



# **LIVETOUCH**

SQ2000 SPORT HIGHLIGHTS & REPLAY SYSTEM

## **Installation Manual**

13-06520-010

2021-02-19

[www.grassvalley.com](http://www.grassvalley.com)

## FCC Compliance

In order to comply with FCC/CFR47: Part 15 regulations, it is necessary to use high-quality, triple-screened Media or Monitor cable assemblies with integrated ferrite suppression at both ends.

## Patent Information

This product may be protected by one or more patents.

For further information, please visit: [www.grassvalley.com/patents/](http://www.grassvalley.com/patents/)

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Title	LiveTouch Installation Manual
Part Number	13-06520-010
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## Important Safety Information

This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions appear throughout the manual where they apply. Please read and follow this important information, especially those instructions related to the risk of electric shock or injury to persons.

### Symbols and Their Meanings



Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



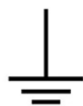
Indicates that the user, operator or service technician should refer to the product manuals for important operating, maintenance, or service instructions.



This is a prompt to note the fuse rating when replacing fuses. The fuse referenced in the text must be replaced with one having the ratings indicated.



Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.



Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.



Indicates that static sensitive components are present, which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.



Indicates that the equipment has more than one power supply cord, and that all power supply cords must be disconnected before servicing to avoid electric shock.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Canadian Standard Association (CSA) regulations and recommendations for USA/Canada.



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The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified to applicable safety test standards for USA/Canada by TÜV SÜD.



The presence of this symbol in or on Grass Valley product means that it complies with applicable UK safety and EMC requirements.



The presence of this symbol in or on Grass Valley product means that it complies with all applicable European Union (CE) directives.



The presence of this symbol in or on Grass Valley product means that it complies with safety of laser product applicable standards.

## Warnings



A warning indicates a possible hazard to personnel, which may cause injury or death. Observe the following general warnings when using or working on this equipment:

- Appropriately listed/certified mains supply power cords must be used for the connection of the equipment to the rated mains voltage.
- This product relies on the building's installation for short-circuit (over-current) protection. Ensure that a fuse or circuit breaker for the rated mains voltage is used on the phase conductors.
- Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only.
- Do not operate the equipment in wet or damp conditions.
- This equipment is grounded through the grounding conductor of the power cords. To avoid electrical shock, plug the power cords into a properly wired receptacle before connecting the equipment inputs or outputs.
- Route power cords and other cables so they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.
- High leakage current may be present. Earth connection of product is essential before connecting power.
- Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.

- To avoid fire hazard, use only the fuse type and rating specified in the service instructions for this product, or on the equipment.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Use proper lift points. Do not use door latches to lift or move equipment.
- Avoid mechanical hazards. Allow all rotating devices to come to a stop before servicing.
- Have qualified service personnel perform safety checks after any service.

## Cautions



A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

- This equipment is meant to be installed in a restricted access location.
- When installing this equipment, do not attach the power cord to building surfaces.
- Products that have no on/off switch, and use an external power supply must be installed in proximity to a main power outlet that is easily accessible.
- Use the correct voltage setting. If this product lacks auto-ranging power supplies, before applying power ensure that each power supply is set to match the power source.
- Provide proper ventilation. To prevent product overheating, provide equipment ventilation in accordance with the installation instructions.
- Do not operate with suspected equipment failure. If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.
- 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. Refer all servicing to qualified service personnel.
- This unit may have more than one power supply cord. Disconnect all power supply cords before servicing to avoid electric shock.
- Follow static precautions at all times when handling this equipment. Servicing should be done in a static-free environment.
- To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

## Electrostatic Discharge (ESD) Protection



Electrostatic discharge occurs when electronic components are improperly handled and can result in intermittent failure or complete damage adversely affecting an electrical circuit. When you remove and replace any card from a frame always follow ESD-prevention procedures:

- Ensure that the frame is electrically connected to earth ground through the power cord or any other means if available.
- Wear an ESD wrist strap ensuring that it makes good skin contact. Connect the grounding clip to an *unpainted surface* of the chassis frame to safely ground unwanted ESD voltages. If no wrist strap is available, ground yourself by touching the *unpainted* metal part of the chassis.

- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.
- When temporarily storing a card make sure it is placed in an ESD bag.
- Cards in an earth grounded metal frame or casing do not require any special ESD protection.

## Battery Handling



This product may include a backup battery. There is a danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Before disposing of your Grass Valley equipment, please review the *Disposal and Recycling Information* at:

[http://www.grassvalley.com/assets/media/5692/Take-Back\\_Instructions.pdf](http://www.grassvalley.com/assets/media/5692/Take-Back_Instructions.pdf)

## Cautions for LCD and TFT Displays



Excessive usage may harm your vision. Rest for 10 minutes for every 30 minutes of usage.

If the LCD or TFT glass is broken, handle glass fragments with care when disposing of them. If any fluid leaks out of a damaged glass cell, be careful not to get the liquid crystal fluid in your mouth or skin. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all times.

## Mesures de sécurité et avis importants

La présente section fournit des consignes de sécurité importantes pour les opérateurs et le personnel de service. Des avertissements ou mises en garde spécifiques figurent dans le manuel, dans les sections où ils s'appliquent. Prenez le temps de bien lire les consignes et assurez-vous de les respecter, en particulier celles qui sont destinées à prévenir les décharges électriques ou les blessures.

## Signification des symboles utilisés



Signale la présence d'une tension élevée et dangereuse dans le boîtier de l'équipement ; cette tension peut être suffisante pour constituer un risque de décharge électrique.



Avertit l'utilisateur, l'opérateur ou le technicien de maintenance que des instructions importantes relatives à l'utilisation et à l'entretien se trouvent dans la documentation accompagnant l'équipement.



Invite l'utilisateur, l'opérateur ou le technicien de maintenance à prendre note du calibre du fusible lors du remplacement de ce dernier. Le fusible auquel il est fait référence dans le texte doit être remplacé par un fusible du même calibre.



Identifie une borne de mise à la terre de protection. Il faut relier cette borne à la terre avant d'effectuer toute autre connexion à l'équipement.



Identifie une borne de mise à la terre externe qui peut être connectée en tant que borne de mise à la terre supplémentaire.



Signale la présence de composants sensibles à l'électricité statique et qui sont susceptibles d'être endommagés par une décharge électrostatique. Utilisez des procédures, des équipements et des surfaces antistatiques durant les interventions d'entretien.



Le symbole ci-contre signifie que l'appareil comporte plus d'un cordon d'alimentation et qu'il faut débrancher tous les cordons d'alimentation avant toute opération d'entretien, afin de prévenir les chocs électriques.



La marque UL certifie que l'appareil visé a été testé par Underwriters Laboratory (UL) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



La marque C-CSA-US certifie que l'appareil visé a été testé par l'Association canadienne de normalisation (CSA) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



La marque C-UL-US certifie que l'appareil visé a été testé par Underwriters Laboratory (UL) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



La marque ETL Listed d'Intertek pour le marché Nord-Américain certifie que l'appareil visé a été testé par Intertek et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



La présence de ce symbole à l'intérieur ou l'extérieur d'un équipement Grass Valley signifie qu'il a été testé et certifié selon les normes applicables de sécurité pour les É.-U./Canada par TÜV SÜD.



La présence de ce symbole sur un appareil Grass Valley signifie qu'il est conforme aux exigences applicables du Royaume-Uni en matière de sécurité et de compatibilité électromagnétique.



Le marquage CE indique que l'appareil visé est conforme aux exigences essentielles des directives applicables de l'Union européenne en matière de sécurité électrique, de compatibilité électromagnétique et de conformité environnementale.



Le symbole ci-contre sur un appareil Grass Valley ou à l'intérieur de l'appareil indique qu'il est conforme aux normes applicables en matière de sécurité laser.

## Avertissements



Les avertissements signalent des conditions ou des pratiques susceptibles d'occasionner des blessures graves, voire fatales. Veuillez vous familiariser avec les avertissements d'ordre général ci-dessous :

- Un cordon d'alimentation dûment homologué doit être utilisé pour connecter l'appareil à une tension de secteur de 120 V CA ou 240 V CA.
- La protection de ce produit contre les courts-circuits (surintensités) dépend de l'installation électrique du bâtiment. Assurez-vous qu'un fusible ou un disjoncteur pour 120 V CA ou 240 V CA est utilisé sur les conducteurs de phase.
- Dans le présent manuel, toutes les instructions qui nécessitent d'ouvrir le couvercle de l'équipement sont destinées exclusivement au personnel technique qualifié.
- N'utilisez pas cet appareil dans un environnement humide.
- Cet équipement est mis à la terre par le conducteur de mise à la terre des cordons d'alimentation. Pour éviter les chocs électriques, branchez les cordons d'alimentation sur une prise correctement câblée avant de brancher les entrées et sorties de l'équipement.
- Acheminez les cordons d'alimentation et autres câbles de façon à ce qu'ils ne risquent pas d'être endommagés. Supportez correctement les enroulements de câbles afin de ne pas endommager les connecteurs.
- Coupez l'alimentation avant de nettoyer l'équipement. Ne pas utiliser de nettoyeurs liquides ou en aérosol. Utilisez uniquement un chiffon humide.
- Des tensions dangereuses peuvent exister en plusieurs points dans cet équipement. Pour éviter toute blessure, ne touchez pas aux connexions ou aux composants exposés lorsque l'appareil est sous tension.
- Avant de procéder à toute opération d'entretien ou de dépannage, enlevez tous vos bijoux (notamment vos bagues, votre montre et autres objets métalliques).
- Pour éviter tout risque d'incendie, utilisez uniquement les fusibles du type et du calibre indiqués sur l'équipement ou dans la documentation qui l'accompagne.
- Ne pas utiliser cet appareil dans une atmosphère explosive.
- Présence possible de courants de fuite. Un raccordement à la masse est indispensable avant la mise sous tension.
- Après tout travail d'entretien ou de réparation, faites effectuer des contrôles de sécurité par le personnel technique qualifié.



## Mises en garde



Les mises en garde signalent des conditions ou des pratiques susceptibles d'endommager l'équipement. Veuillez vous familiariser avec les mises en garde ci-dessous :

- L'appareil est conçu pour être installé dans un endroit à accès restreint.
- Au moment d'installer l'équipement, ne fixez pas les cordons d'alimentation aux surfaces intérieures de l'édifice.
- Les produits qui n'ont pas d'interrupteur marche-arrêt et qui disposent d'une source d'alimentation externe doivent être installés à proximité d'une prise de courant facile d'accès.
- Si l'équipement n'est pas pourvu d'un modules d'alimentation auto-adaptables, vérifiez la configuration de chacun des modules d'alimentation avant de les mettre sous tension.
- Assurez une ventilation adéquate. Pour éviter toute surchauffe du produit, assurez une ventilation de l'équipement conformément aux instructions d'installation.
- N'utilisez pas l'équipement si vous suspectez un dysfonctionnement du produit. Faites-le inspecter par un technicien qualifié.
- Pour réduire le risque de choc électrique, n'effectuez pas de réparations autres que celles qui sont décrites dans le présent manuel, sauf si vous êtes qualifié pour le faire. Confiez les réparations à un technicien qualifié. La maintenance doit se réaliser dans un milieu libre d'électricité statique.
- L'appareil peut comporter plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher tous les cordons d'alimentation avant toute opération d'entretien.
- Veillez à toujours prendre les mesures de protection antistatique appropriées quand vous manipulez l'équipement.
- Pour réduire le risque de choc électrique, branchez chaque cordon d'alimentation dans des circuits de dérivation distincts utilisant des zones de service distinctes.

## Protection contre les décharges électrostatiques (DES)



Une décharge électrostatique peut se produire lorsque des composants électroniques ne sont pas manipulés de manière adéquate, ce qui peut entraîner des défaillances intermittentes ou endommager irrémédiablement un circuit électrique. Au moment de remplacer une carte dans un châssis, prenez toujours les mesures de protection antistatique appropriées :

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.
- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.
- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.

- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.
- Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

## Manipulation de la pile



Ce produit peut inclure une pile de sauvegarde. Il y a un risque d'explosion si la pile est remplacée de manière incorrecte. Remplacez la pile uniquement par un modèle identique ou équivalent recommandé par le fabricant. Disposez des piles usagées conformément aux instructions du fabricant. Avant de vous séparer de votre équipement Grass Valley, veuillez consulter les *informations de mise au rebut et de recyclage* à:

[http://www.grassvalley.com/assets/media/5692/Take-Back\\_Instructions.pdf](http://www.grassvalley.com/assets/media/5692/Take-Back_Instructions.pdf)

## Précautions pour les écrans LCD et TFT



Regarder l'écran pendant une trop longue période de temps peut nuire à votre vision. Prenez une pause de 10 minutes, après 30 minutes d'utilisation.

Si l'écran LCD ou TFT est brisé, manipulez les fragments de verre avec précaution au moment de vous en débarrasser. veillez à ce que le cristal liquide n'entre pas en contact avec la peau ou la bouche. En cas de contact avec la peau ou les vêtements, laver immédiatement à l'eau savonneuse. Ne jamais ingérer le liquide. La toxicité est extrêmement faible, mais la prudence demeure de mise en tout temps.

## Environmental Information

European (CE) WEEE directive.



This symbol on the product(s) means that at the end of life disposal it should not be mixed with general waste.

Visit [www.grassvalley.com](http://www.grassvalley.com) for recycling information.

Grass Valley believes this environmental information to be correct but cannot guarantee its completeness or accuracy since it is based on data received from sources outside our company. All specifications are subject to change without notice.

If you have questions about Grass Valley environmental and social involvement (WEEE, RoHS, REACH, etc.), please contact us at [environment@grassvalley.com](mailto:environment@grassvalley.com).

## Lithium Batteries

### Battery Warning

#### **CAUTION**

This equipment contains a lithium battery.  
**There is a danger of explosion if this is replaced incorrectly.**  
Replace only with the same or equivalent type.  
Dispose of used batteries according to the manufacturer's  
instructions.  
Batteries **shall only** be replaced by trained service technicians.

Your Grass Valley equipment usually comes with at least one button battery located on the main printed circuit board. The batteries are used for backup and should not need to be replaced during the lifetime of the equipment.

### Battery Disposal

Before disposing of your Grass Valley equipment, please remove the battery as follows:

- 1 Make sure the AC adapter / power Cord is unplugged from the power outlet.
- 2 Remove the protective cover from your equipment.
- 3 Gently remove the battery from its holder using a blunt instrument for leverage such as a screwdriver if necessary. In some cases the battery will need to be desoldered from the PCB.
- 4 Dispose of the battery and equipment according to your local environmental laws and guidelines.

#### WARNING

- Be careful not to short-circuit the battery by adhering to the appropriate safe handling practices.
- Do not dispose of batteries in a fire as they may explode.
- Batteries may explode if damaged or overheated.
- Do not dismantle, open or shred batteries.
- In the event of a battery leak, do not allow battery liquid to come in contact with skin or eyes.
- Seek medical help immediately in case of ingestion, inhalation, skin or eye contact, or suspected exposure to the contents of an opened battery.

## Laser Safety - Fiber QSFP Modules Warning

# LASER SAFETY



The average optical output power does not exceed 0 dBm (1mW) under normal operating conditions. Unused optical outputs should be covered to prevent direct exposure to the laser beam.

Even though the power of these lasers is low, the beam should be treated with caution and common sense because it is intense and concentrated. Laser radiation can cause irreversible and permanent damage of eyesight. Please read the following guidelines carefully:

- Make sure that a fiber is connected to the board's fiber outputs before power is applied. If a fiber cable (e.g. patchcord) is already connected to an output, make sure that the cable's other end is connected, too, before powering up the board.
- **Do not** look in the end of a fiber to see if light is coming out. The laser wavelengths being used are totally invisible to the human eye and can cause permanent damage. Always use optical instrumentation, such as an optical power meter, to verify light output.

## Safety and EMC Standards

This equipment complies with the following standards:



### Safety Standards

#### Information Technology Equipment - Safety Part 1

Audio/video, information and communication technology equipment - Part 1: Safety requirements

IEC 62368-1: 2014, EN 62368-1: 2014, UL 62368-1: 2014, CAN/CSA C22.2 No 62368-1: 2014, AS/NZS 62368-1: 2018.

### EMC Standards

This unit conforms to the following standards:

#### EN55032:2015 (Class A)

Electromagnetic Compatibility of multimedia equipment - Emission requirements

#### EN61000-3-2:2014 (Class A)

Electromagnetic Compatibility - Limits for harmonic current emissions

#### EN61000-3-3:2013

Electromagnetic Compatibility - Limits of voltage changes, voltage fluctuations and flicker

#### EN55035:2017

Electromagnetic Compatibility of Multimedia Equipment. Immunity requirements.

**WARNING**

This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

#### FCC / CFR 47:Part 15 (Class A)

Federal Communications Commission Rules Part 15, Subpart B

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

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Note: 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.

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## **EMC Performance of Cables and Connectors**

Grass Valley products are designed to meet or exceed the requirements of the appropriate European EMC standards. In order to achieve this performance in real installations it is essential to use cables and connectors with good EMC characteristics.

All signal connections (including remote control connections) shall be made with screened cables terminated in connectors having a metal shell. The cable screen shall have a large-area contact with the metal shell.

### **SIGNAL/DATA PORTS**

For unconnected signal/data ports on the unit, fit shielding covers. For example, fit EMI blanking covers to SFP+ type ports; and fit 75  $\Omega$  RF terminators to BNC type ports.

### **COAXIAL CABLES**

Coaxial cables connections (particularly serial digital video connections) shall be made with high-quality double-screened coaxial cables such as Belden 8281 or BBC type PSF1/2M and Belden 1694A (for 3Gbps).

### **D-TYPE CONNECTORS**

D-type connectors shall have metal shells making good RF contact with the cable screen. Connectors having "dimples" which improve the contact between the plug and socket shells, are recommended.

# toc

## Table of Contents

FCC Compliance .....	ii
Patent Information .....	ii
Copyright and Trademark Notice .....	ii
Battery Disposal .....	.xi
Laser Safety - Fiber QSFP Modules Warning .....	xii
Safety and EMC Standards .....	xiii
Safety Standards .....	xiii
EMC Standards .....	xiii
EMC Performance of Cables and Connectors .....	xiv
<b>1 Introduction .....</b>	<b>1</b>
About this Manual .....	1
Overview .....	2
Clipnet Media Network .....	2
Advanced Super Motion Support .....	2
A Native UHD and HDR Platform without Sacrifice .....	3
Instant, Integrated Editing .....	3
Summary of the LiveTouch (SQ2000) Server Features .....	4
Overview of LiveTouch System Components .....	5
LiveTouch Server .....	5
LiveTouch Panel .....	5
LiveTouch Desktop Client PC .....	5
LiveTouch ISA .....	5
LiveTouch Manager VM .....	6
LiveTouch Search VM (Web Bin) .....	6
<b>2 Connecting the LiveTouch Components .....</b>	<b>7</b>
Overview .....	7
LiveTouch (SQ2000) Server Connectors .....	8
Removing the SQ2000 Server front door .....	9
Connecting the LiveTouch Server .....	10
<b>3 Environment and Location .....</b>	<b>13</b>
Environmental Considerations .....	13
Rack-mounting Considerations .....	14
Component Cooling .....	15
Air Flow through the LiveTouch (SQ2000) Server .....	15

<b>4 Power Supplies</b>	<b>17</b>
Internal Power Supplies	17
Checking the Power Supplies	18
Removing the Power Supplies	18
<b>5 Specifications</b>	<b>19</b>
Overview	19
LiveTouch (SQ2000) Server Specifications	19
LiveTouch (SQ2000) Server Interface Cards	20
Supported Video Compression Formats	22
Supported Proxy Compression Formats	22
Supported Audio Formats	22
Environmental Specifications	23
Power Specifications	23
Reference Signal Specifications	24
Storage Option Specifications	24
Providing Information to Grass Valley	25
Basic Information	25
Software Application	25
Your Contact Details	25
Customer Support	25
<b>Contact Us</b>	<b>27</b>



# 1 Introduction

## About this Manual

This installation manual help you through the physical installation of your LiveTouch SQ2000 Server, and advise you of all relevant safety aspects.

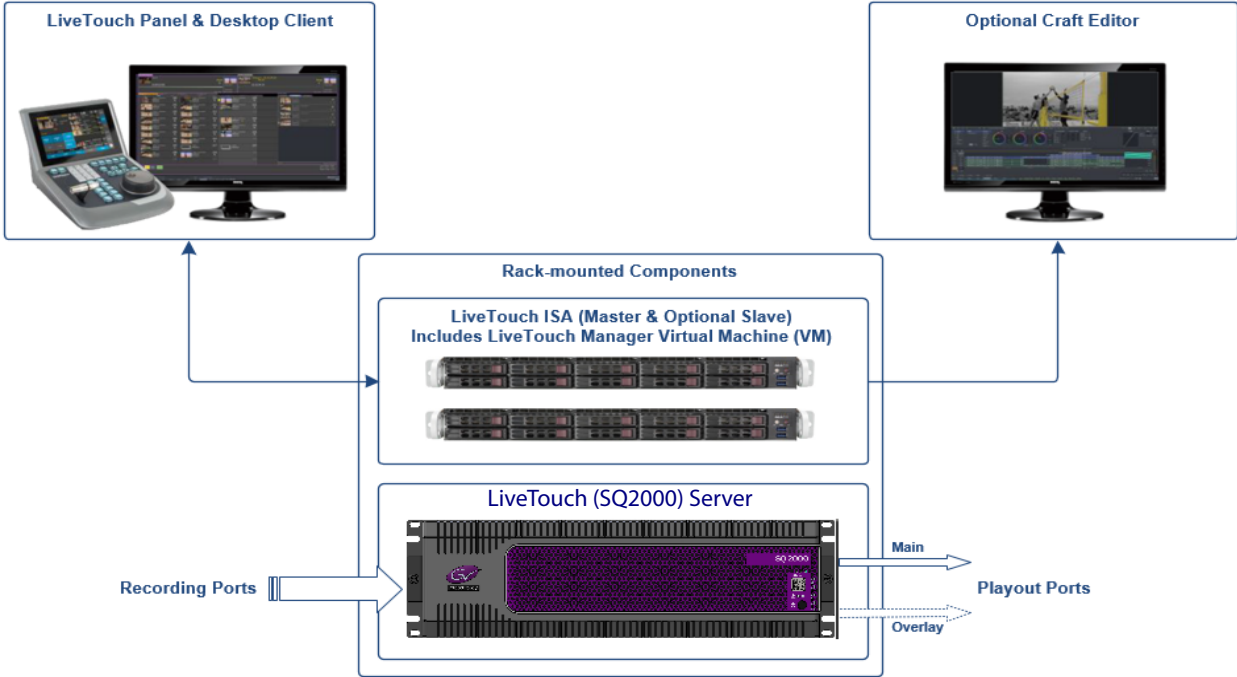


Fig. 1-1: Example of LiveTouch SQ2000 Server and Replay System Components

## Overview

LiveTouch (SQ2000 Server) is the next generation server platform in the sQ/LiveTouch family which will initially target high performance replay workflows. LiveTouch (sQ2000) is an ultra-high density video server which will include a market leading feature set in instant replay and high performance video server applications.

Each LiveTouch (SQ2000) Server is factory configured as a HD (high definition) or UHD (ultra-high definition) networked distribution server employing industry standard compression systems. Features include:

- The highest port density of any replay server on the market
- 12 ports/server in UHD
- 24 ports/server in HD & 3G
- Dual redundant 100G - 2110 IP Interfaces per I/O card (200G total). The most powerful IP architecture on the market enabling unique I/O configurations and headroom to expand even further in the future
- Clipnet media network interfaces for inter-server streaming and media sharing workflows
- Access any angle, anywhere instantaneously with instant system wide access to any angle on the network with Clipnet
- Up to internal 64TB SSD storage to better accommodate the ultra-high port count. The most internal storage available on any replay server in the market today.
- Instant, integrated craft editing available at every operator workstation using Frame Magic technology. Instantly load any replay clip or playlist into a fully featured craft edit timeline.
- Unique powerful, flexible processing in mixed format workflows. Dynamically mix UHD, 3G and HD content on the same playout port. LiveTouch also provides the capability to convert between SDR and HDR on the fly to handle multiple broadcast deliverables simultaneously. LiveTouch even allows cross mapping between different types of HDR.

### Clipnet Media Network

The LiveTouch (SQ2000) Clipnet provides a centralized ingest model for operators, allowing unrestricted access to content anywhere on the system. Access any angle, anywhere instantly with LiveTouch. Clipnet connections allows replay operators to stream remote cameras from any server instantaneously. This removes any delays or complexity when spreading complex workflows across multiple servers.

### Advanced Super Motion Support

LiveTouch (SQ2000) supports a wide range of super motion cameras to support your live sports production. Get ultra-smooth playback from 2x to 10x super motion in HD and 3x super motion in UHD. Super motion inputs are easy to configure via the SQ2000 web page saving valuable time before live productions.

### **A Native UHD and HDR Platform without Sacrifice**

LiveTouch (sQ2000) supports UHD workflows without drastically sacrificing port count or tool set. **LiveTouch SQ2000** supports 12 channels of UHD per server and allows a comprehensive tool set in both editing and replay workflows using XAVC Class 300. Working with multiple resolutions is also a breeze with flexible multi-resolution support. Work with a mixture of HD and UHD on the same server with instant, dynamic up-res and down-res on playout.

SQ2000 also features ultra-flexible HDR support of up to 24 channels of 1080p or 12 Channels of UHD in Rec. 2020. **LiveTouch SQ2000** can also seamlessly handle mixed SDR and HDR inputs. Many sports productions require multiple deliverables in different resolutions and color spaces, LiveTouch 2000 is the perfect replay solution in a mixed environment allowing ultimate flexibility.

### **Instant, Integrated Editing**

LiveTouch is the only replay solution on the market to allow instant media sharing between replay and editing. Using Grass Valley Frame Magic technology, any replay clip or highlight playlist can be instantly loaded into a fully featured craft editor. This eliminates any latency between replay operators and editors allowing unmatched speed for creative workflows. Instantly feed replay assets through the production chain and take advantage of a powerful editing tool set which delivers both simple edits and advanced effects for rapid turnaround during live production.

## Summary of the LiveTouch (SQ2000) Server Features

The following table summarizes the main features of the LiveTouch Server:

Item	Description
<b>General</b>	
Video Channels	<ul style="list-style-type: none"><li>• Up to 24 HD</li><li>• Up to 12 UHD</li></ul>
Clipnet Network	<ul style="list-style-type: none"><li>• 2x 10G (Copper and Optical)</li></ul>
Native Multi-format Support	<ul style="list-style-type: none"><li>• AVC Intra</li><li>• XAVC Class 300 (UHD)</li><li>• DNxHD</li></ul>
IP	<ul style="list-style-type: none"><li>• ST2110</li><li>• Dual 100G (per I/O) Card</li><li>• NMOS IS-04, IS-05</li></ul>
SDI	<ul style="list-style-type: none"><li>• 1.5G SDI, 3G SDI, 12G SDI</li></ul>
HDR	<ul style="list-style-type: none"><li>• S-Log, HLG, PQ</li></ul>
Redundancy	<ul style="list-style-type: none"><li>• Dual-redundant PSUs</li></ul>
Audio	<ul style="list-style-type: none"><li>• Embedded Audio</li><li>• External Audio - MADI</li></ul>
<b>UHD Features</b>	
Channels per server	<ul style="list-style-type: none"><li>• 8x 12G Inputs</li><li>• 4x 12G Outputs</li><li>• 4x 3G Overlay Outputs</li></ul>
Storage	<ul style="list-style-type: none"><li>• Internal Storage - Up to 64TB</li></ul>
Browse/Proxy	<ul style="list-style-type: none"><li>• H.264 and 720p browse workflows for editing and remote access</li></ul>
<b>Agile Codec Support</b>	
Resolution Independent Inputs and Outputs	<ul style="list-style-type: none"><li>• 1080i, 720p, 1080p, UHD</li></ul>
Dynamic upscaling on output	<ul style="list-style-type: none"><li>• Set output resolution, with codecs processed on the fly</li></ul>

If you have any questions about the installation of your product, refer to the contact details listed at the rear of this guide.

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**Note:** All diagrams are for illustrative purposes only and may differ slightly from the purchased product. Grass Valley operates a policy of continuous improvement and development. Grass Valley reserves the right to make changes and improvements to any of the products described in this document without prior notice.

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## Overview of LiveTouch System Components

### LiveTouch Server

LiveTouch (SQ2000) provides an unrivaled channel count in a compact chassis. Utilize 24 channels of 3G or 12 Channels of UHD in a single 3RU mainframe. Each SQ2000 I/O card can be booted in either IP or SDI, providing flexible I/O profiles for demanding live productions. Each I/O card offers a dual redundant 100G IP interface for superior connectivity for SMPTE 2110. The I/O card also features 12 compact HD-SDI connections which are all 12G UHD capable. LiveTouch SQ2000 is the most advanced, high performance video server on the market today.

### LiveTouch Panel

LiveTouch features a dedicated, hardware control panel. Its intuitive touchscreen provides quick clip selection, speed tools and configurable user options. The panel features familiar button placement as well as a number pad for fast navigation by clip number and timecode. The responsive jog wheel provides agile clip navigation and the high-precision T-bar enables precise control of slow-motion playout.

In addition, the LiveTouch Panel touchscreen provides intuitive highlight creation, navigation and playlist building. The LiveTouch Panel can also host third-party web applications such as RT Software tOG Sports for enhanced, live sports workflows.

### LiveTouch Desktop Client PC

The LiveTouch Panel is paired to a LiveTouch Desktop Client PC, which is offered as turnkey hardware or as a software only option. The LiveTouch Client software runs on Windows 7 or Windows 10, as required. The LiveTouch Desktop PC acts as the intermediary between the LiveTouch Panel and LiveTouch Manager, passing commands over the network to execute playback operation.

### LiveTouch ISA

The LiveTouch Integrated Server Architecture (ISA) system is the LiveTouch system component which organizes one or more LiveTouch Video Servers to achieve maximum performance while being tolerant of failures in individual components.

The system can be divided into one or more Zones, each of which has a single or dual-redundant ISA and one or more LiveTouch Video Servers, each having one or more Pools of RAID disks, and zero or more Video Channels.

The ISA Manager stores all the Metadata of all clips in its Zone in a well-protected directory. For user purposes it functions as a single database of all the clips held in that Zone, even though it may be implemented by a number of different computers to ensure reliability. Each clip in a Zone is allocated a unique Clip ID when it is created. The ISA stores the following Metadata items required to describe a Clip:

- ClipID
- Title
- Date of creation.

## **LiveTouch Manager VM**

The LiveTouch Manager is installed as a VM on the ISA Manager. Clients communicate with the LiveTouch Server through the LiveTouch Manager enabling users to access recordings, playout ports, clips and playlists.

## **LiveTouch Search VM (Web Bin)**

The LiveTouch Search engine, which provides the Web Bin functionality, is also installed as a VM on the ISA Manager. The LiveTouch Web Bin allows operators to search, access and share clips and playlists across the system.

# Connecting the LiveTouch Components



## Overview

A standard LiveTouch system comprises the following components:

- LiveTouch Panel
- LiveTouch Desktop Client PC
- LiveTouch Server (SQ2000 Series)
- LiveTouch ISA Managers (Optionally Redundant Pair)

The rear panel connectors for the LiveTouch SQ2000 Server is described in the following sections.

## LiveTouch (SQ2000) Server Connectors

**Note:** The following illustrations of the LiveTouch Server rear panels are for information only.

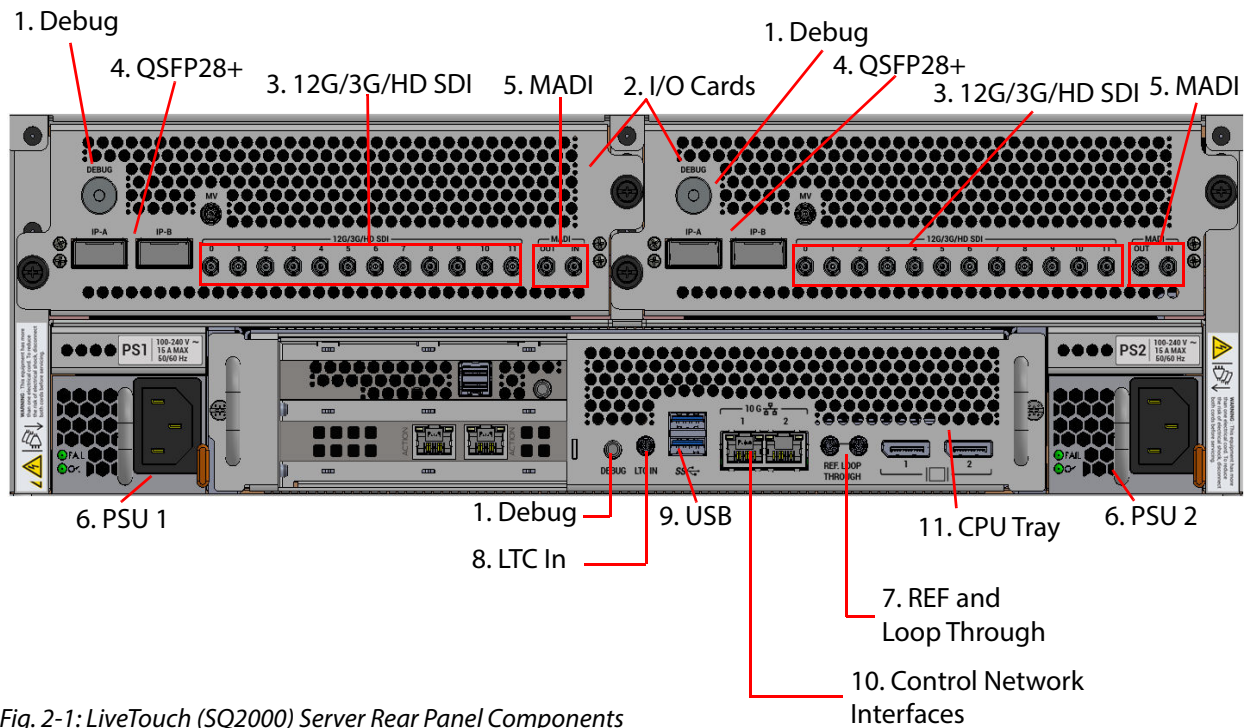


Fig. 2-1: LiveTouch (SQ2000) Server Rear Panel Components

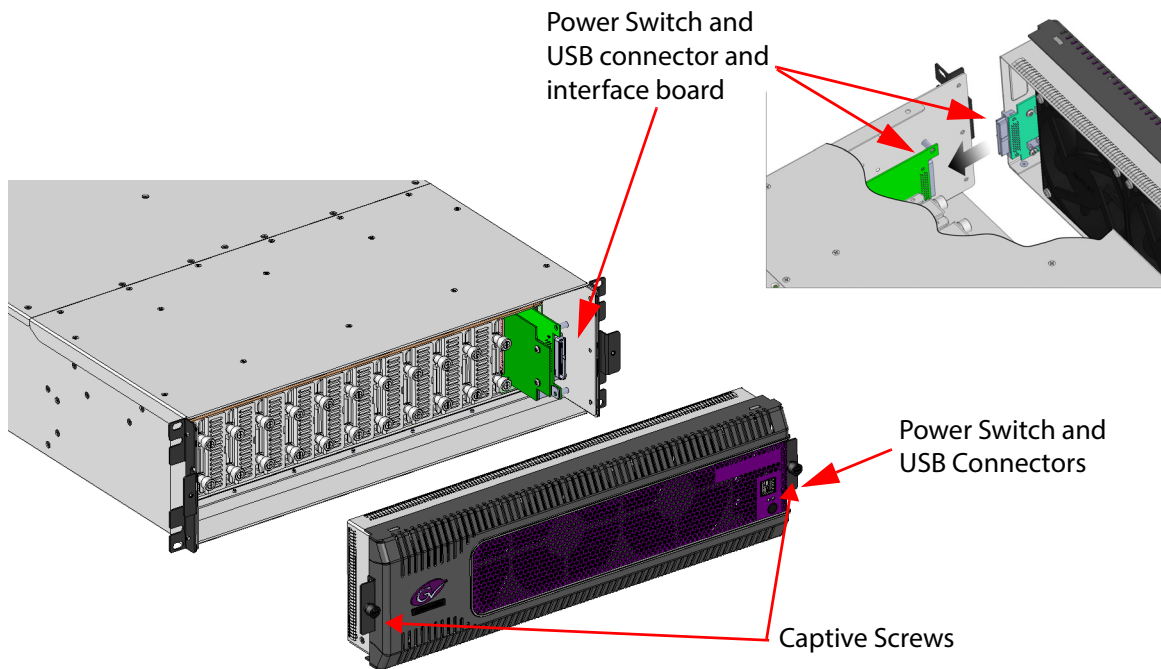
Key to rear panel items shown in Figure 2-1:

Item	Description
<b>LiveTouch (SQ2000) Server Connections</b>	
1	Debug connectors
2	I/O Cards
3	0 to 11 - 12G/3G/HD SDI connectors
4	IP-A and IP-B QSFP28+ connectors
5	MADI In/Out
6	PSU 1 and PSU 2
7	REF and Loop Through connector
8	LTC In connector
9	USB connectors
10	Control Network Interfaces



## Removing the SQ2000 Server front door

On the left and right sides of the front door and captive securing screws. Unscrew the screws and carefully pull the door away from the server body. Do not move the door up and down as you pull away from the server body, as on the right hand side there is an internal connector that connects the power switch and the USB connectors to an internal interface board.



## Connecting the LiveTouch Server

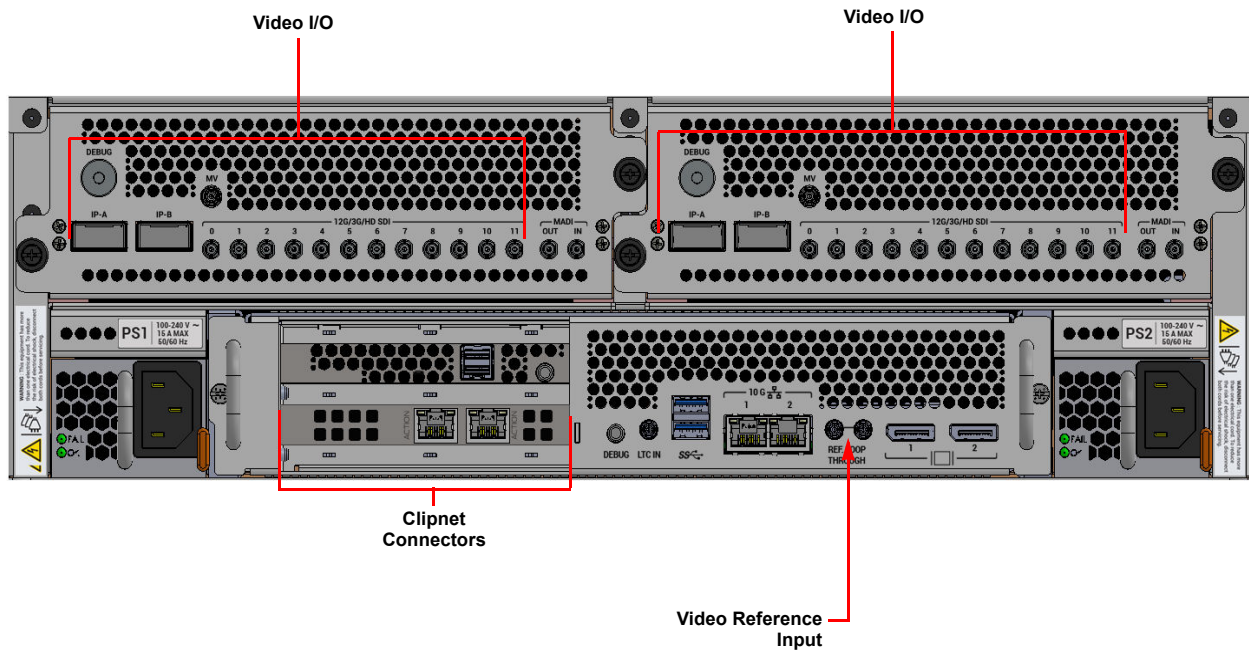


Fig. 2-2: LiveTouch SQ2000 Server Connections

Connect up the LiveTouch SQ2000 Server as follows:

- 1 Connect the server side of the Clipnet network cable to the Clipnet network adapter.
- 2 Connect the other end of the Clipnet network cable to the network Gb Switch.

The Clipnet network cable is as follows:

Option	Description	Details
Dual Ten Gigabit – Copper	Copper interface with RJ45 connections	<b>10G BASE-T</b> <ul style="list-style-type: none"> <li>• Network carrier: 10G BASE-T</li> <li>• Connector type: RJ45</li> <li>• Cable type: CAT 6A</li> <li>• Maximum expected operating distance: 100 m (if patch panels are used, this will reduce)</li> <li>• Communication protocols: TCP/IP &amp; UDP/IP</li> </ul>
Dual Ten Gigabit – Optical	Optical interface with SFP LC connections	<b>10G BASE-SR</b> <ul style="list-style-type: none"> <li>• Network carrier: 10G BASE-SR</li> <li>• Connector type: LC</li> <li>• Cable type: 50/125 µm or 62.5/125 µm fiber</li> <li>• Maximum expected operating distance: Up to 300m dependent on type</li> <li>• Communication protocols: TCP/IP &amp; UDP/IP</li> </ul>

Other Clipnet network cables are optionally available.

- 3 Connect the 1 GbE (RJ45) connector of the Ethernet cable between the Ethernet port and the network Gb Switch.

This enables the ISA to communicate with the LiveTouch Server, and allows control of the LiveTouch Server by the ISA Manager.

- 4 If required, connect the system reference input connector to the reference input defined on the Server Status Summary webpage in the section Reference & System Timecode.

---

**Note:** The reference input is used for SDI video output timing. The reference input/output HD-BNC connectors are unterminated. Terminate the Reference OUT connector with a 75 ohm BNC termination, unless looped-through to a second LiveTouch Server - the last device should always be terminated.

---

- 5 Connect the serial port for monitoring the LiveTouch SQ2000 server as follows:
  - Connect the serial input connector to monitor the status of the CPU.
- 6 Connect the video cables to the HD-BNC connectors of the video processing cards or, to the QSFP28+.
 

Your connections will depend on the requirements and configuration of your system.
- 7 If required, connect the supplied Linear Timecode (LTC) cable between the LTC connector and the house timecode.
 

The LTC input allows a timecode signal to be read by the LiveTouch Server and used as the system timecode as an alternative to the system reference VITC.
- 8 An LTC cable of 1 meter in length, is supplied.

---

**Note:** It is recommended to lock the LTC to the same house reference signal as the Server.

---

- 9 Connect the power cables between the PSU sockets and the power sources mounted in the rack as described in Chapter 4 *Power Supplies*.

# 3 Environment and Location

## Environmental Considerations

This chapter describes how to install the rack-mounted equipment into the 19 inch rack environment and LiveTouch desktop client PC and Panel in the desktop environment. Attention should be paid to the cooling information for the LiveTouch server.

The ambient temperature for all the supplied equipment should not exceed the limits of 5 and 30°C (41 to 86°F) at a relative humidity of 10 to 90% (non-condensing).

Installing the equipment in a clean environment with moderate temperature and humidity will promote a long and trouble-free equipment life.

## Rack-mounting Considerations

To prevent physical injury when mounting or servicing the LiveTouch (SQ2000) Server in a rack, you must take special precautions to ensure that the system remains stable.

The following guidelines are provided for your safety:

- **Caution:** the LiveTouch (SQ2000) server is heavy (28.25Kg) and will need two people to lift into the rack.
- A rack installation kit is supplied with the LiveTouch SQ2000 Server (as shown below).
- Mount units from the lower part of the rack if these are the only components in the rack.
- Mount equipment so that uneven mechanical loading causing hazardous conditions does not arise.

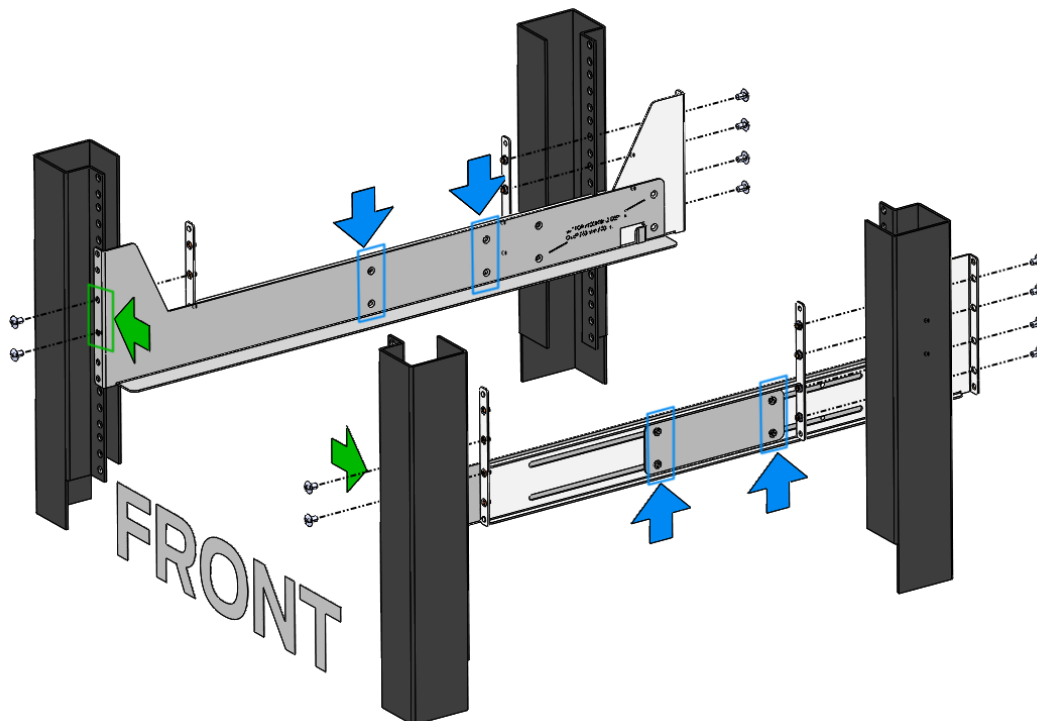


Fig. 3-1: Rack Mount kit Installation.

Blue Arrows:

Loosen these screws while installing the rack kit in a rack, to allow the telescopic effect to work. Tighten them back once the rack kit is installed.

Green Arrows:

When installing the rack kit, only use the two middle rack mount screw holes as shown in the diagram. The holes above and below are for the server. All four screw holes can be used each side on the back.

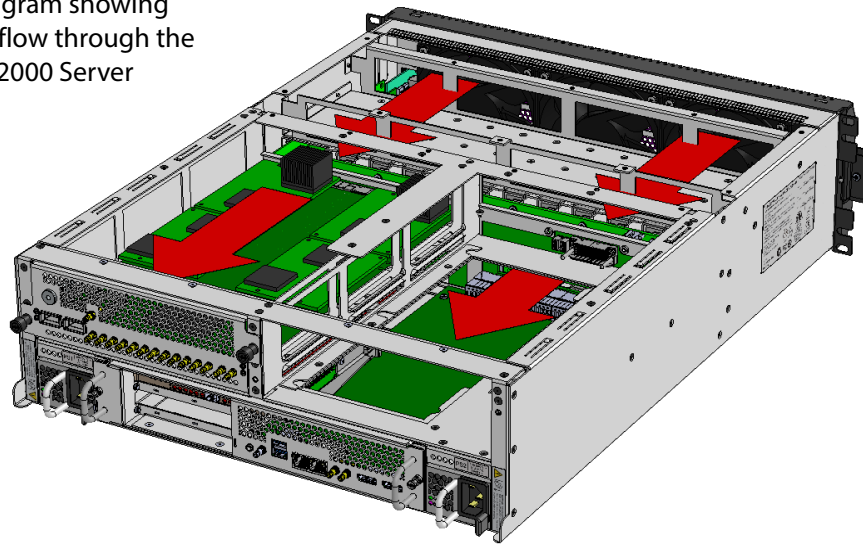
## Component Cooling

### Air Flow through the LiveTouch (SQ2000) Server

The following ventilation precautions should be observed for the rack-mounted LiveTouch (SQ2000) Server:

- 1 The air intakes on both sides and the cooling fan exhausts at the rear of the units must not be obstructed - a minimum clearance of 200 mm (8 inches) at the rear of the rack is essential.
- 2 Air intakes situated at the front and on both sides, are to allow the inflow of cooling air and must not be obstructed.

Diagram showing  
air flow through the  
SQ2000 Server



Airflow through the SQ2000 server is displayed by the red arrows in the diagram above.





# 4 Power Supplies

## Internal Power Supplies

The information below gives an overview of the power supplies used in the LiveTouch SQ2000 Server.



**Note:** To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

The LiveTouch SQ2000 Server is supplied with two power supplies as standard, one powering the device and the other providing redundancy.

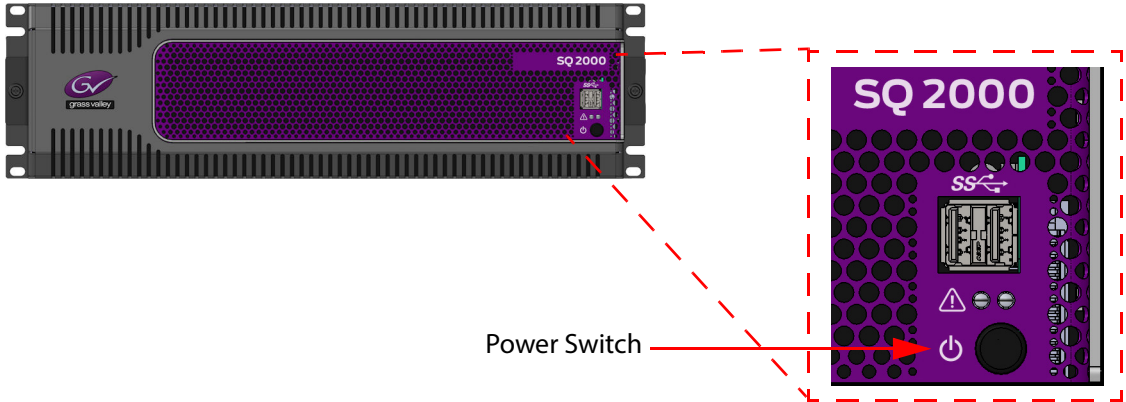
**Note:** To ensure full dual redundancy, the two power supplies must be powered from independent power sources in the cabinet power rails.



This symbol indicates that hazardous voltages are present inside the devices. **No User Serviceable Parts** are inside the power supplies. This unit should only be serviced by trained personnel.

Before powering on the LiveTouch Server, make sure that all foam used to protect the device in transit is removed.

The power supplies for the LiveTouch SQ2000 Server are located at the rear of the unit. The power supplies do not have independent on/off switches. The LiveTouch server has an On/Off switch on the front panel.

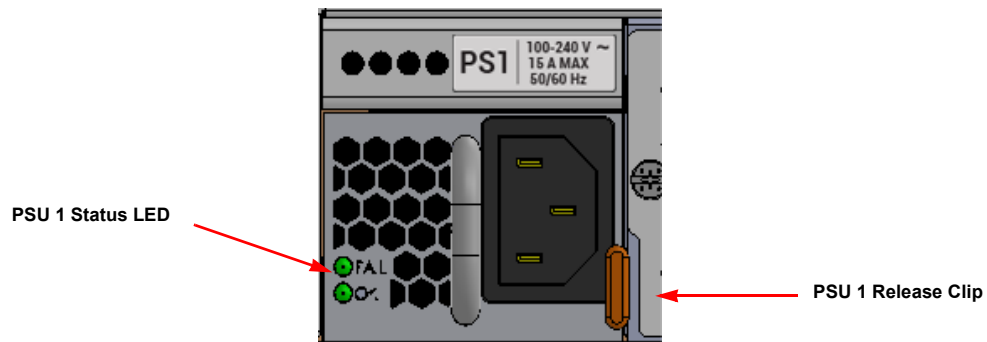


## Checking the Power Supplies

Power supplies in the LiveTouch Server are hot-swappable. Replacing power supplies should only be attempted by qualified personnel.

To check that the power supplies are working correctly, when mains power is applied.

- Green LED = system working OK
- Yellow = Warning
- Red = Error

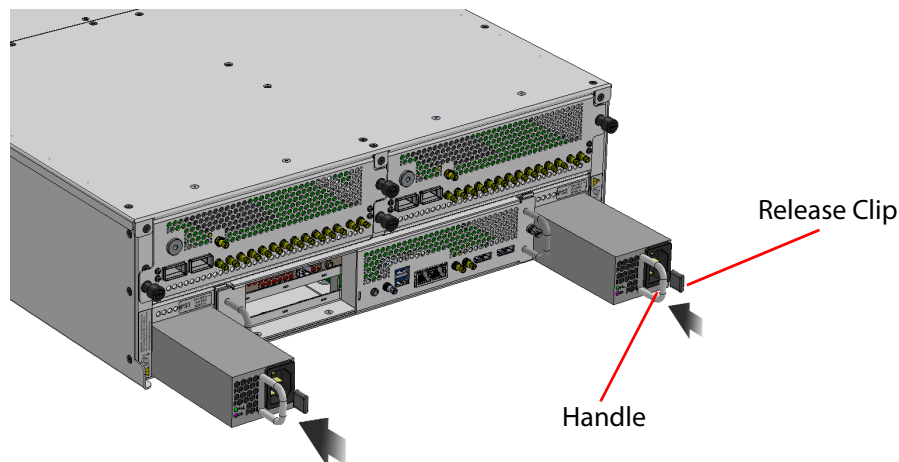


**Note:** Both PSUs have the same configuration

Fig. 4-1: LiveTouch (SQ2000) Server Power Supply Status LEDs

## Removing the Power Supplies

The power supply units (PSUs) in the LiveTouch SQ2000 Server are both hot-swappable so can be individually removed from the unit. Unplug the PSU from the mains and then remove by pressing the release clip, hold the handle and carefully withdrawing the PSU from the body of the Server.



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**Note:** The Power Supplies have NO user serviceable parts inside and if one should become faulty, it should be replaced immediately.

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# 5 Specifications

## Overview

This section defines the specifications of the LiveTouch SQ2000 Server.

## LiveTouch (SQ2000) Server Specifications

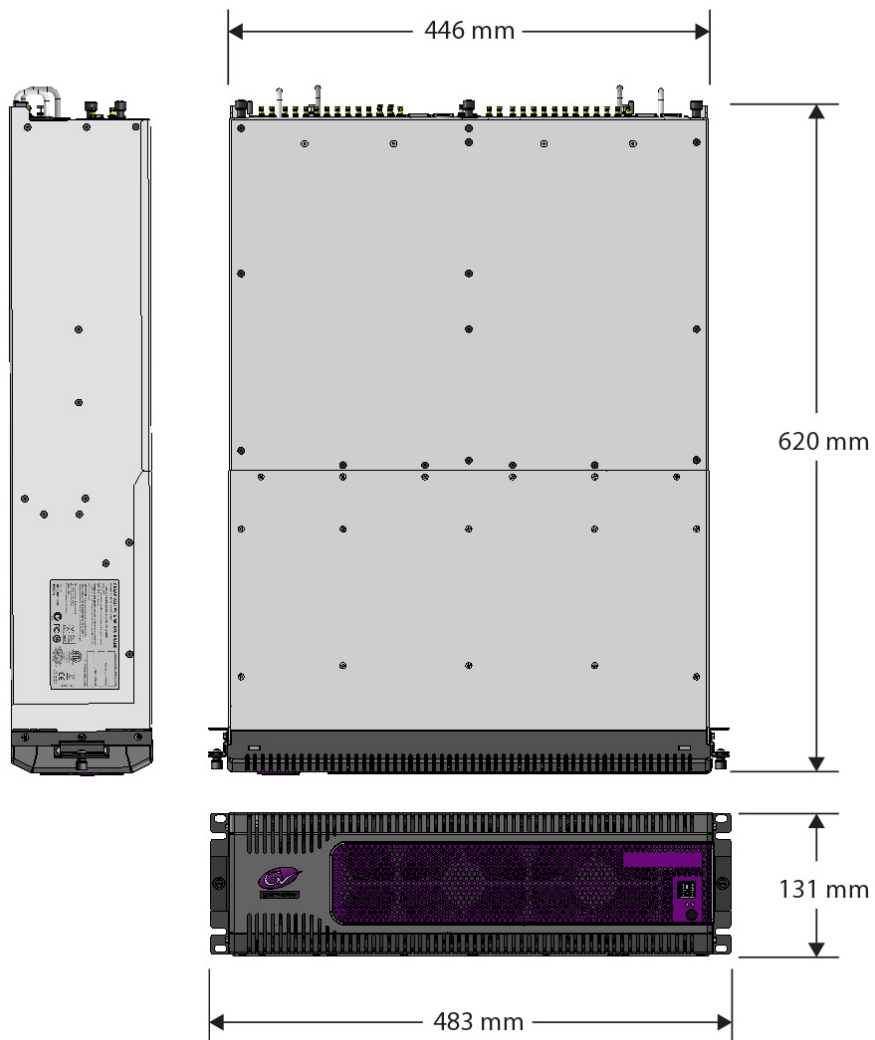


Fig. 5-1: SQ2000 Dimensions

## LiveTouch (SQ2000) Server Interface Cards

<b>Video Network Card</b>	
<b>Item</b>	<b>Description</b>
Internal Name	Clipnet
Interfaces	Dual 10GbE (optical or copper)
Protocol	GV Clipnet QCP and STTP

<b>Video and Audio Connectors</b>	
<b>Inputs</b>	
Connector type	HD-BNC x 1 per port 1.5 GHz / 3 GHz 12 GHz
Input Impedance	75 ohm
Max Cable Length	1.5 GHz / 3 GHz: 100 m of Belden 1694A 12 GHz: 60 m of Belden 1694A
Standards	Each input allows the platform to accept bit serial HD video conforming to SMPTE 292M & 424M with embedded audio packets conforming to SMPTE 299. ANSI/SMPTE 272M (Formatting AES/EBU Audio into Digital Video Ancillary Data Space 48KHz synchronous). SMPTE 292M (Bit-Serial Digital Interface for High-Definition Television Systems). SMPTE 424M (3Gb/s Signal/Data Serial Interface) SMPTE 299M (24-Bit Digital Audio Format for HDTV /Bit-Serial Interface)
<b>Outputs</b>	
Connector type	HD-BNC x 1 per port 1.5 GHz / 3 GHz 12 GHz
Input Impedance	75 ohm
Max Cable Length	270 MHz / 1.5 GHz / 3 GHz: 100 m of Belden 1694A 12 GHz: 100 m of Belden 1694A
Standards	Each input allows the platform to accept bit serial SD video conforming to ITU-R BT. 601-5 & ANSI/SMPTE 259M-2008 with embedded audio packets conforming to ANSI/SMPTE 272M or HD video conforming to SMPTE 292M & 424M with embedded audio packets conforming to SMPTE 299.

<b>Video and Audio Connectors</b>	
<b>Audio</b>	
Embedded Audio	The SQ2000 server has embedded audio via the HD-SDI bit-serial digital video connection ports.
Channels	Up to 32 (record and playback) for embedded SDI audio.
Features	<p>V-Notch on discontinuous media.</p> <ul style="list-style-type: none"> <li>• 16-bit and 24-bit</li> <li>• Freely intermix different audio formats on playback.</li> <li>• Automatic fade up / down.</li> </ul>
<b>Clipnet Video Network</b>	
Two Clipnet options are available:	<ul style="list-style-type: none"> <li>• Dual Ten Gigabit – Copper</li> <li>• Dual Ten Gigabit – Optical</li> </ul>
Dual Ten Gigabit – Copper	<p>Copper interface with RJ45 connections:</p> <ul style="list-style-type: none"> <li>• 10G BASE-T</li> <li>• Network carrier: 10G BASE-T</li> <li>• Connector type: RJ45</li> <li>• Cable type: CAT 6A</li> <li>• Maximum expected operating distance: 100 m (if patch panels are used, this will reduce)</li> <li>• Communication protocols: TCP/IP &amp; UDP/IP</li> </ul>
Dual Ten Gigabit – Optical	<p>Optical interface with SFP LC connections:</p> <ul style="list-style-type: none"> <li>• 10G BASE-SR</li> <li>• Network carrier: 10G BASE-SR</li> <li>• Connector type: LC</li> <li>• Cable type: 50/125 µm or 62.5/125 µm Fibre</li> <li>• Maximum expected operating distance: Up to 300 m dependent on type</li> <li>• Communication protocols: TCP/IP &amp; UDP/IP</li> </ul>
<b>System Network Interface</b>	
The platform provides a 1000 BASE-T Ethernet (RJ45) connection to allow control by the ISA Manager.	<ul style="list-style-type: none"> <li>• Network carrier: 10GbE</li> <li>• Connector type: RJ45</li> <li>• Cable type: CAT 6 or 7</li> <li>• Maximum expected operating distance: 100 m (if patch panels are used, this will reduce).</li> <li>• Communication protocols: TCP/IP &amp; UDP/IP</li> </ul>

## Supported Video Compression Formats

Standard	Details	Description
HD	<ul style="list-style-type: none"><li>• 1080i 59.94</li><li>• 1080i 50</li><li>• 720p 59.94</li><li>• 720p 50</li></ul>	<ul style="list-style-type: none"><li>• AVC Intra</li><li>• DNxHD</li><li>• XAVCi</li></ul>
1080p (Level A)	<ul style="list-style-type: none"><li>• 1080p 59.94</li><li>• 1080p 50</li></ul>	<ul style="list-style-type: none"><li>• AVC Intra</li><li>• DNxHD</li><li>• XAVCi</li></ul>
UHD	<ul style="list-style-type: none"><li>• 2160p 59.94</li><li>• 2160p 50</li></ul>	<ul style="list-style-type: none"><li>• XAVCi</li></ul>

## Supported Proxy Compression Formats

Standard	Details	Compression
HD	<ul style="list-style-type: none"><li>• 720p 59.94</li><li>• 720p 50</li></ul>	<ul style="list-style-type: none"><li>• H264 at 12Mb/s (UHD Only config)</li></ul>

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Note: Proxy generation is not included in all LiveTouch configurations.

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## Supported Audio Formats

- 16 Channels embedded SDI audio per channel
- HD Embedded audio SMPTE 299M
- 16-bit and 24-bit depth
- 48 kHz sampling rate
- Soft clipping in discontinuous clips, at starts and stops
- V-Notch, fades to and from silence
- Freely intermix different audio formats on playback
- Audio input patching
- Audio output patching

## Environmental Specifications

Environmental Specifications	
Minimum Operating Ambient Temperature:	10°C (50°F)
Maximum Operating Ambient Temperature:	30°C (86°F)
Absolute Safe Maximum Ambient Temperature:	40°C (104°F)
Maximum Relative Humidity (RH):	90% (non-condensing)
Weight	28.25Kg

## Power Specifications

The LiveTouch Server power supplies are dual-redundant and hot swappable.

Power Specifications	
Mains Rating:	Dual Source: 90 - 264 V The equipment is designed to operate with a mains supply tolerance of +6% and -10% of the rated values.
Mains Input Frequency:	50 / 60 Hz
Inrush Current (peak):	60 A Max for 115 V AC per module 30 A Max for 230 V AC per module.
Input Connector:	IEC320 C14
Efficiency:	Typical: 85% at 115 V AC 80% at 240 V AC
Earth Leakage Current:	Less than 1.5 mA (both)
Isolation Device:	The socket is the disconnect device for equipment isolation.  <b>WARNING:</b> The mains electrical supply connections to both power supply units must be removed to give complete electrical isolation.
Maximum power Consumption:	TBC

## Reference Signal Specifications

Reference Specifications	
Locking Reference	<p>Connection: Passive loop-thru 75 ohm BNC</p> <ul style="list-style-type: none"> <li>• SD: NTSC/PAL black and sync</li> <li>• HD: SMPTE 296M-2001 Tri-Level for 720p</li> <li>• SMPTE 274M-2008 Tri-Level for 1080i/p</li> <li>• All system video outputs genlock to locking references. The system's video inputs can be asynchronous to the server locking reference.</li> <li>• There are two reference connections. The reference input is a low return loss, low impedance connection, which accepts an SD or HD analogue reference signal. The passive loop through connector can be connected to other equipment and must be terminated to 75 ohm.</li> <li>• The 525/59.94 or 625/50 signal can be a Black &amp; Burst video signal (300 mV sync) with VITC (vertical interval timecode).</li> </ul>
Reference Timecode	<p>The platform extracts VITC (vertical interval timecode) from this external locking reference to provide the system with a studio time reference.</p> <p>The default lines from which VITC are extracted are: PAL Lines 19 and 21 and NTSC Lines 16 and 18.</p>
LTC Input	<p>The platform provides a longitudinal timecode input as an alternative to the VITC on the locking reference input. The LTC source must be locked to the locking reference.</p> <ul style="list-style-type: none"> <li>• Connector type: HD-BNC</li> <li>• Input impedance: 10 kohm differential</li> <li>• Input amplitude: 500 mV to 1 V</li> </ul>

## Storage Option Specifications

Storage Option Specifications	
SQ2000 Internal Storage	<ul style="list-style-type: none"> <li>• Up to 12x SAS 2.5" HDD</li> </ul>

Note: As a result of continuous improvement, specifications are liable to change.



# 6 Product Support

## Providing Information to Grass Valley

If you experience any technical or operational difficulties with a Grass Valley product please do not hesitate to contact us to request assistance.

There is a lot of information you can give us that will enable us to diagnose your problem swiftly. Please read the following guidelines, as these suggestions will help us to help you.

### Basic Information

- **For Units:** Provide the exact product Model, unit Serial Number and Software Version information.

### Software Application

- **Inputs:** Provide full details of the Input Signals being used including any references, etc., and where they are being generated.
- **Outputs:** Provide full details of the Output Signals required and how they are being monitored.
- **System:** Provide a brief description of the system in which your equipment is currently being used.

### Your Contact Details

In addition to the above, remember to provide us with your contact details to enable us to get in touch with you swiftly:

- Name(s)
- Telephone
- E-mail addresses
- Business address
- Contact Details

### Customer Support

For details of our Regional Customer Support Offices, please visit the Grass Valley website and navigate to Support/Contacts Support.

<http://www.grassvalley.com/support>

Customers with a support contract should call their personalized number, which can be found in the contract, and be ready to provide their contract number and details.





## **Grass Valley Technical Support**

For technical assistance, contact our international support center, at 1-800-547-8949 (US and Canada) or +1 530 478 4148.

To obtain a local phone number for the support center nearest you, please consult the Contact Us section of Grass Valley's website ([www.grassvalley.com](http://www.grassvalley.com)).

An on-line form for e-mail contact is also available from the website.

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