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**Contribution to Turin Experts Meeting on Subjective and Objective Audiovisual Quality**

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**TITLE:** Single-Ended Multimedia Subjective Test of Desktop VTC Quality: Test Plan

**Abstract**

This contribution is the test plan for the subjective desktop video teleconferencing audiovisual experiment performed at the Institute for Telecommunication Sciences (ITS). The test plan is provided for those who are interested in the specific details of this test.

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# Single-Ended Multimedia Subjective Test of Desktop VTC Quality: Test Plan

## 1. Purpose of Subjective Test

This test will generate subjective performance data for representative desktop video teleconferencing (DVTC) applications. Objective DVTC models that produce objective performance data can then be designed using this subjective performance data.

This test will include typical DVTC equipment such as a computer monitor and desktop computer speakers, but it will take place in an acoustically isolated chamber. The audio and video will be processed through several representative DVTC configurations.

This test will consist of three individual sessions, a video only test, an audio only test, and a combined audio/video test. That is, subjects will see and subjectively rate the performance of the video only, hear and rate the audio only, and then see and hear the audio and video and rate the overall performance of the audio/video material.

## 2. Experiment Test Factors, Design Parameters and Processing Conditions

The test will use typical VTC configurations and test scenes. Because the test sessions are limited to 16 minutes (see section 0), the test is constrained to include eight processing configurations. Table 1 lists the factors of this test, including audio and video algorithms. Note that the audio rate varies from 8 Kb/s @ 4 KHz bandwidth to 64 Kb/s @ 7 KHz bandwidth (G.722). The video rates span the range from 64 Kb/s to 1472 Kb/s (T1 aggregate rate with 64 Kb/s audio).

Table 1 Test Factors

Factors	Levels
Audio coding	Codec A proprietary 8kbit/s, G.728 (16), G.711 (64), G.722(64)
Aggregate Bit Rate	128, 384, 1536 kb/s
Video coding mode	Codec A proprietary, Codec A QCIF (H.261), Codec B QCIF (H.261), Codec B CIF (H.261)
Motion Compensation	Off (Codec A), on (Codec B)
Window Size	1 (fixed)

Table 2 lists the design parameters in this test. A source tape in the component BetacamSP format will be used as input to each of the eight processing configurations. Both the input and output of the configurations will be composite (NTSC) video, because this is a likely format to be used by DVTC users. Because we wanted to remove delay as a factor in the audiovisual quality rating, the audio was delayed such that the audio and video were synchronized. The delay was fixed for each condition, and it is listed in parentheses in Table 3. The NTSC output of the configurations will be recorded in BetacamSP format and played back to the subjects in s-video (component Y/C) format (see for a block diagram detailing video formats). The video will be input to a PC overlay card and displayed on a PC monitor for the subjects to view. The audio will be delivered via typical PC speakers. The performance ratings will be gathered using the absolute category rating (ACR) method for all three sessions.

The six scenes were selected as representative examples of typical VTC scenes. The scenes vtc1nw and smity2 consist of one person (vtc1nw has very little motion, and smity2 has a moderate amount of motion). The scene vtc2 has one person with graphics (a map). The first portion of this scene has little motion, and the second portion of this scene has a camera zoom that creates a lot of motion. The scene 5row1 has five people sitting around a conference table. And filter and washdc are two graphics-related scenes.

Each of the six scenes will be run through each of the eight processing configurations. Each of the 18 subjects will be presented all 48 conditions in each session. However, one of six rating session orderings (e.g. video only, audio only, audio and video or audio only, audio and video, video only) will be presented for 3 of 18 subjects (see section 2.3).

**Table 2 Test Design Parameters**

Design Parameter	
Type of test	ACR, in 3 sessions, video only, audio only, and combined audio/video
Video editing format	Best available <sup>2</sup>
Codec video I/O format	NTSC
Video playback format	S-Video
Scenes	5row1, filter (dub 1 talker), smity2, vtc1nw, vtc2, washdc (dub 2 talkers)
Viewing device	Sony 17" PC Monitor
Viewing distance	Approximately 4-8 times the video window height
Listening device	PC Multimedia speakers
Randomizations	3 <sup>3</sup>
Subjects	18, chosen from ITS staff.

The specific processing conditions listing aggregate bit rates, resolutions, and audio algorithms are listed in Table 3.

**Table 3 Test Processing Configurations**

Condition Number	Parameters
1	NTSC source video (0 ms)
2	1536 Kb/s, Codec B <sup>4</sup> CIF, G.722 audio <sup>5</sup> (80 ms)
3	1536 kb/s, Codec A proprietary, G.722 audio (16 ms)
4	384 kb/s, Codec A QCIF, G.711 audio (100 ms)
5	384 kb/s, Codec B CIF, G.722 audio (120 ms)
6	128 kb/s, Codec B QCIF, G.728 audio (200 ms)
7	128 kb/s, Codec A QCIF, G.711 audio (144 ms)
8	128 kb/s, Codec A proprietary, 8kb/s audio (30 ms)

**2.1. Test Duration**

Each session of the test is 16 minutes long (6 scenes × 8 configurations × 20 seconds/scene-configuration). There are three sessions to the test, totaling 48 minutes of test time. With 5 minutes of training, and 5-10 minutes between each session, each subject should be finished in just over one hour.

**2.2. Allocation of Scene and Clip Numbers**

The scenes are numbered as follows:

- 1) 5row1, 2) filter, 3) smity2, 4) vtc1nw, 5) vtc2, 6) washdc.

When the scenes are processed through the 8 configurations, this yields 48 clips for voting. The clips are identified as shown in Table 4.

<sup>2</sup> See Figure 1 for block diagram specifying video formats.

<sup>3</sup> See section 0 for detailed information.

<sup>4</sup> In all processing conditions using Codec B, it will run with the default value for motion compensation, the default value for audio volumes, echo suppression will be off, and the frame rate will be set to "best".

<sup>5</sup> Some configurations of audio and video with Codec B required a negative audio delay for proper A/V synchronization. We were unable to produce this. Thus, for audio associated with Codec B, the coding was done using stand-alone audio coding hardware. Codec B was coding audio to insure accurate video coding rates, but the coded audio was not recorded. See Figure 2 for schematic details.

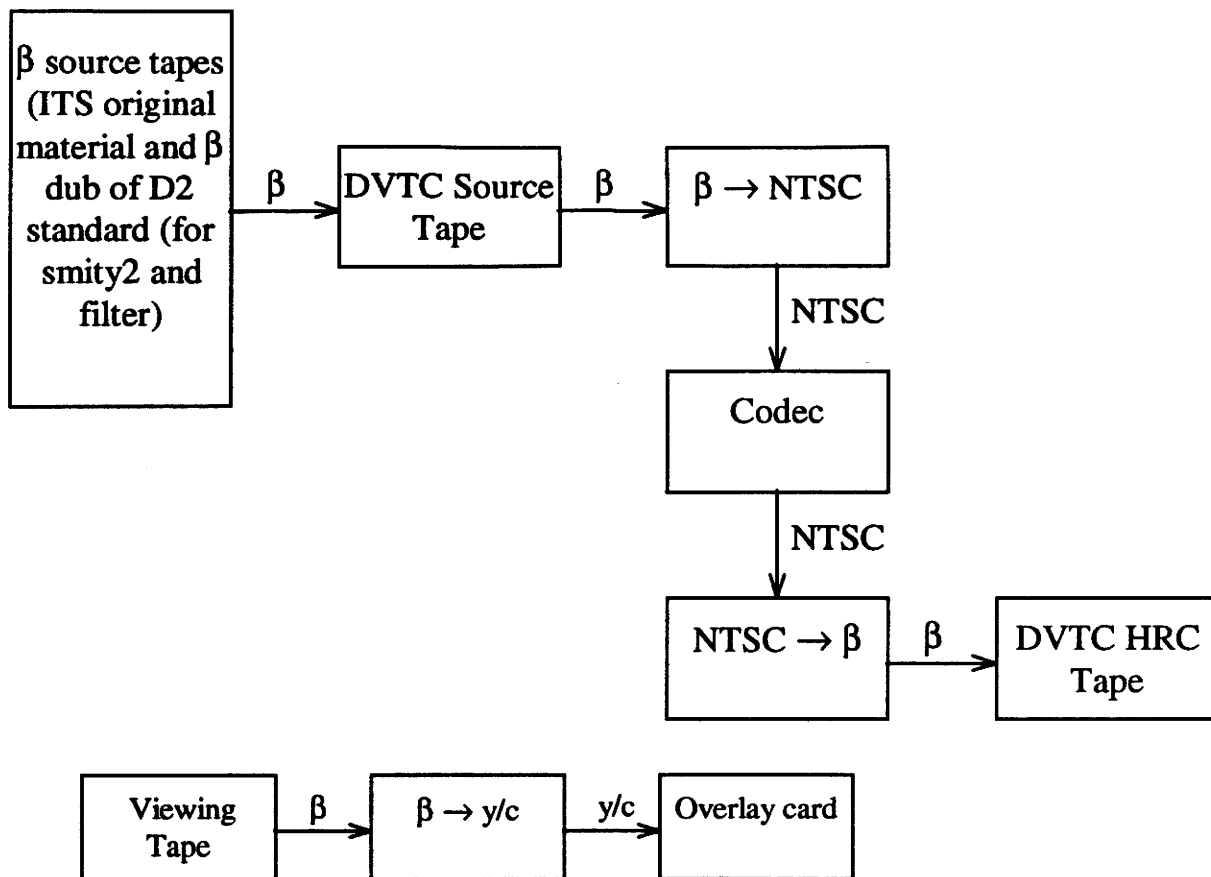
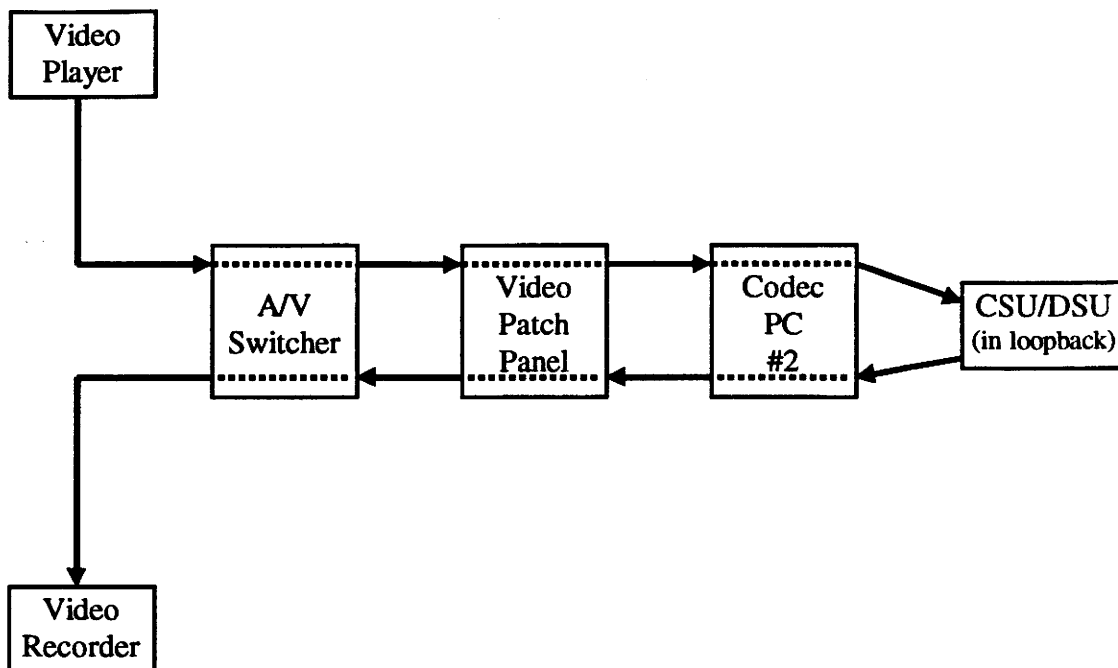


Figure 1 Video Format Diagram

Video Path:



Audio Path:

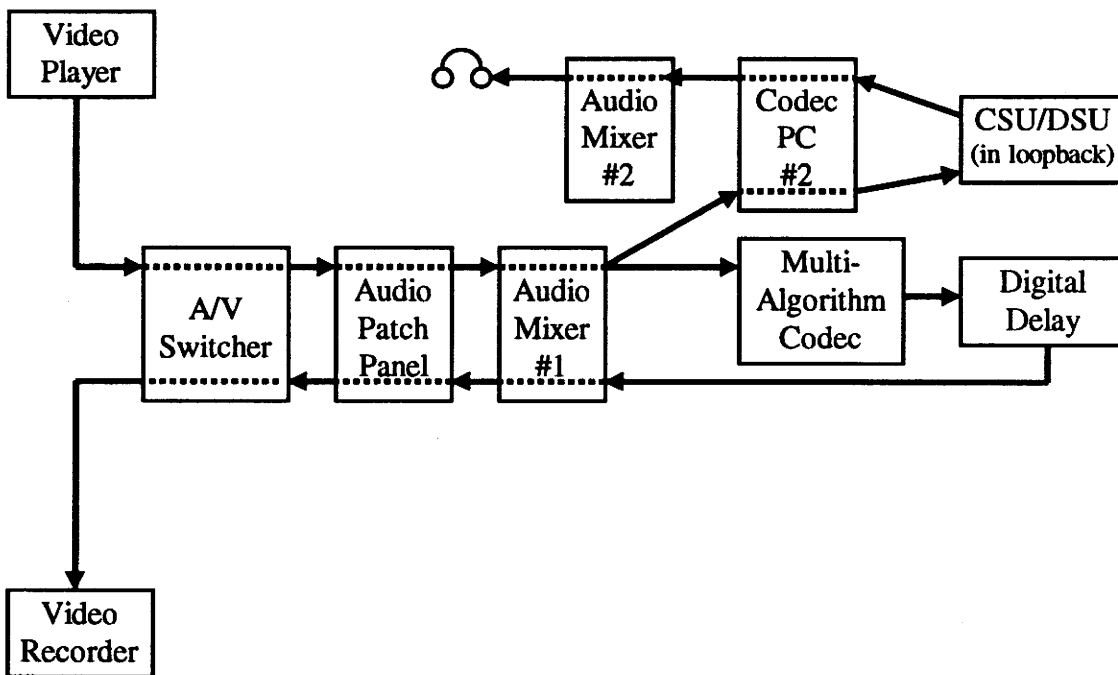


Figure 2 Video and Audio Paths for Codec B Conditions

**Table 4 Relationship between scenes, configurations and clip numbers.**

Clip	Configura tion	Scene	Clip	Configura tion	Scene	Clip	Configura tion	Scene
1	1	1	17	3	5	33	6	3
2	1	2	18	3	6	34	6	4
3	1	3	19	4	1	35	6	5
4	1	4	20	4	2	36	6	6
5	1	5	21	4	3	37	7	1
6	1	6	22	4	4	38	7	2
7	2	1	23	4	5	39	7	3
8	2	2	24	4	6	40	7	4
9	2	3	25	5	1	41	7	5
10	2	4	26	5	2	42	7	6
11	2	5	27	5	3	43	8	1
12	2	6	28	5	4	44	8	2
13	3	1	29	5	5	45	8	3
14	3	2	30	5	6	46	8	4
15	3	3	31	6	1	47	8	5
16	3	4	32	6	2	48	8	6

**2.3. Randomization**

For this test, there are three randomizations (A, B and C) of the test material generated. Randomizations were generated using the randperm function of Matlab™ and are shown in Table 5. There are also three rating sessions: video only (V), audio only (A), and audio and video (AV). Each subject will observe the three randomizations in the order A, B, C (thus, randomization order will be fixed). Each listener will be presented one of six rating session orderings (e.g. V, A, AV or A, AV, V). Table 6 shows the assignment of listener number and rating session presentation order to the sequence of subjects that will participate in the experiment. To help interpret Table 6, assigned subject number 1 will be the 16<sup>th</sup> listener in the sequence of listeners and will view video only (V) for randomization A, will hear audio only (A) for randomization B, and will see and hear audio and video (AV) for randomization C. By contrast, the 1<sup>st</sup> subject in the sequence of subjects will be assigned subject number 14 and will see and hear audio and video (AV) for randomization A, will hear audio only (A) for randomization B, and will view video only (V) for randomization C.

**Table 5 Clip presentation order for randomizations A, B and C**

Presentation order	Clip number for Randomization:			Presentation order	Clip number for Randomization:		
	A	B	C		A	B	C
1	14	8	46	25	41	36	2
2	16	18	47	26	1	2	28
3	12	16	15	27	28	41	6
4	44	14	19	28	4	1	45
5	48	21	4	29	34	28	44
6	11	11	29	30	39	30	22
7	38	17	43	31	30	44	23
8	29	7	24	32	32	45	13
9	35	29	41	33	6	38	20
10	24	4	32	34	47	22	11
11	8	32	1	35	23	3	9
12	20	20	34	36	25	26	14
13	45	24	40	37	17	37	48
14	9	19	5	38	10	43	12
15	19	6	37	39	3	48	39
16	40	13	8	40	7	33	26
17	13	10	33	41	31	15	10

Presentation order	Clip number for Randomization:			Presentation order	Clip number for Randomization:		
18	21	42	30	42	22	9	7
19	46	25	18	43	5	31	36
20	26	23	38	44	18	27	16
21	27	39	21	45	2	12	27
22	37	34	3	46	33	40	25
23	15	5	35	47	43	47	31
24	42	35	17	48	36	46	42

**Table 6 Assignment of subject number and randomization sequence for each subject and each test session.**

Position in Sequence of Subject	Assigned Subject Number	Randomization A	Randomization B	Randomization C
16	1	V	A	AV
11	2	V	A	AV
10	3	V	A	AV
6	4	V	AV	A
15	5	V	AV	A
14	6	V	AV	A
2	7	A	V	AV
17	8	A	V	AV
3	9	A	V	AV
13	10	A	AV	V
5	11	A	AV	V
4	12	A	AV	V
8	13	AV	V	A
1	14	AV	V	A
12	15	AV	V	A
9	16	AV	A	V
7	17	AV	A	V
18	18	AV	A	V

#### 2.4. Test Session Descriptions

The test will consist of three sessions. Randomization A will be presented in the first session, Randomization B will be presented in the second session, and Randomization C will be presented in the third session. In each of the three sessions, a different rating session task (A, V, or AV) will be performed. The output video from the tape deck will be delivered to the overlay card of the PC that serves the viewing room. The output audio from the tape deck will be delivered to multimedia speakers that are positioned alongside the viewing device. For video only (V) sessions, the audio will be muted. For audio only (A) sessions, the video window will either be blacked or minimized. For the audio and video sessions, both audio and video (AV) will be presented to the subject.

#### 2.5. Rating Scale

For all three-test sessions, a five-point ACR rating will be solicited from the subject for each clip. The descriptor words for the ACR scale will be "Excellent", "Good", "Fair", "Poor", and "Bad". For analysis procedures, votes will be assigned values of 5, 4, 3, 2, and 1, respectively.

### 3. Instructions to Subjects

#### 3.1. General Introduction

Welcome to the Institute for Telecommunication Sciences Multimedia Laboratory. We are conducting this experiment to determine the quality of audiovisual clips that have been processed through different systems. You will help us measure the quality of different audiovisual clips by rating the audio and/or video using a standard quality rating method.

If at any time you feel uncomfortable with this experiment, you may elect to stop this experiment. If you have any questions about the experiment, please feel free to ask them before the experiment starts. Your responses will be kept confidential and will only be used as part of this audiovisual quality experiment.

This experiment will consist of three twenty-minute sessions with breaks between sessions. Each session will begin with specific instructions for the session and a practice session. The practice sessions will familiarize you with the task for each session and the electronic form.

We will begin session one in a few moments.

### **3.2. Viewing-only Session**

The purpose of this session is to gather user opinions of video quality. In this session, you will see video clips on the monitor in front of you. You will be asked to judge the video quality of the clips assuming that you are trying to communicate with the person on the screen.

The announcer will announce the number of each clip. After viewing the video clip, the announcer will ask you to rate the video quality as excellent, good, fair, poor, or bad. Please indicate your opinion using the electronic form.

Remember, there are no right or wrong answers. We are interested in your opinion of the video quality of each clip. Please do not base your opinion on the content of the scene or the quality of the acting. Take into account the different aspects of the video quality and form your opinion based upon your total impression of the video quality. Your first reaction is what we wish you to record.

We will begin with five practice video clips. The practice session clips and video quality levels are representative of those used in the following session. We will begin the practice session in a few moments.

### **3.3. Listening-only Session**

The purpose of this session is to gather user opinions of audio quality. In this session, you will hear audio clips through the speakers on the table in front of you. You will be asked to judge the audio quality assuming that you are trying to communicate with the person who is talking.

The announcer will announce the number of each clip. After hearing the audio clip, the announcer will ask you to rate the audio quality as excellent, good, fair, poor, or bad. Please indicate your opinion using the electronic form.

Remember, there are no right or wrong answers. We are interested in your opinion of the audio quality of each clip. Please do not base your opinion on the content of the audio clip or the speaker's voice. Take into account the different aspects of the audio quality and form your opinion based upon your total impression of the audio quality. Your first reaction is what we wish you to record.

We will begin with five practice audio clips. The practice session clips and audio quality levels are representative of those used in the following session. We will begin the practice session in a few moments.

### **3.4. Combined A/V Session**

The purpose of this session is to gather user opinions of combined audio and video quality. In this session, clips that consist of both audio and video will be presented to you using the monitor and speakers on the table in front of you. You will be asked to judge the combined audio and video quality of the clips assuming that you are trying to communicate with the person talking on the screen.

The announcer will announce the number of each clip. After viewing the audiovisual clip, the announcer will ask you to rate the combined audio and video quality as excellent, good, fair, poor, or bad. Please indicate your opinion using the electronic form.

Remember, there are no right or wrong answers. We are interested in your overall opinion of the combined audio and video quality of each clip. Please do not base your opinion on the content of the audiovisual clip. Take into account the different aspects of the combined audio and video quality and form your opinion based upon your total



impression of the audio and video quality. Your first reaction is what we wish you to record.

We will begin with five practice audiovisual clips. The practice session clips and audio and video quality levels are representative of those used in the following session. We will begin the practice session in a few moments.

### 3.5. Subject Training Material

Each session of the test (video, audio, and audio/video) will begin with a practice session. Each practice session will consist of five clips. The practice sessions will familiarize the subjects with the specific task for each session of the test. The practice sessions will contain clips that are representative of the quality levels within the given test session. The practice clips are the same clips that are being tested.

Table 7 lists the practice clips used in the three test sessions.

**Table 7 Viewing Tape Practice Clips**

Configuration	Scene
Viewing Tape A	
3	vtc1nw
1	vtc2
4	5row1
7	filter
8	washdc
Viewing Tape B	
2	filter
6	vtc1nw
4	smity2
7	vtc2
1	5row1
Viewing Tape C	
8	5row1
5	smity2
1	filter
7	vtc1nw
6	washdc

### 3.6. Scoring Cues

Each clip will be preceded by an audio cue "Here is clip n". At the end of the clip, the announcer will cue the subject to score with the phrase "Please score clip n". The generic term clip is used so that it is independent of whether the subject is in the video session, the audio session, or the audiovisual session. The audio cues are on channel two of the viewing tapes, and the clip audio is on channel 1 of the viewing tapes.

### 4. Test Procedure

1. Prepare the rating forms.
2. Assign each subject a subject number as listed in Table 6. Table 6 also lists the order in which each subject will rate the sessions. For example, the fourth subject tested will be assigned subject number 12, and will rate Tape A as the audiovisual session first, then Tape B with video only, and finally, Tape C with audio only.
3. Seat each subject in the acoustically isolated rating room. Explain the definition of a clip (simply a section of audio or video), and also explain the rating form. Explain that we will begin with an introduction about the test and instructions for the first session.
4. Leave rating room and play the introduction and the instructions for the first session from the PC.
5. Return to the rating room and ask the subject if he or she has any questions. Explain that we will begin with a practice session of 5 clips.

6. Leave rating room and play the practice session.
7. Return to rating room and ask if he or she has any procedural questions. Any questions regarding the test material directly will be answered with "I cannot tell you anything about that until this experiment is completed". Explain that we will begin the actual session of 48 clips.
8. When the first session has been completed, let the subject take a break of 5-10 minutes and continue with next session by playing the instructions from the PC. Repeat steps 5 through 8.

Subjects will rate the clips using paper rating forms.

For the video only session, the operator will mute the channel 1 audio (clip audio) and send the video and the audio cues (channel 2, to both left and right speakers) to the subject in the rating room.

For the audio only session, the operator will send both channel 1 (clip audio) and channel 2 (audio cues) to both of the speakers in the rating room. The video window on the PC monitor will be minimized.

Finally, for the audiovisual session, the operator will send both audio channels (sent to both speakers) and the video to the subject in the rating room.

#### Playing Introduction and Instruction Files

Use the P5-166 to play the pre-recorded introduction and instructions.

- Run the program "play\_rec" from the start menu, select mono mode, 16K sample rate
- General introduction: C:\audio\DVTC\_Test\intro.pyr
- Audio instructions: C:\audio\DVTC\_Test\instr\_a.pyr
- Video instructions: C:\audio\DVTC\_Test\instr\_v.pyr
- Audio/Video instructions: C:\audio\DVTC\_Test\instr\_av.pyr
- Pan ch 3 on mixer to center
- Set ch 3 level to +15 dB, output at unity

#### Setup for Audio Session

Use UVW #2 (video normal to codec PC #2)

- Patch UVW #2 audio ch 1 & 2 to CR1604 ch 11 & 12
- Pan ch 11 & 12 to center
- Set ch 11 & 12 level to -12 dB, output at unity
- Set video monitor switch to input B (no input, blank screen in rating room)
- Begin practice session at time code 0;0;55[0]
- Begin rating session at time code 0;2;35[0]

#### Setup for Video Session

Use UVW #2 (video normal to codec PC #2)

- Patch UVW #2 audio ch 1 & 2 to CR1604 ch 11 & 12
- Pan ch 12 to center
- Set ch 11 level off (down all the way)
- Set ch 12 level to -12 dB, output at unity
- Set video monitor switch to input A (video to rating room monitor)
- Move mouse to corner of monitor
- Set video window at 8"X6", center of screen, no menu
- Begin practice session at time code 0;0;55[0]
- Begin rating session at time code 0;2;35[0]

### Setup for Audio/Video Session

Use UVW #2 (video normal to codec PC #2)

- Patch UVW #2 audio ch 1 & 2 to CR1604 ch 11 & 12
- Pan ch 11 & 12 to center
- Set ch 11 & 12 level to -12 dB, output at unity
- Set video monitor switch to input A (video to rating room monitor)
- Move mouse to corner of monitor
- Set video window at 8"X6", center of screen, no menu
- Begin practice session at time code 0;0;55[0]
- Begin rating session at time code 0;2;35[0]

**Appendix A**  
**Video Tape Edit Lists**

<b>Table A-1: DVTC Subjective Test Source Tape</b>		
TC IN NDF	TC OUT NDF	Description
0;0;10[0]	0;0;59[29]	SMPTE Color Bars (Magni) 1 KHz audio test tone (ch 1 & 2) @ 0 VU
0;1;10[0]	0;1;24[29]	5row1 with audio Tape 62 17;24[10]-17;39[10] Ch 1 & 2 audio
0;1;35[0]	0;1;50[29]	Filter Video – ANSI #4 8;22[0]-8;37[29] Audio – DVTC HRC Tape 22;25;43[0]
0;2;0[0]	0;2;14[24]	Smity2 with audio ANSI #4 4;35[4]-4;49[29] Ch 1 audio only
0;2;25[0]	0;2;41[9]	Vtc1nw with audio Tape 41 16;45[0] – 17;01[10] Ch 1 & 2 audio
0;2;50[0]	0;3;5[13]	Vtc2 with audio Tape 23 11;31[15] – 11;46[29] Ch 1 & 2 audio
0;3;15[0]	0;3;30[29]	Washdc Video – Tape 61 21;56[23] – 22;12[23] Audio – DVTC HRC Tape 22;56;28[0]

Table A-2: DVTC Subjective Test HRC Tape				
DVTC Source Tape edit points: In:0;0;6[0] Out: 0;4;5[0] for all eight conditions				
Condition Number	Condition Description	Audio Delay (ms) <sup>6</sup>	TC In	TC Out
1	NTSC Video (NTSC out of BVW-65)	0	0;0;6[0]	0;4;5[0]
2	1536 kb/s Codec B CIF, G.722 audio	80	0;5;6[0]	0;9;5[0]
3	1536 kb/s, Codec A proprietary, G.722 audio	16	0;10;6[0]	0;14;5[0]
4	384 kb/s, Codec A QCIF, G.711 audio	100	0;15;6[0]	0;19;5[0]
5	384 kb/s, Codec B CIF, G.722 audio	140	0;20;6[0]	0;24;5[0]
6	128 kb/s, Codec B QCIF, G.728 audio	200	0;25;6[0]	0;29;5[0]
7	128 kb/s, Codec A QCIF, G.711 audio	144	0;30;6[0]	0;34;5[0]
8	128 kb/s, Codec A proprietary, 8 kb/s audio	30	0;35;6[0]	0;39;5[0]

<sup>6</sup> Audio was manually delayed so that audio and video would be synchronized.

Table A-1. Edit List for Viewing Tape A

Viewing Sequence	Clip	Scene	Configuration	Source <sup>7</sup> TC In	Source TC Out	Duration	Rec TC In	Rec TC Out
Color Bars & Test Tone: <sup>8</sup>								
Practice Session								
1	16	Vtc1nw	3	12:30[9]	12:39[24]	9[15]	1:0[0]	
2	5	Vtc2	1	2:55[15]	3:3[25]	8[10]	1:20[0]	
3	19	5row1	4	16:15[15]	16:23[15]	8[0]	1:40[0]	
4	38	Filter	7	31:39[6]	31:47[6]	8[0]	2:0[0]	
5	48	Washdc	8	38:20[25]	38:29[25]	9[0]	2:20[0]	
Rating Session								
1	14	filter	3	11:38[29]	11:46[29]	8[0]	3:0[0]	
2	16	vtc1nw	3	12:30[9]	12:39[24]	9[15]	3:20[0]	
3	12	washdc	2	8:20[15]	8:29[15]	9[0]	3:40[0]	
4	44	filter	8	36:39[3]	36:47[3]	8[0]	4:0[0]	
5	48	washdc	8	38:20[25]	38:29[25]	9[0]	4:20[0]	
6	11	vtc2	2	7:55[20]	8:4[0]	8[10]	4:40[0]	
7	38	filter	7	31:39[6]	31:47[6]	8[0]	5:0[0]	
8	29	vtc2	5	22:55[21]	23:4[1]	8[10]	5:20[0]	
9	35	vtc2	6	27:55[23]	28:4[3]	8[10]	5:40[0]	
10	24	washdc	4	18:20[15]	18:29[25]	9[10]	6:0[0]	
11	8	filter	2	6:38[21]	6:46[21]	8[0]	6:20[0]	
12	4	vtc1nw	1	2:30[0]	2:39[15]	9[15]	6:40[0]	
13	45	smity2	8	37:5[14]	37:14[20]	9[6]	7:0[0]	
14	9	smity2	2	7:5[4]	7:14[10]	9[6]	7:20[0]	
15	19	5row1	4	16:15[15]	16:23[15]	8[0]	7:40[0]	
16	40	vtc1nw	7	32:30[15]	32:40[0]	9[15]	8:0[0]	
17	13	5row1	3	11:15[10]	11:23[7]	7[27]	8:20[0]	
18	21	smity2	4	17:5[12]	17:14[18]	9[6]	8:40[0]	
19	46	vtc1nw	8	37:30[15]	37:40[0]	9[15]	9:0[0]	

<sup>7</sup> The Source tape for editing viewing tapes is the DVTC subjective test HRC Tape (Table A-2).

<sup>8</sup> The color bars and test tone were edited from the DVTC subjective test Source Tape. In TC 0:0:10[0], Out TC 0:0:54[0].

Table A.1 Edit List for Viewing Tape A

Viewing Sequence	Clip	Scene	Configuration	Source / TC In	Source TC Out	Duration	Rec TC In	Rec TC Out
20	26	filter	5	21:38[25]	21:46[25]	8[0]	9:20[0]	
21	27	smity2	5	22:5[5]	22:14[9]	9[4]	9:40[0]	
22	37	5row1	7	31:15[15]	31:23[15]	8[0]	10:0[0]	
23	15	smity2	3	12:5[8]	12:14[14]	9[6]	10:20[0]	
24	42	washdc	7	33:20[25]	33:29[25]	9[0]	10:40[0]	
25	41	vtc2	7	32:56[0]	33:4[10]	8[10]	11:0[0]	
26	1	5row1	1	1:15[0]	1:23[0]	8[0]	11:20[0]	
27	28	vtc1nw	5	22:30[12]	22:39[27]	9[15]	11:40[0]	
28	20	filter	4	16:39[0]	16:47[0]	8[0]	12:0[0]	
29	34	vtc1nw	6	27:30[8]	27:39[23]	9[15]	12:20[0]	
30	39	smity2	7	32:5[14]	32:14[20]	9[6]	12:40[0]	
31	30	washdc	5	23:20[22]	23:29[22]	9[0]	13:0[0]	
32	32	filter	6	26:38[27]	26:46[27]	8[0]	13:20[0]	
33	6	washdc	1	3:20[10]	3:29[10]	9[0]	13:40[0]	
34	47	vtc2	8	37:56[0]	38:4[10]	8[10]	14:0[0]	
35	23	vtc2	4	17:56[0]	18:4[10]	8[10]	14:20[0]	
36	25	5row1	5	21:15[10]	21:23[10]	8[0]	14:40[0]	
37	17	vtc2	3	12:55[24]	13:4[4]	8[10]	15:0[0]	
38	10	vtc1nw	2	7:30[5]	7:39[20]	9[15]	15:20[0]	
39	3	smity2	1	2:4[29]	2:14[5]	9[6]	15:40[0]	
40	7	5row1	2	6:15[5]	6:23[5]	8[0]	16:0[0]	
41	31	5row1	6	26:15[12]	26:23[12]	8[0]	16:20[0]	
42	22	vtc1nw	4	17:30[15]	17:40[0]	9[15]	16:40[0]	
43	5	vtc2	1	2:55[15]	3:3[25]	8[10]	17:0[0]	
44	18	washdc	3	13:20[19]	13:29[19]	9[0]	17:20[0]	
45	2	filter	1	1:38[20]	1:46[20]	8[0]	17:40[0]	
46	33	smity2	6	27:5[8]	27:14[14]	9[6]	18:0[0]	
47	43	5row1	8	36:15[15]	36:23[20]	8[5]	18:20[0]	
48	36	washdc	6	28:20[18]	28:29[18]	9[0]	18:40[0]	

End of edit list for Viewing Tape A

Table A-4. Edit List for Viewing Tape B

Viewing Sequence	Clip	Scene	Configuration	Source TC In	Source TC Out	Duration	Rec TC In	Rec TC Out
<b>Practice Session</b>								
		Color Bars	Test Tone:			44[0]	0:6[0]	0:50[0]
1	8	filter	2	6:38[21]	6:46[21]	8[0]	1:0[0]	
2	34	vtc1nw	6	27:30[8]	27:39[23]	9[15]	1:20[0]	
3	21	smity2	4	17:5[12]	17:14[18]	9[6]	1:40[0]	
4	41	vtc2	7	32:56[0]	33:4[10]	8[10]	2:0[0]	
5	1	5row1	1	1:15[0]	1:23[0]	8[0]	2:20[0]	
<b>Rating Session</b>								
1	8	filter	2	6:38[21]	6:46[21]	8[0]	3:0[0]	
2	18	washdc	3	13:20[19]	13:29[19]	9[0]	3:20[0]	
3	16	vtc1nw	3	12:30[9]	12:39[24]	9[15]	3:40[0]	
4	14	filter	3	11:38[29]	11:46[29]	8[0]	4:0[0]	
5	21	smity2	4	17:5[12]	17:14[18]	9[6]	4:20[0]	
6	9	smity2	2	7:5[4]	7:14[10]	9[6]	4:40[0]	
7	17	vtc2	3	12:55[24]	13:4[4]	8[10]	5:0[0]	
8	7	5row1	2	6:15[5]	6:23[5]	8[0]	5:20[0]	
9	29	vtc2	5	22:55[21]	23:4[1]	8[10]	5:40[0]	
10	4	vtc1nw	1	2:30[0]	2:39[15]	9[15]	6:0[0]	
11	32	filter	6	26:38[27]	26:46[27]	8[0]	6:20[0]	
12	20	filter	4	16:39[0]	16:47[0]	8[0]	6:40[0]	
13	24	washdc	4	18:20[15]	18:29[25]	9[10]	7:0[0]	
14	19	5row1	4	16:15[15]	16:23[15]	8[0]	7:20[0]	
15	6	washdc	1	3:20[10]	3:29[10]	9[0]	7:40[0]	
16	13	5row1	3	11:15[10]	11:23[7]	7[27]	8:0[0]	
17	10	vtc1nw	2	7:30[5]	7:39[20]	9[15]	8:20[0]	
18	42	washdc	7	33:20[25]	33:29[25]	9[0]	8:40[0]	
19	25	5row1	5	21:15[10]	21:23[10]	8[0]	9:0[0]	
20	23	vtc2	4	17:56[0]	18:4[10]	8[10]	9:20[0]	
21	39	smity2	7	32:5[14]	32:14[20]	9[6]	9:40[0]	



Table A.4. Edit List for Viewing Tape B

Viewing Sequence	Clip	Scene	Configuration	Source TC In	Source TC Out	Duration	Rec TC In	Rec TC Out
22	34	vtc1nw	6	27:30[8]	27:39[23]	9[15]	10:0[0]	
23	5	vtc2	1	2:55[15]	3:3[25]	8[10]	10:20[0]	
24	35	vtc2	6	27:55[23]	28:4[3]	8[10]	10:40[0]	
25	36	washdc	6	28:20[18]	28:29[18]	9[0]	11:0[0]	
26	2	filter	1	1:38[20]	1:46[20]	8[0]	11:20[0]	
27	41	vtc2	7	32:56[0]	33:4[10]	8[10]	11:40[0]	
28	1	5row1	1	1:15[0]	1:23[0]	8[0]	12:0[0]	
29	28	vtc1nw	5	22:30[12]	22:39[27]	9[15]	12:20[0]	
30	30	washdc	5	23:20[22]	23:29[22]	9[0]	12:40[0]	
31	44	filter	8	36:39[3]	36:47[3]	8[0]	13:0[0]	
32	45	smity2	8	37:5[14]	37:14[20]	9[6]	13:20[0]	
33	38	filter	7	31:39[6]	31:47[6]	8[0]	13:40[0]	
34	22	vtc1nw	4	17:30[15]	17:40[0]	9[15]	14:0[0]	
35	3	smity2	1	2:4[29]	2:14[5]	9[6]	14:20[0]	
36	26	filter	5	21:38[25]	21:46[25]	8[0]	14:40[0]	
37	37	5row1	7	31:15[15]	31:23[15]	8[0]	15:0[0]	
38	43	5row1	8	36:15[15]	36:23[20]	8[5]	15:20[0]	
39	48	washdc	8	38:20[25]	38:29[25]	9[0]	15:40[0]	
40	33	smity2	6	27:5[8]	27:14[14]	9[6]	16:0[0]	
41	15	smity2	3	12:5[8]	12:14[14]	9[6]	16:20[0]	
42	11	vtc2	2	7:55[20]	8:4[0]	8[10]	16:40[0]	
43	31	5row1	6	26:15[12]	26:23[12]	8[0]	17:0[0]	
44	27	smity2	5	22:5[5]	22:14[9]	9[4]	17:20[0]	
45	12	washdc	2	8:20[15]	8:29[15]	9[0]	17:40[0]	
46	40	vtc1nw	7	32:30[15]	32:40[0]	9[15]	18:0[0]	
47	47	vtc2	8	37:56[0]	38:4[10]	8[10]	18:20[0]	
48	46	vtc1nw	8	37:30[15]	37:40[0]	9[15]	18:40[0]	

End of Edit List for Viewing Tape B

Table A.3 Edit List for Viewing Tapes C

Viewing Sequence	Clip	Scene	Configuration	Source TC In	Source TC Out	Duration	Rec TC In	Rec TC Out
Practice Session								
1	43	5row1	8	36:15[15]	36:23[20]	8[5]	1:0[0]	
2	27	smity2	5	22:5[5]	22:14[9]	9[4]	1:20[0]	
3	2	filter	1	1:38[20]	1:46[20]	8[0]	1:40[0]	
4	40	vtc1nw	7	32:30[15]	32:40[0]	9[15]	2:0[0]	
5	36	washdc	6	28:20[18]	28:29[18]	9[0]	2:20[0]	
Rating Session								
1	46	vtc1nw	8	37:30[15]	37:40[0]	9[15]	3:0[0]	
2	47	vtc2	8	37:56[0]	38:4[10]	8[10]	3:20[0]	
3	15	smity2	3	12:5[8]	12:14[14]	9[6]	3:40[0]	
4	19	5row1	4	16:15[15]	16:23[15]	8[0]	4:0[0]	
5	4	vtc1nw	1	2:30[0]	2:39[15]	9[15]	4:20[0]	
6	29	vtc2	5	22:55[21]	23:4[1]	8[10]	4:40[0]	
7	43	5row1	8	36:15[15]	36:23[20]	8[5]	5:0[0]	
8	24	washdc	4	18:20[15]	18:29[25]	9[10]	5:20[0]	
9	41	vtc2	7	32:56[0]	33:4[10]	8[10]	5:40[0]	
10	32	filter	6	26:38[27]	26:46[27]	8[0]	6:0[0]	
11	1	5row1	1	1:15[0]	1:23[0]	8[0]	6:20[0]	
12	34	vtc1nw	6	27:30[8]	27:39[23]	9[15]	6:40[0]	
13	40	vtc1nw	7	32:30[15]	32:40[0]	9[15]	7:0[0]	
14	5	vtc2	1	2:55[15]	3:3[25]	8[10]	7:20[0]	
15	37	5row1	7	31:15[15]	31:23[15]	8[0]	7:40[0]	
16	8	filter	2	6:38[21]	6:46[21]	8[0]	8:0[0]	
17	33	smity2	6	27:5[8]	27:14[14]	9[6]	8:20[0]	
18	30	washdc	5	23:20[22]	23:29[22]	9[0]	8:40[0]	
19	18	washdc	3	13:20[19]	13:29[19]	9[0]	9:0[0]	
20	38	filter	7	31:39[6]	31:47[6]	8[0]	9:20[0]	
21	21	smity2	4	17:5[12]	17:14[18]	9[6]	9:40[0]	

Table A.5 Edit List for Viewing Tape C

Viewing Sequence	Clip	Scene	Configuration	Source TC In	Source TC Out	Duration	Rec TC In	Rec TC Out
22	3	smity2	1	2:4[29]	2:14[5]	9[6]	10:0[0]	
23	35	vtc2	6	27:55[23]	28:4[3]	8[10]	10:20[0]	
24	17	vtc2	3	12:55[24]	13:4[4]	8[10]	10:40[0]	
25	2	filter	1	1:38[20]	1:46[20]	8[0]	11:0[0]	
26	28	vtc1nw	5	22:30[12]	22:39[27]	9[15]	11:20[0]	
27	6	washdc	1	3:20[10]	3:29[10]	9[0]	11:40[0]	
28	45	smity2	8	37:5[14]	37:14[20]	9[6]	12:0[0]	
29	44	filter	8	36:39[3]	36:47[3]	8[0]	12:20[0]	
30	22	vtc1nw	4	17:30[15]	17:40[0]	9[15]	12:40[0]	
31	23	vtc2	4	17:56[0]	18:4[10]	8[10]	13:0[0]	
32	13	5row1	3	11:15[10]	11:23[7]	7[27]	13:20[0]	
33	20	filter	4	16:39[0]	16:47[0]	8[0]	13:40[0]	
34	11	vtc2	2	7:55[20]	8:4[0]	8[10]	14:0[0]	
35	9	smity2	2	7:5[4]	7:14[10]	9[6]	14:20[0]	
36	14	filter	3	11:38[29]	11:46[29]	8[0]	14:40[0]	
37	48	washdc	8	38:20[25]	38:29[25]	9[0]	15:0[0]	
38	12	washdc	2	8:20[15]	8:29[15]	9[0]	15:20[0]	
39	39	smity2	7	32:5[14]	32:14[20]	9[6]	15:40[0]	
40	26	filter	5	21:38[25]	21:46[25]	8[0]	16:0[0]	
41	10	vtc1nw	2	7:30[5]	7:39[20]	9[15]	16:20[0]	
42	7	5row1	2	6:15[5]	6:23[5]	8[0]	16:40[0]	
43	36	washdc	6	28:20[18]	28:29[18]	9[0]	17:0[0]	
44	16	vtc1nw	3	12:30[9]	12:39[24]	9[15]	17:20[0]	
45	27	smity2	5	22:5[5]	22:14[9]	9[4]	17:40[0]	
46	25	5row1	5	21:15[10]	21:23[10]	8[0]	18:0[0]	
47	31	5row1	6	26:15[12]	26:23[12]	8[0]	18:20[0]	
48	42	washdc	7	33:20[25]	33:29[25]	9[0]	18:40[0]	

End of Edit List for Viewing Tape C