

# Vigitron IP Infrastructure Design Educational Series



*Bandwidth and Network Switches*

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## Bandwidth and Network Switches

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If a network switch looks like a network switch, is it a network switch that will work for IP video security applications? Surprisingly, the answer to this question is “Not necessarily”.

There are major differences between the network switch performance required for data applications such as word processing, accounting, and web browsing, and that required for IP video for security applications. These differences have a major effect on performance. Often, our selection of a network switch is based on price or major brand names, both of which could lead to problems.

The bandwidth output of IP security cameras is 100Mbps. For networking output, the network speed must be matched by the input switch port speed. However in most cases, the switch ports operating at 100Mbps limit their packet size or video frame in our case to about 1518 bytes. This is equal to about 2-3 megapixel camera. The higher the megapixel, the larger the video frame and the higher the number of bytes contained in that frame. Packet sizes greater than 1518 bytes are generally referred to Jumbo Frames. The inability of a port switch to handle Jumbo Frames can result in blocking information from higher end megapixel cameras, starting at about 3 megapixels. To handle larger megapixel cameras, a network switch must be able to be programed for up to 9600 bytes when the port bandwidth is 100Mbps.

Port Configuration										Refresh
Port	Link	Current	Speed Configured	Current Rx	Current Tx	Configured	Maximum Frame Size	Excessive Collision Mode	Power Control	
*			<>			<input type="checkbox"/>		<>	<>	
1	●	Down	Auto	×	×	<input type="checkbox"/>	9600	Discard	Disabled	
2	●	Down	Auto	×	×	<input type="checkbox"/>	9600	Discard	Disabled	
3	●	100fdx	100Mbps FDX	×	×	<input type="checkbox"/>	9600	Discard	Disabled	

Figure 1: Vigatron's Vi3010, Vi3026, and Vi3326 network switches provide Jumbo Frame programs at 100Mbps port speeds.

Network switches that provide for 1 Gigabyte port bandwidth settings provide the ability to resolve Jumbo Frames. However, the mismatch between the 100Mbps output of the camera and the input of switch is often overlooked and misinterpreted that the switch will have this same ability at 100Mbps. Mis-settings applied to high megapixel cameras can result in distorted video or inability to pass video at all.

The second consideration is called either the throughput or the switch fabric. This defines the bandwidth that connects all the switch ports. In many data-only applications, the maximum port bandwidth is never achieved. In order to assure that high bandwidth video is passed, the switch fabric must be at least two times the total bandwidth of all the ports. For example, a 24 port Gigabyte switch needs to have a switch fabric of 48 Gigabytes. This is not always the case. Switches with less can exhibit video quality issues when all ports are used, which is usually the case with IP video applications.

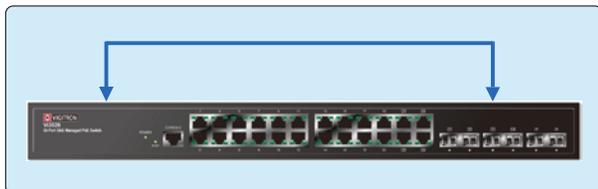
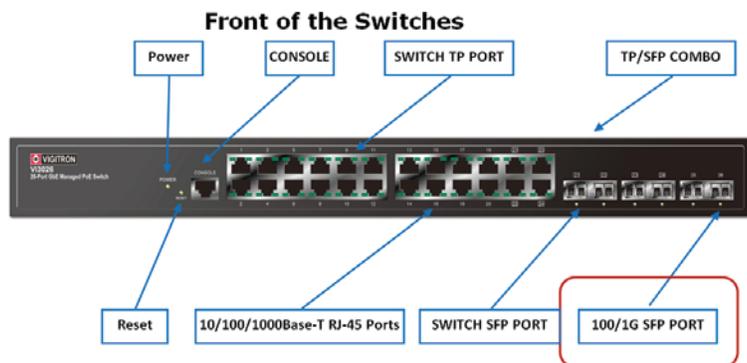


Figure 2: Vigatron managed switches have a minimum of two times the sum of the maximum per port bandwidth.

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The third area that is often overlooked is the actual number of ports. A switch advertised as a 24 port does have twenty four actual ports. However, that doesn't mean you can use all twenty four ports. First, there is the consideration of how the switch is positioned within the network. Often, this requires an up and downlink. As such, two ports are lost reducing the usable ports to twenty two. Some manufacturers realize this and limit the application of power over Ethernet (PoE) to only twenty ports or the total number of ports less two. This also makes their PoE specification look better, but denies you of the use of two ports.



**Figure 3:** Vigatron 26-port switches provide a full 24 ports for camera connections and Vigatron 10-port switches provide a full 8 ports for camera connections providing the most input capacity.

When addressing the issues of the actual number of usable ports, the port packet handling, and the switch fabric bring up the point that there are no standards for these features. In a competitive network switch market, manufacturers will design products to meet the most competitive pricing for the majority of applications. While our major concerns are large packets, video frames and high internal bandwidth for important video security application, they remain a minority concern with the majority of network switches which doesn't include video security IP applications.

Vigatron's network switches are uniquely designed for IP cameras, featuring the ability to transmit the largest Jumbo Frames at 100Mbps and are certified with IP megapixel cameras up to 29MP. Up to 26 ports versions are available with built-in PoE protection allow for port polling and delayed PoE application to prevent damage. Vigatron network switches have the ability to sense connection losses and automatically reconnect avoiding potential service calls while providing the industry's longest warranty.

### Suggested Vigatron Product(s):



Vigatron offers free and without obligation Design Center Services staff by trained factory engineers. To access Vigatron's Design Center, click [here](#) or direct any questions on any Vigatron related subjects to [support@vigatron.com](mailto:support@vigatron.com).

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