

This User Manual was designed for Protectli V16XX series Mini PCs. Including the typical model V1610 which is a 6 port networks hard ware.

1. Application

The most important consideration for choosing your hardware is what application it will be used for. The Protectli Vault can be used in a number of different applications. Customers have deployed Vaults as Windows Clients, Linux Desktops and Servers, Hypervisors, and of course firewalls.

Thinking about the requirements for your use case will help to narrow your choice when it comes to picking your Vault.

Our recommendation: Simple client machines will work great on our smaller 6-port Vaults, while you may want to consider a 4-port or 6-port for firewall or hypervisor applications.

2. Ports

The number of ethernet ports you need depends on your application. Firewalls can be configured on as little as a two physical ports, but for simplicity and throughput, consider that you may want multiple physical ports to segment traffic for multiple networks (i.e. a 'secure' network, an 'IoT' network, a 'guest' network, etc).

For hypervisor applications, consider that a physical port can be 'passed through' to an individual virtual machine so multiple virtual machines may need more physical ports.

The Vault is currently available in 2-Port, 4-Port, and 6-Port variations. In addition, some models have 2.5G or 10G Ethernet ports.

Our recommendation: It is smart to think about future-proofing your Vault from the start, so consider a model with more Ethernet ports and

3. Throughput Requirements

Every Vault's Ethernet ports are PCIe connected to the CPU and can run at line rate of either 1 Gbps, 2.5 Gbps or 10 Gbps.

FIREWALL

As a firewall, every Vault has tested at full wire speed between ports using iperf as a synthetic load. As such, for basic routing applications any Vault is capable of gigabit

throughput. However, in most firewall application, additional services will be turned on that consume CPU and thus may reduce throughput. These include modest services such as DHCP and DNS or heavy CPU users such as Deep Packet Inspection (DPI). A key consideration is Virtual Private Networking (VPN) support. VPN requires processor intensive encryption.

Our recommendation: *With a modest throughput of up to ~300 Mbps, you can run many firewall applications in 'basic' routing and firewall mode on any of our 2-Port or 4-Port port models. With increased throughput (especially gigabit service) or if implementing VPN, DPI, IPS/IDS, SNORT, Sensei, or other firewall add-ons, we recommend a Vault with a performant CPU such as the VP4600 or VP6600.*

Note: For sample VPN throughput tests we have performed to show baselined performance across all models, check out our OpenVPN and IPSEC VPN tests.

HYPERVISOR

For hypervisor applications, the Vault's multiple gigabit ports are ideal for dedicated physical connections passed through to individual VM's.

Our recommendation: *In most circumstances, using a Vault as a hypervisor means that the user will want to run multiple operating systems, requiring CPU, memory, and network connections. As such, we recommend the 6-Port Units.*

4. Security

Security is an important consideration for any network or compute appliance. coreboot is available as an open source BIOS on all the Vaults. In addition, the Vault Pro (VP) series have additional security features.

Our recommendation: *If security is important, we recommend coreboot in general and the advanced security features available on the Vault Pro Series.*

5. Workload and Hardware Requirements by OS

The OS you choose to run can greatly affect the performance requirements of the Vault. Some customers use the Vault to run a basic firewall, while others use it as a hypervisor, desktop, or SD-WAN. Therefore, hardware requirements vary widely. Here are a few examples of usage that typically require a stronger CPU.

- Routing all network traffic through a VPN requires higher CPU clock speeds, especially at higher throughput. [Click here for more performance results.](#)
- Running add-on packages like pfBlocker (pfSense), SNORT (pfSense), or Sensei (OPNsense)
- Using the Vault to run a hypervisor, and/or having other software running on the same device.

Here are hardware recommendations for common OS's:

– OPNsense and pfSense	
Recommended	
Processor	1.5 GHz multi core cpu
RAM	8GB
Storage Space	120GB SSD
All Protectli Vaults can be configured to meet the recommended requirements to run OPNsense and pfSense.	
You can find more information on the official pages:	
OPNsense – Hardware Recommendations	
pfSense – Hardware Requirements	
+ Untangle	
+ Sophos	
+ VMWare ESXi	
+ Ubuntu	

6. The V1610 Photo



The Front Side



The Back Side

7. The Specifications

Model	Gowin 6 Port
Description	6x 2.5G Network Port Fanless Appliance
Processor	Intel N6005 (64 Bit, 2.0GHz, Turbo 3.3GHz, 4MB L3 Cache)
Processor Cores	4
Processor Threads	4
Intel AES-NI	Supported
Virtualization	Intel Vt-x, Vt-d
Network	6x Intel 2.5G Ethernet, RJ-45
Video / Graphics	Intel® UHD Graphics, 1x HDMI 1.4 (with Audio)
Audio	Audio over HDMI
Memory	16GB DDR4 (Soldered), 2933MHz
Storage	32GB eMMC, m.2 NVMe
Optional Storage	
External I/O	6x RJ-45 Ethernet
	2x USB 3.0 Type A
	1x HDMI
	Reset Button (Recessed), GPIO
	4x WiFi/LTE Antenna Mounting Holes
	1x 12V DC Power Jack, Screw in connector
	1x SIM Holder
Internal I/O	1x M.2 3350 B+E-Key PCIe x1, USB 3.0 for wifi or 5G
	1x M.2 2280 M-Key PCIe 3.0 x4 (NVMe/SATA)
	1x CMOS Reset (2 pin)
BIOS	AMI or coreboot
Indicators	1x LED Power Indicator (Blue), 1x LED Disk Activity Indicator (Amber)
Power	1x 12V DC Power Jack, 2.5x5.5 mm screw in connector
Power Usage	
Chassis	Fanless, Aluminum, Black
Chassis Dimensions	
Mounting Options	Desktop, VESA Bracket, Optional 1RU Rack Mount
Weight	
Shipping Weight	
Operating Temperature	+14° - +122° F, -10° - +50° C
Operating Humidity	0 – 95% relative humidity, non-condensing
Approvals	UL (Power Supply), FCC Part 15 Class B, CE, RoHS
Country of Origin	Made in China, Assembled in USA
Optional Connectivity	1x M.2 for wifi or LTE (PCIe x1)

8. The Steps For Users

Step One: Plug the power adaptor

Step Two: Connect any display with HDMI cable

Step Three: Press the power-on button, color blue

Step four: Install the OS you needed

Step Five: Plug in the networks cable and make setting with OS

FCC Warning:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.