Switch Configuration Example **for Q-SYS™ Platform**
Extreme Networks Summit® X450-G2 Series

Important Note

This switch configuration example is intended to serve as a network setup guideline for systems using Q-LAN audio and video streaming within your Q-SYS system and should be used alongside the **Q-SYS Q-LAN Networking Overview** tech note for deeper setup insight. Keep in mind that QSC is unable to provide live network configuration support for third-party switch configuration. To learn more about network switch qualification services and the plug-and-play Q-SYS NS Series preconfigured network switches, visit **http://www.qsc.com/switches**.

> This document applies to these Extreme Networks switches:
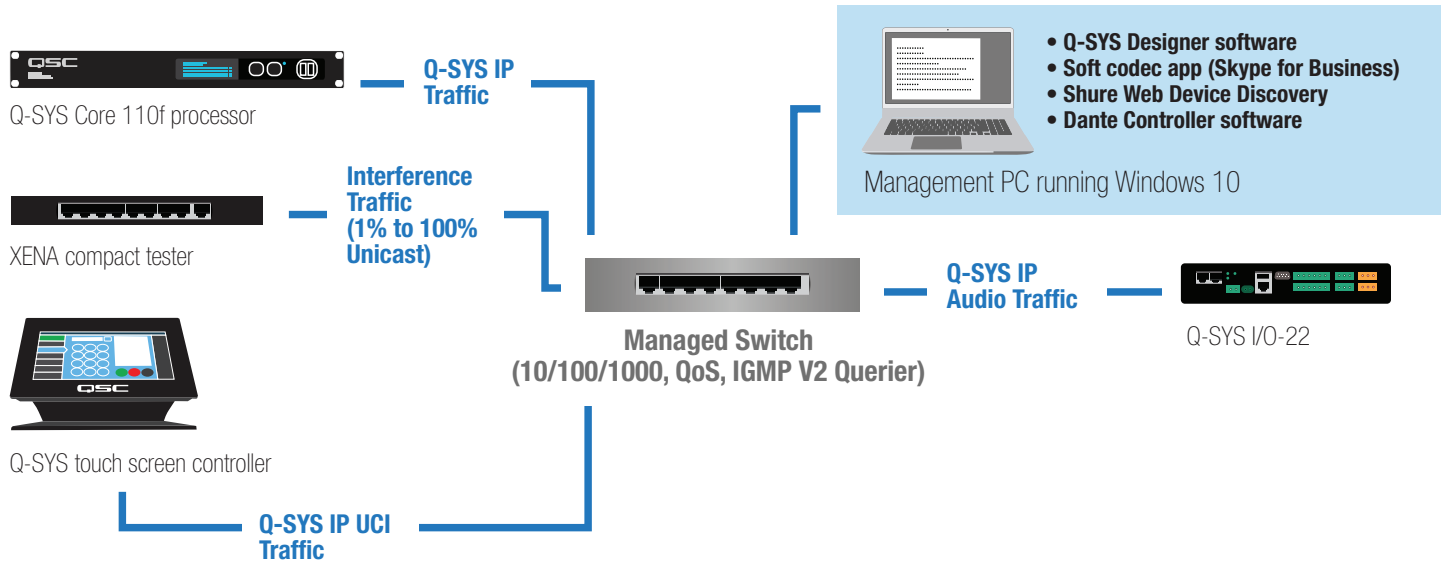> **Summit X450-G2 Series**

NOTE: The Extreme Networks Summit X450-G2 Series are a range of enterprise Ethernet switches.
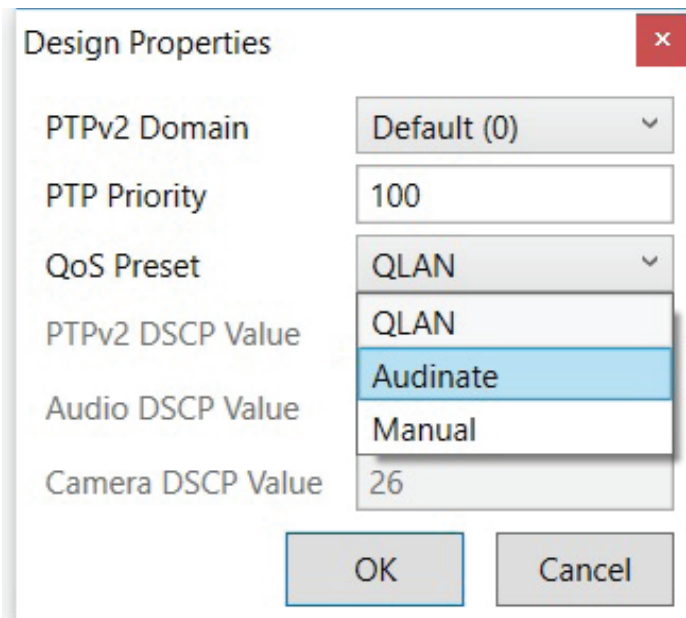
Introduction

As of release 5.3.x, Q-SYS Designer software now supports AES67-standard interoperability. The AES67 standard does not prescribe a method of discovery for devices so manufacturers are free to implement one or more discovery services for their devices. In this configuration document, the process uses Bonjour as the discovery method for AES67 devices.

Q-SYS Designer now also offers a selection of Differential Services Code Point (DSCP) setting presets to optimize Quality of Service (QoS) for different types of deployment. DSCP codes are a six-bit value placed in the IP header of data packet, and they instruct a network switch to handle various types of data with defined levels of priority that ensure proper QoS.

Switch Qualification Protocol

Q-SYS Core 110f processor

Q-SYS IP Traffic

• **Q-SYS Designer software**
• **Soft codec app (Skype for Business)**
• **Shure Web Device Discovery**
• **Dante Controller software**

Management PC running Windows 10

Interference Traffic (1% to 100% Unicast)

XENA compact tester

Q-SYS IP Audio Traffic

Q-SYS I/O-22

Managed Switch (10/100/1000, QoS, IGMP V2 Querier)

Q-SYS touch screen controller

Q-SYS IP UCI Traffic

Selecting QoS presets in a Q-SYS design file

Design Properties ×

PTPv2 Domain	Default (0)
PTP Priority	100
QoS Preset	QLAN
PTPv2 DSCP Value	QLAN
Audio DSCP Value	Audinate
Camera DSCP Value	Manual
	26

OK   Cancel

1. In Q-SYS Designer, open the design. Make sure it is disconnected from the Core processor (press **F7** or select **File > Disconnect**).

2. Select **File > Design Properties**.

3. Select the appropriate QoS preset: **QLAN**, **Audinate**, or **Manual**.
   (See specification table below.)

Specifications

Preset	Q-LAN	Audinate	Manual
Use for:	• Q-LAN-only network	• DANTE-only network	• If custom DSCP settings are necessary
	• Q-LAN + AES67 network	• DANTE + Q-LAN network	
		• DANTE + Q-LAN + AES67 network	
QoS class (DSCP value) assigned:	PTPv2: 46	PTPv2: 56	PTPv2: 56
	Audio: 34	Audio: 46	Audio: 46
	Camera: 26	Camera: 26	Camera: 26

4. Leave the PTPv2 Domain and PTP Priority settings at default. Click **OK**.

5. To save the settings, press **F5** or select **File > Save to Core & Run**.

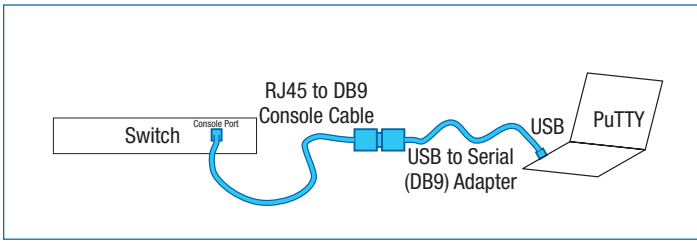## Configuring the network switch for Q-SYS

Configuring the switch requires these items:

•   Computer with an available USB port

•   DB9 to USB serial adaptor

•   Switch rollover cable (usually supplied with the switch)

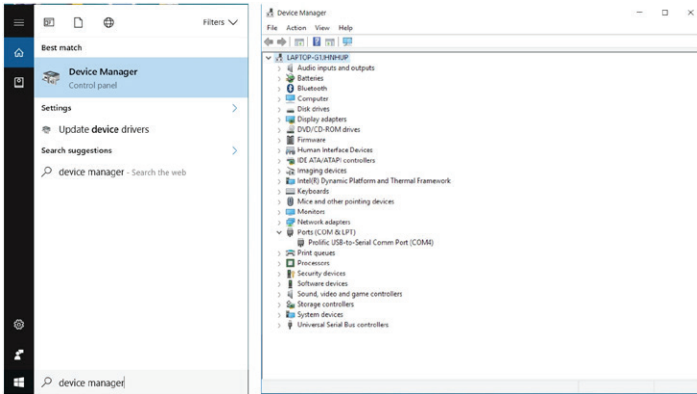•   PuTTY terminal software (or equivalent)
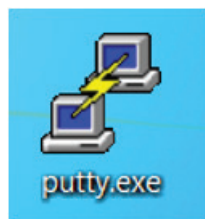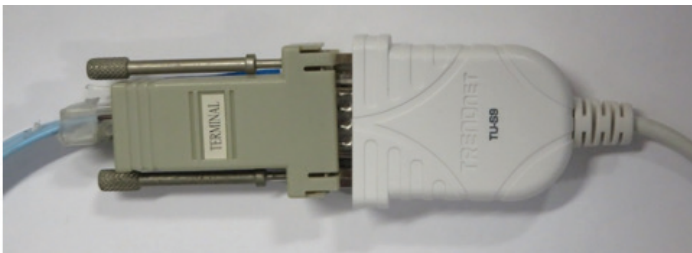
Connect the PC with the PuTTY software to the switch as shown, using the console cable and the USB to serial adapter. The switch's console port is located on its rear panel. Turn the switch on.
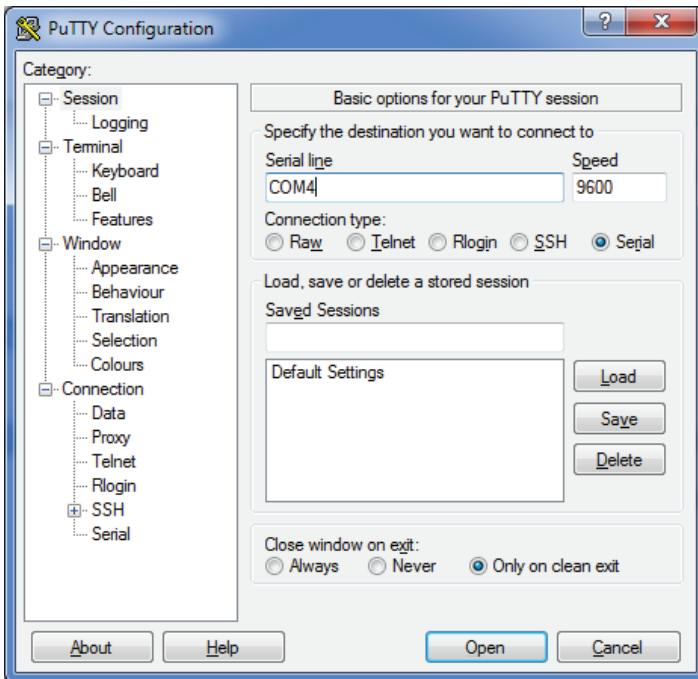

1. Verify that Windows recognizes the USB-to-serial adapter. In Windows, open **Device Manager** (in Windows 10, you can find it by typing `device manager` into the Cortana text box). Expand **Ports (COM & LPT)**; the USB-to-serial comm port adapter should be listed there.

   If the adapter does not appear, try these remedies:

- Plug the USB-to-serial adaper directly into the computer, to bypass any USB hubs.
- Download and install the latest drivers for the USB-to-serial adapter.

- If you are using virtualization, make sure that the USB devices are configured to connect to the virtual machine (shown at left). If you still have problems with the USB connections, try running the computer without any virtualization (i.e., "bare metal").
- See if any Windows updates are queued. If there are, apply them and reboot the computer.
- Check security settings and any security software for issues that might prevent functioning of the USB devices.

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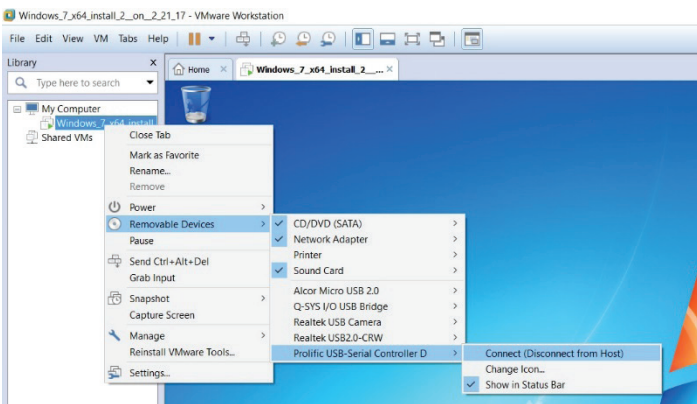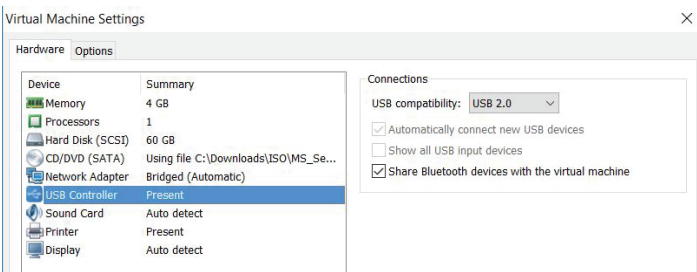
2. When the computer properly recognizes the USB-to-Serial Comm Port, open PuTTY. The PuTTY Configuration window will open first.

3. In the **Category** pane select **Session**.

4. At **Connection type**, select **Serial**.

5. At **Serial line**, select the COM port that the USB-to-serial adapter is connected (as displayed in Device Manager).

   At **Speed**, enter `9600`.
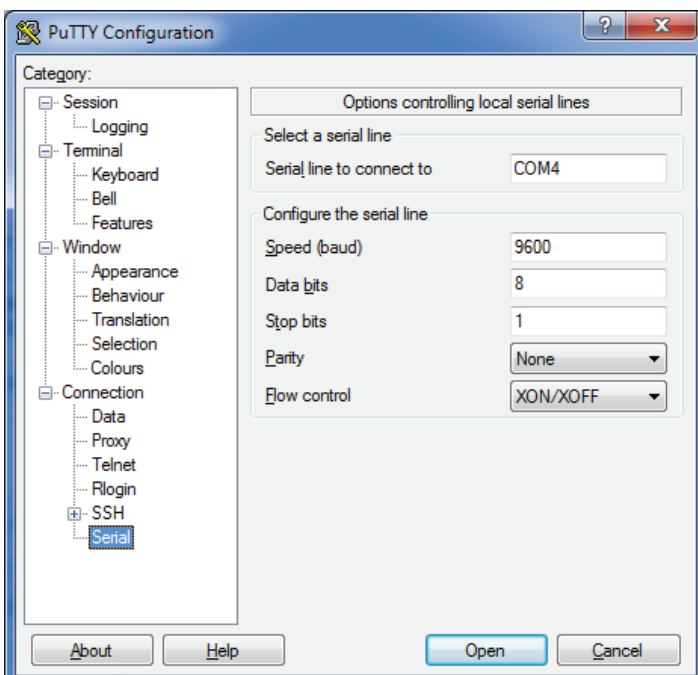
6. In the **Category** pane select **Connection > Serial**.

7. At **Serial line to connect to**, select the COM port you designated in step 5.

8. At **Configure the serial line** set these parameters.

Speed (baud):	9600
Data bits:	8
Stop bits:	1
Parity:	None
Flow control:	XON/XOFF

9. Optional: If you wish to save these settings, select **Session** and enter a name for these settings in **Saved Sessions**. Click **Save**.

10. Click **Open**.

Commencing the terminal session and resetting the switch to factory defaults

1. The terminal session with the switch will commence. The switch will prompt you to enter the login and password.

    If the switch's login credentials have not been changed from its factory default settings, the login is **`admin`** and there is no password (just press **Enter**). At the command prompt, type **`unconfigure switch all`** and press **Enter**. The switch will ask you to confirm **Yes** before proceeding.

    If you don't know the switch's login or password, you can reset it to factory defaults as instructed here: **https://community.extremenetworks.com/extreme/topics/how_do_you_reset_a_summit_x450a_24t_to_factory_default**. Then login with **`admin`** and no password.

2. The switch will reboot to complete the reset process. As it finishes rebooting it will ask configuration questions. Press **Q** to exit the questions and proceed to a manual setup.

Configuring the switch

3. At the prompt, type these QoS priority queue commands:
    `create qosprofile "QP3"` and press **Enter**
    `create qosprofile "QP5"` and press **Enter**
    `create qosprofile "QP7"` and press **Enter**.

4. At the prompt, type these commands to enable diffserv examination on all ports and disable dot1p examination:
    `enable diffserv examination port all` and press **Enter**
    `disable dot1p examination port all` and press **Enter**.

5. At the prompt, type these commands to enable flow control on all ports:
    `enable flow-control rx-pause ports all` and press **Enter**
    `enable flow-control tx-pause ports all` and press **Enter**.

6. At the prompt, type this command to assign an IP address and subnet mask to the switch:
    `configure vlan default ipaddress <ip address> <subnet mask>` and press **Enter**.

7. At the prompt, type this command to enable strict priority queuing on all ports:
    `configure qosscheduler strict-priority ports all` and press **Enter**.

8. At the prompt, type these commands to configure maximum buffer sizes for QP7, QP5, and QP3 in their QoS profiles:
    `configure qosprofile QP3 maxbuffer 100 weight 1` and press **Enter**
    `configure qosprofile QP5 maxbuffer 100 weight 1` and press **Enter**
    `configure qosprofile QP7 maxbuffer 100 weight 1` and press **Enter**.

9. At the prompt, type these commands to configure bandwidths for QP7, QP5, and QP3 in their QoS profiles:
    `configure qosprofile QP3 minbw 0 maxbw 100 ports all` and press **Enter**
    `configure qosprofile QP5 minbw 0 maxbw 100 ports all` and press **Enter**
    `configure qosprofile QP7 minbw 0 maxbw 100 ports all` and press **Enter**.

10. At the prompt, type the following commands to remap the DSCP values to QP1:

`configure diffserv examination code-point 00 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 01 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 02 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 03 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 04 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 05 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 06 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 07 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 08 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 09 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 10 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 11 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 12 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 13 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 14 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 15 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 16 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 17 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 18 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 19 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 20 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 21 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 22 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 23 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 24 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 25 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 26 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 27 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 28 qosprofile QP1` and press **Enter**
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`configure diffserv examination code-point 39 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 40 qosprofile QP1` and press **Enter**
`configure diffserv examination code-point 41 qosprofile QP1` and press **Enter**

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configure diffserv examination code-point 42 qosprofile QP1 and press Enter
configure diffserv examination code-point 43 qosprofile QP1 and press Enter
configure diffserv examination code-point 44 qosprofile QP1 and press Enter
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configure diffserv examination code-point 61 qosprofile QP1 and press Enter
configure diffserv examination code-point 62 qosprofile QP1 and press Enter
configure diffserv examination code-point 63 qosprofile QP1 and press Enter.
```

11. The next set of commands depends on which QoS preset you are configuring the switch for.

For the Audinate QoS preset

At the prompt, type these commands to assign DSCP values to their priority queues:

`configure diffserv examination code-point 8 qosprofile QP3` and press **Enter**
`configure diffserv examination code-point 26 qosprofile QP3` and press **Enter**
`configure diffserv examination code-point 46 qosprofile QP5` and press **Enter**
`configure diffserv examination code-point 56 qosprofile QP7` and press **Enter**.

For the QLAN QoS preset

At the prompt, type these commands to assign DSCP values to their priority queues:

`configure diffserv examination code-point 26 qosprofile QP3` and press **Enter**
`configure diffserv examination code-point 34 qosprofile QP5` and press **Enter**
`configure diffserv examination code-point 46 qosprofile QP7` and press **Enter**.

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12. At the prompt, type these commands to assign static multicast group 224.0.1.129 to all ports:

`configure igmp snooping vlan "Default" ports 1 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 2 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 3 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 4 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 5 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 6 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 7 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 8 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 9 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 10 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 11 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 12 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 13 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 14 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 15 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 16 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 17 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 18 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 19 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 20 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 21 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 22 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 23 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 24 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 25 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 26 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 27 add static group 224.0.1.129` and press **Enter**
`configure igmp snooping vlan "Default" ports 28 add static group 224.0.1.129` and press **Enter**.

13. At the prompt, type this command to set the forwarding database (FDB) time to 3600 seconds:

`configure fdb agingtime 3600` and press **Enter**.

This sets the aging time for dynamic FDB entries. The switch maintains an FDB of all AMC addresses received on its ports and uses the information to determine whether a frame should be forwarded or filtered.

14. At the prompt, type this command to create an access list for multicast group address 224.0.1.129 and redirect traffic to QP7:

`create access-list clockpacket " destination-address 224.0.1.129/32 ;" " redirect-vlan  ;`
`qosprofile qp7 ;"` and press **Enter**.

15. At the prompt, type these commands to configure the access lists of all the ports:

    configure access-list add clockpacket last priority 0 zone SYSTEM ports 1 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 2 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 3 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 4 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 5 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 6 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 7 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 8 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 9 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 10 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 11 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 12 ingress and press **Enter**
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    configure access-list add clockpacket last priority 0 zone SYSTEM ports 25 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 26 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 27 ingress and press **Enter**
    configure access-list add clockpacket last priority 0 zone SYSTEM ports 28 ingress and press **Enter**.

16. At the prompt, type this command to configure fast-path forwarding.

    configure forwarding ipmc local-network-range fast-path and press **Enter**.

    The switch will reply with a message warning that the command will flush all IP multicast forwarding entries, which may temporarily cause loss of IP multicast traffic. Answer **yes** to continue.

    Fast-path forwarding lets certain packets traversing the switch bypass processing by the CPU. The switch will forward packets to the multicast address 224.0.1.129 at the wire speed rate.

17. Finally, save the configuration. At the prompt, type **save** and press **Enter**.

The switch configuration is complete.

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