

H.323 Terminals for Videoconferencing

The H.323 standard describes the equipment used for videoconferencing over packet-based networks like the Internet and JANET. There are a number of options available when considering the purchase of H.323 videoconferencing equipment. Final choice will depend on the type of use and the budget available. For systems to inter-work over networks connected to JANET they need to support the TCP/IP and H.323 protocol suites.

Studio systems

Studio systems tend to be highly specified and high quality. Sited in a room designed and furnished for videoconferencing, studio systems should have camera features such as pan, zoom, and tilt; configurable pre-set views of the room; and auto-tracking. The H.323 CODEC should be permanently connected to the IP network via a low-contention path and may be connected to other networks e.g. Integrated Digital Services Networks (ISDN).

Peripherals are likely to be permanently attached and integrated into the design of the room. These may include: one or more additional cameras; additional microphones; document cameras; laptop or desktop PCs; VCRs; projectors and additional monitors to preview images before sending or to show the image currently being sent. Studio systems often feature unified control interfaces, such as touch-screen controllers or dedicated remote control devices.

Roll-about systems

These are fully featured systems that are suitable for mounting on a trolley. Generally these systems will consist of a set-top box; high-quality camera; integrated speakers and microphone. They will usually have the advanced camera features described above, and the potential to be connected to additional input and output devices such as laptops, monitors, VCRs or projectors. They should have the necessary connectors to use both ISDN (H.320) and IP (H.323) networks.

While it is possible to construct roll-about systems from different manufacturer's components, generally the system will be purchased as an integrated product, and dedicated trolleys can be purchased for most systems of this type. Like studio-based H.323 terminals, roll-about systems can be managed and configured remotely across the network by technical staff, and a remote control unit will usually be supplied for the user to operate the system.

Desktop systems

A number of manufacturers produce the hardware and software necessary to turn a desktop PC into an H.323 videoconferencing terminal. These systems supply the necessary camera, microphone and speakers, and a Peripheral Component Interconnect (PCI) card that provides hardware support for the video and audio encoding. Although a budget option, some of these card-based systems have been found to inter-work with Multi-point Control Units (MCUs) successfully, allowing them to participate in multi-party calls, and to register for the JANET Videoconferencing over IP (JVCS-IP) service.

It is possible to produce a desktop PC-based H.323 terminal that uses no additional processing hardware by connecting a microphone (usually with headphones), a webcam, and the necessary software. However, such terminals are dependent on the processing power of the PC and may only produce lower quality results. A new type of standalone product – the H.323 videophone – has recently appeared on the market and offers simple H.323 videoconferencing. There is currently little experience of videophones in the educational sector.

Features and standards

Minimum features – necessary for H.323 compliance and basic usage:

- support for the TCP/IP and International Telecommunications Union Technical standards group (ITU-T) H.323 standards (preferably v.2 or higher);
- support for the G.711 audio compression algorithm;
- support for the ITU-T H.261 video compression algorithm;
- Quarter Common source Intermediate Format (QCIF) video format resolution (176 x 144 pixels);
- an Ethernet Local Area Network (LAN) 10Mbit/s network interface (or modem for home PC-based use);
- capable of operating at 128kbit/s.

Common features – for a modern H.323 system:

- ITU-T H.320 standard compliance and a suitable network interface for ISDN use;
- support for additional audio compression algorithms: G.723, G.728;
- support for the ITU-T H.263 or H.263+ video compression algorithms;
- Common source Intermediate Format (CIF) video format resolution (352 x 288 pixels);
- up to at least 24 Frames Per Second (FPS) at CIF resolution, at 384kbit/s;
- video outputs and inputs: composite video, S-Video, PAL/NTSC video formats, eXtended Video Graphics Array Display (XVGA);
- audio outputs and inputs: handset, headset, external microphone, stereo, full-duplex;
- RS-232 Serial and Universal Serial Bus (USB) communications ports;
- Ethernet LAN 10/100Mbit/s full-duplex network interface;
- remote management (over the network);
- support for the T.120 standard (ITU-T Recommendation) for data sharing;
- capable of operating up to 768kbit/s;
- camera pan, tilt and zoom (up, down, left, right, zoom in, zoom out);
- remote control unit.

Additional features – available on higher specification and/or the most recent systems:

- web-based interface for remote management and configuration;
- auto-tracking (focussing on the person who is currently speaking);
- support for the emerging H.264 low-bandwidth video compression algorithm;
- capable of operating at up to 1920kbit/s (or 2Mbit/s).

Points to Note:

The number of FPS is not necessarily an indicator of picture quality, as the video compression algorithms allow for a trade off between FPS (which gives smooth movement) and picture definition. Some manufacturers use their own proprietary encoding algorithms for audio or video compression when in a conference with their own products, and these often give a higher quality. These systems use the open standards when inter-working with other manufacturers equipment.

Further information

An Introduction to H.323 Videoconferencing: <http://www.video.ja.net/323intro.pdf>

Video Technology Advisory Service (VTAS): <http://www.video.ja.net/>

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