

# Passive Optical Port Replication in the Data Center

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As most data center professionals can attest, bandwidth needs continue to increase for today's business-driven technologies. This demand for higher bandwidth results in an increase in fiber optic ports for networking and storage. Over the past several decades of data center cabling evolution, this increase has led to significant challenges in the management of fiber cabling infrastructures.

One key component that makes managing this increase in fiber ports and density much easier is port replication in patch panel design. Proper port replication simplifies fiber cable management and increases uptime potential.

Graphic A

***In proper port replication  
the patch panel perfectly  
mirrors the active hardware.***



## What is port replication?

Essentially, port replication is “mirroring” the ports of active fiber optic hardware in a passive component (fiber patch panel). This creates a direct relationship between the active hardware ports and the passive structured cabling environment, thus simplifying the cabling process as all numbers on the hardware directly correspond to the numbers on the patch panel. Due to this exact duplication, port replication helps minimize user error and eliminate mistakes.

*See Graphic A to the left*

## Why use port replication?

Port replication helps reduce the likelihood of downtime. When there is not one-to-one matching between hardware ports and patch panel ports, calculations need to be made on the fly during any moves, adds and changes (MACs) in the data center. These calculations increase the opportunity for human error, a problem further intensified by the fact that many MACs are done under the duress of time constraints or other urgent issues. A one-to-one port replication scenario allows installations to run more smoothly and quickly.

In addition to the one-to-one mapping, port replication essentially reduces the distance between active hardware ports. When utilized in combination with the recommended TIA-942 structured cabling design, all ports are replicated in a Main Distribution Area (MDA), which significantly reduces the physical distance between ports and further minimizes the opportunity for human error.

Proper port replication also reduces cabling bulk in the switch rack by allowing optical harnesses to be used in front of the active switch ports. This can reduce cabling bulk cordage by up to 66 percent and creates the benefit of increased airflow in the data center. With less cabling bulk blocking switch fans, air circulation and hardware operation are improved. Additionally, port replication minimizes the risk of increased signal loss by reducing the opportunity for excessive bending and stress on the connectors plugging into the switch.

Graphic B

**When port replication is implemented in a Main Distribution Area, shorter patch cables (fiber jumpers) can be used and moves, adds and changes are simplified.**

## What are the challenges of port replication?

If port replication is done incorrectly, it can be just as risky as not using it at all. One main problem can occur in the patch panel design. Most fiber optic patch panel port numbering is the same sequence of numbers repeated over and over. For example, consider an enclosure that fits four modules but each module has port numbering of 1 to 12. This makes port mapping from the hardware to the patch panel a challenge. If you were trying to replicate a 48-port chassis blade, port 32 on the blade would need to be calculated and mapped to port 8 on the module in slot 3.

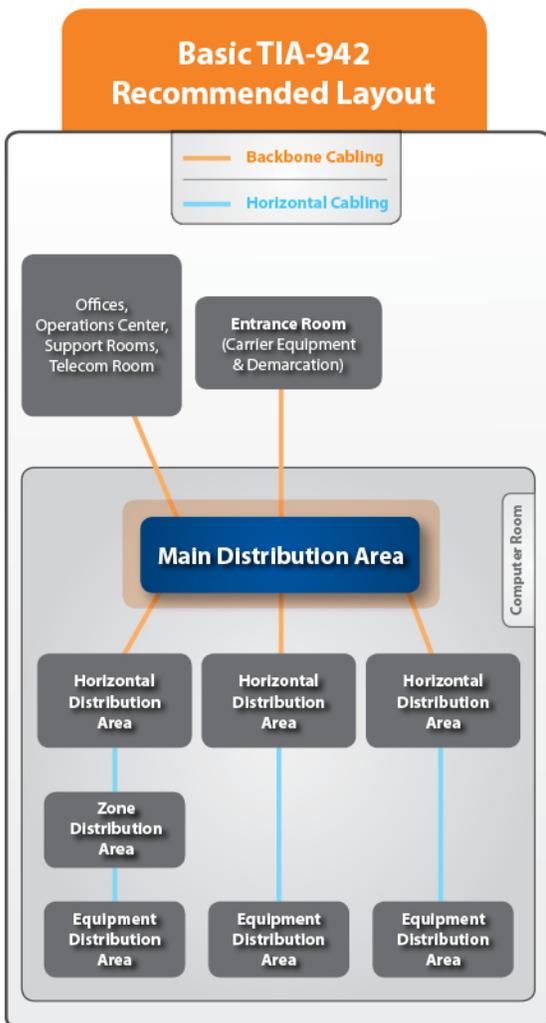
True port replication features the identical number on the patch panel that appears on the corresponding hardware. This creates the one-to-one replication that can be easily recognized, documented and communicated.

Another challenge of port replication is considering optical loss budgets. As hardware speeds increase, optical loss budgets decrease. It is important to stay under these optical loss budgets in order for the hardware to work most effectively. The most significant area of optical loss occurs at the mated pair in the patch panels. In a point-to-point cabling system there are fewer mated pairs than in a Main Distribution Area. Therefore, the additional mated pair connections in the MDA with a structured cabling system can increase optical loss. It is very important to work with low loss structured cabling products for this reason. Fortunately, low optical loss components (patch panels, fiber assemblies) are available that minimize this concern.

See Graphic B to the left

### In conclusion

Port replication can greatly reduce installation time and help mitigate the risk of costly mistakes that lead to downtime. However, it is imperative to utilize high-performance, low loss fiber patch panels that enable a one-to-one relationship to replicate the numbering on the active hardware they mirror. When implemented correctly, port replication can significantly increase efficiency and manageability in the data center by simplifying the cabling process and eliminating opportunities for error.



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