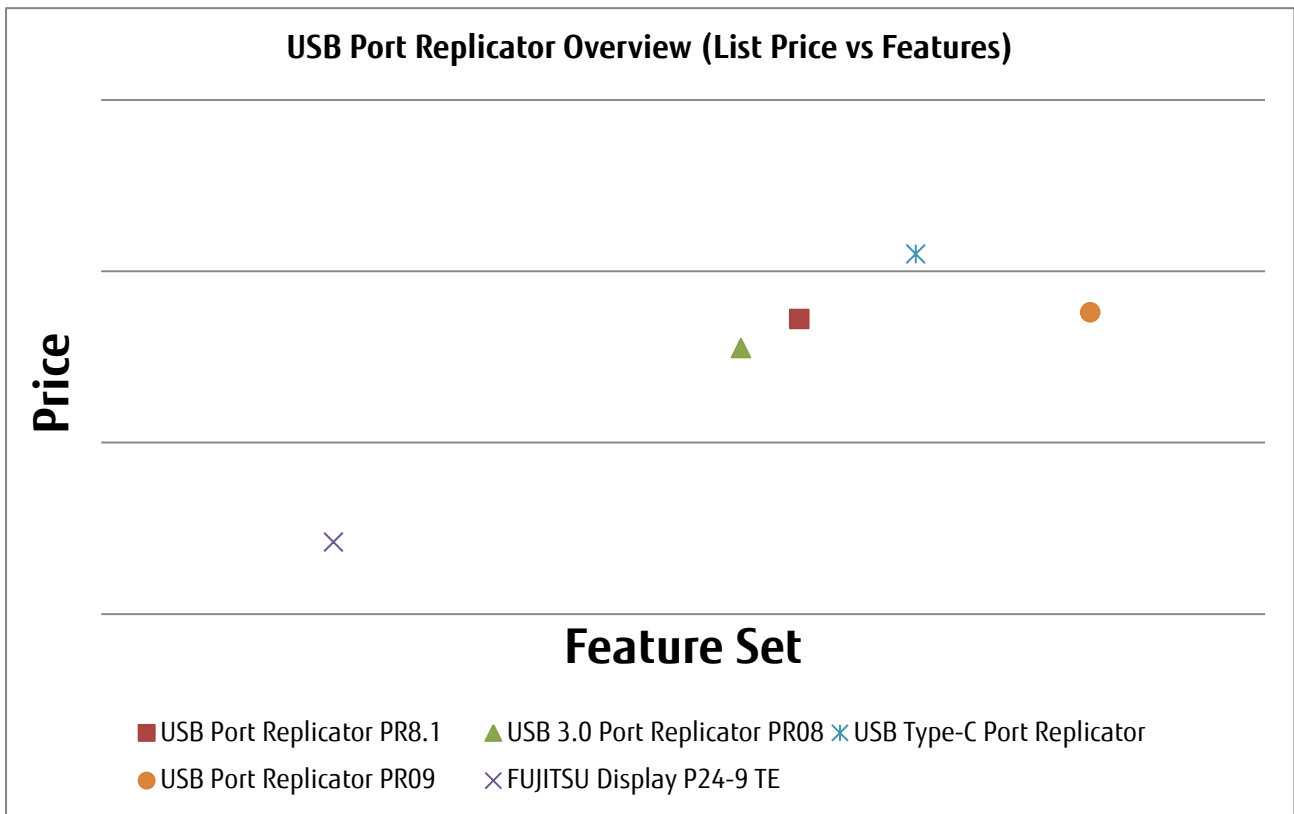
Product	Thunderbolt 3 Port-Replicator	USB Type-C Port Replicator	PR09	Mechanical Replicator
Celsius H760	-	☑ ^{1,3}	☑ ^{2,3}	☑
Celsius H770	☑	☑ ^{1,3}	☑ ^{2,3}	☑
Celsius H780	☑	☑ ^{1,3}	☑ ^{2,3}	-
Celsius H970	☑	☑ ^{1,3}	☑ ^{2,3}	-
Celsius H980	☑	☑ ^{1,3}	☑ ^{2,3}	-

¹ When connected to the USB Type-C Port Replicator the maximum resolution of the Displays is set to 2x Full HD / No Power Delivery supported

² With FUJITSU USB Port Replicator PR09 connected the data is compressed and transferred via USB to the Port Replicator. This compression will hinder the Celsius Workstations to use/send out its full performance to the connected Accessories.

³ Please note that FUJITSU always advises to use the Thunderbolt 3 Port Replicators together with mobile Workstations. The usage of standard USB-C Port Replicators is not tested!

FUJITSU USB Port Replicators Overview



The costs for the FUJITSU Display P24-9 TE are displayed with the price of the "Port Replicator" within the FUJITSU Display P24-9 TE. However the price for the complete display with integrated "Port Replicator" is understandably higher.

Frequently Asked Questions regarding FUJITSU USB Type-C Port Replicators

Please find a frequently asked questions Whitepaper regarding FUJITSU USB Type-C Port Replicators within this link:

<https://partners.ts.fujitsu.com/sites/dmsp/Publications/other/qa-FUJITSU-USB-Port-Replicators.pdf>

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