Digital Discussion Systems

A new and growing sector in the AV market, discussion systems are designed to offer superior audio quality for meetings of large groups, in a cost-effective package that is easy to set up and maintain. Discussion systems can foster a collaborative and orderly meeting environment by delivering very high quality audio directly to every participant while also providing the chairperson with intuitive management tools.

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Introduction

A pervasive culture of collaboration is creating a need for AV solutions that enable equal contributions from everyone. One such solution is the digital audio discussion system, which allows everybody's voice to be heard in large groups of people while also providing easy management tools to keep the gathering on schedule and on topic. These simple, yet high-quality, one-box solutions are easy to integrate for IT departments and rental houses alike, while also offering an intuitive interface that makes them similarly easy to configure and operate for users.

The New Culture of Collaboration

The proliferation of smart mobile devices over the past decade has brought about some major shifts in the ways that people work together. These devices, through the innovative software applications that they support, are increasingly driving easy communication and collaboration. Simultaneously, millennials, who especially value that spirit of collaboration and interaction, have become the largest generation represented in the U.S. work force. Taken together, these factors have hastened the evolution of a collaborative business culture.

Once upon a time, a boardroom meeting, arbitration hearing, conference presentation, sales meeting,

training seminar, or any number of other gatherings, would routinely involve one or more speakers taking the microphone to address the group. But for those other participants, getting their voices heard often required patience and luck, as they waited for the roving microphone to eventually come their way. The challenges associated with passing one or even a couple of mics among all those who wished to be heard could make it very difficult to run such a meeting in a timely, efficient, or fair manner.

As collaborative and team-based practices have spread beyond business environments to other institutions and applications, there is an increasing desire for every participant's voice to be clearly heard and understood. Indeed, there are now numerous venues where attendees should be able to contribute equally, such as parent-teacher associations, school board meetings, classrooms, and other educational applications; conference, meeting, and presentation facilities at hospitality venues such as hotels and conference centers; local, municipal, and other governmental meetings; and legal and judicial organizations and institutions, including the courts.

In all of these situations, the ultimate goal is to be able to manage a large gathering with the same ease as a small meeting, with the team leader or chairperson directing structured, efficient, interactive, productive, and, above all, intelligible, discussions. One way to achieve that goal is to use a microphone conference or discussion system.

Conference System vs. Discussion System

While microphone conference and discussion systems share certain attributes, they are principally differentiated by their scale and respective features.

These days, both types of system tend to be fully digital in their operation, and networked via wire or wireless, using either RF or IR transmission methods. Typically, they offer a network of microphones with associated controls and LEDs that allow each individual to activate or mute the mic and to indicate that they wish to speak. Indicators on each discussion unit — often, a light ring around the mic capsule — show that a mic is active, muted, or queued up to speak next, which can help maintain order in the meeting.
Both types of system also feature a central control unit, to which all of the mic signals are connected. This device generally provides DSP, logic, matrixing, and other functionality.

A conference system tends to be relatively complex in terms of its installation, operation, and feature set, and typically can be scaled up to a size that enables hundreds of people to participate — far greater than the numbers that can be supported by a typical discussion system. For a long time, conference systems have been associated with institutions such as the United Nations and European parliamentary- and congress-style gatherings, where simultaneous translation into many different languages is required. The system may also need to incorporate a method by which participants can be polled or can vote on the issues before them, as well as various other features, such as secure delegate log-in, a local screen for the display of information, or custom capabilities.

In contrast, a discussion system is usually intended for small to medium-sized gatherings. These systems, available from some of the industry's leading manufacturers, tend to be packaged as modular solutions that are simple to implement and expand, and that offer flexibility and portability.

A central control unit generally offers a variety of inputs and outputs. Additional inputs might be used for external sources such as dedicated playback devices, a laptop, or a smart device. Connections may also be provided that allow a separate handheld wireless microphone or lavalier mic to be fed into the system. There may be an integrated USB connection that allows multi-channel recording of the microphones on the system to a separate drive. Output connectors will typically support a feed to an external speaker system in an audience area or public gallery. In situations where the location must comply with the Americans with Disabilities Act, outputs could be used to drive an assistive listening system for the hearing impaired.

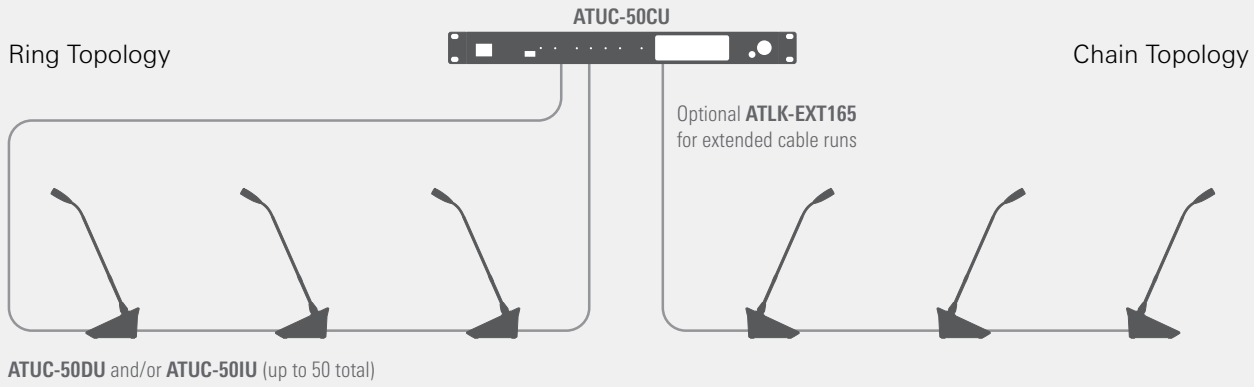
While a discussion system could be permanently installed, it may be more desirable for it to be reconfigurable in order to adapt it to the changing usage of an organization's meeting or conference rooms. Ideally, it should be very easy to set up, portable, and trouble-free and reliable in operation.

Simple, One-Box Solution

A traditional meeting or conference room voice lift design incorporates separate microphones, stands, mixer, matrixing, processing, loudspeakers, amplifiers, and numerous interconnecting cables, including networking. Microphones and speakers are typically installed in the ceiling in a distributed array, an inflexible arrangement that prevents the furniture in the room from being reconfigured for other purposes. Installing, and later expanding, such a set-up can involve multiple disciplines and, consequently, more expense, requiring an IT or network specialist, a DSP programmer, programmers for the third party control systems, audio specialists, and most likely an electrical contractor.

Reliability and/or Connection Options

As shown in the diagram below, discussion units and interpretation units can be connected to the control unit in either ring or chain topology (up to two rings and up to four chains per control unit). Using ring topology increases the system's reliability, since the control unit actually recognizes each end of the ring as the beginning of a new chain. So, if you experience a connection failure somewhere along the ring, all the discussion units will continue to function, albeit as part of two distinct chains.



As essentially a one-box solution, a discussion system instead offers integrators and their clients significant cost savings, not just in hardware but also in implementation. The system is basically plug-and-play, such that it can be moved from room to room and quickly and easily set up by in-house IT or AV staff — or rental companies, of course.

A discussion system usually comprises a single central control unit that interconnects to a number of discussion units — to which it also supplies power — that each house a microphone, loudspeaker, and amplifier. Extra control units may be added to support additional discussion units, up to the system's maximum handling capacity.

Discussion units interconnect to the central processor and with each other often using Cat5e/6 cabling in a daisy-chain or ring topology. The leader of the meeting can control the system via a dedicated discussion unit, usually with extra control features enabled, or on a computer or wifi-enabled tablet or other smart device via a Web browser.

The system's DSP capabilities might include feedback suppression, equalization, and mic gain control, with the ability to set those parameters manually or automatically. The DSP is typically housed within the central control unit and is applied globally to all the connected discussion units. But one person may have a strong voice and speak close to the microphone, while another might be a quiet talker or sit back from the mic. Finding a common setting to suit both could be difficult, if not impossible. It is therefore preferable to be able to customize, save, and recall the appropriate speech settings for specific individuals who use the system regularly or frequently.

Room acoustics can be a major challenge to any audio system. A discussion system that places a microphone and a speaker in very close proximity to each participant effectively overcomes issues relating to the size of the room and its acoustic performance. Everybody in the meeting can hear and be heard clearly and equally well. On-board DSP further ensures crystal-clear and strong speech reproduction while avoiding annoying feedback.

For use in multilingual applications, a discussion system will generally feature additional channels that allow simultaneous interpretation into one or more alternate languages. Individual discussion units will typically feature a headphone output with volume control that allows the relevant participants to listen to a clear audio signal on the interpretation channel for their particular language. And because everybody has his or her own microphone, the interpreter also receives a clear and high-quality audio signal with which to work. A discussion system will also typically include dedicated interpretation units – essentially discussion units with interpretation firmware – that allow interpreters to monitor either the floor language or an alternate one, and output their translations to the appropriate interpretation channel.

Digital minutes of a meeting can be valuable. Lower courts and legal firms, for example, can benefit from the multitrack recording capabilities of a discussion system. A central control unit offering matrixing capabilities will allow particularly critical microphones — for the judge or a witness to be recorded — to be recorded to individual channels, maintaining optimum clarity for the court reporter or transcriptionist.

Hear, and Be Heard

In combination, the features of a typical digital discussion system can ensure the smooth running and easy flow of any meeting or gathering. With overall control of the microphones at his or her fingertips, the person leading the meeting can interrupt proceedings at will in order to maintain a schedule, move to the next item on the agenda, or simply to ensure the meeting remains orderly and productive. The chair can impose structure on proceedings while also enabling a free-flowing discussion.

Lengthy pauses while a microphone is passed around the room are eliminated, since every participant has a mic. Illuminated indicators showing which microphones are active also allow attendees to easily see who is speaking, or about to speak, at a glance, rather than having to search for whomever is currently holding the roving mic.

There is no need for participants to have to raise their hands or otherwise gesture to attract the chairperson's attention. The ability to signal the person running the meeting using simple controls close at hand ensures that every participant will have a chance to be heard and will not be overlooked. Systems can often be operated in a more free-flowing, conversational manner, too, with multiple microphones activated simultaneously.

Mark Donovan, Engineer Manager, Professional Markets for Audio-Technica, notes that a discussion system is beneficial in any situation where people simply need to hear and be heard: "Take the example of a city council, where you've got 15 people in a row on a dais. A council member all the way at one end is going to have a difficult time hearing a council member all the way at the other end — there's no way around it. But discussion units have a loudspeaker built into them, so nobody has to struggle to hear what's going on."

Perhaps most importantly, the presence of a discussion system signals to participants that everybody's voices can and will be heard, that their opinions matter, and that their contributions to the collaborative process are valued. Everybody can be heard, and everybody can hear, including those who are not actively involved in the meeting but are passively listening in the audience to a separate P.A. system or listening at a later date to a recording of the event.

IT-Friendly Implementation

Now that the AV department is usually part of an organization's IT department, consultants and integrators are expected to recommend and provide turnkey systems that are simple to implement yet meet today's sophisticated communication needs. A discussion system is such a solution.

There is minimal wiring between the processor and the discussion units, rather than the confusion of cables typically associated with a conference system assembled from separate components. Further, there are no proprietary multipin connectors to break, as was the case in some early conference systems. Plus, if there are no spare Cat5e/6 cables available, a replacement or extra cable can be purchased at any number of retail outlets.

Not only are Cat5e/6 cable interconnections familiar to IT staff, but additional connections for standard network protocols that may be implemented in a discussion system can also offer certain advantages. For instance, TCP/IP enables the discussion system to be interfaced with third-party controllers, such as those made by Crestron, Extron, or AMX. Additionally, IT staff can monitor the status, performance, and configuration of one or multiple systems on the network, enabling them to quickly provide a solution should a user contact the help desk.

The IT department can also rest easy in the knowledge that, in certain discussion systems, the voice data is secure — a requirement of law firms, for example. While it is possible to gain access to data on some of the commonly used network protocols, a manufacturer might offer encryption or, in other cases, maintain a separate path for the audio, making it impervious to outside interference.

ATUC-50 Digital Wired Discussion System

Audio-Technica's ATUC-50 digital wired discussion system provides 24-bit/48 kHz uncompressed digital audio for clear, intelligible communication. Components include the ATUC-50CU control unit, ATUC-50DU discussion units, and a choice of ATUC-M43H and ATUC-M58H gooseneck microphones.

"Our DNA really calls for the higher quality audio," says Mark Donovan, Engineer Manager, Professional Markets, Audio-Technica. "We've got high-quality mic preamps that can take any mic and provide 24 volts of phantom power in the discussion units, with a really high signal-to-noise ratio, and a dynamic range of 107 dB."

Simple to configure, connect, and operate, the system offers multi-mode operation (Free-Talk, Request-to-Talk, and Full Remote), 12-band feedback suppressor, recording capability directly to a mass storage device on the front of the control unit, and two interpretation channels. A complete system can support up to three control units and 150 discussion units connected in either a daisy-chain or ring topology.

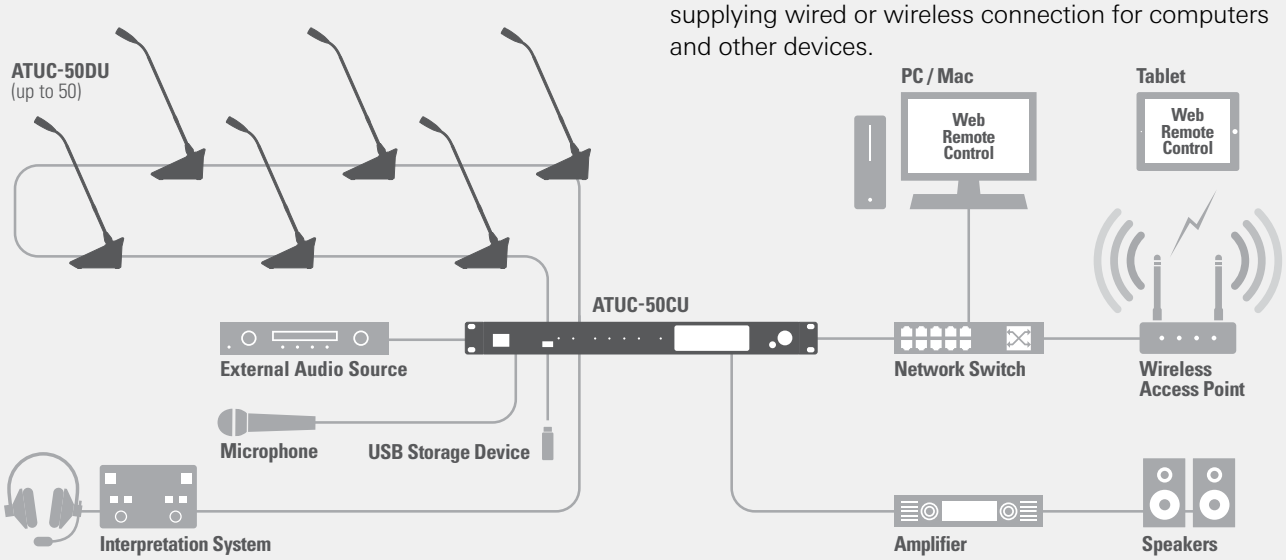
The system can be controlled from any Web browser with no need for additional software installation. Configuration via Web Remote Control is simple and quick; settings may be stored in up to eight presets.

The product is built tough."Audio-Technica spends more time figuring out how to build something for consistency and quality than it takes to design the product in the first place. We're confident enough to put a five-year warranty on this product," says Donovan.

System Connection Example

The diagram below shows common system connections. A total of 50 discussion units and interpretation units with accompanying 16.9" or 22.8" ATUC-M gooseneck microphones connect to the control unit, in either chain or ring topology, using Cat5e (or better) cable. A microphone or other external audio source connects to one of two balanced MIC/LINE inputs.

An amplifier and speaker connect to one of four balanced outputs. A USB mass storage device connects to the USB input on the front panel for recording purposes. A network switching hub connects to the control unit's Network terminal via Cat5e cable, supplying wired or wireless connection for computers and other devices.



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