

Activity Report of Asia-Pacific Medical Network Project in Kyushu University Hospital : Vol.3

Shimizu, Shuji
Kyushu University Hospital

Nakashima, Naoki
Kyushu University Hospital

清水, 周次
九州大学病院

中島, 直樹
九州大学病院

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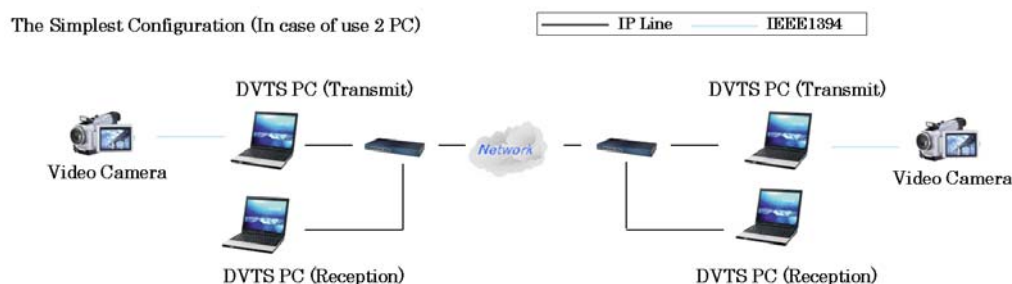


4. New Instruments and Technical Tips

As the number of conferences with multiple, interconnected locations increases, these events have become a primary focus of our activities. For these events to succeed, participants must not only be seen, but also be heard. Sound quality, therefore, is just as important a factor as video. This section discusses audio equipment suitable for these conferences.

1. Instruments

The simplest system for DVTS is a DV camera, personal computer and network as illustrated below (Fig. 4-1-1). However, external microphones (Ext. MIC) and audio amplifiers are required for a comfortable, and audible, conference.



The simplest formats can handle only one visual and one sound source at the same time. An analog-digital video converter (ADVC) is required to handle several visual sources, like operation images or endoscopic video input.

The ADVC is an instrument that converts an analog video signal (S-video or composite) to digital video with audio. Multiple video sources can be input and selected using video a mixer.

Chart 4-1-1 details the features and adaptations of video configurations with or without the use of an ADVC.

Chart 4-1-1 Variation between Basic and Advanced configurations.

	Analog- Digital Video converter	Video source limit	Adaptation for Live Surgery
Advanced	Use	Multiple	○
Basic	No use	One	×

A. Advanced configuration (Fig. 4-1-2)

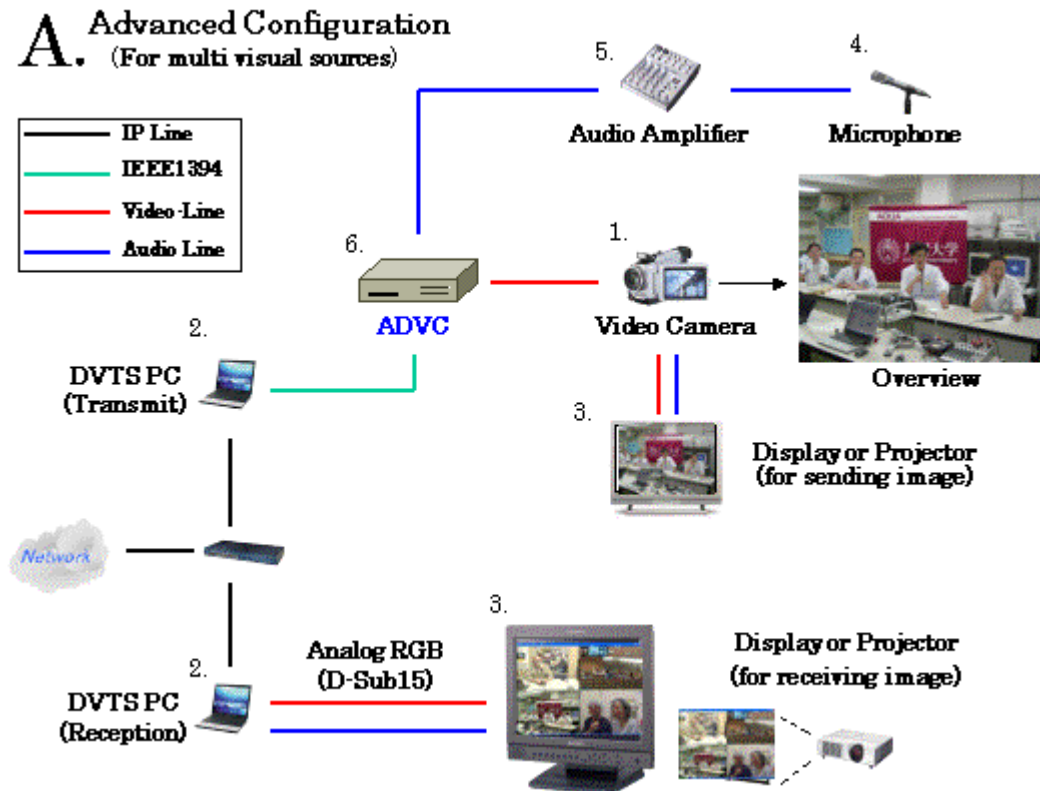


Fig4-1-2 Advanced Configuration

Instruments

1. Video Camera (No DV camera required)
2. DVTS PC (2units with IEEE1394 port)
3. Display (LCD, PDP or Projector)
4. Microphone (Unidirectional sensitivity and Power Switch)
5. Audio Amplifier
6. Analog-Digital Video Converter (ADVC)
7. Cables (Ethernet, Video, Audio, IEEE1394, Display, etc.)

Features:

This configuration provides ample performance for almost all cases, from small conferences to large academic meetings. Since audio and video signals function independently, this system provides complete control for both audio levels and video inputs. This configuration is recommended for locations that send multiple visual sources like operation images.

B. Basic configuration (Fig. 4-1-3)

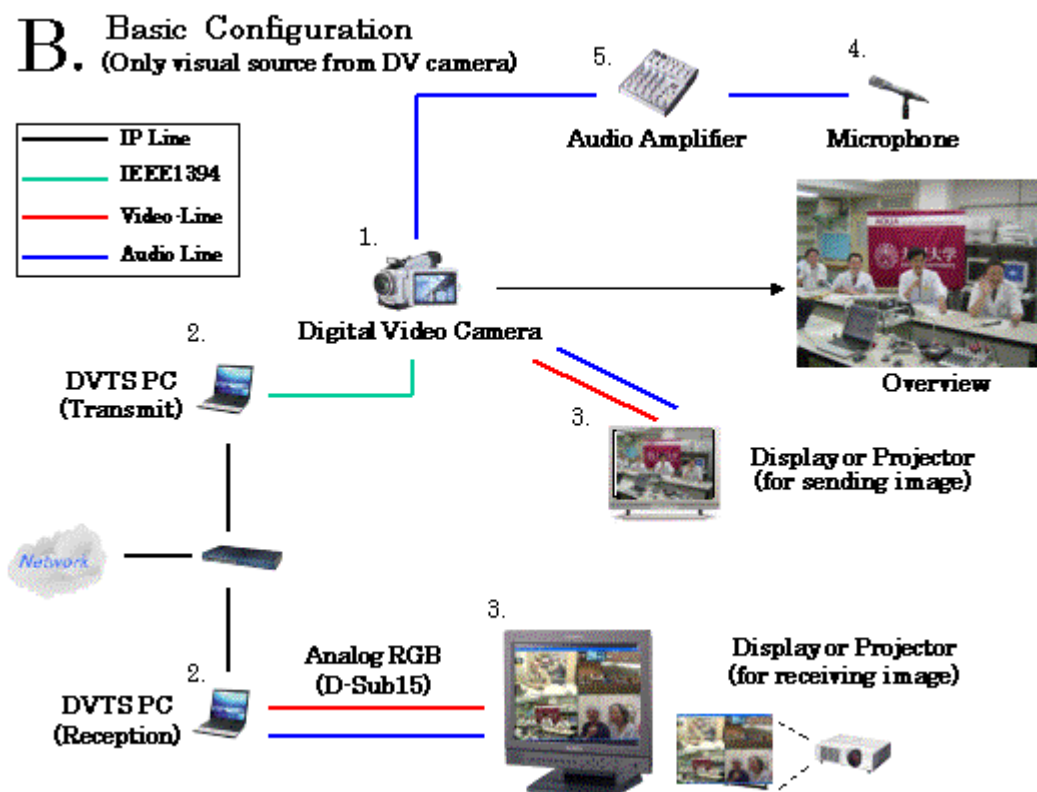


Fig. 4-1-3 Basic Configuration

Instruments:

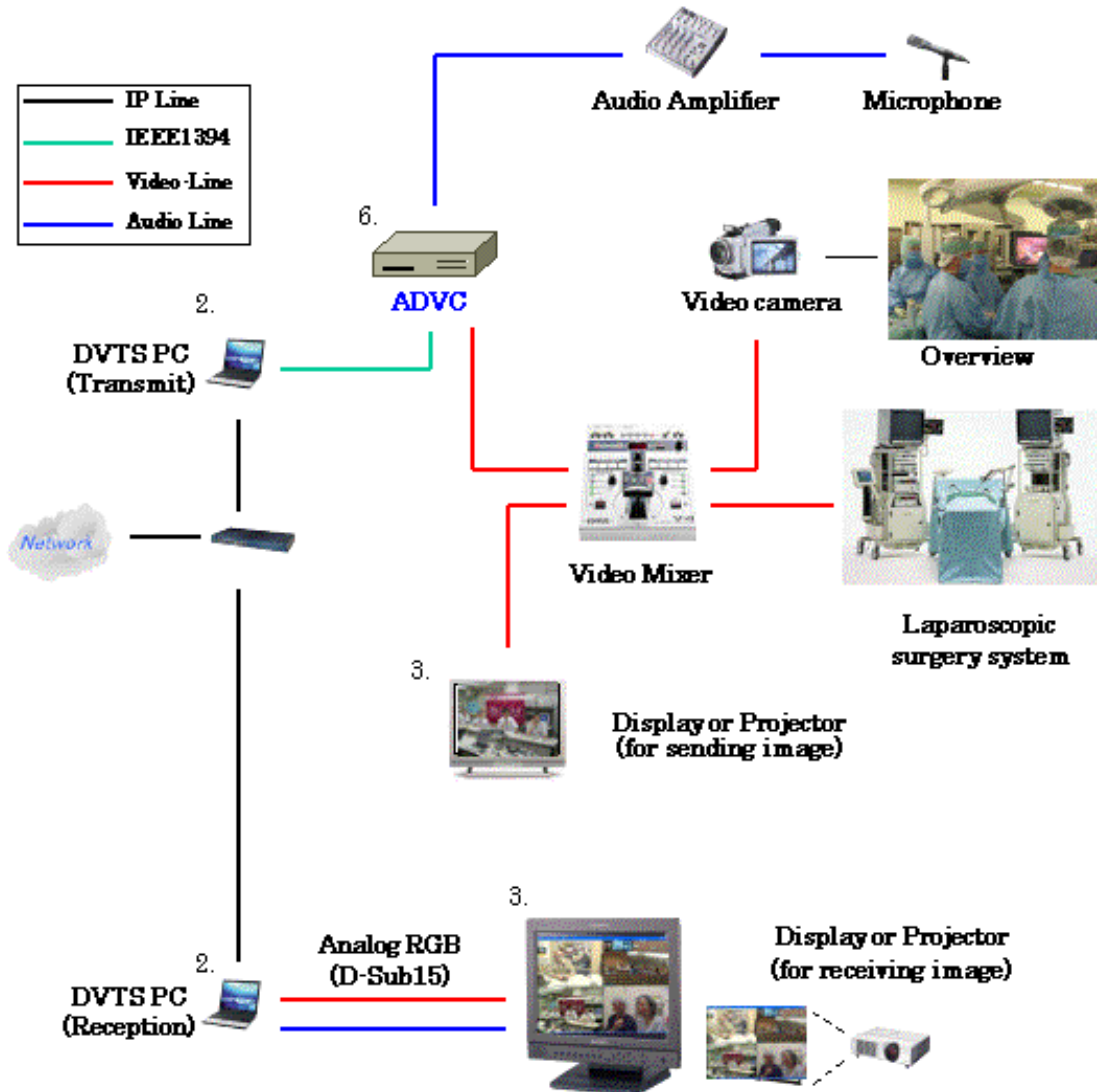
1. Digital Video Camera
2. DVTS PC (2 units with Ieee1394 port)
3. Display (LCD, PDP or Projector)
4. Microphone (Unidirectional sensitivity and Power Switch)
5. Audio Amplifier
6. Cables (Ethernet, Video, Audio, IEEE1394, Display, etc.)

Features:

This configuration does not provide adequate performance for use in important events or large venues. Logistical problems exist, especially concerning audio. The Ext. MIC does not work well, especially if both internal and external microphones are working simultaneously. Since this configuration is limited to one video source, images should be prepared and sent separately, prior to the presentations. We do not recommend connecting the Ext. MIC directly into the “Ext. MIC” port.

Reference: Configuration for Live Surgery Demonstration (Fig. 4-1-4)

Configuration for Live surgery demonstration



In live surgery demonstrations, two video sources are switched using a video mixer and converted to a DV signal by the ADVC. These signals typically include:

- Operation images from laparoscopic surgery systems
- Overview images from normal video cameras

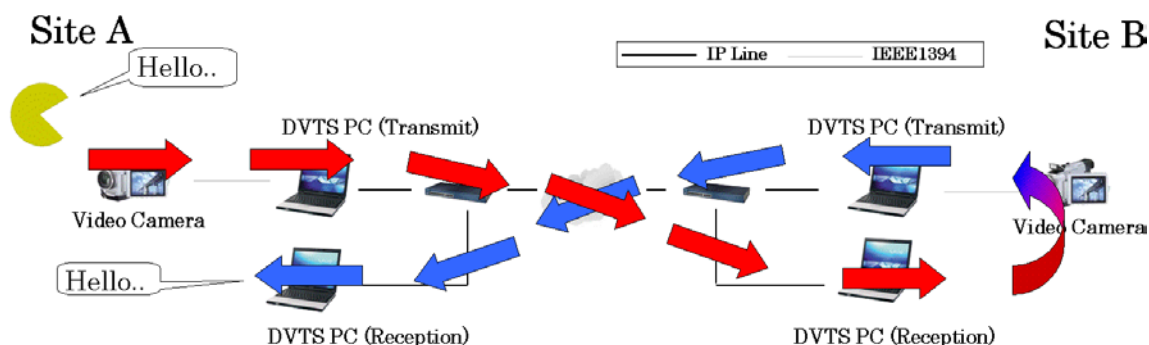
2. Sound Considerations

There are two major causes of sound problems, specific to teleconferences, described in the following chart.

This section discusses echo noise (loop back noise, feedback noise)

Name	Echo (Loop back, Feed back)	Packet Loss
Case	Speaker's voice from another site returns with delay	Voice comes on and off, stuttered audio, robotic voice pattern
Cause	Voice returned through both microphone and speaker at site B (Fig. 4-2-1)	Packet loss (data loss) occurs over Internet connection (Bottle neck, routing, hardware problem etc).
Solution	Adjust microphone and speaker levels at site B to avoid catching sound from speakers.	Ask the network administrator to optimize bandwidth, if possible.

*Mechanism of the Echo noise. (Fig. 4-2-1)




*Avoiding Echo Noise


The optimal configuration can control the microphone input level and the audio output levels easily and simultaneously.

*Equipment Selection

- Audio Amplifier (*must*): A basic 4-channel amp is enough for small venues.


	Used to adjust audio input and output levels. AUX port on audio amplifier is useful for independent adjustment between DVTS sound input and output.
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- Microphone : bullhorn type (Unidirectional, Battery powered, with power switch)

	Battery powered with power switch for convenience. Line powered microphones require compatible devices.
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Trouble case 1: DV camera Problem

- Should the internal MIC on the DV camera be used?
- Can the microphone be directly connected to the DV camera?


	<p>The MIC on DV camera is usually omni directional and auto gain controlled. It catches the sounds from speakers with high sensitivity and causes some echo noise. The same problem will occur if an ext. MIC plugged in directly.</p>
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Trouble case 2: MIC Problem

- Why we should not use MIC for TV conference.

	<p>MIC for TV conference is usually highly sensitive and expected to use special systems designed for it, like an installed echo canceller or auto gain controller.</p> <p>For DVTS, it may cause echo noise or sound level unbalance depend on the speaker's position or the audio speaker's output level.</p>
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- Will an echo canceller solve echo problems?

	<p>Actually, an echo canceller is useful for reducing echo noise, but it is required at each end of the connection. It will not work well unless only the optimal settings for reducing echo noise are used.</p> <p>In the case of a conference with multiple locations, solving sound problems with only an echo canceller is very difficult.</p>
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Configuration Self-Check

Usually, DVTS beginners do not recognize their own configuration errors and sound problems. As a result, they may think the problems originated at the other location.

The multi-location teleconference system (QualImage: Quatre) does not return sound sent from the originating location, thus we often hear echo noise from the other end without taking notice of it.

The next page provides self-check procedures for DVTS configuration.

Self-Check Using Acoustic Feedback. (for Basic configuration Fig. 4-1-3)

1. Set up your DVTS system, as it will actually be used, preferably at the venue.
(No need for global IP Address for DVTS PC.)

2. Set the audio speaker's volume for normal use.

3. Turn off your external MIC and set the level to zero on the Audio Amplifier.

4. Send a DV stream from the local Transmission PC to the local Reception PC.

***Check point 1: Do you hear any acoustic feedback?**

If you hear any acoustic feedback at this time:

**Check Audio amplifier – Is the DV camera cable connected?*

**Verify that the DV camera internal microphone is muted.*

If the Int. MIC is still working, try other DV camera model with a mutable MIC.

5. Turn on your External MIC.

***Check point 2: Is there any acoustic feedback?**

If you connect the Ext. MIC to Ext. MIC plug on DV cam, you will hear acoustic feedback. This problem is caused by automatic gain control on the DV cam and a very high input level. It is difficult to solve this problem without an audio amplifier.

6. Gradually increase the MIC output level on Audio amplifier.

***Check point 3: Acoustic feedback should always be present at this time.**

If there is no feedback, then the MIC or Speaker is not working properly.

Check them again.

7. Turn off your Ext. MIC when you hear feedback.

***Check point 4: Has feedback stopped?**

Reducing the MIC output level on the audio amplifier will have the same effect.

8. Self-check completed.

Echo problems on DVTS are caused by the same mechanism described above. We believe DVTS configurations that pass this self check will not create serious sound problems.