



Network Controller for HDMI® over IP (Model: 29977)

Operation Manual



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1. Overview

1.1. Description

The C2G Network Controller for HDMI over IP (model: 29977) is a Linux-based PC that allows users to control hub-installed C2G products.

When installed on a local area network (LAN), the C2G Network Controller can scan the LAN for C2G products and allows the user to auto-discover, configure and control these products through an Ethernet Web interface.



Figure 1: System Overview

Applications include but are not limited to commercial and residential AV systems, classroom projector systems, digital signage, video wall systems, boardroom systems, multi-room systems, classroom training, retail systems, collaborative PC systems, and medical information systems.

1.2. Features



Figure 2: C2G Network Controller

Front Panel

- Power LED
- Power button
- Audio in (3.5 mm)
- Three (3) USB 2.0 ports
- SS USB 3.0 port
- RS232 Port

Back Panel

- VGA video out port
- HDMI video out port
- Two (2) LAN ports (RJ-45 jack) – “LAN 1” port for AV over IP subnet
- Audio out (3.5 mm)
- Power connector

2. Technical Specifications

Specifications	
CPU	Intel Celeron J1800 Processor, @ 2.41GHz 4 cores
Memory	2GB DDR3
Display	Integrated Intel HD Graphics, 1x HDMI and 1x VGA
Keyboard and Mouse	USB keyboard and mouse (not required and not included)
Peripherals	• USB 2.0 ports (3x) • SS USB 3.0 port (1x) • Network gigabit interface (2x) • VGA Video out port (1x) • HDMI Video out port (1x) • Audio in via 3.5mm port (1x) • Audio out via 3.5mm port (1x) • RS232 port (1x)
Operating System	Ubuntu 18.04 LTS
Temperature/Humidity	Operating: 0 °C to 50 °C, Storage: -20 °C to 80 °C Humidity: 10% to 90% (non-condensing)
Dimensions	5.24 x 5.00 x 1.38 inch (133 x 127 x 35 mm)
Weight	1.5lbs (0.7kg)
Accessories Included	External 12VDC @ 2A Power Adaptor
Regulatory	FCC, CE, RoHS, WEEE
Order Information	29977 Network Controller for HDMI over IP

Table 1: Technical Specifications

3. Installation and Use

3.1. Part List

The C2G Network Controller comes with the following parts:

- Base unit (1x)
- External Power Adapter (1x)



Figure 3: Base Unit

Please verify that both parts are present before proceeding.

3.2. Product Overview

The external connections and connection indicators of the C2G1 Network Controller are detailed in Figure 4 and Figure 5. Please familiarize yourself with them before installing the unit.

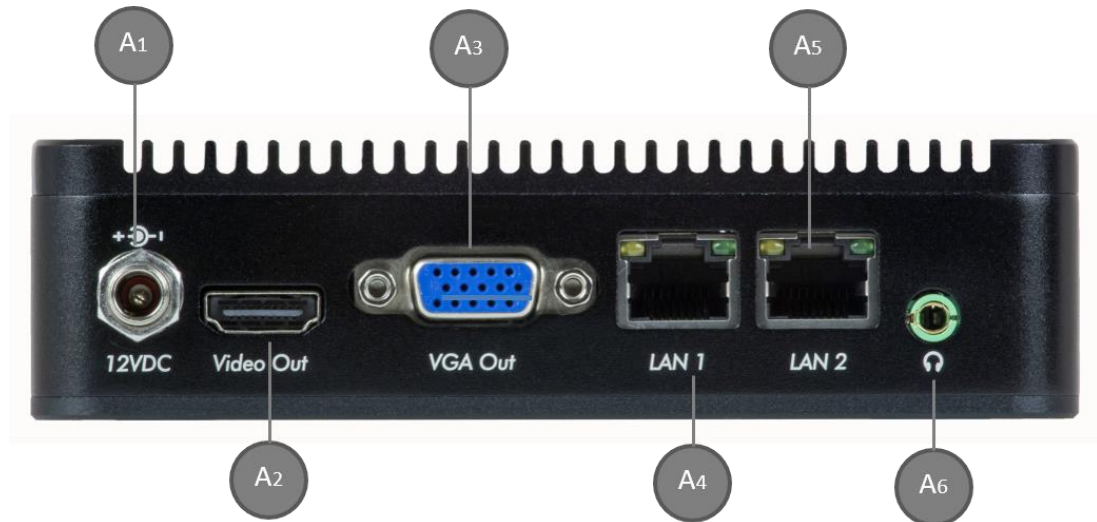


Figure 4: Rear Panel

- A1 = DC Power
- A2 = HDMI video out
- A3 = VGA video out
- A4 = RJ45 Ethernet LAN 1
- A5 = RJ45 Ethernet LAN 2
- A6 = Audio out

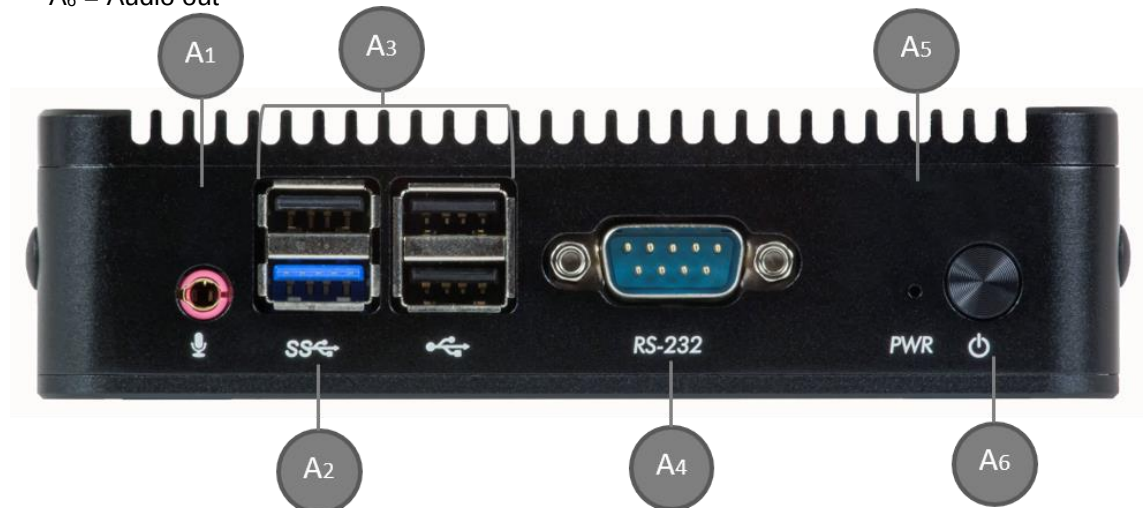


Figure 5: Front Panel

- A1 = Audio In
- A2 = SS USB
- A3 = 2.0 USB Ports
- A4 = RS232
- A5 = Power LED
- A6 = Power Button

3.3. Installation Procedure

Note that the examples below assume that the Ethernet Switch used does not support WiFi, and a Router with WiFi capability is required in order to communicate with smartphones and tablets for control purposes.

Setting the Ethernet Switch & Router to the same Subnet as C2G Devices:

The C2G Network Controller comes with two Ethernet ports. LAN 1 is configured with a static IP address which is 192.168.168.50. **LAN 1 port should be connected in to the same network switch where all the C2G equipment is connected.** Note that LAN 2 port is configured as a DHCP client, and can be utilized for control purpose. The C2G AV over IP Encoders (TX) and Decoders (RX) are set to support DHCP by default. When no DHCP server is available the AV over IP Encoders and Decoders fallback to a static IP address of:

- 192.168.168.62 (for the 29975 Encoders)
- 192.168.168.63 (for the 29976 Decoders)

These C2G products (Network Controller and the AV over IP Encoders & Decoders) work in conjunction with a PoE (PSE) Ethernet Switch (supporting IGMP and Jumbo Frames) and a Router of your choice with WiFi capability to be able to communicate with a smartphone or tablet. Also, in the case where one Ethernet Switch does not have sufficient ports for the number of AV over IP Encoders and Decoders to be connected, then it is recommended that the Ethernet Switch be a stackable Ethernet Switch. The use of a smartphone or tablet to manage the C2G devices with the C2G AVoIP Control App (model: 29986) is the preferred method of control, however C2G devices may also be managed via the Network Controller web interface.

In order for the DHCP server within the Ethernet Switch to support the C2G device subnet, set the static IP of the Ethernet Switch to **192.168.168.1** (recommended setting). Refer to the Ethernet Switch manual for instructions on how to accomplish this. The Router with WiFi capability, must also be placed on the same subnet as the C2G devices and it should be set with a Static IP address, we recommend using a Static IP address of **192.168.168.2**. Refer to your Router documentation on how to accomplish this.

Setting C2G Devices, Ethernet Switch and Router to an Existing Subnet:

If the C2G AV over IP devices are being installed in an existing environment that has a working subnet already configured that cannot be easily changed, then the subnet of the C2G devices, the Ethernet Switch (if a new Ethernet Switch is required), and the Router with Wifi (if a new Router is required) must be changed in order to match the existing subnet. For this case we will use **192.168.2.x** as an example subnet already in place and which must be supported. Note that this is only an example and may not necessarily reflect your actual subnet address.

If the Ethernet Switch does not already reside in the example subnet of 192.168.2.x, then set the static IP of the Ethernet Switch to a free static IP address (for the sake of this example we will use an IP address of **192.168.2.1**). Refer to the Ethernet Switch manual for instructions on how to accomplish this. C2G also has example guides specific to the Cisco SG350 Series, Luxul AMS-1208P Series, and NetGear S3300 Series, which may be found on the C2G website.

If the Router with WiFi does not already reside in the example subnet of 192.168.2.x, then set the static IP of the Router to a free static IP address (for the sake of this example we will use an IP address of **192.168.2.2**). Refer to your Router documentation on how to accomplish this.

The C2G AV over IP Encoders and Decoders are set by default to support DHCP and will automatically be set to the subnet specified by the DHCP Server. These units need only be physically connected into the network as described in their respective Installation Guides and by using the 29977 Network Controller for HDMI over IP to discover them. But before the Network Controller can be used, the new Network Controller subnet must also be set.

To change the subnet of the Network Controller requires a two-step process:

Process 1: Configuring the IP address of the Network Controller

Process 2: Physically installing the Network Controller in the network

Note:

- An example subnet address of 192.168.2.x of the existing network on which the Network Controller will be installed is assumed for this example process.
- The Network Controller LAN 1 port comes with a static IP address of **192.168.168.50** and with DHCP disabled. This process explains how to change it to the example subnet of 192.168.2.x.

Process 1: Configuring the IP address of the Network Controller

Refer to Figure 4 and Figure 5.

1. On the back panel of the Network Controller:
 - A. Plug the supplied power adaptor into the DC power jack. Ensure that the other end of the power adaptor is plugged into a power socket.
 - B. Ensure that the power switch on the front of the unit is ON position (front button • pressed in).
 - C. Connect one end of an Ethernet cable to the LAN 1 Ethernet port. Ensure that the other end of the Ethernet cable is connected to a computer.

Refer to Figure 6.

2. On the computer to which the Network Controller is connected, open up an Internet browser (Explorer, Chrome, Firefox, etc.) and type the following address in the address bar near the top of the screen:

<http://192.168.168.50/mnc/>

NOTE: **mnc** must be written in lower case.

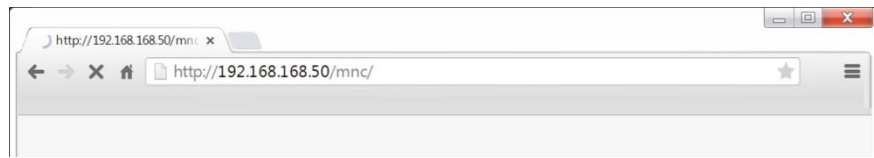


Figure 6: Internet Browser Entry

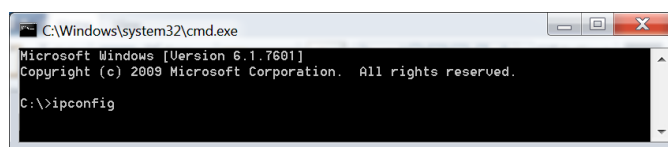
3. Press **Enter** on the keyboard. If the browser connects to the Network Controller, go to Step 7.
4. If the browser fails to connect to the Network Controller, a failure message will appear. Perform the following steps (Steps 4 through 6) in order to set the computer to the same subnet as the Network Controller, to be able to then change the Network Controller subnet (from Step 7 onward) to match the subnet of the existing installation (refer to Figure 7):
 - A. Move the mouse to the bottom of the screen and click on the **Start** button at the lower left.
 - B. Click into the *Search programs and files* field just above the **Start** button and type `cmd`. Press **Enter** on the keyboard.
 - C. A DOS window will appear. Type `ipconfig` and press **Enter** on the keyboard.



Step 4A



Step 4B



Step 4C

Figure 7: Determining Computer IP Address

The following screen will appear (Figure 8).

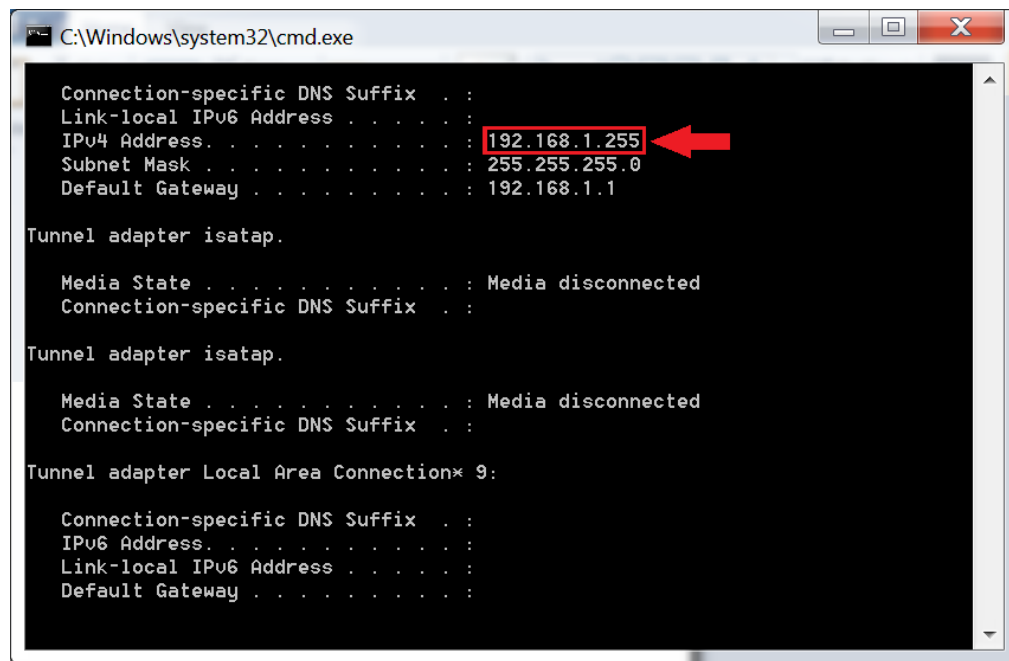


Figure 8: Computer IP Address

5. If the IPv4 Address (shown in the red box of Figure 8) does NOT begin with the numbers 192.168.168.x, then perform the following steps (refer to Figures 9 through 12):
 - A. Type **exit** and press **Enter** on the keyboard.
 - B. Move the mouse to the bottom of the screen and click on the **Start** button at the lower left.
 - C. Click on **Control Panel**
 - D. Click on **Network and Internet**
 - E. Click on **Network and Sharing Center**
 - F. Click on **Local Area Connection**
 - G. Click on **Properties**
 - H. Click on **Internet Protocol Version 4 (TCP/IPv4)**. It will turn blue.
 - I. Click on **Properties**
 - J. Click the **Use the following IP address** radio button.
 - K. In the **IP address** field, type the following:

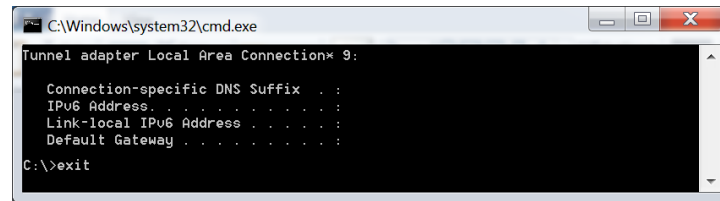
192.168.168.x

Where x can be any number from 2 to 254 except for 50 (since 50 is the Network Controller address). The example in Figure has the PC set to a Static IP address of **192.168.168.12**

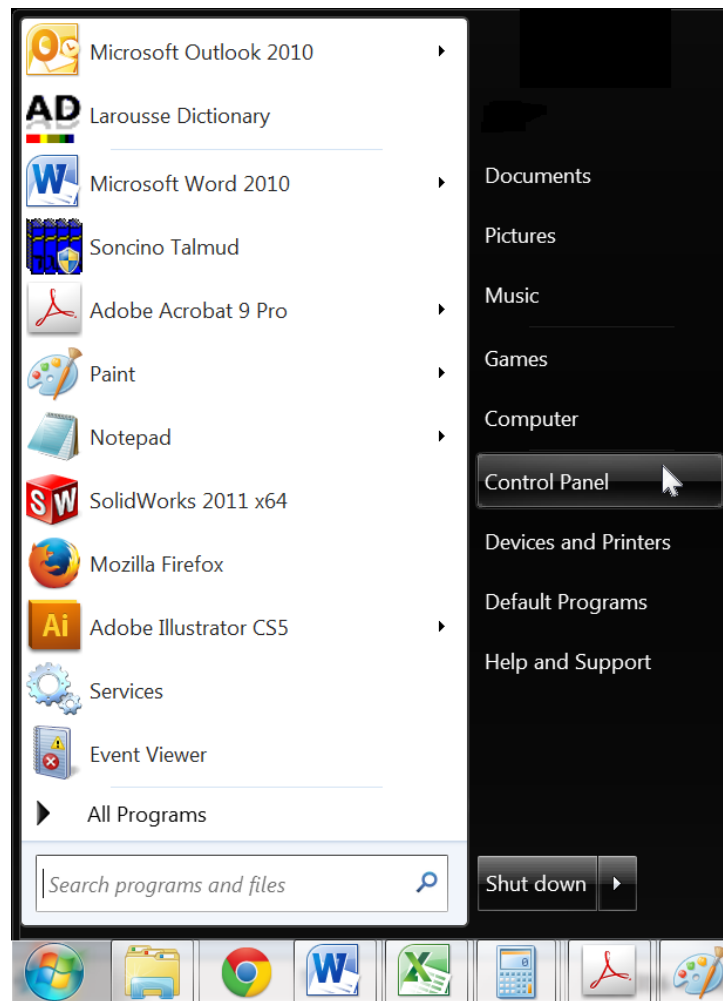
- L. In the **Subnet mask** field, type the following:

255.255.255.0

M. Click on **OK**.

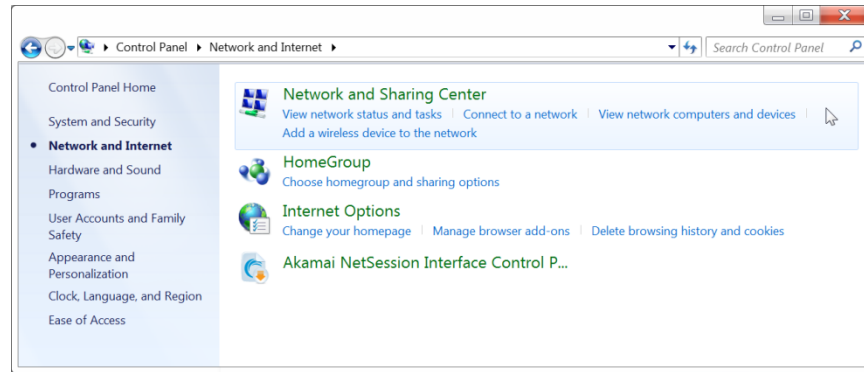


Step 5A

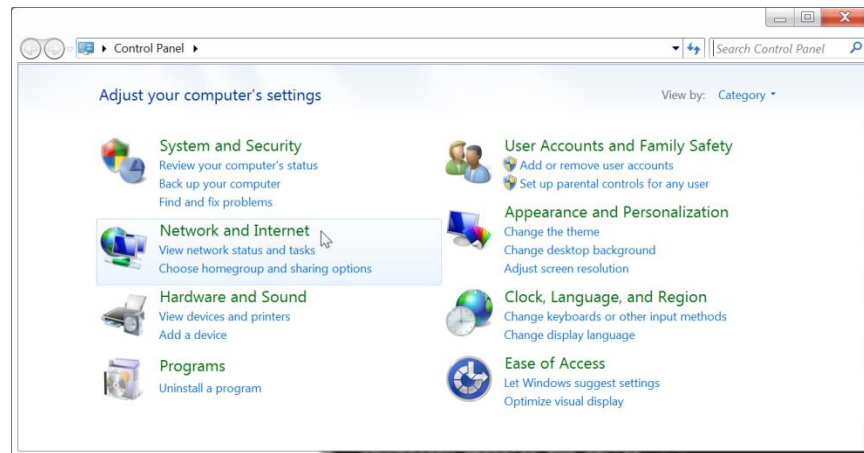


Steps 5B-5C

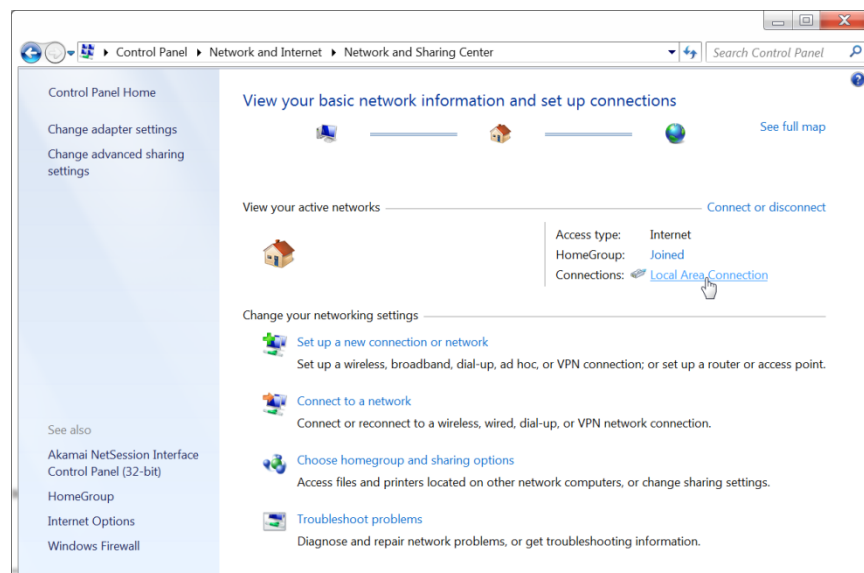
Figure 9



Step 5D

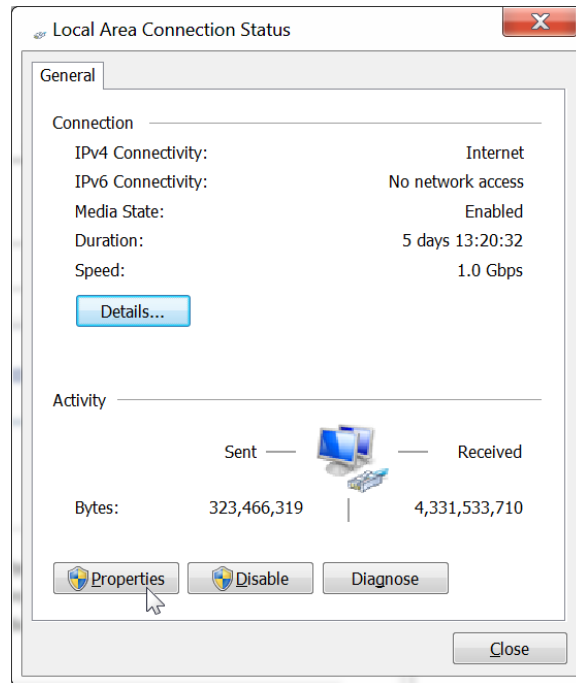


Step 5E

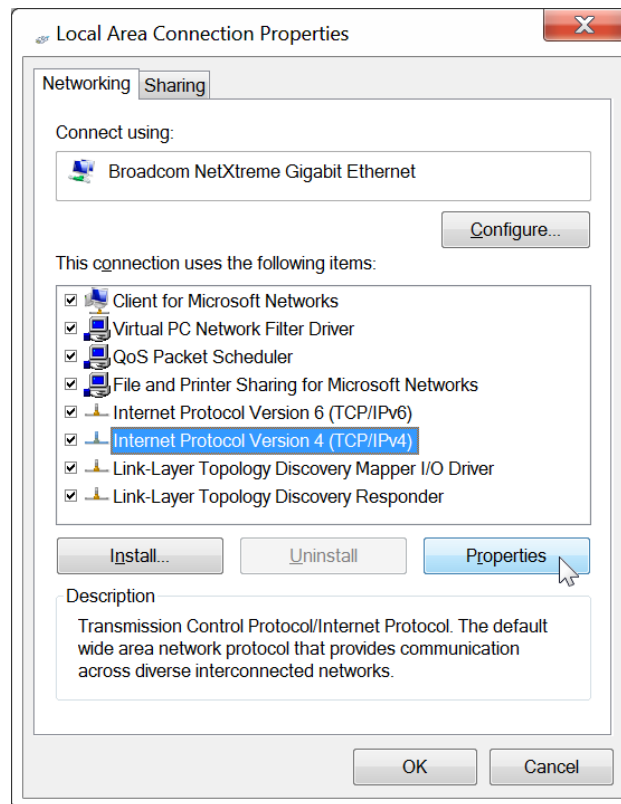


Step 5F

Figure 10

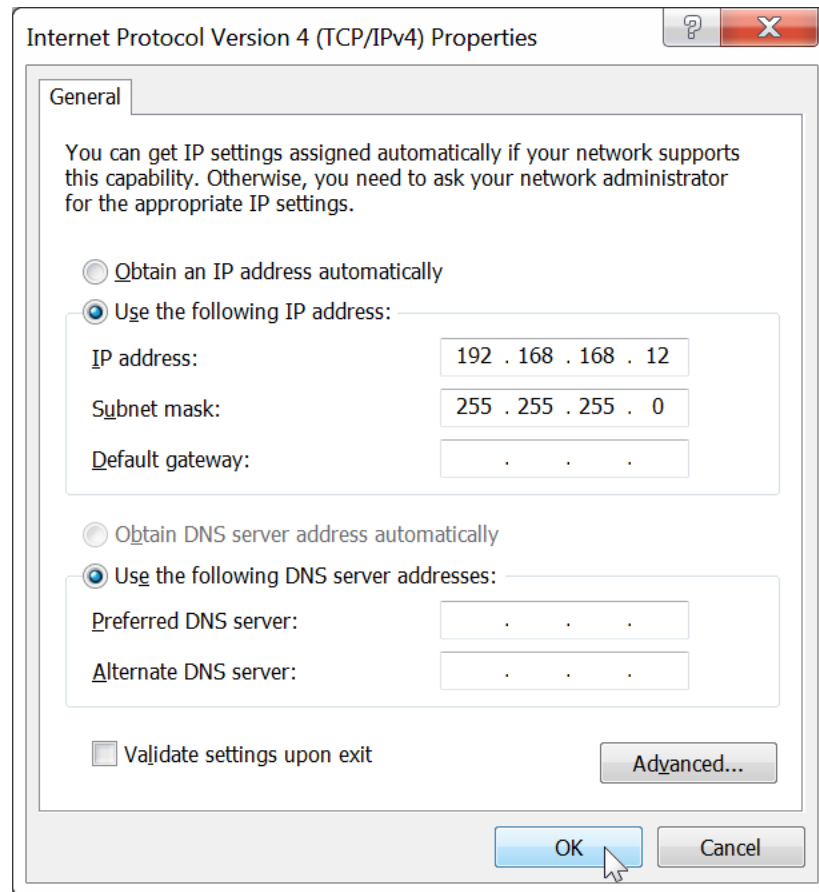


Step 5G



Steps 5H-5I

Figure 11



Steps 5J-5K-5L-5M

Figure 12

The computer is now ready to communicate with the Network Controller.

Refer to Figure 13.

6. Open up an Internet browser (Explorer, Chrome, Firefox, etc.) and type the following address in the address bar near the top of the screen:

<http://192.168.168.50/mnc/>

NOTE: **mnc** must be written in lower case

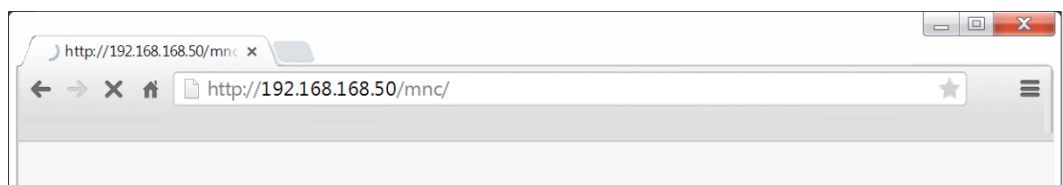
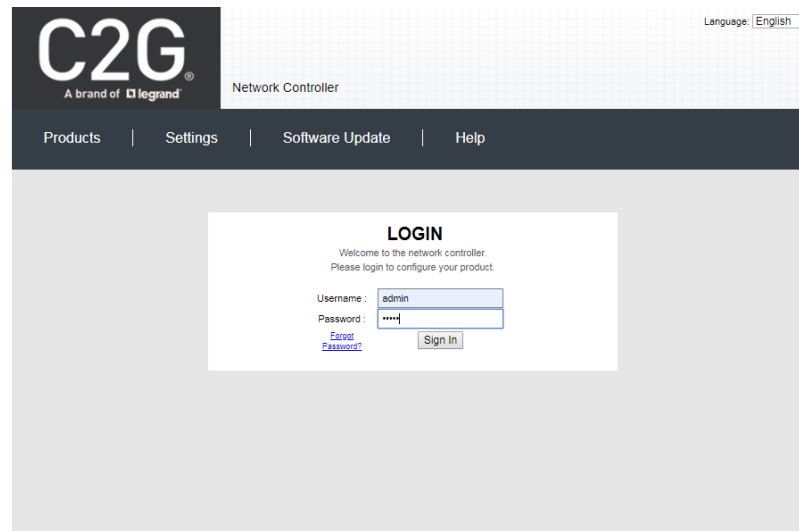


Figure 13: Internet Browser Entry

Refer to Figure 14a.

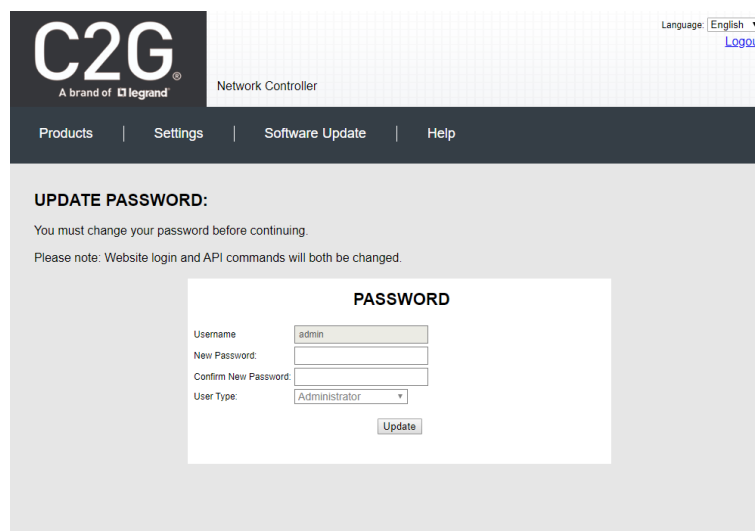
7. The C2G Network Controller Web interface **Login Screen** will appear.



The screenshot shows the C2G Network Controller web interface. At the top left is the C2G logo with the tagline 'A brand of Legrand'. To the right of the logo is the text 'Network Controller'. In the top right corner, there is a language dropdown menu set to 'English'. Below the header is a dark navigation bar with links for 'Products', 'Settings', 'Software Update', and 'Help'. The main content area is light gray and features a white 'LOGIN' box in the center. Inside the login box, it says 'Welcome to the network controller. Please login to configure your product.' There are two input fields: 'Username' with 'admin' entered and 'Password' with four asterisks. Below the password field is a link for 'Forgot Password?'. A 'Sign In' button is at the bottom right of the login box.

Figure 14a: Login Screen

8. In the **User Name** field, type admin (for initial login). Use lower case.
9. In the **Password** field, type admin (for initial login). Use lower case.
10. Click **Log in**.
11. To improve security, after the initial login you must change your administrator password in order to be able to continue, see Figure 14b. Enter your new administrator password and re-enter it again to confirm and press update.



The screenshot shows the C2G Network Controller web interface after login. The header and navigation bar are the same as in Figure 14a. The main content area is light gray and features a white 'UPDATE PASSWORD' box. At the top of the box is the heading 'UPDATE PASSWORD:' followed by the text 'You must change your password before continuing.' and a note: 'Please note: Website login and API commands will both be changed.' Below this is a 'PASSWORD' section with four input fields: 'Username' (pre-filled with 'admin'), 'New Password', 'Confirm New Password', and 'User Type' (a dropdown menu set to 'Administrator'). An 'Update' button is at the bottom right of the password section.

Figure 14b: Update Password Screen

12. Click the **Settings** tab. The Network Settings screen will appear.

C2G
A brand of Legrand

Network Controller

Language: English [Logout](#)

Products | Settings | Software Update | Help

Network Administration mDNS Browser

Network

Use the form below if you'd like to set manual network settings.

LAN 1

Use DHCP: ☐ Yes ☒ No

IP address:
192 168 2 5

Network mask:
255 255 255 0

Router:
192 168 1 1

Mac Address:
00 0E C4 D3 1A 79

[Save](#)

LAN 2

Use DHCP: ☒ Yes ☐ No

IP address:
- - - -

Network mask:
- - - -

Router:
- - - -

Mac Address:
00 0E C4 D3 1A 7A

[Save](#)

Figure 15: Network Settings Screen

13. Next ensure that the above radio buttons are selected as shown. For LAN 1 as Static and LAN 2 as Dynamic (DHCP).
14. In the LAN 1 **IP address** field, type the first 3 entries of the IP address of the network subnet on which the Network Controller will be installed, which in our example is 192.168.2.x.

For example, type the following in the Network Controller **IP address** field:

192.168.2.x

Where x in our example can be any number from 3 to 254, and since “1” was used above for the Ethernet Switch and “2” was used for the Router, then for this example we will select “5” for a Static IP address of **192.168.2.5**, see Figure 15. Just make sure the Static IP address for the Network Controller does not conflict with the Static IP address of the Ethernet Switch and the Router or any other Static IP address already pre-assigned in the given network.

15. In the **Network mask** field, type **255.255.255.0**
16. In the **Router** field, type the IP address of the network Router (which in our example is **192.168.2.2**).

17. Click on **Save**. The Network Controller will reboot (Figure 16).

The Network Controller is now configured to work with your network router.

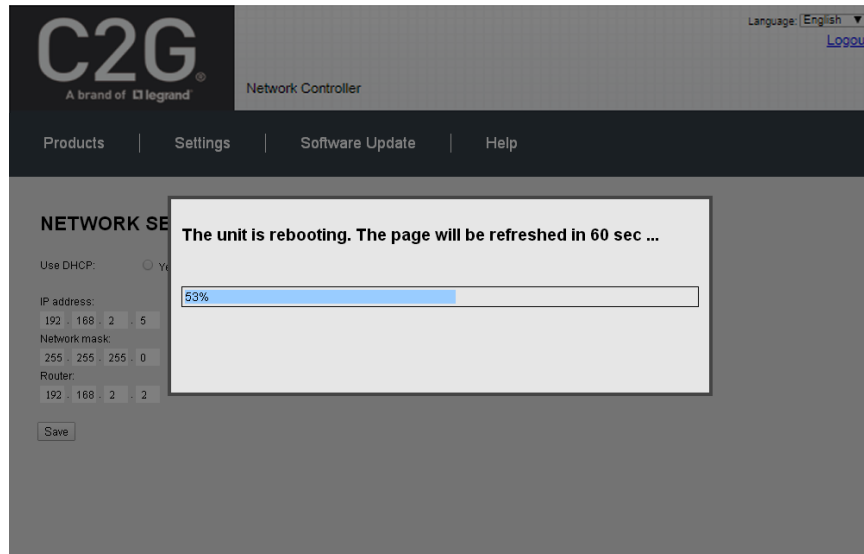


Figure 16: Network Controller Reboot Screen

Process 2: Physically installing the Network Controller to the network

1. Disconnect the Ethernet cable from the computer and connect it to either the Router or the Ethernet Switch. Ensure that the other end is still connected to the Network Controller. Also make sure that the Router is connected to the Ethernet Switch.

3.4. Ethernet Web Interface – Device Management

The Ethernet Web interface allows the user to manage the Network Controller and the AV over IP product family of extenders remotely from a Windows based computer. Make sure the computer is set to a Static IP address in the same subnet, which in our example is **192.168.2.x**. Follow steps 4, 5 & 6 in section 3.3 on how to accomplish this, but set using the subnet 192.168.2.x

Ensure that the computer is connected by an Ethernet cable to the network router on which the Network Controller is physically installed. Open up an Internet browser (Explorer, Chrome, Firefox, etc.) and type in the Network Controller IP address in the address bar near the top of the screen, such as, which in our example is 192.168.2.5:

192.168.2.5/mnc/

NOTE: **192.168.2.x** represents the first three IP address entries of the network subnet on which the Network Controller is physically installed.

The C2G Network Controller Web interface **Login Screen** will appear (Figure 17).

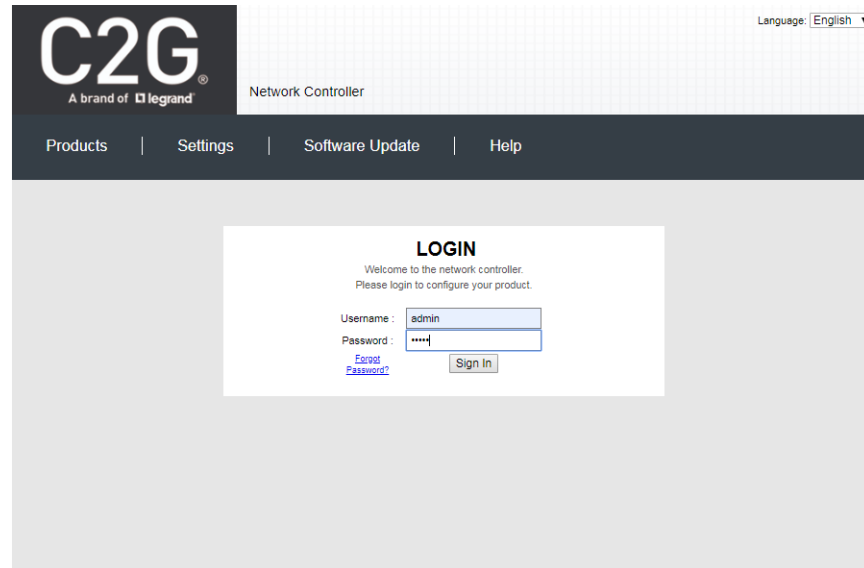


Figure 17 Login Screen

In the **User Name** field, type admin. Use lower case.

In the **Password** field, type the password entered previously in step 11.

Click **Log in**.

You are now ready to manage the C2G Network Controller for HDMI over IP.

Extender Models

The C2G Network Controller is designed to work with the C2G Extender models (refer to Table 2).

These Extender models are controlled using C2G's Network Controller software, although the setup for each may differ slightly.

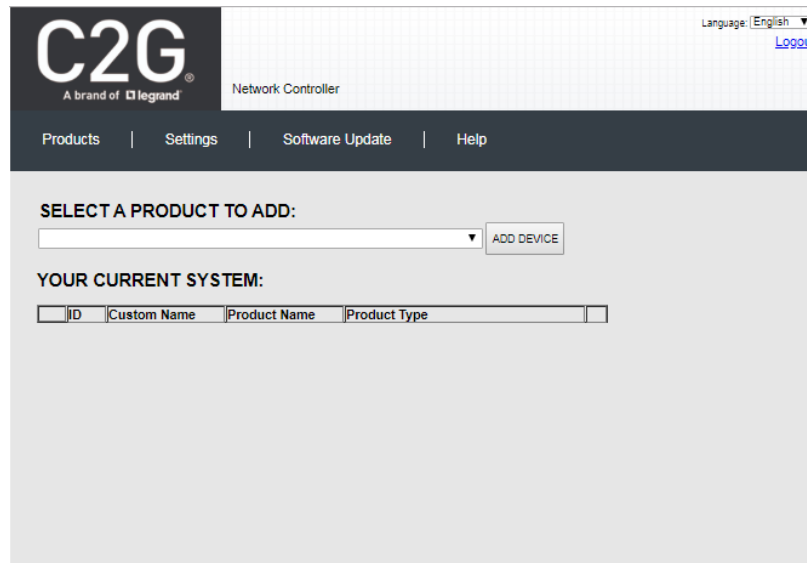
Model	Type	Resolution	Features	Page
29975	HDMI	4K/30	RS232+IR+PoE	21
29976	HDMI	4K/60	USB+RS232+IR+PoE	21

Table 2: Extender Models

3.5. Extender Models 29975 and 29976

Products Screen

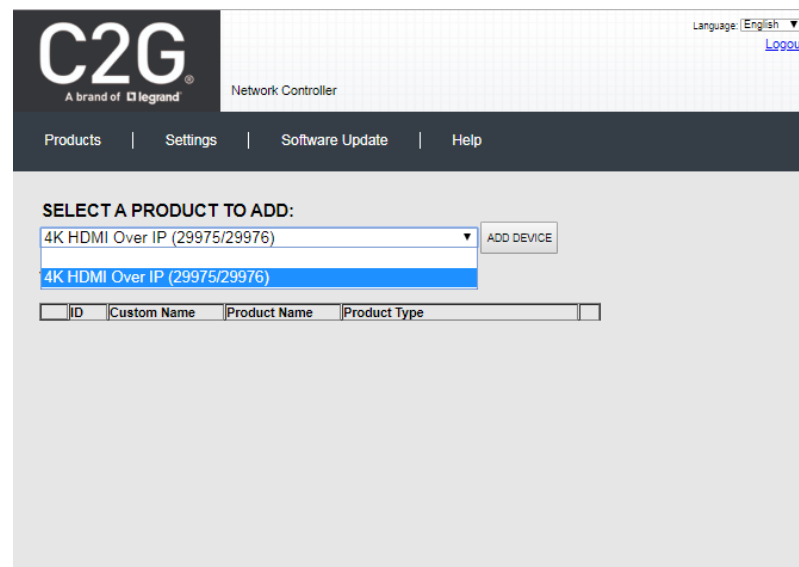
Once the user has logged in, the **Products** screen will appear (Figure 18).



The screenshot shows the C2G Network Controller interface. The header includes the C2G logo (A brand of Legrand), the title 'Network Controller', a language dropdown set to 'English', and a 'Logout' link. A navigation bar contains 'Products', 'Settings', 'Software Update', and 'Help'. The main content area has a section 'SELECT A PRODUCT TO ADD:' with a dropdown menu and an 'ADD DEVICE' button. Below this is a section 'YOUR CURRENT SYSTEM:' containing a table with columns: ID, Custom Name, Product Name, and Product Type.

Figure 18: Products Screen – Initial View

In the **SELECT A PRODUCT TO ADD:** drop down box, select **4K HDMI Over IP (29975/29976)** and then click on **ADD DEVICE** (Figure 19).



This screenshot shows the same C2G Network Controller interface as Figure 18, but with the dropdown menu open under 'SELECT A PRODUCT TO ADD:'. The option '4K HDMI Over IP (29975/29976)' is selected and highlighted in blue. The 'ADD DEVICE' button remains visible to the right of the dropdown.

Figure 19: Products Screen – Selecting a Product

A dialog box appears asking the user to provide a custom name for the selected product (Figure 20). The user then types a name in the **Custom Name:** field and clicks **OK**. Note that if the user decides to click **CANCEL**, the previous screen appears (Figure 18), without a product being added.

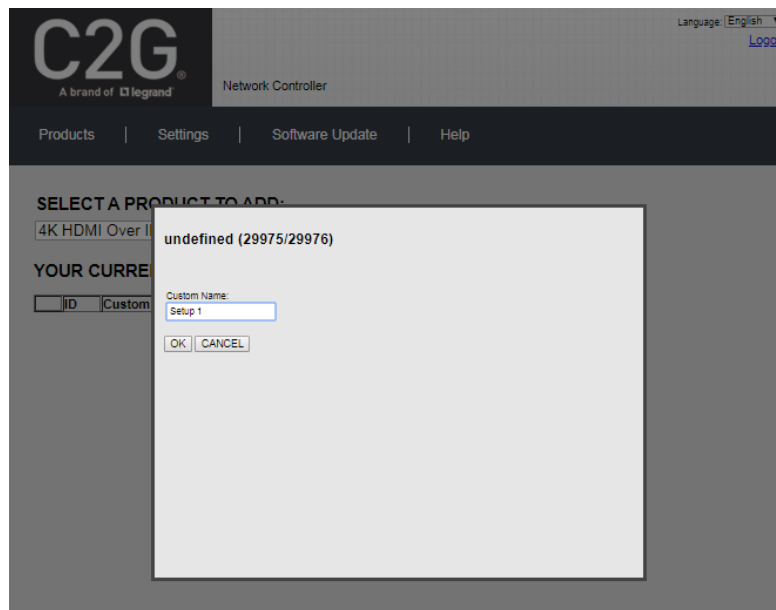


Figure 20: Products Screen – Naming a Product

The custom name has been added to **YOUR CURRENT SYSTEM** (Figure 21).

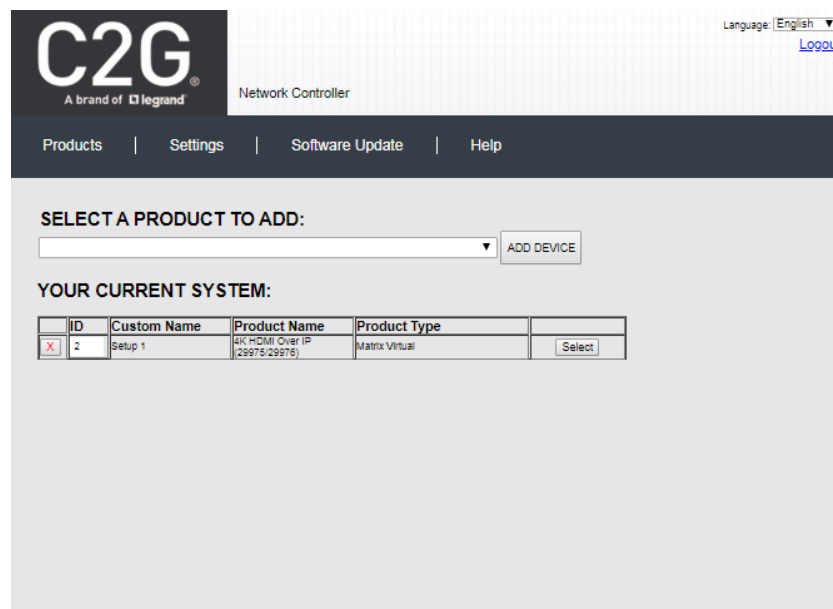


Figure 21: Products Screen – Your Current System Selection

The user can change the ID of each row by modifying the **ID** field. The user can also delete the entire row completely by clicking the **X** next to it.

To configure a given product, the user clicks on **Select**, which brings up a multi-tabbed screen (Figure 22).

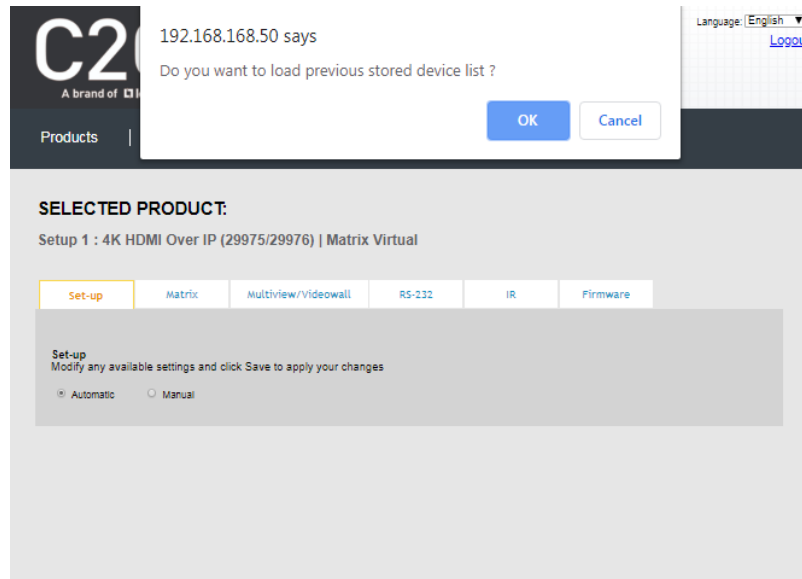


Figure 22: Products Screen – Load Dialog

By default, a dialog appears asking the user to load a previously saved device list (in case such a list has already been stored). This dialog will appear even if no device list has been previously saved. Select **OK** if appropriate.

Six tabs appear within the **Products** screen:

1. Set-up
2. Matrix
3. Multiview/Videowall
4. RS-232
5. IR
6. Firmware

1. Products Screen - Set-up Tab

The **Set-up** tab offers the user two options for the type of set-up allowed: **Automatic** or **Manual**.

Automatic means that the software will scan the system for every dip-switch enabled device. The software will then override its manual dip-switch address settings and place these units under software address control. (Automatic is recommended).

Manual means that the software will allow the manual dip-switch address settings of any found device to remain active.

After selecting **Automatic** or **Manual**, click on **Launch discovery** (Figure 23).

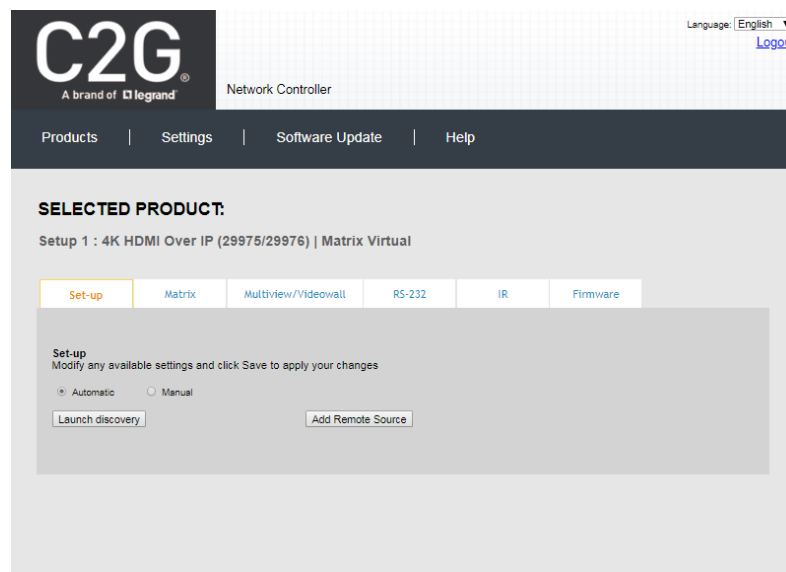


Figure 23: Products Screen – Set-up Tab

The system will scan the network for all source side devices (29975 encoders) and display side devices (29976 decoders), and will display the scan results in tabular form (Figure 24).

Each 29975 encoder and 29976 decoder can be assigned an arbitrary descriptive name, normally reflecting the end device that it is terminated to. To change the name of any Display (RX) or Source (TX) device, click the **Name** field to edit its contents. Several **Name** fields can be edited before saving changes, as shown in Figure 25 (orange highlighted fields).

C2G
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Network Controller

Language: English [Logout](#)

Products | Settings | Software Update | Help

SELECTED PRODUCT:
Setup 1 : 4K HDMI Over IP (29975/29976) | Matrix Virtual

Set-up | Matrix | Multiview/Videowall | RS-232 | IR | Firmware

Set-up
Modify any available settings and click Save to apply your changes

☒ Automatic ☐ Manual

[Launch discovery](#) [Add Remote Source](#)

Display (1 RX)

Port#	Name	MAC address	IP address	MASK	GATEWAY	DHCP	DIP	
0	RX-00-0B-78-05-1C-5D	00-0B-78-05-1C-5D	192.168.168.83	255.255.255.0	192.168.168.1	☒	☐	Reboot Detail

Source (1 TX)

Port#	Name	MAC address	IP address	MASK	GATEWAY	DHCP	DIP	
0	TX-00-0B-78-00-AA-6E	00-0B-78-00-AA-6E	192.168.168.82	255.255.255.0	192.168.168.1	☒	☐	Reboot Detail

[Save](#)

Figure 24: Products Screen – Set-up Tab

C2G
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Network Controller

Language: English [Logout](#)

Products | Settings | Software Update | Help

SELECTED PRODUCT:
Setup 1 : 4K HDMI Over IP (29975/29976) | Matrix Virtual

Set-up | Matrix | Multiview/Videowall | RS-232 | IR | Firmware

Set-up
Modify any available settings and click Save to apply your changes

☒ Automatic ☐ Manual

[Launch discovery](#) [Add Remote Source](#)

Display (1 RX)

Port#	Name	MAC address	IP address	MASK	GATEWAY	DHCP	DIP	
0	4K TV-1	00-0B-78-05-1C-5D	192.168.168.83	255.255.255.0	192.168.168.1	☒	☐	Reboot Cancel Detail

Source (1 TX)

Port#	Name	MAC address	IP address	MASK	GATEWAY	DHCP	DIP	
0	4K Media Player-1	00-0B-78-00-AA-6E	192.168.168.82	255.255.255.0	192.168.168.1	☒	☐	Reboot Cancel Detail

[Save](#)

Figure 25: Name Editing

To save all name changes, click on **Save**. A green UPDATED tag will appear next to newly changed names (Figure 26).

C2G
A brand of Legrand

Network Controller

Language: English Logout

Products | Settings | Software Update | Help

SELECTED PRODUCT:
Setup 1 : 4K HDMI Over IP (29975/29976) | Matrix Virtual

Set-up | Matrix | Multiview/Videowall | RS-232 | IR | Firmware

Set-up
Modify any available settings and click Save to apply your changes

☒ Automatic ☐ Manual

Launch discovery Add Remote Source

Display (1 RX)

Port#	Name	MAC address	IP address	MASK	GATEWAY	DHCP	DIP
0	4K TV-1	00-08-79-05-1C-6D	192.168.168.63	255.255.255.0	192.168.168.1	☒	Reboot Detail UPDATED

Source (1 TX)

Port#	Name	MAC address	IP address	MASK	GATEWAY	DHCP	DIP
0	4K Media Player-1	00-08-79-00-AA-6E	192.168.168.62	255.255.255.0	192.168.168.1	☒	Reboot Detail UPDATED

Save

Figure 26: Saving Name Changes

Remote sources may also be used with the 29976 decoder. Start by pressing on the “Add Remote Source” button in Figure 26. This will bring up a popup menu to fill-in relating to the remote source, as shown in Figure 27, and followed by Figure 28.

ADD REMOTE SOURCE

Model: Select a product model

Custom Name: Enter a name of your choice

MAC Address: Optional (Ex: 00-78-02-00-ab-5d)

IP Address: Optional (Ex: 192.168.168.99)

SAVE CANCEL

Figure 27: Add a remote source

ADD REMOTE SOURCE

Model: Other-TX

Custom Name: Enter a name of your choice

MAC Address: Optional (Ex: 00-78-02-00-ab-5d)

IP Address: Optional (Ex: 192.168.168.99)

RTSP HLS TS FLV MULTICAST

RTSP: Disabled

URL: rtsp://<ip or domain name>:<port>/path_to_file

Port:

SAVE CANCEL

Figure 28: Add a remote source & protocol

Fill in the menu as follows:

- Select a product model, which may either be a 29975 or a different brand transmitter. This will display additional information as shown in Figure 28.
- Assign a name to this device.
- Enter the unit MAC address and IP address.
- Select the protocol to be used, enable it, and set the Port as needed.
- Save the settings.

To view and modify component parameters, click on the **Detail** button next to the given AV over IP device. A dialog appears (Figure 29 for TX, and Figure 30 for RX).

Figure 29: TX Device Detail Dialog

Figure 30: RX Device Detail Dialog

29975 Encoder (TX) Parameters:

- Custom Name: Device name defined by user (info only)
- Model: Device model number (info only)
- Mac Address: Device MAC Address (info only)
- IP Address: Device IP Address (info only)
- FW Version: Installed firmware version (info only)
- Video Resolution: Video resolution at input (info only)
- CPU Usage: Device CPU usage in percentage (info only)
- Memory Usage: Device memory usage in bytes (info only)
- Blink LED: On / Off control to help to locate a device
- Factory Reset: Perform a Factory Reset of the device
- Video Codec: Allows for selection of video codec (to baseline, main or high profile for H.264, or main profile for H.265)
- Video Output Resolution: Allows for selection of output video resolution (to “Same as Input”, or from 176x144 to 3840x2160)
- Bit Rate Control: Allows for selection of bit rate control (to VBR - variable bit rate, or CBR - continuous bit rate)
- Video Bit Rate: Allows for selection is bit rate (from 32kbps to 40Mbps)
- Video Frames per Sec: Video refresh rate in frames per sec (from 5 to 60)
- Group of Picture: Set the GOP or Group of Pictures (from 5 to 300)
- Audio Input: Select embedded audio input source (HDMI, or Analog via 3.5mm jack)
- Audio Codec: Select audio codec type (to AAC or MP3)
- Audio Bit Rate: Select audio bit rate (from 48Kbps to 320Kbps)
- Audio Frequency: Select audio frequency (to 44100Hz or 48000Hz)
- Communication Protocol Selection: RTMP, RTSP, HLS, TS, FLV and Multicast
(**Note:** Only a limited selection should be made at a time. Do not enable all at the same time.)
- Multicast: Allows for enabling or disabling the multicast protocol
- Multicast IP: Shows the multicast IP (info only)
- Multicast Port: Shows the multicast port used (info only)

29976 Decoder (RX) Parameters:

- Custom Name: Device name defined by user (info only)
- Model: Device model number (info only)
- Mac Address: Device MAC Address (info only)
- IP Address: Device IP Address (info only)
- FW Version: Installed firmware version (info only)
- Video Resolution: Video resolution at input (info only)
- CPU Usage: Device CPU usage in percentage (info only)
- Memory Usage: Device memory usage in bytes (info only)
- Blink LED: On / Off control to help to locate a device
- Factory Reset: Perform a Factory Reset of the device
- Set Output Video Format: Allow for the selection of output video format (to Auto, or from 480p/60 to 3840x2160/60)
- Communication Protocol Selection: RTSP, HLS, TS, FLV and Multicast
- Multicast: Allows for enabling or disabling the multicast protocol
- Multicast IP: Shows the multicast IP (info only)
- Multicast Port: Shows the multicast port used (info only)

Note: In the above cases click on “Save” to accept any changes, or on “Cancel” to abandon them.

2. Products Screen - Matrix Tab

The **Matrix** tab of the **Products** screen allows the user to connect any Display to any Source. The user also has the option of using **Presets** to save connection schemes (“Presets”), as well as to edit and delete existing presets (Figure 31).

C2G
A brand of **Legrand**

Network Controller

Language: English [Logout](#)

Products | Settings | Software Update | Help

SELECTED PRODUCT:
Setup 1 : 4K HDMI Over IP (29975/29976) | Matrix Virtual

Set-up | **Matrix** | Multiview/Videowall | RS-232 | IR | Firmware

Connect your displays to the desired sources below. Once you've selected the displays you want to change, use the "Connect" button at the bottom to make the connections.

DISPLAY	SOURCE	PROTOCOL
4K TV-1	-	AUTO

[Connect](#)

PRESETS

- > Current active Preset: No preset selected ID: 0
- > Save current connections in following preset:
- > Save current connections as new preset: [Create](#)
- > Delete following preset:

Figure 31: Matrix Tab

To connect a display to a source, the user first clicks on the drop-down list next to the given display (for example “4K TV-1”) and selects which source to connect it to (Figure 32).

C2G
A brand of **Legrand**

Network Controller

Language: English [Logout](#)

Products | Settings | Software Update | Help

SELECTED PRODUCT:
Setup 1 : 4K HDMI Over IP (29975/29976) | Matrix Virtual

Set-up | **Matrix** | Multiview/Videowall | RS-232 | IR | Firmware

Connect your displays to the desired sources below. Once you've selected the displays you want to change, use the "Connect" button at the bottom to make the connections.

DISPLAY	SOURCE	PROTOCOL
4K TV-1	4K Media Player-1	AUTO

[Connect](#)

PRESETS

- > Current active Preset: No preset selected ID: 0
- > Save current connections in following preset:
- > Save current connections as new preset: [Create](#)
- > Delete following preset:

Figure 32: Change Connection

Once the selection is made (the user can change any or all connections between displays and sources), the user clicks on **Connect** to finalize the change. A green **SUCCESS** tag will appear next to the new or changed connection (Figure 33).

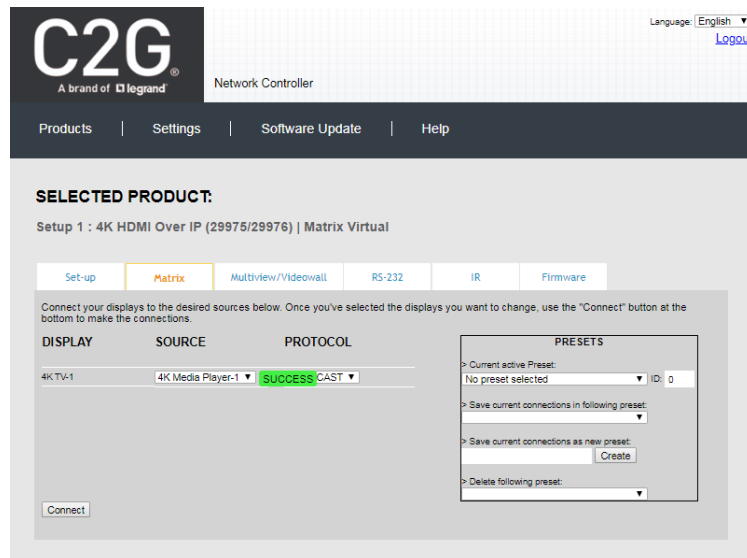


Figure 33: Change Successful

To create a new preset, the user clicks the > **Save current connections as new preset** field (Figure 34) and types a name. This assigned preset name will be linked to the existing connection scheme being shown within the **Matrix** tab.

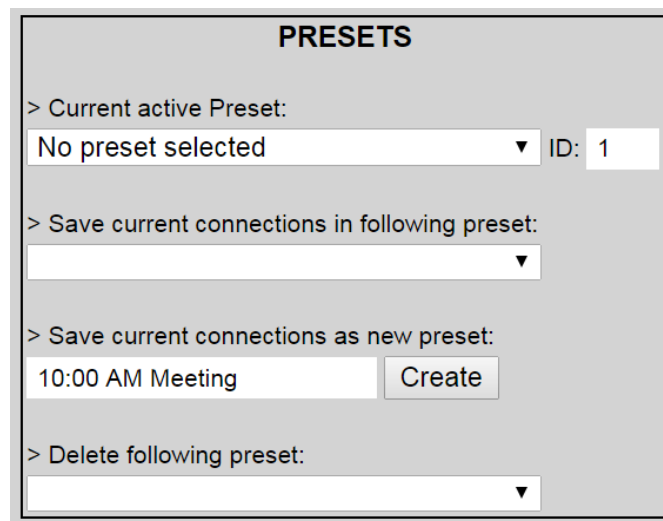


Figure 34: Create New Preset

To save this preset, the user clicks on **Create**. A green SUCCESS tag will appear next to the > **Save current connections as new preset** field and the newly created preset becomes the **Current active Preset** (Figure 35).

PRESETS

> Current active Preset:
[2] 10:00 AM Meeting ▼ ID: 2

> Save current connections in following preset:
▼

> Save current connections as new preset:
Create **SUCCESS**

> Delete following preset:
▼

Figure 35: Confirmation of New Preset

To delete a preset, the user clicks the > **Delete following preset** drop-down box and selects a preset name from the list shown (Figure 36).

PRESETS

> Current active Preset:
[2] 10:00 AM Meeting ▼ ID: 2

> Save current connections in following preset:
▼

> Save current connections as new preset:
Create

> Delete following preset:
▼
[2] 10:00 AM Meeting

Figure 36: Delete Preset

Once selected, a dialog will appear asking the user to confirm the deletion request (Figure 37).



Figure 37: Confirmation of Deleted Preset

Click on **OK**. The preset will be deleted and a green SUCCESS tag will appear next to the > **Delete following preset** field (Figure 38).

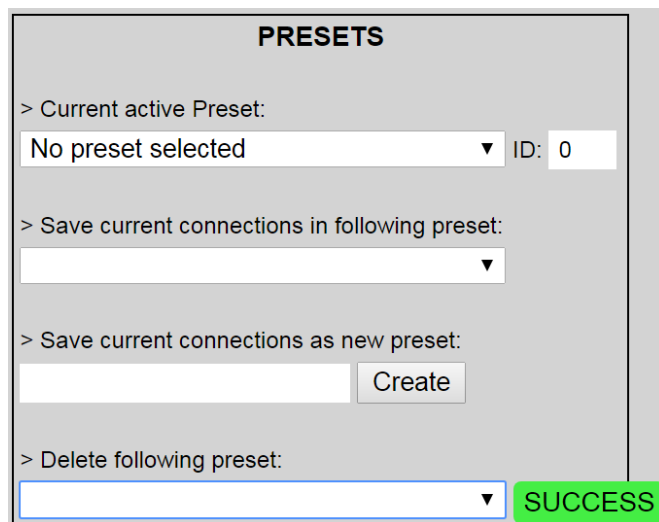


Figure 38: Confirmation of Deleted Preset

To save the current matrix configuration under an existing **Preset** name, click on > **Save current connection in following preset** drop-down box and selects a preset name (Figure 39).

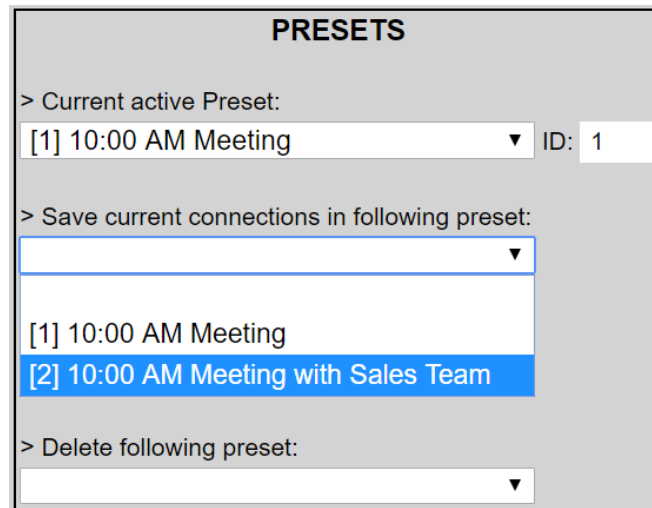


Figure 39: Change Current Active Preset

Once selected, the **Preset** will be saved and a green SUCCESS tag will appear next to the > **Save current connections in following preset** field (Figure 40).

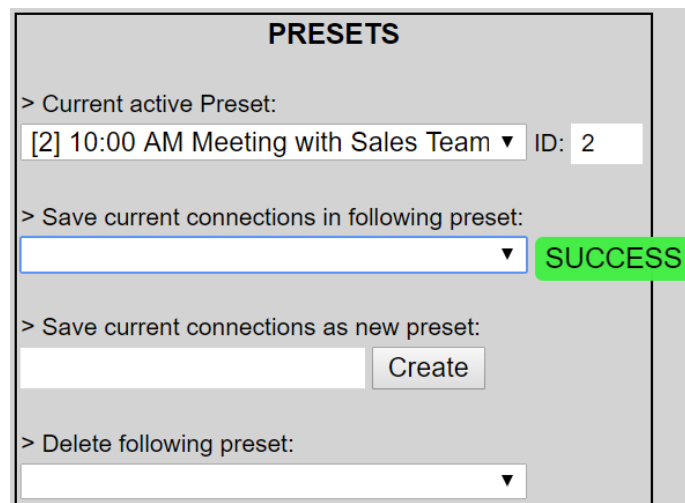


Figure 40: Confirmation of Changed Preset Name

In order to activate an existing **Preset**, select > **Current active Preset**, and select the **Preset** name from the drop-down box and the **Preset** will become active. The active **Preset** will also be displayed in the **Current active Preset** field.

3. Products Screen – Multiview/Videowall Tab

The **Multiview/Videowall** tab of the **Products** screen enables the user to define, configure and manage the connectivity of Multiview screens and/or Video Walls.

Multiview enables the user to display multiple videos or images on a single display or on a Video Wall consisting of multiple displays. Video Wall enables the user to configure an NxM display array consisting of NxM monitors, all of the same size.

Figure 41 shows the main Multiview/Videowall screen. An example consisting of 4 displays and 2 sources is used here to illustrate how to setup and configure Multiviews and/or Video Walls.

Figure 41 allows the user to create and save various configurations and arrangements of display and source layouts, and their connectivity. It includes a grid which represents the main work space for placing and sizing displays and the visible portion of sources, such that any portion of a source overlapping a display will allow that portion of the video to be shown on the monitor once the two have been connected.

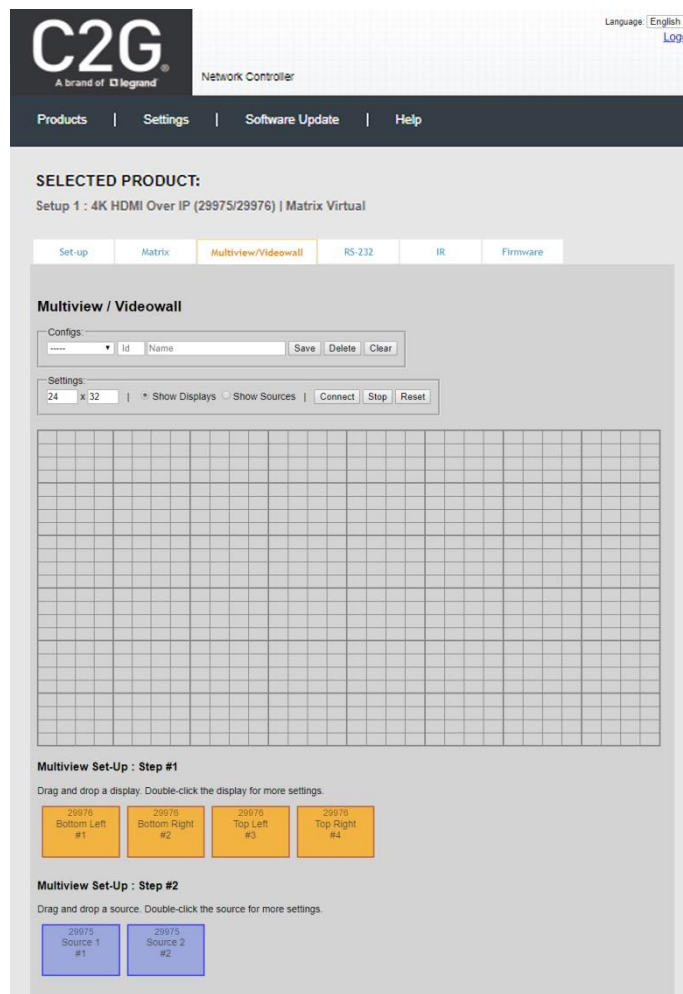


Figure 41: Multiview/Videowall Tab

The “**Config**” sub-section in Figure 41 allows the user to save, load, delete and clear configurations which have been created on the grid.

- The pull-down tab allows the user to load any saved configuration.
- The “ID” field sets a “Config ID” for any given saved configuration. This can be used to call up a configuration.
- The “Name” field represents the configuration name assigned by the user for any saved configuration.
- The “Save” and “Delete” buttons allow quick access to these respective functions, in relation to a current configuration.
- The “Clear” button allows the user to create a new configuration from an existing one. Simply load an existing configuration, modify as needed, press the “Clear” button to clear the “Name” field, enter a new name in the “Name” field, and press “Save”.

In the “**Settings**” sub-section in Figure 41, the user can modify the grid size, set the focus on the displays, set the focus on the sources, connect sources to displays, disconnect sources from displays, and reset the grid which removes all sources and displays from the grid.

- The grid size can be altered from a 4 by 4 grid, up to a 32 by 32 (default is 24 by 32). This grid allows the user to place and size both displays and source content, and manage their connectivity. Displays can be a minimum size of 4 by 4 grids, while sources can be as little as a 1 by 1 grid, depending on the display size. Displays of large grid sizes will limit the minimum size of the source content size (this is automatically determined by the software).
- The “Show Displays” radio button brings all displays on the grid to the foreground, allowing for easy access to displays.
- The “Show Sources” radio button brings all sources on the grid to the foreground, allowing for easy access to sources.
- The “Connect” button connects sources to displays which are located on the grid. In order for source content to be displayed on a given monitor, the source content must either partially or completely overlap the display in question. The source content can overlap more than one display at a time. In addition one source can overlay another source, but no more than one overlap per display should be attempted.
- The “Stop” button disconnects all sources from all displays on the grid.
- The “Reset” button will clear all displays and sources from the grid, allowing the user to restart the process of placing monitors and sources.

The available displays and sources to be placed on the grid are located at the bottom of Figure 41. In this example there are 4 displays and 2 sources.

To setup the displays and source content on the grid, the user begins by clicking on the top left corner of a display and dragging it onto the grid (Figure 42). Each display can be resized on the grid by clicking and dragging the bottom right corner of the display

(Figures 43). Increasing the size of the display to cover multiple grids allows for finer placement of source material within a given display, offering more flexibility when assigning sources in a Multiview arrangement. Multiview allows for virtual windowing across one or more displays.

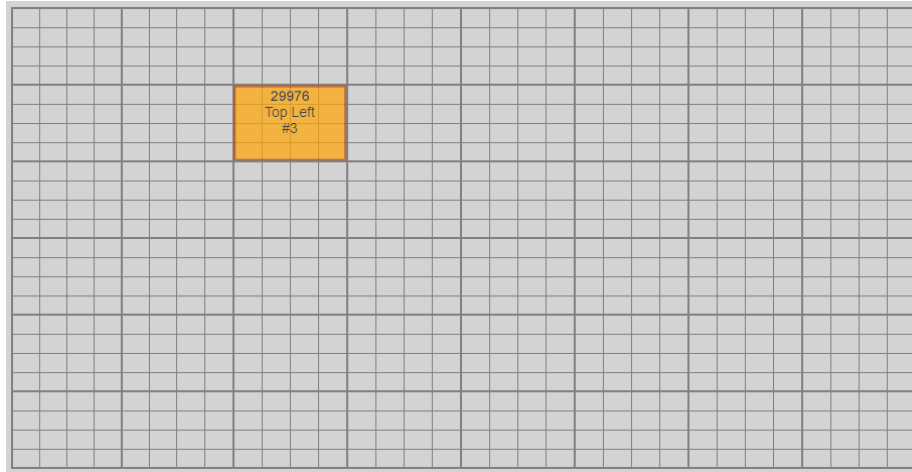


Figure 42: Placing displays

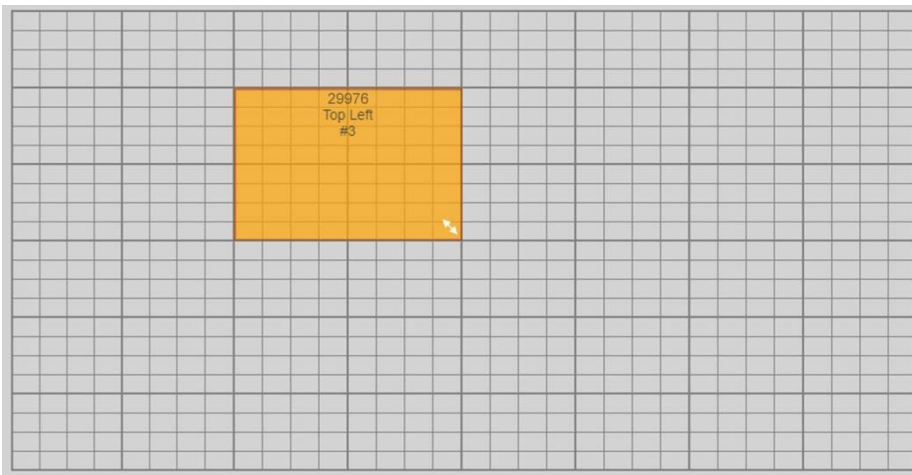


Figure 43: Sizing displays

Continue to place and size all displays on the grid. All displays should be sized equally. Once done, double click on one of the displays to configure it as shown in Figure 44. A “Display Settings” menu will pop up in order to configure the monitor settings.

- Start by setting the “Units” to either inches or centimeters
- Under “Screen Size” enter the screen diagonal dimension
- Enter the bezel size for the top, bottom, left and right bezel
- Save the above settings

Repeat the above steps for each display. When creating Video walls all the displays should be the same brand, size and model, and thus should have the same settings.

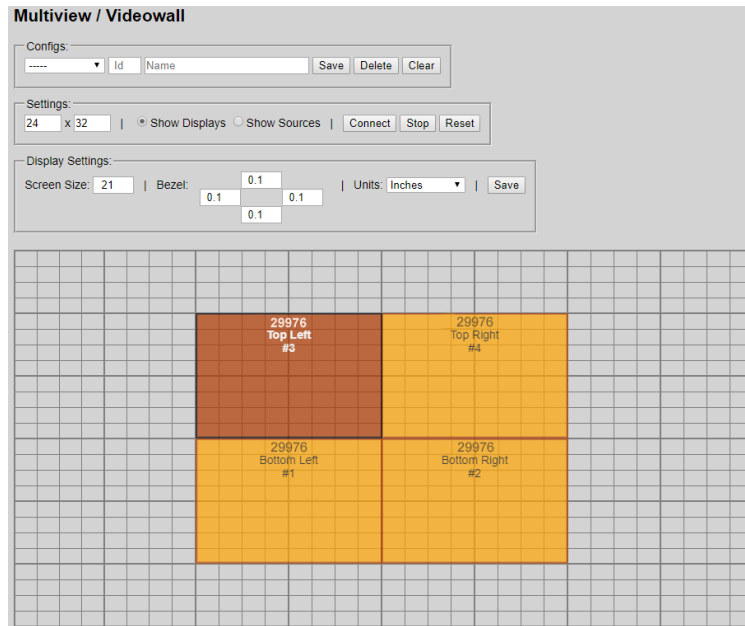


Figure 44: Configuring displays

Next add a source by clicking on the source and dragging it (via top left corner) on to the grid over one or more displays. The source content can be sized by clicking and dragging the bottom right corner. Make sure the source falls within the assigned display area as shown in Figure 45, to ensure that the video will be seen once connected. A source can be placed partially or completely cover one or more displays. Multiple sources can be added as appropriate, and in this example the second source can be added side-by-side or may even overlay the first video, see Figure 46. As mentioned previously up to two levels of source content can be overlapped within a single display, meaning one of the videos can be on the bottom level and the other on the top.

To configure a source, double click on it. This displays the “Source Settings” sub-section.

- The “Copy” button creates a copy of the currently selected source to be able to place two or more copies of a given source on the grid.
- When the “Audio” check-box is enabled, the audio from the selected source will be audible, and audio from all other sources on the grid will be automatically disabled.
- The “On Top” check-box is used in cases where content from two sources overlap, and sets which source is on top and which is on the bottom. To configure this, select the source for the top level (by double clicking on it) and make sure to check-mark the “On Top” box, and press “Save”. Then select the

other source and make sure to un-check the “On Top” box and press “Save”. This is not configured automatically, and must be set manually.

- The “Shift” buttons are used for fine shift adjustments for cases where a video is spread across more than one display and some alignment is required between displays. This step is generally not required, since the display diagonal dimension and bezel settings performed earlier, normally are sufficient for proper alignment.
- The “Scale” buttons are used for fine video scaling adjustments for cases where a video is spread across more than one display and some adjustment is required between displays. This step is generally not required, since the display diagonal dimension and bezel settings performed earlier, normally are sufficient for proper operation.
- The “Reset” button resets all settings in this sub-section for a given source.
- The “Save” button saves all settings configured in this sub-section for a given source.

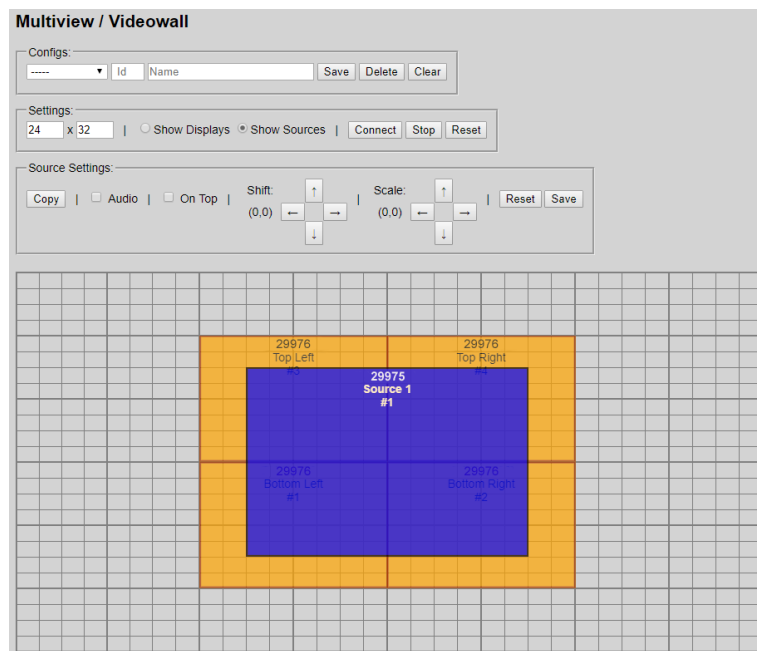


Figure 45: Adding Source Content to the Grid

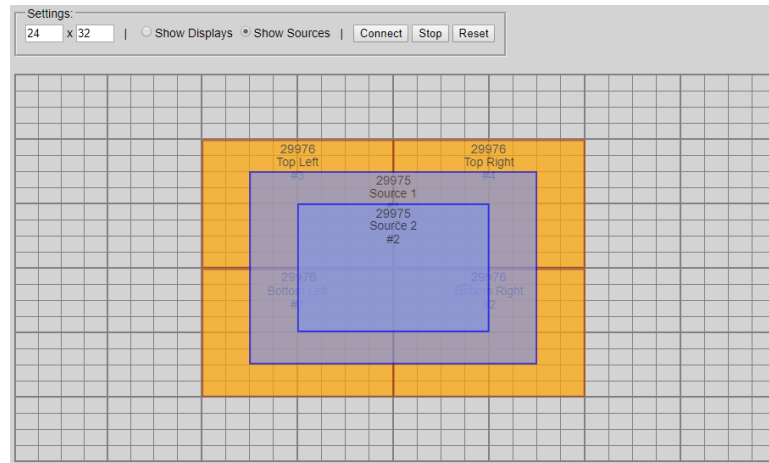


Figure 46: Adding more sources

It is important to note that the number of sources that can be displayed side-by-side simultaneously on one given display depends on the resolution of the sources.

For example:

- Only 1 windowed source can be shown on a given display at 4K
- Up to 2 windowed sources can be shown on a given display at 1080p/60
- Up to 4 windowed sources can be shown on a given display at 1080p/30
- Up to 5 windowed sources can be shown on a given display at 720p/60

Do not exceed the above limits, doing so may cause un-expected and un-intended behavior.

4. Products Screen - RS-232 Tab

The **RS-232** tab of the **Products** screen enables the user to send RS-232 commands from the Network Controller to a C2G 29975 encoder or 29976 decoder (Figure 47).

The screenshot shows the C2G Network Controller web interface. At the top, there is a header with the C2G logo (A brand of Legrand) and the text 'Network Controller'. Below the header is a navigation bar with links: Products, Settings, Software Update, and Help. The main content area is titled 'SELECTED PRODUCT:' and shows 'Setup 1 : 4K HDMI Over IP (29975/29976) | Matrix Virtual'. There are several tabs: Set-up, Matrix, Multiview/Videowall, RS-232 (which is highlighted), IR, and Firmware. Below the tabs, there is a section titled 'Update your device's RS-232 connection settings here.' It includes a 'Select a device:' dropdown menu. Below this, there are input fields for 'Baud rate', 'IP Feedback', 'Data bits', 'Stop bits', and 'Parity'. There is a 'Save' button. Below this, there is a section titled 'Data to send in HEX (ex: A013B155C5)' with a text input field. There is a checkbox for 'Check for feedback data' and a 'Send' button.

Figure 47: RS-232 Tab

When sending RS-232 commands through the Network Controller, the user first selects the device that the RS-232 commands will be sent to. This is done by clicking on the **Select a device** drop-down list and making a selection (Figure 48).

This screenshot is similar to Figure 47, but the 'Select a device:' dropdown menu is now populated with the text '4K Media Player-1'. The 'Baud rate' field is now set to '9600' and the 'IP Feedback' field is set to '192.168.168.49'. The 'Data bits', 'Stop bits', and 'Parity' fields remain the same. The 'Save' button is still present. The 'Data to send in HEX' section and the 'Send' button are also visible.

Figure 48: RS-232 Tab - Selecting a Device

Once a device is selected, the **Data to send in HEX** field becomes enabled. Begin by setting the RS232 parameters as required and click on “Save”. Next enter the RS232 command in Hex in the **Data to send in HEX** field and click on “Send”. In the above example, 4K Media Player-1 was chosen as the selected device (but a decoder connected to sink equipment could have also been selected), meaning that a command sent to 4K Media Player-1 will travel from the Network Controller to the Ethernet Switch, and from the Ethernet Switch to the encoder connected to the 4K Media Player-1 port. That encoder will then send the specified data command to the attached source device.

Note that any RS232 feedback data returned from the end device is automatically sent to the Network Controller and displayed in the Data Feedback Received field.

Note that RS232 pass-through mode is not currently supported.

5. Products Screen - IR Tab

The **IR** tab of the **Products** screen enables the user to send IR commands from the 29977 Network Controller to a 29975 encoder or 29976 decoder IR port (Figure 49).

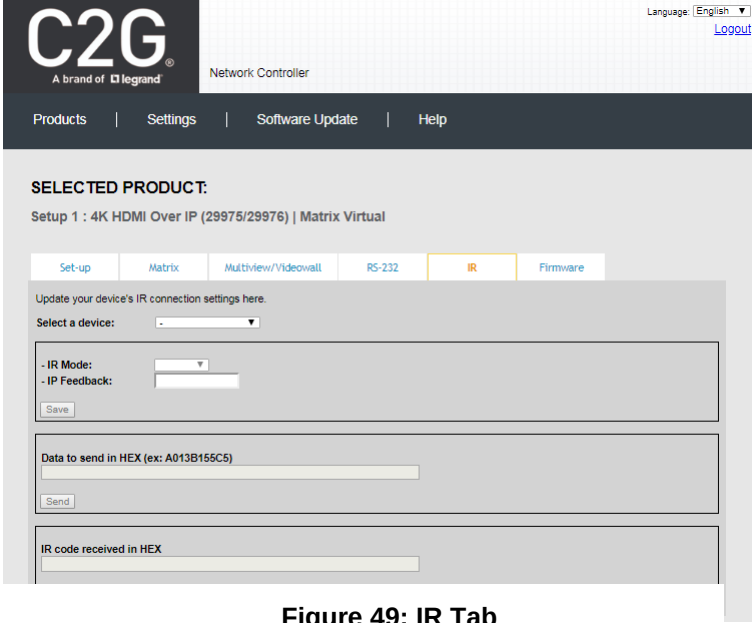
The screenshot shows the C2G Network Controller web interface. At the top, there's a header with the C2G logo (A brand of Legrand) and the text 'Network Controller'. Below this is a navigation bar with links for 'Products', 'Settings', 'Software Update', and 'Help'. The main content area is titled 'SELECTED PRODUCT:' and shows 'Setup 1 : 4K HDMI Over IP (29975/29976) | Matrix Virtual'. There are several tabs: 'Set-up', 'Matrix', 'Multiview/Videowall', 'RS-232', 'IR' (which is highlighted), and 'Firmware'. Under the 'IR' tab, there's a section titled 'Update your device's IR connection settings here.' It includes a 'Select a device:' dropdown menu. Below this are two input fields: '- IR Mode:' and '- IP Feedback:'. There is a 'Save' button. Further down, there's a section 'Data to send in HEX (ex: A013B155C5)' with a text input field and a 'Send' button. At the bottom, there's a section 'IR code received in HEX' with a text input field.

Figure 49: IR Tab

The 29975 and 29976 devices support a bi-directional IR port. The 29977 Network Controller can send IR commands to a 29975 encoder or 29976 decoder and then on to a source or sink device, and can also be configured to decode IR commands from a handheld IR Remote and send these commands to the Network Controller for learning IR command purposes.

Transmitting IR Commands to Source and Sink Equipment:

When sending IR commands through the Network Controller, the user first selects the device that the IR commands will be sent to. This is done by clicking on the **Select a device** drop-down list and making a selection (Figure 50).

Figure 50: IR Tab – Selecting a Device

Once a device is selected, the **Data to send in HEX** field becomes enabled. Begin by setting the IR Mode to “Emitter” and click on “Save”. Next enter the IR command in Hex in the **Data to send in HEX** field and click on “Send”. In the above example, 4K Streaming was chosen as the selected device (but a decoder connected to sink equipment could have also been selected), meaning that a command sent to 4K Streaming will travel from the Network Controller to the Ethernet Switch, and from the Ethernet Switch to the encoder connected to the 4K Streaming port with an attached IR Emitter. That encoder will then send the specified data command via the attached IR Emitter to the source device.

Learning IR Commands from a Handheld IR Remote:

The Network Controller can learn IR Commands in combination with the 29975 encoder or 29976 decoder. To begin the process, select the device as indicated above, and set the IR Mode to Sensor and click on “Save”, and attach an IR Sensor to the device IR port. Click on “Get IR Code”, aim the handheld IR Remote at the Sensor while pressing on an IR command key on the IR Remote. The **IR code received in HEX** field will display the HEX version of an IR command sent from a handheld remote.

6. Products Screen - Firmware Tab

The Firmware tab of the Products screen enables the user to update the firmware for C2G encoders and decoders (Figure 51)

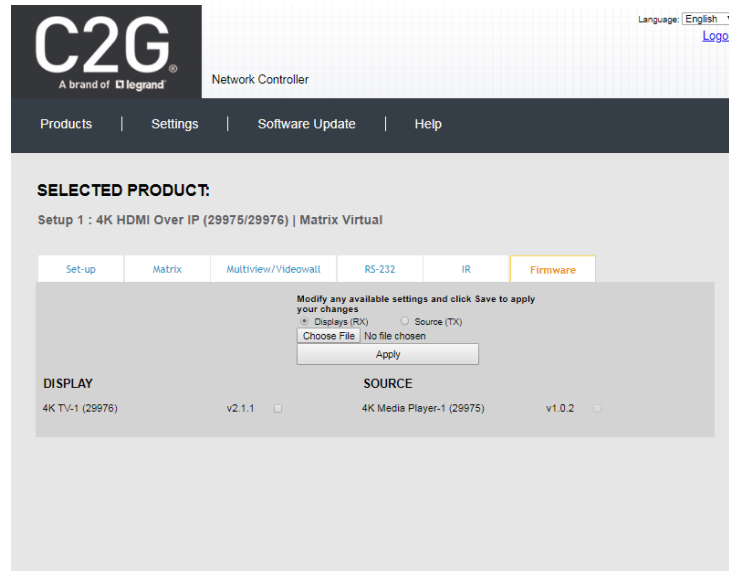


Figure 51: Firmware Tab

The user selects **Source (TX)**, then chooses the firmware update file to upload to the given device. Once the file is selected, the user checks the box next to the given device (listed under **DISPLAY** and **SOURCE**) targeted for firmware upgrade, and then clicks **Apply**.

Settings Screen

The **Settings** screen contains two tabs: **Network** and **Administration**.

The **Network** tab (Figure 52) is used to change the IP address of the C2G Network Controller, the network mask, as well as the router IP address. It also allows the user to enable or disable DHCP.

The screenshot shows the C2G Network Controller web interface. The top navigation bar includes 'Products', 'Settings', 'Software Update', and 'Help'. The 'Settings' tab is active, and the 'Network' sub-tab is selected. The 'Network' section contains two configuration panels for LAN 1 and LAN 2. LAN 1 is currently configured with DHCP disabled, IP address 192.168.158.50, network mask 255.255.255.0, router IP 192.168.158.1, and MAC address 00:0E:C4:D3:1A:79. LAN 2 is currently configured with DHCP enabled. The interface also includes a 'Language' dropdown set to 'English' and a 'Logout' link.

Figure 52: Settings Screen: Network Tab

The **Administration** tab is used to create or delete user accounts, change passwords, restore data, backup data, and retrieve logs (Figure 53)

The screenshot shows the C2G Network Controller web interface with the 'Administration' sub-tab selected. The 'User Accounts' section allows creating a new user or selecting an existing one to edit, with fields for 'User Name', 'new password', 'Confirm new password', and 'User Type'. The 'Restore data' section includes a 'Specify file' dropdown and a 'Restore' button, with a warning to set the IP address to the same as the backup source. The 'Backup data' section has a 'Backup' button. The 'Get Logs' section has 'Download Logs' and 'Delete Logs' buttons. The interface also includes a 'Language' dropdown set to 'English' and a 'Logout' link.

Figure 53: Settings Screen: Administration Tab

The **mDNS Browser** tab is used to find C2G devices on the local network using the mDNS Protocol, and lists their IP and MAC Addresses. See Figure 54.

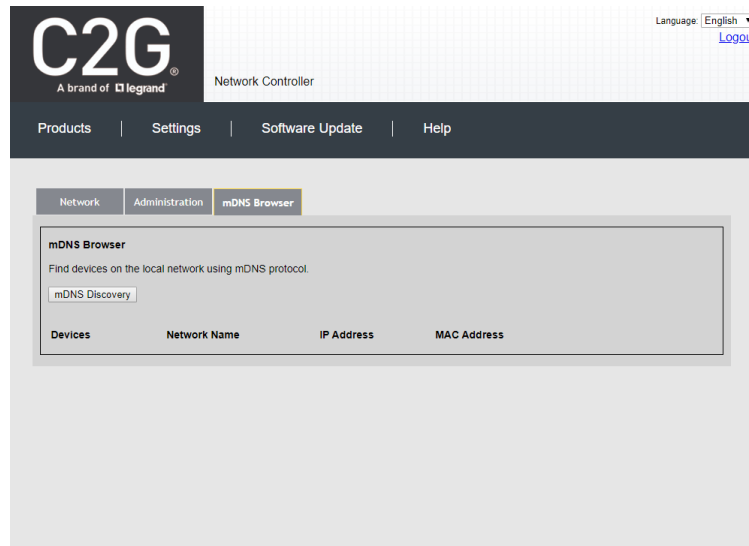


Figure 54: Settings Screen: mDNS Browser Tab

Press the mDNS Discovery button to begin the discovery. See Figure 55. This is practical if a device has an unknown IP Address. Note that some C2G devices may not support the mDNS Protocol.

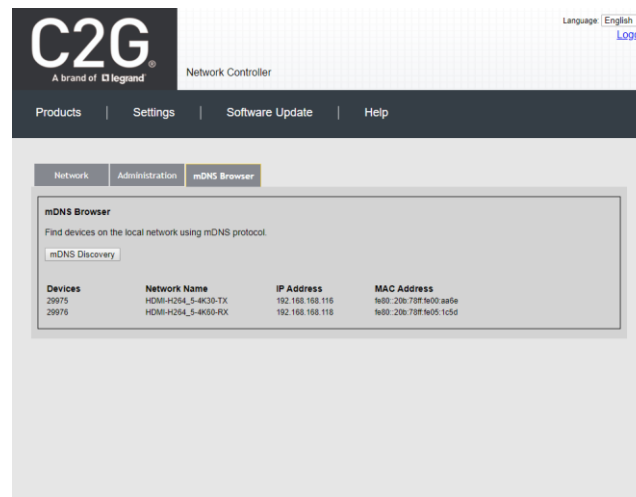


Figure 55: Settings Screen: mDNS Discovery

Software Update Screen

The **Software Update** enables the user to update the C2G Network Controller software (Figure 56). This software is available on C2G's website (www.cablestogo.com). Download the software to the local PC before performing the update.

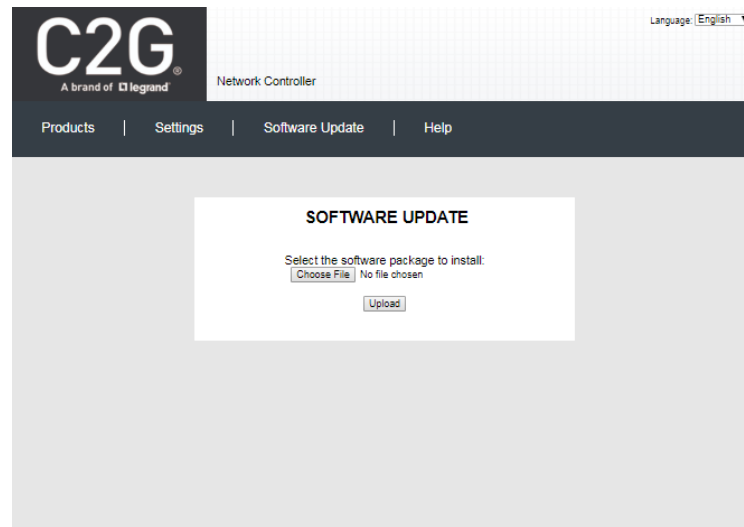


Figure 56: Software Update Screen

Help Screen

The **Help** screen offers quick contact information for customer support and all other inquiries (Figure 57)

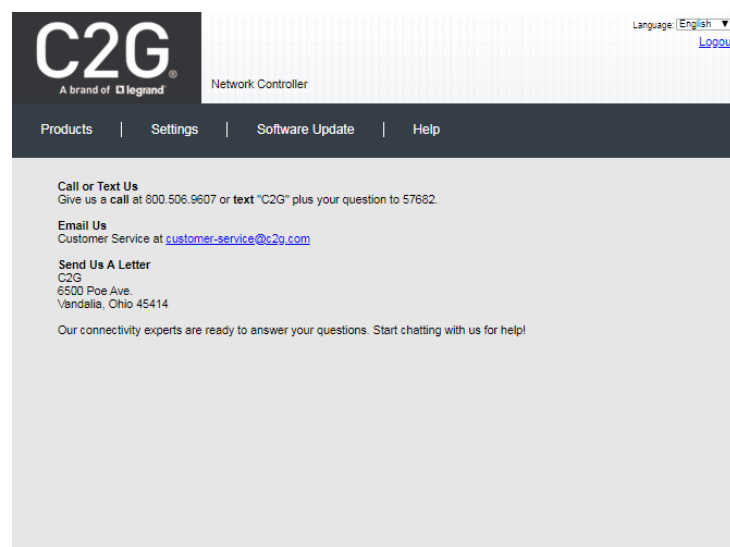


Figure 57: Help Screen

Troubleshooting

Table 3 lists common problems, as well as their possible causes and solutions. If the information below does not solve the problem, technical support contact information can be found at the end of this section.

PROBLEM	POSSIBLE SOLUTIONS
Unable to connect computer to the Network Controller	Ensure the computer IP subnet address matches the IP subnet address of the Network Controller
	Ensure that http://192.168.168.50/mnc/ is written in lower case
Unable to connect computer to Ethernet Switch or to the Router	Ensure the computer IP subnet address matches the IP subnet address of the Ethernet Switch and Router.
General communication problem between devices	As a general rule, all devices required to communicate together on the same local network, must have an IP address in the same subnet
	Static IP address must be unique and in the same subnet.
	DHCP addresses must be assigned within the same subnet and configured at the DHCP server not to overlay with any assigned Static IP addresses.

Table 3: Troubleshooting

If you still cannot diagnose the problem, please contact C2G Customer Technical Support.

Call or Text Us: Give us a **call** at [800.506.9607](tel:800.506.9607) or **text** "C2G" plus your question to 57682.

Email Us: Customer Service at customer-service@c2g.com

Send Us A Letter: C2G, 6500 Poe Ave. Vandalia, Ohio 45414

Please have the following information ready:

Unit model number.

Description of problem.

List of tests performed.

Appendix – IP Command API

The C2G API (Application Program Interface) Commands for the 29977 Network Controller for HDMI over IP are not covered in this document. They are covered in a separate document as follows:

File: 29977 Network Controller IP Commands.PDF

which is available on the 29977 unit webpage of the C2G website.

6. Product Warranty Policy

Important Safety Information

Do not plug the unit in any outlet that does not have enough current to allow the device to function. Refer to the specifications in this manual for power level of the unit.

Liquid: If this unit or it's corresponding power adapter has had liquid spilled on or in it, do not attempt to use the unit. Do not attempt to use this product in an outdoor environment as elements such as rain, snow, hail, etc. can damage the product.

In case of a storm, it is recommended that you unplug this device from the outlet.

Avoid placing this product next to objects that produce heat such as portable heaters, space heaters, or heating ducts.

THERE ARE NO USER SERVICEABLE PARTS. Do not attempt to open this product and expose the internal circuitry. If you feel that the product is defective, unplug the unit and refer to the warranty information section of this manual.

C2G Warranty

At C2G we want you to be totally confident in your purchase. That is why we offer a warranty on this device. If you experience problems due to workmanship or material defect for the duration of this warranty, we will repair or replace this device.

To request a Return Merchandise Authorization (RMA) number, contact customer service at 800-293-4970 or www.c2g.com.

FCC Statement

Note: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may not cause harmful interference, and

This device must accept any interference received, including interference that may cause undesired operation.

FCC Statement - §15.105(b):

"This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution - §15.21:

"Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."



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