

## HDMI over IP

Control4 Driver User Guide

Version 1.02

#### Introduction

This driver has been designed to provide two-way control of an Aavara HDMI-over-IP video system, via TCP/IP.

This driver has been written and tested using the following products:

- Aavara Web Interface (v1.0.3)
- Cisco SG500-52P (FW v1.3.0.62)
- Control4 Composer (v2.4.0)
- Control4 HC-800 (v2.4.0.227470)

Note that the driver should run on all Control4 processor models, but it is recommended that the above software versions (or higher) are used.

Driver release version: 1.01

## **Aavara Switch Configuration**

It is recommended that the Aavara system be installed, configured and tested by a suitably qualified engineer, according to Aavara documentation, prior to integration with this driver. The below illustration shows a basic set up:



Some additional, specific configuration is required to ensure correct operation of the driver.

#### For Pakedge SX series switches:

# The following instructions describe the process for configuring a Pakedge Ethernet switch so that it can be used in conjunction with an Aavara HDMI over IP system, and this driver.

- 1. Access the web server used to configure your Pakedge switch, and log in.
- From the main menu or Top menu, Choose Port > Port Setting > MTU tab > Select all RJ45 ports which connected with Aavara Boxes > Change MTU size to 8192 or above and click Apply Button.

System	Ports	VLAN () Traffic	Management	(ま) System	(····) Ports	VLAN	( Management
Welcome to your SX-24P Switch	System	Ports	VLAN	Ports	Port Settings Port Specific Configuration	POE Power Over Ethernet Configuration	MAC Control Switch MAC Information And Configuration
	<b>(</b> ) Traffic	Management		Dashboard Back To Home Page			
	Port Settings Commo Configuration 2. Select 9216 9216 9216 9216	Port Statistics Flow Control tall RJ45 ports whit 9216 9216 921 9216 9216 921	Broadcast Storm Port Rate ch connected with 2 9216 9216 9216 11 9216 9216 9216	1. Click on M timit MU Link Agregation N Aavara Boxes. 16 9216 9216 9216 9216 9216 9216 9216 9216 9216 9216 9216 9216	TU tab       Nirror       22     24       9216     9216       9216     9216		
	4	. Click Apply Buttol	: МТU МТU 1518-9216 СLe: Арріу СLe:	3. Made sure	8192 or above		

3. From the main menu or Top menu, Choose Traffic> IGMP > Enable IGMP



Optional: Enable IGMP Querier on one of switches, if Aavara boxes connected at

different switches in network.

↑ IGMP								
IGMP Snooping	Mu	lticast I	Filtering	Fast Leave	Multicast Group			
				1. Enable		P Global Setup		
		2. (	Click App	IGMP Status	Enable 🖨 Multic	ast VLAN Registration Stat	us 🤅 Dis	able \$
Optional: Enable IGMP If Aavara boxe	Que os co	rier on onnect	one of ed on Di	Switches ifferent Swi	Apply	Clear		
	ID	VLAN ID	Querier State	Routing Port Age	Group-general Query Max Response Time	Group-specific Query Max Response Time	Host Port Age	Unknown Multicast Action
	1	1	Enable	105	10	2	260	Flood

 Choose Traffic> IGMP > Multicast Filtering Tab, Select all RJ45 ports that Aavara Boxes connected, and Disable Multicast Filtering.
 For RJ45 ports connected to non-Aavara boxes, or connected to Wifi

**AP/Router or C4 controller, Enable Multicast Filtering.** 

() IGM	P											
IGMP Snoo	ping Multic	ast Filteri	ng Fast Leav	e Multicast	Group							
2	4	6	8	10	12	14	16	18	20	22	24	
•				0			0		•	0	•	
		5		9	11	13	15	17	19	21	L	
•	•	•	•	۰	۰	•	•	•	•	•	•	
					●Multic	ast Filtering						
					Multica	st Filtering						
					Disable	•						
					Apply	C	lear					

 Choose Traffic> IGMP > Fast Leave Tab, Select all RJ45 ports that Aavara Boxes connected. If all Aavara Boxes on same switch, Enable Fast Leave. If Aavara Boxes on different switches, Disable Fast Leave.

↑ IGMP		
IGMP Snooping Multicast Filtering Fast Leave	Multicast Group	
2 4 6		15 20 22 24
••••		12 19 21 23
	GFast Leave	
	Fast Leave  Enable	
	Apply Clear	

#### For Cisco SG series switches:

The following instructions describe the process for configuring a Cisco SG series Ethernet switch so that it can be used in conjunction with an Aavara HDMI over IP system, and this driver.

- 6. Access the web server used to configure your Cisco switch, and log in.
- 7. From the side menu, Choose **Port Management**> **Port Settings**, check the box labeled **Jumbo Frames Enable** and click **Apply**.

Small Business CISCO SG300-52P	52-F	Port Gi	gahi	PoE Ma	anaged Swi	matrice video Lan itch	uage: English		•	Logout
Getting Started   Status and Statistics	Port	t Setting	s							
Administration     Port Management     Port Settings     Error Recovery Settings	Jum Jum	nbo Frames: nbo frames c	Constant	able ation changes v	vill tike effect after s	aving the configuratio	n and rebooting	the switc	h.	
Link Aggregation     UDLD     PoE	Port	t Setting Tal	ble							Sh
<ul> <li>Green Ethernet</li> </ul>		Entry No.	Port	Description	Port Type	Operational Status	Link Status	Time R	ange	Port
<ul> <li>Smartport</li> </ul>							SNMP Traps	Name	State	Speed
<ul> <li>VLAN Management</li> </ul>	0	1	GE1		1000M-copper	Up	Enabled			1000M
Default VLAN Settings	0	2	GE2		1000M-copper	Up	Enabled			1000M
VLAN Settings	0	3	GE3		1000M-copper	Up	Enabled			1000M
Port to V/LAN	0	4	GE4		1000M-copper	Up	Enabled			1000M

8. Choose **Multicast** > **Properties**, check the box labeled **Bridge Multicast Filtering Status** and click **Apply**.

Getting Started	Properties	
<ul> <li>Administration</li> </ul>	Bridge Multicast Filtering Statu	s: 🗌 Enable
Port Management     Smartport		
<ul> <li>VLAN Management</li> </ul>	VLAN ID:	1 🗸
<ul> <li>Spanning Tree</li> </ul>	Forwarding Method for IPv6:	MAC Group Address
MAC Address Tables     Multicast		<ul> <li>IP Group Address</li> <li>Source Specific IP Group Address</li> </ul>
Properties MAC Group Address IP Multicast Group Address	Forwarding Method for IPv4:	MAC Group Address     IP Group Address     Source Specific IP Group Address
IGMP Snooping MLD Snooping IGMP/MLD IP Multicast Group Multicast Router Port Forward All	Apply Cancel	
Unregistered Multicast		

9. Next, choose Multicast > IGMP Snooping and check the box labeled Enable IGMP Snooping Status.

	Getting Started				- !	
۲	Status and Statistics	Ľ	IGIV	IP Shoo	bing	
۲	Administration	1	IGM	P Snooning	Statue:	Enable
۲	Port Management	N	101	r onooping	otatus.	Lindble
۲	Smartport			vigo	Cancel	
۲	VLAN Management			*** <u>)</u>		
۲	Spanning Tree		IGM	P Snooping	Table	
۲	MAC Address Tables			Entry No.	VLAN ID	IGMP Snoc
	Multicast					Operationa
	Properties		0	1	1	Disab
	MAC Group Address		0	2	2	Disab
	IP Multicast Group Address		0	3	10	Disab
	MLD Spooning		0	4	11	Disab
	IGMP/MLD IP Multicast Group		0	5	12	Disab
	Multicast Router Port		0	6	13	Disab
	Forward All		0	7	14	Disab
	Unregistered Multicast		0	9	15	Disab

 Still on the same page, select the VLAN to which the Aavara system is connected and click the Edit button to open the Edit IGMP Snooping settings. Enable IGMP Snooping Status and IGMP Querier Status and set the IGMP Querier Version to IGMPV2, before clicking Apply.

VLAN ID:	1 🗸	
IGMP Snooping Status:	Enable	
MRouter Ports Auto Learn:	Enable	
Query Robustness:	2	(Range: 1 - 7, Default: 2)
Query Interval:	125	sec (Range: 30 - 18000, Default: 125)
Query Max Response Interval:	10	sec (Range: 5 - 20, Default: 10)
Last Member Query Counter:	<ul> <li>Use Default</li> <li>User Defined</li> </ul>	(Range: 1 - 7, Default: 2 (Query Robustness
Last Member Query Interval:	1000	mS (Range: 100 - 25500, Default: 1000)
Immediate leave:	Enable	
IGMP Querier Status:	Enable	
Administrative Querier Source IP Add	ress:  Auto User Defined	10.0.0.1
IGMP Querier Version:	IGMPV2	

11. In order for the driver to communicate with the Aavara system, it is necessary to ensure at least one port on the network switch has IGMP disabled, and that this port is used to connect to the same LAN as the Control4 processor. Navigate to Multicast
 > Forward All and set your chosen port to Forbidden.

Getting Started															_		-								
<ul> <li>Status and Statistics</li> </ul>	Forward	All																							
<ul> <li>Administration</li> </ul>		-		_	_									_											
<ul> <li>Port Management</li> </ul>	Filter: V	m	equals	to 1	~ A	ND In	terface	Type e	quals to	Por	t of Unit	1/1 🗸	Go												
<ul> <li>Smartport</li> </ul>	Port	GE1	GE2	GE3	GE4	GE5	GE6	GE7	GE8	GE9	GE10	GE11	GE12	GE13	GE14	GE15	GE16	GE17	GE18	GE19	GE20	GE21	GE22	GE23	GE24
<ul> <li>VLAN Management</li> </ul>	Static	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<ul> <li>Spanning Tree</li> </ul>	Forbidder	ě	ŏ	ŏ	õ	õ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	õ	õ	ŏ	õ	ŏ	ŏ	ŏ	ŏ	ŏ	ŏ	õ	ŏ	ŏ
<ul> <li>MAC Address Tables</li> </ul>	None	ŏ	Ň	ě	ě		ě	ě	ě	ě	ě	ě	ě	ě	ě		ě	ě	ě	ě	ě	ě	ě	ě	ě
✓ Multicast		\~/		۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲	۲
Properties	Port	NE3	GE26																						
MAC Group Address	Static	0	0																						
IP Multicast Group Address	Forbidden	0	0																						
IGMP Shooping	None	۲	۲																						
IGMP/MLD IP Multicast Group																									
Multicast Router Port	Apply		Cancel																						
Forward All																									
Unregistered Multicast																									

12. Ensure that settings are saved to the boot configuration, to avoid losing your changes when the switch is next rebooted.

#### For HP ProCurve switches:

When using an HP ProCurve the switch, you can use the following CLI command to enable IGMP, enable Jumbo Frame and block IGMP on the port which is to be connected to the control system:

ProCurve 2510G-24# <b>config</b>	(Enter configuration mode)
ProCurve 2510G-24(config)# vlan 1	(to select the correct VLAN
which all senders and receivers belong to, VLAN 1 mean all	RJ45 ports on switch)
ProCurve 2510G-24(vlan-1)# ip igmp	(Enable IGMP)
ProCurve 2510G-24(vlan-1)# jumbo	(Enable Jumbo packet/frame)
ProCurve 2510G-24 (vlan-1)# ip igmp blocked 24	(to block IGMP on RJ45 port
24 which connecting to Control 4 controller)	
ProCurve 2510G-24(vlan-1)# exit	(Exit VLAN 1 configuration)
ProCurve 2510G-24(config)# exit	(Exit configuration mode)
ProCurve 2510G-24# write memory	(To save all changes)

## **Aavara IP Configuration**

For the driver to function successfully, the Aavara units must have IP addresses that are accessible from the Control4 unit (i.e. usually on the same IP address range and subnet) and which do not change. This can either be done using a simple initialization process provided with the Aavara system or by configuring each unit by hand.

#### **Advanced IP Address Initialization**

Having fixed addresses can be done either by using DHCP and configuring the DHCP server to reserve IP addresses for the units, or by giving the units static IP addresses. Either way, the IP address configuration of each unit is accessed via a web browser:

#### http://<current Aavara IP address>/cfg.html

Then go to the **Network** tab and enter the appropriate information and press **Apply**. Once the information has been entered, go to the **System** tab, expand the **Utilities** section and click on **Reboot** to have the settings taken into use.

IP Mode	Auto IP DHCP	Static	
ID Addross	102 168 6 211	]	
Subnet Mask	:: 255.255.255.0		
Default Gateway	: 192.168.6.1	Ĵ	
			Apply
Casting Mode			
Multicast	Unicast		Apply

## **Aavara Device Initialization**

Once all units have had their IP addresses configured, it is additionally necessary to configure channels for each sender and codenames for each sender and receiver. To do this, browse to the home page of one of the sender units and click on the Setup tab:

fulticast	Multicas	t Group	OSD Setu	p System	
SYSTE	M S	ETUP			
Found 6	node	es!			
Video Sou	rce / S	ender Se	tup:		
IP	СН	Group		Codename	Reset EDID
192.168.6.21	2 2	0		IN2-BluRayPlayer	
192.168.6.21	1 1	0		IN1-AppleTV	
<b>Display / I</b> ● IP ● Coden	Receiv	er Setup: Channel ●G	roup ● Video	Source ● OSD Off <mark>S</mark>	how OSD
IP	CH G	roup		odename	EDID copy
192.168.6.21	420			OUT3-BotLeft	
192.168.6.21	31 0				
192.168.6.2					
192 166 6 2	<b>6 1 0</b>			JUII-TOPLER	

For senders you need to configure the channel (**CH**) and **Codename**. For receivers just the **Codename**. Set the channel to match the input number that you want to assign to the unit in the driver's switch configuration. Then assign code names as follows:

For sender (input) devices:IN[number]-[name] (number will be same as channel)For receiver (output) devices:OUT[number]-[name]

It is important that each name begins with "IN" or "OUT", which is then followed by the input or output number. You can then optionally add a hyphen (-) followed by an appropriate description for the device (note that no spaces are allowed). For example, in the screenshot above, the first input is named *IN1-BluRayPlayer*, equally valid is just *IN1*.

Additionally, you may wish to create groups of receivers by entering a name in the **Group** field for each device. The driver can then be used to switch all outputs within a group, using a single command. Note that when the "Create Video Wall" command is used, this effectively creates a new group and should therefore not be used for outputs already assigned to a group.

Note that you have to configure the senders and press the Apply button for them and then configure the receivers and press the Apply button for them.

## **Driver Installation & Configuration**

Copy the .c4i files from the zip package to My Documents\Control4\Driver and then open Composer. The drivers can be found under:

Device Type: A/V Switch, Manufacturer: Aavara, Model: nxm HDMI over IP

ltems				
Locations	Discovered	My Driv	ers	Search
	<li>Loc</li>	al Database	0	Online Database
Device Type:	A/V Switch			Ý
Manufacturer:	Aavara 🗸 🗸			
Name		Man	Mode	
Aavara 8x8 HDMI over IP		Aavara	8x8 HDMI over IP	
Aavara 64x64 HDMI over IP Aavara 64x64 HDMI over		HDMI over IP		
😼 Aavara 64x128 HDMI over IP		Aavara	64x12	28 HDMI over IP
😼 Aavara 32x32 HDMI over IP		Aavara	32x32	2 HDMI over IP
🛛 🔤 Aavara 16x	😼 Aavara 16x16 HDMI over IP		16x16	6 HDMI over IP
Aavara 128x128 HDMI over IP Aa			128x1	28 HDMI over

...where "*nxm*" is the number of inputs and outputs. Choose the version that most closely matches your needs. The drivers are all effectively the same; differently sized versions are provided to avoid cluttering your project with unwanted inputs and outputs.

The installed driver will appear as **Aavara** *nxm* **HDMI** over **IP** as below:

🔬 Apple TV 2
🔬 Apple TV 3
🄬 Apple TV 4
🔬 Apple TV 5
🄬 Apple TV 7
🔬 Apple TV 8
Aavara &x8 HDMI over IP

To configure the driver's access to the Aavara system, go to the **Connections** section and set up your input and output connections according to Control4 standard practice. There are also serial connections representing the serial ports on the transmitters and receivers; these can be linked to any equipment that is going to be controlled via the unit's serial port. Then go to the **Network** tab and select the driver from the list. Add the IP address of one of your Aavara transmitters. The driver should now automatically connect to the Aavara system and initialize itself.

The driver features a number of properties that report status or control configuration. Note that the Serial Port Settings Types provide a way of defining the settings for a serial port, which can then be applied to the serial ports of multiple inputs and outputs.

roperues	Properties	List View	Info
dvanced Properties Properties Lua			
Driver Version	100		_
Status	Operational		
Baud Rate 1	9600	•	
Data Bits 1	8	•	
Stop Bits 1	1	•	
Data Parity 1	None	•	
Inputs using Settings 1			
Outputs using Settings 1			
Baud Rate 2	9600	•	
Data Bits 2	8	•	
Stop Bits 2	1	*	
Data Parity 2	None	•	
Inputs using Settings 2			
Outputs using Settings 2			
Baud Rate 3	9600	•	
Data Bite 2	8	-	

Property	Description	
Driver version	The version of the driver. Should be <b>101</b> for version 1.01.	
Status	Should be <b>Operational</b> when actually in communication with the Aavara system and <b>Idle</b> when not. Any other status indicates a connection problem of some sort.	
Serial Port Settings type <i>x</i>	<ul> <li>Baud Rate x - the baud rate in bits per second.</li> <li>Data Bits x - the number of data bits.</li> <li>Stop Bits x - the number of stop bits.</li> <li>Data Parity x - the parity bit setting.</li> <li>Inputs using Settings x, Outputs using Settings x - the transmitter and receiver units that should have their serial point configured to use these settings.</li> <li>Inputs and outputs can be specified as a comma separated list of numbers or number ranges. e.g. 1, 2-5, 7</li> </ul>	
Debug Settings	Debug Mode – support use only Debug Subsystems – support use only Debug Level – support use only	

## **Driver Commands**

The driver features a number of device-specific commands used for control. Wherever a list of inputs or outputs is required, these can be comma separated (e.g. **1,2,3,4**) or defined as a range (e.g. **1-4**), or a combination of the two (e.g. **1,2-4**).

Command	Description
Create Video Wall	Define a video wall using a single host (input).

	Group Name Choose a wall name (this is important as other
	commands refer to this name).
	Size The video wall screen configuration expressed as <b>w</b> , <b>h</b> or <b>w</b> x <b>h</b> .
	For example <b>2x2</b> creates a 2 x 2 (4 screen) video wall.
	<b>Outputs</b> The output numbers used to create the video wall. This
	field must contain a number of outputs equal to the amount defined
	in the <b>Size</b> field.
	Removes the given outputs from the wall configuration, i.e switches
	them back to showing the whole video source rather than a portion
	of it. The outputs remain part of the named group and so sending a
Disable Video Wall	Switch Output Group command will still switch these outputs.
	Use <b>Create Video Wall</b> and set the group name to 0 to remove the
	output from the wall completely.
	<b>Outputs</b> The outputs numbers to disable. List of numbers and
	ranges.
	Switches all outputs that have been defined as part of the named
Switch Output Group	group using a Create Video Wall command to the given input
	Input input to show
	Group Name group of outputs to switch
	Define the size of the TV frame (video edge) to correct for large
	bezel screens in video wall mode.
	<b>Outputs</b> specify the outputs for which the bezel gap should be set
	(this will usually be the same list of outputs you used in <b>Create</b>
Set Bezel Gap	Video Wall).
	Screen Outside Width, Height – the overall size of the television
	in mm (e.g. "600,550").
	Screen Image Width, Height – the size of the actual screen in
	mm (e.g. 550,500).
	Show a short message overlaid on the screen.
Display Message	
	Size sinall of Dig.
	Display a particular cart of information on all outputs
	Display a particular sort of information on all outputs.
	OSD Off romovo all mossagos
	<b>ID</b> show ID address of each receiver
	<b>Channel</b> show which conder channel is being shown by each
Display To All	channel show which sender channel is being shown by each
	Group show the group to which each receiver belongs
	<b>Codename</b> show the codename of each receiver
	Sender's Codename show the codename of the sender
	connected to each receiver (not working in the Aavara
	firmware at time of writing)
	Remove the on screen message (from <b>Display Message</b> or
	<b>Display to All</b> ) from the given outputs after a certain timeout
OSD Off	<b>Outputs</b> list of outputs to show the message
	<b>Time (Seconds)</b> time to wait before removing the message
RS232 Custom	Serial settings are intended to be set using the serial settings
RS232 Custom Settings	Serial settings are intended to be set using the serial settings properties of the driver. In the unlikely event that there are more
RS232 Custom Settings	Serial settings are intended to be set using the serial settings properties of the driver. In the unlikely event that there are more than five different sets of serial port settings required in a system.
RS232 Custom Settings	Serial settings are intended to be set using the serial settings properties of the driver. In the unlikely event that there are more than five different sets of serial port settings required in a system, further settings can be sent to the units using this command. Note

	be done once on system startup. Also note that if you send settings to an input or output that is also included in the property settings, the results are undefined. <b>Inputs</b> list of inputs for which to set the settings <b>Outputs</b> list of outputs for which to set the settings <b>Baud Rate</b> the baud rate in bits per second. <b>Data Bits</b> the number of data bits.
	Stop Bits the number of stop bits.
	Data Parity the parity bit setting.
RS232 Command String	<b>Inputs</b> list of input serial ports to which to send the string <b>Outputs</b> list of output serial ports to which to send the string <b>Command</b> the string to send
RS232 Hex Command String	<b>Inputs</b> list of input serial ports to which to send the string <b>Outputs</b> list of output serial ports to which to send the string <b>Hex Command</b> the byte string to send specified as a hexadecimal string, e.g. 54455354 corresponds to four bytes: T E S T

#### **EXAMPLE:** Creating a Video Wall

To create a 2 x 2 video wall:

In Composer, choose **Programming** and select the Aavara driver in the **Actions** window. Check the box labeled **Device Specific Command** and select **Create Video Wall** from the dropdown box. Enter a name for your wall, the wall size and the outputs to be used and drag the new command into the appropriate script.

Stop Pulse	Set 0 ‡	
Pulse V		
oudness Settings		
Toggle	⊖ Set ∨	
Mute Settings		
Toggle	◯ Set ∨	
) Device Specific Cor	nmand	
ate Video Wall		
oup Name	Video Wall #1	
ze	2x2	

The above example will create a new group with the name "Video Wall #1", which will be configured as a 2x2 video wall, using outputs 1, 2, 3 and 4.

## **Driver Variables**

The driver features a number of variables, providing feedback from the Aavara system.

Variable	Description	
INxxx_Name	The name defined for a particular input in the Aavara system.	
OUT <i>xxx</i> _Name	The name defined for a particular output in the Aavara system.	

The names are taken from the part after the dash in the codename (see the above section entitled "Channel and codename configuration" for more information).

## Troubleshooting

### The driver cannot control the Aavara system

- Confirm the Ethernet switch used by the Aavara system is correctly uplinked to the same network as the Control4 processor and the IP addresses and netmasks for the Control4 processor and Aavara units are compatible.
- Confirm that the correct IP address is defined in the network connection setting for the Aavara driver.

## Switching commands are failing

• Ensure you have named the devices correctly in the Aavara system. Read the section of this guide entitled "Aavara Configuration" for more information.

## The Aavara units are behaving inconsistently

Sometimes the units can get into an inconsistent state and behave oddly, e.g. allowing switching to one input but not another. In the case of suspicion that something is not quite right with a unit, try the following:

• Browse to the following web page on a sender:

http://<sender ip>/cgi-bin/all\_reset.cgi

which will execute a reset of all devices. Note that following a reset you may need to re-enter the channel and codename information.