VersaPOD™

Planning & Installation Guide

Edition 1.2

2010-10-14

CONNECTING THE WORLD TO A HIGHER STANDARD

WWW.SIEMON.COM

SIEMON™

OVERVIEW

The purpose of this guide is to provide both designers and installers with the necessary information to properly plan, design and install a Siemon VersaPOD Cabinet solution. It is strongly recommended to review all information contained in this document prior to the design or installation of a data center cabinet system to ensure all requirements are addressed.

The Siemon VersaPOD is a complete cabinet system that includes a data center cabinet, vertical patching and cable management as well as other accessory items.

Each of the components of the VersaPOD solution is packaged and shipped separately. Some components require assembly in the field, while others are shipped fully assembled. These will be described in more detail throughout this document.

In many ways, the VersaPOD Cabinet is similar in outward appearance to other data center cabinets. However, the similarities end there.

FEATURES

The key feature of the VersaPOD cabinet is in the vertical patching system created when two cabinets are bayed together as a system (*see Figure 1*). The cabinet's main structural posts are recessed in the front, rear and sides. This creates a 178mm (7.0 in.) vertical channel that runs the full 45 U height of the cabinet. The vertical patching system allows cabling to be run in a controlled, dedicated space in server cabinets providing additional rack mount space for equipment. In high density switch cabinets, this channel provides additional space for patchcord routing.

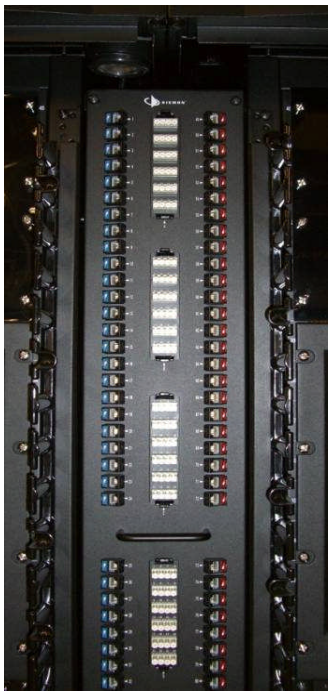


Figure 1
"Zero-U" Space w/Patch Panel Installed

Within this channel "Zero-U" vertical patch panels (VPP's) and patch channels (VPC's) may be installed. The VPP's and VPC's may be installed at the front, rear or both locations within the cabinet in a variety of configurations supporting copper, fiber, 19" rack mount equipment and/or wire management (*see Figure 2*).

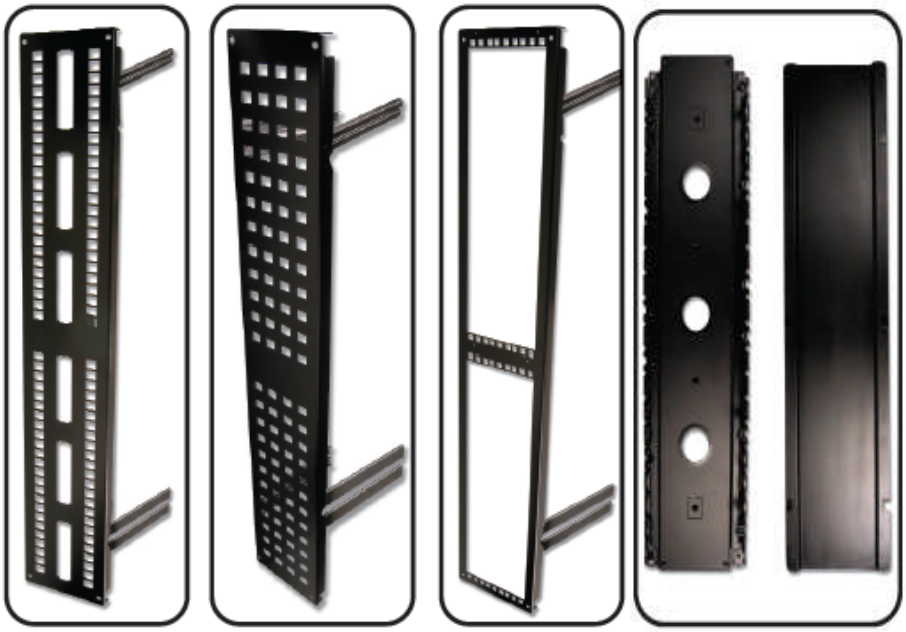


Figure 2
VersaPOD "Zero-U" Vertical Patch Panels (VPP's) & Vertical Patching Channel (VPC)

One other option that is available for the VersaPOD cabinet is a line of products referred to "End of Row". These panels are similar in versatility to the products above but are intended to be installed at the end of a row of cabinets in the space between the frame rail and the side panel. These can also be deployed in single cabinet installations. These panels are offered in (3) versions: the VP-VPP-2U allows for the installation of (2) 1U 19" Rack mount devices; the VP-VWM Vertical Cable Manager and the VP-BLNK1 which is a blank panel ideal for maintaining the thermal efficiency of the cabinet. Each space at the end of a row of cabinets or either side of a stand alone cabinet can accommodate (2) of these panels both in the front and the back (*see Figure 3*).

VP-VPP-2U ***VP-VWM*** ***VP-BLNK1***

Figure 3
End of Row Panels 2U Vertical Patch Panel, Vertical Wire Manager & Blank

Another key feature is the functionality of the doors. The VersaPOD has a single front door hinged at both sides, and split rear doors similarly hinged on both sides as a standard configuration (other configurations available). The dual hinges provide access to the central patching bay when opened one way, and the active equipment if opened at the opposite side.

Both the front and the rear doors can be opened from the left as well as the right simply by operating the appropriate handle. This is important for accessing, not only the equipment within the cabinet, but also the vertical patching and cable management (*see Figure 4*).

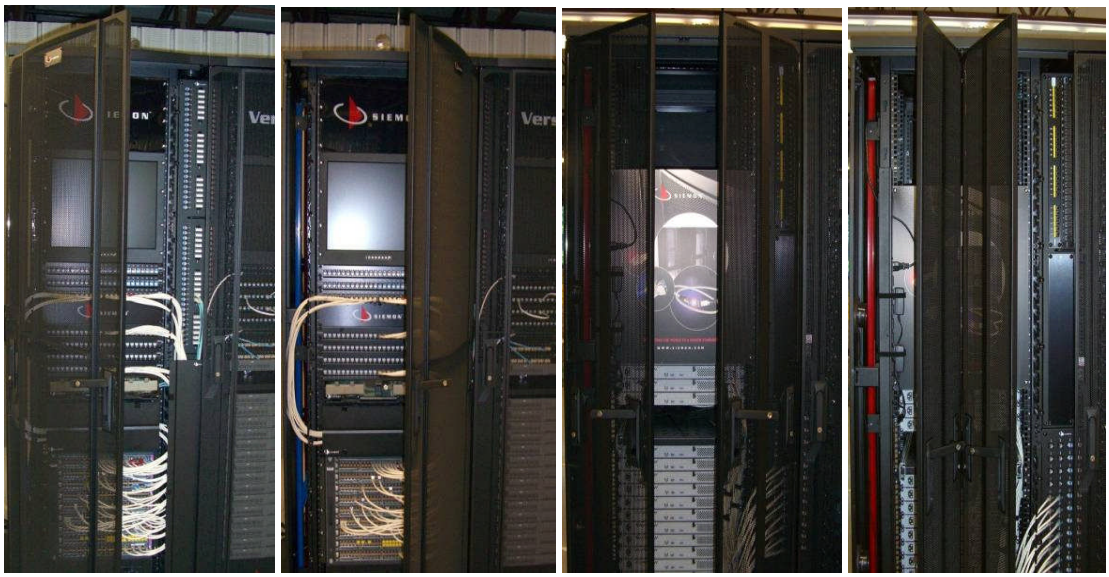


Figure 4

Full Door Opened Left	Full Door Opened Right	Split Door Opened Center	Split Door Opened from End

PLANNING

As with any data center design, it's important to determine space planning. Some key items to consider, outside of total available space, are:

- **Cooling** – how is it being provided and distributed? The VersaPOD is designed to be installed in a passive hot aisle/cold aisle configuration. Additional roof mount exhaust fans are provided as an option to assist with active cooling (*see Figure 5*).

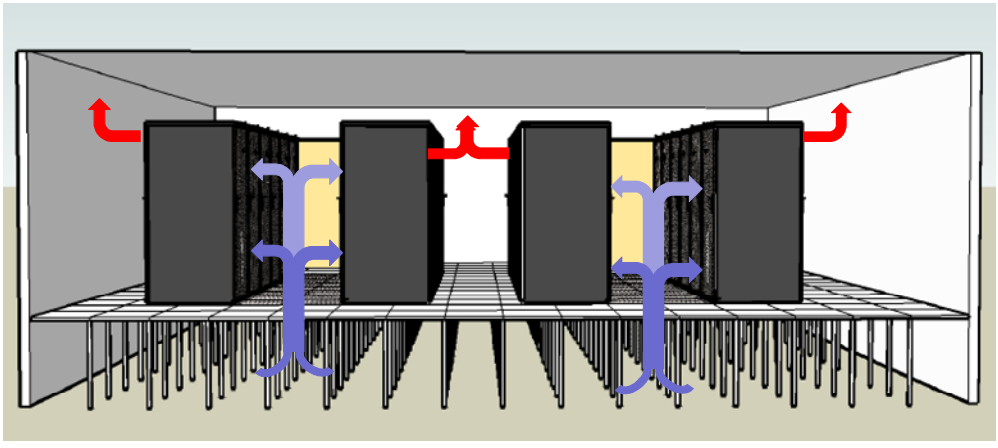


Figure 5
Passive Hot Aisle/Cold Aisle Configuration

- **Aisle dimensions** – The standard recommended clearances for hot aisle/cold aisle dimensions per TIA-942 are:

  Cold Aisle: 914mm (3.0 ft.) min. / 1219mm (4.0 ft.) recommended

  Hot Aisle: 609mm (2.0 ft.) min. / 914mm (3.0 ft.) recommended

  In downdraft systems, the spacing is similar; however the cold air supply grids in the ceiling should be positioned in the cold aisles.

- **Raised Floor Access** – When bringing cabling into the cabinet from an underfloor pathway system, the access holes cut in the floor tiles should be kept to a minimum size and have brush guards installed to ensure that static pressure is maintained under the raised floor. When using the central patching bay, it may be necessary to cut adjacent floor tiles or cut tiles in the center. It is recommended that flooring cuts be determined during the design and layout phase after the flooring grid pattern has been established (*see Figure 6*). ***Refer to the cable capacity charts at the end of this document for additional information to aid in this decision.***

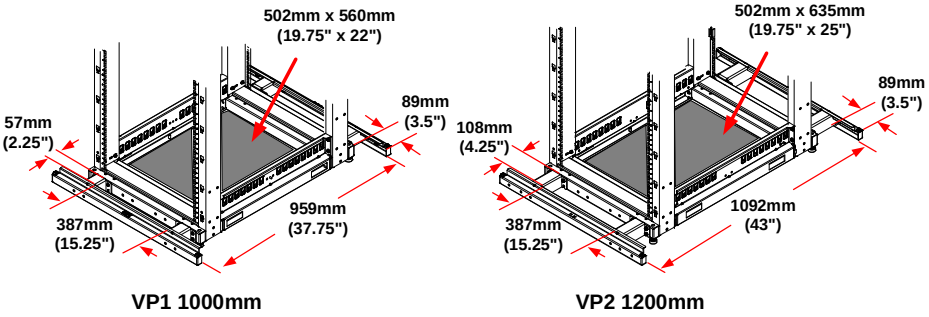


Figure 6
VersaPOD Base Dimensions

- **Cable pathways** – It is important to determine if the cabling pathways and spaces will be overhead, underfloor or a combination of the two. This information is needed to assure that openings in the top have a large enough void. Additional void space will be needed where preterminated trunk cables will be installed to accommodate the size of the connector. For trunking systems or field terminated channels, VP-TRAYs will allow cable slack to be dressed into the cabinets in an orderly, organized manner (*see Figure 12*).

- **Power Distribution** – Most cabinets have some type of Power Distribution Unit/Cabinet Power Unit. Brackets are available to allow these to be mounted in the VersaPOD. 19" Rack mount PDU's will be mounted in the rails typically at the bottom of the cabinet.

- **Growth** – Both TIA-942-A and ISO 24764 state that cabling should be run accommodating growth. This assures that pathways and spaces remain tidy and are of sufficient size to accommodate densities needed day one and day two. This is particularly important when planning pathways and spaces which include cabling cutouts in floor tiles and planning cable capacity coming through the overhead cabinet openings.

- **General Layout for the Data Center** – It is important to at least know generally what equipment will go in each cabinet as cabling densities, routing and vertical bay parts will change depending on the planned equipment. For instance, switch cabinets will have a higher density of cabling than a typical server cabinet. This will impact decisions for vertical panels and mounting location for patch panels.

Once all of the above have been considered, it's now time to start adding the cabinets into the design drawings. There is a variety of ways to configure a data center space and this is ultimately determined by the client's needs and other limitations of the space.

Industry Data Center standards TIA-942-A, ISO 24764, and BICSI-002 offer some information and guidelines for laying out a data center as well as identifying the function and placement of the services within the space.

For the purposes of this document, cabinet recommendations will be based on three cabinet types: Network, Server and SAN (Storage Area Network).

DRESSING CABLING INTO THE VERTICAL CHANNELS

All of the vertical panel modules that fit into the center bay area have sliding rails to facilitate moves, adds or changes. In order to allow the movement along the sliding rails, cabling that is terminated into the center bay must have some cable slack within the cabinet. For all cabinet types, when dressing the cables into the back of the VPP's it's important to leave enough slack to allow for the normal in and out sliding motion of the panel. **The recommended minimum slack is 152mm (6.0 in.).**

NETWORK CABINETS

Network cabinets are those that contain Edge and/or Core Switches. Due to the high concentration of cabling in these cabinets, a typical installation would use 19" patch panels and standard fiber enclosures mounted either at the top of the switch cabinet or in some cases in an adjacent cabinet when the switch cabinet has multiple switches housed in the switch cabinet. The Vertical Patching Channel (VP-VPC) would be populated with wire management, for copper and fiber connections. Patch panels are mounted and connections typically occur at the front of the cabinet.

Lower density switches can utilize the patching within the VPP similar to the server cabinet configuration explained below.

For in row switching or top of rack switching, the set back side rails populated with a horizontal wire manager will allow patching within the cabinet and down the row. This provides a decrease in the number of switches required compared to placing one or two switches in the top of each cabinet. This also decreases the oversubscription of switch ports.

While most data center equipment has a front to rear airflow, there are some legacy switches that have side hot air discharge fans. If these switches are used, it is recommended that VP-TRAYs be installed to stop side airflow into adjacent cabinets if the adjacent cabinets contain active equipment. The tray system also allows the cabling channels to be dressed and managed so that they have minimal impact to airflow. The VP-TRAY would be installed in the vertical space of the adjacent cabinet to provide the necessary clearance. Optional exhaust fans may also be installed in the center opening in the ceiling of the cabinet to draw the heated air out of the cabinet. When

the VP-TRAY is used, the central bay area provides an airflow path for the heated air (*see Figure 7*).

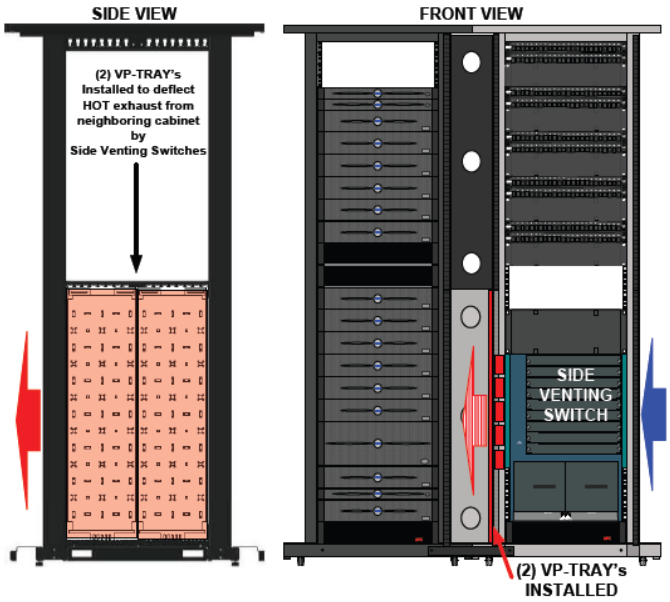


Figure 7
Using VP-TRAY's to Create Airflow Path for Side Vented Switches

The cables from the Network cabinets can be run directly into server VPP/VPC's at the rear of the server cabinets, or to a central patching area where an "any to all" connection is desired.

CENTRAL PATCHING AREAS

For customers that wish to have central patching areas enclosed within cabinets as opposed to open racks, double density central patching areas are supported with the VersaPOD. The front and back of the VersaPOD can be populated with patch panels providing connectivity in both the front and rear of the cabinet. The vertical channels would be fitted with wire management in this scenario. Due to the setback rails, patching can occur down a row of cabinets and still remain behind the doors. It is recommended that horizontal wire management be installed incrementally in the cabinets to allow for cabinet-to-cabinet routing of cables (*see Figure 8*).

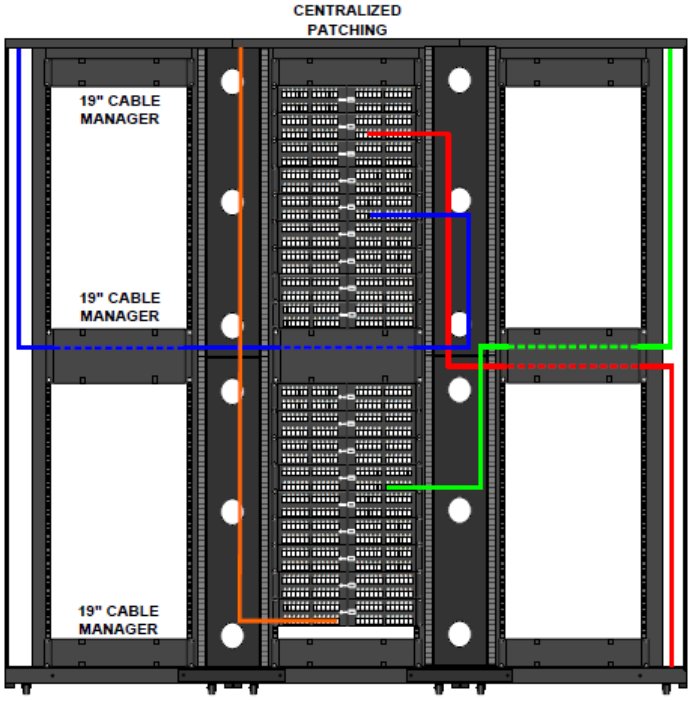


Figure 8
Centralized Patching Configuration

SERVER CABINETS

Server cabinets house mostly active equipment in the form of blade chassis or stackable (aka pizza box) servers (*see Figure 9*). To determine the capacity needed for cabling, servers generally have a primary and secondary network connection (typically copper), primary and secondary SAN connection (typically fiber) and either one or two management ports for in band and out of band management. They may also have another copper connection for KVM's (Keyboard, Video and Mouse connections). The ability to house these connections in the vertical patching space assures that cables are dressed in such a manner that they do not block exhaust fans on the rear of the servers. Swing arms are not necessary to dress cabling in the rear. In lower density situations, one vertical patching channel may serve two adjacent server cabinets. It is important to understand the number and type of connections per server and the total number of servers expected to be housed in a cabinet.

Stackable Servers

Blade Chassis Servers

Figure 9
Server Types

The VPP's for the server cabinets are typically mounted in the rear of the cabinet. The additional fingers in the VPP can be used to route power cables on the opposite side from the copper connections.

Blade servers (chassis based) can use one of two configurations. Either all blades within the chassis will share the chassis network connections, or each blade will have its own set of connections. Again, it is important to understand the number of connections needed per server. Many customers prefer to add cabling accommodating the maximum number of connections should they move away from blade chassis back to regular 1U and/or 2U servers or move to blade architectures that use individual network connections.

SAN CABINETS

Storage Area Network (SAN) cabinets may be copper or fiber, but in most instances will be fiber. These are typically very high density cabinets that contain either storage or a storage director (SAN switch). With the VersaPOD's maximum fiber density, the vertical patching area provides an excellent pathway for fiber connections. The fiber can be terminated into traditional RIC enclosures, plug and play fiber cassettes or a combination of the two. For specific fiber requirements, the SAN manufacturer should be consulted.

CABLE ROUTING

Regardless of the cabinet function, as described above, it's important to understand all the cable access that is provided as part of the VersaPOD solution.

Top Cable Entry

Each 1000mm (40") VersaPOD cabinet is equipped with a lid that offers a total of seven (7) cable access points (*see Figure 10*). Six (6) of these are 280mm x 45mm (11.00 in. x 1.75 in.).The last access point is 445mm x 127mm (17.5 in. x 5.0 in.). If exhaust fans are utilized, they will occupy the one large center cable opening.

Each 1200mm (48") VersaPOD cabinet is equipped with a lid that offers a total of seven (10) cable access points (*see Figure 10*). Six (7) of these are 280mm x 45mm (11.00 in. x 1.75 in.).The other (3) access points are 445mm x 127mm (17.5 in. x 5.0 in.). If exhaust fans are utilized, they will occupy the large center cable openings.

Optional brush guards are recommended for added cable jacket protection for cable entry points.

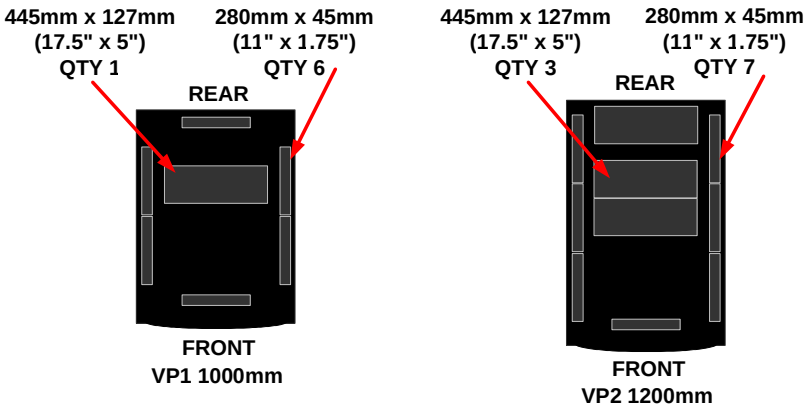


Figure 10
VersaPOD Cable Access Points

The cable management chart can be found in ***Appendix A*** which provides cable capacity information for all the key cabling entry and management areas of the VersaPOD cabinet.

The choice of which access point to use is determined by where in or between the cabinets the cables will be terminated. For the purposes of this document we will work under the assumption that the cables will be terminated into the Vertical Patch Panel (VPP) installed between bayed cabinets (*see Figure 11*).

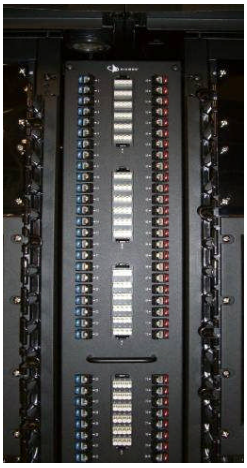


Figure 11
VPP Installed between Bayed Cabinets

As with any structured cabling installation, proper bend radius of the installed cable shall be maintained throughout the entire link. With this in mind, the cable should make an easy transition from the overhead cable tray into the access point in the top of the cabinet. The VP-TRAYs may be installed on either side of the patching channel. These accept a wide variety of Siemon quarter turn cable managers to help with bend radii and cable dressing. They are also beneficial

when dressing in the 152mm (6.0 in.) minimum slack to allow the slides to function and slack from trunking assemblies (*see Figure 12*).

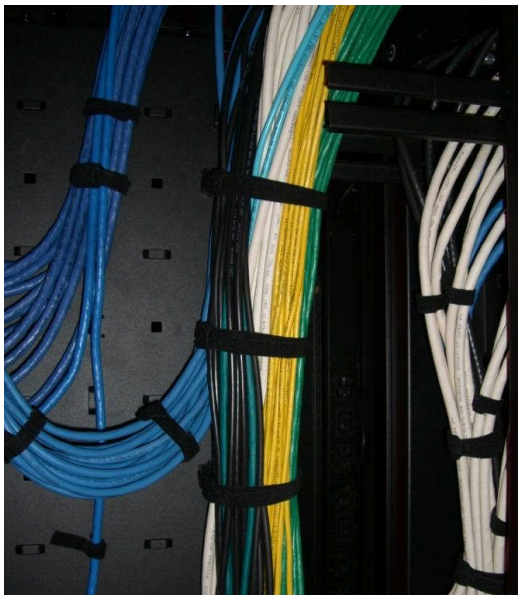


Figure 12
Siemon's ¼-turn cable managers can be attached to VP-TRAYs to properly manage routing and slack necessary for proper sliding operation of VersaPOD panels

As the cables enter the cabinet, they should be supported as close to the point of entry as possible. This can be achieved by taking advantage of the many tie points within the cabinet, but for optimal cable support, the use the internal cable tray accessory (VP-TRAY) is recommended.

The use of angled outlets aids in transitioning patch cords into the cable management fingers (*see Figure 13*).

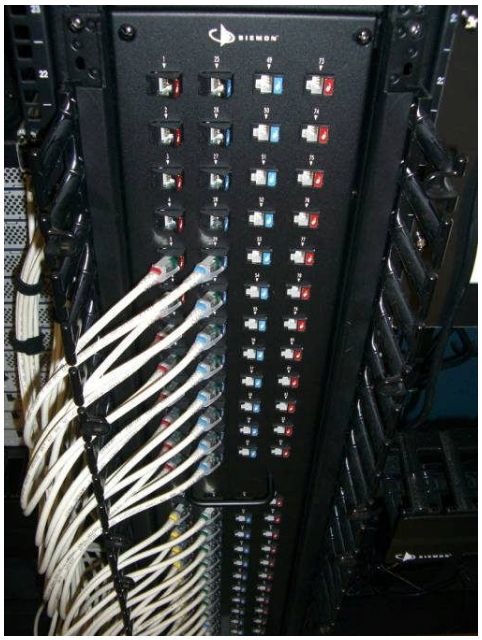


Figure 13
Mounting outlets in angled orientation facilitates routing of patch cords

Bottom of Cabinet Cable Ingress

For underfloor cable access the 1000mm (40") VersaPOD has a 550mm x 500mm (21.75 in. x 19.75 in.) open base and the 1200mm (48") VersaPOD has a 635mm x 500mm (25 in. x 19.75 in.) open base. The resulting opening in the bottom of the vertical space created by two (2) bayed 1000mm (40") cabinets is 952mm x 178mm (37.5 in. x 7.0 in.) the opening in the bottom of the vertical space created by two (2) bayed 1200mm (48") cabinets is 1092mm x 178mm (43 in. x 7.0 in.). The VP-TRAY solutions can be mounted in the lower portion of the cabinet for routing and support (*see Figure 12*). It is important that computer room tiles be installed with brush guards to protect the cables and help maintain the static air pressure under the raised floor (*see Figure 14*).

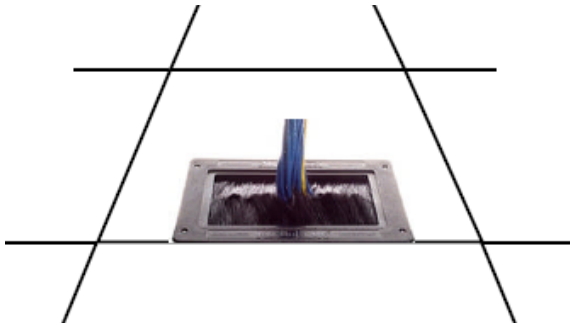


Figure 14
Brush guards should be used when underfloor cable tiles are cut to maintain the static air pressure under the raised floor

PATCHCORD MANAGEMENT

As with any Data Center solution, a well designed permanent link infrastructure is only as good as the patching that is installed after the fact to complete the channel. The VersaPOD system has a variety of patch cord and jumper routing options. In most cases, the customer will find it desirable to install some horizontal managers to facilitate cabinet to cabinet patching where needed. A common configuration is the use of (1) 2U horizontal manager at the top and center of each cabinet. For higher densities, 4U horizontal managers are also available.

VPP Operation with Patchcords installed:
The sliding feature of the VPP's is designed to operate while patch cords are in place. In order to facilitate this movement when the VP-FGR's are installed, the VP-FGR's are secured to the cabinet with only (2) 12-24 screws. Removing these screws along with the (4) screws that secure the VPP allow the VPP, VP-FGR and all the patchcords to slide in and out as one element without the need to disconnect patched connections to any of the active equipment (*see Figure 15*).

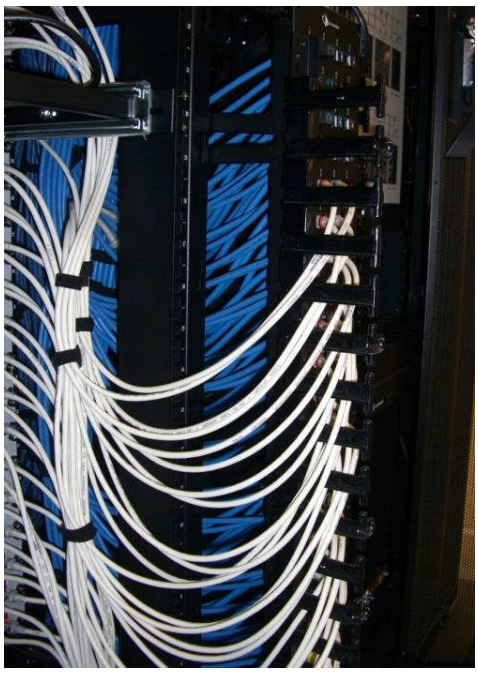


Figure 15
With proper slack management, the vertical panels can be readily opened for access with patch cords in place

NETWORK CABINETS

As mentioned previously, Network Cabinets have the highest concentration of copper cabling in the data center, making patch cord management even more critical. Typically these cabinets would be configured in a manner using horizontally mounted patch panels with VP-VPC (Vertical Cable Managers) used for patch cord management but based on the port density of a given

Network Cabinet, it can by supported by one or more copper/fiber VPP's. One VPP (VP-VPP-6U) can support 288 copper ports using traditional 24-port patch panels. One practice would be to install a VPC in the lower half of the space between bayed cabinets and installing the VPP in the upper half of the same channel.

With this configuration, patchcords from the switch can be dressed to the right, up the vertical channel of the VPC and then plugged into the ports of the panels installed in the VPP above that. This also helps to use up the excess patchcord length when using 1m (3.28 ft.) patch cords, the minimum length recommended by the standards.

The cable management fingers, included with the VPC, aid in making the transition from the switch ports into the VPC, relieving stress on the cords and helping to maintain proper bend radius. By managing the slack in the VPC below the VPP, the VPP's sliding motion will not be hindered by the cords dressed into it. This makes move/add/change operations easier so as not to impact the operation of the active ports (*see Figure 16*).

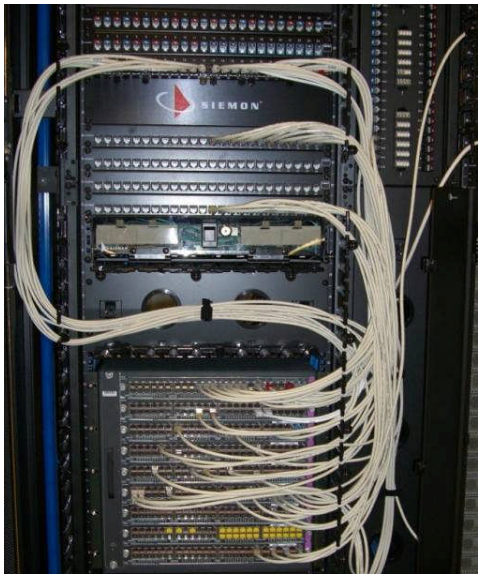


Figure 16
The Vertical Patch Channel (VP-VPC) is ideal for managing patch cords in Network Cabinets

SERVER CABINETS

Server Cabinets typically have the patching for the devices occupying the rear facing portion of the cabinet, along with power connections. This requires management of both network and power cords (*see Figure 17*). The copper (red line) connections and fiber (green line) connections are served from one vertical bay, while power (blue line) connections are addressed from another bay. A mounting area is provided where vertical mounted power strips are used.

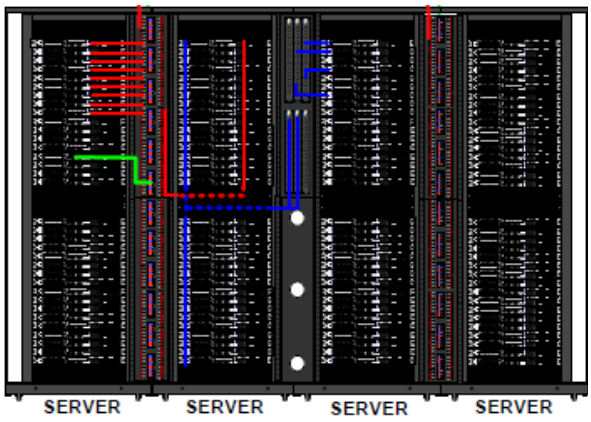


Figure 17
For Server Cabinets, network and power connections can use alternating vertical channels

In instances where power and network cords have to cross from one side of the cabinet to the other, the use of horizontal cable managers can be deployed to provide distinct paths. Note that power and network cords should each be housed in separate cable managers.

If VPP's are not used for power distribution, the VersaPOD cabinet also offers the ability to have most vertical PDU's (Power Distribution Units) mounted to the cabinet. There are multiple mounting locations within the cabinet that will allow the bracket of these PDU's to be secured (*see Figure 18*).

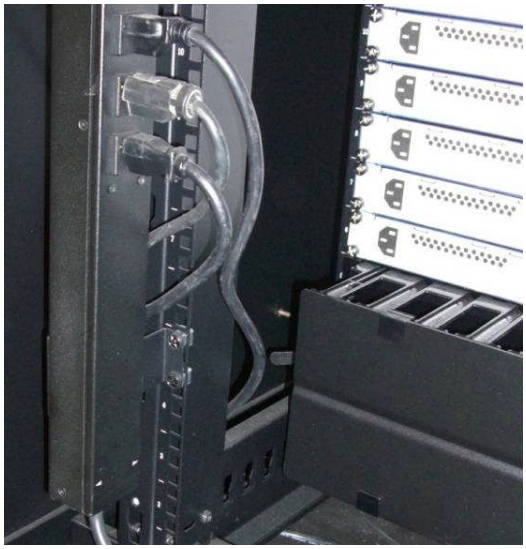


Figure 18
With multiple mounting locations, the VersaPOD can accommodate most industry vertical PDU's.

BONDING & GROUNDING

The VersaPOD cabinet offers multiple bonding locations (*see Figure 19*). Grounding (aka Bonding or Earthing) connections are needed at one end of a link only; however, both links may be terminated without adverse affects provided all potential is equalized as per local, regional or national codes and standards.

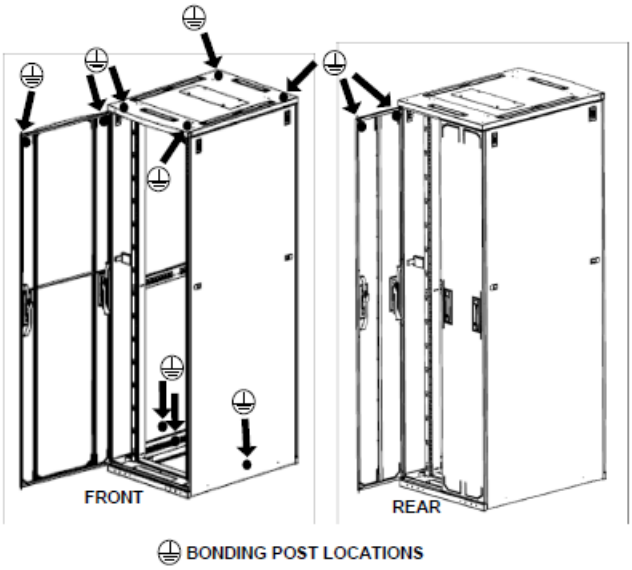
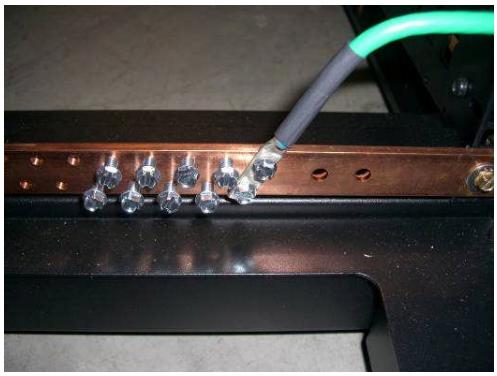
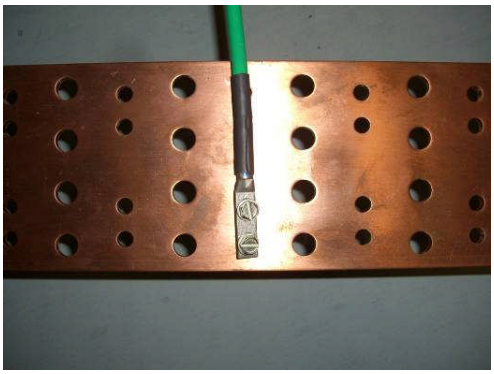


Figure 19
Bonding locations on VersaPOD cabinet

When multiple devices are required to be bonded, the VersaPOD Grounding Bus Bar (VP-GRD) can be used to simplify the process. An example of this would be in the Network Cabinet of a screened or shielded cabling plant where patch panels as well as equipment need to be bonded. The VP-GRD is designed to mount horizontally onto the equipment mounting rails (see Figure 20). ANSI-J-STD-607-A compliant bonding wires can be dressed from the patch panels and equipment to the VP-GRD. Then, a #6 AWG bonding wire can be installed from the VP-GRD to the main Telecommunications Grounding Bus Bar (TGBB) of the Data Center space.



Patch panels and equipment are bonded to the VP-GRD at the base of each VersaPOD cabinet



A single #6 AWG bonding wire connects each VP-GRD to the Data Center TGBB

Figure 20

THERMAL MANAGEMENT

As noted previously, the VersaPOD cabinet's design is based upon a Hot Aisle/Cold Aisle passive data center design (*see Figure 21*).

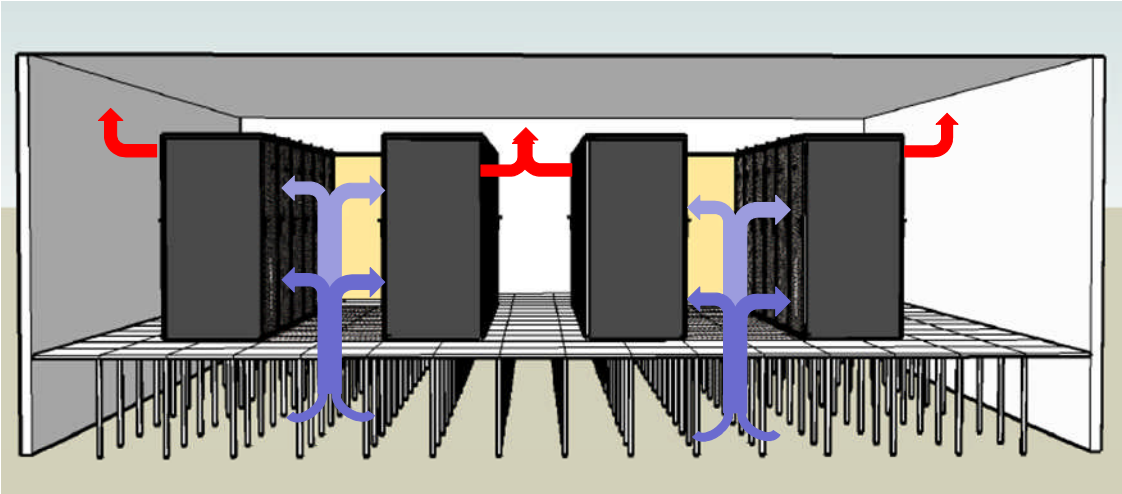


Figure 21
Passive Hot Aisle/Cold Aisle Configuration

With a passive system, equipment draws in cold air from the front and discharges heated air into the hot (rear facing cabinets) aisle. The heated air is then drawn into the building room air conditioners for recooling and recirculation into the floor void. Historically, improperly routed cabling has often had an impact on this free flowing air by blocking air flow, affecting circulation between cabinets (allowing horizontal mixing of hot and cold air), and through open penetrations in the floor. In addition to best practices such as sealing raised floor openings with brush guards to help maintain static pressure under the floor, the VersaPOD incorporates a number of features that help to optimize proper Hot Aisle/Cold Aisle practices.

- Patching channels allow cabling (data and power) to be routed away from air intake and discharge fans.

- Optional blanking panels are recommended to eliminate air circulation within the cabinet. These are available in 1, 2 and 4U sizes.

- Openings in the leveling feet behind the perforated doors allow perforated tiles to align with the front of equipment providing dual cool air pathways (*see Figure 22*).

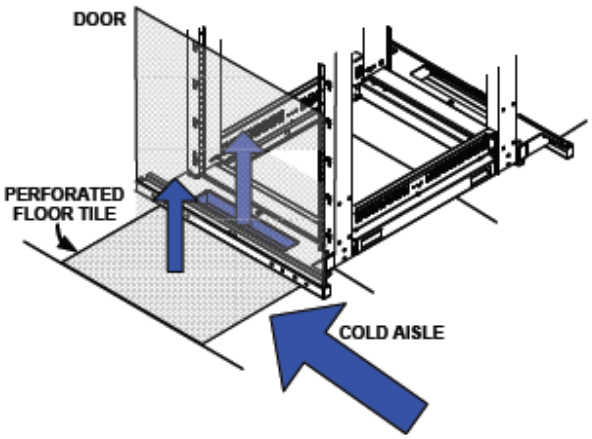


Figure 22
The VersaPOD's recessed leveling feet enable cold air flow from perforated floor tiles to be partially routed directly to active equipment providing additional cooling

- Where supplemental (active) cooling is required, optional exhaust fans are available for the VersaPOD to help draw heated air out of the top of the cabinet though the provided holes in the lid (*see Figure 23*). Aftermarket baffles can also be used to draw heated air from legacy side discharge equipment.

Figure 23
Optional exhaust fans for the VersaPOD can be mounted into the large openings of the cabinet lid

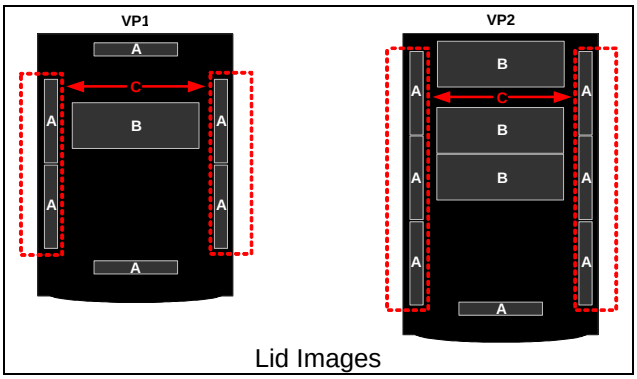
- For top cable entry, optional Brush Guards are available for the lid of the VersaPOD cabinet to maintain the thermal integrity of the cabinet.

SUMMARY

By leveraging the vertical space between bayed cabinets for patching and cable management, the VersaPOD frees critical horizontal space for active equipment, providing the ultimate density in the minimum floor space. The VersaPOD's innovative Zero-U vertical patch panels (VPP) dramatically simplify even the most dense active equipment patching needs while its vertical patching channels (VPC) offer a clean, orderly and easily manageable method of high-density cable routing.

If you have any questions pertaining to the planning and/or installation of the Siemon VersaPOD, please contact our Technical Services Staff at The Siemon Company in Watertown CT at 1-800-365-2285 or your regional international sales office.

Appendix A
VersaPOD Cable Management Capacity Chart



Lid Images

Lid
Small Cable Access Panel

11" x 1.75" = 19.25 sq in	QTY
Cable O.D. 5.33mm (0.21 in)	392
Cable O.D. 5.84mm (0.23 in)	327
Cable O.D. 6.35mm (0.25 in)	277
Cable O.D. 6.86mm (0.27 in)	237
Cable O.D. 7.37mm (0.29 in)	206
Cable O.D. 7.87mm (0.31 in)	180
Cable O.D. 8.38mm (0.33 in)	159
Cable O.D. 8.89mm (0.35 in)	141
Copper Trunk O.D. 23mm (0.90 in)	15
Copper Trunk O.D. 27mm (1.08 in)	14
Fiber Trunk O.D. 5.8mm (0.23 in)	327
Fiber Trunk O.D. 13.7mm (0.54 in)	42
Fiber Trunk O.D. 16.5mm (0.63 in)	32
Fiber Trunk O.D. 19.5mm (0.77 in)	20
Fiber Trunk O.D. 23.9mm (0.94 in)	14
Fiber Trunk O.D. 27mm (1.10 in)	10

Lid
Large Cable Access Panel

17.5" x 5.0" = 87.5 sq in	QTY
Cable O.D. 5.33mm (0.21 in)	1785
Cable O.D. 5.84mm (0.23 in)	1488
Cable O.D. 6.35mm (0.25 in)	1260
Cable O.D. 6.86mm (0.27 in)	1080
Cable O.D. 7.37mm (0.29 in)	936
Cable O.D. 7.87mm (0.31 in)	819
Cable O.D. 8.38mm (0.33 in)	723
Cable O.D. 8.89mm (0.35 in)	642
Copper Trunk O.D. 23mm (0.90 in)	69
Copper Trunk O.D. 27mm (1.08 in)	47
Fiber Trunk O.D. 5.8mm (0.23 in)	1488
Fiber Trunk O.D. 13.7mm (0.54 in)	191
Fiber Trunk O.D. 16.5mm (0.63 in)	142
Fiber Trunk O.D. 19.5mm (0.77 in)	94
Fiber Trunk O.D. 23.9mm (0.94 in)	64
Fiber Trunk O.D. 27mm (1.10 in)	46

VP1 & 2 Bases
Large Cable Access Channels

29" x 7.0" = 203 sq in	QTY	32" x 7.0" = 224 sq in	QTY
Cable O.D. 5.33mm (0.21 in)	2900	Cable O.D. 5.33mm (0.21 in)	3200
Cable O.D. 5.84mm (0.23 in)	2537	Cable O.D. 5.84mm (0.23 in)	2800
Cable O.D. 6.35mm (0.25 in)	2030	Cable O.D. 6.35mm (0.25 in)	2240
Cable O.D. 6.86mm (0.27 in)	1780	Cable O.D. 6.86mm (0.27 in)	1965
Cable O.D. 7.37mm (0.29 in)	1538	Cable O.D. 7.37mm (0.29 in)	1697
Cable O.D. 7.87mm (0.31 in)	1353	Cable O.D. 7.87mm (0.31 in)	1493
Cable O.D. 8.38mm (0.33 in)	1194	Cable O.D. 8.38mm (0.33 in)	1318
Cable O.D. 8.89mm (0.35 in)	1057	Cable O.D. 8.89mm (0.35 in)	1167
Copper Trunk O.D. 23mm (0.90 in)	160	Copper Trunk O.D. 23mm (0.90 in)	176
Copper Trunk O.D. 27mm (1.08 in)	111	Copper Trunk O.D. 27mm (1.08 in)	122
Fiber Trunk O.D. 5.8mm (0.23 in)	2537	Fiber Trunk O.D. 5.8mm (0.23 in)	2800
Fiber Trunk O.D. 13.7mm (0.54 in)	443	Fiber Trunk O.D. 13.7mm (0.54 in)	489
Fiber Trunk O.D. 16.5mm (0.63 in)	325	Fiber Trunk O.D. 16.5mm (0.63 in)	359
Fiber Trunk O.D. 19.5mm (0.77 in)	218	Fiber Trunk O.D. 19.5mm (0.77 in)	241
Fiber Trunk O.D. 23.9mm (0.94 in)	147	Fiber Trunk O.D. 23.9mm (0.94 in)	162
Fiber Trunk O.D. 27mm (1.10 in)	110	Fiber Trunk O.D. 27mm (1.10 in)	120

Vertical Cable Manager[1]

VP-VPC **VP-VPC6**

7" x 4" = 28 sq in	QTY	7" x 6.0" = 42 sq in	QTY
Cable O.D. 5.33mm (0.21 in)	471	Cable O.D. 5.33mm (0.21 in)	706
Cable O.D. 5.84mm (0.23 in)	392	Cable O.D. 5.84mm (0.23 in)	588
Cable O.D. 6.35mm (0.25 in)	332	Cable O.D. 6.35mm (0.25 in)	498
Cable O.D. 6.86mm (0.27 in)	285	Cable O.D. 6.86mm (0.27 in)	428
Cable O.D. 7.37mm (0.29 in)	246	Cable O.D. 7.37mm (0.29 in)	369
Cable O.D. 7.87mm (0.31 in)	216	Cable O.D. 7.87mm (0.31 in)	324
Cable O.D. 8.38mm (0.33 in)	190	Cable O.D. 8.38mm (0.33 in)	285
Cable O.D. 8.89mm (0.35 in)	169	Cable O.D. 8.89mm (0.35 in)	254

[1] *The cable capacity of the VP-VPC's can be increased by 30% by installing the shoulder bolts that support the back plate of the VPC's to the rear most position*

NOTES:

- Cable capacities listed are per opening
- Cable capacities reflect a combination of actual and calculated capacity and represent 50% fill
- Capacities provided reflect properly dressed cables and can be adversely affected by poor cable routing practices