Switch Configuration Example for Q-SYS™ Platform
Artel Video Systems ARG Quarra

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**.
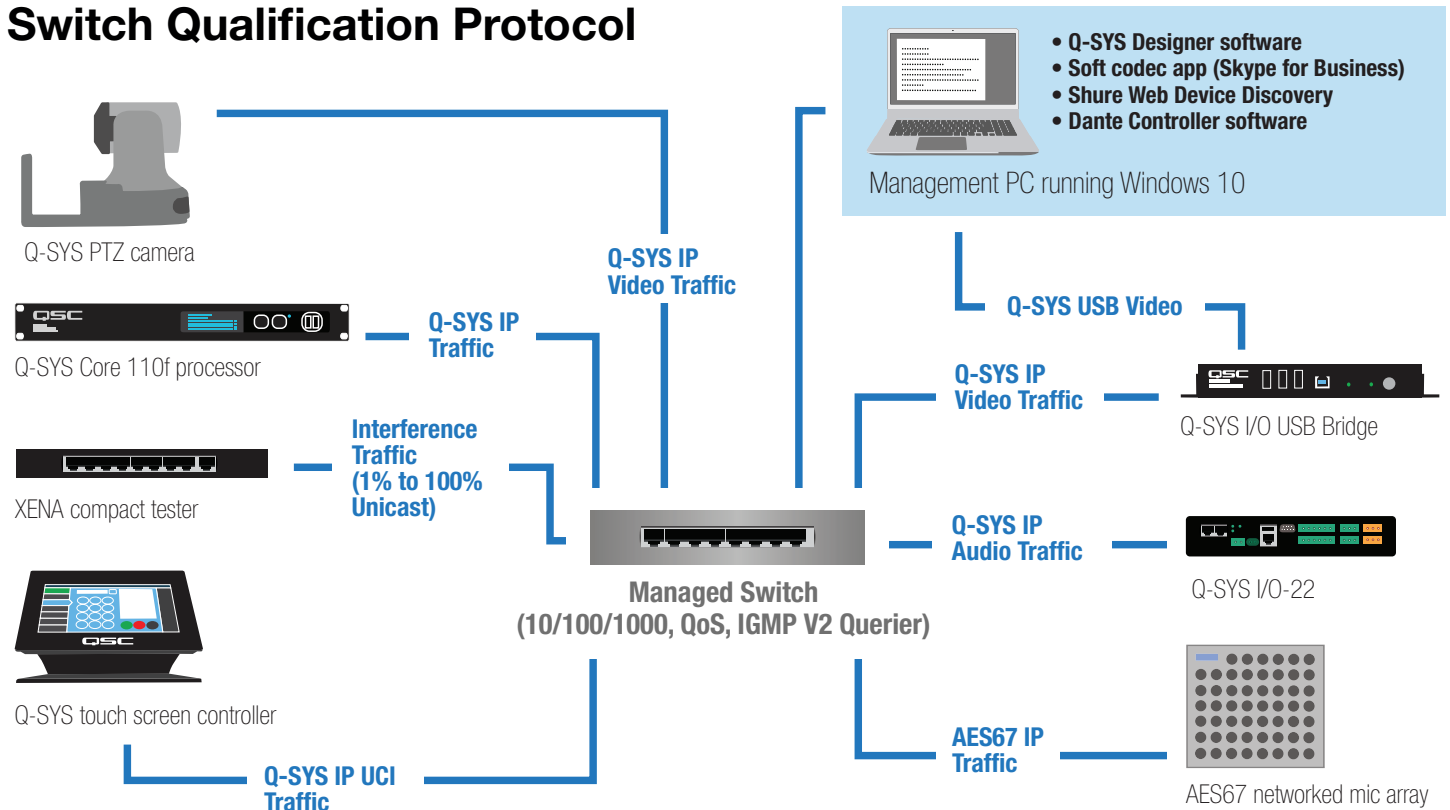
> This document applies to this Artel Video Systems switch:
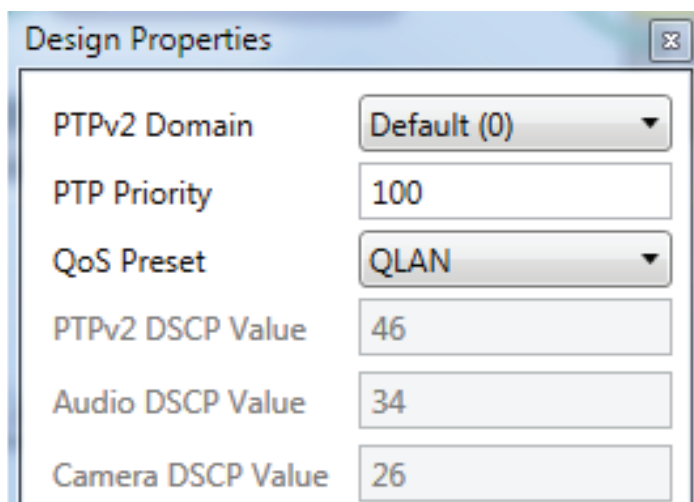> **ARG Quarra**

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

Management PC running Windows 10

Q-SYS PTZ camera

Q-SYS Core 110f processor

Q-SYS IP Traffic

Q-SYS IP Video Traffic

Q-SYS USB Video

Q-SYS IP Video Traffic

Q-SYS I/O USB Bridge

XENA compact tester

Interference Traffic (1% to 100% Unicast)

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

AES67 IP Traffic

AES67 networked mic array

Selecting QoS presets in a Q-SYS design file

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 (See specification table below.)

QSC

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 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

The network switch's default IP address is **10.0.0.181** and subnet is **255.255.255.0**. Make sure your computer's NIC uses an IP address that is within that subnet domain.
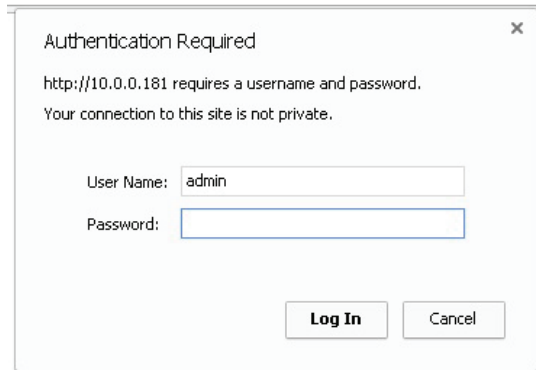
Resetting the switch to factory defaults

It is good practice to start with the switch set to its factory defaults. If the switch is brand new it will already be set this way, but if it is not you should perform a simple, basic reset. Do not reset the switch while it is in a live network because it would cause outages in the network. In addition to the switch you will need only a regular network cable. Use the following procedure to reset the switch.

Factory reset ⟶

RJ45 Cable
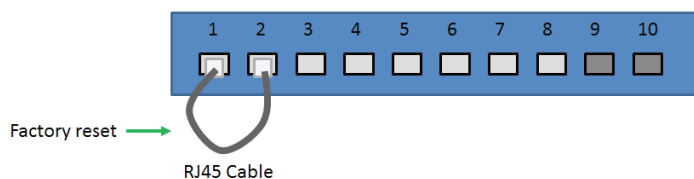
1.   Start with the network switch off (i.e., with the power cable unconnected). Plug the cable into Port 1 and Port 2, to form a loop between them. Plug the switch's power cable in. As Port 2 receives the loopback packets from Port 1 (transmitted in the first minute after the switch turns on), the switch will reset itself and reboot.

2.   Disconnect the looped network cable from the switch. The switch is now reset to factory default settings.

3.   Alternatively, the switch can be reset using its Web GUI, under **Maintenance**.

Configuring the switch

1. With a network cable, connect the computer's network interface card (NIC) to a port on the switch.

Authentication Required ×

http://10.0.0.181 requires a username and password.

Your connection to this site is not private.

User Name: admin

Password:

Log In   Cancel

2. Open a web browser and enter the switch's IP address, **10.0.0.181**, into the address bar. The switch's Web GUI will open.

3. To log into the Web GUI, use the default user name **admin** with no password. Click **Log In**.

System Information Configuration

System Contact	M.R.
System Name	AET-Department
System Location	Costa Mesa

Save   Reset

4. Optional but recommended: Go to **Configuration > System > Information**.

   On the page titled **System Information Configuration**, enter information for **System Contact** (for example, the name of the person responsible for the network), **System Name**, and **System Location**. Click **Save**.

IP Configuration

Mode	Host ▼	
DNS Server 0	No DNS server ▼	
DNS Server 1	No DNS server ▼	
DNS Server 2	No DNS server ▼	
DNS Server 3	No DNS server ▼	
DNS Proxy	☐	

IP Interfaces

| Delete | VLAN | DHCPv4 | | | IPv4 | |
		Enable	Fallback	Current Lease	Address	Mask Length
☐	1	☐	0		192.168.1.25	24

Add Interface

IP Routes

Delete	Network	Mask Length	Gateway	Next Hop VLAN
Delete	0.0.0.0	0	192.168.1.1	1

Add Route

Save   Reset

5. Go to **Configuration > System > IP**. Under the heading **IP Interfaces**, enter the switch's intended IP address and mask length (in bits) in the **Address** field under **IPv4**. (It is good practice to assign IP addresses based on RFC1918 guidelines for private network usage. Class C networks, for example, are most common and use the **192.168.x.x** range and a maximum subnet mask of **255.255.0.0**.)

   An entire IP subnet mask is 32 bits long. Each one of the four fields represents eight bits. Therefore, for example, a subnet mask of **255.255.255.0** would be stated as a mask length of 24, while a mask of **255.255.0.0** would be 16 bits long. Enter the appropriate value in the **Mask Length** field under **IPv4**.

   If there is to be a gateway to allow the switch to be accessed from outside the VLAN, enter its IP address at **Gateway** under **IP Routes**. For **Network**, enter **0.0.0.0**, and for **Mask Length**, enter **0**. At **Next Hop VLAN**, enter **1**. Click **Save**.

6. Because the switch's IP address has changed, the browser will lose connection with it. If the switch's new IP address is on a different subnet than before (such as going from 10.10.0.181 to 192.168.x.x or 172.16.0.0 through 172.31.255.255), change the IP address of the computer's NIC to be on the same subnet.

7. Type the switch's new IP address into the browser's address bar. The Web GUI will open; log in as before.

NTP Configuration

Mode	Enabled ▼
Server 1	192.168.1.4

8. Optional but recommended for larger system deployments: Go to **Configuration > System > NTP**. Under **NTP Configuration**, at **Mode** select **Enabled**. At **Server 1**, enter the IP address of the NTP server. Click **Save**.

Time Zone Configuration

Time Zone Configuration	
Time Zone	(GMT-08:00) Pacific Time (US and Canada) ▼
Acronym	PST (0 - 16 characters)

Daylight Saving Time Configuration

Daylight Saving Time Mode	
Daylight Saving Time	Disabled ▼

9. Go to **Configuration > System > Time**. Under **Time Zone Configuration**, select the applicable **Time Zone** and enter an identifying acronym, initialism, or name for it at **Acronym**.

    Under **Daylight Saving Time Configuration**, enable or disable **Daylight Saving Time** as applicable.

    Click **Save**.

Port Configuration

Port	Link	Speed		Adv Duplex		Adv speed			Flow Control			Maximum Frame Size	Excessive Collision Mode	Frame Length Check
		Current	Configured	Fdx	Hdx	10M	100M	1G	Enable	Curr Rx	Curr Tx			
*			<> ▼	✓	✓	✓	✓	✓	✓			1518	<> ▼	☐
1	Down	Auto ▼		✓	✓	✓	✓	✓	✓	✗	✗	1518	Discard ▼	☐

10. Go to **Configuration > Ports**.

    At **Port *** (wildcard for all the ports), enter **1518** at **Maximum Frame Size**.

Press **Tab**. This should update the Maximum Frame Size fields on all the ports to display 1518 also.

Under **Flow Control**, select **Enable** on **Port ***; . Click **Save**.

Users Configuration

User Name	Privilege Level
admin	15

Edit User

User Settings	
User Name	admin
Password	•••
Password (again)	•••
Privilege Level	15 ▾

Save   Reset   Cancel

Authentication Required   ✕

http://192.168.1.25 requires a username and password.

Your connection to this site is not private.

User Name: admin

Password: ***

Log In   Cancel

QoS Ingress Port Classification

Port	CoS	DPL	PCP	DEI	Tag Class.	DSCP Based	Address Mode
*	<> ▾	<> ▾	<> ▾	<> ▾		☑	<> ▾
1	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾
2	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾
3	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾
4	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾
5	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾
6	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾
7	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾
8	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾
9	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾
10	0 ▾	0 ▾	0 ▾	0 ▾	Disabled	☑	Source ▾

Save   Reset

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11. Setting an admin password is optional but recommended.

    Go to **Configuration > Security > Switch > Users**. Under the heading **Users Configuration**, click on the user name **admin**.

    Under **User Settings**, at **Password** enter the admin password. Re-enter it at **Password (again)**. The password and re-entered password must match; click **Save**. (If they do not match, the **Save** button will be grayed out until you correct them.)

    Log into the Web GUI using the user name **admin** and the password you just defined.

12. Go to **Configuration > QoS > Port Classification**. At **Port *** select **DSCP Based**. The same selection should appear on all the ports. Click **Save**.

DSCP-Based QoS Ingress Classification

DSCP	Trust	QoS Class	DPL
*	☐	<> ▼	<> ▼
0 (BE)	☐	0 ▼	0 ▼
1	☐	0 ▼	0 ▼
2	☐	0 ▼	0 ▼
3	☐	0 ▼	0 ▼
4	☐	0 ▼	0 ▼
5	☐	0 ▼	0 ▼
6	☐	0 ▼	0 ▼
7	☐	0 ▼	0 ▼
8 (CS1)	☑	5 ▼	0 ▼
9	☐	0 ▼	0 ▼
10 (AF11)	☐	0 ▼	0 ▼
11	☐	0 ▼	0 ▼
12 (AF12)	☐	0 ▼	0 ▼
13	☐	0 ▼	0 ▼
14 (AF13)	☐	0 ▼	0 ▼
15	☐	0 ▼	0 ▼
16 (CS2)	☐	0 ▼	0 ▼
17	☐	0 ▼	0 ▼
18 (AF21)	☐	0 ▼	0 ▼
19	☐	0 ▼	0 ▼
20 (AF22)	☐	0 ▼	0 ▼
21	☐	0 ▼	0 ▼
22 (AF23)	☐	0 ▼	0 ▼
23	☐	0 ▼	0 ▼
24 (CS3)	☐	0 ▼	0 ▼
25	☐	0 ▼	0 ▼

13. Go to **Configuration > QoS > DSCP-Based QoS**.

For a combined Audinate (Dante or AES67) and Q-SYS network, set these QoS parameters:

DSCP 8 (CS1): Select **Trust** and at **QoS Class**, select **5**.

DSCP 26 (AF31): Select **Trust** and at **QoS Class**, select **5**.

DSCP 46 (EF): Select **Trust** and at **QoS Class**, select **6**.

DSCP 56 (CS7): Select **Trust** and at **QoS Class**, select **7**.

Click **Save**.

For a combined AES67 and Q-SYS network, set these QoS parameters:

DSCP 34 (AF41): Select **Trust** and at **QoS Class**, select **6**.

DSCP 46 (EF): Select **Trust** and at **QoS Class**, select **7**.

Click **Save**.

PTP Clock Configuration

Delete	Clock Instance	Device Type	Profile
	No Clock Instances Present		

[Add New PTP Clock] [Save] [Reset]

14. Go to **Configuration > PTP**. Click **Add New PTP Clock**.

A new row will appear in the table **PTP Clock Configuration**. The **Clock Instance** ID should be 0. At **Device Type**, select **E2eTransp**. Click **Save**.

PTP Clock Configuration

Delete	Clock Instance	Device Type	Profile
Delete	0	E2eTransp ▼	No Profile ▼

[Add New PTP Clock] [Save] [Reset]

PTP Clock Configuration

Delete	Clock Instance	Device Type	Profile
☐	0	E2eTransp	No Profile

[Add New PTP Clock] [Save] [Reset]

15. Under **Clock Instance**, click **0**. This will open the **PTP Clock's Configuration and Status** page for Clock Instance 0.

Port Enable and Configuration

Port Enable									
1	2	3	4	5	6	7	8	9	10
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

Protocol	One-Way	VLAN Tag Enable	VID	PCP	DSCP
IPv4Multi ▼	False ▼	False ▼	1	0 ▼	46

Under the heading **Port Enable and Configuration**, select every port shown under **Port Enable**.

Under the heading **Clock Default DataSet**, under **Protocol** select **IPv4Multi**. Under **DSCP**, enter **56** if the network is to be a combined Q-SYS / AES67 / Dante one or **46** if it is to be only Q-SYS and AES67.

Click **Save**.

IGMP Snooping Configuration

Global Configuration		
Snooping Enabled	☑	
Unregistered IPMCv4 Flooding Enabled	☐	
IGMP SSM Range	232.0.0.0	/ 8
Leave Proxy Enabled	☑	
Proxy Enabled	☑	

Port Related Configuration

Port	Router Port	Fast Leave	Throttling
*	☐	☐	<> ▼
1	☐	☐	unlimited ▼
2	☐	☐	unlimited ▼
3	☐	☐	unlimited ▼
4	☐	☐	unlimited ▼
5	☐	☐	unlimited ▼
6	☐	☐	unlimited ▼
7	☐	☐	unlimited ▼
8	☐	☐	unlimited ▼
9	☐	☐	unlimited ▼
10	☐	☐	unlimited ▼

Save   Reset

IGMP Snooping VLAN Configuration

Start from VLAN [1] with [20] entries

Delete	VLAN ID	Snooping Enabled

Add New IGMP VLAN

16. Go to **Configuration > IPMC > IGMP Snooping > Basic Configuration**.

   Under **Global Configuration**, clear the **Unregistered IPMCv4 Flooding Enabled** check box. Select **Leave Proxy Enabled** and **Proxy Enabled**.

   In the **Port Related Configuration** table, clear the **Fast Leave** check box on all the ports. Click **Save**.

17. Go to **Configuration > IPMC > IGMP Snooping > VLAN Configuration**. Click **Add New IGMP VLAN**. A configuration table will appear containing a single row for VLAN 1.

   Select **Snooping Enabled** and **Querier Election**. At **Querier Address**, enter the switch's IP address. At **Compatibility**, select **Forced IGMPv2**.

   At **PRI**, select **0**. At **RV**, enter **2**. At **QI (sec)**, enter **125**. At **QRI (0.1 sec)**, enter **10**. At **URI (sec)**, enter **1**. Click **Save**.

IGMP Snooping VLAN Configuration   Refresh |<<   >>

Start from VLAN [1] with [20] entries per page.

Delete	VLAN ID	Snooping Enabled	Querier Election	Querier Address	Compatibility	PRI	RV	QI (sec)	QRI (0.1 sec)	LLQI (0.1 sec)	URI (sec)
☐	1	☑	☑	192.168.1.25	Forced IGMPv2 ▼	0 ▼	2	125	100	10	1

Add New IGMP VLAN

Save   Reset

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Save Running Configuration to startup-config

Please note: The generation of the configuration file may be time consuming, depending on the amount of non-default configuration.

Save Configuration

18. Go to **Maintenance > Configuration > Save start-up-config**. Click **Save Configuration**. This will save the currently running settings that you have just configured as the switch's startup configuration that it loads whenever it is turned on or rebooted. Generating and saving the configuration file might take several minutes.

19. The configuration of the switch is now complete.

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