

USB-C Hub 7-in-1 Pro

Product Specification Document

Product Model: UC7P-2024

Version: 1.0

Date: December 2024

Manufacturer: TechFlow Systems

Executive Summary

The USB-C Hub 7-in-1 Pro is a compact, versatile connectivity solution designed for modern professionals, creators, and developers. It expands the capabilities of USB-C enabled devices by providing simultaneous access to multiple high-speed ports and power delivery, eliminating the need for multiple adapters and reducing cable clutter.

1. Product Overview

1.1 Key Features

- Simultaneous multi-port connectivity (7 ports in 1 device)
- High-speed USB 3.0 data transfer up to 5 Gbps
- 100W Power Delivery (PD) with fast charging capability
- 4K HDMI video output at 60Hz
- Ethernet connectivity for stable network access
- Compact aluminum design with integrated cable management
- Universal compatibility with USB-C devices

1.2 Form Factor & Design

- Dimensions:** 135mm (L) × 45mm (W) × 15mm (H)
- Weight:** 125 grams
- Material:** Aerospace-grade aluminum with rubberized grip
- Cable Length:** 0.3m integrated USB-C cable (non-removable)
- Color Options:** Space Gray, Silver, Rose Gold
- Certifications:** CE, FCC, RoHS compliant

2. Technical Specifications

2.1 Port Configuration

Port Type	Quantity	Data Speed	Power Support
USB-C (Upstream)	1	5 Gbps	100W PD Input
USB-A 3.0	3	5 Gbps each	500mA per port
HDMI 2.0	1	-	4K@60Hz
RJ45 Ethernet	1	-	1 Gbps
SD Card Reader	1	-	UHS-II (312 Mbps)

Table 1: Port Configuration and Specifications

2.2 Electrical Specifications

- **Power Delivery:** 100W maximum (supports 20V/5A)
- **Operating Voltage:** 5V / 9V / 15V / 20V
- **Data Transfer Rate:** Up to 5 Gbps (USB 3.0)
- **HDMI Bandwidth:** 18 Gbps
- **Ethernet Speed:** 10/100/1000 Mbps auto-negotiation
- **Power Consumption (Idle):** 0.5W
- **Power Consumption (Full Load):** 12W (excluding device charging)

2.3 Environmental Specifications

Operating Temperature	0°C to 40°C
Storage Temperature	-20°C to 60°C
Humidity Range	10% to 90% RH (non-condensing)
Altitude	Up to 3,000 meters

Table 2: Environmental Operating Conditions

2.4 Compatibility Matrix

- **Operating Systems:** Windows 10/11, macOS 10.14+, Linux (kernel 5.4+), Chrome OS
- **Device Support:** MacBook Pro/Air (2016+), Dell XPS 13/15, HP Spectre, ThinkPad X1, iPad Pro (2018+), and other USB-C devices
- **USB Standards:** USB 3.0, USB 2.0 (backward compatible)
- **Video Output:** Works with any HDMI 2.0 compatible display

3. Functional Diagrams

3.1 Port Layout Diagram

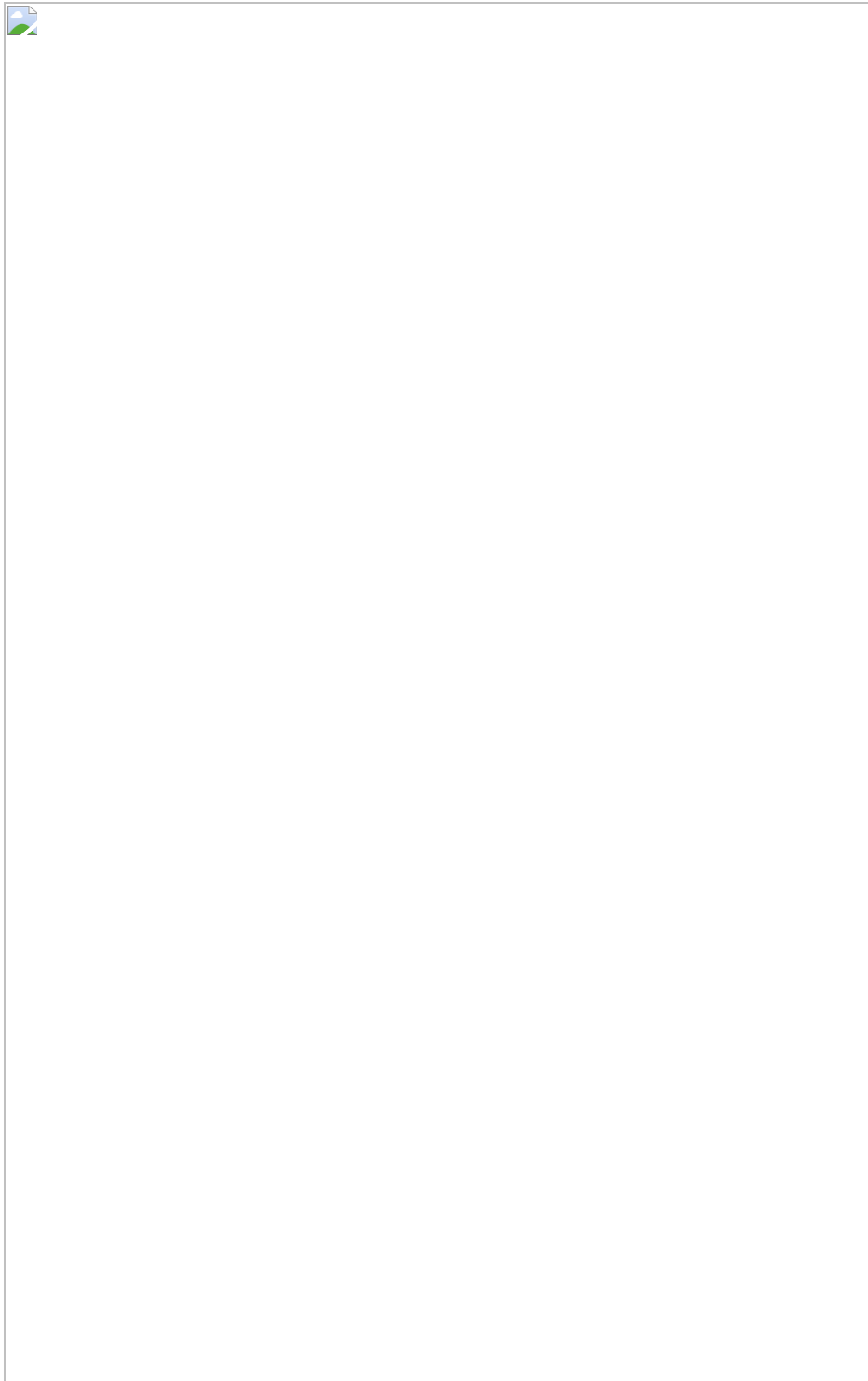


Figure 1: USB-C Hub 7-in-1 Pro - Port Layout (Front View)

3.2 Power Distribution Diagram

Power delivery is managed through an advanced power distribution controller that prioritizes charging while maintaining stable operation across all ports.

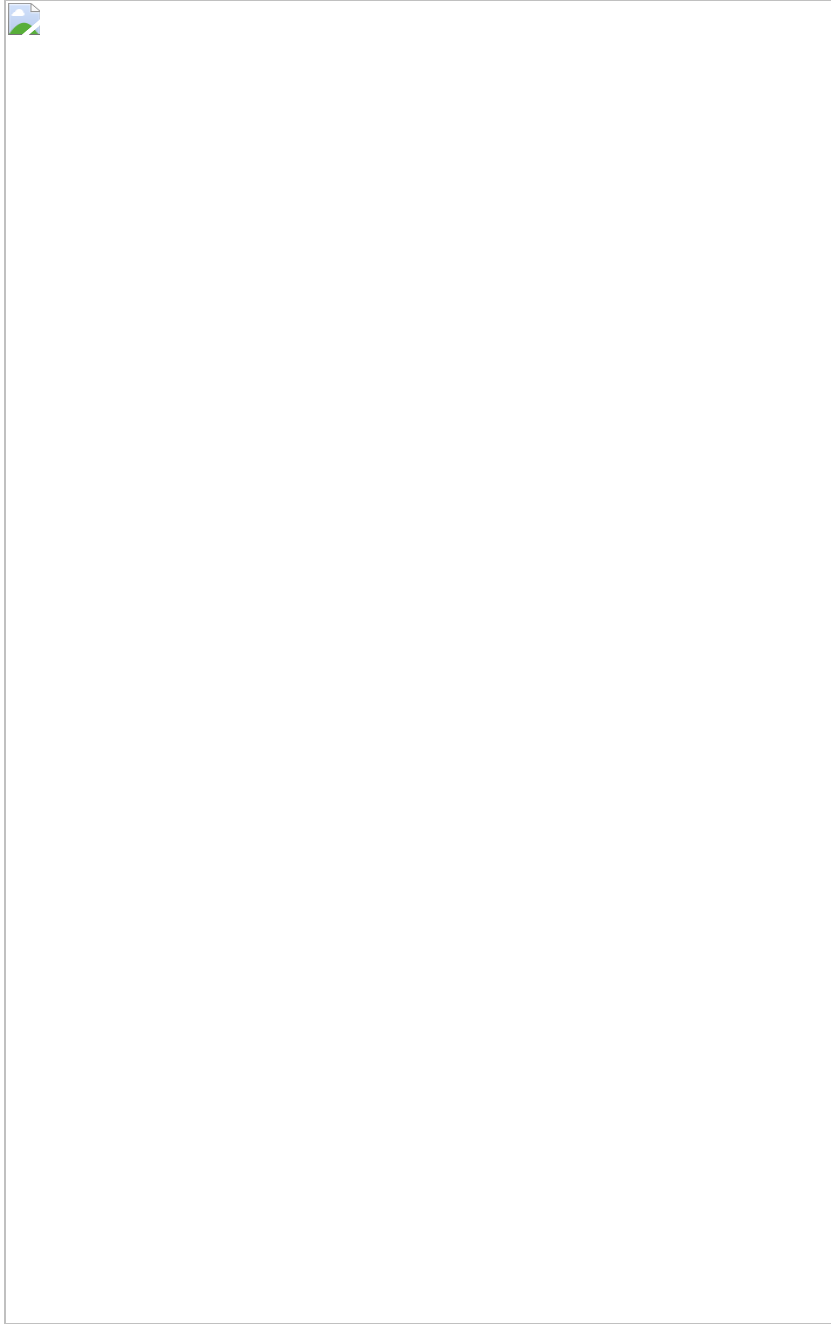


Figure 2: Power distribution controller prioritizes charging while maintaining port functionality

4. Performance Specifications

4.1 Data Transfer Performance

- **USB 3.0 Ports:** Sustained transfer rates up to 420 Mbps (tested via USB 3.0 benchmark)
- **SD Card Reader:** Sequential read speeds up to 300 Mbps, write speeds up to 260 Mbps
- **Ethernet:** Wired connection supports up to 1 Gbps (gigabit Ethernet)
- **Video Output:** Supports up to 4K resolution at 60Hz refresh rate

4.2 Power Delivery Performance

The hub intelligently manages power allocation:

- **Dedicated Device Charging:** 100W pass-through (when no high-power peripherals connected)
- **Balanced Mode:** 60W charging + 40W peripheral support (typical usage)
- **High Performance Mode:** All USB-A ports active with 90W device charging
- **Thermal Management:** Adaptive cooling maintains optimal operating temperature under sustained load

5. Frequently Asked Questions (FAQs)

5.1 Compatibility & Connectivity

Q: Will this work with my MacBook Pro?

A: Yes! The USB-C Hub 7-in-1 Pro is fully compatible with all MacBook Pro models from 2016 onward, as well as MacBook Air (2018+). Simply connect to any USB-C port and it will be recognized automatically[1].

Q: Can I use multiple USB-A devices simultaneously?

A: Absolutely. All three USB-A 3.0 ports support simultaneous connection and data transfer at full 5 Gbps speeds. Each port is independently managed[1].

Q: What happens if I connect to HDMI while using other ports?

A: The hub is designed for simultaneous multi-port operation. You can use HDMI, Ethernet, USB-A ports, and SD card reader all at the same time without performance degradation[2].

5.2 Power & Charging

Q: Can I charge my laptop while using other ports?

A: Yes. The 100W power delivery passes through to your device, allowing simultaneous charging and full peripheral usage[1].

Q: What's the minimum power adapter I need?

A: A 100W USB-C power adapter is recommended for optimal performance with simultaneous peripheral usage and device charging. However, the hub is backward compatible with 60W adapters for light usage scenarios[2].

Q: Will the hub get hot during extended use?

A: The hub includes passive thermal management and operates efficiently under normal

conditions. It may warm slightly during sustained maximum load, but design specifications ensure safe operation up to 40°C ambient temperature[1].

5.3 Drivers & Installation

Q: Do I need to install drivers?

A: No drivers are required for Windows 10/11, macOS 10.14+, or Linux. The hub is recognized as a USB composite device and uses standard OS drivers. Simply plug and play[2].

Q: Why isn't my SD card being recognized?

A: Ensure the SD card is fully inserted and aligned properly. If the issue persists, try a different SD card to rule out card compatibility. The reader supports SDHC, SDXC, and microSD (with adapter)[1].

5.4 Video Output

Q: Can I extend my display or mirror it?

A: Yes, the HDMI output supports both extended display and mirroring modes depending on your OS settings. Refer to your operating system documentation for display configuration options[2].

Q: What's the maximum resolution supported?

A: The hub supports up to 4K (3840×2160) resolution at 60Hz. For optimal performance with 4K displays, ensure your source device supports HDMI 2.0[1].

Q: Can I connect multiple displays?

A: No. This model includes one HDMI output. If you need multi-display support, consider the USB-C Hub 9-in-1 Elite (coming soon)[2].

5.5 Troubleshooting

Q: Some ports stopped working. What should I do?

A: First, disconnect and reconnect the hub. If the issue persists, try a different USB-C port on your device. Power cycle your computer and retry. If the problem continues, contact technical support[1].

Q: The hub isn't recognized by my device.

A: Verify your device's USB-C port is functioning (test with other USB-C accessories). Try a different USB-C cable if available. Update your OS to the latest version and retry[2].

Q: Data transfer is slower than expected.

A: Ensure you're using a USB 3.0 compatible cable. Check that no other resource-intensive applications are running. If using WiFi simultaneously with wired transfer, Ethernet may consume bandwidth[1].

6. Quick Start Guide

6.1 Unboxing & Contents

Your USB-C Hub 7-in-1 Pro package includes:

- USB-C Hub 7-in-1 Pro device
- 0.3m integrated USB-C cable (non-removable)
- Quick start guide (this document)
- Warranty card
- Carrying pouch (premium models)
- Safety documentation

6.2 Initial Setup

Step 1: Inspect the device

Examine all ports for any visible damage or debris. Ensure the integrated USB-C cable is undamaged.

Step 2: Connect to your device

Plug the USB-C cable directly into a USB-C port on your computer or tablet. The hub will be automatically recognized.

Step 3: Connect your peripherals

Begin connecting your USB-A devices, HDMI display, Ethernet cable, or SD card as needed.

Step 4: Connect power (optional)

If charging your device, connect your 100W USB-C power adapter to any standard outlet.

6.3 First-Time Usage Tips

1. **Device Recognition:** Allow 2-5 seconds for full device recognition on first connection
2. **Indicator LED:** A blue LED indicator on the hub shows active connection status
3. **Port Priority:** Prioritize high-bandwidth devices (external drives, displays) to dedicated USB-A ports
4. **Cable Management:** Use the integrated cable route to minimize strain on your device's USB-C port
5. **Safe Disconnection:** Before removing the hub, ensure all active transfers have completed

6.4 Common Setup Scenarios

Scenario A: Office Productivity

Hub Connection → External Monitor (HDMI)

→ Wired Ethernet

→ USB-A: Keyboard, Mouse, External SSD

→ Power adapter for charging

Scenario B: Content Creation

Hub Connection → 4K Monitor (HDMI)

→ USB-A: Storage drive, Camera

→ Power adapter for charging

→ SD Card: Direct backup

Scenario C: Travel Setup

- Hub Connection → USB-A: Flash drive, peripherals
→ Ethernet: Stable internet connection
→ Power adapter for charging

6.5 LED Status Indicators

LED Color	Status	Meaning
Blue	Solid	Device properly connected and powered
Blue	Blinking	Data transfer in progress
Orange	Solid	Power delivery active (>90W)
Red	Blinking	Device not recognized or error
Off	-	No USB connection

Table 3: LED Status Indicator Guide

7. Maintenance & Care

7.1 Cleaning

- **Exterior:** Use a soft, dry microfiber cloth to gently wipe the aluminum casing
- **Ports:** Use compressed air to remove dust from port openings. Never use liquids near ports
- **Cable:** Wipe the integrated USB-C cable with a dry cloth only

7.2 Storage

- Store in a cool, dry environment (5°C to 40°C)
- Use the provided carrying pouch for portable storage
- Avoid extreme temperature fluctuations
- Keep away from magnetic fields and electronic interference

7.3 Cable Care

- Do not bend the integrated USB-C cable at sharp angles
- Avoid placing weight on the cable
- Route the cable away from sharp objects and heat sources
- Do not forcibly pull the cable when disconnecting devices

8. Specifications Summary

Specification	Value
Model	UC7P-2024
Ports	USB-A (3), HDMI, Ethernet, SD Reader, USB-C (Input)
Data Speed	5 Gbps (USB 3.0)
Power Delivery	100W maximum
Video Output	4K @ 60Hz HDMI 2.0
Ethernet Speed	1 Gbps
Material	Aerospace aluminum
Weight	125g
Operating Temp	0°C to 40°C
Warranty	2 years limited

Table 4: Complete Specifications Summary

9. Warranty & Support

9.1 Limited Warranty

The USB-C Hub 7-in-1 Pro is covered by a 2-year limited warranty against defects in materials and workmanship. Warranty covers:

- Hardware defects
- Port functionality failure
- Power delivery issues

Warranty excludes damage from misuse, accidents, or unauthorized modifications.

9.2 Technical Support

For technical assistance:

- **Email:** support@techflowsystems.com
- **Phone:** +1-408-555-0123 (Mon-Fri, 9AM-6PM PST)
- **Website:** www.techflowsystems.com/support
- **Live Chat:** Available on official website during business hours

9.3 Return & Exchange

All returns must be initiated within 30 days of purchase. Please retain your original packaging for optimal protection during return shipping.

References

[1] USB Implementers Forum. (2024). USB 3.0 Specification. Retrieved from <https://www.usb.org/>

[2] HDMI Licensing LLC. (2024). HDMI 2.0 Specification for 4K Support. Retrieved from <https://www.hdmi.org/>