SAMSUNG

White Paper:

USB Type-C: The Complete Guide

Introduction

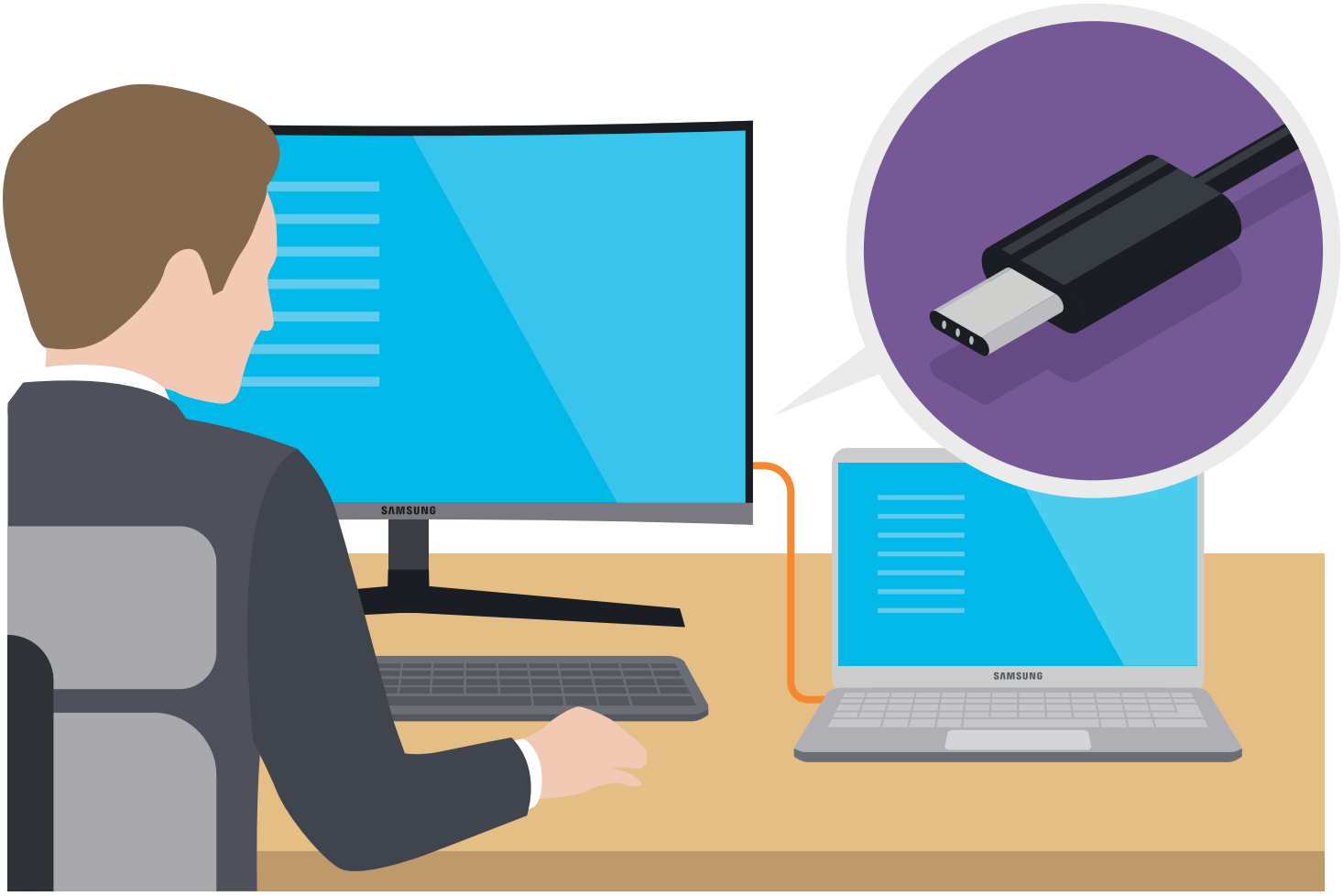
Much of our digital life has now gone wireless, but cables remain a critical part of today's IT infrastructure. An emerging standard called USB Type-C is rapidly becoming the gold standard because of its ability to save time and money, and clean up workstations.

A single USB Type-C cable (or USB-C for short) working with compatible devices can replace a tangle of wires and adapters and remove the need for a USB hub or docking station.

The USB-C connector standard was developed, nurtured and signed off[1] on by a who's who list of technology companies. Industry bodies across the tech sector seek to build common standards so that businesses and consumers don't find themselves using proprietary connectors that don't work well with devices manufactured by other companies.

This white paper looks at how USB-C can turn desktop monitors into office productivity hubs, tidying and simplifying office workspaces. The paper explores why IT support pros should start making USB-C a required specification for new devices like laptops and monitors — so they can reduce support time and trim accessory hardware budgets.

The paper also provides practical tips on selecting the right USB-C devices based on their features and performance.



USB-C Basics

The installed base for laptops with USB-C ports is still small, but it is expected all but budget laptops will eventually ship with the new ports and capabilities.

So what differentiates USB-C from all the other USB cables we've all accumulated through our computing lives?

It's simply a better way to connect a wide range of devices. A single cable connecting a pair of USB-C ports can do the work of the tangle of cables normally found on and around an office workstation. The USB-C connection between a monitor and a laptop, for instance, can send high-definition video signals to the monitor while drawing power to keep the laptop charged. It can also transfer data through that same cable twice as fast as earlier USB connectors.

USB-C connectors and cables support USB 3.1, the current industry standard protocol[2] for Universal Serial Bus (USB). It is the fastest USB standard protocol to date, saving file transfer and backup time with data transfer speeds of up to 10 Gbps. USB 3.1 can work through USB Type-C connectors, but it's backwards compatible with older USB connector styles like A and B.

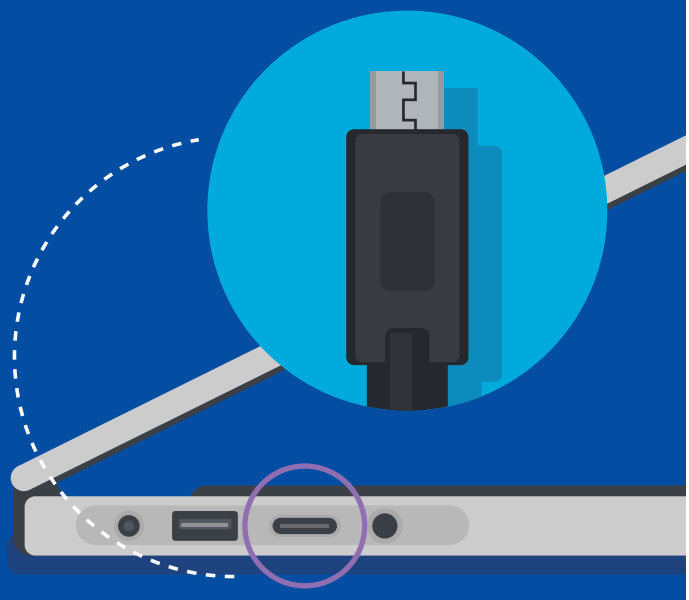
A big attraction of USB-C is its purposefully simple design. A reversible, flattened oval connector — the same at both ends of a cable — means users can connect a cable without worrying about its orientation. We can finally put to rest the old joke about how a USB cable never goes in right the first time, since there's no wrong way anymore.

USB-C is very similar to Thunderbolt 3 in that it shares the same connector shape and also transmits display, power and data. USB-C can also be compatible with Thunderbolt 3*, so if you have a laptop with Thunderbolt 3 and a Monitor with USB-C* you can still connect the two together.

So-called alternate modes for USB Type-C, when used by manufacturers, expand the possibilities for connecting. IHS Markit suggests, in a late 2016 market report on USB Type-C,[3] "a scenario where a notebook PC could transmit video to a DisplayPort monitor, data to an MHL mobile phone, USB 3.1 thumb drive or Thunderbolt external hard drive, while also delivering 100 watts of charging power to a mobile device, all through a single cable type."

The vast majority of the market for computing devices, including desktops and laptops, will converge around USB Type-C, and to a lesser extent, Thunderbolt 3 solutions [by 2025].

Source: ABI Research.[9]



The connectors won't fit, but USB 3.1 is still backwards-compatible with older versions of USB. Users will need physical adapters to connect to plug older devices directly into a USB Type-C port. That said, many laptops and monitors also have more conventional USB ports.

*Check equipment specifications. Must be USB-C with Thunderbolt compatibility.

The USB-C Advantage

USB Type-C represents a new paradigm that will turn the interface market on its head.

That IHS Markit report suggests the arrival of USB Type-C will turn the computing device interface market on its head. USB Type-C represents "the holy grail of interfaces," IHS Technology analysts say, "increasing convenience to the point where only wireless technologies rival it."

Here's what has the industry excited:

Simplified Connection

Standard reversible connectors, the same at both ends, can never plug into a port the wrong way and break one of the pin connectors inside, extending their lifespan. A USB cable can look perfectly fine, but only close examination by a technician might reveal one of the five connector pins has snapped off, meaning a function like fast-charging no longer works.

One Cable, Many Tasks

When devices like laptops and monitors properly support USB-C, a single cable can take on multiple duties. It can:

- Send the video signal to the monitor, whether that's DisplayPort, HDMI or VGA;
- Connect peripherals like keyboards, mice, backup drives and printers all plugged in to the monitor, which acts as the hub;
- Enable high speed data transfers, like file backups;
- Power and quickly recharge devices while performing these tasks.

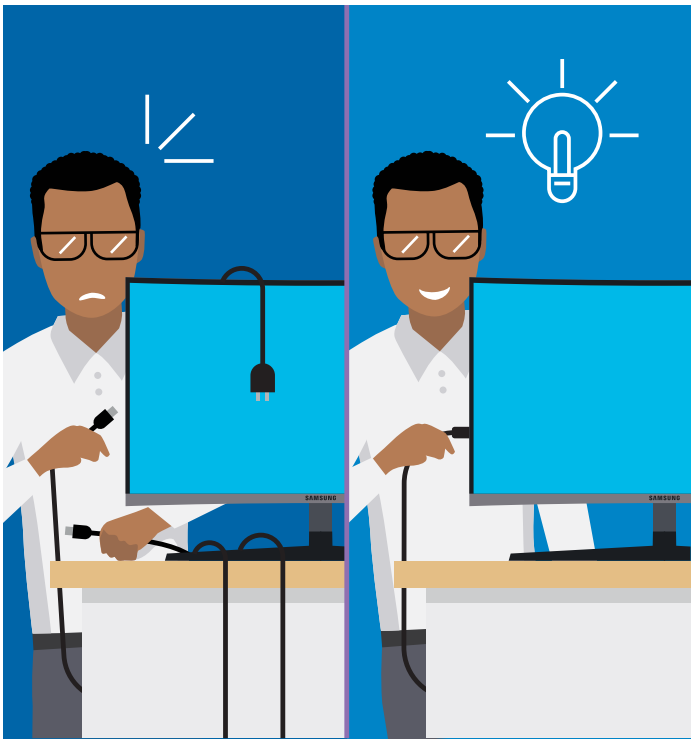
Streamlining Office Set-Ups

Mobile workers can walk in, connect their laptop with a USB-C ready monitor, and be productive in seconds. If the user's laptop is USB-C compliant, the laptop's power cable and adapter "brick" can stay in the bag, or be left at home. Workstations that previously had cables going every which way from a laptop and other devices to facilitate productivity are boiled down to that single connection.

If the office environment shares desks, a different worker with a different USB-C ready laptop can sit down the next day, and get to work just as easily.

"There's always confusion about how to efficiently connect your computing device to your monitor," says Ramseen Evazians, senior product manager of business displays at Samsung. "The full implementation of USB-C functionality in a monitor removes a lot of those headaches."

"If I come into my office, and I have a USB Type-C monitor and I have a USB Type-C computing device, I don't have to worry about multiple cables and docking stations and adapters and dongles. And in most cases, I don't even have to worry about power adapters," he continues. "So it makes life easier for you, to get your job done without having to worry about setting up your PC every day."



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- Ramseen Evazians

Why USB-C Matters for IT Support Pros and End Users

In most corporate environments, IT desktop support teams spend at least part of their day-to-day jobs running around to make things work — at workstations and in meeting spaces.

They're typically the first contact when employees forget or lose a power adapter or video signal cable, need a different docking station, or when two devices refuse to work with one another.

To minimize support time, IT teams are buying docking stations to organize and easily connect laptops to monitors. Complicating matters, offices are evolving into open, flexible spaces where staffers might not even have a regular, fixed workstation. Many workers are bringing in their own devices, instead of a corporate standard laptop specification.

To deal with these varied needs, support teams are equipping formal meeting rooms and pop-up meeting spaces like huddles with multiple types of cables and adapters, hoping to minimize the "urgent" support requests that come in when a colleague can't get a laptop working with a meeting space display.

It can be a mess, but a lot of the scrambling and frustration can end when users have USB-C ready laptops and offices are equipped with USB-C monitors, like Samsung's new 890 series curved display. A USB-C monitor removes the headaches for workers who just want to plug in and get to work, and for IT support team members who'd prefer to focus on mission-critical work like network and server performance and security.

USB Type-C In Brief

1

One cable can handle signal for monitor, data transfer, mouse and keyboard commands and power charging

2

New reversible, bi-directional connector that's easy to plug in

3

Carries enough power to charge laptops

4

At least doubles transfer speeds of other, older USB cables

All USB-C Devices Were Not Created Equal

While USB-C is all about simplifying, streamlining and boosting productivity, the standard is still in its relative infancy. Not all USB devices fully implement the new standard, and that means what a buyer sees is not necessarily what a buyer will get.

Laptops and monitors might have USB-C ports but not fulfill the potential for USB-C, while some cables might have the right connectors, but don't support USB 3.1.

Here's what to look for when buying USB-C devices:

1. Ports don't guarantee support

Devices of all kinds may have USB ports, but that doesn't guarantee the manufacturer has adapted the device to take advantage of the standard.

2. Pay attention to the specs

What's listed on the box or website might not always be clear. You want to ascertain that the device or cable you are buying will do what it says, such as enable charging or support the faster data speeds supported by USB 3.1.

3. Look for Power Delivery

PD is short for power delivery, and in the case of monitors, the specs should stipulate PD or have other language indicating what is supported, and what amount of power can be "delivered." Specifications vary, but a monitor providing 45 watts of power should happily charge and power most laptops.

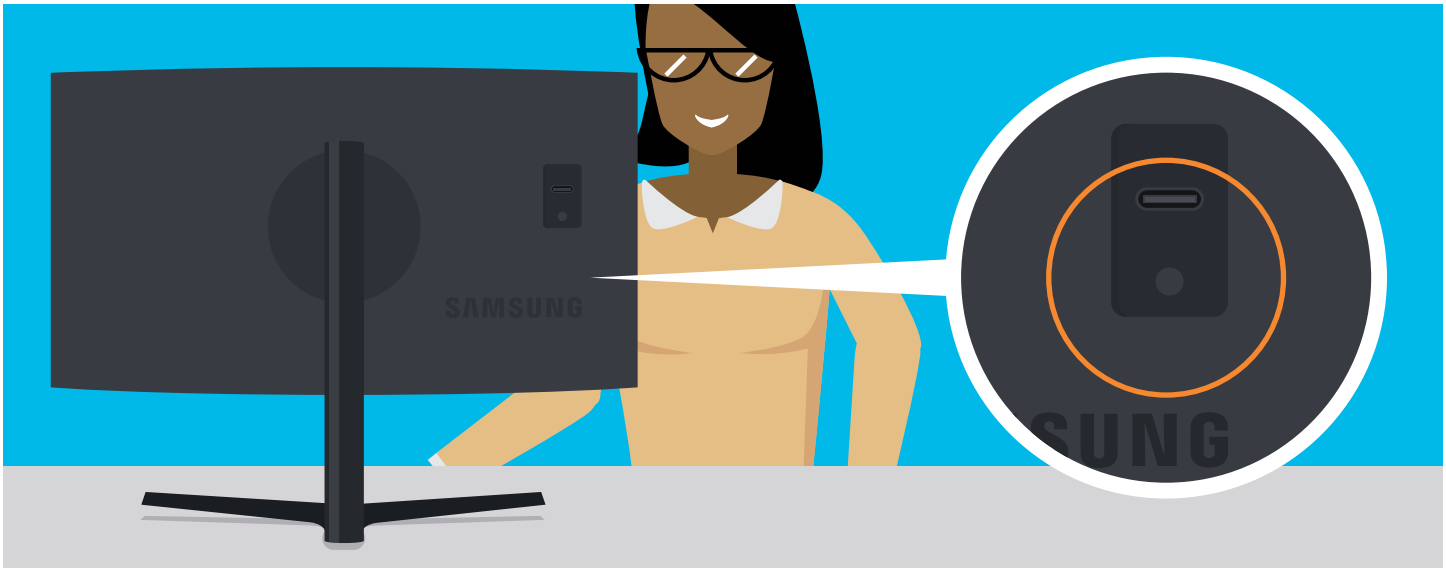
4. Future-proof

Most devices are expected to adopt USB-C as a standard, so when it comes to devices like monitors, buying a USB-C ready monitor now means as devices like laptops go through refresh cycles around a business, the new ones are likely going to have USB-C support.

5. Seize the moment

Particularly with monitors, upgrading to USB-C may also bring other advantages with emerging display technology, such as High Dynamic Range that delivers and balances the brightest brights and deepest blacks — not a big deal for word processing, but important when it comes to creative production, medical imaging or recreational pursuits like gaming.

As such a flexible technology, USB-C has some specific considerations when it comes to different applications.



PCs

A Type-C port on the side of a laptop doesn't guarantee it has full capability. PC Magazine, analyzing the rise of USB Type-C, says while all the new laptops its reviewers have seen that have a USB Type-C port support both data transfers and power delivery, some manufacturers have not done the work to connect the port to their graphics hardware.[4] That means using USB Type-C to send a signal to a monitor with USB Type-C may or may not work.

Monitors

It's possible to use dongles and adapters to get a USB-C connector working with a generic monitor using HDMI or DisplayPort signals, but the tidiest connection is using a monitor that is USB Type-C compatible, like Samsung's 890 Series Curved display.[5] It can charge the laptop driving the screen, but also has three more conventional USB ports for peripherals like a keyboard, mouse and backup external hard drive.

Next, you need to determine if the monitor can push enough power through to provide a charge.

"You can have a USB Type-C monitor that will be set up only to do things like connect the keyboard and mouse and provide 10 watts of power," says Evazians, noting that's enough power to charge a phone, but not a laptop.

"Then you can have a monitor that has USB Type-C input, but it's only for video and data, and it doesn't have power implemented. Or, it could have power, but that could be anything from 5 watts all the way up to 100 watts."

Evazians says Samsung monitors with USB-C support 45 – 100 watts, which is more than enough to power and recharge a typical laptop.

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Cables

While USB Type-C establishes a standard on the connectors, manufacturers aren't always producing cables that support USB 3.1.[6] It's possible to buy identical-looking cables that support different speeds of data transfer. More importantly, some may not support power delivery — meaning users can't plug in to a monitor and charge their laptop or smartphone, as intended. The specifications on these mundane-looking cables need to be closely scrutinized, and when purchased, labeled to indicate the ones that are fully USB-C.

There have been documented cases[7] that have seen cables damaged by things like the wrong voltage being sent through the cable. Amazon has even banned some sub-standard cables from its marketplace.

Time and Budget Savings

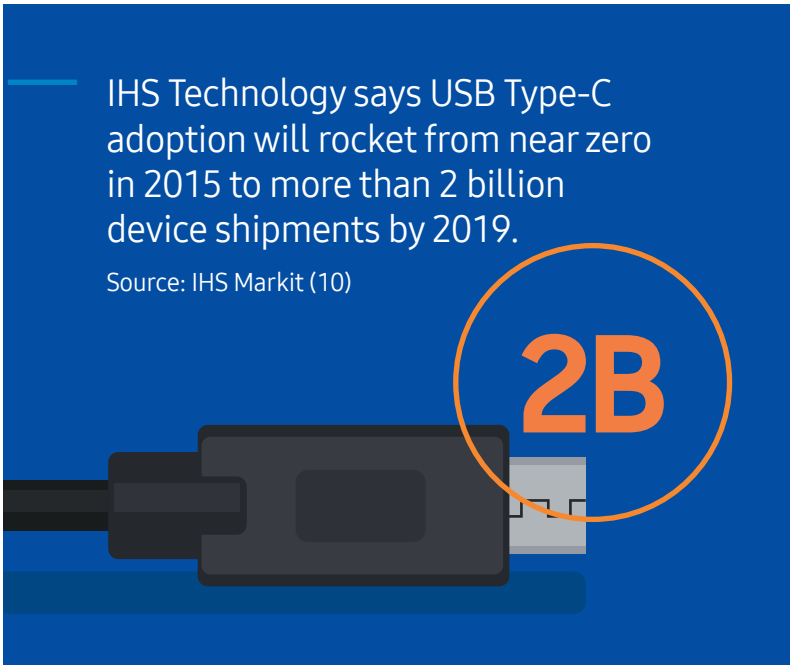
There's a discernible cost to maintaining lots of extra devices and hubs, and dispatching IT personnel to deal with these issues.

"We have customers, major customers, and mid-to-large customers, who've done studies that estimate the soft IT overhead cost of maintaining extra devices," says Evazians. "It ranges between $50 to $200 per device depending how complex the device is ... whether it's a power brick or it's a docking station."

"So there are headaches that are associated with that, that IT people get," says Evazians, "'I lost my power supply,' or 'I had a docking station for HP 13 inch laptop but now I have the 15, and it uses a different docking station.'"

"Or you'll have a workplace that's one third of the employees on HP, one third on Dell, one third on Macs. But to maintain that means a half-dozen different types of docking stations," says Evazians, noting the problem is exacerbated when one of the connector cables simply come loose. "So the users call IT, and IT has to waste time trying to fix all these things."

"All of that is soft IT cost, in terms of time. So not only are they spending money on these extra devices to make things work," he says, "managing them all is a major IT cost."



USB Type-C Is the Future

It's largely assumed — and marketplace stats bear out — that USB-C will be widely adopted for all the reasons outlined in this paper. USB is an ever-evolving standard, and the industry working group has already released a draft version of USB 3.2 that introduces more data transfer capabilities.

There is talk, as well, of USB-C being able to replace the ubiquitous 3.5 mm audio jack on devices, though it is not clear that will happen universally.

One good piece of news is the USB working group is developing a new protocol[8] that will authenticate a connected USB Type-C device or charger before allowing any power or data to pass through. That should minimize the risk posed by bad cables.

That's all for the technical people to work out. For end users, their interests and aspirations when it comes to office technology are far more simple. The less they have to worry about having the right cables and adapters, and the less fuss presented by plugging in and getting to work, the happier they'll be.

For that, USB-C should make them smile.

Learn more: samsung.com/b2bmonitors

Footnotes

1 - http://www.usb.org/developers/usbtypec

2 - http://www.usb.org/developers/ssusb

3 - https://technology.ihs.com/585307/usb-type-c-report-2017

4 - https://www.pcmag.com/article2/0,2817,2478121,00.asp

5 - https://www.samsung.com/us/business/products/computing/monitors/800-series/890-series-34-curved-lc34h890wjnxza

6 - http://www.idownloadblog.com/2017/10/05/problem-with-usb-c-15-inch-macbook-pro/

7 - http://www.trustedreviews.com/news/google-oneplus-usb-type-c-cable-damage-spec-phone-2928330

8 - http://www.trustedreviews.com/news/protective-measures-against-dodgy-usb-c-cables-announced-2946625

9 - https://www.abiresearch.com/market-research/product/1024834-device-connectivity-report

10 - https://technology.ihs.com/585307/usb-type-c-report-2017

11 - ibid.