Pro Model

Connectivity

- USB-C:
  - 3x USB-C ports (data + power, minimum USB 3.x)
  - 1x USB-C Power Delivery Input (100W)
  - 1x USB-C Thunderbolt 3/4 port (40Gbps, video out, power delivery) Vertical
- USB-A:
  - 8x USB 3.0 Type-A ports (Prefer Double Stacked)
- Display:
  - 2x HDMI ports (4K@120Hz or at least two ports capable of 4K@60Hz)
- Storage:
  - 4x NVMe drive slots (consider Key M and Key B+M sizes if space allows)
- Network:
  - 1x Gigabit Ethernet port
- Card Readers:
  - 1x Micro SD (TF) reader
  - 1x SD card reader
- Audio:
  - 1x 3.5mm audio jack (may need dedicated audio codec)

Base Model

Connectivity

- USB-C:
  - 3x USB-C ports (data + power, minimum USB 3.x)
  - 1x USB-C Power Delivery Input (100W)
  - 1x USB-C Thunderbolt 3 port (40Gbps, video out, power delivery) Vertical
- USB-A:
  - 8x USB 3.0 Type-A ports (Prefer Double Stacked)
- Display:
  - 2x HDMI ports (4K@120Hz or at least two ports capable of 4K@60Hz)
- Storage:
  - 2x SATA SSD with Power
- Network:
  - 1x Ethernet port
- Card Readers:
  - 1x Micro SD (TF) reader

    - 1x SD card reader
- Audio:
    - 1x 3.5mm audio jack (may need dedicated audio codec)

Design Requirements

Power Management:

Design robust power delivery system to handle multiple NVMe drives, high-speed data transfers, and charging peripherals
Prioritize safety and regulation compliance
Carefully consider power path design, especially for the 100W PD input

Signal Integrity:

Meticulous impedance control and routing, especially on Thunderbolt 4, USB 3.x, HDMI, and NVMe signals.
Consider strategies to minimize crosstalk and potential interference.

EMI/EMC:

Design with electromagnetic compatibility in mind, implement shielding and grounding techniques as needed.
Adhere to relevant EMC standards

Thermal Management:

Plan for heat dissipation from NVMe drives and power regulators.
Consider heatsinks or potential airflow requirements if necessary.
The housing will be made of aluminum for heat dissipation.

Form Factor:

Compactness is appreciated, but reliability, thermal performance, and signal integrity come first.

Cost-Conscious Components:

Use more readily available components, prioritizing value while maintaining performance goals.
Important Notes for Designers

Component Availability:

Make sure to choose components with good stock levels to streamline production.

Compliance:

Product will be sold in the USA and Europe with an option to expand to asian markets later on.

Collaboration:

I am open to designer input on component selection for potential cost savings or functionality improvements.