

Using Mobile Devices as Control Interfaces for AV Systems



The fundamental objective of an audiovisual control system is to simplify and automate the operation of media systems and control of the physical environment by us, human beings. In the corporate world these humans typically come in two flavors with respect to audiovisual spaces: *users* and *technical support personnel*. While these two stakeholder groups regard audiovisual resources from opposing ends of the functionality spectrum, they both share in a common reality of the world today – that just about every individual in the corporate world not only possesses a mobile device but tends to treat it as an extension of their carbon based existence, keeping it within inches of themselves throughout their conscious life.

This new mobile reality has done two important things with respect to audiovisual control: placed ever increasing data processing power in the hands of virtually every individual and provided them with a familiar interface that they have already learned to interact with almost instinctively via multi-touch swipes, taps and gestures. While audiovisual control systems had made the transition from push button type interfaces to touch interactive *Graphical User Interfaces (GUIs)* as far back as the early '90s, the inevitable paradigm shift of the 2010's will be to harness the personal computing power, ubiquity and familiarity of personal mobile devices to further simplify and improve the audiovisual control experience.

Control to the People

The control system vendors' first foray into distributed control, beyond the physical installation of a standard push button panel or touch screen control panel within a controlled space, was to provide

virtual control portals via web browsers. Different vendors achieved this in different ways, typically by including a web server within their master control processors or by integrating a VNC server within their touch panel processors. Both methods provided a means for users and technical support personnel alike to remotely access a replica of the room based control system GUI via a standard browser on their desktop or laptop.

This means of web based remote control is generally still available today and represents one solution to distributed control via mobile devices, through the use of standard web browsers such as Internet Explorer, Safari and FireFox. The down side is that these web based control pages are not optimized for mobile devices such as smart phones and tablets. They are simply native proprietary touch panel control files that have been re-published as full size web pages using the vendor's GUI design software and re-purposed for viewing on mobile devices (think square pegs in round holes). The end result is that although control is indeed made available to the mobile device, the control experience is no longer as simple, intuitive or effective as it would be using a touch panel or full size laptop/desktop due to the small form factor and multi-touch interface of the mobile device.

Investing in the User Experience

Circa 2010, following the industry altering release of Apple's iPad which infused the notion of tablet computing with the company's signature attention to design aesthetic, build quality and silky smooth user engagement, the major control system vendors started to turn their own attention to the development of small round pegs – dedicated control apps for the exploding mobile device market.

This was initially driven by the residential AV world where users were demanding whole house control via their smart phone or tablet to eliminate the obligatory cluster of disparate device remotes lining the coffee table and to avoid having to install dedicated control panels in every room. Relatively low cost consumer grade solutions emerged that married infrared (IR) control emitters, capable of controlling home AV systems via wired or wireless IR signals, with mobile device apps communicating with them via Bluetooth or Wi-Fi. These included the Logitech Harmony Link system and Griffin Technology's Beacon device (paired with Dijit Media's Universal Remote app). The major commercial control system vendors such as Crestron and AMX were soon to catch up, developing custom control apps for the two dominant mobile device platforms on the market – Apple's line of iOS driven iPhones, iTouches and iPads, and Google's burgeoning line of open architecture Android-based smart phones and tablets.

These control apps finally provided an evolved, easy to use and graphically compelling control interface optimized for mobile devices. The current generation of these apps (for example Crestron's Mobile Pro G and AMX's TPControl apps) capitalize on the now familiar multi-touch interactivity built into smart phones and tablets to provide a rich media control experience incorporating smooth scrolling three dimensional icons, drag and drop functionality and inset video previews. However this investment in replacing browser based control and improving the user experience does not come

without a significant cost that is transferred to the user – the full versions of these dedicated control apps are currently priced anywhere between \$99 and \$699, although reduced functionality freemium versions do also exist (largely to whet the appetite for the almost inevitable deferred investment in the full versions).



Crestron Mobile Pro G control app and iPad / iPhone docking solutions

Mobile Control in the Workplace

As mentioned earlier the adoption of mobile device control in the corporate workplace needs to accommodate both *users* of audiovisual systems and the custodians of those systems, the *technical support personnel* that generally fall under the corporation's AV, IT or Facilities groups.

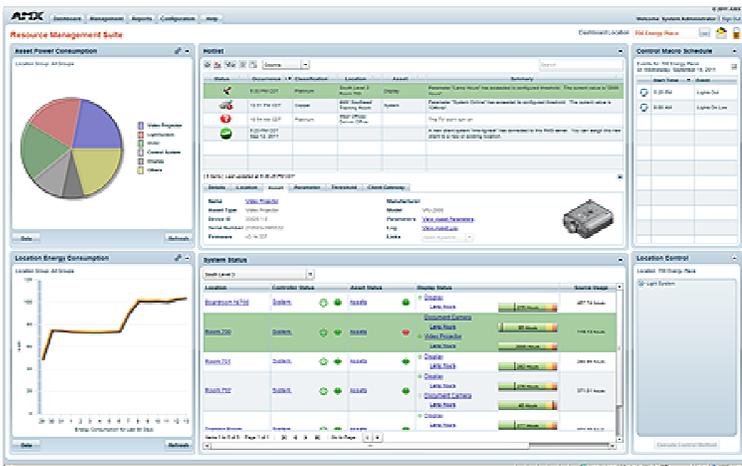
Corporate *users* of audiovisual systems can benefit from mobile control apps by enabling their personal mobile device to control the audiovisual systems in a media collaboration room, for example. This is not without complication or risk however. Firstly, until a reliable solution is available to *automatically* connect a user's mobile device with the control processor in a particular room (more on such emerging technologies below), each "room" will need to be manually pre-configured on each mobile device and corporate Wi-Fi routing permissions set up to where mobile devices are not restricted from accessing audiovisual devices which are typically configured on their own VLAN. This requires planning and management even in a controlled environment where a business adopts a common mobile platform enterprise-wide (say iOS or Android) and distributes mobile devices to each employee. However, with the unstoppable momentum building behind the so-called *Bring Your Own Device (BYOD)* movement, the task of pre-configuring disparate personal mobile devices to integrate with room-based audiovisual systems while maintaining appropriate corporate network security policies becomes exponentially more complicated.

Another challenge that exists today is how to ensure that a user's mobile device is communicating with, and *ONLY* with, the audiovisual systems local to the room he or she is in. With current mobile control apps that user would need to remember to manually switch between rooms pre-populated on

a drop down menu in the app to avoid inadvertently controlling audiovisual systems in another room (perhaps a room they had previously used, for example). Forgetting to make this change could clearly have serious unintended consequences if someone were to unknowingly switch media sources or adjust lighting settings in another room while that room was in use! Reliable Wi-Fi communications can also sometimes be a challenge with mobile control depending on the density of users sharing the available bandwidth, an issue that has been known to compromise the connectivity of even commercial grade wireless touch screen control panels if they are placed on a shared network rather than a dedicated VLAN. For these reasons it is prudent and recommended practice to provide redundant forms of control in corporate audiovisual spaces, typically in the form of a hardwired touch screen control panel, push button panel and/or browser based control of room systems, in addition to any deployment of mobile device control. Businesses may be attracted to the forward thinking concept of audiovisual systems control via mobile devices, but most businesses are also inherently risk averse, so reliability and redundancy become priorities in most commercial installations.

In addition to users, *technical support personnel* can also greatly benefit from the ability to control audiovisual systems via mobile devices. In some ways even more so, since support personnel typically only spend a small percentage of their working day positioned behind a desk while the majority of their time is spent out on site supporting their clients (the *users*). Therefore mobile access to room-based audiovisual systems provides a lifeline giving them the ability to remotely monitor, diagnose and control the audiovisual systems in any room at any time while on the move, which translates into improved response times and more effective support for users requiring technical assistance.

One important differentiator between technical support personnel and users with respect to mobile control is the requirement to remotely monitor and diagnose audiovisual systems. This capability is typically provided using enterprise level audiovisual asset management software (such as Crestron’s Fusion RoomView and AMX’s RMS platforms) to monitor and manage all room-based audiovisual systems via the audiovisual VLAN. Unfortunately at this time even the major control vendors have not developed a dedicated mobile app for their asset management platforms, so remote monitoring and diagnostics remains via a browser based utility portal which is not optimized for tablets.



AMX Resource Management Suite (RMS) asset management portal

Emerging Trends in Mobile Control

The most anticipated developments in mobile control are in the strategic adoption of location based technologies to enable automated handshaking between mobile devices and room-based audiovisual control systems. Control system vendors are researching enabling solutions that can help remove the current dependency on users to have to manually select the room they need to control, which for a large corporate facility or campus may include literally hundreds of possible rooms.

One such solution currently under development by at least one of the major control vendors is the adoption of the *Bump* data sharing app developed by Bump Technologies. In its native form Bump is a platform-agnostic app (available for both iOS and Android devices) used primarily to share personal contact information, photos and chat with people you have “bumped” your mobile device with. The app essentially reports any physical “bump” detected by the device’s built in accelerometer, along with the GPS location of the device, to Bump Technologies’ cloud servers which run intelligent matching algorithms to pair devices that were bumped at exactly the same time in exactly the same location, anywhere in the world. Once paired, selected information can be securely exchanged through the cloud via Wi-Fi or cellular connectivity.

Control vendors can therefore adopt this location based data exchange application to automatically detect which room a user is in by having them bump their mobile device against a known fixed object, such as a wall plate, triggering the control system to send the appropriate mobile control app to that device (or to switch to the control page for that room if the app is already installed). Once the user has left the room, as indicated by the device’s GPS location exceeding a predetermined distance away from the room, the control app can be automatically disabled to prevent inadvertent control of the room. This unique adaptation of the Bump app’s basic functionality is achieved through custom software development at the source code level using Bump Technologies’ open Application Programming Interface (API).

Another enabling technology being considered by the control vendors is Near Field Communication (NFC), an open standards-based proximity technology designed to facilitate contactless handshaking and data exchange between devices in very close proximity (within approximately 1.5 inches of each other). This technology was initially conceived to facilitate wireless payment transactions via mobile devices but the interest and potential in NFC has since grown to include a wide variety of applications such as cardless access control, downloading digital coupons from signage kiosks and automated activation and configuration of “far field” wireless technologies such as Wi-Fi and Bluetooth (for example automating the initial pairing of Bluetooth-enabled devices). It is not difficult to see how NFC could someday also be applied to the audiovisual control industry to further simplify and automate remote control from mobile devices and further improve the user experience. 