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Radvision Scopia VC240

Manufacturer: RADVISION

Model: SCOPIA® VC240

Software Version: 2.5

Optional Features and Modifications: None

Date of Test: 11th – 15th April 2011

A: INTRODUCTION

The RADVISION SCOPIA® VC240 is a self contained High Definition (HD) videoconferencing system with a picture resolution of 1280 x 720 pixels (720p). The system comprises a 24” monitor, CODEC, camera with integral microphone and loudspeakers integrated into a single desktop unit. Compatibility with other H.323 and SIP CODECS is achieved across a range of resolutions from CIF (352 x 288 pixels) up to 1280 x 720 depending on the capability of the remote CODEC and the connection bandwidth.

Feature Summary:

- An integrated high definition videoconferencing system which supports variable resolution up to 1280 x 720 pixels (720p).
- A single desktop unit comprising: The 24” picture monitor, CODEC, camera with microphone and dual loudspeakers.
- A CODEC, operating at connection speeds up to 2 Mbit/s over H.323 and SIP.
- Supports H.263, H.264, and H.264 SVC video coding.
- Supports a wide range of resolutions including HD w720p (1280 x 720), and w480p (848 x 480).
- Supports G.711, G.722, G.722.1 and G.729 audio coding
- Fixed HD camera with a native resolution of 1280 x 720.
- Analogue stereo input (local PC audio monitoring only).
- External microphone input.
- Stereo headphone output.
- H.239 second video connection up to HD w720p (1280 x 720) resolution.
- Digital (DVI) and analogue (VGA) PC inputs.

B: SETUP PROCEDURE

Setting up the SCOPIA® VC240 system was straightforward. After unpacking, the stand requires adjusting and its base fitting.

The connections for basic operation were clearly illustrated on the quick setup guide and involved:

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

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 printed Quick Setup guide and Administrators guide available on CD were both concise and easy to follow.

C: Hardware Description

General

This compact standalone system requires no additional equipment for basic conferencing. Where data sharing is required a PC or laptop computer may be connected and there are provisions for an external microphone and headphones. The CODEC will establish connections up to a maximum bandwidth of 2 Mbit/s and delivers a peak image resolution of 720p at 30 frames per second. The system has a single auto switching 10/100/1000 Ethernet connection with a loop through connector to attach a local computer.

The 24 inch Samsung monitor has a native resolution of 1080p and delivered excellent picture quality when displaying images and for PC data when not conferencing.

The SCOPIA® VC240 system supports several video resolutions including:

- 1280 x 720 @30fps: HD720p
- 848 x 480 @30fps: 480P
- 704 x 576 @30fps: 4CIF
- 512 x 288 @30fps: WCIF
- 352 x 288 @30fps: CIF

The image resolution and frame rate are dependent on the call connection bandwidth and the Video mode (Motion or Sharpness) setting, the default setting being Sharpness:

Video Mode	Sharpness	Motion

Connection Bandwidth	Resolution	Frame rate	Resolution	Frame rate
128 Kbit/s	353x288	10fps	353x288	10fps
384 Kbit/s	848x480	20fps	512x288	25fps
768 Kbit/s	848x480	25fps	848x480	25fps
1 Mbit/s	1280x720	25fps	1280x720	25fps
2 Mbit/s	1280x720	25fps	1280x720	25fps

Both Picture in Picture (PIP) and Picture outside Picture (POP) display formats are supported. This allows both near and far end images to be displayed simultaneously on a single picture monitor. The size, position and transparency of the PIP image are user configurable within the setup menu.

Full screen of the far end image with near image Picture in Picture (PIP)

Far and near image side by side

Large far image, small near image Picture outside Picture (POP)

The “Source” button on the remote control selects either the PC (analogue PC input/ DVI input) or the VC (conferencing CODEC output) to be displayed on the picture monitor. To preview the computer output during a videoconference or to use the system as a PC monitor when not in a call, either PC or DVI are selected.

During a conference the “Layout” button on the remote control cycles between the various screen layouts:

PC/DVI input

- Full screen of the computer image
- Full screen of the computer image with far image PIP
- Side by side computer and far image
- Large computer image with, small near and far images

VC mode

- Full screen of the far image
- Full screen of the far image with near image PIP
- Side by side far and near image
- Large far image with small near image

When H.329 dual images are either transmitted or received the remote control layout button cycles between the available screen layouts in VC Mode:

Transmit H.239

- Full screen of the presentation image
- Full screen of the presentation image with far image PIP
- Side by side presentation and far image
- Large presentation image with small near and far images*

Receive H.239

- Full screen of the presentation image
- Full screen of the presentation image with far image PIP
- Side by side presentation and far image
- Large presentation image with small far image

*The ability to display all three images: Presentation, near and far is only available at the H.239 transmit end. At the receive end only two images i.e. the presentation and far images may be displayed simultaneously.

H.239 Call, large presentation image, small near and far images, Transmit End *

Presentation and far images side by side

Full screen presentation with far image PIP

The 720p High Definition (HD) fixed camera has a native resolution of 1280 x 720 pixels at 30 frames per second. The fixed (non zoom) lens offers a horizontal viewing angle of 58.4 degrees which provides an acceptable image for two conference participants. The camera has a manual tilt facility and together with the picture monitors pan, tilt and elevation adjustments permits a reasonable viewing position to be obtained.

Remote camera zoom control is listed as a feature but was not functioning with other vendors' products. RADVISION confirmed that this feature is to be supported in later software versions

A PC may be directly connected to the CODEC via the DVI-D or the analogue VGA inputs. The set up menu selects the appropriate connection. The DVI input does not support High Definition Content Protection (HDCP.

The following PC resolutions and frame rates are supported.

At an aspect ratio of 4x3

800 x 600 at 56Hz, 60Hz, 72Hz, 75Hz

1024 x 768 at 60Hz, 70Hz, 75Hz

1280 x 1024 at 60Hz, 75Hz

At an aspect ratio of 16x9

1280 x 800 at 60Hz

1440 x 900 at 60Hz, 75Hz

1600 x 900 at 60Hz

1680 x 1050p at 60Hz

1920 x 1080p at 60Hz

H.239 dual video coding provides a second unidirectional video channel during H.323 calls, but without a dedicated second audio channel, to allow simultaneous transmission of the participants and PC material. The bandwidth is shared between the PC channel and the camera video in a fixed ratio with the majority of the bandwidth allocated to the camera channel.

When presentation material is transmitted the resolution and frame rate of the main and second video channels depends on the overall connection bandwidth. Below 256 Kbit/s PC material is not transmitted at all. At connection bandwidths below 1Mbit/s the system protects the resolution of the presentation (PC) channel at 720p while reducing the resolution of the main video channel.

The following table illustrates how the main channel resolution varies with bandwidth.

	Main Channel Only Video Mode: Sharpness		Main Plus Presentation Video Mode: Sharpness	
Call Bandwidth	Resolution	Frame rate	Resolution	Frame rate
384 kbit/s	848x480	20fps	512x288	20fps
768 kbit/s	1280x720	20fps	848x480	25fps
1Mbit/s	1280x720	25fps	1280x720	25fps
2Mbit/s	1280x720	25fps	1280x720	25fps

	Main Channel Only Video Mode: Motion		Main Plus Presentation Video Mode: Motion	
Call Bandwidth	Resolution	Frame rate	Resolution	Frame rate
384 kbit/s	512x288	25fps	352x288	25fps
768 kbit/s	848x480	25fps	848x480	25fps
1Mbit/s	1280x720	25fps	1280x720	25fps

2Mbit/s	1280x720	25fps	1280x720	25fps

Several audio formats are supported by the CODEC: G.722.1, G.722, G.711 and G.729

The PC audio input is not active during a conference. It only feeds PC audio to the local monitor speakers when the PC/DVI source input is selected outside of a videoconference call. The audio input is not available either locally or transmitted to the remote sites when the system is in a videoconference call.

All audio input and output connections are presented on industry standard 3.5mm mini-jack.

Encryption is not supported by the SCOPIA® VC240. RADVISION confirmed that this feature is to be supported in later software versions.

D: SYSTEM OPERATION

The system is limited to set up and control via the infra-red remote control. The on-screen menus are both logical and easy to use.

Image not found or type unknown

System setup menu

The “Source” button on the remote control selects the input to the display screen from the VC (CODEC) output or either of the PC analogue or digital sources. Selecting a PC source allows the user to preview their computer output during a conference or as a PC monitor when not in a call. The “Layout” button on the remote control cycles between the available screen layouts. Microphone and loudspeaker mute buttons are also available.

Image not found or type unknown

SCOPIA® VC240 Remote Control

An H.239 connection is initiated and terminated through the remote control using the single Presentation source button:

- Pressing this button for a short period selects the computer presentation source and starts the H.239 link.
- Pressing the button again for a short period terminates the H.239 link.

The camera occupies one channel and the source connected to either PC input the second channel. At the remote site these two images may either be viewed on two separate monitors or, using POP, displayed on a single large screen, depending on the

capability of the remote CODEC.

The system boots up from cold in approximately 50 seconds. When not in a call the system automatically goes into sleep mode after a user defined period of time. It may also be put into sleep mode via the remote control. A flashing blue light on the monitor indicates that sleep mode is selected. An incoming call or pressing any button on the remote control will return the system to active mode.

The comprehensive call information menu displays call status data including connection bandwidth, frame rate, compression protocols and packet loss. During the evaluation, in calls with some other vendors' systems, although moving images were in fact being transmitted the menu indicated zero (0) transmitted frame rate.

Call information menu

During an H.239 call three separate images, i.e. PC, near and far were displayed at the transmit site, but the receive site could only display two simultaneous images, those of the presentation and far images.

In calls between SCOPIA® VC240 systems it was possible to transmit two simultaneous high resolution images at 720p; however the frame rate of the presentation image was restricted to 2-3 frames per second at all connection speeds.

E: VIDEO TESTS SUMMARY

A basic videoconference between two SCOPIA® VC240 systems produced very good results at 720p resolution. During an H.239 conference the high resolution PC images were restricted, however, by the low frame rate of 2-3 frames per second. This restricts the type of material that can successfully be shared. When H.239 was received from other vendors' systems a higher frame rate of between10-15 frames per second was achieved.

The fixed focus lens high definition camera coped well with difficult lighting conditions.

F: AUDIO TESTS SUMMARY

The echo canceller is fully automatic in operation. The quality of echo cancellation and doubletalk from the system was very good. While a participant was speaking the integral microphone generated significant background noise, but when participants stopped talking, the CODEC's Noise Gating feature produced silence. This contrast was distracting. Using an external headset microphone did reduce this effect but background noise was still evident.

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	Very Good

G: CONNECTIVITY

H.323

There were no problems connecting between the SCOPIA® VC240 units over IP.

Time to Connect

H.323

All speeds	3 seconds

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

5 Seconds	Picture froze - successful reconnection, call does not terminate
15 Seconds	Picture froze - successful reconnection, call does not terminate
30 Seconds	Picture froze - successful reconnection, call does not terminate

Connectivity with Other Machines (models listed with comments)

H.323

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

CODEC **Model and Software Version**	**Call Bandwidth**	**Resolution Transmitted by the SCOPIA® VC240**	**Resolution Received by** **the SCOPIA® VC240**
Polycom PVX S/W 8.0	1.5 Mbit/s	848 x 480	320 x 240
Tandberg 6000 Classic S/W B10.3 PAL	2 Mbit/s	704 x 576	352 x 288
Polycom® VSX7000 S/W 9.0.5.1	2 Mbit/s	704 x 576	352 x 288
Tandberg 990 MXP S/W F7.0 PAL	768 Kbit/s	848 x 480	576 x 448
Tandberg Edge 95 S/W F9.0 PAL	2 Mbit/s	1024 x 576	720p
Tandberg 6000 MXP S/W F9.0 PAL	2 Mbit/s	1024 x 576	720p
Tandberg C40 S/W TC4.0.1	2 Mbit/s	720p	720p

ConnectC Tandberg C60 L S/W TC3.1.1 Po	2 Mbit/s	720p	720p
H.239 Polycom HDX 9002 S/W 2.6.0	2 Mbit/s	720p	720p
Lifesize Team S/W 4.7.10	2 Mbit/s	720p	720p
Lifesize Room 200 S/W 4.7.0	2 Mbit/s	720p	720p

Resolution in pixels and their common designation:

- 1280 x 720 720p
- 848 x 480 48
- 1024 x 576 W4CIF
- 704 x 576 4CIF
- 576 x 448 448p
- 512 x 288 WCIF
- 352 x 288 CIF
- 320 x 240 QVGA

H.239 issues

In general, where XGA content at a resolution of 1024x768 was transmitted by a third party CODEC or MCU to the SCOPIA VC240, the SCOPIA reported receiving 1024x720 pixels and the presentation image was cropped vertically. This effectively removed both the taskbar and the blue bar at the top of the shared application.

Polycom PVX	No H.239 received by the Polycom PVX
Polycom® VSX7000	RADVISION transmitted 704 x 576
Tandberg 6000 Classic	H.239 failed to display
Tandberg 990 MXP	RADVISION transmitted 704 x 576
Tandberg 6000 MXP	RADVISION transmitted 704 x 576
Tandberg C60	RADVISION received 352 x 288
Lifesize Team	RADVISION received 704 x 480
Lifesize Room 200	RADVISION received 704 x 480

Connectivity with JANET Videoconferencing Service (JVCS)

H.323

The SCOPIA connected successfully to the Codian high definition MCU negotiating H.264 video, 720p resolution and G.722 audio with video and audio in both directions. H.239 content was also shared.

When XGA content at 1024x768 was sent by the MCU the SCOPIA reported receiving 1024x720 pixels and the presentation image was vertically cropped. The received audio level

was measured as peaking to -4dBm.

The SCOPIA connected successfully to the Accord MGC 100 standard definition MCU negotiating H.263 video. While the SCOPIA transmitted 4CIF resolution at a low frame rate of about 10fps to the MCU it received CIF from the MCU with G.722 audio in both directions.

H.239 content was also shared via the MGC MCU. When XGA content at 1024x768 was sent by the MCU the SCOPIA again reported receiving 1024x720 pixels and vertically cropped the presentation image. The received audio level was measured as peaking to -4dBm.

Procedure for making a call

1. Press Call button on the remote control
2. Input IP address
3. Press the Call button

Or use the local contacts directory available from the user interface Phone Book, Call History or the Recent Calls lists. Missed calls are also listed in the call history.

Appendix 1 Detailed Physical Information

Dimensions: (w x h x d) 57 x 44 x 23 cm

Video Inputs	Analogue RGB Analogue Y Pb Pr Composite/YC Digital	Connector
Main camera	Internal connection	
PC input	Analogue RGB	15 pin D type
PC Input	Digital	DVI-D

The DVI-D input does not support High Definition Content Protection (HDCP).

Video Outputs	Analogue RGB Analogue Y Pb Pr Composite/YC Digital	Connector
Main monitor	Internal connection	

Audio Inputs	Level	Connector
Microphone	**Microphone**	Internal connection
Microphone (external)	**Microphone**	3.5mm Mini-jack
PC Audio*	**Microphone**	3.5mm Mini-jack

*PC audio signals are only present on the local monitor speakers when the system is not in a videoconference call. This audio cannot be transmitted over the videoconference link.

Audio Outputs	Level	Connector
Main output	Internal connection	
Main output left/right	Line	3.5mm Mini-jack

Data

1. 1 off LAN 10/100/1000 Mbits/s Ethernet connection (RJ45)
2. 1 off LAN 10/100/1000 Mbits/s Ethernet connection loop through (RJ45)
3. 1 off USB connector (future use)

Cables Supplied with the System

1. 1 off - Network cable, 2 Metres RJ45 – RJ45
2. 1 off - 2 metres DVI-D - DVI-D
3. 1 off - 2 metres 15pin D-type - 15pin D-type
4. 1 off - 2 metres audio mini jack – mini jack
5. 1 off – UK Power cable

Mobility

The SCOPIA® VC240 system can be moved easily. To establish a connection, each new location will need the local area network information re-entered into the configuration menu.

Appendix 2 Detailed Video Tests

The SCOPIA® VC240 includes analogue PC and DVI-D inputs which may only be transmitted via the H.239 second channel at 2-3 frames per second, sharing the available bandwidth with the main camera. For this reason the normal subjective video quality tests could not be carried out.

Appendix 3 Detailed Audio Tests

The SCOPIA® VC240 includes only one external audio input with fixed echo cancellation. As the echo cancellation could not be turned off the normal audio quality tests could not be carried out.

The echo canceller is fully automatic in operation. The quality of echo cancellation and doubletalk from the system was very good. While a participant was speaking the integral microphone generated significant background noise, but when participants stopped talking, the CODEC's Noise Gating feature produced silence. This contrast was distracting. Using an external headset microphone did reduce this effect but background noise was still evident.

	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	Very Good

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