

Video Conferencing Manual

Alan Bridle
National Radio Astronomy Observatory
Charlottesville
Virginia 22903

December 22, 2005

HTML Version Available¹

¹<http://www.cv.nrao.edu/~abridle/videoconf/vcm.shtml>

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1 Outline

This document describes the main features, and use, of the NRAO video conferencing system.

Section 2 is an overview of the system and of the three main types of video conference calls that it supports: (1) point-to-point conferencing within the NRAO, (2) multi-point conferencing within the NRAO, and (3) conferencing with non-NRAO sites.

Section 3 describes basic features of the remote control used to place calls and to control the camera during a video conference.

Section 4 describes how to dial the various types of conference call.

Sections 5 and 6 describe features of the main camera and microphones in the video conferencing rooms.

Section 7 outlines how to use secondary video sources (second camera, document camera, computer displays, or video tape) to enhance a meeting or presentation.

Section 8 describes a number of ways to share documents, data or presentations during video conferences, and notes their strengths and weaknesses.

Section 9 suggests responses to situations that may create problems, or possibly confuse novice users, during video conferences.

Section 10 is a checklist for video conference organizers.

Several quick-start pages are also available on the NRAO web, including:

- Quick Guide to Dialing and Camera Control²
- Remote Control Guide³ (postscript)
- Reservations and Contact Information⁴

Each site's video conferencing technical contact person(s)⁵ also have more detailed technical or operating manuals provided by the vendors of the component systems. Please ask them where your site's manuals are kept, if you require more detailed information.

The full Polycom ViewStation manual is also available on the web in PDF format⁶.

This *Manual* is also available in HTML format⁷.

²<http://www.nrao.edu/internal/doc/videoconfquick.shtml>

³<http://www.cv.nrao.edu/~abridle/videoconf/camerasound.eps>

⁴<http://www.nrao.edu/internal/doc/videoconfreserve.shtml>

⁵<http://www.nrao.edu/internal/doc/videoconfreserve.shtml>

⁶<http://www.cv.nrao.edu/~abridle/videoconf/mpugus.pdf>

⁷<http://www.cv.nrao.edu/~abridle/videoconf/vcm.shtml>

2 Overview

The video conferencing system allows compressed digital video and audio signals to be interchanged among NRAO sites in Charlottesville, Green Bank, Santiago, Socorro, Tucson, the VLA and AUI over the observatory's frame-relay Intranet. The equipment that provides these basic capabilities is:

- A Polycom ViewStation or VSX system with a video camera, two microphone pods, and a self-contained video signal processor;
- A remote control (Section 3) for the ViewStation or VSX, allowing each system to be controlled from the conference table;
- An optional secondary video camera (Section 7.1) usually with its own remote control(s);
- An optional document camera (Section 7.2) for showing high-quality video images of paper pages, transparencies, or hardware with a wide range of available magnifications;
- Large-format TV monitors.

This basic equipment provides point-to-point (two-site) video conferencing between any two NRAO video-capable sites, or from any one NRAO video system to one external system via the Internet.

Additional *video hubs* in Charlottesville, Santiago and Socorro provide “multi-conferencing” capability to support three-, four-, five-, or six-way meetings. An ISDN Gateway in Charlottesville allows video conferencing with non-NRAO sites over commercial ISDN telephone lines.

2.1 Point-to-point video conferencing

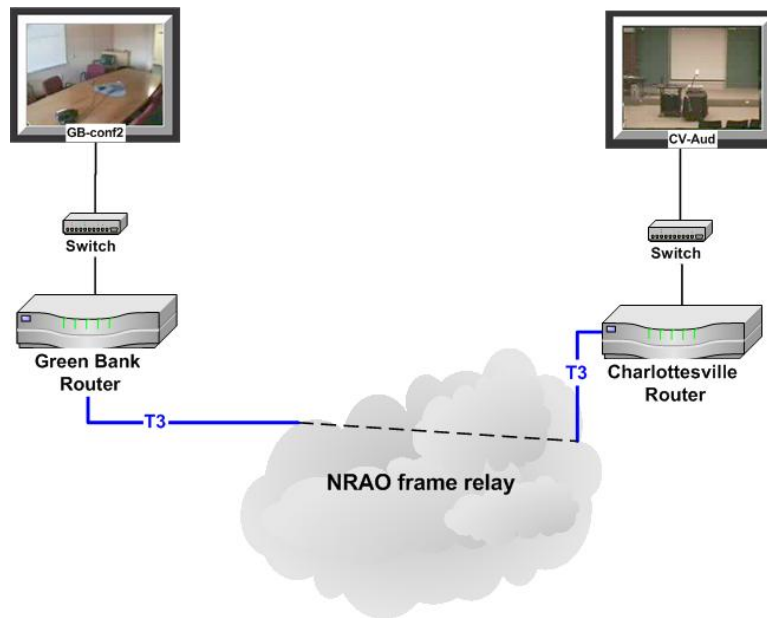


Figure 1: Point to point video conferencing between Green Bank and Charlottesville over the frame-relay Intranet. **No video hub is needed for a point to point call.**

Any *two* NRAO video conferencing systems can be connected directly across the NRAO Intranet for a high-quality, point-to-point, video conference as in the examples shown in Figures 1 and 2.

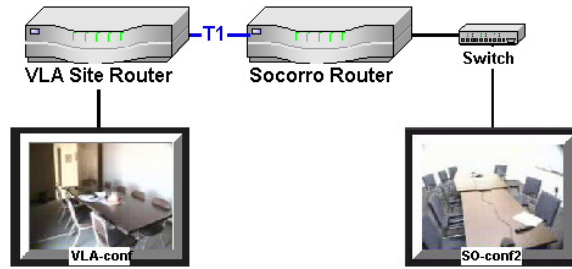


Figure 2: Point to point video conferencing between Socorro and the VLA Site via the dedicated T1 line. **No video hub is needed for the point to point call.**

The systems are connected directly when one dials the other's Internet (IP) address, either by IP number or by using the video Address Book.

The video and audio signals are transmitted separately but remain synchronized with each other, *with a small time delay* between an event at a site and its display on the TV monitors at the other sites. Both sites can control both main cameras, so people at either end of the call can potiiion either camera. The video quality in point-to-point conferences approaches that of a typical broadcast signal.

It is possible to have multiple point-to-point video conferences between the fourteen locations within the NRAO simultaneously, e.g. one Socorro conference room could be conferencing with the VLA Site while another Socorro room talks to Green Bank and Tucson views a colloquium in the Charlottesville Auditorium.

2.2 Multi-point video conferencing

Any meeting between three or more sites requires use of a multi-conferencing unit or MCU, otherwise known as a *video hub*. The video hub receives all of the video and audio signals, then decides which video signal(s) to send to each site, depending on who is currently speaking.

The NRAO has several video hubs in which multi-site meetings can be hosted:

1. a six-way 'VSX' hub built into the system in the main second-floor conference room at Edgemont Road in Charlottesville (CV-ER230),
2. a four-way 'FX' hub built into the system in the main third-floor video conference room at Edgemont Road in Charlottesville (CV-ER311),
3. a four-way 'FX' hub built into the system in the third-floor conference room (SO-conf) at the AOC in Socorro,
4. a four-way 'FX' hub built into the system in the Charlottesville Edgemont Road Auditorium (CV-Aud), and
5. a four-way 'VSX' hub built into the system at the NRAO offices in Santiago.

The VSX hub in Charlottesville conference room ER-230 can host up to a six-way video meeting, *i.e.*, between that conference room and up to five other video systems at the NRAO or elsewhere. The FX hubs in Charlottesville's room ER-311 and Auditorium, and in the third-floor conference room in Socorro, or the VSX hub in Santiago can provide three- or four-way conferencing between these systems and others at the NRAO or elsewhere.

The multi-conferencing capabilities of these hubs are activated simply by placing more than one video call simultaneously from or to them. Multi-site calls can be initiated *either* by these hubs

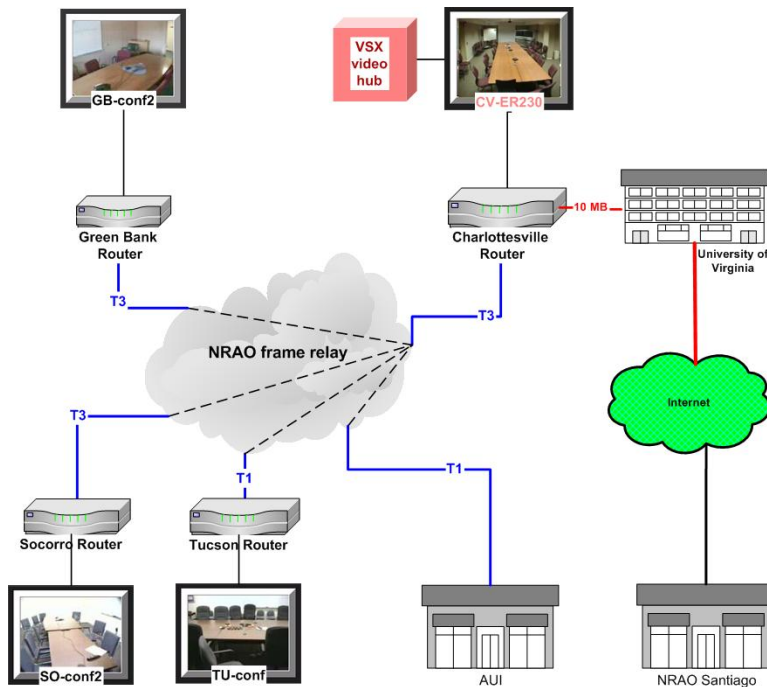


Figure 3: Six-way connection between Green Bank, Charlottesville, Santiago, Socorro, Tucson and AUI hosted by the VSX video hub in CV-ER230 using the NRAO frame-relay and the Internet via U.Va.

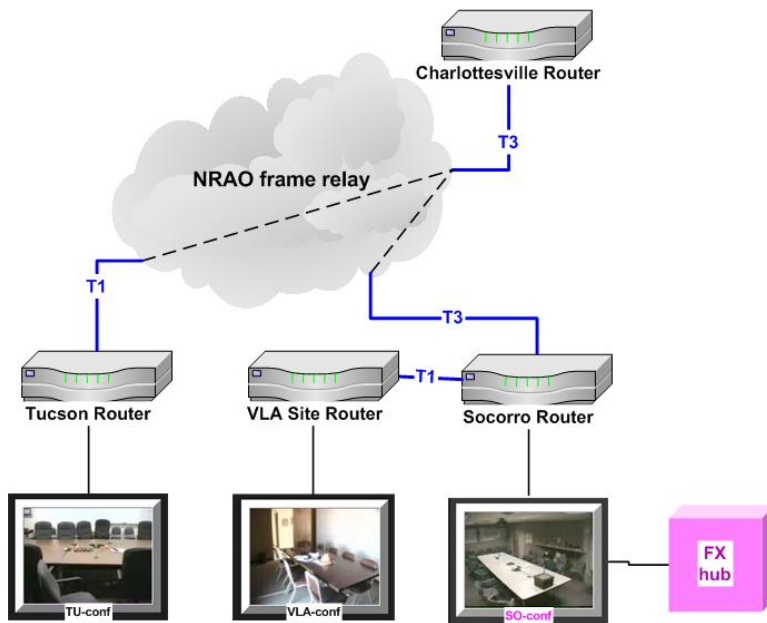


Figure 4: Conferencing between Tucson, Socorro and the VLA Site hosted by the FX hub in SO-conf. Note the use of the frame-relay via Charlottesville to connect Tucson and Socorro.

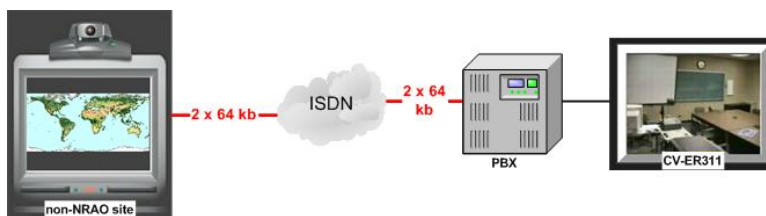


Figure 5: Point-to-point call to non-NRAO ISDN site from Charlottesville’s conference room 311.

calling out, *or* by far sites calling in, *or* by a combination of both. The FX hubs can support three-way meetings at bandwidths up to 512 kbps, and four-way meetings at bandwidths up to 384 kbps. The hubs cannot be used independently of the video systems in their rooms, *i.e.*, to use the hubs you must also reserve the rooms.

Note that the four-way hub in the Charlottesville Auditorium is used mainly for NRAO-wide meetings, colloquia and workshops with a large audience in the Charlottesville Auditorium, and which require the use of auxiliary microphones and cameras. It may however be used for small meetings by rearranging seating and microphones in the Auditorium.

Five- and six-way meetings are also possible using multiple FX hubs, if one of the FX hubs calls the other as part of a multi-site call, then the second FX hub calls out to further sites.

During a multi-site conference, all audio channels are continuous and the video hubs use *voice-activated video switching* to decide which video signal(s) to send to each site. The video hubs are normally configured in a video mode which lets all sites see each other in a “Hollywood Squares” format during multi-way discussion, but which switches to full-screen mode after 15 seconds if only one site is speaking. It is also possible to configure these hubs to send only the full-screen video from the site that is sending the strongest audio, or to stay in all-site discussion mode no matter who is speaking. It is always good etiquette for sites to mute their microphones while listening to a presentation during a multi-point conference, to ensure that other sites will receive uninterrupted full-screen video from the presenting site, and to prevent side-conversations at a listening site from distracting other meeting participants.

The inter-site time delay through any video hub is more noticeable than in point-to-point calls, so participants in multi-site meetings need to be aware that it takes a little longer to get an answer to a question, or to break into a discussion, than it is during a telephone meeting or a point-to-point video meeting. Also, when sites are connected through a video hub, only local (*i.e.* near) camera control is available through the Polycom hand-held remote controls. Each site must then be responsible for steering its own camera unless an arrangement has been made for camera control through the remote camera API (application programming interface), see Section 5.4.

2.3 Video conferencing to external sites using ISDN

Point-to-point conferencing with non-NRAO video sites that have ISDN capability is straightforward, and has been used for video conferences to Europe and to Japan. ISDN connections at 128 or 256 kbps usually give similar audio and video performance to IP connections at 384 or 512 kbps.

The Polycom FX system in the old Charlottesville conference room 311 can connect directly to outside sites over ISDN. In this case, the connection is made through the Charlottesville PBX (Figure 5) (see instructions in Section 4.4.2).

All other NRAO systems can communicate with external ISDN video sites through a Radvision ISDN Gateway that is connected to the Charlottesville PBX (Figure 6). The Gateway translates between the IP protocol that is used to send video and audio over the NRAO Intranet and the ISDN protocol that is used by the external connection. The example shows the connection for a Socorro system, but the same principle applies to the Charlottesville Auditorium, Green Bank, Tucson and VLA Site systems. Section 4.4.1 gives dialing instructions for such external ISDN calls. in .

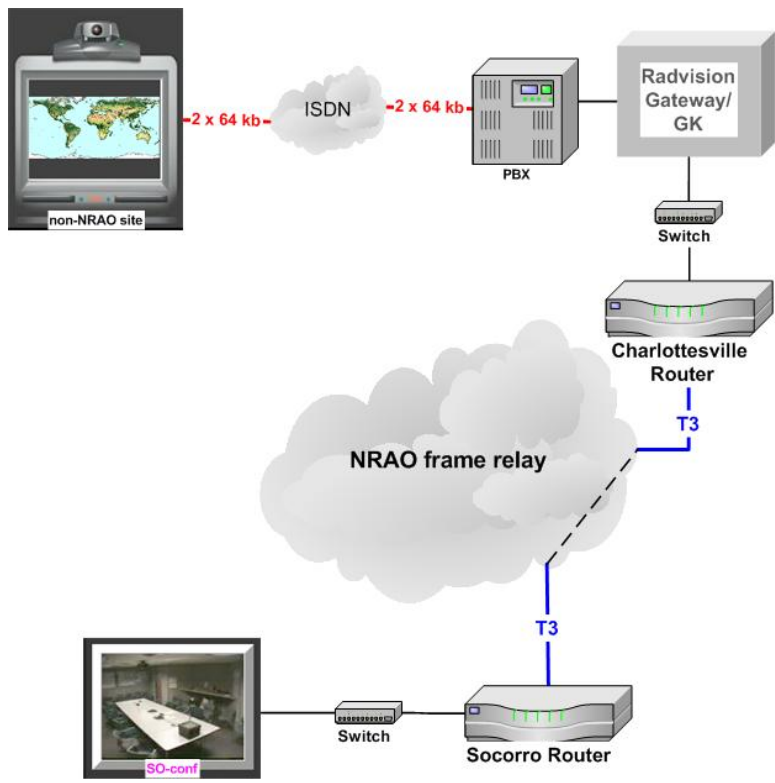


Figure 6: Point-to-point call to non-NRAO ISDN site from Socorro

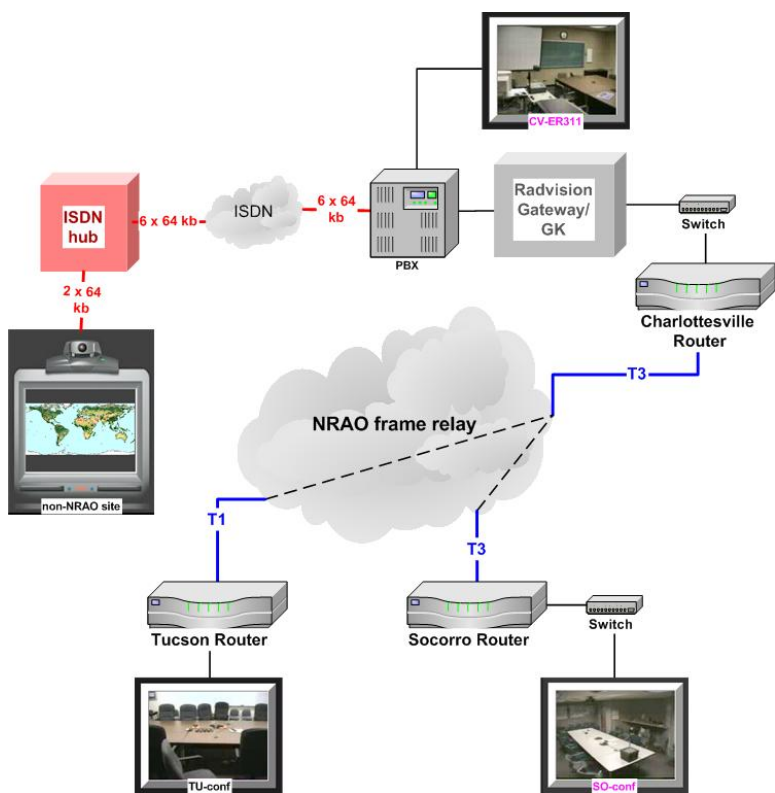


Figure 7: Four-way conference with an external ISDN site, hubbed outside the NRAO

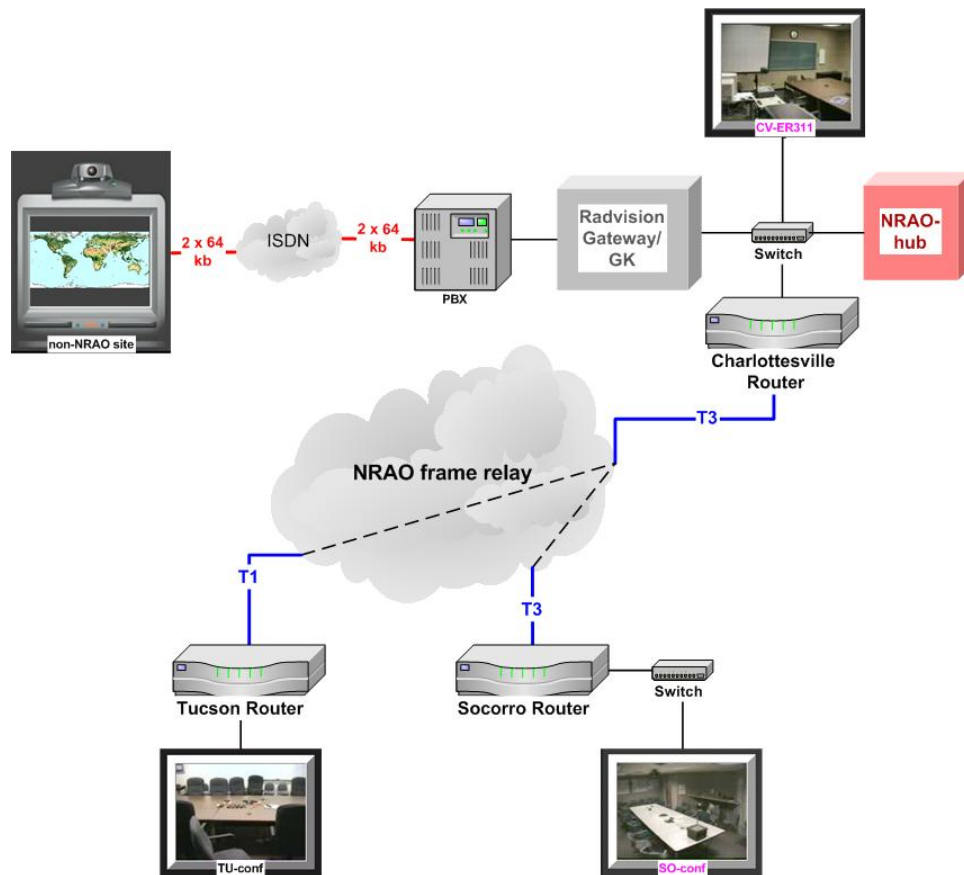


Figure 8: Four-way conference with an external ISDN site, hubbed by the NRAO-hub MCU

Multi-site meetings involving external ISDN sites are possible (but note that these options have not been exercised fully and may need extra testing before they can be used routinely).

As many as three NRAO video systems can connect simultaneously at 128 kbps to an ISDN video conference that is hubbed at an external ISDN site, as shown (in Figure 7). In this example, Tucson and Socorro connect to the external ISDN hub through the Radvision ISDN Gateway, while the Charlottesville system connects directly through the PBX. Three commercial ISDN phone lines providing a total of 384 kbps would be used to connect the external ISDN hub to the Charlottesville PBX. One line would be used by each of the three NRAO systems.

It is also possible for external ISDN sites to connect to the NRAO through the Charlottesville ISDN Gateway in order to join a conference hubbed in the NRAO-hub MCU as shown (in Figure 8). In this case the three NRAO systems would each connect to the NRAO-hub MCU at 128 or 256 kbps. The external site(s) would dial in through the Radvision ISDN Gateway, which would translate their ISDN audio/video data to IP format for processing by NRAO-hub. This mode of operation may yield inferior video quality, however, and dialing into the NRAO hub by ISDN may be complicated by the interactive response system in the PBX. Also, one ISDN lines in Charlottesville that is in principle available for such dial-in by external video sites has been dedicated to NRAO satellite-link communications with Chajnantor. Future software and hardware upgrades in Charlottesville may make this mode more attractive, but trend is strongly towards all-IP video conferencing and to the use of the VSX or FX hubs in Charlottesville as described earlier.

2.4 Ancillary equipment

A PC can be used with any video conferencing system to allow:

- computer-based presentations (e.g., PowerPoint, web browser or other software) in each conferencing room, and
- high-quality (continuous) sharing of such presentations between NRAO sites during meetings or seminars in parallel with sending the video signals (see Section 8), or
- sharing of such presentations as video snapshots using screen capture software such as PolySnap (see Section 8.6.1 below).

Each NRAO site also has a high resolution LCD projector. This may be connected:

- to the video conferencing PC to show computer presentations, or
- directly to the Polycom ViewStation to show video signals in large format, or
- directly to the Document Camera (Section 7.2) for large format local display of documents.

The latter options are especially relevant in large meetings where not all participants may have a good view of the video monitors.

3 Remote Control Basics

Before making your first video conference call, please take a few moments to become familiar with the ViewStation's remote control.

This control lets you:

1. place video calls, as described in Section 4, and
2. operate the main camera, adjust the TV volume, select video sources

from the conference table using menus displayed on the TV monitor. Several buttons have different functions depending on which menu is displayed.

You must pick up the control to access all of its functions.

The following functions are available (in order of the buttons on the Viewstation/FX remote):



- **CALL HANG-UP** : Place/disconnect video calls (details in Section 4).



- **AUTO** : Enable AUTO voice tracking for your site's main camera (details in Section 5.3).



- **NEAR** : Get control of the NEAR (i.e. your) site's main camera, or select an alternate video source (camera, document camera, VCR, see Section 7) at your site
- **FAR** : Get control of FAR site's main camera (only in a point-to-point call)
- **SLIDES** : Show Powerpoint slides preloaded into your site's ViewStation (details in Section 8.6.2).
- **ARROWS** : Highlight menu item or pan camera, LEFT, RIGHT, UP, DOWN



- **SELECT** : SELECT a highlighted item on menu displayed on the TV
- **ZOOM (+/- rocker)** : Main camera zoom in/out
- **VOL** : Polycom (software) volume control
- **SNAPSHOT** : Send a still (snapshot) video frame (details in Section 7.4).



- **MUTE** : MUTE your site's microphone pods
- **NUMBER PAD** : Go to preset camera settings (in camera control mode), or enter a number (in dial-out mode)
- **MENU** : Escape to next higher level of menu on TV monitor
- **INFO** : Polycom menu on-screen help

Figures 9 to 11 show the main buttons used for basic camera and audio control, for video input selection, and for dialing video calls, respectively on the Viewstation and FX systems. Figure 12 illustrates the button layout and functions on a typical VSX remote (not all systems are identical).

You have control of your site's main camera if camera icon on the TV faces you when you pick up the remote ...



NEAR acquires control of your site's main camera or shows menu to select video source

Use arrow keys to PAN the main camera

ZOOM in (+) or out (-)

Use number keys 0 through 9 to go to PRESET camera positions/zooms

MENU escapes from current menu on TV monitor



VOL adjusts TV volume setting

MUTE turns your microphone pods off/on ... red light ON means MUTED (button on mike pod also controls mute)

Figure 9: Basic camera/audio remote control (Viewstation/FX)

Press NEAR once to acquire camera control, twice to select video source for your site

Press AUTO once for free voice tracking, twice for tracking only to camera presets

MENU escapes from current Polycom menu on TV monitor



FAR camera control is available in point-to-point meetings

Preloaded SLIDES (e.g. PowerPoint presentation) can be shown

Still frames (SNAPSHOTS) can be shown alongside live video from your site

Figure 10: Advanced video remote control (Viewstation/FX)

Use arrow keys to highlight items in menus on TV

then use SELECT



to activate the highlighted item

MENU exits to next higher menu level on the TV, press repeatedly to return to Top Menu



Call/Hang Up has multiple uses:

(a) invokes Video Phone Menu

(b) places call from Video Phone Menu

(c) hangs up call at end of a meeting

Use number keys to select from Speed Dial Menu or to custom dial from the Video Phone Menu

Figure 11: Dialing functions on the remote control (Viewstation/FX)



Figure 12: Polycom VSX remote control. Not all versions have separate "Call" and "Hang Up" buttons at the top.

4 Making Connections

This section describes how to use a Polycom system's dial-out functions to place various kinds of video conference calls.

Any call can be dialed manually using the **Video Phone** utility, but you will normally use a shortcut stored in your ViewStation's **Address Book** or **Speed Dial Menu** (for Viewstation or FX systems), **Directory** or **Recent Calls** lists for VSX systems. Sections 4.1 and 4.2 describe these utilities. Section 4.3 gives instructions for calling other NRAO sites over the Intranet, and Section 4.4 describes how to call external sites via ISDN. Section 4.4.3 gives instructions for dialing *into* the NRAO over ISDN.

4.1 Speed Dial / Recent Calls


On a Polycom ViewStation or FX system, the last six unique numbers dialed from your site are kept in a **Speed Dial Menu** in the order (1) *last dialed*, (2) *previous dialed*, etc. This order changes whenever a new number is dialed from your site, so the **Speed Dial Menu** may be differently ordered each time you access it. On a Polycom VSX system a similar function is provided by a **Recent Calls** list which stores previous calls in "last placed first" order.

The Speed Dial Menu on a Viewstation or FX system lets you dial any of its listed sites by pressing 1, 2, 3, 4, 5, or 6 on the ViewStation remote control. To access the Speed Dial Menu, pick up the remote and press MENU until you reach the Polycom Top Menu:



Figure 13: Polycom Top Menu with Address Book icon highlighted

then:

- Use the ARROW keys on the ViewStation remote to highlight the **Address Book** icon as in the example above
- Press SELECT  on the remote

The ViewStation will then display the **Speed Dial Menu** (Figure 14).

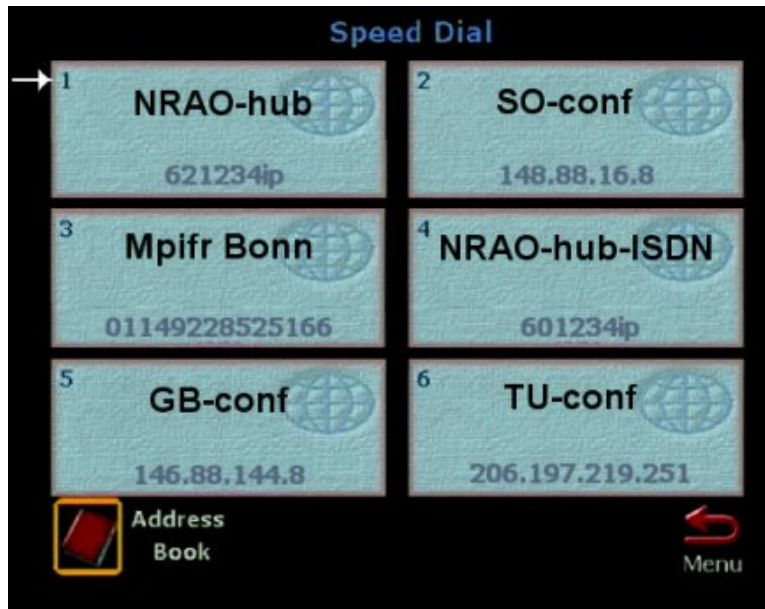



Figure 14: Example Speed Dial Menu (Viewstation/FX)

If the site you wish to dial is in this menu, you can dial it by pushing the single number button 1 to 6 corresponding to its current position in the menu.


4.2 Address Book / Directory

Each ViewStation or FX system has an **Address Book** that holds *all* of its commonly dialed video conferencing numbers. On a VSX system this listing is called the **Directory**. To access the full Address Book:

- Use the ARROW keys to highlight the Address Book icon at lower left in the Speed Dial Menu
- Press SELECT  on the remote

The initial **Address Book Menu** shows only the first seven entries. The others can be accessed either

- by scrolling down with the DOWN ARROW button on the ViewStation remote control, or
- by typing their first letter, or
- by using the ARROW keys on the remote control to highlight one of the lettered tabs at the right of the **Address Book Menu** (Figure 15).

Once an **Address Book** or VSX **Directory** entry has been highlighted, press SELECT  on the remote control to dial the corresponding connection.

Names and numbers stored in your system's Address Book or Directory should not be changed without consulting your local NRAO video conferencing support staff.

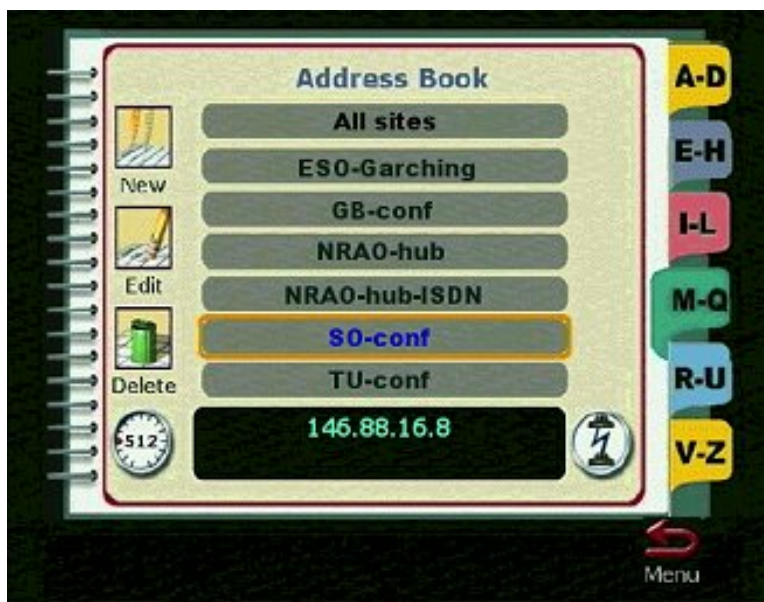



Figure 15: Example Address Book Menu (Viewstation/FX)

4.3 Calls Among NRAO Intranet Sites

For NRAO internal meetings, the quickest way to connect is usually to dial the other site or the video hub as appropriate using the **Speed Dial Menu** (Section 4.1):

Pick up the remote control for the Polycom ViewStation, then:

1. If the **Speed Dial Menu** is already displayed, go to step 5, else
2. Press **MENU** on the remote control until the Polycom Top Menu (Figure 13) appears on the TV monitor
3. Highlight the **Address Book** icon with the **LEFT ARROW** button
4. Press **SELECT** 
5. The current **Speed Dial Menu** should be displayed
6. Dial site by ordinal number (1 through 6 from the numeric keypad) or point with **ARROW** button(s), then **SELECT**
CV-ER311, **GB-conf**, **SO-conf**, **TU-conf** for point-to-point call
NRAO-hub for a multi-site call

If the connection that you need is not in your system's current **Speed Dial Menu**, then dial it from the **Address Book Menu** as follows:

1. Highlight the **Address Book** icon below the **Speed Dial Menu**
2. Press **SELECT**
3. The **Address Book Menu** should appear
4. Use the **DOWN ARROW** button to step through this menu until you find the site or site combination that you need

5. Press SELECT

Note that only there are several pages of entries in most of the Address Book displays; to see later pages of entries, use the DOWN ARROW button to move down the list.

Address Book entries can also be accessed by pushing the letter on the remote control dial pad that corresponds to the first letter of the address, e.g. N for NRAO-hub, S for SO-conf, etc. (Every NRAO site has been given an alternate entry under N to facilitate this).

If the connection that you need is not in the Address Book, you can dial it manually using the Video Phone utility as follows:

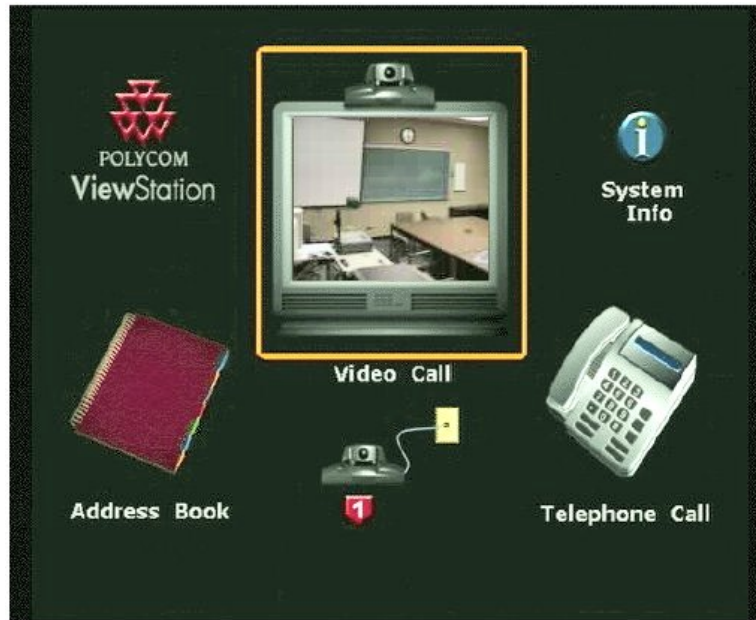



Figure 16: Polycom Top Menu with Video Call highlighted

1. Press MENU on the ViewStation remote control until you reach the Polycom Top Menu on the TV monitor, then
2. Use the ARROW keys to highlight the Video Call icon (top center of this menu, as illustrated in Figure 16),
3. Press SELECT  to obtain the Video Phone screen
4. Use the numeric keypad to enter the number that you want to dial from Table 1. On a ViewStation or FX system, use the right arrow key to enter the decimal point in an IP address. On a VSX system, use the decimal point (“dot”) key.
5. If in Charlottesville, check that the type of call is set to IP; if it is set to ISDN, move the highlight to this field with the ARROW keys and set it to IP
6. Check that the speed is set to 384 (kbps); if it is not, use the ARROW keys to highlight this field, then set it to 384 unless you wish to dial at a different speed.
7. Place the call using the green CALL-HANG-UP button.

Whichever connection method is used, the TV monitor will show the number dialed, type of call (IP/ISDN) and connection speed while the connection is being established.

Table 1: Standard NRAO Address Book entries

Name	Address	Name	Address
GB-aud	192.33.117.146	NRAO Santiago	200.2.7.249
GB-conf	192.33.117.144	SO-aud	146.88.16.9
GB-conf2	192.33.117.145	SO-conf	146.88.16.8
CV-aud	192.33.117.18	SO-conf2	146.88.16.10
CV-ER311	192.33.117.17	SO-West	146.88.8.10
CV-ER230	192.33.117.16	TU-conf	146.88.176.8
CV-NTC	192.33.117.81	VLA-conf	146.88.17.8

4.3.1 Placing Multi-site Calls from the FX Hubs in Charlottesville and Socorro

To place calls to multiple sites from CV-aud, CV-ER311 or SO-conf, simply place the first call, then press MENU to get back to the Polycom Top Menu, place the second call, then (if needed) press MENU again and place the third call.

The FX hubs support 3-way meetings at 512 kbps using the regular point-to-point Address Book entries. Unless you are showing movies or other views with much movement, you can save video bandwidth with little loss in video quality (and none in audio quality) by dialing three-way connections at the NRAO default bandwidth of 384 kbps. To make connections at 512 or greater kbps, use the Video Phone dialer to dial the IP address while setting the bandwidth to the higher value.

The FX hubs support 4-way meetings *only* at 384 kbps, so connections to these *must* for four-way meetings should always be dialed using the standard NRAO Address Book or Directory (VSX) entries.

To place calls to multiple sites from the VSX hub in Santiago, simply place the first call, then select DIRECTORY to place the further calls as needed.

4.3.2 Placing Multi-site Calls from the VSX Hub in Charlottesville Room 230

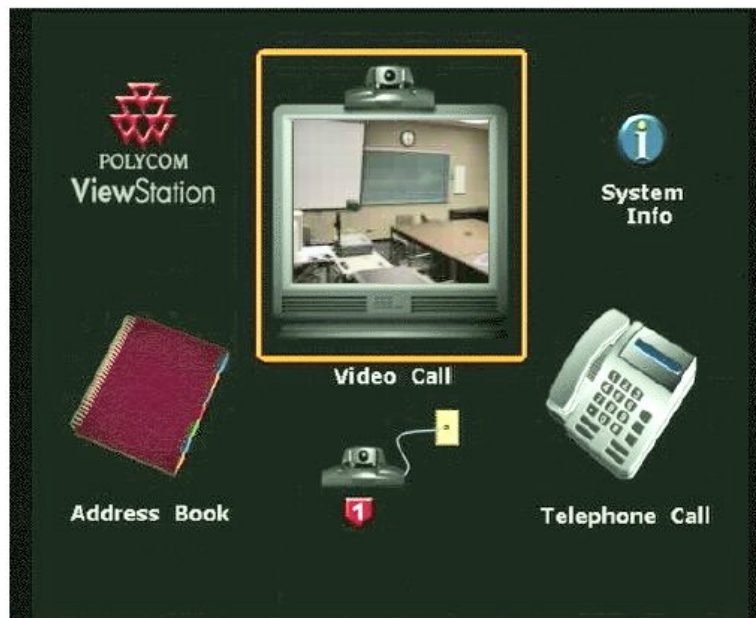
The VSX hub in the new Charlottesville conference room 230 at Edgemont Road supports up to 6-way meetings (*i.e.*, Room 230 and five other sites) at 384 kbps. Higher bandwidths are also supported by this hub, but should not be used unless unusually high video quality is needed, in order not to overburden the data networks at the other sites. To place calls to multiple sites from CV-ER230, simply place the first call, then select DIRECTORY to place the further calls as needed..

4.4 Calls to External Sites via ISDN

Charlottesville's CV-ER311 Polycom FX system has direct ISDN connections so that ISDN calls of 384 Kbps and below can be placed or received directly from it.

The other NRAO video systems do not have direct ISDN service, but can receive calls from, or place calls to, ISDN sites outside the NRAO by connecting to the NRAO ISDN Gateway.

Start the process from the Polycom Top Menu, shown below for a Viewstation or FX system:



If you see any other menu when you pick up the Polycom remote control, press the MENU button on the remote (HOME button on a VSX) until you reach the Polycom Top Menu screen .

4.4.1 To place ISDN Calls to non-NRAO sites from Green Bank, Socorro or Tucson

If your ISDN call is in the Speed Dial/Recent Calls Menu or Address Book/Directory, you can dial it in the same way as an NRAO internal call. If you are placing an ISDN call to a site whose ISDN number has not been entered in the Address Book/Directory, you will need to dial it using the Video Phone utility as follows:


1. With Video Call highlighted on the Polycom Top Menu (as in the example above) press the green CALL-HANG-UP button on the remote. This will bring up the Video Phone Menu (see below).
2. Use the ARROW keys to highlight, then SELECT  the Speed item.
3. This will bring up a menu of connection speeds. Use the ARROW keys to highlight, then SELECT 128, if supported at the other end.
4. The Video Phone Menu will return with the number entry highlighted, as in the example shown in Figure 17.
5. Enter the first phone numbers, e.g.:
Video A: 92914342960370
where the 92 requests NRAO Gateway service



Figure 17: Example Video Phone Menu

9 requests an outside line, and


14342960370 is an example of 1+(Area Code)+the ISDN phone number you wish to dial

6. Press the DOWN arrow and enter the second phone number, e.g.:
Video B: 92914342960371
7. Then press the green CALL-HANG-UP button to place the call.

The example given above would dial the Charlottesville ViewStation via ISDN at 2x64 Kbps (which may be a useful test if you wish to familiarize yourself with the steps before making an ISDN call beyond the NRAO).

Note: When dialing from the Polycom ViewStation remote unit, press the * or # key if a dial pad is required. For example, when our ISDN Gateway is called, an Interactive Voice Response System answers and a second number must be entered; the dial pad lets you do this if you counter such a gateway while placing a call to a outside site.

4.4.2 To place ISDN calls from Edgemont Road Room 311

1. With Video Call highlighted on the Polycom Top Menu, press the green CALL-HANG-UP button on the VideoStation remote control. This will bring up the Video Phone Menu (see Figure 17) .
2. Select ISDN; located at bottom, center on phone display, SELECT  button toggles between IP and ISDN.
3. Highlight and then SELECT Speed. Typically 128.
4. Enter the phone number(s). The 9 prefix for an outside line is automatically prepended.
5. Press the green CALL-HANG-UP button on the remote to place the call.

Note: when dialing from the Polycom ViewStation remote unit, press the * or # key if a dial pad is required. For example, when our ISDN Gateway is called, an Interactive Voice Response System answers and a second number must be entered; the dial pad lets you do this if you counter such a gateway while placing a call.

4.4.3 To call into an NRAO video system via the ISDN Gateway

The following are instructions that you should give to outside sites if they will dial into the NRAO over ISDN to initiate a video conference.

1. The available ISDN Phone Numbers are:
434-296-0386/7
434-296-0388/9
434-296-0392/3
2. An Interactive Voice Response system answers. At the voice prompt, enter a number from the following selection:

For multi-point calls (several NRAO sites will be connected):

Hub number: 601234#

For point-to-Point Calls:

CV via the Gateway: 46652#

GB via the Gateway: 46699#

SO via the Gateway: 46678#

TU via the Gateway: 35750#

Note: the Gateway should default to connecting the caller to the NRAO video hub if the caller does not enter anything. Some video phone systems may not be able to entering further numbers at the IVR prompt, and these systems will always connect to the hub. Any NRAO users who wish to conference with incoming ISDN calls from such systems should therefore also connect to the NRAO video hub, even for a point-to-point meeting.

ISDN numbers for calling **directly** into Polycom video system in Charlottesville's main conference room:

- CV, direct to Polycom: 434-296-0370/1
- CV, direct to Polycom: 434-296-0376/7
- CV, direct to Polycom: 434-296-0378/9

4.4.4 Mixing NRAO Intranet and external ISDN Sites

The system will support calls involving *any number* of the NRAO video conferencing sites and *from one to three* external ISDN sites (i.e. up to a seven-way conference).

All NRAO sites involved in the conference should call the **NRAO-hub-ISDN** number from their Address Book or Speed Dial (equivalent to hand-dialing 601234 to reach this hub at 128 Kbps). Each outside site involved in the conference should call the NRAO ISDN Gateway on a different pair chosen from 434-296-0386/7, 434-296-0388/9, or 434-296-0392/3, and then select 601234.

4.4.5 Hanging up an ISDN call

Press the green CALL-HANG-UP button to disconnect the call from your site. If the number dialed was not in the Address Book for your site, you will be asked if you want to store it. Answer YES and follow instructions if the number is one that you are likely to need again.

4.5 Mixed Video and Phone Conferencing

The built-in facility for patching a phone line directly into the Polycom ViewStation presently gives poorer audio quality than the direct approach:

1. use the Polycom phone conferencing unit to provide audio from dial-in participants to a nearby Polycom video conferencing microphone, and
2. use the TV monitor audio to provide sound from the video conferencing participants to the dial-in participants via the microphone in the phone conferencing unit.

The essential rule for mixed video and phone conferencing is: **DO NOT CONNECT ANY PAIR OF CONFERENCE SITES BOTH BY PHONE AND BY VIDEO CONFERENCING SIMULTANEOUSLY** (this creates an audio feedback loop between those sites).

5 Main Camera

The near (i.e. your) site's **main camera** is the one built into the top of its Polycom ViewStation video conferencing unit. This self-focusing camera is controlled by the ViewStation remote control.



Figure 18: Polycom ViewStation

You have control of the main camera

- by default when you first connect a video conferencing call to another site, or
- whenever the lens in the **Camera Icon** at the top right of the TV monitor faces towards you when you pick up the ViewStation remote control.



Figure 19: Camera Icon facing towards you

If you do not see the **Camera Icon** facing towards you when you pick up the ViewStation remote control, press the **NEAR** button once on the ViewStation remote control to take control of the camera.

5.1 Main Camera Pan/Zoom



Figure 20: Arrow Buttons

To adjust the pan (left, right) or tilt (up, down) of the camera, use the corresponding **ARROW BUTTONS** on the ViewStation remote control.

To adjust the zoom, use the ZOOM button on the ViewStation remote control: (+) to go closer to subject, (-) to widen field of view.

If the camera does not respond to commands from the remote control


- pick up the remote control,
- press NEAR.

The Camera Icon should appear, with the lens facing towards you, in the top right corner of the TV monitor.

5.2 Main Camera Presets

You can set and store up to ten presets (camera pan and zoom settings) for the main camera in a Viewstation/FX (99 for a VSX), then recall them with number buttons 0 through 9 on the remote control.

To set a preset:

- Pan or zoom the camera as desired using the ARROW and/or ZOOM buttons on the View-Station remote control
- Press SELECT 
- A message **Press 0-9 to store a preset** will appear on the TV monitor. (Existing presets are shown as gold numbers, unused presets as grey numbers.)
- Press a number button on the remote control to assign the current pan/zoom settings that to that numbered preset.
- Existing presets can be overwritten by new ones.

5.3 Main Camera Auto Voice Tracking

The main camera can automatically track towards whoever is speaking. The voice detector for this function is in the camera unit (not in the microphone pods). It is important that people face the main camera if they want their voices to be detected!

The first time that the main camera moves to an individual it may take several seconds of continuous speech to locate them. After that, it will pick out their position more quickly (if the speaker stays in the same place).

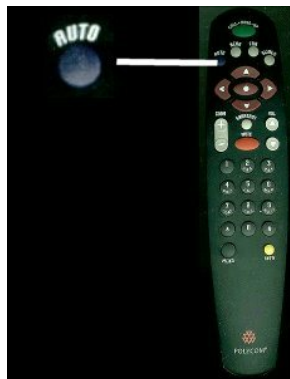


Figure 21: Automatic voice tracking button

The main camera can also be set to track only to its preset positions (this may be more satisfactory than fully automatic tracking, because of echoes from the ceilings).

- To have the camera track freely toward whoever is talking, press the dark blue AUTO button on the ViewStation remote control ONCE.
- To have the camera track to the preset camera position closest to the speaker, press the dark blue AUTO button TWICE. (The **Near Camera** icon on the TV monitor will then show gold balls, to represent the preset camera positions, as well as the camera.)
- Automatic voice tracking will be disabled if you pan, tilt, or zoom the camera manually.

The success of voice tracking depends on your room acoustics, on how clearly people speak (especially if they are sitting far from microphones) and on the level of other sounds in the room. It will work better in meetings with small groups than it will in a large audience at a lunch talk, and with camera presets that have been optimized for the room.

5.4 Remote Control of Main Camera from Far Sites

In a point-to-point call, the far *i.e.*, other, video site can control your main camera from its hand-held remote if the site has a Polycom video conferencing system (*i.e.*, if it is an NRAO system or one with similar hardware to ours). To do this, the other site selects “far” camera control on its hand-held remote before pressing the pan, tilt or zoom camera control buttons.

This capability is not available during a *multi-site* video conference through a video hub, because there is no unique “far” site in such a conference. If remote control of your main camera is needed during a hubbed call, *e.g.*, by a far site that is “chairing” the meeting and wishes to select who or what is seen in close-up at your site, or if your room is an Auditorium where your own hand-held remote cannot be located near its own video unit, then another method of remote camera control may be needed.

The NRAO has a capability for a far site (usually Charlottesville) to send commands to any NRAO video system via the Polycom remote application programming interface (API). Our interface to this API is through scripts written by Alan Bridle and Gene Runion for Windows PCs, and normally requires one of Alan Bridle, Gene Runion or Gareth Hunt to be present at the meeting. If you need remote control of your site’s main camera during a multi-way meeting, please contact one of these people well before the meeting to arrange this.

6 Sound

Each Polycom microphone pod contains three microphones, one on each long face of the pod. NRAO video conferencing systems may use one, two or three pods depending on the size of the room and the type of system installed. In all cases, the Polycom software will automatically switch to whichever of the individual microphones provides the strongest continuing audio, so it is important to ensure that no extraneous noise source is too close to *any* of the video microphone pods. *Good microphone placement is as important to successful video conferencing as good camera placement*, and extra care may be needed if a meeting will use a projector with a noisy fan or if other steady noise sources, such as notebook computer fans or air conditioning vents, are present in the room.

6.1 Microphone Positioning



Figure 22: Video Conferencing Microphone Pod

Video conferencing microphone pods (see illustration) should always be placed slightly in front of meeting participants. As people usually look at the TV monitor when speaking, try to place the microphone pods in the direction in which people will look when they are facing towards the TV.

Presentation speakers tend to face their projected slides (and thus away from the usual microphones) and may also move around the room while talking. These traits and noise from fans in projectors make it trickier to place microphone pods for a presentation than for a conversational meeting. At least one microphone pod at each site should be on a long cable to allow flexible positioning (but microphone cables should not be longer than 60 feet). The Polycom ViewStation has an auxiliary audio input that can be used with a lapel microphone to ensure good audio from a presentation speaker.

If you need to change the position of a microphone pod *during* a meeting, press the MUTE button first (to avoid deafening listeners at other sites while your pod is moved). There is a MUTE button at the center of each pod as well as on the video remote control.

Presentations from a large room such as an auditorium will almost always require the use of extra microphones if you wish to capture both the speaker's presentation and an audience discussion. One arrangement that has worked well for presentations in large rooms (e.g. colloquia and conference sessions) is to use just *one* Polycom microphone pod close to the presenter, and then to mix in audio from independent room microphone(s) to capture audience discussion. This single Polycom pod can then use its internal switching to select the best way to detect the speaker, maintaining the needed balance with a preset audio level for the audience. (This approach works much better than placing the second Polycom pod in the audience, as the Polycom system may decide to switch to this second pod in response to sounds from the audience, and thereby mute the presenter at inappropriate times.)

An alternative approach for large rooms such as the Auditoria in Charlottesville, Green Bank and Socorro is to give the presenter(s) a lapel microphone connected to the Polycom system's auxiliary audio input, to place both Polycom minirophone pods in the *audience*. You must also adjust the level on the lapel microphone so that the presenter is always audible over the discussion (or coughing or other noises) from the audience as picked up by the pods.


6.2 Sound Check (Audio Meter)

The quickest and best, way to check your sound levels is to ask participants at the other sites if they can hear speakers from your site clearly.

The ViewStation also has an Audio Meter that may help you to determine a good microphone placement, and the best mixing level between audio from the pods and any auxiliary microphones before a meeting starts.



Figure 23: System Info Icon

To access the Audio Meter, use the ARROW button to highlight the **System Info** icon on the Polycom Top Menu, then SELECT  this menu.

Then highlight and SELECT **Diagnostics** to reach the Polycom Diagnostics Menu (Figure 24):

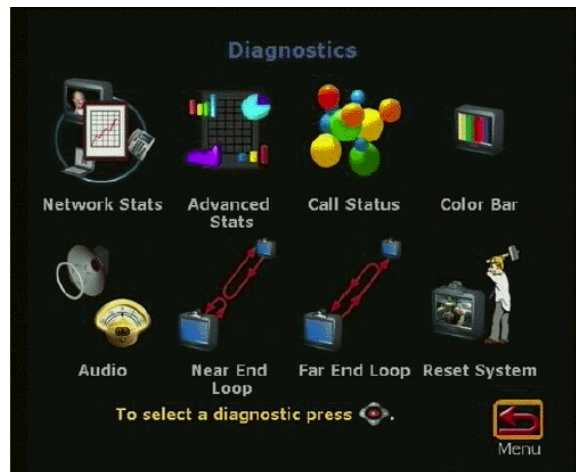


Figure 24: Diagnostics Menu

Highlight and SELECT the **Audio** icon from the Diagnostics Menu, then the **Audio Meter**:

The meter shows the combined sound level from all audio inputs. Polycom recommends that this level be in the range 0-15 on this meter.



Figure 25: Audio Meter

6.3 TV monitor volume

Polycom recommend setting the volume control on the TV monitor to about half of its maximum, then further adjusting the volume with the VOL buttons on the ViewStation remote control.

The TV has a separate remote control but this is not needed during a video conference and may confuse conference participants if left on the table. It is better to keep that remote out of view once the TV monitor's own volume control has been set satisfactorily.

6.4 Muting your site



Figure 26: Mute Button

To prevent far-site participants from hearing a sidebar conversation at your site, or from being switched to your video feed in at inappropriate times during a multi-site call, press the orange MUTE button on the ViewStation remote (or the button in the center of a microphone pod).

A red light appears on the microphone pods when they are muted. A Mute icon (microphone with a cross-out bar through it) also appears on the TV monitor at lower left.

It is good etiquette to mute your site's microphones while listening to an extended presentation from another site in a multi-site conference. Please remember that the video signal seen at other sites

is voice-activated, so extraneous noises or a sidebar conversation at your site could prevent another site from seeing the video from the presenting site continuously, unless you mute your microphones. In general, you should mute your microphones except when inter-site discussion is expected from the context of the meeting or presentation.

7 Alternate Cameras/Video Sources

Most small-group discussion meetings use only the main camera, but meetings that include a presentation that employs visual aids will benefit from the use of secondary cameras and video sources. This section of the manual describes the main options available at all the NRAO video conferencing sites and how to use them.


With NEAR camera control already selected, press the NEAR button on the ViewStation remote control again to bring up the **Video Input Selection Menu** with on-screen icons for each of your local video sources:



Figure 27: Video Input Selection Menu

The video input choices in an NRAO video conference room setup may include:

- **Main Camera**
- **Document Camera**
- **VCR**
- **Secondary Camera(s)**

Use the **RIGHT ARROW** button on the ViewStation remote control to highlight the appropriate icon, then press **SELECT** , or just press the number button corresponding to the menu item, to activate the corresponding video feed.

You can also generate and send a variety of still video frames to the other sites:

- **Snapshots**, i.e. still frames from any of the video inputs,
- **Screen captures** from a Windows PC connected to the ViewStation using PolySnap
- **Powerpoint Slides** preloaded into your ViewStation.

7.1 Secondary Camera

Many NRAO video conferencing systems are equipped with a secondary camera. In most cases this is optically identical to the main camera, but its individual remote controls may provide a slightly different selection of operations than those available through the Polycom remote control.

In most cases the secondary camera can be controlled through a hand-held remote control (see Figure 29).

The secondary camera in Edgemont Road Room 230 has no independent remote control, and can be controlled only through the Polycom system's remote control or the remote API interface (ask Gene Runion or Alan Bridle for details).

The secondary camera in Edgemont Road Room 311 can be controlled from the Polycom remote control when in a call, from the hand-held remote control, or from a joystick controller on the conference table (select camera 1 on the joystick box to control this camera, but select video source 4 in the Polycom video input menu).



Figure 28: Secondary Video Camera

The two secondary cameras in the Charlottesville Auditorium are usually controlled from a joystick in the projection booth. Only the main camera is usually controlled from the Auditorium itself, using the Polycom system's remote control.

The secondary camera in the NTC Penthouse (NTC-400) can be controlled from a hand-held remote or through an AXIS visual web interface (ask Gene Runion or Alan Bridle for details).

The secondary camera in the Socorro Third Floor Conference Room (317) can be controlled from the Polycom remote control when in a call, from the hand-held remote control, or through the remote API interface ((ask Gene Runion or Alan Bridle for details).

The secondary camera in the Socorro Auditorium can be controlled only by using its own hand-held remote control. It cannot be controlled through the Polycom remote control or via the remote API interface.

The standard secondary camera remote control allows use of six preset camera pan/zoom positions that are stored in the remote control, and also allows you also to store a backlight compensation setting as part of each camera preset. Backlight compensation lets you balance the visibility of the images on the projector screen relative to those of people in the room when someone is making a presentation using an overhead projector. (Backlight compensation is also available for the main camera, but it can be set only *globally* within the Polycom ViewStation, not separately for each camera preset.)

The ability to store a backlight compensation setting with each preset gives the secondary camera a big advantage over the main camera when covering presentations that use the overhead or LCD projectors,

The remote control for the secondary cameras has two zoom speeds and finer camera panning.

Presets for the secondary camera are set by pushing the PRESET button and the desired preset number simultaneously on its remote control, and then invoked by pressing only the numbered buttons. There is no ViewStation menu on the TV monitor for the secondary camera.

Auto voice tracking is not available with the secondary camera.

Presets for the secondary camera will be lost if power is completely disconnected from this camera, but not if it is turned off/on using the POWER button on its remote control.

The remote control for the secondary camera must be pointed towards the camera more precisely than remote control for the main camera, so it is important that the secondary camera operator have a clear view of the camera.

The focus of the secondary camera can also be adjusted manually from its remote control using the FOCUS button, but this feature should rarely be needed.



Figure 29: Secondary camera remote control

Table 2: Pros and cons of secondary camera

Advantage	Disadvantage
Backlight compensation	Second remote needed
Finer pan/zoom control	Remote more directional
Manual focus possible	No audio tracking
Second camera angle	Fewer presets



Figure 30: Document Camera

7.2 Document Camera

The document camera (a Sony Video Presentation Stand) allows high-video-quality presentations to be made easily from materials in a wide variety of formats, including overhead transparencies, paper, or three dimensional objects such as circuit boards. It is particularly useful when high or variable magnification is needed, e.g. to show details of circuit boards, 35 mm slides, or very fine print.

To switch to using the Document Camera as your site's video source:

Press the NEAR button on the ViewStation remote control until the **Video Input Selection Menu** (Figure 27) appears at the bottom left of your TV monitor, then:

- Use the RIGHT ARROW button to highlight the **Document Camera** icon on this menu
- Press SELECT  to switch to the Document Camera video feed.

or

- Press the number button (usually 2) corresponding to the **Document Camera** icon on this menu

7.2.1 Document Camera Operation

- **Power** — black rocker switch at rear right of document camera
- **Lighting** — blue button at front right of document camera cycles through three settings: **none**, **front** and **back lighting**. **none** works surprisingly well providing the room lighting is diffuse, **back lighting** works well with transparencies and 35 mm slides.
- **Zoom** — **wide/tight** black buttons at front right offer a huge range of magnifications with good depth of field. This control allows you to show an enormous variety of visual aids during a meeting, from full page documents to 35 mm slides to hardware such as circuit boards, etc.
- **Pan** — joystick control
- **Video Feed** — grey buttons at front left, LED above button shows selection:
 - **Camera** selects document camera output,
 - **Video1** selects secondary video camera if this is connected through document camera.


7.3 Videotape

You can use a VCR connected to your site's ViewStation either to record your video conference or to present pre-recorded video material as part of your video conference.

If recording, the VCR will record whatever video and audio signals were appearing on your site's main monitor during the conference.

If playing tapes, both audio and video from the VCR are sent to all sites. To play a tape in the VCR, press the NEAR button on the ViewStation remote control until the **Video Input Selection Menu**

appears at the lower left of your TV monitor, then:

- Use the RIGHT ARROW button to highlight the **VCR** icon on this menu, then press
- SELECT  on the remote, or
- Press the number button (usually 3) corresponding to the **VCR** in the menu
- Once the Polycom has switched to the VR video feed, use the VCR's remote control or control panel to play the tape.

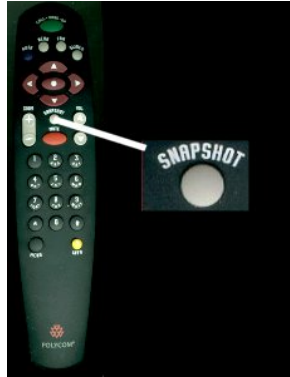


Figure 31: Snapshot button

7.4 Video Snapshots

You can send a still frame from any of your site's local video sources to the other site(s) using the SNAPSHOT button on the ViewStation remote control.

This mode lets you send snapshots from one camera and live video from another *simultaneously*. It is therefore very useful for video presentations. Far sites can see the presenter continuously on one monitor and the snapshot frames on the other. Single snapshots also make small fonts easier to read at the far site(s).

To initiate snapshot mode:

- Press the SNAPSHOT button
- Select a camera by number using the numeric keypad on the remote unit
- Position/zoom the selected camera as required
- Press SNAPSHOT again to send the image to the other sites.

Once the snapshot mode is enabled, a far site will see your still frames on the monitor that normally shows its own outgoing signal, and your live video on the monitor that normally shows its incoming signal. Their own outgoing video will be displayed in a small picture-in-picture screen on their incoming signal monitor, after a few seconds.

If you pick up your ViewStation remote while you have initiated snapshot sending, there will be a still camera icon at the top right of your incoming signal monitor, and an icon representing the video source whose frames are being sent as snapshots at the top left. If your live video is coming from the main (ViewStation) camera, your own live video signal will also appear in a picture-in-picture window on your incoming signal monitor. (Both displays end if you put the remote down.)

This mode is initiated by the site that sends the snapshots. It can be cancelled at a receiving site by activating that site's NEAR camera. Receiving sites will therefore lose the currently displayed

snapshot if they adjust their own cameras while snapshots are being sent. The first new snapshot arriving from the sending site will re-establish snapshot mode at the receiving site, however. The mode also times out at the receiving site(s) if the snapshot does not update for several minutes.

The site that is sending snapshots can switch to NEAR camera control without affecting the current snapshot display at the far site(s) (a) in calls placed through the hub or (b) when the sending site's secondary camera is the one providing the live video. If two ViewStations are connected in a point-to-point call and one is sending live video from its *main* camera, both sites enter normal video display mode if the sender switches to NEAR camera control. (Note that the sender does not need to do this in order to view its outgoing video signal, as that is available in the picture-in-picture preview in this setup).

8 Document/Data/Presentation Sharing In Video Meetings

There are many ways to share documents, data, or presentation materials during a video conference. Those requiring the least advance preparation usually produce the poorest results at the far end, so meeting organisers need to determine what is the best tradeoff for their needs.

The simplest approach is to use the video conferencing system's video camera or document camera to send a video image of the material, but if the document or presentation exists in digital form there are much better alternatives *if you are prepared to do some extra work* to set them up.

Alternative approaches that can produce better displays of the information in the far rooms while requiring less camera work in yours are:

- Send the documents or presentation digitally to all participants before the meeting so they can print them locally or display them on local computer monitors or LCD projectors. Remote sites can then use your video just to see people in your room and to verify which slide or document is being shown there.
- Computer to computer screen sharing over the NRAO Intranet that slaves a computer in each of the far rooms to the one that is hosting the presentation. Far sites can then view the presentation on a large-format projector screen at the same resolution as the one in the originating room, and stay synchronized to the originating computer at all times
- Computer to computer screen sharing through a commercial web-based service outside the NRAO, such as WebEx or MyMeeting. This produces results similar to the above but is more suitable for large meetings where many sites connect to the commercial hub, and for mixed NRAO and non-NRAO access to the meeting presentation.
- Computer to TV screen sharing through the video conferencing system using Polycom People Plus Content software in the rooms that are equipped for this. This is a higher-resolution alternative to using the video camera to capture the presentation, but still suffers from some of the disadvantages of display on a TV system at the far end.

The merits and problems of each approach are summarized below.

8.1 Video Camera

The approach requiring the least setup *before* a meeting is to project documents, visual aids, Powerpoint presentations etc. onto a screen in the live meeting room and to point the video camera at that screen as needed during the meeting. This has the advantage that you can show a presenter and their presentation in the same video frame, which may be important when someone is using a pointer to draw attention to details in the presentation. It also works seamlessly for showing people, still presentations, and animations or movies. This method (or use of a document camera) is also the only practical approach for sharing a presentation that uses overhead projector transparencies.

The main drawbacks to viewing a document or presentation through the video camera are:

1. loss of resolution by converting the information into a TV signal, and the addition of a video camera's color table response, both of which may make information hard to read at the far sites, regardless of the size of the far TV,
2. information may be harder to read across a large room when displayed on a smaller TV screen simply because the TV screen subtends a much smaller angle than a projection screen, and
3. you may need to enlist a helper to pan, tilt and zoom the camera in the originating room to overcome the above issues by zooming in on small-format material when appropriate; this helper may need to understand the format and content of the presentation to do this effectively.

8.2 Email/FTP

Distributing a digital document or presentation to participants by email or by placing it in an ftp area before the a meeting lets them read it in parallel with the presentation using whatever method is most convenient for them - paper copies, local computer screen(s) or LCD projector, etc. This approach only works well for materials that are not being changed until the last moment. It has the advantage that you do not need to set up a second real-time connection outside the video hookup in order to share the materials.

8.3 Computer screen sharing over the NRAO Intranet

You can send a digital document or presentation to participants in real time using a network-based computer screen-sharing facility such as Microsoft Netmeeting or its browser-based replacement Microsoft LiveMeeting. This approach requires you to establish a separate digital collaboration channel between computers at all of the participating sites in addition to the video conference call. It then permits (a) late, or even live, changes to the documents or presentations and (b) interaction with the documents from several sites during the meeting using the collaboration software.

For example, a software demonstration or tutorial could be shown “live” at all sites in large format using their LCD projectors, in parallel with video and audio from the video conferencing system. The remote desktop control capability the remote participants to interact with a document or a program running at the originating site,

8.3.1 NetMeeting

MicroSoft Windows NetMeeting is a tool for real-time PC-to-PC screen sharing and for remote control of Windows PC’s across the network. It can be used in parallel with the main video conferencing system so that any site that has connected to the NetMeeting session can *share* a computer display or application with all of the other sites. If you also allow *control*, sites can both see and *use* the programs at the other sites.

When you execute NetMeeting on your site’s PC, you will see the interface shown in Figure 32.

To communicate with another site, first establish audio communication with that site and have them start their copy of NetMeeting. As you cannot change the computer’s display resolution or color depth when NetMeeting is running, it is best to set all computers that will participate in a NetMeeting presentation to the same display resolution and color depth before running the software.

Then click on the **Place Call** button, enter the IP number of the far PC (the pull-down menu to the left of this button remembers recently-called IP numbers), and click **Call**. The far site will see an “incoming” prompt and must **Accept** your call (unless it has been configured to accept NetMeeting calls automatically). The **Name** window will display the user names at both sites once the connection has been made.

Open any application that is to be shared between the sites, then press the **Sharing** button to bring up a menu of running applications. Click on those you wish to share. The far site will open a new window displaying that application. Its display will be identical to yours only if you set the resolution and color depth identically before starting NetMeeting.

Using Remote Desktop Sharing, sites can access a computers shared desktop. The first time that Remote Desktop Sharing is used, it must be initiated by an administrator for that machine. Once connected, they can work in the host’s shared desktop with any program that the host computer has access to. Only one site can be in control of a shared program at a time. If **controllable** appears in the title bar of the shared program window, the site who shared the program has control now but is allowing others to work in the program. If the mouse pointer has a box with initials, then another site has control of the program.

All sites can share programs during a meeting. The shared programs of each site appear in separate shared program windows on the other sites’ desktops.

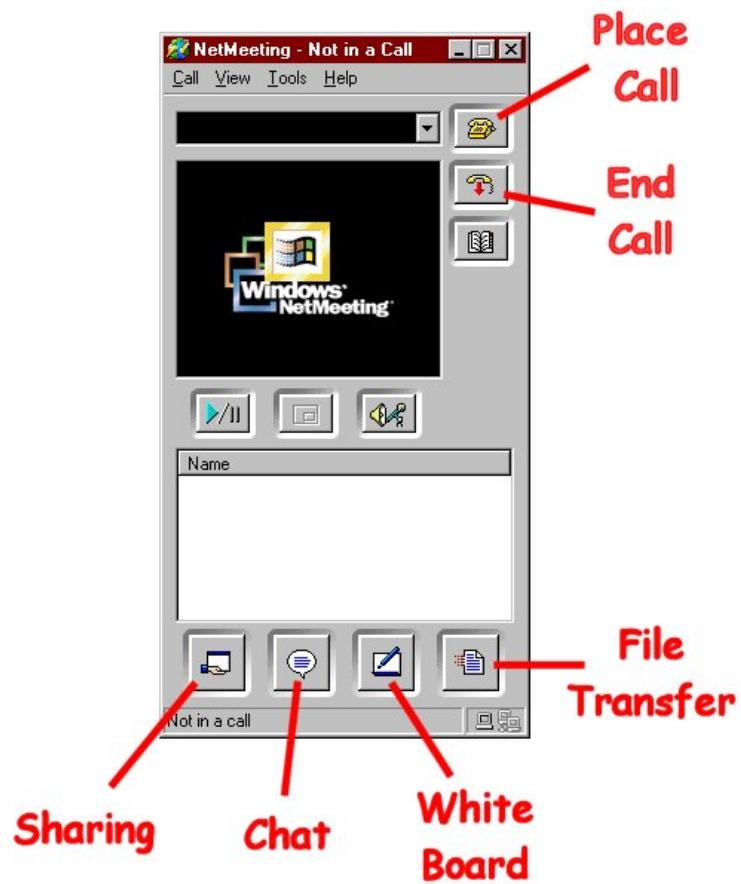


Figure 32: NetMeeting interface

A **Chat** feature in NetMeeting lets all sites type messages for the others to see.. If any site in a meeting runs **Chat**, a shared Chat window appears on all other sites' screens. (This might also be used during a video conference for backchannel communication, e.g. about audio or video difficulties, without intruding on a meeting's discussion.) NetMeeting Chat files can be saved, e.g. as HTML, for use after a meeting as appropriate.

Whiteboard lets everyone in a meeting draw and type simultaneously, but the mouse-based interface is awkward for anything beyond very rough sketches. It is probably simpler to send sketches from a conventional whiteboard with a video camera, or from paper using the document camera. Whiteboard items may however be emphasized with a Highlighter or Remote Pointer, and you can copy and paste items between the Whiteboard and other programs if you want meeting participants to see particular items without sharing access to your site's entire desktop.)

It is also possible to send a file to the other sites during a NetMeeting session:

- Click the **Transfer Files** button.
- In the File Transfer dialog box, click the **Add File** button, and select the files you want to send.
- Click the name of the site you want to send the file to, or click **All** to send it to all sites in the meeting.
- Click the **Send All** button.

To specify where to save received files:

- Click the **Transfer Files** button to open the File Transfer dialog box.
- On the File menu, click **Change Folder**, and then click the folder where you want NetMeeting to save received files.

To receive a file, click **Accept** and close the dialog box.

Click the **End Call** button to terminate a NetMeeting session.

NetMeeting is a freely distributed MicroSoft product that is included with their more recent operating systems, but is being phased out in favor of the browser based LiveMeeting service. It is well suited to point-to-point screen sharing (two sites in the meeting) but may not scale well to many-site meetings.

8.4 Computer screen sharing over the commercial Internet

Several commercial services (*e.g.*, Webex.com and MyMeeting.net, offer subscription-based web hosting of presentations with a passworded conferencing capability. Documents or presentations must be uploaded to their server before the meeting and participants must be told where to point the web browser of a computer in each of the meeting rooms. The presentation is then hosted in that server and shared over the commodity Internet, not the NRAO Intranet. These facilities vary in ease of use and interactivity but may be well suited to meetings that involve sites outside the NRAO. The video conferencing system is then used only to show people and transmit audio.

8.5 Computer screen sharing using high-resolution video

Some NRAO video conferencing systems (those with VSX or FX systems) can support TV displays capable of showing a computer screen at XGA (1024 by 768) resolution. It is then possible to share the content of a computer screen with a high-resolution TV display at the far end across the video conferencing link using Polycom's **People Plus Content** software. In rooms which have been equipped for this capability (ER-230, ER-311 and SO-conf will be equipped for it early in 2006) this

may be a good compromise between ease of use and quality of the end result. Further instructions for using the People Plus Content facility will be provided as soon as we have gained some in-house experience with it.

8.6 Computer screen sharing using normal video resolution

Polycom has two older tools for capturing PC presentations to standard video resolution as video “snapshots”. These tools do not overcome the resolution issues of “through-the-camera” video capture of a document or presentation. They merely eliminate the use of the video camera and its color table to obtain the video image of the digital information.

8.6.1 PolySnap

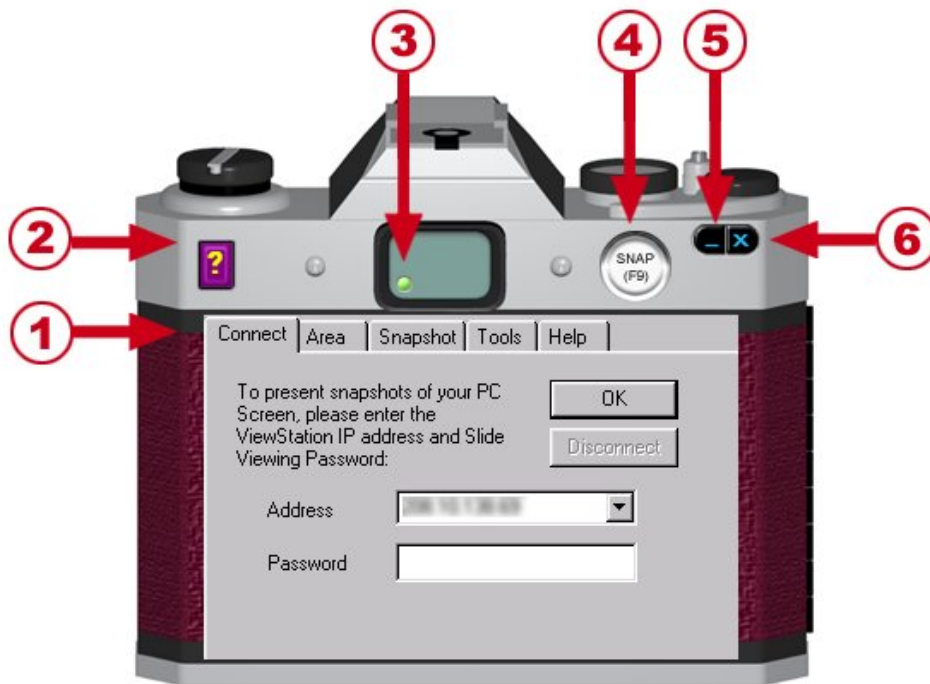


Figure 33: PolySnap interface

Polycom provides a PC-hosted utility, **PolySnap**, for acquiring single or multiple video snapshots from a Windows PC that is connected to a ViewStation over the network, and transmitting them to all sites in a video conference exactly as if they were snapshots from a video camera at the originating site.

The area to be captured is user-definable, and you can elect to send a new snapshot whenever the contents of the area being captured change. **PolySnap** is therefore a particularly simple way to automate sending a PC-based presentation to all sites in a video conference.

There is a short delay while each screen capture is processed into video and transmitted to the ViewStation.

When you run **PolySnap** on the PC, you see an interface based on the back view of a camera (Figure 33).

1. Each tab (**Connect**, **Area**, **Snapshot**, **Tools**, and **Help**) contains information related to the tab's title. Click on a tab to display its contents.
2. Click on the question mark to open the online help
3. The green light in the "viewfinder" indicates that the PC which is running **PolySnap** is connected to the ViewStation. If the light in the viewfinder is red, the PC is not connected to the ViewStation.
4. Click on the **Snap** button, or press the **F9** key to take a snapshot of the PC screen or area that is currently defined.
5. Click on the blue underscore (_) to minimize the camera interface onto the Windows toolbar.
6. Click on the blue **X** to exit from **PolySnap**.

To connect the PC to the ViewStation, click on the **Connect** tab, enter the IP address of the ViewStation, and the Slide Viewing Password (get this from your site's video conferencing support staff). You will see the message

Connecting ... collecting System Info

then the light in the viewfinder should turn green. Hitting **Snap** on the camera back or **F9** on the PC keyboard will send a snapshot to the selected ViewStation (or begin an automatic snapshot-sending sequence).

The **Area** tab lets you elect to send the capture the full screen, a user-defined area, or a particular application window.

The **Snapshot** tab lets you elect to send a single snapshot, a timed series of snapshots, or an automatic snapshot whenever the capture area changes.

The **Tools** tab lets you elect to send sound effects, change the language of the help display, or update the software.

The **Info** screen tells you basic information about the ViewStation to which you are connected.

PolySnap is free, available from \\Eagle\TechSupport\Videoconf\polycom, or from Polycom's video software download site⁸.


8.6.2 Powerpoint Slides on the ViewStation

The ViewStation has a built-in web server that lets you present still slides (but not animations) from a MicroSoft Powerpoint presentation on the video monitors using a browser-based interface between the ViewStation and a PC.

The dialog between the PC and the ViewStation is managed by **pcPresents**, a software package that stores thumbnails of your slides in the ViewStation's flash memory so that the presentation can be controlled from the Polycom remote. Several different presentations may be loaded and named for use during a meeting. The PC must remain connected to the ViewStation via a web browser during the meeting. Slides presented in this way will be seen at the video resolution (small fonts will be hard to read) but with good color matching to what is on the PC's monitor.

- Write the Powerpoint presentation to a hard disk that is accessible from your site's video conferencing PC.
- On that PC, open the **Internet Explorer** browser configured to accept cookies and for **Low security** on the Intranet. (Unfortunately, neither Netscape nor higher security levels work adequately with the current Polycom/Powerpoint interface but we expect this to improve with later releases of the software).
- In the URL field, enter **http://** followed by the IP address of your ViewStation (see Table 1). The **Welcome** web page for that video system should appear.

⁸<http://esupport.polycom.com/downloads/video.html>

- Click on the **Select a Presentation** icon. A web page should appear including a button **Press here to Select a PowerPoint Presentation**
- Click on this button to obtain a **pcPresents** application window on the PC. This will prompt you for a user name and password that has been established for your ViewStation (get this from your local video conferencing technical contact person). Enter this information and press **OK**.
- A window will appear asking you to define a name and a password for the slide show. Assign a name that is meaningful to you, leave the password field blank, then click on the **Please Press Here to Select a Presentation** button.
- You will be presented with a File Management window for the disk(s) accessible from the PC. Use this to find and select your presentation file.
- Click on the **pcPresents** button to load the thumbnails from this presentation into the ViewStation.
- Pick up the ViewStation remote control and press its **SLIDES** button
- Select your presentation from the list of available titles, leave the password entry field blank again, and press **SELECT**  on the remote control.
- Thumbnails of your slides will appear on the TV monitor. Use the **ARROW** buttons to point to the slide you wish to start with, then press **SELECT** again.
- The slide will be displayed on the monitor that shows your local (**NEAR**) video signal monitor. You should also see a slide icon with **BACK** and **FORWARD** arrows at the top right of the monitor showing your far video signal.
- Use the **BACK** and **FORWARD** arrow buttons on the remote control to move back and forward through your presentation. Press the **UP** arrow button to go to the first slide of the presentation. Press the **DOWN** arrow button to go to the end of the presentation. Press **SELECT** to end the presentation and return to sending live video. Press **SLIDES** to select another presentation.

This Powerpoint utility predates **PolySnap** (Section 8.6.1) and is significantly more cumbersome to use. Its main advantage is that the slide presentation can be controlled entirely from the remote control and that it avoids the time delay associated with processing the computer screen to video frames during the presentation.

9 Troubleshooting

The following tables suggest responses to situations that may create problems during video conferences.

- Table 3: audio difficulties.
- Table 4: video difficulties.
- Table 5: automatic voice tracking.
- Table 6: general system issues

Table 3: Audio Troubleshooting

Symptom	Cause	Solution
Low volume during call	Volume set too low on ViewStation.	Turn up ViewStation volume using the remote control.
	Volume set too low on TV monitor.	Turn up volume on TV itself using VOLUME+ button above TV screen.
No audio in call	Far site muted.	Ask far site to un-mute.
	Too many line errors.	Hang up call and reconnect.
	Monitor audio input not connected.	Check audio output using Generate Tone in Diagnostics Menu .
	ViewStation connected to wrong audio input on monitor.	Connect to correct input.
Near Mute Icon on all the time	Your site is muted.	Un-mute with button on remote or in center of microphone pod.
	Microphone not connected properly.	Check microphone connection. Note that microphone cable should not be longer than 60 feet.
Echo heard at your site when speaking	Echo can be caused by a <i>far</i> site if their microphone is too close to their audio (TV) speaker for your site.	Ask far site to move microphone away from their audio speaker or to turn down hardware volume setting on their TV/speaker
	Far site software audio volume may be too loud.	Ask far site to turn down their audio volume using their Polycom remote control.
Sporadic echoes from far site at your site	Line transmission errors can jumble audio packets and confuse software; video may also be jerky or frozen if this happens.	If persistent, hang up call and reconnect.
Incoming call ringing or other sound effects too loud	Sound effects volume selected too high in Setup Audio Menu .	Go to Setup Audio Menu and change level. If persistent (0 will turn off all sound effects).

Table 4: Video Troubleshooting

Symptom	Cause	Solution
No picture on TV monitors	System goes into sleep mode after 10 minutes of inactivity	Pick up the ViewsStation remote control to wake up system.
	TV monitors are powered down.	Turn on TV monitors with POWER button to right of row above screen
TV monitor shows broadcast signal	TV was tuned to broadcast channel by previous user.	Press TV/VIDEO button at left of row above TV screen to select local video input.
Same picture on both monitors	Both monitors connected to same output (pictures <i>identical</i> in quality).	Monitor 1 has two outputs (composite and S-video). Make sure Monitor 2 is connected to the Monitor 2 connection, not one of these.
Picture freezes often during call	Line transmission errors.	If persistent, try hanging up and reconnecting.
	Polycom ViewStation problem.	Rare condition. Power cycle your Polycom ViewStation and place the call again. If this does not clear up the problem, tell your site's video conferencing technical contact.
Picture slow/jerky and/or lightning bolt icon to left of TV monitor	Too much motion in picture you are receiving, or network errors, or another site is joining your meeting in progress.	Observe if situation improves when there is less motion at far site, or less network traffic. If problem persists, tell your site's video technical contact.
Blue screen on TV monitor	No video input.	Check that there is a video source on selected input.
	VCR input selected while VCR idle or not running (many VCR's generate a blue screen when no tape is playing).	Select different video input or play a tape!
View from near camera does not pan or tilt	Your are trying to move the camera with the wrong remote.	Only the main camera is controlled by the ViewStation remote. Secondary cameras have their own controls. Check which camera and remote you were using.
	You have selected FAR camera control from the ViewStation remote unit.	Select NEAR camera control.

Table 5: Voice Tracking Troubleshooting

Symptom	Cause	Solution
Camera does not attempt voice tracking	Automatic camera tracking was turned off by you or by far side in a point-to-point call.	Camera tracking is turned off if you or the far site adjust your camera manually. Press AUTO button on the ViewStation remote to restore auto tracking.
	Far site is speaking or noisy.	The camera stops tracking when the far site is loud, to prevent the camera from seeking your own speaker.
	Your site is muted.	Un-mute your site
Camera tracks erratically	Near site is too noisy.	Reduce noise in the room
Camera points to ceiling or wall away from speaker	Echo or steady noise source	Room acoustics may be too confusing for camera tracking, or steady noise source, e.g. air conditioning vent or fan, in that direction.

Table 6: System Control Troubleshooting

Symptom	Cause	Solution
System does not go into sleep mode between meetings	The system enters sleep mode only when showing the Polycom Top Menu.	Leave the ViewStation at Top Menu level between meetings (press MENU on the remote until Top Menu is reached).
System does not respond to the remote control	No batteries, or incorrect battery sense, in the remote.	Insert batteries with correct +/- position. Green light at front of ViewStation should blink with each button press on the remote.
Low battery icon on screen	Low battery in the remote.	Replace AAA batteries in remote.
Slow blinking green light at front of ViewStation	System is in sleep mode.	Normal state for sleep mode. System will wake up on any incoming call or on any action from the remote.
Red light at front of ViewStation	The system is in a call.	Normal state when in call.
Green light at front of ViewStation	The system is awake but not in a call.	Normal state when not in call.
System starts in Software Update screen	System software corrupt or not loaded properly.	Ask video conferencing support staff to reload system software.

10 Video Conferencing Checklist

Here are some items to consider before, during and after a video conference.

Days before conference

- Reserve⁹ the video conferencing rooms. This is *essential*, as all the rooms are in demand and often cannot be obtained at short notice.
- Notify conference participants about arrangements, including dial-up instructions (e.g., "all sites call NRAO hub", or who will call who if a point-to-point call). Will you need to mix video and telephone-only sites?
- Consider use of visual aids to enhance the meeting ... will you use auxiliary cameras, special camera presets, additional microphones, computer connections?
- Consult with your site's video conferencing technical contact¹⁰ people if you require technical assistance before or during your meeting.
- Arrange for someone at each participating site to carry out the pre-conference checklist below

Minutes before conference

- Check your site's camera presets and test any other special video setups to be used.
- Check that your site's microphone placement is appropriate for your meeting/presentation.
- Establish connections a few minutes early, check video and audio quality at participating sites.

During conference

- Introduce participants at your site to those at other sites if necessary (not all NRAO employees have had a chance to meet each other outside the video conferences).
- Mute your site's audio when listening to a long presentation from another site during a *multi-site* conference (otherwise a sidebar discussion at your site may interrupt another site's reception of video from the presenting site).
- Pan/zoom your camera to show any speaker at your site who makes extended comments or gives a presentation (automatic voice tracking is also available).

After conference

- Report any problems or difficulties encountered at your site to its video conferencing technical contact people.
- Report any problems or difficulties with signals from *another* site to your colleague(s) there, or to *its* video conferencing technical contact people ... some problems, e.g. poor audio or video quality, may not be apparent at the originating site and will persist until someone speaks up about them from another site.

⁹<http://www.nrao.edu/internal/doc/videoconfreserve.shtml>

¹⁰<http://www.nrao.edu/internal/doc/videoconfreserve.shtml>

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