

## Architectural and Engineering Specifications

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The solution shall be a complete audio solution for conference rooms and conference spaces. All components in the solution shall be Dante enabled and PoE or PoE+ powered, requiring only one CAT5e or Cat6 cable for both power and data/audio transmission to the devices. The solution shall include up to eight tabletop microphones, two wall speakers, an audio processor, and a network switch all from one manufacturer. Furthermore, the solution shall be expandable by up to two ceiling microphones. The tabletop microphones shall all be programmable for the audio pick-up patterns. Audio pick-up patterns shall include omni-directional and a toroid pattern to capture 360 degree around the microphone with toroid reducing sounds from above the microphone. The microphone shall also allow for cardioid, super cardioid, and hyper cardioid pick-up pattern. When selecting any of the cardioid pick-up patterns, up to four independent directions (“channels”) can be defined per microphone and all four will be active. A predefined bi-directional cardioid pick-up pattern with two lobes opposite to each other shall be available, with free selection of the direction of that pattern. When selecting several active channels, different mixing options shall be offered, including gain-sharing options and all-mix. The tabletop solution shall also offer an Active Voice Tracking setting in which the microphone elements that provide the best audio capture are automatically selected and mixed into the audio output of the microphone. The microphone shall include audio post-processing. This shall include Adaptive Acoustic Echo Cancellation, Noise Reduction, Human Voice Activity Detection, Automatic Gain Control, Automatic mixing of audio signals, dereverberation, and others. An installation mechanism shall be provided to install microphones in a fixed location on surfaces like tables. Each tabletop microphone shall provide an audio signal that was only post-processed using linear algorithms allowing for technology like speech recognition to use the signal without loss of performance. The wall speakers shall be line-array speakers with 16 speaker elements each. Two speakers shall be included in the solution. The line array wall speakers shall create a directionality to the audio signal, resulting in reduced signal loss over distance. The line array wall speakers shall be specifically designed for communication and conferencing applications, with emphasis on the typical frequency spectrum of human voices. The room audio processor shall support a means to detect the separate solution devices like tabletop microphone and wall speakers and auto-configure the audio flow between these devices. As part of that process it shall configure the devices to communicate correctly with each other. It also shall provide a mode to automatically measure the acoustic in the room and tune the audio of the solution to the specific room acoustic. The room audio processor shall integrate with standard call managers using SIP telephony. It furthermore shall support Bluetooth to connect to cell phones. USB audio shall be supported for integration with Unified Communications clients. The room audio processor shall support analog audio for connections with video appliances/codecs. The room audio processor shall support two analog microphone inputs for presenters in the room. These inputs shall allow voice lift for audio on these microphones, but at the same time mix the audio into the outgoing stream on USB, BT, analog audio, and SIP. Feed-back suppression shall be supported on these microphone inputs. A network connection into the room audio processor shall allow for remote management of the overall solution from a corporate network. The network switch shall be approved and pre-configured to be used in Dante networks. It shall support PoE+ support on eight connections, up to 240 Watts. The solution shall provide connectivity for third party control systems, allowing to manage system, microphone, and audio behavior from the room control system. It shall be remotely accessible for monitoring and managing. The solution shall be able to send proactive information on its state and possible problems to a management system. The Yamaha ADECIA tabletop solution is specified.