MODIFYING THE SOUNDSTATION VIDEO INTERFACE ADAPTER

AN APPLICATION NOTE

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INTRODUCTION

Polycom created the Video Interface Adapter (VIA) to allow the SoundStation and SoundStation Premier to function as a high-quality voice terminal with a variety of videoconferencing systems. While the Video Interface Adapter is compatible with many video systems, it may sometimes be necessary to make internal adjustments to optimize its performance with a particular system. This paper describes the steps to successfully adapt the VIB to a particular system.

ELEMENTS OF SUCCESSFUL ADJUSTMENT

Because there is a wide variety of video conferencing systems available today, it is important to have a known good system, such as a Polycom VSX7000, available as a "far end." This allows the engineer to adjust the signal levels properly by having a remote user who can monitor the received loudness and who can produce a representative voice signal for listening at the near end.

PREPARING FOR CALIBRATION

1. *Confirm that the system is working properly.* Before making any adjustments, place a test call between the known good system and another video system using the standard audio interface, not the VIB or SoundStation. Verify that the known good system is properly set (loudness set correctly, attached TV set or audio system turned on, and so forth).
2. *Connect VIA and SoundStation to UUT.* The VIA appears to an attached video system as a replacement speaker and microphone. The "Line Out" jack from the VIA should be connected to a "Mic IN" or "AUX IN" audio connection in the video system, and the "Line In" should go to the "Speaker Out" or "AUX OUT" from the video system. The SoundStation's Wall Module or Unimod will plug into the "POWER" jack on the VIA, the SoundStation console cable will plug into the "CONSOLE" jack on the VIA. Finally (very important), be sure that the VIA switch

is in the "DIGITAL" position, or the SoundStation will be connected to its POTS telephone interface, not to the video system.

3. *Prepare VIA for calibration.* Depending on the signal paths that require adjustment, it may be necessary to change the values of the following resistors:
    a. *R3.* This is a 47.5k resistor that controls the signal strength from the video system to the SoundStation loudspeaker.
    b. *R6.* This is another 47.5k resistor, controlling the microphone loudness into the attached video system.

    For calibration purposes, either or both of these may be replaced, or placed in series or parallel with an adjustable resistor such as a potentiometer or a decade box. The wires should be kept short to minimize chances of spurious oscillation.
4. *Configure Video system for external audio.* Depending on the video system, there may be configuration controls that must be set for it to communicate with this external unit. There may be an internal/external microphone switch, for example, or software settings to enable this external function. An AUX OUT jack may have multiple functions and need to be set for "loudspeaker" function instead of "record out." Plug in all systems and turn them on.
5. *Place call to Unit Under Test.* Place a call between the known good system and the Unit Under Test (UUT), the video system that is connected to the VIA under calibration. Verify that some signal is audible, both send and receive. This may be very faint (gain too low) or very loud and distorted (clipping), but there should be some signal audible; the procedure following will correct the gains, but it will not produce audio where there is none to begin with. If no signal is heard in a direction, check all hardware *and software* switches and cables to be sure the signal should be getting through.

Setting the Receive Gain

Before adjusting the VIA gain, check all other gains in the receive path of the system. Video systems, especially PC-based video systems, will often have multiple places where the receive signal strength is controlled. The video system may have a "Volume" control in its software User Interface, plus a hardware knob control, plus a "Speaker" loudness control inside the "control panel" of its Macintosh, Linux, or Windows operating system. It is usually best to adjust each of these to the middle of its range. More than one engineer has been very frustrated by a lack of audio, only to discover after fifteen minutes of checking cables and tapping the far-end microphone that the loudspeaker path was muted within Windows itself.

With a live video call in process, turn on the SoundStation console and turn the volume to six clicks below maximum (press and hold the VOL UP button until the light stops flashing; this means that it is at maximum, and then tap six times to bring it down). This is about the middle of the range.

Once this is set up, have a talker speak at the far end. They should sit a normal distance from the microphone, about one meter, and talk in a normal voice. Adjust the receive

path resistor, R3, so that the SoundStation volume is acceptable. Loudness will be inversely proportional to the resistor value; the smaller the resistor, the louder the signal will be. This should not be adjusted beyond a range of about 10k to 200k, as noise and distortion may begin to creep in, but this allows adjustment from +14dB to -12dB, which should be ample.

After the nominal setting is made, turn the SoundStation volume up to maximum and confirm that the loudness is adequate.

Setting the Transmit Gain

Turn the volume back down to six clicks below maximum.

Before adjusting the VIA gain, check all other gains in the transmit path of the system. As before, there are often other adjustments that control the transmit gain. Set them all to midpoint. Be sure that the listener at the far end has turned their gains to nominal levels as well. The SoundStation console should be turned on and not muted.

Sit about a meter away from the SoundStation, and talk normally. Adjust the value of R6 until the far-end listener indicates that the loudness is acceptable. 10k to 200k, as before, is the allowable range, yielding gain variation, from nominal, of +14dB to -12dB respectively.

Completing the Process

Once the transmit and receive gains are set, place a few test calls to confirm that they are acceptable over a range of normal operation, using the SoundStation volume control and other gain controls in the system as appropriate. Once they are satisfactory, measure the value of the adjustment resistors and replace them with fixed resistors on the VIA circuit board, then close it up. Re-test the system to be sure nothing has changed. Confirm that the SoundStation behaves properly, without howling or clipping.

Congratulations! You are done!