

NCast Product Specification

Presentation Recorder Reference Manual

Revision 1.1

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PR-720 Software Release 6.1.7



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Regulatory Compliance Information

Equipment Label

The Presentation Recorder meets all applicable FCC, CE and ICAN radiation and emission standards:

 <p>44366 S. Grimmer Blvd. Fremont, CA 94538 (510) 490-4307 (510) 490-3441 Fax</p>	<p>Report 3054-1 Electromagnetic Compatibility Test Report 47 CFR Part 2 Subpart J Paragraph 2.906</p> <p>Report 3054-2 Electromagnetic Compatibility Test Report ECD 2004/108/EC, LVD 2006/95/EC</p>
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- (1) Connections between peripherals of this equipment may be made with low voltage non-shielded computer data cables.
- (2) Network connections may consist of non-shielded CAT 5 cable.

Warnings

- (1) A non-shielded power cord may be used to connect AC power to every component and peripheral of the system.

FCC NOTICE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC NOTICE – INFORMATION FOR THE USER

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- (1) Reorient or relocate the receiving antenna.
- (2) Increase the separation between the equipment and receiver.
- (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- (4) Consult the dealer or an experienced radio/TV technician for help.

The user may find the following publication prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems"

Stock Number 004-000-00345-4, available exclusively from the Superintendent of Documents, Government Printing Office, Washington, DC 20402 (telephone +1-202-512-1800).

FCC WARNING

Changes or modification not expressly approved by the party responsible for compliance to Part 15 of the FCC Rules could void the user's authority to operate the equipment.

CE NOTICE – INFORMATION FOR THE USER

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to EN 55022 Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the expense of the user.

The user may find the following publication prepared by the Federal Communication Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems"

Stock Number 004-000-00345-4, available exclusively from the Superintendent of Documents, Government Printing Office, Washington, DC 20402 (telephone +1-202-512-1800).

WARNING

Changes or modifications not expressly approved by the party responsible for compliance to EN 55022 Rules could void the user's authority to operate the equipment.

ICAN Class A Digital Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

1. Introduction

1.1. PURPOSE

The *NCast Presentation Recorder Reference Manual* is intended for the Audio/Video or Network engineer who will be tasked with the job of installing and setting up a Presentation Recorder or a system of multiple Presentation Recorders. This guide is designed to cover topics in depth and to assist in optimizing the performance of a Presentation Recorder.

1.2. DOCUMENT OVERVIEW

This document is divided into two major sections: the theory of operation and a discussion of parameter settings.

1.3. TERMS AND DEFINITIONS

A complete discussion of MPEG compression, Internet streaming, webcasting protocols and related topics is beyond the scope of this document. Other sources cover this material in great detail. The following are brief definitions of some of the terms used throughout this manual.

AAC – Advanced Audio Coding, a wideband audio encoding and compression algorithm.

Auto-detect – A capability to automatically sense if an input signal (graphics or video) is present and to lock onto that signal without further manual intervention.

CIF - Describes an image or display surface with a resolution of 352x288 pixels.

DVI – Digital Visual Interface, a digital interface standard which provides for connection to LCD panels and displays.

H.264 – A compression format that delivers very high quality video at low bit rates. MPEG-4 Part 10 utilizes the H.264 codec for transmission.

IETF – Internet Engineering Task Force, the standards body for Internet protocols.

ISO – International Standards Organization

Latency – The end-to-end time delay between a change in the source image and the corresponding change in the remotely displayed image.

Line-Level – Sound level signals typically in the range of –10 dBu to +30 dBu.

Lip-sync – The synchronization of independent audio and video streams at a receiving decoder so that the presentation is in the same time relationship as the source.

Mic-Level – Sound level signals typically in the range of –70 dBu to –30 dBu.

MPEG Compression – MPEG is an acronym for Motion Picture Experts Group, an industry-wide committee which has defined a series of standards for the compression of audio and video source material.

MTU – The maximum transmission unit is the maximum number of bytes permitted in a transmitted packet.

Multicast – A family of computer transmission protocols where multiple receivers access a single transmitted packet stream.

NCCP – NCast Conference Control Protocol provides coordination, control and identification of participants in a multi-way collaborative conference session.

N-Way – An NCast proprietary service for multicast bridging and webcasting.

PIP – A picture-in-picture function overlays one video or graphics image with a reduced-sized version of another video image.

RFC – Request for Comments, an Internet protocol standard.

RTSP – Real-Time Streaming Protocol is an IETF approved protocol for control of real-time streaming on the Internet.

S-Video – A video connector (usually DIN style) where luminance and chroma information are transmitted on separate wires or cable pairs. Provides for a higher fidelity image than a composite connection.

SDP – Session Description Protocol, for describing streaming media transmissions

SIF - Describes an image or display surface with a resolution of 320x240 pixels.

SVGA – Describes an image or display surface with a resolution of 800x600 pixels.

SXGA – Describes an image or display surface with a resolution of 1280x1024 pixels. The aspect ratio for SXGA is 5:4. Support for a 4:3 aspect ratio is accomplished by utilizing a 1280x960 subset of the display surface.

Telnet – An IP network based protocol, which was originally used to connect remote consoles and terminals to mainframes, but is now used as a general, bi-directional, [byte oriented](#) communications facility. See RFC's 854 and 855.

Unicast – Refers to a point-to-point connection between two Internet host machines.

UXGA – Describes an image or display surface with a resolution of 1600x1200 pixels.

VGA – Describes an image or display surface with a resolution of 640x480 pixels.

WUXGA - Describes an image or display surface with a resolution of 1920x1200 pixels.

WXGA – Describes an image or display surface with a resolution of 1366x768 pixels. Some projectors use WXGA to refer to 1280x720 as well. This display size implements a 16:9 aspect ratio, as compared to a normal 4:3 monitor.

XGA – Describes an image or display surface with a resolution of 1024x768 pixels.

1.4. PRESENTATION RECORDERS

The Presentation Recorder is a stand-alone network communications appliance which captures RGB (VGA) or DVI signals from a desktop or laptop, compresses the image with an industry standard compression algorithm, packetizes and transmits the imagery as an internet media stream, receives a media stream from the internet, decompresses the imagery, and presents the received information to a viewing audience through use of a large-screen monitor or via a room projector. Presentation Recorders are able to archive the media stream in real-time while simultaneously webcasting, allowing for playback by the recipient at a later date.

The following Presentation Recorder models are covered by this documentation:

PR-720-R – A rack-mounted unit with streaming and archiving capabilities. The PR-720-R introduces support for up to WUXGA (1920x1200) input resolutions with up to WXGA (1280x720) capture resolutions and PiP (Picture In Picture) video and graphics overlay.



NCast Presentation Recorder Reference Manual

PR-720-D – A rack-mounted unit with streaming and archiving capabilities. The PR-720-D introduces support for up to WUXGA (1920x1200) input resolutions with up to WXGA (1280x720) capture resolutions and PiP (Picture In Picture) video and graphics overlay. This unit has two independent and identical encoders in a single 1U rack-mount chassis (each encoder and its power supply occupy 1/2 rack).



The dual-encoding capabilities of this model enables many different applications, for example:

- Two independent 720p encoders – With identical inputs, one encoder may be setup to stream and record a high-bandwidth, high-resolution stream and the second encoder provides for a reduced resolution, reduced bandwidth stream.
- Dual wide-screen delivery – One encoder transmits a 720p hi-def camera stream, and the second transmits a wide-screen presentation. Telepresence at a budget price!
- Synchronized Encoders – Two 1280x720 wide-screens side by side, giving a 2560x720 panorama, or a 3D left-right image.
- Two-way Interactive – One encoder is configured for streaming send, and the second is setup for streaming receive.
- Fail-Safe System – Each encoder independently transmitting the same material. Should one fail, the receivers can switch to the other.

PR-720-P - A flange-mounted unit with streaming and archiving capabilities. This is a very small form-factor chassis suitable for mounting on the walls of a podium, on top of or underneath a podium shelf, in a mobile cart, or on a wall in an equipment room.



PR-720-M - A desktop unit with streaming and archiving capabilities. This is a very small form-factor case suitable for desktop or mobile cart applications.

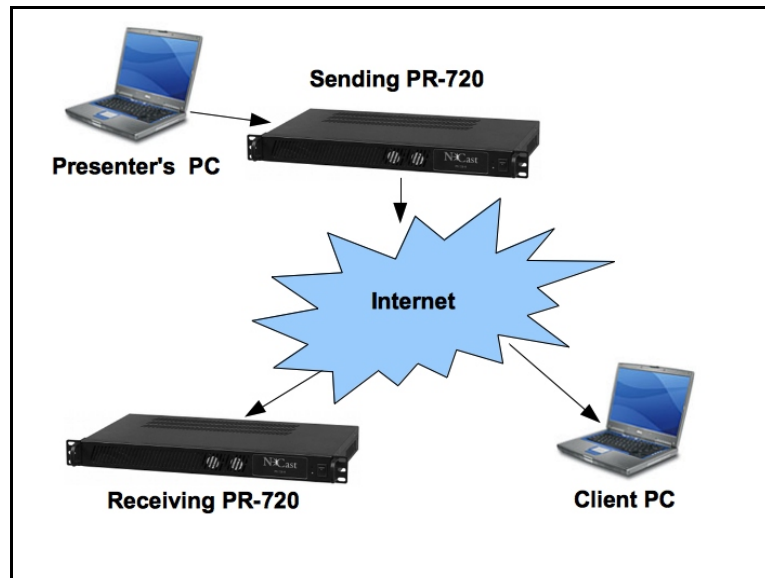


All PR-720 Series units share a core operating system and base set of features. The mainboard and connector set is identical for all units.

1.5. PRESENTATION RECORDER MODES OF OPERATION

The Presentation Recorders have four major modes of operation:

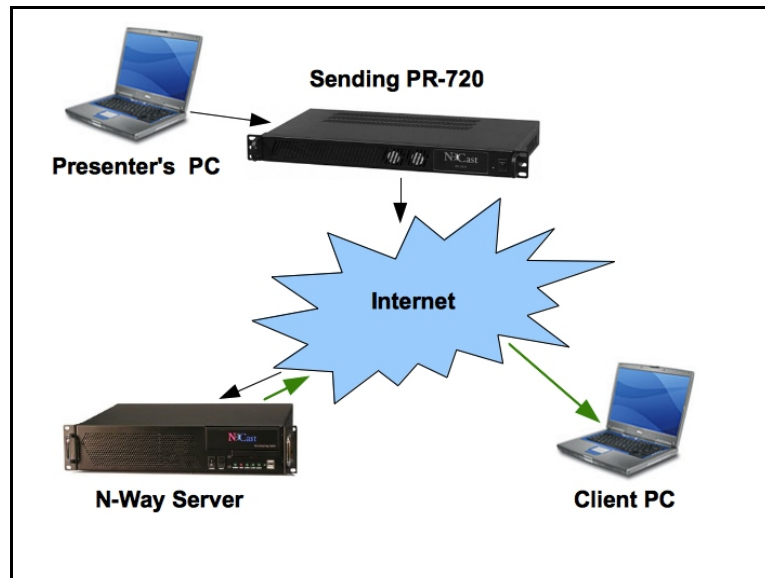
Streaming Send – In this mode of operation one of the Presentation Recorders is designated as the “Sender” and all of the other units are designated as “Receivers”. The media streams originate from the Sender and are decoded by one or more Receivers or desktop client media players. The transmission is strictly one-way, and no feedback or interactivity is provided for. The one-to-many operation is enabled via use of multicast connected networks. The unit is able to stream and record simultaneously.



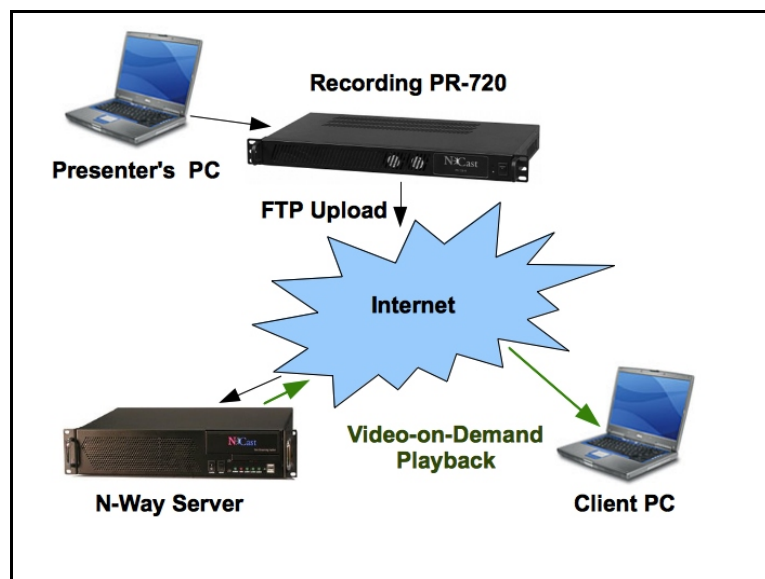
Streaming Receive – In this mode of operation the Presentation Recorder is configured to receive a stream from another unit acting as a sender. See diagram above.

NCast Presentation Recorder Reference Manual

Automatic Unicast – In this mode of operation the Presentation Recorder sends a unicast stream to a streaming server which then reflects the stream to one or more client PCs for live streaming playback. The unit is able to stream and record simultaneously.



Record Only – The Presentation Recorder only records the file to storage. Once the Session has ended the file may be automatically uploaded to a video-on-demand server for later playback by client PCs.



1.6. STARTUP

1.6.1. Really, Really Quick Start

Here's a really short description on how to get started:

1. Plug the unit into a network with DHCP, plug in a component display to the VGA Out (you'll need a VGA-->RGB breakout cable), plug your laptop into the VGA In, a camera into a video connector (if you have one) and turn on the power.
2. When you see the bootup screen with the IP network address, log into the unit at *http://ipaddress* using "admin" as the user and "ncast" as the password.
3. On the Sources page select your input feeds from the top two rows of buttons and then on the Channels page click the Channel Start button "1" on the left.
4. Go to the View page, click on "Launch Quicktime Player in window Multicast" and you're done!

1.6.2. Mini Start

This is a short introduction on how to get started with a Presentation Recorder:

1. Plug the unit into a network, plug in a component display to the VGA Out (you'll need a VGA-->RGB breakout cable), plug your laptop into the VGA In, a camera into a video connector (if you have one) and turn on the power. If you aren't using DHCP and need to enter static IP addresses, edit a "ntwkconf.txt" file onto a USB stick and plug it into a USB port. See the Network Settings section for details on this file.
2. When you see the bootup screen with the IP network address, log into the unit at *http://ipaddress* using "admin" as the user and "ncast" as the password.
3. Go to the Configuration/Unit Options page and fill in all the information required.
4. On the Sources page select your input feeds from the top two rows of buttons. Select your Audio Input source. Also select the Main and PIP Window settings. Turn the audio meter on. You should see your captured graphics and video on the local display screen. Check your audio levels on the meter.
5. On the Channels page modify a Channel for the transmission rates and multicast or unicast addresses you wish to use. Use the Layout tab to specify the resolution and window placement desired. Review the Recording options. Update the Channel information. Click the Channel Start button on the left for the Channel you have modified.
6. You will see a Session Start page come up with details about your ongoing transmission. If you wish to start recording the Session, press the Record button.
7. Go to the View page. This page allows you to connect different media desktop players using multicast protocol. If you have Quicktime installed on your PC, click on "Launch Quicktime Player in window Multicast". If your network is not multicast enabled you must be on the same LAN segment as the encoder. Your client player should launch and you should see your captured graphics and video. For other client players, try clicking on the "SDP" link. You're done!

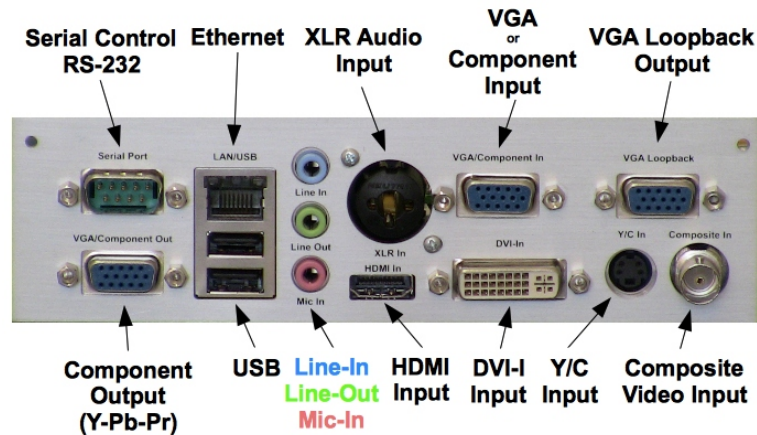
1.6.3. Long Start

Read this whole manual from cover to cover (RTFM). There are hundreds of different configuration options for a Presentation Recorder, allowing the setup and composition of many different formats, resolutions, PIP options, layouts, bit-rates, frame-rates, start and stop and scheduling options and the like. You can automatically upload your archives to a video server. You can tag your archives automatically with course numbers and notes. You can add your own customized graphic overlays to the captured graphics and video. Transmission can be automated so that all that is required is to press the power-on button.

Please feel free to contact NCast Corporation if you have any questions about the use or configuration of the Presentation Recorder.

1.7. CONNECTIONS

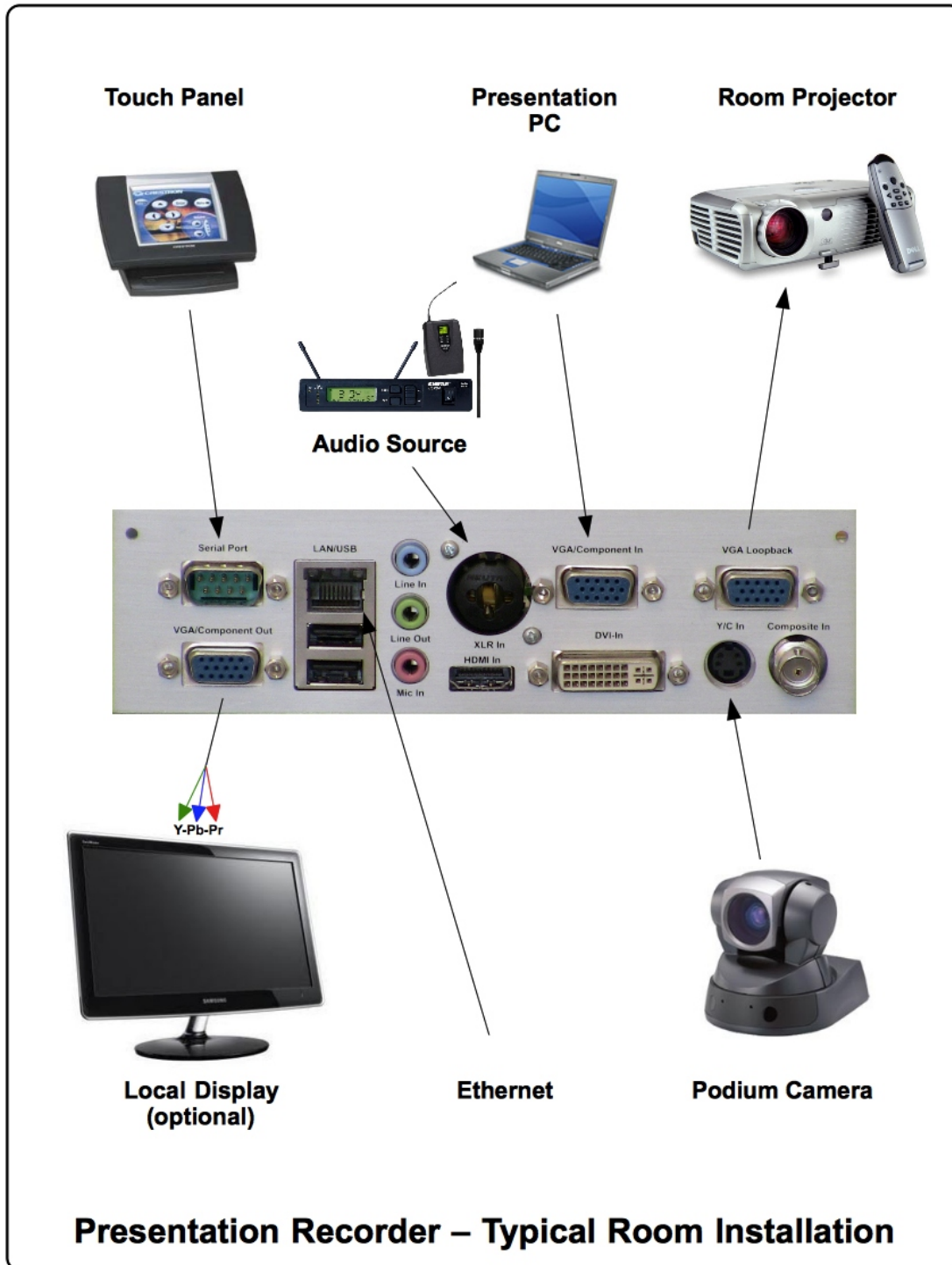
The following diagram describes the back-panel connectors available:



- Serial Control – Wired control from a touch panel, such as Crestron or AMX
- Ethernet – Connection to the Internet
- XLR Audio – Balanced XLR input connector and additionally a balanced 0.25" connector
- VGA or Component – Input from the presenter's PC or a component hi-def camera
- VGA Loopback – VGA output, usually to the room projector
- Component Out – Y-Pb-Pr output to the local display, VGA → Y-Pb-Pr breakout cable required
- USB – For specifying a static IP connection with a USB drive
- Line-In, Line-Out, Mic-In - Unbalanced 3.5 mm. audio connections
- HDMI – Video input from cameras, audio not supported
- DVI-I – Digital or Analog DVI input
- Y/C – S-Video NTSC or PAL input
- Composite – NTSC or PAL input

1.8. INSTALLATION

The diagram below shows a typical room installation:



2. Theory of Operation

2.1. PRESENTATION RECORDER COMPONENT BLOCK DIAGRAM

The Presentation Recorder consists of these main hardware functions:

Capture Hardware – A custom designed, high-performance module is used to grab and digitize the RGB or video signals created by the presenter or media source. This module accepts VGA, Y-Pr-Pb, DVI-I, HDMI, PAL/NTSC composite or PAL/NTSC S-Video connections and converts those signals to YUV digital format. Two of these inputs may be active simultaneously for generation of a picture-in-picture (PIP) display.

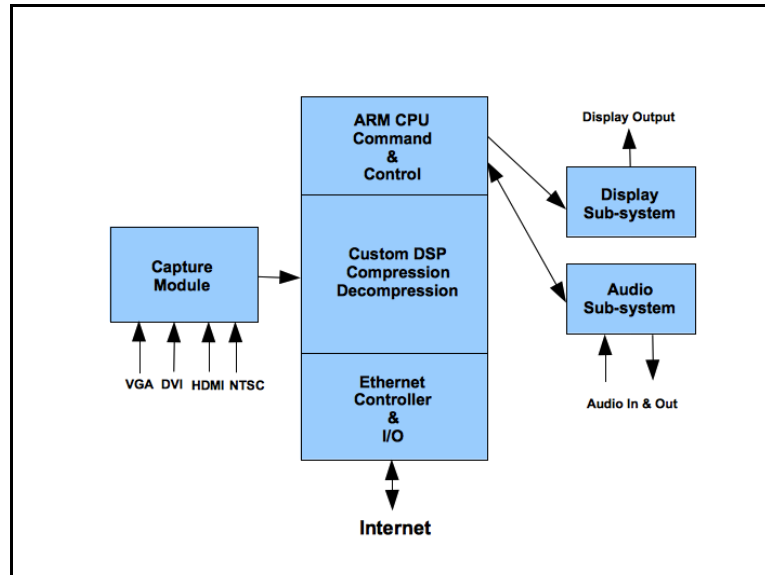
Central CPU – A general-purpose ARM processor is used to compress and decompress audio streams, to encapsulate and decapsulate outgoing and incoming packets streams, to enable the web interface, serial interface and telnet interface, and to prepare data for display on the attached monitor. A highly secure open-source operating system underlies and supports all of this functionality.

DSP – A custom DSP is used to compress and decompress YUV video and graphics images to H.264 streams.

Display Output Sub-system – Media streams, which are received and decoded, are presented on the attached display for viewing. Currently, only component output (Y-Pb-Pr) is supported.

Audio Sub-system – A sound system with stereo input-output capabilities and with support for microphone and line-level inputs and line-level outputs is used to create the AAC audio streams transmitted in conjunction with the associated graphics or video imagery. Balanced XLR inputs are also supported

Ethernet Interface – Industry-standard ethernet connectors are used to connect the Presentation Recorder with the Internet network used for communications.



2.2. CAPTURE MODULE FUNCTION

The capture module selects one of the available six inputs (VGA, DVI-D, DVI-A, HDMI, Composite, S-Video) and locks onto the signal. The signal is converted into the appropriate digital formats, and each pixel in the image is stored in a local memory buffer on the module. Any required sizing and re-scaling is done in the module. At an appropriate time the pixels in module are transferred to the DSP where they are processed and compressed.

If PIP mode is enabled, two signals may be selected (exceptions: Composite and S-video share one video decoding chip and are the same signal, VGA and DVI-A share one input chip and are the same signal).

2.3. COMPRESSION

The digitized RGB signals are converted in format from an {R,G,B} representation to {Y,U,V}. Industry-standard compression algorithms implemented in the DSP are then used to reduce the source data to a more manageable size, and to generate sequences of I-P-B frames found in MPEG-4 media streams.

2.4. TRANSMISSION

The MPEG media stream is split into segments, which are then encapsulated into RTP packets according to the protocol standards set forth in IETF RFC 3016 or RFC 3984 (H.264). These packets are presented to the Ethernet hardware interface for subsequent transmission on the attached IP network.

2.5. DECOMPRESSION

The received packet stream is decompressed and the resulting image is placed into a video frame buffer. At that instant it will become visible to the receiving viewers.

2.6. DISPLAY FUNCTION

The display will output imagery from two different sources. If the unit is configured as the sending unit, a local copy of the captured image (prior to compression, but after capture and conversion to digital format) will be displayed. If the unit is a receiving unit, the displayed image will be from the remote sender.

2.7. AUDIO SUBSYSTEM

Each Presentation Recorder supports an audio subsystem consisting of an high-quality codec and associated input/output connectors. The unit has microphone and line-level input signals, and a line-level output signal. Each line-level connector supports stereo signals. An XLR connector provides for mono balanced audio input. Audio input via the HDMI connector is not currently supported.

2.8. ARCHIVE FLASH DISK

A flash memory card in the Presentation Recorder is available for recording transmitted sessions. The file format is standard MPEG-4 Part 10 (H.264, .mp4), which can be played on a variety of desktop client players, or these same files can be installed on a video-streaming server for on-demand playback over the Internet. All unit come with 32 GB of storage standard, and an additional 32 GB of storage may be purchased as an option.

3. Configuration Settings and Parameters Reference

3.1. UNIT OPTIONS SETTINGS

The Unit Options page gives the Presentation Recorder its unique ID and provides a place to enter system-wide settings. The ID and contact information are transmitted over the Internet to identify this Presentation Recorder as a member of an ongoing conference session.

NCast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

View | Viewers | Session | Channels | Archives | Sources | Configuration

Unit | Passwords | Web | Display | Custom | Network | Telnet | Scheduler | Notifications | Logs | Update

UNIT OPTIONS

Unit ID:	Presentation Recorder	Shutdown	Reboot
Contact name:	Administrator	Date & Time	Factory Defaults ¹
Contact e-mail:	info@ncast.com	Export Settings	Import Settings ¹
Contact phone:	408-541-9230		
Contact location:	Sunnyvale CA		
Contact web page:	http://www.ncast.com		
	Update		

¹ Stops current session and reconfigures system.

Serial number:	PR720R-382410-000004
Architecture:	dm368
Software release:	6.1.6 - 2011-03-18
Genesis code version:	1.95
FPGA code version:	5
Current date and time:	2011-03-18 19:40

Idle Main input: no signal
PIP input: no signal

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3.1.1. Unit ID

The Unit ID uniquely identifies a Presentation Recorder within a conference. The Unit ID can be descriptive of the location of the unit, or it can reflect the departmental ownership, or any other characteristic that clearly differentiates it from its peers.

Examples:

PR720 West Campus

PR720 Engineering

The Unit ID is written to the XML meta-data file which accompanies each recording, and may be used to index the recorded file based on information about which unit sourced the recording.

3.1.2. Contact name

The Contact name is typically the name of the owner or administrator of the unit responsible for being the source of the generated media stream. It could also be the name of the person in charge of the course material being webcast. This item is transmitted in real-time over the network as an SDDES element in the RTP protocol (see IETF RFC 1889 for a more detailed description of the Real-Time Protocol). Other SDDES items include the Contact e-mail, Contact phone, Contact location, and Contact web page.

3.1.3. Contact e-mail

The Contact e-mail should be the address of the owner/administrator of the unit or an address where questions or service requests concerning the unit are sent. The email address should be formatted according to RFC 822, for example, info@ncast.com.

3.1.4. Contact phone

The Contact phone should be the number of the owner/administrator of the unit or a number of a service desk, which a user could contact for help with regards to the media stream being generated. The phone number should be formatted with a + sign replacing the international access code. For example, a phone number in the United States would appear as "+1-800-555-1212".

3.1.5. Contact location

The location of the unit. The degree of precision of the location is at the discretion of the systems administrator. For example, one might enter "Sunnyvale, CA" or "Room 23B, Building 5, San Jose Campus, 2050 Tasman Drive, San Jose, CA".

3.1.6. Contact web page


The Contact web page can be the URL of the Contact name's personal web page, department, service group, help page or course material outline.

3.1.7. Date & Time - Time zone

The Time zone setting is required so that the timestamp information embedded in the archive filenames correctly matches the local time-of-day.

3.1.8. Date & Time - Network Time Protocol

When enabled the unit's system time is synchronized with public or private NTP servers. When stopped the system time is not synchronized and may drift over longer time periods. This option is controlled by the "Stop NTP" button, which will terminate any active Session and reconfigure the system. If the NTP client has been stopped an additional setting for manual time and date setup appears. The NTP client requires a proper DNS configuration to work correctly.



TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

View
Viewers
Session
Channels
Archives
Sources
Configuration

Unit
Passwords
Web
Display
Custom
Network
Telnet
Scheduler
Notifications
Logs
Update

DATE & TIME

Time zone: America/Los Angeles

NTP server 1: 0.pool.ntp.org

NTP server 2: 1.pool.ntp.org

NTP server 3: 2.pool.ntp.org

[Update ¹](#)

[Stop NTP ²](#)

¹ Reboot unit or restart NTP to activate NTP servers changes.
² Stops current session and reconfigures system.

[\[Back\]](#)

Idle
Main input: no signal
PIP input: no signal

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Selection of this option requires that the network in use allows the Presentation Recorder to access external, publicly available time servers. If you are on a private or closed network, local NTP servers may be listed in the "NTP server N" fields.

Disable this selection if access to the network time servers is not available (closed network) or if the unit is being used in a temporary location with a standalone hub or router (e.g. a tradeshow, conference or demo). Bootup time will be substantially reduced if the system does not wait for a response from non-existent time servers.

3.1.9. Serial Number and Revision Information

At the bottom of the Unit Options page internal system information is listed including:

- Serial number of the hardware unit
- Hardware architecture in use and firmware revision numbers
- Software release revision and date for firmware and digitizers
- System date and time


3.1.10. Configuration/Reset Buttons

On the right side of the web page are six buttons which may be used to configure, restart or reset the unit:

- Shutdown – Powers down the unit and is recommended as the proper means to turn off a Presentation Recorder if it will be idle for some time or is to be moved or reconfigured. All operating parameters will be properly saved and restored.
- Reboot – Shuts down and then restarts the unit. This operation may be needed to clear problems after a power brownout or other unexpected glitch.
- Date & Time – Controls setup of Date & Time and access to internal or external time servers.
- Factory Defaults – All operating parameters are reset to the Presentation Recorder's initial factory configuration. Nothing is saved and the reset is irreversible.
- Export Settings/Import Settings – Export or Import ALL configuration settings for this unit.

3.2. PASSWORDS

The Passwords page provides for entry of four different password types to control access to the Presentation Recorder.



Current User: Admin [Logout](#)

View
Viewers
Session
Channels
Archives
Sources
Configuration

Unit
Passwords
Web
Display
Custom
Network
Telnet
Scheduler
Notifications
Logs
Update

PASSWORDS

Admin password:	<input type="text" value="ncast"/>		
Coordinator password:	<input type="text" value="ncast"/>		
Verify viewer password:	<input checked="" type="checkbox"/>		
Viewer 1:	<input type="text" value="viewer"/>	Password:	<input type="text" value="viewer"/>
Viewer 2:	<input type="text"/>	Password:	<input type="text"/>
Viewer 3:	<input type="text"/>	Password:	<input type="text"/>
Viewer 4:	<input type="text"/>	Password:	<input type="text"/>
HTTP API password:	<input type="text" value="ncast"/>		

Streaming on channel 1
1 participant

Sending video 1280x720 29.9fps 1026kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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3.2.1. Admin password

The Admin password grants rights to all configuration and setup options for the Presentation Recorder. This password should be chosen carefully and with security in mind. Avoid use of common names, dictionary words and the like. A randomly chosen string greater than 8 characters in length is suggested.

3.2.2. Coordinator password

The Coordinator password allows access to the Archive files.

3.2.3. Viewer passwords

The View page allows desktop or laptop users to access the live media streams being encoded by the Presentation Recorder. This access may or may not be restricted, depending on the content and needs of the installation and/or organization. If the "Verify viewer password" checkbox is enabled, then access is restricted and a viewer needs to enter a password to see the media stream.

There is provision for four different viewer names and passwords.

3.2.4. HTTP API password

The HTTP API password allows access to archived files. This password permits HTTP access to the archive list, allows downloading of the archive and details file and the removal of one or more archived files. All of these operations utilize special HTTP URLs described in Section 9.3. Commonly available programs such as "wget" may be executed from shell scripts to automate this archive download function. There is no login page for a backup operator using the web interface.

3.3. WEB CONTROL

The Web Control page allows configuration of security settings related to use and access of the web administrative interface.

The screenshot shows the NCast web interface. At the top left is the NCast logo with the tagline "TAKE STREAMING FURTHER". At the top right, it says "Current User: Admin" with a "Logout" button. Below the logo is a navigation bar with tabs: View, Viewers, Session, Channels, Archives, Sources, and Configuration. The "Configuration" tab is selected. Under "Configuration", there are sub-tabs: Unit, Passwords, Web, Display, Custom, Network, Telnet, Scheduler, Notifications, Logs, and Update. The "Web" sub-tab is selected. The main content area is titled "WEB CONTROL" and contains the following fields and buttons:

- Protocol: HTTP (dropdown menu)
- HTTP port: 80 (text input)
- HTTPS port: 443 (text input)
- Update (button)
- Certificate to upload: (text input) with a Browse... button
- Private key to upload: (text input) with a Browse... button
- Upload Files (button)

At the bottom of the interface, there is a status bar with the following information:

- Streaming on channel 1, 1 participant
- Sending video 1280x720 29.9fps 1025kbps and audio 44kHz Mono 64kbps
- Main input: 720x240i@60Hz, PIP input: no signal
- NCast Copyright © 2010

3.3.1. HTTP/HTTPS Access

Normal web access, which is unprotected and insecure, is accomplished through use of the HTTP protocol typically utilizing port 80. Secure access using HTTPS (the SSL protocol) utilizes port 443. Administration of

the Presentation Recorder in open and insecure networks without the use of HTTPS presents a security risk and should be avoided.

The Web Control page allows three different options related to Viewer and Administrative access.

- All HTTP – Utilizes HTTP for Viewer and Administrative access.
- Viewer HTTP/Admin HTTPS – Utilizes HTTPS for Administrative access
- All HTTPS – Viewers and Administrators must use HTTPS

The downside of using HTTPS is that SSL Certificates (which usually require an annual fee or license payment) are required for each Presentation Recorder unit. Non-authoritative certificates may be used, but Viewers will see ominous warning notices in their browsers about the certificate, asking the user to accept the validity of the connection. Also, client players such as Quicktime, which need to download .sdp files using HTTPS protocol, may not function correctly if the certificate is not valid. Consult with your network administrator about certificate availability for your organization.

Access using HTTPS is straightforward. Simply use the “https” prefix:

https://pr720.ncast.com

This will automatically direct the request to port 443, the standard for HTTPS access.

3.3.2. Certificates and RSA Keys

If an organization has purchased an official SSL Certificate, or has created a non-authoritative one (which can be done with many different SSL tools) this new certificate may be uploaded and installed on the Web Control page.

When HTTPS is turned on, the Apache server requires that the certificate be authenticated with a password. Since this is not possible inside the Presentation Recorder, a private RSA key may be used instead of a password. If there is not a valid private RSA key available, then Apache will not start. This is used to disable third parties launching HTTPS with stolen certificates. More information on this topic is at <http://www.apache.org>. The pass-phrase should be removed from the private key before upload.

3.4. DISPLAY SETTINGS

The Display settings control activity relative to the local display attached to the Presentation Recorder. If activated this display normally loops back the graphics or video signals selected on the input connectors (after digitization of the signal). The displayed material shows the final-form composition of what will be compressed and recorded (except for the audio-meter, if present). Also, if graphic overlays are being used, these will appear on the local loopback display.

3.4.1. Display Loopback

Turns on and off the loopback of locally generated graphics or video input. If local loopback is not being used in an installation this setting should be set to “Disabled” as that will free up CPU cycles which are required to generate the loopbacked image.

3.4.2. Display Loopback Framerate

If local loopback has been selected, the CPU will maintain on the local screen a copy of the material which is being digitized and sent out as a webcast or recorded as an archive. The process of refreshing this screen consumes CPU cycles, especially if large resolutions and fast framerates are involved. Excessive CPU utilization can negatively impact maximum outbound framerates.

This parameter allows the operator to decrease the local loopback refresh loading. The local screen will still be updated, but at a rate which provides some relief from excessive use. Reduce the setting from the “Full” value if needed to maximize outbound transmission performance.

Obviously, a very low setting will impair the visual quality (in terms of motion) of the local display.

View	Viewers	Session	Channels	Archives	Sources	Configuration				
Unit	Passwords	Web	Display	Custom	Network	Telnet	Scheduler	Notifications	Logs	Update

DISPLAY

Display loopback:

Loopback framerate:

Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1029kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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View	Viewers	Session	Channels	Archives	Sources	Configuration				
Unit	Passwords	Web	Display	Custom	Network	Telnet	Scheduler	Notifications	Logs	Update

DISPLAY

Display loopback:

Loopback framerate:

Full

One half

One quarter

One twelfth

One sixtieth

Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1029kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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3.4.3.

Display Component Output Only

At this time the Presentation Recorders only support Component output (Y-Pr-Pb) and this will usually require use of a VGA-to-Component breakout cable. A VGA-to-VGA cable will not function correctly with many LCD displays.

3.5. CUSTOM SETTINGS

The Custom Settings page allows users of the Presentation Recorder to define unique dimensions for the Frame Size (capture window), Aspect Ratios, Main and PIP windows, and Graphics and Text Overlay

N*Cast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

View | **Viewers** | **Session** | **Channels** | **Archives** | **Sources** | **Configuration**

Unit | **Passwords** | **Web** | **Display** | **Custom** | **Network** | **Telnet** | **Scheduler** | **Notifications** | **Logs** | **Update**

CUSTOM SETTINGS

Frame sizes

Aspect ratios

Windows

Image overlays

Text overlay 1

Text overlay 2

Text overlay 3

Text overlay 4

Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1030kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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images. These custom definitions are used in conjunction with Layout options in the Channel Table (see Section 4.4) and settings on the Sources page(see Section 6.1), so it is necessary to understand Channel Layout options and Source selections first to fully appreciate the custom definitions which are entered here.

3.5.1. Custom Frame Sizes

The Channel Table permits the selection of many common, industry standard frame sizes. However, if a special composite image is desired (some combination of Main, PIP and Overlay windows) then the user would probably have to define a custom Frame Size.

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TAKE STREAMING FURTHER

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CUSTOM FRAME SIZES

Frame size 1 (W/H):	1280	720
Frame size 2 (W/H):	1280	720
Frame size 3 (W/H):	1280	720
Frame size 4 (W/H):	1280	720
Frame size 5 (W/H):	1280	720
Frame size 6 (W/H):	1280	720
Frame size 7 (W/H):	1280	720
Frame size 8 (W/H):	1280	720
Frame size 9 (W/H):	1280	720
Frame size 10 (W/H):	1280	720

[\[Back\]](#)

Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1031kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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The two entry fields define, in pixels, the width and height of the frame. The width must be in the range 128-1280, and the height must be in the range 128-720.

3.5.2. Custom Aspect Ratios

The aspect ratio defines the visual geometry of the Frame (capture surface). If the frame width (in pixels)

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CUSTOM ASPECT RATIOS

Aspect ratio 1 (W/H):	16	9
Aspect ratio 2 (W/H):	16	9
Aspect ratio 3 (W/H):	16	9
Aspect ratio 4 (W/H):	16	9
Aspect ratio 5 (W/H):	16	9
Aspect ratio 6 (W/H):	16	9
Aspect ratio 7 (W/H):	16	9
Aspect ratio 8 (W/H):	16	9
Aspect ratio 9 (W/H):	16	9
Aspect ratio 10 (W/H):	16	9

[\[Back\]](#)

Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1030kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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divided by the frame height (in pixels) is the same as the aspect ratio, then square pixels will be displayed. Otherwise the pixels will be non-square, which is common in many video systems.

The values entered for W,H are integers in the range 1-1000.

3.5.3. Custom Windows

The Main and PIP input streams must be associated with a Window to define their placement and size on the frame surface area. The Channel and Sources page defines common settings (such as Full-screen and Top-right corner), but for custom compositions ten new Windows may be defined.

N*Cast Current User: Admin [Logout](#)

View | Viewers | Session | Channels | Archives | Sources | Configuration

Unit | Passwords | Web | Display | Custom | Network | Telnet | Scheduler | Notifications | Logs | Update

CUSTOM WINDOWS

Window 1 (X/Y/W/H):	0%	0%	100%	100%
Window 2 (X/Y/W/H):	0%	0%	100%	100%
Window 3 (X/Y/W/H):	0%	0%	100%	100%
Window 4 (X/Y/W/H):	0%	0%	100%	100%
Window 5 (X/Y/W/H):	0%	0%	100%	100%
Window 6 (X/Y/W/H):	0%	0%	100%	100%
Window 7 (X/Y/W/H):	0%	0%	100%	100%
Window 8 (X/Y/W/H):	0%	0%	100%	100%
Window 9 (X/Y/W/H):	0%	0%	100%	100%
Window 10 (X/Y/W/H):	0%	0%	100%	100%

[Update](#)

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Streaming on channel 1
1 participant

Sending video 1280x720 30.1fps 1035kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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The values for X,Y,W,H may be entered as integers or percents. If integers are used then these are pixel widths and heights or pixel offsets from the upper left corner of the frame. If percents are used, then the dimensions are scaled to the current size of the frame area (e.g. if the frame area is 960x720, then a 50% window width would be equivalent to entering a value of 480 pixels). The use of percents is convenient when the frame changes in dimension. The top-left corner is the origin and has an (X,Y) value of (0,0).

3.5.4. Custom Image Overlays

Customized images may be added to the media stream being created. These images would typically be corporate or organizational logos, trademarks or watermarks, copyright statements, media content or date annotation, or descriptive information on the course or presentation being viewed (speaker, topic, etc.).

These images must be created in .jpg, .png, .gif or animated .gif format (up to 1280x720 pixels) and may use transparency to limit the amount of underlying graphical material which is blocked.

The X,Y entries in these fields are integers or percents. The X,Y offset defined will position the image relative to the top-left corner of the frame.

The enable/disable setting will cause the image to be included or not included in the composite media stream being created. More than one image (all four, in fact) may be included if required.

THE ENTRIES ON THIS PAGE ARE OVERWRITTEN BY CHANNEL TABLE VALUES WHEN A SESSION IS STARTED!

The corresponding Channel Table Image Overlays are transferred to the operating Session parameters and thus initialize the image overlays used during Channel startup. This page may be used to alter Session image overlays being displayed after a Session has started.

For example, if Image Overlay 4 contains the presenter's name and topic in a multi-presentation recording, Overlay 4 on this page can be uploaded and enabled when that presenter begins his/her delivery.

3.5.5. Overlay n to upload

Use the "Browse ..." button to select the image file to be uploaded and then press the "Upload Files" button.

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TAKE STREAMING FURTHER

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CUSTOM IMAGE OVERLAYS

Overlay 1 details: overlay1.png
 Overlay 2 details: overlay2.png
 Overlay 3 details: overlay3.png
 Overlay 4 details: overlay4.png

Overlay 1 (X/Y):	0%	0%	Disabled
Overlay 2 (X/Y):	0%	25%	Disabled
Overlay 3 (X/Y):	0%	50%	Disabled
Overlay 4 (X/Y):	0%	75%	Disabled

[Update](#)

Overlay 1 to upload: [Browse...](#)
 Overlay 2 to upload: [Browse...](#)
 Overlay 3 to upload: [Browse...](#)
 Overlay 4 to upload: [Browse...](#)

[Upload Files](#)

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Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1030kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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Overlay graphics can be uploaded dynamically, allowing scheduling tools and scripts to automatically change the presentation graphics and layouts at prescribed times (e.g. to conform to speaker times and track changes at a conference). Dynamic upload is not supported while in a Session.

3.5.6. Custom Text Overlays

Text Overlays are windows which contain text to be displayed on the frame. The text can be inserted from fields on administration web pages (Channel settings and the Configuration menu), or can be sent via serial RS-232 or Serial Telnet IP commands. See the *Presentation Recorder Serial Interface Specification* for details on these commands.

View	Viewers	Session	Channels	Archives	Sources	Configuration
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Scheduler	Notifications	Logs	Update			

CUSTOM TEXT OVERLAY 1

State:	Disabled	Window (X/Y/W/H):	5%	0%	50%	20%
Text alignment:	Left	Text wrapping:	Enabled			
Font size (pixels):	30	Padding (pixels):	0			
Foreground (R/G/B):	255	255	255	Background (R/G/B):	0	0

Text overlay 1

Text:

[Update](#)

[\[Previous\]](#)
[\[Back\]](#)
[\[Next\]](#)

Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1029kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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Text overlays can implement dynamically displayed text such a news tapes, stock tickers, closed captions, and for other purposes such as changing the name of the speaker for a presentation due to a last-minute change of presenters or participants

Details of using Custom Text Overlays are discussed in Channel Table setup (Section 4.6).

THE ENTRIES ON THIS PAGE ARE OVERWRITTEN BY CHANNEL TABLE VALUES WHEN A SESSION IS STARTED!

Use this page when a Text Overlay needs to be modified after Session start.

3.6. NETWORK SETTINGS

The Network Configuration page is used to set and report parameters related to the IP address of the unit and its behavior on an Internet network. The network parameters are normally set using this page, but alternatively, they may be entered through the use of commonly available USB memory sticks.

When shipped the units are setup with DHCP enabled. The DHCP setting means that any network or router which provides DHCP services will automatically assign an IP address to the unit. This address is reported on the display screen during initial bootup. Once that address is noted, the installer may use the web interface and Network Configuration page to assign the unit to any statically desired IP address, which will take effect on the next power-on cycle. If this method does not work, use the USB stick method discussed below.

N*Cast
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NETWORK CONFIGURATION

DHCP: Enabled

IP address: 204.89.223.15

Netmask: 255.255.255.192

Gateway: 204.89.223.1

Primary DNS: 204.89.223.4

Secondary DNS: 204.89.223.44

Ethernet mode: Auto-negotiation

Update ¹

¹ Reboot unit to activate changes.

HTTP Proxy

IP address: 204.89.223.15

Netmask: 255.255.255.192

Gateway: 204.89.223.1

Primary DNS: 204.89.223.4

Secondary DNS: 204.89.223.44

Ethernet mode: 100 Mb/s full-duplex

MAC Address: 00:30:48:b1:7d:e1

Automatic unicast on channel 3
1 participant

Sending video 1280x720 30.0fps 755kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

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The following parameters may be configured on the Network page:

3.6.1. DHCP

If DHCP is enabled the unit will automatically receive an IP address from the network's DHCP server. Some networks require MAC address registration with the DHCP server before an IP address can be allocated. The MAC address is on a label on the bottom of the chassis, and is also reported on the Network Configuration page. If DHCP is disabled, a static IP address must be provided by the installer. Consult with the IT staff or network management to obtain the IP address allocated for the unit.

3.6.2. IP Address

The static IP address to be used by the unit in numeric form (www.xxx.yyy.zzz). Not required if DHCP is enabled.

3.6.3. Netmask

The IP netmask in use for this LAN segment (e.g. 255.255.255.0).

3.6.4. Gateway

The numeric IP address of the gateway host on this LAN segment (e.g. www.xxx.yyy.1).

3.6.5. Primary DNS

The numeric IP address of the primary Domain Name Server (DNS) for this LAN segment (e.g. www.xxx.yyy.10). Domain name servers translate symbolic domain names to numeric IP addresses. Various processes within the Presentation Recorder may, on occasion, require contact with a valid name server.

3.6.6. Secondary DNS

The numeric IP address of the secondary (or backup) Domain Name Server.

3.6.7. Ethernet Mode

Adjusts the hardware link level settings for the connection between the Presentation Recorder and its network switch. Normally Auto-negotiation will be sufficient to establish the correct settings, but under special circumstances the installer may wish to force the Ethernet hardware to assume a different configuration. The link speed and full/half duplex settings are adjusted through use of the pulldown menu tab.

3.6.8. MAC Address

The Ethernet address of the Presentation Recorder. There is no provision for changing this address. Some networks may require registration of the MAC address for proper operation.

3.6.9. Use HTTP proxy

Software updates for the Presentation Recorder are achieved through use of HTTP protocol. If the network being used is firewalled and requires the use of HTTP Proxy services, then this checkbox must be enabled for proper downloads of new software updates.

3.6.10. Proxy server

The IP address (symbolic or numeric) of the network's proxy server.

3.6.11. Proxy port

The proxy server port (e.g. 80).

3.6.12. Proxy user

If the proxy server requires a username and password for access, enter the username.

3.6.13. Proxy password

If the proxy server requires a username and password for access, enter the password.

All changes to these network settings require a reboot of the unit. Press the "Update & Reboot" button when all entries are complete and you have double-checked the correctness of these entries.

3.6.14. USB Stick Network Settings

An alternative way to configure network parameters for the unit is to edit a special text file on a USB memory stick and to insert that memory stick into any USB slot in the unit during power-on. The operating software looks for the presence of a USB memory and searches for the presence of a specially named file. If this file is found, the network parameters are read from the file, installed into unit and used during the network boot process. Once the unit has booted, the USB memory may be removed and is not required again. The network settings from the file will be reflected as permanent entries shown on the Network Configuration page.

The file on the USB stick must be named "ntwkconf.txt" and has the following lines of information:

```
dhcp=(bool)0
dns_1=(string)204.89.223.4
dns_2=(string)204.89.223.44
ethernet=(string)auto
gateway=(string)204.89.223.1
ipaddress=(string)204.89.223.25
netmask=(string)255.255.255.0
ntp=(bool)1
```

The "dhcp" keyword accepts two values: 0 which means disabled (no dhcp, use static addresses) or 1 which means enabled (use dhcp, dynamic addresses). The "dns" values identify the domain name servers. The "ethernet" keyword accepts these link-level values: auto, 10fd, 10hd, 100fd, 100hd, 1000fd, 1000hd (auto negotiation, 10, 100, 1000 Mbps, Full or Half Duplex). These values are case sensitive. The other keywords require numeric IP addresses or netmasks as shown above.

The "ntp" parameter enables or disables network time protocol within the unit. If enabled, the Presentation Recorder must be on a network where access to public network time servers is available. Disable (ntp=(bool)0) this parameter if the unit is on a closed network. Setting this parameter to 0 is useful when the Presentation Recorder is being used with a simple hub or switch. Long bootup times will be shortened as the box is no longer searching for network time servers.

This file should be created/edited with any simple ASCII text editor (e.g. Notepad, Teachtext). Do not use an advanced word-processing editor to alter this file. Each key=value pair must be on a separate line with no whitespace prior to the key, and no blank lines in the file.

3.6.15. IP Address Display

If the audio meter is displayed (on the local loopback screen) the current IP address of the unit will be shown with the meter, allowing verification of the unit's address.

3.7. TELNET SETTINGS

The Telnet Configuration page is used to enable the Telnet Serial Interface to the unit, an interface, which may be used to send and receive command and control, strings over IP-based networks. See the Serial Interface Specification Manual for complete information on the serial command interfaces.

If the interface is enabled, secure the interface with a unique and non-dictionary password, and configure the IP restriction field to only allow the IP address of the controller unit to command the Presentation Recorder.

Note that for security reasons the default Telnet port is not utilized.

3.7.1. Telnet Access

Disable access if the serial command interface is not in use.

3.7.2. Password

Choose a password, which has random characters and numbers and is at least 8 characters in length. Unfortunately, Telnet protocol sends this password in clear-text, so network sniffers may be able to compromise this entry.

3.7.3. IP restriction

This limits the valid IP addresses, which may send commands to the Presentation Recorder. Normally this field should contain a single IP address, which is the IP of the controller in charge of the Presentation Recorder. Thus, if the password is compromised an attacker will still not gain access to the unit. This field may contain:

www.xxx.yyy.zzz	A single address
www.xxx.yyy.*	An address range
www.xxx.yyy.0/24	A subset of a network (CIDR notation)
www.xxx.yyy.zzz,sss.ttt.uuu.vvv	A comma-separated list of addresses

www.xxx.yyy.zzz,sss.ttt.uuu.*

A comma-separated list of addresses and ranges

Standard CIDR notation is documented in IETF RFC 4632.

3.8. SCHEDULER

3.8.1. Overview

The PR-720 Series Scheduler is a feature that allows the manager of one or more Presentation Recorders to schedule these appliances through use of a Google calendar or through use of industry-standard iCalendar files. The manager can start and stop each Presentation Recorder at a predetermined time, load unique settings for each individual presentation, send serial control commands to each Presentation Recorder to provide additional functionality, and specify how and where the Presentation Recorder sends its output, all without touching the actual Presentation Recorder user interface. All that is required is one or more Presentation Recorders, each with a connection to the Internet, and access to a Google calendar or an iCalendar file, no matter where in the world the equipment is located.

3.8.2. Components of the Solution

The Scheduler Implementation uses three components to allow automatic start/stop scheduling of one or more Presentation Recorders in a network. These components are:

- An administrative interface based on Google Calendar or other Calendar system using iCalendar
- A scheduler process which queries the calendar information and activates the Presentation Recorder.
- The Presentation Recorder IP serial command interface, which receives commands at the scheduled times.

3.8.3. Scheduler Overview

The following sections describe how to use a Google Calendar account or an iCalendar file to setup a schedule for one or more Presentation Recorders and how to use the Scheduler web page.

Complete documentation for the serial command set is in the *"Presentation Recorder Serial Interface Specification"*. Please refer to this manual for a more complete description of commands which may be used. This guide lists a few basic commands which allow the user to start and stop a unit from the Scheduler interface.

3.8.4. Google Calendar Events

Google Calendar is a web-based interface used to enter calendar events such as meetings and appointments. It allows multiple personal calendars (e.g. business and home) and allows sharing of public and private calendars with friends and associates.

One interesting and important aspect of this calendaring system is that Google has defined a standards-based software API (called "gdata" for many of their services) which allows programmatic access to the calendars and the events contained within them. The API is implemented in Java and several other languages, and allows outside programs (e.g. clock widgets, PDA's, other calendar systems) to access and create events within a Google calendar.

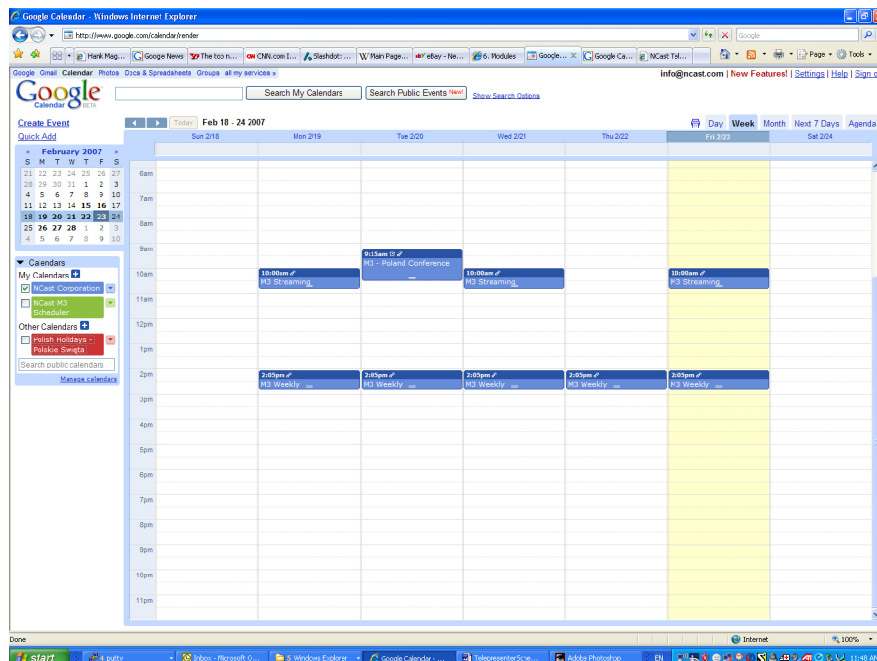
NCast has taken advantage of this programmable API to implement a scheduling system for Presentation Recorders where the web-based Google Calendar is the administrative interface for defining session start/stop times for one or more Presentation Recorders within a customer's network.

The process works in three steps:

1. An administrator enters one or more scheduled events for a Presentation Recorder
2. The scheduling process queries the calendar at regular intervals and captures these events.
3. Commands sent to the IP Serial Interface of a Presentation Recorder starts and stops the unit.

The calendar interface allows an administrator to setup single or repeating events. The example below shows a single event scheduled for Tuesday, a Monday-Wednesday-Friday repeating event, and a Monday-

to-Friday repeating event. An event is associated with a single Presentation Recorder listed in the “Where” field. Two events with the same start/stop times on the same day can be directed to two different Presentation Recorders simply by changing the contents of the “Where” field. The “Description” field (discussed below) allows customization of the actions executed at scheduled start time.



So to get started, and administrator must establish a Google Calendar account (different from a Google mail account) and provide a password for this account. Multiple accounts can be established for multiple Presentation Recorders if that is easier to administer.

Only the primary or default user calendar is processed. The program is not able to deal with secondary calendars at this time.

3.8.5. Creating Scheduled Events

To create an event click on a time-slot and fill in the following fields:

Gmail Calendar Documents Web Reader [more](#) ▼ hank.magnuski@gmail.com | [Offline](#) | [Settings](#) ▼ | [Help](#) | [Sign out](#)

Google calendar [Show search options](#)

[Back to calendar](#)

PR720 Weekly Webcast

9/16/2010 9:00am to 10:00am 9/16/2010 ☐ All day ☐ Repeat...

Event details [Find a time](#)

Where [map](#)

Calendar

Created by Hank Magnuski

Description

Reminders ☐ No reminders set [Add a reminder](#)

Show me as ☐ Available ☒ Busy

Privacy ☒ Default ☐ Public ☐ Private

[Learn more about private vs public events](#)
[Publish event](#)

Add guests

Enter email addresses

Guests can ☐ modify event
☒ invite others
☒ see guest list

[Back to calendar](#)

The "*What*" field (Title shown above) must contain (anywhere in the field) the letters "PR720" to identify this as a Presentation Recorder event. Additional words can further describe the nature of this entry (e.g., "Chem 101", "Weekly Staff", etc.).

The "*When*" field (Dates shown above) is used to delimit the start/stop times for the event. The drop-down menu only shows hour/half-hour entries, but by clicking again on the time field arbitrary times may be entered. The repeat options allow multiple occurrences of this event. If a stop time of 11:00 am is listed, the program uses 10:59:59 as the actual stop time. Thus, events may be scheduled back-to-back.

The "*Where*" field is the DNS name or IP address of the Presentation Recorder to be controlled. Only one Presentation Recorder may be listed. This allows one calendar to control many different units.

The "*Calendar*" field must be the primary or default calendar for this account.

The "*Description*" field is a series of serial IP commands to be issued to the Presentation Recorder at the time of the Start event (see below). In the example above, "C1" starts the Presentation Recorder session on Channel 1.

3.8.6. Scheduled Event Commands

The "*Description*" or content field is a series of serial IP commands to be issued to the Presentation Recorder at the time the Start event is processed. Each command is terminated with a ";" character. For example:

C10;

This is the only command needed to start a Presentation Recorder ("Start on Channel 10 with all other settings unchanged"). A more complicated example:

G3; V1; p1; C8; R1; RP,The CEO; RT,Weekly Performance Review;

where:

G3 Set the Main input to the VGA input connector

V1 Set the PIP input to the Composite video input connector

p1 Turn PIP on

- C8 Start session on Channel 8
- R1 Turn recording on
- RP Set presenter information to "The CEO"
- RT Set title information to "Weekly Performance Review"

Commands are case-sensitive and must be written exactly as shown. The commands are processed in the order given.

The presenter and title information are stored by the Presentation Recorder in an XML file associated with archived MPEG-4 file. This XML file will normally be uploaded to the content server and can be used to provide additional details about the content for archiving and indexing.

The "*Presentation Recorder Serial Interface Specification*" lists all the commands available on the serial IP interface. Please check that document for additional setup commands that might be issued.

At the end of the event period, the program issues the "End Session" command "PE". No other commands are sent.

The scheduler program queries the calendar every few minutes. Changes to the schedule may be entered prior to this query. Once an event has started the event can only be stopped by going directly to the Web interface of the Presentation Recorder and stopping it manually or waiting for the scheduled stop.

The scheduler program does not check for conflicts or overlapping events. If times overlap for a given Presentation Recorder the results will occur in the order scheduled

3.8.7. iCalendar Overview

There are many different calendar applications in use, both PC based and Web based. N*Cast provides a facility to utilize these other calendar applications to generate schedules through a file interchange standard known as "iCalendar".

Another situation where use of an iCalendar file would be needed is when immediate access to Google Calendar is not available. For example, if Presentation Recorders are being utilized to record a conference on a closed network at a hotel without Internet access, the scheduler file can be created for all tracks of the conference and used to run all machines during the event.

3.8.8. The iCalendar Standard

iCalendar is the name for an Internet industry standard from the Internet Engineering Task Force (IETF):

- [RFC 2445: Internet Calendaring and Scheduling Core Object](#)
- [RFC 2446: iCalendar Transport-Independent Interoperability](#)

These standards specify the format and contents of a file (usually a ".ics" file) which contains text strings describing calendar events. The sample below is a small portion of a typical iCalendar file:

```
BEGIN:VCALENDAR
PRODID:-//Google Inc//Google Calendar 70.9054//EN
VERSION:2.0
CALSCALE:GREGORIAN
METHOD:PUBLISH
X-WR-CALNAME:N*Cast Corporation
X-WR-TIMEZONE:America/Los_Angeles
BEGIN:VTIMEZONE
TZID:America/Los_Angeles
X-LIC-LOCATION:America/Los_Angeles
BEGIN:STANDARD
TZOFFSETFROM:-0700
TZOFFSETTO:-0800
TZNAME:PST
DTSTART:19701025T020000
RRULE:FREQ=YEARLY;BYMONTH=10;BYDAY=-1SU
END:STANDARD
```

The iCalendar file interchange standards are not associated with the popular Macintosh program “iCal” or any other specific calendar application. The files provide a standard way to export, import and exchange calendar events, ToDo’s, meeting invitations and blog entries between different computer applications, and indeed, many different programs now support this standard (including Google Calendar).

The NCast Scheduler can read standard iCalendar (.ics) files containing scheduled events, and can control Presentation Recorders based on the contents of these events.

3.8.9. Using an iCalendar File

There are three basic steps to use an iCalendar file with the NCast Scheduler:

1. Create the schedule in a calendar application
2. Export a “.ics” file with the event information
3. Start the scheduler program with this file.

It is possible to use both iCalendar and Google Calendar at the same time. The scheduler program reads the file first and extracts up to one month’s worth of events from the file, then checks for a Google Calendar account and utilizes any additional event information coming from Google Calendar. Overlapping or conflicting event information is not checked for and could cause scheduling errors.

Entering the event information is similar to the process described above using Google Calendar:

- Summary field – must contain “PR720” somewhere in the field
- Location field – must contain the IP address of the Presentation Recorder
- Description field – contains serial commands to be sent to a Presentation Recorder

3.8.10. Importing iCalendar Files

An alternate way of utilizing iCalendar files is to first import them into a Google Calendar account, and then use the Scheduler program only with Google Calendar.

To import an iCalendar file into Google:

1. Go to the “Settings” link (upper right corner) and click on it.
2. Select the “Import Calendar” tab and click on it.
3. Browse for the “.ics” file on the PC and select it.
4. Choose the default or primary calendar for the account.
5. Click “Import”
6. Verify that the events have been properly imported and that all required fields are present.

This facility allows Presentation Recorder scheduling from almost any calendar application in use.

3.8.11. Exporting iCalendar Files

Each calendar application should have an “Export” or “Save” command to create an “.ics” file for backup or use by other applications.

To do this in Google Calendar:

1. In the “Calendars” sidebar/block on the left side, click on the menu pop-up for the primary calendar.
2. Select “Calendar settings”.
3. In the “Private Address:” details, click on the green “ICAL” button. A pop-up window should come up.
4. Right click on the “basic.ics” and do a “Save as ...” function in your browser, saving the .ics file to a known location in your PC.

If you simply click on the link, your calendar application will probably come up, and that is not the way to save the file. It will, however, allow you to import the file into your calendar and look at the contents locally.

Current User: Admin [Logout](#)

N*Cast
TAKE STREAMING FURTHER

[View](#) [Viewers](#) [Session](#) [Channels](#) [Archives](#) [Sources](#) [Configuration](#)

[Unit](#) [Passwords](#) [Web](#) [Display](#) [Custom](#) [Network](#) [Telnet](#) [Scheduler](#) [Notifications](#) [Logs](#) [Update](#)

SCHEDULER CONFIGURATION

Google calendar: [View Google](#)

Google username:

Google password:

iCalendar: [View iCalendar](#)

[Update](#)

iCalendar to upload: [Browse...](#)

[Upload File](#)

Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1030kbps and audio
44kHz Mono 64kbps

Main input: 720x240@60Hz
PIP input: no signal

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3.8.12. Configuration

These parameters control scheduler process:

- Google calendar – Enables or disables scheduling using Google Calendar data.
- Google username – The account containing the calendar to be used.
- Google password – Password for the above account
- iCalendar – Enables or disables scheduling using an iCalendar file.
- iCalendar to upload – Use this item to enter the filename of the iCalendar scheduling file which will be used.

3.8.13. View Buttons

These buttons allows the operator to check on scheduled events:

- View Google – Check on activities scheduled by Google calendar entries.
- View iCalendar – Check on activities scheduled by iCalendar entries.

3.8.14. Activating the Serial Interface

The IP serial interface on a Presentation Recorder must be enabled to receive the session start/stop commands from the scheduler process. By default this interface is “Disabled” (See Section 3.7).

To enable the IP serial interface, bring up the web interface, log into the Presentation Recorder under the “admin” administrative account and go to the Configuration/Telnet screen tab.

The fields on this page are set as follows:

Telnet access - Must be “Enabled” for IP access

Password - Set a password to allow Telnet access

IP restriction - Set this to the IP address of this unit

Port number - The given port “7474” is a non-standard port for telnet protocol access

When all fields are filled, click on the “Update” button.

3.8.15. Viewing Scheduler Activity

The Logs page (See Section 3.10) permits viewing the scheduler activity logs for possible error messages, reports on scheduled events and other actions. The Serial log contains information on serial command activity.

3.8.16. External Scheduler Program

There is an external utility program available (in the Python programming language) which may be used to schedule multiple Presentation Recorders from a single, central location. Check the download area of the N*Cast website for this utility.

3.9. NOTIFICATIONS

The PR-720 Series has an extensive system of notifications by e-mail for routine and extraordinary events during its operation. Events can be informational, like “Archive uploaded”, or they can be error reports such as “Disk full”.

Current User: Admin [Logout](#)

N*Cast
TAKE STREAMING FURTHER

View Viewers Session Channels Archives Sources Configuration

Unit Passwords Web Display Custom Network Telnet Scheduler Notifications Logs Update

NOTIFICATIONS

Notifications:

E-mail address:

E-mail from address:

SMTP server:

SMTP port:

SMTP authentication: ☒

SMTP username:

SMTP password:

SSL/TLS: ☐

[Update](#) [Connection Test](#) [Select Events](#)

Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1029kbps and audio
44kHz Mono 64kbps

Main input: 720x240@60Hz
PIP input: no signal

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Event are categorized by their severity level (Info, Warning, Error and Critical), and by their specific action or type (e.g. Session start, Recording start, etc.). Events can be system-wide (e-mails are sent to the system administrator) or Channel specific (a subset of events is associated with a single Channel and sent to an e-mail address associated with that Channel).

System-wide events are configured in the Configuration → Notifications → Select Events Menu, and Channel related events are configured in the Channel → Modify → Notifications → Select Events Menu (see Section 4.8.). The rules controlling event reporting are the same in both cases, except for the system or Channel orientation of the activity.

In summary, there is a comprehensive e-mail notification system in place to inform the administrator that “The disk is full!” or the Channel owner that “Your recording is ready” and many other notices.

3.9.1. Notifications

This dropdown menu selection enables or disables the system-wide e-mail notification service. It does not affect Channel notification activity.

3.9.2. E-mail address

Enter the e-mail address of the administrator to be informed about system-wide events.

3.9.3. E-mail from address

Enter the e-mail address denoting the source of this email (this unit). Something like *PR-720.RoomA105@myorganization.com* would instantly identify the source of the e-mail.

3.9.4. SMTP Server

Enter the DNS address or IP number of your mail server.

3.9.5. SMTP Port

Enter the port number needed to contact your SMTP (outbound) server. Normally port 25, the port number might be non-standard due to firewall rules, ISP restrictions or other requirements.

3.9.6. SMTP Authentication

Check this box if your SMTP server requires authentication.

3.9.7. SMTP Username

The username required for authenticated e-mails.

3.9.8. SMTP Password

The password required for authenticated e-mails.

3.9.9. SSL/TLS


Check this box if your SMTP server utilizes secure SSL or TLS connections.

3.9.10. Connection Test

Clicking this button will send a test message to the account listed on this page.

3.9.11. Select Events

This button brings up a checkbox menu which allows selection of notifications by severity level or by type.



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Update

NOTIFICATIONS EVENTS

Select by event type:

☐ Critical ☐ Error ☐ Warning ☐ Info

Select by event name:

<input type="checkbox"/> Power on	<input type="checkbox"/> Session start	<input type="checkbox"/> Archive restore
<input type="checkbox"/> Shutdown	<input type="checkbox"/> Session stop	<input type="checkbox"/> Archive upload
<input type="checkbox"/> Reboot	<input type="checkbox"/> Detected main input signal	<input type="checkbox"/> Archive download
<input type="checkbox"/> Software update start	<input type="checkbox"/> Detected PIP input signal	<input type="checkbox"/> Disk full
<input type="checkbox"/> Software update finish	<input type="checkbox"/> Lost main input signal	<input type="checkbox"/> Disk near full
<input type="checkbox"/> New software update available	<input type="checkbox"/> Lost PIP input signal	<input type="checkbox"/> Empty archive trash
<input type="checkbox"/> No digitizer card found	<input type="checkbox"/> Video framerate stall	<input type="checkbox"/> Resize archive trash
<input type="checkbox"/> Unknown digitizer card found	<input type="checkbox"/> Recording start	<input type="checkbox"/> Scheduler start event
<input type="checkbox"/> Digitizer card driver reload	<input type="checkbox"/> Recording pause	<input type="checkbox"/> Scheduler stop event
<input type="checkbox"/> Digitizer card firmware update start	<input type="checkbox"/> Recording continue	<input type="checkbox"/> Lost Google Calendar connection
<input type="checkbox"/> Digitizer card firmware update finish	<input type="checkbox"/> Recording stop	<input type="checkbox"/> Telnet connected
<input type="checkbox"/> Web login	<input type="checkbox"/> Archive ready	<input type="checkbox"/> Telnet disconnected
<input type="checkbox"/> Web logout	<input type="checkbox"/> Archive remove	

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Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1030kbps and audio
44kHz Mono 64kbps

Main input: 720x240@60Hz
PIP input: no signal

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There are two methods by which to choose a notification to be reported:

- *Select by event type* – Any event which is assigned the selected severity level is reported. Selecting “Info” will report Info level events, but not others. You must also select “Critical” and “Error” to be informed about events classified as Critical and Error.
- *Select by event name* – Any activity identified by the given name is reported. It does not matter if the “type” box is checked or not, the report is issued.

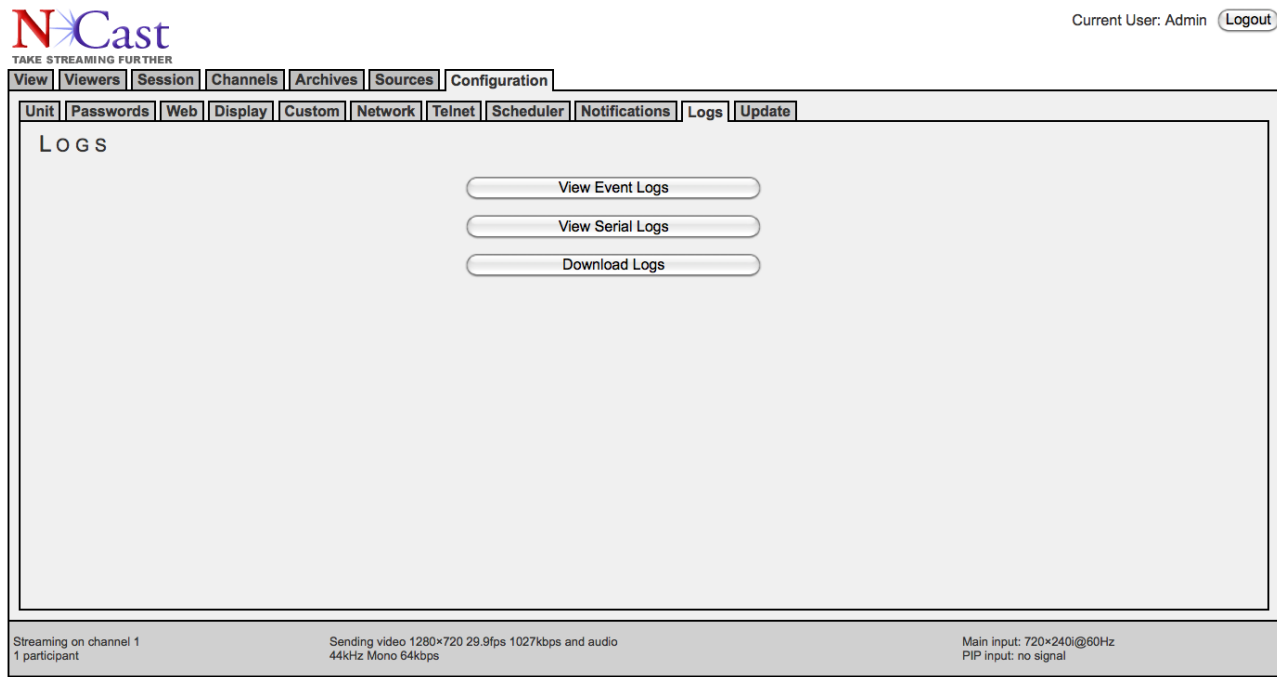
So a typical strategy for using this selection page is as follows:

First, select the severity level desired for reporting. Typically this would be “Critical” and “Error” unless there is an interest in the more frequent and less interesting “Warning” and “Info” messages.

Next, select particular events of interest to be reported. Perhaps “Session start” and “Recording start” are required. The net result is that all “Critical” and “Error” messages will be generated, and “Info” level messages about “Session start” and “Recording start” will be sent as well.

3.10. Logs

Several run-time logs are maintained by the Presentation Recorder and are accessed via the Logs page:



3.10.1. View Event Logs

Many events during the operation of the Presentation Recorder are recorded in the Event Logs. These Logs are part of the Event Notification System discussed in Section 3.9.

View | **Viewers** | **Session** | **Channels** | **Archives** | **Sources** | **Configuration**

Unit | **Passwords** | **Web** | **Display** | **Custom** | **Network** | **Telnet** | **Scheduler** | **Notifications** | **Logs** | **Update**

EVENT LOGS

From: Type: Category:

Date	Time	Type	Category	Event
2010-07-23	08:34:43	Info	Session	Session start on channel 1 succeeded
2010-07-23	08:34:42	Info	Video	Enable PIP
2010-07-23	08:34:42	Info	Video	Video aspect ratio set to 16:9
2010-07-23	08:34:42	Info	Video	Video frame size set to 1280x720
2010-07-23	08:34:35	Info	Session	Session stop on channel 2
2010-07-23	08:34:24	Info	Session	Session start on channel 2 succeeded
2010-07-23	08:34:24	Info	Video	Video framerate set to 30 fps
2010-07-23	08:34:23	Info	Video	Video bitrate set to 1024 kbps
2010-07-23	08:34:23	Info	Video	Video format set to h264
2010-07-23	08:34:23	Info	Video	PIP window set to 25%x25% at 5%x5%
2010-07-23	08:34:23	Info	Video	PIP input set to vga
2010-07-23	08:34:23	Info	Video	Main window set to 100%x100% at 0%x0%
2010-07-23	08:34:23	Info	Video	Main input set to svideo
2010-07-23	08:34:23	Info	Video	Video aspect ratio set to square pixel
2010-07-23	08:34:23	Info	Video	Video frame size set to 1280x720
2010-07-23	08:34:21	Info	Network	Found network
2010-07-23	08:34:19	Info	Video	Video frame size set to 1280x720

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Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1029kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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3.10.2. View Serial Logs

Serial command activity can be initiated from the RS-232 connector or the Telnet interface. Serial commands are also used with the Scheduler interface. This screen allows inspection of recent activity for the Serial link.

View | **Viewers** | **Session** | **Channels** | **Archives** | **Sources** | **Configuration**

Unit | **Passwords** | **Web** | **Display** | **Custom** | **Network** | **Telnet** | **Scheduler** | **Notifications** | **Logs** | **Update**

SERIAL LOGS

From:

Date	Time	Command
2010-07-23	10:40:31	&
2010-07-23	10:40:31	?
2010-07-23	10:40:30	+ma
2010-07-23	10:40:30	\$-30.3,-24.8,0.0,0.0
2010-07-23	10:40:30	&
2010-07-23	10:40:30	ma
2010-07-23	10:40:30	+?
2010-07-23	10:40:30	*E:0,G2,V3,A2:49,00:50,C1,L1,M0,I1,J0,S1,R0,T:S,V:0,N:1,I0,r0,Q0,U0,p1,b0,m0,mse,c1280x720,a16:9,W0:0:1280:720,w64:3
2010-07-23	10:40:30	&
2010-07-23	10:40:30	?
2010-07-23	10:40:29	+ma
2010-07-23	10:40:29	\$-24.8,-24.8,0.0,0.0
2010-07-23	10:40:29	&
2010-07-23	10:40:29	ma
2010-07-23	10:40:29	+?
2010-07-23	10:40:29	*E:0,G2,V3,A2:49,00:50,C1,L1,M0,I1,J0,S1,R0,T:S,V:0,N:1,I0,r0,Q0,U0,p1,b0,m0,mse,c1280x720,a16:9,W0:0:1280:720,w64:3

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Streaming on channel 1
1 participant

Sending video 1280x720 29.9fps 1027kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

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3.10.3. Download Logs

Log reporting is an important tool which NCast uses to diagnose any problems, whether they hardware or software, bugs or operational issues. When reporting a problem, please click on the "Download Logs" button

which will create a .zip file of recently logged activity. Make a note of the time of the incident (if known) and forward this information to NCast for analysis.

3.11. UPDATE TOOL

The Update Tool page lists the current release(s) of software available for this Presentation Recorder. If no information is listed then there is a problem reaching the update server. The Update Tool requires HTTP access to the external Internet to function correctly. If this access is firewalled or if the HTTP proxy settings are not correctly employed, then update listings and software updates are not available. There may also be a problem with the settings for the DNS servers as well.

The screenshot shows the NCast web interface. At the top left is the NCast logo with the tagline 'TAKE STREAMING FURTHER'. At the top right, it says 'Current User: Admin' with a 'Logout' button. Below the logo is a navigation bar with tabs: View, Viewers, Session, Channels, Archives, Sources, Configuration. The 'Configuration' tab is selected, and within it, the 'Update' sub-tab is active. The main content area is titled 'SOFTWARE UPDATE' and contains the text 'Consult with NCast Corporation before downloading an update.' Below this is a table with two columns: 'Release name' and 'Date'. The table lists one release: '6.1.7' with the date 'April 6, 2011'. Below the table is an 'Update' button. At the bottom of the interface, there is a status bar showing 'Idle' on the left and 'Main input: 720x240i@60Hz' and 'PIP input: no signal' on the right. The footer of the page says 'NCast Copyright © 2011'.

Once the “Update” button is pressed the Presentation Recorder downloads a list of required files and their timestamps. Files which are missing or out-of-date are downloaded and installed. The unit will then reboot and becomes ready for service again with the new software release.


Configuration files are not altered during this process. All Unit, Channel, Source and other settings should remain intact through this update.

File system verification and new file download may take some time, so allow the unit to reboot on its own and do not prematurely hit the reset switch as that could damage the filesystem and cause the unit to fail to restart.

4. The Channel Table

4.1. CHANNEL SETTINGS

A channel is a collection of parameter settings that defines the operating characteristics for a streaming, webcast or collaborative session. Just as Channel 2 on your TV defines the video carrier to be “55.25 MHz.”, Channel 2 on a Presentation Recorder might define the graphics multicast address to be “239.192.0.1”. There are many parameters associated with a channel, items like the video and audio multicast or unicast addresses, port numbers, MTU’s, codecs, bit rates, layouts, overlays and modes of operation. Think of a channel as a type of “preset” for all of those parameters. There are 100 channels allowed, so 100 different presets are available for definition.


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CHANNELS

No.	Name	Type	Bitrate (kbps)	Framerate (fps)			
1	MIT Club of Northern California	Streaming	2564	30	Modify	Export	Import
2	Telemedicine	Streaming	1064	30	Modify	Export	Import
3	NCast Webcast	Streaming	814	30	Modify	Export	Import
4	House of Worship Demo	Streaming	1064	30	Modify	Export	Import
5	Streaming 5	Streaming	1088	10	Modify	Export	Import
6	Collaboration - Master	Collaboration	1088	30	Modify	Export	Import
7	Streaming 7	Streaming	1088	10	Modify	Export	Import
8	Snader Expo	Streaming	2564	30	Modify	Export	Import
9	Streaming 9	Streaming	1088	10	Modify	Export	Import
10	Financial Demo	Streaming	1064	30	Modify	Export	Import
11	Streaming 11	Streaming	1088	10	Modify	Export	Import
12	Streaming 12	Streaming	1088	10	Modify	Export	Import
13	Streaming 13	Streaming	1088	10	Modify	Export	Import
14	Streaming 14	Streaming	1088	10	Modify	Export	Import
15	Mizzen Houston A/V Expo	Streaming	2564	30	Modify	Export	Import
16	Streaming 16	Streaming	1088	10	Modify	Export	Import
17	Streaming 17	Streaming	1088	10	Modify	Export	Import
18	Streaming 18	Streaming	1088	10	Modify	Export	Import
19	Enright Sojourn Shows - Flash	Streaming	564	30	Modify	Export	Import
20	Enright Sojourn Shows	Streaming	1064	30	Modify	Export	Import
21	Cenic 2010 A	Streaming	2564	30	Modify	Export	Import
22	Cenic 2010 B	Streaming	2564	30	Modify	Export	Import

Automatic unicast on channel 3
1 participant
Sending video 1280x720 30.0fps 758kbps and audio
44kHz Mono 64kbps
Main input: 1024x768@60Hz
PiP input: 720x240@60Hz

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Once the channel settings have been established, typically by the administrator of the Presentation Recorder, or maybe the IT or Network department within an organization, they will not be changed by ordinary users of the Presentation Recorder. The user is instructed to “Use Channel 2” and no further detailed instructions are required.

When a Channel is started the Presentation Recorder begins its broadcast or recording Session. All of the many Channel parameters are transferred to the working Session parameters and the encoding and layout parameters defined by the Channel become the current encoding mode and layout of the Presentation Recorder. Any changes or updates to the Channel Table have no effect on the Session until the next Session start.

Session parameters which may be changed or updated appear on the Sources page and on the Custom page. Windows and Overlays may be altered during a Session, but the initial Frame size and aspect ratio may not change. The Frame size **MUST** remain fixed during a Session.

4.1.1. Channel Initiation

At the left edge of each channel listed is an activation button. Pressing this button activates all the parameters for the Channel and a new Session based on these settings is started.

4.1.2. Channel Modification

Setup of a Channel is divided into seven parts:

- General – Channel name and network parameters
- Recording – Recording options and archive naming
- Layout – Frame size and placement of the Main and PIP windows
- Image Overlays – Definition of graphical overlay images to be used
- Text Overlays – Definition of text overlays to be used
- Upload – FTP or Secure FTP server names and passwords
- Notifications – E-mail reports of important Channel events

The paragraphs which follow describe in detail each of these parts.


4.1.3. Channel Export/Import

A Channel's setup with all required parameters and settings may be exported to a .zip file. This provides for off-line backup. Use of the Import button allows restoration of the channel, or copying of the parameters from one channel to another.

4.2. CHANNEL SETTINGS - GENERAL

4.2.1. Channel Name

Each channel can be assigned a name, and these names can reflect the functional use of the channel. For example, "International Sales Team Update" for corporate usage, "Engineering Collaboration" in the case of departmental usage, "San Francisco" designating some geographical assignments, or "Chemistry 101" designating course related usage.



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CHANNEL 3 SETTINGS - GENERAL

Name:	<input type="text" value="N*Cast Webcast"/>			Auto start:	<input checked="" type="checkbox"/>
Type:	<input type="text" value="Streaming (send)"/>			Show thumbnail:	<input checked="" type="checkbox"/>
Video format:	<input type="text" value="H.264"/>			Advanced settings:	<input type="checkbox"/>
Video bitrate (kbps) & framerate (fps):	<input type="text" value="750"/>	<input type="text" value="30"/>			
Audio format:	<input type="text" value="44 kHz Mono, 64 kbps"/>				
Video address & port & MTU:	<input type="text" value="239.192.0.2"/>	<input type="text" value="10020"/>	<input type="text" value="1500"/>		
Audio address & port & MTU:	<input type="text" value="239.192.2.2"/>	<input type="text" value="11020"/>	<input type="text" value="1500"/>		
TTL:	<input type="text" value="15"/>				

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Automatic unicast on channel 3
1 participant

Sending video 1280x720 30.0fps 745kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

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As a specific example, a Presentation Recorder might set up the following 3 channel assignments:

Channel 1 – The PR-720 unit transmits using multicast address 239.192.0.0

Channel 2 – The PR-720 unit receives using multicast address 239.192.0.0

Channel 3 – The PR-720 unit initiates an Automatic Unicast to the required CDN.

Enter a descriptive name for the channel. This could be by department “Engineering”, by location “Sunnyvale”, by content “HR Training”, by bit-rate “High Resolution Webcast”, by arbitrary token “Red”, or any other scheme that makes sense to the administrators or users.

4.2.2. Channel Type

The PR-720 has four basic modes of operation:

- **Recording** – The unit is placed into record-only mode. No stream for internet use is generated. This mode enables the highest quality capture at the highest frame rates.
- **Streaming Send** – The unit will be transmitting in a one-way, one-to-many session to other units or remote desktops. Recording in all streaming modes is a configurable option.
- **Streaming Receive** – The unit will be receiving a transmission from some other source on this address.
- **Automatic Unicast** – The unit will utilize the services of a streaming server for rebroadcast (reflection) of the incoming stream. Through use of the RTSP protocol an announcement is sent to the server indicating a new streaming session is starting. Recording in all streaming modes is a configurable option.

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CHANNEL 1 SETTINGS - GENERAL

Name:

Type: ☐ Auto start:

Video format: ☐ Advanced settings:

Video bitrate (kbps) & framerate (fps):

Audio format:

Video address & port & MTU:

Audio address & port & MTU:

TTL:

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Idle Main input: 720x240i@60Hz
PIP input: no signal

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4.2.3. Video Format

Select the type of compression encoding desired. The two choices:

- MPEG-4 (MPEG-4 Part 2 encoding, original MPEG standard)
- H.264 (MPEG-4 Part 10 encoding, latest industry standard)

4.2.4. Video Address

An address entered for Video (the Video or Graphics media stream) will be either a valid multicast address, or the numeric host IP address of the remote unit if a point-to-point connection is being established.

A full discussion of multicast addressing is beyond the scope of this document, but briefly summarized, there are three classes of multicast addresses typically used by multicast applications:

- **Global Addresses** – The range of multicast addresses 224.0.1.0-238.255.255.255 are used for global communications. These addresses are dynamically allocated and not statically reserved. These addresses are unsuited for static assignment in the Channel Table.
- **GLOP Addresses** – A document, IETF RFC 3180, describes a mechanism for statically assigned multicast addresses in the address space 233/8 based on a formula that incorporates the Autonomous System (AS) number in the middle two octets. The AS number is owned by the ISP providing service to the account and use of a GLOP address must be coordinated with that ISP.
- **Administratively Scoped Addresses** – The multicast address range of 239.0.0.0 to 239.255.255.255 has been defined to be a range of administratively scoped multicast addresses in IETF RFC 2365. These addresses may be statically assigned by the administrator of an organization's network, and there will be no conflict with other organization's use of these addresses because border routers on the edge of an organization's network enforce policies to stop multicast traffic flow for addresses within this range. Further, these same border routers can enforce policies so that subsets of these addresses are contained within administrative boundaries, such as a local LAN, a building, a campus or a region. These are safe addresses to use in setting up an organization's multicast network and ideal entries for use in the Channel Table. Consult with the Network Administrator for the particular address ranges in use on the network hosting the Presentation Recorder.

All units in one session use the same multicast address. The Video, Audio and Collaboration multicast addresses for a session can be the same if the Port numbers are different. Units engaged in different sessions should use different multicast addresses to minimize traffic loading on the network (the multicast routers distribute all traffic to all points subscribed on a particular multicast address, independent of the port number).

The default settings for a Presentation Recorder use Administratively-Scoped multicast addresses. This implies that streams created using these addresses will not exit the organization's network.

If the network is not multicast enabled, point-to-point communications between two Presentation Recorders is possible by entering the numeric IP address of the remote unit into this field.

To disable multicasting of a session (e.g. in a record-only situation), set all multicast addresses to "127.0.0.1".

4.2.5. Video Port

In addition to a multicast address, each media stream requires a unique port to be assigned. Ports must be even-numbered (the succeeding odd number is used for control purposes and must be available). Port numbers range from 1024 to 65,535 and this range is divided into two parts: the Registered Ports are those from 1024 through 49151 and Dynamic and/or Private Ports are those from 49152 through 65535.

In practice, multicast applications assign port numbers in the range of 5002 and up. The port range 1024-5000 is typically used by a Unix system to assign ports to applications desiring an automatically generated port number.

Even if different multicast addresses are being used, it is recommended that different port numbers be used for the different media streams (graphics, audio and collaboration). On some system implementations, use of the same port number will cause errors.

For multicast traffic to get through a firewall, the even-odd pair defined in this entry must be opened by the firewall administrator.

4.2.6. Video Bit-rate

The video bit-rate in kilobits-per-second defines the maximum bit-rate that the encoders may utilize in creating the media stream. For static images the bit-rate may decrease from this peak level.

The following table lists the absolute minimum recommended bit-rates for high frame-rates:

<i>Resolution</i>	<i>Minimum Bit-rate</i>	<i>Preferred Bit-rate</i>
QVGA (320x240)	128 kbps	192 kbps
VGA (640x480)	220 kbps	330 kbps
SVGA (800x600)	310 kbps	465 kbps
HD720 (1280x720)	550 kbps	800 kbps

Settings below these values will generate pixelation and other visual artifacts in the received image. Also, use of the minimum bit-rates will increase end-to-end latency, may reduce the visual clarity of the image and introduce lip-synch problems. As with any other type of compression system, there is a complex interaction between bit-rate, frame-rate, image resolution, and end-to-end latency. For HD720 images, settings above 1000 kbps generally produce excellent results. The lowest latency is achieved by setting the bit-rate to the maximum permitted, which is 5,000 kbps.

Reducing the bit-rate, frame-rate and resolution will allow older PCs operating at lower performance levels to decode the received imagery without skips and stutters. For the full frame-rate and bit-rate at HD720 resolutions modern PCs in the 2 GHz.+ class are required.

For the lowest bit rate, 128 kbps, a resolution of 640x480 and a frame-rate of 5 frames/second for graphics or 10 frames/second for video are recommended.

There is no way to define the optimum settings for a given application. It depends on the material being presented, the expectations for motion smoothness and embedded video performance, the equipment available to the receiving audience, the maximum network bandwidth available, and other factors. The only way to determine the optimum settings for a particular installation is to run tests on the material being presented using the network at hand.

4.2.7. Video Frame-rate

The video frame-rate represents the number of frame (visual image) grabs per second the system will attempt to achieve. The range of this setting is 1-30 frames per second. For NTSC video encoding a full 30 frames/second is achieved.

At HD720 resolutions, dropping the frame rate to lower values (5 frames/second, for example) allows a broader range of lower performance PCs to successfully decode the received presentations. It also reduces the required network bandwidth. At these rates, however, cursor movements look somewhat jerky and embedded video clips do not play well. One tradeoff might be to send a lower resolution (SVGA, 800x600) image at a higher frame-rate.

At settings of 10 frames/second cursor movement and drop-down menus look natural, but video still suffers. At 15 frames/second video playback starts to become acceptable, but high-motion imagery has detectable artifacts. At the higher rates of 20 frames/second and up both the video and graphics performance look natural. These high frame-rates deliver smooth animation and video playback that most viewers will find acceptable.

4.2.8. Video MTU

The Maximum Transmission Unit (MTU) is the maximum length of a packet and is normally set to 1500. For some special circuits (satellite links, others) the maximum size may need to be adjusted downward to avoid packet fragmentation, which leads to inefficiencies and possible packet loss.

4.2.9. Audio Address

An address entered for Audio (the Audio media stream) will be either a valid multicast address, or the numeric host IP address of the remote unit if a point-to-point connection is being established.

For a discussion of multicast addresses, see the discussion above (Graphics addresses).

All units in one session use the same multicast address. The Graphics, Audio and Collaboration multicast addresses for a session can be the same if the Port numbers are different. Units engaged in different sessions should use different multicast addresses to minimize traffic loading on the network (the multicast routers distribute all traffic to all points subscribed on a particular multicast address, independent of the port number).

If the network is not multicast enabled, point-to-point communications between two Presentation Recorders is possible by entering the numeric IP address of the remote unit into this field.

To disable multicasting of a session (e.g. in a record-only situation), set all multicast addresses to "127.0.0.1".

4.2.10. Audio Port

The port number assigned to the audio media stream.

See the discussion above (Graphics ports) for more detailed information on ports.

4.2.11. Audio Format

This menu pulldown selects the bandwidth and encoding properties of the audio media stream associated with the graphics stream. All audio is encoded in the Advanced Audio Coding (AAC) format. Different bit-rates and an optional stereo setting provide for a wide selection of audio formats to be associated with the graphics media stream.

<i>Sample Rate</i>	<i>Channels</i>	<i>Bit Rate</i>	<i>Quality</i>
11 kHz.	Mono	16 kbps.	Phone
22 kHz.	Mono	32 kbps.	FM radio
44 kHz.	Mono	64 kbps.	CD
44 kHz.	Stereo	128 kbps.	Stereo CD

If audio is not to be transmitted or recorded, it may be disabled here as well.

If recording in Mono and using the Line input, make sure that active audio is available on the LEFT channel.

4.2.12. Audio MTU

The Maximum Transmission Unit (MTU) is the maximum length of a packet and is normally set to 1500. For some special circuits (satellite links, others) the maximum size may need to be adjusted downward to avoid packet fragmentation, which leads to inefficiencies and possible packet loss.

When using N-Way bridging, this value should be set to 1476.

4.2.13. Time-to-Live (TTL)

The time-to-live defines the number of router hops that will be valid for a packet. When the number of hops is exceeded, the packet is discarded. The minimum value for this field is 1, and a value of 127 or greater should be used for global transmission.

In some multicast networks TTL defines the "scope" or boundary conditions for containment of the multicast traffic flow. The following table lists commonly accepted values of TTL used in this manner.

TTL	Scope
0	Restricted to the same host. Won't be output by any interface.
1	Restricted to the same subnet. Won't be forwarded by a router.
<32	Restricted to the same site, organization or department.
<64	Restricted to the same region.
<128	Restricted to the same continent.
<255	Unrestricted in scope. Global.

TTL scopes, however, have fallen into disfavor, and current practice recommends use of administratively scoped addresses for containment of multicast traffic flows.

4.2.14. Automatic Unicast

This Channel Type enables automatic transfer of a Presentation Recorder's SDP file to a streaming server (e.g. a QTSS/DSS server). The transfer is accomplished by RTSP ANNOUNCE commands sent from a Presentation Recorder RTSP client to the server. The system makes sure that the latest version of the SDP file is always on the server (SDP files describe the media being streamed and other details such as port assignments).

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CHANNEL 3 SETTINGS - GENERAL

Name: NCast Webcast

Type: Automatic Unicast

Video format: H.264

Video bitrate (kbps) & framerate (fps): 750 | 30

Audio format: 44 kHz Mono, 64 kbps

Video MTU & audio MTU: 1500 | 1500

RTSP server & port: nway.ncast.com | 1935

RTSP username: telepresenter

RTSP password: *****

SDP filename: ncaststreaming/ncast.sdp

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Auto start: ☒

Advanced settings: ☐

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Automatic unicast on channel 3
1 participant

Sending video 1280x720 30.0fps 748kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

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Typically the SDP file is transferred when a session starts and during the session when the SDP file changes. The Presentation Recorder issues "Announced kill" when a session has ended.

4.2.15. Configuration

The following parameters related to the Announce capability are available:

- RTSP server - IP address or name of the streaming (QTSS/DSS, NWay, Flash) server
- RTSP port - server RTSP port number (554 for QTSS/DSS, 1935 for Flash)
- Username - server username for the SDP file save authorization (can be empty if authorization is not used)
- Password - server password for SDP file save authorization (can be empty if authorization is not used)
- SDP filename – the name under which the SDP file is saved by the server. Should have a .sdp extension. The names should be unique for each Presentation Recorder accessing a reflecting server.

4.2.16. Auto-Start

If the “Auto-Start” checkbox is enabled on a Channel, then Session activity for that Channel will automatically resume when the unit is rebooted or restarted after a power failure.

4.2.17. Show Thumbnail

If this box is checked, a thumbnail image of the current capture will appear on the View page. Thumbnails are only available in Streaming Send mode. Uncheck this box if video/graphic material being streamed needs to be kept private.

4.2.18. Advanced Channel Settings

For additional tuning of the channel parameters an Advanced channel settings button may be activated. The entry fields on the page change when the Advanced checkbox is clicked:

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CHANNEL 1 SETTINGS - GENERAL

Name:	<input type="text" value="Streaming 1"/>	Auto start:	<input type="checkbox"/>
Type:	<div style="border: 1px solid black; padding: 2px;">Automatic Unicast</div>	Advanced settings:	<input checked="" type="checkbox"/>
Video format:	<div style="border: 1px solid black; padding: 2px;">H.264</div>	Bandwidth smoothing:	<input checked="" type="checkbox"/>
Video bitrate (kbps) & framerate (fps):	<div style="display: flex; border: 1px solid black; padding: 2px;"> <div style="flex: 1; border-right: 1px solid black; text-align: center;">1024</div> <div style="flex: 1; text-align: center;">30</div> </div>		
Video key frame interval:	<div style="border: 1px solid black; padding: 2px;">10 secs</div>		
Video min quantizer:	<div style="border: 1px solid black; padding: 2px;">10</div>		
Video max quantizer:	<div style="border: 1px solid black; padding: 2px;">51 (worst quality)</div>		
Video CBR buffer size:	<div style="border: 1px solid black; padding: 2px;">1.0 sec</div>		
Audio format:	<div style="border: 1px solid black; padding: 2px;">44 kHz Mono, 64 kbps</div>		
Max audio frames in packet:	<div style="border: 1px solid black; padding: 2px;">8</div>		
Video MTU & audio MTU:	<div style="display: flex; border: 1px solid black; padding: 2px;"> <div style="flex: 1; border-right: 1px solid black; text-align: center;">1500</div> <div style="flex: 1; text-align: center;">1500</div> </div>		
RTSP server & port:	<div style="display: flex; border: 1px solid black; padding: 2px;"> <div style="flex: 1; border-right: 1px solid black; text-align: center;">nway.ncast.com</div> <div style="flex: 1; text-align: center;">1935</div> </div>		
RTSP username:	<div style="border: 1px solid black; padding: 2px;">telepresenter</div>		
RTSP password:	<div style="border: 1px solid black; padding: 2px;">*****</div>		
SDP filename:	<div style="border: 1px solid black; padding: 2px;">ncaststreaming/ncast.sdp</div>		

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Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1026kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PiP input: no signal

4.2.19. Bandwidth Smoothing

If enabled, the encoder smooths the stream transmission and sends packets at the prescribed target bit rate (this is the default setting). This will increase network jitter and latency. If disabled, the encoder uses burst transmission by sending all packets immediately after encoding. This will significantly decrease network jitter and latency, but, depending on network connection, it can cause packet loss and bottlenecks. If burst

network transmission is acceptable, it is possible to disable this option to get extra low video latency. This is a video encoder option - it doesn't affect the decoder.

4.2.20. Graphics Quantizer

These options set minimum and maximum video quality. The valid range is from 1 (best quality) to 31 (worst quality). The default range is 2-31 for MPEG-4. For H.264 the range is 0-51 (default is 10-51). Decreasing min quantizer will increase the maximum possible video quality, and increasing min quantizer will decrease the maximum possible video quality. Increasing max quantizer will decrease minimum permitted video quality. Increasing max quantizer too much may cause the encoder to skip frames in order to maintain the target framerate. This is a video encoder option - it doesn't affect the decoder.

4.2.21. Graphics CBR Buffer

Sets the Constant Bit Rate buffer size in seconds. This controls how much the bit-rate can vary locally. A larger buffer size results in higher overall video quality and less frame skips, but increases the video latency. This is a video encoder option - it doesn't affect the decoder.

4.2.22. Audio Frames

Sets how many AAC frames can be sent in one packet. The default value is 8. The valid range is from 1 to 10. Lower values result in lower network jitter and lower latency, but higher network overhead (each packet contains additional headers). Set to 1 to achieve extra low audio latency. This is an audio encoder option - it doesn't affect the decoder.

4.2.23. Audio/Video Synchronization

This option is only visible if the Channel is set to "Full-duplex" or "Receive". If enabled, audio and video is synchronized during playback to maintain lip-sync (this is the default setting). If disabled, audio and video is not synchronized during playback. In typical configuration audio will be played ahead of video. If lip-sync is not needed, disable this option to get lower audio or video latency. This is a decoder option - it doesn't affect the encoder.

4.2.24. Burst Video Playback

This option is only visible if the Channel is set to "Full-duplex" or "Receive" and is only available if "Audio/Video Synchronization" is disabled. If enabled, the decoder forces video frames to playback immediately after being received. This will result in lower video latency, but video playback will be jumpy due to encoder and network jitter. If disabled, video frames are delayed to achieve smooth and fluid video playback (this is the default setting). If jumpy video playback is acceptable, disable this option to get the lowest video latency. This is a video decoder option - it doesn't affect the encoder.

4.3. CHANNEL SETTINGS - RECORDING

4.3.1. Recording Options

Three options are available for control of recording:

Manual – Recording must be started and stopped by the user via controls on the Session page or by the room controller via one of the serial interfaces.

Auto – Recording starts and stops when the Session starts and stops.

Disabled – Recording is not permitted on this channel.

4.3.2. Max Recording Time

The Maximum Recording Time specifies when a recording should be unconditionally stopped. This value is used to prevent "runaway" recordings where the presenter forgets to press the Stop button on the control panel interface and the unit might be left recording all weekend long. The time value is in minutes and the default is 10 hours.

4.3.3. Archive Filename

The default archived filename is of the form

20071119-143206-001.mp4

which represents the start time of the recording through use of the fields: *year, month, day, hours, minutes, seconds, channel-number, filetype*.

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CHANNEL 1 SETTINGS - RECORDING

Recording:	<input type="text" value="Manual"/>	Add MP4 hint tracks:	<input checked="" type="checkbox"/>
Max recording time (min):	<input type="text" value="600"/>	Optimize MP4 layout:	<input checked="" type="checkbox"/>
Archive filename:	<input type="text" value="%Y%m%d-%H%M%S-%n"/>		
Archive title:	<input type="text" value="NCast Installation Demonstration"/>		
Archive presenter:	<input type="text" value="NCast Staff"/>		
Archive description:	<input type="text" value="This movie demonstrates steps r"/>		

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Idle
Main input: 720x240i@60Hz
PIP input: no signal

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This default filename format may be altered to reflect more customized filenames through use of a formatting string utilizing any of the following codes:

- %a** - abbreviated weekday name
- %b** - abbreviated month name
- %c** - 4 digit counter
- %C** - 6 digit counter
- %d** - day of the month (01 to 31)
- %H** - 24 hour clock (00 to 23)
- %I** - 12 hour clock (01 to 12)
- %m** - month (01 to 12)
- %M** - minute (00 to 59)
- %n** - channel number (001 to 100)
- %p** - AM or PM
- %P** - am or pm
- %S** - seconds (00 to 61)
- %Y** - year
- %%** - %

For example, if a Presentation Recorder user wishes to create a custom filename for the “Accounting 101” series of lectures, the following filename formatting string might be used:

Acct101-%Y-%m-%d

This will create filenames of the form:

Acct101-2007-11-19.mp4

Acct101-2007-11-21.mp4

Acct101-2007-11-23.mp4

...

Using this formatting notation, the default value of the format string for standard archive filenames is this:

%Y%m%d-%H%M%S-%n

The counter variables start at 0001 or 000001 and go to 9999 or 999999. Only one counter variable is permitted per filename. The counter's next value is calculated by scanning existing archives which match the filename template. The filename with highest counter value is discovered and the counter value found is incremented by one. If all files are removed the counters will start again from 1.

If a newly created archive filename conflicts with an existing archive, a suffix *_n* (*_1*, *_2*, *_3*, ...) is added to the new name to avoid overwriting an existing file.

4.3.4. Archive Title

Enter information about the Title of the session being recorded (e.g. class or course number, conference session title, meeting name, etc.). This information is entered as meta-data about the recorded archive and will be captured in the .xml data file associated with the archive.

4.3.5. Archive Presenter

Enter information about the Presenter of the session being recorded (e.g. class professor or instructor, conference session speaker, meeting chairperson, etc.). This information is entered as meta-data about the recorded archive and will be captured in the .xml data file associated with the archive.

4.3.6. Archive Description

Enter additional descriptive details about the event, the presenter, the topic or background of the recording. This description field will be used, for example, in automatically creating RSS feeds for the recording once it has been uploaded to an N-Way server.

4.3.7. Add MP4 Hint Tracks

Streaming servers require some additional information about the contents of a media file to optimize delivery for remote clients. An additional track, called a hint track, contains this information. If the file is to be used with a streaming server this option must be checked. If streaming is not required, uncheck to save on file processing and to reduce the file size.

4.3.8. Optimize MP4 Layout

Sometimes a media file is placed on a web server and is played without the assistance of a streaming server. In such instances the location of the media data required for progressive download needs to be optimized. Optimization rearranges the audio and video blocks within the file. Optimization does not significantly affect the size of a file, but adds slightly to the post-Session processing time required. Uncheck this box if files will not be used in progressive download environments.

4.4. CHANNEL SETTINGS - LAYOUT

4.4.1. Frame Size

The Frame Size defines the dimensions of the Frame, a surface (capture surface or "the canvas") which is the primary imaging surface on which the composite image (Main window + PIP window + Overlays) is drawn. The resolution and aspect ratio of the transmitted or archived media stream aligns exactly with the resolution and aspect ratio of the Frame. Consequently, selection of one of the default frame sizes and aspect ratios, or definition of a custom Frame Size and possibly a custom Aspect Ratio is the first step in defining the format of the media stream which will be produced by the Presentation Recorder. The Frame can have any dimension or aspect ratio, with the limitation that the maximum dimensions are 1280 x 720.

Once the frame is defined, the next step is the (X,Y) placement and (W,H) sizing of the primary or "Main" image stream. Typically the "Main" stream is sized at "Full-screen" which means that the primary stream is scaled to the full dimensions of the frame. It is useful to note, however, that the primary stream can be dimensioned to a smaller size than the full frame size. The unused space might then be reserved for the

secondary image stream (the PIP image, but placed outside the boundaries of the Main image) and possibly an overlay graphic. A “Main” and “PIP” side-by-side composition would also dictate that the Main image only occupies one-half of the capture surface area.

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CHANNEL 3 SETTINGS - LAYOUT

Frame size:	<div>HD720 - 1280 × 720</div>	PIP:	<input checked="" type="checkbox"/>
Aspect ratio:	<div>16:9</div>	PIP border:	<input type="checkbox"/>
Main window:	<div>Custom</div>		
Main window (X/Y/W/H):	<div>320 0 960 720</div>		
PIP window:	<div>Custom</div>		
PIP window (X/Y/W/H):	<div>0 0 320 240</div>		

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Automatic unicast on channel 3
1 participant

Sending video 1280×720 30.0fps 743kbps and audio
44kHz Mono 64kbps

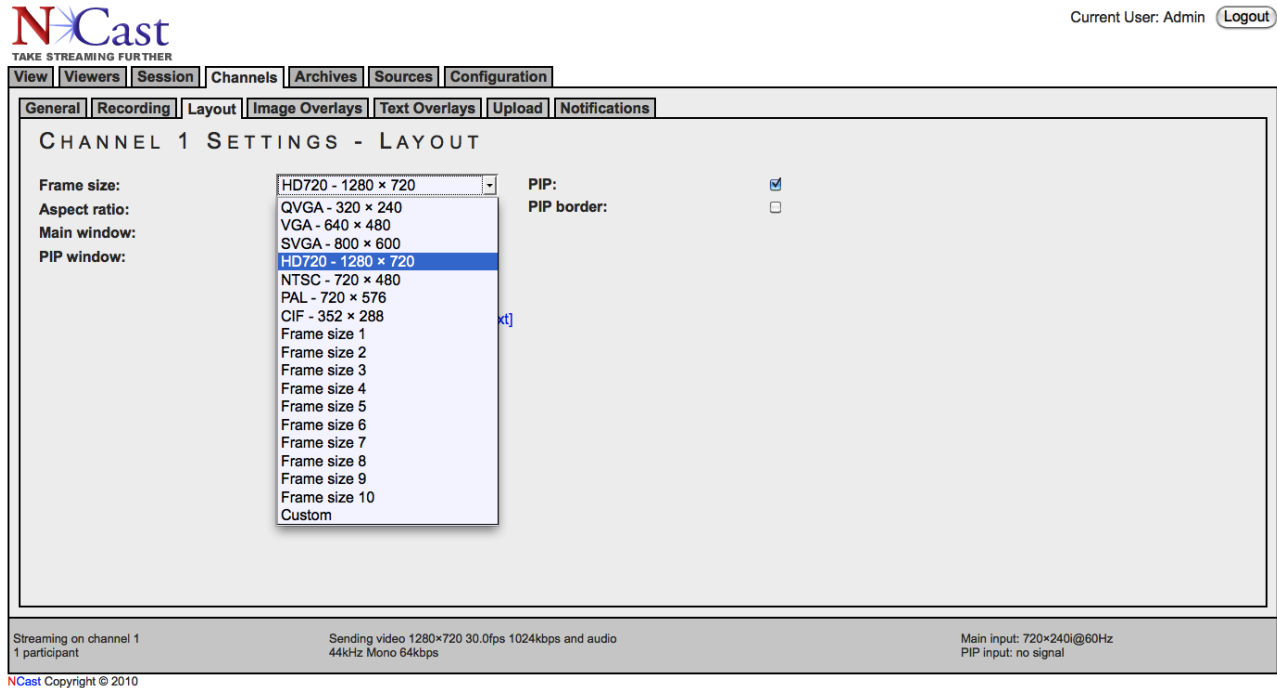
Main input: 1024×768@60Hz
PIP input: 720×240@60Hz

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Next, if the secondary “PIP” stream is enabled, its (X,Y) placement and (W,H) dimensions are overlaid on the frame. Typically this might be in the upper-right or lower-right corner of the frame. The PR-720 Series user has the option of determining if the PIP window obscures any portion of the Main window. It can be placed on top of or outside of the Main image.

Finally, the Overlay Graphics or Text Overlays, if preloaded and enabled, are added to the composition. These graphics would usually be a corporate or organizational logo, a trademark or watermark, a course descriptor or content designator, and possibly a copyright or other statement about the media stream being transmitted or archived.

Once this content has been composited and created, it is handed off to the compression codecs for transmission to the outside or for archiving.



In a typical conference it is quite common to have different input resolutions during the course of one session (graphical input from laptops set for SVGA and XGA resolution, and video input from a camera). These different resolution images can be transmitted in their native dimensions, or stretched or shrunk to some common size for the webcast or the recording. The setting of the Main and PIP Windows controls this process and the implications of these settings are explained below:

Graphics Capture Size	Results
QVGA, VGA, SVGA, HD720, ...	The media streams and archive files are sent/kept in the resolution selected, Captured images which are larger or smaller than the selected Frame Size are automatically scaled to the Window dimensions specified by the Main and PIP settings.
Frame size n	The media streams and archive files are sent/kept in a custom resolution. Custom resolutions allow for non-standard images of user defined width and height. The Custom menu under the Configuration tab allows setting of these non-standard frame sizes.

4.4.2. Aspect Ratio

The aspect ratio of an image is the visual width divided by the visual height. For most computer systems "square pixels" are displayed, so the aspect ratio of the image is the pixel width divided by the pixel height. In video systems, however, often "non-square" pixels are displayed and the aspect ratio differs from the pixel width to height ratio. The Frame size (see 4.4 above) only determines the pixel dimensions of an image. For proper display the aspect ratio must be specified and used to render the final image.

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CHANNEL 3 SETTINGS - LAYOUT

Frame size:
Aspect ratio:
Main window:
Main window (X/Y/W/H):
PIP window:
PIP window (X/Y/W/H):

HD720 - 1280 x 720

16:9

Square pixel

5:4

4:3

5:3

16:10

16:9

Aspect ratio 1

Aspect ratio 2

Aspect ratio 3

Aspect ratio 4

Aspect ratio 5

Aspect ratio 6

Aspect ratio 7

Aspect ratio 8

Aspect ratio 9

Aspect ratio 10

Custom

PIP:

PIP border:

☒

☐

Automatic unicast on channel 3
1 participant

Sending video 1280x720 30.0fps 758kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

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This menu selection item allows specification of five standard aspect ratios and ten custom aspect ratios (which are defined in the Custom menu under the Configuration tab). “Square pixel” derives the aspect ratio from the given capture width and height.

4.4.3. Main Video/Graphics Window

This pull-down menu specifies the positioning of the primary (Main) image input onto the capture surface. The most common selection would be “Full-screen”, but in some situations a side-by-side image (Left half, Right half) might be desirable, or the Main image might be temporarily utilized as the video overlay (picture-in-picture), in which case one of the corner settings (Top-left, Top-right, Bottom-left, Bottom-right) would be chosen.

The custom window selections (Window 1, Window 2, ...) allow for placement of the primary and secondary images in arrangements not covered by the standard selections. These window sizes and positions are specified on the Custom tab under the Configuration menu.

A key concept to understand this hardware implementation is to realize that the “Main” and “PIP” channels are really independent and nearly equal in functionality, and could have just as well been called “A” and “B”. We use the terminology “Main” and “PIP” to conceptually simplify the idea of one channel overlaying another, but in reality both input channels are basically equivalent in character and operation. The primary differences are that the PIP channel will overlay the Main, and the Main channel does not have deinterlacing functions, which are available in the PIP channel.

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CHANNEL 3 SETTINGS - LAYOUT

Frame size:	HD720 - 1280 × 720	PIP:	<input checked="" type="checkbox"/>
Aspect ratio:	16:9	PIP border:	<input type="checkbox"/>
Main window:	Custom		
Main window (X/Y/W/H):	Full-screen		
PIP window:	Top-left corner		
PIP window (X/Y/W/H):	Top-right corner		
	Bottom-left corner		
	Bottom-right corner		
	Left half		
	Right half		
	Window 1		
	Window 2		
	Window 3		
	Window 4		
	Window 5		
	Window 6		
	Window 7		
	Window 8		
	Window 9		
	Window 10		
	Custom		

Automatic unicast on channel 3
1 participant

Sending video 1280×720 30.0fps 755kbps and audio
44kHz Mono 64kbps

Main input: 1024×768@60Hz
PIP input: 720×240@60Hz

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4.4.4. PIP Video/Graphics Window

This pull-down menu specifies the positioning of the secondary (PIP) image input onto the frame. The most common selection would be one of the corner settings (Top-left, Top-right, Bottom-left, Bottom-right).

The custom window selections (Window 1, Window 2, ...) allow for placement of the PIP window in arrangements not covered by the standard selections. These window sizes and positions are specified on the Custom tab under the Configuration menu.

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General **Recording** **Layout** **Image Overlays** **Text Overlays** **Upload** **Notifications**

CHANNEL 3 SETTINGS - LAYOUT

Frame size:	HD720 - 1280 × 720	PIP:	<input checked="" type="checkbox"/>
Aspect ratio:	16:9	PIP border:	<input type="checkbox"/>
Main window:	Custom		
Main window (X/Y/W/H):	320 0 960 720		
PIP window:	Custom		
PIP window (X/Y/W/H):	Full-screen		
	Top-left corner		
	Top-right corner		
	Bottom-left corner		
	Bottom-right corner		
	Left half		
	Right half		
	Window 1		
	Window 2		
	Window 3		
	Window 4		
	Window 5		
	Window 6		
	Window 7		
	Window 8		
	Window 9		
	Window 10		
	Custom		

Automatic unicast on channel 3
1 participant

Sending video 1280×720 30.0fps 755kbps and audio
44kHz Mono 64kbps

Main input: 1024×768@60Hz
PIP input: 720×240@60Hz

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4.5. CHANNEL SETTINGS – IMAGE OVERLAYS

Customized images may be added to the media stream being created. These images would typically be corporate or organizational logos, trademarks or watermarks, copyright statements, media content or date annotation, or descriptive information on the course or presentation being viewed (speaker, topic, etc.).

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CHANNEL 3 SETTINGS - IMAGE OVERLAYS

Overlay 1 details: N*CastWebcast.jpg

Overlay 2 details: N*CastWebcast.jpg

Overlay 3 details: N*CastWebcast.jpg

Overlay 4 details: N*CastGeneric.jpg

Overlay 1 (X/Y):	0	240	Enabled	▼
Overlay 2 (X/Y):	0	240	Disabled	▼
Overlay 3 (X/Y):	960	240	Disabled	▼
Overlay 4 (X/Y):	0	240	Disabled	▼

Overlay 1 to upload:

Overlay 2 to upload:

Overlay 3 to upload:

Overlay 4 to upload:

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Automatic unicast on channel 3
1 participant

Sending video 1280x720 30.0fps 750kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

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There can be up to four different Overlay images per Channel (100 images total). These images must be created in .jpg, .png, or .gif format (up to 230,400 pixels or 25% of the maximum screen size). Transparency in the alpha channel is not implemented.

4.5.1. Overlay n (X/Y)

The X,Y entries in these fields are integers (pixel values) or percents (of the Frame dimension). The X,Y offset defined will position the image relative to the top-left corner of the frame.

The enable/disable setting will cause the image to be included or not included in the composite media stream being created. More than one image (all four, in fact) may be included if required.

The Channel Table Image Overlays are transferred to the operating Session parameters at Session startup and thus initialize the image overlays used during the Session. Once a Session has started modifications to these entries have no effect until the next Session start.

Changes to the Image Overlay in use during a Session may be made from the Sources page (see Section 6.1) or from the Configuration menu (see Section 3.5).

4.5.2. Overlay n to upload

Use the “Browse ...” button to select the image file to be uploaded and then press the “Upload Files” button.

Overlay graphics can be uploaded dynamically, allowing scheduling tools and scripts to automatically change the presentation graphics and layouts at prescribed times (e.g. to conform to speaker times and track changes at a conference). See Section Error: Reference source not found for details on dynamic upload.

4.6. CHANNEL SETTINGS – TEXT OVERLAYS

Text Overlays are windows which contain text to be displayed on the frame. The text can be inserted from fields on administration web pages (Channel settings and the Configuration menu), or can be sent via serial

RS-232 or Serial Telnet IP commands. See the *Presentation Recorder Serial Interface Specification* for details on these commands.

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CHANNEL 3 SETTINGS - TEXT OVERLAY 1

State:
Text alignment:
Font size (pixels):
Foreground (R/G/B/A):

Window (X/Y/W/H):
Text wrapping:
Padding (pixels):
Background (R/G/B/A):

Text overlay 1

Text:

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Automatic unicast on channel 3
1 participant
Sending video 1280x720 30.0fps 736kbps and audio
44kHz Mono 64kbps
Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

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Text overlays can implement dynamically displayed text such a news tapes, stock tickers, closed captions, and for other purposes such as changing the name of the speaker for a presentation due to a last-minute change of presenters or participants

The Channel Table Text Overlays are transferred to the operating Session parameters at Session startup and thus initialize the text overlays used during the Session. Once a Session has started modifications to these entries have no effect until the next Session start.

Changes to the Text Overlay in use during a Session may be made from the Sources page (see Section 6.1) or from the Configuration menu (see Section 3.5).

4.6.1. State

The enable/disable setting will cause the text to be included or not included in the composite media stream being created. More than one text window (all four, in fact) may be included if required.

4.6.2. Window (X/Y/W/H)

The X,Y,W,H entries in these fields are integers (pixel values) or percents (of the Frame dimension). The X,Y offset defined will position the text window relative to the top-left corner of the frame. The W,H values define the window width and height.

4.6.3. Text alignment

Text may be aligned Left, Center or Right within the window.

4.6.4. Text wrapping

Text wrapping may be enabled or disabled.

4.6.5. Font size

This entry specifies the font size in pixels.

4.6.6. Padding in Pixels

Specifies a minimum distance (in pixels) between the frame of a window and the text. This option keeps the text from crowding or adjoining the edge of the window.

4.6.7. Foreground (R/G/B/A)

The (R,G,B) color values for the text and alpha value (transparency setting) for the characters are specified here. Values must be in the range 0-255. For transparency, 0 is fully transparent and 255 is opaque.

4.6.8. Background (R/G/B/A)

The (R,G,B) color values for the window background and alpha value (transparency setting) for the background matte are specified here. Values must be in the range 0-255. For transparency, 0 is fully transparent and 255 is opaque.

4.6.9. Text

The text to be displayed in the window. This text may include format strings (e.g. %H, %M, %S for hour, minute, and second) which are dynamically updated in the overlay on a regular basis.

4.6.10. Serial Commands

The text within a text overlay can be changed and frequently updated through use of serial commands. See the *Presentation Recorder Serial Interface Specification* for details.

- OT0 - disables all four text overlays
- OT[1|2|3|4],[0|1] - disables/enables given text overlay
- OS0 - sets empty text on all four text overlays
- OS[1|2|3|4],TEXT - set TEXT text on given text overlay

4.6.11. Format Strings

The following special codes are available for text overlays:

<i>Format String</i>	<i>Function</i>
%a	Abbreviated weekday name (for example Sun)
%A	Full weekday name (for example Sunday)
%b	Abbreviated month name (for example Jan)
%B	Full month name (for example January)
%d	Day of the month (01 to 31)
%D	Archive description
%H	Hour (00 to 23)
%I	Hour (01 to 12)
%k	Hour (0 to 23)
%l	Hour (0 to 12)
%L	Archive title
%m	Month (01 to 12)
%M	Minute (00 to 59)
%n	Channel number (001 to 100)
%N	Channel name
%p	AM/PM
%P	am/pm
%R	Archive presenter
%S	Second (00 to 60)
%T	Recording duration (for example 01:45:12)
%x	Date (for example 12/31/08)
%X	Time (for example 23:13:48)
%Y	Year (for example 2009)
%z	Numeric time zone (for example -4000)
%Z	Alphabetic time zone abbreviation (for example EDT)
%%	%

4.7. CHANNEL SETTINGS – UPLOAD

The Upload tab provides for automatic upload of archives to a streaming server using File Transfer Protocol (FTP) or Secure File Transfer Protocol (SFTP). Automatic upload transfers archives automatically at a scheduled time (or immediately after creating the archive).

The system marks an archive for automatic upload right after it was created if auto upload is enabled. If auto upload is disabled archives are not marked and will be not uploaded even when auto upload is later enabled. Archives marked for automatic upload will not start uploading when a session is active. The automatic upload mark is preserved after system shutdown or reboot.

Manual upload is available from the "Archives" tab, where a user may choose to upload one archive or all archives. Selected archive(s) will be marked for manual upload. Manual upload is executed immediately and can start when a session is active. The system will upload archives marked for manual upload before archives marked for automatic upload. The manual upload mark is not preserved after system shutdown or reboot. When the archive is being uploaded to the FTP server its transfer progress is shown on "Archives" tab.

Secure FTP (SFTP) is supported with password and private key authorization. It will first try to use private key and if it fails password authorization is used. Only SSH-2 protocol is supported. The private key should be in Open SSH's SSH-2 format or PuTTY's SSH-2 format or ssh.com's SSH-2 format and can't be password protected.

Secure retrieval of files is also possible through use of the HTTPS SSL encrypted interface, utilizing either the standard web page or the scripts documented in Section 9.3 on the HTTP interface.

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CHANNEL 3 SETTINGS - UPLOAD

Auto upload: Disabled

Start auto upload: Immediately

Remove after upload: ☐

Protocol: File Transfer Protocol

FTP server: nway.ncast.com

FTP port: 21

FTP anonymous login: ☐

FTP username: ftpuser

FTP password: *****

FTP upload directory:

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Automatic unicast on channel 3
1 participant

Sending video 1280x720 30.0fps 749kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

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4.7.1. Configuration

The following parameters related to FTP transfer are available:

- Auto upload - enable/disable automatic upload
- Start auto upload - schedules automatic upload. It will start immediately after capture or in the selected 2 hour time window (i.e. "After 18:00" means upload after 6:00 p.m., not after an 18 hour delay)
- Remove after upload - remove the archive after uploading it to the server
- Protocol – selects insecure (FTP) or secure (SFTP) protocol to use
- (S)FTP server - IP address or name of the FTP server
- (S)FTP port - FTP server port number

- (S)FTP username - FTP server username
- (S)FTP password - FTP server password
- FTP anonymous login - login as anonymous (username & password are not used)
- (S)FTP upload directory - directory where to upload archives, which may be absolute or relative
- Private key to upload – SSH2 secure key for use with the SFTP protocol

4.7.2. (S)FTP Upload Directory – Special Parameter

The (S)FTP upload directory name may include special codes (%n, %t) which will modify the directory name based on the Channel number or Transcode variable. For example, if the FTP upload directory path is written as:

pr720/Class-%n/archives

then for files completing a Channel 1 session the effective upload directory will be

pr720/Class-001/archives

and for files completing a Channel 2 session the effective upload directory will be

pr720/Class-002/archives

This provides for automatic placement of uploaded files into directories based on the channel number which was used for recording. Changing directories based on Channel number or Transcode variable may help ease the administration of many incoming files being recorded and uploaded by a single Presentation Recorder.

Directory based access rights (as implemented on the N-Way server) will automatically restrict viewers rights to the directory/channel for which they are entitled.

4.7.3. Connection Test

The PR-720 will try to connect to the (S)FTP server and list contents of the upload directory. It uses the current configuration of all parameters.

4.7.4. Multiple Upload Locations

The (S)FTP information is specified on a Channel basis. Since each Channel has its own unique (S)FTP information, different (S)FTP sites may be accessed by starting or using different Channels.

For example, if the Session starting at 9:00 am needs to be uploaded to Dept. A's server, and the Session starting at 10:00 am needs to be uploaded to Dept. B's server, this is easily accomplished by specifying different (S)FTP sites in the Channel Table. Or if some uploads go to a local, on-campus server and if other uploads go to a remote CDN server, the Channel Table settings may be used to differentiate the upload repository for each different recording.

Information about what Channel was used to record an archive is retained with the archive. If later, from the Archives page, a new upload or re-upload is requested, the system extracts current (S)FTP settings from the Channel Table entry and uses that (S)FTP site information to upload the recording. Thus, the "Upload All Archives" button may result in the transfer of existing archives to many different (S)FTP sites.

4.8. CHANNEL SETTINGS – NOTIFICATIONS

The Presentation Recorder has an extensive system of notifications by e-mail for routine and extraordinary events related to Channel operation. Events can be informational, like "Archive uploaded" or "Recording Started Normally", or they can be error reports such as "Recording Start Failed - Disk Full" or "Archive Upload Failed". See Section 3.9. for information on how to setup system-wide error notifications.

4.8.1. Channel N Settings - Notifications

Each Channel provides for entry of an e-mail to be associated with that Channel. Channels are often used in conjunction with specific presenters or Departments, so the person or Department most closely associated

with the operation of that Channel will be informed of any normal or unusual events. A typical use would be to inform a presenter or lecturer that the recordings and transcodes have completed and are available on the VOD server.

See Section 3.9. for detailed information on the entries required for this page.

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CHANNEL 3 SETTINGS - NOTIFICATIONS

Notifications:

E-mail address:

E-mail from address:

SMTP server:

SMTP port:

SMTP authentication: ☒

SMTP username:

SMTP password:

SSL/TLS: ☐

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Automatic unicast on channel 3
1 participant

Sending video 1280x720 30.0fps 748kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

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4.8.2. Channel N Settings – Notification Events

A subset of all system-wide events is available for Channel-specific notifications. A system-wide event would report the start of ANY Session, whereas a Channel-specific event would only report the start of activity on Channel N. See Section 3.9.11. for additional information on use of this menu.

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CHANNEL 3 SETTINGS - NOTIFICATIONS EVENTS

Select by event type:

☐ Critical ☐ Error ☐ Warning ☐ Info

Select by event name:

☐ Session start ☐ Archive ready

☐ Session stop ☐ Archive remove

☐ Recording start ☐ Archive restore

☐ Recording pause ☐ Archive upload

☐ Recording continue ☐ Archive download

☐ Recording stop

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Automatic unicast on channel 3
1 participant

Sending video 1280x720 30.0fps 750kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

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5. Archives Page

5.1. ARCHIVE SETTINGS

The Presentation Recorder units with archive disks allow complete recording of audio and graphics streams onto a hard-drive for later retrieval and playback.

The estimate for recording time is a simple calculation based on the bit-rate set for the channel.

Take the bit rate set for the channel in use and divide by eight to get the bytes/second of archive space needed. Multiply by 3600 to get the bytes required per hour.

So for a 5 Mbps stream (graphics plus audio) we estimate 625,000 bytes/second or 2.25 GB per hour. If we use a 16 GB archive disk that's about 7.1 hours of recording. The disk size in the unit is noted at the beginning Archive page.

The resolution and framerate of a channel aren't as important as the max bit-rate set for operation. Recording times may be slightly longer than the above calculation would suggest because the actual bit-rate generated during operation varies with the material being encoded, and the calculation above should represent worst-case conditions.

Archive files are named with time-stamp information indicating the start time of the archive:

yyyymmdd-hhmmss-nnn.mp4

where

yyyy Year of archive

mm Month of archive

dd Day of archive

hh Hour of archive

mm Minute of archive

ss Second of archive

nnn Channel number

.mp4 File format, MPEG-4

The default archive filename may be changed (See Section 4.3 above).

If the archive time is not correct, check the Date & Time Timezone field settings on the Unit Options page, check for correct DNS entries on the network page, and finally, determine if any network firewall is blocking access to the time-servers configured in the Presentation Recorder.

The final processing of an archive file occurs when a Session has ended. If a Session is active an archive file may be in an incomplete state listed as "Captured" or "Processing". After pressing the "End Session" button all archive files will be finished and converted into a "Ready" state.

ARCHIVES

Archive total: 7.52GB. Free space: 21.89GB (74%).

[Remove All](#) [Upload All](#) [Open Trash](#)

No.	Title	Presenter	State	Download	About	Details	Remove	Upload
1	Bio 54H Lesson 1		READY	Download	About	Details	Remove	Upload
2	Bio 54H Lesson 1		READY	Download	About	Details	Remove	Upload
3	Bio 54H Lesson 1		READY	Download	About	Details	Remove	Upload
4	Bio 54H Lesson 1		READY	Download	About	Details	Remove	Upload
5	Bio 54G Lesson 5		READY	Download	About	Details	Remove	Upload
6	Bio 54H Lesson 1		READY	Download	About	Details	Remove	Upload
7	Bio 54G Lesson 5		READY	Download	About	Details	Remove	Upload
8	Bio 54G Lesson 4		READY	Download	About	Details	Remove	Upload
9	Bio 54G Lesson 3		READY	Download	About	Details	Remove	Upload
10	Bio 54G Lesson 5		READY	Download	About	Details	Remove	Upload
11	Bio 54G Lesson 4		READY	Download	About	Details	Remove	Upload
12	Bio 54G Lesson 3		READY	Download	About	Details	Remove	Upload
13	Bio 54G Lesson 5		READY	Download	About	Details	Remove	Upload
14	Bio 54G Lesson 4		READY	Download	About	Details	Remove	Upload
15	Bio 54G Lesson 3		READY	Download	About	Details	Remove	Upload
16	October 13th, Test		READY	Download	About	Details	Remove	Upload
17	Introduction to Theological Studies		READY	Download	About	Details	Remove	Upload
18	October 13th, Test		READY	Download	About	Details	Remove	Upload
19	October 13th, Test		READY	Download	About	Details	Remove	Upload
20	October 13th, Test		READY	Download	About	Details	Remove	Upload

Idle

Main input: 720x240@60Hz
PIP input: no signal

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Note that during recording two separate files (one video, one audio) are being created and at the end of recording these two files must be multiplexed into a single .mp4 file. This multiplexing is not permitted during active Sessions. At the end of a Session the Archive page will show a status of "Processing" for files, which are in the process of being multiplexed. When the status becomes "Ready" the archived file is ready for download.

5.1.1. Download Button

Downloads the archived file to the operator's PC.

5.1.2. About Button

This button allows downloading or viewing of the associated xml file. This information is available in XML format for use by other applications:

```
<?xml version="1.0" encoding="UTF-8"?>
<archive version="1.0">
<filename>20101119-143215-001.mp4</filename>
<filesize>250598733</filesize>
<title>Weekly update</title>
<presenter>The CEO</presenter>
<description>The CEO's weekly discussion on the state of the company</description>
<unit>Presentation Recorder Room 209</unit>
<channel>Streaming 1</channel>
<start>2010-11-19 14:32:15</start>
<duration>00:30:09</duration>
<timezone>-0800</timezone>
<width>1280</width>
<height>720</height>
<aspect_width>4</aspect_width>
<aspect_height>3</aspect_height>
<main_window>0,0,960,7620</main_window>
<pip_window>0,0,240,180</pip_window>
<bitrate>768</bitrate>
<framerate>30</framerate>
<file_format>mp4</file_format>
<video_format>h264</video_format>
<audio_format>aac</audio_format>
```


</archive>

The use of XML format allows the content to be encoded in the Unicode (UTF-8) character set.

The <main_window> and <pip_window> tags record the position of these windows at the start of a session. This information may be useful for downstream video editing processes which wish to extract video or graphics details from these windows.

The “video_format” types currently supported are “mpeg4” and “h264”. There is currently only one audio format available, “aac”.

5.1.3. Details Button

Along with every archive file an associated text file (in XML format) is kept with additional information about the archive. The Details button allows entry of “Title”, “Presenter” and “Description” comments into this file. These entries may be made during the presentation or afterwards.

5.1.4. Remove Button

Places the archive file into the Trash. Files may be recovered from the Trash Can if they have not yet been automatically deleted by the system during recording operations which require more disk space.

5.1.5. Upload

Clicking on this button marks this archive file for immediate upload (via FTP or Secure FTP) to the configured FTP server (see Section 4.7 for details on (S)FTP server setup). The upload is executed immediately and can start when a Session is active. Immediate upload may interfere with ongoing Session streaming, and should be used cautiously or not at all if network bandwidth is not available to support both streaming and file transfer.

The (S)FTP information is specified on a Channel basis. Since each Channel has its own unique (S)FTP information, different (S)FTP sites may be accessed by starting or using different Channels.

For example, if the Session starting at 9:00 am needs to be uploaded to Dept. A's server, and the Session starting at 10:00 am needs to be uploaded to Dept. B's server, this is easily accomplished by specifying different (S)FTP sites in the Channel Table. Or if some uploads go to a local, on-campus server and if other uploads go to a remote CDN server, the Channel Table settings may be used to differentiate the upload repository for each different recording.

Information about what Channel was used to record an archive is retained with the archive. If later, from the Archives page, a new upload or re-upload is requested, the system extracts current (S)FTP settings from the Channel Table entry and uses that (S)FTP site information to upload the recording. Thus, the “Upload All Archives” button may result in the transfer of existing archives to many different (S)FTP sites.

5.1.6. Remove All Archives

This action places all archive files into the system Trash Can.

5.1.7. Upload All Archives

Clicking this button marks all archive files for immediate upload and initiates a file transfer to the configured (S)FTP server(s). Immediate upload may interfere with ongoing Session streaming, and should be used cautiously or not at all if network bandwidth is not available to support both streaming and file transfer. See Section Error: Reference source not found5.1.5. above for additional details.

5.1.8. Open Trash

Files which have been removed are placed into the system Trash Can. If a file was removed or deleted in error, opening the Trash Can permits recovery of the file, provided the file was not permanently deleted in the quest for more recording space. At the start of recording the system reserves a fixed percent (currently 5%) of the disk for new recordings. If the recording consumes all free space, more archive files in the Trash Can will be permanently deleted until the disk becomes completely full.

5.1.9. Editing Archive Files

There are several tools which have been used to edit and manipulate MPEG-4 archive files: Quicktime Pro, Adobe After Effects and Streamclip. There may be, and probably are, other tools as well, but these are known to work.

The words "video editing" means different things to different people. Common tasks related to manipulating archive files would include these different activities:

- Reducing resolution and reducing the frame rate to downsize the file to smaller formats and smaller bit rates so lower power PCs can successfully play them back.
- Cleaning up a file by removing unneeded material at the beginning, end or in the middle of a file.
- Converting archive files to another format (e.g. conversion to RealMedia or WindowsMedia formats).
- More complex editing tasks such as adding titles, inserting other video sequences or material that was not in the original presentation, selectively adding or deleting sequences or scenes from the original file, rearranging the order of the presentation, adding fancier transitions or wipes, and technical work such as fixing color balance.
- Creation of DVDs, VCR tapes, CDs etc. from the original material.

Obviously this could be a long list and the above items are only representative.

The nature of MPEG-4 files (one keyframe - I frame followed by many differential frames - P, B frames) is hard for a video editor to deal with directly. Any type of more complex edit would require conversion of the archive files to an I-frame only format (Motion JPEG or DV format, for example) where differential frame interpolation is no longer required.

Quicktime Pro, an inexpensive add-on to Quicktime player for both MACs and Windows, is suitable for taking the original files and exporting them to a variety of other formats for further editing or simple playback in the new format. It is not a video editor and should be used just for straight export of the original files to the new format.

Adobe After Effects (available on PCs and MACs) is a high powered, full-featured video editor, which is very popular with professional videographers and which can do almost any video editing or rendering task known to man. It is, however, expensive in both cost and time-to-learn. This package can import the archive files directly.

Squared 5 MPEG Streamclip is an application for editing Presentation Recorder MPEG-4 files, setting In/Out points, and converting to different formats such as AVI and DV.

The archive files are at the ultra-high-end in terms of resolution and frame rate, and that processing times for these files are not trivial, with rendering times often being 3 to 7 times real-time (one minute of material may take three minutes to export, for example).

A high-powered PC is absolutely essential, with something like a 3 GHz. Pentium with 1.5 GB of RAM being the required hardware. A 1 GHz laptop with 256 MB of memory will not do the job.

Customers should carefully assess what their target audience requirements are, and make recordings in reduced resolution or reduced frame rates if a lot of down-conversion is contemplated. Keeping everything at the highest resolution and highest frame rates will be very costly in terms of video-editing post processing.

6. Sources Page

6.1. SOURCES SETTINGS

The Sources Page controls what graphics/video or audio inputs will be sent to the compression engines.

N*Cast TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

[View](#) [Viewers](#) [Session](#) [Channels](#) [Archives](#) [Sources](#) [Configuration](#)

SOURCES

Main input: VGA DVI-D DVI-A HDMI Composite S-Video Autodetect Swap

PIP input: VGA DVI-D DVI-A HDMI Composite S-Video Autodetect

PIP & PIP border: On/Off On/Off

VGA position: Auto Move Left Move Right Move Up Move Down

Image Overlays: On/Off On/Off On/Off On/Off

Text Overlays: On/Off On/Off On/Off On/Off

Audio input: Mic Line-In XLR

Audio meter: On/Off Top-left Top-right Bottom-left Bottom-right

Main window: Full-screen

PIP window: Top-left corner

Audio mic gain: 50

Audio line-in gain: 49

Audio XLR gain: 50

Audio output gain: 50

Audio loopback gain: 0

[Update](#)

[Video Adjustments](#)

[Video Preview](#)

Streaming on channel 1
1 participant

Sending video 1280x720 30.0fps 1028kbps and audio
44kHz Mono 64kbps

Main input: 720x240i@60Hz
PIP input: no signal

6.1.1. Main input

The user may select one of the following graphics/video sources for capture as the primary image:

Graphics/Video	Input
VGA	RGB analog signals from the 15-pin VGA connector
DVI-D	Digital RGB signals from the DVI connector
DVI-A	Analog RGB signals from the DVI connector
HDMI	HDMI signals
S-Video (Y/C)	NTSC or PAL video from the auxiliary S-video pin connector
Composite	NTSC or PAL video from the composite (BNC) connector

The DVI input is compatible with the DVI 1.0 specification and the VESA DCC/EDID 1.3 specification. The required interface cable is a DVI-D (Single Link Digital) or DVI-I (Combo Analog and Digital) or DVI-A (Analog RGB). A DVI-D (Dual Link) cable is also acceptable.

If **Autodetect** is selected the hardware will search for an active signal from one of the input connectors. If more than one signal is present, then the first one detected will be utilized.

The **Swap** button is used during Picture-in-Picture (PIP) setups. The Main and PIP inputs will be exchanged when the button is toggled. For example, if a video PIP was overlaying a graphics background, pressing the **Swap** button will result in a graphics PIP overlaying a video scene.

6.1.2. PIP input

The user may select a graphics or video source for capture as the secondary image, which may be positioned inside of and thus overlay the Main image (picture-in-picture, PIP) or the secondary image may be placed adjacent to and outside the Main image (picture-out-of-picture, POP, side-by-side). The following table shows Main/PIP combinations which are available:

MAIN \ PIP	VGA	DVI-A	DVI-D	HDMI	S-VIDEO	COMPOSITE
VGA	Duplicate	No	Yes	Yes	Yes	Yes
DVI-A	No	Duplicate	N/A	Yes	Yes	Yes
DVI-D	Yes	N/A	Duplicate	Yes	Yes	Yes
HDMI	Yes	Yes	Yes	Duplicate	Yes	Yes
S-VIDEO	Yes	Yes	Yes	Yes	Duplicate	No
Composite	Yes	Yes	Yes	Yes	No	Duplicate

In the above table, "Yes" implies that the PIP arrangement is normal and would be used during a capture session. "Duplicate" implies that the Main image and the PIP image are identical, and this arrangement could be used, but would probably not be useful. The "No" entries are present because the Composite and S-video or the VGA and DVI-A channels are not completely independent inputs. The hardware has only one video decoder, and only Composite or S-video may be selected as the video feed. Thus there is no way to have an S-video as a PIP on a Composite signal, or to have a Composite signal as a PIP on an S-video signal.

6.1.3. PIP graphics

This button enables or disables PIP on-screen images. The Border On/Off control applies a thin border line on the inside edge of the PIP window.

The settings of these buttons are OVERWRITTEN during Session start.

6.1.4. Graphics position

These buttons control fine positioning of the Graphics image (VGA input connector only). The image will move a few pixels to the left, right, up or down when these buttons are activated. The Auto button attempts to center the image properly on the screen.

6.1.5. Image Overlays

Enables or disables display of uploaded graphical overlay 1-4. Overlay graphics are initialized from the Channel Table and after Session start may be uploaded from the Custom page.

The settings of these buttons are OVERWRITTEN during Session start.

6.1.6. Text Overlays

Enables or disables display of text overlay 1-4. Text overlays are initialized from the Channel Table and after Session start may be changed through use of serial commands or via the Custom page.

The settings of these buttons are **OVERWRITTEN** during Session start.

6.1.7. Audio input

There are three audio input connectors on the chassis, XLR (balanced), line (high-level) and microphone (low-level). This control selects the primary audio input source. If recording in Mono, make sure the active audio is available on the LEFT channel.

6.1.8. Audio Meter

When the Audio Meter pushbutton is on, two pairs of audio meters appear on the local loopback display connected to the Presentation Recorder. The audio meter window is never transmitted over the network nor recorded as part of the media stream.

The stereo meters on the left show local audio activity originating from the microphone or line-level inputs. The stereo meters on the right show network activity, that is, strength of the audio derived from the incoming media stream in full-duplex or collaboration mode.

The local meters are useful to check for proper connectivity and activity of the sound system connected to the Presentation Recorder. The levels should be checked for proper range, and gains should be changed if the audio is too hot or soft.

The Audio Meter positioning controls (Top-left, Top-right, Bottom-left, Bottom-right) allow the meter display to be set in an area of the screen that does not obscure other important windows (like the PIP window, for example).

6.1.9. Main Window

The placement of the Main window may be altered after Session start with this menu selection. Custom Windows 1-10 are defined on the Custom page under the Configuration Tab.

The position of this window is **OVERWRITTEN** during Session start using values from the Channel Table.

6.1.10. PIP Window

The placement of the PIP window may be altered after Session start with this menu selection. Custom Windows 1-10 are defined on the Custom page under the Configuration Tab.

The position of this window is **OVERWRITTEN** during Session start using values from the Channel Table.

6.1.11. Audio Microphone Gain

The audio microphone gain adjusts the signal level from the microphone to the input of the audio codec.

A reference signal of -40.0 dBu (7.75 mV RMS) will produce maximum sample values when the Mic Gain is set to a value of approximately 90. If this is considered the internal 0.0 dB signal reference, the chart shows gain adjustments for different values of Mic Gain.

6.1.12. Audio Line-In Gain

The audio line-in gain adjusts the signal level from the line-in connector to the input of the audio codec.

A reference signal of 0.0 dBu (0.775 V RMS) on the line-in connector will produce maximum sample values with the line-in gain set to approximately 21. If this is considered the internal 0.0 dB signal reference, the chart shows gain adjustments for different values of Line-in Gain.

If recording in Mono, make sure the active audio is available on the LEFT channel.

6.1.13. Audio Output Gain

The audio output gain adjusts the signal level from the audio codec to the line-out connector. This signal powers the local speakers (after suitable amplification) and delivers the audio media stream to the audience. For a 0.0 dB reference signal (maximum sample values) the measured output levels in dBu are shown in the chart.

6.1.14. Audio Loopback Gain

Allows input audio to be looped back to the output connector. The normal use of this loopback is for confidence checking of the input audio on a control monitor or speaker. If input microphones are able to

pickup this output signal, serious feedback loops (whine) will result. Setting this value to non-zero where speakers and microphones are in the same space is not recommended.

Audio Gain Charts

<i>Mic Gain</i>	<i>Amplification</i>	<i>Line-in Gain</i>	<i>Amplification</i>	<i>Output Gain</i>	<i>Output Level</i>
0		0		0	
10		10		10	
20		20		20	
30		30		30	
40		40		40	
50		50		50	
60		60		60	
70		70		70	
80		80		80	
90		90		90	
100		100		100	

6.1.15. Video Adjustments - Brightness, Contrast, Saturation, Hue, Sharpness

These values allow fine tuning of image brightness, contrast, saturation, hue and sharpness. The following table shows the allowable ranges of adjustment:

<i>Control</i>	<i>Range</i>
Brightness	0-100
Contrast	0-100
Saturation	0-100
Hue	0-100
Sharpness	0-44

For each Control there are four adjustments for the four different inputs: XGA, DVI, Composite and S-Video. There is no Sharpness control for XGA or DVI, as this control applies to the video inputs only.

SOURCES - VIDEO ADJUSTMENTS

VGA brightness:	<input type="text" value="50"/>	DVI brightness:	<input type="text" value="50"/>
VGA contrast:	<input type="text" value="50"/>	DVI contrast:	<input type="text" value="50"/>
VGA saturation:	<input type="text" value="50"/>	DVI saturation:	<input type="text" value="50"/>
VGA hue:	<input type="text" value="50"/>	DVI hue:	<input type="text" value="50"/>
Composite brightness:	<input type="text" value="50"/>	S-Video brightness:	<input type="text" value="50"/>
Composite contrast:	<input type="text" value="50"/>	S-Video contrast:	<input type="text" value="50"/>
Composite saturation:	<input type="text" value="50"/>	S-Video saturation:	<input type="text" value="50"/>
Composite hue:	<input type="text" value="50"/>	S-Video hue:	<input type="text" value="50"/>
Composite sharpness:	<input type="text" value="15"/>	S-Video sharpness:	<input type="text" value="15"/>

[Update](#)

[\[Back\]](#)

Automatic unicast on channel 3
1 participant

Sending video 1280x720 30.0fps 753kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

NCast Copyright © 2010

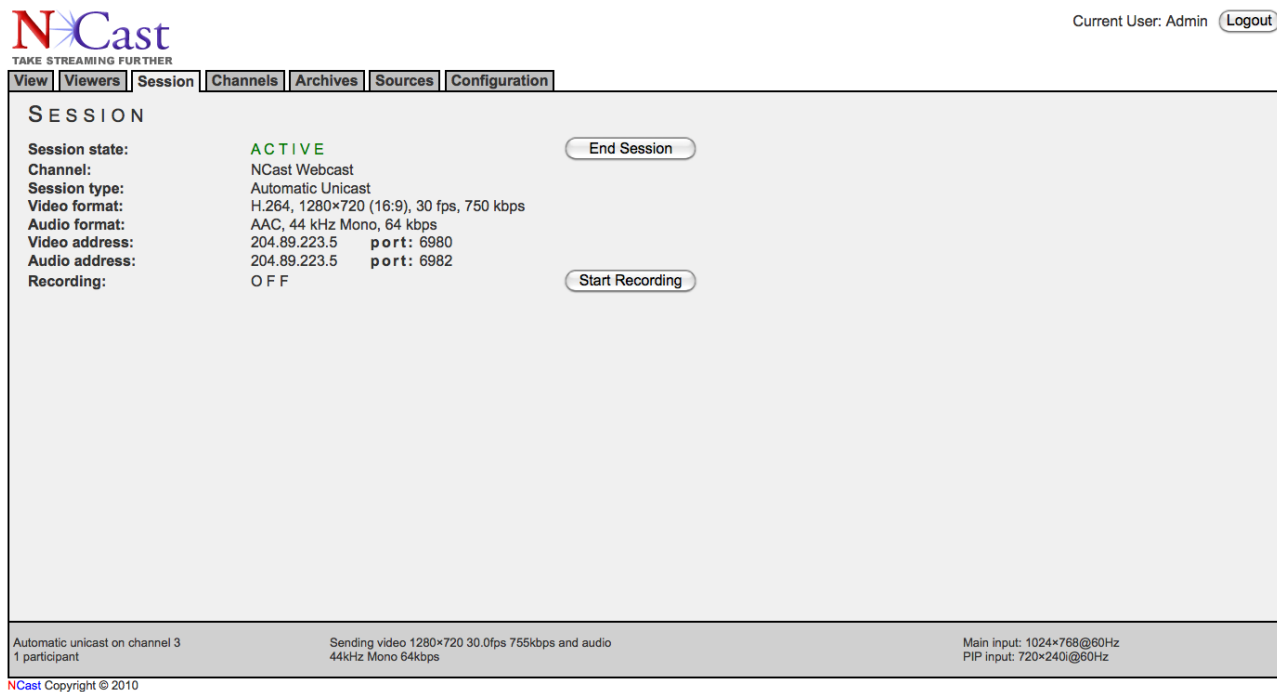
6.1.16. Video Preview

This button launches a new web page with a single-frame capture of the composite image currently being encoded and compressed. Provides an excellent confidence check of the video and graphics capture in progress without the need for an attached local output display. Can be used to check on the current frame grab of the Presentation Recorder from a remote site.

7. Information Pages Reference

7.1. SESSION PAGE

The Session Page summarizes the current operational state of the Presentation Recorder. The bulk of the information listed here comes directly from the Channel Table parameters.



The screenshot shows the N*Cast web interface. At the top left is the N*Cast logo with the tagline 'TAKE STREAMING FURTHER'. At the top right, it says 'Current User: Admin' with a 'Logout' button. Below the logo is a navigation bar with tabs: View, Viewers, Session, Channels, Archives, Sources, and Configuration. The 'Session' tab is selected. The main content area is titled 'SESSION' and displays the following information:

Session state:	ACTIVE	<input type="button" value="End Session"/>
Channel:	N*Cast Webcast	
Session type:	Automatic Unicast	
Video format:	H.264, 1280x720 (16:9), 30 fps, 750 kbps	
Audio format:	AAC, 44 kHz Mono, 64 kbps	
Video address:	204.89.223.5 port: 6980	
Audio address:	204.89.223.5 port: 6982	
Recording:	OFF	<input type="button" value="Start Recording"/>

At the bottom of the page, there is a status bar with three sections of information:

- Automatic unicast on channel 3
1 participant
- Sending video 1280x720 30.0fps 755kbps and audio
44kHz Mono 64kbps
- Main input: 1024x768@60Hz
PIP input: 720x240i@60Hz

At the very bottom left, it says 'N*Cast Copyright © 2010'.

When a Session is started, the Channel in use is queried and all addresses, ports and other controls listed for the Channel are activated. If one of the parameters looks incorrect, check the corresponding Channel entry to verify if the entry had been made correctly.

The Session Page also shows if the Session is currently active, and the state of archiving. Buttons on the page allow the operator to stop and start a Session, and to start, pause and stop archiving.

In addition to this static information, at the very bottom of the page (every web page, not just the Session page) there are four fields of information listed that are dynamically updated on a regular basis.

Note: Interlaced video sources will be reported at their field rate and resolution rather than the frame rate. So NTSC video will be reported as 720x240i@60Hz rather than 720x480.

N*Cast TAKE STREAMING FURTHER Current User: Admin [Logout](#)

[View](#) [Viewers](#) [Session](#) [Channels](#) [Archives](#) [Sources](#) [Configuration](#)

SESSION

Session state: ACTIVE [End Session](#)

Channel: NCast View

Session type: Streaming (send)

Video format: MPEG-4, 1280x1024 (4:3), 30 fps, 1500 kbps

Audio format: AAC, 44 kHz Mono, 64 kbps

Video address: 239.192.0.0 **port:** 10000

Audio address: 239.192.2.0 **port:** 11000

Recording: OFF [Start Recording](#)

Streaming on channel 1
1 participant

Sending video 1280x1024 30.0fps 1504kbps and audio
44kHz Mono 64kbps

Not receiving

Main input: 1920x540@60Hz
PIP input: 720x240@60Hz

Mode
Send/Receive
Channel
Number of Participants

Send Activity
Resolution
Frame-rate
Audio
Audio-rate

Receive Activity
Resolution
Frame-rate
Audio
Audio-rate

Input Status
Main Input
PIP Input

7.2. VIEWERS PAGE

The Viewers Page lists units that are currently on-line and active in this Session. This information is derived from RTCP (Real-time Control Protocol) reports. The descriptive information comes from entries made in each unit's Unit Options page.

N*Cast TAKE STREAMING FURTHER Current User: Admin [Logout](#)

[View](#) [Viewers](#) [Session](#) [Channels](#) [Archives](#) [Sources](#) [Configuration](#)

VIEWERS

ID	Name	IP	E-mail	Phone	Location	Tool
NCast Telepresenter	Administrator	204.89.223.15	info@ncast.com	408-541-9230	Sunnyvale CA	NCast RTP Video

Automatic unicast on channel 3
1 participant

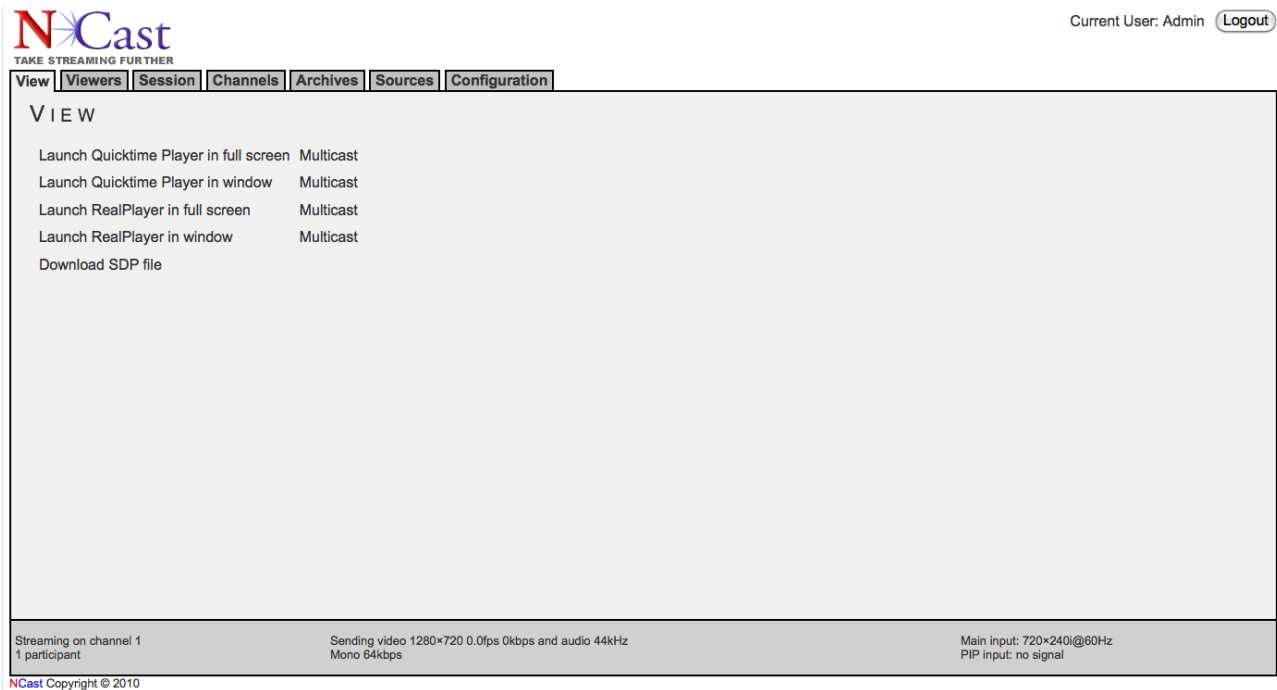
Sending video 1280x720 30.0fps 754kbps and audio
44kHz Mono 64kbps

Main input: 1024x768@60Hz
PIP input: 720x240@60Hz

NCast Copyright © 2010

7.3. VIEW PAGE

The View Page allows users at their desktops or laptops to launch client media players, which will receive and decode the media streams for playback to the user.



Access controls on the “Passwords” page may be used to restrict viewing to selected users or groups.

For small organizations and departments this page will be sufficient for most uses. However, for larger organizations or for universities the functions of this page should probably be duplicated on the streaming media pages of the organization’s website. A discussion of how to achieve this is beyond the scope of this manual.

The various links on this page are used to launch client applications on the desktop. In each case the link causes a small control file to be downloaded, and this control file is passed to the appropriate client player. The control file provides the client player with all the information required to find or request the media stream(s) and to decode the information contained therein.

Four different types of files are dynamically created by the links:

<i>File Name</i>	<i>File Type</i>
rtp_fullscreen_live.qtl	Quicktime RTP Fullscreen
rtp_live.qtl	Quicktime RTP in a Window
rtp_fullscreen_live.ram	Real Player RTP Fullscreen
rtp_live.ram	Real Player RTP in a Window
live.sdp	Session Description Protocol File

In all cases these files contain parameters such as the address of the server, media stream types, multicast groups, etc. To view samples of these files, right-click and “Save Target As ...” to a directory on your desktop. The graphics, overlays and PIP video are in one media stream, inseparable.

The file extension will determine which media player to launch. Each web browser keeps a list of file extensions and the appropriate application to process a file with that extension.

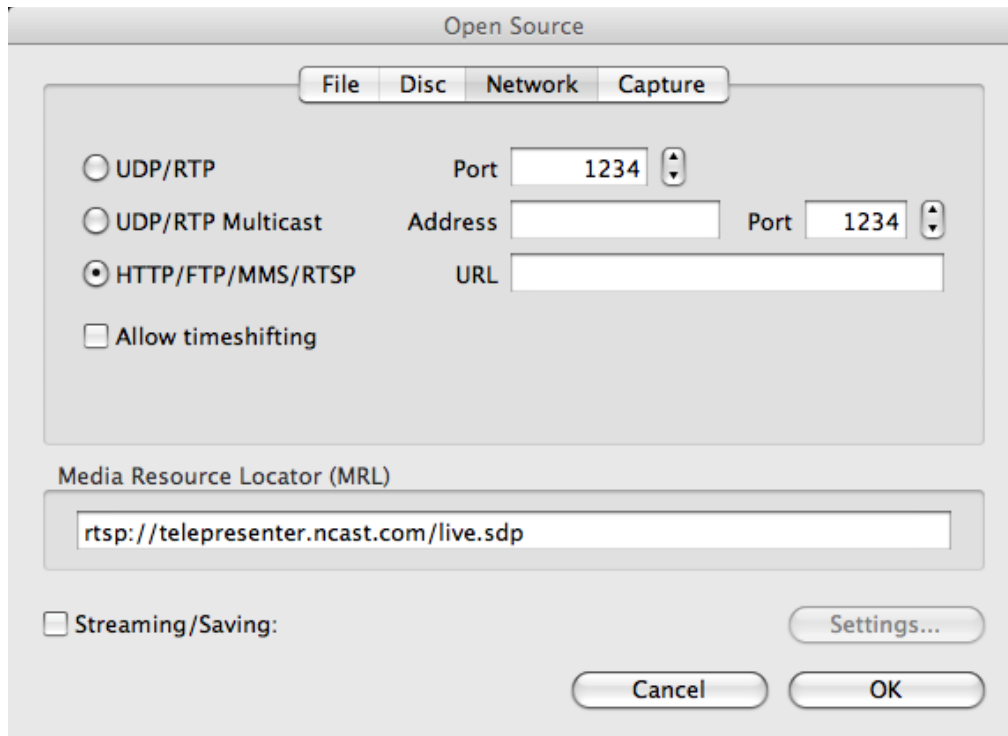
The most generic of these files, the SDP file, might be associated with any number of different players on different operating systems. The sequence of events for getting a successful playback with an SDP file works like this:

1. At installation the client player informs the web browser that “If you see an SDP file, launch me and pass the file information to me”.
2. On the web page, when the playback link is clicked, the browser sends a request to the server to retrieve the requested SDP file.
3. The server, upon receiving this request, dynamically generates an SDP file based on the current channel and media parameters in use. This SDP file is returned to the browser.
4. When the browser get the SDP file requested it launches the application currently associated with the “SDP” extension. This application must be the client media player.
5. The browser passes the file information to the application by giving the application the filename or the location of the file.
6. The application (the client media player) reads the contents of the SDP file and determines how many media streams must be requested, what types of audio/video codecs are required to process the media, and what type of connection (multicast, RTSP) is required.
7. When all the appropriate components have been loaded, the client player opens up the Internet connections required to play the media streams, and starts buffering media for playback.
8. After a few seconds of initial buffering the viewer sees the media playback.

7.4. VLC MEDIA PLAYER

A popular cross-platform media player with low latency is called “VLC” (Video Lan Client). There are several ways to launch VLC for use with a Presentation Recorder:

1. Associate the file extension “.sdp” with the VLC application. Under Windows this can be done using:
My Documents → Tools → Folder Options
and associating a .sdp extension with the vlc.exe application.
2. Download (Right click and Save as ...) the .sdp file, and then drag it onto the VLC client. This method works only for multicast connectivity.
3. For an RTSP connection, use File → Open Network Stream → RTSP and enter the proper RTSP URL: `rtsp://PresentationRecorder.ncast.com/live.sdp`



7.5. MEDIA PLAYERS

The MPEG-4 format used by the Presentation Recorders is an industry-wide standardized format which multiple client players support.

For PCs with properly configured software the playback process will be quick and easy.

However, if a customer is having difficulty, common problems to check include:

- The client player has not been installed or is not at the latest revision level.

- A codec required for playback has not been installed. Windows Media Player does not natively support MPEG-4 files and needs a plug-in to be installed to properly decode Presentation Recorder streams. Contact NCast Corporation for details concerning availability of its MPEG-4 plug-in.

- Some other application has associated with one of the above file extensions.

- Firewalls (either in the laptop/desktop or externally) are blocking access to the required RTSP or UDP ports.

- The network being used is not multicast enabled and multicast connectivity is being requested.

- The network path between the client and the server is bottlenecked and unable to sustain the packet flow required for smooth, continuous playback. Wireless links, very commonly, do not have the throughput required for media streaming.

- The machine does not have enough processing power or memory to sustain continuous playback. Some modern PC have a "power-saving" mode, and there have been instances where the machine goes into power-save mode during playback, crippling the capacity of the machine.

- Other activities in the machine (including hidden spyware or Trojans) are consuming so much CPU time that the media player is unable to get the processing cycles required for correct playback. Even some active web pages can consume nearly 100% of the CPU.

- The audio devices set for the media player have not been configured correctly.

The audio has been muted.

7.6. CLOSED-CAPTION SUPPORT

Section 508 of the Rehabilitation Act of 1973, is an amendment to a law requiring that electronic and IT technology provided by agencies of the Federal Government be accessible to both employees with disabilities and to members of the public with disabilities. The Section 508 requirement has been adopted by a growing number of university and university systems, including all California State University colleges.¹ Video and/or multimedia products also fall under the standard, by including requirements for captioning of multimedia products such as training or informal multimedia productions. Captioning, or video descriptors must be able to be turned on or off.² NCast's Presentation Recorder product lines fall under the category of video and/or multimedia products, and are thus required to implement closed captioning for appropriate compliance.

7.6.1. Real-time sub-titles and chapters

There does not appear to be a single, widely adopted standard for recording timed-event information for use either in sub-titles or chaptering. Some client players use various forms of .txt files and others use .xml files.

The Presentation Recorder implementation has adopted one format which is simple to use and has some existing support in the open-source community and works with several players.

The format is an ".srt" text file type which is described here:

<http://en.wikipedia.org/wiki/SubRip>

New serial commands have been added to receive text information and automatically create ".srt" files during a recording.

These files will be:

- Available on the Archives page for download
- Available for download via our http interface
- Uploaded automatically via the FTP upload service

Upon receipt of this file a program can easily extract the timing information of interest and create a web page with playback start points of interest. For example, Quicktime uses the "STARTTIME" parameter:

<http://www.apple.com/quicktime/tutorials/embed2.html>

```
<embed src="sample.mp4" width="320" height="240" starttime="00:15:22.5">
```

After recording is finished and there is at least one subtitle, an .srt subtitle file is created which can be downloaded from the web-page or HTTP interface. The .srt format is very simple, this example has two subtitles:

```
1
00:00:20,000 --> 00:00:24,400
Subtitle 1

2
00:00:24,600 --> 00:00:27,800
Subtitle 2
```

The NCast Presentation Recorders support real-time caption or sub-title capture through use of serial commands which define timings and durations of sub-title text. See the *Presentation Recorder Serial Interface Reference Manual* for complete details.

7.6.2. Sub-titles using Quicktime and SMIL

¹ http://www.calstate.edu/accessibility/section508/section_508_FAQs.shtml

² <http://www.section508.gov/index.cfm?FuseAction=Content&ID=11>

Receivers/Decoders of the stream, whether using a desktop player (QuickTime, Windows Media Player, etc.) or a Presentation Recorder system, must have the ability to turn on/off the captioning features; thus the term "closed". Unfortunately, there is no fully standardized mechanism for captioning across these technologies. Each media player handles captions differently.

QuickTime does not currently support industry standard closed caption such as ISMA. QuickTime currently supports closed captioning by including a text track alongside audio and video content. QuickTime currently supports two main methods of introducing captions, through .QT.TXT and .SMIL files. This URL provides an overview of the QuickTime text track:

http://www.apple.com/education/accessibility/technology/quicktime_cc.html

The following sample .smil file launches a QuickTime player with a closed-caption text area:

```
<?xml version="1.0" encoding="UTF-8"?>
<smil xmlns:qt="http://www.apple.com/quicktime/resources/smilextensions"
      xmlns="http://www.w3.org/TR/REC-smil" qt:time-slider="true">
  <head>
    <meta name="title" content="NCast PR-720 Series Commercial"/>
    <meta name="author" content="VP Sales"/>
    <meta name="copyright" content="NCast Corporation 2007"/>
    <layout>
      <root-layout height="285" width="330" background-color="black"/>
      <region id="videoregion" left="5" height="240" width="320" top="5" background-
color="black"/>
      <region id="textregion" left="5" height="40" width="320" top="245" background-
color="black"/>
    </layout>
  </head>
  <body>
    <par dur="0:03:14.10">
      <video region="videoregion"
src="rtsp://www.ncast.com/archives/NCastCommercial320x240.mp4" dur="0:03:14.10"/>
      <textstream region="textregion"
src="http://www.ncast.com/archives/NCastCommercial.en_US.qt.txt" dur="0:03:14.10"/>
    </par>
  </body>
</smil>
```

The .txt file used to play back the captions is shown here:

```
{QTtext}{timescale:100}{font:Arial}{size:12}{backColor:0,0,0}
{textColor:65535,65535,65535}{width:320}{justify:left}

[00:00:02.69]
Have you ever wanted to communicate with someone face-to-face?

[00:00:05.28]
To show them something, maybe a presentation or brochure?

[00:00:08.44]
But they were far away.

[00:00:10.00]
You could call them, but audio alone is not enough.

[00:00:13.00]
You could video-conference,

[00:00:15.00]
but that lacks graphics and only works for small audiences.

[00:00:18.07]
You could get on a plane, or you could telepresent.
```

```
[00:00:21.38]
Introducing the NCast PR-720 Series Recorders,

[00:00:24.07]
the easy and affordable way to present when your audience is not present.

[00:00:27.98]

[00:00:33.46]
The PR-720 Series Recorder is an all-in-one multimedia production appliance.
```

7.6.3. Captioning software

MAGpie 1.0 can be used to export the captions to three multimedia formats: SAMI, RealText Apple's Timed Text and SMIL (which can also be used by Apple and Real). Magpie 2.02 is the newest version, and adds functionality for Flash, and can play NCast's MPEG-4 media files. The tool can be found here:

<http://ncam.wgbh.org/webaccess/magpie/#v2>

World Caption is a program written by a University of Wisconsin staff member and is distributed free. See:

<http://www.journalism.wisc.edu/worldcaption/>

World Caption is a program for adding captions to a QuickTime compatible video, using a transcript of that video. While World Caption cannot be used to generate a transcript, it makes the process of synchronizing a transcript to video simple, and allows quick and easy generation of captions.

World Caption accepts UTF-8 encoded text files, which means it can handle a wide number of languages - including languages with non-Latin character sets such as Japanese.

World Caption allows addition of any number of tracks to the video. This allows the creation of caption tracks for several languages. World Caption eases the process of synchronization by using interpolation. It isn't necessary to synchronize every caption, but just a few. World Caption will infer the location of other captions from the ones synchronized with the video.

System Requirements: World Caption requires Mac OS X version 10.4 or later.

8. Custom Layouts

8.1. FRAME LAYOUTS AND PRESETS

The main Frame of a Presentation Recorder composition consists of the following elements:

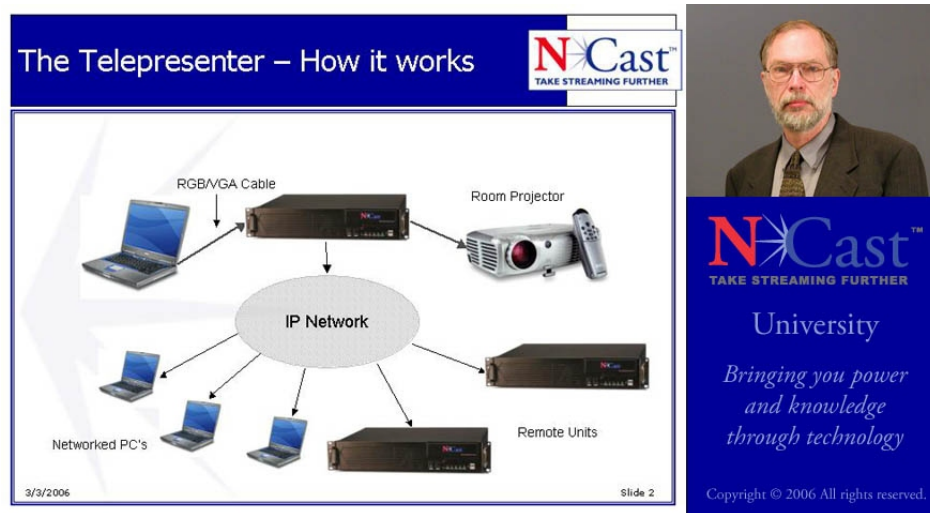
- The Main Window
- The PIP Window (optional)
- Graphical Overlays (1-4)
- Text Overlays (1-4)
- Black Matte Background

The size and arrangement of all of these elements is completely under the user's control and may be changed on a Channel-by-Channel basis.

This example shows how to setup a Channel for one custom layout

8.1.1. Custom Settings Example

For a distance learning application the client wishes to transmit a 640x480 graphics capture of the presentation, a 240x180 video shot of the instructor, and a University logo with a copyright statement. The proposed composite image should look like this:



To create this composite the following steps are required:

1. Go to the Configuration Tab and select the Custom Settings page.
2. Click on Frame sizes and in the "Frame size 1" fields enter 880 and 480, which are the dimensions of the width and height of the desired media stream. Update the change.
3. Go Back and click on Aspect ratios. In the "Aspect ratio 1" fields enter 11 and 6 (or 88 and 48) to define an aspect ratio appropriate for this image. Update the change.
4. Go Back and click on Windows. In the "Window 1" fields enter 0, 0, 640, 480 to define Window 1 as the window which will be associated with the Main graphics image.

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5. In the "Window 2" fields enter 640, 0, 240, 180 to define Window 2 as the window which will be associated with the PIP video stream. Update the change.
6. Go to the Channel Table and click "Modify" on the Channel which will be used for this custom layout. Click on the Layout tab.
Select "Frame size 1", "Aspect ratio 1", "Window 1" and Window 2" in their respective menus. Check the PIP checkbox and Update the change.
7. Click on the Image Overlays tab. In the "Overlay 1" fields enter 640, 180 to define the upper-left corner of the overlay. Change the right-hand field to "Enabled". Update the change.
8. In the "Overlay 1 to upload" field use the "Browse ..." button to find the required .jpg or .png image and then upload the image. This image must have dimensions of 240x300 to properly fit in the capture window.
9. On the Sources page make these selections and press "Update":
 - a. Main input: VGA (or possibly DVI)
 - b. PIP input: Composite (or possibly S-Video)

The Presentation Recorder is now ready to transmit the composite image as defined in this example.

8.1.2. Hi-Definition 720p Layout Example

For archival purposes or for playback on hi-definition 16:9 screens the following example gives the dimensions of a 720p layout that NCast and its customers have used successfully to capture conference proceedings and other seminars. The capture window used is WXGA at 1280x720 resolution and 16:9 aspect ratio. The Main graphics window occupies an area of 960x720 (Custom Window 1) and the PIP video window is set to 320x240 (Custom Window 2). In this example the Graphic Overlay 1 .png image is 320x480 and is located at (0,240). For a graphics framerate of 30 frames/second a bitrate of 2.5 Mbps produces excellent results.



The Channel Table Layout parameters required to produce this frame arrangement is shown below:

CHANNEL 1 SETTINGS - LAYOUT

General
Recording
Layout
Image Overlays
Text Overlays

Frame size:

Aspect ratio:

Main window:

Main window (X/Y/W/H):

PIP window:

PIP window (X/Y/W/H):

HD720 - 1280 × 720

16:9

Custom

320	0	960	720
-----	---	-----	-----

Custom

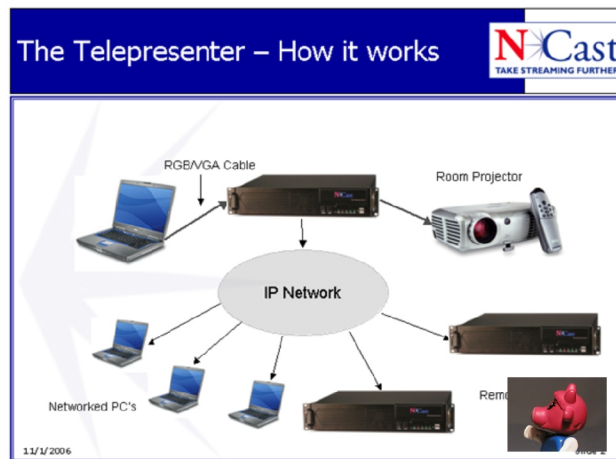
0	0	320	240
---	---	-----	-----

Update

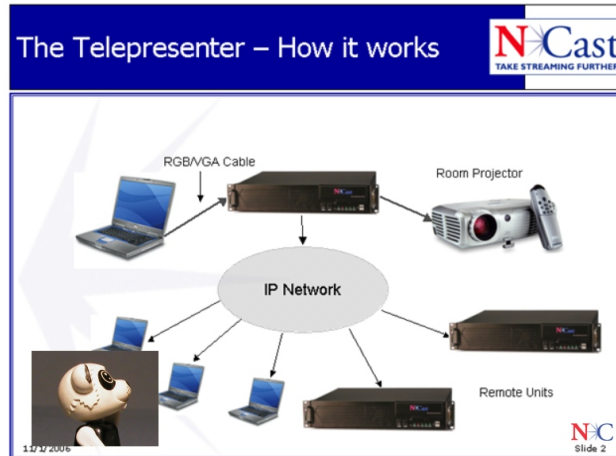
8.1.3. Overlay Layout Placement

Conference rooms or presentation auditoriums typically have the speaker's podium to the right or left of the projection screen being viewed by the audience. A potential problem in using the PIP video window or speaker shot as a side-by-side layout is to position the window in the wrong spatial relationship to the screen being discussed by the presenter.

If the podium is to the right of the projection screen (as viewed from the audience) the following layout shows the correct positioning for the PIP window:



If the podium is to the left of the projection screen (as viewed from the audience) the following layout shows the correct positioning for the PIP window:



The point being made here is that in planning for a conference or seminar recording, rooms may have a podium right or podium left configuration and the overlay graphics which are created must be able to accommodate right-side or left-side speaker placements (the speakers naturally look at the projected graphics while presenting). Here is an example of a mismatched left-right alignment:

Telepresenter Features

- UXGA (1600x1200) quality
 - Digitizes RGB signal for display (1600x1200 max input)
 - Real time compression 30 fps (M3), 8-10 fps. (S).
- Streaming graphics capability
 - Multicast/Unicast
 - Room to Room
 - Room to Desktop
- Archiving support
 - Manual or automatic capture
- Standards based
 - MPEG-4 on RTP encoding
- Low Bandwidth Requirements
 - Variable from 128 kbps to 3 Mbps

NCast
TAKE STREAMING FURTHER

University

*Bringing you power
and knowledge
through technology*

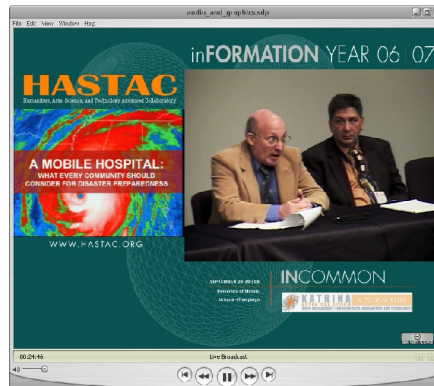
Copyright © 2006 All rights reserved.

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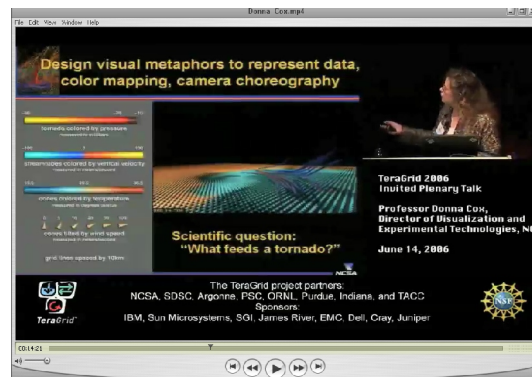
8.1.4. Customer Layout Examples

NCast customers and associates have created some outstanding examples of graphically interesting and aesthetically pleasing layouts using this overlay facility. The following are some examples of captures done from live conferences:

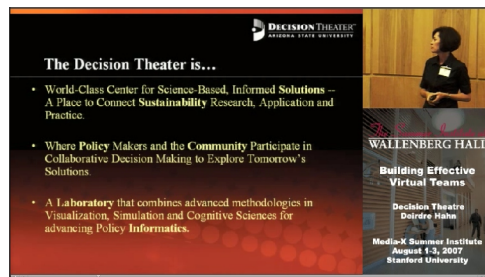
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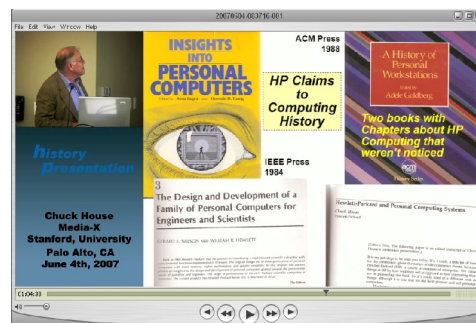
HASTAC Conference, courtesy of Duke University



TeraGrid Conference, courtesy of UCSD



Virtual Teams Conference, courtesy of Media-X



HP Historical Presentation

9. Presentation Recorder Interfaces

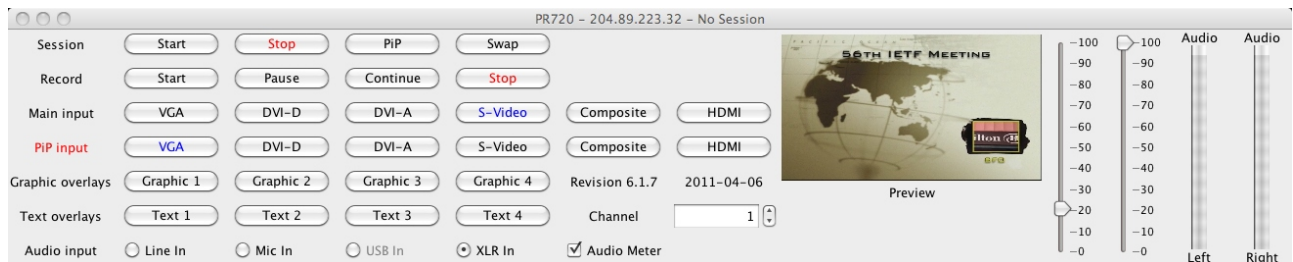
9.1. SERIAL INTERFACE

Commands to control the Presentation Recorder over an RS-232 style serial interface are documented in the *Presentation Recorder Serial Interface Specification*. Please refer to that document for complete details.

9.2. TELNET INTERFACE

Commands to control the Presentation Recorder over an IP network interface using industry standard Telnet protocol are documented in the *Presentation Recorder Serial Interface Specification*. Please refer to that document for complete details.

NCast offers several example programs which allow operation of the Presentation Recorder using the Telnet Interface. One such program is called the "Presentation Recorder Management System" and there is a version written in Java and Python. See the "Download" area of the NCast web site. An example of the interface implemented by TMS is shown here:



For simple operations such as starting and stopping a Presentation Recorder from a controlling system, simple scripts will be adequate. For example, to start a Presentation Recorder here is a sample script:

```
#!/bin/bash
#
# Starts Presentation Recorder session using telnet interface

if [ $# -ne 3 ]; then
    echo "This script starts a Presentation Recorder session using the telnet interface."
    echo "Synopsis: start.sh address password channel"
    exit
fi

ADDRESS=$1
PASSWORD=$2
CHANNEL=$3

( echo "IdTelnet,002,$PASSWORD"
  sleep 1
  echo "C$3"
  sleep 1
  echo "QT"
  sleep 1 ) | telnet $ADDRESS 7474 >& /dev/null
```

Stopping a session utilizes this script:

```
#!/bin/bash
#
# Stops a Presentation Recorder session using the telnet interface
```

```
if [ $# -ne 2 ]; then
    echo "This script stops a Presentation Recorder session using the telnet interface."
    echo "Synopsis: stop.sh address password"
    exit
fi

ADDRESS=$1
PASSWORD=$2

( echo "IdTelnet,002,$PASSWORD"
  sleep 1
  echo "PE"
  sleep 1
  echo "QT"
  sleep 1 ) | telnet $ADDRESS 7474 >& /dev/null
```

9.3. HTTP INTERFACE – ARCHIVE DOWNLOAD

Special HTTP commands are available to enable automatic or script downloading of archive files:

<code>http://w.x.y.z/backup/list.cgi</code>	Downloads a list of READY archive files
<code>http://w.x.y.z/backup/download/file.mp4</code>	Downloads an archive file
<code>http://w.x.y.z/backup/download/file.xml</code>	Downloads an archive xml file
<code>http://w.x.y.z/backup/remove.cgi?file=file.mp4</code>	Removes an archived file

where

<code>file.mp4</code>	The time-stamped archive filename obtained from the downloaded list (also .wmv or .ogg)
<code>file.xml</code>	The time-stamped xml file associated with an archive file.

Note that archive operations are username/password protected and this information must be supplied to utilize these special URLs. The required username is “backup”. The password is entered on the Configuration → Passwords web page (“HTTP API” entry). Removed files are immediately deleted, and not stored in the trash can.

A comprehensive sample retrieval script follows:

```
#!/bin/tcsh

# Usage: PR720files.tcsh host password delete
#
# host      - the hostname or IP address of the PR720 unit
# password  - backup password for the unit
# delete    - optional keyword to delete archived files after download

set PR720ip = $1
set passwd = $2
set deleteoption = $3

set verbosity = --quiet
#set verbosity = --non-verbose
#set verbosity = --verbose

if ($PR720ip == "") then

    echo "PR720files: PR720 Host address or IP address missing"
    echo "Usage: PR720files.tcsh host password"
    exit

endif

if ($passwd == "") then

    echo "PR720files: PR720 password required"
    echo "Usage: PR720files.tcsh host password"
```

```
exit 1

endif

# Get list of current archive files

if (-e PR720-filelist) then
    rm -f PR720-filelist
endif

wget $verbosity --output-document=PR720-filelist --http-user=backup --http-passwd=$passwd http://
$PR720ip/backup/list.cgi

if ($status != 0) then
    echo "PR720files: Error in accessing archive"
    exit 1
endif

if (! -e PR720-filelist) then
    echo "PR720files: Failed to retrieve archive file list"
    exit 1
endif

if (-z PR720-filelist) then
    echo "PR720files: No archive files in list"
    exit 1
endif

# Process all files in the list that was downloaded

foreach mp4 (`cat PR720-filelist`)

# Get the media file

    echo "PR720files: Retrieving media file $mp4"
    wget $verbosity --timestamping --http-user=backup --http-passwd=$passwd http://
    $PR720ip/backup/download/$mp4

    if ($status != 0) then
        echo "PR720files: Error in accessing media file $mp4"
        exit 1
    endif

# Get the associated xml description file

    set xml = $mp4:r.xml

    echo "PR720files: Retrieving xml file $xml"
    wget $verbosity --timestamping --http-user=backup --http-passwd=$passwd http://
    $PR720ip/backup/download/$xml

    if ($status != 0) then
        echo "PR720files: Error in accessing xml file $xml"
        exit 1
    endif

# Delete the file if it was downloaded and if the delete option was set (argument_3 == "delete")

if ($deleteoption == "delete" && -e $mp4 && -s $mp4) then
    echo "PR720files: Deleting archive file $mp4"
    wget $verbosity --http-user=backup --http-passwd=$passwd --output-document=$mp4:r.msg http://
    $PR720ip/backup/remove.cgi/?file=$mp4

    if ($status != 0) then
        echo "PR720files: Error in deleting media file $mp4"
        exit 1
    endif

    echo "PR720files: returned result is: `cat $mp4:r.msg`"
    rm -f $mp4:r.msg
endif
endforeach
```



```
endif  
end  
rm -f PR720-filelist
```

The Python programming language is a widely available, cross-platform programming language available for Windows, Macs, Linux and other platforms. The following is a sample Python program for downloading archive files:

```
#!/usr/bin/python  
"""  
ncfiles.py -- A Python program to download NCast archive files  
  
This program allows downloading of archive files from one or more Presentation Record-  
ers.  
It requires installation and use of the Python programming language. The most  
recent versions of the language may be installed by visiting "www.python.org" and  
downloading the correct binaries for Windows, Linux, Macs or other platforms.  
  
All archive files are downloaded into the directory where the program was started.  
  
Sample usage:  
  
ncfiles.py Presentation Recorder.ncast.com          Download all files from a single  
host  
ncfiles.py -r Presentation Recorder.ncast.com      Download all files and then remove  
them  
ncfiles.py 192.168.0.5 192.168.0.6                Download from multiple hosts  
ncfiles.py -p adam Presentation Recorder.ncast.com Download using password "adam"  
  
Complete specification:  
  
ncfiles.py -d -f hostfile -h -p password -r -v --debug --file=hostfile --help  
--pswd=password --remove --version host host1 host2 ...  
  
where  
  
-d, --debug          Turn debug statements on  
-f, --file=hostfile  Use a list of hosts from a file (see below)  
-h, --help           Print usage information  
-p, --pswd=password  Use "password"  
-r, --remove         Remove archive file from the host after download  
-v, --version        Report program version  
  
host ...             One or more hosts to download from  
  
The list of hosts is a text file (e.g. created with Notepad) that contains a  
list of hosts to download from and optionally password information:  
  
# This is a sample host file  
  
# Optional password line for supplying a password  
  
pswd=adam  
  
# Hosts to download from  
  
192.168.0.5  
Presentation Recorder.ncast.com  
my.other.bboxes.com
```


To run this program under Windows you may use a command line, such as:

```
C:> "C:\Program Files\Python24\python.exe" ncfiles.py 192.168.0.5
```

A simpler alternative is to create a shortcut to "ncfiles.py" and then using the Properties tab for the shortcut enter the required arguments:

```
"C:\Documents and Settings\owner\My Documents\Python\ncfiles.py" 192.168.0.5
```

Please send comments or questions to "info@ncast.com".

Copyright (2005) NCast Corporation
All rights reserved

```
"""
```

```
import sys
import os, os.path
import time
import getopt
import string
import urllib
import urllib2
import socket
```

```
def Download(host, user, pswd, realm, remove):
```

```
# Create an OpenerDirector with support for Basic HTTP Authentication...
```

```
    auth_handler = urllib2.HTTPBasicAuthHandler()
```

```
    auth_handler.add_password(realm, host, user, pswd)
```

```
    opener = urllib2.build_opener(auth_handler)
```

```
# ...and install it globally so it can be used with urlopen.
```

```
    urllib2.install_opener(opener)
```

```
# Get list of files to download
```

```
    url = "http://" + host + "/backup/list.cgi"
```

```
    try:
```

```
        filelist = urllib2.urlopen(url)
```

```
    except urllib2.URLError, msg:
```

```
        print "ncfiles: Urllib2 error (%s)" % msg
```

```
        return False
```

```
        except socket.error, (errno, strerror):
```

```
            print "ncfiles: Socket error (%s) for host %s (%s)" % (errno, host, strerror)
```

```
    ror)
```

```
        return False
```

```
# Process the list of files to download
```

```
    files = []
```

```
    for line in filelist.read().split("\n"):
```

```
        file = line.strip(' \n\r')
```

```
        if file == "":
```

```
            break
```

```
        files.append(file)
```

```
        filelist.close()

    if debug:
        print "ncfiles: Download list", files

    if len(files) == 0:
        print "ncfiles: No files to download"
        return True

# Download each file

for mp4 in files:

    url = "http://" + host + "/backup/download/" + mp4

    print "ncfiles: Downloading", url

    try:
        filein = urllib2.urlopen(url)
    except urllib2.URLError, msg:
        print "ncfiles: Urllib2 error (%s)" % msg
        return False
    except socket.error, (errno, strerror):
        print "ncfiles: Socket error (%s) for host %s (%s)" % (errno, host, strerror)
        return False

    fileout = open(mp4, "wb")

    while True:
        try:
            bytes = filein.read(1024000)
            fileout.write(bytes)
        except IOError, (errno, strerror):
            print "ncfiles: I/O error(%s): %s" % (errno, strerror)
            sys.exit(2)

        if bytes == "":
            break

    filein.close()
    fileout.close()

# Download the detail xml file associated with the mp4 file

url = "http://" + host + "/backup/download/" + mp4[:-4] + ".xml"

if debug:
    print "ncfiles: Downloading", url

    try:
        filein = urllib2.urlopen(url)
    except urllib2.URLError, msg:
        print "ncfiles: Urllib2 error (%s)" % msg
        return False
    except socket.error, (errno, strerror):
        print "ncfiles: Socket error (%s) for host %s (%s)" % (errno, host, strerror)
        return False

    fileout = open(mp4[:-4] + ".xml", "w")

    bytes = filein.read()
    fileout.write(bytes)
```

```
filein.close()
fileout.close()

# Remove file if requested

if remove:

    url = "http://" + host + "/backup/remove.cgi?file=" + mp4

    if debug:
        print "ncfiles: Removing", url

    try:
        filerm = urllib2.urlopen(url)
    except urllib2.URLError, msg:
        print "ncfiles: Urllib2 error (%s):" % msg
        return False
    except socket.error, (errno, strerror):
        print "ncfiles: Socket error (%s) for host %s (%s)" % (errno, host, strer-
ror)
        return False

    filerm.close()

return True

# Main Program -----

hostlist = []
debug = False
inputfile = None
user = "backup"
pswd = "ncast"
realm = "N*Cast PR720"
remove = False

def Usage():
    print "Usage: ncfiles.py -d -f hostfile -h -p password -r -v --debug
--file=hostfile --help --pswd=password --remove --version host host1 host2 ..."

try:
    options, args = getopt.getopt(sys.argv[1:], 'df:hp:rv:', ['debug', 'file=', 'help',
'pswd=', 'remove', 'version'])
except getopt.GetoptError:
    Usage()
    sys.exit(2)

for o, a in options:
    if o in ("-d", "--debug"):
        debug = True
    if o in ("-h", "--help"):
        Usage()
        sys.exit()
    if o in ("-p", "--pswd"):
        pswd = a
    if o in ("-r", "--remove"):
        remove = True
    if o in ("-v", "--version"):
        print "ncfiles.py Version 1.0"
        sys.exit()
    if o in ("-f", "--file"):
        inputfile = a

hostlist.extend(args)
```

```

if inputfile :
    try:
        f = open(inputfile, 'r')
        for line in f:
            host = line.strip(' \n\r')
            if host == "":
                continue
            if host[0] == '#':
                continue
            if host[0:4] == 'pswd':
                pswd = host[5:]
                continue
            print "ncfiles: Adding host", host, "to list of hosts"
            hostlist.append(host)
        f.close()
    except IOError, (errno, strerror):
        print "ncfiles I/O error(%s): %s" % (errno, strerror)
        sys.exit(1)

if len(hostlist) == 0 :
    print "ncfiles: No hosts listed for download"
    sys.exit(1)
else:
    print "ncfiles: Downloading from these hosts:", hostlist

for host in hostlist:
    if remove:
        removetext = "and removing files"
    else:
        removetext = "and keeping files"
    print "ncfiles: Downloading from host", host, removetext

    result = Download(host, user, pswd, realm, remove)

    if not result:
        print "ncfiles: Download error on host", host

print "ncfiles: Download complete"

```

9.4. HTTP INTERFACE – IMAGE AND THUMBNAIL CAPTURE

The HTTP Interface may be used to capture single images from the encoder. Commonly employed utilities such as “wget” can retrieve the current composite frame for placement of the image on a web page or elsewhere. Here is an example of the single command line needed (without the required user/password):

```
wget http://w.x.y.z/api.cgi?cmd=capture -O capture.jpg
```

All required capture parameters like format, frame size and quality are supplied as arguments in the URL. You can override all capture parameters, for example:

```
wget http://w.x.y.z/api.cgi?cmd=capture&format=png&width=1024&height=768 -O capture.png
```

These parameters are supported:

format	- jpg or png
width	- 128 to 1280
height	- 128 to 720
quality	- jpeg quality 0 to 100

compression_level - png compression level 0 to 9

With no parameters the default settings are format=jpg, quality=85, and the width and height will match the current settings of the session frame size.

The interface is password protected, so each “wget” must include a username and password as two additional arguments. The required username is “api” and the password is set on the Configuration → Passwords page at the “HTTP API” entry:

```
wget --http-user=api --http-passwd=passwd
```

9.5. HTTP INTERFACE – GRAPHICS OVERLAY UPLOAD

Overlay graphics used in presentations may be uploaded dynamically through use of an upload utility program. When used in conjunction with a scheduler or serial interface command controller this leads to a powerful method to configure all aspects of a Presentation Recorder for a given Session. It allows custom templates to be changed on an hourly basis, for example.

A single command line using a widely available utility is enough to upload a single graphic:

```
curl -u api:ncast -F "overlay_1_file=@test.png" http://w.x.y.z/api.cgi
```

The following program is an example of a Python utility which may be used to upload multiple new graphics images on command (check the NCast website for the latest version of this program):

```
#!/usr/bin/env python

'''
Tool to upload graphical overlays to an NCast Presentation Recorder.
Rewritten version by Matt Eastman
Updated by H. S. Magnuski

Usage: ncgo.py <options> <host>

-d, --debug          Turn debug statements on (not used)
-h, --help           Print usage information
-p, --pswd=password  Use "password"
-v, --version        Report program version
-1, --g1             Overlay graphic 1
-2, --g2             Overlay graphic 2
-3, --g3             Overlay graphic 3
-4, --g4             Overlay graphic 4
'''

__author__ = 'Matt Eastman <matt@meastman.org>'
__version__ = '2.1 (meastman rewrite, updated)'

import getopt
import mimetools
import mimetypes
import os
import sys
import urllib
import urllib2

def main():
    debug = False
    username = 'api'
    password = 'ncast'
    images = {}
```

```

try:
    getopt_func = getopt.gnu_getopt
except AttributeError:
    getopt_func = getopt.getopt
shortopts = 'dhp:v1:2:3:4:'
longopts = ('debug', 'help', 'pswd=', 'version', 'g1=', 'g2=', 'g3=', 'g4=')
try:
    opts, args = getopt_func(sys.argv[1:], shortopts, longopts)
except getopt.GetoptError, e:
    print >>sys.stderr, 'Error: %s' % str(e)
    print >>sys.stderr
    usage(sys.stderr)
    sys.exit(1)
for optname, optvalue in opts:
    if optname in ('-d', '--debug'):
        debug = True
    elif optname in ('-h', '--help'):
        usage(sys.stdout)
        sys.exit(0)
    elif optname in ('-p', '--pswd'):
        password = optvalue
    elif optname in ('-v', '--version'):
        print __version__
        sys.exit(0)
    elif optname in ('-1', '-2', '-3', '-4', '--g1', '--g2', '--g3', '--g4'):
        imgnum = int(optname[-1])
        if not os.path.exists(optvalue):
            raise Exception('Invalid image file', optvalue)
        images[imgnum] = optvalue
    else:
        raise Exception('BUG: should have caught %s but didn\'t' % `optname`)

if not images:
    print >>sys.stderr, 'Error: no images specified'
    print >>sys.stderr
    usage(sys.stderr)
    sys.exit(1)

if not args:
    print >>sys.stderr, 'Error: no server specified'
    print >>sys.stderr
    usage(sys.stderr)
    sys.exit(1)
server = args[0]

upload(server, username, password, images)

def usage(stream):
    stream.write(__doc__)

def upload(server, username, password, filenames):
    # build payload
    print 'ncgo: building payload'
    fields = {}
    for key, filename in filenames.items():
        fields['overlay_%d_file' % key] = {
            'filename': os.path.basename(filename),
            'value': file(filename).read(),
            'content-type': get_content_type(filename),
        }
    content_type, data = encode_multipart_formdata(fields)

```

```
# upload
print 'ncgo: uploading image(s)'
url = 'http://%s/api.cgi' % server
# Create an OpenerDirector with support for Basic HTTP Authentication...
auth_handler = urllib2.HTTPBasicAuthHandler()
auth_handler.add_password(realm='NCast Presentation Recorder', uri=url, user=user-
name, passwd=password)
opener = urllib2.build_opener(auth_handler)
# ...and install it globally so it can be used with urlopen.
urllib2.install_opener(opener)
request = urllib2.Request(url, data)
request.add_header('Content-Type', content_type)

try:
    response = urllib2.urlopen(request)
except urllib2.HTTPError, msg:
    print "ncgo: Urllib2 HTTP Error (%s)" % msg
    sys.exit(1)
except socket.error, (errno, strerror):
    print "ncgo: Socket error (%s) for host %s (%s)" % (errno, host, strerror)
    sys.exit(1)
print 'ncgo: finished'

def encode_multipart_formdata(fields):
    boundary = mimetools.choose_boundary()
    lines = []
    for key in fields:
        if isinstance(fields[key], dict):
            entry = fields[key]
        else:
            entry = {'value': fields[key]}
        lines.append('--' + boundary)
        if 'filename' in entry:
            lines.append('Content-Disposition: form-data; name="%s"; filename="%s"' % (key,
entry['filename']))
        else:
            lines.append('Content-Disposition: form-data; name="%s"' % key)
        if 'content-type' in entry:
            lines.append('Content-Type: %s' % entry['content-type'])
        lines.append('')
        lines.append(entry['value'])
    lines.append('--' + boundary + '--')
    lines.append('')
    body = '\r\n'.join(lines)
    content_type = 'multipart/form-data; boundary=%s' % boundary
    return (content_type, body)

def get_content_type(filename):
    type = mimetypes.guess_type(filename)[0]
    if type is None:
        type = 'application/octet-stream'
    return type

if __name__ == '__main__':
    main()
```

10. Techniques for Presentation Capture

10.1. WEBCASTING, PODCASTING AND ARCHIVING

The new world of webcasting meetings and conferences, recording presentations and running effective distance learning operations requires some thought, planning, and understanding of the objectives to be met for the operation. This section discusses common problems in making an excellent presentation capture, based on the experience of doing a number of live meeting and conferences. Hopefully, the tips and techniques discussed here will aid in avoiding common problems.

10.1.1. Objectives for the Webcast or Recording

Creating a quality, professional recording is not trivial, and requires cooperation from the organization hosting the meeting. It should be well understood in advance what the ground rules for the recording of the meeting will be:

1. The live meeting is paramount, the recording will be done on a best effort basis.
2. The needs of the live meeting and the recording should be balanced.
3. The recording/webcasting is most important, and the live audience is there for the ride.

Achieving balance is not difficult and the needs of the webcaster/recorder can be accommodated without much extra effort. The paragraphs below offer specific tips on how to achieve this balance.

Another objective that needs definition is the intended audience for the recording:

1. Distribution to a wide audience – If the captured visualizations need to be seen by a wide audience with a variety of connecting bandwidths and PC playback capabilities, then the bandwidth used must be limited (i.e. typically less than 750 kbps) and the resolution and frame rate must be restricted (i.e. 800x600 or less and a target framerate of 15-20 frames per second). If these limits are not observed, viewers will see various artifacts (pixelation, stuttering, loss of lip-sync) that lead to a negative experience. The principal causes of these artifacts are packet loss (due to overloading of the internet connection) and processing capability (the receiving PC does not have enough CPU capacity to process high-resolution, high frame-rate imagery).
2. Distribution to a local audience – If transmission is only on a local campus or high-speed network, then bandwidth is not an issue and can be set as needed. There remains the issue of the processing capabilities of the receiving devices.
3. Archiving only – If the recording will not be transmitted as is, but needs to be transcoded into other formats during post-production, then the highest bandwidth and highest resolution settings available should be used.

Finally, the speaker or presenters need to know that a webcast/recording will occur, and this may require a written release from the speaker giving authority to capture and distribute the material. Speakers may have many different reasons for not wanting a webcast of their material (e.g. a webcast of some research material may be considered a “publication” by some and they wish to reserve first publication rights for a specific journal or the speaker may be using copyrighted video, audio or text in the presentation which may not be freely distributed). Doing a recording and finding after-the-fact that it may not be released is a waste of everybody’s time. These details need to be worked out and agreed to in advance, and not two minutes before the presentation.

10.2. CAPTURING GRAPHICS, VIDEO AND AUDIO

The following paragraphs outline common problems in recording a typical conference or presentation.

10.2.1. Capturing Graphics

The output of the presenter’s laptop needs to go to two places: the room projector and the Presentation Recorder. Many conference rooms are currently not capable of this two-way split. It’s a really good idea to

check out the A/V equipment in the room the day before the recording, if possible, or to consult with the A/V staff to plan how these video, graphics and audio connections will be made.

There are several ways to solve this problem:

- **VGA Splitter** – A VGA splitter is a small distribution amplifier which accepts a VGA signal as input and provides two or more VGA signals as output. The VGA splitter plus two extra cables is all that's required. One cable (a short one, one or two meters in length) connects the output of the presentation PC to the splitter. The other cable (a long one, 25 meters or more) connects the output of the splitter to the input capture card of the Presentation Recorder. A long cable is required as the Presentation Recorder recording table/station is frequently in the back of the room (where there is a power connection and where the technician can operate the video camera). The projector plugs into the second output of the splitter. Test all the cable connections ahead of time to insure correct mating, or bring along enough gender-changer adapters to accommodate misconnections.
- **Projector Loopback Output** – Some projectors have a loopback output connector, and that is a suitable place for the Presentation Recorder to capture the graphics signal.
- **Presentation Recorder Loopback Output** – The room projector can be plugged into the loopback output of the Presentation Recorder.
- **Matrix switcher** – Some A/V setups have an XGA matrix switcher as part of the room installation, and the Presentation Recorder could plug into one of the output connectors on that device.

10.2.2. Capturing Video

The video signal for PIP or side-by-side video is usually easy to obtain. Most cameras have Composite or S-video output connectors available, and only an appropriate cable is required to connect to the Presentation Recorder.

- Make sure that the camera's video output does not have time/date stamps, battery icons or other clutter on the signal being captured. There are usually menu options to turn these information icons off.
- Arrange with the conference staff to have one or two spotlights on the podium. Often the room lights will go dark so the audience can see the projection screen, and if there is no lighting on the speaker, the video quality deteriorates rapidly. Ask the speakers to not wander from the lighted podium area.
- A dark background behind the speaker leads to visually pleasing results. White screens, white tablets or signs behind the podium will lead to backlighting of the speaker, causing the exposure level on the speaker to go dark. Remove any unneeded visual clutter behind the podium. Ask the conference staff for a black curtain or sheet behind podium if there are whiteboards or bright white surfaces there.
- Speakers often like to stand directly in front of the projection screen while making a point. This leads to horrible backlight problems for the camera and a terrible recording. Ask speakers not to stand in front of the screen. The screen should not be anywhere in the framing of a video shot.
- Keep the video shots "tight" on the speaker. The PIP format reduces the size, and it's best to have as large a headshot as possible. Video of half the room is neither visually pleasing nor does it convey the karma of the speaker.
- Mount the camera on a high tripod. Waiters, latecomers and other traffic right in front of the camera is very distracting to the video recording.
- Speakers invariably move around, and it is unrealistic to not have an operator full-time on the camera, unless there is some sort of automatic tracking device being used.

10.2.3. Capturing Sound

Quality sound recording is probably one of the most important requirements for a decent presentation capture. Viewers will find the presentation incomprehensible if the audio is soft, distorted or noisy. This is especially true if there are non-native language speakers or listeners. Clean audio can be achieved by following these steps:

- **Lavalier Microphone** – The best audio capture is through use of wireless lavalier (lapel) microphone on the speaker. Including one in the Presentation Recorder gadget bag is a really good idea. The levels will be consistently correct (through experience), and the results will be predictable.
- **House Audio** – If the conference staff is setting up audio, ask for a feed from their mixer. It is usually easy to get a balanced or unbalanced feed (if asked for in advance). A balanced feed going into a small mixer (e.g. a Mackie 12-channel or similar) which then plugs (unbalanced) into the Presentation Recorder is an excellent solution. The operator can instantly adjust and check levels. The Presentation Recorder has an option for external connections to balanced audio.
- **Audio Meter** – Use the Audio Meter on the local loopback display to confirm correct level into the Presentation Recorder. Audio peaks should be 2/3 to ¾ high on the meter.
- **Listen to the webcast/archive** – Do an audio pre-check and listen to the final recorded audio from the Presentation Recorder. Make sure the levels are correct and that noise, hum or other problems are eliminated.
- **Audience Microphones** – If the audience will be interacting and asking questions, arrange for wired or wireless audience microphones, and insist on their use. A long dead silence during an audience question followed by a speaker response to a question the remote viewers did not hear is very frustrating. Ask the speakers or chairperson to always repeat or summarize the audience question.
- **Panel Microphones** – If there will be a panel discussion, insure that a suitable number of microphones for the panel discussion is available.

10.2.4. Automatic Recording

A Presentation Recorder Channel can be setup to automatically start recording when a Session is started. This is probably the best solution for guaranteeing that the recording will happen.

10.2.5. Graphics and Video Swap

Usually during conferences there are periods when no active or meaningful graphics are being displayed (e.g. during Q&A sessions, panel commentaries, introductions). Be prepared to swap the video and graphics windows during these times. The Swap button on the Sources web page will do this easily.

10.3. CONFERENCE DAY PROBLEMS AND ISSUES

During the actual conference or seminar, these problems and issues may occur:

10.3.1. The Podium

The Presentation Recorder screen-capture composition has a natural podium-left or podium-right orientation. If the exact room layout is not known in advance, two composition setups will need to be ready for use, and the operator will need to know how to setup a left or right arrangement.

Speakers naturally look at the projection screen while they are talking, so using a right-hand setup for a left-hand podium gives unnatural looking results and should be avoided. Most of the graphics used will probably be symmetrical and so the re-arrangement will not be difficult, but must be planned for in advance.

10.3.2. The Conference Chairperson

The meeting Chairperson or Master of Ceremonies (MC) needs to be informed that a webcast/recording is happening and that there are certain things he/she can do to assist in a quality recording:

- **Clean Breaks** - The MC should arrange to have a clean introduction to each new speaker or topic (i.e. Power-point all setup and ready to go, no fumbling around trying to find and start the next slide show) and a clean break at the end so that recording can stop and video tapes can be changed, overlay graphics updated and recording restarted. In many cases the MC starts introducing the next speaker while the previous speaker's graphics are still being projected. The speaker is given the podium while his/her computer is being connected and the desired graphics being discussed are not present. Viewing this later in a recorded archive looks very unprofessional and sloppy. With just a little care the MC can make some interesting comments on the previous speaker or can make small

talk or tell a story while this speaker transition is occurring. It is hard to capture clean recordings when one presentation runs right into the next one.

- **Session Length** – If the cameras are recording a backup copy of the sound and video (which is a really good idea) the MC must know that MiniDV tapes only record for an hour (or some other length of time) and need to be changed at some point.
- **Discrete Units** – The webcast file recording should be broken up into discrete units by topic or speaker so that the file lengths remain manageable and viewers can download or view only the material of interest. A continuous three or four hour conference recording is very difficult to manage or post-process. The MC must plan for some breaks.
- **Speaker Order** – If the MC plans on changing the order of speakers or presentations, the recording crew needs to be informed so that the proper sequence of overlay graphics can be readjusted.

10.3.3. The Conference Speakers

If possible, the recording crew should talk to the speaker(s) prior to their presentation and make the following points:

- **Use a microphone** – Even if the room audience can hear the speaker well, non-use of a microphone can be a disaster for the webcast or recording. The proper microphone must be on and functioning, period.
- **Stay near the podium** – The speaker should stay near the lighted area of the podium and not wander up and down the front of the room.
- **Don't stand in front of the projection screen** – Talking in front of the projection screen leads to video backlighting problems and should be avoided.
- **Start of Talk** – Ideally, the presenter's discussion should start once the proper graphics are being projected, and no sooner.
- **Repeat the Question** – If there are audience questions or comments, the speaker should repeat them or summarize them for the viewing audience.

10.3.4. The Conference Audience

The conference audience should be informed that a webcast/recording is underway and that a few rules need to be applied:

- **Audience microphones** – The audience needs to use the audience microphones any time a question or comment is being given. The MC and/or speaker needs to help enforce this directive.
- **Public audience** – Comments provided by the audience are being recorded and archived so that any type of inappropriate comment, personal attack, sexist joke, or other outburst should be avoided.

10.3.5. Summary

Fixing these problems in post-production is very time-consuming and expensive and recompression degrades the quality of the captured material.

With these relatively minor changes and help from the organizers and the MC and perhaps a little training for the speakers the recordings will be captured well and become great historical archives worthy of the effort.

10.4. VIDEO POST-PRODUCTION

If there is a need to do some minor editing on an archive file, there are tools which can clip and trim the archive file without recompression of the material.

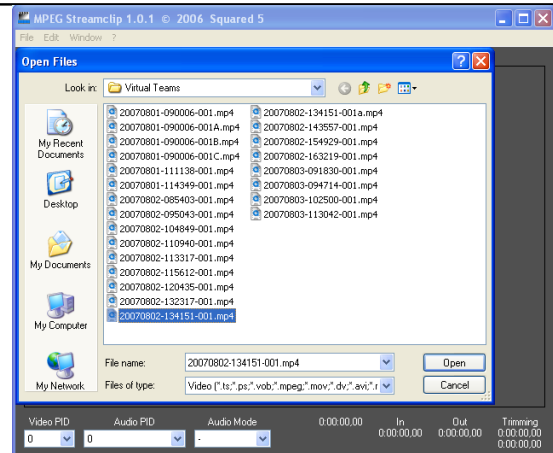
10.4.1. Streamclip

One such tool is a free utility called "Streamclip". This program may be obtained at the following website:

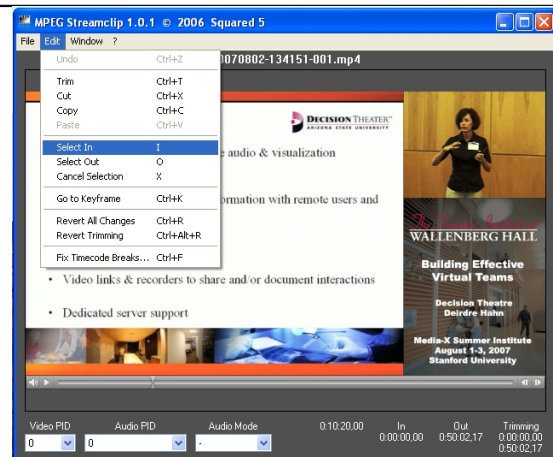
<http://www.squared5.com/>

To use Streamclip to trim a file, follow these steps:

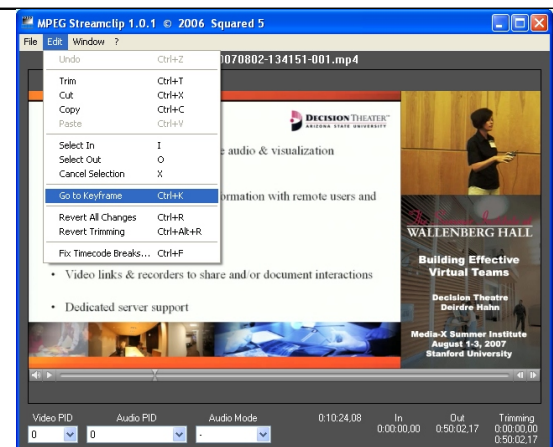
Open the .mp4 file to be trimmed



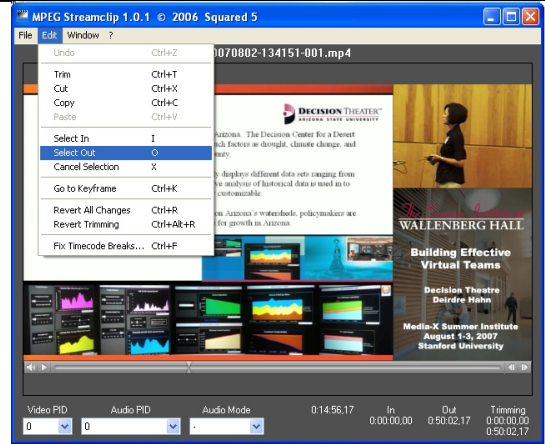
Drag the slider to the starting sequence of your new clip and select the “In” point where the new clip should start



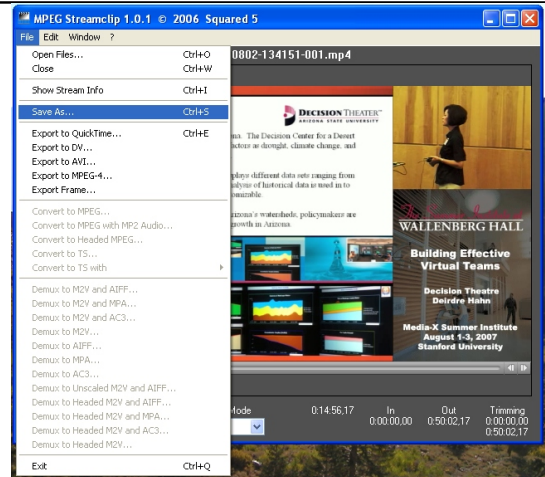
Align the “In” point to the nearest key frame. This is required to eliminate pixelation and picture breakup at the start of the new clip. If that key frame is unacceptable as a starting point, move the slider backward or forward until a usable key frame is found.



Drag the slider to the end of the new clip and select an “Out” point where the new clip ends



Save the file as a new .mp4 file. You should override the “.mov” suggested suffix with “.mp4”.



If this file will be used on a streaming server, the “hint” tracks must be added to the file.

11. References

11.1. MPEG COMPRESSION

ISO 14496-12 - ISO base media file format

ISO 14496-14 - MP4 file format

11.2. PACKET TRANSMISSION

IETF RFC 3550 "*RTP: A Transport Protocol for Real-Time Applications*", H. Schulzrinne, et. al., July 2003

IETF RFC 3551 "*RTP Profile for Audio and Video Conferences with Minimal Control*", H. Schulzrinne, et. al., July 2003

IETF RFC 3016 "*RTP Payload Format for MPEG-4 Audio/Visual Streams*", Y. Kikuchi, et. al., November 2000

IETF RFC 3640 "*RTP Payload Format for Transport of MPEG-4 Elementary Streams*", J. van der Meer, et. al., November 2003

IETF RFC 2326 "*Real Time Streaming Protocol (RTSP)*", H. Schulzrinne, et. al., April 1998

IETF RFC 2327 "*SDP: Session Description Protocol*", M. Handley, et. al., April 1998

11.3. MULTICAST

IETF RFC 1112 "*Host Extensions for IP Multicasting*", S. Deering, August 1989

IETF RFC 3171 "*IANA Guidelines for IPv4 Multicast Address Assignments*", Z. Albanna, et. al., August 2001

IETF RFC 3180 "*GLOP Addressing in 233/8*", D. Meyer, et. al., September 2001

IETF RFC 3138 "*Extended Assignments in 233/8*", D. Meyer, June 2001

IETF RFC 2365 "*Administratively Scoped IP Multicast*", D. Meyer, July 1998

IETF RFC 2327 "*SDP: Session Description Protocol*", M. Handley, et. al., April 1998

12. Revision History

- Revision 1.1 – Updates based on software Release 6.1.7. There is a new Date & Time configuration screen. Also a new option to set the Max Recording Time on the Channel Settings Recording tab. Transcode functions have been dropped from the product due to excessively long processing times. The PR-720-S model has been discontinued.
- Revision 1.0 – Initial revision based on software Release 6.0.0.