

# Guide to Scaling Control4 4K UHD Switches

## Overview

Control4's line of 4K/UHD AV matrix switches includes models capable of distributing up to ten 4K sources to up to ten displays. For most Control4 systems, one of these models provides all of the inputs and outputs required. Very large systems, however, may require distributing video to more than ten displays. This guide has been prepared to assist Control4 dealers in designing AV distribution systems for these projects.

## Recommended Process

### 1. PLANNING

Before you can design a video distribution system for your customers, you must understand their needs and desires. This comes down to asking questions and listening. Here are some questions to consider that are applicable to a multi-switch system design:

1. What do you want to be able to watch in each room? Which sources will provide the desired content? Example: We either watch satellite TV or stream from Netflix on our Roku. We need access to those sources from every room.
2. How many different channels or streaming programs will you watch simultaneously in your home? Example: In the morning, my wife watches her morning show in the exercise room, I watch CNN in the bathroom, and our toddler watches cartoons in the Family Room.
3. Which video sources might you want to watch simultaneously, in multiple rooms? Which rooms? Example: When entertaining, we want to be able to watch a movie streamed from a Roku in the theater, the Family Room, and the Kitchen.
4. Which video sources must be available in all rooms? Example: We need to be able to view the security NVR on any TV in the house.

### 2. DESIGN

Armed with this data, you will be able to design a system to meet your customers' needs. For example, if they need access to an Apple TV or a satellite receiver in every room in the house, at least one of each must be available on each C4-LUunn switch in the project. If there are unique sources that must be viewable on every TV in the house, an HDMI splitter will be required for that source. If they desire to watch the same program on multiple TVs at the same time (e.g., watching a new DVD release in the Theater and the Family room), if those TVs can be attached to the same switch, this requirement is satisfied. If, however, they need the ability to share that source on displays that cannot be attached to the same switch (e.g., they want to view the source on ALL of their TVs at once), then the applicable source will need to be split to service each switch.

General Design Guidelines:

- Specify a combination of 4K switches that provide sufficient HDBaseT and HDMI outputs for the TVs, AVRs, and projectors in the project.
- Connect display devices into each switch according to the probability that sources will be shared amongst them. For example, if the Kitchen and Family Room are adjacent, and the same program will often be viewed in both zones at the same time, attach these two displays to the same switch.
- Design for sufficient sources of each type to satisfy the customer's use cases. For inexpensive source devices that don't need to support viewing on displays attached to different switches, it may be best to design for multiple source devices rather than splitting.

- For unique sources, like a surveillance system NVR, specify a pre-tested HDMI splitter to share the source across two or more switches.

### 3. INSTALLATION AND CONFIGURATION

Whenever you are going to deploy a complex system, we always recommend that you test the system in your shop before installing it onsite at your customer's property. This will allow you to test all committed functionality and to work out any kinks or add/replace any gear that isn't working as expected before you are on site.

With a proper pre-tested design and system, of course nothing will go wrong during the installation. Right? Of course there can still be unanticipated issues. But at least you will have the confidence that your design meets the stated customer expectations. Follow your plan in installing the switches, sources, and displays. Be sure to follow the guidelines in the *HDMI and HDBaseT Cabling Guide* and the *4K UHD LU Series Dealer Setup Guide*. See <http://ctrl4.co/4kmatrix> for links to these documents.

We have found that some HDMI splitters require that Compatibility Mode be enabled on the switches. This is a new feature added in FW v2.19 and driver v290 that allows the switch to be more tolerant of certain kinds of source devices. This property can be set in the Properties tab of each Control4 4K video switch.

The default for this property is disabled:



If you find that you are not getting video to pass through the switch when routed through your splitters, try setting Compatibility Mode to enabled. Do be sure to enable it on each switch that is connected to the splitter and remember to press the Set button.



After enabling Compatibility Mode, it is not necessary to reboot the switches. But you should turn off any video zones (using Room Off) before re-testing.

### 4. TEST

It should go without saying, but before leaving the customer's property, you should test all specified functionality of the Control4 system, including the video distribution system.

- Verify that all sources are working as expected.
- Verify that all displays are working as expected.
- Ensure that all required sources can be selected and viewed on each TV. Be aware that device menus and some free content may not be protected by HDCP 2.2. Therefore, you should always test with protected content (DVD, BD, or rented streaming content) to make sure the system is working.
- Verify that all required and specified device sharing scenarios are working as expected – that copy protected content can be simultaneously viewed in all rooms required by the customer.
- Ensure that the audio for each zone is playing through the configured video's audio endpoint, and that volume control is working as expected.
- Verify that all supported audio formats are working, and that Audio Down-mixing is performing as specified (when a model with audio downmixing support is installed).

### 5. TRAINING THE CUSTOMER

As with all Control4 systems, you should walk the customers through the home to show them how the system works. Be sure to note (and document) any limitations inherent in the design (these should have all been preapproved by the homeowner). For example, if they didn't buy switches with audio downmixing support, they will not be able to share that content across surround and stereo zones except in stereo. Also, some sources may not be configured for sharing across all TVs.

## Selecting a 4K HDMI Splitter

Not every 4K HDMI splitter on the market works as advertised. And more importantly, not every splitter works with the Control4 4K UHD switches. We have tested a number of splitters including 1x2 and 1x4 models and found that while many work, some require Compatibility Mode to be enabled. Others simply do not work. At a minimum, ensure that any splitters you source claim support for:

- 4K @ 60 Hz
- HDMI 2.0 support
- HDCP 2.2 support

Unfortunately, we found that some splitters do not perform as advertised. It is imperative that you source and test splitters before including them on a project bid. Also, it is conceivable that even a splitter that worked on your last job could have undergone a firmware or component change in manufacturing that renders it unsuitable for our purposes. Always source and test splitters before including them in a bid.

Below is a short list of HDMI splitters that, as of October 2016, were found to work with Control4 switches. Control4 makes no guarantee that these splitters will continue to work with our switches. Also, we do not endorse any particular 3<sup>rd</sup> party supplier or seller. Source links are provided only as a convenience, and in the hopes of providing further details about the splitters we found to work.

### E-SDS 1x2 HDMI Splitter

Source: <http://amzn.com/B01FSFV4X8>

Requires Compatibility Mode



### E-SDS HDMI 2.0 Splitter 1 In 2 Out 2-Port Amplifier

Source: <http://amzn.com/B018QNM31Q>

Requires Compatibility Mode



### Orei 1x2 2.0 HDMI Splitter

Source: <http://amzn.com/B016O5NMMC>

Requires Compatibility Mode



### Monoprice Blackbird 4K Pro 1x2 HDMI Splitter with HDCP 2.2 Support

Source: <http://amzn.com/B01BOB6QMO>

Requires Compatibility Mode



In addition to the above splitters, which were found to support HDCP 2.2, we also tested two splitters that were found to work with Control4 4K switches, but which strip, rather than pass HDCP 2.2.

### WolfPack 4K 1x2 HDMI 2.0 Splitter

Source: <http://www.hdtvsupply.com/1x2-hdmi-splitter-hdmi-2-0.html>

Strips HDCP 2.2



### KanexPro SP-HD20-1X24K

Source: <http://amzn.com/B01D69JWXC>

Strips HDCP 2.2



## Important note

As a Control4 dealer, you are responsible for understanding, specifying, installing, configuring, and supporting your customers' systems. Before making a system design proposal to your customers, you should know exactly how you will provide the system capabilities that you propose. One of the approaches to scaling C4-LU switches to larger systems that is proposed in this document requires using 3<sup>rd</sup> party HDMI splitters. Due to the rapidly changing landscape of consumer electronics, various vendors, product lines, and models may change over time. It is possible that an "Acme HDMI Splitter model X" that you buy one day may work great, but when you order more splitters later, they no longer work with Control4 switches due to a component change or FW update on the splitter. To avoid issues, we recommend that you source and test splitters before spec'ing them into a job.