

# QuickTime™ Conferencing SDK

## Tips for Using QuickTime Conferencing

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# Getting Started

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The QuickTime Conferencing Beta Release includes an end-user application to demonstrate QuickTime Conferencing. This application, Apple Media Conference, is intended to give you a cool experience using QuickTime Conferencing.

The following hints, tips and system requirements are provided for using and developing QuickTime Conferencing applications. These guidelines should be followed when creating applications or experimenting with the included QuickTime Conferencing sample applications, and represent the best choices in our experience. Feel free to experiment with other configurations and settings. Feedback from users and developers is welcome on this topic.

**Note:** In most sections of this document, the ideal configuration of software, hardware and network is described for potential QuickTime Conferencing power users.

## CPU

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To send and receive shared data through the shared window only:

Use a 68020 machine or better.

To send and receive sound only (with shared multimedia data):

Use a 68030 machine or better with Macintosh sound input. The standard microphone, AV monitor microphone or PlainTalk microphone will work for sound input.

To receive sound only from a broadcast:

Use a 68030 machine or better.

To receive sound and video only from a broadcast:

Use a 68030 machine or better. For best picture results, use 16-bit (thousands) or 24-bit (millions) of colors. 68040 machines are preferred.

To send and receive sound and video (along with shared multimedia data):

Use a 68040 machine or better. The AV Macintoshes work optimally with QuickTime Conferencing, particularly the Power Macintosh AV series. For best picture results, use 16-bit (thousands) of colors. Also, on the 840 AV, two megabytes of VRAM is strongly recommended (Note that on the 840AV only one Megabyte of VRAM is standard). On the 8100 AV, two megabytes of VRAM is standard and this is ideal. The standard microphone, AV monitor microphone or PlainTalk microphone will work for sound input.

Non-AV machines can also work reasonably with QuickTime Conferencing.

**Note:** QuickTime Conferencing 1.0.2 has not been fully tested on non-AV configurations (i.e. only 660AV, 840AV, and PowerPC AV configurations). Other configurations are not supported in this release. It is possible to install QTC on non-qualified machines using the “Custom Install” option from the installer.

**Note:** The ideal machine configuration for using QuickTime Conferencing is:

Power Macintosh 8100AV /80 or 8100AV/110.

Minimum 16 MBytes of RAM.

Built-in ethernet network interface.

Minimum 500 MBytes disk space

A 17” color monitor (allowing display of conference participants, along with reasonably sized shared window documents)

## System Software

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System 7.5 is recommended for use with Apple Media Conference. Use of System 7.5 provides (1) drag and drop capabilities for the shared window and stream controllers; (2) PowerTalk services (resulting in an address book and network browsing capabilities); (3) use of the Apple Guide for Apple Media Conference, an interactive method to learn how to use the end-user application, and (4) the WindowShade feature, allowing a triple-click of the mouse to hide and show application windows.

System 7.1.1 and 7.1.2 will work with Apple Media Conference, but will not include the Drag and Drop, Apple Guide or WindowShade features. However, you can use the Drag and Drop system extension to obtain Drag and Drop features in earlier versions of the operating system.

**Note:** the ideal version of MacOS™ for using QuickTime Conferencing is System 7.5 with PowerTalk, WindowShade and Drag and Drop services enabled

## Memory Requirements

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Sixteen megabytes of RAM or more is recommended for use with the QuickTime Conferencing end-user application. More memory is always nice, and is preferred.

For users who wish to share large color images (i.e., greater than 640 x 480 resolution) or share QuickTime movies through the shared window, or for users who intend to enjoy multi-party conferences with many users (i.e., >= four users), or watch multiple broadcasts concurrently (i.e., >= three broadcasts), 16 MBytes of RAM is strongly recommended. Those same users should also consider increasing their application partition size to more than the standard preferred size of three MBytes. In that case, a partition size of between five and eight MBytes is suggested, depending on other application memory needs.

**Note:**

The ideal amount of RAM for using QuickTime Conferencing is 16 MBytes.

The ideal memory partition for using QuickTime Conferencing is 5 MBytes.

This allows for multi-party conferencing with many users while simultaneously permitting use of other applications (to use for sharing via the shared window) and a large system.

## Network Configuration

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The primary and recommended network interfaces to use with QuickTime Conferencing at this time are 10 Mbit ethernet and narrowband (2B+D) ISDN. It is expected that this current set of two network interfaces will be improved upon and extended over time to include support for a diversity of networks.

**Ethernet.** For AppleTalk, AppleTalk Multicast and TCP/IP QuickTime Conferencing connections, use either the built-in ethernet connection, or an ethernet card.

**ISDN.** For ISDN connections, the currently supported hardware is the Planet-ISDN card from Euronis. For additional configuration information, please check the documents in the folder entitled "QuickTime Conferencing and ISDN" on this CD-ROM.

Compatibility information with other ISDN network interface cards is not available at this time. Feedback is welcomed on this topic from vendors and users.

**Token Ring.** Token Ring (16 Mbit) will also work properly with QuickTime Conferencing and has undergone a limited amount of testing. Keep in mind that Token Ring has not been tested as extensively as ethernet. Feedback is welcomed on this topic from vendors and users.

**FDDI.** FDDI should work properly with QuickTime Conferencing but has not undergone testing at this point in time. Feedback is welcomed on this topic from vendors and users.

**ATM.** A limited number of vendors are providing ATM network interface cards at this time. These ATM NuBus cards are initially supporting ATM through ATM network drivers for "classic networking" for both MacTCP and AppleTalk. QuickTime Conferencing has undergone limited testing internally at Apple with the production versions of these cards, and it should be noted that ATM cards should work with QuickTime Conferencing, since QuickTime Conferencing is just another network application running on top of ATM. Future implementations of QuickTime Conferencing over ATM will most likely be different, and will be tailored more specifically to the characteristics of ATM network services, which are well suited to supporting multimedia networking applications. Feedback is welcomed on this topic from vendors and users.

**LocalTalk Networks.** The beta release of QuickTime Conferencing does not support LocalTalk. It is hoped that this restriction will be removed in future release of QuickTime Conferencing.

**Note:** The ideal network configurations for using QuickTime Conferencing is:

Built-in ethernet network interface with switched ethernet support from the network so that the QuickTime Conferencing machine is on an isolated network segment

2B+D ISDN network interface with 2B+D wide area ISDN connection to the desktop, along with an H.320 hardware compressor.

T1 network interface (1.5 Mbit/sec) or better (i.e., DS-3 at 45 Mbit/sec) connected from a local enterprise network to the world-wide TCP/IP Internet

## Disk Requirements

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**Real-Time Communications Only:** Practically no disk space is needed to run QuickTime Conferencing for real-time communications only. This is pretty cool. The only disk space required is for the application itself (approximately 800 kBytes) and the preferences file(s) associated with the application.

**Archiving Digital Contents of Conference:** However, you will need disk space to save (1) images from each participants video window, (2) save shared window contents, (3) save shared window annotations, (4) save shared window contents together with annotations and (5) save QuickTime movie recordings of individual participants in a connection, or of all of the participants in a conversation. Considerable disk space is recommended if recording will be used. In this case, drives of 160, 230, 500 MByte, 1 gigabyte or larger configurations are recommended, depending on the length of movies which will be created.

**Conversation Recording with Different Video Compressors.** For users who will be frequently recording conversations and doing this with conversation movies of multiple users, it is recommended to set aside a significant amount of disk space for QuickTime Conferencing usage. Note that different video and audio compressors will produce very different results for disk space usage. Two examples are given here to illustrate this point.

**Conversation Recording with Apple Video Compressor:** Using the Apple Video compressor (which produces data rates typical for CD-ROM playback), a conversation movie of two users will typically require between 1 Mbit and 2 Mbit/sec. Three users will typically require 1.5 to 3 Mbit/sec, and four users will typically require 2 Mbit/sec to 4 Mbit/sec. Keep in mind that a 1 Mbit/sec data rate produces approximately 8 MBytes per minute (or 500 MBytes per hour) so a conversation movie with three users for 10 minutes may require as much as 240 MBytes. This is a lot of data to record a relatively short conversation.

**Conversation Recording with Apple H.261 compressor:** However, use of the new Apple provided H.261 video compressor can reduce these data rates dramatically by a factor of as much as 10 to 20. This type of data rate is atypical

for CD-ROM playback, but is very typical for teleconferencing compression schemes. In the case of H.261, the same figures indicate a conversation movie of two users will typically require between 64 kbit and 128 kbit/sec. Three users will typically require 96 to 192 kbit/sec, and four users will typically require 128 to 256 kbit/sec. Keep in mind that a 64 kbit/sec data rate produces approximately 500 kBytes per minute (or 30 MBytes per hour) so a conversation movie with three users for 10 minutes may require as little as 15 MBytes. Indeed, it should be noted that a single CD-ROM can hold a 20 hour movie using QCIF H.261. Please note that the software based H.261 compressor runs only on Power Macintosh machines at this time.

## Adjusting Audio Levels

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When using QuickTime Conferencing , it is typically necessary to adjust the outgoing sound level (microphone gain) and incoming sound level (speaker volume) to achieve a good balance between reducing echo and maximizing volume levels of the incoming sound. This can take some getting used to. These sound levels can be modified by interactively adjusting the microphone icon (on the sending QuickTime Conferencing controller) and the speaker icon (on the receiving QuickTime Conferencing controller). The adjustments should be made until there is minimal echo of your own voice heard from the remote site. At this time, the default is to have the "echo reduction" box checked in the connection setup dialog.

**Note:** the ideal microphone for using QuickTime Conferencing on an AV or Power Macintosh is the PlainTalk microphone.

## Using External Speakers

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When using QuickTime Conferencing , it is often an advantage to use external speakers with your Macintosh for playback of sound from remote conference participants or broadcast sources. Using external speakers allows a user to amplify the audio coming from remote systems, and often produce a much higher quality audio output than is possible with the built in speakers on many Macintosh computers.

A variety of speakers are available for use with the Macintosh, from the low end (i.e., AppleDesign Powered Speakers II), to higher end systems capable of high-quality stereo sound output with good bass response. It should be noted that often times the computer itself may be on the floor, or in a covered enclosure, reducing the sound levels coming from the computer. Sometimes the reduction in volume can be significant enough so that the audio is inaudible. Use external speakers if possible.

**Note:** the ideal playback of audio when using QuickTime Conferencing, is with a set of high-quality external speakers.

## Selecting Sound and Video Settings:

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The standard image sizes offered in the Apple Media Conference application (using NTSC) are as follows:

Half size (80 x 60)

Normal size (160 x 120)

Double size (320 x 240)

These sizes may be different, depending on the video digitizer used. Also, PAL and SECAM digitizers may provide different resolutions.

### To run on local-area ethernet networks using AppleTalk or TCP/IP:

For conferences with a mix of 68K and Power Macintoshes, it is most practical to use the Apple Video compressor.

Use the Apple Video compressor, 160 x 120 pixels, normal picture quality, no key frames, best frame rate on the send side. Double-size the receive window to 320 x 240 pixels on the receiving machine (optionally). Use normal uncompressed 11 KHz (or 22 KHz) sound for audio on the send and receive stations. To reduce the data rate produced by the Apple Video compressor, use temporal compression and set the key frame rate to 30 frames between key frames. You can also select the MACE3 or MACE6 audio compressor.

If Power Macintosh machines are available for all machines in a conference, then it is bandwidth conserving to use the JPEG or H.261 video compressor.

If JPEG is selected, use 160 x 120 pixels, normal quality, best frame rate and best color depth. JPEG will provide good picture quality and no temporal compression artifacts.

If H.261 is selected, use 160 x 120 pixels, normal quality, best frame rate, temporal compression on with key frames every 50 frames, and picture depth set to thousands of colors.

### To broadcast on a local-area ethernet network using AppleTalk multicast:

Use the Apple Video compressor, 160 x 120 pixels, normal picture quality, no key frames, 15 fps on the send side. Double-size the receive window to 320 x 240 pixels on the receiving machine (optionally). Use normal uncompressed 11 KHz (or 22 KHz) mono or stereo sound for sound on the broadcast stations. You can also resize the sending window while maintaining aspect ratio (to achieve a resolution between 160 x 120 and 320 x 240) by resizing the window while holding down the shift key. It is possible to achieve good frame rates and picture quality for broadcasting at resolutions greater than 160 x 120, but less than 320 x 240. One recommendation is to use 200 x 150 resolution for good results.

If you are using only Power Macintosh's for sending and receiving multicast machines, you can get the best picture quality for sending and receiving

broadcasts, by selecting the Apple Photo JPEG compressor, 160 x 120 pixels, normal picture quality, no key frames, 15 fps on the send side. Double-size the receive window to 320 x 240 pixels on the receiving machine (optionally).

To run on the worldwide TCP/IP internet:

For conferences with a mix of 68K and Power Macintoshes, it is most practical to use the Apple Video compressor.

Use the Apple Video compressor, 80 x 60 pixels, normal picture quality on the send side. Double-size the receive window to 160 x 120 pixels on the receiving machine (Mandatory!). Use MACE 6:1 compressed 11 KHz (or 22 KHz) sound, or use normal uncompressed 11 KHz sound.

If Power Macintosh machines are available for all machines in a conference, then it is bandwidth conserving to use the JPEG or H.261 video compressor.

On Power Macintosh, you should use the Apple H.261 video compressor, 160 x 120 pixels, select least picture quality, temporal compression on, use a key frame every 50 frames, best frame rate, and color depth set to thousands of colors. Use MACE 6:1 compressed 22 KHz for sound. The frame rate should be approx. 10 fps using the software only H.261 video compressor. Another option is to use JPEG, 160 x 120 pixels, normal picture quality, no key frames, 15 fps, color depth set to best depth.

**Note:** Be sure that your site has a T-1 (1.5 Mbit/sec) connection or better to the worldwide TCP/IP internet for full audio, video and shared window connections. We do not recommend using QuickTime Conferencing on links to the internet at only 56 kbit/sec or less for audio, video and shared window connections. However, note that slower speed connections (such as 56 or 64 kbit/sec) can use video only, sound only, or the shared window in conjunction with either sound or video.

## Tips for Better Performance

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Multimedia networking is incredibly demanding of a personal computer and the network it is attached to. It typically involves concurrent sound/video compression/decompression, stream multiplexing/demultiplexing, echo reduction, bi-directional network I/O, and disk I/O, of course typically all at high bandwidths too. For this reason, the following simple tips are provided to achieve good throughput and performance:

Do not leave Finder windows open on your desktop which belong to server volumes. Any server windows which are open require CPU and network servicing which puts a drag on the CPU, and takes time away from QuickTime Conferencing. You may see slight sound breakup if you do not follow this tip.

Do not leave control panels or the Chooser open. This also requires servicing which takes time away from idling QuickTime Conferencing.

Do not leave unnecessary other applications open. This may require servicing even when running in the background and not doing any processing, which takes time away from idling QuickTime Conferencing.

Do not leave the MediaPlayer application open. This requires a lot of servicing even when running in the background and not doing any processing, which takes time away from idling QuickTime Conferencing.

Do not hold the mouse down for very long periods of time for no good reason. After all, why bother? It will take servicing time away from idling QuickTime Conferencing.

Use an optimized disk for recording connections and conversations. This should yield better disk recording speeds.

Don't use large window sizes on older machines. The digitization and compression time can overwhelm some older (and even newer) Macintoshes. RISC machines now and in the future, together with better compression algorithms will yield higher performance at higher resolutions. Try to stick with 160 x 120 resolutions in general for now (but just you wait...).

If you are seeing odd behavior when using the Apple Media Conference application, it sometimes helps to quit the application and drag the Apple Media Conference Prefs file (found in the Preferences folder within the System Folder) to the trash.

## Document Version

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This is version 1.0.1f2.

## Credits

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Document by Eric M. Hoffert & Dean Blackketter.

Software by the QuickTime Conferencing team.

## Important Note

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