Overview

LED wall technology is advancing at an incredible rate; offering finer pixel pitch and higher resolutions. With this emerging trend, it is not uncommon for LED walls to reach resolutions of 4K, 8K, or higher. The scalable nature, high framerate capability, and superb quality of the AV Binloop Uncompressed makes it the ideal solution for these applications. As a multi-channel uncompressed player with true Genlock capability, you can add as many channels as you need to fill the native resolution of any LED wall. With the solid-state reliability of Alcorn McBride design, these channels will play in perfect synchronization every time for years with zero maintenance. When you add the flexibility of an Alcorn McBride V16Pro show controller and our ShowTouch panels, you can provide operators with easy touch panel control, scheduling, and monitoring of the system.

How It's Done

Introduction

A typical LED wall system consists of multiple LED panels that lock together a bit like LEGO blocks for scalability. They are often linked with a proprietary video connection back to an LED wall controller that has HDMI, DVI, DisplayPort, or SDI video inputs. Because of the scalable nature of this technology, LED walls can range from small resolutions like 96x96 pixels to literally millions of pixels. They can also be used to form very unusual shapes which defy the commonly accepted belief that all video displays must be rectangles!

The bottom line is that most LED walls generally have a lot of pixels to fill with video; often more pixels than a single video output can provide. The problem with using more than one video output to drive the same wall is that it is very difficult to synchronize multiple video channels. This is often attempted with video playback equipment designed for digital signage applications with less than spectacular results. The lack of true Genlock capability between players makes it impossible to synchronize these players properly, which results in nasty artifacts in the video image.

Another very common problem is when computer-based playback solutions are used to drive LED walls. It's generally bad for the video experience when Windows or OS-X messages pop up on the LED wall because the computer wants to update itself or inform you about a problem. Also, computers often get bogged down with other non-essential tasks that can result in poor playback performance. Instead of getting a nice smooth 60fps video, you get an inconsistent stutter-fest.

The best solution for scalable display technologies like LED walls is a scalable playback technology like the AV Binloop Uncompressed. This is solid-state solution that was purpose-built for high-quality high-frame-rate playback. It is not a computer-based player, so you get smooth playback with clean window-free video on the outputs every time. With true genlock capability, you can also scale up to any resolution with absolutely no risk of artifacts that result from improperly synchronized video.

Integrating the System

To clearly demonstrate the advantages that Alcorn McBride Show Control and the A/V Binloop Uncompressed bring to video wall systems, we will implement a 2048x3240 LED video wall in this application. This requires a total of three perfectly synchronized 2K (2048x1080) sources.

This example system will simply run through a playlist containing various presentations on an LED billboard. The touch panel interface will provide operators with system status (i.e. current clip) as well as buttons for triggering presentations on-demand.

System Components

Let's take a moment to walk through each component and its role in the LED wall system.

A/V Binloop Uncompressed – Multi-channel Synchronous Video Player

An AV Binloop Uncompressed equipped with three 2K playback channels (AVUC-BIN3) will handle this application very nicely. If your LED wall applications requires more resolution, keep in mind that this product can provide up to 8 channels of 2K and up to 2 channels of 4K. Multiple products can even be genlocked to achieve higher resolutions like 8K, 16K, or any-K! Content is stored safely on solid-state media drives as uncompressed Targa sequences. This product physically connects to the LED wall controller three 3G-SDI or HDMI connections. This device also connects to the V16Pro show controller via Ethernet so that video clips can be played at the appropriate time and synchronized with other devices in the system.

V16Pro – Show Controller

The V16Pro is the brain of the system. This product is a fully-programmable control system that is capable of remotely controlling equipment like video players, LCD panels, audio DSPs, projectors, lighting systems, or pretty much anything with a serial or Ethernet port and remote control capability.

In this system, the V16Pro is responsible for commanding the Binloop to play different clips. This can happen as a result of touch panel buttons, IO (motion sensors, physical buttons, etc.), or clock-based scheduling. The V16Pro is also required to provides touch panel functionality using our ShowTouch panels or Apps. kind of flexibility and much more.

ShowTouch – Touch Panel Interface

These devices work in conjunction with the V16Pro to provide a customizable touch panel interface for users. This interface can be designed to be as simple or as complex as the application requires and can provide the ability to control the system as well as monitor status. You can use custom graphics to suit the client, like corporate logos, graphics, and color themes. ShowTouch can run on various hardware platforms which include our ShowTouch panels (available in 7”, 10”, and 17”), iPads, iPhones, as well as any Windows-based PC.

Network Infrastructure

Although it is not shown in the system diagram, it is implied that a system like this would consist of network switches, routers, and POE-enabled devices as needed. At the very least, a switch would be required to network all of this gear so that the V16Pro could connect to and control everything. A wireless bridge or router would be required if you wanted to integrate WIFI devices like a laptop running WinScript Live or an iPad running our ShowTouch app.

Content Creation

From a content creation standpoint, the Binloop is quite simple to understand. Each channel is dedicated to an area of 2048x1080 pixels within the LED wall. In this example, three channels are required to fill the entire 2048x3240 LED canvas. The diagram to the right illustrates how the three channels combine to form the entire image.

When creating the content, just keep in mind that the content needs to be divided and stored on the individual Binloop channels as demonstrated in the diagram. The content playing on channel 1 would form the top 1/3 of the image, Channel 2 would form the center of the image, and Channel 3 would form the bottom. When played synchronously together, all 3 images will combine to form a coherent 2048x3240 image.

File Naming

When it comes to playback control, the Binloop uses a file numbering convention to identify and play files. For example, if we send the control message "Play Clip #1 on All Channels" to the Binloop it will analyze the Targa folders on the storage media to find the clip that is properly named to be clip #1. The clip number is determined by a 5-digit number at the end of the folder name. Here's an example:

C1_CompanyLogo_00001

As you can see, the folder name ends with "00001" which the Binloop identifies as being clip #1. Any text located before these numeric digits is completely optional and can be anything you want. For the sake of organization, the example above uses this text to provide a nice description of the clip. For example, "C1" indicates that this file was created for Channel 1. "CompanyLogo" is a description of the clip itself. This text has no functional meaning to the Binloop, but it sure is nice for helping a user to identify the clip at a glance.
When synchronizing clips between multiple channels, the most ideal practice is to keep the clip numbers the same for each presentation. For example, if we were creating a "Company Logo" video that spanned across all 3 channels it would be best to name them like so:

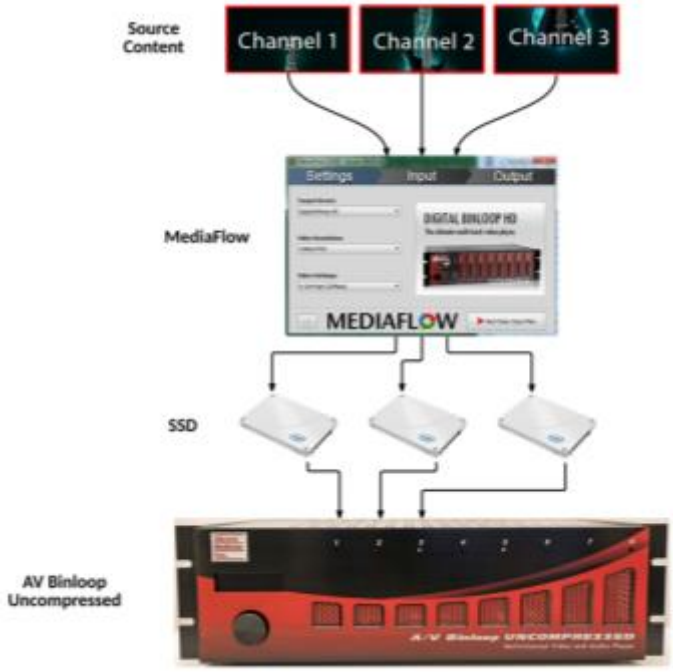
C1_CompanyLogo_00001
C2_CompanyLogo_00001
C3_CompanyLogo_00001

Another set of video files for a different presentation might look something like this:
C1_ToothpasteAd_00002
C2_ToothpasteAd_00002
C3_ToothpasteAd_00002

When the files are named properly like this, all we have to do is tell the Binloop to “Play Clip 1” or “Play Clip 2” to trigger the different presentations.

MediaFlow

Once you have created the individual pieces of content, it’s best to import them into our free MediaFlow software. This software will convert the Targa frames to the most efficient format for playback in the AV Binloop Uncompressed. It will also assist with naming the files properly, loading the files directly to the SSD drives, and indexing the SSD drive for proper playback in the unit.



The quickest and easiest way to load content to the SSD drives is by interfacing to them directly from a computer using a SATA adapter. A USB 3.0 SATA adapter is included with every AV Binloop Uncompressed for this purpose.

Once content is loaded to the drives and indexed by MediaFlow, be sure to properly ‘eject’ them from the computer before unplugging them from the adapter. The SSD drives can then be re-inserted into the AV Binloop Uncompressed.

Implementing Control

A show controller adds a great deal of flexibility to this system design. It can provide users with a touch panel interface so they can monitor and control the system. It's also used to automate the various components of the system (Binloops, LED wall processor, lighting system, etc.).

As demonstrated in the system diagram, we will be using a V16Pro to provide the control for the entire system. It will operate in conjunction with ShowTouch panels to provide the touch panel interface. Both the V16Pro and the ShowTouch devices are configured and programmed using our WinScript Live software.

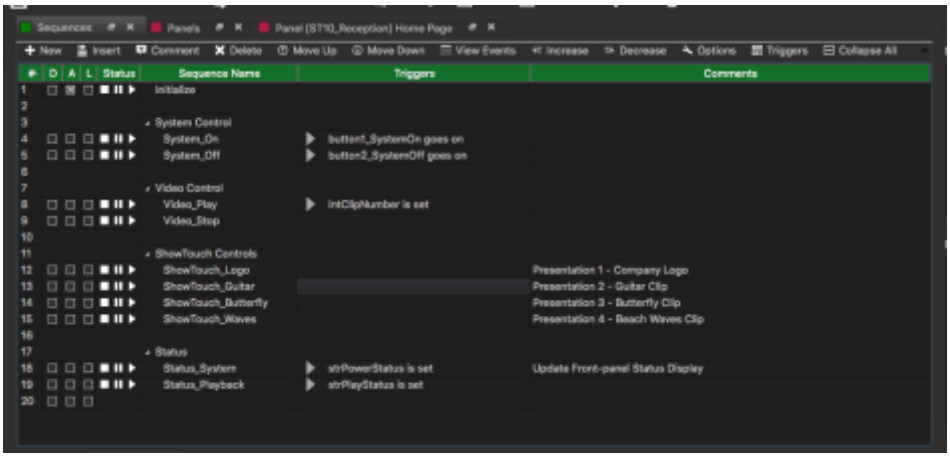
Show Control Programming

To provide the flexibility required by various applications, the V16Pro show controller is a fully-programmable device. Using the WinScript Live software, we must configure the V16Pro so that it is aware of the devices that it will be controlling and the type of interface it will use to control them (i.e. RS232, RS422, MIDI, Ethernet, etc.). The comprehensive library of devices supported by the V16Pro is constantly updated to make this as easy as possible.

In this video wall application, we must configure the V16Pro to communicate with the AV Binloop Uncompressed. We must also create programming to trigger the various presentations when buttons are pressed on the touch panel.

Although Alcorn McBride goes through great effort to make this programming significantly easier than many other control systems, there is a learning curve to using WinScript Live and the V16Pro. If you're looking to learn more about using this interface, Alcorn McBride offers free training in the form of interactive in-person classes and online courses.

For this example, we will be using the same WinScript Live project that contains the ShowTouch panel. This script file is called **LED Wall.WS4.**



The script starts off with an 'Initialize' Sequence which does nothing more that initialize the front-panel display of the V16Pro. This clears the display and writes some text on the screen that says "LED Wall Example".

Then we have our **System_On** and **System_Off** sequences. The intention of **System_On** is to turn on any devices that are powered down when the system is inactive. This might be things like LED controllers, LCD panels, lights, etc. Once equipment is powered on, the default video presentation (corporate logo). **System_Off** is intended to turn off devices and stop playback.

The **Video_Play** sequence will start playback on the Binloop unit. It is triggered whenever the **intClipNumber** variable is changed. This clip number is relayed to the Binloop to trigger the clip that has been assigned to this number.

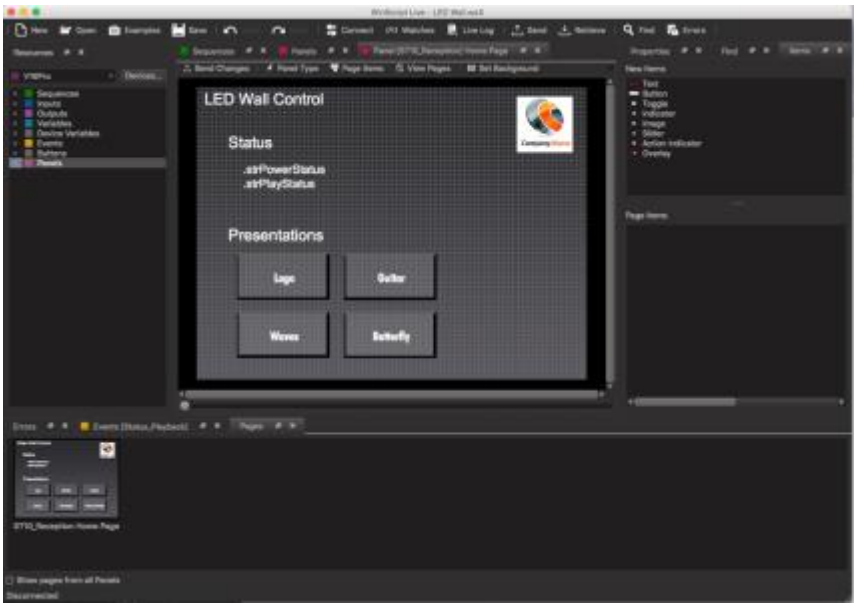
Next, we have the sequences that are associated with ShowTouch buttons. When a button is pressed, the sequence launches and then sets the **inClipNumber** variable. The resulting variable change causes the **Video_Play** sequence to play the appropriate presentation.

Last we have a few sequences dedicated to updating the front-panel display when status information changes.

Aside from this, there is some simple logic in this script to prevent presentations from being triggered when the system is in the OFF state.

Touch Panel Design

WinScript Live is a powerful tool for creating customized touch panel interfaces that can be deployed on ShowTouch enabled devices. Its flexibility allows you to cater the look and feel of controls and status readouts to suit the needs of the application. For our LED wall application, we want to provide something that is designed to be operated by a receptionist or tour guide to provide simple one-button control to switch between different presentations. An example is contained within the **LED Wall.WS4** project file included with this application note.


LED Wall Control
Status
.strPowerStatus
.strPlayStatus
Presentations
Logo
Gutter
Waves
Butterfly

Conclusion

This application note can serve as a starting point in implementing your own LED wall. Keep in mind that this design can easily be scaled up or down depending on the channel count. Even if you need more channels than a single Binloop can provide, the V16Pro can easily synchronize multiple units with the help of a video sync generator.

Now it's time for you to make your own LED wall with the AV Binloop Uncompressed and V16Pro. Please don't forget that we are here to help you so feel free to contact us with questions.