Verified Network Switches for use with
Key Digital Enterprise AV – HD over IP Systems

**Supported Models:**

4K Systems:
- KD-IP922ENC, KD-IP922DEC
- KD-IP822ENC, KD-IP822DEC
- KD-IP1022ENC, KD-IP1022DEC

1080p Systems:
- KD-IP1080Tx, KD-IP1080Rx
- KD-IP120Tx, KD-IP120Rx, KD-IP120POETx, KD-IP120POERx

**Important Note:**

Setup is different for 4K (KD-IP922, KD-IP822, KD-IP1022) and 1080p (KD-IP1080, KD-IP120) systems.
There are separate setup instructions for each where applicable.

1. [Supported Models and System Facts](#) Pg. 2
2. [Network Switch Requirements for Enterprise AV](#) Pg. 3
3. [Verified Network Switches Table](#) Pg. 4
4. [Araknis Setup for 1080p Systems](#) Pg. 7
5. [Araknis Setup for 4K Systems](#) Pg. 12
6. [Cisco Setup for SF/SG Series](#) Pg. 17
7. [Cisco Setup for 4K Systems](#) Pg. 27
8. [D-Link Setup for 4K and 1080p Systems](#) Pg. 38
9. [Engenius IGMP Setup for 1080p Systems](#) Pg. 45
10. [Linksys IGMP Setup for 1080p Systems](#) Pg. 49
11. [Linksys IGMP Setup for 4K Systems](#) Pg. 55
12. [Luxul IGMP Setup for 4K and 1080p Systems](#) Pg. 64
13. [Netgear IGMP Setup for 4K and 1080p Systems](#) Pg. 69
14. [Pakedge S3 IGMP Setup for 4K and 1080p Systems](#) Pg. 74
15. [Pakedge SX Series IGMP Setup for 4K and 1080p Systems](#) Pg. 79
16. [Titan Networx IGMP Setup for 1080p Systems](#) Pg. 84
17. [Wifi Router Setup and Requirements](#) Pg. 92
Supported Models:
Key Digital Enterprise AV product family consists of many different models. Not all models are compatible together
See Key Digital Enterprise AV over IP Selection Guide for more info

System Facts
4K Systems: KD-IP822, KD-IP922, KD-IP1022 models
- Video Compression Standard: Motion JPEG 2000
- Data Stream Bandwidth: < 900 Mbps

<table>
<thead>
<tr>
<th>Stream Resolution</th>
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<tr>
<td>4K @ 60Hz/30Hz</td>
<td>≤ 850 Mbps</td>
</tr>
<tr>
<td>1080p @ 60Hz</td>
<td>≤ 250 Mbps</td>
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<tr>
<td>1080i / 720p @ 60Hz</td>
<td>≤ 125 Mbps</td>
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</tbody>
</table>

- Latency: ≈ 40ms @4K. Less at lower resolutions.
- PoE Power Consumption: ≤ 9 Watts per unit
- Required network cabling: CAT6 UTP/STP, CAT6A, CAT7

1080p Systems: KD-IP1080, KD-IP120 models
- Video Compression Standard: H.264
- Data Stream Bandwidth: < 15 Mbps

<table>
<thead>
<tr>
<th>Stream Resolution</th>
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<tbody>
<tr>
<td>1080p @ 60Hz</td>
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<td>1080i / 720p @ 60Hz</td>
<td>≤ 12 Mbps</td>
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<tr>
<td>480p @ 60Hz</td>
<td>≤ 4 Mbps</td>
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</table>

- Latency: ≈ 400ms @1080p. Less at lower resolutions.
- PoE Power Consumption: ≤ 6 Watts per unit
- Required network cabling: CAT5e UTP/STP, CAT6 UTP/STP, CAT6A, CAT7
Network switch Requirements for Enterprise AV

Key Digital’s Enterprise AV is an HDMI over IP system that utilizes multicasting technology to broadcast streams throughout the network.

Enterprise AV requires a network switch with IGMP (Internet Group Management Protocol) support in order to direct traffic of the broadcasted streams, ensuring that only the desired decoders receive the stream from the selected encoder.

For 1080p systems (KD-IP1080, KDIP120 models) that plan to use the video preview feature of the Key Digital App, IGMP v3 must be enabled. For 1080p or 4K systems that will not use the video preview feature, IGMP v2 is enabled.

KD-IP922 systems require the following IP addresses to be reserved. They cannot be assigned to KD-IP922 units: 192.168.1.1, 192.168.1.50, 192.168.1.90, 192.168.1.100, 192.168.1.150, 192.168.1.200

<table>
<thead>
<tr>
<th>Feature</th>
<th>4K System (KD-IP822, KD-IP922, KD-IP1022 models)</th>
<th>1080p System (KD-IP1080, KD-IP120 models)</th>
</tr>
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<tbody>
<tr>
<td>IGMP v2</td>
<td>X</td>
<td>X (for non-video preview systems)</td>
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<td>IGMP v3</td>
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<td>Bandwidth</td>
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<td>8K Jumbo Frame</td>
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<td>PoE</td>
<td>Optional</td>
<td>Optional (excl KD-IP120PoE models)</td>
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IGMP Setup Guide: Araknis
1080p Systems (KD-IP1080, KD-IP120)

1. Before Araknis network switch is configured Key Digital KD-IP120/KD-IP1080 HDMI switch set must be
   connected to all HDMI sources/displays/network switches, and configured using Key Digital KD-IP120 Key
   Digital Management Software latest version; refer to Key Digital KD-IP120/KD-IP1080 configuration manual.
2. Power-up all the system components. Using Key Digital KD-IP120 Key Digital Management Software, switch
   All Outputs -> Through at switching page.
3. **IMPORTANT:** Disconnect all the DHCP devices like routers, servers from the Araknis network switch.
4. Locate a pinhole “RESET” button at the front panel left bottom corner of your Araknis network switch. Using
   a paper clip press and hold a reset button for more than 10 seconds and then release. Wait while the device
   is restarted and ready to use (about 5min).
5. **IMPORTANT:** At this point all the displays should be displaying distorted randomly flashing video images.
6. Connect your PC to the Araknis network switch directly using a network cable.
7. If you have not done yet, configure your PC’s IP address to the same range as the switch (default
   192.168.20.xxx).
8. Enter the switch’s IP address (default is 192.168.20.254) in your browser and press ENTER.
9. Enter user name and password (default is “araknis” for both). Then click Log In.
10. Navigate to **Settings -> System**. Under **IP Address Settings** elect **Static**. Change an IP address to **192.168.1.251**, **Subnet Mask** to **255.255.255.0**, **Default Gateway** to **192.168.1.1** (in this case), and at the bottom click **Apply**. If you are setting up multiple network switches it is recommended to set first one to **192.168.1.251**, second to **192.168.1.252**, and so on, and each switch must be set individually same way as described below.
11. Page will refresh. Configure your PC’s IP address to the same range as the switch (default 192.168.1.xxx).
   Enter the switch’s IP address (default is 192.168.1.251) in your browser and press ENTER.

12. Make sure the settings remain as above.

14. **IMPORTANT**: At this point all the displays should be displaying stable running video from the selected sources. If you do not have them displaying properly, than network switch is configured incorrectly.

15. Navigate to Maintenance -> Restart Device and click Restart Switch. After switch is rebooted and back to normal log in again, check all the settings again.
16. **IMPORTANT:** Now you can connect back your DHCP equipment (routers, servers and so on).
17. Power down Araknis network switch and power it up back again. Wait for the whole system to start and until you can see video on your displays.
18. Log in to your Araknis network switch again and make sure that IGMP settings are intact.
19. Rescan your components with Key Digital KD-IP120 Key Digital Management Software and make sure HDMI video switch is functional.
20. At this point your Araknis network switch is set and ready to use.
1. Before Araknis network switch is configured Key Digital KD-IP120/KD-IP1080 HDMI switch set must be connected to all HDMI sources/displays/network switches, and configured using Key Digital KD-IP120 Key Digital Management Software latest version; refer to Key Digital KD-IP120/KD-IP1080 configuration manual.

2. Power-up all the system components. Using Key Digital KD-IP120 Key Digital Management Software, switch All Outputs -> Through at switching page.

3. **IMPORTANT:** Disconnect all the DHCP devices like routers, servers from the Araknis network switch.

4. Locate a pinhole “RESET” button at the front panel left bottom corner of your Araknis network switch. Using a paper clip press and hold a reset button for more than 10 seconds and then release. Wait while the device is restarted and ready to use (about 5min).

5. **IMPORTANT:** At this point all the displays should be displaying distorted randomly flashing video images.

6. Connect your PC to the Araknis network switch directly using a network cable.

7. If you have not done yet, configure your PC’s IP address to the same range as the switch (default 192.168.20.xxx).

8. Enter the switch’s IP address (default is 192.168.20.254) in your browser and press ENTER.

9. Enter user name and password (default is “araknis” for both). Then click Log In.
10. Navigate to Settings -> System. Under IP Address Settings elect Static. Change an IP address to 192.168.1.251, Subnet Mask to 255.255.255.0, Default Gateway to 192.168.1.1 (in this case), and at the bottom click Apply. If you are setting up multiple network switches it is recommended to set first one to 192.168.1.251, second to 192.168.1.252, and so on, and each switch must be set individually same way as described below.
11. Page will refresh. Configure your PC’s IP address to the same range as the switch (default 192.168.1.xxx).
Enter the switch’s IP address (default is 192.168.1.251) in your browser and press ENTER.
12. Make sure the settings remain as above.
14. Enter Settings -> Ports and set Jumbo Frame size to 9216 bytes, enabling the required 8K jumbo frame support feature.
15. **IMPORTANT**: At this point all the displays should be displaying stable running video from the selected sources. If you do not have them displaying properly, then network switch is configured incorrectly.

16. Navigate to **Maintenance -> Restart Device** and click Restart Switch. After switch is rebooted and back to normal log in again, check all the settings again.

17. **IMPORTANT**: Now you can connect back you DHCP equipment (routers, servers and so on).

18. Power down Araknis network switch and power it up back again. Wait for the whole system to start and until you can see video on your displays.

19. Log in to your Araknis network switch again and make sure that IGMP settings are intact.

20. Rescan your components with Key Digital KD-IP120 Key Digital Management Software and make sure HDMI video switch is functional.

21. At this point your Araknis network switch is set and ready to use.
IGMP Setup Guide: Cisco SF500-48, SG300
1080p Systems (KD-IP1080, KD-IP120)

Note: Compatible with KD-IP1080, KD-IP120 Enterprise AV Systems Only

1. Before Cisco network switch is configured Key Digital KD-IP120/KD-IP1080 HDMI switch set must be connected to all HDMI sources/displays/network switches, and configured using Key Digital KD-IP120 Key Digital Management Software latest version.
2. Power-up all the system components. Using Key Digital KD-IP120 Key Digital Management Software, switch All Outputs -> Through at switching page.
3. **IMPORTANT:** Disconnect all the DHCP devices like routers, servers from the Cisco network switch.
4. Locate a pinhole “RESET” button at the front panel left bottom corner of your Cisco network switch. Using a paper clip press and hold a reset button for more than 10 seconds and then release. Wait while the device is restarted and ready to use (about 5min).
5. **IMPORTANT:** Make sure the green “SYSTEM” LED next to the pinhole “RESET” button is flashing.
6. **IMPORTANT:** At this point all the displays should be displaying distorted randomly flashing video images.
7. Connect your PC to the Cisco network switch directly using a network cable.
8. If you have not done yet, configure your PC’s IP address to the same range as the switch (default 192.168.1.xxx).
9. Enter the switch’s IP address in your browser and press ENTER (check the user manual for a default IP address - it is usually 192.168.1.254).
10. Enter user name and password (check the user manual for a default user name and password; it is usually “cisco” for both). Then click Log In.
11. **Change Password** screen will appear. Enter old and then new password two times as at the picture below and click Apply.
12. **Getting Started** screen will appear.
13. Navigate to Administration -> Management Interface -> IPv4 Interface. Select “1” under Management VLAN. Select Static for IP Address Type. Change an IP address to 192.168.1.251. If you are using multiple network switches it is recommended to set first one to 192.168.1.251, second to 192.168.1.252, and so on. Leave Network Mask as 255.255.255.0, set Administrative Default Gateway as User Defined and enter your router IP address (in this case: 192.168.1.1), then click Apply.

14. Click OK to confirm.
15. Log in again using new password and new IP address.
16. Confirm all the administration page settings as at the picture below.

17. Navigate to Multicast -> Properties. Check Enable box next to the Bridge Multicast Filtering Status box. Make sure the other settings are exactly as shown below. Then click Apply.
18. Navigate to Multicast -> IGMP Snooping. Check the IGMP Snooping Status: Enable box and click Apply.

19. Click on a radio button on the left and then click Edit. New window will appear.
20. Click on a radio button on the left and then click Edit. New window will appear. Select “1” for VLAN ID. Check Enable box under IGMP Snooping Status. Check Enable box under Immediate Leave. Check Enable box under IGMP Querier Status. Select User Defined next to Administrative Querier Source IP Address: and select 192.168.1.1. For IGMP Querier Version: select IGMPV3. Then click Apply and Close. Make sure all the setting are exactly as shown at the picture below.

21. **IMPORTANT:** At this point all the displays should be displaying stable running video from the selected sources. If you do not have them displaying properly, than network switch is configured incorrectly.

22. On the top of the page click on flashing “x Save”. For **Source File Name**: select Running configuration. For **Destination File Name**: select Startup configuration. Check the selections and make sure they are exactly as shown below. Click Apply.
23. Click **Apply** to confirm.

24. Click **Done**.
25. **IMPORTANT:** Now you can connect back your DHCP equipment (routers, servers and so on).

26. Power down Cisco network switch and power it up back again. Wait for the whole system to start and until you can see video on your displays.

27. Log in to your Cisco network switch again and make sure that IGMP settings are intact:

28. Rescan your components with Key Digital KD-IP120 Key Digital Management Software and make sure HDMI video switch is functional.

29. At this point your Linksys network switch is set and ready to use.
IGMP Setup Guide: Cisco C3850 Series
4K Systems (KD-IP922)

Cisco Catalyst 3850 Series

This guide describes how to use Express Setup to initially configure your Catalyst 3850 switch. We have modified original Express Setup guide from Cisco to help you install it easily. For more information, see the Catalyst 3850 documentation on Cisco.com.

Running Express Setup & Configuration Setup for KD-IP922

Use Express Setup to enter the initial IP information. This action enables the switch to connect to local routers and the Internet. You can access the switch through the IP address for further configuration.

Note: Even you already finish Express Setup on your switch, please check every step one by one.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Make sure that nothing is connected to the switch.</th>
</tr>
</thead>
</table>
| Step 2 | During Express Setup, the switch acts as a DHCP server. If your PC or laptop has a static IP address, temporarily change your PC or laptop settings to DHCP.  

Note: Do not connect LAN cable from your PC or laptop to Cisco’s switch until Step 7. |
| Step 3 | Install the power supply modules. See the “Power Supply Installation” chapter in the Catalyst 3850 Switch Hardware Installation Guide for instructions.  
http://www.cisco.com/go/cat3850_hw |
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 4</td>
<td>Power the switch. AC power switches: Plug the AC power cord into the switch power supply and into a grounded AC outlet. DC power switches: See the wiring instructions in Step 3</td>
</tr>
<tr>
<td>Step 5</td>
<td>Observe the POST results. Approximately 30 seconds after the switch powers on, it begins the power-on self-test (POST), which can take up to 5 minutes to complete. During POST, the SYSTEM LED blinks green. When POST is complete, the SYSTEM LED turns solid green. The ACTV LED is green if the switch is acting as the active switch. <strong>Note</strong> Before going to the next step, wait until POST is complete. <strong>Troubleshooting:</strong> If the SYST LED does not turn solid green, or turns amber, the switch failed the POST. Contact your Cisco representative or reseller.</td>
</tr>
<tr>
<td>Step 6</td>
<td>Press and hold the Mode button until all the LEDs next to the Mode button turn green. You might need to hold the button for more than 3 seconds. The switch is now in Express Setup mode. <strong>Troubleshooting:</strong> If the LEDs next to the Mode button blink when you press the button, release it. Blinking LEDs mean that the switch is already configured and cannot go into Express Setup mode. For more information, see the “Resetting the Switch” section.</td>
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<tr>
<td>Step 7</td>
<td>Connect a Category 5e/6 Ethernet cable to first port on the front panel of Cisco Switch. Connect the other end of the cable to the Ethernet port on your PC or laptop. Wait until the port LEDs on the switch and your PC or laptop are green or blinking green. Green LEDs indicate a successful connection. <strong>Troubleshooting:</strong> If the port LEDs do not turn green after about 30 seconds, make sure that: You are using an undamaged Category 5 or 6 Ethernet cable (Do not connect console ports)</td>
</tr>
</tbody>
</table>
### Step 8
Run command shell on your PC or laptop and enter “ipconfig” on the command line. You will get Windows IP configuration and find IP address of Default Gateway. **Note.** According to Express Setup from Cisco, it said “10.0.01” is default IP address. But it’s not correct for all Cisco Catalyst 3850 series. It looks default IP address will be varied depend on Cisco Switches.

![Command Prompt with ipconfig output](image)

<table>
<thead>
<tr>
<th>Ethernet adapter VMware Network Adapter VMnet8:</th>
<th>Ethernet adapter VMware Network Adapter VMnet1:</th>
<th>Ethernet adapter Local Area Connection:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection-specific DNS Suffix:</td>
<td>Connection-specific DNS Suffix:</td>
<td>Connection-specific DNS Suffix:</td>
</tr>
<tr>
<td>IP Address: 192.168.180.1</td>
<td>IP Address: 192.168.119.1</td>
<td>IP Address: 10.0.2.2</td>
</tr>
<tr>
<td>Subnet Mask: 255.255.255.0</td>
<td>Subnet Mask: 255.255.255.0</td>
<td>Subnet Mask: 255.255.255.0</td>
</tr>
<tr>
<td>Default Gateway</td>
<td>Default Gateway</td>
<td>Default Gateway: 10.0.2.1</td>
</tr>
</tbody>
</table>
Step 9  Start a browser session on the PC or laptop, and enter the IP address of your Default Gateway.

**Note:** As I mentioned on Step 8, your IP address of Default Gateway may differ with our IP address.

When a pop-up dialog window “Connect to 10.0.2.1” appear, skip the User name and enter the default password, “cisco”

Troubleshooting: If the Express Setup window does not appear, make sure that any browser pop-up blockers or proxy settings are disabled and that any wireless client is disabled on your PC or laptop.

---

Step 10  Click “Continue” button on Startup Report page.

---

Step 11  Select the Basic Settings on the Express Setup window and change the network settings as you like, then go Step 12.
Step 12 Select the **Advanced Settings** tab on the Express Setup window

- In the Telnet Access field, click **Enable** to use Telnet to manage the switch by using the command-line interface (CLI). If you enable Telnet access, you must enter a Telnet password.
- In the Telnet Password field, enter a password. The Telnet password can be from 1 to 25 alphanumeric characters, is case sensitive, allows embedded spaces, but does not allow spaces at the beginning or end. In the Confirm Telnet Password field, reenter the Telnet password.

And click **Submit** to save your changes and to complete the initial setup.
Step 13  
After you click **Submit**:  
- The switch is configured and exits Express Setup mode.  
- The browser displays a warning message and tries to connect with the earlier switch IP address. Typically, connectivity between the PC or laptop and the switch is lost because the configured switch IP address is in a different subnet from the IP address on the PC or laptop.

Now, change IP address of your PC or laptop to static IP address in same subnet of the Switch.

---

Step 14  
To configuring Multicast IGMP Snooping and Jumbo Frame setting at the switch for KD-IP922 devices, you have to connect to the Switch via Telnet.

**Note.** To access Telnet, you can use PuTTY or Tera Term software. We recommend to use Tera Term software and you can download it as below link.  

Run Tera Term software, and press Alt + N keys to open new connection.  
14-1. Select “TCP/IP” on Tera Term:New Connection Window.  
14-2. Type the IP address of the Switch at the field of Host: Ex) 192.168.1.251  
14-3. Type 23 at the field of TCP Port# and select “Telnet”.  
14-4. Then click OK button.
Step 15
When you connect to the switch via Telnet successfully, you have to log in to Telnet server of the switch.
15-1. Enter your Telnet password you assigned at Step12 if prompted.
15-2. Enter “enable” on Switch> prompt to enable privileged EXEC mode
15-3. Enter your Telnet password once again.
Then ‘Switch>’ prompt will turn into ‘Switch#’ prompt as below.

Step 16
To Enable Jumbo Frame for IP922.
Note: IP922 requires Jumbo Frame(8K) for video/audio transmission via 1G-BaseT with the Switch.

16-1. Enter “configure terminal” on Switch# prompt
16-2. Enter “system mtu 9000” on Switch(config)# prompt
16-3. Enter “end” on Switch(config)# prompt
16-4. Enter “copy running-config startup-config” on Switch# prompt
16-5. Press Enter key on the question of “Destination filename [startup-config]?”
Step 17

To confirm Jumbo Frame setting on the switch.

17-1. Enter “show interfaces vlan 1” on Switch# prompt
You can check MTU 9000 bytes in the status of Vlan1 interface
Step 18

To Enable Multicast IGMP Snooping for IP922.

Note: IP922 requires Multicast IGMP Snooping for matrix switch configuration.

1. Enter “configure terminal” on Switch# prompt
2. Enter “ip igmp snooping” on Switch(config)# prompt
3. Enter “ip igmp snooping vlan 1” on Switch(config)# prompt
4. Enter “ip igmp filter” on Switch(config)# prompt
5. Enter “ip igmp snooping tcn query solicit” on Switch(config)# prompt
6. Enter “ip igmp snooping querier” on Switch(config)# prompt
7. Enter “ip igmp snooping querier version 2” on Switch(config)# prompt
8. Enter “ip igmp snooping vlan 1 immediate-leave” on Switch(config)# prompt
9. Enter “end” on Switch(config)# prompt
10. Enter “copy running-config startup-config” on Switch# prompt
11. Press Enter key on the question of “Destination filename [startup-config]?”

Now, we are all set.
Step 19

To confirm multicast IGMP Snooping setting on the switch.

19-1. Enter “show ip igmp snooping detail” on Switch# prompt

You can check global IGMP Snooping configuration on the switch.
Switch#
Switch#show ip igmp snooping detail
Global IGMP Snooping configuration:

 IGMP snooping : Enabled
 IGMPv3 snooping (minimal) : Enabled
 Report suppression : Enabled
 TCN solicit query : Enabled
 TCN flood query count : 2
 Robustness variable : 2
 Last member query count : 2
 Last member query interval : 1000

Ulan 1:

 IGMP snooping : Enabled
 IGMPv2 immediate leave : Enabled
 Multicast router learning mode : pim-dm
 IGMP interoperability mode : IGMP ONLY
 Robustness variable : 2
 Last member query count : 2
 Last member query interval : 1000
 Topology change : No
 Switch#
 Switch#
Login to the switch:

1. Plug an Ethernet cable into any of the ports of the switch

2. Plug the other end into the Ethernet port of your computer

3. Power on the switch

4. Check to see that the IP address of the computer is within this network
   Subnet: 10.90.90.xxx ("xxx" ranges 1~254). For example, 10.90.90.10
5. Open the Web browser and enter **10.90.90.90** (default IP address of D-Link DGS-3630-52PC). The login window appears as below.

![Login window](image)

6. Leave the user name and password fields empty. They are NOT required. Click “**Login**” to login to the switch configuration window.

**Enable Jumbo Frame:**

7. Find **System -> Port Configuration -> Jumbo Frame** in the menu on left side of the window. (IP922 requires Jumbo Frame(8K) for video/audio transmission via 1G-BaseT).
8. Select the last 52 port “eth 1/0/52” in the menu on To Port, then enter “12288” in Maximum Frame Size on the right side of the Jumbo Frame window as below. And then click “Apply” button.
9. After applying, you should see Maximum Receive Frame Size **12288** for all ports as below.

Enable IGMP Snooping:

10. Find **L2 Features -> L2 Multicast Control -> IGMP Snooping -> IGMP Snooping Settings** in the menu on left side of the window. (KD-IP922 requires IGMP Snooping for multicasting video/audio transmission via 1G-BaseT). Check the **Global State Enabled** box of Global Settings in IGMP Snooping Settings window as below. Click “Apply” button on the right side of IGMP Snooping Settings window.

11. To add VLAN of the IGMP Snooping at the switch, enter “1” in VID of VLAN Status Settings. (VLAN must be added in IGMP Snooping). Then select “Enabled” and click “Apply” button.
12. Click “**Edit**” button in IGMP Snooping Settings window.

13. In the IGMP Snooping VLAN Settings window, select below options as depicted below in red and then click “**Apply**” button:
   - **Minimum Version**: 2
   - **Fast Leave**: Enabled
   - **Report Suppression**: Enabled
   - **Querier State**: Enabled
   - **Query Version**: 2
   - **Ignore Topology Change**: Enabled
Network IP Settings:


This D-Link switch series can be set to IP address range 10.x.x.x. ONLY.

If you use a single network switch, you may not need to change network IP settings. But if you are stacking network switches (connecting multiple network switches through D-Link 10G fiber cables), it is recommended to set first on to 10.90.90.91, second to 10.90.90.92, and so on.

Set Get IP From “Static”, set Subnet Mask to 255.0.0.0 and click Apply.

If you change an IP address, the page will be refreshed and you will need to log in again using new IP address, same user name and password. If you did not change IP address just continue to the next step. Make sure your screen looks exactly like pictured below.
15. To save all Running Configurations to Startup-Configuration, Find **Save ➔ Save Configuration** in the menu on top of the window. Then click **“Apply”** button in Save Running Configuration to startup-config window.

16. To reboot the switch, Find **Tool ➔ Reboot System** in the menu on top of the window. Then click **“Reboot”** button in Reboot System window. The switch will be rebooted automatically.
IGMP Setup Guide: Engenius
1080p Systems (KD-IP1080, KD-IP120)

1. It is recommended to reset the switch to factory defaults before configuring for multicast operation. Power up the device, wait for about 2 minutes, using a paper clip press and hold a reset button for more than 10 seconds and then release. After device is rebooted power down and then power up the device. Wait while the device is restarted and ready to use.

2. Connect your PC to the switch directly using a network cable.

3. Configure your PC’s IP address to the same range as the switch (default 192.168.0.xxx).

4. Enter the switch’s IP address (default is 192.168.0.239) in your browser and press ENTER.

5. Enter user name and password (default is “admin” and “password”). Then click Log In.
6. On the left select **Switch**. Navigate to **System** -> **IP Settings** -> **IPv4**. Under **Auto Configuration** select **Static**. Change an IP address to **192.168.1.250**, **Subnet Mask** to **255.255.255.0**, **Default Gateway** to **192.168.1.1** (in this case), and at the bottom click **Apply**.

![Switch Interface](image)

7. Page will refresh. Configure your PC’s IP address to the same range as the switch (default **192.168.1.xxx**). Enter the switch’s IP address (default is **192.168.1.250**) in your browser and press ENTER. Log in again with the same user name /password.

8. On the left select **Switch**. Navigate to **L2 Feature** -> **IGMP Snooping** -> **Global Settings**. Under **Status** select **Enabled**, under **Version**: **V2** and under **Report Suppression**: **Enabled**. Click **Apply**.

10. Now the switch should work properly with IP audio/video equipment.
IGMP Setup Guide: Linksys
1080p Systems (KD-IP1080, KD-IP120)

1. Before Linksys network switch is configured Key Digital KD-IP120/KD-IP1080 HDMI switch set must be connected to all HDMI sources/displays/network switches, and configured using Key Digital KD-IP120 Key Digital Management Software latest version.

2. Power-up all the system components. Using Key Digital KD-IP120 Key Digital Management Software, switch All Outputs -> Through at switching page.

3. IMPORTANT: Disconnect all the DHCP devices like routers, servers from the Linksys network switch.

4. Locate a pinhole “RESET” button at the front panel left bottom corner of your Linksys network switch. Using a paper clip press and hold a reset button for more than 10 seconds and then release. Wait while the device is restarted and ready to use (about 5min).

5. IMPORTANT: Make sure the blue “SYSTEM”LED next to the pinhole “RESET” button is flashing.

6. IMPORTANT: At this point all the displays should be displaying distorted randomly flashing video images.

7. Connect your PC to the Linksys network switch directly using a network cable.

8. If you have not done yet, configure your PC’s IP address to the same range as the switch (default 192.168.1.xxx).

9. Enter the switch’s IP address in your browser and press ENTER (check the user manual for a default IP address - it is usually 192.168.1.251).

10. Enter user name and password (check the user manual for a default user name and password; it is usually “admin” for both). Then click Log In.
11. Navigate to **Configuration -> IP Interface -> IPv4 -> IPv4 Interface**. Select **Static IP Address**. IP address can be changed by the administrator depending on the network configuration. If you are using multiple network switches it is recommended to set first one to **192.168.1.251**, second to **192.168.1.252**, and so on (we will leave the IP address unchanged). Set **Subnet Mask** to **255.255.255.0**, set **User Defined Default Gateway** to **192.168.1.1** (in this case), make sure that Management VLAN is set to “1” and click **Apply**. If you changed an IP address page will refresh and you will need to log in again using new IP address, same user name and password. If you did not change IP address just continue to the next step.

12. Make sure your screen looks exactly like pictured below.

15. Click on radio button and click **Edit**. **Edit IGMP Snooping** window will appear. Make sure **VLAN ID <1>** is selected. Enable all the settings as shown below. Select **IGMP v3** as **IGMP Querier Version**, Click **Apply** and then **Close**.

![Edit IGMP Snooping window](image1)

16. Refresh your browser, go to **IGMP Snooping** tab and make sure you have an image as below:

![IGMP Snooping tab](image2)
17. **IMPORTANT:** At this point all the displays should be displaying stable running video from the selected sources. If you do not have them displaying properly, then network switch is configured incorrectly.

18. Navigate to **Maintenance** -> **File Management** -> **Configuration File Copy**. Select radio buttons as shown below, click **Apply**. This will save current configuration and will apply this configuration every time switch is powered up.

19. **IMPORTANT:** Now you can connect back you DHCP equipment (routers, servers and so on).

20. Power down Linksys network switch and power it up back again. Wait for the whole system to start and until you can see video on your displays.
21. Log in to your Linksys network switch again and make sure that IGMP settings are intact:

![Linksys Configuration](image1)

22. Rescan your components with Key Digital KD-IP120 Key Digital Management Software and make sure HDMI video switch is functional.

23. At this point your Linksys network switch is set and ready to use.
IGMP Setup Guide: Linksys
4K Systems (KD-IP922)

1. Before Linksys network switch is configured Key Digital KD-IP922 HDMI switch set must be connected to all HDMI sources/displays/network switches, and configured using Key Digital Management Software latest version.

2. Power-up all the system components. Using Key Digital Management Software, switch All Outputs -> Through at switching page.

3. **IMPORTANT**: Disconnect all the DHCP devices like routers, servers from the Linksys network switch.

4. Locate a pinhole “RESET” button at the front panel left bottom corner of your Linksys network switch. Using a paper clip press and hold a reset button for more than 10 seconds and then release. Wait while the device is restarted and ready to use (about 5min).

5. **IMPORTANT**: Make sure the blue “SYSTEM” LED next to the pinhole “RESET” button is flashing.

6. **IMPORTANT**: At this point all the displays should be displaying or flashing Key Digital logo with information stamp.

7. Connect your PC to the Linksys network switch directly using a network cable.

8. If you have not done yet, configure your PC’s IP address to the same range as the switch (default 192.168.1.xxx).

9. Enter the switch’s IP address in your browser and press ENTER (check the user manual for a default IP address - it is usually 192.168.1.251).

10. Enter user name and password (check the user manual for a default user name and password; it is usually “admin” for both). Then click Log In.
11. Navigate to **Configuration -> IP Interface -> IPv4 -> IPv4 Interface**. Select **Static IP Address**. IP address can be changed by the administrator depending on the network configuration. If you are using multiple network switches it is recommended to set first one to **192.168.1.251**, second to **192.168.1.252**, and so on (we will leave the IP address unchanged). Set **Subnet Mask** to **255.255.0.0**, set **User Defined Default Gateway** to **192.168.1.1** (in this case), make sure that Management VLAN is set to “1” and click **Apply**. If you changed an IP address page will refresh and you will need to log in again using new IP address, same user name and password. If you did not change IP address just continue to the next step.

12. Make sure your screen looks exactly like pictured below.

13. Navigate to **Port Management -> Ports**. Select **Enable** under **Jumbo Frames** and click **Apply**.
15. Navigate to Multicast -> IGMP Snooping. Select Enable under IGMP Snooping, click Apply.
16. Click on radio button and click Edit. Edit IGMP Snooping window will appear. Make sure VLAN ID <1> is selected. Enable all the settings as shown below. Select IGMP v2 as IGMP Querier Version, Click Apply and then Close.
17. Refresh your browser, go to IGMP Snooping tab and make sure you have an image as below:
18. Navigate to **Maintenance -> File Management -> Configuration File Copy**. Select radio buttons as shown below, click **Apply**. This will save current configuration and will apply this configuration every time switch is powered up.

19. **IMPORTANT**: Now you can connect back you DHCP equipment (routers, servers and so on).

20. Power down Linksys network switch and power it up back again. Wait for the whole system to start and until you can see video on your displays.

21. Log in to your Linksys network switch again and make sure that IGMP settings are intact:
22. **IMPORTANT**: At this point all the displays should be displaying stable running video from the selected sources. If you do not have them displaying properly, than network switch is configured incorrectly.
23. Rescan your components with Key Digital KD-IP922 Management Software and make sure HDMI video switch is functional.

24. At this point your Linksys network switch is set and ready to use.
Luxul AMS-4424P
Network Setup Guide for KD-IP922/KD-IP1080

Important Notes:
- Please use firmware v.4.0.8.1. Other firmware versions are not compatible.
- Verified for single switch use only. Stacking switches may cause compatibility issues.

1. Login to the switch:
   a. Plug an Ethernet cable into any of the ports of the switch
   b. Plug the other end into the Ethernet port of your computer
   c. Power on the Switch
   d. Check to see that the IP address of the computer is within this network Subnet: 192.168.0.xxx (“xxx” ranges 1~254). For example, 192.168.0.100

2. Open the Web browser, and enter 192.168.0.4 (default IP address of Luxul AMS-4424P). The login window appears as below:
3. Enter the user name and password. (default user name and password are both set as “admin”), then click “OK” to login to the switch configuration window.

4. Ensure all ports have Maximum Frame Size of 10056 entered as below. To check it, find Configuration → Ports → Ports in the menu on left side of the window. (KD-IP922 requires Jumbo Frame(8K) for video/audio transmission via 1G-BaseT).

5. To enable IGMP Snooping of the switch, Find Configuration → IPMC → IGMP Snooping → Basic Configuration in the menu on left side of the window. (KD-IP922 requires IGMP Snooping for multicasting video/audio transmission via 1G-BaseT), then check the box of Snooping Enabled of Global Configuration in
IGMP Snooping Configuration window. And check the Fast Leave box for all Ports related Configuration in the same window as below.

6. Click “Save” button on the bottom of IGMP Snooping Configuration window

7. To add VLAN of the IGMP Snooping at the switch, Find Configuration → IPMC → IGMP Snooping → VLAN Configuration in the menu on left side of the window. (VLAN must be added in IGMP Snooping), then click “Add New IGMP VLAN” if there is not any specified VLAN in IGMP Snooping VLAN Configuration window.
Step 11. Then enter “1” in VLAN ID, check the box of Snooping Enabled and Querier Election in new VLAN. And select “Forced IGMPv2” in the list box of Compatibility in IGMP Snooping VLAN Configuration window. Then click “Save” button on the bottom of IGMP Snooping VLAN Configuration window.
Step 12. To save all Running Configurations to Startup-Configuration, Find **Administration → Configuration → Save startup-config** in the menu on left side of the window. Then click “Save Configuration” button in Save Running Configuration to startup-config window.

![Save Running Configuration to startup-config](image)

Step 13. To reboot the switch, Find **Administration → Reboot** in the menu on left side of the window. Then click “Yes” button in Reboot Device window. The switch will be rebooted automatically.

![Reboot Device](image)
Login to the switch with the following steps:
1. Plug an Ethernet cable into any of the ports of the switch
2. Plug the other end into the Ethernet port of your computer
3. Power on the Switch
4. Check to see that the IP address of the computer is within this network, 192.168.0.xxx (“xxx” ranges 1~254). For example, 192.168.0.100
5. Open the Web browser, and enter 192.168.0.239 (default IP address of Netgear GS). The login window appears as below:

6. Enter the password (default password is “password”). And then click ‘OK’ to login to the switch configuration window

7. To enable Jumbo Frame of the switch, go to Switching -> Ports -> Port Configuration. (IP922 requires Jumbo Frame(8K) for video/audio transmission via 1G-BaseT). Select the empty checkbox that is above the checkbox beside g1 Port in the table to select all the ports. All selected ports highlight to yellow color. Then enter “9216” in Maximum Frame Size field as shown below and press Apply button
8. To enable IGMP Snooping of the switch, go to Switching -> Multicast -> IGMP Snooping -> IGMP Snooping Configuration. (IP922 requires IGMP Snooping for multicasting video/audio transmission via 1G-BaseT), Enable IGMP settings as shown below and press Apply button

9. Go to Switching -> Multicast -> IGMP Snooping -> IGMP Snooping Interface Configuration. Select the empty checkbox that is above the checkbox beside g1 Port in the table to select all the ports. All selected ports highlight to yellow color. Enable Admin Mode and Fast Leave Admin Mode as shown below and press Apply button
10. Go to Switching -> Multicast -> IGMP Snooping -> IGMP Snooping VLAN Configuration. Add VLAN ID=1, Fast Leave Admin Mode=Enable and Query Mode=Enable as shown below and press Add button. (Note: the empty fields are populated automatically to default values)

![Netgear Switch Configuration Screen](image)

11. Go to Switching -> Multicast > IGMP Snooping Querier -> Querier Configuration. Enable Querier Admin Mode as shown below and press Apply button

![Netgear Switch Configuration Screen](image)
12. Finally, go to Maintenance -> Device Reboot. Enable checkbox for device reboot as shown below and press Apply button. It takes approximately 2 minutes to power cycle the switch and an additional 2 min for IP922 to start showing video.
Login to the switch with the following steps:

1. Plug an Ethernet cable into any of the ports of the switch
2. Plug the other end into the Ethernet port of your computer
3. Power on the Switch
4. Check to see that the IP address of the computer is within this network, 192.168.1.xxx (“xxx” ranges 1~254). For example, 192.168.1.154

5. Open the Web browser, and enter 192.168.1.205 (default IP address of Pakedge S3L). Then the login window appears as below.
6. Enter the User ID (default user id is “pakedge”) and password (default password is “pakedges”). And then click ‘OK’ to login to the switch configuration window. Make sure to set appropriate IP address and netmask to make the switch to be in same network as the Key Digital Devices you are going to be using.

7. To enable Jumbo Frame of the switch, go to Administration -> Manage ->
Port. (IP922 requires Jumbo Frame(8K) for video/audio transmission via 1G-BaseT). Make sure under Port Settings, Port field is set to All. Then enter “9216” in Maximum Receive Frame Size field as shown below and press Apply button. After applying check that the settings are updated in the table below.

8. To enable IGMP Snooping of the switch, go to Configure -> Application -> IGMP Snooping. (IP922 requires IGMP Snooping for multicasting video/audio transmission via 1G-BaseT), Enable IGMP settings as shown below and press Apply button. You should see a new entry in the table below.
9. Go to Configure -> Application -> IGMP. Enter the settings as shown in the picture below and press Apply button. You should see the updated settings in the entries table below.

10. Go to Maintenance -> Save. Click on Save button.
11. Go to Maintenance -> Reboot. Click on Reboot button. It takes approximately 30 seconds for the switch to reboot and an additional 30 sec for IP922 to start showing video.
Pakedge SX Series
IGMP Setup Guide for KD-IP922, KD-IP1080

1. Connect to the network switch
   a. Plug an Ethernet cable into any of the ports of the switch
   b. Plug the other end into the Ethernet port of your computer
   c. Power on the Switch
   d. Configure the PC with static IP address of 192.168.1.10 and the subnet mask of 255.255.255.0 to be within range of Pakedge’s default settings (IP address 192.168.1.205 subnet mask 255.255.255.0). Default Getaway and DNS can be left blank

![Internet Protocol Version 4 (TCP/IPv4) Properties](image)

2. Open a web browser, and enter **192.168.1.205** (default IP address of Pakedge) to enter the login window

3. Enter the user name and password (default user name is pakedge and password is pakedges) and then click Login to login to the switch configuration window.
4. Go to **System Settings** and change the Subnet Mask to 255.255.0.0. Press the **apply** button.

5. Go to **Port** → **Port Settings** → **MTU** and change MTU to 10,000 (max)
6. Go to TRAFFIC → IGMP → IGMP Snooping and Enable IGMP Status, and Report Suppression. Press the Apply button.

7. Press the button with red pencil icon
8. **Enable State and Immediate Leave**

   ![IGMP VLAN Setup](image)

   - VLAN ID: 1
   - State: Enable
   - Immediate Leave: Enable
   - Query Robustness: 2
   - Query Interval: 125

9. Go to TRAFIC ➔ IPMC ➔ IGMP Querier and press the button with red pencil icon

   ![IGMP Querier](image)

10. Enable State and choose IGMPv2 version. Click Apply button

   ![IGMP Querier](image)
10. Go to **TRAFC** → **IPMC** → **MULTICAST PORPERTY** and set Unknown Multicast Action to **Drop**. Press **Apply**.
IGMP Setup Guide: Titan Networx
1080p Systems (KD-IP1080, KD-IP120)

1. Before Titan Networx network switch is configured Key Digital KD-IP120/KD-IP1080 HDMI switch set must be connected to all HDMI sources/displays/network switches, and configured using Key Digital KD-IP120 Key Digital Management Software latest version.
2. Power-up all the system components. Using Key Digital KD-IP120 Key Digital Management Software, switch All Outputs -> Through at switching page.
3. IMPORTANT: Disconnect all the DHCP devices like routers, servers from the Linksys network switch.
4. Locate a pinhole “RESET” button at the front panel left bottom corner of your Titan Networx network switch. Using a paper clip press and hold a reset button for more than 10 seconds and then release. Wait while the device is restarted and ready to use (about 5min).
5. IMPORTANT: At this point all the displays should be displaying distorted randomly flashing video images.
6. Connect your PC to the Titan Networx network switch directly using a network cable.
7. If you have not done yet, configure your PC’s IP address to the same range as the switch (default 192.168.1.xxx).
8. Enter the switch’s IP address in your browser and press ENTER (check the user manual for a default IP address – usually, it is: 192.168.1.30).
9. Enter user name and password (check the user manual for a default user name and password; it is usually “admin” for both). Then click Log In.
10. Navigate to Administration -> System Configuration. Select IP Address box. IP address can be changed by the administrator depending on the network configuration. If you are using multiple network switches it is recommended to set first one to 192.168.1.251, second to 192.168.1.252, and so on (we will change an IP
address to 192.168.1.251. Set Subnet Mask to 255.255.255.0, set Gateway to 192.168.1.1 (in this case), make sure that Management VLAN is set to “1”, DHCP is set to “Disable” and click OK. Page will refresh with the new IP address. If it is timed out than log in again using the new IP address.

11. Make sure your screen looks exactly like pictured below.

12. Click Save Configurations on the left bottom corner. New screen will appear. Click Save under Save Current Settings, than OK and OK again.
13. Navigate to **Device Management -> IGSP**, Select **IGMP Snooping** tab. Set **IGSP Status** to **Enable**, set **Unknown Multicast Drop** to **Enable**, set **Multicast VLAN Status** to **Enable**, set **Multicast VLAN ID** to “1”, and leave all other settings as indicated below. Click **OK**, and **OK** again.
14. Select **Fast Leave** tab. Click **Config** button.

15. Set **Fast Leave** to **Enable**, click **Select All**. Click **OK**, and **OK** again.
16. Make sure all the ports are set to **Enable**.
17. **IMPORTANT**: At this point all the displays should be displaying stable running video from the selected sources. If you do not have them displaying properly, than network switch is configured incorrectly.

18. Click **Save Configurations** on the left bottom corner. New screen will appear. Click **Save** under **Save Current Settings**, than **OK** and **OK** again.
19. **IMPORTANT**: Now you can connect back your DHCP equipment (routers, servers and so on).

20. Power down Titan Networx network switch and power it up back again. Wait for the whole system to start and until you can see video on your displays.

21. Log in to your Titan Networx network switch again and make sure that IGMP settings are intact:
22. Rescan your components with Key Digital KD-IP120 Key Digital Management Software and make sure HDMI video switch is functional.

23. At this point your Titan Networx network switch is set and ready to use.
WiFi Router Setup

It is required to set your WiFi router to **filter multicast (aka filter broadcast)** to ensure that your router is not overwhelmed by the data broadcast from Enterprise AV units on the network.

*Example of applying multicast filtering in a Linksys router:*

![Image of Linksys router interface showing multicast filtering](image)

*The following requirements must be met in order to support the live streaming feature of the Key Digital app (1080p systems, KD-IP1080/KD-IP120 only):

- Verified model = Cisco/Linksys EA6700 router
- Network switch must support IGMP v3 and configured to enable IGMP v3.
- **Wifi Router**
  - Must be configured so that multicast filtering is enabled. See above example
  - Must support 50Mbps bandwidth per iOS that will be streaming video
    - It is recommended that only 1 iOS be in the Live Stream page at a time
- **iOS Device**
  - Best performance is with iPad4, iPad Air, iPad Mini. More powerful processing will always benefit.
  - Should have Static IP with Router IP corresponding to master network switch