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Rack ‘em Up

Proper cable management is key to network survival.

Without proper cable management your network has little chance for survival. Cables are frequently required to change direction and incorrectly doing so can cause sharp bends or kinks, which can modify the electrical properties of the cables by altering the size, twist rate, relative proximities or lengths of the individual conductors. In addition, tight bundling or improper support of cables can deform, stretch or add tension to the cable, negatively affecting the overall performance and ultimately creating costly downtime.

Therefore it is critical to choose and implement superior cable management so that optimum cable performance and data transmission can be achieved. By managing and maintaining cables successfully, you can provide the vital support, reliability and flexibility needed to grow your network capabilities, while at the same time presenting an aesthetically pleasing look.

Before actually planning your cable management it is important to begin with selecting a basic support solution. This means choosing between an open two-post and four-post rack system. Two-post racks provide the most cost-effective and efficient use of floor space and can be used in the majority of applications, but are generally used with rack-mount equipment that is less than 20” deep (510 mm). While four-post racks are a good solution for larger and heavier equipment, like modular network switches, because they surround equipment and provide front and rear support.

Make sure that the mounting width of your rack matches equipment requirements and that the depth of the rack is carefully selected. Generally plan a minimum 3’ (0.9 m) aisle at the front and rear of the rack and remember that the rack height determines the number of vertical RMU.

Chatsworth Products, Inc. (CPI) offers three styles of two-post racks and six styles of four-post racks, available in various widths and heights.

When selecting your racks height, it is essential to choose one that provides enough overhead space to install cable runway or trays. Cable runway and trays create pathways for premise cables and should be supported from the top of the rack, wall, ceiling or floor. Position your cable runway above installed racks (rather than below) so that the cable weight is supported by the runway and does not pull against the connections on the patch panels.

CPI Cable Runway sustains 132 lb/ft (196 kg/m) when supported every 5’ (1.5 m) of span.

Be sure and provide radius drops to support the proper cable bend radius wherever the cables enter or exit the overhead pathway. Elevate runway 3” to 6” (80 mm to 150 mm) above the rack and support it with brackets every 5’ (1.5 m) of span and within 2’ (0.6 m) of every intersection or splice. Select a cable runway size that matches your cable fill requirements. The ANSI/EIA/TIA-569B standard limits runway cable fill to 50%, and cable cannot be stacked more than 6" high (150 mm) on the cable runway. In addition, the amount of weight the runway can support varies depending on the distance between the supports, so it is important to check the manufacturer’s load and fill tables before making a final decision.

If looking to gain valuable cable management space along the sides of your rack-mount equipment, add vertical cable managers to your rack system. Both single and double-sided vertical cable managers are available to organize front and rear cables. To separate the front and rear pathways for patch cords and premise cables, use double-sided vertical cable managers alongside your racks that support patch panels, fiber enclosures or a mix of active equipment and cable termination hardware.

Don't forget to carefully consider the size of your vertical cable managers and the corresponding cable fill capacity, especially when a vertical cable manager is shared between adjacent racks. Most manufacturers publish cable fill tables, but remember that they may be using different methods to determine the cable fill, so keep this in mind if comparing different manufacturer's tables. The typical practice is to use a 30% to 50% cable fill or fill ratio when selecting vertical and horizontal cable management. This allows sufficient space for maintaining cable bend radius for patch cords. Expect cable fills for Category 6a cables to be roughly half of the fill values for Category 5e cables.


CPI provides four styles of vertical cable managers with patented cable management fingers.

Use vertical managers that have individual cable guides aligned with each rack-mount space whenever angled-face patch panels are utilized. If you have flat-faced patch panels or network switches that cable from above or below, use horizontal cable managers to complete the support pathway for patch cords between the vertical cable managers and the exact connection ports on the patch panel or switch. Alternately, you can also use horizontal management to create rack-to-rack pathways for patch cords.


CPI's horizontal cable managers offer cable guides, trays, rings and patented cable management fingers.

When selecting your horizontal cable manager, make sure to choose one that works with your vertical cable manager. Generally, it is best to plan 1 RMU of horizontal cable management for every 2 RMU of connectivity for Category 5e and 6 patch cords. Plan 1 RMU of horizontal cable management space for every 1 RMU of connectivity for Category 6a patch cords. You should ensure that the cable capacity (cable fill) of the horizontal manager can support at least half of the patch panel ports supported by the cable manager. This method assumes that patch cords enter from both sides of the rack. Capacity should equal port density when cables enter from one side of the rack only.

Further organize your cables by adding some cable management accessories including cable management straps and cable spools. Cable management straps allow you to bundle cables loosely so that they can be added or removed easily, while also preventing cable jacket deformation, which can occur when using plastic tie wraps. Cable spools help promote a gradual bend radius for cable runs and controls patch cord slack within cabling sections. Use Cable Spools to make 180° turns and to drape patch cords over spools to manage excess slack. Patch cords are often purchased at standard lengths that may exceed the distance between ports, therefore the slack should be controlled with bend radius requirements in mind.

As a rule of thumb, it is important to make sure you are aware of the type of cabling that will populate your cable managers. Some high performance cables like Category 6a require solutions that are large enough to accommodate the size and support the weight of the bigger and heavier cables.

For the industries most comprehensive line of Cable Management Products, look to CPI, the premier choice for protecting and supporting cables, including the latest cabling technologies such as Cat 6a and fiber. If you would like more information about CPI Cable Management Products visit www.chatsworth.com/cablemanagement or create a customized solution by using the Product Configurator at www.chatsworth.com/configurator.