

NCast Product Specification

Telepresenter Series 2 Reference Manual

Revision 1.10

December 3rd, 2008

M3 Software Release 3.1.7

M3 Series 2 Software Release 4.2



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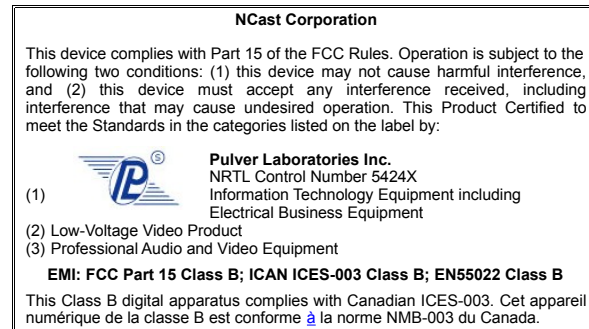
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Regulatory Compliance Information

Equipment Label

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



Cautions

- (1) Use a shielded data cable connection between the parallel ports and peripherals of this equipment.
- (2) Other connections between peripherals of this equipment may be made with low voltage non-shielded computer data cables.
- (3) 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 B 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 B or Class 2 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 B Digital Equipment

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

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

It's like a ... TV Station in Box™

1. Introduction

1.1. PURPOSE

The *N*Cast Telepresenter Reference Manual* is intended for the Audio/Video or Network engineer who will be tasked with the job of installing and setting up a Telepresenter or a system of multiple Telepresenters. The *Quick Start Manual* should be consulted for basic setup, power-on of a unit and troubleshooting. This guide is designed to cover topics in greater depth and to assist in optimizing the performance of a Telepresenter.

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

N-Way – An N*Cast 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. TELEPRESENTER UNITS

The Telepresenter is a stand-alone network communications appliance which captures RGB (VGA) 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 computer (VGA) monitor or via a room projector. Some Telepresenter models also archive the media stream in real-time, allowing for playback by the recipient at a later date.

The following Telepresenter models are covered by this documentation:

Telepresenter S – A small stand-alone unit used primarily for webcasting.

Telepresenter S3 – A small stand-alone unit with SXGA resolution capabilities.

Telepresenter G2 – A rack mounted unit with streaming and archiving capabilities.

Telepresenter M2P – A rack mounted unit with streaming, archiving, collaboration and PIP capabilities.

Telepresenter M3 – A rack-mounted unit with streaming, archiving, collaboration capabilities at UXGA (1600x1200) resolutions. Includes PIP and overlays.

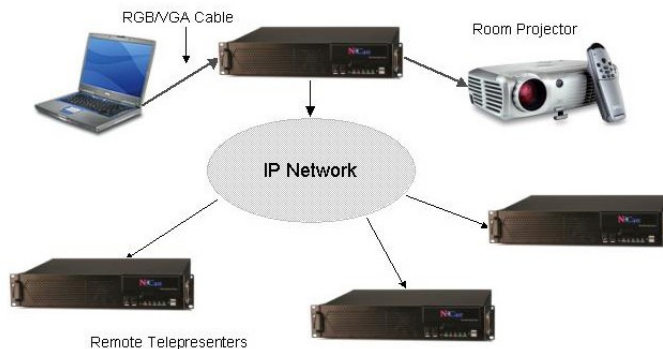
Telepresenter M3 Series 2 – A rack-mounted unit with streaming, archiving, collaboration, capabilities at WUXGA (1920x1200) and 1080p resolutions. Includes PIP and overlays.

All Telepresenter models share a core operating system and base set of features.

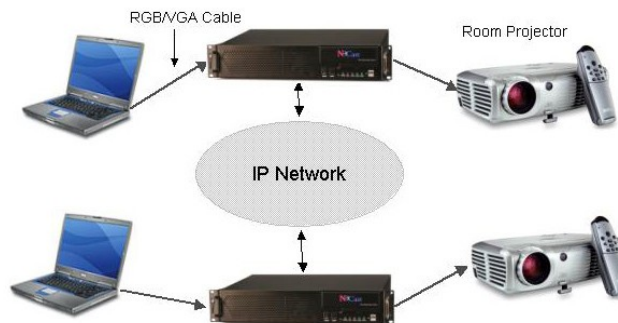
1.5. TELEPRESENTER MODES OF OPERATION

The Telepresenter have three major modes of operation:

One-to-Many Streaming – In this mode of operation one of the Telepresenter 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. 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.



Full-Duplex Streaming – Two Telepresenter can be connected via a point-to-point unicast or multicast link. Each endpoint will be transmitting to the other endpoint and simultaneously receiving a stream from the remote unit.



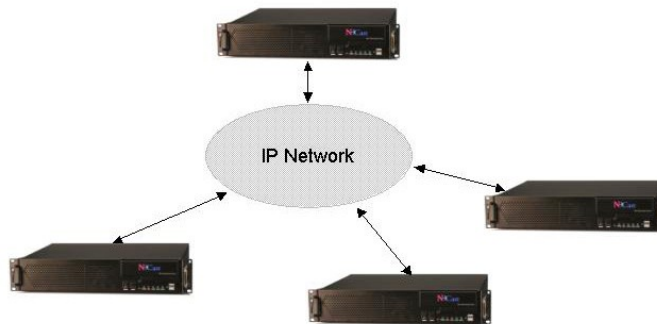
Collaboration Mode – Two or more Telepresenter can be engaged in N*Cast’s proprietary Collaboration Mode. In this mode, one unit is designated as “Conference Coordinator” and all other units are designated as “Conference Participants”.

The Coordinator is the master controller for the conference, and is allowed to pass control to any participant in the conference at any time. When a participant receives control, the participant’s unit begins transmission and the coordinator’s unit stops transmission. All other units are then “tuned in” to the media stream being generated by the participant unit which was granted control. When the participant’s presentation is done, the coordinator takes back floor control and continues the conference as before.

In this mode the audio from each unit transmits continuously, and at each receiver all audio streams are combined or mixed to allow real-time interactive discussion amongst all

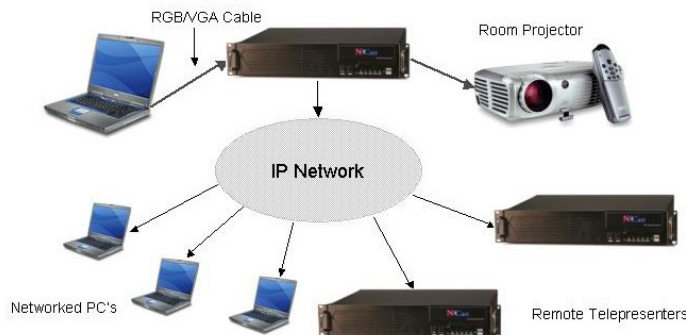
participants. Use of collaboration mode audio requires external echo-canceling microphones or amplifiers to avoid problems with echo and feedback. Equipment made by companies such as ClearOne (was Gentner), PolyCom or others is a must for quality audio-conferencing results.

Collaboration mode requires units to be situated on a multicast-enabled network, or to use N-Way bridging technology.



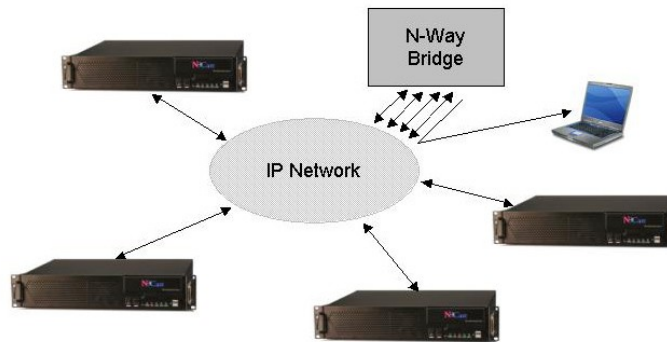
In addition to these three modes of operation there is the following additional functionality:

Webcasting to Desktops – The Telepresenters can generate RTSP media streams which may be unicast to desktops or laptops that wish to join a conference. Commonly available client players allow these presentations to be displayed either full-screen or in a window on an individual's monitor or LCD display. In addition to the Desktops using RTSP, remote Telepresenters connected via multicast can receive the media streams. For optimum performance consideration must be given to the bandwidth requirements for all senders and receivers.



In this mode of operation questions and comments from students or the audience may be enabled through use of any number of popular instant messaging applications (e.g. Jabber, Yahoo Messenger, Google Talk, etc.).

Multicast Bridging – Through the use of N-Way technology and services, multiple Telepresenters, which are not situated on a native multicast network, can participate in a conference through the use of a bridge. The N-Way bridge can also serve as a distribution point for RTSP unicasts to desktops.



N-Way functionality and services are described in the *N-Way Reference Manual*. Contact N*Cast Corporation for more information on N-Way Servers and Services.

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, and plug in an LCD Display to the VGA Out, 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 "Quicktime RTSP" and you're done!

1.6.2. Mini Start

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

1. Plug the unit into a network and plug in an LCD Display to the VGA Out, 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. Go to the Display page and setup your local loopback display parameters.
5. On the Sources page select your input feeds from the top two rows of buttons. Select your Audio Input source. Also select the Capture Size to use and 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.
6. On the Channels page modify a Channel for the transmission rates and multicast or unicast addresses you wish to use. Update the Channel information. Click the Channel Start button on the left for the Channel you have modified.

7. 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.
8. Go to the View page. This page allows you to connect different media desktop players using either multicast or RTSP (unicast) protocol. If you have Quicktime installed on your PC, click on "Quicktime Multicast" if you have multicast on your network or "Quicktime RTSP" for unicast. 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 Telepresenter, 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 Telepresenter.

2. Theory of Operation

2.1. TELEPRESENTER COMPONENT BLOCK DIAGRAM

The Telepresenter consists of these main hardware functions:

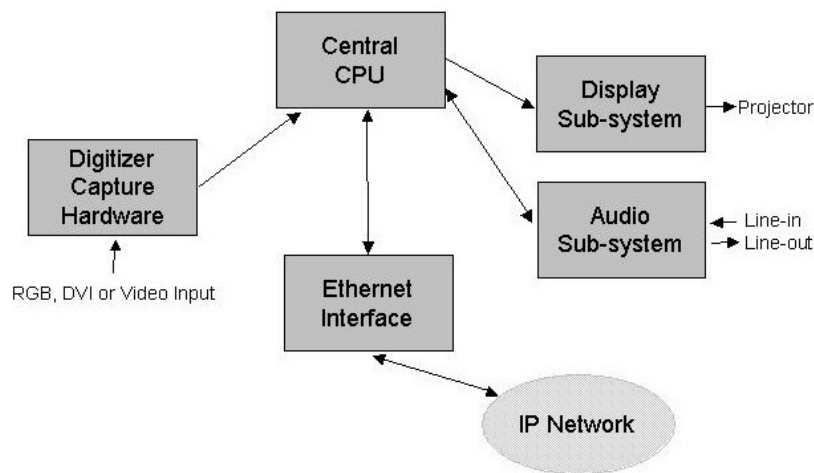
Digitizer Capture Hardware – A specially designed, high-performance PCI card is used to grab and digitize the RGB or video signals created by the presenter or media source. This card accepts VGA, DVI, PAL/NTSC composite or PAL/NTSC S-Video connections and converts those signals to RGB or YUV digital format. With the introduction of the Digitizer-3 PCI card, two of these inputs may be active simultaneously for generation of a picture-in-picture (PIP) display.

Central CPU – A general-purpose, high performance processor is used to compress and decompress media 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.

Display Output Sub-system – Media streams, which are received and decoded, are presented on the attached display for viewing.

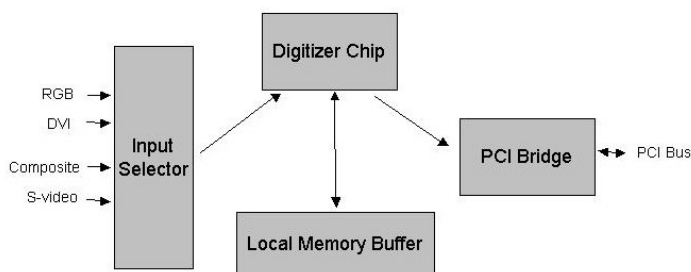
Audio Sub-system – A sound system with stereo input-output capabilities and with support for microphone and line-level inputs and line-level outputs is used to create the AAC audio streams transmitted in conjunction with the associated graphics or video imagery.

Ethernet Interface – Industry-standard 100-base TX connectors are used to connect the Telepresenter with the Internet network used for communications.



2.2. DIGITIZER CAPTURE FUNCTION

The digitizer capture card selects one of the available four inputs (VGA, DVI, 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 card. At an appropriate time the pixels in memory are transferred over the PCI bus to the memory of the main CPU where they are pre-processed and compressed.



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 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 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. 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 Telepresenter supports an audio subsystem consisting of an AC '97 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.

2.8. ARCHIVE DISK

A local hard-drive in the Telepresenter is available for recording transmitted sessions. The file format is standard Mpeg-4, 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.

3. Settings and Parameters Reference

3.1. UNIT OPTIONS SETTINGS

The Unit Options page gives the Telepresenter 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 Telepresenter as a member of an ongoing conference session.

NCast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

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

Unit Options

Unit: [Shutdown](#)

Contact name: [Reboot](#)

Contact e-mail: [Factory Defaults](#)

Contact phone:

Contact location:

Contact web page:

Time zone: [Update](#)

Network time protocol:

Serial number: M3S2-302707-0003
Architecture: pdsba
Software release: 4.2.0 - 2008-11-18
Genesis code version: 2.1
FPGA code version: 0.34
Current date and time: 2008-11-30 09:58

Streaming on channel 1
1 participant

Sending video 1280x720 26.6fps 753kbps
and audio 44kHz Mono 64kbps

Not receiving

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

NCast Copyright © 2008

3.1.1. Unit ID

The Unit ID uniquely identifies a Telepresenter 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:

M3 West Campus

M3 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 SDES element in the

RTP protocol (see IETF RFC 1889 for a more detailed description of the Real-Time Protocol). Other SDES 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, service@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. 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. Network Time Protocol

When enabled the unit's system time is synchronized with public NTP servers. When disabled the system time is not synchronized and may drift over longer time periods. This option takes effect immediately. If the NTP client is disabled an additional setting for manual time and date setup shows up. The NTP client requires a proper DNS configuration to work correctly.

Selection of this option requires that the network in use allows the Telepresenter to access external, publicly available 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
- System date and time

3.1.10. Reset Buttons

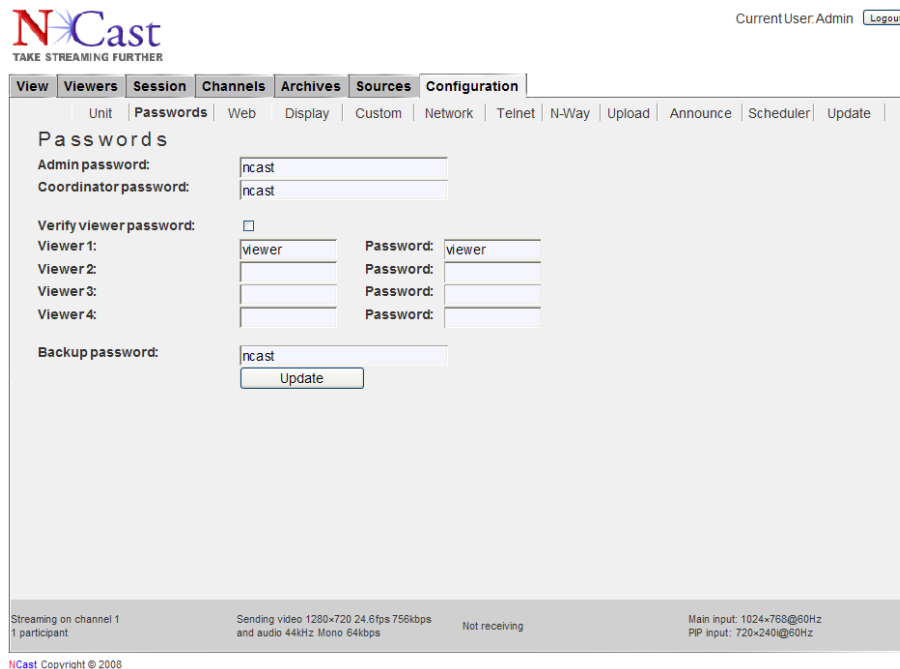
On the right side of the web page are three buttons which may be used to restart or reset the unit:

- Shutdown – Powers down the unit and is recommended as the proper means to turn off a Telepresenter 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.

- **Factory Defaults** – All operating parameters are reset to the Telepresenter's initial factory configuration. Nothing is saved and the reset is irreversible.

3.2. PASSWORDS

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



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 this is a navigation bar with tabs: View, Viewers, Session, Channels, Archives, Sources, and Configuration (which is selected). Under the Configuration tab, there are sub-tabs: Unit, Passwords (selected), Web, Display, Custom, Network, Telnet, N-Way, Upload, Announce, Scheduler, and Update. The main content area is titled 'Passwords' and contains the following fields:

- Admin password:** A text box containing 'ncast'.
- Coordinator password:** A text box containing 'ncast'.
- Verify viewer password:** A checkbox that is currently unchecked.
- Viewer 1:** A text box containing 'viewer' and a corresponding **Password:** text box containing 'viewer'.
- Viewer 2:** An empty text box and an empty **Password:** text box.
- Viewer 3:** An empty text box and an empty **Password:** text box.
- Viewer 4:** An empty text box and an empty **Password:** text box.
- Backup password:** A text box containing 'ncast' and an **Update** button below it.

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

- Streaming on channel 1, 1 participant
- Sending video 1280x720 24.6fps 756kbps and audio 44kHz Mono 64kbps
- Not receiving
- Main input: 1024x768@60Hz, PIP input: 720x240@60Hz

The footer of the page reads 'N*Cast Copyright © 2008'.

3.2.1. Admin password

The Admin password grants rights to all configuration and setup options for the Telepresenter. 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 the Conference Coordinator to control the conference session and to pass control to the participating units.

3.2.3. Viewer passwords

The View page allows desktop or laptop users to access the live media streams being encoded by the Telepresenter. 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. Backup password

The Backup 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 5.3. 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.

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 Telepresenter 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 Telepresenter 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://telepresenter.ncast.com`

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

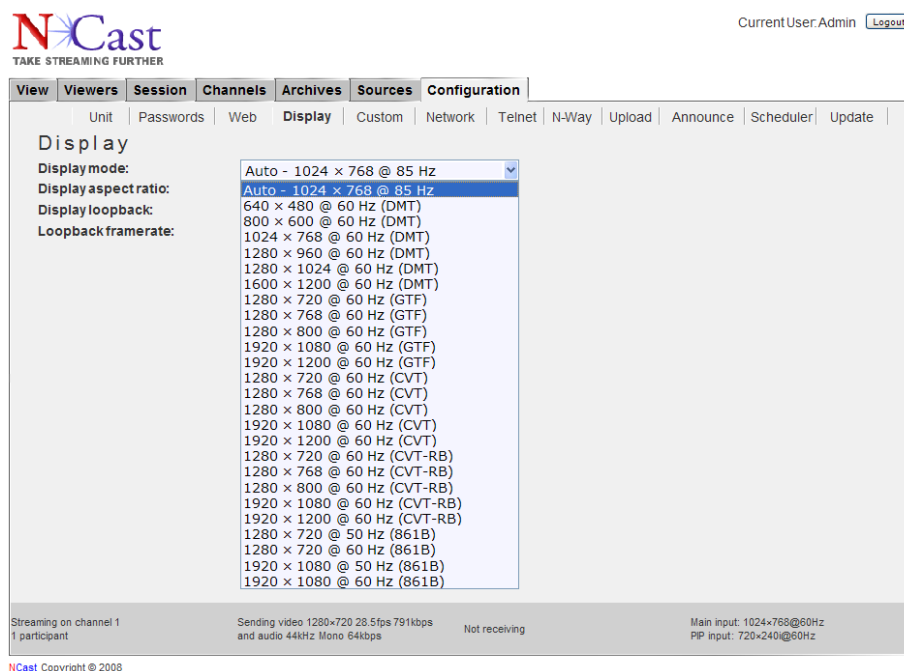
3.3.2. Certificates and RSA Keys

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 Telepresenter, 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 Telepresenter. 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). However, in the case of full-duplex streaming or collaboration mode, the display will be showing graphics or video that is being generated at some remote site. Also, if graphic overlays are being used, these will appear on the local loopback display.



3.4.1. Display Mode

The Telepresenter auto-detects the attached monitor's native resolution and aspect ratio. Auto-detection works only if the monitor has EDID and the DDC link is available. Otherwise, the unit will fall back to a

default resolution (1280x1024) and a default aspect ratio (4x3). Auto-detection is done only once during startup - if you switch your monitor later it will be auto-detected on the next startup. Auto-detected resolution and display aspect ratio are reported in the Display tab on web-page.

If Auto-detection mode is not used, the output resolution size may be set to some fixed value (VGA, SVGA, XGA, ...). This is sometimes needed when the EDID connection is broken due to use of a matrix switch, VGA distribution amp, splitter or some other equipment which does not properly transport the required EDID information to the graphics connector. Also, some older CRT displays may not support EDID at all. In these cases the required output resolution size must be set with the pull-down tab. All incoming media streams are scaled to this fixed resolution. There may be a loss of quality if, for example, an incoming XGA image is scaled to SVGA size.

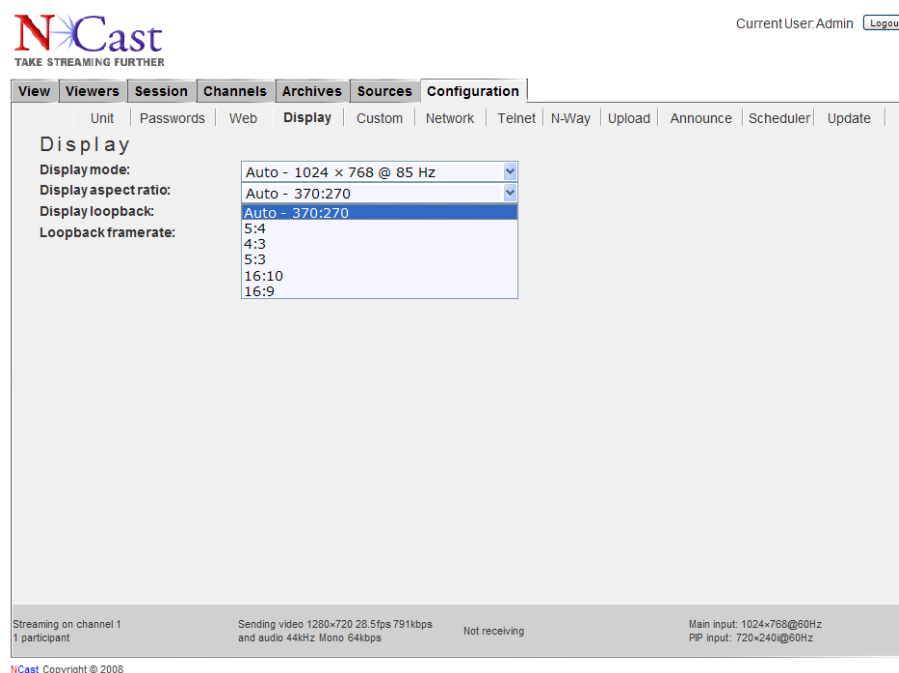
There are five different timings standards available:

- DMT - VESA Display Monitor Timing
- GTF - VESA Generalized Timing Formula
- CVT - VESA Coordinated Video Timings
- CVT-RB - VESA Coordinated Video Timings with Reduced Blanking
- 861B - CEA/EIA-861B

Consult the technical specifications of your CRT or LCD display to determine which of these settings is appropriate. Or, plug the display directly into the graphics connector to determine which setting is reported without the use of any distribution amps, splitters or intervening equipment.

3.4.2. Display Aspect Ratio

The display aspect ratio will normally be auto-detected (as above) through the use of EDID information. If not correctly detected it may be set through the use of this pull-down menu.



3.4.3. Display Loopback

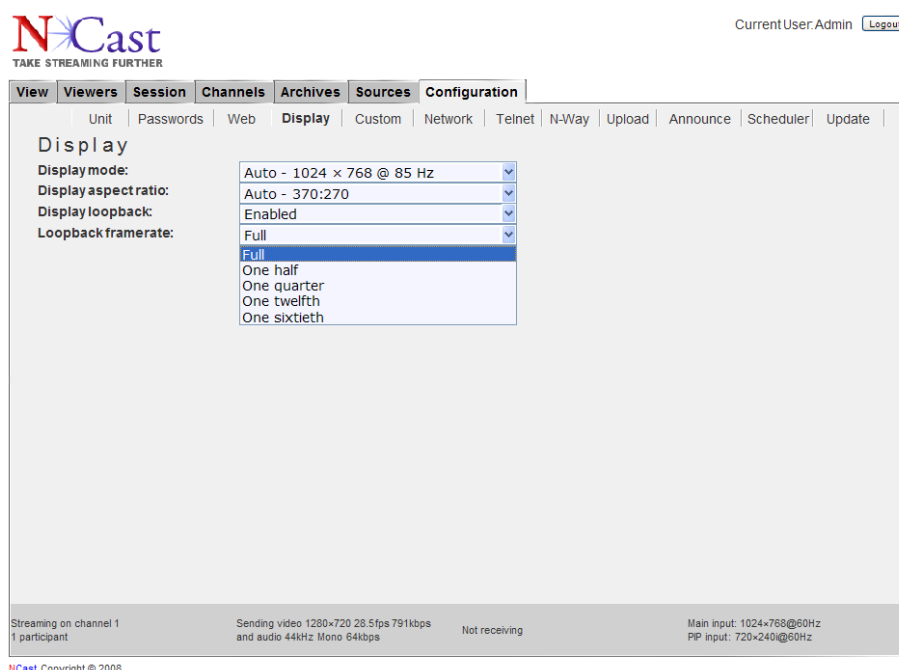
Turns on and off the loopback of locally generated graphics or video input. If local loopback is not being used in an installation this setting should be set to “Disabled” as that will free up CPU cycles which are required to generate the loopbacked image.

3.4.4. 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.



3.5. CUSTOM SETTINGS

The Custom Settings page allows users of the Telepresenter to define unique dimensions for the capture window, PIP windows, aspect ratios, and an overlay image. These custom definitions are used in conjunction with settings on the Sources page, so it is necessary to understand the Source selections first to fully appreciate the custom definitions which are entered here.

The Custom Settings page has changed form for M3S2 Release 4.2. In earlier releases and in M3 Release 3.1.7 the page appears as below:

NCast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

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

Unit | Passwords | Web | Display | **Custom** | Network | Telnet | FTP | Announce | Scheduler | Update

Custom Settings

Capture size 1 (W/H):	1024	768		
Capture size 2 (W/H):	1024	768		
Capture size 3 (W/H):	1024	768		
Capture size 4 (W/H):	1024	768		
Aspect ratio 1 (W/H):	4	3		
Aspect ratio 2 (W/H):	4	3		
Aspect ratio 3 (W/H):	4	3		
Aspect ratio 4 (W/H):	4	3		
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%
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](#)

Streaming on channel 1
1 participant

Sending video 1600x1200 29.4fps 1652kbps and
audio 44kHz Mono 64kbps

Not receiving

Main input: 1600x1200@60Hz
PIP input: no signal

For M3S2 Release 4.2 the new Custom Settings page has been partitioned and has a new sectioned layout:

NCast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

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

Unit | Passwords | Web | Display | **Custom** | Network | Telnet | N-Way | Upload | Announce | Scheduler | Update

Custom Settings

[Capture sizes](#)

[Aspect ratios](#)

[Windows](#)

[Overlays](#)

Streaming on channel 1
1 participant

Sending video 1280x720 27.8fps 768kbps
and audio 44kHz Mono 64kbps

Not receiving

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

NCast Copyright © 2008

The Capture size defines the dimensions of a surface (“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 capture surface. Consequently, selection of one of the default capture sizes and aspect ratios, or definition of a custom capture 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 Telepresenter. The capture surface can have any

dimension or aspect ratio, with the limitation that the maximum dimensions are 1920 x 1200 (1600 x 1200 for the M3).

Once the capture surface 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 capture surface. It is useful to note, however, that the primary stream can be dimensioned to a smaller size than the full capture 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.

Next, if the secondary “PIP” stream is enabled, its (X,Y) placement and (W,H) dimensions are overlaid on the capture surface. Typically this might be in the upper-right or lower-right corner of the capture area. The Telepresenter 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, 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.

3.5.1. Capture size n (W,H)

The Sources page permits the selection of many common, industry standard capture 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 Capture size.

The two entry fields define, in pixels, the width and height of the capture window. The width must be in the range 128-1920 (128-1600 for the M3), and the height must be in the range 128-1200.

3.5.2. Aspect ratio n (W,H)

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

Current User: Admin [Logout](#)

View Viewers Session Channels Archives Sources Configuration

Unit Passwords Web Display **Custom** Network Telnet N-Way Upload Announce Scheduler Update

Custom Aspect Ratios

Aspect ratio 1 (W/H):	4	3
Aspect ratio 2 (W/H):	4	3
Aspect ratio 3 (W/H):	4	3
Aspect ratio 4 (W/H):	4	3

[Update](#)

[\[Back\]](#)

Streaming on channel 1
1 participant

Sending video 1280x720 26.9fps 790kbps
and audio 44kHz Mono 64kbps

Not receiving

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

NCast Copyright © 2008

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

3.5.3. Window size n (X,Y,W,H)

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

NCast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

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

Unit | Passwords | Web | Display | **Custom** | Network | Telnet | N-Way | Upload | Announce | Scheduler | Update

Custom Windows

Window 1 (X/Y/W/H):	320	0	960	720
Window 2 (X/Y/W/H):	0	0	320	240
Window 3 (X/Y/W/H):	0%	0%	100%	100%
Window 4 (X/Y/W/H):	0%	0%	100%	100%

[Update](#)

[\[Back\]](#)

Streaming on channel 1
1 participant

Sending video 1280x720 27.5fps 760kbps
and audio 44kHz Mono 64kbps

Not receiving

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

NCast Copyright © 2008

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 capture window. If percents are used, then the dimensions are scaled to the current size of the capture area (e.g. if the capture area is 1024x768, then a 50% window width would be equivalent to entering a value of 512 pixels). The use of percents is convenient when the capture window changes in dimension. The top-left corner is the origin and has an (X,Y) value of (0,0).

3.5.4. Overlay n (X,Y)

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 the .png format and may use transparency to limit the amount of underlying graphical material which is blocked. Images must be less than 4 MB in size.

Current User: Admin [Logout](#)

View Viewers Session Channels Archives Sources Configuration

Unit Passwords Web Display **Custom** Network Telnet N-Way Upload Announce Scheduler Update

Custom Overlays

Overlay 1 details: SMW-2008.png
 Overlay 2 details: N*CastNetwork-NC.png
 Overlay 3 details: overlay3.png
 Overlay 4 details: overlay4.png

Overlay	X	Y	Enabled
Overlay 1 (X/Y):	0	240	Enabled
Overlay 2 (X/Y):	90%	90%	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](#)

[\[Back\]](#)

Streaming on channel 1
1 participant

Sending video 1280x720 28.7fps 870kbps
and audio 44kHz Mono 64kbps

Not receiving

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

N*Cast Copyright © 2008

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 capture window.

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.

If the graphics program being used cannot generate .png images, there are utilities which can convert many different formats to .png (e.g. <http://www.imagemagick.org/>).

3.5.5. Overlay n to upload

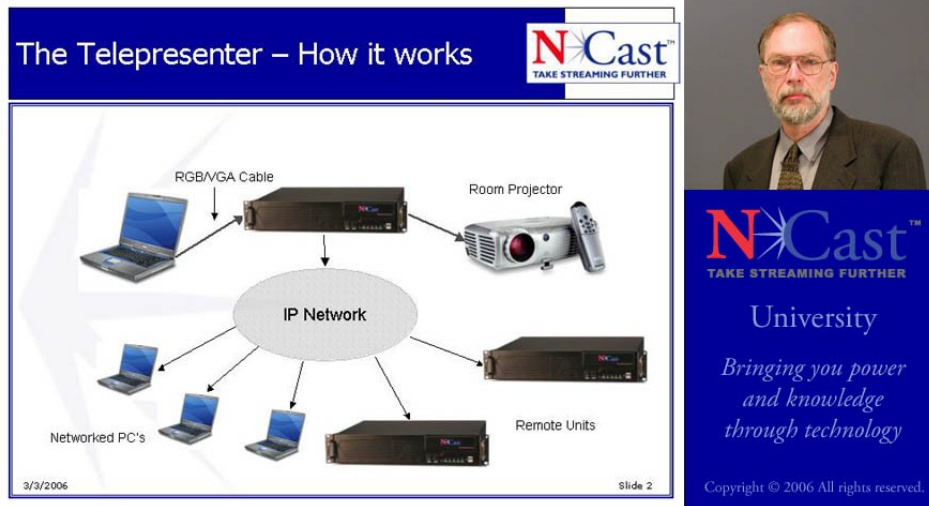
There can be up to four different Overlay images. Currently only .png pictures with sizes up to 4 MB and resolution up to 1920x1200 (1600x1200 for the M3) are accepted. The transparency feature of .png images is also supported. Most current photo editing tools now have options to save imagery in the .png format.

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 5.4 for details on dynamic upload.

3.5.6. 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. In the "Capture size 1" fields enter 880 and 480, which are the dimensions of the width and height of the desired media stream.
3. In the "Aspect ratio 1" fields enter 11 and 6 (or 88 and 48) to define an aspect ratio appropriate for this image.
4. In the "Window size 1" fields enter 0, 0, 640, 480 to define Window 1 as the window which will be associated with the Main graphics image.
5. In the "Window size 2" fields enter 640, 0, 240, 180 to define Window 2 as the window which will be associated with the PIP video stream.
6. In the "Overlay 1" fields enter 640, 180 to define the upper-left corner of the overlay. Change the right-hand field to "Enabled".
7. Press the "Update" button to record and save these entries.
8. In the "Overlay 1 to upload" field use the "Browse ..." button to find the required .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: XGA (or possibly DVI)
 - b. PIP input: Composite (or possibly S-Video)
 - c. PIP graphics: On
 - d. Graphics capture size: Capturesize 1
 - e. Graphics aspect ratio: Aspect ratio 1
 - f. Main graphics window: Window 1
 - g. PIP graphics window: Window 2

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

3.5.7. Hi-Definition 720p Layout Example

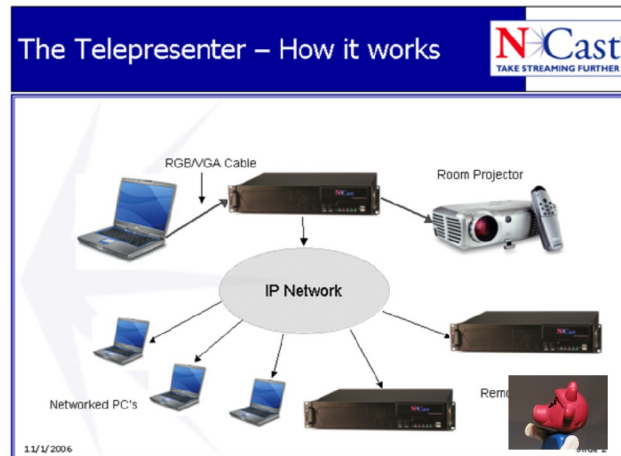
For archival purposes or for playback on hi-definition 16:9 screens the following example gives the dimensions of a 720p layout that NCast and its customers have used successfully to capture conference proceedings and other seminars. The capture window used is WXGA at 1280x720 resolution and 16:9 aspect 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.



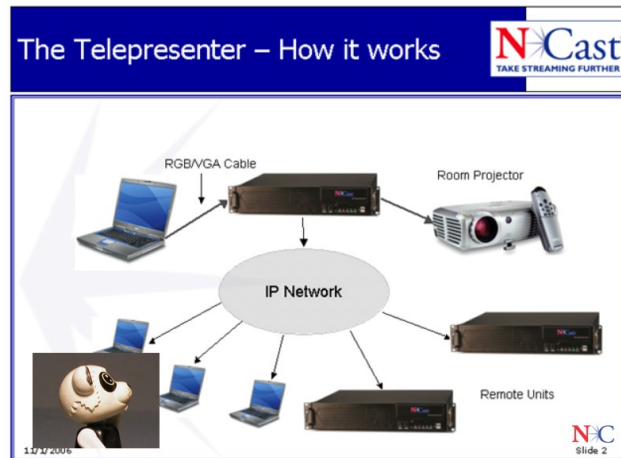
3.5.8. Overlay Layout Placement

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



11/17/2006
Slide 8



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TAKE STREAMING FURTHER

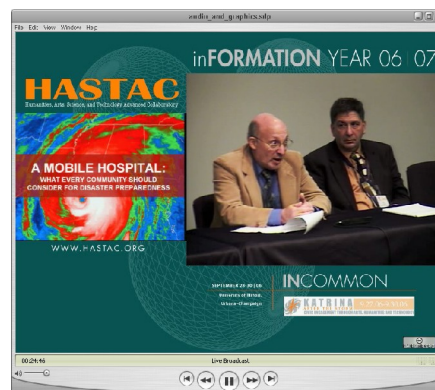
University

Bringing you power
and knowledge
through technology

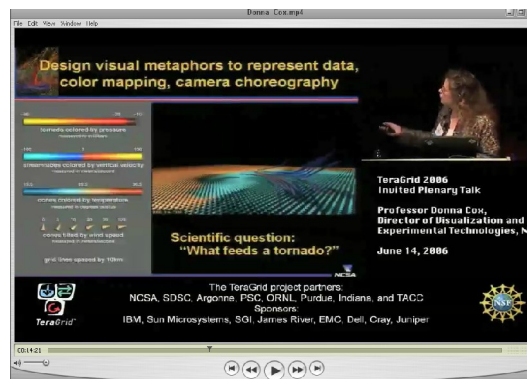
Copyright © 2006 All rights reserved.

3.5.9. Customer Layout Examples

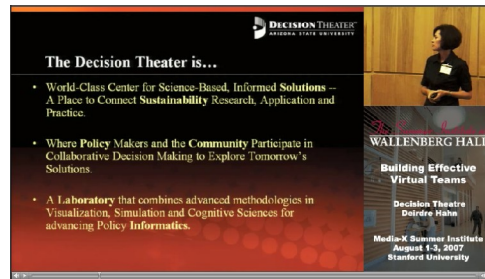
NCast customers and associates have created some outstanding examples of graphically interesting and aesthetically pleasing layouts using this overlay facility. The following are some examples of captures done from live conferences:



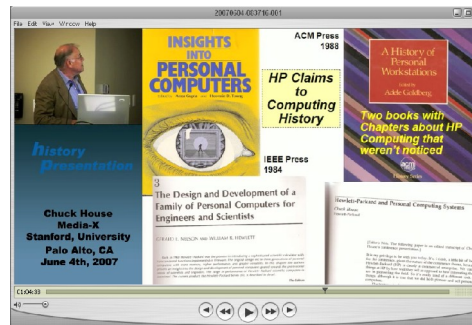
HASTAC Conference, courtesy of Duke University



TeraGrid Conference, courtesy of UCSD



Virtual Teams Conference, courtesy of Media-X



HP Historical Presentation

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.

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).

N*Cast
TAKE STREAMING FURTHER

CurrentUser:Admin [Logout](#)

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

Unit | Passwords | Web | Display | Custom | **Network** | Telnet | N-Way | Upload | Announce | Scheduler | Update

Network Configuration

DHCP:

IP address:

Netmask:

Gateway:

Primary DNS:

Secondary DNS:

Ethernet mode:

MAC Address:

HTTP proxy:

Proxy server: port:

Proxy user:

Proxy password:

* If required

Streaming on channel 1
1 participant

Sending video 1280x720 26.7fps 744kbps
and audio 44kHz Mono 64kbps

Not receiving

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

N*Cast Copyright © 2008

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 Telepresenter 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 Telepresenter 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 Telepresenter. 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 Telepresenter 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, 100FD, 100HD, 10FD, 10HD (auto negotiation, 100 or 10 Mbps, Full or Half Duplex). 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 Telepresenter 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 Telepresenter is being used with a simple hub or switch. Long bootstrap times will be shortened as the box is no longer searching for network time servers.

The previous version of this file was named “g2_conf.txt”. If both the new file and the old file are present on the USB disk, only the new one will be used.

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

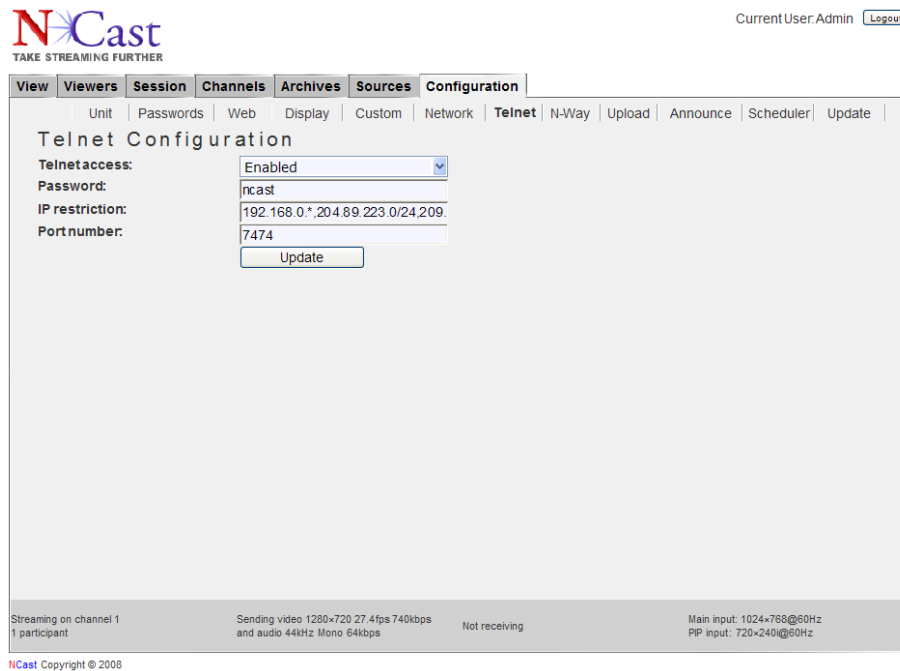
If the audio meter is displayed (on the local loopback screen) the current IP address of the unit will be shown with the meter, allowing verification of the unit’s address.

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 Telepresenter.

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 Telepresenter. Normally this field should contain a single IP address, which is the IP of the controller in charge of the Telepresenter. 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, 4.2 only)
- [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

Currently, standard CIDR notation (e.g. [www.xxx.yyy.0/24](#)) is supported in Release 4.2 only.

3.8. N-WAY

The N-Way tab is used on Telepresenters which are configured for service with an N-Way Server. See the "*NWay Reference Manual*" for further information on the settings of this tab.

NCast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

View Viewers Session Channels Archives Sources Configuration

Unit Passwords Web Display Custom Network Telnet **N-Way** Upload Announce Scheduler Update

N-Way Connection

Connection status: Disconnected

N-Way state:

Username:

Password:

Primary server: port:

Secondary server: port:

Streaming on channel 1
1 participant

Sending video 1280x720 21.8fps 747kbps
and audio 44kHz Mono 64kbps

Not receiving

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

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3.9. UPLOAD

The Upload menu provides for automatic and manual 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 M3S2 Release 4.2. SFTP upload supports 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 5.3 on the HTTP interface.

The screenshot shows the NCast Telepresenter web interface. At the top, the NCast logo and tagline 'TAKE STREAMING FURTHER' are on the left, and 'Current User: Admin' with a 'Logout' button are on the right. Below the logo is a navigation bar with tabs: View, Viewers, Session, Channels, Archives, Sources, and Configuration (which is selected). Under the Configuration tab, there are sub-tabs: Unit, Passwords, Web, Display, Custom, Network, Telnet, N-Way, Upload (selected), Announce, Scheduler, and Update. The 'Upload Configuration' section contains the following fields and buttons:

- Auto upload: Disabled (dropdown)
- Start auto upload: Immediately (dropdown)
- Remove after upload: ☐
- Protocol: SSH File Transfer Protocol (dropdown)
- SFTP server: (text input)
- SFTP port: 22 (text input)
- SFTP username: (text input)
- SFTP password: (text input)
- SFTP upload directory: (text input)
- Buttons: Connection Test, View Logs, Update
- Private key to upload: (text input) with a 'Browse...' button and an 'Upload File' 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 23.8fps 741kbps and audio 44kHz Mono 64kbps
- Not receiving
- Main input: 1024x768@60Hz, PIP input: 720x240@60Hz

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3.9.1. 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

3.9.2. (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:

m3/Class-%n/archives

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

m3/Class-001/archives

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

m3/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 Telepresenter.

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.

3.9.3. Connection Test

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

3.9.4. View Logs

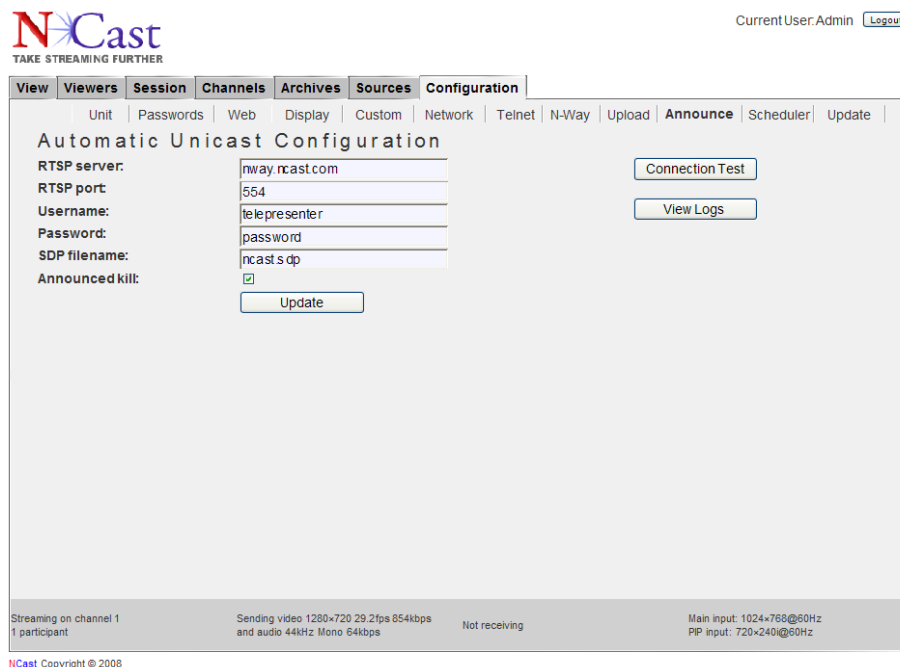
This command displays all the logs of all (S)FTP uploads sent to the server.

3.10. ANNOUNCE

This feature enables automatic transfer of a Telepresenter's SDP file to a streaming server (e.g. a QTSS/DSS server). The transfer is accomplished by RTSP ANNOUNCE commands sent from a Telepresenter 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).

Typically the SDP file is transferred when a session starts and during the session when the SDP file changes. As an option "Announced kill" is supported. This should disconnect all RTSP clients from streaming server and remove the SDP file. The Telepresenter issues "Announced kill" when a session has ended.

This feature, also known as "Automatic Unicast", is activated per channel by enabling the "Announce" checkmark.



N*Cast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

View Viewers Session Channels Archives Sources Configuration

Unit | Passwords | Web | Display | Custom | Network | Telnet | N-Way | Upload | **Announce** | Scheduler | Update

Automatic Unicast Configuration

RTSP server: [Connection Test](#)

RTSP port:

Username: [View Logs](#)

Password:

SDP filename:

Announced kill: ☒ [Update](#)

Streaming on channel 1
1 participant

Sending video 1280x720 29.2fps 854kbps
and audio 44kHz Mono 64kbps

Not receiving

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

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3.10.1. Configuration

The following parameters related to the Announce capability are available:

- RTSP server - IP address or name of the streaming (QTSS/DSS) server
- RTSP port - server RTSP port number
- 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
- Announced kill - issue an “announced kill” command when the session has ended

3.10.2. Connection Test

The Telepresenter will try to connect to the RTSP server and download and display an SDP file. This test will verify that an SDP file was indeed successfully uploaded to the server and is available there. By manually logging onto the server it is possible to list the SDP files, but this requires an extra step.

Doing this verification is easier with the Connection Test than trying to use a media player to determine if the connection is functional. Once the SDP upload is verified, use a media player to confirm your results.

3.10.3. View Logs

This command displays all the logs of all SDP file transfers to the server (announced kill transfers an SDP file with a ".kill" suffix).

3.11. SCHEDULER (SERIES 2 ONLY)

3.11.1. Overview

The Telepresenter Scheduler is a feature that allows the manager of one or more Telepresenters 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 Telepresenter at a predetermined time, load unique settings for each individual presentation, send serial control commands to each Telepresenter to provide additional functionality, and specify how and where the Telepresenter sends its output, all without touching the actual Telepresenter user interface. All that is required is one or more Telepresenters, 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.

3.11.2. Components of the Solution

The Scheduler Implementation uses three components to allow automatic start/stop scheduling of one or more Telepresenters 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 Telepresenter.
- The Telepresenter IP serial command interface, which receives commands at the scheduled times.

3.11.3. 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 Telepresenters and how to use the Scheduler web page.

Complete documentation for the serial command set is in the “*Telepresenter 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.

3.11.4. 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.

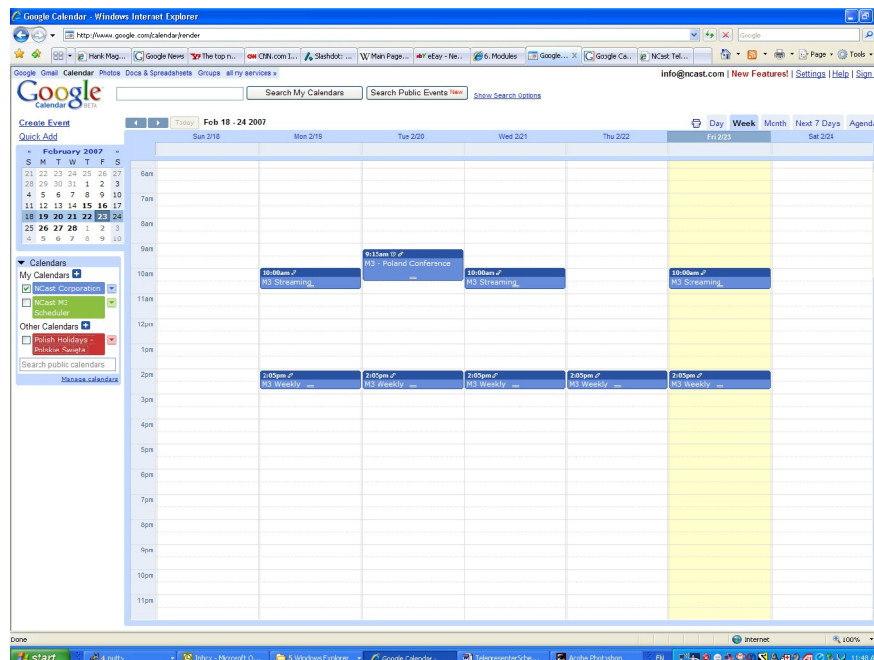
One interesting and important aspect of this calendaring system is that Google has defined a standards-based software API (called “gdata” for many of their services) which allows programmatic access to the calendars and the events contained within them. The API is implemented in Java and several other 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 Telepresenter where the web-based Google Calendar is the administrative interface for defining session start/stop times for one or more Telepresenter within a customer's network.

The process works in three steps:

1. An administrator enters one or more scheduled events for a Telepresenter
2. The scheduling process queries the calendar at regular intervals and captures these events.
3. Commands sent to the IP Serial Interface of a Telepresenter 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 Telepresenter listed in the “Where” field. Two events with the same start/stop times on the same day can be directed to two different Telepresenter simply by changing the contents of the “Where” field. The “Description” field (discussed below) allows customization of the actions executed at scheduled start time.

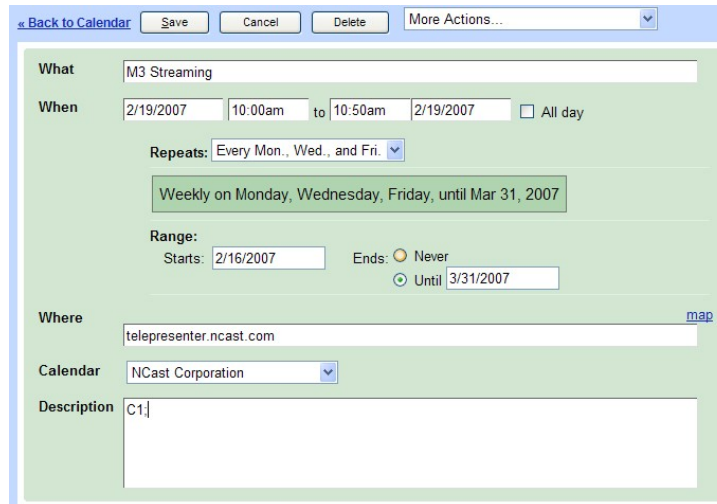


So to get started, an administrator must establish a Google Calendar account (different from a Google mail account) and provide a password for this account. Multiple accounts can be established for multiple Telepresenters if that is easier to administer.

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

3.11.5. Creating Scheduled Events

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



The screenshot shows a web form for creating a scheduled event. At the top, there are buttons: « Back to Calendar, Save, Cancel, Delete, and a dropdown for More Actions... The form fields are as follows:

- What:** A text field containing "M3 Streaming".
- When:** Date and time fields. The date is 2/19/2007, the time is 10:00am to 10:50am. There is an "All day" checkbox which is unchecked.
- Repeats:** A dropdown menu showing "Every Mon., Wed., and Fri.". Below it, a text box says "Weekly on Monday, Wednesday, Friday, until Mar 31, 2007".
- Range:** Starts: 2/16/2007. Ends: Radio buttons for "Never" (selected) and "Until 3/31/2007".
- Where:** A text field containing "telepresenter.ncast.com" with a "map" link to its right.
- Calendar:** A dropdown menu showing "N*Cast Corporation".
- Description:** A text area containing "C1;"

The "*What*" field must contain (anywhere in the field) the letters "M3" to identify this as a Telepresenter event. Additional words can further describe the nature of this entry (e.g., "Chem 101", "Weekly Staff", etc.).

The "*When*" field 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 Telepresenter to be controlled. Only one Telepresenter 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 Telepresenter at the time of the Start event (see below). In the example above, "C1" starts the Telepresenter session on Channel 1.

3.11.6. Scheduled Event Commands

The "*Description*" or content field is a series of serial IP commands to be issued to the Telepresenter 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 Telepresenter ("Start on Channel 10 with all other settings unchanged"). A more complicated example:

G3; V1; p1; C88; 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
- C88 Start session on Channel 88
- 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 Telepresenter 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 "*Telepresenter Serial Interface Manual*" 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 Telepresenter 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 Telepresenter the results will occur in the order scheduled

3.11.7. 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 Telepresenter 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.

3.11.8. 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 N*Cast Scheduler can read standard iCalendar (.ics) files containing scheduled events, and can control Telepresenter based on the contents of these events.

3.11.9. Using an iCalendar File

There are three basic steps to use an iCalendar file with the N*Cast 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 “M3” somewhere in the field
- Location field – must contain the IP address of the Telepresenter
- Description field – contains serial commands to be sent to a Telepresenter

3.11.10. 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 Telepresenter scheduling from almost any calendar application in use.

3.11.11. 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.

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, and within it, the Scheduler Configuration sub-tab is active. The Scheduler Configuration page has several input fields and buttons. On the left, there are labels for "Google calendar:", "Google username:", "Google password:", "iCalendar:", and "iCalendar to upload:". The "Google calendar:" and "iCalendar:" fields are dropdown menus, both currently set to "Disabled". There are "View Google", "View iCalendar", and "View Logs" buttons on the right. Below the "Google password:" field is an "Update" button. Below the "iCalendar to upload:" field is a "Browse..." button and an "Upload File" button. At the bottom of the page, there is a status bar with information about streaming: "Streaming on channel 1", "1 participant", "Sending video 1280x720 28.6fps 827kbps and audio 44kHz Mono 64kbps", "Not receiving", and "Main input: 1024x768@60Hz PIP input: 720x240@60Hz". The footer says "NCast Copyright © 2008".

3.11.12. 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.

3.11.13. 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.

- View Logs – View activity logs for possible error messages, reports on scheduled events and other actions.

3.11.14. Activating the Serial Interface

The IP serial interface on a Telepresenter must be enabled to receive the session start/stop commands from the scheduler process. By default this interface is “Disabled”.

To enable the IP serial interface, bring up the web interface, log into the Telepresenter 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

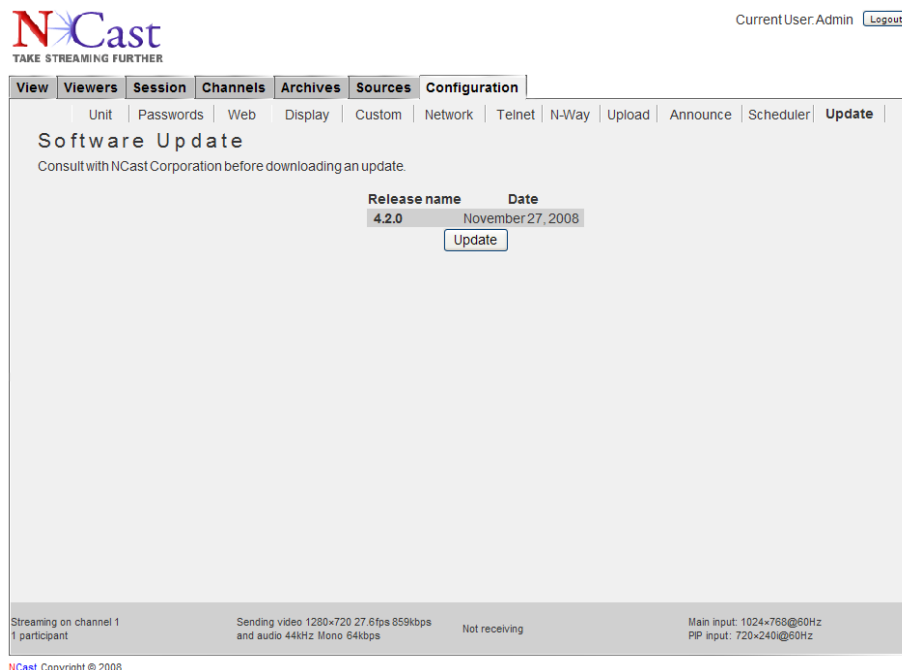
When all fields are filled, click on the “Update” button.

3.11.15. External Scheduler Program

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

3.12. UPDATE TOOL

The Update Tool page lists the current release(s) of software available for this Telepresenter. 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.



Once the “Update” button is pressed the Telepresenter 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.

3.13. 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 Telepresenter might define the graphics multicast address to be “239.192.0.1”. There are approximately fifteen parameters associated with a channel, items like the graphics and audio multicast or unicast addresses, port numbers, MTU’s, codecs, bit rates 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.

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

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, “M3 San Francisco” designating some geographical assignments, or “Chemistry 101” designating course related usage.

As a specific example, if there are three Telepresenter in an organization, the following 6 channel assignments might be made for Telepresenter “A”:

Channel 1 – Telepresenter A transmits using multicast address 239.192.0.0

Channel 2 – Telepresenter A receives using multicast address 239.192.0.0

Channel 3 – Telepresenter A coordinates a collaborative session on multicast address 239.192.2.0

Channel 4 – Telepresenter A participates in a collaborative session on multicast address 239.192.2.0

Channel 5 – Telepresenter A establishes a full-duplex session to B using unicast point-to-point

Channel 6 – Telepresenter A establishes a full-duplex session to C using unicast point-to-point

The channel tables in units B and C are setup to complement these assignments.

3.13.1. Channel Name

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.

3.13.2. Channel Type

The Telepresenter has five basic modes of operation:

- Streaming Send – The unit will be transmitting in a one-way, one-to-many session to other units or remote desktops.
- Streaming Receive – The unit will be receiving a transmission from some other source on this address.
- Streaming Full Duplex – The unit will be engaged in a two-way, simultaneous connection with one other Telepresenter. Graphics and Audio generated on one unit will be received at the other unit.
- Conference Coordinator – The unit will be the conference coordinator for a multi-unit collaborative session (2 or more units). This unit will transmit on the channel until the “floor control” is handed off to one of the remote units by the Coordinator. Upon completion of the remote presentation “floor control” is returned to the Coordinator who resumes transmission. The Coordinator always retains the right to pass control to any of the units.
- Conference Participant – The unit will participate in a collaborative conference, but will not transmit until “handed the floor” by the Coordinator.

The passing of “floor control” triggers two important events for the participants in the conference. First, the media stream being generated by the Coordinator is shut down, and a new media stream being generated by one of the participants starts up. Only one graphics media stream is present on the network, leading to constant network utilization in terms of traffic load or bandwidth used. The total bandwidth utilized remains flat, independent of how many participants are in the conference.

The second event occurring when the floor is passed is a signal that is sent to all units which tells them to look for and display the new media stream being generated by a participant. The content being displayed to conference viewers automatically switches from one source to another, that is, from one site to another site. When the Coordinator retakes control, another signal is sent and the units relock on the Coordinators media stream.

In Collaboration mode, audio from all sites is mixed and presented as one combined stream. Everyone can hear everyone else. Echo-canceling microphones or equipment are required for this type of usage. The bandwidth used for audio increases linearly as the number of units in the conference increases.

For a two-unit conference there is a subtle difference between Full-Duplex streaming and Collaboration Mode. In Full-Duplex streaming two graphics streams are occupying the network bandwidth, so the total bandwidth used is $2B+2A$ where B is the graphics bandwidth used and A is the audio bandwidth used. In Collaboration Mode, the total bandwidth used is $1B+2A$, that is, roughly half the utilization of Full-Duplex.

3.13.3. Graphics Address (Gfx Address)

An address entered for Graphics (the 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 Telepresenter.

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).

The default settings for a Telepresenter 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 Telepresenters 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".

3.13.4. Graphics Port (Gfx 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.

3.13.5. Graphics Bit-rate (Gfx Bit-rate)

The graphics 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
XGA (1024x768)	500 kbps	750 kbps
SXGA (1280x1024)	1250 kbps	1875 kbps
UXGA (1600x1200)	1850 kbps	2775 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 XGA 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 (10,000 kbps for the M3S2).

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 XGA 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.

3.13.6. Graphics Frame-rate (Gfx Frame-rate)

The Graphics 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 (1-60 for the M3S2). For NTSC video encoding a full 30 frames/second is achieved.

At XGA 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.

3.13.7. Graphics MTU (Gfx 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.

3.13.8. 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 Telepresenter 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".

3.13.9. Audio Port

The port number assigned to the audio media stream.

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

3.13.10. 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.

3.13.11. 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.

3.13.12. 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.

<i>TTL</i>	<i>Scope</i>
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.

3.13.13. Conference Address

If a channel is defined as a collaboration channel, a multicast address must be assigned for use by the Conference Control Protocol (NCCP). This multicast group supports protocol messages between the coordinator and the participants for implementation of floor control and conference identification and participation.

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

In the case of a two-party, point-to-point collaboration channel using a unicast link, this address may be the numeric IP address of the remote unit.

Note that the Conference Address fields will only be visible if the Channel is setup as a Collaboration channel.

3.13.14. Conference Port

The port number assigned to the conference control protocol.

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

Note that the Conference Port fields will only be visible if the Channel is setup as a Collaboration channel.

3.13.15. Archiving Options

Three options are available for control of archiving:

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.

Automatic – Recording starts and stops when the session starts and stops.

Never – Recording is not permitted on this channel.

3.13.16. 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*.

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)
%t - transcode variable
%Y - year
%% - %
```

For example, if a Telepresenter 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.

3.13.17. 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.

3.13.18. 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.

3.13.19. 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.

3.13.20. 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.

3.13.21. Announce

If checked, an SDP file is automatically uploaded to the streaming server at Session start. See Section 3.10 for more details on the implementation of this feature.

3.13.22. Transcode n (H.264)

The H.264 Mpeg-4 file format is becoming the industry standard for webcasting, streaming and other video distribution uses. The mainstream media players (Flash, Quicktime and Silverlight) now support this common format for video-on-demand playback. With M3S2 Release 4.2 a Telepresenter is now able to transcode high-quality Mpeg-4 Part 2 files into four different H.264 formats, with selectable resolution sizes and bit-rates. A high-bit-rate file can be created for local distribution; a medium quality file can be created for DSL and cable modem clients, and a low-bit-rate, low-resolution version can be created for iPods and other mobile devices.

The original file and the four transcoded files will be automatically uploaded via FTP or SFTP to the video-on-demand server specified on the Upload page.

Transcoding options are shown on the Modify Channel page when a Transcode box is checked. Here you can assign a resolution, graphics bit-rate and a filename to each H.264 file. The audio track is moved to the H.264 file without any changes. You may keep your original Mpeg-4 file by unchecking the "Remove original archive" option. Otherwise when transcoding is finished the original archive is deleted.

For best results you should choose wisely the graphics bit-rate and graphics capture size. Setting the highest possible graphics bit-rate is recommended for optimum transcode quality. The Graphics Capture size should match the H.264 size (or highest H.264 size if transcoding to multiple files). We recommend using values dividable by 16. Transcoding is done when the Session is off and can take a very long time. Don't power off or reboot the unit when transcoding a file because the whole process will be restarted. Transcoding adds a new special parameter "%t" which can be used in filename format string and in the FTP/SFTP upload directory - it will be filled with transcode number (1 to 4) or skipped (original recording).


3.13.23. Remove Original Archive

Uncheck this box to retain the original Mpeg-4 archive file after all transcode operations have finished. If only the transcoded output is desired, leave it checked.

The original Mpeg-4 file may be larger in resolution and size than is needed for distribution to viewers. However, for archival purposes it may be desirable to keep the high-quality original. Also, some video editing tools may find Mpeg-4 Part-2 files easier to deal with than the H.264 equivalents.

3.13.24. 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:



Current User: Admin [Logout](#)

View
Viewers
Session
Channels
Archives
Sources
Configuration

Channel 1 Settings

Name:	Streaming Media		Auto start:	<input type="checkbox"/>
Type:	Streaming (send)		Announce:	<input type="checkbox"/>
Gfx bitrate (kbps) & framerate (fps):	750	30	Transcode 1 (H.264):	<input type="checkbox"/>
Gfx min quantizer:	2		Transcode 2 (H.264):	<input type="checkbox"/>
Gfx max quantizer:	10		Transcode 3 (H.264):	<input type="checkbox"/>
Gfx CBR buffer size:	1.0 sec		Transcode 4 (H.264):	<input type="checkbox"/>
Audio format:	44kHz Mono (64kbps)		Advanced settings:	<input checked="" type="checkbox"/>
Max audio frames in packet:	8		Bandwidth smoothing:	<input checked="" type="checkbox"/>
Gfx address & port & MTU:	239.192.0.0	10000 1500		
Audio address & port & MTU:	239.192.2.0	11000 1500		
TTL:	15			
Archiving:	Manual			
Archive filename:	%Y%m%d-%H%M%S-%n			
Archive title:	Streaming Media Demonstration			
Archive presenter:	NCast Sales Staff			
Archive description:	Demonstration of NCast's Telepre			

[Update](#)

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

Streaming on channel 1
1 participant

Sending video 1280x720 25.1fps 738kbps
and audio 44kHz Mono 64kbps

Not receiving

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

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3.13.25. 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.

3.13.26. 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 2-10. 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.

3.13.27. 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.

3.13.28. 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.

3.13.29. 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.

3.13.30. 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.

3.13.31. 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.

3.14. ARCHIVE SETTINGS

The Telepresenter 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 50 GB archive disk that's about 22.2 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 3.13 above).

If the archive time is not correct, check the hardware clock settings in the BIOS during hardware bootup, check the Time-zone 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 Telepresenter.

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.



Note that during recording two separate files (one graphics, 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.

3.14.1. Download Button

Downloads the archived file to the operator's PC.

3.14.2. 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>20071119-143215-001.mp4</filename>
<title>Weekly update</title>
<presenter>The CEO</presenter>
<description>The CEO's weekly discussion on the state of the company</description>
<unit>Telepresenter Room 209</unit>
<channel>Streaming 1</channel>
<start>2007-11-19 14:32:15</start>
<duration>00:30:09</duration>
<timezone>-0800</timezone>
<width>1024</width>
<height>768</height>
<aspect_width>4</aspect_width>
<aspect_height>3</aspect_height>
<main_window>0,0,1024,768</main_window>
<pip_window>0,0,240,180</pip_window>
```

```
<bitrate>768</bitrate>
<framerate>30</framerate>
<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”.

3.14.3. 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.

3.14.4. Remove Button

Permanently deletes the archive file from the system.

3.14.5. Upload

Clicking on this button marks this archive file for immediate upload (via FTP) to the configured FTP server (see Section 3.9 for details on FTP transfer). 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.

3.14.6. Remove All Archives

This action permanently deletes all archive files in the system.

3.14.7. Upload All Archives

Clicking this button marks all archive files for immediate upload and initiates a file transfer to the configured FTP server (see Section 3.9 for details on FTP transfer). 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.

3.14.8. Record Only Sessions

It is possible to disable multicasting of a Session in a record-only situation by using a special multicast address in the Channel Table. To disable multicasting set all multicast addresses to “127.0.0.1”.

3.14.9. 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 Telepresenter 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.

3.15. SOURCES SETTINGS

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

Sources

Main input: XGA DVI Composite S-Video Autodetect

PIP input: XGA DVI Composite S-Video Autodetect **Swap**

PIP graphics & PIP border: On/Off On/Off

Graphics XGA position: Auto Move Left Move Right Move Up Move Down

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

Audio input: Mic Line-in

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

Graphics capture size: HD720 - 1280 x 720

Graphics aspect ratio: 16:9

Main graphics window: Window 1

PIP graphics window: Window 2

Graphics brightness (XGA/DVI/Composite/S-Video): 50 50 50 50

Graphics contrast (XGA/DVI/Composite/S-Video): 50 50 50 50

Graphics saturation (XGA/DVI/Composite/S-Video): 50 50 50 50

Graphics hue (XGA/DVI/Composite/S-Video): 50 50 50 50

Graphics sharpness (Composite/S-Video): 15 15

Audio mic gain: 95

Audio line-in gain: 50

Audio output gain: 50

Update

Streaming on channel 1
1 participant

Sending video 1280x720 24.1fps 751kbps
and audio 44kHz Mono 64kbps

Not receiving

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

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3.15.1. Main input

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

Graphics/Video	Input
XGA	RGB analog signals from the 15-pin VGA connector
DVI	Digital RGB signals from the DVI connector
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-D 1.0 specification and the VESA DCC/EDID 1.3 specification. Analog input on the DVI cable is not supported. The required interface cable is a DVI-D (Single Link). A DVI-D (Dual Link) cable is also acceptable. The following cables will not connect: DVI-I (Single Link), DVI-I (Dual Link) and DVI-A.

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 (XGA) background, pressing the **Swap** button will result in a graphics PIP overlaying a video scene.

3.15.2. 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	XGA	DVI	S-VIDEO	COMPOSITE
XGA	Duplicate	Yes	Yes	Yes
DVI	Yes	Duplicate	Yes	Yes
S-VIDEO	Yes	Yes	Duplicate	No
Composite	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 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.

3.15.3. 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.

3.15.4. 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.

3.15.5. Overlays

Enables or disables display of uploaded graphical overlay 1-4. Overlay graphics may be uploaded from the Custom page.

3.15.6. Audio input

There are two audio input connectors on the chassis, 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.

3.15.7. Audio Meter

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

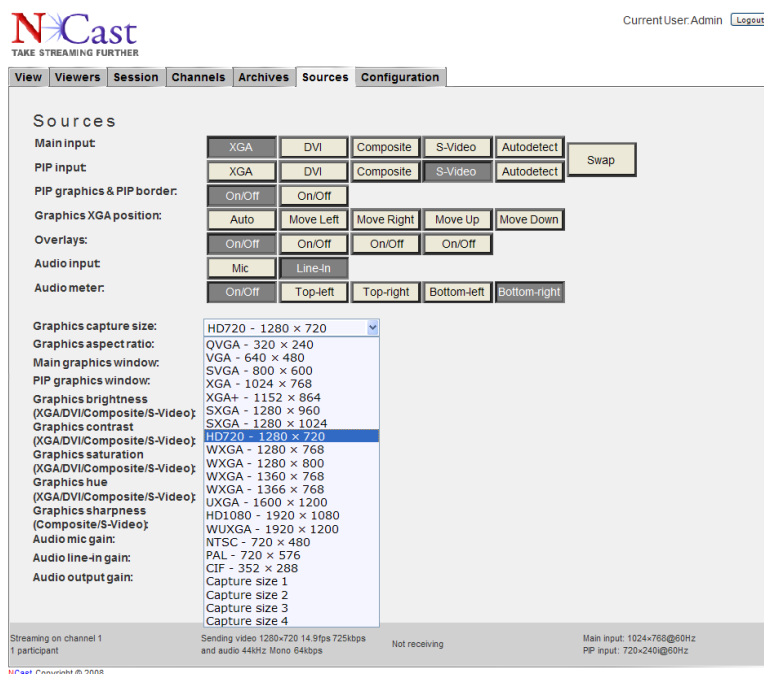
The stereo meters on the left show local audio activity originating from the microphone or line-level inputs. The stereo meters on the right show network activity, that is, strength of the audio derived from the incoming media stream in full-duplex or collaboration mode.

The local meters are useful to check for proper connectivity and activity of the sound system connected to the Telepresenter. 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).

3.15.8. Graphics capture size

The graphics capture size is the key element in determining the dimensions and resolution of the final transmitted or archived image. It defines the underlying “canvas” or “master window” on which all other windows are placed (i.e. the Main and PIP windows and the graphics Overlays). As will be discussed later, the capture surface or window determines reference points and dimensions for the embedded windows used in PIP processing. Once set and the Session started, this size may not be changed. All Source inputs (XGA, DVI, Composite and S-video) are mapped and placed on this canvas for composition and compression.



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
XGA, SXGA, ...	The media streams and archive files are sent/kept in resolution selected, Captured images which are larger or smaller than the selected Capture Size are automatically scaled to the Window dimensions specified by the Main and PIP settings.
Capture Size 1 - 4	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 capture sizes.

3.15.9. Graphics 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 Graphics Capture Size (3.15 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.

N*Cast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

View Viewers Session Channels Archives Sources Configuration

Sources

Main input: XGA DVI Composite S-Video Autodetect Swap

PIP input: XGA DVI Composite S-Video Autodetect

PIP graphics & PIP border: On/Off On/Off

Graphics XGA position: Auto Move Left Move Right Move Up Move Down

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

Audio input: Mic Line-in

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

Graphics capture size: HD720 - 1280 x 720

Graphics aspect ratio: 16:9

Main graphics window: Auto

PIP graphics window: Square pixel

Graphics brightness: 5:4

(XGA/DVI/Composite/S-Video): 4:3

Graphics contrast: 5:3

(XGA/DVI/Composite/S-Video): 16:10

(XGA/DVI/Composite/S-Video): 16:9

Graphics saturation: Aspect ratio 1

(XGA/DVI/Composite/S-Video): Aspect ratio 2

Graphics hue: Aspect ratio 3

(XGA/DVI/Composite/S-Video): Aspect ratio 4

Graphics sharpness: 15 15

(Composite/S-Video):

Audio mic gain: 95

Audio line-in gain: 50

Audio output gain: 50

[Update](#)

Streaming on channel 1
1 participant

Sending video 1280x720 14.9fps 725kbps
and audio 44kHz Mono 64kbps

Not receiving

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

N*Cast Copyright © 2008

This menu selection item allows specification of five standard aspect ratios and four 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. “Auto” attempts to determine the aspect ratio based on the INPUT signal timing, which do not have to be square pixels. For example, NTSC (720x240i), which does not use square pixels, is properly detected as 4:3.

3.15.10. Main 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, Window 3, Window 4) 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.

NCast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

View Viewers Session Channels Archives Sources Configuration

Sources

Main input: XGA DVI Composite S-Video Autodetect

PIP input: XGA DVI Composite S-Video Autodetect [Swap](#)

PIP graphics & PIP border: On/Off On/Off

Graphics XGA position: Auto Move Left Move Right Move Up Move Down

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

Audio input: Mic Line-in

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

Graphics capture size: HD720 - 1280 x 720

Graphics aspect ratio: 16:9

Main graphics window: Window 1

PIP graphics window: 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

Graphics brightness (XGA/DVI/Composite/S-Video):

Graphics contrast (XGA/DVI/Composite/S-Video):

Graphics saturation (XGA/DVI/Composite/S-Video):

Graphics hue (XGA/DVI/Composite/S-Video):

Graphics sharpness (Composite/S-Video):

Audio mic gain: 95

Audio line-in gain: 50

Audio output gain: 50

[Update](#)

Streaming on channel 1
1 participant

Sending video 1280x720 14.9fps 725kbps
and audio 44kHz Mono 64kbps

Not receiving

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

NCast Copyright © 2008

3.15.11.PIP graphics window

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

NCast
TAKE STREAMING FURTHER

Current User: Admin [Logout](#)

View Viewers Session Channels Archives Sources Configuration

Sources

Main input: XGA DVI Composite S-Video Autodetect

PIP input: XGA DVI Composite S-Video Autodetect [Swap](#)

PIP graphics & PIP border: On/Off On/Off

Graphics XGA position: Auto Move Left Move Right Move Up Move Down

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

Audio input: Mic Line-in

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

Graphics capture size: HD720 - 1280 x 720

Graphics aspect ratio: 16:9

Main graphics window: Window 1

PIP graphics window: Full-screen Top-left corner Top-right corner Bottom-left corner Bottom-right corner Left half Right half **Window 2** Window 1 Window 3 Window 4

Graphics brightness (XGA/DVI/Composite/S-Video):

Graphics contrast (XGA/DVI/Composite/S-Video):

Graphics saturation (XGA/DVI/Composite/S-Video):

Graphics hue (XGA/DVI/Composite/S-Video):

Graphics sharpness (Composite/S-Video):

Audio mic gain: 95

Audio line-in gain: 50

Audio output gain: 50

[Update](#)

Streaming on channel 1
1 participant

Sending video 1280x720 14.9fps 725kbps
and audio 44kHz Mono 64kbps

Not receiving

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

NCast Copyright © 2008

The custom window selections (Window 1, Window 2, Window 3, Window 4) 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.

3.15.12. 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.

3.15.13. Audio Microphone Gain

The audio microphone gain adjusts the signal level from the microphone to the input of the AC'97 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.

3.15.14. Audio Line-In Gain

The audio line-in gain adjusts the signal level from the line-in connector to the input of the AC'97 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 40. 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.

3.15.15. Audio Output Gain

The audio output gain adjusts the signal level from the AC'97 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.

Audio Gain Charts

<i>Mic Gain</i>	<i>Amplification</i>
0	Mute
10	-18.0
20	-16.5
30	-13.5
40	-12.0
50	-9.0
60	-7.5
70	-4.5
80	-3.0
90	0
100	+1.5

<i>Line-in Gain</i>	<i>Amplification</i>
0	Mute
10	-6.0 dB
20	-4.5 dB
30	-1.5 dB
40	0.0 dB
50	3.0 dB
60	4.5 dB
70	7.5 dB
80	9.0 dB
90	12.0 dB
100	13.5 dB

<i>Output Gain</i>	<i>Output Level</i>
0	Mute
10	-37.3 dBu
20	-33.2 dBu
30	-28.8 dBu
40	-24.9 dBu
50	-19.3 dBu
60	-14.9 dBu
70	-10.7 dBu
80	-6.3 dBu
90	-1.9 dBu
100	2.6 dBu

3.15.16. USB (XLR) Audio Input and Output

The USB Matchbox from Henry Engineering (<http://www.henryeng.com/USBmatch.html>) is a high-performance, ultra-low-noise audio interface which supports industry standard balanced XLR connectors for line-level audio input and output. Microphone input is not supported.

Using an input device such as this both improves audio quality and allows easier audio cable interface with professional sound systems.

The system detects an attached USB Matchbox on boot (hot-plug is not supported). If the USB device is present a new option "Audio Device" is added to the "Sources" tab. The user can switch between the internal AC97 and USB audio codec at any time. The audio device will be changed immediately.

When the user selects the USB device, audio samples are captured and played back using the USB interface. In this configuration some audio settings will disappear from the "Sources" tab: audio input, audio mic-gain and audio line-in gain. The audio output gain setting is shared between the two devices.

4. Information Pages Reference

4.1. SESSION PAGE

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

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.

The screenshot shows the N*Cast web interface. At the top right, it says "Current User: Admin [logout]". Below the N*Cast logo is a navigation bar with tabs: View, Viewers, Session, Channels, Archives, Sources, and Configuration. The "Session" tab is selected.

The "Session" page displays the following information:

- Session state:** ACTIVE (with an "End Session" button)
- Channel:** Streaming 1
- Session type:** Streaming (send)
- Gfx address:** 239.192.0.0 **port:** 10000
- Gfx bitrate (kbps):** 800
- Gfx framerate (fps):** 30
- Audio address:** 239.192.2.0 **port:** 11000
- Audio format:** 44kHz Mono (64kbps)
- Recording:** Off (with a "Start Recording" button)

At the bottom of the session page, there are four dynamic information fields with arrows pointing to them from boxes below:

- Mode:** Streaming on channel 1 (6 participants).
- Send Activity:** Sending video 640x480 29.4fps 812kbps and audio 44kHz Mono 64kbps.
- Receive Activity:** Receiving video 640x480 30.1fps 804kbps and audio.
- Input:** Input resolution: 720x480.

Below the screenshot, four boxes define the parameters for each dynamic field:

- Mode:** Send/Receive, Channel, Number of Participants
- Send Activity:** Resolution, Frame-rate, Audio, Audio-rate
- Receive Activity:** Resolution, Frame-rate, Audio, Audio-rate
- Input:** Input Resolution

4.2. VIEWERS PAGE

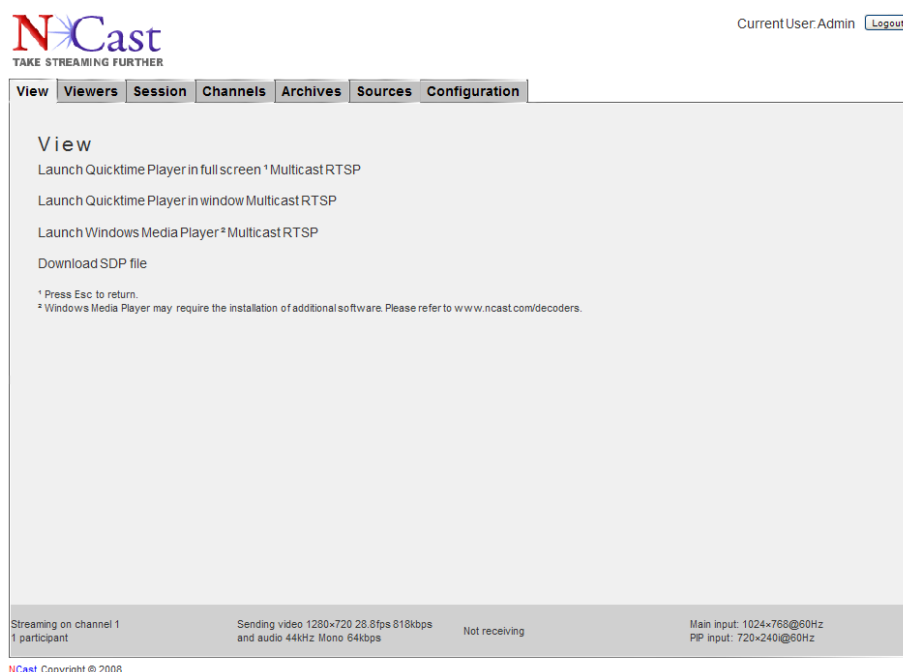
The Viewers Page lists units that are currently on-line and active in this Session. This information is derived from RTCP (Real-time Control Protocol) reports and from information obtained through use of the NCast Conference Protocol. The descriptive information comes from entries made in each unit's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

Desktop streaming media players which issue RTCP reports will also be listed on this page.

In Collaboration Mode the Coordinator is able to select which participant has floor control by highlighting a Viewer and clicking on the selection.

4.3. 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.

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

<i>File Name</i>	<i>File Type</i>
audio.qtl	Quicktime Audio Link File
graphics.qtl	Quicktime Graphics/Video Link File
audio_and_graphics.qtl	Quicktime Audio and Graphics File
audio.asx	Windows Media Audio Playlist
graphics.asx	Windows Graphics/Video Playlist
audio_and_graphics.asx	Windows Audio and Graphics Playlist
audio.sdp	Session Description Protocol File
graphics.sdp	Session Description Protocol File
audio_and_graphics.sdp	Session Description Protocol File

In all cases these files contain parameters such as the address of the RTSP 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.

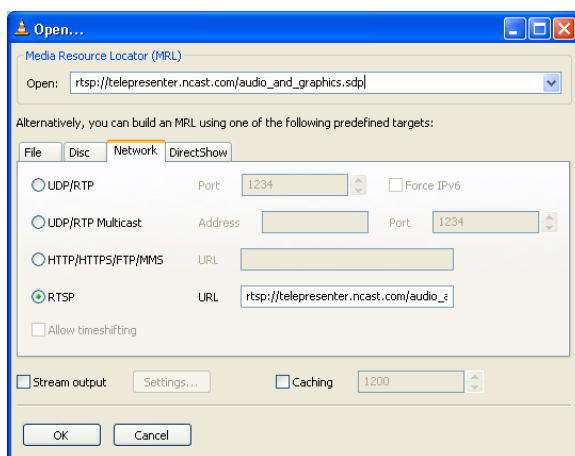
The most generic of these files, the SDP file, might be associated with any number of different players on different operating systems. The sequence of events for getting a successful playback with an SDP file works like this:

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.

4.4. 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 Telepresenter:

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://telepresenter.ncast.com/audio_and_graphics.sdp



4.5. MEDIA PLAYERS

The MPEG-4 format used by the Telepresenter 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 Telepresenter 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.

4.6. 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 N*Cast's Telepresenter product lines fall under the category of video and/or multimedia products, and are thus required to implement closed captioning for appropriate compliance.

4.6.1. 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 Telepresenter 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
```

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

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

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

4.6.2. Sub-titles using Quicktime and SMIL

Receivers/Decoders of the stream, whether using a desktop player (QuickTime, Windows Media Player, etc.) or a Telepresenter 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="N*Cast Telepresenter M3 Commercial"/>
    <meta name="author" content="VP Sales"/>
    <meta name="copyright" content="N*Cast 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/N*CastCommercial320x240.mp4" dur="0:03:14.10"/>
      <textstream region="textregion"
src="http://www.ncast.com/archives/N*CastCommercial.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 N*Cast Telepresenter M3,  
  
[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 Telepresenter M3 is an all-in-one multimedia production appliance.
```

4.6.3. 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 N*Cast'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.

5. Telepresenter Interfaces

5.1. SERIAL INTERFACE

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

5.2. TELNET INTERFACE

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

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

```
#!/bin/bash
#
# Starts Telepresenter session using telnet interface

if [ $# -ne 3 ]; then
    echo "This script starts a Telepresenter 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 Telepresenter session using the telnet interface

if [ $# -ne 2 ]; then
    echo "This script stops a Telepresenter 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
```


5.3. HTTP INTERFACE

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

<http://www.xxx.yyy.zzz/backup/list.cgi> Downloads a list of READY archive files
<http://www.xxx.yyy.zzz/backup/download/file.mp4> Downloads an archive file
<http://www.xxx.yyy.zzz/backup/download/file.xml> Downloads an archive xml file
<http://www.xxx.yyy.zzz/backup/remove.cgi?file=file.mp4> Removes an archived file

where

file.mp4 The time-stamped archive filename obtained from the downloaded list
 file.xml 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 default username is "backup". The password is entered on the Configuration/Passwords web page.

A comprehensive sample retrieval script follows:

```
#!/bin/tcsh

# Usage: m3files.tcsh host password delete
#
# host      - the hostname or IP address of the M3 unit
# password  - backup password for the unit
# delete    - optional keyword to delete archived files after download

set m3ip = $1
set passwd = $2
set deleteoption = $3

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

if ($m3ip == "") then

  echo "m3files: M3 Host address or IP address missing"
  echo "Usage: m3files.tcsh host password"
  exit

endif

if ($passwd == "") then

  echo "m3files: M3 password required"
  echo "Usage: m3files.tcsh host password"
  exit 1

endif

# Get list of current archive files

if (-e m3-filelist) then
  rm -f m3-filelist
endif

wget $verbosity --output-document=m3-filelist --http-user=backup --http-passwd=$passwd http://
$m3ip/backup/list.cgi

if ($status != 0) then
  echo "m3files: Error in accessing archive"
  exit 1
endif
```

```
if (! -e m3-filelist) then
  echo "m3files: Failed to retrieve archive file list"
  exit 1
endif

if (-z m3-filelist) then
  echo "m3files: No archive files in list"
  exit 1
endif

# Process all files in the list that was downloaded

foreach mp4 (`cat m3-filelist`)

# Get the media file

  echo "m3files: Retrieving media file $mp4"
  wget $verbosity --timestamping --http-user=backup --http-passwd=$passwd http://
  $m3ip/backup/download/$mp4

  if ($status != 0) then
    echo "m3files: Error in accessing media file $mp4"
    exit 1
  endif

# Get the associated xml description file

  set xml = $mp4:r.xml

  echo "m3files: Retrieving xml file $xml"
  wget $verbosity --timestamping --http-user=backup --http-passwd=$passwd http://
  $m3ip/backup/download/$xml

  if ($status != 0) then
    echo "m3files: 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 "m3files: Deleting archive file $mp4"
    wget $verbosity --http-user=backup --http-passwd=$passwd --output-document=$mp4:r.msg http://
    $m3ip/backup/remove.cgi?file=$mp4

    if ($status != 0) then
      echo "m3files: Error in deleting media file $mp4"
      exit 1
    endif

    echo "m3files: returned result is: `cat $mp4:r.msg`"
    rm -f $mp4:r.msg

  endif

end

rm -f m3-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 N*Cast archive files

This program allows downloading of archive files from one or more Telepresenters.
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 telepresenter.ncast.com          Download all files from a single host
ncfiles.py -r telepresenter.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 telepresenter.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
telepresenter.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".
```

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```
"""

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, strer-
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, strer-
ror)
        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, strer-
ror)
        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,
strerror)
    return False

    filerm.close()

return True

# Main Program -----

hostlist = []
debug = False
inputfile = None
user = "backup"
pswd = "ncast"
realm = "N*Cast M3"
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"

```

5.4. 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 Telepresenter for a given Session. It allows custom templates to be changed on an hourly basis, for example.

The following program is an example of a Python utility which may be used to upload new graphics images on command (check the N*Cast website for the latest version of this program):

```

#!/usr/bin/python
"""
ncpng.py -- A Python program to upload .png overlay graphics files

```

This program allows uploading of .png graphics files to a Telepresenter. 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.

Sample usage:

```
ncpng.py -l graphic1.png telepresenter.ncast.com
ncpng.py --g1=graphic1.png --g2=graphic2.png telepresenter.ncast.com
```

Complete specification:

```
ncpng.py -d -h -p password -v -l file1.png -2 file2.png -3 file3.png -4 file4.png --
debug --help --g1=file1.png --g2=file2.png --g3=file3.png --g4=file4.png --pswd=pass-
word --version host
```

where

-d, --debug	Turn debug statements on
-h, --help	Print usage information
-p, --pswd=password	Use "password"
-v, --version	Report program version
-l, --g1	Overlay graphic 1
-2, --g2	Overlay graphic 2
-3, --g3	Overlay graphic 3
-4, --g4	Overlay graphic 4
host ...	Telepresenter to receive file(s)

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

```
C:> "C:\Program Files\Python24\python.exe" ncpng.py -l file.png 192.168.0.5
```

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

```
"C:\Documents and Settings\owner\My Documents\Python\ncpng.py" -l file.png
192.168.0.5
```

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

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"""

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

```
def Upload(host, user, pswd, realm, gfile, graphic):
```

```
# Create an OpenerDirector with support for Cookies ...
```

```
    cookie_handler = urllib2.HTTPCookieProcessor()
```

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



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

urllib2.install_opener(opener)

url = "http://" + host + "/main.cgi"

data = 'action=login&user=' + user + '&password=' + pswd

req = urllib2.Request(url=url, data=data)

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

url = "http://" + host + "/upload.cgi"

data = ''
separator = '-----7d7781f303ca'

for i in range(0,4):

    # Create mime part for this file

    data = data + separator + '\r\n'
    data = data + 'Content-Disposition: form-data; name="overlay%s_file"; file-
name="%s"\r\n' % (i+1, gfile[i])

    if len(graphic[i]) > 0:
        print 'ncpng: Uploading graphic file %d, length(%d), name="%s"' % (i+1,
len(graphic[i]), gfile[i])
        data = data + 'Content-Type: image/x-png\r\n\r\n'
        data = data + graphic[i] + '\r\n'
    else:
        data = data + 'Content-Type: application/octet-stream\r\n\r\n'

    data = data + separator + '--' + '\r\n'

    req = urllib2.Request(url=url, data=data)
    req.add_header('Content-type','multipart/form-data; boundary=' + separator)

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

    return True

# Main Program -----

host = None
debug = False
gfile = ["", "", "", ""]
```

```

graphic = ["", "", "", ""]
graphics = False
user = "admin"
pswd = "ncast"
realm = "N*Cast M3"

def Usage():
    print "Usage: ncpng.py -d -h -p password -v -l file1.png ... --debug
--g1=file1.png ... --help --pswd=password --version host"

try:
    options, args = getopt.getopt(sys.argv[1:], 'dhp:vl:2:3:4:', ['debug', 'g1=',
'g2=', 'g3=', 'g4=', 'help', 'pswd=', '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 ("-v", "--version"):
        print "ncpng.py Version 1.0"
        sys.exit()
    if o in ("-l", "--g1"):
        gfile[0] = a
    if o in ("-2", "--g2"):
        gfile[1] = a
    if o in ("-3", "--g3"):
        gfile[2] = a
    if o in ("-4", "--g4"):
        gfile[3] = a

if len(args) == 1:
    host = args[0]
else:
    print "ncpng: hostname error %s" % args
    sys.exit(1)

for i in range(0, 4):
    if len(gfile[i]) > 0 :
        try:
            f = open(gfile[i], 'r')
            graphic[i] = f.read()
            f.close()
            print "ncpng: Uploading file %s" % gfile[i]
            graphics = True
        except IOError, (errno, strerror):
            print "ncpng I/O error(%s) on file %s: %s" % (errno, gfile[i], strerror)
            sys.exit(1)

if not graphics:
    print "ncpng: No graphics files to upload. Exiting."
    sys.exit(1)

if host:
    print "ncpng: Uploading to this host:", host
else:

```

```
print "ncpng: No host listed for upload"
sys.exit(1)

result = Upload(host, user, pswd, realm, gfile, graphic)

print "ncpng: Upload complete"
```

6. Techniques for Presentation Capture

6.1. 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.

6.1.1. 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.

6.2. CAPTURING GRAPHICS, VIDEO AND AUDIO

The following paragraphs outline common problems in recording a typical conference or presentation.

6.2.1. Capturing Graphics

The output of the presenter's laptop needs to go to two places: the room projector and the Telepresenter. 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 Telepresenter. A long cable is required as the Telepresenter 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 Telepresenter to capture the graphics signal.
- **Telepresenter Loopback Output** – The room projector can be plugged into the loopback output of the Telepresenter.
- **Matrix switcher** – Some A/V setups have an XGA matrix switcher as part of the room installation, and the Telepresenter could plug into one of the output connectors on that device.

6.2.2. 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 Telepresenter.

- 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.

6.2.3. 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 Telepresenter 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 Telepresenter is an excellent solution. The operator can instantly adjust and check levels. The Telepresenter 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 Telepresenter. 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 Telepresenter. 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.

6.2.4. Automatic Recording

A Telepresenter 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.

6.2.5. 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.

6.3. CONFERENCE DAY PROBLEMS AND ISSUES

During the actual conference or seminar, these problems and issues may occur:

6.3.1. The Podium

The Telepresenter 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.

6.3.2. 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.

6.3.3. 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.

6.3.4. 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.

6.3.5. 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.

6.4. 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.

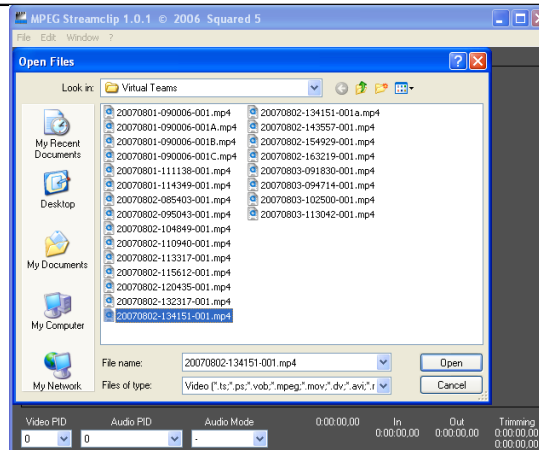
6.4.1. Streamclip

One such tool is a free utility called "Streamclip". This program may be obtained at the following website:

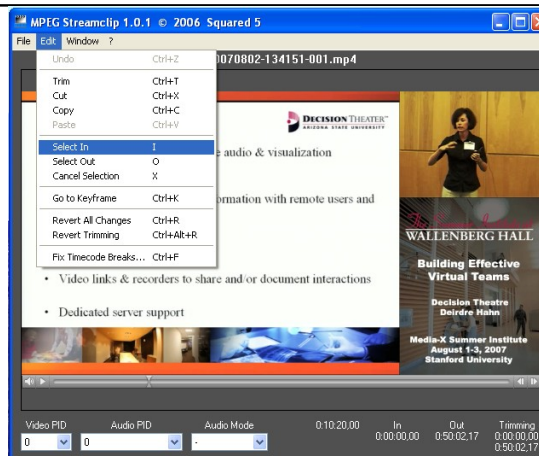
<http://www.squared5.com/>

To use Streamclip to trim a file, follow these steps:

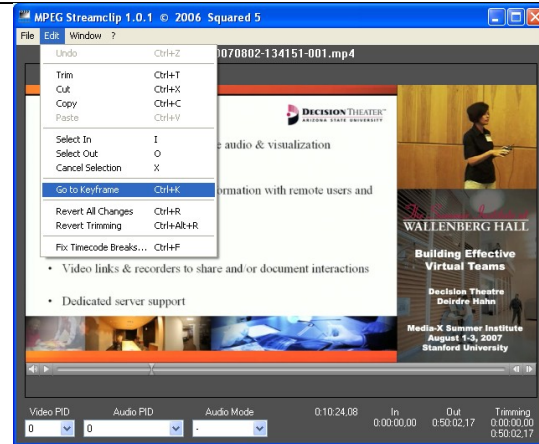
Open the .mp4 file to be trimmed



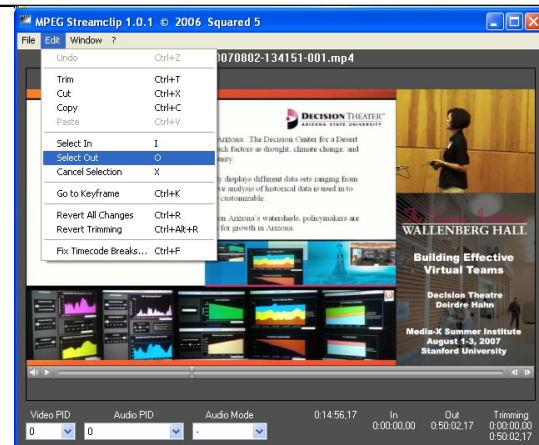
Drag the slider to the starting sequence of your new clip and select the "In" point where the new clip should start



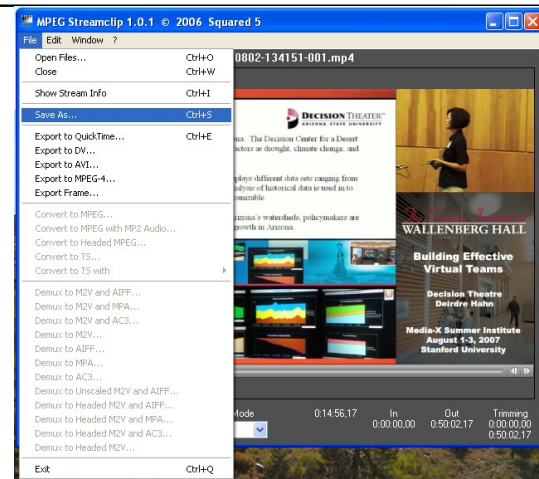
Align the “In” point to the nearest key frame. This is required to eliminate pixelation and picture breakup at the start of the new clip. If that key frame is unacceptable as a starting point, move the slider backward or forward until a usable key frame is found.



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.

7. References

7.1. MPEG COMPRESSION

ISO 14496-12 - ISO base media file format

ISO 14496-14 - MP4 file format

7.2. 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

7.3. 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

8. Revision History

- Revision 1.10 – Updates for Release 4.2. New facilities for automatic transcoding to H.264. Support for SFTP file upload. Improved support for wide-screen displays and alternate timings, with or without supporting EDID information. Serial command changes for display modes. Additional support for sub-title events and Chaptering. Increased Overlay storage space. Overlay buttons on the Sources page. Additional tags in the XML file for format description. CIDR notation added to the Telnet IP restriction field. CE Compliance information. Additional closed caption program pointer.
- Revision 1.9 – Documentation changes for PIP border, audio meter position, advanced channel options and Channel page layout. A new “Description” field on the archive Details and Channels page and the corresponding <description> tag in the XML file. Other additions to the XML file.
- Revision 1.8 – M3S2 software version change to 4.0.x release numbers.
- Revision 1.7 – Updates for Release 1.0.4. Archive filename formatting options. FTP upload filename formatting options. Additions to the XML archive file. Audio meter IP address.
- Revision 1.6 – Updates for Telepresenter Series 2. Documentation on the Scheduler interface. Remove reference section on external scheduler program. New section on techniques for presentation capture. Added a section on startup.
- Revision 1.5 – Updates for software Release 3.1.0. Two new configuration tabs are introduced: an FTP page for ftp “push” operations and an Announce tab for automatic use of .sdp files by a streaming server. A new network configuration file has been introduced. Optional support for network time servers. New examples of Closed Caption support. Balanced line-level XLR support via an external USB interface. Telepresenter scheduling. Graphics overlay upload from a command script.
- Revision 1.4 – FCC and CE compliance language added to the text.
- Revision 1.3 – Updated for Release 3.0 with description of higher resolutions and PIP.
- Revision 1.2 – Added additional information on the DVI interface.
- Revision 1.1 – Updates required for changes introduced in Release 2.8. The web interface has new “Passwords” and “Web Control” tabs. There is a change in options on the “Display” page. An “Auto-start” option is now available for a Channel. The Archive detail files now support Unicode and are in XML format. The .txt files are no longer available.
- Revision 1.0 – Initial revision based on software Release 2.7.4.