



QUORUM

Installation Guide

Version 3.3

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1. Provide a Superior Customer Experience
 - offer the best product quality and support
2. Make Cool Practical Technology
 - develop great products that customers love

Ross has become well known for the Ross Video Code of Ethics. It guides our interactions and empowers our employees. I hope you enjoy reading it below.

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at solutions@rossvideo.com.



David Ross
CEO, Ross Video
david.ross@rossvideo.com

Ross Video Code of Ethics

Any company is the sum total of the people that make things happen. At Ross, our employees are a special group. Our employees truly care about doing a great job and delivering a high quality customer experience every day. This code of ethics hangs on the wall of all Ross Video locations to guide our behavior:

1. We will always act in our customers' best interest.
2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.
9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

Quorum · Installation Guide

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Notice

The material in this manual is furnished for informational use only. It is subject to change without notice and should not be construed as commitment by Ross Video Limited. Ross Video Limited assumes no responsibility or liability for errors or inaccuracies that may appear in this manual.

Important Regulatory and Safety Notices to Service Personnel

Before using this product and any associated equipment, refer to the “**Important Safety Instructions**” listed in the front of this manual to avoid personnel injury and to prevent product damage.

Product may require specific equipment, and/or installation procedures to be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Definitions



Protective Earth: This symbol identifies a Protective Earth (PE) terminal, which is provided for connection of the supply system's protective earth (green or green/yellow) conductor.



Important: This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.



Warning: The symbol with the word “Warning within the equipment manual indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION: The symbol with the word “Caution” within the equipment manual indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



Warning Hazardous Voltages: This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product enclosure that may be of sufficient magnitude to constitute a risk of shock to persons.



ESD Susceptibility: This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

Important Safety Instructions

General Safety Instructions



1. **Warning:** Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with manufacturer's instructions.
8. Do not install near heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. Do not expose this apparatus to dripping or splashing, and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.
15. To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
16. The mains plug of the power supply cord shall remain readily operable.
17. **Warning:** Indoor Use: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

18. The safe operation of this product requires that a protective earth connection be provided. A grounding conductor in the equipment's supply cord provides this protective earth. To reduce the risk of electrical shock to the operator and service personnel, this ground conductor must be connected to an earthed ground.

19.  **Warning:** This apparatus, when equipped with multiple power supplies, can generate high leakage currents. To reduce the risk of electric shock, ensure that each individual supply cord is connected to its own separate branch circuit with an earth connection.

20.  **CAUTION:** These service instructions are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

21. Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after servicing.

22. This product contains safety critical parts, which, if incorrectly replaced, may present a risk of fire or electrical shock. Components contained within the product's power supplies and power supply area are not intended to be customer-serviced and should be returned to the factory for repair.

23. Use only power cords specified for this product and certified for the country of use.

24. The safe operation of this equipment requires that the user heed and adhere to all installation and servicing instruction contained within the equipment's Setup Manuals.

25.  **Warning:** This product includes "Ethernet Ports" which allow this product to be connected to local area networks (LAN). Only connect to networks that remain inside the building. Do not connect to networks that go outside the building.

26. For use at altitude 2000m or lower.

27. For use in non-tropical locations.

28.  **CAUTION:** Do not make mechanical or electrical modifications to the equipment or add metallic items, such as metallic foil labels, to the printed circuit boards. Modifications can impair regulatory compliance, or performance and may void your warranty.

29.  **CAUTION: RISK OF ABNORMAL SUPPLY LOADING:** USB connected accessory loading not to exceed 5 USB unit loads. Each USB unit Load on Rear panel is limited to 250mA max.

30.  **CAUTION:** This apparatus contains a Lithium battery, which if replaced incorrectly, or with an incorrect type, may cause an explosion. Replace only with a CR2032 coin type lithium battery. Dispose of used batteries according to the manufacturer's instruction by qualified service personnel.

EMC Notices

United States of America — FCC Part 15

This equipment has been tested and found to comply with the limits for a class A Digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



Important: Changes or modifications to this equipment not expressly approved by Ross Video Limited could void the user's authority to operate this equipment.

Canada

This Class "A" digital apparatus complies with Canadian ICES-003.

Cet appareil numerique de la classe "A" est conforme a la norme NMB-003 du Canada.

Korea - Class A Statement

이 기기는 업무용 환경에서 사용할 목적으로 적합성 평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

This device has been evaluated for conformity for use in a business environment. When used in a home environment, there is a danger of interference.

Europe

This equipment is in compliance with the essential requirements and other relevant provisions of **CE Directive 93/68/EEC**.

International

This equipment has been tested to **CISPR 32:2015** along with amendment **AMD1:2019**, and found to comply with the limits for a Class A Digital device.



Important: This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.

General Handling Guidelines

- Careful handling, using proper ESD precautions, must be observed.
- Power down the system before PCB removal.

A Word About Static Discharge

Throughout the many procedures in this manual, please observe all static discharge precautions.



CAUTION: Avoid handling the switcher circuit boards in high static environments such as carpeted areas, and when synthetic fiber clothing is worn. Touch the frame to dissipate static charge before removing boards from the frame, and exercise proper grounding precautions when working on circuit boards.

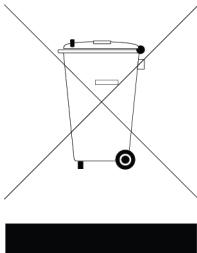
Environmental Information

Waste Electrical and Electronic Equipment Directive (WEEE Directive)

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performances of our products.

Use of Hazardous Substances in Electrical and Electronic Products (China RoHS)

Ross Video Limited has reviewed all components and processes for compliance to:

“Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products” also known as China RoHS.

The “Environmentally Friendly Use Period” (EFUP) and Hazardous Substance Tables have been established for all products. We are currently updating all of our Product Manuals. The Hazardous substances tables are available on our website at: <http://www.rossvideo.com/about-ross/company-profile/green-practices/china-rohs.html>

电器电子产品中有害物质的使用

Ross Video Limited 按照以下的标准对所有组件和流程进行了审查：

“电器电子产品有害物质限制使用管理办法”也被称为中国 RoHS。

所有产品都具有“环保使用期限”(EFUP)和有害物质表。目前，我们正在更新我们所有的产品手册。

有害物质表在我们的网站：

<http://www.rossvideo.com/about-ross/company-profile/green-practices/china-rohs.html>

Power Information

To ensure safe operation and to guard against potential shock or risk of fire, ensure your AC power source for the system is within the required voltage range and frequency.

- Input AC Power Requirements:
 - › 100-127VAC / 15.0-12.0A / 50-60Hz (x2)
 - › 200-240VAC / 8.5-7.0A / 50-60Hz (x2)

Operating Environment

The optimum operating environment is within the following ranges:

- Recommended Operating Temperature: 13°C to 35°C (55°F to 95°F)
- Recommended Operating Humidity: 20% to 80% non-condensing

★ High temperature/humidity should be avoided at all times.

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Introduction

A Word of Thanks

Thank you for choosing Ross Video Quorum as your meeting control solution.

We are committed to providing you with the highest level of customer satisfaction possible. If, for any reason, you have questions or comments, please call Ross Video at +1-613-652-4886 or send us an e-mail at techsupport@rossvideo.com.

We hope that you visit our website www.rossvideo.com to stay up to date with ongoing software releases, join our customer forum and learn more about the complete range of Ross Video products.

Note that software maintenance and extended warranties are available for your system to protect and extend the life of your investment. Our sales team are more than happy to provide further information on the plans available. Members of our sales team promptly respond to e-mails sent to: solutions@rossvideo.com.

Again, thank you for your purchase of a Quorum meeting control solution from Ross Video. We are confident of your future pleasure with your choice.

Yours Sincerely,



Jack Horry
Product Manager
jack.horry@rossvideo.com

About This Guide

This guide contains the following chapters that cover the installation and configuration of Quorum Server software:

1. “**Introduction**” summarizes the guide and explains important terms, conventions, and features.
2. “**System Overview**” provides an overview of Quorum system components and connections.
3. “**Installation Notes**” provides pre-installation instructions for your Quorum system.
4. “**IP Address Configuration**” provides instructions for configuring the IP addresses for the Windows and Linux environments on the server computer in your
5. “**Software Installation**” provides instructions for installing your Quorum software after a system re-image.
6. “**Software Upgrade**” provides instructions for upgrade Quorum Server software.
7. “**Software Licensing**” provides instructions for licensing Quorum Server software.
8. “**Caprica Communication Configuration**” provides instructions to connect your Caprica Server to your Quorum Server to enable Quorum to control the switcher, graphics engine, cameras, and other devices in your meeting control system

If you have questions pertaining to the operation of the Ross Video product, please contact us at the numbers listed in the section “**Contacting Technical Support**” on page 1–3. Our technical staff is always available for consultation, training, or service.

Documentation Conventions

This guide uses special text formats to identify parts of the user interface, text that a user must enter, or a sequence of menus and submenus that a user must follow to reach a particular command.

Interface Elements

Bold text identifies a user interface element such as a dialog box, a menu item, or a button. For example:

In the **Media Manager Client**, click **Channel 1** the **Channels** section.

User Entered Text

Courier text identifies text that a user must enter. For example:

In the **File Name** box, enter `Channel01.property`.

Referenced Guides

Italic text identifies the titles of referenced guides, manuals, or documents. For example:

For more information, refer to the section “**Twitter Configuration**” on page 3–6 in the ***Quorum User Guide***.

Menu Sequences

Menu arrows identify a sequence of menu items that a user must follow to reach a particular command. For example: if a procedure step contains “**Server > Save As**,” a user should click the **Server** menu and then click **Save As**.

Important Instructions

Star icons identify important instructions or features. For example:

★ After installing Quorum Server software, you must obtain Quorum feature licenses from Ross Video Technical Support before users can access Quorum features.

Getting Help

To access the Quorum Server Online Help system, click the  **Help** icon in the main toolbar. For help about the currently open panel, click the  **Help** button in a panel title bar to view a help topic about the panel.

The Online Help system contains the following navigation tabs to locate and access Online Help topics:

- **Contents** — table of contents
- **Search** — full text search
- **Favorites** — preferred information storage and access

Ross Video also supplies print-ready PDF files of the *Quorum Server Installation Guide*, *Quorum Server Configuration Guide*, and the *Quorum User Guides* on the Quorum Server Software Installation DVD.

The Quorum Online Help system contains information about how to configure various aspects of your Quorum application. There are two separate Quorum Online Help systems; one for the Configuration interface, and one for the User interface.

Contacting Technical Support

Technical Support is staffed by a team of experienced specialists ready to assist you with any question or technical issue.

Ross Video has technical support specialists strategically located around the globe to ensure a prompt response to technical inquiries. Our primary technical support center is located in Ottawa, Ontario, Canada. In addition, we have offices in The United Kingdom (London), Australia (Sydney), and Singapore with satellite locations in New York City, The Netherlands, and China. As we expand our presence globally, we are constantly evaluating other key locations to have a local technical support specialist in order to better service our customers.

North America

Our North America center located in Ottawa, Ontario, Canada and is open Monday to Friday 8:30 a.m. to 6:00 p.m. EST, with 24/7/365 on-call service after hours.

Our telephone number is: +1-613-686-1557

Toll free within North America: +1 833-859-0499

EMEA

Our EMEA center is open Monday to Friday 8:30 a.m. to 5:00 p.m. GMT. After hours support is provided by our North America location.

Our telephone number is: +44 (0)1189502446

International toll free: +800 3540 3545

If the local support specialist is not available, your call will be transferred automatically to our North America center.

Australia

Our Sydney, Australia office is located in Alexandria, NSW.

Our local support telephone number is: 1300 007 677

If the local support specialist is not available, your call will be transferred automatically to our North America center.

Online

E-mail: techsupport@rossvideo.com

Website: open a support request using the link <https://support.rossvideo.com/> to open a support request.

System Overview

Quorum is an automation system that controls your switcher, graphics engine, cameras, and microphones through a web browser to help simplify the production of meeting broadcasts.

This chapter discusses the following topics:

- Quorum System Connections
- Quorum Server Computer

Quorum System Connections

Quorum is installed on a server computer in your facility and accessed through a web browser. To control all the devices in your meeting broadcast system, Quorum uses the following Ross Video software products:

- **Caprica** — controls the switcher, graphics engine, and camera devices.
- **Media IO** — routes the MultiViewer feed from the switcher to the Quorum user interface.
- **XPression Datalinq** — communicates with the Quorum Server to send graphic data used by the XPression graphics engine.

Quorum, Caprica, and Media IO software are all installed on the Quorum Server computer. The following diagram (Figure 2.1) shows the interaction between the hardware and software parts of a Quorum system.

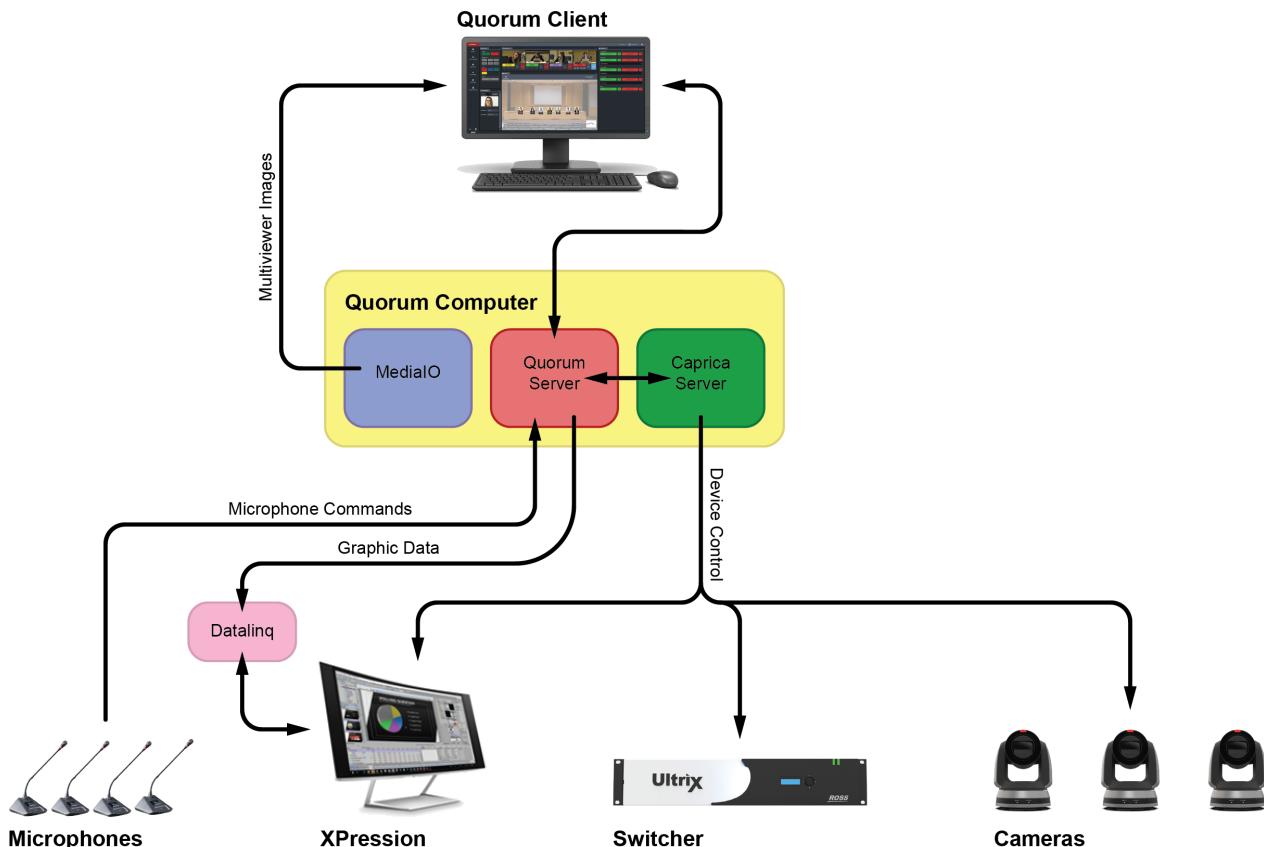


Figure 2.1 Quorum Systems Connections

Quorum Server Computer

The Quorum Server computer is the hub of your Quorum system. Quorum, Caprica, and Media IO software all run on the Quorum Server computer.

Front Panel

The power button and the LED status indicator are the main controls on the Quorum Server computer front panel (**Figure 2.2**).

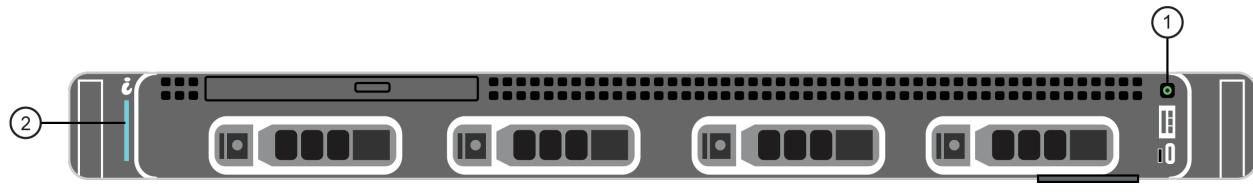


Figure 2.2 Quorum Server — Front Panel (Door Removed)

1) Power Button

2) LED Status Indicator

1. Power Button

The main power button for the Quorum server.

2. LED Status Indicator

Indicates the system health and system ID status. LED status indicator can display the following codes:

- › **Solid Blue** — system is powered on, the system is healthy, and the system ID mode is not active.
- › **Blinking Blue** — system is powered on, the system is healthy, and the system ID mode is active.
- › **Solid Amber** — system is in fail-safe mode.
- › **Blinking Amber** — system is experiencing an error.

Back Panel

The Quorum Server computer back panel contains the power, network, and monitor connections (**Figure 2.3**).

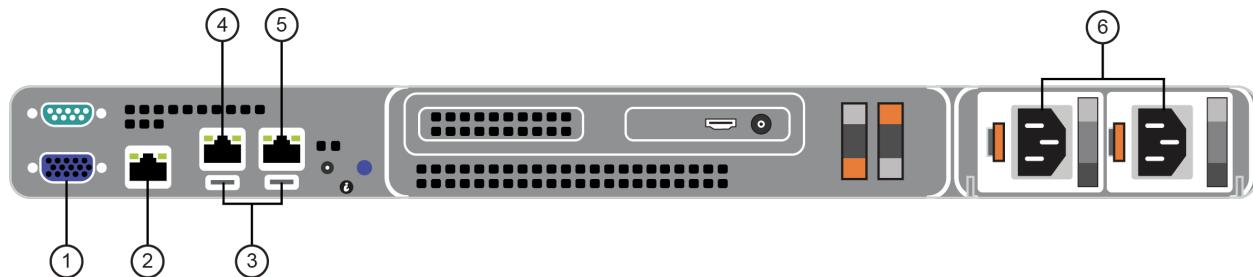


Figure 2.3 Quorum Server — Back Panel

1) VGA Port

2) iDRAC9 Port

3) USB 3.0 Ports

4) 1 GigE Ethernet Port

5) 2 GigE Ethernet Port

6) AC Power Connections

1. VGA Port

Connects to a monitor to the Quorum Server computer using a VGA cable.

2. iDRAC9 Port

Quorum does not use this port.

3. USB 3.0 Ports

Connects USB devices to the Quorum Server computer. You can connect the included USB-C to Display Port adapter to connect a monitor to these USB 3.0 ports.

4. 1 GigE Ethernet Port

Connects the Quorum Server computer to the local area network using an Ethernet cable. This Ethernet port has a maximum throughput one Gbps (Gigabits per second).

5. 2 GigE Ethernet Port

Connects the Quorum Server computer to the local area network using an Ethernet cable. This Ethernet port has a maximum throughput two Gbps (Gigabits per second).

6. AC Power Ports

Connects the Quorum Server computer to the mains power using AC power cords.

Installation Notes

This chapter provides information about the general requirements of a Quorum system. The following topics are discussed in this chapter:

- Switcher and Caprica Software Compatibility
- Computer System Requirements
- Ports
- Processes

Switcher and Caprica Software Compatibility

To ensure the proper function of a Quorum system, the version of software installed on the switcher and the installed version of Caprica must be compatible with the installed Quorum software. Quorum 3.3 software is compatible with the following versions of switcher and Caprica software:

Table 3.1 Quorum 3.3 Switcher and Caprica Software Compatibility

Acuity	v9.2 or greater
Ultron Acuity	v10.1b or greater
Carbonite Black	v13.0.6 or greater
Carbonite Ultra	v4.0 or greater
Ultron Carbonite	v6.0.0 or greater
Graphite	v4.0 or greater
Caprica	v7.2h or greater

Computer System Requirements

To ensure the proper function of a Quorum system, verify that the Quorum Server computer meets the requirements described in the following sections:

Server Hardware

Ross Video recommends the following minimum computer hardware configuration to run Quorum software:

Table 3.2 Dell R350 PowerEdge Quorum Server Specifications

CPU	Intel® Xeon®
RAM	32GB
Storage	2 x 480GB Hot-plug AG Drive
RAID Controller	PERC H355
LAN	1Gb
Power Supply	Dual, Hot-Plug, Redundant Power Supply (1+1), 600W
Operating System	Windows 2022 Server 64-bit
Trusted Platform Module	TPM 2.0 V3

Operating System

Ross Video recommends the following minimum operating systems for Quorum Server and Client computers:

Table 3.3 Quorum Computer Software

Server	Microsoft® Windows Server 2019 or 2022 with the latest patches. Windows Server 2022 is recommended.
Client	Microsoft® Windows® 10 or 11 64 bit with the latest patches. Windows 11 is recommended.

- ★ Ensure that the operating system is updated with all necessary security patches and service packs before installing Quorum software on a computer.

Web Browser

Quorum can be accessed using one of the following web browsers:

- Microsoft Edge version 100 or greater
- Google Chrome™ browser version 100 or greater
- Mozilla Firefox® version 100 or greater
- Apple Safari® version 16 or greater

Ports

As part of the Quorum Server software installation process, the installer automatically creates the required firewall exceptions locally for the ports that Quorum uses to communicate with Quorum clients and MOS devices.

★ If an external firewall separates your Quorum Server from your Quorum clients and MOS devices, you may need to update the port exceptions on your external firewall to enable communication with the Quorum Server.

Quorum

The information provided in the following table lists the ports used by Quorum:

Table 3.4 Quorum Ports

Application	Port	Purpose	Set By	Connection
Quorum	80	Quorum Jetty server (unsecured)	Internal	Quorum client to the Quorum Server
	443	SSL for Jetty server	Internal	Quorum client to the Quorum Server
MariaDB	3306	MariaDB database	Internal	Quorum Server and client to computer running MariaDB database
Ross Product Manager	3030	Licensing	Internal	Quorum Server to Ross Product Manager
	8443	SSL for Licensing	Internal	Quorum Server to Ross Product Manager
Datalinq	2222	XPression Datalinq	Internal	XPression to Quorum Server
Bosch	443	Bosch microphone system	Internal	Microphone system to Quorum Server
Shure	3142	Shure microphone system	Internal	Microphone system to Quorum Server
BiAmp	2300	BiAmp microphone system	Internal	Microphone system to Quorum Server
Taiden	7370	Taiden microphone system	Internal	Microphone system to Quorum Server

Caprica

The information provided in the following table lists the ports used by Caprica:

Table 3.5 Caprica Ports

Application	Port	Purpose	Set By	Connection
Caprica	22	SSH	Internal	Caprica Servers
	973	rsync	Internal	Caprica Servers
	5253	Dashboard OGP Interface	Internal	Dashboard Clients and Caprica Servers
	5404	Cluster / Corosync	Internal	Caprica Servers
	5405	Cluster / Corosync	Internal	Caprica Servers
	5406	Cluster / Corosync	Internal	Caprica Servers
	5901	VNC	Internal	Caprica Servers
	8080	Vintage Caprica web page	Internal	Caprica Servers and external users
	9090	Caprica web page	Internal	Caprica Servers and external users
	12345	Caprica port	User	Quorum Server to Caprica Server
Devices	Any	Port defined during configuration	User	Caprica Servers and devices

Processes

The information provided in the following table lists the Quorum processes that run on Client and Server computers in a Quorum system:

Table 3.6 Quorum System Processes

Process	Quorum Server	Client
Quorum Server service	Yes	No
Quorum Jetty service	Yes	Optional †
MariaDB database	Yes	No
Web Browser	Optional *	Yes

* Development environment

† Multiple NRCS configuration

IP Address Configuration

This chapter provides instructions for configuring the IP addresses in the Windows and Linux environments of the server computer in your Quorum system. The procedures in this chapter apply to Quorum Server server computers supplied by Ross Video. IP address configuration on customer supplied server computers may differ from the procedures in this chapter.

★ If you are in doubt about configuring the IP addresses for your Quorum system, please contact Ross Video Technical Support for assistance.

The following topics are discussed in this chapter:

- Set the Windows Server IP Address
- Set the Caprica VM (Hyper -V) IP Address

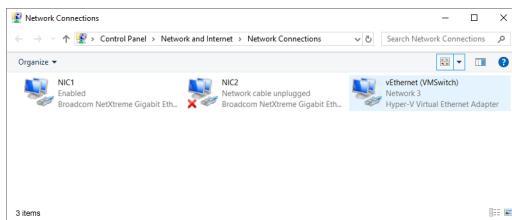
Set the Windows Server IP Address

Set the IP address for your Quorum Server in your network.

To set the Windows server IP address

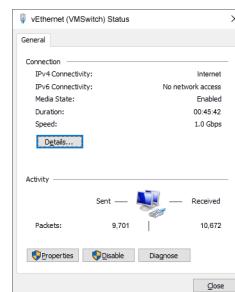
1. Use the following credentials to log in to the Quorum Server computer.
 - **User:** `quorum`
 - **Password:** `<your_password>`
2. Open the **Control Panel**.
3. In the **Control Panel** click **Network and Internet**.
4. In the **Network and Internet** panel click **Network and Sharing Center**.
5. In the left hand list of the **Network and Sharing Center** panel click **Change adapter settings**.

The **Network Connections** window opens.



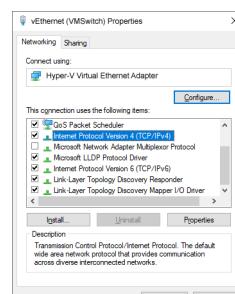
6. Double click the **vEthernet (VMswitch)** network.

The **vEthernet (VMswitch) Status** dialog box opens.



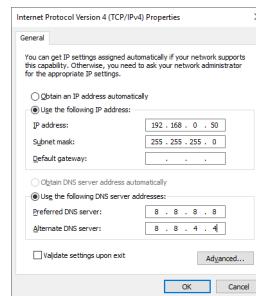
7. Click **Properties**.

The **vEthernet (VMswitch) Properties** dialog box opens.



8. Select **Internet Protocol Version 4 (TCP/IPv4)**.
9. Click **Properties**.

The **Internet Protocol Version 4 (TCP/IPv4)** Properties dialog box opens.



10. Select the **Use the following IP address** option.
11. In **Use the following IP address** section, enter the IP address settings for your Quorum server.
12. Select the **Use the following DNS server addresses** option.
13. In **Use the following DNS server addresses** section, enter the IP addresses for your DNS server.
14. Click **OK**.

The **Internet Protocol Version 4 (TCP/IPv4) Properties** dialog box closes.

15. Close the **vEthernet (VMSwitch) Properties** dialog box.
16. Close the remaining open dialog boxes and windows.

Set the Caprica VM (Hyper -V) IP Address

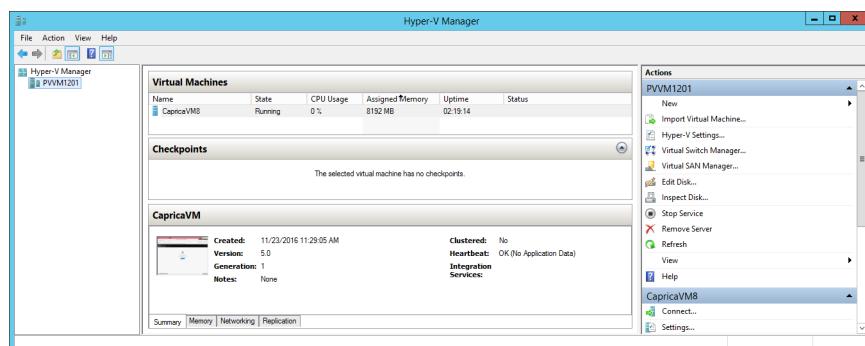
Set the IP address for your Caprica VM (Hyper-V) in your network.

★ If you are setting up a Redundant Caprica system, refer to the “**Redundant Caprica System**” chapter in the *Caprica User Guide*.

To set the Caprica VM (Hyper -V) IP address

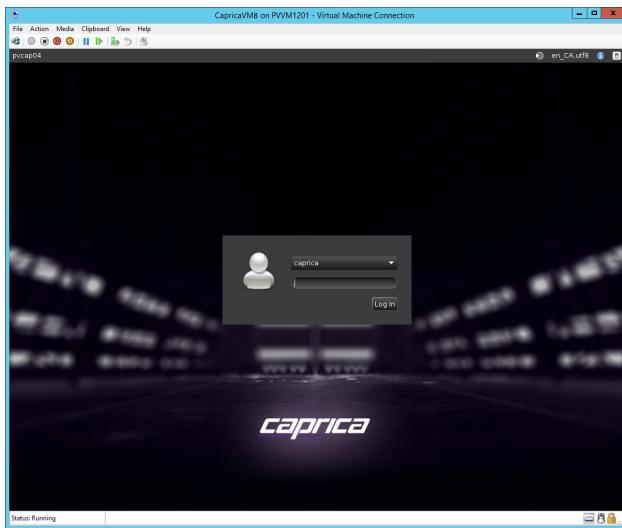
1. Use the following credentials to log in to the Quorum Server computer that hosts your Caprica Server in Hyper-V:
 - **User:** `quorum`
 - **Password:** `<your_password>`
2. Use the **Start** menu to select **Hyper-V Manager**.

The **Hyper-V Manager** window opens.



3. In the **Virtual Machines** section, double-click **CapricaVM8**.

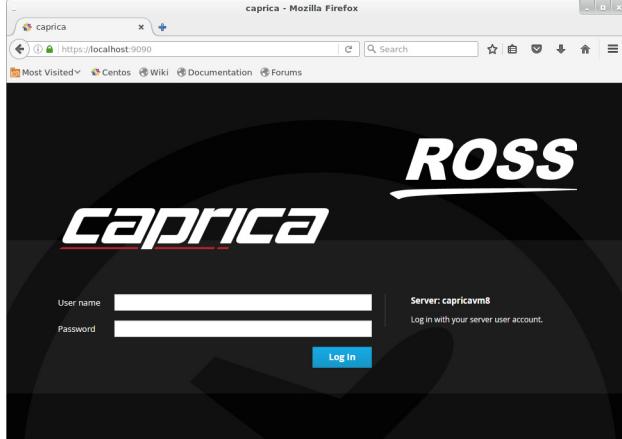
The **Hyper-V Manager** window opens.



4. Use the following credentials to log in to the Caprica Server.
 - **User:** caprica
 - **Password:** <your_password>
5. Use a web browser to open the **Caprica** web page at the following URL:

<https://localhost:9090>

The **Caprica Login** web page opens.

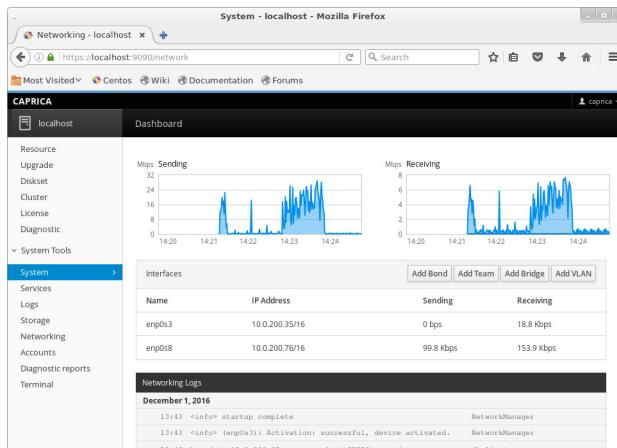


6. Use the following credentials to log in to the Caprica web page:
 - **User:** caprica
 - **Password:** <your_password>
7. Click **Log In**.

The **Caprica** web page opens.

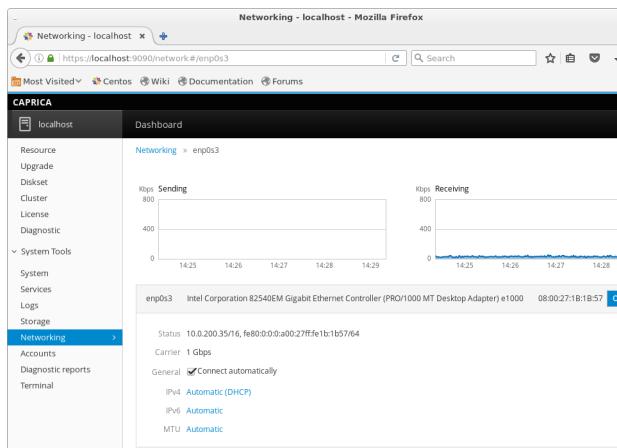
8. In the tree view, expand the **System Tools** node.
9. Click **Networking**.

The **Networking** web page opens.



10. In the **Interface** section, click the first NIC in the list of available network interfaces.

A panel opens for the selected NIC.



11. In the **IPv4** field, click the current setting.

The **IPv4 Settings** dialog box opens.

12. Use the **Addresses** list to select **Manual**.
13. In the **Address** box, enter a static IP address for NIC 1 of your Caprica Server.
14. In the **Prefix length or Netmask** box, enter the network mask for NIC 1 of your Caprica Server.
15. In the **Gateway** box, enter the gateway for NIC 1 of your Caprica Server.
16. Click **Apply**.

The **IPv4** field displays the set IP address for NIC 1 of the your Caprica Server.

Software Installation

This chapter provides instructions for installing Quorum software on a Quorum Server computer for the first time or after a system re-image.

This chapter discusses the following topics:

- Before You Install Software
- Installing Quorum Database Software
- Installing Quorum Server Software
- Tuning the Quorum Server for Performance
- After You Install Quorum Server Software

Before You Install Software

Before you install Quorum version 3.3 software on the Quorum Server in your Quorum system, you must prepare your Quorum system for the new Quorum software.

★ After installing Quorum Server software, you must obtain Quorum feature licenses from Ross Video Technical Support before users can access Quorum features.

To prepare your Quorum system for Quorum version 3.3

1. Configure the IP addresses for your server computer.
2. Contact Ross Video Technical Support to obtain the following software installers for Quorum version 3.3:
 - Quorum v3.3
 - Caprica-Quorum v3.3
 - Ross Platform Manager (latest version)
 - Media I/O (latest version)
 - MariaDB 11.4.4
3. Verify that the Quorum Server computer hostname only contains the uppercase or lowercase ASCII letters “A” through “Z”, the digits “0” through “9”, or the hyphen character (“-”). No other symbols, punctuation characters, or white space are permitted.
4. Update Quorum Server and Client computers with the latest Windows® updates recommend by your Network Administrator.
5. Exit all other Windows® programs currently running on the Quorum Server computer.
6. Temporarily disable antivirus software running on the Quorum Server computer. Some heuristic-based intrusion detection systems prevent the installation of Quorum software. Re-enable antivirus software after installing Quorum software.

Installing Quorum Database Software

Quorum uses the MariaDB database to store and manage application data. Only the initial installation or recovery installations of Quorum Server software on a computer require the installation of the MariaDB database software.

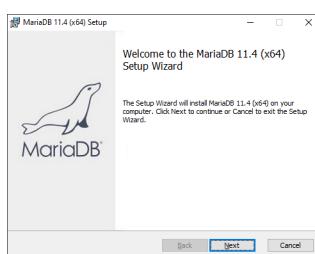
★ You must install and configure MariaDB database software on the Quorum Server computer before installing Quorum Server software on the computer.

Upgrading Quorum Server software to a new version does not require a re-installation of the MariaDB database software. For the complete upgrade procedure, refer to the chapter “**Software Upgrade**” on page 6–1.

To install MariaDB database software for an initial install of Quorum software

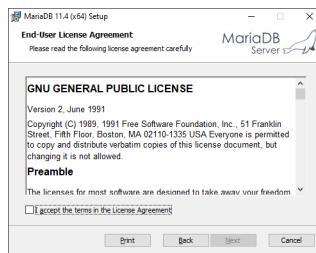
1. On the Quorum Server computer, exit all currently running Windows® applications.
2. Locate the MariaDB database software installer, **mariadb-11.4.4-winx64.msi**, that you obtained from Ross Video Technical Support.
3. Double-click the **mariadb-11.4.4-winx64.msi** icon.

The **Setup** wizard opens.



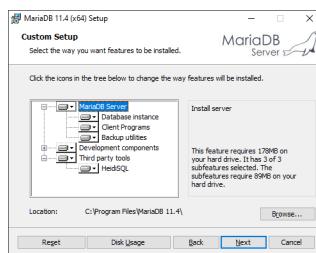
4. Click **Next**.

The **End-User License Agreement** screen opens.



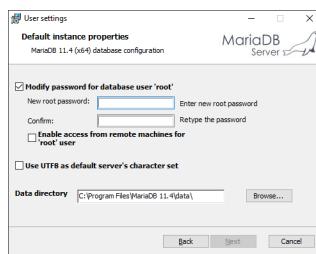
5. Read the **GNU GENERAL PUBLIC LICENSE**.
6. Select the **I accept the terms of the license agreement** check box.
7. Click **Next**.

The **Custom Setup** screen opens.



8. Click **Next**.

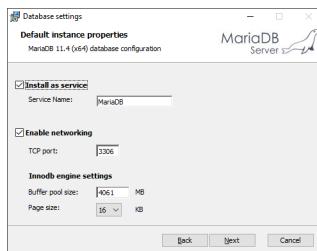
The **Default instance properties** screen opens.



9. Select the **Modify password for database user 'root'** check box.
10. In the **Password** box, enter a password that meets the password security requirements set by your organization. Record the entered password to replace the password `mariadb` with your password when installing, reinstalling, or upgrading Quorum Server software.
11. In the **Confirm** box, enter the same password as entered in the **Password** box.
12. Record the **root** user **password** in a safe place.
13. Select the **Enable access from remote machines for 'root' user** check box.

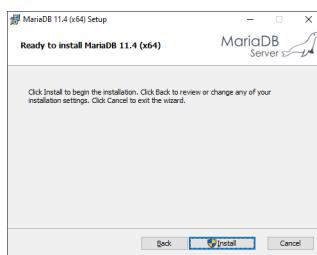
14. Click Next.

The second **Default instance properties** screen opens.



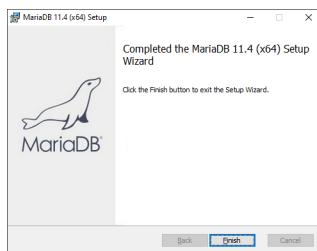
15. Click Next.

The **Ready to Install** screen opens.

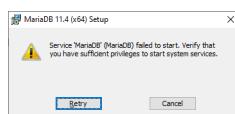


16. Click Install.

The **Installing MariaDB 11.4 (x64)** screen opens. A progress bar displays the installation status. After the installer finishes installing the required files, the **Completed the MariaDB 11.4 (x64) Setup Wizard** screen opens.



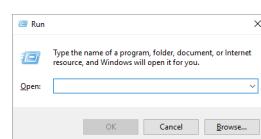
When the **Setup** wizard cannot start the **MariaDB** service, it displays the following alert:



Follow these steps to continue the MariaDB installation:

a. From the Windows Desktop, press **Windows Key R.**

The **Run** dialog box opens.

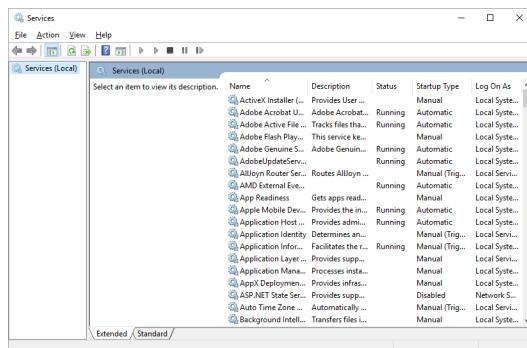


b. In the **Open box, type the following application name:**

`services.msc`

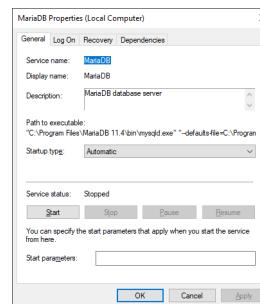
c. Click **OK**.

The **Services** window opens.



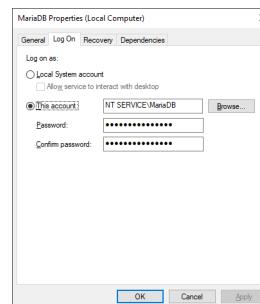
d. In the **Services** list, locate the **MariaDB** service.
e. Right-click the **MariaDB** service and select **Properties** from the shortcut menu.

The **MariaDB** dialog box opens.



f. Click the **Log On** tab.

The **Log On** tab opens.



g. Select the **Local System Account** option.

h. Click **OK**.

The **MariaDB** dialog box closes.

i. In the **Services** window, click **Restart** for the **MariaDB** service.
j. Use the **File** menu to select **Exit**.

The **Services** window closes.

k. In the open **alert**, click **Retry**.

17. Click **Finish**.

The **Setup** wizard closes.

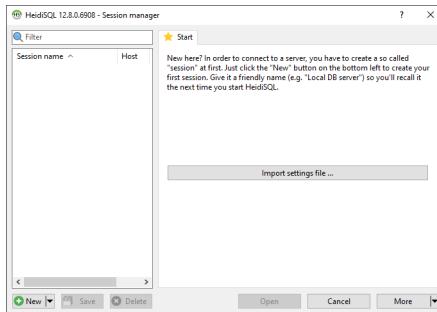
Quorum Database

You must create a MariaDB database named “quorum” before you install Quorum Server software.

To create the database for Quorum

1. From the Windows Desktop, use the **Windows** menu to select **All Programs > MariaDB 11.4 (x64) > HeidiSQL**.

The **HeidiSQL Session Manager** window opens.



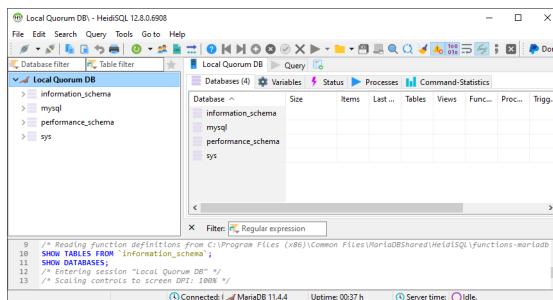
The first time you open HeidiSQL, you must create a session to connect to the MariaDB Server. Complete the following steps to create a MariaDB Server session:

- a. In the **Session name** column, right-click the **Unnamed** session name and select **Rename** from the shortcut menu.
- b. Enter a name that describes the session, for example: **Local Quorum DB**.
- c. In the **Password** box of the **Settings** tab, enter the **password** that was set in step 10 of the “**To install MariaDB database software for an initial install of Quorum software**” on page 5–2.
- d. Click **Save**.

The Session Manager saves the defined session.

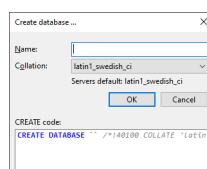
2. In the **Session name** column, select the session to connect to the MariaDB Server.
3. Click **Open**.

The **HeidiSQL Session Manager** window closes, and the **Session** window opens.



4. In the **Object Browser** tree view, right-click the **session name** and select **Create new > Database** from the shortcut menu.

The **Create database** dialog box opens.



5. In the **Name** box, enter the following name:

quorum

6. Click **OK**.

The **Create database** dialog box closes, and **HeidiSQL** adds the **quorum** database to the **Object Browser** tree view.

7. In the **Session** window, use the **File** menu to select **Exit**.

The **Session** window closes.

Installing Quorum Server Software

After installing and configuring the MariaDB database software on the Quorum Server computer, you can install the Quorum Server software.

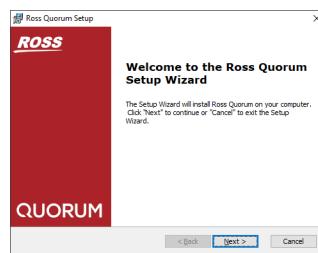
- ★ After installing Quorum Server software, you must obtain Quorum feature licenses from Ross Video Technical Support before users can access Quorum features.

To install Quorum Server software

1. On the Quorum Server computer, exit all currently running Windows® applications.
2. Temporarily disable antivirus software running on the Quorum Server computer.
Some heuristic-based intrusion detection systems prevent the installation of Quorum software.
3. Locate the QuorumServer software installer, **Quorum-3.3.x-xxx-xxx.msi**, that you obtained from Ross Video Technical Support.
4. Double-click **Quorum-3.3.x-xxx-xxx.msi**.

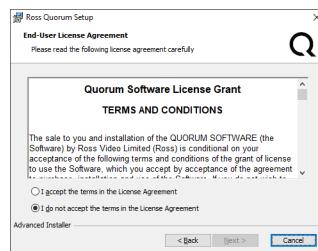
If a **Security Warning** message displays, click **Run**.

The **Ross Quorum Setup** wizard opens.



5. Click **Next**.

The **End-User License Agreement** screen opens.

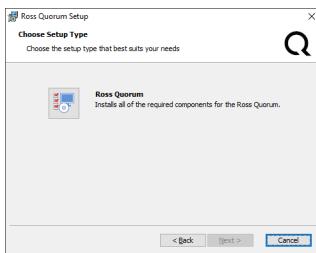


6. Read the **Quorum Software License Grant**.

7. Select the **I accept the terms of the license agreement** option.

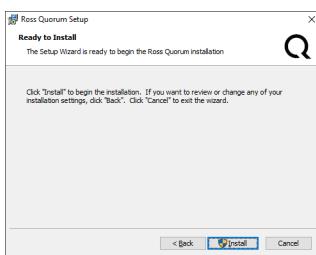
8. Click **Next**.

The **Choose Setup Type** screen opens.



9. Click the **Ross Quorum** icon.

The **Ready to Install** screen opens.



10. Click **Install**.

After installation of the Quorum Server is complete, the **Installation Complete** screen opens.



11. Click **Finish**.

The **Ross Quorum Setup** wizard closes and adds the **Ross Quorum** icon to the Desktop. The Quorum Server starts automatically after the installation of the Quorum Server software.

12. Re-enable antivirus software.

Tuning the Quorum Server for Performance

The goal of Quorum Server tuning is to maximize use of system resources to perform work as efficiently and rapidly as possible. The installation or upgrade of Quorum Server software configures the Quorum Server to manage work efficiently, but it is possible to greatly improve performance by tuning the values of a few key Quorum Server settings.

The Quorum Server saves configuration settings in the jvm.conf file. The settings to tune are as follows:

- **wrapper.java.initmemory** — sets the initial java heap size for the Quorum Server.
- **wrapper.java.maxmemory** — sets the maximum java heap size for the Quorum Server.

★ You must retune Quorum Server settings after each install or upgrade of Quorum Server software.

To tune Quorum Server settings in the **jvm.conf file:**

1. On the Quorum Server computer, locate the **jvm.conf** file in the following folder.

C:\Program Files\Ross Video\Quorum\configuration

2. Use a text editor to open and edit the **jvm.conf** file.

3. In the **jvm.conf** file, locate the following setting:

wrapper.java.initmemory

4. Replace the default memory value for the **wrapper.java.initmemory** setting with a tuned value. The tuned value for **wrapper.java.initmemory** depends on the software running on your Quorum Server computer and the amount of RAM installed in the computer. Use the following table to set the **wrapper.java.initmemory** value for your Quorum system:

	System RAM					
	2 GB	4 GB	8 GB	12 GB	16 GB	32 GB
Quorum Server & Database	256	512	1024	1536	2048	4096
Dedicated Quorum Server	1024	2048	4096	6144	8192	16384

5. Locate the following setting:

wrapper.java.maxmemory

6. Replace the default memory value for the **wrapper.java.maxmemory** setting with a tuned value. The tuned value for **wrapper.java.maxmemory** depends on the software running on your Quorum Server computer and the amount of RAM installed in the computer. Use the following table to set the **wrapper.java.maxmemory** value for your Quorum system:

	System RAM					
	2 GB	4 GB	8 GB	12 GB	16 GB	32 GB
Quorum Server & Database	512	1024	2048	3072	4096	8192
Dedicated Quorum Server	1536	3072	6147	9216	12288	24576

7. Save the updated **jvm.conf** file and exit the text editor.

8. Restart the Quorum service as follows:

- From the Windows Desktop, press **Windows Key R**.
- In the **Open** box, type **services.msc**.
- Click **OK**.
- In the **Services** list, locate and select the **Ross Quorum** service.
- Click **Restart** for the **Ross Quorum** service.
- Use the **File** menu to select **Exit**.

After You Install Quorum Server Software

After successfully installing Quorum Server software, perform the following tasks:

- Re-boot the Quorum Server computer.
- Read the ***Quorum Software Release Notes*** document in the `C:\program files\Ross Video\RossQuorum` folder.
- Obtain a license activation key from Ross Video Technical Support for Quorum features.
- Activate your Quorum product key in Ross Platform Manager.

For More Information on...

- licensing Quorum Server software, refer to chapter “**Software Licensing**” on page 7–1.

Software Upgrade

This chapter provides instructions for upgrading Quorum Server software on the Quorum Server computer to latest version of Quorum Server software.

This chapter discusses the following topics:

- Before You Upgrade Software
- Upgrade to the Latest Quorum Server Software

Before You Upgrade Software

Before you upgrade software on a Quorum Server in your Quorum system, you must prepare your Quorum system for the new Quorum software.

★ After upgrading Quorum Server software, you must also update your Quorum feature licenses.

To prepare your Quorum system for Quorum version 3.3

1. When upgrading Quorum Server software before version 3.1, Contact Ross Video Technical Support to migrate your Quorum Server data to a MariaDB database.
2. Contact Ross Video Technical Support to obtain the following software installers for Quorum version 3.3:
 - Quorum v3.3
 - Caprica-Quorum v3.3
 - Media I/O (latest version)
3. Use **Add/Remove Programs** control panel to remove any existing versions of Quorum Server software.
4. Verify that the Quorum Server computer hostname only contains the uppercase or lowercase ASCII letters “A” through “Z”, the digits “0” through “9”, or the hyphen character (“-”). No other symbols, punctuation characters, or white space are permitted.
5. Update Quorum Server and Client computers with the latest Windows® updates recommend by your Network Administrator.
6. Exit all other Windows® programs currently running on the Quorum Server computer.
7. Temporarily disable antivirus software running on the Quorum Server computer. Some heuristic-based intrusion detection systems prevent the installation of Quorum software. Re-enable antivirus software after installing Quorum software.

Upgrade to the Latest Quorum Server Software

This section provides instructions for upgrading Quorum Server software on the Quorum Server computer to Quorum Server software version 3.3.

★ When upgrading Quorum Server software, do not uninstall the Quorum database. Quorum Server software upgrade procedures only require the uninstall of the previous version of Quorum Server software.

★ Performance tuned Quorum Server settings must be retuned after a Quorum Server software upgrade.

To upgrade Quorum Server software to version 3.3

1. Use **Add/Remove Programs** on the **Control Panel** to remove the currently installed version of Quorum Server software from the Quorum Server computer.
2. Restart the Quorum Server computer.
3. After the Quorum Server computer restarts, log into the Quorum Server computer.
4. Locate the Quorum Server software installer, **Quorum-3.3.x-xxx-xxx.msi**, that you obtained from Ross Video Technical Support.
5. Double-click **Quorum-3.3.x-xxx-xxx.msi** to run the **Ross Quorum Setup** wizard.
For the complete installation procedure, refer to the chapter “**Software Installation**” on page 5–1.
6. Retune Quorum Server settings by completing the procedure “**To tune Quorum Server settings in the *jvm.conf* file:**” on page 5–9.
7. Update your Quorum product key in **Ross Platform Manager**.

For More Information on...

- updating a Quorum Server license key, refer to chapter “**Software Licensing**” on page 7–1.

Software Licensing

Ross Video uses a product key and feature license keys to control user access to Quorum features. You can obtain a Quorum product key from Ross Video Technical Support. This chapter provides instructions for licensing a Quorum Server.

- ★ When a Quorum Server computer has multiple active network adapters (wireless, wired, or multiple NIC cards), disabling an adapter after licensing the Quorum Server may invalidate your Quorum product key. To re-license your Quorum Server, restart the server and reactivate the product key.

This chapter discusses the following topics:

- Ross Platform Manager Setup
- Activate Quorum Product Keys
- License Your Quorum Software

Ross Platform Manager Setup

Complete the following sections to initially set up Ross Platform Manager for a Quorum system.

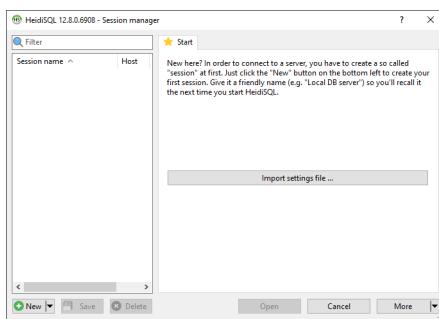
Create the Ross Platform Manager Database

You must create a MariaDB database named “platform_manager” before you install Ross Platform Manager software on the Ross Platform Manager computer in your Quorum system.

To create the Ross Licensing Service database

1. From the Windows Desktop, use the **Windows** menu to select **All Programs > MariaDB 11.4 (x64) > HeidiSQL**.

The **HeidiSQL Session Manager** window opens.



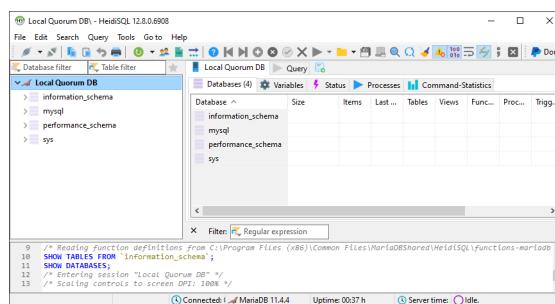
The first time you open HeidiSQL, you must create a session to connect to the MariaDB Server. Complete the following steps to create a MariaDB Server session:

- a. In the **Session name** column, right-click the **Unnamed** session name and select **Rename** from the shortcut menu.
- b. Enter a name that describes the session, for example: **Local Quorum DB**.
- c. In the **Password** box of the **Settings** tab, enter the **password** that was set in step 10 of the “**To install MariaDB database software for an initial install of Quorum software**” on page 5–2.
- d. Click **Save**.

The Session Manager saves the defined session.

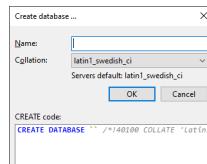
2. In the **Session name** column, select the session to connect to the MariaDB Server.
3. Click **Open**.

The **HeidiSQL Session Manager** window closes, and the **Session** window opens.



4. In the **Object Browser** tree view, right-click the **session name** and select **Create new > Database** from the shortcut menu.

The **Create database** dialog box opens.



5. In the **Name** box, enter the following name:

platform_manager

6. Click **OK**.

The **Create database** dialog box closes, and **HeidiSQL** adds the **quorum** database to the **Object Browser** tree view.

7. In the **Session** window, use the **File** menu to select **Exit**.

The **Session** window closes.

Install Ross Platform Manager

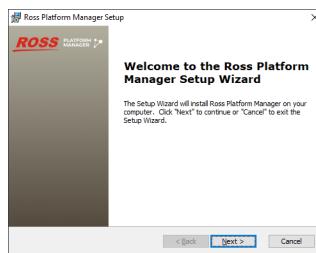
After you create the platform_manager database, you can install Ross Platform Manager to manage your Quorum product keys.

To install Ross Platform Manager software

1. Contact Ross Video Technical Support to obtain the most recent **Ross Platform Manager** software installer.
2. On the **Ross Platform Manager** computer, exit all currently running Windows® applications.
3. Temporarily disable antivirus software running on the Ross Platform Manager computer.
Some heuristic-based intrusion detection systems prevent the installation of Ross Platform Manager software.
4. Copy the **Ross Platform Manager** software installer obtained from Ross Video Technical Support to your Ross Platform Manager Server computer.
5. Navigate to the folder where you copied the Ross Platform Manager software installer.
6. Double-click **PlatformManager-X.X.X-XXXX.XX.XX-XX.XX.msi**.

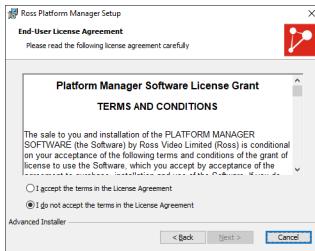
If a **Security Warning** message displays, click **Run**.

The **Ross Platform Manager Setup** wizard opens.



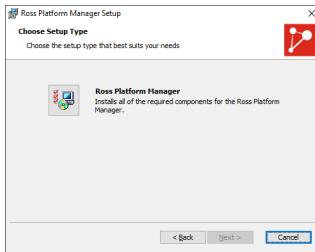
7. Click **Next**.

The **End-User License Agreement** screen opens.



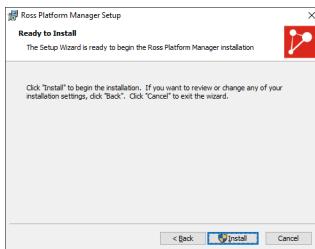
8. Read the **Platform Manager Software License Grant**.
9. Select the **I accept the terms of the License Agreement** option.
10. Click **Next**.

The **Choose Setup Type** screen opens.



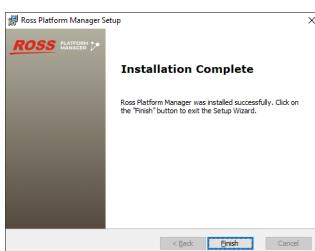
11. Click the **Ross Platform Manager** icon.

The **Ready to Install** screen opens.



12. Click **Install**.

After the Ross Platform Manager installation completes, the **Installation Complete** screen opens.



13. Click **Finish**.

The **Ross Platform Manager Setup** wizard closes and adds the **Ross Platform Manager** icon to the Desktop. Ross Platform Manager Server starts automatically after the installation of the Ross Platform Manager software.

14. Re-enable antivirus software.

Configure the Ross Platform Manager Port Number

Before you can run Ross Platform Manager in your Quorum system, you must configure Ross Platform Manager to run on port number 3030 or the port number on which you ran Horizon.

To run Ross Platform Manager port number 3030

1. On the Ross Platform Manager Server computer, locate the **http.conf** file in the following folder.

`C:\Program Files\Ross Video\RossPlatformManager\configuration`

2. As an administrator use a text editor to open and edit the **http.conf** file.

3. In the **http.conf** file, locate the following setting:

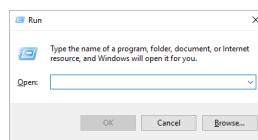
```
wrapper.java.additional.41=-Dorg.eclipse.equinox.http.jetty.http.port=80
```

4. Replace **80** with **3030** or the port number on which your Quorum Licensing Service ran.

5. Save the updated **http.conf** file and exit the text editor.

6. From the Windows Desktop, press **Windows Key+R**.

The **Run** dialog box opens.

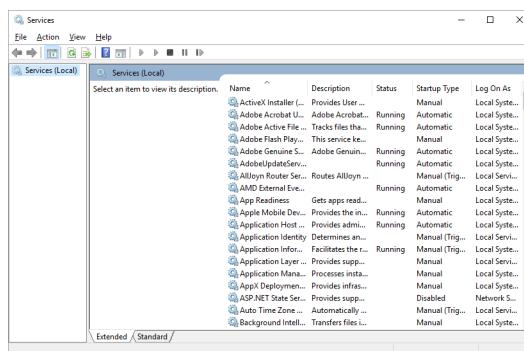


7. In the **Open** box, type the following application name:

`services.msc`

8. Click **OK**.

The **Services** window opens.



1. In the **Services** list, locate and select the **Ross Platform Manager** service.

2. Click **Restart** for the **Ross Platform Manager** service.

3. Use the **File** menu to select **Exit**.

The **Services** dialog box closes.

Activate Quorum Product Keys

You must activate your Quorum product key in your Ross Platform Manager before you can use it to license your Quorum Server software.

To active a product key in the Ross Platform Manager

1. Use a web browser to open the **Ross Platform Manager** web page URL. The format of the URL is as follows, where <Ross Platform Manager Server> is the hostname or IP address of your **Ross Platform Manager Server** computer:

`http://<Ross Platform Manager Server>:3030`

2. Log in to the **Ross Platform Manager** web page as an **administrator**.
3. Point to the  **Product Keys** icon in the toolbar and then select **Product Key Manager** from the menu.
The **Product Key Manager** panel opens.
4. Add a Quorum or Caprica product key by completing the following steps:
 - a. In the **Product Key Manager** panel toolbar, click the  **Add Product Key** icon.
The **Add Product Key** dialog box opens.



- b. In the **Product Key** box, enter your product key.
- c. Click **Add**.

Ross Platform Manager adds the entered product key to the **Product Key Manager** panel.

5. Activate your added Quorum or Caprica product keys by completing the following steps:
 - a. Double-click a **Not Active** product key.
The selected product key opens in the **Product Key View** panel.
 - b. In the **Product Key View** panel toolbar, click the  **Activate** icon.
The **Add Product Key** dialog box opens.



- c. Enter the associated Quorum or Caprica version in the **Version** box.
- d. Click **Activate**.
6. After activating your product keys, close the **Ross Platform Manager** web page.
7. Open Quorum or Caprica to verify that your product keys have licensed your applications as expected.

You should not encounter **Invalid License** or **License Not Present** warnings.

License Your Quorum Software

After you have activated your Quorum product key on the Ross Platform Manager, you can license your Quorum Server software. Ross Video uses a product key to control access to Quorum. You can use your Quorum product key with the following licensing servers to license your Quorum software:

- **Ross Activation Licensing Server** — your Quorum system must have access to the internet to use the Ross Activation licensing server.
- **Ross Platform Manager** — use this licensing server when your Quorum system does not have access to the internet. The Ross Platform Manager must be installed on a computer in your local network that your Quorum system can access. For information on setting up the Ross Platform Manager, refer to the section “**Ross Platform Manager Setup**” on page 7–2 in the *Quorum Installation Guide*.

You can obtain a Quorum product key from Ross Video Technical Support.

For More Information on...

- contacting Ross Video Technical Support, refer to the section “**Contacting Technical Support**” on page 1–3.

Accessing Quorum

Quorum is installed on a server computer in your facility and accessed through a web browser. Before you can use Quorum, you must log in to Quorum.

To access Quorum

1. Verify that the **Ross Platform Manager** is installed on a computer in your network to which your **Quorum** computer can connect.

For information on installing and configuring the Ross Platform Manager, refer to the section “**Ross Platform Manager Setup**” on page 7–2.

2. Verify the **Quorum** product key is activated on the **Ross Platform Manager** in your system.

For information on using the Ross Platform Manager to active product keys, refer to the section “**Activate Quorum Product Keys**” on page 7–6.

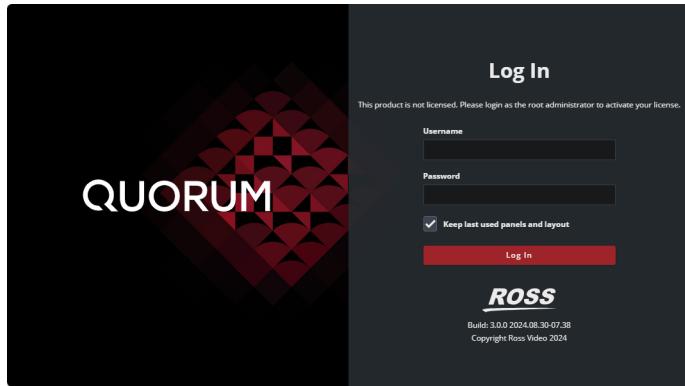
3. Use one of the following methods to open the **Quorum** web page:

- On the desktop of your **Quorum** computer, double-click the **Ross Quorum** icon.
- On your **Quorum** computer, use the **Start** menu to select **Ross Quorum > Ross Quorum**.
- On a computer connected to the same subnetwork as your Quorum computer, use a supported web browser to open the following URL:

`http://<Quorum_Server>:8059/`

In the URL, `<Quorum_Server>` is the hostname or IP address of the Quorum Server in your Quorum system.

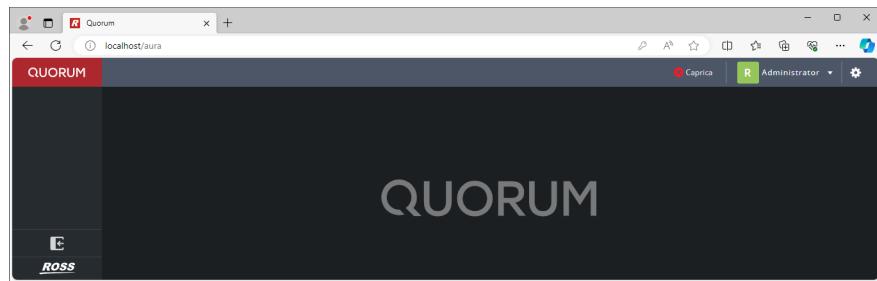
The **Log In** web page opens.



★ If a message displays indicating that the system is in **maintenance** mode, the Quorum cannot communicate with the database. Please contact Ross Video support.

4. In the **Log In** section, enter the login credentials of a Quorum user with administrator privileges in the **Username** and **Password** boxes.
5. Click **Log In**.

The **Quorum** opens.



★ For your security, the Quorum automatically logs you out after 30 minutes of inactivity.

6. After logging in to Quorum, you can license your Quorum Server software through the **Ross Activation Licensing Server** or **Ross Platform Manager**.

Ross Activation Licensing Server

When your Quorum system has access to the internet, you can use the Ross Activation licensing server to activate your product key. You can obtain an Quorum product key from Ross Video Technical Support.

★ When you activate a Quorum product key, your Quorum system computer must contact the Ross Activation licensing server through the internet.

To use the Ross Activation Licensing Server to activate product keys

1. Verify that the **Quorum** computer can connect to the Internet.
2. Log in to **Quorum** as user with **administrator** privileges.

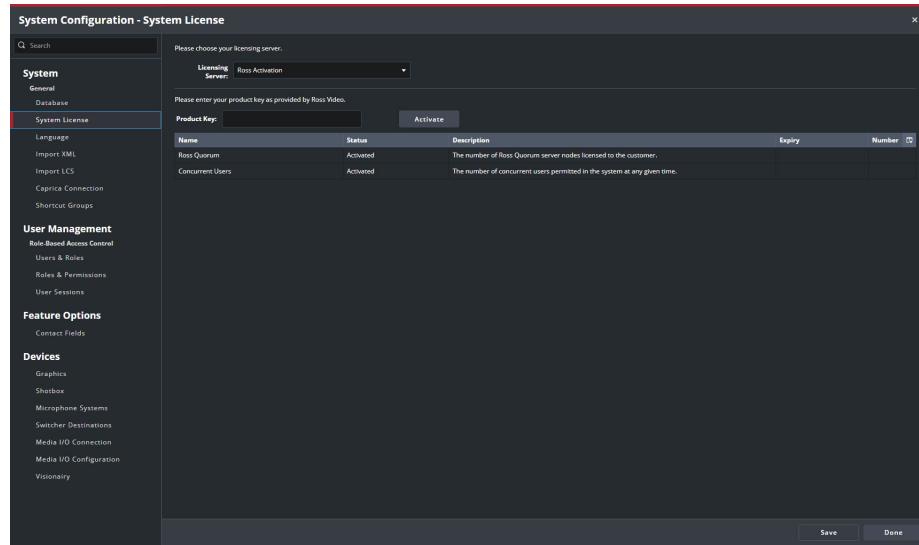
Quorum opens.

3. On the main toolbar, click the  **System Configuration** icon.

The **System Configuration** window opens.

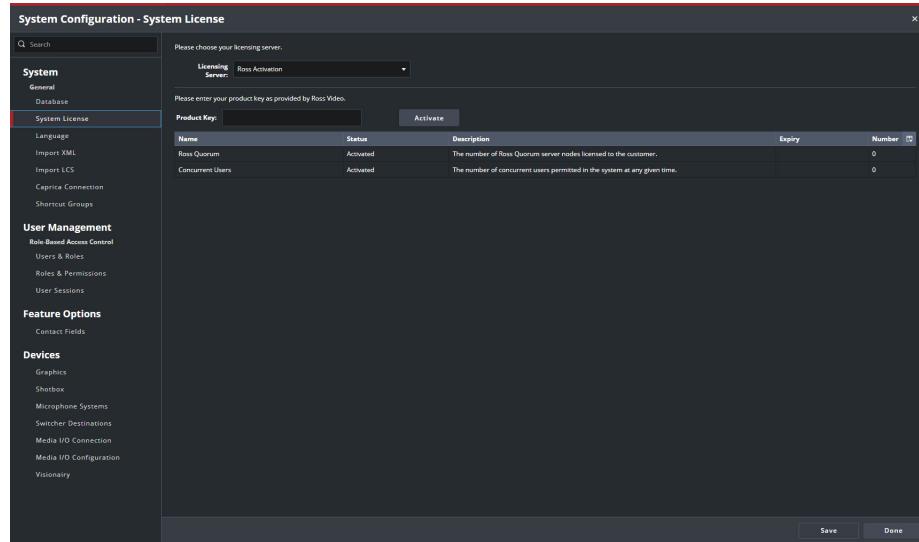
4. In the **System** section of the side navigation, click **System License**.

The **System License** panel opens.



5. Obtain a Quorum product key from Ross Video Technical Support.
6. Use the **Licensing Server** list to select **Ross Activation**.
7. In the **Product Key** box, enter the product key obtained from Ross Video Technical Support.
8. Click **Activate**.

The **System License** panel updates to display the feature licenses associated with the activated product key.



The **Status** column displays one of the following states:

- **Activated** — feature is active and available to Quorum users.
- **Expires in # days** — feature availability for Quorum users expires in the displayed number of days.
- **Expired** — feature has expired and is no longer available to Quorum users.
- **Invalid MAC** — feature license key is invalid for the active network interface card of the Quorum computer.
- **Not Purchased** — feature is not accessible to Quorum users, but it is available for purchase.

9. Click **Save**.

Quorum saves the set licensing configuration.

10. Click **Done** when you want to close the **System Configuration** window.

When the **System Configuration** window contains unsaved changes, the **Unsaved Changes** alert opens to enable you to save your changes before closing the window.

Ross Platform Manager

When your Quorum system does not have access to the internet, use the Ross Platform Manager licensing server to activate your Quorum product key. You can obtain a Quorum product key from Ross Video Technical Support.

To use the Ross Platform Manager licensing server to activate product keys

1. Verify that the **Ross Platform Manager** is installed on a computer in your network to which your **Quorum** computer can connect.

For information on installing and configuring the Ross Platform Manager, section “**Ross Platform Manager Setup**” on page 7–2 in the ***Quorum Installation Guide***.

2. Activate your **Quorum** product key on the **Ross Platform Manager** in your system.

For information on using the Ross Platform Manager to active product keys, section “**Activate Quorum Product Keys**” on page 7–6 in the ***Quorum Installation Guide***.

3. Log in to **Quorum** as user with **administrator** privileges.

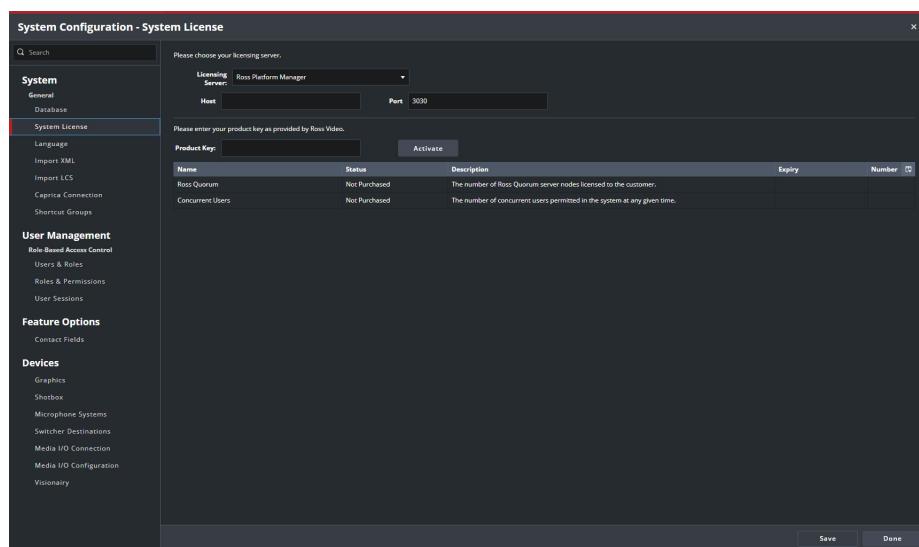
Quorum opens.

4. On the main toolbar, click the  **System Configuration** icon.

The **System Configuration** window opens.

5. In the **System** section of the side navigation, click **System License**.

The **System License** panel opens.



6. Obtain a Quorum product key from Ross Video Technical Support.
7. Use the **Licensing Server** list to select **Ross Platform Manager**.
8. In the **Host** box, enter the IP address or hostname of your **Ross Platform Manager Server** computer.

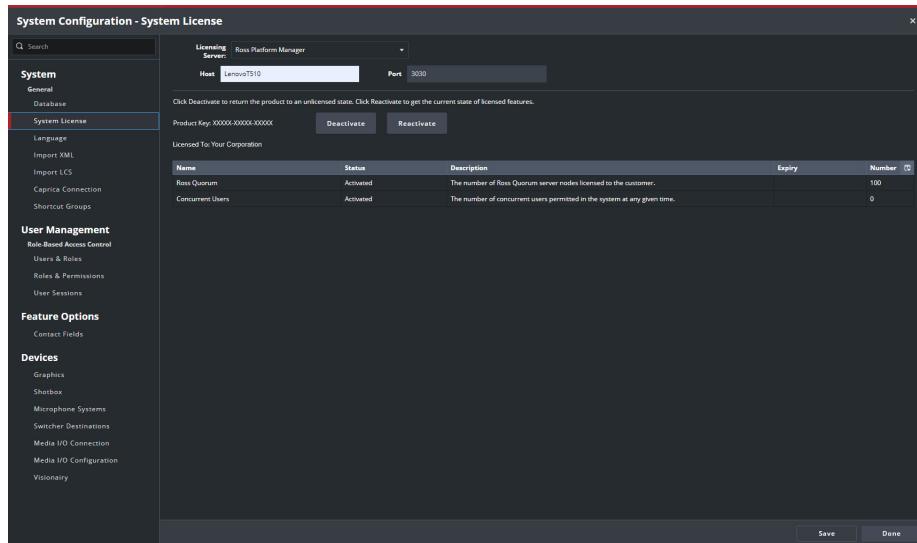
- In the **Port** box, enter the network port number of your **Ross Platform Manager Server**.

Ross Platform Manager Servers in a Quorum system use port 3030 as the network port for unsecure HTTP connections. **Ross Platform Manager Servers** use port 443 for secure HTTPS connections.

- In the **Product Key** box, enter the product key obtained from Ross Video Technical Support.

- Click **Activate**.

The **System License** panel updates to display the feature licenses associated with the activated product key.



The **Status** column displays one of the following states:

- Activated** — feature is active and available to Quorum users.
- Expires in # days** — feature availability for Quorum users expires in the displayed number of days.
- Expired** — feature has expired and is no longer available to Quorum users.
- Invalid MAC** — feature license key is invalid for the active network interface card of the Quorum computer.
- Not Purchased** — feature is not accessible to Quorum users, but it is available for purchase.

- Click **Save**.

Quorum saves the set licensing configuration.

- Click **Done** when you want to close the **System Configuration** window.

When the **System Configuration** window contains unsaved changes, the **Unsaved Changes** alert opens to enable you to save your changes before closing the window.

Reactivate a Product Key

After purchasing new features for your Quorum system, the Quorum product key requires reactivation to make the purchased features available to Quorum users.

To reactivate a Quorum product key

- Log in to **Quorum** as user with **administrator** privileges.

Quorum opens.

- On the main toolbar, click the **System Configuration** icon.

The **System Configuration** window opens.

3. In the **System** section of the side navigation, click **System License**.

The **System License** panel opens.

4. Click **Reactivate**.

The **System License** pop-up messages reports the status of your product key reactivation.

5. Click **Save**.

Quorum saves the set licensing configuration.

6. Click **Done** when you want to close the **System Configuration** window.

When the **System Configuration** window contains unsaved changes, the **Unsaved Changes** alert opens to enable you to save your changes before closing the window.

Deactivate a Product Key

When you want to move Quorum software on another computer, you must first deactivate the Quorum product key on the current Quorum computer.

To deactivate a Quorum product key

1. Log in to **Quorum** as user with **administrator** privileges.

Quorum opens.

2. On the main toolbar, click the  **System Configuration** icon.

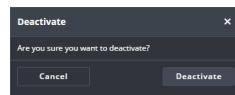
The **System Configuration** window opens.

3. In the **System** section of the side navigation, click **System License**.

The **System License** panel opens.

4. Click **Deactivate**.

The **Deactivate** alert opens.



5. Click **Deactivate** to deactivate the product key or **Cancel** to keep it active.

The **Deactivate** alert closes. When you clicked **Deactivate**, the product key displayed in the **Product Key** box deactivates. You can now use the deactivated product key to activate Quorum software on another computer.

Deactivating a product key unlicenses and removes Quorum user access to all the Quorum features associated with the product key.

6. Click **Save**.

Quorum saves the set licensing configuration.

7. Click **Done** when you want to close the **System Configuration** window.

When the **System Configuration** window contains unsaved changes, the **Unsaved Changes** alert opens to enable you to save your changes before closing the window.

Caprica Communication Configuration

This chapter provides instructions to connect the Quorum Server to the Caprica Server in your Quorum system. The Caprica Server connection enables Quorum to control the switcher, graphics engine, cameras, and other devices in your meeting control system.

- ★ To connect the Caprica Server and the Quorum Server in your Quorum system, you must enter the IP address of the Quorum system on the Quorum Server and the Caprica Server.

The following topics are discussed in this chapter:

- Set the Connection Between Quorum and Caprica Servers
- Set the Quorum System IP Address on the Caprica Server

Set the Connection Between Quorum and Caprica Servers

On a Quorum Server, the IP address of the Quorum Server and the Caprica port number are set in the Caprica Connection panel of the System Configuration window.

To set the Quorum Server IP Address and Caprica port to enable Caprica to connect

1. Log in to **Quorum** as user with **administrator** privileges.

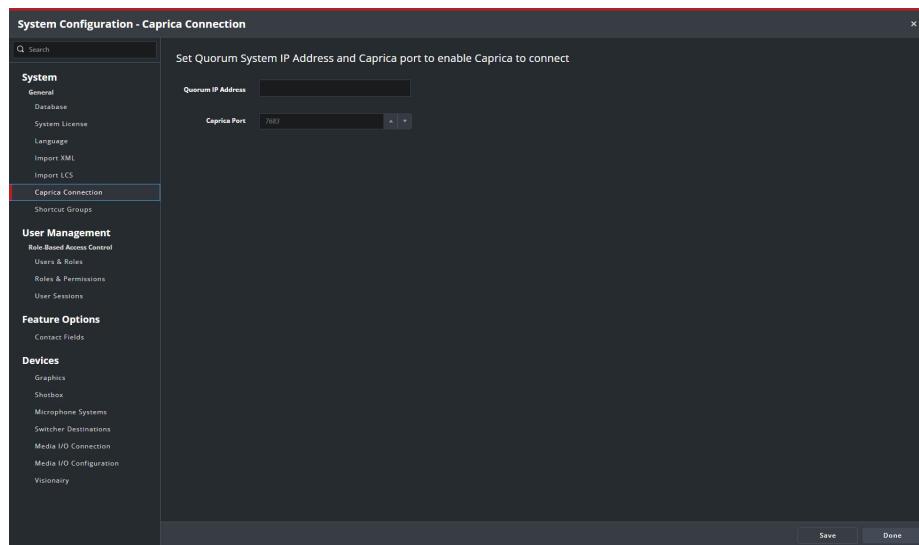
Quorum opens.

2. On the main toolbar, click the  **System Configuration** icon.

The **System Configuration** window opens.

3. In the **System** section of the side navigation, click **Caprica Connection**.

The **Caprica Connection** panel opens.



4. In the **IP Address** box, enter the **IP address** of your **Quorum Server**.
5. The default 7683 port number works for most Caprica Servers. If your Caprica Server uses a different port number than the default, you can use the **Caprica Port** box to enter or select the port number for your Caprica Server.
6. Click **Save**.

Quorum saves the set IP address of your Quorum Server and the Caprica port number.

7. Click **Done**.

The **System Configuration** window closes. When the **System Configuration** window contains unsaved changes, the **Unsaved Changes** alert opens to enable you to save your changes before closing the window.

Follow the procedure in the next section to set the Quorum system IP address on your Caprica Server.

Set the Quorum System IP Address on the Caprica Server

After setting the IP address of your Quorum Server and the Caprica port number on the Quorum Server, you are ready to complete the connection by setting the IP address of your Quorum Server on the Caprica Server. On a Caprica Server, the IP address of the Quorum Server is set in the Quorum device.

To set the Quorum System IP Address on your Caprica Server

1. Verify that a **Caprica Server** is connected to your internal network as part of your Quorum system.
2. On a Client computer, verify that the following conditions are true:
 - The Client computer uses the current version of **DashBoard** software.
 - The Client computer can access a running Caprica Server on the network.
3. Use one of the following methods to launch **DashBoard**:
 - Double-click the **DashBoard** icon on the desktop.
 - Use the **Start** menu to select **All Programs > DashBoard > DashBoard**.

DashBoard opens.

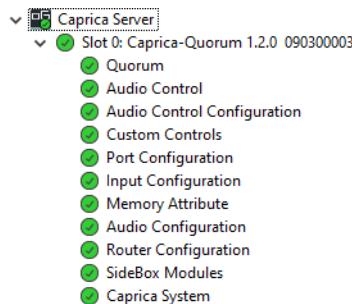
4. In the **DashBoard Tree View**, expand the **Caprica Server** node.

The **Caprica Server** node displays the available Caprica Servers.



5. In the **Caprica Server** node, expand the **Slot 0: Caprica** node.

The **Slot 0: Caprica** node displays the available Caprica Server clients.

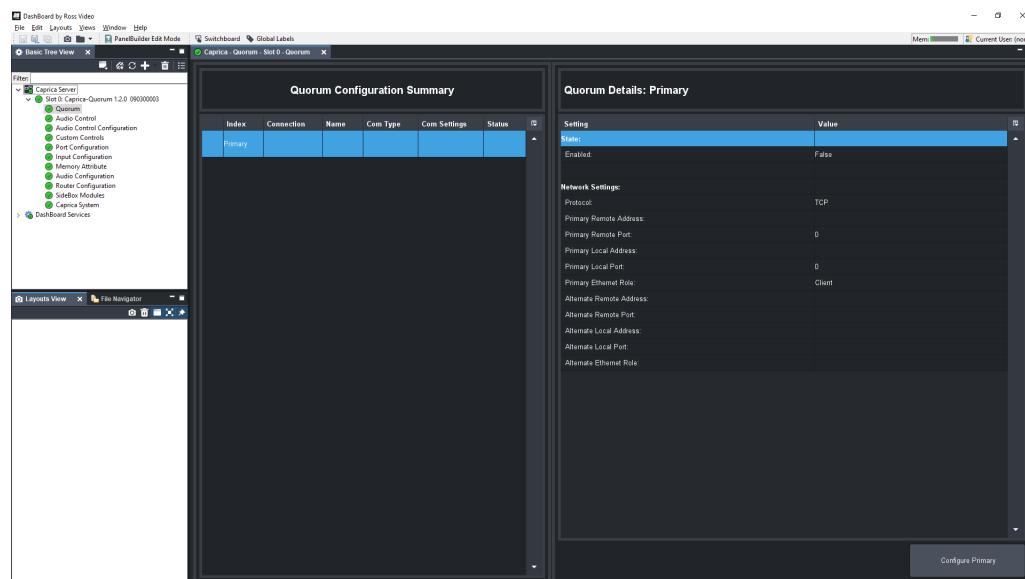


6. Double-click the **Quorum** node.

The **Quorum** client opens in the **Device View**.

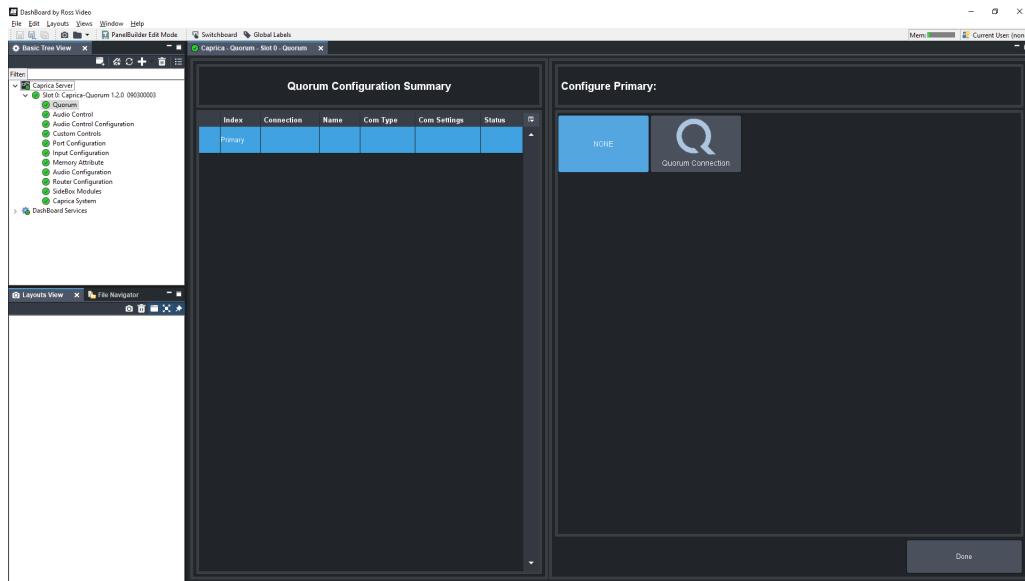
7. Use the **Window** menu to select **Full Screen**.

The **Quorum** client expands to full screen view.



- In the **Index** column of the **Quorum Configuration Summary** table, double-click the **Primary** Quorum connection.

The **Configure Primary** panel opens.

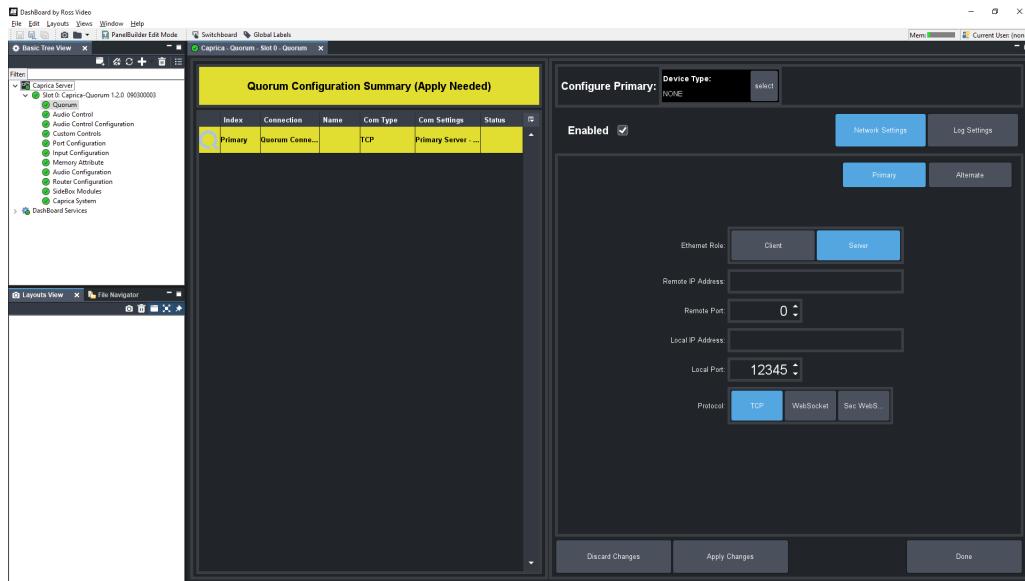


- In the **Configure Primary** panel, click **Quorum Connection**.

The **Configure Primary** panel displays the available settings.

- Click **Network Settings**.

The **Configure Primary** panel displays the **Network Settings** for the Primary OD Connection.



- In the **Configure Primary** panel, select the **Enable** check box to enable Caprica Server to Quorum Server communication by WebSocket.

12. Use the following settings to configure the **Network Settings** for the **Primary OD Connection**:
 - **Ethernet Role** — click **Client**.
 - **Remote IP Address** — enter in this box the **IP address or hostname** of your **Quorum Server**.
 - **Remote Port** — in this box, enter or select **7683** as the port number that your Quorum Server uses to communicate with your Caprica Server.
 - **Local IP Address** — enter **0.0.0.0** in this box.
 - **Local Port** — enter **0** in this box.
 - **Protocol** — click **WebSocket** to set the communication protocol.

13. Click **Apply Changes** to save the Quorum Connection device settings.

14. In the **Quorum Main** toolbar, verify that the **Caprica** icon is a  (green check mark) indicating that the Quorum Server is connected to the Caprica Server in your Quorum system.

A  (red X) **Caprica** icon indicates that the servers in your Quorum system are disconnected. To repair your server connection, check the following settings:

- Quorum System IP address is set the same on your Quorum Server and your Caprica Server.
- Quorum Connection device settings match those in step **12** on page 8-5.

For More Information on...

- Caprica Server configuration, refer to the *Caprica User Guide for Quorum*.
- Caprica switcher device configuration, refer to the *Caprica User Guide for Quorum*.

Appendix A. Software Licenses

Your Ross Video product uses software covered by one or more of the licenses described in this document.

★ As required by the GNU General Public License, and the Lesser GNU Public License (LGPL), source code can be obtained from Ross Video for at least 3 years. Contact Ross Video Technical Support for more information.

The following licenses are contained in this appendix:

- End User Software License Agreement
- GNU GENERAL PUBLIC LICENSE
- GNU GENERAL PUBLIC LICENSE WITH THE CLASSPATH EXCEPTION
- GNU LESSER GENERAL PUBLIC LICENSE
- BSD License
- Apache License
- Eclipse Public License - v 1.0
- Expat License
- IMLIB2
- Jiffy
- Fedora 14 - License Agreement
- PSF LICENSE AGREEMENT FOR PYTHON 2.7.3
- Jetty
- Apache ActiveMQ

End User Software License Agreement

This End User Software License Agreement is a legal agreement between you (the “Licensee”) and Ross Video Limited (“Ross Video”) specifying the terms and conditions of your installation and use of the Software and all Documentation (as those terms are defined herein).

IMPORTANT:

BY DOWNLOADING, ACCESSING, INSTALLING OR USING THE SOFTWARE AND/OR DOCUMENTATION LICENSEE AGREES TO THE TERMS OF THIS AGREEMENT AND THE LICENSE GRANTED HEREUNDER SHALL BE EFFECTIVE AS OF AND FROM SUCH DATE. IF YOU DO NOT WISH TO ACCEPT THE TERMS AND CONDITIONS OF THIS AGREEMENT, DO NOT DOWNLOAD, ACCESS, INSTALL, REFER TO OR OTHERWISE USE THE SOFTWARE AND/OR DOCUMENTATION.

- 1. INTERPRETATION.** In this Agreement, (a) words signifying the singular number include the plural and vice versa, and words signifying gender include all genders; (b) every use of the words “herein”, “hereof”, “hereto” “hereunder” and similar words shall be construed to refer to this Agreement in its entirety and not to any particular provision hereof; (c) reference to any agreement or other document herein will be construed as referring to such agreement or other document as from time to time amended, modified or supplemented (subject to any restrictions on such amendment, modification or supplement set forth therein); (d) every use of the words “including” or “includes” is to be construed as meaning “including, without limitation” or “includes, without limitation”, respectively; and (e) references to an Article or a Section are to be construed as references to an Article or Section of or to this Agreement unless otherwise specified.
- 2. DEFINITIONS.** In this Agreement, in addition to the terms defined elsewhere in this Agreement, the following terms have the meanings set out below:

“**Affiliate**” means, with respect to any Person, any other Person who directly or indirectly controls, is controlled by, or is under direct or indirect common control with, such Person. A Person shall be deemed to control a Person if such Person possesses, directly or indirectly, the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities, by contract or otherwise; and the term “controlled” and “controlling” shall have a similar meaning.

“**Agreement**” means this End User Software License Agreement including the recitals hereto, as the same may be amended from time to time in accordance with the provisions hereof.

“**Backup System**” means the secondary piece of Designated Equipment upon which the Software is installed and mirrored for the sole purpose of replacing a Primary System in the event such Primary System is not available or functioning properly for any reason.

“**Change of Control**” means (a) the direct or indirect sale, transfer or exchange by the shareholders of a Party of more than fifty percent (50%) of the voting securities of such Party, (b) a merger or amalgamation or reorganization or other transaction to which a Party is party after which the shareholders of such Party immediately prior to such transaction hold less than fifty percent (50%) of the voting securities of the surviving entity, (c) the sale, exchange, or transfer of all or substantially all of the assets of a Party.

“**Confidential Information**” means all data and information relating to the business and management of either Party, including the Software, trade secrets and other technology to which access is obtained or granted hereunder by the other Party, and any materials provided by Ross Video to Licensee; provided, however, that Confidential Information shall not include any data or information which:

- is or becomes publicly available through no fault of the other Party;
- is already in the rightful possession of the other Party prior to its receipt from the other Party;
- is already known to the receiving Party at the time of its disclosure to the receiving Party by the disclosing Party and is not the subject of an obligation of confidence of any kind;
- is independently developed by the other Party;
- is rightfully obtained by the other Party from a third party; or
- is disclosed with the written consent of the Party whose information it is.

“Designated Equipment” shall mean (a) the hardware products sold by Ross Video to Licensee on which the Software is installed and licensed for use, as the same may be replaced from time to time by Ross Video; or (b) in the case of Software sold on a stand-alone basis, the equipment of Licensee on which the Software is to be installed and meets the minimum specifications set out in the Documentation.

“Documentation” shall mean manuals, instruction guides, user documentation and other related materials of any kind pertaining to the Software (whether in electronic, hard-copy or other media format) that are furnished to Licensee by or on behalf of Ross Video in relation to the Software.

“Governmental Authority” means (a) and federal, provincial, state, local, municipal, regional, territorial, aboriginal, or other government, governmental or public department, branch, ministry, or court, domestic or foreign, including any district, agency, commission, board, arbitration panel or authority and any subdivision of any of them exercising or entitled to exercise any administrative, executive, judicial, ministerial, prerogative, legislative, regulatory, or taxing authority or power of any nature; and (b) any quasi-governmental or private body exercising any regulatory, expropriation or taxing authority under or for the account of any of them, and any subdivision of any of them.

“Improvements” means all inventions, works, discoveries, improvements and innovations of or in connection with the Software, including error corrections, bug fixes, patches and other updates in Object Code form to the extent made available to Licensee in accordance with Ross Video’s release schedule.

“License Fee” means the fee(s) payable in respect of the Software in accordance with the relevant invoice(s) or other purchase documents delivered in connection with this Agreement.

“License Period” means the period of time that Licensee will have the rights granted under this Agreement, as may be specified in a Quote.

“Maintenance Fee” means the yearly maintenance fee(s) payable by Licensee to Ross Video, as determined by Ross Video, for the support, maintenance and update of the Software after the expiry of the Maintenance Period as set forth in this Agreement.

“Maintenance Period” means, in connection with the Software, the maintenance period of one (1) year from the date of shipment unless otherwise specified in the table below:

Product Category	Software Maintenance Period
Switchers	For the life of the Designated Equipment
Routers (excluding Ultrix)	For the life of the Designated Equipment
Master Control System Software (Dashboard)	For the life of the Designated Equipment
Gear	For the life of the Designated Equipment
Neilsen Encoders	For the life of the Designated Equipment
Sports Analysis	For the License Period

“Modifications” means any enhancements, changes, corrections, translations, adaptations, revisions, developments, upgrades or updates thereto; and **“Modify”** shall mean the creation of any of the foregoing.

“Object Code” means the machine readable executable form of a computer software program.

“Parties” means both Ross Video and Licensee and **“Party”** means either one of them as the context requires.

“Person” will be broadly interpreted and includes (a) a natural person, whether acting in his or her own capacity, or in his or her capacity as executor, administrator, estate trustee, trustee or personal or legal representative; (b) a corporation or a company of any kind, a partnership of any kind, a sole proprietorship, a trust, a joint venture, as association, an unincorporated association, an unincorporated syndicate, an unincorporated organization or any other association, organization or entity of any kind; and (c) a Governmental Authority.

“Primary System” means the Designated Equipment upon which the Software is installed and executed to deliver its intended functionality.

“Quote” means the document provided by Ross Video to Licensee detailing the Ross Video products contemplated for purchase, the corresponding fees and any License Period that may apply to the Software.

“Software” shall mean the version of the Object Code sold and delivered to Licensee by Ross Video concurrently with delivery of this Agreement and any subsequent error corrections, updates, Modifications or Improvements provided to Licensee by Ross Video pursuant to this Agreement, but specifically excluding any features or plug-ins that may be purchased by you directly from third parties as upgrades or enhancements to the Software.

“Source Code” means the human readable form of a computer software program, all tools and documentation necessary for a reasonably computer programmer to understand, maintain and Modify the Software.

“Third Party Software” means those portions of the Software, if any, which are owned or controlled by third parties and licensed to Ross Video pursuant to certain license agreements or arrangements with such third parties, including the NewTek NDI™ software (<http://NDI.NewTek.com/>)

“Use” means to execute, run, display, store, copy, make, use, sell, merge, network, Modify, translate, host, outsource, or integrate with Licensee’s products or other third party software;

3. **LICENSE.** Subject to the terms and conditions of this Agreement, upon payment of the applicable License Fee by Licensee, Ross Video hereby grants to Licensee a non-transferable and non-exclusive right to Use the Software and Documentation solely for the internal use of Licensee (the “**License**”), during the License Period. In the event that a License Period is not identified on the Quote, such License Period shall be deemed to be perpetual, subject to Section 7 D of this Agreement. The Software shall only be used in connection with or installed on the Designated Equipment and, where applicable, shall only be used on the Primary System, provided such Primary System is operating properly. If the Primary System is not operating properly for any reason, the Software may be used on the designated Backup System for that Primary System until such time that the Primary System begins operating properly. The Software and Documentation are provided to Licensee for the exclusive use by Licensee’s organization for its ordinary business purposes and shall not be used by any third party for any purposes. Licensee may make copies of the Software as required for internal backup and archival purposes. To the extent permitted hereunder, Licensee may distribute copies of the Software and/or Documentation to members of its organization, provided (a) this Agreement is included with each copy, (b) any member of its organization who uses the Software and/or Documentation accepts and agrees to be bound by the terms of this Agreement and by any other license agreements or other agreement incorporated by reference into this Agreement, and (c) Licensee has paid any applicable additional License Fees in respect of copying and redistributing of the Software. To the extent Licensee is permitted to make copies of the Software under this Agreement, Licensee agrees to reproduce and include on any copy made or portion merged into another work, all Ross Video proprietary notices, including any notices with respect to copyrights, trademarks and this License. With the exception of copying the Software for backup or archival purposes, Licensee agrees to keep a record of the number and location of all such copies and will make such record available at Ross Video’s request. The Software may include mechanisms to limit or inhibit copying.
4. **LICENSE RESTRICTIONS.** Except as otherwise provided in section 2 above, Licensee shall not: (1) copy any Software or Documentation, or part thereof, which is provided to Licensee by Ross Video pursuant to this Agreement, in Object Code form, Source Code form or other human or machine readable form, including written or printed documents, without the prior written consent of Ross Video; (2) in any way market, distribute, export, translate, transmit, merge, Modify, transfer, adapt, loan, rent, lease, assign, share, sub-license, sell, make available for download on any website or make available to another Person, the Software and/or Documentation, in whole or in part, provided that Licensee shall not be prohibited from renting or leasing the Software if Ross Video has consented, in writing, to Licensee engaging in such activities in respect of the Software; (3) reverse engineer, decompile or disassemble the Software or electronically transfer it into another computer language; or (4) otherwise Use the Software or Documentation in a manner that is inconsistent with the License granted hereunder or that will result in a breach of this Agreement. Licensee agrees to take all reasonable precautions to prevent third parties from using the Software and/or Documentation in any way that would constitute a breach of this Agreement, including such precautions Licensee would ordinarily take to protect its own proprietary software, hardware or information.
5. **DELIVERY.** Ross Video shall deliver to Licensee one (1) master copy of the Software in compiled binary (executable) form suitable for reproduction in electronic files only and Ross Video shall deliver to Licensee a minimum of one copy of the Documentation.

6. IMPROVEMENTS. Licensee may from time to time request Ross Video to incorporate certain Improvements into the Software. Ross Video may, in its sole discretion, undertake to incorporate and provide such Improvements to Licensee with or without payment of a fee to be negotiated at the time of such request. All Improvements, whether recommended and developed by Ross Video or Licensee, shall be considered the sole property of Ross Video and shall be used by Licensee pursuant to the terms of the License granted under this Agreement.

7. LIMITED REPRESENTATIONS AND WARRANTIES.

(A) Software Warranties

Ross Video represents and warrants that:

- a. During the Maintenance Period the Software is warranted to be free from material defects under normal use;
- b. Ross Video has the authority to enter into this Agreement, is the owner or licensee of the Software and Documentation and has the right to grant all of the license rights herein;
- c. Except as expressly stated herein, no disabling mechanism or protection feature designed to prevent the Software's Use, including any computer virus, worm, lock, drop dead device, Trojan-horse routine, trap door, time bomb or any other codes or instructions that may be used to access, Modify, delete, damage or disable the Software or any other hardware or computer system, will be used or activated by Ross Video in respect of Software that is delivered to Licensee under a valid License; and
- d. The Software, if properly installed and used with Designated Equipment, will perform substantially as described in Ross Video's then current Documentation for such Software for the Maintenance Period.

(B) Warranty Exclusions and Inclusions

Notwithstanding the above, all of Ross Video's obligations with respect to the warranties set out in 7(A) above shall be contingent on Licensee's use of the Software in accordance with the terms and conditions of this Agreement and Ross Video's instructions as provided in the Documentation. Ross Video shall have no warranty obligations where any Software failure occurs as a result of misuse, neglect, accident, abuse, misapplication, improper installation, unauthorized modification, extreme power surge or extreme electromagnetic field or other Act of God. Ross Video shall pass through to Licensee the benefit of all warranties from third party manufacturers and suppliers.

(C) Remedy

If the Software becomes defective, and a valid claim is received by Ross Video during the Maintenance Period, Ross Video will, at its sole option and sole discretion, either (1) repair the defective Software at no charge, or (2) exchange the defective Software for a comparable product at no charge. The remedies set forth in this Section shall be the exclusive remedies available to Licensee in connection with a breach of the limited warranties set out above.

(D) Maintenance Charges

Technical support for the Software by telephone and email contact with Ross Video is provided by Ross Video to Licensee at no extra charge for the life of the product. During the Maintenance Period, Ross Video shall supply downloadable Software Modifications upon request of Licensee, when available, at no extra charge to Licensee. Notwithstanding the foregoing, Ross Video shall be under no legal obligation to create or release Software Modifications at any time or in accordance with a fixed schedule. Upon expiry of the Maintenance Period, where applicable, Licensee may purchase Software maintenance, including downloadable Software upgrades in one (1) year increments at the then applicable extended Maintenance Fee rates offered by Ross Video, in which case the warranties granted by this Agreement shall survive and remain in full force and effect during each such one (1) year term.

8. OWNERSHIP. The Parties acknowledge and agree that, as between the Parties, Ross Video shall be the owner of all intellectual property rights in the Software, Documentation and all related Modifications and Improvements, written materials, logos, trademarks, trade names, copyright, patents, trade secret and moral rights, registered or unregistered. No proprietary interest or title in or to the intellectual property in the Software, Documentation or any Improvements or Modifications is transferred to Licensee by this Agreement. Ross Video reserves all rights not expressly licensed to Licensee under section 3.

9. **THIRD PARTY SOFTWARE.** Licensee acknowledges that the Third Party Software is not owned by Ross Video. Notwithstanding any other provision of this Agreement, Ross Video, to the extent permitted by applicable law, offers no warranties (whether express, implied, statutory or by course of communication or dealing with Licensee, or otherwise) with respect to the Third Party Software. Ross Video may pass through to Licensee, if and to the extent permitted by applicable law, any warranties expressly provided by such third parties to Ross Video for such Third Party Software.
10. **INTELLECTUAL PROPERTY INDEMNITY.** Ross Video agrees to defend, indemnify and hold harmless Licensee from final damages awarded by a court of competent jurisdiction (hereinafter referred to as the “**Losses**”), which Licensee, or any of its officers or directors, may incur, suffer or become liable for as a result of, or in connection with, any third party claim asserted against Licensee to the extent such claim is based on a contention that the Software, Documentation or any portion thereof, infringes any valid, registered, enforceable patents, copyrights, trade secrets, trademarks or other intellectual property rights of any third party, provided that (a) the allegedly infringing Software or Documentation has been used within the scope of and in accordance with the terms of this Agreement, and (b) Licensee notifies Ross Video in writing of such claim within ten (10) days of a responsible officer of Licensee becoming aware of such claim. If the Software, Documentation or any portion thereof is held to constitute an infringement of a third party’s intellectual property rights, and use thereof is enjoined, Ross Video shall, at its election and expense, either (i) procure the right to use the infringing element of the Software or Documentation; or (ii) replace or modify the element of the Software or Documentation so that the infringing portion is no longer infringing and still performs the same function without any material loss of functionality. Ross Video shall make every reasonable effort to correct the situation with minimal effect upon the operations of Licensee.

Notwithstanding the above, Ross Video reserves the right to terminate this Agreement and the License granted hereunder on immediate notice to Licensee, and without liability to Licensee, in the event that the Software or Documentation constitutes or may, in Ross Video’s determination, constitute, an infringement of the rights of a third party that Ross Video, in its sole discretion, does not consider to be affordably remediable.

Either party may terminate this Agreement immediately should any Software become, or in either party's opinion be likely to become, the subject of a claim of infringement of any intellectual property right and, in such event, there shall be no claim by either Licensee or Ross Video against the other arising out of such termination, provided that the foregoing shall not apply to a claim for infringement by Ross Video against Licensee in the event that Licensee is alleged to have infringed Ross Video's intellectual property rights, in which case Licensee shall remain liable for all outstanding License Fees and other amounts owing to Ross Video.

Notwithstanding the foregoing, Ross Video shall have no liability for any claim of infringement based on use of other than a current, unaltered release of the Software and/or Documentation available from Ross Video if such infringement would have been avoided by the use of a current, unaltered release of the Software and/or Documentation provided that such current, unaltered release performs substantially in conformance with the specifications set out in the Documentation and was provided, at no additional cost by Ross Video, to those subscribing for maintenance services for the Software or Documentation.

11. **CONFIDENTIALITY.** Each Party shall maintain in confidence all Confidential Information of the other Party, shall use such Confidential Information only for the purpose of exercising its rights and fulfilling its obligations under this Agreement, and shall not disclose any Confidential Information of the disclosing Party to any third party except as expressly permitted hereunder or make any unauthorized use thereof. Each Party shall disclose the Confidential Information only to those of its employees, consultants, advisors, and/or subcontractors who have a need to know the Confidential Information. Each Party shall, prior to disclosing the Confidential Information to such employees, consultants, advisors and/or subcontractors, obtain their agreement to receive and use the Confidential Information on a confidential basis on the same terms and conditions contained in this Agreement. The receiving Party shall treat the Confidential Information of the disclosing Party with the same degree of care against disclosure and/or unauthorized use as it affords to its own information of a similar nature, or a reasonable degree of care, whichever is greater. The receiving Party further agrees not to remove or destroy any proprietary or confidential legends or markings placed upon any documents or other materials of the disclosing Party. The obligations of confidence set forth in this Agreement shall extend to any Affiliates that have received Confidential Information of the disclosing Party and shall also cover Confidential Information disclosed by any Affiliate. The receiving Party shall be responsible for any actions or omissions of its Affiliates as if such actions or omissions were its own.

Either party may disclose certain Confidential Information if it is expressly required to do so pursuant to legal, judicial, or administrative proceedings, or otherwise required by law, provided that (i) such Party provides the other Party with reasonable written notice prior to such disclosure; (ii) such Party seeks confidential treatment for such Confidential Information; (iii) the extent of such disclosure is only to the extent expressly required by law or under the applicable court order; and (iv) such Party complies with any applicable protective or equivalent order.

Each of Ross Video and Licensee (the “**Indemnifying Party**”, as applicable) agree to indemnify the other (the “**Indemnified Party**”, as applicable) for all Losses incurred by the Indemnified Party as a result of a failure of the Indemnifying Party to comply with its obligations under this Section 11 provided that the Indemnified Party has given prompt notice of any such claim and, to the extent that a claim may lie against a third party for the unauthorized disclosure of such Confidential Information, the right to control and direct the investigation, preparation, action and settlement of each such claim and, further, provided that the Indemnified Party reasonably co-operates with the Indemnifying Party in connection with the foregoing and provides the Indemnifying Party with all information in the Indemnified Party’s possession related to such claim and such further assistance as reasonably requested by the Indemnifying Party.

The Parties acknowledge and agree that any breach of the confidentiality provisions of this Agreement by one Party may cause significant and irreparable injury to the other Party that is not compensable monetarily, as well as damages that may be difficult to ascertain, and agrees that, in addition to such other remedies that may be available at law or in equity, the other Party shall be entitled to seek injunctive relief (including temporary restraining orders, interim injunctions and permanent injunctions) in a court of competent jurisdiction in the event of the breach or threatened breach by such party of any of the confidentiality provisions of this Agreement. The relief contemplated in this Section shall be available to each Party without the necessity of having to prove actual damages and without the necessity of having to post any bond or other security. Each Party further agrees to notify the other Party in the event that it learns of or has reason to believe that any Person has breached the confidentiality provisions of this Agreement.

12. LIMITATION OF LIABILITY. The limitation of liability provisions of this Agreement reflect an informed voluntary allocation of the risks (known and unknown) that may exist in connection with the licensing of the Software or Documentation hereunder by Ross Video, and that voluntary risk allocation represents a material part of the Agreement reached between Ross Video and Licensee. Should Ross Video be in breach of any obligation, Licensee agrees that Licensee’s remedies will be limited to those set forth in this Agreement. No action, regardless of form, arising out of this Agreement may be brought by Licensee more than twelve (12) months after the facts giving rise to the cause of action have occurred, regardless of whether those facts by that time are known to, or reasonably ought to have been discovered by, Licensee.

- a. EXCEPT AS EXPRESSLY PROVIDED IN THIS AGREEMENT, THE SOFTWARE AND DOCUMENTATION ARE PROVIDED “AS IS” AND ROSS VIDEO (I) MAKES NO OTHER REPRESENTATIONS, AND PROVIDES NO WARRANTIES OR CONDITIONS OF ANY KIND, EXPRESS OR IMPLIED, STATUTORY, BY USAGE OF TRADE CUSTOM OF DEALING, OR OTHERWISE, AND (II) SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING ANY IMPLIED WARRANTY OF UNINTERRUPTED OR ERROR FREE OPERATION, MERCHANTABILITY, QUALITY OR FITNESS FOR A PARTICULAR PURPOSE. ROSS VIDEO DOES NOT REPRESENT OR WARRANT THAT THE SOFTWARE WILL MEET ANY OR ALL OF LICENSEE’S PARTICULAR REQUIREMENTS, THAT THE USE AND OPERATION OF THE SOFTWARE WILL OPERATE ERROR-FREE OR UNINTERRUPTED, THAT ALL PROGRAMMING ERRORS IN THE SOFTWARE CAN BE FOUND IN ORDER TO BE CORRECTED, OR THAT THE SOFTWARE WILL BE COMPATIBLE WITH OTHER PROGRAMS, SYSTEMS, AND HARDWARE.
- a. IN NO EVENT SHALL ROSS VIDEO, ITS AFFILIATES AND LICENSORS, AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES AND AGENTS, BE LIABLE FOR ANY CLAIM FOR INDIRECT, CONSEQUENTIAL, SPECIAL, INCIDENTAL, PUNITIVE, EXEMPLARY, AGGRAVATED DAMAGES; LOST PROFITS, OR LOST REVENUE ARISING FROM OR IN CONNECTION WITH THIS AGREEMENT, REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, OR IN TORT, EVEN IF THE PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.
- a. IN ANY EVENT THE AGGREGATE LIABILITY OF ROSS VIDEO, ITS AFFILIATES AND LICENSORS, AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES AND AGENTS,

FOR ANY CLAIM FOR DIRECT DAMAGES WITH RESPECT TO THE SUBJECT MATTER OF THIS AGREEMENT SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE PAID TO ROSS VIDEO UNDER THIS AGREEMENT.

13. TERM AND TERMINATION.

- a. Unless terminated earlier in accordance with the terms of this Agreement, the term of this Agreement shall commence upon Licensee's first download, access, installation, or other use of the Software or Documentation and continues until, in the case of Software sold with Designated Equipment provided by Ross Video, the earliest of (a) the end of the License Period, or (b) if the Designated Equipment is assigned or transferred in accordance with this Agreement, the date on which the Designated Equipment is no longer owned by Licensee;
- a. Either Party shall have the right to terminate this Agreement on notice to the other Party if:
 - a. the other Party fails to pay any fees or other amounts when due hereunder or under any other agreement between the Parties (or any Affiliates of the Parties, as applicable) in connection with the Software and/or Designated Equipment and such breach is not cured within thirty (30) days after written notice of such failure to pay is given to the defaulting Party by the non-defaulting Party;
 - a. the other Party shall file a voluntary petition in bankruptcy or insolvency or shall petition for reorganization under any bankruptcy law, consent to an involuntary petition in bankruptcy, or if a receiving order is given against it under the *Bankruptcy and Insolvency Act* (Canada) or the comparable law of any other jurisdiction (and such is not dismissed within ten (10) days);
 - a. there shall be entered an order, judgment or decree by a court of competent jurisdiction, upon the application of a creditor, approving a petition seeking reorganization or appointing a receiver, trustee or liquidator of all or a substantial part of the other Party's assets and such order, judgment or decree continues in effect for a period of thirty (30) consecutive days; or
 - a. the other Party shall fail to perform any of the other material obligations set forth in this Agreement and such default, in the case of a default which is remediable, continues for a period of thirty (30) days after written notice of such failure has been given by the non-defaulting Party or, in the case of a non-remediable default, immediately upon notice.
- a. Notwithstanding any to the contrary contained in this Agreement:
 - a. Ross Video may forthwith terminate this Agreement if Licensee is in breach of any of sections 3, 4 or 11 of this Agreement. For greater certainty, In such instances Ross Video shall provide written notice of such termination as soon as practicable but written notice shall not be a necessary prerequisite to such termination; and
 - a. in the event of a Change of Control of Licensee, Ross Video shall have the rights to terminate this Agreement and the License granted hereunder upon thirty (30) days' prior written notice to Licensee. For greater certainty, Ross Video's right to terminate in the event of a Change of Control of Licensee shall continue for a period of six (6) months from the date Licensee delivers notice of such Change of Control to Ross Video.
 - a. Ross Video may terminate the License immediately on the date on which it provides notice to Licensee, if its agreements for Third Party Software are terminated.
- a. Upon the termination or expiry of this Agreement:
 - a. Licensee shall immediately cease and desist all use of the Software and Documentation;
 - a. Licensee shall immediately deliver to Ross Video any of Ross Video's Confidential Information provided hereunder (including the Software and Documentation) then in its possession or control, if any, and shall deliver a certificate of an officer of Licensee certifying the completeness of same;
 - a. Licensee shall refrain from further use of such Confidential Information; and
 - a. Licensee shall forthwith pay all amounts owing to Ross Video or any of its Affiliates hereunder.

14. SURVIVAL. The provisions of sections 1, 2, 4, 6, 8, 9, 11, 12, 13, 14, 17 and 19 herein shall survive the expiry or termination of this Agreement.

- 15. FORCE MAJEURE.** Dates and times by which Ross Video is required to render performance under this Agreement shall be automatically postponed to the extent and for the period that Ross Video is prevented from meeting them by reason of events of force majeure or any cause beyond its reasonable control provided Ross Video notifies Licensee of the commencement and nature of such cause and uses its reasonable efforts to render performance in a timely manner.
- 16. ASSIGNMENT.** Ross Video may assign this Agreement, or any of its rights or obligations hereunder, in whole or in part, upon notice to Licensee. Licensee shall not assign this Agreement, or any of its rights or obligations hereunder, in whole or in part, without the prior written consent of Ross Video, which consent may not be unreasonably withheld. This Agreement enures to the benefit of and is binding upon each of the Parties and their respective successors and permitted assigns.
- 17. GOVERNING LAW.** This Agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and federal laws of Canada applicable therein and shall be treated, in all respects, as an Ontario contract. Each Party irrevocably and unconditionally submits and attorns to the exclusive jurisdiction of the courts of the Province of Ontario to determine all issues, whether at law or in equity, arising from this Agreement.
- 18. LANGUAGE.** The Parties have expressly required that this Agreement and all documents relating thereto be drawn-up in English. Les parties ont expressément exigé que cette convention ainsi que tous les documents qui s'y rattachent soient rédigés en anglais.
- 19. GOVERNMENT CONTRACTS.** If the Software and/or Documentation to be furnished to Licensee hereunder are to be used in the performance of a government contract or subcontract, the Software and/or Documentation shall be provided on a “restricted rights” basis only and Licensee shall place a legend, in addition to applicable copyright notices, in the form provided under the applicable governmental regulations. For greater certainty, Ross Video shall not be subject to any flowdown provisions required by any customers of Licensee that are a Governmental Authority unless Ross Video expressly agrees to be bound by such flowdown provisions in writing.
- 20. EXPORT AND IMPORT LAWS.** Licensee acknowledges and agrees that the Software (including any technical data and related technology) may be subject to the export control laws, rules, regulations, restrictions and national security controls of the United States and other applicable countries (the “**Export Controls**”) and agrees not export, re-export, import or allow the export, re-export or import of such export-controlled Software (including any technical data and related technology) or any copy, portion or direct product of the foregoing in violation of the Export Controls. Licensee hereby represents that it is not an entity or person to whom provision of the Software (including any technical data and related technology) is restricted or prohibited by the Export Controls. Licensee agrees that it has the sole responsibility to obtain any authorization to export, re-export, or import the Software (including any technical data and related technology), as may be required. Licensee will defend, indemnify and hold Ross Video harmless from any and all claims, losses, liabilities, damages, fines, penalties, costs and expenses (including attorney’s fees) arising from or relating to any breach by Licensee of its obligations under this Section.
- 21. AMENDMENT AND WAIVER.** No amendment, discharge, modification, restatement, supplement, termination or waiver of this Agreement or any Section of this Agreement is binding unless it is in writing and executed by the Party to be bound. No waiver of, failure to exercise or delay in exercising, any Section of this Agreement constitutes a waiver of any other Section (whether or not similar) nor does any waiver constitute a continuing waiver unless otherwise expressly provided.
- 22. SEVERABILITY.** Each Section of this Agreement is distinct and severable. If any Section of this Agreement, in whole or in part, is or becomes illegal, invalid, void, voidable or unenforceable in any jurisdiction by any court of competent jurisdiction, the illegality, invalidity or unenforceability of that Section, in whole or in part, will not affect (a) the legality, validity or enforceability of the remaining Sections of this Agreement, in whole or in part; or (b) the legality, validity or enforceability of that Section, in whole or in part, in any other jurisdiction.
- 23. ENTIRE AGREEMENT.** This Agreement, and any other documents referred to herein, constitutes the entire agreement between the Parties relating to the subject matter of this Agreement and supersedes all prior written or oral agreements, representations and other communications between the Parties.

Quorum Software License Grant

TERMS AND CONDITIONS

The sale to you and installation of the QUORUM SOFTWARE (the Software) by Ross Video Limited (Ross) is conditional on your acceptance of the following terms and conditions of the grant of license to use the Software, which you accept by acceptance of the agreement to purchase, installation and use of the Software. If you do not wish to accept these terms and conditions of the license grant, do not use the Software and contact Ross immediately.

This license grant ("grant") is effective from the date of Software installation (the "Effective Date") by Ross as agreed upon by you, the purchaser of the Software ("Licensee").

1. DEFINITIONS.

1.1 "Change of Control" means, with respect to any corporation, the sale, transfer, pledge, assignment or other conveyance of in excess of fifty percent (50%) of the voting equity of the corporation.

1.2 "Designated Equipment" shall mean the hardware products identified on Exhibit "A" with which the Software is licensed for use.

1.3 "Documentation" shall mean all manuals, user documentation, and other related materials pertaining to the Software that are furnished to Licensee by or on behalf of Ross in connection with the Software.

1.4 "Hardware" refers to the Designated Equipment.

1.5 "Improvements" means all inventions, works, discoveries, improvements and innovations of or in connection with the Software including without limitation error corrections, bug fixes, patches and other updates made by or on behalf of Ross;

1.6 "License Fee" shall mean the fee payable in accordance with the provisions of this grant of the license to the Licensee of the Software and the Documentation.

1.7 "Software Maintenance Fee" shall mean the yearly fee to support, maintain and update software as set forth in this grant.

1.8 "Software" shall mean the computer programs in machine-readable object code form listed in Exhibit "A" attached hereto and any subsequent error corrections or updates supplied to Licensee by Ross pursuant to this grant as well as any Improvements. The definition of the Software set forth in Exhibit "A" may be amended from time to time by Ross in its sole discretion on written notice to the Licensee.

1.9 "Territory" means worldwide.

2. GRANT OF RIGHTS.

Subject to the provisions of this grant, Ross hereby grants to Licensee the non-exclusive perpetual right, license and privilege to use the Software and the Documentation in the Territory solely on the number of primary systems of Designated Equipment identified on Exhibit A. The Software shall be used only on such primary systems if they are operating properly. If any primary system is down, the Software may be used on a backup system for that primary system.

2.2 Sub-Licensing. Licensee shall not grant sub-licenses of the Software.

3. DELIVERY.

3.1 Software. Ross shall deliver to Licensee a master copy of the Software licensed hereunder in object code form, suitable for reproduction, in electronic files only.

3.2 Documentation. Ross shall deliver copies of Documentation.

4. MODIFICATIONS.

4.1 Error Corrections and Updates. Ross will provide Licensee with any Improvements, in the form of error corrections, bug fixes, patches or other updates, in object code form to the extent available in accordance with Ross's release schedule for a period of one (1) year from the date of shipment.

4.2 Other Modifications. Licensee may, from time to time, request that Ross incorporate certain Improvements such as features, enhancements or modifications into the Software. Ross may, in its sole discretion, undertake to incorporate such changes and distribute the Software so modified to all or any of Ross's licensees.

4.3 Title to Modifications. All such Improvements, whether recommended and developed by Ross or Licensee, shall be the sole property of Ross and Licensee hereby disclaims any proprietary interest of any kind in any Improvement.

5. COPIES.

5.1 Printed Matter. Except as specifically set forth herein, no Software or Documentation which is provided by Ross pursuant to this grant in human readable form, such as written or printed documents, shall be copied in whole or in part by Licensee without Ross's prior written agreement. Additional copies of printed materials may be obtained from Ross at the charges then in effect.

5.2 Machine-Readable Matter. Except as specifically set forth herein, any Software provided in machine-readable form may not be copied by Licensee in whole or in part, except for Licensee's backup or archive purposes. Licensee agrees to maintain appropriate records of the number and location of all copies of the Software and make such records available upon Ross's request. Licensee further agrees to reproduce all copyright and other proprietary notices on all copies of the Software in the same form and manner that such copyright and other proprietary notices are originally included on the Software.

6. LICENSE FEES AND PAYMENT.

6.1 License Fee. In consideration of the license rights granted in Article 2 above, Licensee shall pay the License Fees or other consideration for the Software and Documentation as set forth on Exhibit "A" attached hereto. All amounts payable hereunder by Licensee shall be payable no later than thirty (30) days following receipt of invoice without deductions for taxes, assessments, fees, or charges of any kind. Cheques shall be made payable to Ross and shall be forwarded to the Office at Ross as follows:

Ross Video Ltd.
8 John Street
Iroquois, ON
K0E 1K0

6.2 Software/Hardware Maintenance Fee. In consideration of the license rights granted in Article 2 above, Licensee shall pay, on a yearly basis, the Software/Hardware Maintenance Fee or other consideration for the maintenance, support and update of the software as set forth on Exhibit "B". The Software/Hardware Maintenance Fee is due on a yearly basis starting on the date that is 15 months after shipment by Ross of the product described on Exhibit "A" attached hereto and thereafter on each 12 month anniversary of such date. All amounts payable hereunder by Licensee shall be payable no later than thirty (30) days following receipt of invoice without deductions for taxes, assessments, fees, or charges of any kind. Cheques shall be made payable to Ross and shall be forwarded to the Office at Ross as follows:

Ross Video Ltd.
8 John Street
Iroquois, ON
K0E 1K0

Provided that the Licensee has paid in full the Software/Hardware Maintenance Fees for 3 consecutive years, Licensee shall receive a Quorum Server Hardware upgrade as per Exhibit "B" after payment of the 3rd consecutive Maintenance Payment. The Quorum Server Hardware may change from time to time and the model and type used is designated by Ross. If Licensee is in default of payment of a Software/Hardware Maintenance Fee, such must be paid in full for any default years before a hardware or software upgrade will be provided. Such upgrade will be available to the Licensee at the end of each three (3) year period, following the end of the first (1st) year of the term of this License, provided that the Licensee continues to own and operate the Designated Equipment in connection with which this License is granted and provided, as stated above, that the Licensee has paid its Software/Hardware Maintenance Fee in each of the 3 preceding years.

6.3 Taxes and Other Charges. Licensee shall be responsible for paying all (i) sales, use, excise, value-added, or other tax or governmental charges imposed on the licensing or use of the Software or Documentation hereunder, (ii) freight, insurance and installation charges, and (iii) import or export duties or like charges.

7. PROTECTION OF SOFTWARE.

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Eclipse

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* org.eclipse.jetty.orbit:org.eclipse.jdt.core

The following artifacts are EPL and ASL2.

* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.

* org.eclipse.jetty.orbit:javax.mail.glassfish

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Oracle

The following artifacts are CDDL + GPLv2 with classpath exception.

https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
* javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

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Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following
artifacts may be included in the distribution or downloaded when ALPN
module is selected.

* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications
are hosted at github and both modified and original are under GPL v2 with
classpath exceptions.

http://openjdk.java.net/legal/gplv2+ce.html

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OW2

The following artifacts are licensed by the OW2 Foundation according to the
terms of http://asm.ow2.org/license.html

org.ow2.asm:asm-commons
org.ow2.asm:asm

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Apache

The following artifacts are ASL2 licensed.

org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl
```

MortBay

The following artifacts are ASL2 licensed. Based on selected classes from following Apache Tomcat jars, all ASL2 licensed.

org.mortbay.jasper:apache-jsp
org.apache.tomcat:tomcat-jasper
org.apache.tomcat:tomcat-juli
org.apache.tomcat:tomcat-jsp-api
org.apache.tomcat:tomcat-el-api
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-api
org.apache.tomcat:tomcat-util-scan
org.apache.tomcat:tomcat-util
org.mortbay.jasper:apache-el
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-el-api

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<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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