Evaluation of the Emblaze-VCON xPoint Videoconferencing System

Wainhouse Research

EVALUATION

Evaluation of the Emblaze-VCON xPoint Videoconferencing System

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Wainhouse Research

EMBLAZE VCON

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Executive Summary

In Q4 2007, Wainhouse Research (WR) conducted an evaluation of Emblaze-VCON's xPoint appliance-based videoconferencing system. Specific areas of focus during the evaluation included ease of use, video performance, audio performance, data collaboration support, interoperability, and security / encryption.

To facilitate the testing, WR added two (2) identical xPoint video systems to the existing eight (8) non-xPoint systems in our Atlanta test lab. All systems in the test lab were assigned public IP addresses within the same network subnet, so all video traffic remained local within our facility. The test team then placed more than 50 calls between the two xPoint systems and from xPoint to non-xPoint systems at various connection rates.

WR was pleased with the performance of the xPoint videoconferencing system.

WR was pleased with the performance of the xPoint videoconferencing system. Based on the rating system described within, the xPoint earned an overall rating of 3.8 out of 5. Specific areas of strength include exceptional ease of use, strong video performance – especially at relatively low (384 and 768 kbps) call speeds, and solid interoperability with the other systems in the test lab. Current weaknesses include acceptable - but not exceptional - audio quality and the lack of an embedded MCU (expected to be released as an option in early 2008).

This document provides detailed information about the testing methodology and results of this evaluation.

Important Note:

This project was sponsored by Emblaze-VCON.

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The xPoint Videoconferencing System

The xPoint videoconferencing system is the newest group video endpoint release from Emblaze-VCON. Key features of the xPoint include:

- Appliance-based device running a Microsoft Windows kernel
- Support for H.323 and SIP (up to 4 Mbps) and H.320 / ISDN (up to 4 BRI lines)
- Ability to transmit and receive 4CIF / 4SIF resolution
- Ability to receive (but not transmit) HD 720p resolution
- Support for AAC-LD 20 kHz wide-band audio
- Support for H.239 dual stream and H.235 encryption
- Tight integration with Emblaze-VCON's MXM server and VCB line of video bridges / MCUs
- Relatively low entry price (starting at ~ US $6,700)

Emblaze-VCON expects to release an optional 6-site internal video bridge capability for the xPoint in Q1 2008. Note that WR did not test this capability.

Figure 1: Emblaze-VCON xPoint Video System

The Emblaze-VCON videoconferencing endpoint product family includes a variety of systems with different form factors and functionality as shown in the table below.

Product	Description
xPoint	Executive Videoconferencing Room System
HD5000	Multimedia Conferencing System
HD4000	Software-Only Group System Application
HD4000pro	Multi Media PC-Based Conferencing System (Hardware Included)
HD3000 / HD3000 LT	Set-Top Videoconferencing
HD2000 / HD 1000	Integrator's Videoconferencing Codec
HD600	Executive Videoconferencing Set-Top
vPoint HD	Desktop Videoconferencing Software Solution
Escort / Cruiser	Desktop Videoconferencing Hardware / Software Solution

Figure 2: Emblaze-VCON Videoconferencing Endpoints

Despite the use of the letters "HD" within the product names and the term "High Definition" within the product descriptions, the products are NOT HD (as in HD-resolution) capable. The only exception is the xPoint which is able to receive (not send) HD720p resolution signals. This is an unfortunate and longstanding nomenclature decision on the part of Emblaze-VCON.

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Evaluation Results

Based on our testing and evaluation, WR gave the evaluated solution ratings from one to five in each category (where five is the best possible score) as shown below.

Recognizing that each enterprise will have different needs and priorities, we have included a weighting factor that WR believe represents the needs of many enterprises. WR recommends that enterprises considering an investment of this type should recalculate the averages below using weighting factors appropriate for their environment.

Ratings: **Higher = Better**	**WR Weighting Factor**	**Emblaze-VCON xPoint Solution**
Packaging / Form Factor / I/O	3	3
Installation / Configuration	3	4
Ease of Use	5	4
Video Performance (like to like)	4	4
Audio Performance (like to like)	5	3
Data Collaboration Support	4	5
Embedded Multipoint (if applicable)	4	N/A
Enhanced Features	4	3
Interoperability	4	4
Cost	3	4
Un-Weighted Average		3.8
Weighted Average		3.8

Figure 3: Evaluation Results - Overall Ratings

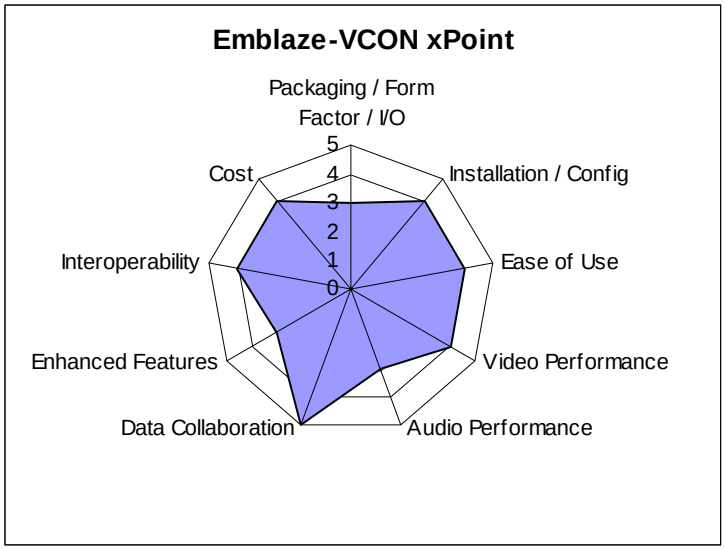

Figure 4: Evaluation Results – Radar Chart

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As shown above, the Emblaze-VCON xPoint solution scored well in numerous areas including installation / configuration, ease of use, video performance, data collaboration support, and interoperability.

Packaging / Form Factor / I/O - Reflects WR's opinion of the system's overall packaging, form factor (look, feel, shape, size, etc.) and I/O options (# of inputs and outputs, connectors used, labeling, etc.).

Installation / Configuration - Provides an assessment of various install / configuration related items including the time required, overall difficulty and complexity, and the need for specialized knowledge.

Ease of Use - Provides an assessment of the system's user interface including the organization, structure, and responsiveness of the UI, the design and feel of the remote control, and our assessment of the learning curve associated with using the system.

Video Performance (like to like) - Provides an assessment of the system's overall video performance during calls between the two subject systems including video resolutions (and aspect ratios) supported, frame rate, motion handling, color rendition, and overall image quality.

Audio Performance (like to like) - Provides an assessment of the system's overall audio performance during calls between the two subject systems including audio clarity and fidelity, noise cancellation, echo cancellation, lip sync, and support for advanced features including wide-band audio, virtual positioning, and stereo microphone audio.

Data Collaboration Support - Provides an assessment of the system's support for data collaboration, specifically H.239 dual stream functionality. Specific areas of interest include support for sending and displaying the content signals in native resolution and the frame rate / motion handling associated with the content stream.

Embedded Multipoint (if applicable) – Provides an assessment of the overall functionality and features supported by the internal multipoint bridge. Specific areas of interest include the number of sites supported, transcoding support, video resolutions supported, frame rates provided to the participating sites, and available display / operational modes (CP, VAS, etc.).

Enhanced Features – Reflects the system's support for advanced / additional features including encryption, streaming capabilities, H.460, SIP, IPv6, etc. Note that not all advanced features are tested during the typical system evaluation.

Interoperability - Provides an indication of whether the system was able to interoperate with other standards-based video systems in terms of general connectivity, video resolutions and protocols supported, audio protocols supported, and support for encryption and data collaboration (H.239).

Cost – Provides an indication of how the list price (in US $) of this system compares to systems with similar form factors / offering similar performance and functionality. A high rating indicates that the subject system is less expensive than its peers.

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Test Environment and Methodology

Videoconferencing Endpoints

The following videoconferencing endpoints were utilized during the testing.

Manufacturer	Model	Software Version
Aethra	Vega X3	10.02.0014
Emblaze-VCON	xPoint	SW Release: 7500062-1.1.0.14 - Firmware Version 04
LifeSize	Room	LS-RM1_3.0.5(21)
Polycom	HDX 9002	2.0.0-2198
Polycom	VSX-3000	8.7
Polycom	VSX-7000	8.7
Sony	G-50	Host: 2.5 / DSP 03.56
Tandberg	6000MXP	F6.1 NTSC
Tandberg	880MXP	F6.0 NTSC

Figure 5: Video Endpoints Used During the Evaluation

Video Displays

The following video / PC displays were used during the testing.

Manufacturer	Model	Description
Sharp	AQUOS LC-26DA5U	26” 16:9 HD-Capable LCD Display
Magnavox	20MT4405/17	19” 4:3 SD TV / Monitor
Acer	AL2223W	22” 16:9 LCD Display
Dell	E153FPc	17” 4:3 LCD Display
I-INC	iF1910 HV198W	19” 16:9 LCD Display

Figure 6: Video / PC Displays Used During the Evaluation

Network

Each system was assigned an IP address within the public IP address space assigned to WR’s Atlanta office. The formal test calls were placed locally over the local area network (LAN) within WR’s Atlanta test lab. In addition, WR placed a limited number of calls to external video systems over the Masergy MPLS network currently installed in four WR locations. Using Masergy’s high quality of service network allowed the evaluation team to conduct external video calls without experiencing any network-related quality issues. We did not use ISDN for any calls.

Gatekeeper / Dial Plan

For this evaluation, WR did NOT use a gatekeeper within the environment. All video calls were placed using each system’s IP address.

H.239 Testing

For the H.239 testing, WR utilized an IBM X40 ThinkPad (providing an XGA / 1024x768 resolution signal with a 4:3 aspect ratio) as the signal source.

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General Items

1) Unless otherwise noted, all other system settings on all other endpoints were set to either Default or Auto.
2) The Tandberg 880MXP has a maximum connection rate of 1152 kbps. As a result, some of the call connection rates were automatically decreased to 1152 kbps during the testing.
3) The real-time call statistics were pulled from one or both of the video systems as required.
4) To assess the motion handling performance of the subject system, WR's test subject waved his hand in front of the camera at a rate of approximately 1 cycle (or full wave) per second, during which the test team assessed the clarity of the test subject's individual fingers at the receive site.

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Installation and Configuration

As a part of this evaluation, Emblaze-VCON provided WR with two identical xPoint video systems.

System Contents / Packaging

Each system arrived in a single box containing the xPoint codec and three smaller boxes as follows:

Box #1 – Basic Accessories Kit

This box included the system power supply (an external "brick"), the system microphone, the handheld IR remote, the IR receiver, and various audio, video, and data / control cables. WR believes that this box would normally include the external Sony camera. In our case, however, this was not provided, so we used two Sony D-100 cameras that we had on-hand in our lab.

Box #2 – Data Collaboration Kit

This box included the tabletop pod (an I/O device that allows the user to connect an XGA video source, a microphone, and a USB device), the Datapoint adaptor, and additional cables.

Box #3 – ISDN Kit

This box included a 4-BRI ISDN adapter, a power supply, and various cables. Since ISDN testing was not a part of this evaluation, we did not connect the ISDN adaptor.

We give kudos to Emblaze-VCON for dividing the mass of power supplies, cables, and accessories logically between three well-labeled boxes. To further simplify the system installation, Emblaze-VCON provides a very simple and easy to read foldout which a) provides a graphical representation of the items in each of the three boxes above, and b) highlights how to connect the various accessories and components. The front and back of this foldout are shown below.

Figure 7: Front of Foldout - "What's In the Box"

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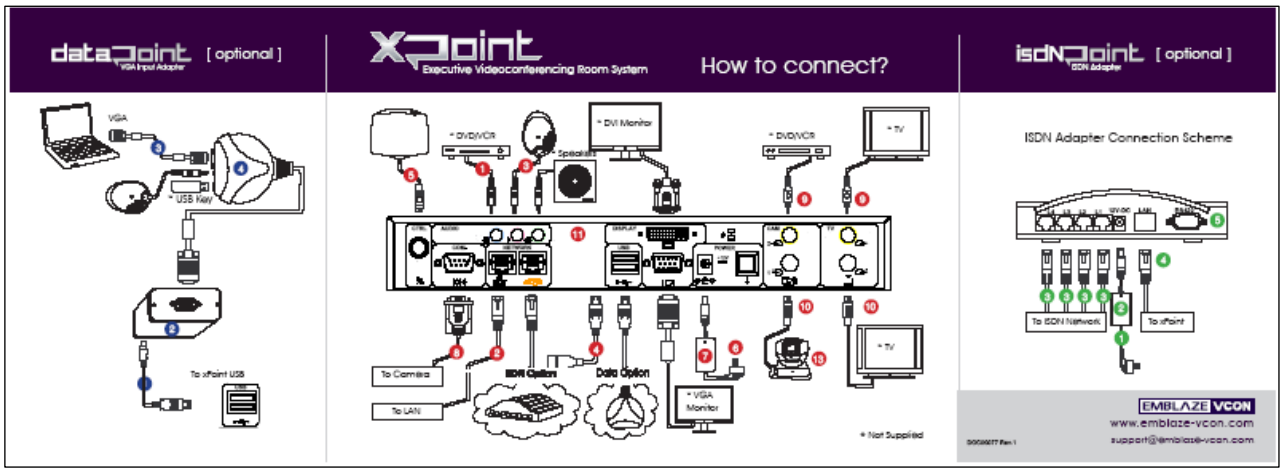

Figure 8: Back of Foldout - "How to Connect?"

Like many systems today, the xPoint package did not include a printed user manual or even a "quick start" guide. It did, however, include a documentation CD including an installation / setup guide and a brief guide to the remote control (in English and German). Wainhouse Research has mixed feelings about this choice. On the one hand, it is reassuring to open a box and put your hands on a quick start guide or even a complete operator's manual. On the other hand, replacing a paper guide with a CD is the environmentally responsible choice.

System Installation

Although well hidden within an appliance chassis, the xPoint is actually a PC-device as evidenced by the use of PC-style connectors (9-pin COM port for camera control, USB ports for the data option, and 1/8" jacks for the microphone audio input and speaker audio output). Although functional, these connectors are not typically associated with professional videoconferencing devices.

Unlike most videoconferencing systems today, the xPoint uses an external IR receiver and an external VGA input adaptor. It is likely that the xPoint's small form factor did not allow for the placement of these connectors / items within the chassis itself. The advantage is that this allowed Emblaze-VCON to house the xPoint is a relatively small 12" x 8.75" x 1.75" chassis. It also allows one to hide the codec easily (as long as the IR receiver is still visible). The disadvantage is that it complicates the connections (and cable management). For example, as shown in the top left portion of the "How to Connect" drawing above, connecting an XGA signal to the xPoint requires connecting the laptop to the tabletop pod, which is connected to the Datapoint adaptor, which is connected to the USB input on the codec.[1] This is clearly more complex than allowing a direct connection between the PC and the video codec as supported by most current VC systems. Once again, although this is not necessarily a problem, it is not typical.

Despite the above, it took us less than 5 minutes to make all of the necessary system connections.

[1] Although not tested by WR, the xPoint also allows users to share documents by copying the file(s) onto a USB flash drive and inserting that drive into the xPoint's USB port.

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System Configuration

The system power-up took roughly 90 seconds (which is relatively long compared to traditional appliance-based systems) and was accompanied by relatively loud fan noise; both typical of PC-based systems. WR does not believe either of these items is significant since most people will keep the systems powered up and the codec itself can be easily installed in a cabinet / equipment rack.

Once powered up, the system configuration was straight forward requiring the user to navigate to the Settings – System menu page and enter the system IP address, subnet mask, and default gateway. After a relatively quick 15 second system reload, the system was ready to make and receive video calls. Although the system configuration was straight forward, WR would welcome the addition of a setup / configuration wizard.

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Ease of Use / User Interface

Although no user interface is perfect, Emblaze-VCON gets high marks from Wainhouse Research for the xPoint user interface.

1) Look, Feel, and Organization

The xPoint's on-screen user interface is clean, easy to navigate, and for the most part well organized. For example, the camera settings (type of camera, color / contrast / brightness settings) can be found under the Settings / Camera menu. In addition, the choice of colors (white text on dark purple) makes the text relatively easy to read (although we would suggest increasing the font size slightly). We also appreciate the availability of context-sensitive help within the UI.

2) IR Remote

The xPoint hand-held remote is well designed and ergonomic. The curved back on the remote makes it comfortable to hold, and the buttons are clearly labeled and logically positioned. For example, the "call" button is bright green and located conveniently around the center joystick (used for menu navigation and camera pan / tilt). Without exception, we found the xPoint UI very responsive to IR remote commands. One suggestion for improving the remote would be to make the buttons for common functions (e.g. mic mute, display, etc.) a bit larger and a different color, and to position them away from some of the less frequently used buttons.

<u>Additional Notes:</u>

Although the "Status" and "Settings" buttons on the remote were very helpful during our testing, we wonder if the average user would need such convenient access to those functions. One could make a case for removing those buttons (and some others) in order to simply the IR remote.

While testing the "Mute Video" function (available directly on the IR remote), we found that muting the video DOES mute your outgoing video, but DOES NOT mute your outgoing audio. Depending upon the situation, this could be a significant issue.

3) Web Interface

The xPoint web interface is also clean and easy to use. One minor nit - the web menus do not exactly match the on-screen menus (for example, the AES options are located on the Settings / General / Security menu in the on-screen UI and on the Configuration / Calls / General menu in the web interface. Fortunately, this is easily fixed.

Thanks to the intuitive and well-implemented UI, we found the xPoint system extremely easy to use.

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Summary of Test Results

As a part of this evaluation exercise, Wainhouse Research placed (and documented the call settings / results of) more than 50 calls including one or both of the xPoint test systems. Calls were launched using a combination of the on-screen and web user interfaces.

1) xPoint to xPoint Test Calls

The xPoint successfully encrypted all like-to-like test video calls and provided an on-screen padlock icon to inform the users that the calls were secure.

> ***The xPoint's video performance during like-to-like video calls was exceptional – especially at low calling speeds.***

a) Video Performance

The xPoint's video performance during like-to-like video calls was exceptional - especially at low calling speeds. At 384 kbps, the system sent 4SIF resolution at 15 – 30 fps. At 768 kbps, the frame rate increased to 25 – 30 fps. What is not reflected in the call statistics is the exceptional motion handling and image quality provided during those sessions. Overall, the video quality provided by the xPoint rivals that provided some competing systems at much higher bandwidth.

One interesting item that we observed is that at speeds of 1.5 Mbps and above, the systems used VGA resolution (instead of the higher resolution 4SIF used for the lower bandwidth calls). In addition, the frame rate dropped to the low 20s. Although the resulting video performance was still very strong, this is not as one would expect. Emblaze-VCON has since confirmed that this is a known issue which they expect to resolve in the near future.

b) Audio Performance

Overall, we found the xPoint's audio performance to be good, but not exceptional. At 128 kbps, the system used the G.722.1C audio protocol at 24 kbps, and at higher call speeds it used AAC-LD. Although wide-band audio protocols were used, the audio did not sound like wide-band audio.

c) H.239 Performance

For the most part, the xPoint's H.239 performance was equal to, or better than, other video systems WR has evaluated in the past. Activating H.239 required only a press of the "Data" button on the handheld remote, and the quality was as expected. In almost all cases the image received by the far end was native-resolution XGA. We did, however, note that after pressing the "Data" button on the remote to activate H.239, it takes ~ 7 – 10 seconds before the PC image is displayed locally and remotely.

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2) Interoperability Testing

In general, the xPoint performed well during the interoperability testing. Without exception, the xPoint interoperability test calls were encrypted.

a) Video Performance:

Depending upon the system called and call speed used, video resolutions provided by the xPoint ranged from CIF/SIF to 4CIF/4SIF. As highlighted in the system specifications, the xPoint was able to receive HD720p signals from HD capable endpoints.

During the interoperability testing, WR noted that during calls to the LifeSize Room, Polycom HDX 9002, Tandberg 880MXP, and Tandberg 6000MXP systems, the xPoint had the same issue of decreased resolution (from 4SIF to VGA) and frame rate at call speeds above 768 kbps. Once again, although the resulting video experience was still strong, this is not as expected.

b) Audio Performance

Depending upon the system called, the xPoint negotiated a wide range of audio protocols including G.722 and wide-band G.722.1C (at 24 and 48 kbps) and AAC-LD.

c) H.239 Testing

The xPoint performed well in the H.239 interoperability testing and was able to successfully negotiate an H.239 connection, and send what appeared to be a native resolution content signal, to all systems in the test lab.

d) Specific Results

Interoperability with the Aethra Vega X3 – No connectivity issues noted, although the two systems were unable to negotiate any resolution higher than CIF / SIF – regardless of call speed used.

Interoperability with the LifeSize Room – The video interoperability between the xPoint and the Room system was strong. Depending upon the call speed, various enhanced resolutions (4SIF, 768x432, 1120x624) and even HD720p resolution was used (from the LifeSize Room to the xPoint). However, the testing revealed an audio interop issue. When the G.722.1C audio protocol was used (which is the default audio protocol negotiated between these two systems), each site received sporadic chirps instead of the remote voice audio. When we disabled G.722.1C on the xPoint and changed the audio protocol preference order on the LifeSize Room, G.722 audio was used and the audio was as expected.

Interoperability with the Polycom HDX 9002 – At 384 kbps, no issues were noted. At 768 kbps and above, the receive frame rate from the HDX 9002 unacceptably low (cited as 2 fps on the call statistics, but in reality much lower). In addition, regardless of call speed, the HDX 9002's send resolution remained at SIF. At the higher call speeds, the HDX 9002 should have sent much higher (even up to HD720p) resolutions to the xPoint.

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Interoperability with the Polycom VSX 3000 and VSX 7000 – No issues noted, although regardless of call speed, the video resolutions remained at CIF / SIF. Since the xPoint was able to negotiate other resolutions with other systems, this is presumably related to the limited interim-resolution support within the VSX product line.

Interoperability with the Sony G-50 – No issues noted, although once again the video resolutions remained at CIF / SIF at all call speeds. Also the Sony G-50 was the only system with which the xPoint negotiated narrow-band (G.722) and not wide-band audio.

Interoperability with the Tandberg 880MXP – Overall, the xPoint and 880MXP interoperated well, using enhanced resolution (4SIF, VGA, 400p) and wide-band audio at all call speeds (up to the 1152 kbps limit of the Tandberg 880MXP).

Interoperability with the Tandberg 6000MXP – As with the Tandberg 880MXP, overall interoperability was strong. In this case, however, the 6000MXP sent the xPoint HD720p resolution video at call speeds above 768 kbps.

Overall, with the exception of the Polycom audio interoperability issue, the xPoint performed well during the interoperability testing.

System Strengths:

- Clean, well-organized, and responsive on-screen user interface and web interface
- Strong documentation (provided on a CD) and context-sensitive help within the on-screen UI
- Exceptional low-bandwidth video performance (4SIF at 30 fps at 384 kbps)
- Strong video performance / image quality / motion handling
- Strong interoperability (connectivity, encryption, and H.239)
- Ability to receive HD720p resolution images at ~ 30 fps
- Easily accessible call statistics

System Weaknesses:

- Disadvantages related to underlying PC architecture:
  - Lengthy boot-up process (~ 90 seconds)
  - Relatively loud system fan
  - Use of PC-style connectors (e.g. 1/8” audio jack)
- Need for multiple external adaptors (table pod, Datapoint box, etc.) to send PC image
- Bug causing decreased video resolution (from 4CIF to VGA) as connection rate increases
- Acceptable, but not exceptional, wide-band audio performance
- Lack of far-end mute indicator
- No internal multipoint capability available today
- Limited interoperability with scheduling / management systems (currently only the Emblaze-VCON MXM system manages / controls the xPoint endpoint).
- Lack of RS-232 / Telnet support (useful for remote troubleshooting and integration with AV control systems like Crestron and AMX)

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Conclusion

Overall, Wainhouse Research was pleased by the video, audio, and data performance of Emblaze-VCON's xPoint videoconferencing system. Despite a few trivial quirks reported above, the xPoint performed at least as well, or better, than its peers. In fact, this is the first endpoint from this company that not only met, but in many ways exceeded, our expectations.

Thanks to its straight-forward and intuitive UI, context sensitive on-screen help, and strong like-to-like and interoperability performance, the xPoint video system is well suited to meet the standard-definition videoconferencing requirements of virtually any enterprise – assuming an internal bridging capability is not required. Once the internal bridging option is released, and assuming its performance is on-par with the rest of this system's features, the xPoint story will be even more compelling.

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About Wainhouse Research

Wainhouse Research (www.wainhouse.com) is an independent market research firm that focuses on critical issues in rich media communications and conferencing. The company conducts multi-client and custom research studies, consults with end users on key implementation issues, publishes white papers and market statistics, and delivers public and private seminars as well as speaker presentations at industry group meetings. Wainhouse Research publishes Conferencing Markets & Strategies, a three-volume study that details the current market trends and major vendor strategies in the multimedia networking infrastructure, endpoints, and services markets, as well as a variety of segment reports, the free newsletter The Wainhouse Research Bulletin, and the PLATINUM (www.wrplatinum.com) content website.

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About Emblaze-VCON

Emblaze-VCON, a subsidiary of ZONE-IP Ltd., is a world leader in the development and deployment of Video over-IP Conferencing Solutions, enabling enterprises of all sizes to optimize their productivity and efficiency through enhanced interaction and communication. The Company designs, develops, manufactures and markets high-performance, feature-rich desktop and group videoconferencing systems designed for a variety of networks, including those based on the Internet Protocol as well as infrastructure servers to manage the video network and services.

More information is available at www.vcon.com.

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Appendix A –Test Call Results

The sheets that follow include detailed information about the test calls performed by Wainhouse Research during the evaluation of the Emblaze-VCON xPoint videoconferencing system.

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Emblaze VCON xPoint

SW Release: 7500055-1.1.0.10 - Firmware Version 02

Notes: All calls below originated from one of the Emblaze-VCON xPoint video endpoints.
Frame rate tends to vary based on degree of motion

xPoint to xPoint Calls

Requested Call Configuration				Call Results		Actual Outgoing Stats (sent by test system)				Actual Incoming Stats (received by test system)			
Call#	**EP Recipient**	**BW**	**Encrypt**	**BW**	**Encryption**	**V Prot**	**Resol**	**FPS**	**A Prot**	**V Prot**	**Resol**	**FPS**	**A Prot**
1	Emblaze-VCON xPoint	128	Y	128	Y	H.264	SIF (352x240)	15	G.722.1C (24kbps)	H.264	SIF (352x240)	15	G.722.1C (24kbps)
		Audio	Video	Comments									
		Good	Good	Kudos for solid 15 fps motion handling and wide band at 128 kbps. Slight lip-sync issue noted.									
2	Emblaze-VCON xPoint	384	Y	384	Y	H.264	4SIF (704x480)	15 - 30	AAC-LD	H.264	4SIF (704x480)	15 - 30	AAC-LD
		Audio	Video	Comments									
		Good	Very Good	A very strong video call - including enhanced resolution at up to 30 fps with exceptional motion handling.									
3	Emblaze-VCON xPoint	768	Y	768	Y	H.264	4SIF (704x480)	25-30	AAC-LD	H.264	4SIF (704x480)	25-30	AAC-LD
		Audio	Video	Comments									
		Good	Very Good	An excellent call. Compared to prior 384 kbps call, frame rate is now a solid 24 - 25 fps.									
4	Emblaze-VCON xPoint	1536	Y	1536	Y	H.264	VGA (640x480)	23 - 25	AAC-LD	H.264	VGA (640x480)	23 - 25	AAC-LD
		Audio	Video	Comments									
		Good	Very Good	A very good call, although we do not understand why the resolution decreased to VGA from 4SIF.									
5	Emblaze-VCON xPoint	2048	Y	2048	Y	H.264	VGA (640x480)	23 - 25	AAC-LD	H.264	VGA (640x480)	23 - 25	AAC-LD
		Audio	Video	Comments									
		Good	Very Good	No improvement noted over the prior 1536 kbps call.									
6	Emblaze-VCON xPoint	4096	Y	4096	Y	H.264	VGA (640x480)	20 - 22	AAC-LD	H.264	VGA (640x480)	20 - 22	AAC-LD
		Audio	Video	Comments									
		Good	Very Good	Once again a solid call, but we do not understand why the frame rate decreased at this higher call speed.									
	Notes for Calls 1 - 6:	Overall, all six of the xPoint to xPoint calls produced good (but not superb) audio and good to very good video. The xPoint's 4SIF performance at low (384 and 768 kbps) call speeds was exceptional. The use of VGA resolution and decreasing frame rates at higher call speeds was not expected.											
3a	H.239 Test	768	Y	768	Y	H.264	4SIF (704x480)	25-30	AAC-LD	H.264	4SIF (704x480)	25-30	AAC-LD
		H.239 signal		220-320		H.263	XGA (1024x768)	5					
	Notes:	To test the H.239 capabilities, WR placed call #3 (768 kbps call speed), activated H.239, and recorded the call statistics above. Far end allowed selection of various display options (H.239 full screen with video in PiP, video in full screen with H.239 in PiP, either signal full screen with no PiP). Although the call statistics claimed it was sending an XGA H.239 signal, we noted the clarity of the receive image was lower than that of the source image. When using two monitors (one for video, one for content), the the above issue was resolved and the H.239 signal was displayed in native resolution.											

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Notes: All calls below originated from one of the Emblaze-VCON xPoint video endpoints.
Frame rate tends to vary based on degree of motion

Interoperability Test Calls

Requested Call Configuration				Call Results		Actual Outgoing Stats (sent by test system)				Actual Incoming Stats (received by test system)			
Call#	**EP Recipient**	**BW**	**Encrypt**	**BW**	**Encryption**	**V Prot**	**Resol**	**FPS**	**A Prot**	**V Prot**	**Resol**	**FPS**	**A Prot**
7	Aethra Vega X3	384	Y	384	Y	H.264	SIF (352x240)	30	AAC-LD	H.264	SIF (352x240)	30	AAC-LD
8	Aethra Vega X3	768	Y	768	Y	H.264	SIF (352x240)	30	AAC-LD	H.264	SIF (352x240)	30	AAC-LD
9	Aethra Vega X3	1536	Y	1536	Y	H.263	CIF (352x288)	30	AAC-LD	H.263	SIF (352x240)	30	AAC-LD
10	Aethra Vega X3	2048	Y	2048	Y	H.263	CIF (352x288)	30	AAC-LD	H.263	SIF (352x240)	30	AAC-LD
11	Aethra Vega X3	4096	Y	4096	Y	H.264	SIF (352x240)	30	AAC-LD	H.263	SIF (352x240)	30	AAC-LD
	Notes:	Although it didn't noticably impact the call performance, WR finds it interesting that at 2048 kbps the xPoint sent H.263, but at 4096 kbps it sent H.264.											
8a	H.239 Test	768	Y	768	Y	H.264	SIF (352x240)	30	AAC-LD	H.264	SIF (352x240)	30	AAC-LD
		H.239 signal		240-310		H.263	XGA (1024x768)	5					
	Notes:	To test the H.239 capabilities, WR placed call #8 (768 kbps call speed), activated H.239, and recorded the call statistics above.											
12	LifeSize Room	384	Y	384	Y	H.264	4SIF (704x480)	30	G.722.1C (48kbps)	H.264	768x432	30	G.722.1C (32kbps)
13	LifeSize Room	768	Y	768	Y	H.264	4SIF (704x480)	30	G.722.1C (48kbps)	H.264	1120x624	30	G.722.1C (48kbps)
14	LifeSize Room	1536	Y	1536	Y	H.264	VGA (640x480)	22	G.722.1C (48kbps)	H.264	HD720p (1280x720)	30	G.722.1C (48kbps)
15	LifeSize Room	2048	Y	2048	Y	H.264	VGA (640x480)	22	G.722.1C (48kbps)	H.264	HD720p (1280x720)	30	G.722.1C (48kbps)
16	LifeSize Room	4096	Y	4096	Y	H.264	VGA (640x480)	22	G.722.1C (48kbps)	H.264	HD720p (1280x720)	30	G.722.1C (48kbps)
	Notes:	The use of VGA resolution and decreasing frame rates at higher call speeds was not expected. Although the stats for calls 44 to 46 showed 30 fps incoming from the LifeSize to the xPoint, WR believes the actual frame rate was between 15 and 20 fps. WR noted an audio interop issue between these two systems related to the use of the G.722.1C audio protocol. Adjusting the settings of both endpoints to force the use of the G.722 audio protocol resolved the audio interop issue. The xPoint display showed banding (black bar on top and bottom of screen) as it displayed the 16:9 image on the 3:4 display.											
13a	H.239 Test	768	Y	768	Y	H.264	4SIF (704x480)	30	G.722.1C (48kbps)	H.264	1120x624	30	G.722.1C (48kbps)
		H.239 signal		210-280		H.263	XGA (1024x768)	5					
	Notes:	To test the H.239 capabilities, WR placed call #13 (768 kbps call speed), activated H.239, and recorded the call statistics above.											
17	Polycom HDX 9002	384	Y	384	Y	H.264	4SIF (704x480)	30	G.722.1C (48kbps)	H.264	SIF (352x240)	30	G.722.1C (48kbps)
18	Polycom HDX 9002	768	Y	768	Y	H.264	4SIF (704x480)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	2	G.722.1C (48kbps)
19	Polycom HDX 9002	1536	Y	1536	Y	H.264	VGA (640x480)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	2	G.722.1C (48kbps)
20	Polycom HDX 9002	2048	Y	2048	Y	H.264	VGA (640x480)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	2	G.722.1C (48kbps)
21	Polycom HDX 9002	4096	Y	4096	Y	H.264	VGA (640x480)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	2	G.722.1C (48kbps)
	Notes:	The use of VGA resolution at higher call speeds was not expected. As shown, at 1536 kbps and higher, the frame rate of the incoming signal (from the HDX to the xPoint) was extremely low. This appears to be an interop issue.											
18a	H.239 Test	768	Y	768	Y	H.264	4SIF (704x480)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	2	G.722.1C (48kbps)
		H.239 signal		250-290		H.263	XGA (1024x768)	5					
	Notes:	To test the H.239 capabilities, WR placed call #18 (768 kbps call speed), activated H.239, and recorded the call statistics above.											

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Notes: All calls below originated from one of the Emblaze-VCON xPoint video endpoints.
Frame rate tends to vary based on degree of motion

Interoperability Test Calls

Requested Call Configuration				Call Results		Actual Outgoing Stats (sent by test system)				Actual Incoming Stats (received by test system)			
Call#	EP Recipient	BW	Encrypt	BW	Encryption	V Prot	Resol	FPS	A Prot	V Prot	Resol	FPS	A Prot
22	Polycom VSX 3000	384	Y	384	Y	H.264	SIF (352x240)	25	G.722.1C (48kbps)	H.264	SIF (352x240)	30	G.722.1C (48kbps)
23	Polycom VSX 3000	768	Y	768	Y	H.264	SIF (352x240)	25	G.722.1C (48kbps)	H.264	SIF (352x240)	30	G.722.1C (48kbps)
24	Polycom VSX 3000	1536	Y	1536	Y	H.263	CIF (352x288)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	30	G.722.1C (48kbps)
25	Polycom VSX 3000	2048	Y	2048	Y	H.263	CIF (352x288)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	30	G.722.1C (48kbps)
26	Polycom VSX 3000	4096	Y	4096	Y	H.263	CIF (352x288)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	30	G.722.1C (48kbps)
	Notes:	No issues noted.											
23a	H.239 Test	768	Y	768	Y	H.264	SIF (352x240)	25	G.722.1C (48kbps)	H.264	SIF (352x240)	15	G.722.1C (48kbps)
		H.239 signal		245-320		H.263	XGA (1024x768)	5					
	Notes:	To test the H.239 capabilities, WR placed call #23 (768 kbps call speed), activated H.239, and recorded the call statistics above.											
27	Polycom VSX 7000	384	Y	384	Y	H.264	SIF (352x240)	25	G.722.1C (48kbps)	H.264	SIF (352x240)	30	G.722.1C (48kbps)
28	Polycom VSX 7000	768	Y	768	Y	H.264	SIF (352x240)	25	G.722.1C (48kbps)	H.264	SIF (352x240)	30	G.722.1C (48kbps)
29	Polycom VSX 7000	1536	Y	1536	Y	H.263	CIF (352x288)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	30	G.722.1C (48kbps)
30	Polycom VSX 7000	2048	Y	2048	Y	H.263	CIF (352x288)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	30	G.722.1C (48kbps)
31	Polycom VSX 7000	4096	Y	4096	Y	H.263	CIF (352x288)	30	G.722.1C (48kbps)	H.263	SIF (352x240)	30	G.722.1C (48kbps)
	Notes:	No issues noted.											
28a	H.239 Test	768	Y	768	Y	H.264	SIF (352x240)	25	G.722.1C (48kbps)	H.264	SIF (352x240)	15	G.722.1C (48kbps)
		H.239 signal		240-300		H.263	XGA (1024x768)	5					
	Notes:	To test the H.239 capabilities, WR placed call #28 (768 kbps call speed), activated H.239, and recorded the call statistics above.											
32	Sony G-50	384	Y	384	Y	H.264	SIF (352x240)	30	G.722	H.264	CIF (352x288)	30	G.722
33	Sony G-50	768	Y	768	Y	H.264	SIF (352x240)	30	G.722	H.264	CIF (352x288)	30	G.722
34	Sony G-50	1536	Y	1536	Y	H.264	SIF (352x240)	30	G.722	H.264	CIF (352x288)	30	G.722
35	Sony G-50	2048	Y	2048	Y	H.264	SIF (352x240)	30	G.722	H.264	CIF (352x288)	30	G.722
36	Sony G-50	4096	Y	4096	Y	H.264	SIF (352x240)	30	G.722	H.264	CIF (352x288)	30	G.722
	Notes:	No issues noted.											
33a	H.239 Test	768	Y	768	Y	H.264	SIF (352x240)	30	G.722	H.264	CIF (352x288)	30	G.722
		H.239 signal		210-360		H.263	XGA (1024x768)	1					
	Notes:	To test the H.239 capabilities, WR placed call #33 (768 kbps call speed), activated H.239, and recorded the call statistics above. WR noted the low H.239 frame rate received by the Sony.											

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Interoperability Test Calls

Requested Call Configuration				Call Results		Actual Outgoing Stats (sent by test system)				Actual Incoming Stats (received by test system)			
Call#	EP Recipient	BW	Encrypt	BW	Encryption	V Prot	Resol	FPS	A Prot	V Prot	Resol	FPS	A Prot
37	Tandberg 880 MXP	384	Y	384	Y	H.264	4SIF (704x480)	30	AAC-LD	H.264	400p (528x400)	30	AAC-LD
38	Tandberg 880 MXP	768	Y	768	Y	H.264	4SIF (704x480)	30	AAC-LD	H.264	400p (528x400)	30	AAC-LD
39	Tandberg 880 MXP	1536	Y	1152	Y	H.264	VGA (640x480)	30	AAC-LD	H.264	400p (528x400)	30	AAC-LD
40	Tandberg 880 MXP	2048	Y	1152	Y	H.264	VGA (640x480)	30	AAC-LD	H.264	400p (528x400)	30	AAC-LD
41	Tandberg 880 MXP	4096	Y	1152	Y	H.264	VGA (640x480)	30	AAC-LD	H.264	400p (528x400)	30	AAC-LD

Notes: The use of VGA resolution at higher call speeds was not expected.
The connect rate for calls 34 - 36 was limited by the Tandberg 880MXP's bandwidth limitation of 1152 kbps.

38a	H.239 Test	768	Y	768	Y	H.264	4SIF (704x480)	30	AAC-LD	H.264	400p (528x400)	25	AAC-LD
		H.239 signal		240-300		H.263	XGA (1024x768)	7					

Notes: To test the H.239 capabilities, WR placed call #38 (768 kbps call speed), activated H.239, and recorded the call statistics above.

42	Tandberg 6000 MXP	384	Y	384	Y	H.264	4SIF (704x480)	30	AAC-LD	H.264	w288p (512x288)	30	AAC-LD
43	Tandberg 6000 MXP	768	Y	768	Y	H.264	4SIF (704x480)	30	AAC-LD	H.264	w448p (768x448)	30	AAC-LD
44	Tandberg 6000 MXP	1536	Y	1536	Y	H.264	VGA (640x480)	22	AAC-LD	H.264	HD720p (1280x720)	30	AAC-LD
45	Tandberg 6000 MXP	2048	Y	2048	Y	H.264	VGA (640x480)	22	AAC-LD	H.264	HD720p (1280x720)	30	AAC-LD
46	Tandberg 6000 MXP	4096	Y	4096	Y	H.264	VGA (640x480)	22	AAC-LD	H.264	HD720p (1280x720)	30	AAC-LD

Notes: The use of VGA resolution and decreasing frame rates at higher call speeds was not expected.
Although the stats for calls 39 to 41 showed 30 fps incoming from the 6000MXP, WR believes the actual frame rate rec'd was between 15 and 20 fps.
The xPoint display showed banding (black bar on top and bottom of screen) as it displayed the 16:9 image on the 3:4 display.

43a	H.239 Test	768	Y	768	Y	H.264	4SIF (704x480)	30	AAC-LD	H.264	w448p (768x448)	30	AAC-LD
		H.239 signal		240-350		H.263	XGA (1024x768)	7					

Notes: To test the H.239 capabilities, WR placed call #43 (768 kbps call speed), activated H.239, and recorded the call statistics above.