LifeSize Passport

Manufacturer: LifeSize

Model: Passport

Software Version: 4.7.0

Optional Features and Modifications: None

Date of Test: 23rd – 27th August 2010

A: INTRODUCTION

The LifeSize Passport is a compact high definition (HD) videoconferencing system with a picture resolution of 1280 x 720 pixels at 30 fps (frames per second). Compatibility with other H.323 CODECS is achieved across a range of resolutions from CIF (352x288 pixels) up to 1280 x 720 depending on the capability of the remote CODEC and the connection bandwidth.

The LifeSize Passport offers two system configurations:

Configuration One	Configuration Two
LifeSize CODEC	LifeSize CODEC
LifeSize Focus camera with integral microphone	LifeSize Pan Tilt Zoom camera
	LifeSize MicPod microphone

The equipment submitted for evaluation included version 4.7 software and was the basic “Configuration One” including the LifeSize Focus camera.

LifeSize also produce the LGExecutive which shares the architecture of the Passport but is built into a 24” LG high definition monitor.

Feature Summary:

- A high definition videoconferencing system which supports multiple resolutions up to 1280x720 pixels at 30 fps.
- A very compact CODEC (206mm x 121mm x 33mm) operating at connection speeds up to 2 Mbit/s over H.323 and SIP.
- Supports Skype™ audio connections with automatic import of Skype contacts into the Passport directory.
- H.261, H.263 and H.264 video coding.
- G.711, G.722, G.722.1, G.728, G.729, MPEG4 AAC-LC and SILK (Skype™) audio coding.
- Separate fixed focus HD camera with a native resolution of 1280x720 @ 30 frames per second and an integrated microphone array.
- Analogue stereo output.
- Digital audio output carried in the HDMI monitor connection.
- Supports AES encryption.
- Far end camera control.
- An H.239 second video channel is supported, but as there is no PC interface on the CODEC then the LifeSize Virtual Link software must be installed on a PC or Laptop to provide the H.239 Content signal.
- Supports live streaming and recording (when not in a call) via the LifeSize Video Center.

- LDAP global directory support

B: SETUP PROCEDURE

Setting up the Passport system was straightforward. The CODEC unit may be mounted either under the monitor in a cabinet or positioned adjacent to the monitor. The HD camera may be positioned either on top of or below a picture monitor. An infrared remote control and external power supply complete the package.

The system connections were clearly illustrated on the installation reference card and in the documentation supplied on CD and involved:

- Mounting the camera adjacent to the monitor.
- Connecting the Firewire type video, audio and control cable between the camera and the CODEC.
- Connecting the CODEC to the monitor with the supplied HDMI-HDMI cable.

- Establishing an Ethernet IP network connection through the single RJ45-RJ45 cable.
- Connecting power to the unit.

System set up was conveniently configured through the “on-screen” menus via the hand held remote control. IP address, IP Gateway, Subnet mask and Gatekeeper address were all entered through these menus.

Approximate set-up time: 10 minutes

Documentation quality: The supplied installation card and Administrators guide on CD were both concise and easy

to follow.

C: Hardware Description

General

This IP only CODEC with a single auto switching 10/100 Mbit Ethernet connection was capable of delivering at its maximum bandwidth of 2 Mbit/s an image resolution of up to 720p. The equipment submitted for evaluation had Version 4.7.0 software installed with the basic LifeSize Focus camera. The CODEC is near silent in operation with a cooling fan mounted at the rear of the unit.

The CODEC only offers single monitor mode of operation with resolution support up to w720p widescreen. The main HDMI output connection carries audio signals but alternatively there are also separate analogue audio outputs.

The Passport™ system supports a number of video resolutions from the basic CIF format of 352x288 pixels up to high definition (HD) w720p 1280x720 at 30 fps

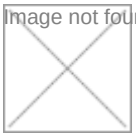
The call connection bandwidth determines the upper image resolution and frame rate. On calls between two Passport systems the negotiated resolution and frame rate is indicated in the table below.

Connection Bandwidth	**Resolution**	**Frame Rate**
128 Kbit/s	452 x 240	15
384 Kbit/s	720 x 400	30
768 Kbit/s	1024 x 576	30
1 Mbit/s	1232 x 688	30
1.5 Mbit/s	1280 x 720	30
2 Mbit/s	1280 x 720	30

The CODEC only supports a single monitor/display with Picture in Picture (PIP) and Picture outside Picture (POP) options. The PIP may be set to ON, OFF or Auto, in Auto mode the PIP is displayed for 10 seconds following any button press on the remote control.

The Image button on the remote control enables the user to cycle through a number of different screen layouts including:

- Full screen display of the local image, with or without remote image PIP
- Full screen display of the remote image, with or without local image PIP
- Side by side local and remote images POP.

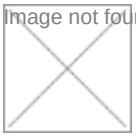
Image not found or type unknown 

Picture outside Picture (POP) no Presentation Material

When presentation material is incorporated six layouts are available.

- Full screen display of the presentation image, with or without local video image PIP
- Full screen display of the local video image, with or without presentation image PIP
- Side by side presentation image and local video image POP
- Full screen display of the remote video image, with or without local video image PIP
- Full screen display of the local video image, with or without remote video image PIP
- Side by side remote video image and local video image POP

Note: you cannot view the remote presenter and the transmitted or received presentations simultaneously.

Image not found or type unknown 

Picture in Picture (PIP) with Presentation Material

The LifeSize Focus camera is a fixed focus camera with manual pan and tilt and a wide horizontal viewing angle of 70 degrees. To reduce interference caused by fluorescent lighting the camera includes an anti-flicker mode. When anti-flicker was set to 50Hz the camera sensitivity was reduced slightly. The camera connects to the CODEC through a 10 foot long proprietary Firewire type cable. Optional 25 and 50 feet cables are also offered. The camera includes two omni-directional, beam-forming microphones.

Dual video H.239 coding provides a second unidirectional (Content) video channel during H.323 calls, but without a second audio channel. Bandwidth is shared between this Content channel and the main camera signal. Bandwidth allocation between channels is fixed. Thus the main camera output and material from a PC or laptop can be transmitted simultaneously and displayed at the remote site.

As no PC interface is provided on the CODEC, H.239 can only be achieved by using the downloadable software package LifeSize Virtual Link. This package enables an IP connection between the PC or Laptop and the CODEC. This arrangement supports image resolution up to XGA but at low frame rates so that it is only suitable for still or slow moving material. Thus snapshots of the computer screen at user adjustable frame rates of 1 to 5 frames per second may be transmitted from the PC via the CODEC to remote sites.

The minimum PC or Laptop specification for effective use of Virtual Link is:

Supported Operating Systems:

- Windows Vista - 32 bit & 64 bit
- Windows 7 - 32 bit & 64 bit
- Mac OS X 10.5 & 10.6
- Windows XP

CPU:

- Dual Core AMD processors 2.1 GHz or higher
- Pentium Core Duo or Core 2 Duo 2.1 GHz or higher

Storage:

- 50 MB minimum available hard disk space

Memory:

- 2 GB minimum

Software:

- Adobe AIR 2 runtime

When a LifeSize Passport is connected to a LifeSize Video Centre then Live streaming and recording is achieved. As a LifeSize Video Centre was not accessible during the evaluation we were unable to test this feature.

Several audio formats are supported by the Passport CODEC. LifeSize has implemented the ITU standard MPEG-4 AAC-LC, giving 16 KHz analogue audio. The microphones integrated within the LifeSize Focus camera provided the audio but an optional more comprehensive MicPod is also available. Analogue stereo audio output is available via a mini jack connector and digital stereo audio is carried within the main HDMI monitor output connection.

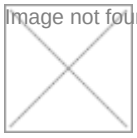
Skype audio calls may also be initiated or received when the CODEC is signed in to a Skype user account. The users contact list is automatically uploaded into the Passport directory on Skype sign in.

Encryption is available at all connection speeds through Advanced Encryption Standard (AES) with a 128 bit session key.

A Kensington lock fixing is included to assist in physical security of the CODEC.

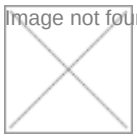
D: SYSTEM OPERATION

The system is controlled by the infra red remote control which features four context sensitive colour coded buttons: yellow (triangle), green (square), blue (circle) and orange (return), the function of each button is indicated by the on-screen menus. This indication is vital as the function of each button can change depending on how the system is used.



Main Menu

There are dedicated buttons for Call, Hang up, Microphone mute, Near/Far camera, Display layout, Volume, Zoom and Input select.



LifeSize Remote Control

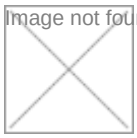
The system takes two minutes to boot up from cold. When not in a call the system automatically reverts to screensaver mode which may be selected to 1, 10, 20, 30 minutes or never. Sleep mode may also be activated after 1, 10, 20 or 30 minutes, and 1, 2, 3 or 4 hours of inactivity. An incoming call or pressing a remote control button will then return the system to active mode.

The Statistics menu displays call status data including resolution, connection speed, compression protocols, packet loss, jitter and frame rate for the main video channel. Frame rate information is not available for the H.239 Content channel.

In wide screen mode, a 4x3 aspect ratio video image transmitted from a computer is displayed on a widescreen monitor with the familiar black bars on each side of the image, thus maintaining the aspect ratio of the image.

Using the LifeSize Virtual Link software to share PC or laptop material

When the software application is started on the PC a list of available endpoints is displayed. Selection of the “Start” presentation button causes an “Accept/Reject” caption to appear on the local CODEC output, the presenter must then accept this presentation start using the Passport remote control.



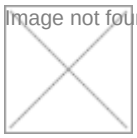
Virtual Link Application

Screenshot reproduced by permission of LifeSize

The presentation transmission is also terminated from the Virtual Link application.

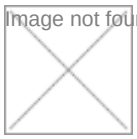
The Virtual Link PC connection is restricted to a maximum frame rate of 5 frames per second which limits the type of material able to be transmitted. During calls when H.264 video coding was negotiated the H.239 channel was displayed at XGA resolution. If H.263 was negotiated then the PC image was downgraded to 4CIF.

Remote configuration and control is available via a web browser, with password protection, a useful tool for configuring the system and remotely monitoring calls. Call status, diagnostic information, together with the ability to initiate and terminate calls are available through this web interface. Web snapshots of transmit and receive images are however not available.



Remote Configuration Screen Shot

Screenshot reproduced by permission of LifeSize



Remote Web Monitoring with Statistics

Screenshot reproduced by permission of LifeSize

E: VIDEO TESTS SUMMARY

For a basic CODEC the Passport systems were capable of producing excellent pictures. At a bandwidth of 1.5Mbit/s and above with images of 720p resolution and 30 frames per second the images from the HD camera were impressive.

When sharing PC “Content” material over H.239, quality was limited for moving sequences due to the restricted frame rate of 5 frames per second. During calls where H.263 was negotiated the H.239 channel resolution was further downgraded to 4CIF. When H.264 was negotiated the higher resolution XGA was displayed. When Content material was transmitted from the Passport the image received at the far end took a while to construct, this effect was observed even on static images. This effect degraded the image for a few seconds while the image achieved its optimum resolution.

To summarise, while the H.239 channel may be considered adequate for a PowerPoint presentation, a web page with embedded video, an animation or small characters on a spreadsheet may be difficult to read as the movement or fine detail will be lost.

F: AUDIO TESTS SUMMARY

The evaluation was carried out using the microphones in the LifeSize Focus cameras. The audio quality was good when the conference participant was positioned close to the camera. However when the participant moved further from the camera the audio level

was adequate but the overall audio quality decreased. In larger room installations where more than one participant is present consideration should be given to using the optional MicPod microphone.

Setup The echo canceller is fully automatic in operation. The quality of echo cancellation and doubletalk from the system was good.

	Lecture Theatre	Room
Audio levels adequate? (Yes/no)	Not tested	Yes
Audio quality acceptable? (Yes/no)	Not tested	Yes
Echo cancellation acceptable? (Yes/no)	Not tested	Yes
Quality of double talk	Not tested	Good

G: DATA TESTS

A PC running the Virtual Link software may be connected to the CODEC via an IP connection

H: CONNECTIVITY

H.323

There were no problems connecting between the LifeSize Passport systems during the evaluation.

Time to Connect with encryption On

H.323	
All speeds	8 seconds

During an H.323 call the network connection was removed and reconnected after a specific period.

5 Seconds	Picture froze – picture goes to black - successful reconnection, call does not terminate

15 Seconds	Picture froze – picture goes to black - successful reconnection, call does not terminate
30 Seconds	Picture froze – picture goes to black - call terminates

Connectivity with Other Machines (models listed with comments)

H.323

Successful connections were made in each direction with the following CODECs, where the system supported H.239 presentation material was also shared.

CODEC	**Call Bandwidth**	**Resolution Transmitted by the Passport**	**Resolution Received by the Passport**
Polycom® VS4000	2 Mbit/s	CIF	CIF
Polycom® VSX8000	2 Mbit/s	CIF	CIF
Polycom® PVX	2 Mbit/s	704 x 480	QVGA
Polycom HDX 9002	2 Mbit/s	720 x 400	w720p
Tandberg 6000 Classic (B version hardware)	2 Mbit/s	CIF	CIF
Tandberg 990 MXP	2 Mbit/s	720 x 400	w448p
Tandberg Edge 95	2 Mbit/s	720 x 400	w720p
Tandberg 6000 MXP	2 Mbit/s	720 x 400	w720p

Tandberg C20	2 Mbit/s	w720p	w720p
Tandberg C90	2 Mbit/s	w720p	w720p
Lifesize Team	2 Mbit/s	w720p	w720p
Connectivity with JANET Videoconferencing Switching Service (JVCSS)			
Lifesize Room 200	2 Mbit/s	w720p	w720p

H.323

The LifeSize Passport connected successfully to the JVCSS Codian MCU negotiating H.264 Video, 720p resolution and AAC-LC audio with video and audio in both directions. H.239 was shared at XGA resolution.

The received audio level was measured as peaking to -2dBm.

The LifeSize Passport connected successfully to the JVCSS MGC MCU negotiating H.263 Video, CIF resolution and G.722 audio with video and audio in both directions. H.239 was shared at 4CIF resolution.

The received audio level was measured as peaking to -4dBm.

Procedure for making a call

- Press Call button on the remote control
- Select connection speed/quality (the system defaults to auto)
- Input IP address or E.164 number
- Press the OK button

Or use the Local Contacts directory available from the user interface. A five number recent call lists is also available.

Appendix 1 Detailed Physical Information

Dimensions: (w x h x d) 20.6 x 3.3 x 12.1 cm

Video Inputs	**Signal Type**	**Connector**
Main camera	Digital	Firewire

Video Outputs	**Signal Type**	**Connector**

Main monitor	Digital	HDMI*

*The main monitor HDMI output also includes embedded stereo audio.

Audio Inputs	**Level**	**Connector**
MicPod	Microphone	Mini jack

Audio Outputs	**Level**	**Connector**
Main output	Digital	HDMI
Main output left/right	Line	Mini jack

Data

1. 1 off LAN 10/100 Mbits/s Ethernet connection (RJ45)
2. 1 off USB connector

Cables Supplied

1. 1 off 3 metre Firewire camera cable
2. 1 off 3 metre HDMI-HDMI monitor cable
3. 1 off 3 metre RJ45 – RJ45 network cable
4. IEC mains cables for international markets

Mobility

The LifeSize Passport is a very small portable lightweight system and can be moved easily. To establish a connection, each new location will need the local IP address to be re-entered into the configuration menu or its DHCP registration amended.

Appendix 2 Detailed Video Tests

The LifeSize Passport does not include any external video inputs hence the normal suite of detailed video quality tests could not be undertaken.

Appendix 3 Detailed Audio Tests

The LifeSize Passport only includes a single microphone level audio input with echo cancellation permanently selected, so only a limited range of subjective audio tests was undertaken.

Test 4: Echo Cancellation

Setup The echo canceller is fully automatic in operation. The quality of echo cancellation and doubletalk from the system was good.

	Lecture Theatre	**Room**
Audio levels adequate? (Yes/no)	Not tested	Yes
Audio quality acceptable? (Yes/no)	Not tested	Yes
Echo cancellation acceptable? (Yes/no)	Not tested	Yes
Quality of double talk	Not tested	Good