Clear-Com, LLC
1301 Marina Village Parkway
Suite 105
Alameda, CA 94501
United States

T +1 510 337 6600
F +1 510 337 6699
www.clearcom.com

What is the network bandwidth requirement for IVC-32 and Concert / V-Series-IP panels?

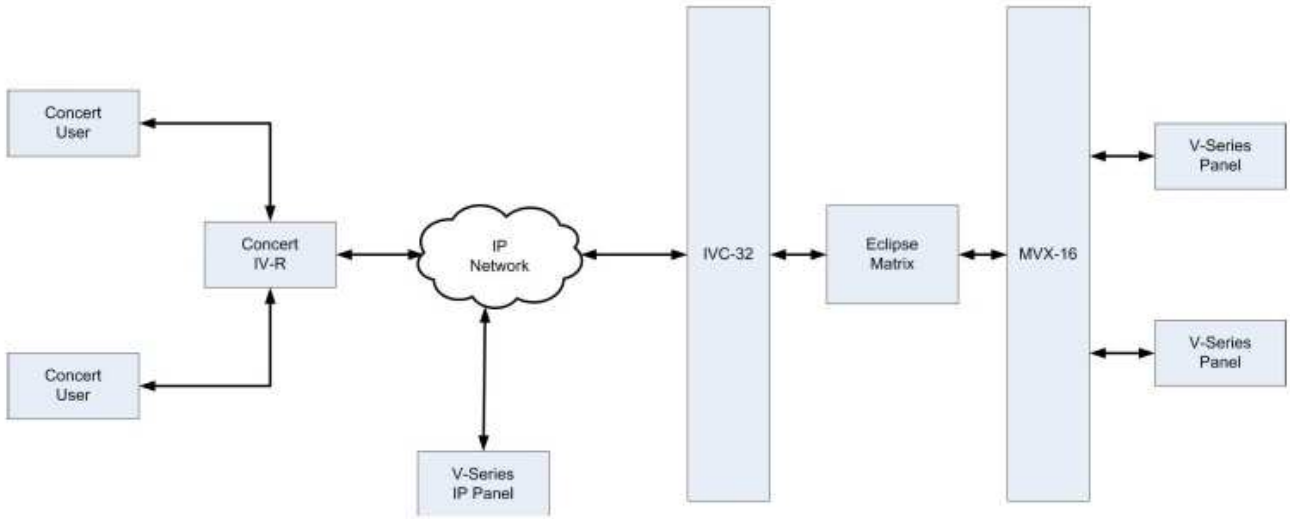
The IP networking requirements are directly related to the number of Concert and or V series IP Panels that are connected over the network and the connection type set on each panel.
Also note that the IP network may have to carry other traffic, such as communication between the Concert server and PC concert clients.
You can use the following table to estimate the bandwidth requirements for audio data when using IP Panels. The total utilization of the network should never exceed 20% of its nominal capacity.

Bandwidth requirements for audio data when using IP Panels

	LAN (kbps)	WAN (kbps)	Internet (kbps)
Half Duplex from IVC32 to panel	120	90	140
Half Duplex from Panel to IVC32	120	90	140**

** Note: Silence suppression is enabled from Panel to Matrix, and Forward Error Correction module is ON both ways. The FEC module increases bandwidth but will support ~5% packet loss without affecting audio and keep acceptable audio up to ~10% loss.

This also relates to IVC-32 trunk and direct lines



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Concert Client User Panel Data:

Network	TCP/IP based LAN/WAN/Internet
Connections	Ethernet/Fiber/Wireless
Packet type	UDP voice packets
QoS	60-100 ms
Security	128 bit AES encryption
Ports	TCP port 6001 UDP port 6001
System management	Web-Based
Network Load	60 – 150 kbps per connection passing audio, depending on Codec setting

System requirements: Network

Concert Client Panel Network / QoS Settings

In Network Settings, select the type of network connection that best describes your network (the default setting is WAN). Select from the following types of network connection: LAN, WAN or Internet

Network connection	Description
LAN	Concert is used on a corporate LAN (same office). High and stable bandwidth. High audio quality but more bandwidth is used.
WAN	Default setting. Concert is used on a corporate WAN (controlled network environment). Bandwidth is reduced between two offices or sites.
Internet	Concert is used on a wireless, low bandwidth or poor quality Internet connection. A higher level of packet recovery is enabled.

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In Options, you can configure the following QoS audio settings:

QoS audio setting	Description	Default
Noise Filter/Voice Activity Detection	Reduces background noise and enables the microphone when speech is detected (interfaces only).	Disabled
Audio Buffer	Improves overall audio quality by adjusting the Windows Sound Channel Buffer. *	Medium

*Higher settings increase latency but can solve issues with uneven ('choppy') audio. Lower settings decrease latency but can cause audio quality issues. The performance level of the PC is also a factor in determining the correct Audio Buffer setting. In Bandwidth Settings, select the appropriate bandwidth (Low, Medium or High).

Audio Options (QoS Audio Settings Advanced Mode)

QoS audio setting	Description	Default	
Jitter	Smoothes out the audio in high-latency environments.	**Min**	**Max**
		60ms	800ms
Echo Cancel	Helps eliminate echo (feedback). *	Enabled	
Noise Filter/Voice Activity Detection	Reduces background noise and enables the microphone when speech is detected (Interfaces only).	Disabled	
Loss Protection (Forward Error Correction – FEC)	Helps reduce the effect of packet loss.	Medium	
Audio Buffer	Improves overall audio quality by adjusting the Windows Sound Channel Buffer. **	Medium	

Audio: Options (QoS audio settings, Advanced mode)

*In most circumstances, we recommend that you keep Echo Cancel enabled. Echo Cancel helps optimize audio quality by reducing noise and cancelling echo (feedback).

**Higher settings increase latency but can solve issues with uneven ('choppy') audio. Lower settings decrease latency but can cause audio quality issues. The performance level of the PC is also a factor in determining the correct Audio Buffer setting.