A Phone Patch for CU-SeeMe Packet Video
(modified for public distribution)

Overview

A phone patch is a circuit that takes a telephone line, a twisted pair which carries information in both directions, and provides separated, line level, audio input and output connections which can be used by a computer and CU-SeeMe. Predictably, hybrid CU-SeeMe/POTS (Plain Old Telephone System) conferences don't work well when microphones are simply dangled in front of speakers. There are feedback loops which interfere with full duplex communications.

As configured at SLAC, the CU-SeeMe Mac/Phone Patch requires its own telephone line which calls into the telephone conference. The Mac should not have its speakers or microphone enabled; this would produce a feedback loop as the Mac sits in the same room as a telephone speakerphone used in the conference. The Mac should do all of its ‘audio I/O’ electronically through its audio input and output connectors. Participants in the SLAC conference speak and listen only through the telephone speaker phone. A pleasant value added feature that comes from having the CU-SeeMe Mac/Phone Patch physically present in the conference room at SLAC is that telephone participants in the room can see the CU-SeeMe participants on the Mac screen, and CU-SeeMe participants can see the telephone participants at SLAC when the SLAC V-Tel system cameras are used to send a video feed to the CU-SeeMe Mac/Phone Patch.

Plugging in the Phone Patch

The front panel of the phone patch is shown in Figure 1. The patch requires +12V power which is provided with a Radio Shack power supply. The patch accepts a standard RJ-11 telephone connector. A real telephone should be located on the same line for dialing and testing purposes. The toggle switch can take the telephone line off hook (the equivalent of picking up the receiver on a normal telephone). Three LED’s are used to indicate when the patch has Power, when it is off Hook, and when the line is Ringing. The trapezoidal connector is not used. Audio connections are made from the side panel using RCA connector cables such as used in home audio systems. The audio output (input) of the patch should be connected to one of the audio inputs (outputs) of the Mac. Note that the Mac is equipped for stereo, but a telephone is monaural. Should this set-up be duplicated with a Mac without separate RCA audio connectors, audio I/O to the Mac is possible via the microphone and headphone 1/8 inch mini jacks in a less convenient manner.

Establishing a CU-SeeMe/POTS Connection

To establish the CU-SeeMe conference, connect the Mac CU-SeeMe client to the CU-SeeMe reflector being used for the conference. CU-SeeMe participants would connect to the same conference, either on the reflector or on a reflector which has been unicast-peered to that reflector. The phone patch/CU-SeeMe client should be set to transmit 100 ms sound packets using the Intel DVI (32 kb/s) audio codec (Figure 3) to maintain compatibility with all combinations of White Pine, Cornell, and vat clients on Windows, NT, Mac and UNIX platforms.
The microphone threshold settings in the Audio window shown in Figure 4 is important. These are the two horizontal, sliding bars to the right of the microphone volume. The effect of the very low setting of the lower threshold is to transmit all sounds received from the telephone conference when none is talking on the CU-SeeMe side. The very high threshold for the telephone conference takes effect when someone is talking on the CU-SeeMe side. A little of the CU-SeeMe sound which is relayed by the Phone Patch to the telephone side is presented back to the CU-SeeMe client by the patch due to cross talk. The high threshold setting blocks the crosstalked signal, at the cost of blocking the telephone conversation on the CU-SeeMe side when someone speaks on the CU-SeeMe side. This isn't a serious problem, since when everyone talks at once, information transfer is poor. Care should be taken to prevent a rogue CU-SeeMe client from transmitting continuous noise. The little diamonds beside the mike and speaker volume indicators are volume controls. To change the volume of CU-SeeMe participants as heard on the telephone, use the speaker volume control. To change the volume of telephone participants as heard by CU-SeeMe clients, use the microphone volume control. This should not need to be tinkered with once it has been set up, however speaker phone participants in particular should pay attention to speaking loud enough that all remote participants, telephone and CU-SeeMe can hear them clearly.

To establish the telephone side of the conference, use the telephone attached to the phone patch to dial into the telephone conference. Once the phone connection is established, flip the toggle to Off Hook and hang up the telephone. The telephone and CU-SeeMe connections can be established in either order.

When a conference is finished, the CU-SeeMe client should be disconnected from the reflector and the Phone Patch should be place on hook.

A $BaBar$ hybrid conference meeting is shown in Figure 5.

**Technical Information**

The board inside the Phone Patch is an autopatch interface for an RLC3 controller from Link Communications, a company that supplies the amateur radio community. Note that this is only the autopatch interface ($125 + $15 shipping as of early 1997) and not the controller itself which costs over $1000.

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Figures

Figure 6 shows the physical layout of the Link Communication board, and Figure 7 is a circuit diagram. Figures 6 and 7 are reproduced with permission, courtesy of Link Communications. To take the circuit Off Hook, the toggle connects pin 3 to ground. Audio In is pin 4, and Audio Out is pin 5. The LED’s on the board have been replaced with LED’s visible from the outside of the circuit housing.

Figure 5. BaBar Physics Analysis Meeting of July 15, 1997 with corporeal, telephone, CU-SeeMe, and nv participants.

Figure 6. Phone patch layout, ©Link Communications
Phone Patch/CU-SeeMe Cheat Sheet

Launch the CU-SeeMe application on the Mac and turn on the V-Tel unit if you will be using its cameras for a CU-SeeMe video feed. Connect Mac CU-SeeMe client to the reflector.

With the phone patch toggle 'on hook', i.e. toggle set away from 'off hook', pick up the receiver on the attached phone and dial into the telephone conference. After the connection is established, flip the toggle to 'on hook' and place the telephone back in its cradle. The phone patch will keep the line active. The CU-SeeMe and telephone portions of the conference have now been connected.

When your conference is completed, flip the phone patch toggle to 'on hook' to release the phone line, and disconnected the CU-SeeMe program from the reflector.

Note: this 'Cheat Sheet' assumes the phone patch and Mac have been properly connected, and some prior experience with CU-SeeMe. If there is a problem, please consult the videoconferencing support staff at SLAC. *BaBar Note 371, "A Phone Patch for CU-SeeMe Packet Video" may also be useful.*