



Welcome

Technical Services Virtual Boot Camp Session 12

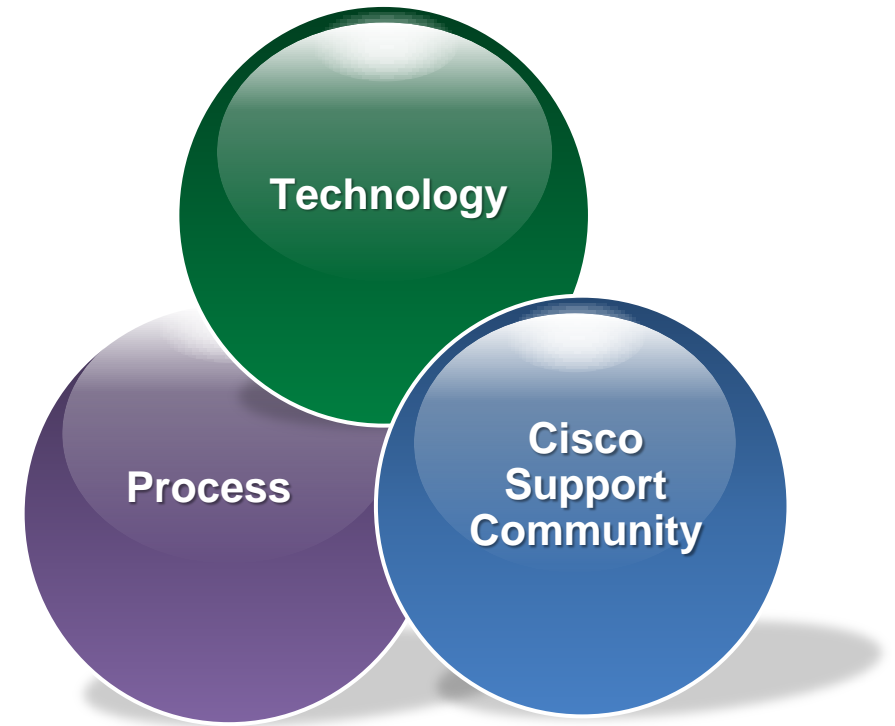
Technical Services India Team



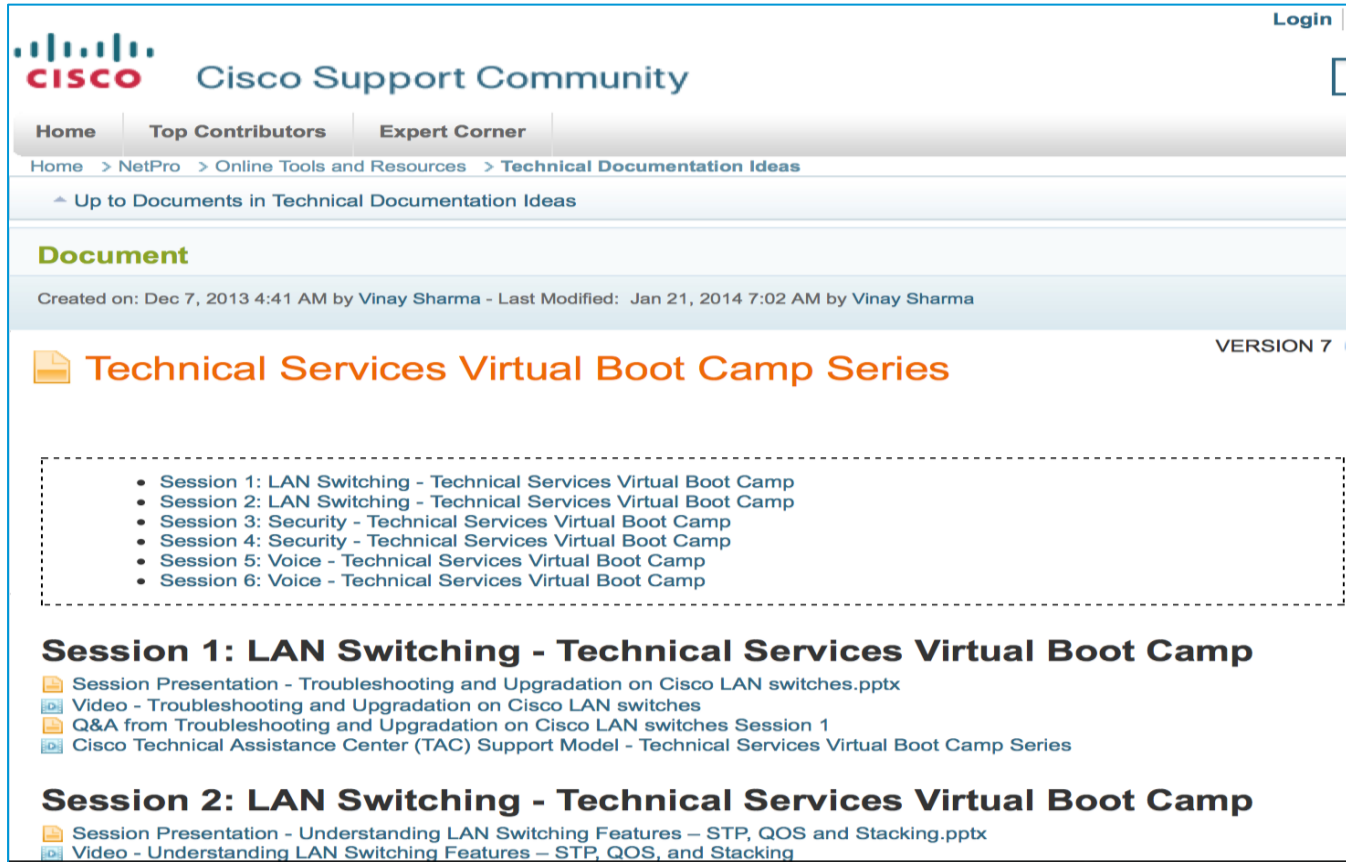
Session 11 Recap - Telepresence

Technology

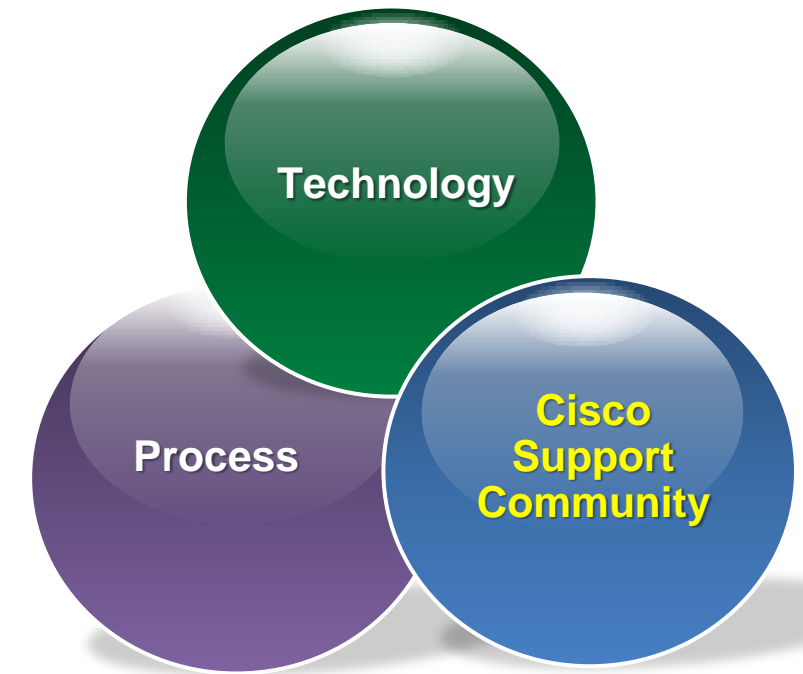
- Product Portfolio - TC codec series
- Camera details
- Cables & Connectors
- How to capture logs
- Troubleshooting
- Lab



Q&A



The screenshot shows the Cisco Support Community website. At the top, there is a navigation bar with 'Home', 'Top Contributors', and 'Expert Corner'. Below that is a breadcrumb trail: 'Home > NetPro > Online Tools and Resources > Technical Documentation Ideas'. The main content area is titled 'Document' and includes the text 'Created on: Dec 7, 2013 4:41 AM by Vinay Sharma - Last Modified: Jan 21, 2014 7:02 AM by Vinay Sharma'. The document title is 'Technical Services Virtual Boot Camp Series' with a 'VERSION 7' indicator. A dashed box contains a list of sessions: 'Session 1: LAN Switching - Technical Services Virtual Boot Camp', 'Session 2: LAN Switching - Technical Services Virtual Boot Camp', 'Session 3: Security - Technical Services Virtual Boot Camp', 'Session 4: Security - Technical Services Virtual Boot Camp', 'Session 5: Voice - Technical Services Virtual Boot Camp', and 'Session 6: Voice - Technical Services Virtual Boot Camp'. Below this, there are two detailed session entries. 'Session 1: LAN Switching - Technical Services Virtual Boot Camp' lists resources: 'Session Presentation - Troubleshooting and Upgradation on Cisco LAN switches.pptx', 'Video - Troubleshooting and Upgradation on Cisco LAN switches', 'Q&A from Troubleshooting and Upgradation on Cisco LAN switches Session 1', and 'Cisco Technical Assistance Center (TAC) Support Model - Technical Services Virtual Boot Camp Series'. 'Session 2: LAN Switching - Technical Services Virtual Boot Camp' lists: 'Session Presentation - Understanding LAN Switching Features – STP, QOS and Stacking.pptx' and 'Video - Understanding LAN Switching Features – STP, QOS, and Stacking'.



[https://supportforums.cisco.com/docs/DOC-37994 ...PPT](https://supportforums.cisco.com/docs/DOC-37994...PPT)

[https://supportforums.cisco.com/videos/7517 ...Video](https://supportforums.cisco.com/videos/7517...Video)

[https://supportforums.cisco.com/docs/DOC-37851 ...Q&A](https://supportforums.cisco.com/docs/DOC-37851...Q&A)



Introduction



Nirmal Sodani
Technical Support Manager



Mohit Mmangal
Manager, CSC



Sanjit Roy
TAC Escalation Engineer



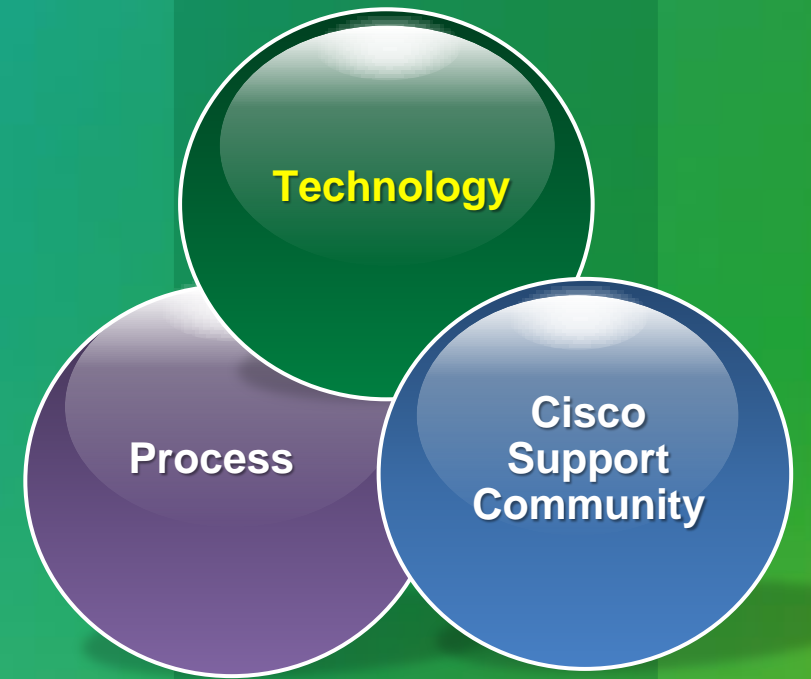
Vinay Sharma
Lead, CSC



Dharmesh Nandoria
TAC Escalation Engineer



Shiv Goel
Technical Support Manager



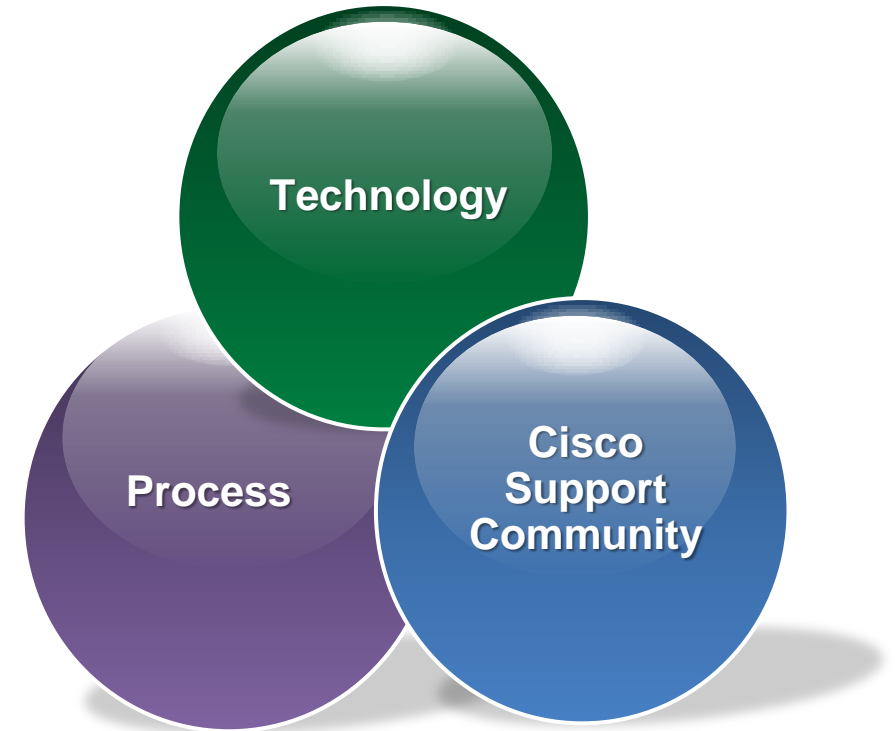
Technology – Telepresence

Sanjit Roy

Dharmesh Nandoria

Technology

- Product Portfolio - Legacy MXP series
- Camera details
- Cables & Connectors
- How to capture logs
- Troubleshooting
- Lab



Q&A

Contd. from previous session

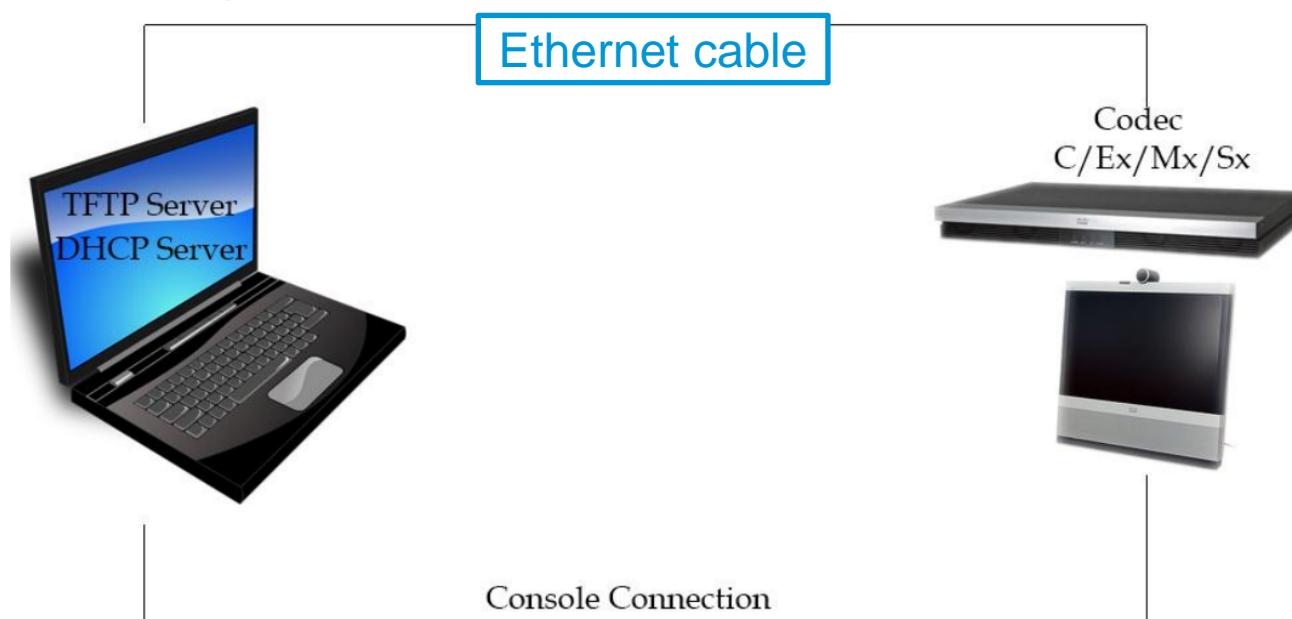
- TFTP Procedure
- Call Quality issue
- Backup & restore

TFTP procedure

- <https://supportforums.cisco.com/docs/DOC-23161>

- Codec should be connected to dhcp network.

Connections Diagram:



TFTP procedure

- 1) Create a folder on the tftp server and place the TC pkg file as well as the 'pgkextract.elf' and u-boot.bin file.
- 2) At the serial port, break the boot to get the SATURN>
- 3) Run the following commands at the SATURN>
- 4) SATURN>setenv serverip IP_ADDRESS , where IP_ADDRESS is the IP address of the tftp server.
- 5) SATURN>setenv tftp_path (Blank)

TFTP procedure cont

7) SATURN>setenv saturnpkg FILE_NAME where FILE_NAME is the name of the c90 pkg file, e.g.s52000tc10_b14.pkg

8) SATURN>run pkgex

- Video Demo .

Call Quality issue

Video quality : bad video quality in calls with symptoms such as pixilation image, the most likely cause for this is packet loss in the network

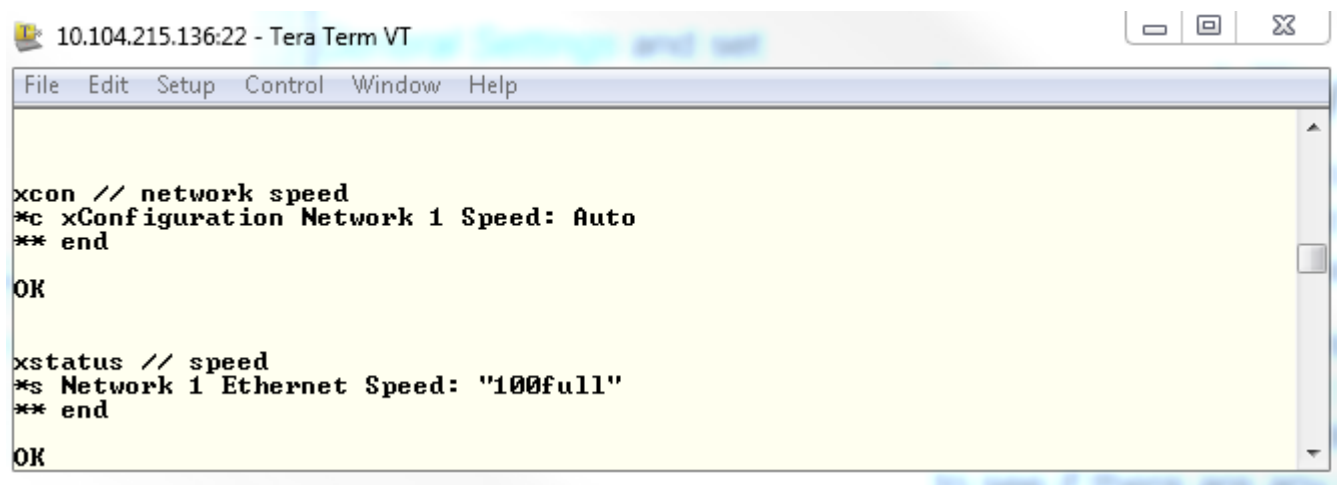
Call		
Protocol	H323	
Transmit call rate	1920 kbps	
Receive call rate	1920 kbps	
Encryption	NONE	

Audio	Transmit	Receive
Protocol	AACLD	AACLD
Channel rate	63 kbps	64 kbps
Total packet loss	20.7%	26.6%
Current packet loss	0.0%	0.0%
Jitter	0 ms	3 ms

Video	Transmit	Receive
Protocol	H264	H264
Resolution	1280x720	1280x720
Frame rate	30 fps	30 fps
Channel rate	1764 kbps	1081 kbps
Total packet loss	0.0%	30.8%
Current packet loss	0.0%	0.0%
Jitter	4 ms	2 ms

Call Quality issue

- Check Network speed
- xConfiguration Network 1 Speed: Auto or same as configured on switch
- xstatus Network 1 Ethernet Speed



```
10.104.215.136:22 - Tera Term VT
File Edit Setup Control Window Help

xcon // network speed
*c xConfiguration Network 1 Speed: Auto
** end

OK

xstatus // speed
*s Network 1 Ethernet Speed: "100full"
** end

OK
```

Call Quality issue

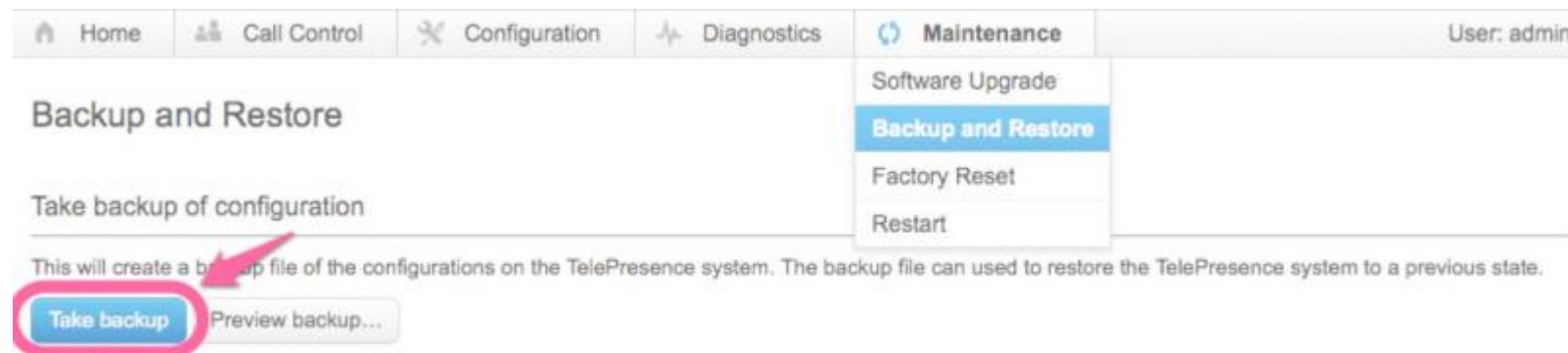
- Implementing QoS (Quality of Service)

Another way to deal with packet loss is to implement QoS in your network so that the video conferencing traffic is prioritized over other data. QoS has to be implemented throughout the entire network for this to be effective. Some suggested QoS values are shown below.

	PHB	DSCP (Diffserv Value)
Video and Audio Media	<i>AF41</i>	<i>34</i>
Signalling	<i>CS3</i>	<i>24</i>
Data	<i>AF21</i>	<i>18</i>
NTP	<i>Best Effort</i>	<i>0</i>
ICMPv6	<i>Best Effort</i>	<i>0</i>

Backup Restore

- To take a backup of the system configuration go to Maintenance -> Backup and Restore and press on Take backup.



- To restore a backup go to Maintenance -> Backup and Restore and press Browse... and locate the backup file taken previously (default name –configuration.tsh). Select this file and press Restore.

Restore configuration from backup

Restore the TelePresence system from a backup file. Some configurations may require a reboot to take effect.

No file selected

Figure 18 - Browse for Backup File

Restore configuration from backup

Restore the TelePresence system from a backup file. Some configurations may require a reboot to take effect.

configuration.tsh



Endpoints Portfolio – MXP

Dharmesh Nandoria

Endpoint: TelePresence MXP-series Codec

Standard definition codec

- MXP 770 /880 /990 – set top model -use same hardware
- MXP 550

Personal Series

- MXP 150 / MXP 1000 – SD
- MXP 1700 HD

High definition codec – 720p

- Edge 75 /85/95 – use same hardware

Integrator codec

- MXP 3000 / MXP 6000

Endpoint: TelePresence MXP - Profile

- TANDBERG 8000 *MXP* Profile – 6000 MXP codec
- TANDBERG 6000 *MXP* Profile -6000 MXP codec
- TANDBERG Maestro *MXP* Profile – 3000 MXP codec
- TANDBERG 3000 *MXP* Profile – 42 – 3000 MXP codec
- TANDBERG 3000 *MXP* Profile – 32 – 3000 MXP codec

TANDBERG 8000 *MXP* Profile

Design

Fully integrated Board room solution

2 x 50" widescreen plasma screens

PrecisionHD Camera

Premium, True CD quality audio:

- Stereo, Digital NAM
- Satellite speakers optional



Performance

Share or View live PC presentations and presenter at same time

Join up to 6 video + 5 audio sites into the meeting

Supports multiple protocols: IP: SIP/H.323 and ISDN: H.320

Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication

High bandwidth: up to 2 Mbps ISDN / 4 Mbps H323/ 4 Mbps SIP/ 6 Mbps Multisite

Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.

TANDBERG 6000 *MXP* Profile

Design

Fully integrated meeting room solution

1 x 50" widescreen plasma screen

PrecisionHD Camera

Premium, True CD quality audio:

- Stereo, Digital NAM
- Satellite speakers optional

Performance

Share or View live PC presentations and presenter at same time

Join up to 6 video + 5 audio sites into the meeting

Supports multiple protocols: IP: SIP/H.323 and ISDN: H.320

Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication

High bandwidth: up to 2 Mbps ISDN / 4 Mbps H323/ 4 Mbps SIP/ 6 Mbps Multisite

Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.

Optional Wheel Base



TANDBERG Maestro *MXP* Profile

Design

Medium to large meeting room solution

Leverage existing screens or projectors

PrecisionHD Camera

Premium, True CD quality audio:

- Stereo, Digital NAM
- Satellite speakers optional

Performance

Incorporates the power of the 6000 MXP codec

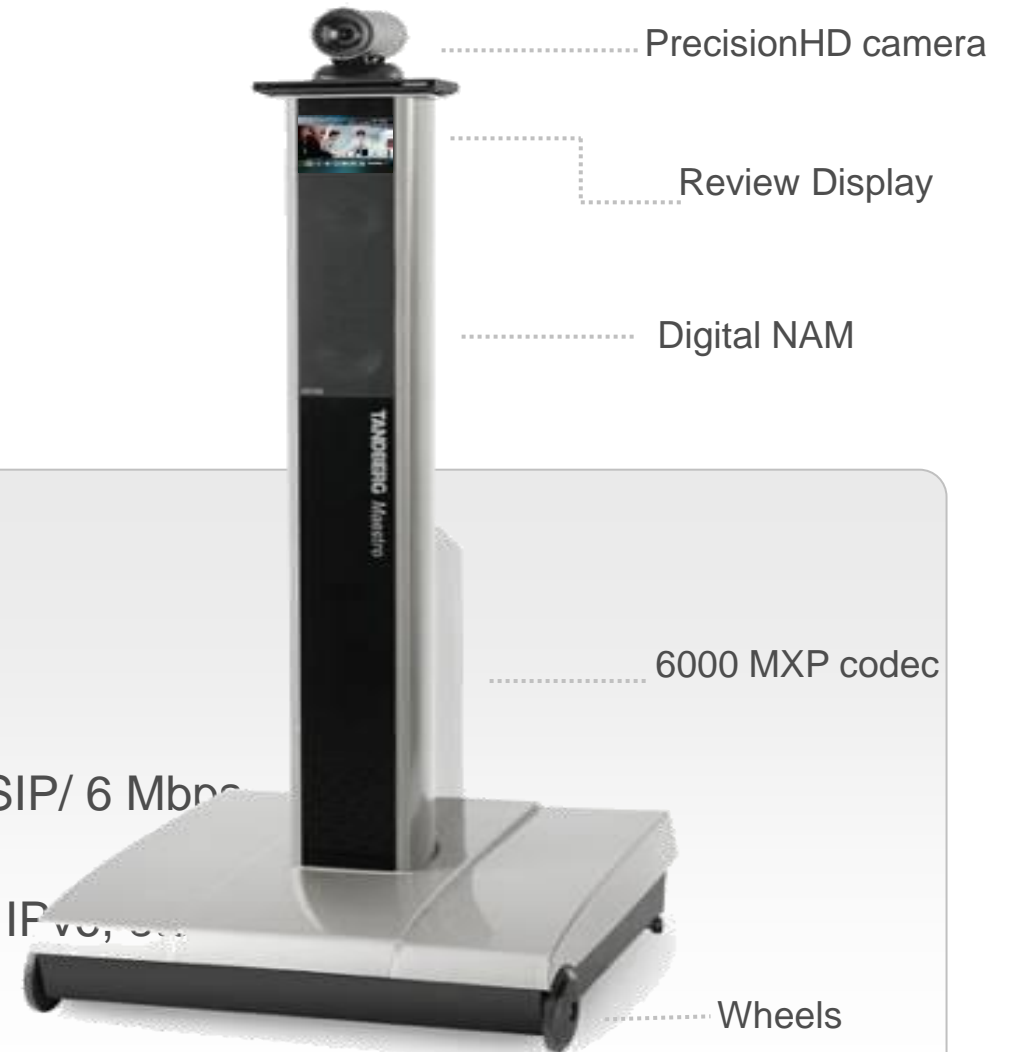
Share or View live PC presentations and presenter

Join up to 6 video + 5 audio sites into the meeting

High bandwidth: up to 2 Mbps ISDN / 4 Mbps H323/ 4 Mbps SIP/ 6 Mbps

Multisite

Support for TANDBERG Total Solution: Expressway, FindMe, IP vs, etc.



TANDBERG 3000 *MXP* Profile

Design

Fully integrated small meeting room solution

1 x 42" plasma or 32" LCD widescreen

PrecisionHD Camera

Premium, True CD quality audio:

- Digital NAM

Performance

Share or View live PC presentations and presenter at same time

Join up to 4 video + 3 audio sites into the meeting

Supports multiple protocols: IP: SIP/H.323 and ISDN: H.320

Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication

High bandwidth: up to 512kbps ISDN / 2 Mbps H323/ 2 Mbps SIP

Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.

Optional Wheel Base



TANDBERG Edge *MXP*

Design

Small meeting room solution for use with an existing screen

PrecisionHD Camera

Premium, True CD quality audio



Performance

Three versions based on bandwidth, presentation and MultiSite requirements

- Edge 95, 85, 75

Share or View live PC presentations and presenter at same time

Join up to 4 video + 3 audio sites into the meeting

Supports multiple protocols: IP: SIP/H.323 and ISDN: H.320

Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication

High bandwidth: up to 512kbps ISDN / 2 Mbps H323/ 2 Mbps SIP

Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.

TANDBERG 1700 *MXP*



Design

Personal Telepresence solution for the executive desktop
Fully integrated solution with HD Camera
20" LCD widescreen
Premium, True CD quality audio

Performance

Share or View live PC presentations and presenter at same time
Join up to 4 video + 3 audio sites into the meeting
Supports multiple protocols: IP: SIP/H.323
Stereo conference audio through 2 speakers and 2 microphones or use a headset for privacy
Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication
High bandwidth: up to 2 Mbps H323 / 2 Mbps SIP
Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.

TANDBERG 1000 *MXP*

Design

Personal Desktop solution for the desktop
Fully integrated solution with direct PC input
12.1" LCD display

Performance

Share or View live PC presentations and presenter at same time
Supports multiple protocols: IP: SIP/H.323 and ISDN: H.320
Speaker & microphone for clear audio or use a headset for privacy
Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication
High bandwidth: up to 768kbps H323 / 768kbps SIP and up to 384kbps ISDN
Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.



TANDBERG 150 *MXP*

Design

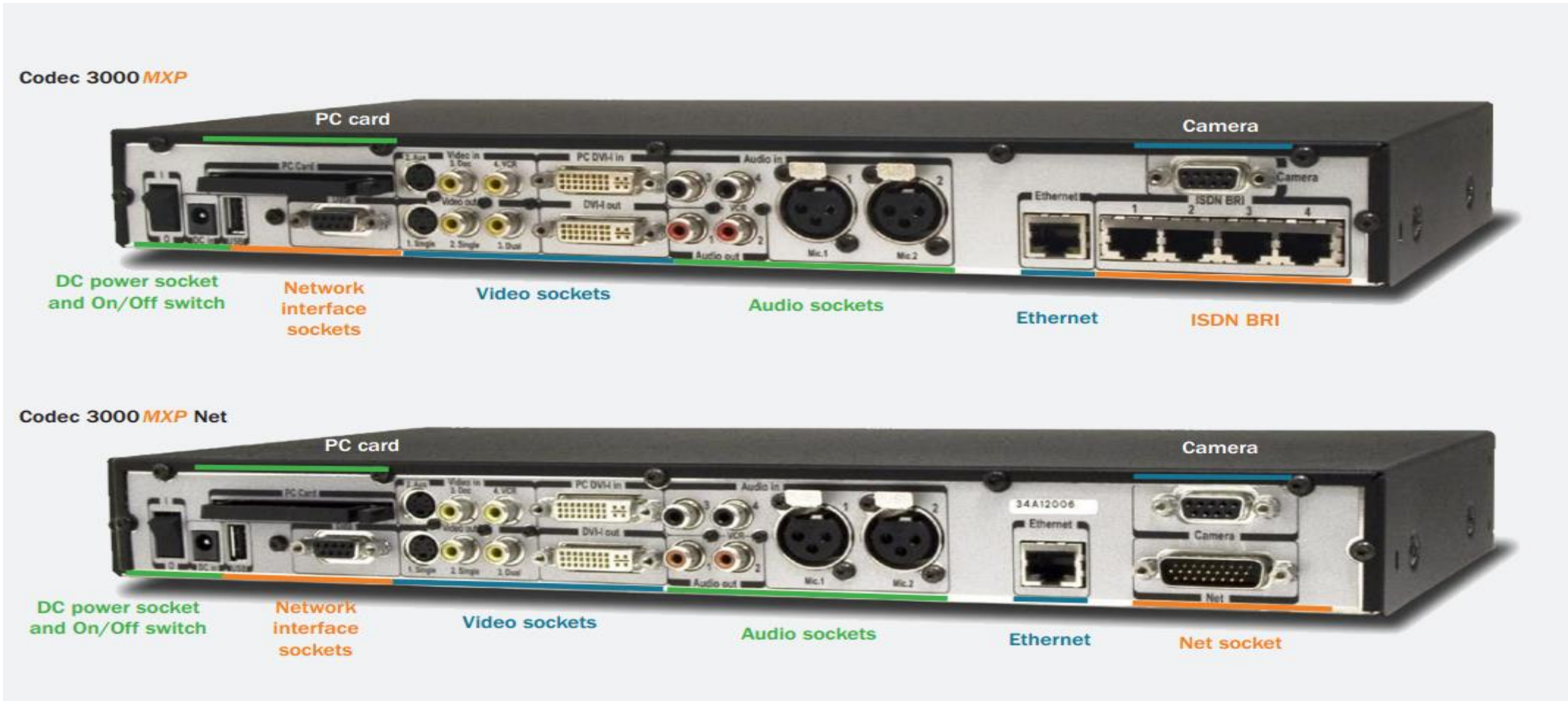
Personal Desktop Video Phone solution for every desktop
Fully integrated solution
8.4" LCD display

Performance

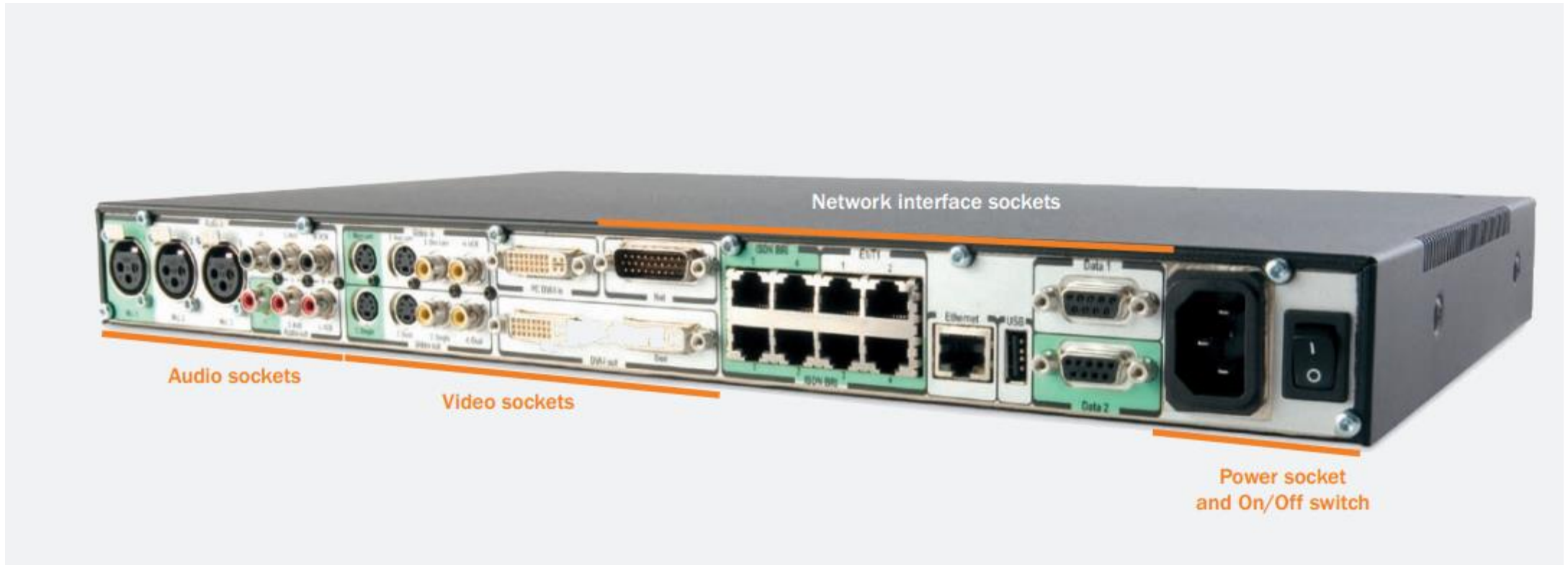
View live PC presentations and presenter at same time
Supports multiple protocols: IP: SIP/H.323
Speaker & microphone for clear audio or use a headset for privacy
Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication
High bandwidth: up to 512kbps H323 / 512kbps SIP
Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.



3000 *MXP* Codecs - Variants



6000 MXP Codec



TANDBERG Tactical *MXP*

Design

Mobile video solution for use in rugged environments
Protected 15.4" WXGA screen
Durable, integrated system contained in a carry-on size case
Storage space for laptop or satellite modem



Performance

Share or View live PC presentations and presenter at same time
Join up to 4 video + 3 audio sites into the meeting
Supports multiple protocols: IP: SIP/H.323 and ISDN: H.320
Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication
High bandwidth: up to 512kbps ISDN / 2 Mbps H323/ 2 Mbps SIP
Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.
Includes Wheels & handcart, headset, and automobile power adapter

TANDBERG Compass *MXP*

Design

Attractive wall mounted solution with simple control for public use
Integrated with a complete video system, telephone handset and light
12.1" LCD display

Performance

Easy to use with five-button menu navigation
Dial from a phone book, or auto-dial when the handset is lifted
Supports multiple protocols: IP: SIP/H.323 and ISDN: H.320
Handset, speaker & microphone for flexible audio
Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication
High bandwidth: up to 768kbps H323 / 768kbps SIP and up to 384kbps ISDN
Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.



TANDBERG Utility *MXP*

Design

Durable, wall mounted solution with auto-dial for ease of use in a rugged environment

Integrated with a complete video system, telephone handset and light

12.1" LCD display

Performance

Robust, splash-proof with a protected cabinet

Auto-dial when the user simply picks up the handset

Supports multiple protocols: IP: SIP/H.323 and ISDN: H.320

Embedded Security: AES/DES, H.235 and IEEE 802.1x Network Authentication

High bandwidth: up to 768kbps H323 / 768kbps SIP and up to 384kbps ISDN

Support for TANDBERG Total Solution: Expressway, FindMe, IPv6, etc.





MXP Licensing

Dharmesh Nandoria

System Licensing – MXP Endpoint

- Product: 6000MXP, Edge MXP, Set top MXP, 150MXP, etc.
- Release Key: For Major Software upgrade/downgrade
- Features Option Key: Standard / NPP / MS+NPP
- Bandwidth Option Key: IP only / IP + ISDN (very depend on product model)
- Note: NPP Keys are part of MS key

Release Key and Option Keys are 16 digits long

Only one key for each Feature and Bandwidth option key

Sys S/N	HW S/N	MAC	Product Name	Shipped SW	Orig. rel. key	Upgrade to	New rel. key
25A22773	25A22773		113545N - TANDBERG Codec 6000 MXP	F5.2 (S50000)	5324023512592676	F9.0.2 (S50000)	1207118332613822
			11389004 - Codec 6000 MXP product id		6790167077812426		
			1138563 - Codec 6000 MXP bw option 2M ISDN/4M Ext/		3061256064527801		
			113828MS - Codec 6000 MXP MS option		6048739635958818		

Product ID – EDGE xx , MXP 990/880/770

- EDGE 95/85/75 Use same hardware , Use different product key as per model
- MXP 990/880/770 Use same hardware , Use different product key as per model
- Difference is bandwidth / Option keys.

<input type="checkbox"/>	Sys S/N	HW S/N	MAC	Cisco Product Name	Tandberg Item Number	Shipped SW	Orig. rel. key	Quantity	Upgrade to	New rel. key
<input type="checkbox"/>	FTX1528C0AZ	26B15475	00506083BDF8	LIC-S50000-K9:	LIC-S50000-K9:SW PAL/NTSC for MXP				F1.0 ▾	-
				LIC-EDG75:	11389022:Edge 75MXP product id		0508091775618713	1		
				LIC-EDG75-BW1:	1155992:Edge 75 MXP bw option 128k ISDN/ 768k IP		3774105442380672	1		
				LIC-EDG75-NPP:	115596NPP:Edge 75 MXP NPP option		6484938301001607	1		
<input type="checkbox"/>	FTX1530C0J8	26B15710	00506083C395	LIC-S50000-K9:	LIC-S50000-K9:SW PAL/NTSC for MXP				F9.3.1 ▾	2530912932444603
				LIC-EDG95:	11389024:Edge 95MXP product id		0164582463662041	1		
				LIC-EDG95-BW1:	1155972:Edge 95 MXP bw option 512k ISDN/ 2M IP		4759527954611794	1		
				LIC-EDG95-MS:	115594MS:Edge 95 MXP MS option		7609217713557246	1		

Codec Comparison

TANDBERG

04/2007
VIDEO
PRODUCT
MATRIX



Model	Experia	8000 MXP	Profile 6000 MXP	Profile 3000 MXP	Maestro HD	Edge 75 MXP	Edge 85 MXP	Edge 95 MXP	Centric 1700 MXP
Feature	HD	HD	HD	HD	HD	HD	HD	HD	HD
Base Price <i>May 2007</i>									
Environment	Exec Boardroom	Exec Boardroom Large Group	Large Group	Small & Medium Group	Large Group Auditorium	Small & Medium Group	Small & Medium Group	Small & Medium Group	Executive Office
Camera	4 TANDBERG PrecisionHDs	TANDBERG PrecisionHD	TANDBERG PrecisionHD	TANDBERG PrecisionHD	TANDBERG PrecisionHD	TANDBERG PrecisionHD	TANDBERG PrecisionHD	TANDBERG PrecisionHD	Compact HD 1/3" CMO
Display	Quad 50" XGA Plasma	Dual 50" XGA Plasma	50" Plasma	42" Plasma or 30" LCD	N/A	N/A	N/A	N/A	20" Widescreen LCD
Bandwidth	8-12M IP	4M IP 2M ISDN 2M V.35	4M IP 2M ISDN 2M V.35	2M IP 512k ISDN	4M IP 2M ISDN 2M V.35	768kpbs IP 128k ISDN	1.1 M IP 384k ISDN	2M IP 512k ISDN	2M IP
Presentation	Through the collaboration monitor, DuoVideo/H.239 dual stream, on the collaboration monitor	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by Side, POP, Add See & Share

Network	Ethernet	Ethernet 6xBRI, V.35 PRI USB 2	Ethernet 6xBRI, V.35 PRI USB 2	Ethernet Wireless Ethernet 4xBRI USB 2	Ethernet 6xBRI, V.35 PRI USB 2	Ethernet Wireless Ethernet 4xBRI USB 2	Ethernet Wireless Ethernet 4xBRI USB 2	Ethernet Wireless Ethernet 4xBRI USB 2	Ethernet Wireless Ethernet USB 2
Expressway	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460
MCU	Multisite telepresence mode. MCU on collaboration monitor for use with H.323 systems, up to 6 video + 5 audio, H.264, AES	Up to 6 video + 5 audio, Up to 6M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	Up to 6 video + 5 audio, Up to 6M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	4 video + 3 audio, Up to 2.3M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	Up to 6 video + 5 audio, Up to 6M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	N/A	4 video + 3 audio, Up to 1.1 M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	4 video + 3 audio, Up to 2.3M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	4 video + 3 audio, Up to 2.3M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)
H.264	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Security	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryp- tion H.235 authentication 802.1x authentication	AES & DES encryp- tion H.235 authentication 802.1x authentication	AES & DES encryp- tion H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryp- tion H.235 authentication 802.1x authentication
Privacy	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Headphones
Stereo/CD Quality	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Microphone	3 x Large XLR	3 x Large XLR	3 x Large XLR	2 x Large XLR	3 x Large XLR	2 x Large XLR	2 x Large XLR	2 x Large XLR	Built In
Audio Inputs	3 x Microphone 2 x RCA/Phono, Line Level: VCR/DVD 2 x 3.5mm Stereo Line Level: PC	1 x RCA Line Level 1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Line Level 1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Line Level 1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)
Video Inputs	4 x HD Main Cameras, 1 x MiniDin, S-video: DVD 2 x HD15: PC 1 X HD15: DOC CAM	HD Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	HD Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	HD Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	HD Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	HD Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	HD Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	HD Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	HD Main Camera 1 x DVI-I (SXGA)
Video Outputs	3 x DVI-I: main displays 1 x DVI-I: collaboration display, Output up to 1280 x 720 @ 60hz	2 x S Video 2 x Composite 2 x DVI-I (XGA)	2 x S Video 2 x Composite 2 x DVI-I (XGA)	1 x S Video 2 x Composite 1 x DVI-I (XGA)	2 x S Video 2 x Composite 2 x DVI-I (XGA)	1 x S Video 2 x Composite 1 x DVI-I (XGA)	1 x S Video 2 x Composite 1 x DVI-I (XGA)	1 x S Video 2 x Composite 1 x DVI-I (XGA)	N/A
Integration Control	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
IPv6 Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

All specifications subject to change without notice, system specifics may vary.



Model	Centric 1000 MXP	Centric 150 MXP	990 MXP 880 MXP 770 MXP	550 MXP	Compass MXP	Utility MXP	6000 MXP Codec 6000 MXP Portable	6000 MXP Integrator Package HD HD	3000 MXP Codec 3000 MXP Portable	3000 MXP Integrator Package HD HD
Feature										
Base Price <i>May 2007</i>	[Redacted Price Information]									
Environment	Office	Desk	Small & Medium Group	Small Group	Public Space	Public Space	Large Room Integration	Large Room Integration	Small & Medium Room Integration	Small & Medium Room Integration
Camera	Built-in 1/4" CCD	Built-in 1/4" CCD	TANDBERG WAVE II	TANDBERG WAVE II	Built-in 1/4" CCD	Built-in 1/4" CCD	TANDBERG WAVE II	TANDBERG PrecisionHD	TANDBERG WAVE II	TANDBERG PrecisionHD
Display	12.1" LCD	8.4" LCD	N/A	N/A	12.1" LCD	12.1" LCD	N/A	N/A	N/A	N/A
Bandwidth	768k IP 384k ISDN	512k IP	Up to 2M IP 512k ISDN 512k V.35 (optional)	768k IP 384k ISDN	768k IP 384k ISDN	768k IP 384k ISDN	4M IP 2M ISDN 2M V.35	4M IP 2M ISDN 2M V.35	2M IP 512k ISDN 512k V.35 (optional)	2M IP 512k ISDN
Presentation	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Add See & Share	Receive XGA, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by-Side, POP, Add See & Share	Soft Presenter, Receive XGA, Add See & Share	Receive DuoVideo/H.239 dual stream, Add See & Share	Receive DuoVideo/H.239 dual stream, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by-Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by-Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by-Side, POP, Add See & Share	Soft Presenter, DVI (SXGA) In, DuoVideo/H.239 dual stream, Side-by-Side, POP, Add See & Share
Network	Ethernet, Wireless Ethernet 3xBRI	2 x Ethernet	Ethernet Wireless Ethernet 4xBRI USB 2 V.35 optional	Ethernet, Wireless Ethernet 3xBRI	Ethernet 3xBRI USB 1	Ethernet 3xBRI USB 1	Ethernet 6xBRI, V.35 PRI USB 2	Ethernet 6xBRI, V.35 PRI USB 2	Ethernet Wireless Ethernet 4xBRI USB 2 V.35 optional	Ethernet Wireless Ethernet 4xBRI USB 2

Expressway	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460	Yes, including H.460
MCU	N/A	N/A	4 video + 3 audio, Up to 2.3M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	N/A	N/A	N/A	Up to 6 video + 5 audio, Up to 6M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	Up to 6 video + 5 audio, Up to 6M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	4 video + 3 audio, Up to 2.3M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)	4 video + 3 audio, Up to 2.3M total Bandwidth, Transcoding & Rate-matching H.264, AES Dual Stream (any site)
H.264	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Security	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication	AES & DES encryption H.235 authentication 802.1x authentication
Privacy	Headset	Handset Headset	N/A	N/A	Handset	Handset	N/A	N/A	N/A	N/A
Stereo/CD Quality	CD Quality	N/A	Yes	CD Quality	CD Quality	CD Quality	Yes	Yes	Yes	Yes
Microphone	Built In	Built In	2 x Large XLR	1 x Large XLR	Built In	Built In	3 x Large XLR	3 x Large XLR	2 x Large XLR	2 x Large XLR
Audio Inputs	N/A	N/A	1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Aux Line Level	N/A	N/A	1 x RCA Line Level 1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Line Level 1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)	1 x RCA Aux Line Level (or VCR Stereo L) 1 x RCA VCR Line Level (or VCR Stereo R)

Video Inputs	Main Camera 1 x DVI-I (SXGA)	Main Camera	Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	1 x S Video 1 x Composite	Main Camera 1 x DVI-I (SXGA)	Main Camera 1 x DVI-I (SXGA)	Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	HD Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)	HD Main Camera 1 x S Video 2 x Composite 1 x DVI-I (SXGA)
Video Outputs	N/A	N/A	1 x S Video 1 x Composite 1 x DVI-I	1 x S Video 1 x Composite 1 x DVI-I	N/A	N/A	2 x S Video 2 x Composite 2 x DVI-I (XGA)	2 x S Video 2 x Composite 2 x DVI-I (XGA)	1 x S Video 2 x Composite 1 x DVI-I (XGA)	1 x S Video 2 x Composite 1 x DVI-I (XGA)
Integration Control	N/A	N/A	Yes	N/A	N/A	N/A	Yes	Yes	Yes	Yes
IPv6 Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



MXP Cameras

Dharmesh Nandoria

Type of Cameras For MXP



Wave II



720p30 Precision HD

- Wave II – Slandered Definition Camera
- Precision HD – High definition camera , Resolution : 720p , 30 fps (frames per second)
- With 3000 & 6000 integrator codec Third party camera can be used (Control works on visca protocol)

Camera Comparision

	Wave II	PHD 720p30
Resolution and Frame rate	PAL / NTSC	1280x720 30fps
Zoom	10x	7x
Outputs	THSI / S-video	THIS , HDMI
F value	F1.8	1.7
Wide view angle	77 degrees	70 degrees
Tilt range	61 deg	42 deg
Daisy chain Support	Yes	Yes



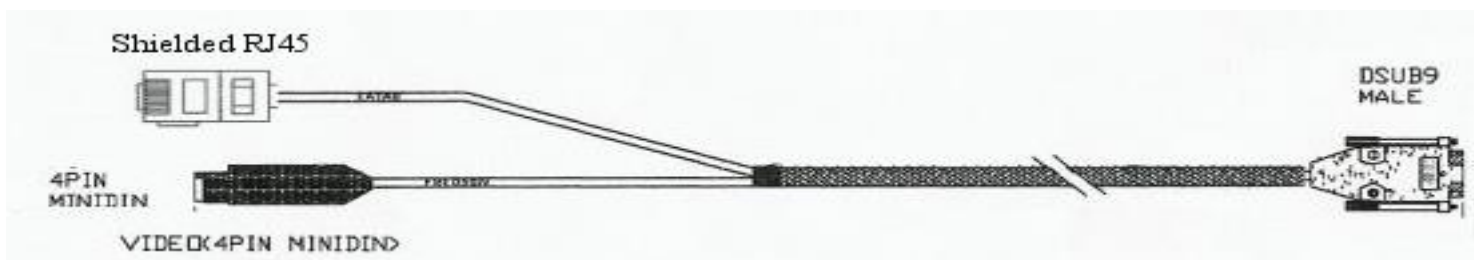
MXP Cameras Cables

Dharmesh Nandoria

3000MXP Wave Camera Cable



Split cable for 3000MXP (non-TANDBERG camera)



Camera cable for Wave Camera (control & video)

720PHD/1080PHD Camera Cable(THSI)



Camera cable (control & video)

- THSI : Tandberg High speed serial Interface cable
- Power and control codec to camera , Video from camera to codec.
- PHD camera is common for EDGE / 3000 / 6000 / Profile
- 3000 & EDGE xx use same camera cable (Marking 3000 on cable)
- 6000 use different camera cable (Marking 6000 on cable)



3000MXP Camera Cable Pin Out

TANDBERG 3000 WAVE II Camera cable pin-out			
SIGNAL NAME	RJ-45	S-VIDEO	DSUB
+12V DC	8	—	4
GND	7	—	5
+12V DC	3	—	4
TXD	4	—	3
RXD	5	—	2
GND	6	—	5
GND	2	—	5
+12V DC	1	—	4
Y-GND	—	1	8
C_GND	—	2	1
Y	—	3	9
C	—	4	6
NC	—	—	7

TANDBERG HD 3000 Camera cable pin-out			
SIGNAL NAME	RJ-45		DSUB
+12V DC	1	Twisted pair	4
GND	2		1
Rx	3	Twisted pair	2
TX	4		6
LVDS+	5	Twisted pair	9
LVDS-	6		3
GND	7	Twisted pair	5
+12V DC	8		4

Cable is Category 7.5/ Class F AWG24.
Extreme care should be taken if you choose to make your own version of this cable!

Non-TANDBERG Camera cable pin-out			
SIGNAL NAME	DSUB Camera	S-VIDEO	DSUB Codec
+12V DC	1	—	4
GND	2	—	5
+12V DC	3	—	4
TXD	4	—	3
RXD	5	—	2
GND	6	—	5
GND	7	—	5
+12V DC	8	—	4
Y-GND	—	1	8
C_GND	—	2	1
Y	—	3	9
C	—	4	6
NC	—	—	7

6000MXP Camera Cable Pin Out

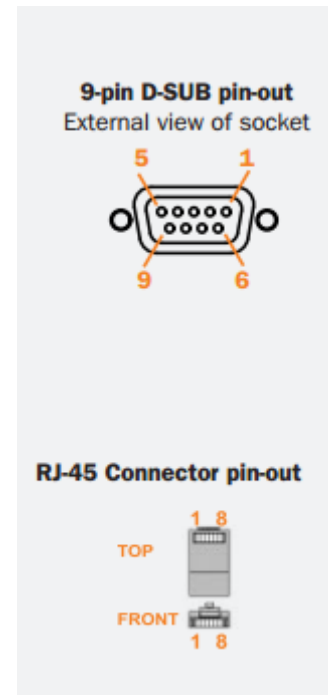
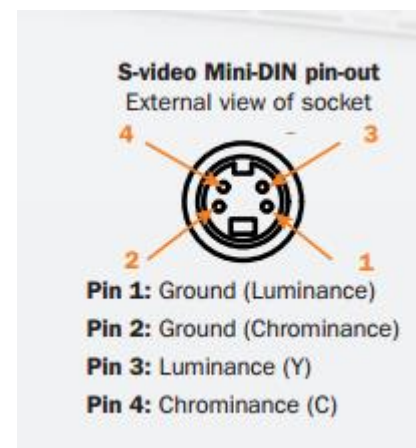
TANDBERG WAVE II Camera cable pin-out

SIGNAL NAME	RJ-45	DSUB
+12V DC	8	4
GND	7	5
+12V DC	3	4
TXD	4	3
RXD	5	2
GND	6	5
GND	2	5
+12V DC	1	4

TANDBERG HD 6000 Camera cable pin-out

SIGNAL NAME	RJ-45		DSUB
+12V DC	1	Twisted pair	4
GND	2		5
Rx	3	Twisted pair	2
TX	6		3
LVDS+	4	Twisted pair	1
LVDS-	5		6
GND	7	Twisted pair	5
+12V DC	8		4

Cable is Category 7.5/ Class F AWG24.
Extreme care should be taken if you choose
to make your own version of this cable!



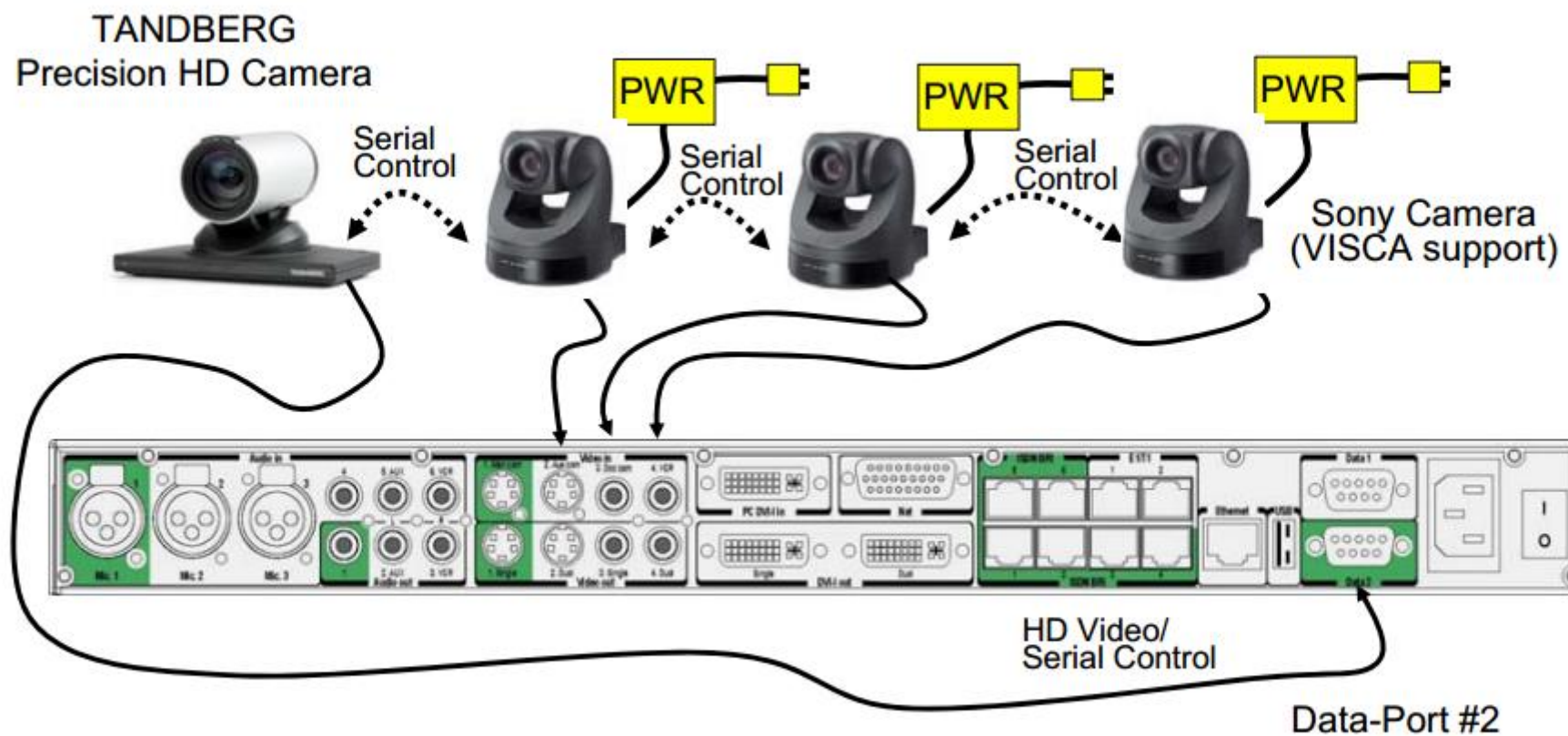
Daisy chain Cameras / Tandberg Video Switch

Dharmesh Nandoria

Daisy chain

- Daisy chain technique is used to connect multiple camera with codec .
- MXP can support 1 PHD 720p and 3 of SD camera
- SD camera can be WAVE II or Third party camera (which support Visca)
- Camera use visca protocol for signaling.
- Video from camera to codec from separate analog video cable (Composite or S video)

Daisy chain connection



Wave Camera Daisy Chain Cable

RS232 DATA AND POWER:

6-pin modular plug (RJ)	Signal Name	8-pin modular plug (RJ)	Cable	
1	GND	6	WHITE/BLUE	4-PAIR UTP CAT5 DULL BLACK WO/PRINTING
2	PRESENCE	8	BLUE	
3	TXD	5	WHITE/GREEN	
4	RXD	4	GREEN	

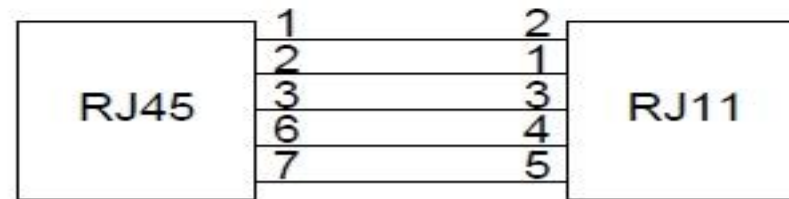
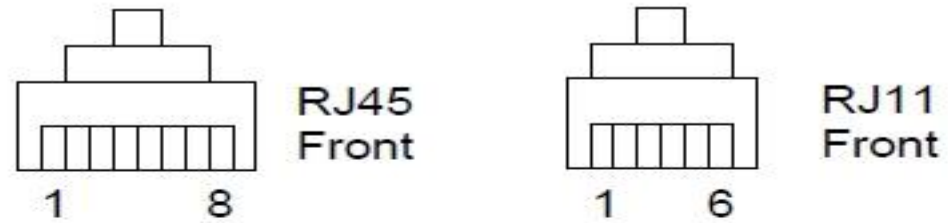
4 & 3 – twisted

2 & 1 – twisted

PHD-PHD Daisy Chain Cable



PHD-PHD Daisy Chain Cable

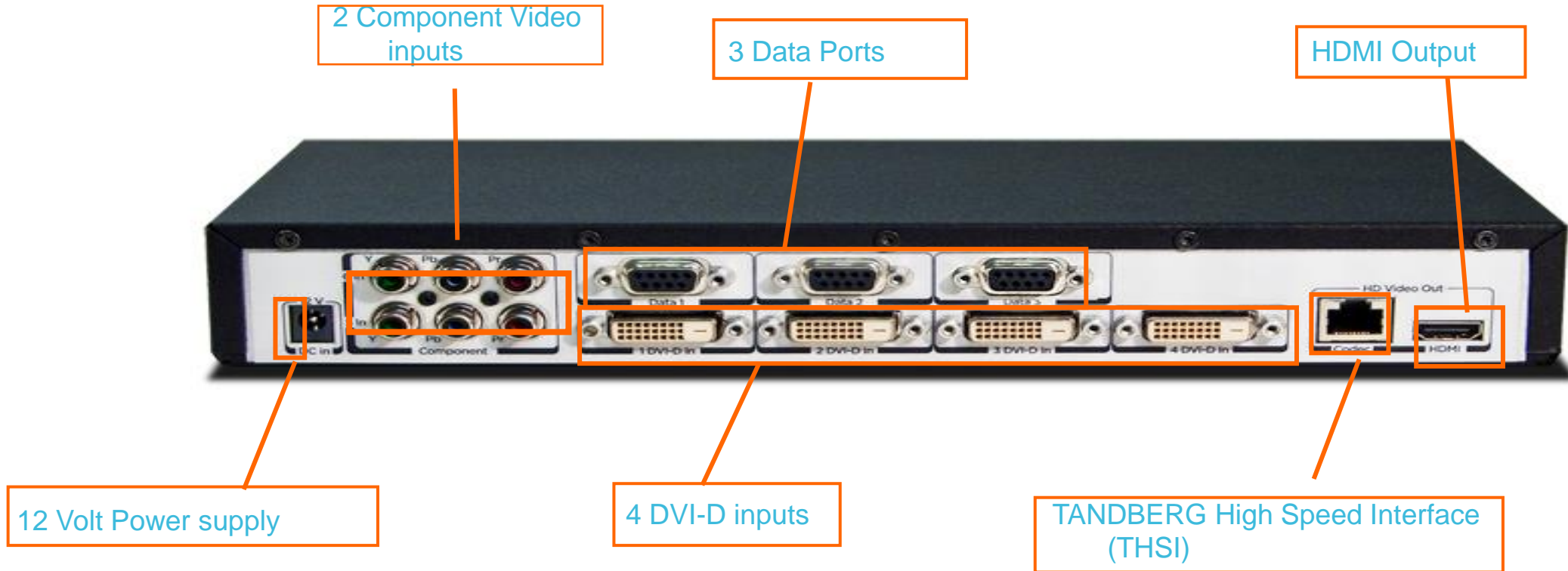


Tandberg Video Switch (TVS)

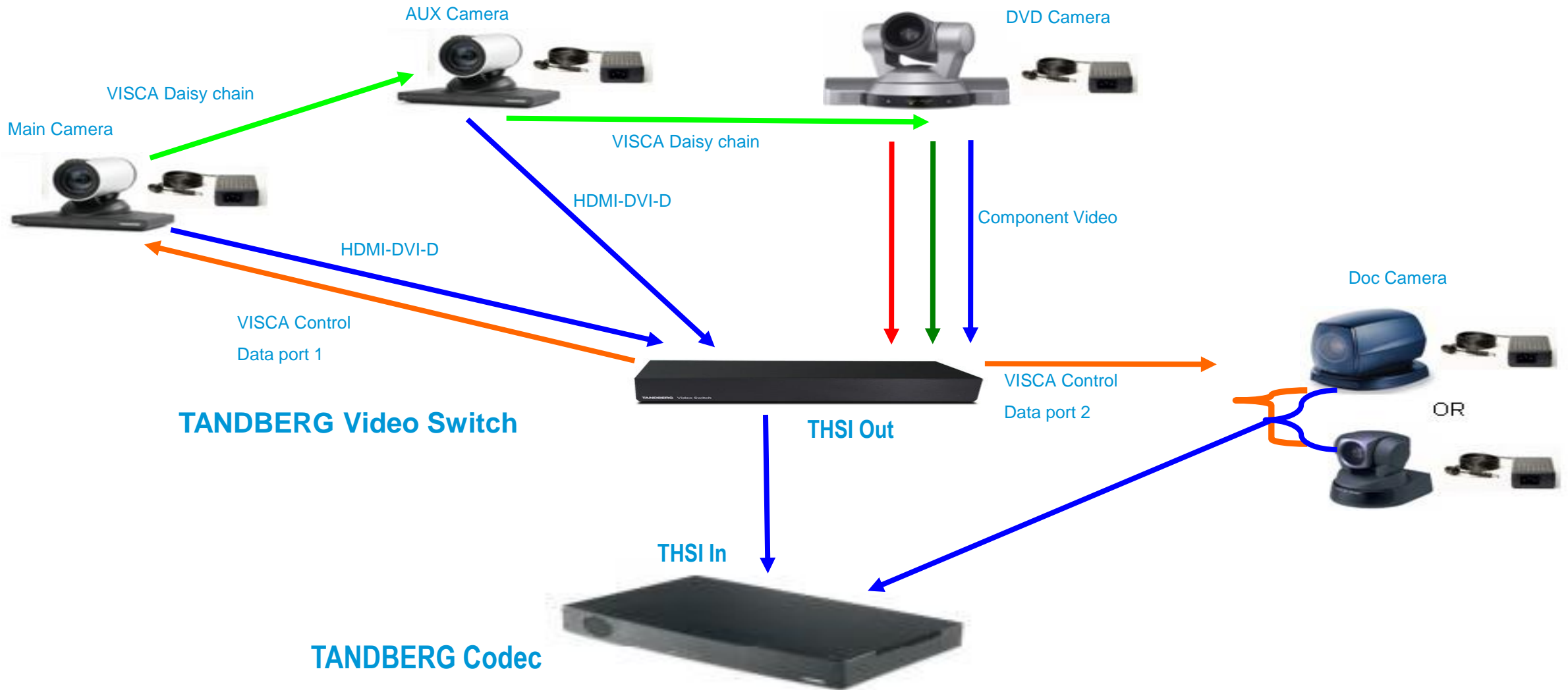
- The TANDBERG Video Switch is a rack-mountable hardware option for 6000 MXP and 3000 MXP codec's
- Supports 6 HD camera inputs, 4 PHD cameras and 2 third parity HD camera, like the Sony EVI-HD1



Video Switch Interface



Example 4: 2 PHD, 1 3rd Party HD & 1 SD cameras





Software details

Dharmesh Nandoria

Software Detail

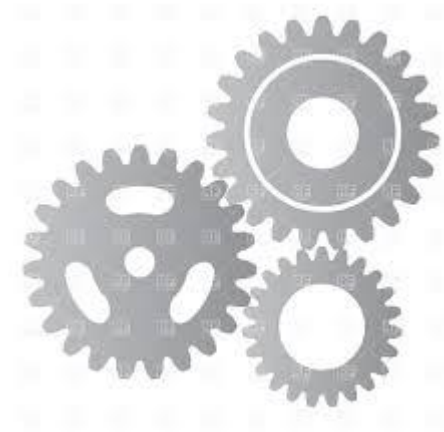
- **All MXP use same software – F series (Except 150 MXP)**
- s5000xFx.x.x pkg
- Software Name - AES encryption **s50000f9_3.pkg**
- Software Name – No AES encryption **s50001f9_3.pkg**
- **Latest software F 9.3.1**
- **MXP 150 MXP software - L series**
- Software Name - AES encryption **s51000l6_1.pkg**
- Software Name – No AES encryption **S51001l6_1.pkg**
- **Latest software L 6.1**

Download software link

- No log in required
- <ftp://ftp.tandberg.com/pub/software/endpoints/mxp/>
- All software F1 to F9 and release note available .

Name	Size	Last Modified
TANDBERG MXP Endpoints Software Release Notes (F1).pdf	1346 KB	1/13/2005 12:00:00 AM
TANDBERG MXP Endpoints Software Release Notes (F2).pdf	1098 KB	4/2/2005 12:00:00 AM
TANDBERG MXP Endpoints Software Release Notes (F3).pdf	1433 KB	9/6/2006 12:00:00 AM
TANDBERG MXP Endpoints Software Release Notes (F4).pdf	908 KB	7/5/2006 12:00:00 AM
TANDBERG MXP Endpoints Software Release Notes (F5).pdf	844 KB	6/4/2007 12:00:00 AM
TANDBERG MXP Endpoints Software Release Notes (F6).pdf	824 KB	12/21/2004 12:00:00 AM
TANDBERG MXP Endpoints Software Release Notes (F7).pdf	627 KB	9/3/2009 12:00:00 AM
TANDBERG MXP Endpoints Software Release Notes (F8).pdf	957 KB	11/2/2010 12:00:00 AM
TANDBERG MXP Endpoints Software Release Notes (F9).pdf	362 KB	6/13/2013 8:23:00 AM
F0	1/27/2005	12:00:00 AM
F1	1/27/2005	12:00:00 AM
F2	1/27/2005	12:00:00 AM
F3	1/27/2005	12:00:00 AM
F4	1/27/2005	12:00:00 AM
F5	1/27/2005	12:00:00 AM
F6	2/4/2005	12:00:00 AM
F7	2/6/2005	12:00:00 AM
F8	2/6/2005	12:00:00 AM
F9	2/13/2005	12:00:00 AM
F10	3/28/2005	12:00:00 AM
F11	4/29/2005	12:00:00 AM
F12	6/2/2005	12:00:00 AM
F13	7/21/2005	12:00:00 AM
F14	8/26/2005	12:00:00 AM
F15	12/14/2005	12:00:00 AM
F16	3/23/2006	12:00:00 AM
F17	5/9/2006	12:00:00 AM
F18	6/13/2006	12:00:00 AM
F19	1/30/2006	12:00:00 AM
F20	11/27/2012	12:00:00 AM
F21	7/9/2006	12:00:00 AM
F22	8/25/2006	12:00:00 AM
F23	10/17/2006	12:00:00 AM
F24	11/2/2007	12:00:00 AM
F25	6/4/2007	12:00:00 AM
F26	5/2/2007	12:00:00 AM
F27	6/14/2013	12:22:00 PM
F28	12/6/2007	12:00:00 AM

Troubleshooting



Endpoint configuration and status log

- **System Status**

xstatus

full system status log

xstatus // process

status log for specific process



```
122.208.146.196:23 - Tera Term VT
File Edit Setup Control Window Help
xsta
*s SystemUnit:
  ProductType: "TANDBERG Codec"
  ProductId: "TANDBERG CODEC 8000MXP"
  Uptime: 1505920
  Software:
    Version: "F9.0Beta7 PAL"
    Name: "s50000"
    ReleaseDate: "2010-07-02"
    CameraSoftwareID: "30038"
  Configuration:
    Telephony: 5
    VideoTelephony: 5
    TotalBandwidth: 6144
    ISDNBandwidth: 1920
    LANBandwidth: 4096
    PresenterOption: True
    MultisiteOption: True
    StreamingSupport: True
    Encryption: True
  Hardware:
    SerialNumber: "25A22773"
    MainBoard: "100670 rev. 07"
    AdditionalBoard: ""
    BootSoftware: "Rev. 1.16, 2009-01-21"
  Configuration:
    PRI: 1
    BRI: 6
```

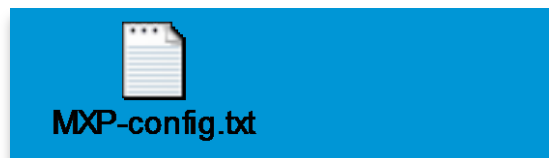
```
122.208.146.196:23 - Tera Term VT
File Edit Setup Control Window Help
xsta //h323
*s H323Gatekeeper (status=Registered):
  Alias: "0001"
  Address: "122.208.146.197"
  Port: 1719
  Alternates: /
*s/end
OK
xsta //conf
*s SystemUnit:
  Software:
    Configuration:
      Telephony: 5
      VideoTelephony: 5
      TotalBandwidth: 6144
      ISDNBandwidth: 1920
      LANBandwidth: 4096
      PresenterOption: True
      MultisiteOption: True
      StreamingSupport: True
      Encryption: True
  Hardware:
    Configuration:
      PRI: 1
      BRI: 6
      ExternalNetwork: 1
```

Endpoint configuration and status log

- System Configuration

xconfig full system configuration

xconfig //<process> configuration for specific process



```
122.208.146.196:23 - Tera Term VT
File Edit Setup Control Window Help
xconfig
*c xConfiguration SystemUnit Name: "T6000MXP"
*c xConfiguration SystemUnit InternationalName: ""
*c xConfiguration SystemUnit DisplayName: ""
*c xConfiguration OptionKey Features: "6048739635958818"
*c xConfiguration OptionKey Bandwidth: "3061256064527801"
*c xConfiguration SerialPort 1 BaudRate: 115200
*c xConfiguration SerialPort 1 Parity: None
*c xConfiguration SerialPort 1 DataBits: 8
*c xConfiguration SerialPort 1 StopBits: 1
*c xConfiguration SerialPort 1 Direct Buffer: 5120
*c xConfiguration SerialPort 1 Mode: Control
*c xConfiguration SerialPort 2 BaudRate: 9600
*c xConfiguration SerialPort 2 Parity: None
*c xConfiguration SerialPort 2 DataBits: 8
*c xConfiguration SerialPort 2 StopBits: 1
*c xConfiguration SerialPort 2 Direct Buffer: 5120
```

```
122.208.146.196:23 - Tera Term VT
File Edit Setup Control Window Help
xconfig //option
*c xConfiguration OptionKey Features: "6048739635958818"
*c xConfiguration OptionKey Bandwidth: "3061256064527801"
OK
xconfig /conf
*c xConfiguration Conference DefaultCall CallRate: 256
*c xConfiguration Conference DefaultCall Restrict: Off
*c xConfiguration Conference DefaultCall NetProfile: 1
*c xConfiguration Conference H323Alias E164: "0001"
*c xConfiguration Conference H323Alias ID: ""
*c xConfiguration Conference SIP URI: ""
*c xConfiguration Conference H263: On
*c xConfiguration Conference H264: On
*c xConfiguration Conference H264RCDO: On
*c xConfiguration Conference G722: On
*c xConfiguration Conference G722.1: On
*c xConfiguration Conference G728: On
```

Log from MXP Endpoint

- For H.323/SIP call log

Start capturing call log:

syslog 3

Stop capturing call log:

syslog 0 or syslog off



Step 1: Open the console/telnet/ssh session with codec

Step 2: Execute *xstatus* command

Step 3: Execute *xconfig* command

Step 4: Execute *syslog 3* command

Step 5: Make a call and keep running until you have recreated the problem

Step 6: Execute *xstatus call* command, if issue related to video/audio channel status etc.

Step 7: Hang up a call

Step 8: Execute *syslog off* command

Log from MXP Endpoint

- For ISDN call log

Start capturing call log: *syslog 3* and *isdntrace on*
Stop capturing call log: *syslog 0 or syslog off* and *isdntrace off*
Retrieve H.211 trace log: *dumph221*

Step 1: Open the console/telnet/ssh session with codec

Step 2: Execute *xstatus* command

Step 3: Execute *xconfig* command

Step 4: Execute *syslog 3* and *isdntrace on* commands

Step 5: Make a call and keep running until you have recreated the problem

Step 6: Execute *xstatus call* command, if issue related to video/audio channel status etc.

Step 7: Hang up a call

Step 8: Execute *syslog off* and *isdntrace off* commands

Step 9: Execute *dumph221* command, if issue related to call establish

Log from MXP Endpoint

- For System Restart

Retrieve event log: *eventlog*

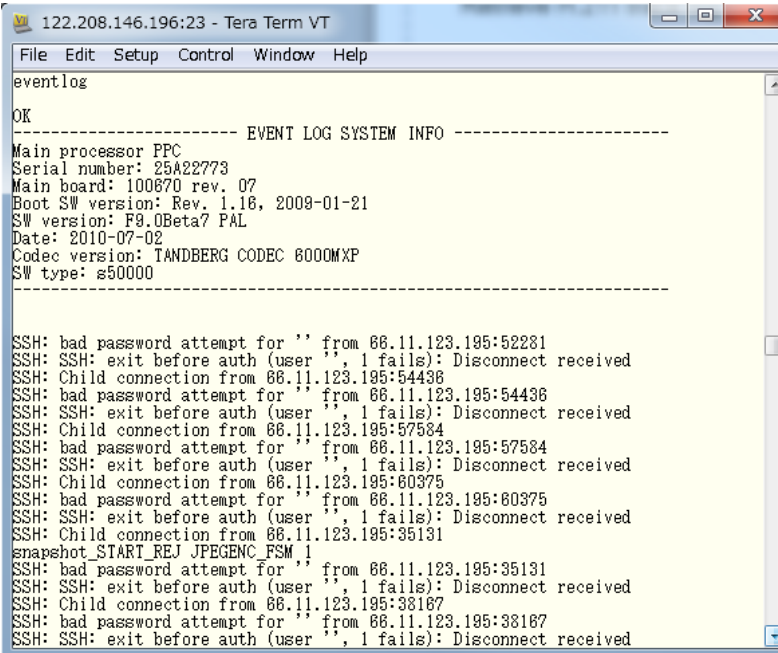
Step 1: Open the console/telnet/ssh session with codec

Step 2: Execute *eventlog* command

or

Step 1: Access to Codec by using FTP client or command

Step 2: Download event.log file under home directory



```
122.208.146.196:23 - Tera Term VT
File Edit Setup Control Window Help
eventlog
OK
----- EVENT LOG SYSTEM INFO -----
Main processor PPC
Serial number: 25A22773
Main board: 100670 rev. 07
Boot SW version: Rev. 1.16, 2009-01-21
SW version: F9.0Beta7 PAL
Date: 2010-07-02
Codec version: TANDBERG CODEC 6000MXP
SW type: s50000
-----
SSH: bad password attempt for '' from 66.11.123.195:52281
SSH: SSH: exit before auth (user '', 1 fails): Disconnect received
SSH: Child connection from 66.11.123.195:54436
SSH: bad password attempt for '' from 66.11.123.195:54436
SSH: SSH: exit before auth (user '', 1 fails): Disconnect received
SSH: Child connection from 66.11.123.195:57534
SSH: bad password attempt for '' from 66.11.123.195:57534
SSH: SSH: exit before auth (user '', 1 fails): Disconnect received
SSH: Child connection from 66.11.123.195:60375
SSH: bad password attempt for '' from 66.11.123.195:60375
SSH: SSH: exit before auth (user '', 1 fails): Disconnect received
SSH: Child connection from 66.11.123.195:35131
snapshot_START_REJ JPEGENC_FSM 1
SSH: bad password attempt for '' from 66.11.123.195:35131
SSH: SSH: exit before auth (user '', 1 fails): Disconnect received
SSH: Child connection from 66.11.123.195:38187
SSH: bad password attempt for '' from 66.11.123.195:38187
SSH: SSH: exit before auth (user '', 1 fails): Disconnect received
```

Factory reset MXP / selectsw process.

- Open the console/telnet/ssh session with codec
- Take backup of system configuration and option keys
- xCommandDefaultValuesSet Level:3
- Factory reset will delete all config , local phonebook and option keys .

Select Software procedure

- Restart codec and break the boot sequence
- **Ctrl + Break**(for hyper terminal), or **Alt + B** (for TeraTerm/Putty)
- “\$” prompt will feedback
- **selectsw**
- Wait for “Active application: x” message
- If x = 1, then **selectsw 2**
- If x = 2, then **selectsw 1**
- **q**
- Codec will automatically restart with previous sw version of Codec had
- t booting or in continuous reboot mode , select sw procedure is used .

```
COM8:9600baud - Tera Term VT
File Edit Setup Control Window Help

boot
OK
Boot requested, restarting
Break ?
Loading (#2) ... Break requested by user, entering boot menu.
BOARD: 101070, rev. 7, objectlevel 7
SU: S01614, rev. 1.15, 2008-01-04
SNO: 33A49689
RAM: 64MB
FLASH: 64MB
MAC_0: 00:50:60:02:CE:9E
CPU: Core version 0x8002, Core revision 0x2014
Partnum 0xa, Masknum 0x10, Microcode 0x71
$
```

DNAM troubleshooting

- Check Cable connection between codec and DNAM – RCA cable
- Power cycle complete system using mains power
- if the problem persists, check the DNAM fuse. Make sure not to damage the fuse holder when removing the fuse for inspection. push the fuse holder slightly inwards and turn counterclockwise for release. On some systems this can be done with fingers only, on others a flat screwdriver is required.
- If the fuse is blown it should be replaced with a Littelfuse 215002, which is a 2A 250V time-delay high-breaking capacity fuse.

DNAM – 6000 profile

6000 MXP

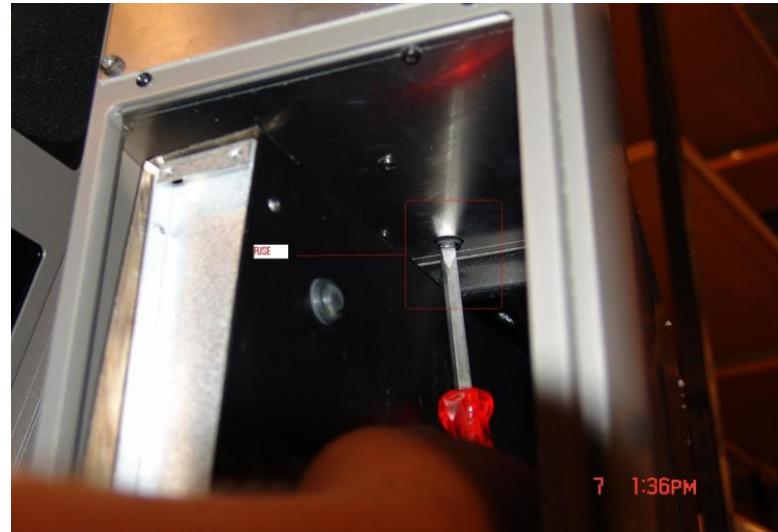
CTS-P52 MXP-K9



DNAM - Mastro

Tandberg Mastro

CTS-MSTR-HD-N-K9=



Information on service request

- **Describe in detail about problem/issue**
- **Describe how often the problem occurs**
- **Describe the latest operation before problem occurs, if any**
- **Describe in detail, procedure to recreate the problem, if any**
- **Describe in detail, which steps have been taken in investigating the problem**

- **Describe the software version of system (from all sites involved)**
- **Logs from system including configuration and system status**

Lab

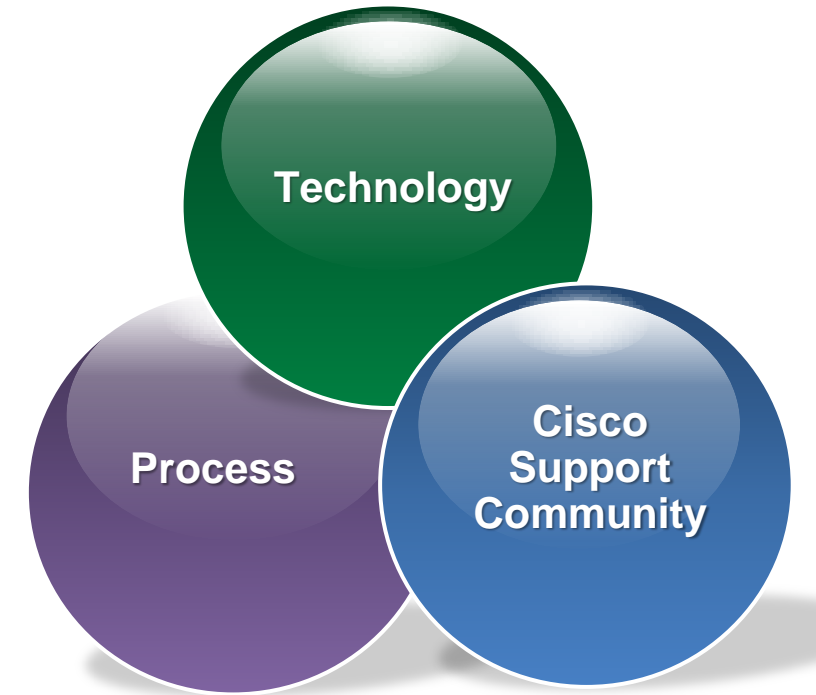


Upcoming Sessions.....

April “Month of Telepresence Technology”

May “Month of Wireless Technology”

And many more.....Months and Technologies



Thank you.

