

CONTROLWORKS VOTING SOLUTIONS FAQ

Abstract

This publication responds to frequent inquiries from various municipalities and integrators regarding ControlWorks voting system functions and capabilities.



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Introduction

ControlWorks is pleased to provide this FAQ for your evaluation of our Voting Solutions. Although Voting systems are a ControlWorks specialty, we also offer the integration of additional functionality, including request to speak, timers, automated broadcast control (to enhance public access to meetings with reduced costs), in room audiovisual and lighting control into a single comprehensive, reliable, and user friendly interface.

For any specific questions, or if you would like to discuss your project in more detail, please contact us at 440.449.1100 and select option 3 for commercial programming, or you can send us an email at support@controlworks.com.

ControlWorks Company Background

Established in 1998, ControlWorks is a premier Crestron Services Provider specializing in consulting, designing, and programming Crestron integrated systems. Our solutions typically use "off-the-shelf" Crestron hardware with custom programming and a wide variety of hardware and software interface options. We also provide programming and system design services for systems designed around solutions from Extron and Biamp among other leading manufacturers.

With voting and legislative systems as a core specialization, ControlWorks is proud of its involvement with successful projects with the Senate of Virginia (United States), City of Vancouver (British Columbia, Canada), and City of Oroville (California, United States), among many others.

Qualifications

100% of our programming staff has attained the title of "Crestron Certified Master Programmer" including two Silver Certified Master Programmers (CCMP-S), one Gold Certified Master Programmer (CCMP-G) and one Platinum Certified Mater Programmer (CCMP-P). Our dedicated staff brings decades of experience with Crestron systems combined with diverse professional backgrounds including integration management, University audiovisual and information technology design and engineering, electronics engineering, and technical theater/theme park environments.

ControlWorks Role in Voting Projects

ControlWorks Voting Solutions are not prepackaged but rather customized to the specific needs and wants of the legislative body. Although we prefer to develop this as a collaborative undertaking between stakeholders, in some cases it may be desirable for the body to develop a Request for Proposals/Quotes (RFP/RFQ) that includes a compete statement of work that multiple vendors may consider and respond to in an open bid format.

The nature and degree of ControlWorks' involvement in a project is typically determined based on procurement policies and organizational budgets. Most commonly one of two engagement formats is used; however these are not the only options that may be considered:



- Direct Contract/Consultant: In this format, ControlWorks engages directly with the end user, and a collaborative relationship is forged to assist the end user to develop a final software and hardware design and to coordinate with integrators (who will provide the hardware sales, installation and non-Crestron configuration services). Although this approach provides closer coordination and may ensure that the Body's needs are met more completely, it involves the body letting at least two contracts (to ControlWorks and to the selected hardware vendor(s)/installer(s)). This format is a particularly good fit for organizations looking for particularly unconventional or "boundary-pushing" solutions
- Subcontract/Programmer: In this format, ControlWorks operates as a subcontractor to the
 Crestron dealer (hardware integrator) and is subject to their direction regarding system design
 and our scope of work. Although this approach lessens the body's contracting burden and may
 simplify project management from the body's perspective, the lack of a direct relationship and
 communication between the body and ControlWorks may decrease the efficiency and pose
 some challenges in ensuring that the overall design completely meets the body's needs.

Regardless of format, ControlWorks provides complete end-to-end control system programming and on-site programming commissioning based on a scope of work prepared by ControlWorks. This scope of work is presented to the end user (in the Direct Contract/Consultant format) or Dealer (in the Subcontract/Programmer format) for approval before any programming is commenced and describes all features that will be provided as part of the system programmed by ControlWorks, warranty and intellectual property terms, as well as the total price for ControlWorks services.

Request to Speak

Does your solution support Request to Speak (RTS) Functionality?

- Yes. While the opportunities for customization are unlimited typical ControlWorks Request to Speak Queue functionality allows the Clerk or Chairperson to "advance the queue" wherein one button gives the "Floor" to the next speaker in chronological (First in-First out) order. Additionally the Clerk or Chairperson may select any user from the queue and grant them the floor ("jump the line") or remove them from the queue entirely. The option to "Clear the Floor" may be used to remove the current user from the floor without granting the floor to another user, or to "Clear the Queue" to remove all users from the queue.
 - Notifications can be delivered to the user (e.g. "You have been removed from the queue",
 "You currently have the floor") via their touch screen interface.
 - The ability for the Clerk or Chairperson to reorder the queue dynamically may be provided if desired.
 - As long as a compatible Audio DSP platform is used (Such as Biamp Tesira, BSS SoundWeb, Symetrix Radius, etc.), microphone control can be easily accommodated in "Fully Manual", "Fully Automatic" or "Manually Assisted" configurations.
 - **EXAMPLE:** In some ControlWorks-programmed systems, granting a user the floor will automatically activate their microphone. When the user no longer has the floor their microphone will automatically be disabled. In other systems, granting the user the floor will enable controls for their microphone but not automatically activate it.



- Depending on the client's desire, this may be used in conjunction with manual control from the Clerk/Chair's touch screens and/or Member's user interface, or manual control may be inhibited.
- Microphone control through or from a 3rd party web based system would depend on the capabilities
 and available interfaces to that system; typically microphone control is via direct control of a
 compatible audio DSP platform as mentioned previously.
 - EXAMPLE: In the Senate of Virginia projects, microphone status (e.g. "On" or "Off") is reported to senate-maintained systems in real time as the status changes but no persistent log is maintained in the Crestron system.
 - Depending on the Body's desires, this information may be stored locally on the Crestron processor (e.g. as a .CSV file), or it may be passed to an external system using the methods previously discussed.

Can you have multiple Request to Speak (RTS) gueues?

- Yes, multiple independent Request to Speak (RTS) queues can be easily supported; the total number
 of queues that could be supported is practically unlimited, and would be determined and fixed as
 part of the scope development process.
 - EXAMPLE: In the City of Vancouver project, support four RTS queues is provided Question, Main, Amendment 1, and Amendment 2, although City staff determine which queue will be active at any point in the proceedings.
 - EXAMPLE: In Senate of Virginia Committees a "Request to Present" queue is employed to allow proponents of legislation to electronically "sign in" to present their matter before the committee, in addition to a traditional Request to Speak queue for committee members.
- Although RTS queues typically function independently, if desired by the body, ControlWorks can
 apply business rules or link actions across queues. For example, clearing all queues in one action
 when the order of business is advanced rather than needing to clear each queue independently.

Can the Request to Speak (RTS) queue be displayed elsewhere?

- As the Request to Speak Queue exists within the Crestron environment, we can display the contents
 of that queue wherever it may be desired including on member touch screens, on independent
 RTS queue displays, or (with appropriate hardware) overlaid on presentation video.
 - EXAMPLE: In the City of Vancouver project, the contents of the RTS Queue are displayed on each Councillor's software-based "XPanel", and at the City's discretion may also be displayed with the projected video in the Chamber.
- The Request to Speak Queue may also be rendered in other formats or relayed to other systems (such as archival, meeting management, or web servers) based on the specific needs and desires of the client determined during the Scope of Work Development.



Agenda/Meeting Management

Can the voting system interface with outside systems to retrieve agenda items, load voter names, or "push" vote results to external devices?

- Our Voting solutions can be designed to operate as a self-contained solution or with an interface to
 other systems. Specific details on the type of interface would need to be coordinated in cooperation
 with those responsible for maintaining that system.
 - EXAMPLE: In the Senate of Virginia projects a RESTful interface utilizing the industry standard JSON format, enhanced in consultation with Senate staff, is used to interchange (push and pull) data in real time between multiple ControlWorks voting systems and backend Legislative Information Systems processing.
 - EXAMPLE: In the City of Vancouver project, information inbound to the ControlWorks voting system is retrieved using an HTTP GET of a specially formatted file. Voting results are written to a.CSV file stored on the Crestron processor and are emailed in a human-readable format from the Crestron processor to a designated email address.
 - EXAMPLE: In various systems used by smaller municipalities, all information is entered by the Clerk and/or Chairperson using Crestron touch screens, while voting results are emailed in a Human-readable format with a .CSV file attachment that may be imported to their archival systems.
- As with the previous bullet, loading agenda items and member names is quite easily achievable via a number of possible interfaces that would need to be coordinated with those responsible for the 3rd party system.
 - EXAMPLE: For the Senate of Virginia systems, all name management is handled in Senatemaintained applications and passed using JSON objects and pushed using our RESTful interface allowing changes in seating assignments or committee assignments to be updated instantaneously without requiring duplicate efforts.
 - EXAMPLE: For the City of Vancouver project, Councillor Names and seating assignments are maintained on the Crestron processor, while agenda items are initially loaded via an HTTP GET request for a specially formatted file. The ability to make modifications (for example, adding amendments, adding new items, or deleting items) via Crestron touch screens is provided, however this is not currently synchronized back to the source.

Attendance and User Management

Does your solution support Attendance?

- Attendance needs and business rules are an area of wide variation however the most common approaches are a dedicated "PRESENT" button that is either always enabled or only enabled during specified times (e.g. attendance calls at the beginning of meetings) or using events (such as voting) to set attendance.
- Depending on the body, business rules may be such that "any vote sets attendance to present"
 (with the assumption that by voting the member is clearly present), "user may only vote if



previously marked present" (with the assumption that if the user is not present, clearly they may not vote), or voting and attendance may be completely independent.

• In all cases, it is typical that the Clerk/Chair have functionality to view attendance as well as change each user's attendance state as needed.

Can we add members when we need to?

- Changes to existing Members (such as seating changes or name changes) can be easily accomplished
 with the specific means to be determined (for example, if the Crestron processor is maintaining
 names, this could be accomplished from Crestron touch screens; if names are retrieved from an
 outside source, these changes could be automatically loaded by the Crestron processor after being
 changed in that system)
 - The maximum number of Members is fixed in programming; thus additions beyond that maximum could be easily accomplished but not done by the operator directly.
 - EXAMPLE: For all Senate of Virginia systems, names and seating assignments are maintained by Senate systems and passed via the RESTful interface. In the Senate chamber, there is always a total of 40 Members, however in Senate Committee Rooms the number of users varies based on the specific committee utilizing the system. Committee voting systems are designed to a maximum of 21 users and touch screens associated with unused seats are locked out and display the Senate Seal/Coat of Arms.

We have additional spaces that require voting. Can your solution span more than one space?

- Systems could be designed and programmed for any number of auxiliary spaces maintaining a
 consistent look, feel, and method of operation for those spaces. Those systems would typically
 undergo an abbreviated design process defining the differences from the primary system.
 - o EXAMPLE: In 2016/17 The Senate of Virginia piloted Committee Voting in one Committee room, with the project being expanded to all current Senate Committee Rooms during the Spring and Summer of 2017. As of 2019, plans are underway to incorporate voting into all new Committee rooms in the General Assembly Building currently under construction. The Senator's user interface for all systems is virtually identical with minor modifications to suit the differences in use, room capabilities, and rules between the main body and Committees (including, for example, the ability to grant or revoke a Proxy to another member allowing them to vote on that Senator's behalf in Committee meetings.) Expandability and Flexibility

Our room is used with multiple types of meetings (such as committees, boards, or combined city/county facilities). Can your solution work across those meeting types?

Support for multiple bodies is typical, with most City or County-based voting systems supporting 5-9
meeting types. However, the maximum number of meeting types is determined as part of the scope
development process and does not have an architecture-imposed maximum.



Some meetings do not require voting capabilities. How does your solution accommodate a simple presentation?

• Typically one "non-voting" or "Audiovisual Only" meeting type is provided where voting and Request to Speak functionality is disabled but audiovisual controls such as microphone control remain available.

What do our Members use to cast their vote?

- As our voting systems are built with a Crestron processor at the core, any touch screens, keypads, etc. that are supported by a Crestron processor can be supported.
 - ControlWorks recommends dedicated Crestron user interfaces for simplicity, security, and reliability. In particular ControlWorks has found the TSW-732 or TSW-560P touchpanels and Keypads with distinct buttons and tactile feedback work particularly well for voting member user interfaces.
 - Android and iOS devices can be supported via the Crestron applications available for those devices or, as a more ambitious approach, a custom Android or iOS app could be developed to communicate with the voting system.
 - EXAMPLE: In the City of Vancouver project, Councillors use the Crestron XPanel executable application running on their desktop computer as their primary interface to the voting and audiovisual systems to help free up limited desk space.

How does your solution accommodate people with disabilities?

- Every individual is different and has different capabilities so any solution ideally involves information gathering along with consultation with the impacted user to determine the best accommodation.
 - **EXAMPLE:** In the City of Sioux City, a council member with limited mobility uses a keypad with distinct, tactile, buttons to register his vote.
 - The use of a tactile keypad instead of or in addition to a touch screen can be easily accommodated and may assist low-vision or visually impaired users with their access to the system.
 - Touch paddles or "sip and puff" devices with an appropriate interface (such as serial, contact closure/logic/TTL, voltage, or Ethernet) could be incorporated.

How does your solution work in the event of a failure such as power, or network interruptions?

- Specific considerations will depend on the ultimate hardware configuration and communication topology, for example assuming a system similar to that deployed for the Senate of Virginia, using Crestron Ethernet-based touch screens and a RESTful interface with Senate applications:
 - The failure or disconnection of a single touch screen would only affect the operation of that touch screen with no cascading effects. Changes in votes or requests to speak from that touch screen would not be recorded until it had been replaced (in the event of a failure) or allowed to fully boot (in the event of a disconnection). This would not impact other users.



- EXAMPLE: In the City of Vancouver, where a PC-based application was used, and
 thus the potential points of failure are increased, a "Vote Assist" function was
 provided to allow the Clerk and Chair to vote on behalf of any Councillor if needed.
- At a minimum, we recommend that the Crestron processor and network switch(es) be connected to an uninterruptable power supply (UPS). In the event of a power failure or Crestron processor reboot, after being allowed to boot, the system will return to the same state as it was immediately prior to the interruption. Request to Speak Queues are typically not saved in memory during a reboot, however these could be preserved across reboots if desired.
- Any transient network disruptions between the Crestron processor and user interfaces will be virtually seamless and user interfaces will sync to the current state and information once connectivity is restored.

Other Capabilities

Does your solution support speaker timers?

- One or more timers may be provided (for example, "Council" and "Public") with individually configured time limits and "warning" times. Although countdown is the typical method, timers that count up may be provisioned. These timers may be displayed on touchpanels, 3rd party video devices, relayed to other systems, and used to trigger warning ("Traffic Signal") lights.
 - Timers may be manually started and stopped or configured to automatically start when a microphone is turned on, when a user has been granted the floor in the Request to Speak queue or based on other pre-defined trigger events.
 - EXAMPLE: In Senate of Virginia Committees, public speakers are reminded of time remaining via a dedicated display located on the lectern as well as a timer overlaid on informational video displays in the room. When the timer is started, the green indicator is illuminated, when a City-determined "warning" time is reached the yellow indicator is illuminated, and at 5 seconds remaining the red indicator is illuminated. When time expires the red indicator turns grey and begins counting up until the timer is reset by the Clerk or chair person.
 - EXAMPLE: In the City of Vancouver, each Councillor is tracked for the total time speaking on any one agenda item. This time is displayed in the Request to Speak Queue so that all Councillors may be aware of their colleagues' use of time. A Councillor's individual timer is automatically started when he or she is granted the floor and stopped when the Councillor no longer has the floor.

We'd like to broadcast our meetings over a live streaming platform.

To reduce costs while enhancing public access to proceedings, an automatic camera control system
may be provided. Typically, this feature would include pan/tilt/zoom cameras, a broadcast switcher
to switch between cameras and character generator to insert City logos and speaker names.
Interfaces to the room audio DSP and intelligence about the meeting already contained within the
ControlWorks system allows for camera positioning, switching, and titling to be accomplished
completely automatically with a high degree of accuracy.



- **EXAMPLE:** ControlWorks deployed such a system for the City of Vancouver ensuring that Councillors are correctly identified and that the viewer never sees a camera move on air.
- EXAMPLE: ControlWorks has developed specifications for the Senate of Virginia's Committee Rooms. This solution allows for all committee meetings to be broadcast and streamed live, complete with closed captioning and tightly-integrated on-screen graphics including name of the current speaker, bill number, a brief description of the current item, and timer status all without requiring any additional staff. This solution dramatically increases public access to and transparency in the legislative process while realizing a savings of over \$60,000 per year.



Selected User Interface Examples

The options for user interfaces are virtually unlimited – ranging from Crestron hardware solutions to applications running on commodity hardware, or even a standard pushbutton. The images below and on the following pages reflect a sampling of the possible solutions for your consideration, however the specific look, feel and operation of your system would be the result of a collaborative process with input from the end user.

Senate of Virginia, Virginia, United States – Chamber Voting System

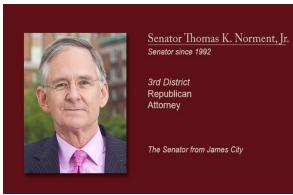


In this second generation system, Crestron TSW-730/TSW-732 touch screens are located at each Senator's desk. Voting controls are provided on the right side of the touch screen while microphone management, request to speak, and page request controls are provided along the left side. The TSW-730 and TSW-732 include tactile buttons with individually selectable Red or Green backlighting for each key which is

leveraged to convey information. When the Senate is not in Session, either the Senate Seal (Coat of Arms) or demographic information about the Senator assigned to that seat may be displayed.

Microphone On/Off and Retract Microphone: This system allows microphones to be simultaneously controlled in a number of ways: The Senator may turn his or her microphone on or off manually by touching the "MIC OFF" button or the associated hard button. When the microphone is on the color changes to green and the text changes to "MIC ON". Members of the Senate Clerk's staff may turn microphones on or off individually or may turn all microphones off if needed. As hand-held microphones are used, a switch located in the microphone holder automatically turns the microphone on when it is removed or off when it is replaced. Finally, an electronic cable retractor is provided for the microphones and may be activated either by tugging on the microphone cable, or by touching the "RETRACT MIC" button, additionally turning the microphone off.

Request to Speak and Request Page: These functions toggle (add or remove) the Senator from the queues utilized in this system. Request to Speak indicates to the President of the Senate and Clerk's staff that the Senator desires to speak and the list is presented in the order requested. Request Page indicates that the Senator desires the assistance of a Senate Page. Depending on the section of the Chamber the Senator is seated in (North or South) different queues are utilized. The contents of both queues are displayed on



When the chamber is not in use, demographic information about each Senator is displayed on the touch screen at that Senator's seat to aid school and tour groups visiting the Capitol.



"Page Boards" allowing available Pages to serve Senators in their section of the Chamber in the order that Page assistance is requested.

Voting Controls: The YEA, NAY, and R36 (Rule 36 – Indicating that the Senator has a financial conflict of interest) buttons allow the Senator to register their desired vote. When the vote is closed these buttons are displayed in gray. After a vote has been called and no vote is recorded the YEA, NAY, and R36 buttons are indicated in Green, Red, and Yellow respectively. Concurrently the physical buttons associated with the YEA and NAY touchscreen buttons are also illuminated in Green and Red. Once a vote is registered, only that button remains illuminated while the other options return to the grey state. As long as the vote



remains open the user may change their vote by selecting any other option; touching "CANCEL" clears the selected vote and returns that user to the not voted state.

Summon Member: A function allows the Clerk or Clerk's Staff to "Summon" a Senator to the Dais by selecting their seat from a floorplan. When a Senator is summoned a large red message is flashed on that Senator's touch screen. Any number of Senators may be summoned simultaneously.

Senate of Virginia, Virginia, United States – Senate Room A Committee Voting

This system is utilized in one of the Senate Committee Rooms and supports committee sizes up to 21 members – the maximum Committee provided for under Senate rules. Functionality is very similar to that encountered in the Chamber making the transition easy for Senators. Differences based on room utilization and Committee rules include:

- Adding the Senator's name at the top of the touch screen to ensure the Senator is correctly seated as seating assignments differ from committee to committee.
- Proxy voting functionality, allowing a Senator to designate another Senator to vote on their behalf during temporary absences.
- Substituting an ABS (Abstain) vote option for the R36 vote option to accommodate different rules for voting between votes taken in Committee or in Senate Session.



Example of Committee Voting System Touch screen Showing Senators who have granted Sen. Black their proxy to vote; this list may be scrolled by "swiping", similar to a smartphone. Similar functionality may be used to display Request to Speak queues or other information.

- Removal of the "Request Page" function as Pages are not generally used during Committee meetings.
- Temporary removal of the Microphone controls, as for the pilot project the existing room audio system was not modified.



Senate of Virginia - Administration

These images reflect components of the displays available for use by the Clerk and Chair/President in the Senate of Virginia Systems.



Request to Speak Queue – Allows the Clerk or Chair to view or manage the Request to Speak Queue. The next user in the queue may be granted the floor simply by touching "Give Floor to next user". Similarly the floor may be cleared by touching "Clear Floor". Any user waiting in the queue may be selected and granted the Floor out of order by touching "Give Floor to selected user", or the user may be removed from the queue by touching "Remove selected user". All users may be removed from the queue immediately by touching "Remove all users from Queue". When the number of users waiting in the queue exceeds the available display space, this list may be "swiped" up or down, much like a smartphone or tablet.

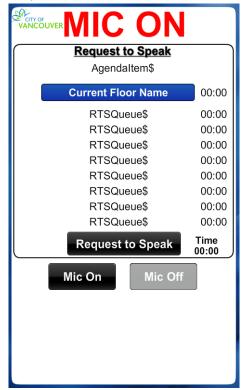
Microphone Control – This screen reflects the arrangement of member desks in the Senate Chamber. The Clerk or Clerk's staff may view microphones that are currently on as well as turn individual microphones on or off by touching the desired name or desk number. All microphones may be muted or disabled to prevent any Senator microphone from being used. A similar display is utilized to summon Senators to see

the Clerk, as seen on Page 9.





City of Vancouver, British Columbia, Canada



City of Vancouver Councillor XPanel when a vote is neither open nor vote totals displayed.



Lower portion of Councillor XPanel displaying Voting controls when a vote is open



Lower portion of Councillor XPanel displaying Voting totals after voting has been closed

In this system, to conserve desk space, each Councillor utilizes a custom Crestron XPanel running on their desktop computer. The XPanel provides microphone control, Request to Speak control and status, as well as voting controls and results in the lower section of the display. At the top of the application a prominent "MIC ON" warning is displayed when the microphone is on. Although microphones are primarily automatically turned on when a Councillor is granted the Floor and turned off when the Councillor no longer has the Floor, manual control is available – for example, if it is necessary to raise a point of order or make an inquiry of a speaker or the Chair. Conversely, the microphone may be manually turned off to suppress a cough or side conversation.

For each Agenda Item, Councillors are permitted a maximum time to speak to that item. The timers next to each user in the Request to Speak queue allow visibility to help ensure equitable use of time while the Councillor's own time is always displayed to ensure judicious use.

When a vote is open, the voting controls are displayed in the lower section of the application. When a vote is closed the results of the vote are displayed in the same region.



City of Oroville, California, United States



In this system, each City Councilor has a four-button Crestron keypad available for voting, as well as requesting to speak. When the user is not in the queue, pressing the Request to Speak button adds them to the end of the queue and the LED illuminates. If the user is in the queue, pressing the Request to Speak button removes the user from the queue and extinguishes the LED. The LED flashes when the user has the Floor. Microphones are manually controlled via buttons built into each microphone and separate from this keypad.

St. Charles Parish, Louisiana, United States



In this system each County Commissioner has a six-button Crestron keypad available to vote Yea, Nay, or Abstain. In addition, the user may insert his or herself into the Request to Speak queue or remove his or herself from the queue by touching the "Cancel Request" button. The "Attendance Present" button allows the user to mark his or herself present (LED illuminated) or absent (LED extinguished) at any time and voting controls are only activated if the user is preset.