Console Installation Guide

For Quasar Table-Top and Flush-Mount Frame consoles,
Quasar Engine and Engine RPS

Telos Alliance®

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Notices and Cautions

Notices

The installation and service instructions in this manual are for use by qualified personnel only. To avoid 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 personnel.

This instrument has an autoranging line voltage input. Ensure the power voltage is within the specified range of 100-240v. The ~ symbol, if used, indicates an alternating current supply.

This symbol, wherever it appears, alerts you to the presence of uninsulated, dangerous voltage inside the enclosure – voltage which may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to important operating and maintenance instructions. Read the manual.

Caution: Double Pole/Neutral Fusing

The instrument power supply incorporates an internal fuse. Hazardous voltages may still be present on some of the primary parts even when the fuse has blown. If fuse replacement is required, replace fuse only with same type and value for continued protection against fire.

Warning

The product's power cord is the primary disconnect device. The socket outlet should be located near the device and easily accessible. The unit should not be located such that access to the power cord is impaired. If the unit is incorporated into an equipment rack, an easily accessible safety disconnect device should be included in the rack design.

To reduce the risk of electrical shock, do not expose this product to rain or moisture. This unit is for indoor use only.

This equipment requires the free flow of air for adequate cooling. Do not block the ventilation openings in the top and sides of the unit. Failure to allow proper ventilation could damage the unit or create a fire hazard. Do not place the units on a carpet, bedding, or other materials that could interfere with any panel ventilation openings.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

This equipment is not suitable for use in locations where children are likely to be present.

USA Class A Computing Device Information to User. Warning

This equipment generates, uses, and can radiate radio-frequency energy. If it is not installed and used as directed by this manual, it may cause interference to radio communication. This equipment complies with the limits for a class a computing device, as specified by FCC rules, part 15, subpart J, which are designed to provide reasonable protection against such interference when this type of equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference. If it does, the user will be required to eliminate the interference at the user's expense. Note: objectionable interference to tv or radio reception can occur if other devices are connected to this device without the use of shielded interconnect cables. FCC rules require the use of shielded cables.

Canada Warning

"This digital apparatus does not exceed the class a limits for radio noise emissions set out in the radio interference regulations of the Canadian department of communications."

"Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques (de class a) prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des communications du Canada."

CE Conformity Information

This device complies with the requirements of the EEC council directives:
- 93/68/EEC (CE MARKING)
- 73/23/EEC (SAFETY – LOW VOLTAGE DIRECTIVE)
- 89/336/EEC (ELECTROMAGNETIC COMPATIBILITY)

Conformity is declared to these standards: EN50081-1, EN50082-1.

A copy of the CE Certificate of Conformity for this product is available in the last page of this User Manual.

Quasar Installation Guide

Disclaimer

All versions, claims of compatibility, trademarks, etc. of hardware and software products not made by Axia Audio which are mentioned in this manual or accompanying material are informational only. Axia makes no endorsement of any particular product for any purpose, nor claims any responsibility for operation or accuracy. We reserve the right to make improvements or changes in the products described in this manual which may affect the product specifications, or to revise the manual without notice.

Trademarks

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Warranty

This product is covered by a two-year limited warranty. For more details, please visit https://www.telosalliance.com/warranty-information

After-Sales Information

Should you require any technical information or assistance with your Axia product please contact your local Axia distributor. Customers within the United States could contact Axia directly. For a complete list of worldwide distributors by region, go to www.telosalliance.com or contact us for more information. Our Support Team works closely with our global distributor network to provide the highest level of after sales support. Your distributor should be your first point of contact and will often be able to provide an instant solution, be it technical advice, spares or a site visit by an engineer.

Updates

The operation of Quasar is determined largely by software. We routinely release new versions to add features and fix bugs. Check the Axia Audio web site for the latest. We encourage you to sign-up for the email notification service offered on the site.

Feedback

We welcome feedback on any aspect of Quasar, or this manual. In the past, many good ideas from users have made their way into software revisions or new products. Please contact us with your comments. If you find anything in this manual that you feel needs clarification or correction, please let us know by sending an e-mail to quasar@telosalliance.com

Serial Numbers

All units produced by Axia are given a serial number and are booked into a central record system at the time of manufacture. These records are updated whenever a piece of hardware is dispatched to or received from a customer. When contacting Axia Customer Support with a hardware inquiry it is important to provide the correct Quasar serial number.
This is prented on a label on the Rear I/O Module, located at the back of the console frame.

Service

You must contact Axia before returning any equipment for factory service. We will need your unit's serial number, located on the back of the unit. Axia will issue a return authorization number, which must be written on the exterior of your shipping container. Please do not include cables or accessories unless specifically requested by the Technical Support Engineer. Be sure to adequately insure your shipment for its replacement value. Packages without proper authorization may be refused. US customers, please contact Axia Technical Support at +1-216-622-0247. For customers outside the US, please shipping to our European Repair Centre via the distributor, in order to avoid having to deal with export paperwork. If there is a need to send direct to Axia, contact Support beforehand to log the incoming repair and for assistance with export documents.

After Sales Modifications

Please be aware that any modifications other than those made or approved by Axia Audio, may invalidate the console's warranty. This includes changes to cabling provided by Axia and variations to the recommended installation as detailed in Axia documentation. Modifications to this equipment by any party other than Axia Audio may invalidate EMC and safety features designed into the equipment. Axia Audio can not be liable for any legal proceedings or problems that may arise relating to such modifications.

Credits...

Kudos to the entire Quasar Team, for their tireless work, incredible perseverance and commitment to this project. Many, many thanks to: Serhiy Borisov (you'll be always in our hearts!), Sergey Eremeenkov, Dmytriy Gritsay, Steve Kiffmeier, Andris Kalejs, Oleg Krylov, Gunta Lazdina, Gints Linis, Traian Mohan, Andrew Rogovenko, Normunds Veselis. There wouldn't be any Quasar without all of you guys, you have my respect.

Much Gratitude goes to our CTO Greg Shay. and to fellow managers John Granchi and Milos Nemcik for their precious consulting work, and for being always there when I needed their support.

Many Thanks to Dan Bays for adding all that cool stuff into Pathfinder that makes Quasar so versatile, and to Maciej Slazpka for providing us the hooks to control the best IP intercom system on this planet.

And last but not least... Ojigi to "Sir" Derek Pilkington for his continued trust in our team, and a very large Grazie goes to our guru, and Padrino, Frank Foti, and the whole of Telos, for the opportunity they gave us!

We Support You

By Phone / Fax

- You may reach our 24/7 Support team anytime around the clock by calling +1-216-622-0247.

- For billing questions or other non-emergency technical questions, call +1-216-241-7225 between 9:30 am to 6:00 PM, USA Eastern time, Monday through Friday.

- Our Fax number is +1-216-241-4103.

By Email

- Technical support is available at **support@telosalliance.com**.

- All other questions, please email **inquiry@telosalliance.com**.

Via World Wide Web:

The Axia Audio web site has a variety of information which may be useful for product selection and support. The URL is **telosalliance.com.**

Register Your Product

Please take a moment to activate your coverage online at http://telosalliance.com/product-registration/ .

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Creating the Most Exciting and Engaging Audio Experiences Imaginable

Congratulations on your new Telos Alliance product!

The gang here at Telos is committed to shaping the future of audio by delivering innovative, intuitive solutions that inspire our customers to create the most exciting and engaging audio experiences imaginable.

We're grateful that you have chosen audio tools from Telos® Systems, Omnia® Audio, Axia® Audio, Linear Acoustic®, 25-Seven Systems®, and Minnetonka Audio®. We're here to help you make your work truly shine. We hope that you enjoy your Telos Alliance product for many years to come and won't hesitate to let us know if we can help in any way.

The Telos Alliance

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Introduction

About this Installation Guide

Planning a mixing console installation in a new or existing facility is no easy task. Before starting the design phase, it's necessary to collect a lot of information about all the units to be installed, in order to make sure that their installation requirements are fully met. At the same time, when designing the control room lots of details must be taken into account, considering the technical specs of the equipment to be installed, the various needs and the environmental factors of the host facility.

This document is intended for the experienced technician, or systems integrator, who is approaching the installation of a Quasar system and is looking for all the technical information necessary to plan and execute a correct installation.

This document is not intended for an engineer looking for operating instructions. Please download the Quasar User Manual if you need such information. The Quasar User Manual is available from our website, at https://www.telosalliance.com/Axia/Quasar-AoIP-Mixing-Console. A convenient link to the User Manual can be found on the Quasar Web UI, at the bottom of the Home page

This Installation Guide will be continuously updated, based on the feedback we receive from installers around the world. If you have any comments or suggestions, please contact us or your local Dealer to let us hear from you. You are welcome to share your installation experience with us!

Luca La Rosa
Senior Project Manager
Axia Quasar Lead Designer

1 - Installation

Preparing for Installation

Unpacking the Console

The Quasar console is available in 7 different sizes: 2.5U, 3.5U, 4.5U, 5.5U, 6.5U, 7.5U and 8.5U.

- 2.5U, 3.5U, 4.5U and 5.5U size consoles are packaged in a heavy-duty cardboard box
- 6.5U, 7.5U and 8.5U size consoles are packaged in a custom wooden crate

Package Contents

All packages use anti-static wrapping and custom padding, and contain the following items:
- Quasar Control Surface
- Quick Start Guide
- Warranty information sheet
- Quasar Cleaning Cloth
- Axia Hexagonal Key tool

Lifting and Carrying Quasar

The Quasar package includes lifting handles wrapped around the unit. These should be always used when lifting the unit out of the box.

Warning – Risk of injury! Quasar surfaces can be very heavy (depending on size) and will require at least 2 persons to lift and carry the unit.

Console Frame Types

The Quasar console frames are available in two versions, for table-top and flush mounting.

For more details about the physical dimensions of the Quasar Table-Top Frames please refer to Chapter 8 of this Installation Guide, Table-Top Frames Dimensions

For more details about the physical dimensions of the Quasar Flush-Mount Frames please refer to Chapter 8 of this Installation Guide, Flush-Mount Frames Dimensions

Additionally, "Direct Mount" Kits are available, to allow for individual modules to be flush-mounted in a *Standalone* configuration.

For more details about installing Standalone surface modules using the Direct Mount Kits, please refer to Chapter 2 of this Installation Guide, Standalone Modules Installation.

For more details about the physical dimensions of the Quasar Direct-Mount Kits please refer to Chapter 8 of this Installation Guide, Direct-Mount Frames Dimensions.

Table-Top Frames

The Quasar flush-mount frame is designed to install a console on top of a countertop. Multiple Frames can be arranged in a "split surface" configuration, to form a single logical console.

Flush-Mount Frames

The Quasar flush-mount frame is designed to install a console into a countertop in two different ways:

The simplest way to install it is to cut a hole the size of the base of the frame. This way, the mounting flanges will overlap the table surface and hide cutting imperfections. This system is suitable when you do not have a CNC machine to drill the hole.
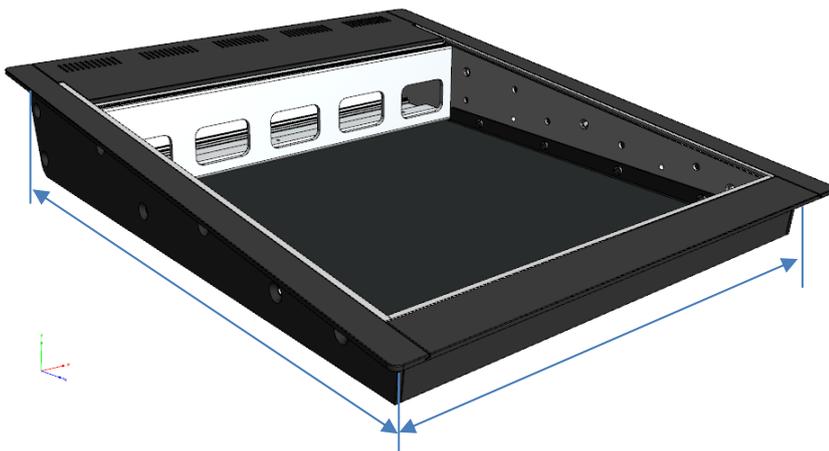
The other option, to cut a hole the size of the base of the frame and to use a CNC machine to route a hole the size of the mounting flanges, so as to have these completely flush with the countertop surface.

Joining Two Frames of the same type

In case a very large console frame is required, it is possible to mechanically couple two frames together.

We recommend positioning frames in the final location where they need to be installed, before they are joined.

Warning – Do not move or lift frames after they are joined, to avoid the risk of damaging the frames' chassis.

1. Remove the Right black plastic bumper (or right mounting flange, in case of a flush-mount frame) from the LEFT console frame

2. Remove the Left black plastic bumper (or left mounting flange, in case of a flush-mount frame) from the RIGHT console frame

3. Remove the rightmost control module from the LEFT console frame

4. Remove the leftmost control module from the RIGHT console frame

5. Place the two frames side by side in their final position on the worksurface

6. Make sure they are correctly aligned, by inserting two Phillips screwdrivers through a couple of adjacent holes

7. Insert an M6x12mm screw (use Telos p/n 1301-00310 or 1301-00321, or equivalent) in each of the Pass-Thru Holes of the right-side plate (marked in red), threading the screws into the left-side plate holes.

8. Leave the screws loose, re-align the frames, then tighten the screws

9. Re-install the two control modules previously removed

1451-01096 QUASAR FRAME CHASSIS SIDE PLATE RIGHT

Left Console, Internal View

Pass-Thru holes >

1451-01046 QUASAR FRAME CHASSIS SIDE PLATE LEFT

Right Console, External View

Threaded holes >
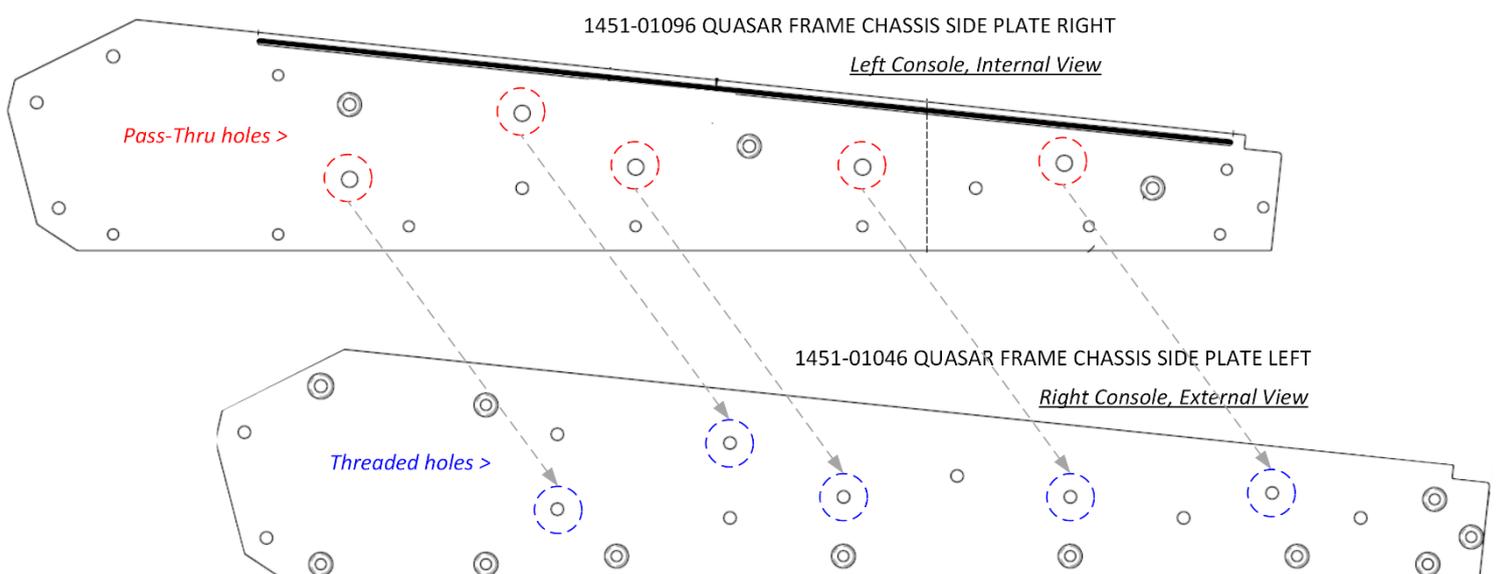
2 – The Control Surface

Control Surface Building Blocks

The Quasar is more than just a mixing console — it is a complete studio system, with various components that serve different functions. Its main components are:

- The Quasar modular Control Surface
- The Quasar Engine DSP platform

This chapter gives an overview of the different components. A full understanding of these basic concepts is required in order to read the following chapters and dive deeper into Quasar's features and capabilities.

Quasar Control Surface

The Quasar Control Surface is a highly modular desk, consisting generally of a Frame populated with modules. Its main components are:

- The Quasar surface Frame, which includes:
    - one Rear I/O module,
    - a variable number of Rear PSU modules
    - any Rear Blank Plates

- one Master Touchscreen & Monitor module
- a variable number of Fader Modules
- any optional modules like:
    - the MIC in / HP out Module
    - the single channel blank strips
    - the 4-Channel Blank Module

Quasar does not require an external display to operate; however, a display could be connected to show a duplicate of the Touchscreen UI, in landscape Full HD format.

Quasar Surface Frame

The Quasar Surface frame offers a reduced footprint and a completely flat outline, since the traditional meter bridge has been eliminated and the displays integrated directly into the surface.

Quasar Frames are available in both Table-Top and Flush-Mount versions and can be converted from one type to the other. The Quasar surface frame comes available in 7 different lengths:
1.5 Units - 3.5 Units - 4.5 Units - 5.5 Units - 6.5 Units - 7.5 Units - 8.5 Units.

Each "Unit" corresponds to the width of a Fader module, equal to 155mm.

One Fader module corresponds to 1 Unit, and one Master module corresponds to 1.5 Unit. So, for example, an 8.5U frame will accommodate up to 7 Fader modules (28 faders) plus the Master.

Surface Rear Modules

At the back of the surface, you can find the Quasar Rear I/O module, the modular Rear Power Supply Units (main and redundant, if present) and some blanking plates (or none) depending on the frame size & configuration.

Rear View of the Quasar Frame

All the main connections, beside the AC Mains are also located on the Rear I/O Module. This is generally found right behind the Master Monitor Module, at the rear of the console.
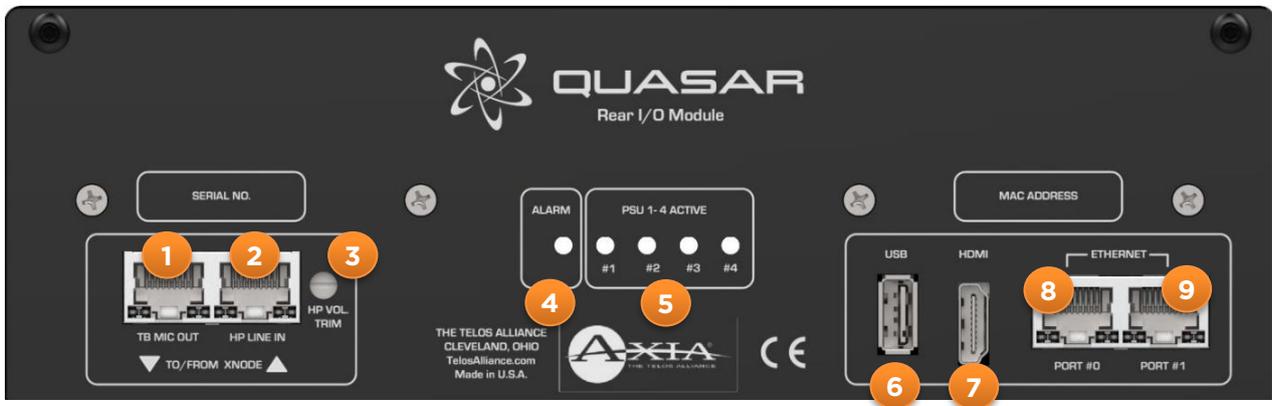

Rear I/O Module

Rear Power Supply Module

Rear I/O Module – Main frame

The Rear I/O module hosts the connections from the outside to the inside of the surface as well as some status indications on power. Below is the detailed description of all the I/Os:


1. **TB MIC OUT :** Analog audio output internally connected to Quasar MIC in – HP out Module's XLR-F connector. Connect this output to an xNode Mic Input.
2. **HP LINE IN :** Analog audio input (line level) internally connected to Quasar HP Amp Board. This board feeds the MIC in – HP out Module's TRS Jack connector. Connect this input to an xNode Analog output.
3. **HP VOL. TRIM :** Internal HP Amplifier board gain adjustment trimpot
4. **ALARM :** This LED Lights up red when the internal power sequencing circuit is engaged and it is cycling power to all modules. This may occur in case of internal short circuits to the 12VDC rail, or if the 12VDC supply to the modules is not within nominal range (+/- 8%).
5. **PSU 1-4 ACTIVE :** These LEDs light up green when the corresponding PSU units are alive and outputs 12VDC within nominal range (+/- 2%).
6. **USB :** For future use
7. **HDMI :** Outputs a copy of the image displayed by the Master Module touchscreen, in standard landscape, Full HD 1920x1080 60fps format.
8. **PORT #0 :** Primary control port, Gigabit Ethernet. Use it to create the primary link to the AoIP Network switch.
9. **PORT #1 :** Secondary control port, Gigabit Ethernet. Use it to create a redundant link to the AoIP Network switch (requires Spanning Tree configured on the two switch ports) OR to connect to Port#0 on a second Quasar frame, in case of split-frame configuration.

Rear I/O Module – Split Frame

Quasar SR Split frames come equipped with a special version of the Rear I/O module, which offers a USB-B Input port instead of the 2x Ethernet and HDMI ports.

10. **USB IN :** Connect the USB cable supplied with the Split frame here. Connect the other end of the cable to the USB port (#6) of the main frame.
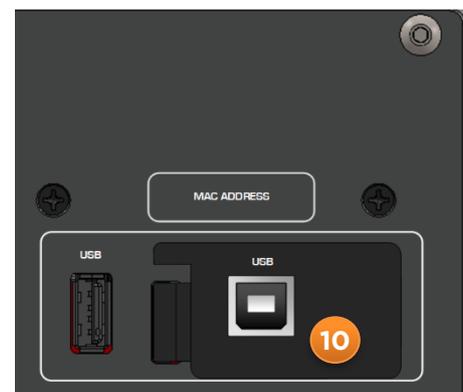
Rear PSU Module

Quasar uses Auto-sensing, auto-ranging power supplies, which accept any AC voltage between 90 – 132 / 187 – 264VAC, with 50Hz/60Hz frequency. The PSUs are installed at the back of the console, typically located behind the first and last Fader Module.
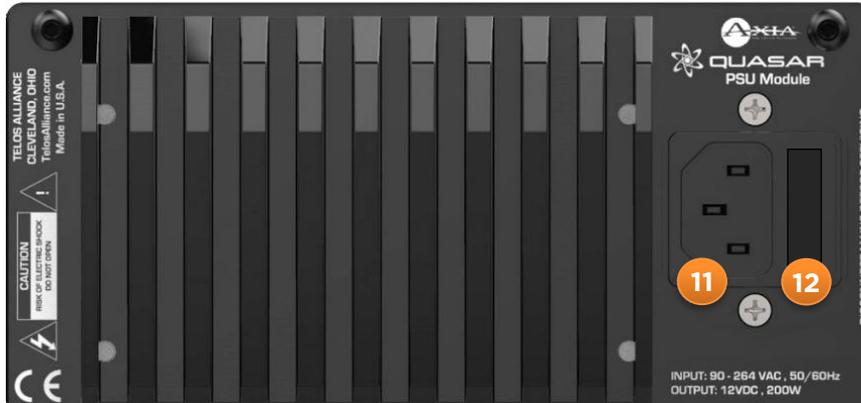
11. **AC INPUT :** Connect the IEC Type 13 cable supplied here
12. **FUSE :** Fuse Holder can be extracted only when the AC Mains cable is disconnected. Insert a small flat-blade screwdriver into the release notch, to open. The fuse type is 3.1A Slow-Blow.

> **Note -** If you have more than one power supply installed and choice of standard and uninterrupted mains (UPS) in your studio, it is a good idea to connect each PSU to a different type of Mains supply. For example, don't connect both supplies to the same UPS.

Earth Connection and Grounding

This is a Class I product. An Earth connection MUST be provided in each AC power cord. Quasar is grounded through the AC Mains cables, and does not require a separate chassis ground, therefore an Earth Lug at the rear of the console is not provided.

However, for those users who wish to have a separate ground/earth connection using a dedicated earth cable (at least 6mm² or 10 AWG cross section), this could be connected to any of the rear I/O modules fixing screw via a Grounding Tab with integrated lock washer. Such a cable is not provided with the console, as this connection is optional and it is NOT a requirement to comply with safety standards.

> **Note –** We recommend using shielded Ethernet cables to connect the Control Surface to the network, in order to eliminate ground loops and any possible noise present on the data lines through the console chassis ground.

The Quasar Rear I/O board is designed to protect the Ethernet interface of the Master module from Static Electricity and incorporates surge protection devices (ESD) that discharge static charges to ground. This design assumes that the ground is clean, and is at zero potential. In order for the ground to be clean, all equipment in the studio must be referenced to the same ground, and ground must be connected to earth in a single point, while cables connecting equipment should be shielded.

This is just good design practice and we are assuming that all studios would follow it.

The MTS-MON Module (Master Touch Screen & Monitor)

The Quasar Master Touchscreen and Monitor module (we will refer to it as "MTS module" in this manual) is the brain and heart of your Quasar System. It is the host of the studio/console logic, and provides the control and feedback of various studio functions through the touchscreen and hardware. Some hardware buttons/encoders are soft controlled (their function changes based what you are doing) and some have capacitive touch functionality.

One MTS-MON module is always required to operate a console. It features a 12.1″ TFT IPS Touchscreen display, 7x Touch-Sensitive high-resolution optical encoders, up to 4x Banks of 8 Touch-Sensitive RGB User Buttons, 4x Layer buttons, 7x High Resolution Touch-Sensitive optical encoders.

The rear panel (or "backshell", as we call it) offers the following connections:

- 2x Gigabit Ethernet ports, switched
- 1x HDMI Out
- 2x USB Type A Outs
- 12VDC PSU IN/THRU (wired in parallel).

These provide connectivity to the rear I/O module, and the fader modules. Depending on the type of fader module, a USB or Ethernet control loop will be used.

The HDMI connection permits the option to connect an external PC display which will mirror the display of the master module, in a landscape format.
This can be a useful backup output (in case the touchscreen gets damaged) or can be used to display the UI on an additional external monitor.
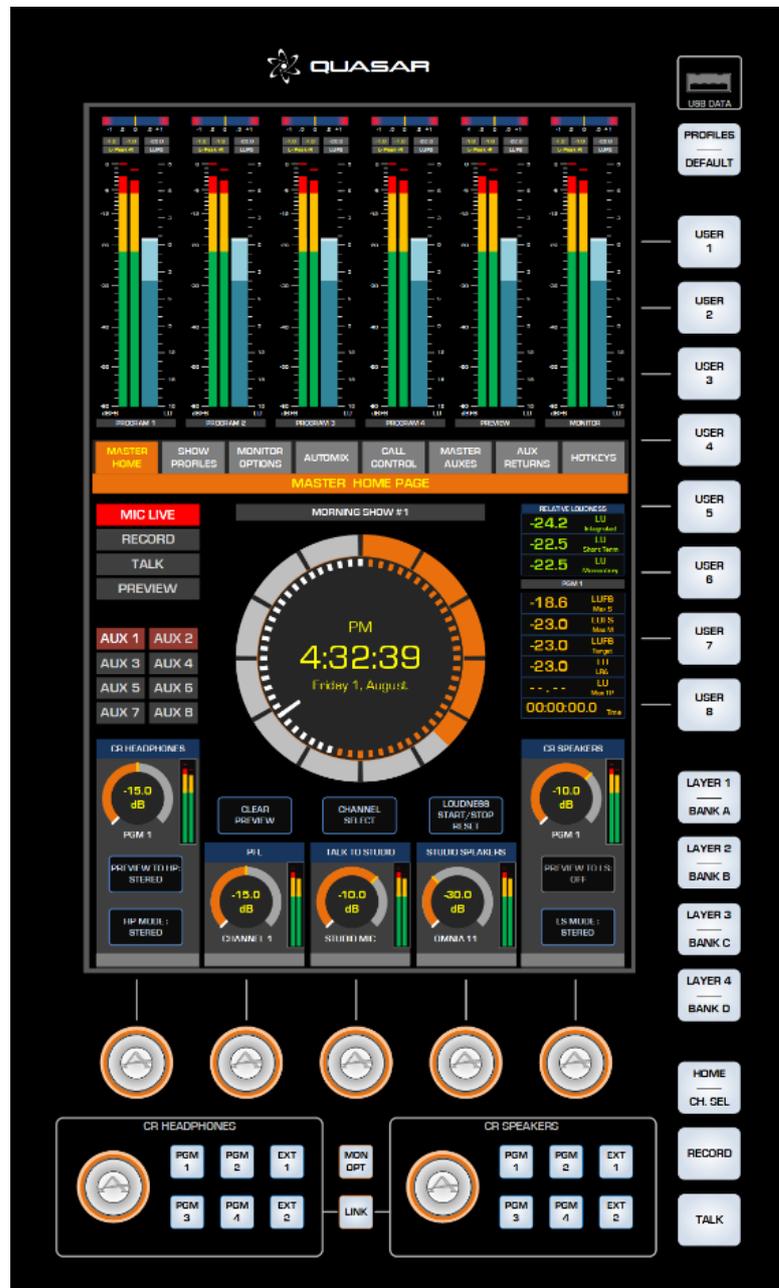
Note - The USB port on the front panel of the MTS module is for future use.

Rear I/O Connections

Please see the paragraph <u>Wiring DC Power to the Modules</u> for more details.
Please see the paragraph <u>Wiring Ethernet to the MTS and XR Modules</u> for more details.

The XR-4FAD Module (4-Faders, motorized)

The XR-4FAD is the "full optional" fader module in the Quasar range.

This module provides all the standard controls needed for studio operation along with motorized faders, user definable buttons per fader. Each hardware button is RGB (Red, Green Blue) , and it is programmable by the user via the Module's Web UI.
The layout of its controls makes it perfect for complex workflows, where more feedback is required from the surface, and direct access to all controls is preferred by the engineer.

Both the top encoders and the motorized fader knobs are touch sensitive, and can interact with the operator. Each fader-channel has LED meters for source level indication or Automix gain adjust information. Above each meter are LED status indicators for the channel.

Each fader channel also includes a color display for channel/source information. Between the two large buttons at the bottom of the module is an RGB color bar which can be used for fader identification.

The Master module with the fader modules provide the functionality expected in a studio. With this comes some standard functions that automatically happen based on what is known (or assumed) by the console, such as:

- Muting
- ON/OFF commands
- GPIO control
- Mix conditions
- Source ownership (which console has control of an active source)
- Phone control

...and many others.

Internally, the XR Fader module has dual Gigabit Ethernet , USB connectivity, and dual 12VDC PSU inputs. These provide connectivity to the rear I/O module, and the MTS module. An Ethernet control loop is used between the MTS module and all XR Fader Modules.
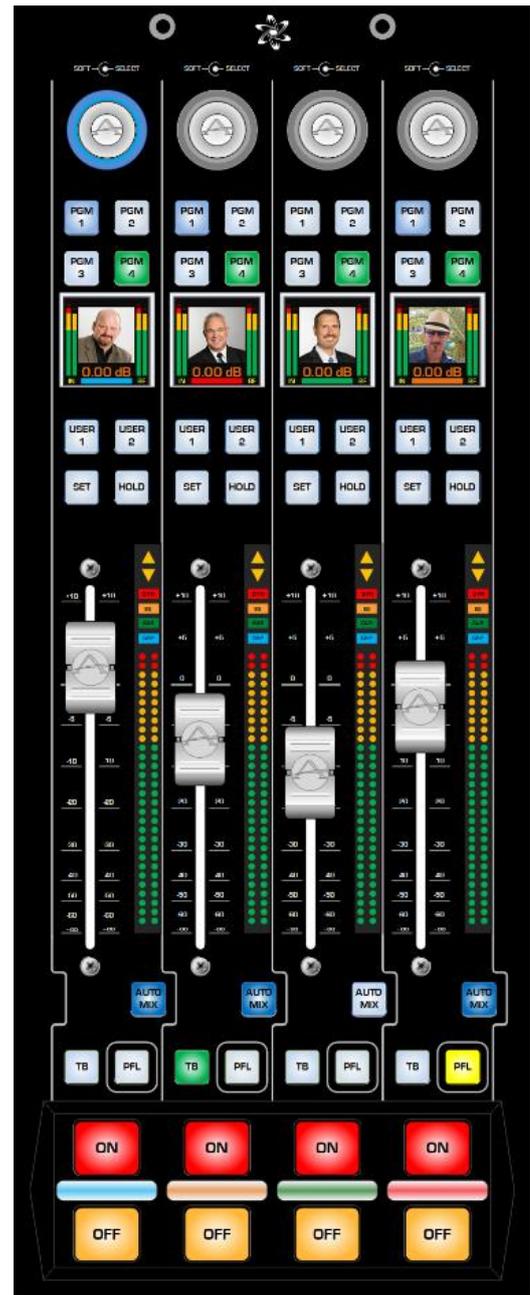
Rear I/O Connections

Please see the paragraph <u>Wiring DC Power to the Modules</u> for more details.

Please see the paragraph <u>Wiring Ethernet to the MTS and XR Modules</u> for more details.

The SR-4FAD Module (4-Faders, non-motorized)

The SR-4FAD is the "entry-level" fader module in the Quasar range.

This module provides all the standard controls needed for studio operation along with user definable buttons per fader. Each hardware button is RGB (Red, Green Blue) , and it is programmable by the MTS Module's Web UI. The layout of its controls makes it perfect for self-operated workflows, where only the essential controls are required by the operator, and ease of reach is a must.

Both the top encoders and the fader knobs are touch sensitive, and can interact with the operator. Above each fader are LED arrows that indicate when a fader physical position is not matching the corresponding DSP channel
logical position.

Each fader channel also includes a color display for channel/source information. Between the two large buttons at the bottom of the module is an RGB color bar which can be used for fader identification.

The Master module with the fader modules provide the functionality expected in a studio. With this comes some standard functions that automatically happen based on what is known (or assumed) by the console, such as:

- Muting
- ON/OFF commands
- GPIO control
- Mix conditions
- Source ownership (which console has control of an active source)
- Phone control

...and many others.

Internally, the SR Fader module has dual USB host (out) ports, one USB device (input) port, and dual 12VDC PSU inputs. These provide connectivity to the other SR modules, and the MTS module. A USB control loop is used between the MTS module and all SR Fader Modules.
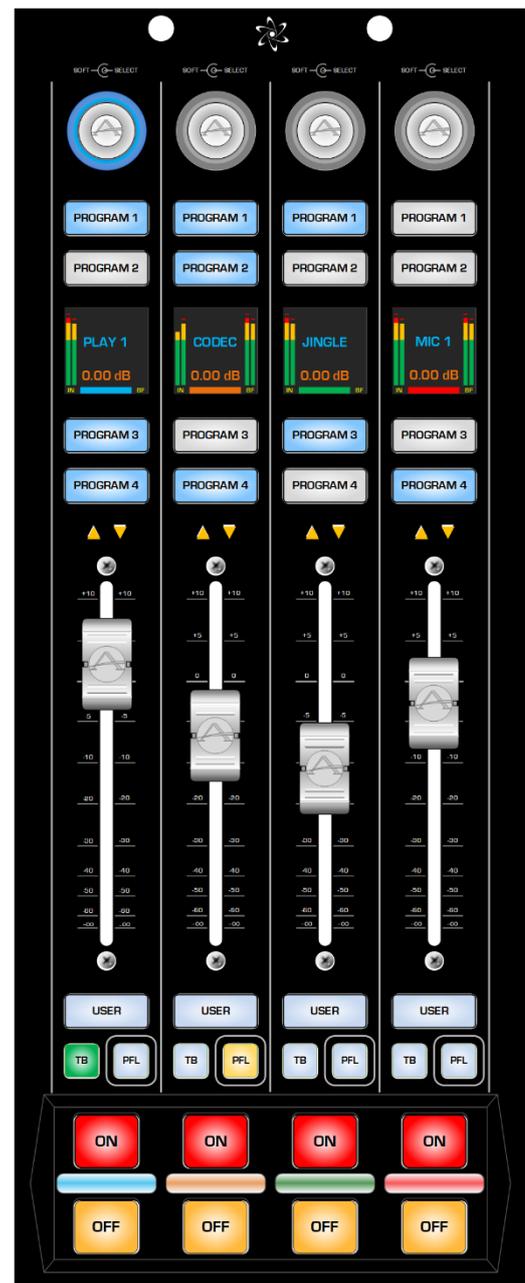
Rear I/O Connections

Please see the paragraph Wiring DC Power to the Modules for more details.
Please see the paragraph Wiring USB to the SR and SK Modules for more details.

The SK-BTN SmartKey Modules

The Quasar SmartKey Modules are designed for adding User-Programmable LCD Buttons to the console.

Each SmartKey Module is a fully-featured control module that connects to the Master through an internal USB network.

The module can be programmed <u>only via Pathfinder</u>, and comes in 4 versions, with 6, 12, 18, or 24 User Buttons. Modules with 6, 12 and 18 buttons can be daisy chained (via USB). Up to 4 of these Modules can be daisy chained.

> **Note -** The SK-24BTN Module (24-Buttons version) <u>cannot</u> be Daisy chained.

The SmartKey Module require Quasar SW v2.2 or greater, and Pathfinder Core Pro v1.9.12.60 or greater, in order to operate.

Rear I/O Connections

Please see the paragraph <u>Wiring DC Power to the Modules</u> for more details.

Please see the paragraph <u>Wiring USB to the SR and SK Modules</u> for more details.

Shown here:
SK-24BTN module

The MIC in / TB out Module

The MIC in / TB out module is an optional accessory designed to provide connectivity for one Microphone (input) and one Headphone (output) right at the surface, so that a gooseneck microphone can be used for Talkback, for example.

In case the surface is ordered with this module, the Rear I/O module will come equipped with an <u>additional HP Amplifier board</u>, which has audio I/O connections to/from one of our xNodes.

In case this module is purchased as an aftermarket upgrade, (Telos p/n the HP Amplifier board will have to be added to the Rear I/O module, which is normally supplied with a blanking plate. Detailed mounting instructions are supplied with this part
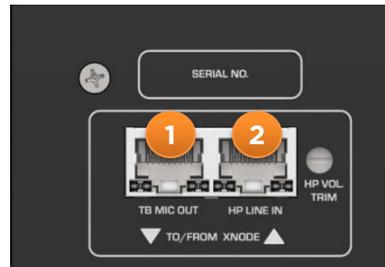
Note - Connectors 1 and 2 are Analog audio I/Os....
They are <u>not</u> Ethernet sockets!

This module simply extends the audio I/O of the node up to the surface, adding powerful and high-quality amplification for your headphones. Connect the TB MIC OUT (A) socket to the input of your xNode , and the HP LINE IN (B) socket to one of the outputs of your xNode using standard RJ-45 cables. Use the HP Volume Trimpot (C) to adjust the internal Amplifier's gain up to the desired level.

TBP-IO

Quasar Accessory Modules

The MF1-ACC module (with Motor Fader) and the MPC-ACC module (without fader) are optional Accessory Modules designed to provide the Talent with direct control of his Microphone and Headphone monitor, right in the studio.

Every Quasar Accessory Module has 2 Gigabit PoE ports, with a network switch built-in, to allow for daisy chaining Ethernet without the need of an external switch.

The Accessory Modules require a standard PoE connection to operate. Connecting these modules to a PoE+ switch will not work, unless the switch has the ability to automatically switch its ports to standard PoE.


MPC-ACC   MF1-ACC

A convenient "PoE Thru" feature has been added to the modules' PoE ports, in order to enable daisy chaining up to three modules in one PoE line. In case multiple modules are installed in one desk, this reduces the amount of network wiring required from the Talents' positions to the Studio edge switch.

Several wiring schemes are supported by these modules:

- They can be connected to the Studio edge switch where the console connects to, (providing it is PoE capable)
- They can be connected to any other PoE switch in the network
- They can be connected directly to the second Ethernet port of the Quasar Frame (port #1) with the addition of a PoE injector

Rear PoE/Data Connections

The main PoE input connector is labeled "Data IN". This connector provides Ethernet data <u>and receives</u> 48V to power the module. The second PoE connector is labeled "Data THRU". This connector provides data thru <u>and outputs</u> 48V power to the next module in the PoE chain.
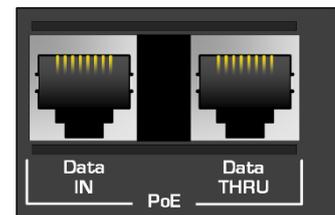
Warning – Do not plug the cable from your PoE switch into the Data THRU port. Although this is protected, the ACC Module could be damaged.

<u>Up to three MPC-ACC Modules can be daisy-chained with one PoE connection, from a switch.</u> The standard PoE power budget is 15.4W. The MPC-ACC module can draw from 5.0W to 6.4W depending on its brightness settings. It will not be possible to connect three of these modules in a PoE chain if the brightness level is set above 50% . If the PoE port power budget is exceeded, the switch might shut down power on the port until one of the modules is disconnected from the chain.

<u>Up to two MF1-ACC Modules can be daisy-chained with one PoE connection, from a switch.</u> The standard PoE power budget is 15.4W. The MF1-ACC module can draw from 5.0W to 8.4W depending on brightness settings and fader movement. It will not be possible to connect two of these modules in a PoE chain if the brightness level is above 50%, or if the fader is frequently stalled. If the PoE port power budget is exceeded, the switch might shut down power on the port until one of the modules is disconnected from the chain.

Using PoE injectors
In case a PoE Injector is required, a professional-grade type must be used, in order to safely power the Quasar Accessory Modules. This injector should provide 1000Mbps (1GBps) connection, Auto-Recover, Over-Voltage, and Short-Circuit protection. We do not recommend daisy chaining more than two MPC-ACC modules , or one MF1-ACC module, when a PoE injector is used.

Warning – Do not plug the cable from a PoE injector into the DATA THRU port instead of the Data IN. These injectors are not smart devices and will surely damage the Accessory Module.

Warning - Exceeding the power budget on a cheap PoE injector might destroy the injector and damage the Accessory Module.

Standalone Modules Installation

All Quasar surface modules (MTS-MON, XR-4FAD, and SR-4FAD) can be ordered in a special "STANDALONE, UNINSTALLED" version by those who need to install these modules directly in custom furniture without the need of a standard Quasar Frame chassis.
In this case the modules are supplied in a box, pre-assembled with a backshell, and each comes with short DC power and Ethernet loop cables.

We have designed two Flush-Mount adapter kits to facilitate installation of Standalone Quasar Modules directly into furniture:

- QUASAR 1U MODULE DIRECT MOUNT KIT (p/n: 2011-00808-102)
- QUASAR 1.5U MODULE DIRECT MOUNT KIT (p/n: 2011-00809-102)

Each kit comes with printed installation instructions, which include mechanical drawings and cutout dimensions. These two documents, p/n 1981-00009-001 (1U DM Kit) and p/n 1981-00010-001 (1.5U DM Kit) , are available in Chapter 8 of this Guide.

Connecting Standalone Modules

Connecting Ethernet and USB
Wiring Ethernet and USB to the Quasar standalone modules follows the same principles applied for wiring modules in a console frame. Please see Chapter 3 of this Guide for:

- Wiring Ethernet to the MTS and XR Fader Modules
- Wiring USB to the SR Fader Modules

Choosing the correct Power Supply
In order to have a fully functional control surface, the Master and Fader Modules shall be ordered together with adequate Power Supply Units. There are two options for powering a surface consisting of Standalone Modules:

1. Using the Quasar Module External Power Supply Kit (p/n: 2011-00810).

   This is a small, portable 12VDC power supply with an adapter cable, capable of powering up to two surface modules. No redundancy will be possible in this case. Since one external PSU can connect to two modules, a loop cable is needed to daisy chain each pair of modules. We make these cables in 4 lengths: 1711-00429-100 (12″) , 1711-00441-100 (24″) , 1711-00455-100 (36″) , and 1711-00488-100 (48″).

   Please refer to the QUASAR STANDALONE MODULES INSTALLATION GUIDE, (p/n 1490-00245) for instructions on how to install these kits.

2. Using the Quasar Rack-Mount power Supply (p/n: 2001-00582).

   This is a 2RU, rack-mountable Power Supply Unit that can power up to 8 modules. With dual redundant PSU modules and 4 independent DC outputs, each output can supply power to two modules, if daisy-chained.

   Please refer to the QUASAR RACKMOUNT PSU QUICKSTART GUIDE, (p/n 1490-00246) for instructions on how to install the Rackmount Power Supply.

Please see Chapter 3 of this Installation Guide for Wiring DC Power to the Modules

3 – Internal Connections

Inside the Quasar Surface

This chapter describes the internal operation of the console, its internal wiring and connection architecture.

Power Supply Configuration

The Quasar PSU modules have a built-in load-sharing mechanism. This is means that every PSU module is constantly contributing to feed power to the surface, so a hard switching between one module and the other never occurs, in case one should fail. This is a much smarter way to handle redundancy!

Quasar can be configured with up to four (4) Power Supply Units per each frame, depending on the frame size and the user requirements in terms of power redundancy.
The console frames always come as standard with non-redundant PSU configuration.

One or two PSU may be installed, depending on the size of the frame according to the following criteria:

	Frame Sizes	PSU Configuration	PSU Quantity
Standard	from 2.5U to 5.5U	Non-Redundant PSU operation	1x PSU module per frame
Optional	from 3.5U to 5.5U	Redundant PSU operation	2x PSU module per frame
Standard	from 6.5U to 8.5U	Non-Redundant PSU operation	2x PSU module per frame
Optional	from 6.5U to 8.5U	PSU operation with 1x Hot-Spare	3x PSU module per frame
Optional	from 6.5U to 8.5U	Fully redundant PSU operation	4x PSU module per frame

> **Note -** It is not possible to fit two PSUs in the 2.5U Frame. This frame can operate only in non-redundant mode.

Ordering Redundant Power Supply Units with your Frame

In case you would like to order Quasar with redundant Power Supply Units pre-installed in the console frame, following the scheme above, please add to your order the following Telos p/n:
2001-00564 QUASAR REDUNDANT PSU - FACTORY INSTALLED
Please note that this part includes the installation labor and does not include any internal interconnect cables.

Adding Extra Power Supply Modules

In case you ordered a console with a Non-Redundant PSU configuration, and later on would like to add an extra PSU module to have redundancy, please note that we have a special kit for this purpose: 2011-00813 QUASAR FRAME SPARE PSU KIT WITH CABLES

This is an aftermarket upgrade kit designed for adding a Redundant PSU to your Quasar console: It comes standard with a 600mm (24") long cable harness. Please inform your dealer if you require a different cable length. Available cable harness lengths that fit this kit are:

1711-00452 QUASAR PS TO PDB/CNTRL 300MM   (request before ordering)
1711-00453 QUASAR PS TO PDB/CNTRL 600MM   (included as standard in the 2011 Kit)
1711-00486 QUASAR PS TO PDB/CNTRL 900MM   (request before ordering)
1711-00487 QUASAR PS TO PDB/CNTRL 1200MM (request before ordering)

Internal wiring – PSU Modules

Each of the Rear PSU units (up to 4 can be installed) has a Control Port (A) and a 12VDC output (B).

These are wired to the corresponding 1-4 inputs of the power distribution board.
The Power distribution board outputs 12VDC power to the modules, and actively controls load sharing between the installed Power Supplies.

Internal wiring – Rear I/O Module

Inside the frame, the Rear I/O board, and Power distribution board, (which are part of the Rear I/O module) are clearly visible.

C. **ETHERNET PORT #1** pass-trough connector (Rear I/O board)
D. **ETHERNET PORT #0** pass-trough connector (Rear I/O board)
E. **HDMI PORT** pass-trough connector (Rear I/O board)
F. **12VDC OUTS & STATUS LEDs #1-4** (Power Distribution board)
G. **12VDC OUTS & STATUS LEDs #5-8** (Power Distribution board)
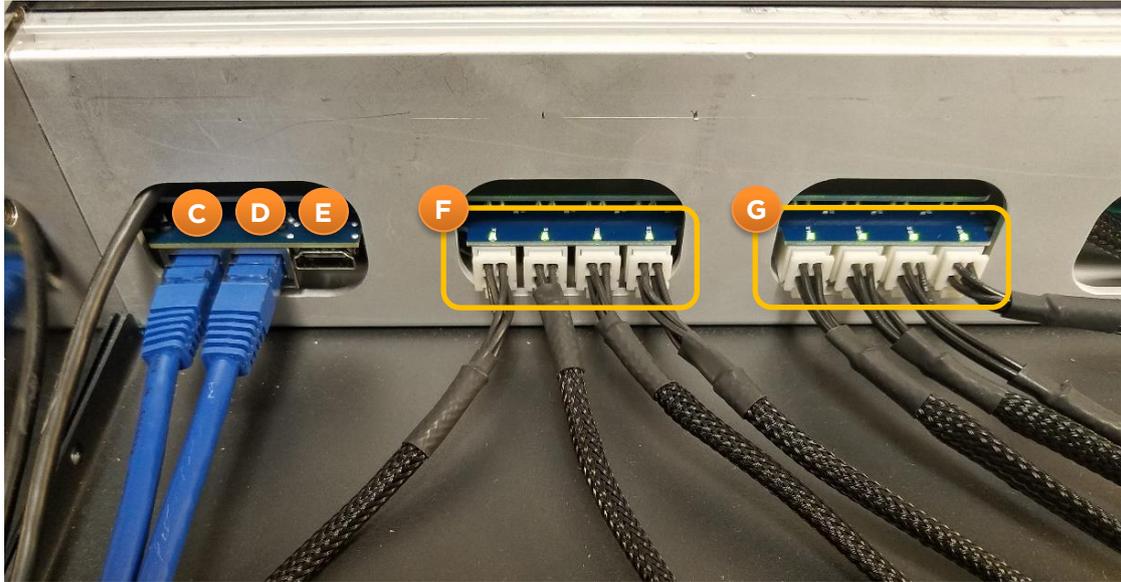
Wiring DC Power to the Modules

The DC Power wiring inside the console frame follows the following criteria:

1. Each 12VDC Out port on the Power Distribution Board (DC output connector groups F and G) is connected directly to any one of the 12VDC I/O at the back of each module
2. The other 12VDC I/O connector on the module is left disconnected.

The unused power connector at the back of each module can be used to loop DC power OUT to another module, in case the power distribution board is installed too far away from that module. Power from one module to another can be looped also in case one of the eight outputs should be damaged.
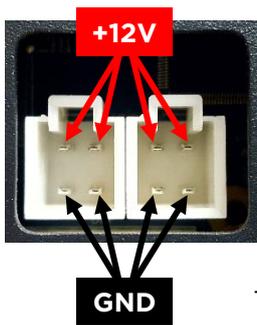
Note - A maximum of two Modules can be connected to a single Power Distribution Board output.
Each PD Board DC Output is rated @ 12VDC-25W when 2x PSU modules are installed.
Each PD Board DC Output is rated @ 12VDC-50W when 4x PSU modules are installed.

The 12VDC Input connectors at the back of each module are connected in parallel, to allow daisy chaining power from one module to the next one, in case this is necessary. This is a useful feature when modules are installed outside of a Console frame, and no Power Distribution Board is present.

Warning - The two 12VDC ports at the back of each module are not intended for connecting two redundant power supplies. They are wired in parallel for daisy-chaining the same 12VDC supply between modules.

In case power redundancy is required in custom installations that do not make use of a console frame, we suggest using the Quasar Rack-Mount Power Supply (p/n: 2001-00582).

Wiring Ethernet to the MTS and XR Modules

Each Quasar XR Module has a 2-port ethernet switch built-in, to allow for daisy chaining Ethernet without the need of a switch inside the console. The standard Ethernet wiring inside the console frame follows the following criteria:

1. The Rear I/O Module's Port #0 (connector D in the picture above) is always connected to any one of the Ethernet ports at the back of the MTS module. This is to ensure that the MTS module is <u>directly connected</u> to the studio Edge switch.

2. The other Ethernet connector on the MTS module is connected to (one of) the nearest XR Fader Modules, and initiates a daisy chain which is then looped back to the Rear I/O Module's Port #1 (connector C in the previous page's picture).
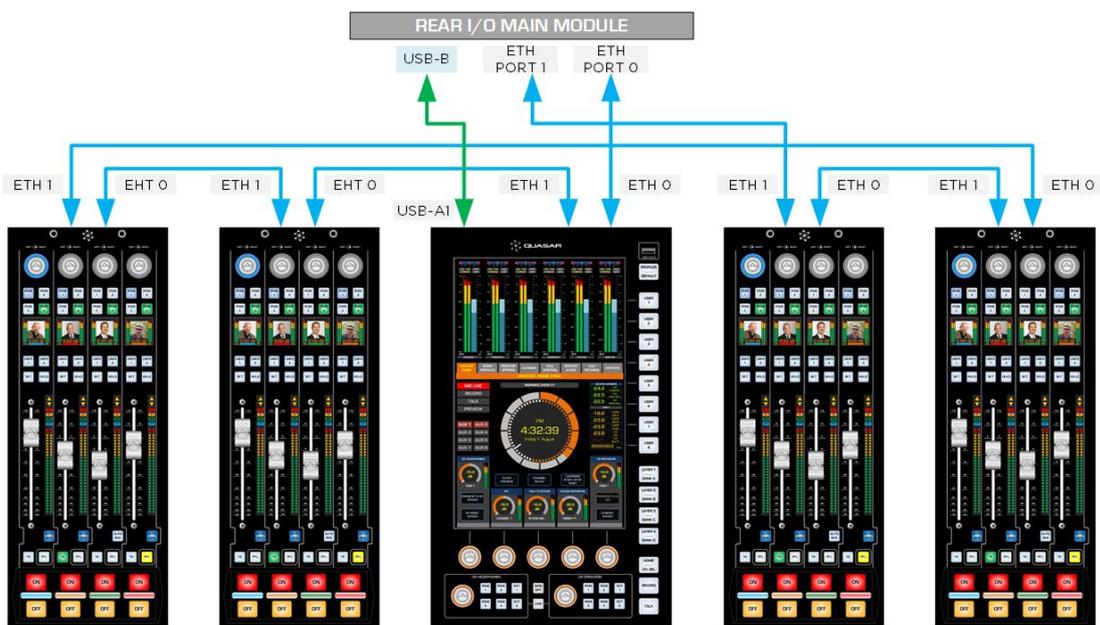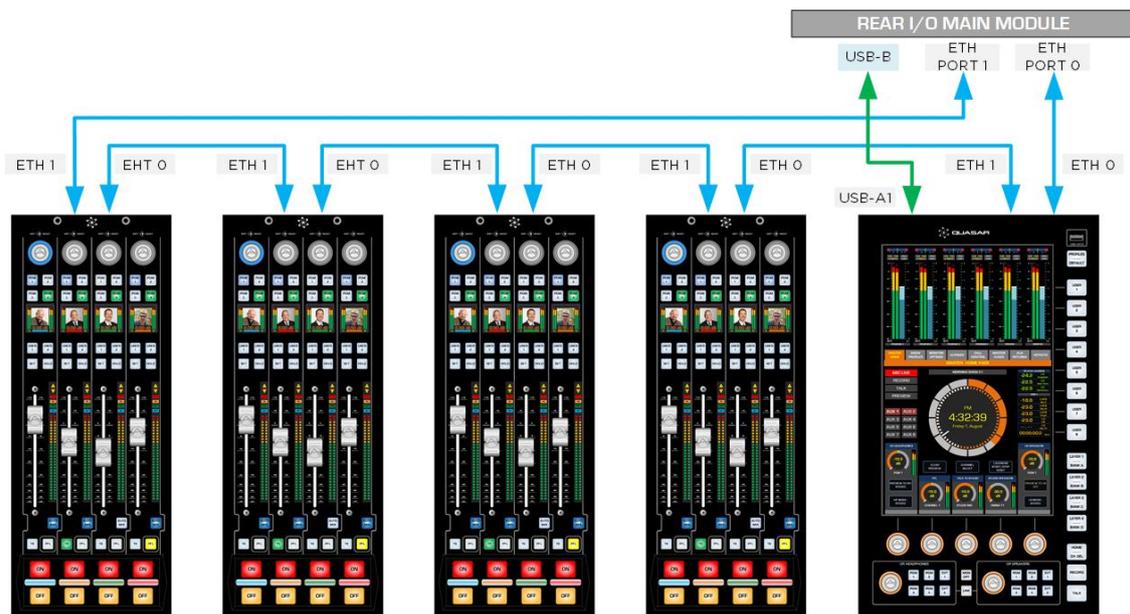
Wiring a Split Quasar XR Frame

Wiring a Split Quasar XR Frame is simple: just connect each of the frames' Ethernet ports (port #0) directly to the edge switch. You do not need to daisy chain frames.

Wiring USB to the SR and SK Modules

The USB wiring inside the console frame follows the following criteria:

1) One of the two USB-A ports at the back of the MTS module is connected to the Rear I/O Module's internal USB-B port.

2) The other USB-A port at the back of the MTS module is connected to the next SR module's USB-B port. A USB chain can be started from the first SR module by connecting one of its two USB-A ports to the next SR module's USB-B port, and so on.

3) If up to 4 SR modules are present, a single USB chain can be created, starting from the MTS Module. A maximum of 4 USB links (5 hubs) is allowed in case of a single chain.
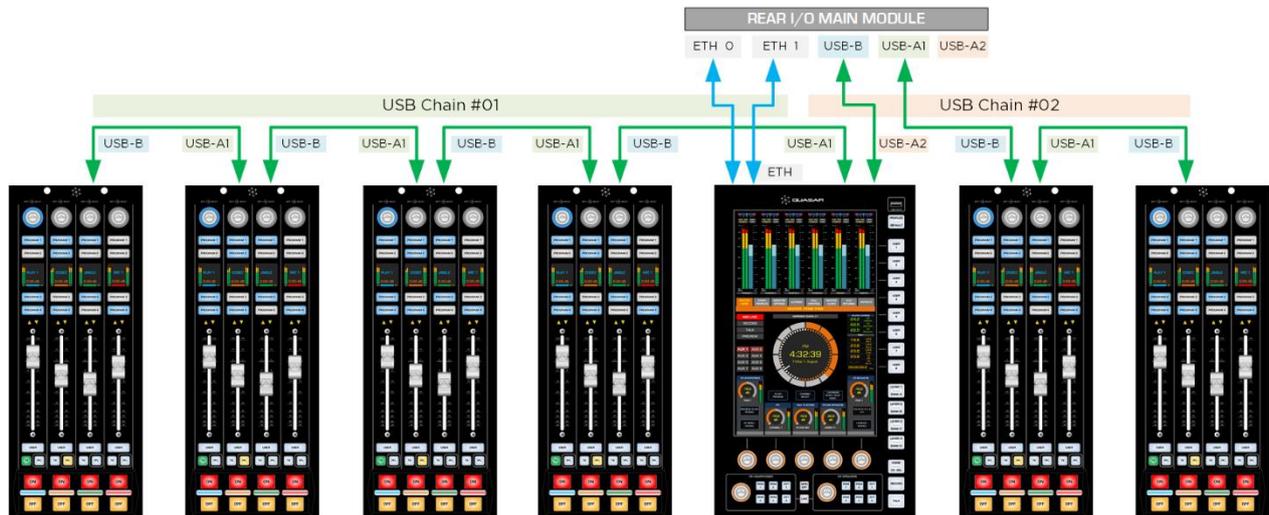

4) If more than 4 SR modules are present, a new chain has to be started, either from the Rear IO module's internal USB hub, or from one of the SR modules. In this case, each chain will support a maximum of 3 USB links (4 hubs).
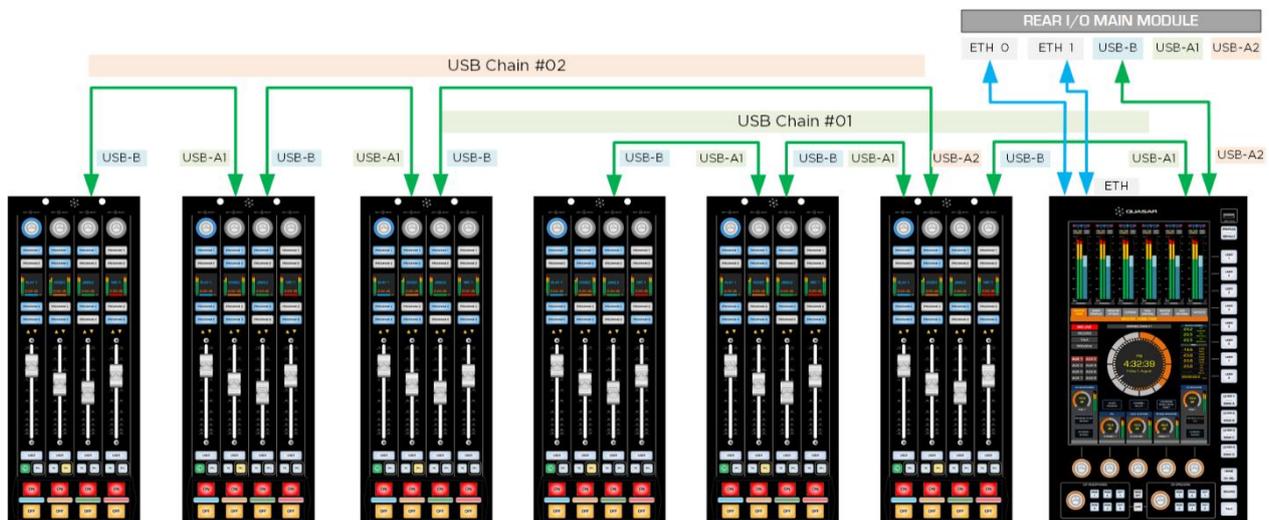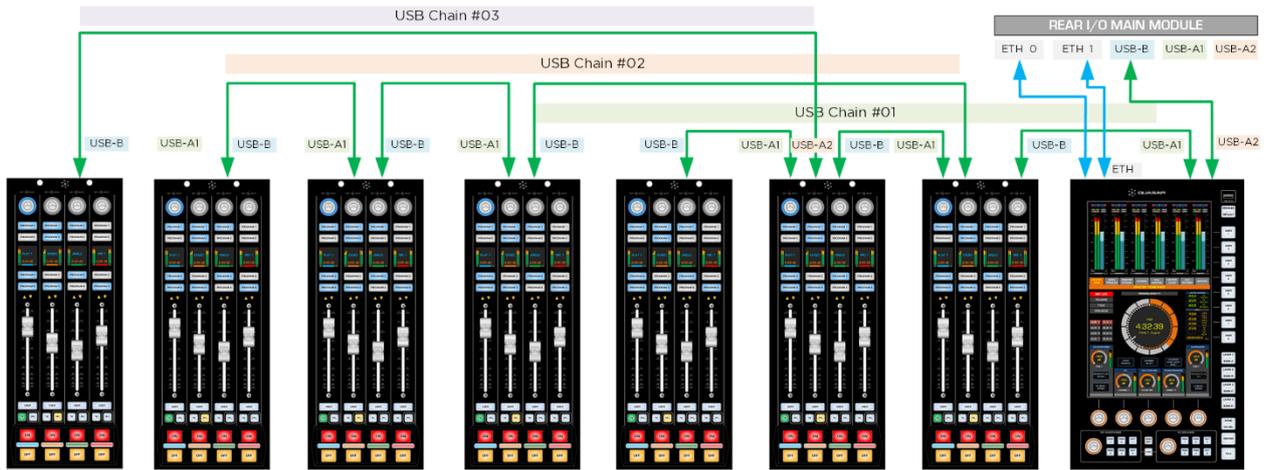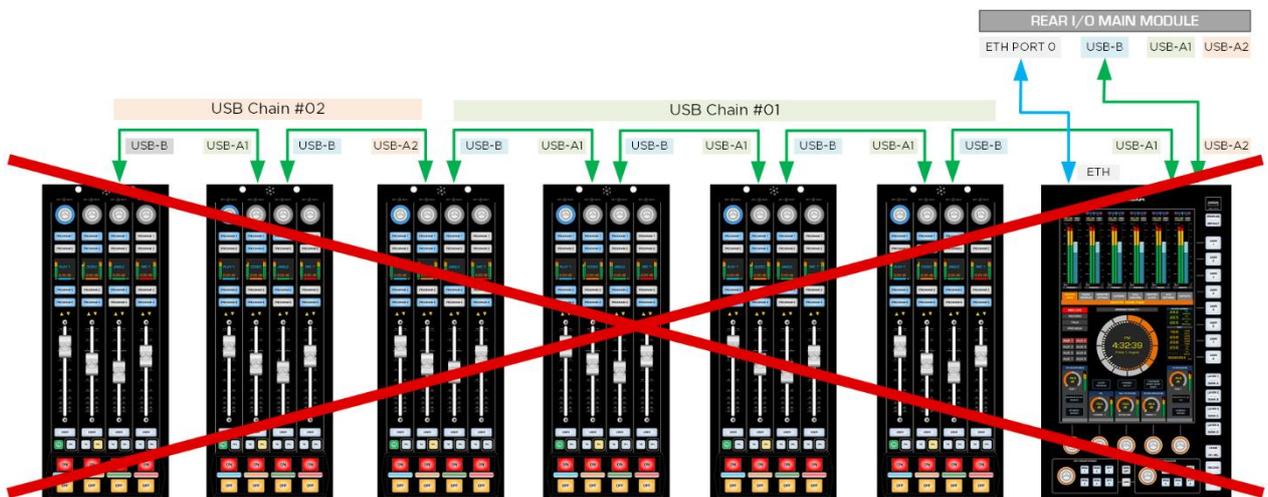
Another possibility is to start a new USB chain from the Rear I/O module's internal USB hub. In this case, one of the MTS USB-A ports will be connected to the Rear I/O, and the two internal USB-A ports can be used to initiate chains.
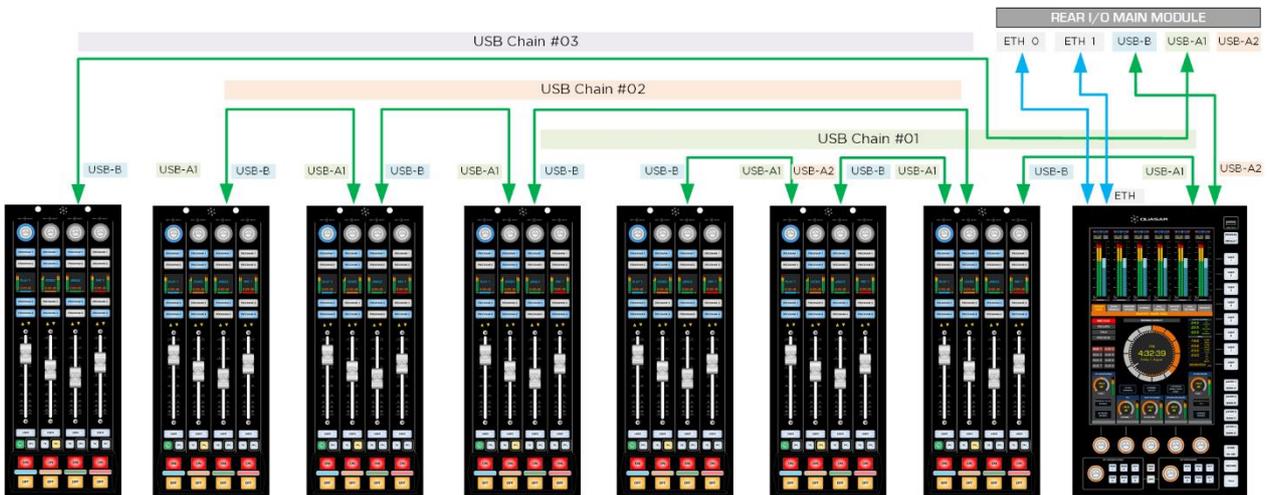
Below is an example of how an SR Console should not be wired:

Wiring a Split Quasar SR Frame

A Split Quasar SR Frame requires one QUASAR SPLIT FRAME REAR I/O KIT (telos p/n 2011-00824-000) installed. This kit must be ordered at the time of purchasing the system, and is installed at the factory. It converts a standard main frame into a split frame by replacing the QUASAR REAR I/O MAIN BOARD (Telos p/n: 1701-00617, located in the rear I/O module) , with the REAR USB SPLIT I/O BOARD (Telos p/n: 1701-00608).

The Main and Split frames' internal wiring will follow the criteria described above.

The Main Frame (with a Master Module installed) USB OUT port is daisy chained to the Split Frame (without a Master module) USB IN port, using the USB-A to USB-B cable provided with the Split Frame Rear I/O Kit.
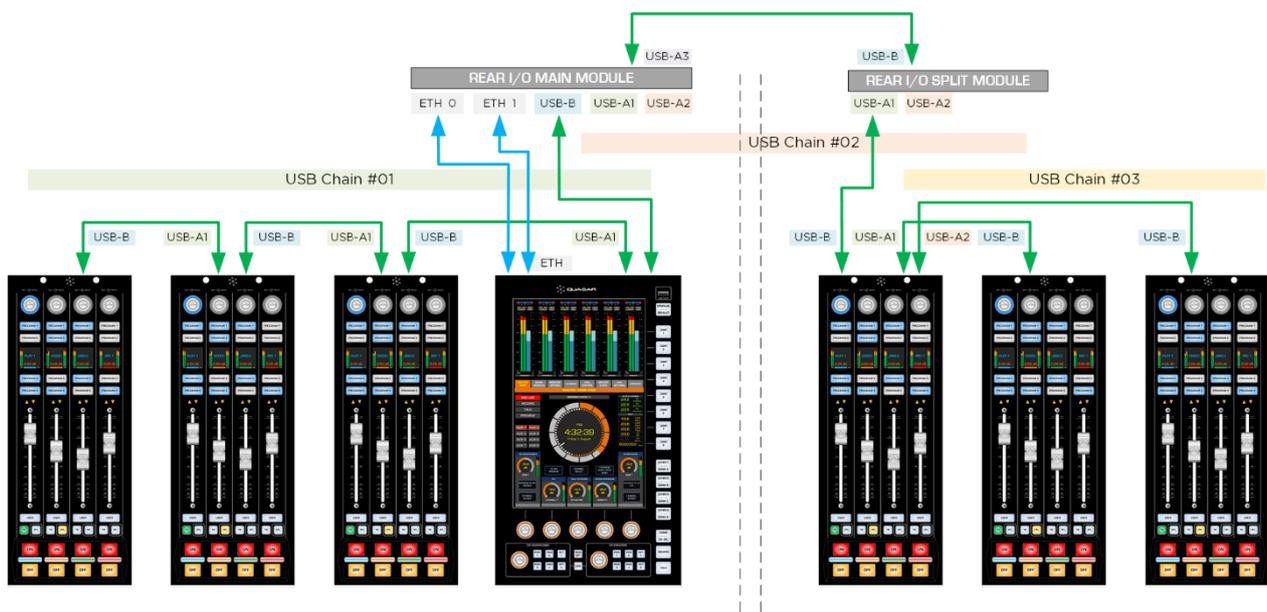
Note – A maximum of 4 USB Hubs (3 links) is allowed per each USB daisy chain which starts from the Rear I/O module.

For reference, here is a view of the SR Module's Rear USB connections:

The same principles apply when connecting any of the SmartKey Modules.
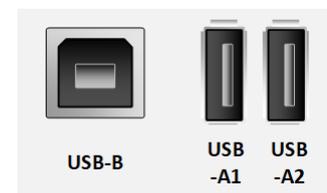
4 – External Connections

Redundant Connections

This chapter describes the options available to those who wish to wire their control surface with redundant connections.

Surface Redundancy

- It is possible to have dual redundant ethernet links from one XR surface to the network switch, by connecting the two ports at the back of the Quasar to the switch, and configuring spanning tree option on the switch. This is not possible with a Quasar SR.
- It is possible to connect multiple surfaces to the network and to switch control of the engine from one surface to another, in case the first surface is offline.
- In case the Master Module is OK but one or more fader modules stop working, or must be taken offline for servicing, it is possible to use Quasar Soft control those channels using a PC with a browser.

Engine Redundancy

- NO redundancy option exists today for the Quasar Engine. It is not yet possible to connect one surface to two engines in hot-spare configuration.
- NO redundant Ethernet link option exists today for the Quasar Engine. The second Ethernet port at the back of the engine is disabled at the moment (please see page 9).
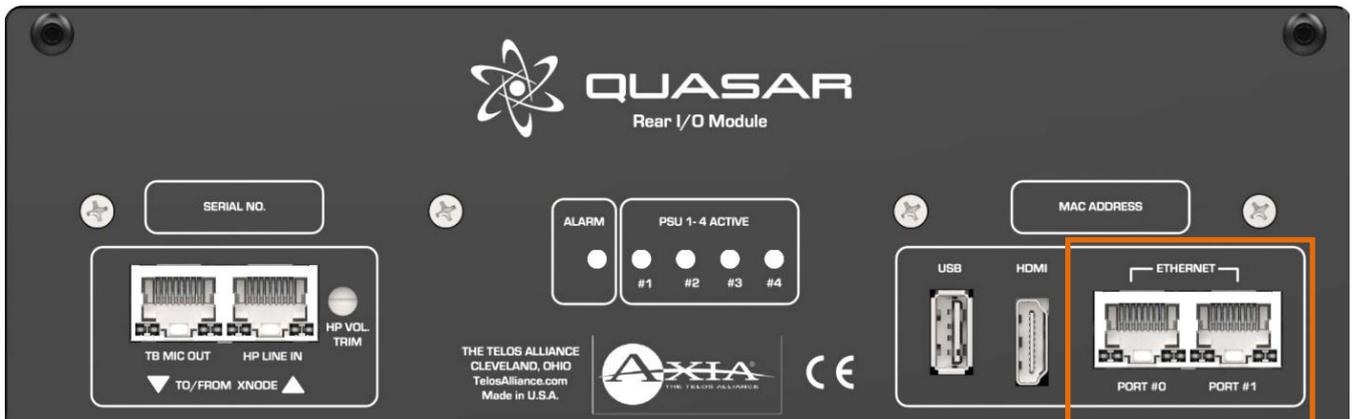
External Network Connections

The Quasar Surface will have to be connected to a network switch, in order to become part of your network and communicate with the Quasar Engine and all the I/O Nodes.

Quasar uses Gigabit Ethernet ports on all of its modules. The Ethernet ports at the back of the Surface are Gigabit. A Quasar console and its Quasar Engine will require a Gigabit link to the network switch. Quasar requires at least one free Gigabit port on your network switch, (or two in case a redundant link is required). In case the Quasar engine is connected to the same switch, an additional free Gigabit port is required on the switch.

> **Note -** The switch ports shall be configured as access (not trunk) ports. The Axia xSwitch is not suitable for the Quasar, because it has two 1-gigabit ports only, and they are configured for redundant trunking to a core switch.

The simplest way to hook up your Quasar is by connecting PORT #0 to a gigabit port on your switch.

1. Connect one Ethernet cable to the primary network port labeled "PORT #0" on the Quasar Console Rear I/O board, connect the other end to a configured Gigabit Ethernet switch.
2. Optionally, and for Quasar XR surfaces only, it is also possible to use the secondary Ethernet port, labeled "PORT #1" to create a redundant connection link. This will require the switch ports to be configured for Spanning Tree operation. Please see the paragraph: "Configuring Spanning Tree on your Switch".

> **Note –** We recommend using shielded Ethernet cables to connect the Control Surface to the network, in order to eliminate any possible noise present on the data lines through the console chassis ground.

Quasar XR - Internal Network Architecture

Inside each module (MTS-MON and XR-4FAD) there is a SOM (System On Module), with its own network interface (and a MAC address). This is connected to an internal 2-port switch, to allow daisy chaining of the network connection between modules.

Therefore the two ETH ports at the back of the Quasar Frame have two different MACs, since one is connected to the Master, while the other is connected to the last fader module in the chain. The two ports at the back of each module have the same MAC address.

> **Note -** The "MAC ADDRESS" Sticker at the back of the Rear I/O Module reports the primary MAC address of the system, which corresponds to the MAC address of the Master Module.

Ethernet switch configuration

The recommended switch configurations we publish on our website remain valid for Quasar, which will have to be connected to a switch port configured as **Access** mode (same mode used for xNodes). However, Quasar requires an additional setting to be entered on the switch port it is connected to: Energy Efficient Ethernet must be turned off . On some Cisco switches this is achieved by adding the **no power efficient-ethernet auto** command on the port configuration.
Please see Cisco's dedicated guide for configuring EEE here. In case the link is broken, please

search the web for "Configuring EEE – Cisco".

> **Note -** If Automatic Energy Efficient Ethernet is enabled on a switch, it will cause the Quasar to temporarily and randomly loose connection to its engine, especially when not operated and left unattended. You must disable EEE on all ports of your switch, if this is used primarily in an AoIP network. Not all Cisco switches have this option – please check your switch manual if EEE is available.

Below is a screenshot of the Web GUI from a Cisco2960X switch, showing the correct EEE settings
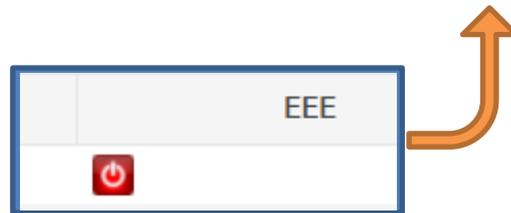
Configuring Spanning Tree on your Network Switch

Spanning Tree Protocol (STP) is a Layer 2 link management protocol that provides path redundancy while preventing loops in the network.

STP is used in situations where Ethernet links, or entire Network Paths are required to be redundant. Redundant links offer a simple way to backup the connection between the surface and the switch, but offer no protection in case the switch fails. Redundant network paths are important as backups in the case of a link failover in a network. With STP configured properly, a failure of your primary link will activate the backup link so that the console can continue to communicate with the network.

Connecting both Ethernet Port #0 and Port#1 of your Quasar XR surface to a network will require setting up Spanning Tree Protocol (STP) on the switch ports you are connecting to. Spanning Tree Protocol (STP) is a Layer 2 link management protocol that provides path redundancy while preventing loops in the network.

> **Warning –** Connecting both Ethernet ports of the console to a switch not configured for Spanning Tree will create a network loop which could flood the switch, due to the high number of Multicast traffic generated by the console. The same is valid for split frames. DO NOT connect both ETH ports unless STP is configured on the switch.

On Cisco Catalyst series switches, spanning tree is always enabled by default on vlan 1. Executing the *show spanning-tree* command on the Cisco CLI will display the status of the STP configuration.

In case you need to set up a redundant link to a single switch, configured per standard Livewire recommendations, some parameters can be added in order to tune the timing constants of the switching between the primary and secondary ports, where the Quasar surface connects to.

Here is an example of global STP configuration on a Cisco Catalyst Switch:

spanning-tree mode pvst
spanning-tree extend system-id
spanning-tree vlan 1 priority 0
spanning-tree vlan 1 hello-time 1
spanning-tree vlan 1 forward-time 4
spanning-tree vlan 1 max-age 6

In case redundant Network paths to multiple switches need to be configured, then other parameters like VLAN priority, port priority and path cost, need to be configured. These depend on the network architecture, so we recommend that you consult your IT Manager. For more detailed and comprehensive information about configuring Spanning Tree Protocol on Cisco Catalyst switches, please visit this page.

Default IP Addresses

Each Quasar Console that is assembled at the factory is tested before shipping. During this process, some default IP addresses are assigned to all of its modules.

The following IP address are assigned for testing, by the factory:

- Quasar MTS-MON (Master Touch Screen - Monitor) module - 192.168.2.10
- Quasar XR Fader Modules - Starting at 192.168.2.11 and increment from there, depending on how many modules are installed in your system.
- Quasar Accessory Panels – Starting at 192.168.2.21 and increment from there, depending on how many modules are installed in your system.
- Quasar Engine – 192.168.2.100

Since you may have more than one Quasar Console in your system, it is best to set the IP addresses BEFORE you plug them in to the larger network to avoid IP address conflicts.

IP Address Configuration

Should you need to change the default settings, or if the warning message: "No Connection to Engine" should appear on the surface's home screen (just above the clock) once the system boot is completed, then you will need to enter new network settings manually.

- Access the System Setup page on the Master Touchscreen Module, by pushing and holding the Monitor Options key (labeled "MON OPT" and located between the two Control Room volume pots) for 5 seconds.
- Enter the desired IP address and Netmask for the Surface and Engine using the touchscreen or the corresponding rotary encoders beneath the display. A Gateway is optional but typically not required when the console is part of a closed network.
- Press the "Save & Reboot" button.

Connecting Quasar to a Laptop

If you need to connect your laptop PC to the Quasar, for initial configuration, or simply for navigating its web UI, you can connect it directly to PORT #1 at the back of the console.
If you have set up a redundant link to your network switch, you will have to connect your laptop to any port on the switch.
If you have a split-frame console, and PORT #1 on the primary frame (where the Master Module is installed) is used to connect to PORT #0 on the secondary frame, you have the option to connect your laptop to PORT #1 on the secondary frame… or on your network

switch.

Connecting Quasar to an external Display

The rear HDMI port supports any display with Full HD resolution (1920x1080) at 60Hz frame rate.

Connecting Talkback and Headphones

If a console is ordered with the optional Quasar MIC in - HP out module, (Telos p/n 2001-00579), the rear I/O module will come with the HP Amp board installed. Normally this board is not installed and the module will have a plastic blanking plug installed. If this is present, the rear I/O module left side will be populated with two RJ-45 connectors, as shown in the picture below.

Connect the TB MIC OUT (A) socket to the input of your xNode , and the HP LINE IN socket to one of the outputs of your xNode using standard RJ-45 cables.

Calibrating the HP Amp level

1. Set the output of the xNode to 0dB and the VOLUME TRIM (C) to the minimum level, turning the trim pot fully counterclockwise.
2. Rotate the CR HEADPHONES volume knob on your console to 12 o'clock position (-15.0dB)
3. Now put your headphones on and adjust the trim pot gain to your standard listening level.
4. This will give you 15dB of Headroom in case you need to crank up the volume on your headphones.

Warning - The HP amplifier is very powerful and can output very loud audio signals. It is a safe practice to check for audio presence while your headphones are still on the table, before wearing them.

5 – Quasar Engine

Hardware Platform Installation

The Quasar Engine serves as the DSP platform of the studio. Audio from the AoIP network enters the mixing engine and is manipulated per the user's actions on the Quasar surface. Processed audio becomes streams (sources) from the Engine into the network.

Front Panel

The front-panel of the New Quasar Engine has no display or navigation buttons.

Five LED indicators located to the top-right corner of the front panel can turn green or red to provide quick visual feedback about the status of the following parameters:

1. Informational LED
2. Network Port 1 activity (green)
3. Network Port 2 activity (green)
4. Disc Activity (yellow)
5. Power (green)

Additionally, there is an LED integrated in each PSU module ate the back of the unit.

Informational LED

Status	Description
Solid red	An overheat condition has occurred. (This may be caused by cable congestion).
Blinking red (1Hz)	Fan failure, check for an inoperative fan.
Blinking red (0.25Hz)	Power failure, check for a non-operational power supply.
Solid blue	Local UID has been activated. Use this function to locate the server in a rack mount environment.
Blinking blue (300 msec)	Remote UID is on. Use this function to identify the server from a remote location.

Network Port LED #1
Indicates network activity on GLAN12 when flashing. The NET 1 interface is not enabled and it is intended for future functionality. This Port is normally left unconnected.

Network Port LED #2

Indicates network activity on GLAN12 when flashing. NET 2 is the port that you want to use, when connecting to your core switch.

Disc Activity LED

Indicates IDE channel activity. SAS/SATA drive and/or DVD-ROM drive activity when flashing.

Power LED

Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

Rear PSU LEDs

On the rear of the power supply module, an LED displays the status:

- **Solid Green**: When illuminated, indicates that the power supply is on.

- **Solid Amber**: When illuminated, indicates the power supply is plugged in and turned off, or the system is off but in an abnormal state.

- **Blinking Amber**: When blinking, this system power supply temperature has reached 63°C. The system will automatically power-down when the power supply temperature reaches 70°C and restarts when the power supply temperature goes below 60°C.

Rear Panel Connections
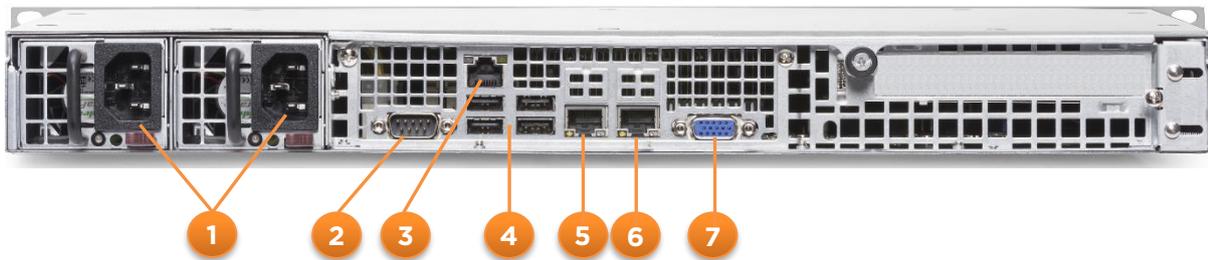
1. Power Inputs: These are dual, hot-swappable, 400W OEM supplies that will take voltages from 100VAC to 240VAC at both 50 and 60 cycles per second. To use the system with one supply, remove the unused one from the chassis using the lever below the IEC socket. This will disable any alarms.
2. RS-232: This is for development and diagnostic purposes only.
3. IPMI Control Port: This Intelligent Platform Management Interface is a connection for development purposes only.
4. USB Ports: These are serial ports used for development and factory production only.
5. NET #1 port: This port is currently not in use.
6. NET #2 port: This port must be connected to the Livewire+/AES67 network.
7. VGA port: This is used for development and diagnostic purposes only.

Thermal Design
This 1RU platform features an advanced thermal design for highly efficient cooling and quiet operation with up to six 4cm counter-rotating cooling fans, and supporting a selection of high-efficiency power supplies to fit the desired application. Tool-less serviceability and quick release sliding rails are also available for use in HPC and data center environments.

Drives
The Quasar Engine chassis supports up to two fixed 2.5" drives (with optional bracket).
In the unlikely event that the SSD drives supplied with the unit fails and has to be replaced, Please follow these instructions:

1. Power down the system
2. Remove the three screws and the one thumbscrew securing the top cover to the chassis.
3. Slide the cover back toward the rear of the chassis.
4. Lift the cover upwards and off of the chassis.
5. Replace the SSD drive
6. Proceed to install a new Software image. You will need to contact Telos Support to obtain the 1621-00188-0xx-QuasarEngine-SM-USBimage file and the instructions to create a USB flash disk.

> **Warning -** Do not operate the Engine without the cover in place, except for very short periods of time. The cover must be in place to allow proper airflow and prevent overheating of the internal circuitry.

Fans
The chassis includes three or four heavy-duty fans with open slots for two or three additional fans if required. System fans for the SC514 chassis are powered from the mainboard. These fans are 1U high and are powered by 4-pin connectors.

Power Supply
Each Quasar Engine chassis includes two high-efficiency dual redundant power supplies rated at 400 or 440/480 Watts. In the unlikely event your power supply fails, replacement is simple and may be done without tools, and without powering down the server.

Rack Installation

The Quasar Engine is designed for high-density installations in rack furniture. No empty rack spaces are required above and below the unit. Air cooling flows only from the faceplate vent slot to the rear panel vents.

> **Warning -** Make sure there is no obstruction to the front and rear panel venting slots while it is operating, or serious damage to the unit may occur!
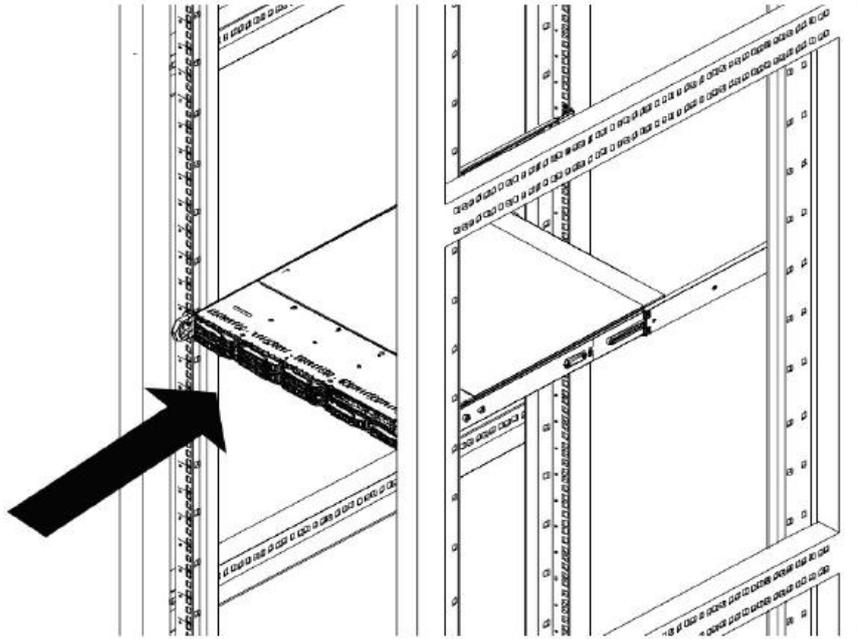
Glide Rails
The glide-rails included with the Quasar Engine platform will fit a rack between 26" and 33" deep. The fixed inner portion of the glides with their locking tabs are already installed onto the chassis, so the assembly of the outer portion is all that is needed. The outer glide rails attach to the rack and hold the chassis in place. Each end of the assembled outer glide rail includes a bracket with square pegs to fit into your rack holes. If you have an older rack with round holes, these brackets must be removed, and you must use screws to secure the glide rail to the rack.

Mounting the Unit

1. Identify the left and right outer glide rails by examining the ends, which bend outward. Match the left front outer glide rail with the left rear outer glide rail and the same for the right rails.

2. Align the round post in the rear rail (2) with the round hole at the end of the slot in the front rail (1), and slide the front section into the rear section.

3. Align the square pegs on the front end of the rail with the square holes on the front of the rack. Push the rail into the rack until the quick release bracket snaps into place, securing the rail to the rack ---or--- remove the filler bracket with the square pegs and use the oval screw holes to mount the angle to the front rack rail. Keep the glide-rail horizontal.

4. Adjust the glide-rail to reach just past the full depth of your rack.

5. Align the square pegs on the rear end of the glide to the holes on the rack and push the glide rail into the rack until the quick release bracket snaps into place, securing the rail to the rack. ---or--- Remove the filler bracket with the square pegs and use the screw-holes to mount the glide rail to the rear rack rail.

6. Repeat the procedure for the other outer glide rail assembly.

7. Align the inner portions of the glides mounted to the chassis with the outer portion of the glides that you have just installed in the rack and slide the chassis into position. The locking tabs will engage when they reach the proper position.

8. The center holes in the front panel/glide rails can be used to lock the chassis into position. They can then be removed if the unit needs to slide out on its glides for servicing.
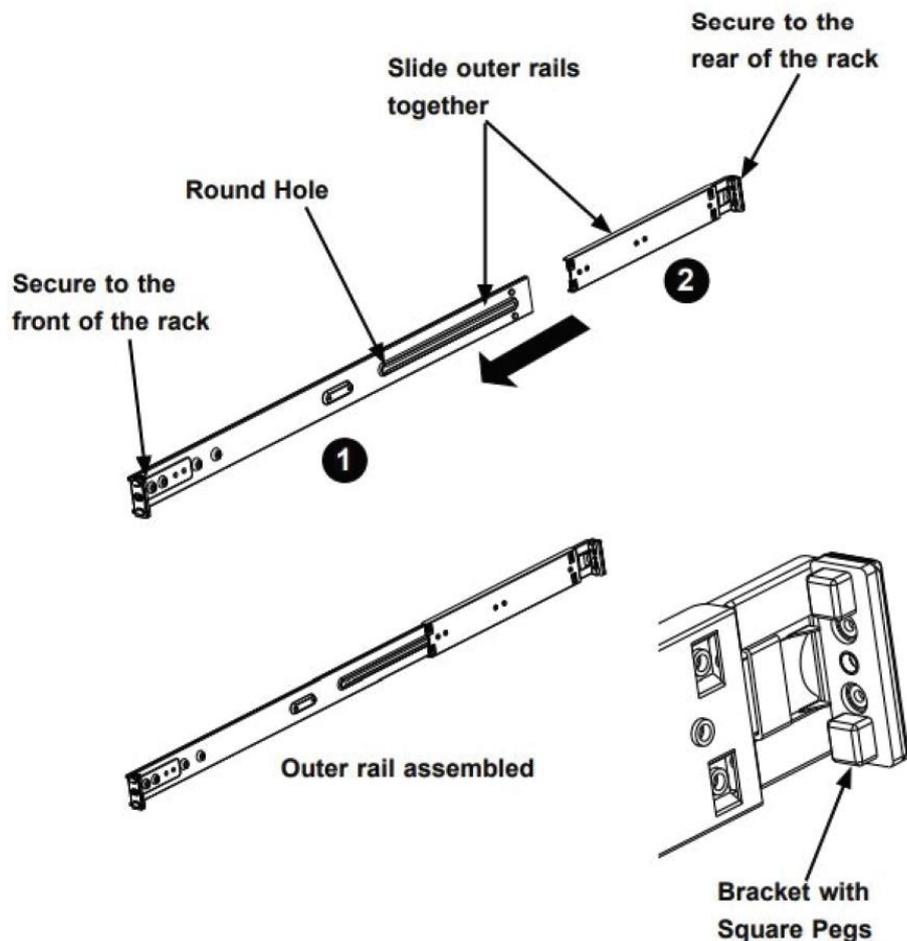
Warning - Never pick up the chassis by the front handles. The handles are designed to pull the chassis out on the glide rails for servicing only. Glide-rail mounted equipment is not to be used as a rack shelf or a workspace.

Quasar Engine RPS

Quasar Engine RPS is essentially a Quasar Engine with a HW upgrade, which consists of an additional PCI card (the Engine RPS Board) which has its own Network, HDMI, and USB ports, similar to those found at the back of a standard MTS-MON Module. There are a few differences with the MTS though, and these will be described in the next pages.

Upgrading an existing Engine to an Engine RPS
In addition to being available as a unique, ready-to-use product, existing Quasar Engines can be field-upgraded by way of the RPS Upgrade Kit (p/n 2011-00835-000), which contains the RPS card and all associated mounting hardware. While Quasar Engine RPS includes a Quasar Soft and Quasar Cast license, RPS Upgrade Kits do not, and licenses must be purchased separately.

For all details on how to upgrade a Quasar Engine to an Engine RPS, please refer to the Quasar Engine RPS Quick Start Guide (p/n 1490-00248-000).

Engine RPS board connections

Below is a detailed view of all the connection ports available on the RPS Board:
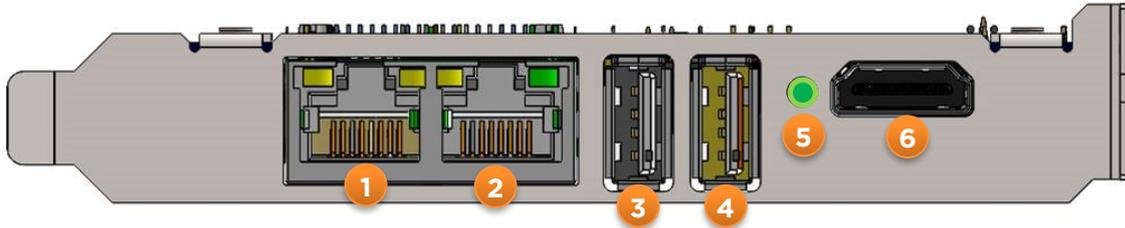
1. **WAN Port:** This port is disabled by default. Its IP address is set to 0.0.0.0 and can be changed from the Web GUI, reachable from the LAN Port. The use of this port is not required, if no remote control is required from a different network other than your Local AoIP network

2. **LAN Port:** This port is assigned by default to IP 192.168.2.10/255.255.255.0 and must be connected to a Gigabit port of your AoIP network.

3. **USB-A Port #1:** Quasar Fader Modules, such as the SR-4FAD module or one of the SmartKey modules (SK-6/12/18/24BTN) can be connected to this port. This port can also be used to connect to an external touchscreen monitor.

4. **USB-A Port #2:** Same as Port #1.

5. **STATUS LED:** This Status LED is normally ON and Green when the card is active and in working state. It can turn to Red in case an alarm is triggered by the internal watchdog. Please check the Web UI if the LED should become Red.

6. **HDMI Port:** Connect an external Display, or Touchscreen monitor to this port in case you need to control The Engine RPS GUI directly without using the built-in Quasar Soft Web interface.

Earth Connection and Grounding

- The Quasar Engine RPS Board is grounded through the Engine platform chassis.
- The Quasar Engine RPS platform is grounded through its Mains AC cables.

The Quasar Engine RPS does not require a separate chassis ground connection.

Network Connections

The Quasar Engine RPS card behaves and connects like a Quasar Surface. Therefore, a total of two network cables must be connected from the Engine RPS platform to your AoIP switch: one from the Engine Network port, and one from the RPS card LAN port. That's because the Engine RPS board and the Quasar Engine are two completely separate entities sharing the same chassis.

Following are some interesting examples of how an Engine RPS system can be deployed in your network:
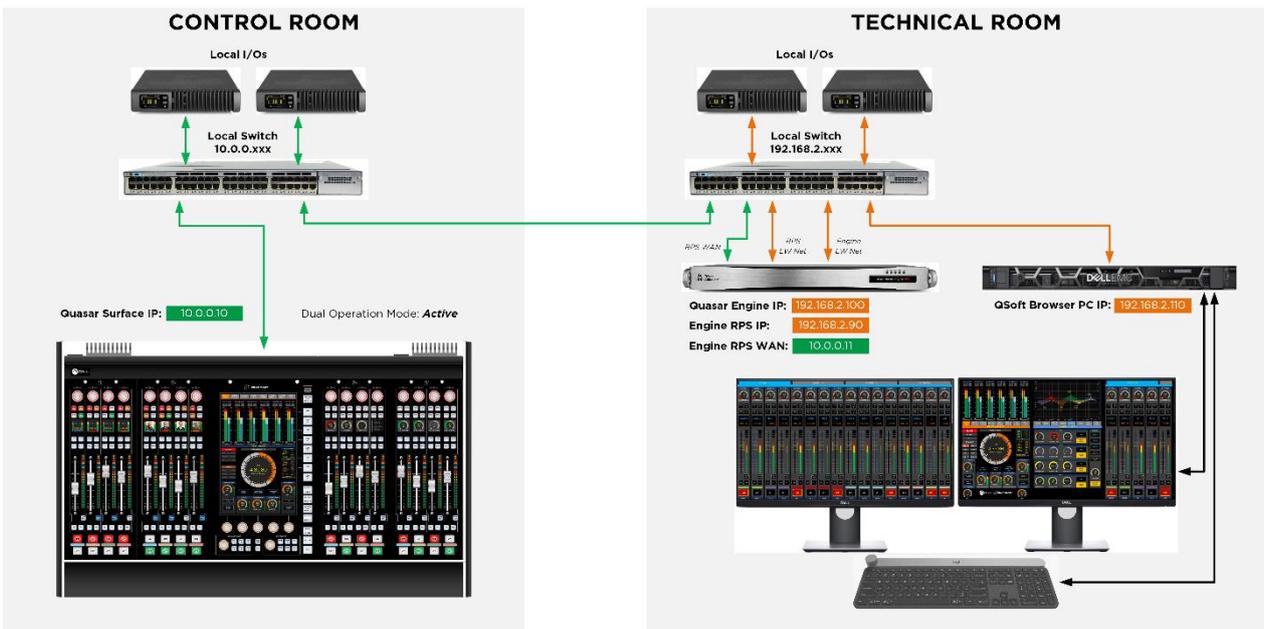
One Physical Network, one Subnet

In the following example, a Quasar control surface installed in a Control Room, has its Edge Switch connected directly to another Edge (or Core) Switch in the Technical Room. The two switches together form one physical network based on a flat subnet, and all devices' IP addresses belong to the same Netmask.
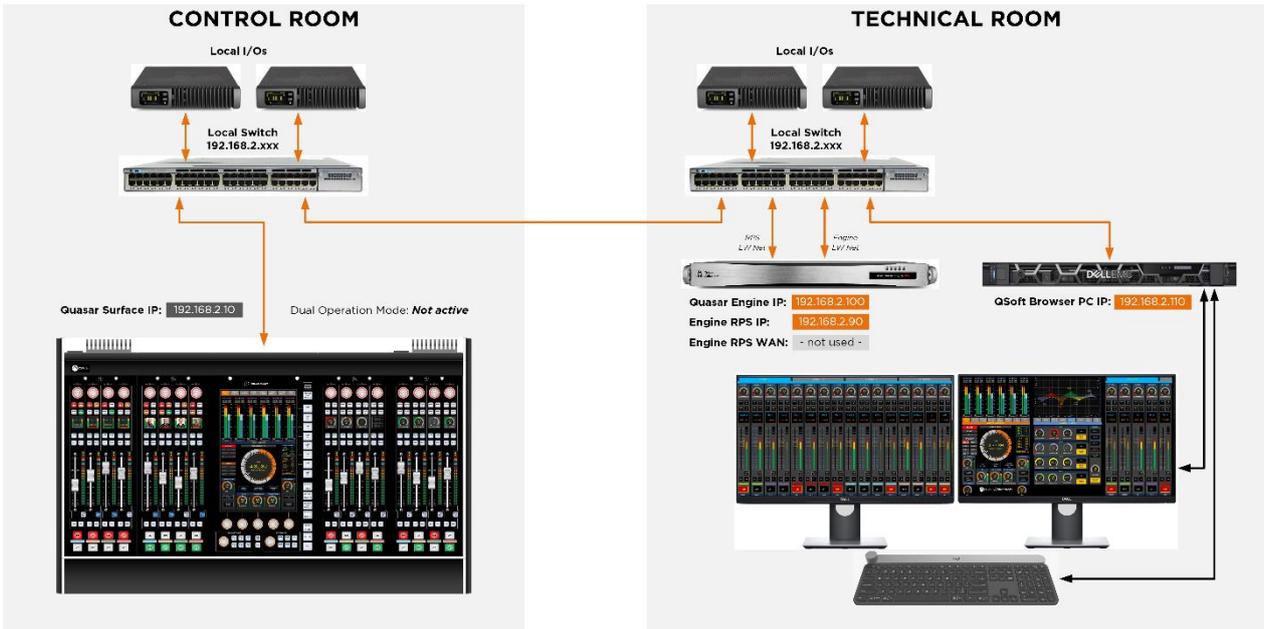

One Physical Network, two Subnets

In the following example, a Quasar control surface installed in a Control Room, has its Edge Switch connected directly to the Tech Room Switch. The two switches form one physical network which includes two subnets (marked with green and orange connections): the RPS board connects to both subnets: its WAN port is connected to Subnet #1 while its LAN port is connected to Subnet #2. There is no physical separation between the subnets.

Two Physical Networks, with different Subnets

In the following example, the Control Room and Tech Room have separate AoIP networks: the RPS WAN port connects only to the Control Room subnet (green), and the RPS LW LAN port is connected only to the Tech Room subnet (orange). The two subnets are kept physically separate by the RPS board, which sits across the two without interconnecting them internally.
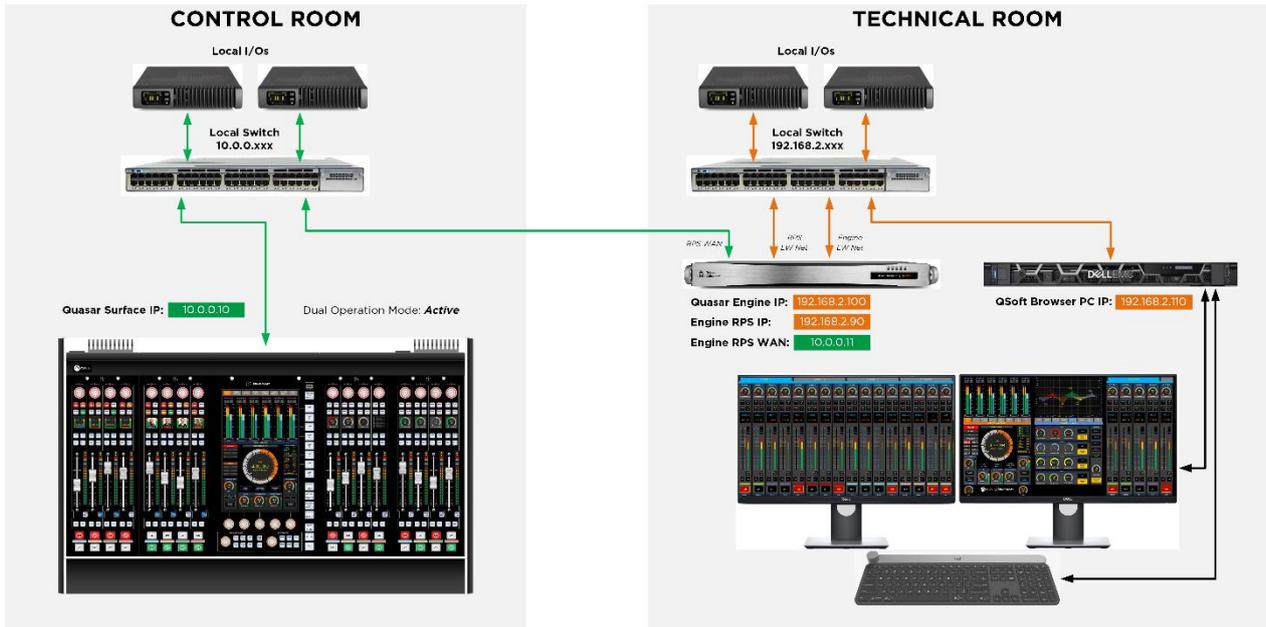
Multiple Physical Networks, with Routing

In the following example, the Control Room and Tech Room networks are connected to a Router which forwards packets between the two. The Control Room consists of a single network, and the Tech Room has multiple networks, one of which is directly connected to the RPS WAN port, and the LW AoIP Network is separate.
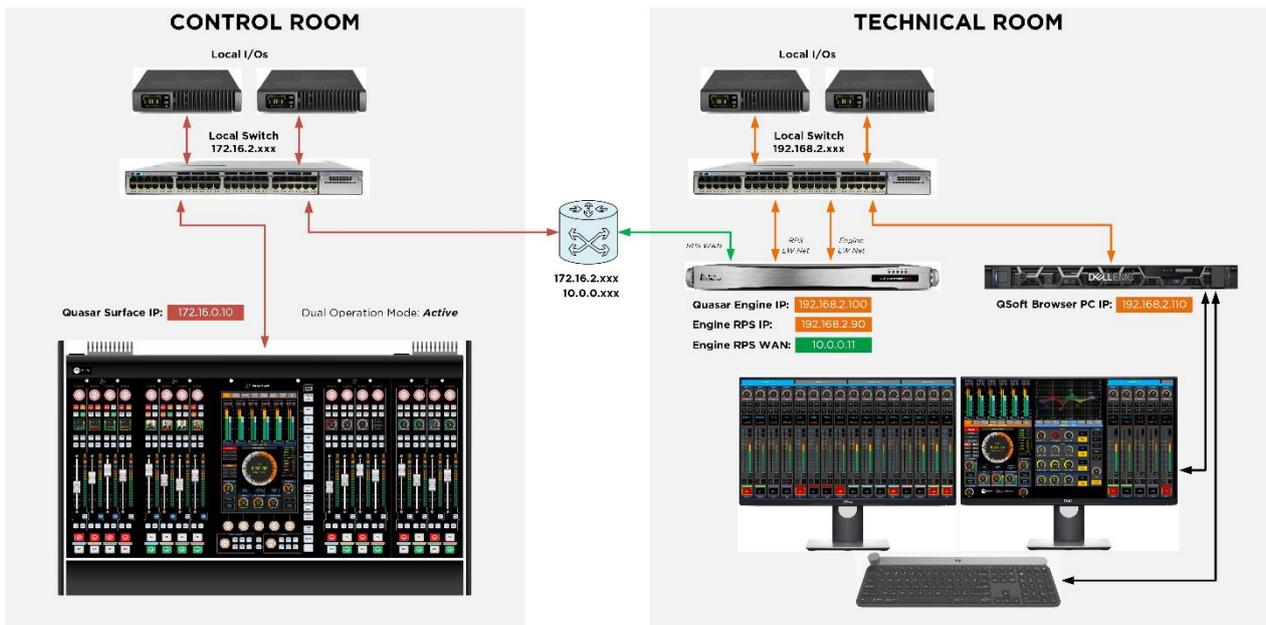
6 – Diagnostics

Diagnostics & Troubleshooting

Whether you are running a simple periodic console check, or diagnosing a system malfunction, a good place to start is the Status Page built in the Web UI of each system Component: Master module, Fader Modules, and Engine.

Master & Fader Modules Status Pages

Navigate to each of your modules' web UI home pages.

Please check periodically <u>each</u> Module's Status page for:

- Uptime
- CPU Usage
- CPU Temp
- System Tempeature
- RTC Battery

- Network Link Status and Usage

Uptime should increase every day, providing the surface is left always on. A "O days" information on the Master, or a very short uptime, will indicate that the console has been rebooted.

CPU usage should be in the range of 0-20% . High CPU usage values might indicate that the is a hardware problem with its SOM module.

CPU temp ideal range is 40-60°C. Temperatures between than 60°C and 70°C can be tolerated for short periods of time and might be due to excessively high ambient temperature. Temperatures higher than 70°C are not acceptable and might be due to damage (dry-out) of the thermal heat transfer material inside the module. Please contact Support in this case.

RTC Battery is installed only on the MTS-MON module. A "Not OK" message will be displayed only when very low or disconnected. In case the "OK" message is displayed, but the time set from the PC is not saved and kept at the next reboot, it is time to replace your battery. Please contact Support in this case.

Network Link status should always be "1000Mb/s, full duplex". This is the speed of the internal Ethernet bus. <u>It is not</u> the speed of the link between your console and the switch it connects to.
Anything different from 1000Mb/s will indicate a problem with the SOM module or the internal Ethernet switch.

Net Usage shows the utilization of the link between the internal switch and the SOM module. In general, Rx should never exceed 100Mbps. If this happens, most likely something is flooding

the network. In this case the console might lose network packets and network communication would become unstable.

Tx is mostly informative, it might be a good indication of activity on external protocols, like Pathfinder or html5 or (in future) streaming. If it grows too high (above 100Mbps) probably some external controllers are stressing the console too much.

The parameters found in each of the Fader Modules (XR-4FAD only) Status pages are the same as those found in the MTS Module.

System Test

The System Test is a special operating mode, useful to diagnose issues with the hardware controls of your Quasar surface. The System Test should never be performed on the console while it is on the air, since the controls are disengaged from the DSP Engine while the Test is executed.

To enter System Test you need to access the System Setup page on the Master Touchscreen Module, you need to push and hold the "Monitor Options" key (labeled "MON OPT" and located between the two Control Room volume pots) for 5 seconds.
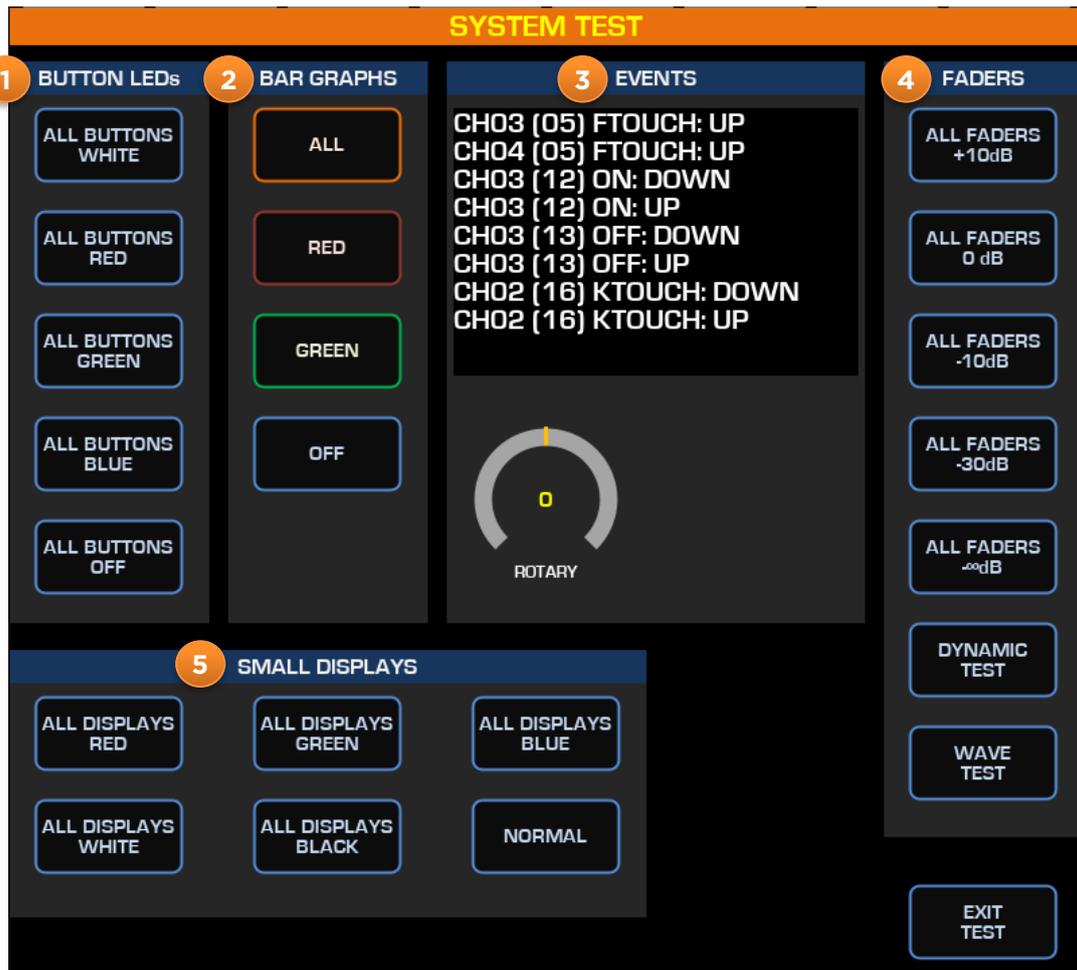
1. **BUTTON LEDs:** Use buttons in this section to test the LEDs inside each key of your surface. All keys except the channel ON and OFF keys include an RGB LED. The ALL BUTTONS WHITE button will turn all RGB LEDs white. If one of these LED isn't white, then proceed by checking each individual color with the other buttons to determine if something is wrong with one of the colors.

   Note – the Button Test will include the Quasar SmartKey modules, if any is installed onto the surface.

2. **BAR GRAPHS:** Use buttons in this section to test the LED Bargraph located next to each fader of a Quasar XR-4FAD module. The bargraph LEDs are bi-color: red and green.

3. **EVENTS:** This window will display an event each time one of the physical controls is operated:

   a. Fader Touch Sensor pressed (DOWN)
   b. Fader Touch Sensor depressed (UP)
   c. Knob Touch Sensor pressed (DOWN)
   d. Knob Touch Sensor depressed (UP)
   e. Key pressed (DOWN)

  f. Key depressed (UP)
  g. Rotary Encoder rotation, with direction

4. **FADERS:** Use buttons in this section to test the motorized faders position. If they are not all equal, when set to +10dB, 0dB, -10dB, -30dB and -inf positions, then a Fader calibration is required. Press the DYNAMIC TEST button to check how well each fader brakes to the top (+10dB) and bottom (-inf.) position. If one of the faders hits the rubber stop and a mechanical noise is heard, the fader needs calibration, and in the worst case, to be replacement. Press the WAVE TEST button to check how quiet are the motors during continuous movement operation. If a motor is particularly noisier than others, the fader will need to be cleaned, lubricated, and in the worst case, replaced.

5. **SMALL DISPLAYS:** Use buttons in this section to test the Channel Displays' backlight.

Press the EXIT TEST button to exit the System Test.

> **Note -** After exiting System Test, the two RGB collars of the CR and HP volume controls might change their colors. This is perfectly normal because the system test does not preserve the state of the MTS-MON module hardware controls.

> **Warning -** A reboot of the MTS-MON module will be required after exiting System Test, in order to reset all HW controls to their normal state. Do not go on the air before performing an MTS reboot.

Console Rear I/O

If your console has redundant PSU Modules, please check the green status LEDs at the back of your Quasar frame.
One or more green LEDs should be lit, corresponding to the number and position of PSU Modules installed.

If the number of active LEDs doesn't match the number of PSUs, please check the fuse on the corresponding PSU.
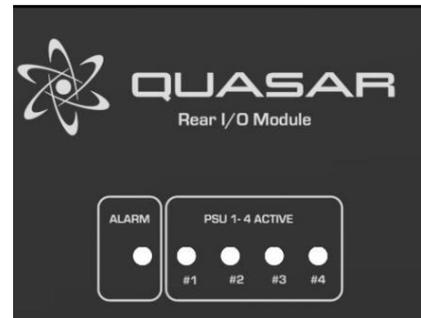
Engine Hardware Info Page

Please check periodically the Engine Web UI Status page for:

- Status Errors
- PSU status
- Voltage Rails
- Internal RTC Battery
- FAN status
- System Temperature
- CPU Temperature
- Link Status
- Link Speed
- System Uptime

Connectivity Issues

Power Connections

In case power to one module seems to not be present, please check the following:

- Do the next modules (those immediately beside it) work correctly or not? If they do, the Ethernet switch inside the "suspect" module is working correctly, therefore it is unlikely that your module has no power.

- In case the next modules have lost Ethernet connectivity (a message will appear on their displays) then proceed with removing the module and inspecting the internal LEDs on the Power Distribution board:

- If they are all solid lit, then inspect the power cable for loose crimped pins on both connector ends.

- If the LED on the output which corresponds to the faulty module is not lit, try moving the cable connector to a free output with LED lit. Contact Telos Support if you suspect a failure of the Power Distribution board

Ethernet Connections

In case a loss of Ethernet connection between the Surface and the external network switch should occur, a message on the Master Module will appear, indicating there is no connection to the Engine.

If frequent or random loss of connection is experienced, and the **Switch Statistics** page reports a high quantity of Tx/Rx errors, you may have problems with your Ethernet wiring and more specifically, with its grounding. Please see Chapter 2 - Earth Connection and Grounding.

In case a loss of Ethernet connection between the Surface internal modules should occur, a message onto some of the modules' displays will appear, indicating there is no connection to the Master.
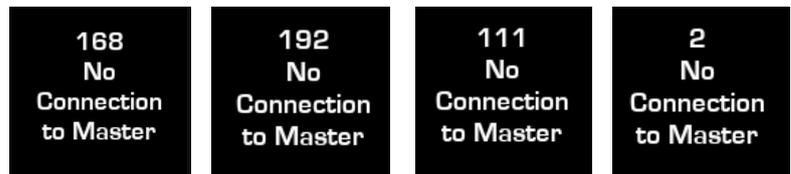
If one module is defective, it will affect all the other modules which follow it in the chain. We suggest checking the modules' internal Ethernet connections, in this case.

Finding the IP address of a Module

The IP address of each network-connected Quasar module is displayed in the **Console Discovery** menu of the MTS-MON module Web UI.
You can also read each fader module (XR—4FAD) IP address during boot. The IP will appear on the four channel displays at startup.

In case one of the console modules should not display its Web UI, there could be more than one device in your network with the same IP address. IP address conflicts can prevent your browser to access the web server built inside each module. Please check for duplicate IP addresses on your network, that might prevent you from accessing each module's Web UI. Also check for duplicate MAC addresses.

Locating the Serial numbers on your console

The serial numbers are located on the upper backside of the modules' rear shells.

7 – Maintenance

System Updates

Software Updates

What we refer to as "Software" is the Top-Level application which runs on the main CPU and includes the embedded Linux Operating System, Web Server, Console Logic and GUI.
This software is not what many engineers call "Firmware", which instead is a Low-level configuration file used to determine the behavior of all the hardware controls such as buttons, faders, encoders and LEDs, normally found on a control surface module.
When talking to our Support, please keep in mind that each surface module has a Software and a Firmware file.

Please refer to the Software Release Notes published on Telos' website, for instructions on how to perform Software updates. Each Software Release Note contains the instructions required to perform the software update it references to.

Firmware Updates

Updating the Firmware is an exceptional activity, required only in case Telos issues a Service Bulletin instructing Customers to do so.

Firmware to each module can be updated directly from the module web UI. Please contact Support in case you need instructions to perform such an update.

> **Warning -** Updating firmware is a delicate process that should be considered only in case your hardware is malfunctioning, and the problem you observe is described in a Service Bulletin which has been released to address your specific issue. The Bulletin will also be containing the instructions required to install the new firmware.

Cleaning and Preventive Maintenance

Although rugged and robust, the Quasar surface cannot be cleaned with just ANY chemical substance.

We recommend using the following products to clean the touchscreen and surface:

- Standard 70° Ethyl Alcohol (usually it is pinky)
- Computer Monitor cleaners

We recommend using the following products to clean the armrest:

- Standard 70° Ethyl Alcohol (usually it is pinky)

- Computer Monitor cleaners

- Water with mild soap

When cleaning, <u>do not spray</u> any of the allowed substances directly onto the surface! Spray them on the cleaning cloth you will use to rub the surface, instead.

<u>Never use</u>, on any parts of the surface:

- Pure isopropyl alcohol 99°

- Any type of Paint thinner

- Other chemical solvents (like acetone)

- Degreasers

- Window cleaners

- Any cleaner that contains ammonia or chlorine

A note about sanitizing your equipment:
There are two predominant types of alcohol used to sanitize. Isopropyl alcohol (IPA) and Ethyl alcohol (ETOH or ethanol). They are seldom registered as disinfectants as they evaporate too fast, but are effective against many organisms. They need to be blended with demineralized water to make them most effective, typically to a [level of 70% alcohol](). Isopropyl Alcohol could be used to clean Quasar only if in a concentration below 70%.

> **Warning -** Button caps (clear plastic lenses and black bezels) can be seriously damaged if aggressive cleaners or bacterial disinfectants are used to clean the console surface. Never use cleaning products different from the one we suggest above.

> **Warning -** The Anti-Glare coating on the Modules' overlays can be seriously damaged if aggressive cleaners or bacterial disinfectants are used to clean the console surface. Never use cleaning products different from the one we suggest above.

Tips & How-to Guides

Some interesting How-to Guides, and configuration tips are available in the HelpDocs section of the Telos Support page at the following address:
https://docs.telosalliance.com/docs/quasar-help-documents

Spare/Replacement Modules

Quasar is a modular control surface that allows modules to be added or replaced during normal operation.

- All Quasar Surface Control Modules are hot-swappable, from an electrical standpoint.

- All Quasar Frame rear PSU and I/O Modules, require the power to be disconnected before they are replaced.

Replacing Modules while the console is On Air

Replacing a Fader Module

Any of the Fader Modules (XR-4FAD, or SR-4FAD) can be disconnected and replaced while the console is being operated, without affecting the audio being sent on the air.

- When disconnecting a module, always remove DC power before disconnecting Ethernet or USB.

- When reconnecting a module, always connect Ethernet or USB before reconnecting DC power.

Replacing a Master Module

The Master Touch Screen Module (MTS-MON) *could be* disconnected, and replaced while the console is being operated, BUT after reconnecting and booting the new module, this will reset all control connections to the Quasar Engine, which will result in a temporary loss of the audio program being sent on the air, until the desired Show Profile is manually loaded. This period is variable (it depends on the network switch state) and could last from one to several seconds.

In case it is necessary to replace the console MTS Module while on the air, we strongly suggest bypassing the Studio (the console feed to the On Air processor and transmitter chain) before performing this operation.

Also please make sure that the following points are addressed before replacing the unit:

1. Create a backup configuration file from the original unit before it is disconnected
2. Restore this file to the replacement unit
3. Pre-configure the replacement unit with the same IP of the unit to be replaced
4. Pre-configure the replacement unit to connect to the desired Quasar Engine IP address

Note that Steps #3 and #4 will require the replacement unit to be disconnected from the console network (you should connect it directly to a laptop) , in order to avoid IP conflicts.

8 – Dimensions

Surface Modules' Dimensions

MTS-MON Module

(Dimensions are in mm)
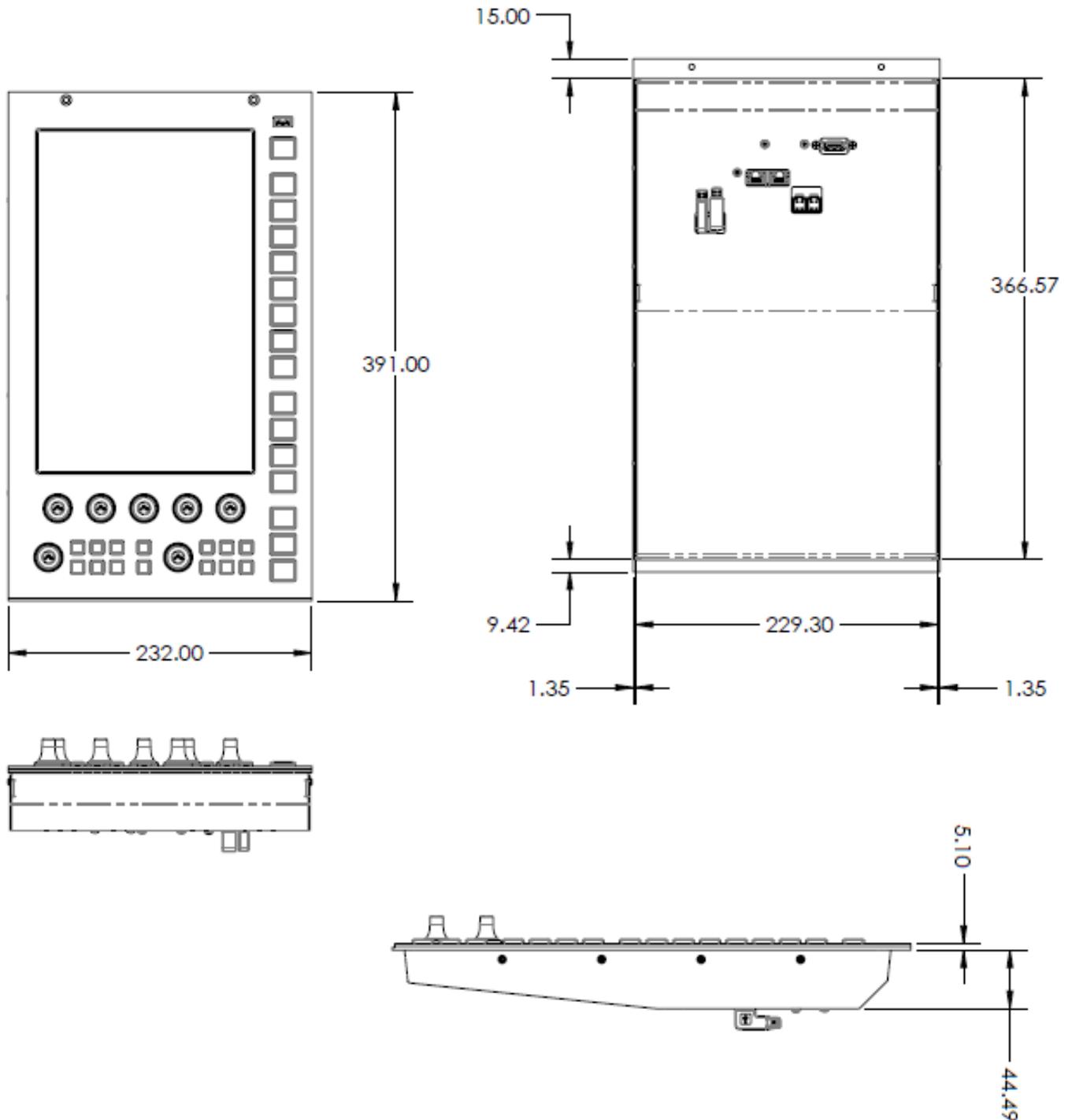
XR-4 and SR-4 FAD Modules

(Dimensions are in mm)
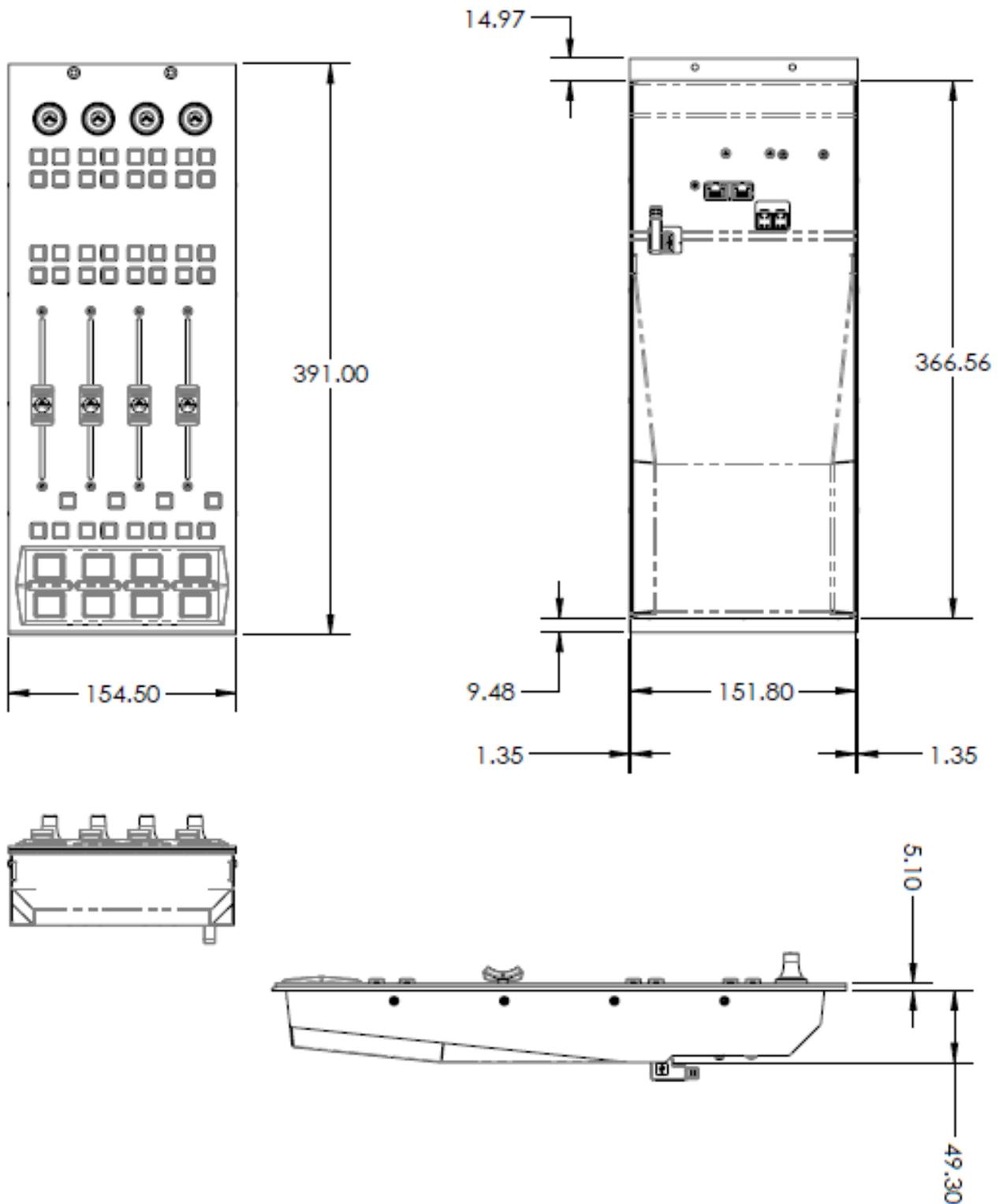
MPC-ACC Accessory Panel

(Dimensions are in mm)
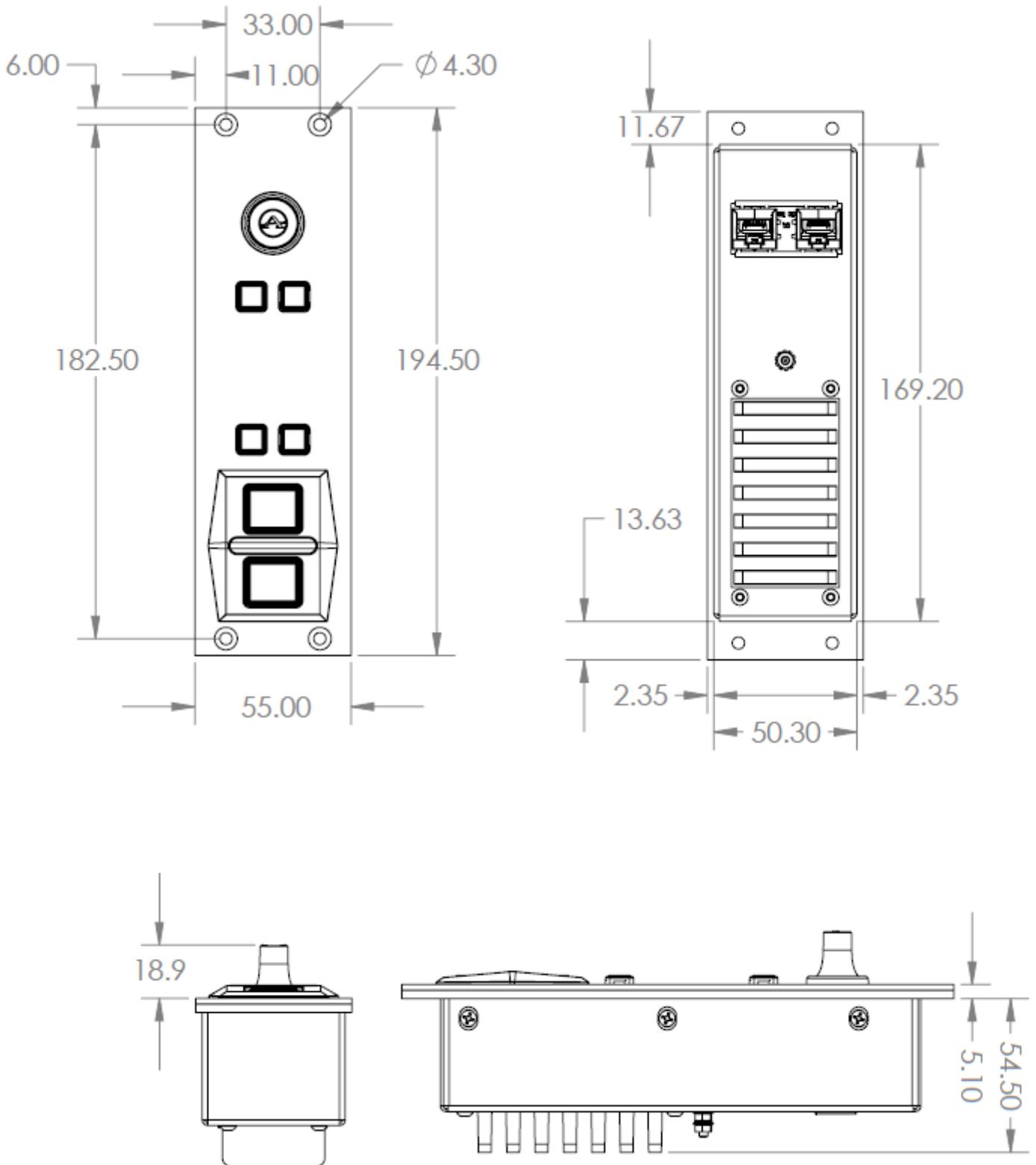
MF1-ACC Accessory Panel

(Dimensions are in mm)
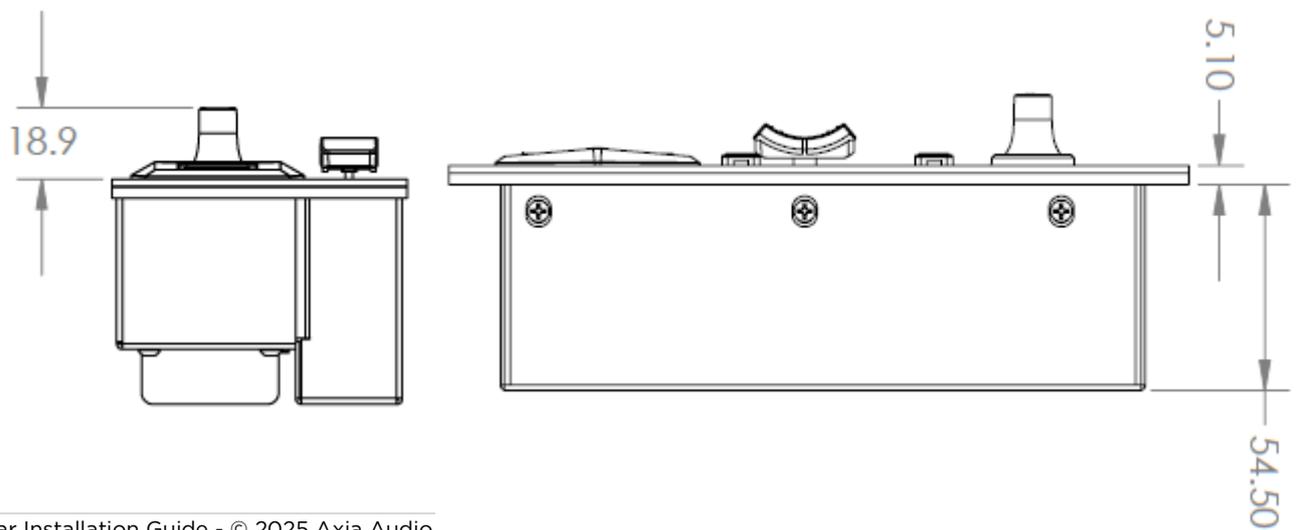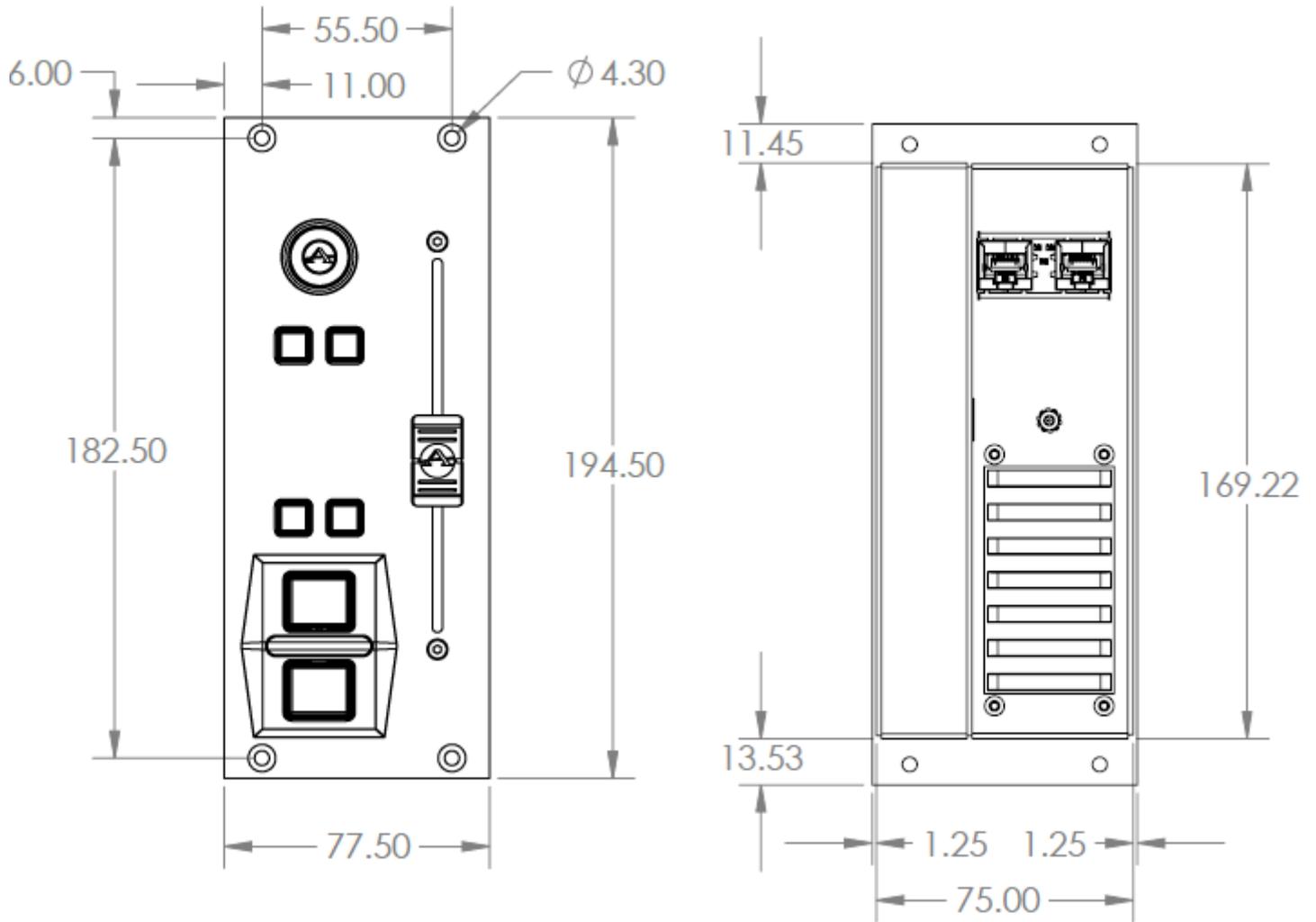
Table-Top Frames Dimensions

2.5U TABLE-TOP FRAME
Length: 430mm – 16.93"

3.5U TABLE-TOP FRAME
Length: 585mm – 23.03"

4.5U TABLE-TOP FRAME
Length: 740mm – 29.13"

5.5U TABLE-TOP FRAME
Length: 895mm – 35.24"

6.5U TABLE-TOP FRAME
Length: 1050mm – 41.34"

7.5U TABLE-TOP FRAME
Length: 1205mm – 47.44"
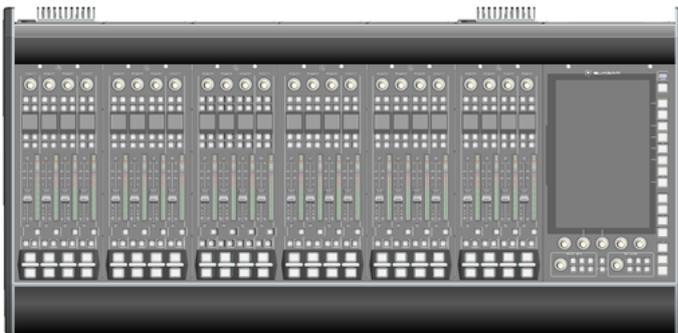
ALL TABLE-TOP FRAMES
Heigth: 110mm – 22.83" (at the top knobs)

8.5U TABLE-TOP FRAME
Length: 1360mm – 53.54"

ALL TABLE-TOP FRAMES
Depth: 580mm – 22.83"

Flush-Mount Frames Dimensions

536.11 [21.1]
514.11 [20.2]

2.5 U
405.50 [16.0] /002\
447.50 [17.6]

3.5 U
560.50 [22.1] /002\
602.50 [23.7]

4.5 U
715.50 [28.2] /002\
757.50 [29.8]

5.5 U
870.50 [34.3] /002\
912.50 [35.9]

6.5 U
1025.50 [40.4] /002\
1067.50 [42.0]

A

4.0 [0.2]
FLANGE THICKNESS

SECTION A-A

7.5 U
1180.50 [46.5] /002\
1222.50 [48.1]

R6.35 [0.3] 4 PLCS

8.5 U
1335.50 [52.6] /002\
1377.50 [54.2]
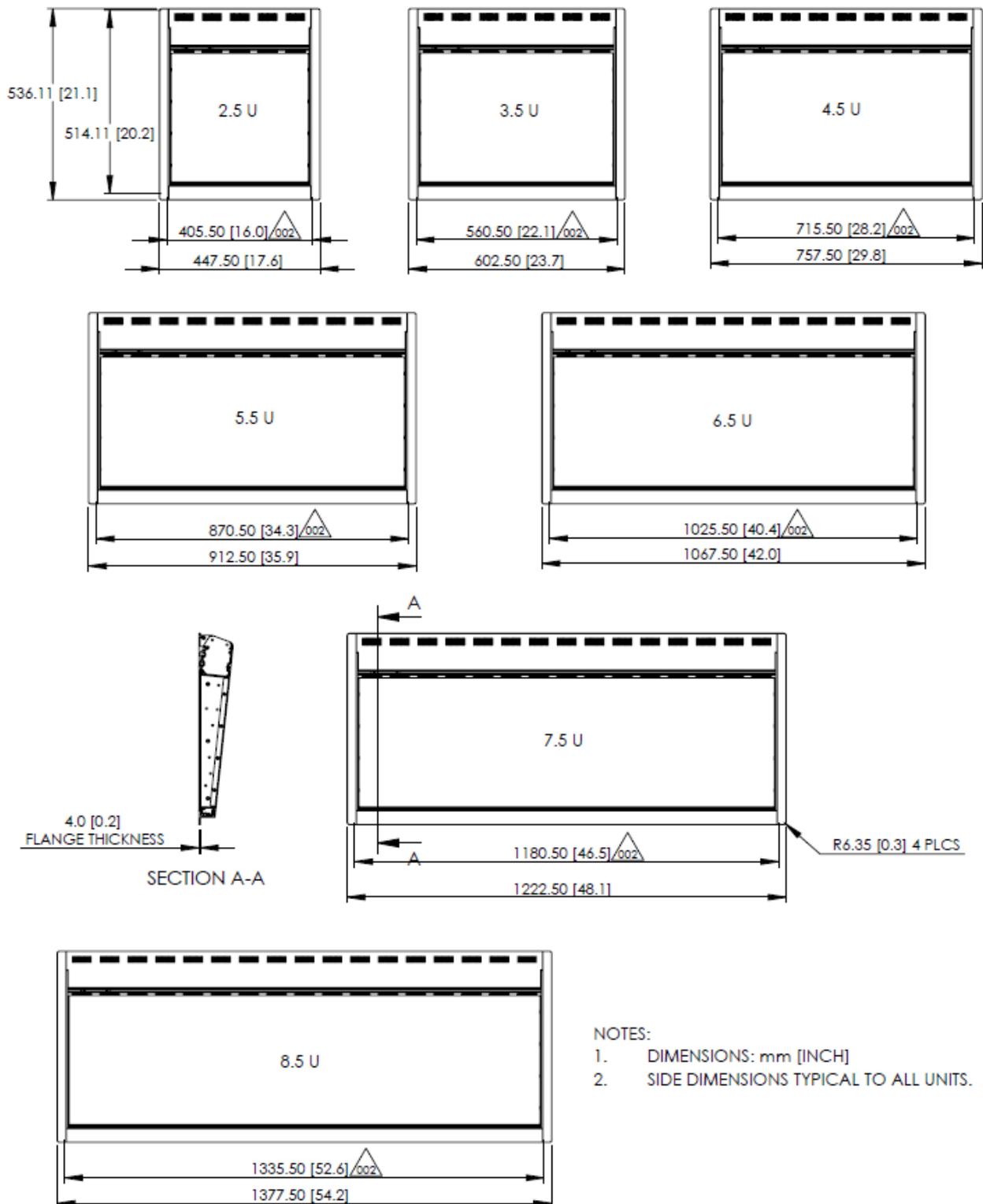
NOTES:
1.   DIMENSIONS: mm [INCH]
2.   SIDE DIMENSIONS TYPICAL TO ALL UNITS.

Direct-Mount Frames Dimensions

Labels on diagram:
- 1302-00054 (X2)
- 1303-00036
- 1451-01200
- 1301-00103 (X4)
- 1771-00220
- GROUND STUD
- 1301-00319 (X4)
- QUASAR MODULE(154.50 mm WIDTH)
- CONSOLE SURFACE
- INSTALLATION HARDWARE KIT IS PART # 1771-00221
- 1451-01199
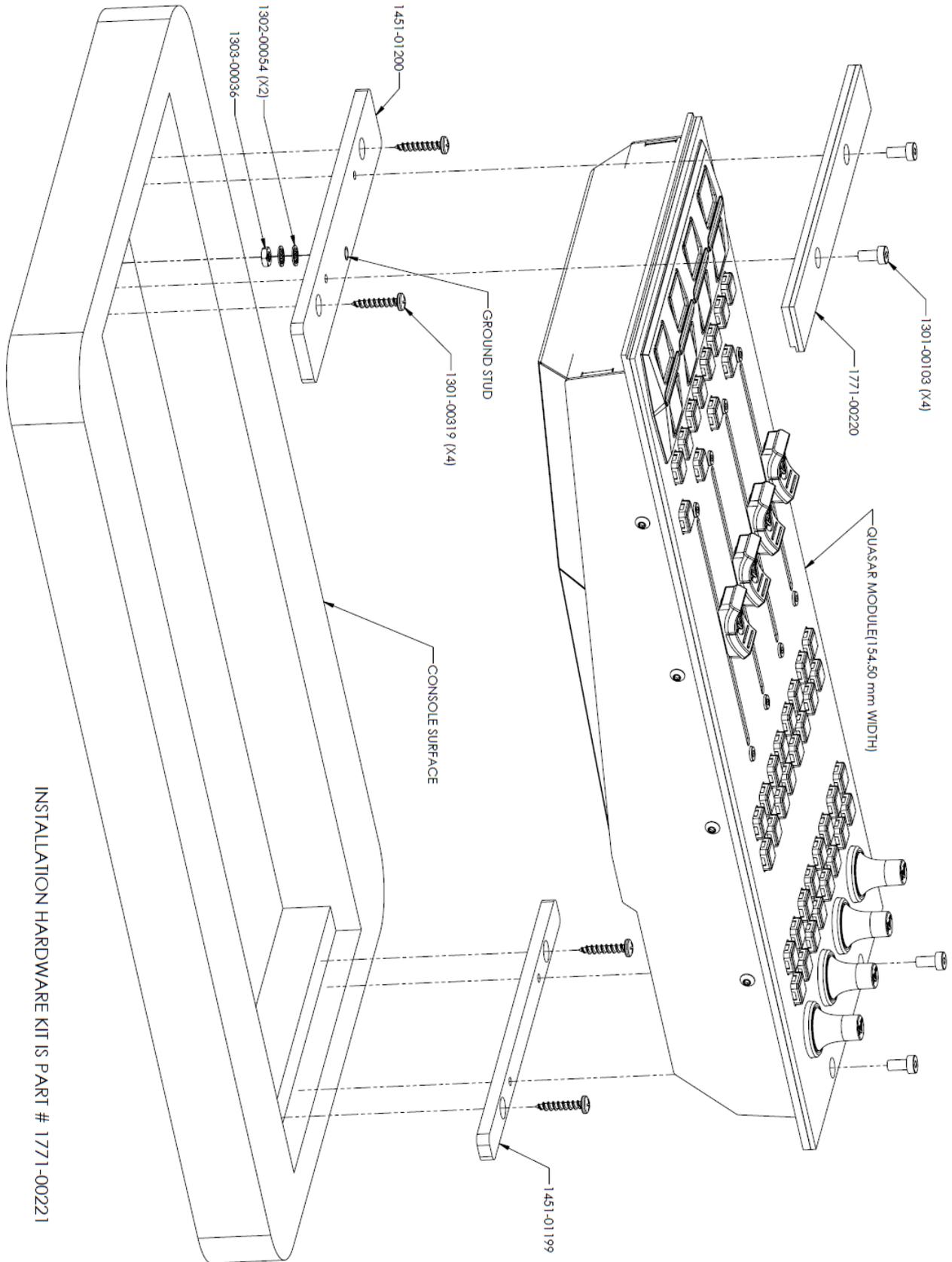
SUGGESTED CONSOLE SURFACE INSTALLATION DIMENSIONS
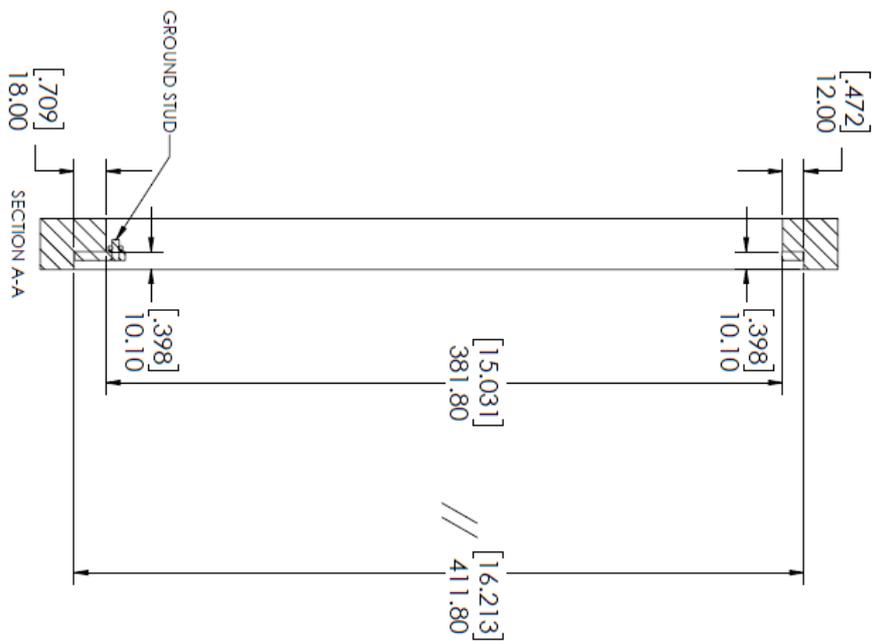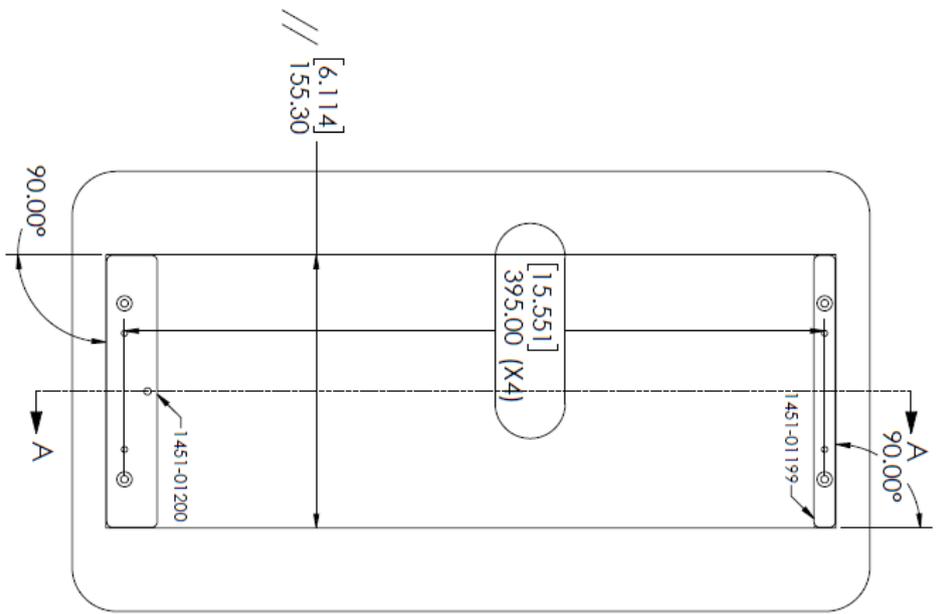
NOTES:
1. DIMENSION UNITS ARE mm [INCH].
2. MODULE WIDTH IS 154.50 mm [6.083].
3. THE SUGGESTED WIDTH DIMENSION OF 155.30 WILL ALLOW A SLIGHT RELIEF EDGE AND ALLOW FOR MANUFACTURING TOLERANCES. THIS WIDTH DIMENSION CAN BE REVIEWED WITH THE CUSTOMER AND CAN BE ADJUSTED PER INSTALLATION.
4. DIMENSION 395.00 FOR THE 8 MOUNTING HOLES IS CRITICAL FOR MODULE FIT.
5. THE SUGGESTED DEPTH DIMENSION OF 10.10 mm SHOULD RESULT IN THE MODULE FACE TO BE FLUSH WITH THE CONSOLE SURFACE. IN THE EVENT THAT THE CUSTOMER PREFERS A SLIGHTLY HIGHER OR LOWER PROFILE, THIS DIMENSION CAN BE ADJUSTED TO ACCOMIDATE A DIFFERENT PROFILE.
6. THE DEPTH OF THE MODULE CAN BE RAISED POST INSTALLATION BY ADDING SHIMS UNDERNEATH PLATES 1451-01199 AND 1451-01200.
7. MODULE MUST HAVE CORRECT EARTH GROUND CONNECTION TO GROUND STUD FOR ESD IMMUNITY.

[6.114] 155.30
90.00°
[15.551] 395.00 (X4)
1451-01199
1451-01200
A
90.00°
A

SECTION A-A
GROUND STUD
[.709] 18.00
[.398] 10.10
[.472] 12.00
[.398] 10.10
[15.031] 381.80
[16.213] 411.80

1451-01205

1302-00054 (X2)
1303-00036

GROUND STUD

1301-00319 (X4)

Console Surface

1301-00103 (X4)

1771-00222

Quasar Module (232 mm Width)

1451-01204
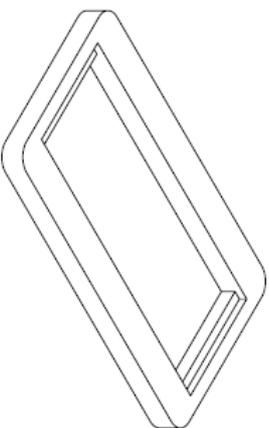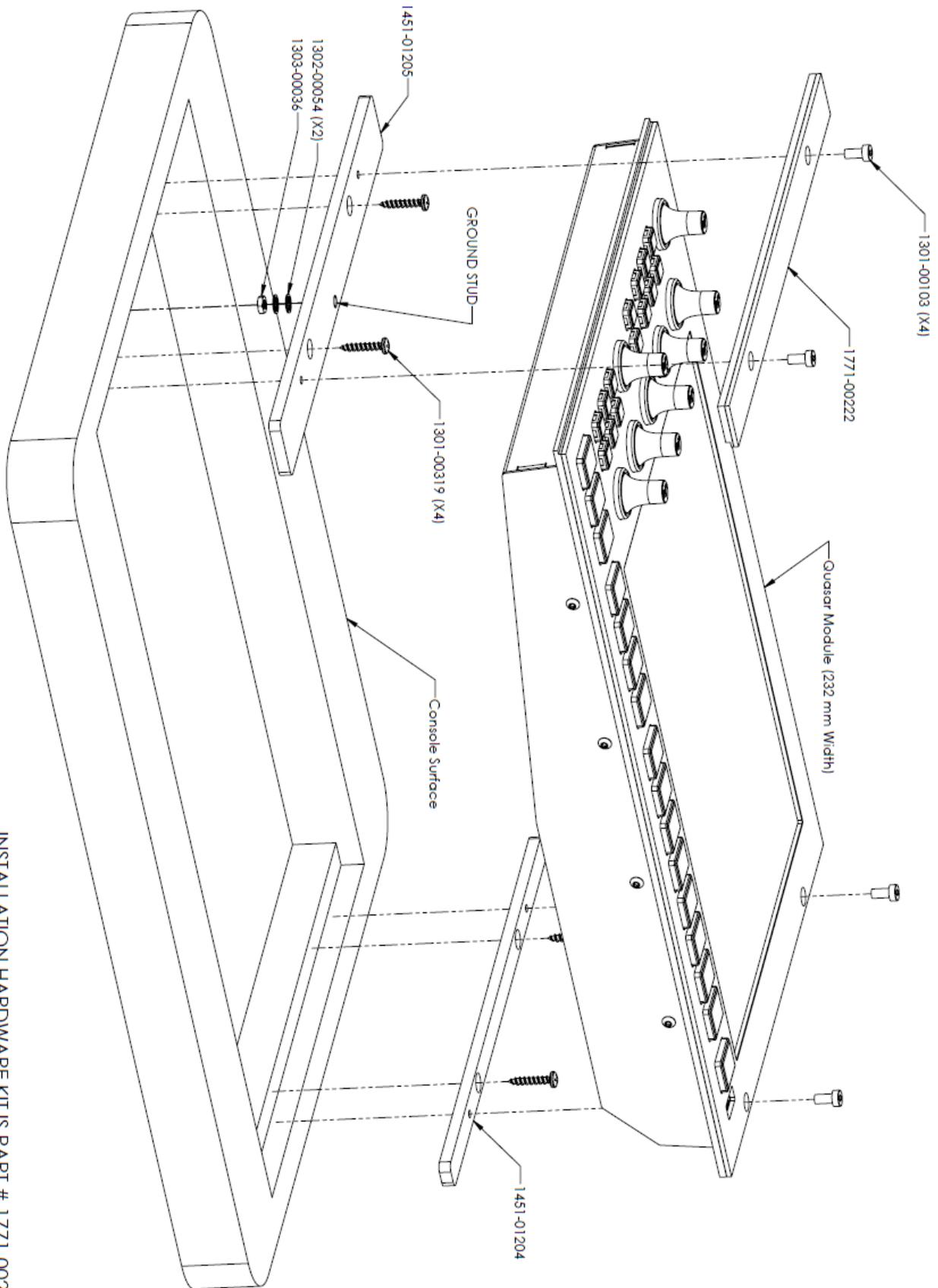
INSTALLATION HARDWARE KIT IS PART # 1771-00223
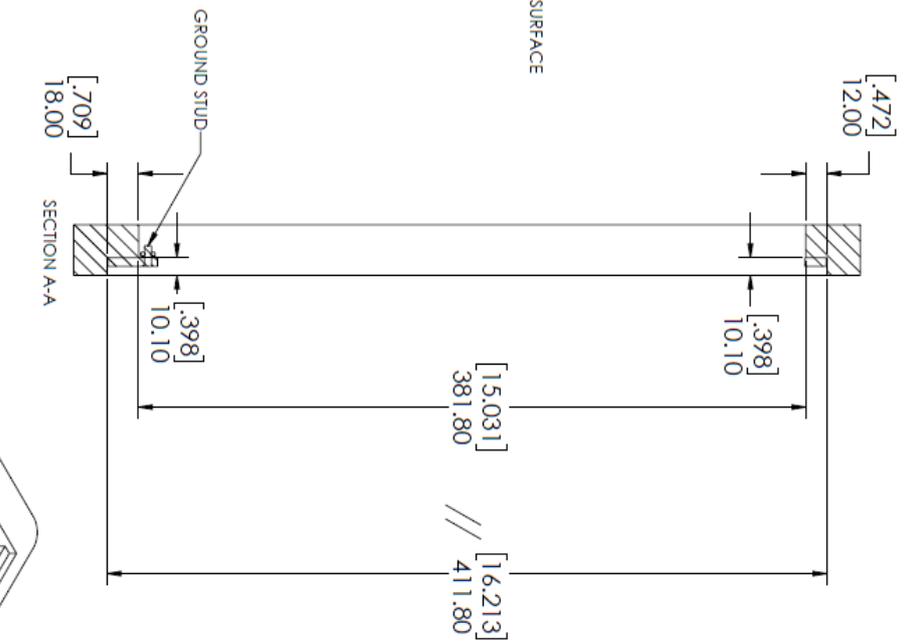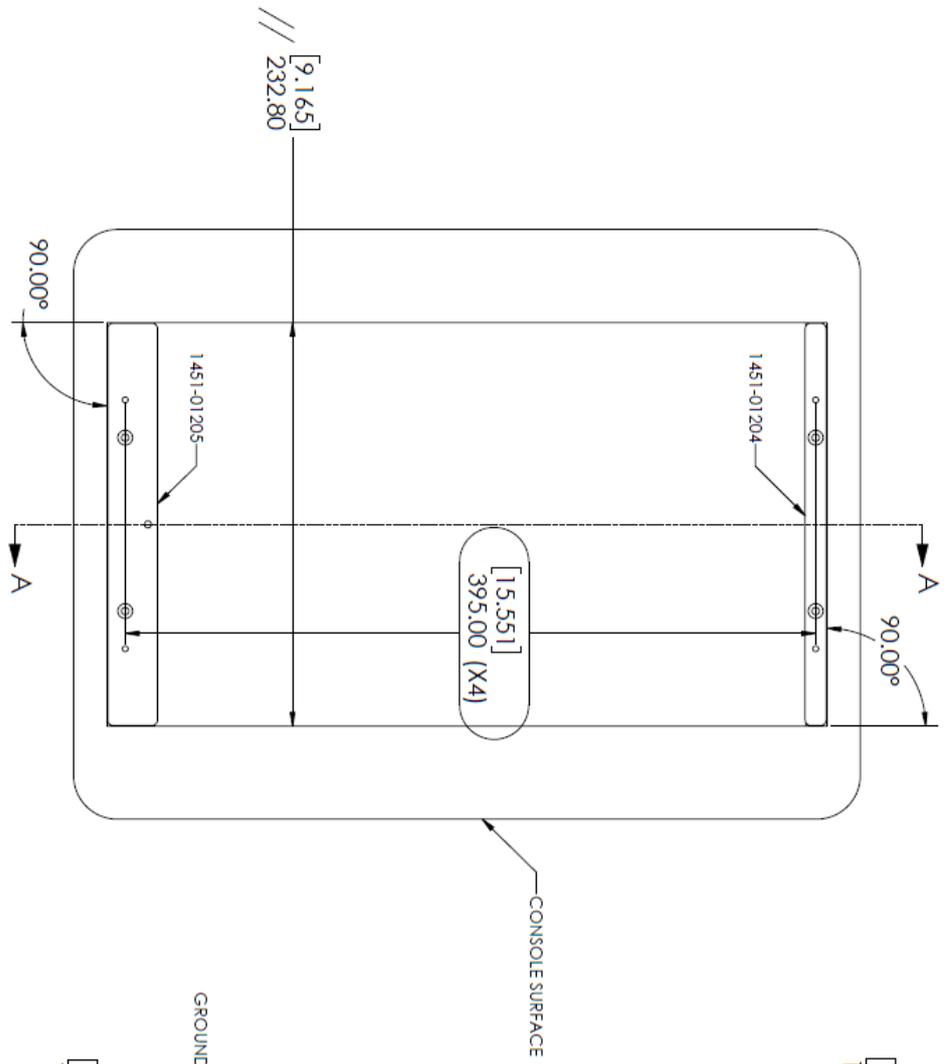
NOTES:
1. DIMENSIONS UNITS ARE mm [INCH].
2. MODULE WIDTH IS 232 mm [9.134].
3. THE SUGGESTED WIDTH DIMENSION OF 232.80 WILL ALLOW A SLIGHT RELIEF EDGE AND ALLOW FOR MANUFACTURING TOLERANCES. THIS WIDTH DIMENSION CAN BE REVIEWED WITH THE CUSTOMER AND CAN BE ADJUSTED PER INSTALLATION.
4. DIMENSION 395.00 FOR THE 8 MOUNTING HOLES IS CRITICAL FOR MODULE FIT.
5. THE SUGGESTED DEPTH DIMENSION OF 10.10 mm SHOULD RESULT IN THE MODULE FACE TO BE FLUSH WITH THE CONSOLE SURFACE. IN THE EVENT THAT THE CUSTOMER PREFERS A SLIGHTLY HIGHER OR LOWER PROFILE, THIS DIMENSION CAN BE ADJUSTED TO ACCOMIDATE A DIFFERENT PROFILE.
6. THE DEPTH OF THE MODULE CAN BE RAISED POST INSTALLATION BY ADDING SHIMS UNDERNEATH PLATES 1451-01204 AND 1451-01205.
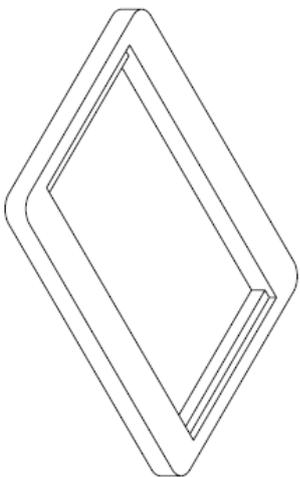7. MODULE MUST HAVE CORRECT EARTH GROUND CONNECTION TO GROUND STUD FOR ESD IMMUNITY.

[9.165]
232.80

90.00°

1451-01205

1451-01204

90.00°

[15.551]
395.00 (X4)

A

A

CONSOLE SURFACE

GROUND STUD

[.709]
18.00

SECTION A-A

[.398]
10.10

[.472]
12.00

[.398]
10.10

[15.031]
381.80

[16.213]
411.80

Control Surface Specifications

Power Supply

Universal AC Input Range (90 – 264VAC)
Operating Mains Frequency 47-63Hz
-40 to +85 degrees Celsius, no condensation
IEC receptacle, with locking clip. Internal fuse.
Mains Outlet rating: 200W minimum (for each PSU module)
Standard Operating Power consumption: 50W (each PSU module)

Surface Operating Temperatures

-10 degrees C to +40 degrees C, <70% humidity, no condensation

Mechanical Data

Width sizes: 430mm (2.5U), 585mm (3.5U), 740mm (4.5U), 895mm (5.5U), 1050mm (6.5U), 1205mm (7.5U), 1360mm (8.5U) Depth: 580mm Front Height (measured after armrest) : 50mm Rear Height (measured at highest point) :110mm
From 4 to 28 faders in a single frame. Up to 60 with two frames (split or bolted together)
Unit Weight: N/A kgs
Shipping Weight: N/A kgs

Quasar Engine Specifications

Input Filters

Filter 1 & 2 Frequency : 20Hz to 20.0kHz

Filter 1 & 2 Slope: 6-12-24-36-48 dB/Octave, selectable

4-Band Equalizer

Bands 1-2-3-4 Frequency : 20Hz to 20.0kHz

Bands 1-2-3-4 Gain: -25.0dB to +20.0dB

Bands 1-2-3-4 Q: 0.2 to 20.0

Bands 1-2-3-4 Type: Peak, Low Shelf, High Shelf selectable

EQ Output Trim Gain: -10.0dB to +10.0dB

Compressor

Threshold: -60.0dB to 0.0dB

Ratio: 1.0 : 1 to 50.0 : 1

Knee: 0.0dB to +30.0dB

Auto Gain Make-up: Adjustable from 0% to 100% (+30dB)

Attack Time: 0.1ms to 1.00s

Release Time: 0.1ms to 5.00s

Automatic Attack & Release Time selectable

Expander/Noise Gate

Threshold: -60.0dB to 0.0dB

Ratio: 1.0 : 1 to 50.0 : 1

Knee: 0.0dB to +30.0dB

Depth: 0.0dB to +60.0dB

Attack Time: 0.1ms to 1.00s

Release Time: 0.1ms to 5.00s

Low Frequency Filter: 1.99kHz to 6.31kHz

High Frequency Filter: 3.98kHz to 12.5kHz

De-Esser

Threshold: -60.0dB to 0.0dB

Ratio: 1.0 : 1 to 50.0 : 1
Depth: 0.0dB to +30.0dB
Attack Time: 0.1ms to 1.00s
Release Time: 0.1ms to 5.00s
Automatic Attack & Release Time selectable
Mechanical Data
1 RU chassis, Industrial-Grade hardware platform
Width: 482mm - 19"
Depth: 457mm - 18"
Height: 1 Rack Unit
Unit Weight:
Shipping Weight:
Power Supply
Dual Redundant, hot-swap capable Power Supply modules
Auto-sensing, auto-ranging power supplies. 90 – 132 / 187 – 264 VAC, 50Hz/60Hz.
IEC receptacle, internal fuse.
Power consumption: 150 Watts
Operating Temperatures
-10 degrees C to +40 degrees C, <90% humidity, no condensation
CE CONFORMANCE INFORMATION:
This device complies with the requirements of the EEC council directives:
• 93/68/EEC (CE MARKING)
• 73/23/EEC (SAFETY – LOW VOLTAGE DIRECTIVE)
• 89/336/EEC (ELECTROMAGNETIC COMPATIBILITY)
Conformity is declared to those standards: EN50081-1, EN50082-1.

Quasar I/O Specifications (Axia xNodes)

Microphone Preamplifiers

Source Impedance: 150 Ohms

Input Impedance: 4kOhms minimum, balanced

Nominal Level Range: Adjustable, -75dBu to -20dBu

Input Headroom: >20dB above nominal input

Output Level: +4dBu, nominal

Analog Line Inputs

Input Impedance: >40kOhms, balanced

Nominal Level Range: Selectable, +4dBu or -10dBv

Input Headroom: 20 dB above nominal input

Analog Line Outputs

Output Source Impedance: <50 Ohms balanced

Output Load Impedance: 600 Ohms, minimum

Nominal Output Level: +4dBu

Maximum Output Level: +24dBu

Digital Audio Inputs and Outputs

Reference Level: +4dBu (-20dB FSD)

Impedance: 110 Ohms, balanced (XLR)

Signal Format: AES-3 (AES/EBU)

AES-3 Input Compliance: 24-bit with selectable sample rate conversion,

32 kHz to 96kHz input sample rate capable.

AES-3 Output Compliance: 24-bit

Digital Reference: Internal (network timebase) or external reference 48 kHz, +/-2ppm

Internal Sampling Rate: 48kHz

Output Sample Rate: 44.1kHz or 48kHz

A/D Conversions: 24-bit, Delta-Sigma, 256x oversampling

D/A Conversions: 24-bit, Delta-Sigma, 256x oversampling

Latency <3ms, mic in to monitor out, including network and processor loop

Frequency Response

Any input to any output: +0.5 / -0.5 dB, 20Hz to 20kHz

Dynamic Range

Analog Input to Analog Output: 102dB referenced to 0dBFS,

105 dB "A" weighted to 0dBFS

Analog Input to Digital Output: 105dB referenced to 0dBFS

Digital Input to Analog Output: 103dB referenced to 0dBFS, 106dB "A" weighted

Digital Input to Digital Output: 138dB

Equivalent Input Noise

Microphone Preamp: -128dBu, 150 Ohm source, reference -50dBu input level

Total Harmonic Distortion + Noise

Mic Preamp Input to Analog Line Output: <0.005%, 1 kHz, -38dBu input, +18dBu output

Analog Input to Analog Output: <0.008%, 1 kHz, +18dBu input, +18dBu output

Digital Input to Digital Output: <0.0003%, 1 kHz, -20dBFS

Digital Input to Analog Output: <0.005%, 1 kHz, -6dBFS input, +18dBu output

Crosstalk Isolation, Stereo Separation and CMRR

Analog Line channel to channel isolation: 90dB isolation minimum, 20Hz to 20kHz

Microphone channel to channel isolation: 80dB isolation minimum, 20Hz to 20kHz

Analog Line Stereo separation: 85dB isolation minimum, 20Hz to 20kHz

Analog Line Input CMRR: >60dB, 20Hz to 20kHz

Microphone Input CMRR: >55dB, 20Hz to 20kHz

Appendix

CE Declaration of Conformity – EU

$C\mathcal{E}$

EU DECLARATION OF CONFORMITY

Declaration: The listed product is in conformity with following Union harmonization legislation:

Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility (recast).

The Technical Documentation demonstrates the fulfilment of the essential requirements as set out in Annex I of Directive 2014/30/EU

Directive 2011/65/EU + (EU) 2015/863 of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast).

Manufacturer:
Telos Alliance
1241 Superior Avenue
Cleveland, OH 44114
USA

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product Name :

Quasar MTS-MON Module	2001-00568 : Standalone 2001-00568-999
Quasar SR-4FAD Module, Non Motorized	2001-00571 : Standalone 2001-00571-999
Quasar XR-4FAD Module, Motorized	2001-00569 : Standalone 2001-00569-999
Quasar Mic in/HP out Module	2001-00579
Quasar table-top frame 2.5U thru 8.5U	2001-00550 thru 2001-00556
Quasar flush-mount frame 2.5U thru 8.5U	2001-00557 thru 2001-00563
QUASAR SK-6BTN MODULE	2001-00612
QUASAR SK-12BTN MODULE	2001-00613
QUASAR SK-18BTN MODULE	2001-00614
QUASAR SK-24BTN MODULE	2001-00615

Referenced harmonized standards to which conformity to 2014/30/EU is declared:

EN 55032:2015 Electromagnetic compatibility of multimedia equipment - Emission requirements (CISPR 32:2012(EQV)).

EN 55035:2017 Electromagnetic compatibility of multimedia equipment – Immunity requirements

Referenced harmonized standard to which conformity to 2011/65/EU + (EU) 2015/863 is declared:

EN 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Referenced harmonized standard to which conformity to 2014/35/EU is declared:

EN 62368-1:2020 Audio/video , information and communication technology equipment – Part 1: Safety requirements.

Signature of Manufacturer: _____ Date: 2/23/23

EU DECLARATION OF CONFORMITY

Declaration:	The listed product is in conformity with following Union harmonization legislation:
	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility (recast).
	The Technical Documentation demonstrates the fulfilment of the essential requirements as set out in Annex I of Directive 2014/30/EU
	Directive 2011/65/EU + (EU) 2015/863 of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
	Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast).
Manufacturer:	Telos Alliance 1241 Superior Avenue Cleveland, OH 44114 USA
	This declaration of conformity is issued under the sole responsibility of the manufacturer.
Product Name:	2001-00606 Infinity VIP Server Appliance
	2001-00602 Pathfinder Core Pro AE-2000
	2001-00605 IPORT High Density
	2001-00510 VX Prime +
	2001-00599 IPORT High Density + Content Delay
	2001-00583 Quasar Engine
	2001-00581 Quasar Engine RPS Base (16 channel)
	2011-00835 Quasar Engine RPS Upgrade Kit
	2001-00515 Pathfinder Core Pro MK2
	2001-00503 VX Enterprise
	2001-00437 Z/IPStream R/2

Referenced harmonized standards to which conformity to 2014/30/EU is declared:

EN 55032:2015 Electromagnetic compatibility of multimedia equipment - Emission requirements (CISPR 32:2012(EQV)).

EN 55035:2017 Electromagnetic compatibility of multimedia equipment – Immunity requirements

Referenced harmonized standard to which conformity to 2011/65/EU + (EU) 2015/863 is declared:

EN 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Referenced harmonized standard to which conformity to 2014/35/EU is declared:

EN 62368-1:2020 Audio/video , information and communication technology equipment – Part 1: Safety requirements.

Signed for and on behalf of Telos Alliance, 1241 Superior Avenue, Cleveland, Ohio 44114 USA:

Signature of Manufacturer: _____ Date: FEB 6, 2024

DECLARATION OF CONFORMITY

MANUFACTURER: Telos Alliance
1241 Superior Avenue
Cleveland, Ohio 44114 USA

PRODUCT :

Quasar MTS-MON Module	2001-00568
Quasar MTS-MON Module, Standalone	2001-00568-999
Quasar SR-4FAD Module, Non Motorized	2001-00571
Quasar SR-4FAD Module, Standalone	2001-00571-999
Quasar XR-4FAD Module, Motorized	2001-00569
Quasar XR-4FAD Module, Standalone	2001-00569-999
Quasar Mic in/HP out Module	2001-0000579
Quasar table-top frame 2.5U thru 8.5U	2001-00550 thru 2001-00556
Quasar flush-mount frame 2.5U thru 8.5U	2001-00557 thru 2001-00563
QUASAR SK-6BTN MODULE	2001-00612
QUASAR SK-12BTN MODULE	2001-00613
QUASAR SK-18BTN MODULE	2001-00614
QUASAR SK-24BTN MODULE	2001-00615

REPORTS: F2P23529A-01E, F2P23529A-01S, F2P26704-0E, F2P26704-01S

Conforms to the following standards:

UK LEGISLATION: Electromagnetic Compatibility Regulations 2016

Electrical Equipment (Safety) Regulations 2016

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

STANDARDS: BS 55032:2015

BS 55035:2017

BS 62368-1:2020

BS 63000:2018

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Signature of manufacturer: _____ DATE 2/23/23

DECLARATION OF CONFORMITY

MANUFACTURER: Telos Alliance
1241 Superior Avenue
Cleveland, Ohio 44114 USA

PRODUCT / MODEL:

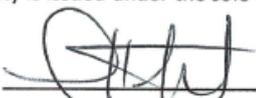|	
Infinity VIP Server Appliance	2001-00606
Pathfinder Core Pro AE-2000	2001-00602
Pathfinder Core Pro MK2	2001-00515
IPORT High Density	2001-00605
Quasar Engine	2001-00583
Quasar Engine RPS Base (16 Channel)	2001-00581
Quasar Engine RPS Upgrade Kit	2011-00835
VX Prime+	2001-00510
VX Enterprise	2001-00503
Z/IPStream R/2	2001-00437
IPORT High Density+Content Delay	2001-00599

REPORTS: HA201216-GGC-012-E01, HA201216-GGC-012-S01

Conforms to the following standards:

UK LEGISLATION: Electromagnetic Compatibility Regulations 2016

Electrical Equipment (Safety) Regulations 2016

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

STANDARDS: BS 55032:2015

BS 55035:2017

BS 62368-1:2020

BS 63000:2018

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Signature of manufacturer: _____   DATE FEB 6, 2024