UCP-3901

UNIFIED COMPUTE PROCESSOR FOR DENSITÉ

User Manual

13-03084-010-M00 AB

2020-10-27

www.grassvalley.com

FCC Compliance

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

Patent Information

This product may be protected by one or more patents.

For further information, please visit: www.grassvalley.com/patents/

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A Grass Valley manual may have been revised to reflect changes made to the product during its manufacturing life. Thus, different versions of a manual may exist for any given product. Care should be taken to ensure that one obtains the proper manual version for a specific product serial number.

Information in this document is subject to change without notice and does not represent a commitment on the part of Grass Valley.

Warranty information is available from the Legal Terms and Conditions section of Grass Valley's website (www.grassvalley.com).

Title	UCP-3901 User Manual
Part Number	13-03084-010-M00 AB
Revision	2020-10-27, 12:18

Document History

See the Release Notes for more information about the features added to this product.

Document Number	Publication Date	Notes
13-03084-010-M00 AA	2020-07-08	Initial release.
13-03084-010-M00 AB	2020-10-27	Update to use Havent core version 16.0 code base. Added 50Gbps.

Electrostatic Discharge (ESD) Protection

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

- Ensure that the frame is electrically connected to earth ground through the power cord or any other means if available.
- Wear an ESD wrist strap ensuring that it makes good skin contact. Connect the grounding clip to an *unpainted surface* of the chassis frame to safely ground unwanted ESD voltages. If no wrist strap is available, ground yourself by touching the *unpainted* metal part of the chassis.
- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.
- When temporarily storing a card make sure it is placed in an ESD bag.
- Cards in an earth grounded metal frame or casing do not require any special ESD protection.

Protection contre les décharges électrostatiques (DES)

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

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.
- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.
- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.
- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.
- Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

Environmental Information

European (CE) WEEE directive.

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

Visit www.grassvalley.com for recycling information.

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

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

Laser Safety - Fiber Output SFP and QSFP Modules Warning

LASER SAFETY

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

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

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

Safety and EMC Standards

This equipment complies with the following standards:

Safety Standards

CE

Information Technology Equipment - Safety Part 1

EN60950-1: 2006

Safety of Information Technology Equipment Including Electrical Business Equipment.

UL1419 (4th Edition)

Standard for Safety – Professional Video and Audio equipment (UL file number E193966)

EMC Standards

This unit conforms to the following standards:

EN55032:2015 (Class A)

Electromagnetic Compatibility of multimedia equipment - Emission requirements

EN61000-3-2:2014 (Class A)

Electromagnetic Compatibility - Limits for harmonic current emissions

EN61000-3-3:2013

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

EN55103-2:2009 (Environment E2)

Electromagnetic Compatibility, Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2. Immunity

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

FCC / CFR 47:Part 15 (Class A)

Federal Communications Commission Rules Part 15, Subpart B

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

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

EMC Performance of Cables and Connectors

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

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

SIGNAL/DATA PORTS

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

COAXIAL CABLES

Coaxial cables connections (particularly serial digital video connections) shall be made with high-quality double-screened coaxial cables such as Belden 8281 or BBC type PSF1/2M, Belden 1694A (for 3Gbps), and Belden 4794A (for 12Gbps).

toc

Table of Contents

1 Introduction

The UCP-3901 provides a hardware platform which can offer different functionality depending on the software option loaded. These options are known as *Software-Defined Cores* (SDCs), and can be purchased through a licensing mechanism and loaded as operational needs demand.

UCP-3901 modules are also fully compatible with Grass Valley's broadcast-centric IP routing and network management solution, designed to migrate broadcasters from a traditional baseband routing and control environment to new Hybrid SDI and IP work-flows.

The UCP-3901 currently supports on 25G or 50G networks:

- The Essence Processing (EP) SDC.
- The Multiviewer (MV) SDC.
- NMOS IS-04 discovery and registration with group hint tag support.
- NMOS IS-05 device connection management.
- In-band or out-of-band control of NMOS.

Essence Processing (EP) SDC

For SDI to IP gateway type applications. See Essence Processing SDC on page 45 for information on how to configure this option.

- SDI IP Encapsulation and De-encapsulation:
  - For 12G.
  - SMPTE ST 2022-6, ST 2022-7, AES67 & ST 2110-20/30/40.
- Frame synchronizer.
- Audio sample rate conversion, shuffling & delay.
- Audio embedding and de-embedding.

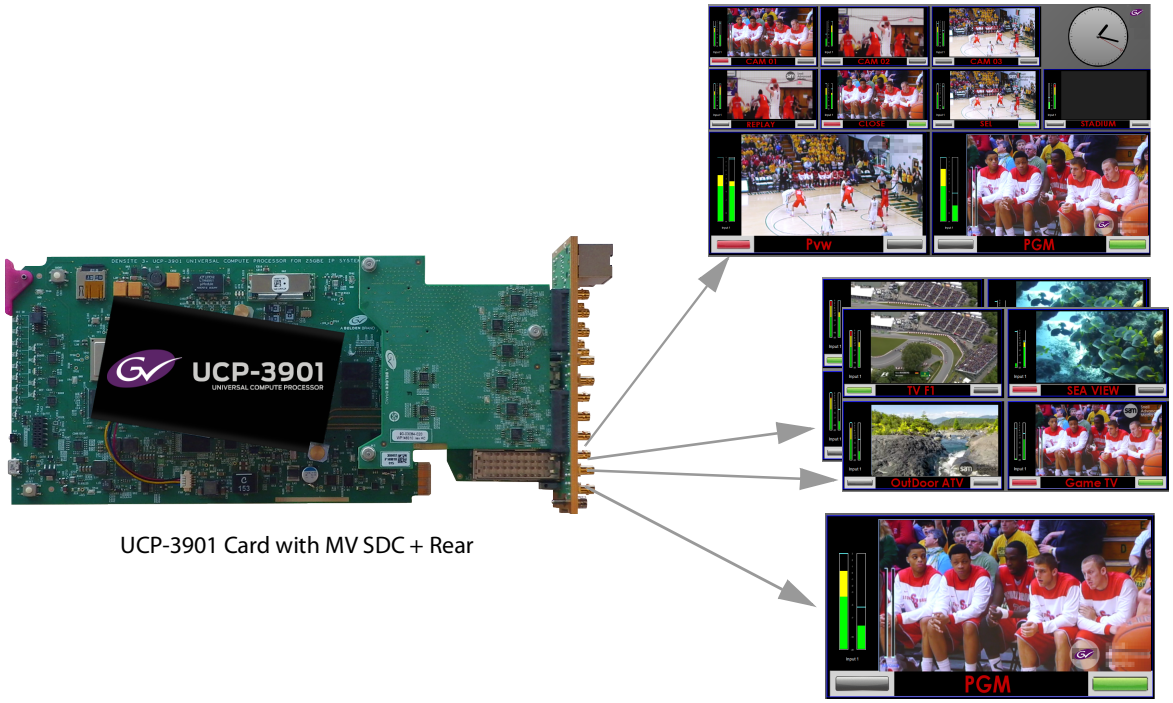
Multiviewer (MV) SDC

The multiviewer comprises an advanced multiviewer for monitoring applications. It has 12 video inputs and up to 4 multiviewer head display outputs. Multiviewer video wall layouts are designed using the Grass Valley Orbit software tool. The multiviewer SDC requires the multiviewer license.

- Flexible configurations – 12 x 1 UHD (quad link) or 12 x 4 (3G).
  - IP inputs.
  - IP outputs and SDI HD-BNC copy outputs.
- Audio metering support.
- UMD and Tally support.

- Clocks and Timers.

See Multiviewer SDC on page 151 for information on how to configure this option.



UCP-3901 Card with MV SDC + Rear

Fig. 1-1: UCP-3901 Card and Multiviewer SDC

Related Documentation

The following related documentation is available. You can obtain the latest product documentation from the Documentation Library section of Grass Valley's website.

Document Number	Software Defined Core		Title
	Multiviewer	Essence Processing	
3084-2927-001 AA	•	•	UCP-3901 User Manual (this document)
3084-2928-001 AA	•	•	UCP-3901 Release Notes
-	•	•	RollCall V4 Suite & RollCall Lite Installation Guide
-	•	•	RollCall Control Panel User Manual
-	•	•	RollMechanic Operator's Manual
13-03082-030	•		GV Orbit Client Quick Start Guide: A general introduction to GV Orbit and its applications.
-	•		Orbit for Multiviewers: Describes multiviewer-specific details of Orbit.
-	•		Orbit for IP Routing: Describes the IP Routing configuration with Orbit.

Block Diagram

These are the features supported in the initial release and do not necessarily represent all hardware connectors available.

UCP-3901 with Essence Processing SDC

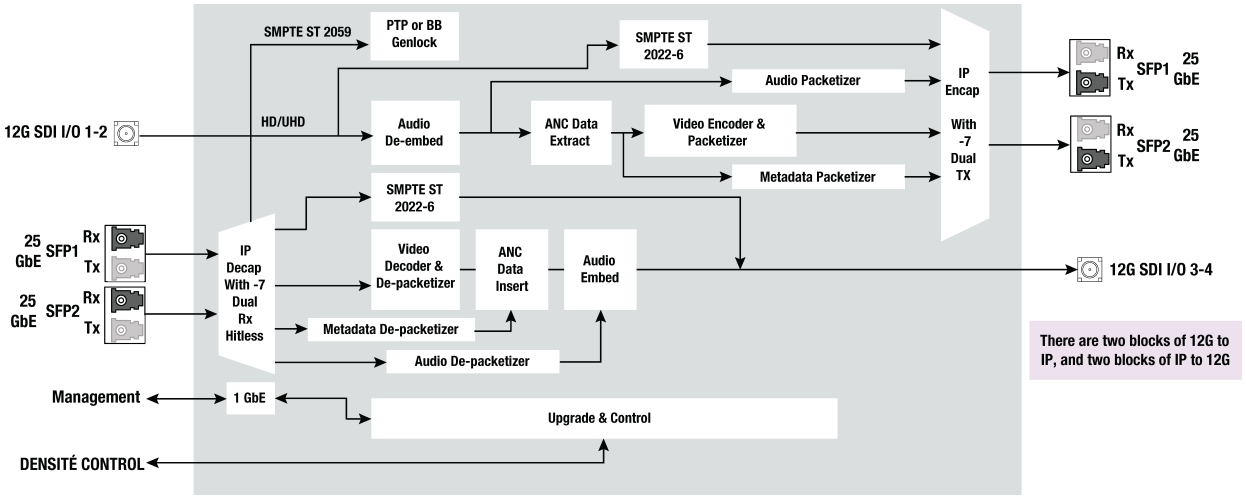


Figure 1 - 2: *UCP-3901 Universal Compute Processor Functional Block Diagram*

UCP-3901 Ordering Information

Order Code Selection	Description
Cards:	
UCP-3901-25G	Unified Compute Processor with a 25 GB/s network interface.
UCP-3901-50G	Unified Compute Processor with a 50 GB/s network interface.
Rear Panels:	
UCP-3901-3+DRP	Double rear panel for Densité 3+ with HD-BNC. See Rear Panel and Connectors on page 24.

Available Upgrade Licenses

The following Software-Defined Core license is available.

Software Upgrade Selection	For use with card	Description
UCP-3901-25G-EP	UCP-3901-25G	Essence Processing Software-Defined Core license with 25G network support.
UCP-3901-50G-EP	UCP-3901-50G	Essence Processing Software-Defined Core license with 50G network support.
UCP-3901-25G-MW	UCP-3901-25G	12 × 4 multiviewer license with 25G network support.
UCP-3901-50G-MW	UCP-3901-50G	12 × 4 multiviewer license with 50G network support.

See Installing a License into an UCP-3901 on page 188 to install a license.

Supported SFP28 Cartridges

Up to four SFP28 cartridges are required (extra). These are shipped as a separate order. To support 50G bandwidth requires 4 × 25G SFPs.

SFP Model Selection	Description
SFP-ETH10G-RT-M85-LC	Short range optical 10GBase Ethernet SFP cartridge with LC/PC fiber connector: • <300m link with OM3 MMF. • <82m link with OM2 MMF. • <33m link with OM1 MMF. 850 nm multi-mode optical transceiver that supports signals up to 10.5 Gb/s for bidirectional serial data communications such as 10GBASE-SR and 10GBASE-SW.
SFP-ETH10G-RT-S13-LC	Long range optical 10GBase Ethernet SFP cartridge with LC/PC fiber connector (<10 000m): 1310 nm single mode optical transceiver that supports signals up to 10.5 Gb/s for bidirectional serial data communications such as 10GBASE-LR and 10GBASE-LW.
SFP-25-SR	Short range SFP28 25GBASE Optical Transceiver MMF cartridge (<300m).
SFP-25-LR	Long range SFP28 25GBASE Optical Transceiver SMF cartridge (<10 000m).

Supported Multiviewer Media Network Input Capacity

The number of supported input streams to a multiviewer depends on SFP cartridge capacity, the resolution of the input streams, and whether redundancy is required.

Video Input Resolution	Number of Multiviewer Video IP Inputs on Media Network Connection				
	No network redundancy			Network redundancy	
	1x 25G	2x 25G	2x 50G	25G + 25G	50G + 50G
1080i50/59.94	12	12	12	12	12
720p50/59.94	12	12	12	12	12
1080p50/59.94	8	12	12	8	8

2 UCP-3901 Card Installation and Operation

Front Card-edge Interface

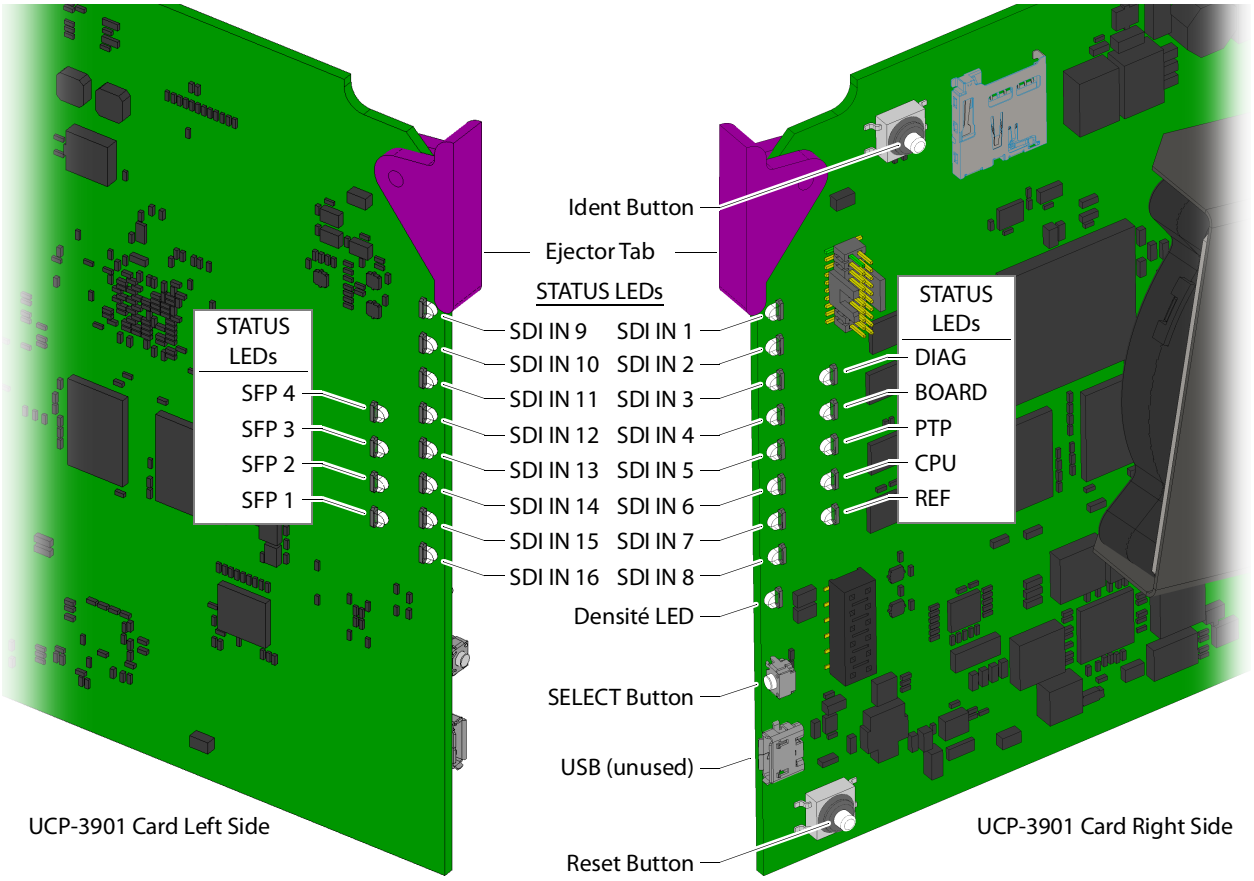


Figure 2 - 1: *Front card-edge layout*

Status LEDs are located on the front card-edge of the UCP-3901 Card. The **Densité LED** is visible through the front access door of the Densité frame. The remaining LEDs are unlit until the **SELECT** button is pressed. These multi-color LEDs indicate the status of the UCP-3901 Card by color, and by flashing/steady illumination.

Item	Description
Ident Button	Push to: • Make the card's SDI IN LEDs flash. • Activate the **Configuration** > **Location** > **Where Am I** checkbox in RollCall. This works bi-directionally between the card and the RollCall setting. See also Configuration, on page 48 for more information about the **Where Am I** checkbox.
Ejector Tab	Lift the bottom edge of the ejector tab to lever and remove the card out of the frame. See Installation of the Rear Connector Panel and Card, on page 23.
SDI IN 1 to SDI IN 16 status LEDs	As an input, this shows the following port status: • **Green:** Signal is detected. • **Yellow:** Test pattern generator has been activated. • **Red:** Signal loss. • Off: Input/Spigot not in use. As an output, this shows the following port status: • **Green:** Valid flow is detected. • **Yellow:** Test pattern generator has been activated. • **Red:** Flow is not found or invalid. • Off: Output/Spigot not in use. See also Spigot Pages, on page 80 and Logging - SDI Info, on page 89 for more information.
SFP 1 to SFP 4 status LEDs	Shows the SFP 1, 2, 3, and 4 link status: • **Blue:** Link OK (25G/50G/100G SFP). • **Blue flashing:** SFP detected, link down (fiber not connected, different FEC selection from host). • **Unlit:** SFP not detected. See also Ethernet Pages 1 and 2, on page 62 and Logging - Network, on page 96 for more information.
DIAG status LED	Shows the following states: • **Green:** PTP-LOCK OK. • **Off:** PTP-LOCK Fail. See also Time Sync Configuration, on page 50 and Logging - System, on page 91 for more information.
BOARD status LED	Shows the following states: • **Green:** PTP-SYNC OK. PTP being used and clocks are within the accepted range. • **Off:** PTP-SYNC Fail. PTP being used but clocks haven't synchronized within +/- 1mS.
PTP status LED	Future use.

Item	Description
CPU status LED	Future use.
REF status LED	Shows the following state: • **Flashing Green:** Watchdog timer OK.

Densité status LED	Shows the following states (status indication priority[a]):
	• **Red** (level 6): Card is powering up.
	If solid red persists (>6 seconds), a hardware failure has been detected: the card's CPU could not boot. This may be the result of the UCP-3901 Card not being equipped with its Micro-SD card or the Micro-SD card is not properly inserted. See Replacing the Micro-SD Card, on page 197.
	• **Yellow** (level 2): Card is booting.
	• **Green** (level 1): Card has finished booting. Normal operation.
	• **Flashing Yellow** (level 5): Card has been selected for local control using the Densité frame's control panel by having pressed the card's **SELECT** button. Press the card's **SELECT** button again to remove local control.
	• **Alternating Red / Green** (level 4): Card's firmware is being upgraded.
	• **Flashing Red** (level 3): Indicates one of the following possible errors:
	  • The presence of the rear panel has not been detected.
	  • Ensure the card is inserted into the correct Densité frame slot that lines-up with the rear panel.
	  • Ensure the rear panel is installed. See Installation of the Rear Connector Panel and Card, on page 23.
	  • Fan Error: the card's fan is not spinning, or is spinning too slowly, or the fan cable is disconnected. Urgent maintenance procedures must be considered: If this alarm has been raised, the fan on the UCP-3901 Card may have to be replaced. See Cooling Fan Operational Assessment, on page 193.

SELECT Button	Press to select this card for local control using the Densité frame's control panel. Through the Densité frame's control panel, you can set the card's IP addresses of the Ethernet interfaces. See Local control using the Densité frame control panel to set the Card's IP Addresses, on page 29
USB Socket	Unused.
Reset Button	Performs a hardware reset of the card. Only use this feature during off hours as this will result in an outage until the card has returned to normal operation (Densité status LED becomes green).

a. Level 1 = lowest priority, greater than level 1 = higher priority. How the status indication priority operates: The Densité status LED only shows the highest active priority condition at any given time. When the condition that triggers a status is removed or is rectified, then the next lower status indication priority that is currently active is shown.

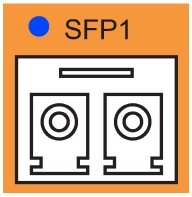
For further information about how to troubleshoot an issue, see Troubleshooting, on page 198.

All alarms and operational statuses can also be seen from Rollcall Logging pages. These pages provide the live status of the card. Theses statuses are also logged when using a Log Server. See Logging Pages, on page 88.

SFP Socket Status Indicators

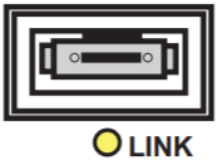
Each SFP socket has a status indicator. If the LED is flashing, the link is down.

10/25G Ethernet SFP Socket Link LED Status Indicator



- **Red:** Fault, 3V3 regulator failure.
- **Green:** 10G OK
- **Blue:** 25G OK

50G Ethernet QSFP+ Socket Link LED Status Indicator



- **Red:** Fault, 3V3 regulator failure.
- **Cyan:** 40G OK
- **Blue:** 50G, 100G OK

Fiber Optic Handling

Never assume a fiber is dark. Never look directly into the end of a fiber cable. All people in the area must wear laser safety glasses with side shields. See also Keep Fiber Connections Clean, on page 200.

Installation

Getting Organized / Unpacking

Make sure the following items have been shipped with your UCP-3901 order. If any of these are missing, contact your distributor or Grass Valley (see Grass Valley Technical Support, on page 210).

Your UCP-3901 package includes the following:

- UCP-3901 Card (front and rear modules), as per order

- SFP modules, as per order

Required Tools

In addition to the above, you will need the following tools (field supplied):

- Phillips #2 screwdriver to remove and install rear panels

Required Material

In addition to the above, you will need the following (field supplied):

- Client PC
- Optionally for a multiviewer, display cables /converter (to connect your multiviewer to displays)
- At least one Densité frame with available modular card slots
- Ethernet network connectivity

Installation of the Rear Connector Panel and Card

Grass Valley Densité series cards are each associated with a rear connector panel, which must be installed in the Densité frame before the card can be inserted.

The UCP-3901 card is designed to fit into Grass Valley's Densité-3 or Densité-3+ frame. See UCP-3901 Ordering Information, on page 15 for details about the cards and rear panels that are available.

See Rear Panel and Connectors, on page 24 for details of the signal connections available on a rear panel.

All cards and rear panels can be installed with the frame power on. The card has connectors which plug into a mid-frame mother board for distribution of power and for connection to the controller card, and a second connector which plugs directly into the rear connector panel for input and output.

The rear connector panel must be installed with the card out of the frame.

- To remove an existing card from the slot, tilt up the swivel handle on the front of the card to lever the connectors apart, then use the handle to pull the card straight out of the slot.

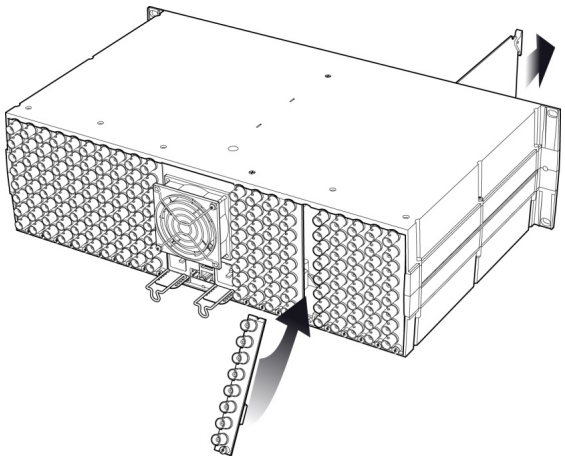


Figure 2 - 2: *Densité-3 frame – rear panel installation*

Step 1: To install the connector panel:

1 If a card is installed in the slot whose rear panel is being changed, remove it as described above.
2 Remove the existing panel (either blank or belonging to an existing card that is being changed) by releasing the captive screw(s) at the bottom.
3 Position the new panel and secure it in place with the captive screw(s) at the bottom.

Step 2: To install the UCP-3901 Card:

Once a matching rear connector panel has been installed, install the UCP-3901 card as follows:

1 Open the front panel of the frame.
2 Slide the UCP-3901 card into the slot and push gently on the handle to seat the connectors.

  When using a double-slot-width rear panel, the card should be inserted into the right-most of the two slots. Inserting the card into the wrong slot will not damage the card, and will be flagged by the on-card status LED flashing red to indicate that there is no connection to the rear panel.
3 Close the front panel of the frame.

Installation of the Optical Interface (option)

See Installing the SFP Ethernet Module, on page 207.

Rear Panel and Connectors

Images of Rear Panel Connectors

The rear panel is shown below, and its various inputs and outputs are described.

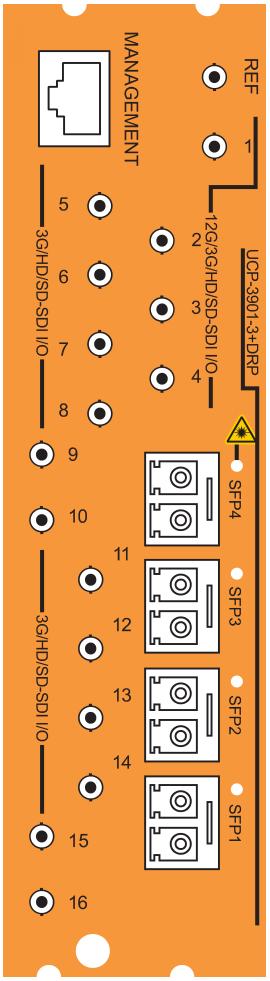


Figure 2 - 3: *UCP-3901 Rear Panel: UCP-3901-3+DRP*

Summary of Rear Panel Connections

Connector Nomenclature	Count	UCP-3901-3+DRP Rear Connector Type	Used for SDC application
12G/3G/HD/SD-SDI I/O	4	HD BNC	Essence Processing
3G / HD / SD SDI I/O	12	HD BNC	Essence Processing Multiviewer (head display outputs 1 to 4 on BNCs 13, 14, 15 and 16 only).
REF	1	HD BNC	Essence Processing Multiviewer
MANAGEMENT	1	RJ-45	Essence Processing Multiviewer
SFP1 to SFP4	4	SFP+	Essence Processing Multiviewer

Details of rear panel connections

12G/3G/HD/SD-SDI I/O – Serial digital video inputs / outputs (4)

Connect a serial digital video signal to the HD-BNC labeled **12G/3G/HD/SD-SDI I/O 1** to **12G/3G/HD/SD-SDI I/O 4** conforming to the:

- SMPTE 2082-10 standard for a 12 G input signal.
- SMPTE 425-1 standard for a 3G input signal.
- SMPTE 292-1 standard for an HD input signal.
- SMPTE 425-5 standard for link #1 to #4 of a quad link 3G HD signals to transmit a 4K UHD signal. For a quad link configuration, see Link Control, on page 71.

Connector Nomenclature	SDC application			
	Essence Processing (EP)		Multiviewer (MV)	
	Spigot[a]	Application	Spigot	Application
12G/3G/HD/SD-SDI I/O 1	1	12G/3G/HD/SD-SDI I/O	-	Not used
12G/3G/HD/SD-SDI I/O 2	2	12G/3G/HD/SD-SDI I/O	-	Not used
12G/3G/HD/SD-SDI I/O 3	3	12G/3G/HD/SD-SDI I/O	-	Not used
12G/3G/HD/SD-SDI I/O 4	4	12G/3G/HD/SD-SDI I/O	-	Not used

a. See Spigot Pages, on page 80.

3G / HD / SD SDI I/O – Serial digital video inputs / outputs (12)

Connect a serial digital video signal to the HD-BNCs labeled **3G/HD/SD-SDI I/O 5** to **3G/HD/SD-SDI I/O 16** conforming to the:

- SMPTE 425-1 standard for a 3G input signal.
- SMPTE 292-1 standard for an HD input signal.
- SMPTE 425-5 standard for link #1 to #4 of a quad link 3G HD signals to transmit a 4K UHD signal. For a quad link configuration, see Link Control, on page 71.

Connector Nomenclature	SDC application			
	Essence Processing (EP)		Multiviewer (MV)	
	Spigot[a]	Application	Spigot[b]	Application
3G/HD/SD-SDI I/O 5	5	3G/HD/SD-SDI I/O	-	Not used
3G/HD/SD-SDI I/O 6	6	3G/HD/SD-SDI I/O	-	Not used
3G/HD/SD-SDI I/O 7	7	3G/HD/SD-SDI I/O	-	Not used
3G/HD/SD-SDI I/O 8	8	3G/HD/SD-SDI I/O	-	Not used
3G/HD/SD-SDI I/O 9	9	3G/HD/SD-SDI I/O	-	Not used
3G/HD/SD-SDI I/O 10	10	3G/HD/SD-SDI I/O	-	Not used
3G/HD/SD-SDI I/O 11	11	3G/HD/SD-SDI I/O	-	Not used
3G/HD/SD-SDI I/O 12	12	3G/HD/SD-SDI I/O	-	Not used

Connector Nomenclature	SDC application			
	Essence Processing (EP)		Multiviewer (MV)	
	Spigot[a]	Application	Spigot[b]	Application
3G/HD/SD-SDI I/O 13	13	3G/HD/SD-SDI I/O	1	Multiviewer Head 1
3G/HD/SD-SDI I/O 14	14	3G/HD/SD-SDI I/O	2	Multiviewer Head 2
3G/HD/SD-SDI I/O 15	15	3G/HD/SD-SDI I/O	3	Multiviewer Head 3
3G/HD/SD-SDI I/O 16	16	3G/HD/SD-SDI I/O	4	Multiviewer Head 4

a. See Spigot Pages, on page 80.
b. See Spigot Pages, on page 166.

REF – External Analog Reference

For genlock operation. This can be black burst or tri-level sync signal.

In the card's configuration, REF is related to the **Genlock** parameter (see Configuration, on page 48).

MANAGEMENT – GigE RJ-45 Ethernet

The management network is used:

- To configure and upgrade the UCP-3901 card.
- By management systems to configure and control the UCP-3901 card, such as GV Orbit and RollCall.
- For NMOS IS-04 and IS-05

In the card's configuration, MANAGEMENT is related to the **Ethernet Gb** configuration page (see Ethernet Gb, on page 117).

SFP1 to SFP4 – Fiber-optic Ethernet input and outputs (MEDIA ports)

High speed MEDIA port to transmit and receive video/audio/metadata IP streams. In addition to video/audio/meta streams, these SFP ports are used:

- To configure and upgrade the UCP-3901 card.
- To support the following protocols:
  - PTP
  - NMOS IS-04 and IS-05

These fiber optic interfaces consists of two parts:

- A socket on the rear panel into which an optional SFP interface module is plugged.
- An optional SFP (Small Form-factor Pluggable) module into which the optical fibers are plugged, and which incorporates the optical/electrical interface.

The optical fibers must be terminated in an LC connector.

In the card's configuration, SFP1 is identified as Ethernet 1 and SFP2 is identified as Ethernet 2 in the **SFP Configuration** page (see SFP Configuration, on page 121).

See Installing the SFP Ethernet Module, on page 207 for instructions on installing and removing the SFP interface module, and for plugging and unplugging the LC-terminated fibers.

See Supported SFP28 Cartridges, on page 16 for the SFP modules supported by the UCP-3901.

User Interface

Control options

The UCP-3901 can be controlled in the following ways:

- The local control panel and its push-buttons can be used to move through a menu of parameters and to adjust parameter values (see section Local control using the Densité frame control panel to set the Card's IP Addresses, on page 29).
- Grass Valley's GV Orbit can be used to access the card's operating parameters from a remote computer, using a convenient graphical user interface (GUI). The initial setup can be made through RollCall; see Remote control using RollCall, on page 31.

Local control using the Densité frame control panel to set the Card's IP Addresses

Only make changes to the Ethernet settings during off hours as any settings change will take the card offline for up to 30 seconds.

Push the SELECT button on the UCP-3901 card edge (see Front Card-edge Interface, on page 19) to assign the local control panel to operate the UCP-3901.

- The STATUS LED on the UCP-3901 card edge flashes yellow.

Use the control panel buttons to navigate through the menu. The menu allows you to view and set the UPC-3901 card's current:

- **MANAGEMENT** Ethernet port IP address that you use in RollCall to connect to the card. See also Ethernet Gb, on page 117.
- **SFP1** and **SFP2** Ethernet port IP addresses that you use for media streams. See also Ethernet Pages 1 and 2, on page 62.

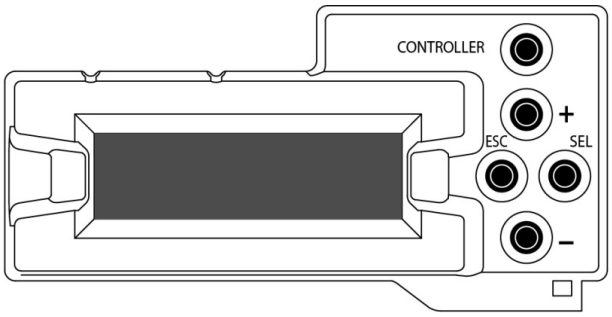
The Ethernet port configuration parameters are:

- The Ethernet port's current operating mode: DHCP or DISABLE.
- The Ethernet port's current IP Address: when mode is set to DISABLE, set the card's IP address.
- The Ethernet port's current subnet Mask: when mode is set to DISABLE, set the subnet mask for your network.
- The Ethernet port's current default Gateway: When mode is set to DISABLE, set the network switch's IP address.

The UCP-3901 Card will reboot once you have changed a network parameter when:

- Densité local control is removed from the card or,
- You navigate back to the top level menu. You can change all network parameters in one shot (without the unit rebooting for every parameter change) by staying at a menu level lower than the top level menu (stay within the NETWORK SETTINGS menu level or lower) when changing the network settings.

A reboot takes approximately 75 seconds. Two versions of the local control panel exist:

Panel type	Frame models	Appearance
Physical	Densité-3, Densité-3+FR1	
Touch screen	Densité 3+FR4, GV Node	

The local control panel is fastened to the front of the controller card.

- The physical panel is accessed by opening the front door of the frame.
- The touch screen panel is accessed through an aperture in the frame door.

The panel incorporates a display capable of displaying two lines of text, each 16 characters in length, and four pushbuttons. The functionality of the pushbuttons is as follows:

[+] [–]	Used for menu navigation and value modification
[SELECT]	Gives access to the next menu level. When a parameter value is shown, pushing this button once enables modification of the value using the [+] and [–] buttons; a second push confirms the new value
[ESC]	Cancels the effect of parameter value changes that have not been confirmed; pushing [ESC] causes the parameter to revert to its former value. Pushing [ESC] moves you back up to the previous menu level. At the main menu, [ESC] does *not* exit the menu system. To exit, re-push the [SELECT] button for the card being controlled.

Notes

If you do not touch any buttons on the local control panel, the controller will revert to its normal standby mode after 30 seconds.

If you changed a parameter from the control menu, but have not applied your change (you did not touch the SEL button on the control panel), once the 30-second timeout has occurred, the parameters will be confirmed as if you had touched the SEL button

Remote control using RollCall

The operation of the UCP-3901 may be controlled using Grass Valley's RollCall.

- This manual describes the control panels associated with the UCP-3901 and their use.
- Please consult the RollCall User's Guide for information about setting up and operating RollCall.

In RollCall, double-click the UCP-3901 in the tree to open the configuration panel. See Connecting to the Card's Configuration Interface, on page 37.

3 Connections and Cabling

Cabling Diagrams

The following figures show the typical connections for an UCP-3901.

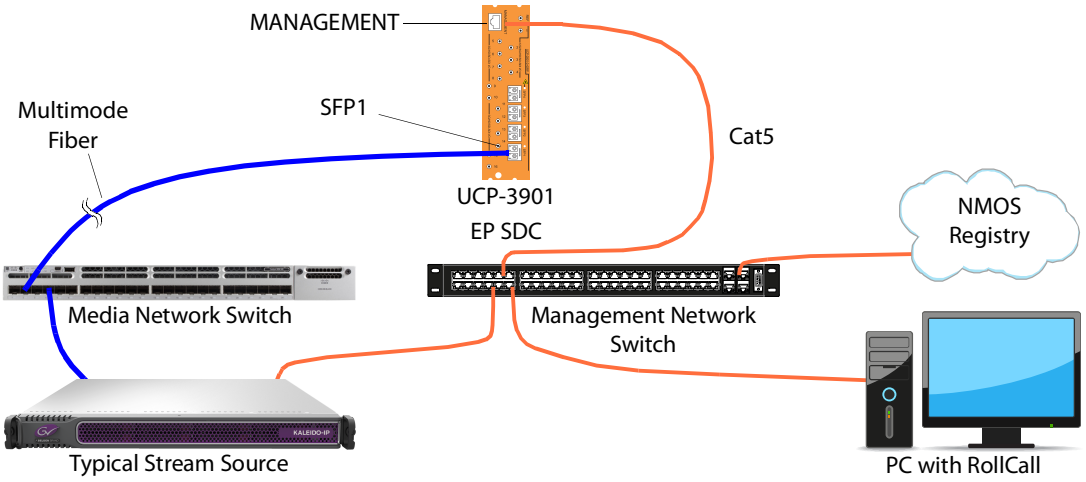


Fig. 3-1: Typical UCP-3901 Essence Processing Network Cabling

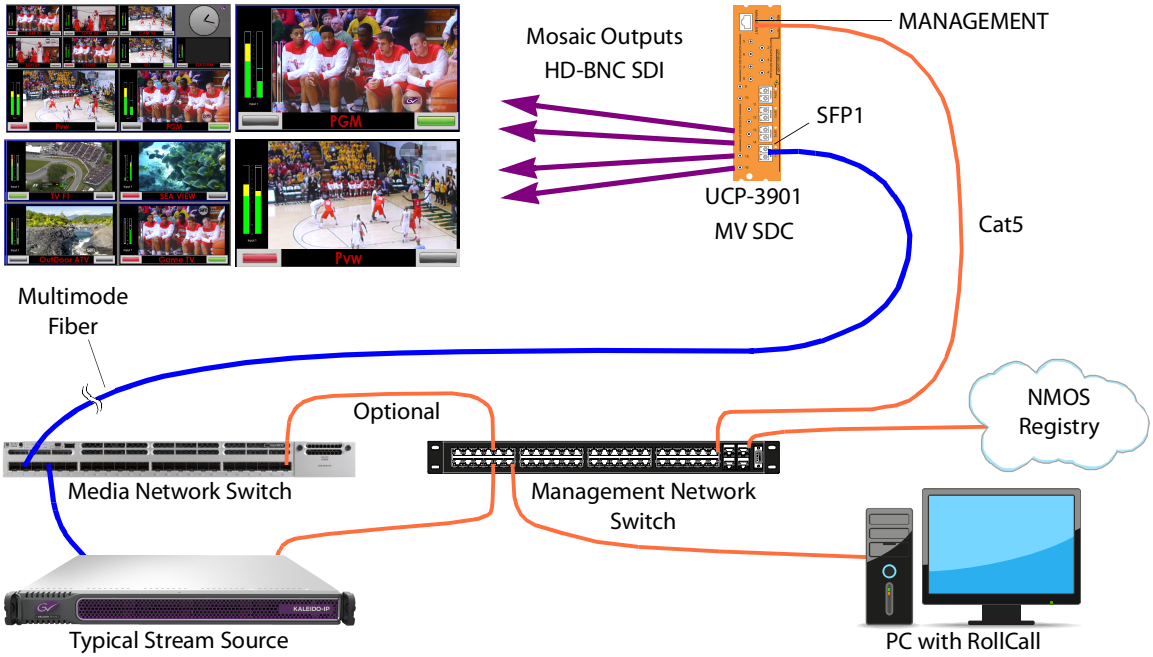


*Fig. 3-2: Typical UCP-3901 Multiviewer Network Cabling**Figure 3-1 on page 33*

The optional Cat5 Ethernet cable is not necessary when a specific configuration option is used. See Connecting to the Multiviewer SDC with RollCall, on page 39.

Cabling to Support SMPTE ST 2022-7 with a UCP-3901

The UCP-3901 supports network redundancy, for use with any SMPTE ST 2022-7 compatible equipment.

To make streaming more reliable over an IP network, the implementation of SMPTE ST 2022-7 seamless protection switching depends on stream redundancy. This protection scheme transmits two identical packet streams over physically separate network routes (shown as Media Red LAN and Media Blue LAN in the figure below), so that if packets from one route are lost, the data can be reconstructed using packets from the second stream. This process is seamless because switching between the streams is instantaneous and does not impact content.

PREREQUISITES:

- At least two DCNM-compliant switches must be used for this application. Contact Grass Valley for more information about switch compatibility. See Grass Valley Technical Support, on page 106.
- For the UCP-3901, in both Rollcall's **Input Spigot** panel and **Output Spigot** panel, make sure to change the **Streaming** type to **Dual**. See Input Spigots, on page 81 and Output Spigots, on page 85.

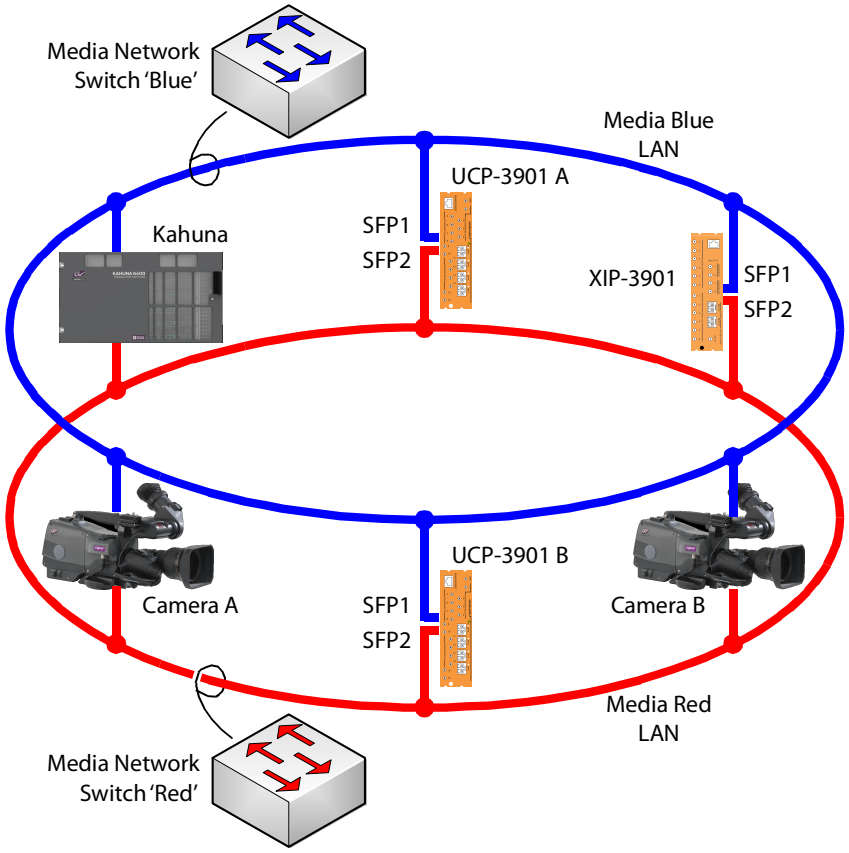
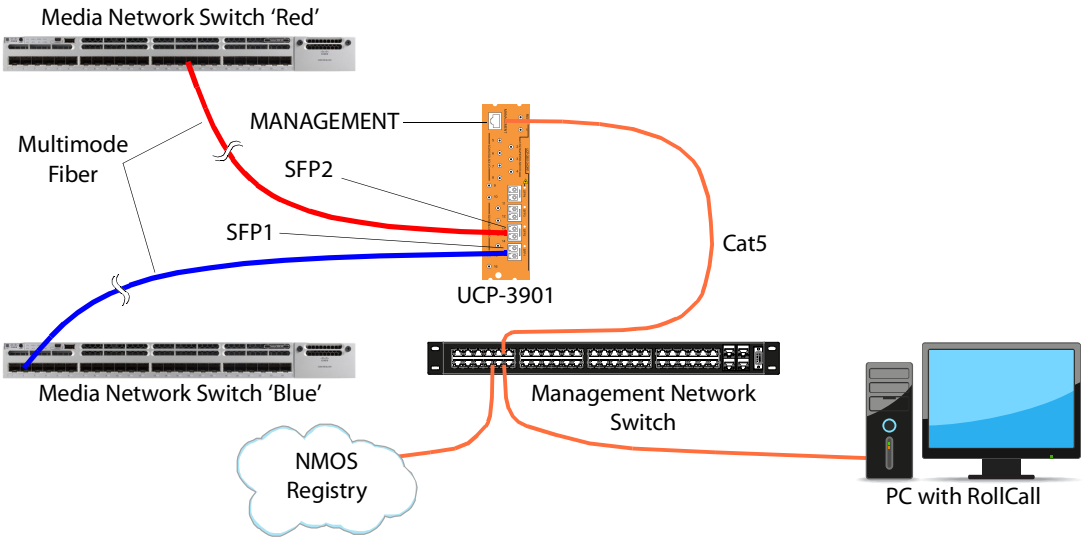


Fig. 3-3: Typical SMPTE ST 2022-7 UCP-3901 Network Overview

The cabling connections are shown in greater detail below.



4 Connecting to the Card's Configuration Interface

Installing RollCall

Use RollCall to configure the UCP-3901 Card. To install RollCall on your PC, see the *RollCall V4 Suite & RollCall Lite Installation Guide*. See Related Documentation, on page 14.

For help with general use of the RollCall application, open the user manual by clicking the  button on the main RollCall toolbar.

IP Address and Network Port Usage

Use the Densité frame's control panel to view and set the UCP-3901's current IP address that you use in RollCall to connect to it. See Local control using the Densité frame control panel to set the Card's IP Addresses, on page 29.

Once you have connected to the card with RollCall, you can change the card's IP configuration through RollCall; see Ethernet Gb, on page 117 and Ethernet Pages 1 and 2, on page 62.

Certain ports must be open on the management network. This information can be found under **Port Usage** in the *RollCall V4 Suite & RollCall Lite Installation Guide*. See Related Documentation, on page 14.

Connect with RollCall on Configuration Port	Software Defined Core		Description
	Multiviewer	Essence Processing	
2050 (default)	•	•	Basic UCP-3901 Card configuration / network connectivity
2051	•		Multiviewer SDC configuration

Connecting to the UCP-3901 Card with RollCall

First Time Connection to the UCP-3901 Card with RollCall

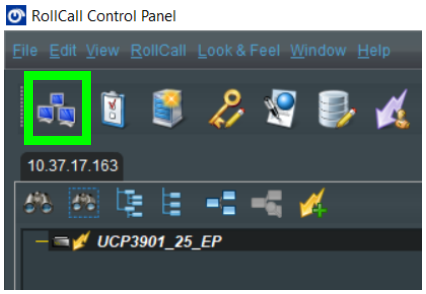
Connect to the UCP-3901 Card with RollCall. The connection is made to the card's MANAGEMENT Ethernet interface. To set the IP address of the card's Ethernet interfaces, see Local control using the Densité frame control panel to set the Card's IP Addresses, on page 29.

The generic UCP-3901 Card is supplied with software which contains each of the available Software Defined Cores (SDC), *unlicensed*. By default, a new UCP-3901 Card starts up with

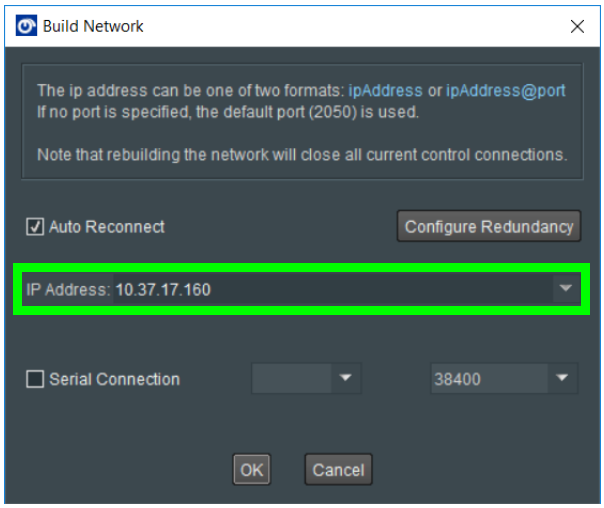
the Essence Processing core selected *but it is unlicensed*. You must then license the SDCs you will use.

1 Set the UCP-3901 Card's IP address for the **MANAGEMENT** Ethernet port IP address. See Local control using the Densité frame control panel to set the Card's IP Addresses, on page 29.

2 Click **Connect to RollCall Network** button in the main toolbar.



3 Using RollCall, connect to the card's **MANAGEMENT** IP address, at port 2050 (default). For example, if the card's management IP address is 10.37.17.160, then connect to the card as follows.



4 Open the connection to card.

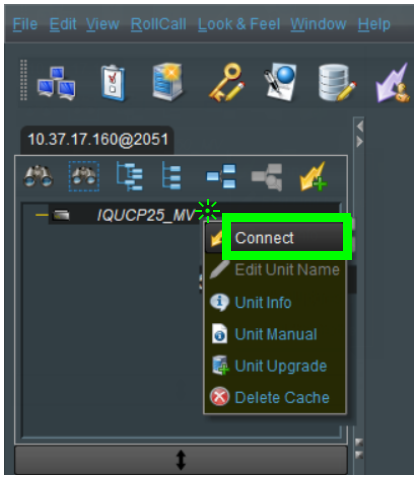


Fig. 4-1: Connecting to UCP-3901 Card RollCall Templates from RollCall Control Panel

5 Once connected, install the required licenses for the SDCs you will be using for your installation. See Available Upgrade Licenses, on page 15 for a list of available licenses. See Installing a License into an UCP-3901, on page 188 to install the license(s).

6 Configure the card.

Licensed SDC	See
Essence Processing (EP)	Essence Processing SDC, on page 45
Multiviewer (MW)	Connecting to the Multiviewer SDC with RollCall, on page 39

Connecting to the Multiviewer SDC with RollCall

The Multiviewer SDC consists of two configuration components to which you have to make separate connections. By default, you connect with RollCall to the:

- UCP-3901 Card at the **MANAGEMENT** IP address, at port 2050 (default).
- Multiviewer SDC at the **SFP1** IP address, at port 2051.

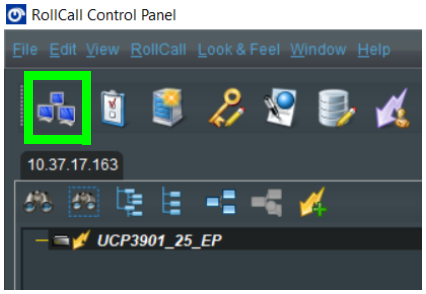
To set the IP address of the card's Ethernet interfaces, see Local control using the Densité frame control panel to set the Card's IP Addresses, on page 29.

PREREQUISITE: The Multiviewer SDC license must have been installed.

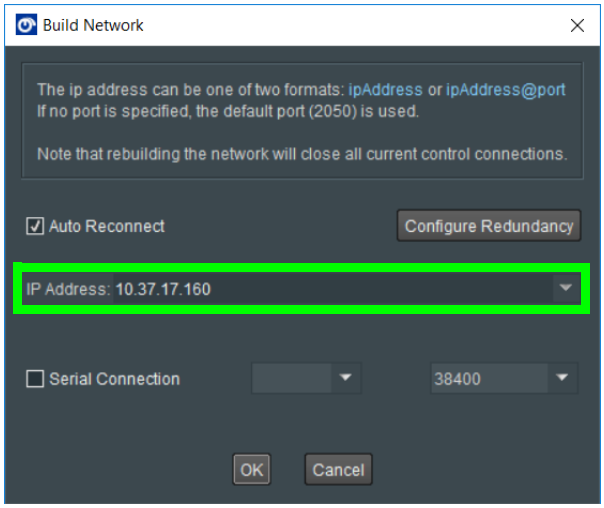
By changing a configuration parameter, you can access both configuration components at the same IP address using a single network connection to the card. You will still use two different port numbers to individually access the card's two configuration components. See also Figure 3-2 on page 33. Proceed as follows.

1 Set the UCP-3901 Card's IP address for the **MANAGEMENT**, **SFP1**, and **SFP2** Ethernet port IP addresses. See Local control using the Densité frame control panel to set the Card's IP Addresses, on page 29.

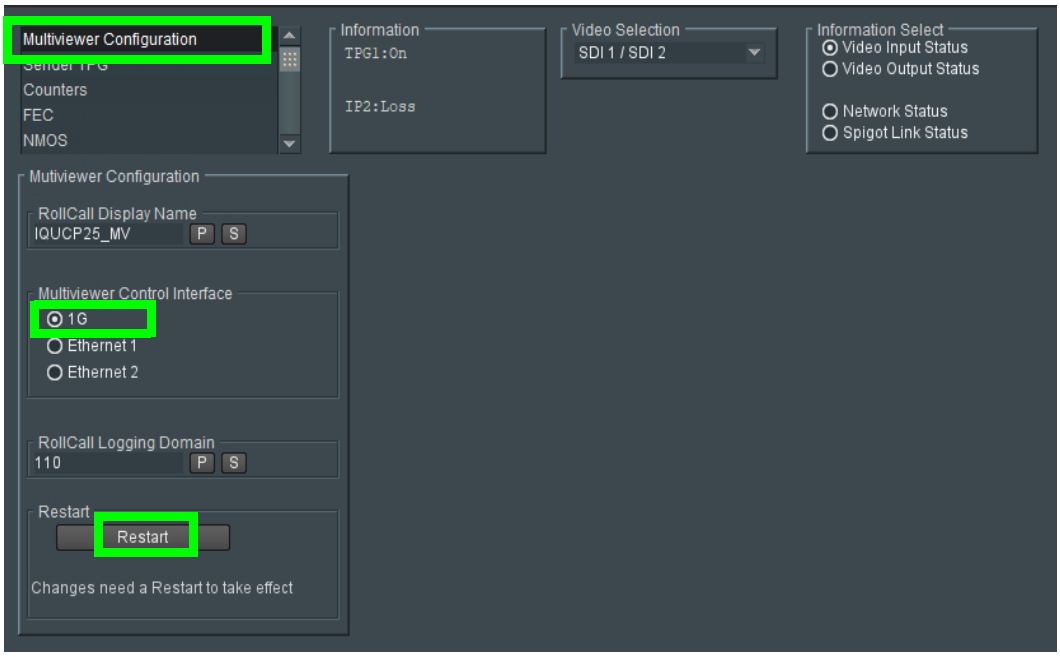
2 Click **Connect to RollCall Network** button in the main toolbar.



3 Using RollCall, connect to the **MANAGEMENT** IP address, at port 2050 (default). For example, if the card's management IP address is 10.37.17.160, then connect to the card as follows.



4 Navigate to **Multiviewer Configuration** template page and set **Multiviwer Control Interface** to **1G**.



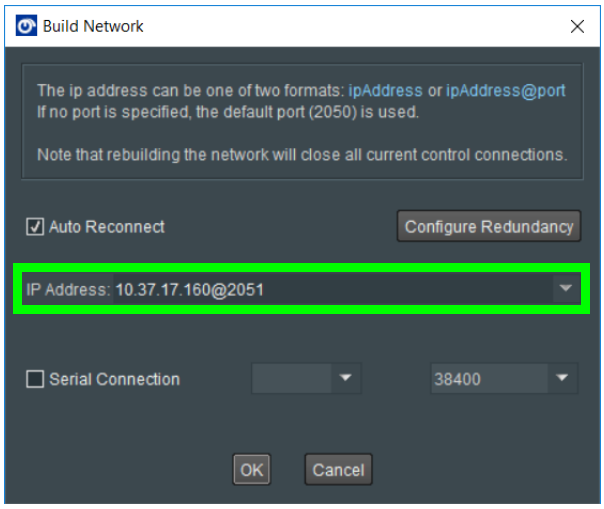
5 Click **Restart**.

Wait for the card to reboot and then connect with RollCall to the individual components (approximately 75 seconds).

Configuration Component	SDC Connection	Description
UCP-3901 Card	Connect with RollCall to the UCP-3901 Card at the **MANAGEMENT** IP address, at port **2050** (default).	Configures items associated with the UCP-3901 Card through RollCall. See RollCall Templates - UCP-3901 Card Configuration on IP port 2050, on page 152.
Multiviewer SDC	Connect with RollCall to the Multiviewer SDC at the **MANAGEMENT** IP address, at port **2051**.	Interface used by Grass Valley Orbit Client tool to: • setup IP routing to/from the module • push/pull multiviewer video wall designs to/from the module. Configures items associated with the multiviewer core functionality through RollCall: • for setting up the multiviewer • for selecting different multiviewer video wall layouts See RollCall Templates - Multiviewer SDC Configuration on IP port 2051, on page 171.

6 Configure the card.

For example, if the card's management IP address is 10.37.17.160, then connect to the Multiviewer SDC on port 2051 as follows.



7 Open the connection to card.

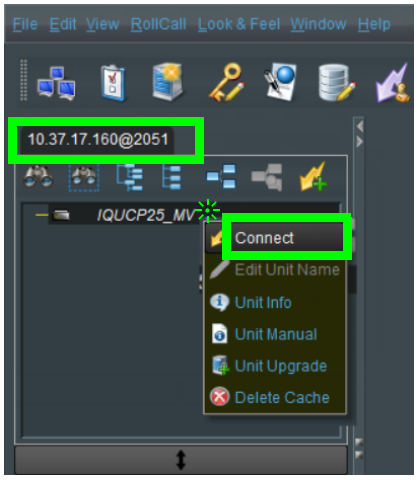


Fig. 4-2: Connecting to UCP-3901 Card RollCall Templates from RollCall Control Panel

8 To configure the multiviwer, see Getting Started with the Multiviewer, on page 123.

Firmware Upgrade

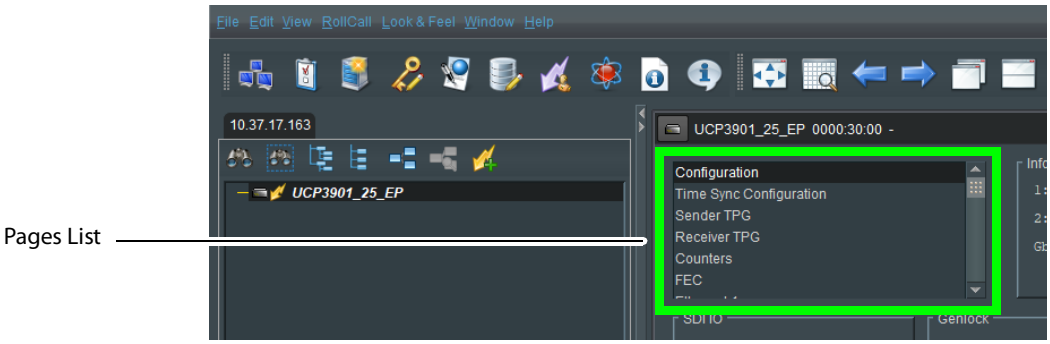
The firmware in the UCP-3901 can be upgraded in the field. We strongly recommend to upgrade the UCP-3901 with the latest firmware for the latest feature and stability enhancements. See Upgrading the UCP-3901's SDC Application, on page 183.

Terminology Used with RollCall

Term	Description
Essence	A general term used to describe an SDI component; video, audio and data are all essences.
Spigot	Generic term for a source or destination of a Video IP stream on an IP network.
Flow	SMPTE ST-2022, 2110-20, 2110-30 and 2110-40 are all flow types. An SDI input can be used to create multiple IP flows.
Stream	A stream comprises one or more flows.
Source	Originator of one or more flows, that is a set of one or more sender spigots.
Destination	Receiver of one or more flows, that is a set of one or more receiver spigots.

Navigating Pages in the RollCall Template

The RollCall template has a number of pages, each of which can be selected from the drop-down list at the top left of the display area. Right-clicking anywhere on the pages will also open a page view list, allowing quick access to any of the pages.



Setting Values in RollCall

Many of the settings within the templates have values, either alpha or numeric.

When setting a value in a field, the value, whether text or a number, must be set by pressing the **Enter** key, or clicking the S **Save Value** button.

Clicking an associated P **Preset Value** button returns the value to the factory default setting.

5 Essence Processing SDC

This section contains information on using an UCP-3901 card running the Essence Processing (EP) SDC, through RollCall.

For help with the general use of the RollCall application, open the user manual by clicking the  button on the main RollCall toolbar.

Feature Summary - UCP-3901 with Essence Processing SDC

General Features

- Supports configuration of Ethernet links for maximum signal transport using both SFPs, or, for dual link mode, to provide link redundancy as per SMPTE ST 2022-7. When operating as a receiver, the UCP-3901 will dynamically adapt to any stream presented to it.
- Supports unicast as well as IGMPv3 source-specific multicast, allowing point to point operation or transmission in multicast groups, and forward error correction.
- Standards supported:
  - 3G-SDI to SMPTE 424M/425M level A compatible
  - HD-SDI to SMPTE292M/274M/296M
  - SD-SDI to SMPTE259M-C
  - 25GbE Ethernet to IEEE 802.3
- RollCall control and monitoring compatible with standard logging and reporting features.

Essence Processing Features

- Handles up to 16 SDI signals over dual 25GbE IP links (dependent on SDI signal format and compressed or uncompressed transport mode).
- Multiple transport types available for each SDI input including:
  - Uncompressed video transport using either VSF TR-03 and TR-04 RTP or SMPTE-2022-6 encapsulation.
  - PCM audio using TR-03 & AES67.
  - SMPTE-291M metadata support through IETF standard *RTP Payload for Ancillary Data*.
- Supports frame synchronized SDI inputs with audio rate adaption, referenced to IEEE-1588v2 (PTP) network timing (compliant with SMPTE-2059-2).
- Low delay mode and Independent H & V offset available for each channel, along with up to 2 frames of video delay, and up to 255ms of audio delay.

Template Pages

The following pages are available:

Information Display

The **Information** display pane appears at the top of each page, and shows basic information on the input, standard and status of the card. The information to be displayed is defined on the **Video Selection** and **Information Select** panes to the right of the **Information** display.

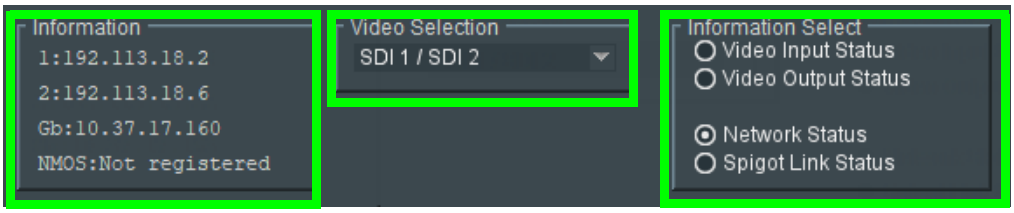


Figure 5 - 1: *Information and Selection Panes*

Selecting the Information to Display

- Select the inputs to display data for from the **Video Selection** drop-down list.
- Select **Video Input Status**, **Video Output Status**, **Network Status**, or **Spigot Link Status** from the **Information Select** pane as required.

The selected information type is displayed on the **Information** display pane.

Configuration

The **Configuration** page allows basic card parameters to be set.

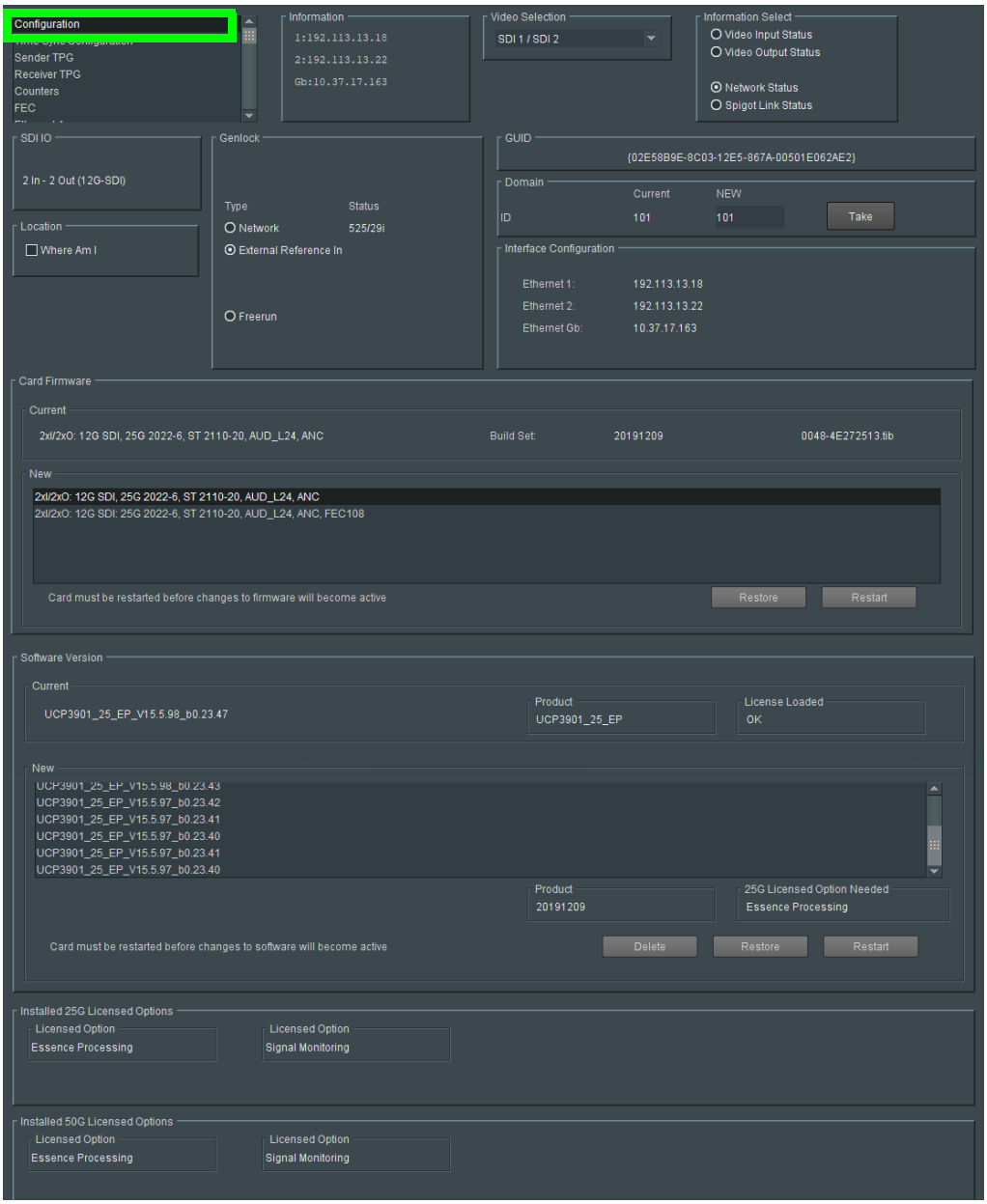


Figure 5 - 2: *Configuration Page*

Note: SDC functionality options are also set here. See Upgrading the UCP-3901's SDC Application on page 183 and Installing a License into an UCP-3901 on page 188 for more information.

Parameter	Description
SDI IO	Displays how input and output spigots are currently configured. See *Card Firmware/Software Version*, below, for information on how to change this.
Where Am I	Causes the front-edge and rear panel LEDs to flash, allowing the card to be easily identified.
Genlock	Select **Genlock** type: • **Network** - use the network's PTP clock. See Time Sync Configuration on page 50 for further configuration settings. • **External Reference** - use the reference signal found at the **REF** connector on the card's rear panel. See Rear Panel and Connectors on page 24. • **Freerun** - card is using its own clock with no reference to any other source.
GUID	Displays the absolute unique identifier associated with the card.
Domain	RollCall+ uses domains to partition a network; only nodes on the same domain can communicate with one another. A domain is uniquely identified with a number and a friendly name/alias. Set an ID as required, then press **Take** to confirm the change.
Interface Configuration	Displays the IP address for each of the Ethernet interfaces.
Card Firmware / Software Version	Each software version contains multiple firmware images. These allow different spigot input/output and flow standard combinations to be selected. Select the required software from the **Software Version** pane, then select the firmware which provides the required combination of inputs, outputs and flow standards from the list displayed on the **Firmware** pane. **Note**: **Restore** and **Restart** buttons are displayed only when an item not currently installed is selected. Click **Take** to restart the card and implement any changes made. See Upgrading the UCP-3901's SDC Application on page 183 for how to change the SDC application.
Installed 25G / 50G Licensed Options	Shows the currently installed licensed card options. See See Installing a License into an UCP-3901 on page 188 for how to install a license.

Time Sync Configuration

The **Time Sync Configuration** page allows selection of the source to be used for synchronizing flows, and configuration of any properties associated with the relevant source. To use PTP, first set **Genlock** to **Network**. See Configuration on page 48.

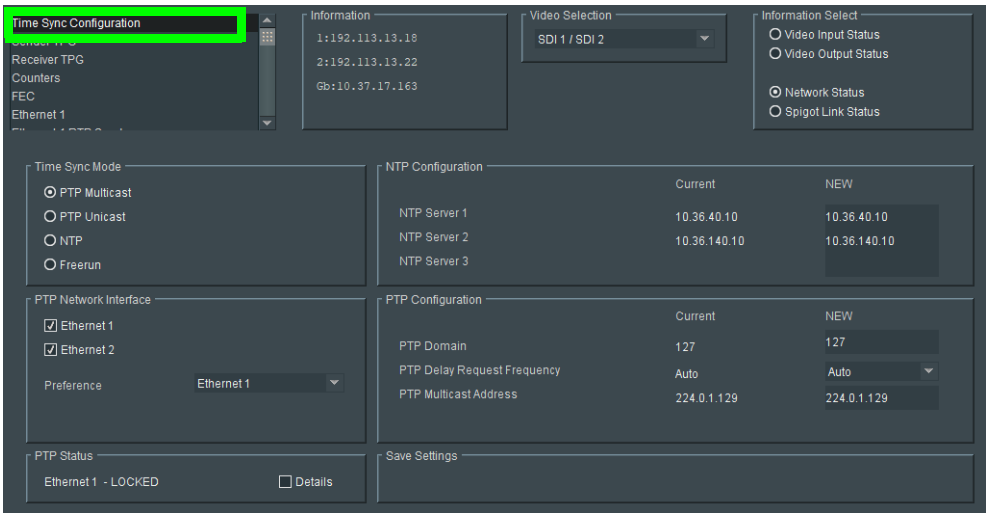


Figure 5 - 3: *Time Sync Configuration Page*

Parameter	Description
Time Sync Mode	Click a radio button to select the required mode. Note that the PTP options require a grandmaster clock to be present in the system.
NTP Configuration	To add an NTP server, enter the server's IP address in to the **New** field.
PTP Network Interface	Click check boxes to enable PTP reception on individual network interfaces. The **Preference** pulldown sets the primary interface to use. If the primary interface fails, the alternate interface (if enabled) will be switched to automatically.
PTP Configuration	Select values from the **PTP Domain** and **PTP Delay Request Frequency** drop-down lists, as required. Type the appropriate IP number into the **PTP Multicast** address field.
PTP Status	Shows the current network port used for the PTP connection and the connection status for that port: • **Free running:** Card is not being synchronized. • **No Lock:** PTP being used but clocks haven't synchronized within +/- 1mS. • **Locked:** PTP being used and clocks are within the accepted range. • **NTP:** Card is using NTP to synchronize.

Parameter	Description
Details	Set the **Details** check box to display status information. See Interface Status Panel on page 51, Histogram Panel on page 51, and Visible Clocks Panel on page 52.
Save Settings	Displayed only if settings on this page are changed. • **Restore:** discards any configuration changes made. • **Restart:** implements the configuration changes and reboots the card (a reboot takes approximately 75 seconds).

Interface Status Panel

When **Details** has been set, the displays important system status information on a single convenient panel.

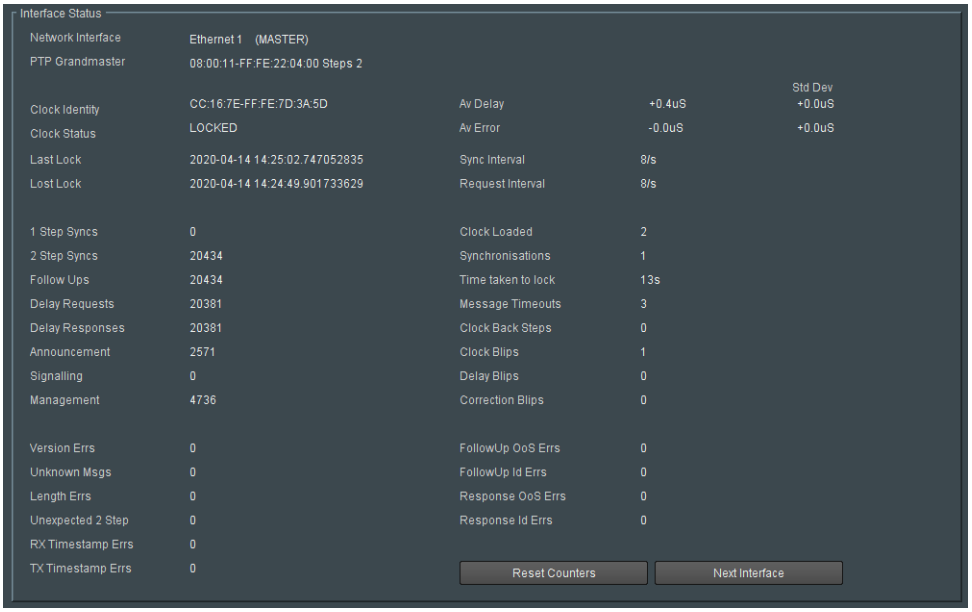


Figure 5 - 4: *Time Sync Status*

Histogram Panel

When **Details** has been set, the Histogram provides a graphical representation of the distribution of differences between the card's clock and the PTP grandmaster clock. Every time the clock difference is recalculated, the relevant bar is incremented. A correctly

functioning system will show a distinct peak around the 0ns level. The Histogram Panel is located to the below the **Status** panel.

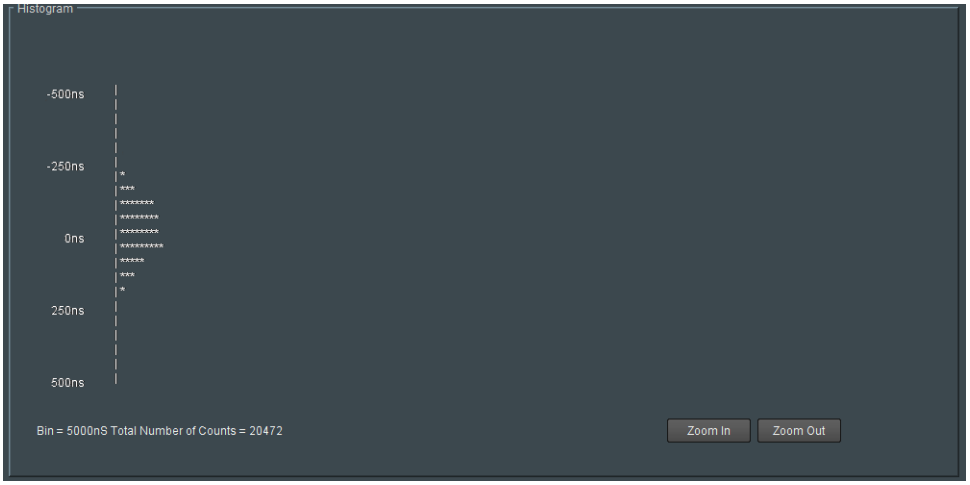


Figure 5 - 5: *Time Sync Status Information - Histogram*

Visible Clocks Panel

Located to the below the **Histogram** panel, this shows a list of available network clocks and the operational parameters for each clock.

Sender TPG (Test Pattern Generator)

The Sender TPG page allows test patterns to be applied to senders on a spigot-by-spigot basis.

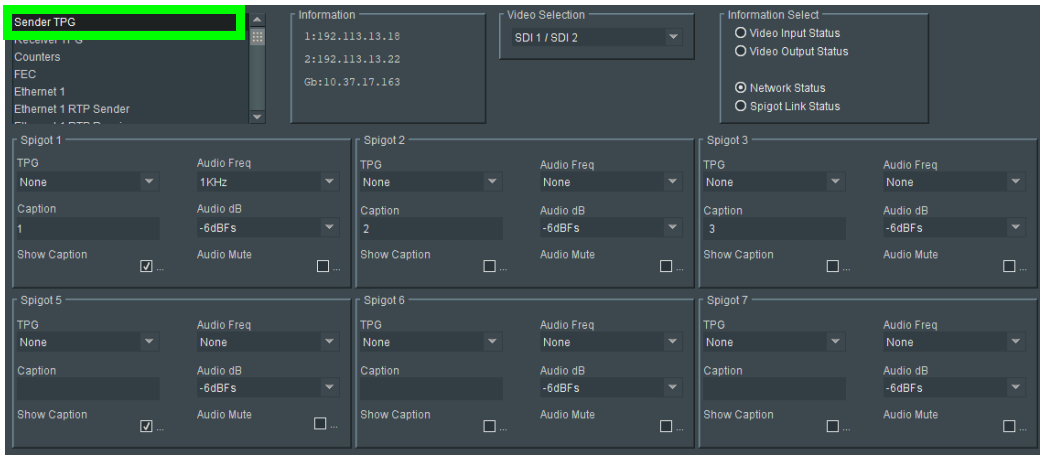


Figure 5 - 6: *Sender TPG Page*

The following options are available for each spigot:

Parameter	Description
TPG	Select the video standard of the moving color bars test pattern to apply to the spigot from the drop-down list. Select **None** to turn off the test pattern.
Audio Freq	Select the audio frequency to apply to the spigot from the drop-down list.
Caption	Type a caption (max 19 characters) to optionally be displayed with the test pattern.
Audio dB	Select the dB level to apply to the spigot from the drop-down list.
Show Caption	Set to enable the overlay the caption on the test pattern.
Audio Mute	Set to mute the audio tone.

If a test pattern is applied, either a pattern or a tone, the spigot cannot be used for streaming any other IP flow.

Receiver TPG (Test Pattern Generator)

The Receiver TPG page allows test patterns to be applied to receivers on a spigot-by-spigot basis.

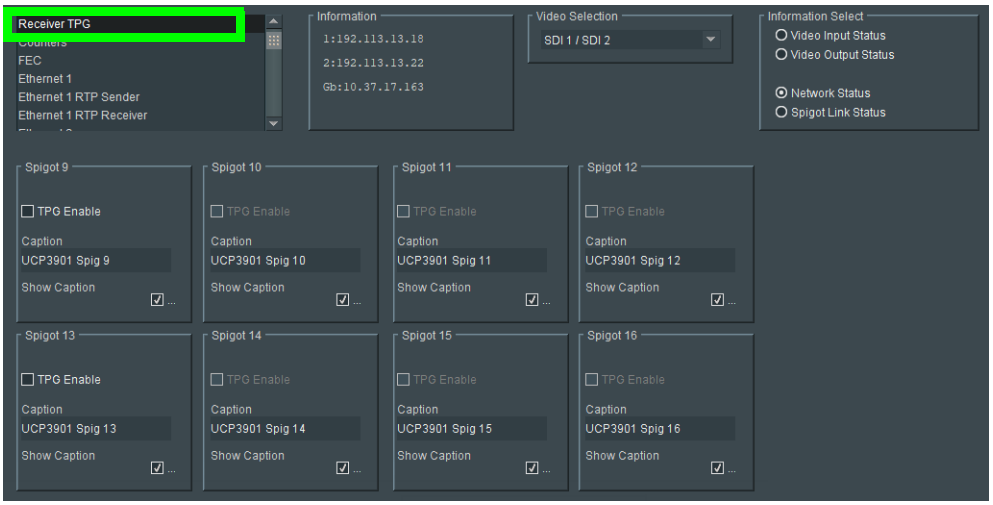


Figure 5 - 7: *Receiver TPG Page*

The following options are available for each spigot:

Parameter	Description
TPG Enable	Set to enable TPG on this spigot.
Caption	Enter a caption for the spigot (optional).
Show Caption	Set to overlay the caption on the video essence.

If a test pattern is applied, the spigot cannot be used for streaming any other IP flow.

Counters

The **Counters** page allows the various counters provided to be cleared down.

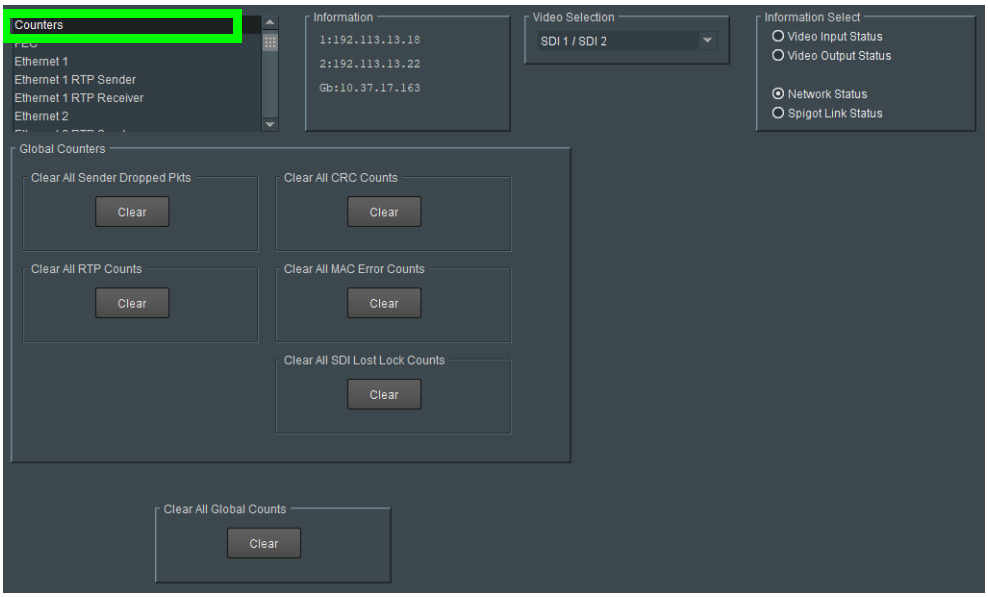


Figure 5 - 8: *Counters Page*

Parameter	Description
Clear All Sender Dropped Pkts	Counts the number of data packets an IP sender has had to drop. For example, if an IP connection were over-subscribed, a sender may drop data packets to prevent the total IP sending bandwidth being exceeded.
Clear All CRC Counts	These count any SDI video CRC errors.
Clear All RTP Counts	Counts jumps in an Real-time Transport Protocol (RTP) packet ID sequence in an IP flow. This indicates any lost, dropped or out-of-sequence RTP packets. These counters are found on RTP Receiver and Ethernet pages.
Clear All MAC Error Counts	Counts packets marked as bad, for example, for a data packet CRC error. Such an error is normally also accompanied by an RTP error because a packet would be dropped.
Clear All SDI Lost Lock Counts	Counts the number of times an (internal) SDI signals to the Multiviewer SDC comes and goes. These counters are found on the sending spigots pages,
Clear All Global Counts	Clear all above counts.

FEC

The FEC page allows Forward Error Correction (FEC) Clause 74 (FC) and Clause 108 (RS) functionality of IEEE 802.3[1] to be enabled. FEC performance logging and statistics are also available. The variety of FEC to be used is selected through the Card Firmware/Software Version options on the Configuration page; see Configuration on page 48 for more information.

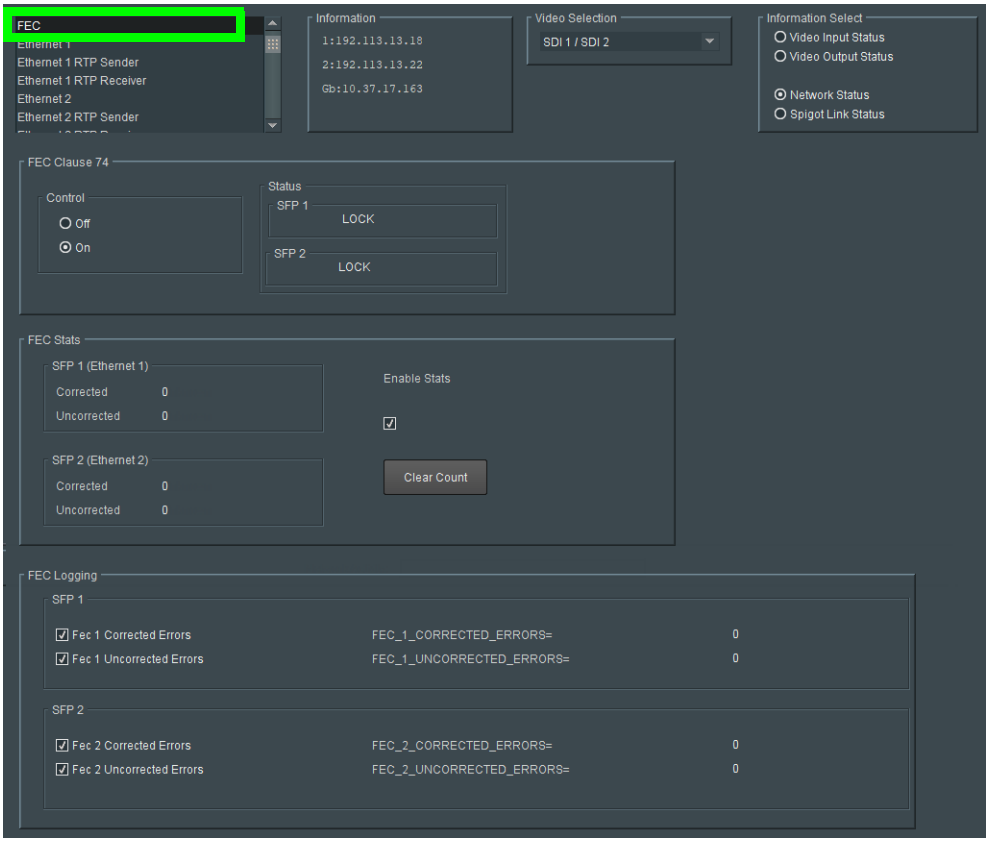


Figure 5 - 9: *FEC Page*

Parameter	Description
FEC Clause 74	Allows low-latency FEC Clause 74 error correction to be used. Options are: • **On** • **Off**
Status	Displays lock status for each SFP.

1. Ensure the network switch you plan to use supports CL91-RS-FEC. For example, for Cisco products, see https://www.cisco.com/c/en/us/td/docs/switches/datacenter/aci/apic/sw/kb/b_Cisco_ACI_and_Forward_Error_Correction.html.

Parameter	Description
FEC Stats	When **Enable Stats** is set, this displays the number of corrected and uncorrected errors received through the SFPs. Click **Clear Count** to zero the counters.
FEC Logging	Information on several parameters can be made available to a logging device connected to the RollCall network. Individually set the log fields to activate logging as required. **Fec *N* Corrected Errors:** Number of corrected errors for FEC *N*. **Fec *N* Uncorrected Errors:** Number of uncorrected errors for FEC *N*. The available log fields are shown in the table below.

Log Field	Description
FEC_*N*_CORRECTED_ERRORS=	Number of corrected errors for FEC *N*.
FEC_*N*_UNCORRECTED_ERRORS=	Number of uncorrected errors for FEC *N*.

Where N is the SFP number. To identify SFP 1 / 2, see *Rear Panel and Connectors* on page 24.

NMOS

The **NMOS** page allows various NMOS parameters to be set, allowing the UCP-3901 to inter-operate with other equipment through an NMOS registry.

UCP-3901 supports Networked Media Open Specifications (NMOS) AMWA IS-04 for device discovery and registration and IS-05 for connection management. Furthermore, it supports AMWA BCP-002 recommendations for Grouping NMOS Resources.

UCP-3901 relies on an external NMOS registry that is used to register NMOS devices.

PREREQUISITE:

- A working NMOS registry service must be available on the network.
- Entries for your NMOS registries have been added to the network DNS server. This enables automatic DNS-SD discovery. Contact your IT department to do so. Otherwise you can manually specify the registry to connect to.

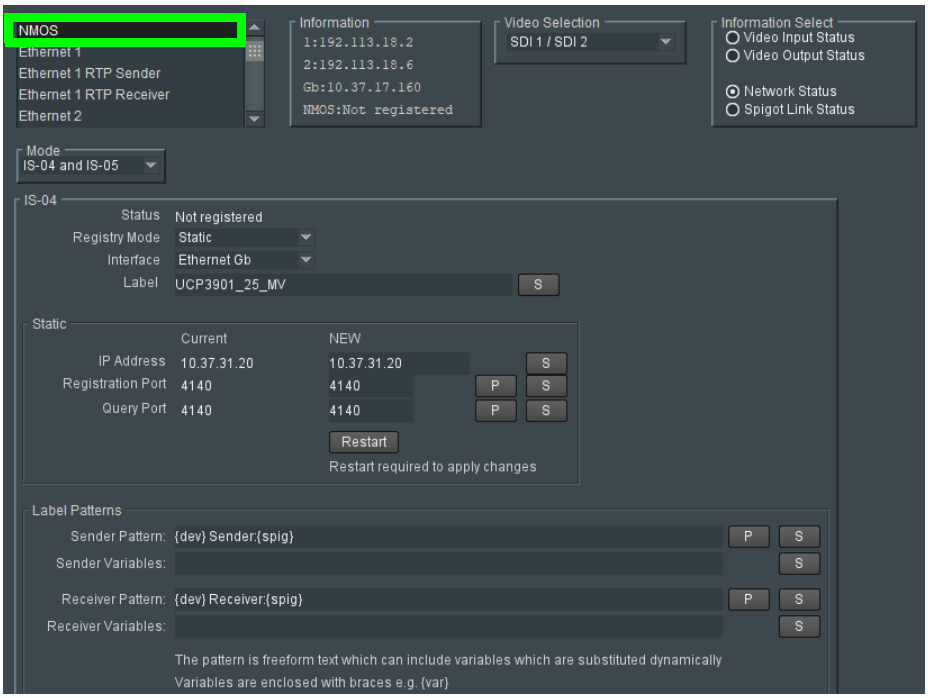


Fig. 5-10: NMOS Page

Parameter	Description
Mode	Set the NMOS operating mode: **OFF:** disable NMOS. This is the default. **IS-04:** enable the Networked Media Open Specifications (NMOS) IS-04 v1.2 or higher for device discovery and registration. Receivers are updated as a result. **IS-04 & IS-05:** enable the NMOS IS-04 for device discovery and registration and IS-05 for connection management. Receivers will accept routing request and process the received SDP file.
Status	When the NMOS node registers successfully to NMOS registry service, the status shows a message indicating that it has registered to the IP address, registry port number, and query port number of that NMOS registry service. For example, the message **Registered to 10.37.19.115:4041 Query:4041** indicates a successful registration. Whereas, when it fails to register then the status will simply show the message **Not registered**.
Registry Mode	Set the IS-04, registry connection mode: **Auto:** automatic discovery of the NMOS registry using DNS Service Discovery (DNS-SD), as described in AMWA IS-04 NMOS Discovery and Registration Specification v1.2. **Static:** manually specified NMOS registry values for address, registration port and query port.
Interface	Select the network interface to be used to connect to the NMOS registry. **Ethernet 1** represents the UCP-3901's **SFP1** connection, **Ethernet 2** represents the UCP-3901's **SFP2** connection, and **Ethernet Gb** represents the UCP-3901's **MANAGEMENT** connection. See Rear Panel and Connectors on page 24.
Label	Set the identifier by which this UCP-3901 will be known in the NMOS registry, and by extension, to other NMOS devices using this NMOS registry.
Auto / DNS IP	Set the IP address of the network DNS server providing the DNS Service Discovery (DNS-SD) to allow the automatic discovery of the NMOS registry when the **Registry Mode** is set to **Auto**.
Auto / Search domain, Current	The network's domain name on which the UCP-3901 will search for NMOS devices and the NMOS registry when the **Registry Mode** is set to **Auto**.
Auto / Search domain, New	Set a new search domain on which the UCP-3901 will search for NMOS devices and the NMOS registry when the **Registry Mode** is set to **Auto**.
Static / IP Address	Set the NMOS registry's IP Address when the **Registry Mode** is set to **Static**.
Static / Registration Port	Set the NMOS registry's registration port number when the, **Registry Mode** is **Static**. The default Registry Port value is 3210.

Parameter	Description
Static / Querry Port	Set the NMOS registry's query port number when the **Registry Mode** is **Static**. The default Query Port value is 3211.
Restart	Click to apply your new settings.

Label Patterns

By default, IP Senders and Receivers will use the default labels in the NMOS Registry. However, you can optionally customize the label to be generated according to a pattern. This pattern allows you to specify a label in a generic manner, which will automatically be adopted and applied to all NMOS IP Senders and Receivers. This definition is known as a Label Pattern.

Defining a Label Pattern

Label Patterns are defined for both IP Senders and IP Receivers. The basic process for defining a label pattern is:

1. Enter at least one **Auto-generated** variable into the **Sender Pattern** / **Receiver Pattern** field. The available variables, plus the syntax to be used, are shown in the **Auto-generated** section below the input fields. It does not matter which variable is used, but at least one must be present.
2. Optionally, enter one or more **Optional variables** into the **Sender Variables** / **Receiver Variables** fields. These allow a more descriptive label to be generated if required. The available variables, plus the syntax to be used, are shown in the **Optional variables** section below the input fields.
3. When all the required values have been entered, click **Restart** to power-cycle the UCP-3901 Card; IP Senders and Receivers will then automatically generate labels as defined.

The Sender Pattern / Receiver Pattern Fields

Leaving the **Sender Pattern** / **Receiver Pattern** fields empty will result in the default text string labels for IP Senders/Receivers being used. If a minimum of one variable is entered, the IP Sender/Receiver will auto-generate labels in accordance with the label pattern you have set. There is a maximum limit of 63 characters for all text entry boxes.

Preset Values

Preset values can be restored by clicking **P**.

- For the **Sender Pattern** field: `{dev} Sender:{spig}`
- For the **Receiver Pattern** field: `{dev} Receiver:{spig}`

Where `Sender` and `Receiver` are "static" text.

Saving and Recalling Values

Field values may be saved by clicking **S** next to the appropriate field, and recalled using a Memory or a Saveset. See the *RollCall Control Panel User Manual* for more information on saving and recalling saved values.

Auto-generated Variables

The following variables are available.

Variable	Description
{dev}	Device label. For example, *Camera1*.
{spig}	Spigot number (starting from {s_snum} or {r_snum}).
{flow}	Flow number.
{flowalt}	Flow number with alternate formatting. Restarts at 1 for each flow format type.
{fmt}	Flow format type. Uses one of {sf_v1}, {sf_v2}, {sf_v3}, {sf_a}, {sf_d}, {rf_v1}, {rf_a} or {rf_d}. See below for more information.

Free "static" text can also be added between the variables, as shown in the Preset Values section above. Add variables/static text as required.

The Sender Variables / Receiver Variables Field

Sender/Receiver Variables are optional, and allow a more descriptive label to be defined if required. The following optional variables are available.

Variable	Description
{sf_v1}	Sender 2022-6 format description. Default = "Video".
{sf_v2}	Sender 2110-20 format description. Default = "VideoAlt".
{sf_v3}	Sender VC2 format description. Default = "VC2". VC2 is currently unsupported.
{sf_a}	Sender 2110-30 format description. Default = "Audio".
{sf_d}	Sender 2110-40 format description. Default = "Data".
{rf_v1}	Receiver video format description. Default = "Video".
{rf_a}	Receiver audio format description. Default = "Audio".
{rf_d}	Receiver data format description. Default = "Data".
{s_snum}	Sender start index number. Default = 1.
{r_snum}	Receiver start index number. Default = 1.
{s_pad}	Sender number padding. Prefixes small numbers with leading zeroes. Default = 2.
{r_pad}	Receiver number padding. Prefixes small numbers with leading zeroes. Default = 2.

Updating Default Values

The default description values listed above may be updated if required. To do this, simply overwrite the default value as displayed in the Sender/Receiver Variables fields with the required value. This new value will then become the default.

Ethernet Pages 1 and 2

Ethernet 1 and **Ethernet 2** pages configure the card's high speed media ports. **Ethernet 1** is identified as **SFP1** and **Ethernet 2** is identified as **SFP2** on the card's rear panel. See Rear Panel and Connectors on page 24.

Media ports manage PTP, video, metadata, and audio streams, card configuration and upgrade, as well as NMOS IS-04 and IS-05 communications with the NMOS registry.

The **Ethernet** pages show details and status for each of the card's high speed media network interfaces. The UCP-3901 defaults to use DHCP for Ethernet port address negotiation, but this can be overridden and a static IP address can be specified if required.

The Ethernet configuration for these ports can also be set through the frame's control panel. This is useful when the card is first installed in the frame, to make it quickly operational. See Local control using the Densité frame control panel to set the Card's IP Addresses on page 29.

Only make changes to the Ethernet settings during off hours as any settings change will take the card offline for up to 30 seconds.

See Ethernet Gb on page 117 for information on the **MANAGEMENT** Ethernet connector.

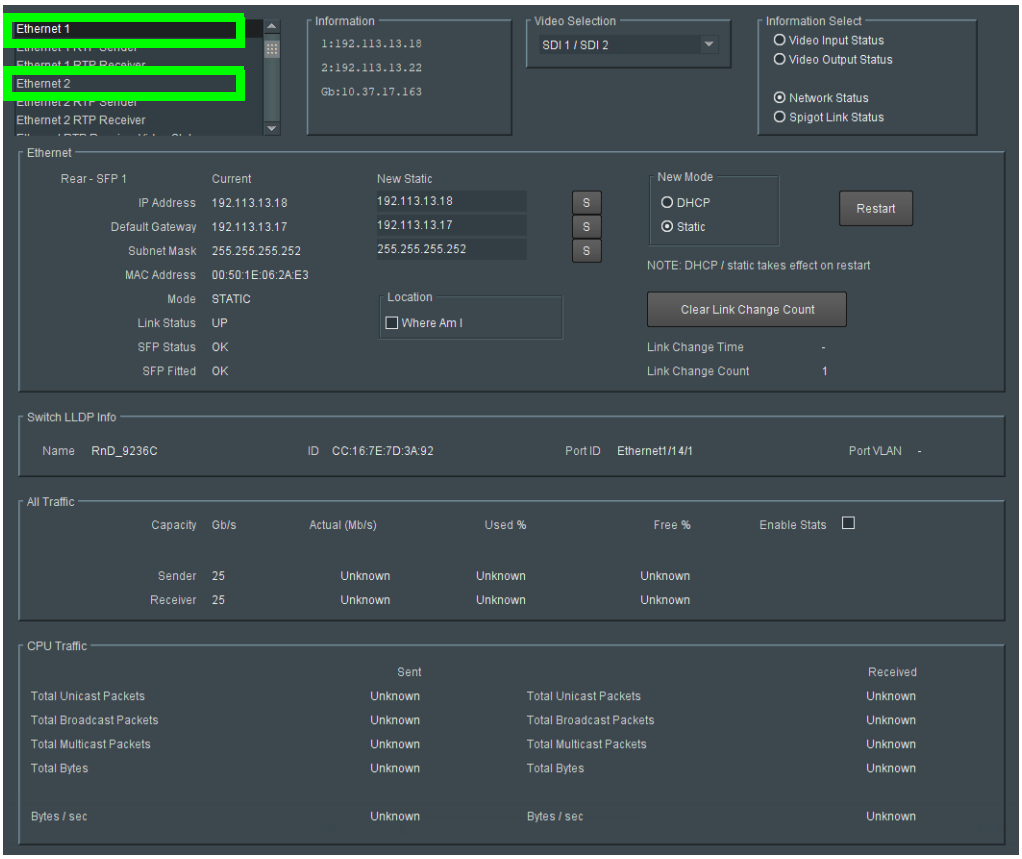


Figure 5 - 11: *Ethernet 1 Page*

Parameter	Description
Ethernet Pane	The Ethernet pane displays details of the currently selected network interface, and allows a static IP address to be defined. **Rear - SFP 1 / 2:** See Rear Panel and Connectors on page 24. **IP Address:** When Mode is set to **Static**, set the card's IP address. **Default Gateway:** When Mode is set to **Static**, set the network switch's IP address. **Subnet Mask:** When Mode is set to **Static**, set the subnet mask for your network. Enter information as required, then click S to save. New settings are applied when **Restart** is clicked.
New Mode	Set the Ethernet port's connection mode. **DHCP:** The Ethernet port uses automatic configuration obtained from the network's DHCP server. **Static:** You set a fixed Ethernet port configuration (**IP Address**, **Default Gateway**, and **Subnet Mask**).
Restart	Click when the New Mode setting is changed for this to take effect. Only make this change during off hours as this can take up to 30 seconds to complete.
MAC Address	Shows the Ethernet port's MAC Address.
Mode	Shows the Ethernet port's current operating mode (**DHCP** or **Static**). See **New Mode** to set the operating mode.
Link Status	Shows the Ethernet port's connections status with the network switch. **UP:** Connection successful **DOWN:** Connection failed
SFP Status	Shows the health status for the SFP cartridge. **OK:** SFP cartridge detected and operational. **NONE:** SFP cartridge unavailable.
SFP Fitted	Shows if an SFP cartridge is present in the rear panel. **OK:** SFP cartridge detected. **NONE:** SFP cartridge unavailable.
Location: Where am I?	When set, the **Where Am I** function causes the SFP LEDs for the relevant Ethernet connector to flash.
Clear Link Change Count	If the state of the Ethernet link changes, the Link Change Count and Link Change Time fields are updated. Click **Clear Link Change Count** to reset the Link Change Count to zero.

Parameter	Description
Switch LLDP Info	Shows the switch's Link Layer Discovery Protocol information received from the switch that the UCP-3901 is connected to. **Name:** Shows the name assigned to the network IP switch. **ID:** Shows the IP switch ID. **Port ID:** Shows the IP switch port ID. **Port VLAN:** Shows the VLAN ID number used by the network interface.
All Traffic	Shows the Ethernet port's bandwidth **Capacity**, current data rate (**Actual** / **Used %**), and the remaining available (**Free**). Click **Enable Stats** to activate.
CPU Traffic	Shows information about traffic going through the card.

Ethernet 1 and 2 RTP Sender

The **RTP Sender** page displays the amount of data transmitted, on a spigot-by-spigot basis. Units are megabits per second.

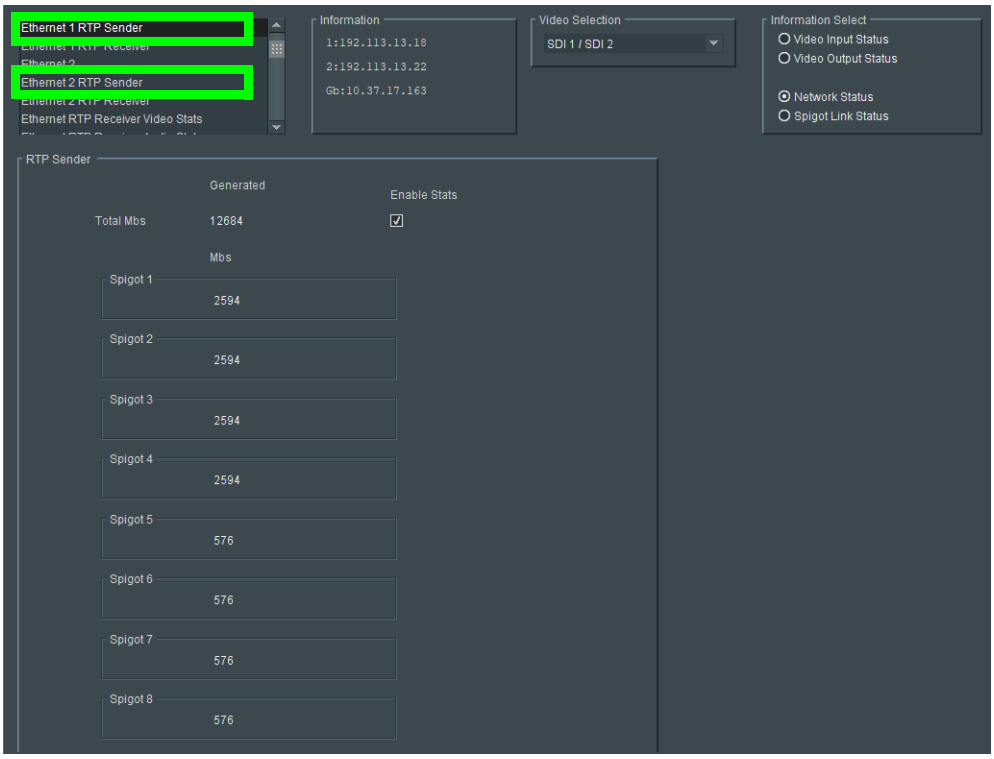


Figure 5 - 12: *Ethernet 1 & 2 RTP Sender Page*

Parameter	Description
Enable Stats	Set to display the amount of data transmitted.

Ethernet 1 and 2 RTP Receiver

The **RTP Receiver** pages display the amount of data received, details of packet loss, plus any unwanted multicast traffic on a spigot-by-spigot basis. Units are megabits per second.

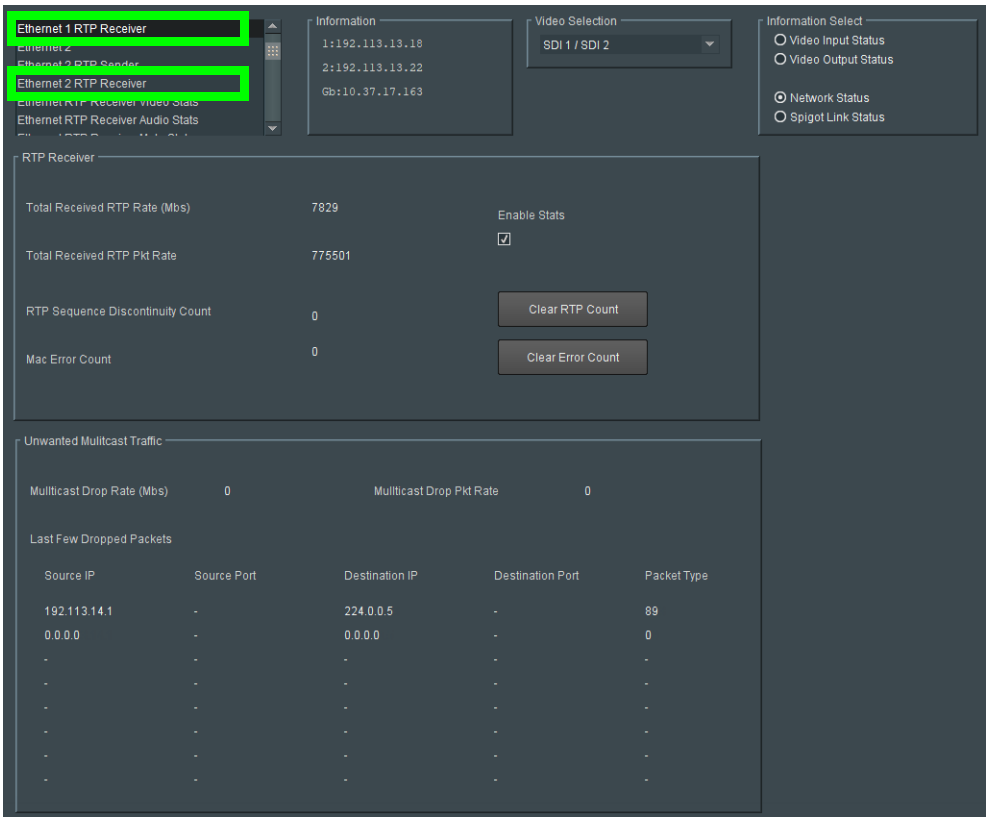


Figure 5 - 13: *Ethernet 1 & 2 RTP Receiver Page*

Parameter	Description
Enable Stats	Set to display the amount of data received.
Clear RTP Count	Click to zero RTP Sequence Discontinuity counters.
Clear Error Count	Click to zero Error counters.

Parameter	Description
Unwanted Multicast Traffic pane	This pane measures of the unexpected multicast packets the card has received. This is an indication that the card is receiving flows that are not configured properly and have been effectively thrown away, thereby wasting network bandwidth. For example, say another card's media interfaces were misconfigured by setting them to be within the same vlan (for example, A=172.19.164.21, B=172.19.164.22) but they were supposed to be in separate vlans (or example, A=172.19.164.21, B=172.19.166.22). GV Orbit / RollCall assigns a source address for a flow based on the media interface address and if you tried to route a source from such a misconfigured card, the destination card then complains that the source being on 164 instead of 166. If you see unexpected mutlicast traffic, you need to identify and resolve the offending source flows.
Multicast Drop Rate	The wasted network bandwidth due to dropped multicast packets. See above for more information.
Multicast Drop Pkt Rate	The rate of dropped multicast packets. See above for more information.
Last Few Dropped Packets	Use the information in this table to troubleshoot source flows that result in unwanted multicast traffic.

Ethernet RTP Receiver Video Stats

The **Ethernet RTP Receiver Video Stats** page displays information on the reception of video IP flows on network interfaces 1 and 2 on a spigot-by-spigot basis. Units are megabits per second.

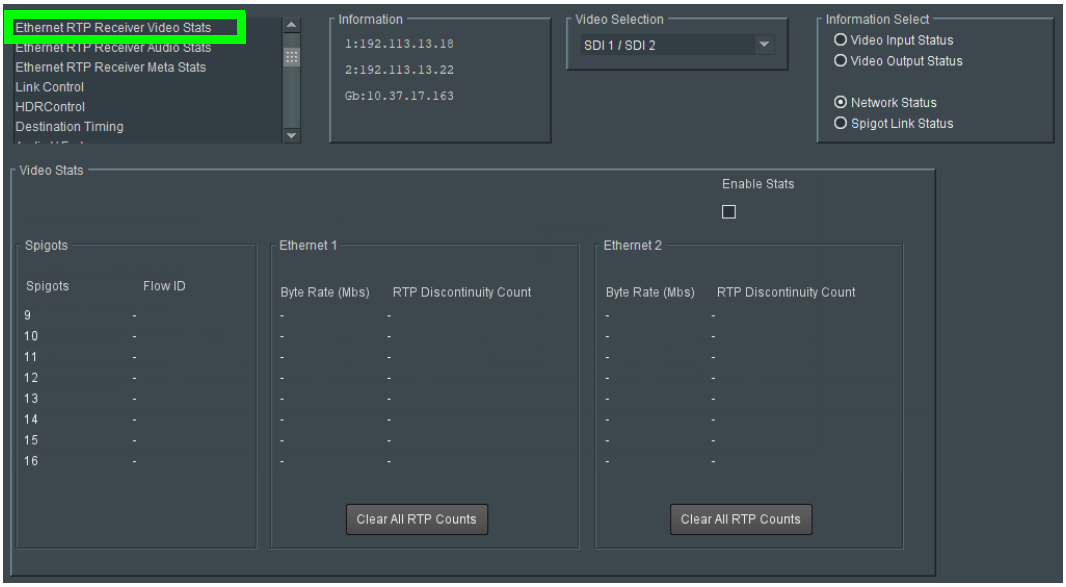


Figure 5 - 14: *Ethernet RTP Receiver Video Stats Page*

Parameter	Description
Enable Stats	Set to display values
Clear All RTP Count	Click to zero RTP Discontinuity counters for each Ethernet input.

Ethernet RTP Receiver Audio Stats

The **Ethernet RTP Receiver Audio Stats** page displays information on the reception of audio IP flows on network interfaces 1 and 2 on a spigot-by-spigot basis. Units are megabits per second.

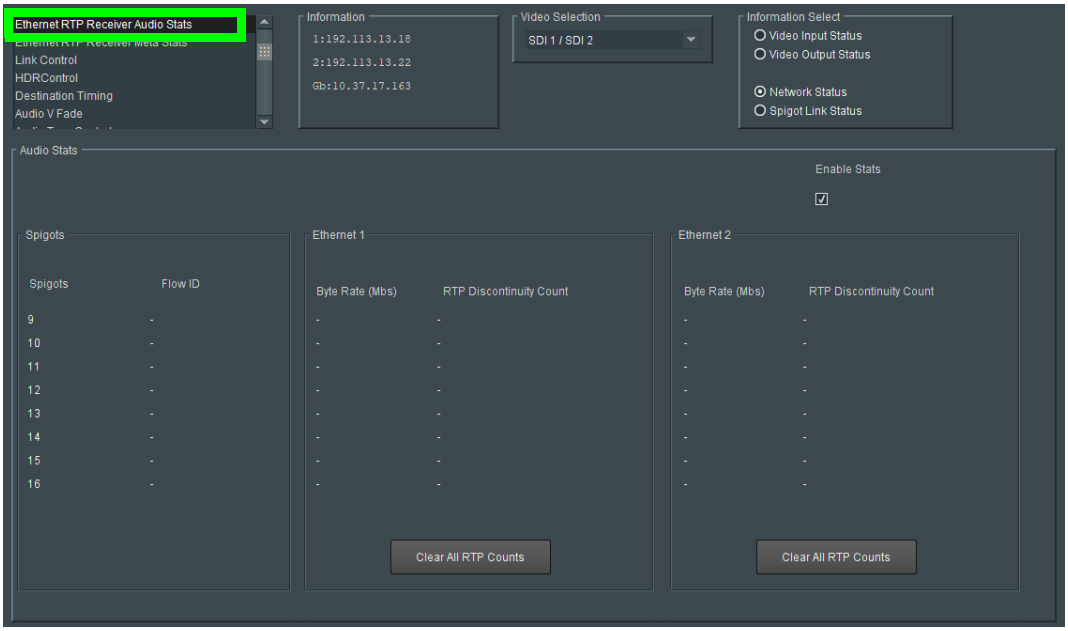


Figure 5 - 15: *Ethernet RTP Receiver Audio Stats Page*

Parameter	Description
Enable Stats	Set to display values
Clear All RTP Count	Click to zero RTP Discontinuity counters for each Ethernet input.

Ethernet RTP Receiver Meta Stats

The **Ethernet RTP Receiver Meta Stats** page displays information on the metadata received through RTP on each Ethernet input. Units are megabits per second.

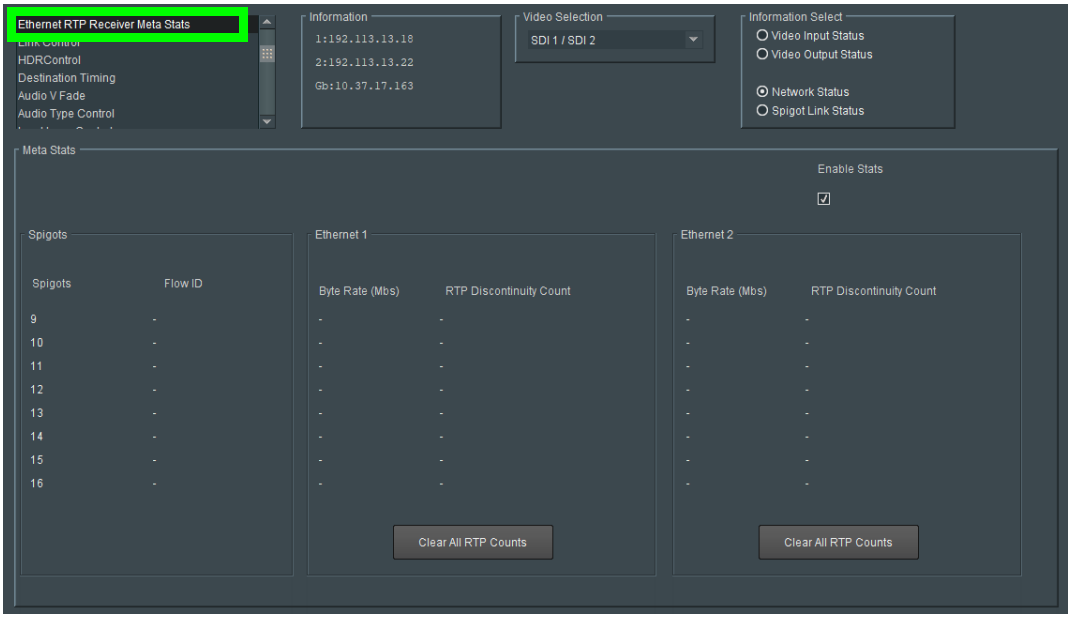


Figure 5 - 16: *Ethernet RTP Receiver Meta Stats Page*

Parameter	Description
Enable Stats	Set to display values
Clear All RTP Count	Click to zero RTP Discontinuity counters for each Ethernet input.

Link Control

The **Link Control** page allows 4K UHD spigots to be aggregated and synchronized by the UCP-3901 Card. Inputs/outputs can be set to be single or quad-link. See Configuration on page 48 for information on selecting the required input/output configuration.

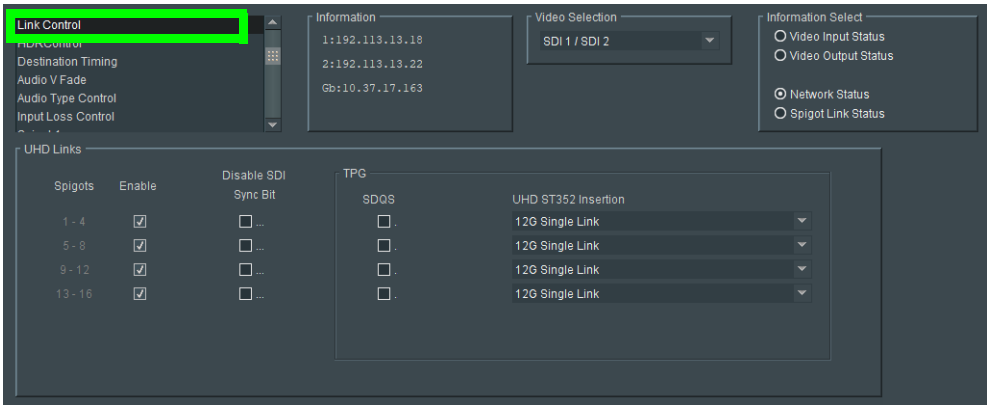


Figure 5 - 17: *Link Control Page*

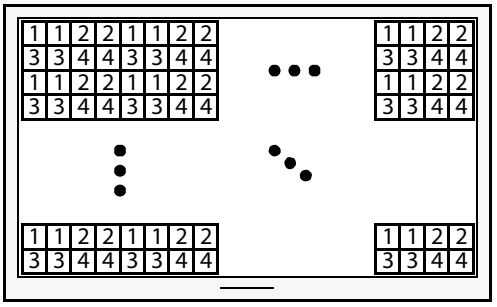
Parameter	Description
Spigots	When **Enable** is set, this show the 4 spigots that are to be used for the 4K UHD quad link signals. The individual spigots must be configured as HD signals. See Input Spigots on page 81 and Output Spigots on page 85. On the rear panel, see 12G/3G/HD/SD-SDI I/O – Serial digital video inputs / outputs (4) on page 26 and 3G / HD / SD SDI I/O – Serial digital video inputs / outputs (12) on page 26 to know on which BNC input / output each spigot is available.
Enable	Enable the spigots to be used for UHD Quad Links as required. Note that these controls are not available when using 12G.
Disable SDI Sync Bit	Some older SDI receiving equipment may not support sync bit insertion. When transmitting signals to these devices, sync bit insertion can be disabled by checking the boxes as required.

Parameter	Description
TPG / SDQS	Set the quad link mode: • Deselect the **SDQS** check boxes as required to use two-sample Interleave (2SI). See Configuring the Streams for use with 4K UHD Two-Sample Interleave Division on page 72. • Set the **SDQS** check boxes as required to use Square Division signals. See Configuring the Streams for use with 4K UHD SQD on page 73.
TPG / UHD ST352 Insertion	Set the ST352 ancillary data type according to how the TPG data is to be output. • **None:** For no ancillary data. • **12G Quad Link:** For ST425 output over quad links. • **12G Single Link**: For ST2082-10 output over a single link. See *SMPTE 2082: 12G-SDI Bit-Serial Interfaces*, *SMPTE 425: Bit-Serial Interfaces at 3 Gb/s* and *SMPTE 352: Payload Identification Codes For Serial Digital Interfaces* for further information.

Configuring the Streams for use with 4K UHD Two-Sample Interleave Division

To support 4K streams, the image is mapped onto four HD sub-images using a Two-Sample Interleave division (2SI), as defined by SMPTE ST 424-5. This means each of the four sub-stream carries a quarter-resolution picture. These four sub-streams must be logically linked together so that they are switched together at once ensuring that there is no switching delay between the four streams that would create visible glitches.

The following shows the typical video stream composition of a two-sample interleave division display.



4K UHD Composite Image

To configure a 4K UHD Two-Sample Interleave Division input or output

1 Open the **Link Control** page. See Link Control on page 71.
2 Set **Enable** for the four spigots on which a quad link signal will be used (Spigots 1 to 4, Spigots 5 to 8, Spigots 9 to 12, and Spigots 13 to 16).
3 Deselect the **SDQS** check boxes to use two-sample Interleave (2SI).

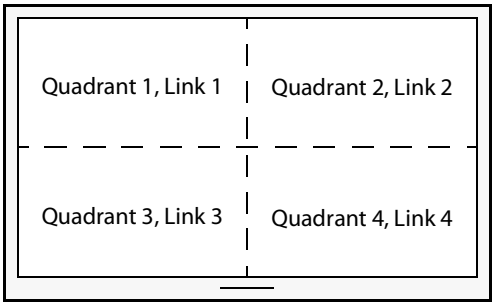
4 Configure each of the four UCP-3901 spigots that are to receive / send the four HD sub-images. These links are assigned in groups of 4 as shown by the **Spigots** parameter. For example Spigots 1 to 4, Spigots 5 to 8, Spigots 9 to 12, and Spigots 13 to 16.

5 Connect the quad link signals to the rear panel. See Rear Panel and Connectors on page 24.

Configuring the Streams for use with 4K UHD SQD

To support 4K streams, a quad-link (square division) configuration can be used. That is, the 4K image is divided into four HD quadrants, and each quadrant is sent as four separate streams. These four streams must be logically linked together so that they are switched together at once ensuring that there is no switching delay between the four streams that would create visible glitches between the four quadrants.

The following shows the typical video stream composition of a 4K quad-link display.



4K UHD Composite Image

PREREQUISITES:

- Configure each of the four UCP-3901 spigots that are to receive / send the four quad-link images. These links are assigned in groups of 4 as shown by the **Spigots** parameter. For example Spigots 1 to 4, Spigots 5 to 8, Spigots 9 to 12, and Spigots 13 to 16.

To configure a 4K UHD Quad Link Square Division input or output

1 Open the **Link Control** page. See Link Control on page 71.

2 Set **Enable** for the four spigots on which a quad link signal will be used (Spigots 1 to 4, Spigots 5 to 8, Spigots 9 to 12, and Spigots 13 to 16).

3 Set the **SDQS** check box to use Square Division signals.

4 Configure each of the four UCP-3901 spigots that are to receive / send the four quad-link images. These links are assigned in groups of 4 as shown by the **Spigots** parameter. For example Spigots 1 to 4, Spigots 5 to 8, Spigots 9 to 12, and Spigots 13 to 16.

5 Connect the quad link signals to the rear panel. See Rear Panel and Connectors on page 24.

HDR Control

The **HDR Control** page allows HDR essences to be configured.

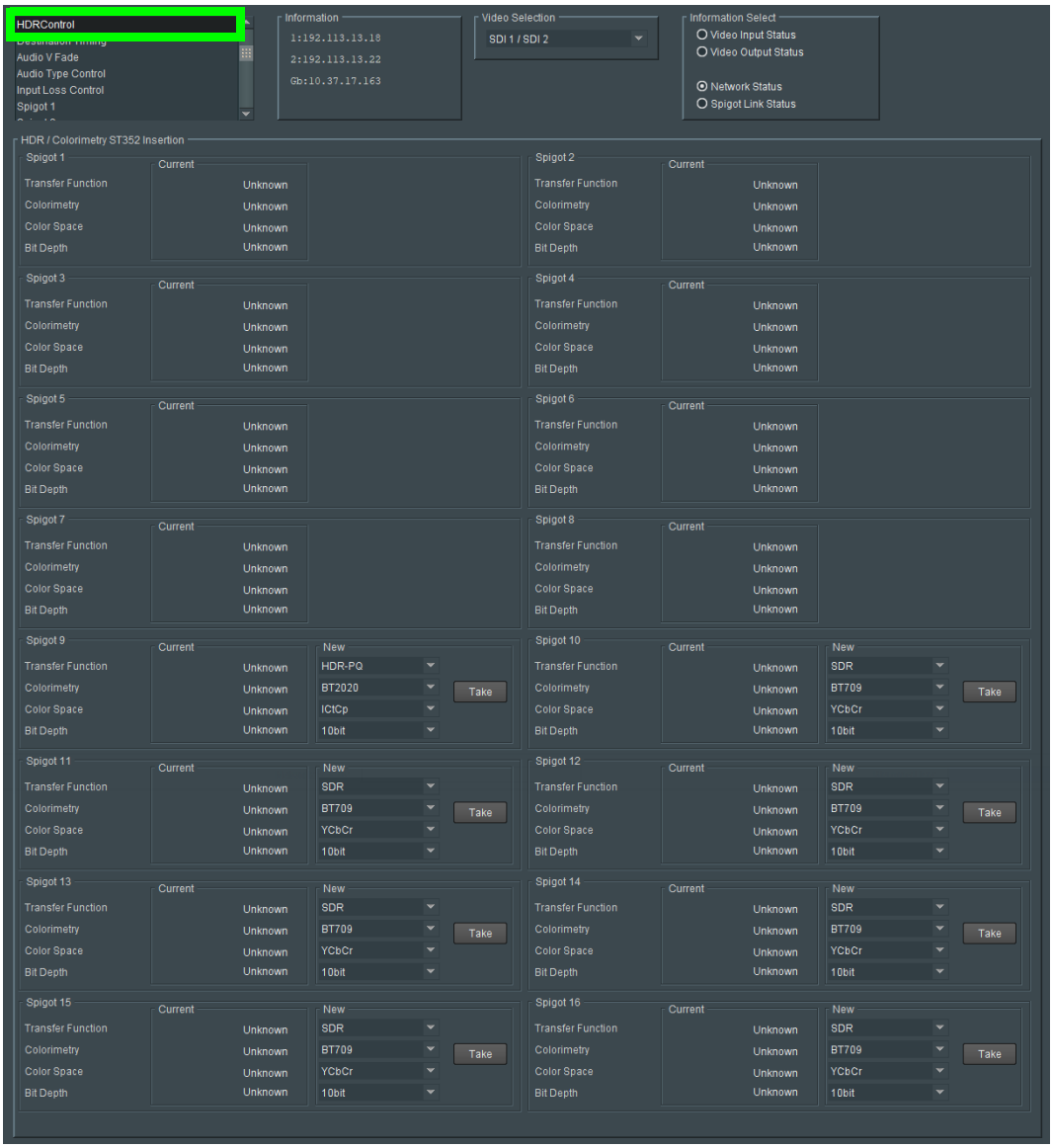


Figure 5 - 18: *HDR Control Pages*

Parameter	Description
Transfer Function	**SDR:** the HD input video signal meets the Rec. 709 standard. **HDR-HLG:** the Hybrid Log-Gamma input video signal meets the BT.2100 standard. **HDR-PQ:** the Perceptual Quantizer input video signal meets the SMPTE ST 2084 standard.
Colorimetry	**BT709:** the input video signal's color gamut meets the Rec. 709 standard. **BT2020:** the input video signal's color gamut meets the Rec. 2020 standard.
Color Space	**YCbCr:** the input video signal's color space uses the YCbCr color model. **ICtCp:** the input video signal's color space uses the ICtCp color model.
Bit depth	**10-bit Full Range:** 0 to 1023 image mapping range according to SMPTE RP. 2077. This is also called *computer RGB*. **10-bit (narrow range):** the standard 64 to 940 image mapping range. This is also called *studio RGB*.
Take	Click to apply new setting. The HDR parameters can be set for receiver spigots only. Sender spigots show the current stream's status.

Destination Timing

The **Destination Timing** page allows genlock timing on each receiver spigot to be adjusted, in order to synchronize the IP signal with the house reference.

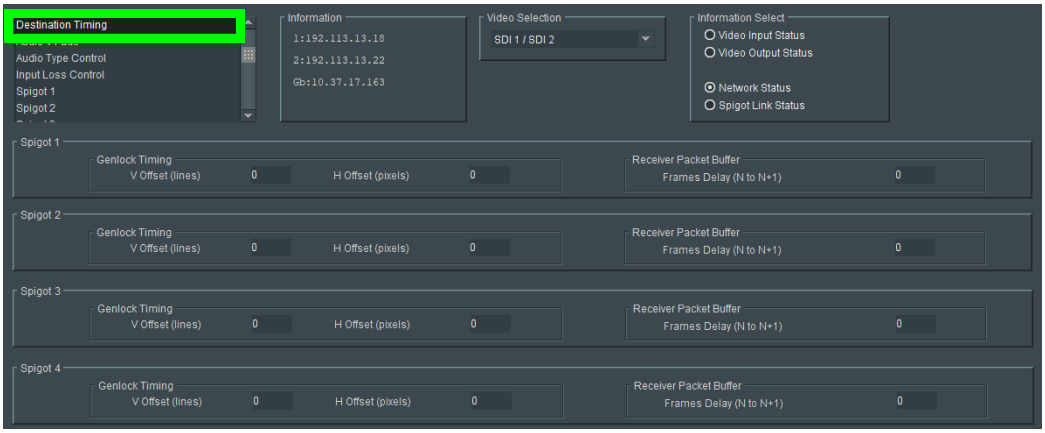


Figure 5 - 19: *Destination Timing Page*

Parameter	Description
Genlock Timing V Offset	Vertical timing offset in lines with respect to the chosen video reference signal. See **Genlock** in Configuration on page 48.
Genlock Timing H Offset	Horizontal timing offset in pixels with respect to the chosen video reference signal. See **Genlock** in Configuration on page 48.
Receiver Packet Buffer Frames Delay	The receiver packet buffer provides additional buffering for a received IP flow. Typically this is required where the IP flow is bursty in nature. However, increasing buffering can affect the time required to switch between IP flows at a spigot, owing to increased switching latency. Adjust as required.

Audio V Fade

The **Audio V Fade** page configures an audio V-fade for each video input IP stream (for example, at receiving or destination spigots). When the video input switches to another source, an audio V-fade can be used to reduce audio disturbances at switch-over. When **Enable** is set, the audio will fade down on input loss and perform an audio V fade (down then up) during input switching.

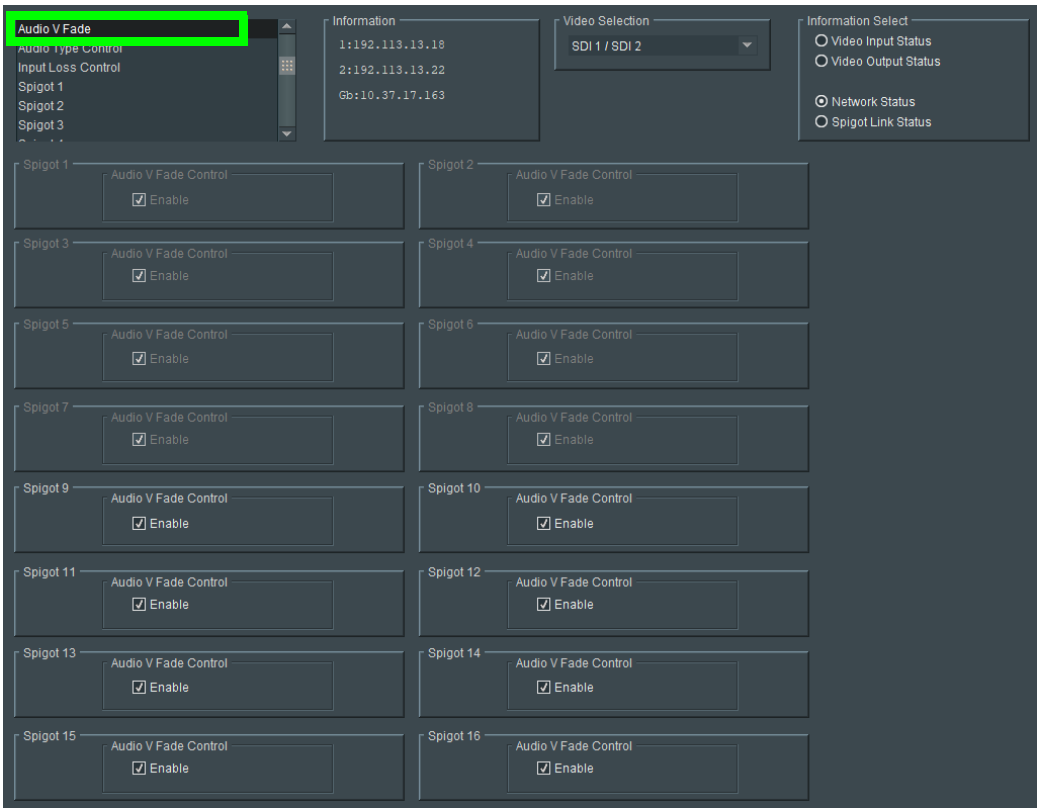


Figure 5 - 20: *Audio V Fade Page*

Audio Type Control

The **Audio Type Control** page allows you to override the audio type bit within the outgoing SDI to mark it non-PCM. Set the check boxes as required.

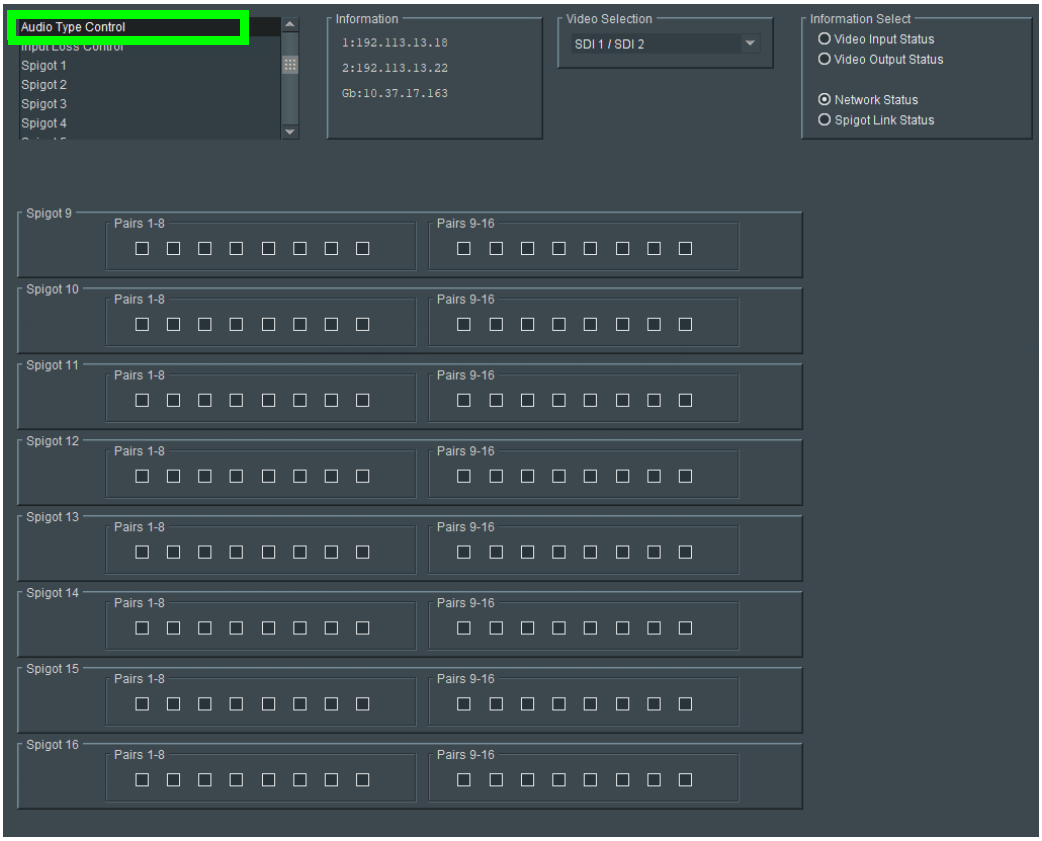


Figure 5 - 21: *Audio Type Control Page*

Input Loss Control

The **Input Loss Control** page allows control of the card's response to signal loss. Select as required.

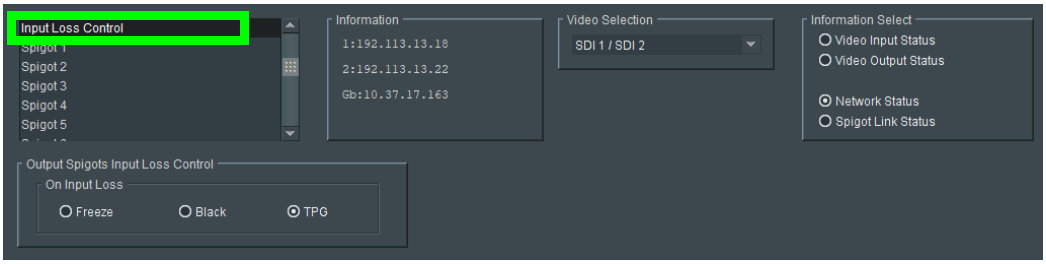


Figure 5 - 22: *Input Loss Control Page*

Options upon signal loss are:

Option	Operation
Freeze	Picture will freeze.
Black	Picture will cut to black.
TPG	Picture will be replaced by a test pattern output, as set on the **Sender TPG** page. See Sender TPG (Test Pattern Generator) on page 53 for more information.

Spigot Pages

A separate page is provided for each of the active spigots. These pages are dynamically configured by the product, based on the capabilities of the software version/firmware selected.

Note: The pages shown here may differ from those seen on your particular system, depending on the model and configuration of your UCP-3901 card.

On the rear panel, see 12G/3G/HD/SD-SDI I/O – Serial digital video inputs / outputs (4) on page 26 and 3G / HD / SD SDI I/O – Serial digital video inputs / outputs (12) on page 26 to know on which BNC input / output each spigot is available.

Input Spigots

Input spigots are defined by selecting the appropriate firmware version on the **Configuration** page. See Configuration on page 48 for more information.

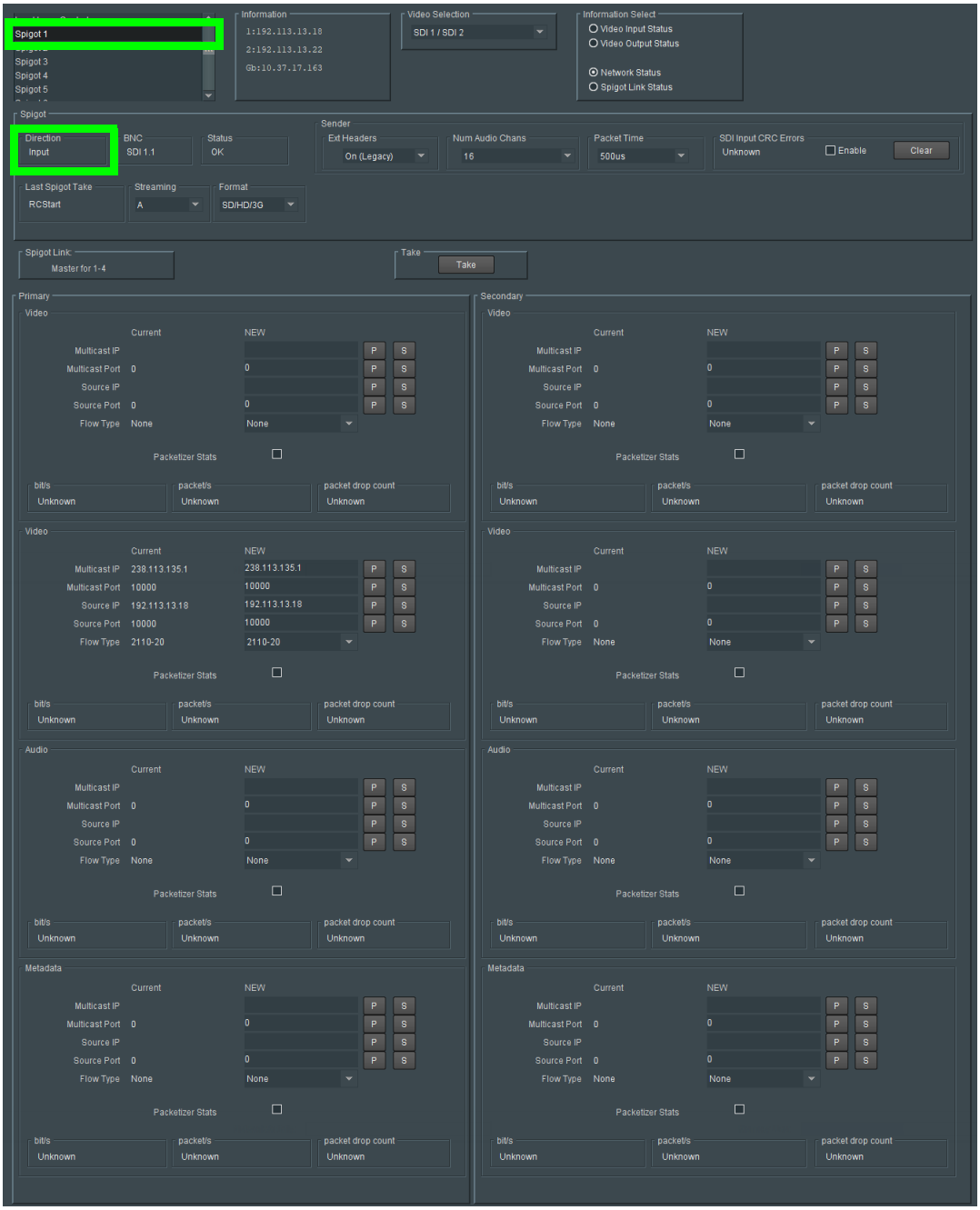


Figure 5 - 23: *Typical Input Spigot Page*

Parameter	Description
Spigot pane	The **Spigot** pane provides basic configuration for the selected Spigot. Click **Take** to apply any changes made in this pane.
Direction	Displays spigot direction. **Input:** This spigot is a sender. **Output:** This spigot is a receiver. See Output Spigots on page 85 for this mode of operation.
BNC	Associated BNC connector on the rear panel. See also 12G/3G/HD/SD-SDI I/O – Serial digital video inputs / outputs (4) on page 26 and 3G / HD / SD SDI I/O – Serial digital video inputs / outputs (12) on page 26.
Status	Current spigot's status. • **OK**: signal good. • **FAIL**: signal not detected. • **WARN: TPG:** a test pattern is being shown.
Last Spigot Take	The last **Take** performed on the spigot and how it was made. • **RC:** RollCall; Operation from a control panel or by an external agent, like VSM. • **IPCtrl:** GV Orbit. • **RCStart:** The module start up itself.
Streaming	Set the redundancy options for this spigot. This will also determine the bandwidth to be used. Options are: • **Dual:** Full redundancy to support SMPTE ST 2022-7, both Primary (**SFP1**) and Secondary (**SFP2**) Ethernet connectors are used. Bandwidth is split between the Primary and Secondary. See Cabling to Support SMPTE ST 2022-7 with a UCP-3901 on page 34. To support redundancy, you must set the **Flow Type** to 2110 for both the primary and secondary ports for the Video, Audio, and Metadata essences. See below. • **Single:** Primary Ethernet connector only (**SFP1**), but with all available bandwidth. • **A:** Primary Ethernet connector only (**SFP1**). • **B:** Secondary Ethernet connector only (**SFP2**). See Rear Panel and Connectors on page 24 for SFP / connector locations.
Format	Select the format to be used on this spigot. This will ensure that the appropriate level of bandwidth is allocated for the stream.

Parameter	Description
Sender / Ext Headers	Extended header operation can be adjusted for TR-03/TR-04 compatibility. Extended headers provide in-band metadata regarding the essence flow and its format, and are applicable to ST-2110 only. If third-party equipment is unable to support this, the functionality can be disabled, or set to On (Legacy), which ensures that the packet format complies with ST2110 but has no video content. Options are: • **Off:** Extended headers are disabled. • **On:** Sends extended headers fully compliant with ST2110-20. • **On (Legacy):** Sends extended headers only, as with previous versions of the card.
Sender / Num Audio Channels	Select the actual number of audio channels present on this spigot. Set the highest number of audio channels expected to be used.
Sender / Packet Time	Select the amount of time required to complete the transmission of each audio packet.
Sender / SDI Input CRC Errors	Enable the check box to display the number of CRC errors. Click **Clear** to reset the counter to zero.
Spigot Link	When inputs are linked together to support an UHD quad link input, this shows the group of 4 input spigots used for this. See Link Control on page 71 to enable UHD inputs. **Master X-Y:** This is a range of spigots that the above settings apply to. **Slaved to X:** This is the spigot on which the above settings come from.
Take	Click to apply any changes made to the above parameters.

Parameter	Description
Primary and Secondary Panes	The **Primary** IP flows pass through one network connection (usually SFP1), while the **Secondary** IP flows pass through another network connection (usually SFP2).
Flow Panes for Video, Audio and Metadata	Displays Video, Audio, and Metadata status, and allows multicast IP and port details to be defined for the selected spigot. IP flow settings may be set through GV Orbit. The **Current** column shows the present value. To manually set the multicast details for the spigot, set the value in the **New** column and click **S** to save the details, or **P** to return to the preset default value. • Enter **Multicast IP** and **Multicast Port** details as required. • Enter the appropriate details in the **Source IP** and **Source Port** fields. Each spigot can support a variety of flows. • Select the required flow type (video standard) from the **Flow Type** drop-down list. To support redundancy (SMPTE ST 2022-7), you must set the **Flow Type** to 2110 for both the primary and secondary ports for the Video, Audio, and Metadata essences and set **Streaming** to **Dual**. To verify that redundancy is working, see Testing if Network Redundancy (SMPTE ST 2022-7) is Working on page 200. **Packetizer Stats:** set to view network statistics for the flow, if required.

To Set Multicast Details

1. Enter IP address and IP port number details in the 'New settings' column, as required. Click **S** or press the enter key to enter each new value.
2. Select the **Flow Type**.
3. Click **Packetizer Stats** to view network statistics for an outgoing flow, if required.
4. Click **Take**.

Output Spigots

Output spigots are defined by selecting the appropriate firmware version on the **Configuration** page. See Configuration on page 48 for more information.

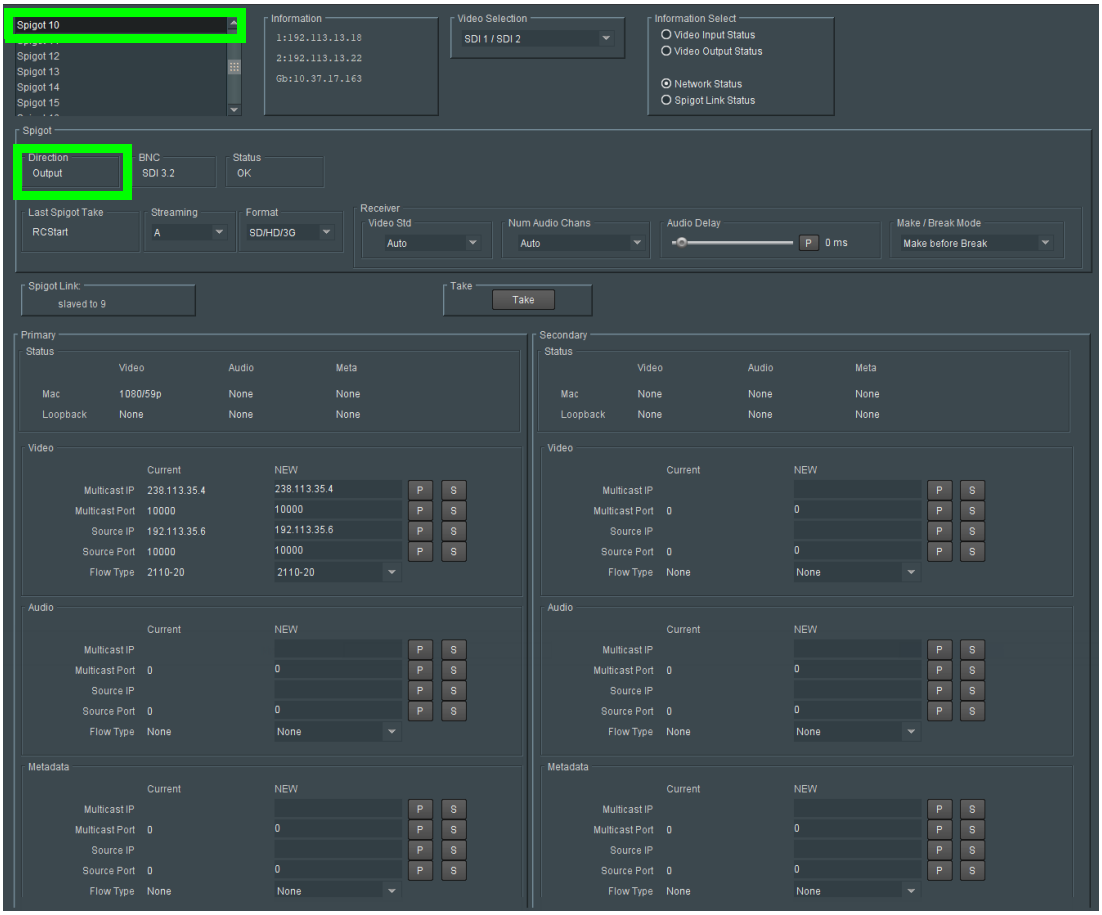


Figure 5 - 24: *Typical Output Spigot Page*

Parameter	Description
Spigot pane	The **Spigot** pane provides basic configuration for the selected Spigot. Click **Take** to apply any changes made in this pane.
Direction	Displays spigot direction. **Input:** This spigot is a sender. See Input Spigots on page 81 for this mode of operation. **Output:** This spigot is a receiver.
BNC	Associated BNC connector on the rear panel. See also 12G/3G/HD/SD-SDI I/O – Serial digital video inputs / outputs (4) on page 26 and 3G / HD / SD SDI I/O – Serial digital video inputs / outputs (12) on page 26.

Parameter	Description
Status	Current spigot's status. • **OK**: signal good. • **FAIL**: signal not detected. • **WARN: TPG:** a test pattern is being shown.
Last Spigot Take	The last **Take** performed on the spigot and how it was made. • **RC:** RollCall; operation from a control panel or by an external agent, like VSM. • **IPCtrl:** GV Orbit. • **RCStart:** The module start up itself.
Streaming	Set the Ethernet connectors to use for this spigot. This will also determine the bandwidth to be used. Options are: • **Dual:** Full redundancy to support SMPTE ST 2022-7, both Primary (**SFP1**) and Secondary (**SFP2**) Ethernet connectors are used. All bandwidth of both Ethernet connectors are used. See Cabling to Support SMPTE ST 2022-7 with a UCP-3901 on page 34. To support redundancy, you must set the **Flow Type** to 2110 for both the primary and secondary ports for the Video, Audio, and Metadata essences. See below. • **Single:** use either Ethernet connector (**SFP1** & **SFP2**), and so half of the available bandwidth. • **A:** Primary (**SFP1**) Ethernet connector only, and so half of the available bandwidth. • **B:** Secondary (**SFP2**) Ethernet connector only, and so half of the available bandwidth. See Rear Panel and Connectors on page 24 for SFP / connector locations.
Format	Select the format to be used on this spigot. This will ensure that the appropriate level of bandwidth is allocated for the stream.
Receiver / Video Std	Select the standard for the incoming video, or set to **Auto** to detect the standard automatically.
Receiver / Num Audio Chans	Select the number of audio channels present on this spigot. Set the highest number of audio channels expected to be used. Auto mode only works if the source stream uses an extended header.
Receiver / Audio Delay	Move the slider to set an **Audio Delay** as required. Click **P** to return to the preset default value.
Receiver / Make/Break Mode	Specifies how changes to an output's destination will be made. **Make before Break:** causes the new destination to buffer data before connection to the previous destination is broken; this results in a smoother transition, but requires more bandwidth. **Break before Make:** simply swaps the output's destination without buffering. Select the required mode from the drop-down list.

Parameter	Description
Spigot Link	When inputs are linked together to support an UHD quad link output, this shows the group of 4 output spigots used for this. See Link Control on page 71 to enable UHD inputs. **Master X-Y:** This is a range of spigots that the above settings apply to. **Slaved to X:** This is the spigot on which the above settings come from.
Take	Click to apply any changes made to the above parameters.
Primary and Secondary Panes	The **Primary** IP flows pass through one network connection (usually SFP1), while the **Secondary** IP flows pass through another network connection (usually SFP2).
Status	The **Status** panel reports the video, audio, and metadata status information for each enabled flow. • **Mac** - IP flow received over IP network. • **Loopback** - IP flow received by the UCP-3901 Card looped-back from the UCP-3901 Card. Loop-back can be achieved by either explicitly setting the UCP-3901 Card to receive a flow from itself, or by using the UCP-3901 Card's loop-back router facility. See Loopback Router on page 114.
Flow Panes for Video, Audio and Metadata	Displays Video, Audio, and Metadata status, and allows multicast IP and port details to be defined for the selected spigot. IP flow settings may be set through GV Orbit. The **Current** column shows the present value. To manually set the multicast details for the spigot, set the value in the **New** column and click S to save the details, or P to return to the preset default value. • Enter **Multicast IP** and **Multicast Port** details as required. • Enter the appropriate details in the **Source IP** and **Source Port** fields. Each spigot can support a variety of flows. • Select the required flow type (video standard) from the **Flow Type** drop-down list. To support redundancy (SMPTE ST 2022-7), you must set the **Flow Type** to 2110 for both the primary and secondary ports for the Video, Audio, and Metadata essences and set **Streaming** to **Dual**. To verify that redundancy is working, see Testing if Network Redundancy (SMPTE ST 2022-7) is Working on page 200. **Packetizer Stats:** set to view network statistics for the flow, if required.

To Set Multicast Details

1 Select the required **Video Std**.

2 Enter IP address and IP port number details in the 'New settings' column, as required. Click **S** or press the enter key to enter each new value.

3 Select the **Flow Type**.

4 Click **Take**.

Logging - Configuration

The **Logging Configuration** page sets the destination logging server, if required.

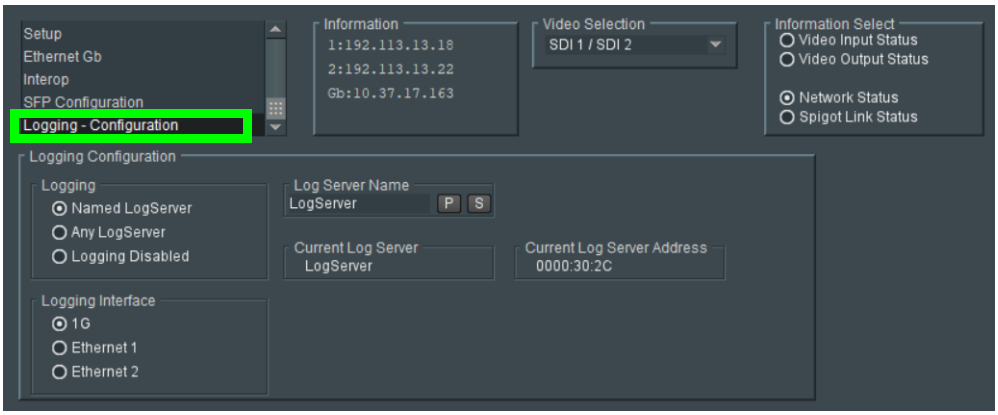


Figure 5 - 25: *Logging Configuration Page*

Parameter	Description
Logging	Set the connection type to the log server. **Named LogServer:** Specify the specific name of the log server to use for logging. **Any LogServer:** Logging is sent to any LogServer that is discovered on the network. **Logging Disabled:** No logging is generated.
Logging Interface	Set the network interface that has network connectivity to the log server. **1G:** The Gb management Ethernet network. **Ethernet 1:** The Ethernet network connected to SFP 1. **Ethernet 2:** The Ethernet network connected to SFP 2. See Rear Panel and Connectors on page 24 for the location of the card's Ethernet ports.
Log Server Name	When **Logging** is set to **Named LogServer**, this sets the name of the log server to use for logging.
Current Log Server	Shows the name of the current log server being used for logging.
Current Log Server Address	The current Rollcall log server's IP address.

Logging Pages

All alarms and operational statuses can be seen from Rollcall Logging pages. These pages provide the live status of the card. Theses statuses are also logged when using a Log Server.

Logging - SDI Info

The **Logging - SDI Info** page shows SDI log message types: Log field names and current log values are listed. Information on various parameters can be made available to a logging device connected to the RollCall network. The information below describes the various parameters available for logging. Logging must be configured and enabled; see Logging - Configuration on page 88.

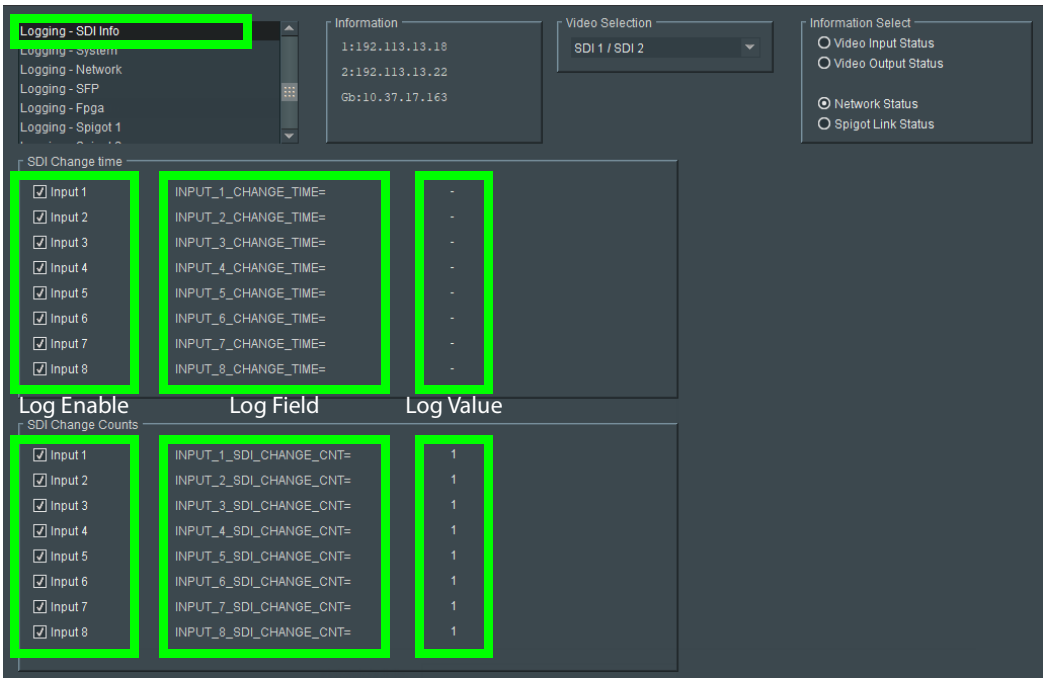


Figure 5 - 26: *Logging SDI Info Page*

Logging Page Column	Description
SDI Change Time pane	Logs the time at which the SDI input changed.
SDI Change Counts pane	Logs number of times that the SDI input has changed.

The logging page comprises three columns:

Logging Page Column	Description
Log Enable	Select the check boxes that correspond to the parameters for which log information should be collected.
Log Field	Displays the name of the logging field. **INPUT_N_CHANGE_TIME=:** Logs the time at which the SDI input changed. **INPUT_N_SDI_CHANGE_CNT=:** Logs number of times that the SDI input has changed. Where **N** is the input number. To identify SFP 1 / 2, see Rear Panel and Connectors on page 24.
Log Value	Displays the current log value.

Logging - System

The **Logging System** page shows system message types: Log field names and log values are listed in the *Log Field* and *Log Value* columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network. Logging must be configured and enabled; see Logging - Configuration on page 88.

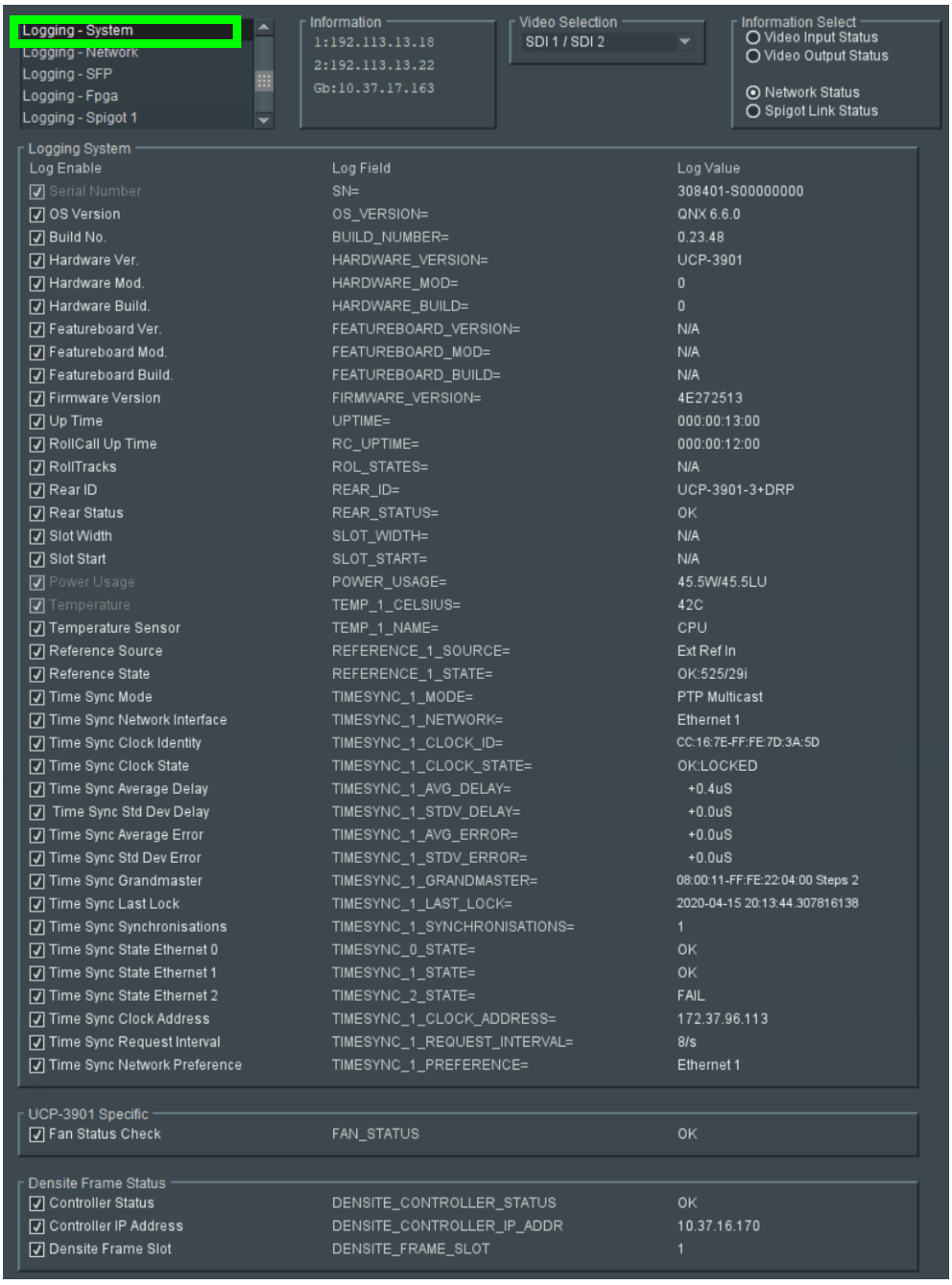


Figure 5 - 27: *Logging - System Page*

The logging page comprises three columns:

Logging Page Column	Description
Log Enable	Select the check boxes that correspond to the parameters for which log information should be collected.
Log Field	Displays the name of the logging field.
Log Value	Displays the current log value.

Enable check boxes to activate log fields as required.

Log Field Parameter	Description
SN=	Logs the card serial number, which consists of an *S* followed by eight digits. **Note**: this cannot be deselected.
OS_VERSION=	Logs the operating system name and version.
BUILD_NUMBER=	Logs the build number.
HARDWARE_VERSION=	Logs the hardware version number.
HARDWARE_MOD=	Logs the hardware modification number.
HARDWARE_BUILD=	Logs the hardware build number.
FEATUREBOARD_VERSION=	Not applicable. Logs the rear card daughter board version number.
FEATUREBOARD_MOD=	Not applicable. Logs the rear card daughter board modification number.
FEATUREBOARD_BUILD=	Not applicable. Logs the rear card daughter board build number.
FIRMWARE_VERSION=	Logs the FPGA version number.
UPTIME=	Logs the time since the last restart in the format *ddd:hh:mm:ss*.
RC_UPTIME=	Logs time RollCall has been up in the format *ddd:hh:mm:ss*.
ROL_STATES=	Logs the RollCall status. Valid values are: • **OK** • **FAIL:n** where *n* is the RollTrack index or indexes which are failing • **Disabled**
REAR_ID=	Logs the model number of the currently installed rear panel.
REAR_STATUS=	Logs the status of the rear panel when this can be determined.
SLOT_WIDTH=	Logs the slot width. UCP-3901 cards are available in single and triple width.

Log Field Parameter	Description
SLOT_START=	Logs the slot in the rack where the card is located.
POWER_USAGE=	Logs the power usage in watts and PR Units. **Note**: this cannot be deselected.
TEMP_*N*_CELSIUS=	Logs the temperature status of the FPGA in Celcius. **Note**: this cannot be deselected.
TEMP_*N*_NAME=	Logs the Temperature measurement name.
REFERENCE_*N*_SOURCE=	Logs the time reference source.
REFERENCE_*N*_STATE=	Logs the time reference value. Valid values are: • **OK:Locked** • **OK:Input** • **WARN:Freerun** • **WARN:CrossLock**
TIMESYNC_*N*_MODE=	Logs the time sync mode value. Valid values are: • **Free running**: Card is using its own clock with no reference to any other source. • **PTP Multicast**: Card is synchronizing to a PTP grandmaster clock using multicast network messages. • **PTP Unicast**: As PTP Multicast but using the delay request. Reply messages are unicast to minimize network traffic. • **NTP**: Card clock is synchronized to an NTP clock. Generally less precise than PTP.
TIMESYNC_*N*_NETWORK=	Logs the network port currently being used for synchronization for UCP-3901 cards, dependent on the choice of interfaces made on the Time Configuration page. If PTP and multiple interfaces are enabled, the PTP synchronization will switch ports if it doesn't see regular sync messages on the port.
TIMESYNC_*N*_CLOCK_ID=	Logs the identification number of PTP clock being used for synchronization. This is not necessarily the grandmaster clock identity, as there can be intermediate clocks between the grandmaster and the card, depending on network configuration.
TIMESYNC_*N*_CLOCK_STATE=	Logs the time sync value. Valid values are: • **Free running**: Card is not being synchronized. • **No Lock**: PTP being used but clocks haven't synchronized within +/- 1mS. • **Locked**: PTP being used and clocks are within the accepted range. • **NTP**: Card using NTP to synchronize.

Log Field Parameter	Description
TIMESYNC_*N*_AVG_DELAY=	Logs the current network delay time between the card and the clock sending the synchronization messages. This should be relatively constant and is dependent on network configuration.
TIMESYNC_*N*_STDV_DELAY=	Logs the current standard deviation in the network delay time between the card and the clock sending the synchronization messages. Should be a low number as the network delay is expected to be constant.
TIMESYNC_*N*_AVG_ERROR=	Logs the current difference between the cards time and the grandmaster time. Should be close to zero once card has synchronized.
TIMESYNC_*N*_STDV_ERROR=	Logs the standard deviation in the average error.
TIMESYNC_*N*_GRANDMASTER=	Logs the identity of network clock acting as PTP grandmaster. This is the source of the PTP synchronization messages used by all PTP slave clocks on the network. If there are multiple grandmasters, they should negotiate between themselves to identify the most accurate and then silence the others.
TIMESYNC_*N*_LAST_LOCK=	Logs the time when the card last changed from not locked to locked. Ideally this will be a few seconds after the card has powered up. This allows you to confirm which clock the card has synchronized to.
TIMESYNC_*N*_SYNCHRONISATIONS=	Logs the number of times the card has synchronized since it was powered up. Ideally this will be a low number, as cards are expected to synchronize and stay synchronized. Large numbers indicate possible problems with the network or grandmaster clock.
TIMESYNC_N_STATE=	When card is synchronized to a network PTP grandmaster clock, this shows the connection state: **OK** or **FAIL**
TIMESYNC_N_CLOCK_ADDRESS=	When card is synchronized to a network PTP grandmaster clock, this shows the PTP grandmaster clock's IP address.
TIMESYNC_N_REQUEST_INTERVAL=	When card is synchronized to a network PTP grandmaster clock, this shows the interval between PTP message.
TIMESYNC_N_REFERENCE=	When card is synchronized to a network PTP grandmaster clock, this shows which Ethernet port is being used to receive the PTP clock source.

Log Field Parameter	Description
FAN_STATUS	Logs the card's cooling fan health. • **OK:** The card's fan is operating normally. • **FAIL:** The card's fan is not spinning, or is spinning too slowly, or the fan cable is disconnected. Urgent maintenance procedures must be considered: If this alarm has been raised, the fan on the UCP-3901 card may have to be replaced. See Cooling Fan Operational Assessment on page 193.
DENSITE_CONTROLLER_STATUS	Reports the connection status of the Densité frame's controller card to the UCP-3901 card. **OK:** The UCP-3901 card has successfully connected to the Densité frame's controller. **Not Connected:** The UCP-3901 card did not connect to the Densité frame's controller or the UCP-3901 card has lost connection to the Densité frame's controller.
DENSITE_CONTROLLER_IP_ADDR	Reports the IP Address of the Densité frame's controller card. If the IP address is 0.0.0.0, then the UCP-3901 card has not yet received the IP address from the frame's controller.
DENSITE_FRAME_SLOT	This is the slot number in which the UCP-3901 card is located within the Densité Frame.

Where N is the input or Ethernet port number. To identify SFP 1 / 2, see Rear Panel and Connectors on page 24.

Logging - Network

The **Logging Network** page shows MEDIA network message types: Log field names and current log values are listed in the *Log Field* and *Log Value* columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network. Logging must be configured and enabled; see Logging - Configuration on page 88.

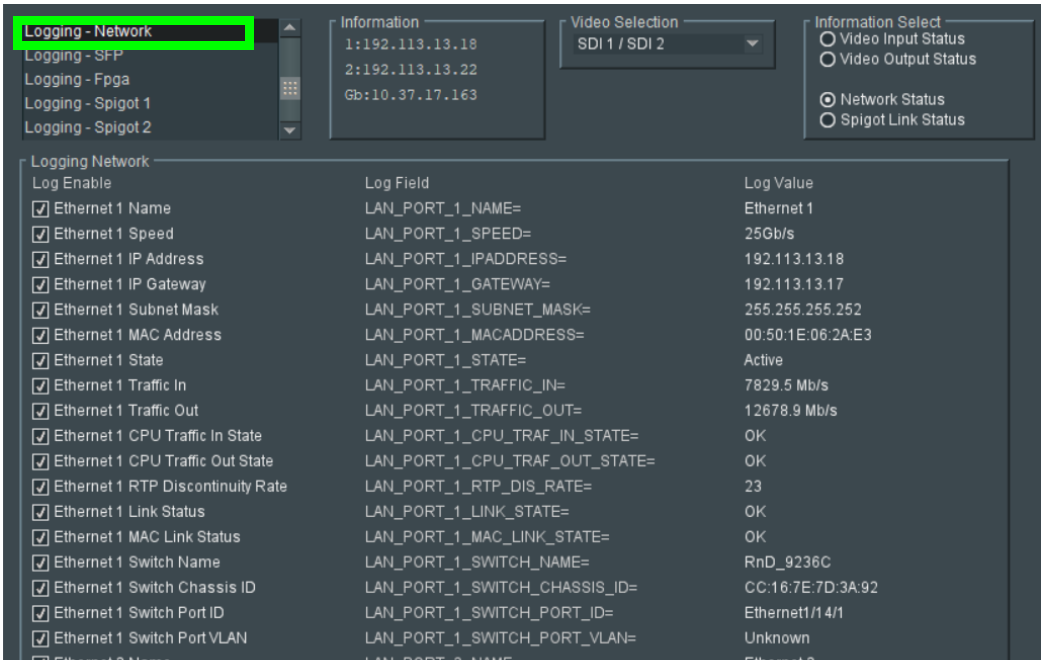


Figure 5 - 28: *Logging - Network Page*

The logging page comprises three columns:

Logging Page Column	Description
Log Enable	Select the check boxes that correspond to the parameters for which log information should be collected.
Log Field	Displays the name of the logging field.
Log Value	Displays the current log value.

Enable check boxes to activate log fields as required.

Parameter	Description
LAN_PORT_*N*_NAME=	Logs the Ethernet port name.
LAN_PORT_*N*_SPEED=	Logs the Ethernet connection speed. Valid values are: • **10 Mbit/s Full Duplex** • **10 Mbit/s Half Duplex** • **100 Mbit/s Full Duplex** • **100 Mbit/s Half Duplex** • **1 Gbit/s Full Duplex** • **25 Gbit/s** • **No Link**
LAN_PORT_*N*_IPADDRESS=	Logs the Ethernet port IP address.
LAN_PORT_*N*_GATEWAY=	Logs the network gateway IP address.
LAN_PORT_*N*_SUBNET_MASK=	Logs the IP network's subnet mask.
LAN_PORT_*N*_MACADDRESS=	Logs the Ethernet port MAC address.
LAN_PORT_*N*_STATE=	Logs the Ethernet connection state. Valid values are: • **Active** • **WARN:Inactive**
LAN_PORT_*N*_TRAFFIC_IN=	Logs speed of traffic received by the Ethernet port. Values are reported in kbps, Mbps or Gbps, as appropriate.
LAN_PORT_*N*_TRAFFIC_OUT=	Logs speed of traffic transmitted by the Ethernet port. Values are reported in Kbps, Mbps or Gbps, as appropriate.
LAN_PORT_*N*_CPU_TRAF_IN_STATE=	Logs whether the flow of data into the CPU is satisfactory. Valid values are: • **OK** • **WARN:LOW DATA** • **FAIL**
LAN_PORT_*N*_CPU_TRAF_OUT_STATE=	Logs whether the flow of data out of the CPU is satisfactory. Valid values are: • **OK** • **WARN:LOW DATA** • **FAIL**
LAN_PORT_*N*_RTP_DIS_RATE=	Logs RTP discontinuity rate for the Ethernet port.

Parameter	Description
LAN_PORT_*N*_LINK_STATE=	Logs the Ethernet link state. Valid values are: • **OK** • **WARN:DOWN**
LAN_PORT_*N*_MAC_LINK_STATE=	Logs state of the card's FPGA Ethernet link. Valid values are: • **UP** • **DOWN**
LAN_PORT_*N*_SWITCH_NAME=	Logs name of the network switch that the card is connected to.
LAN_PORT_*N*_SWITCH_CHASSIS_ID=	Logs name of the network switch's chassis ID that the card is connected to.
LAN_PORT_*N*_SWITCH_PORT_ID=	Logs Port ID of the network switch the card is connected to.
LAN_PORT_*N*_SWITCH_PORT_VLAN=	Logs name of the VLAN that the card is connected to.

Where N is the input or Ethernet port number. To identify SFP 1 / 2, see *Rear Panel and Connectors* on page 24.

Logging - Network - 1G

The **Logging Network** page shows MANAGEMENT network message types: Log field names and current log values are listed in the *Log Field* and *Log Value* columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network. Logging must be configured and enabled; see Logging - Configuration on page 88.

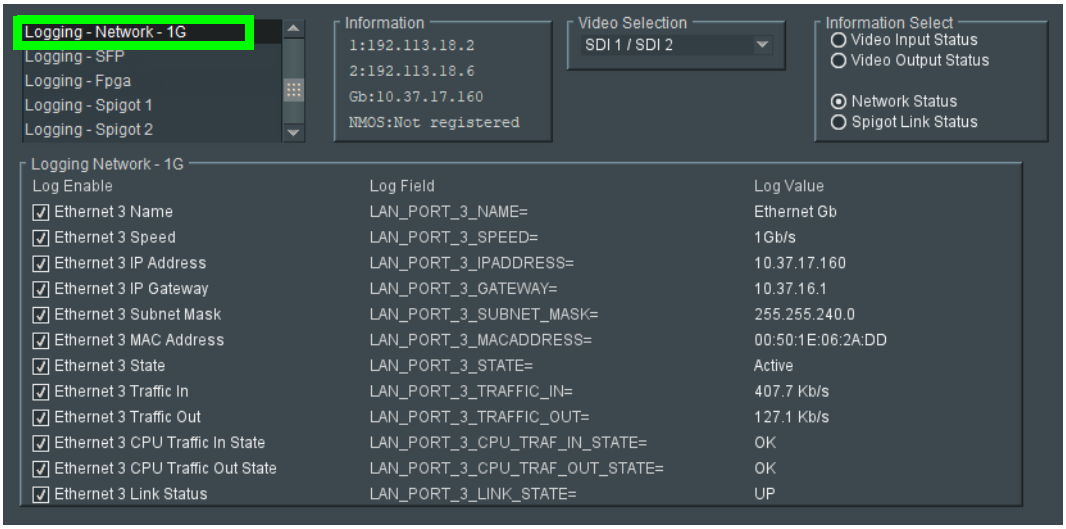


Figure 5 - 29: *Logging - Network Page*

The logging page comprises three columns:

Logging Page Column	Description
Log Enable	Select the check boxes that correspond to the parameters for which log information should be collected.
Log Field	Displays the name of the logging field.
Log Value	Displays the current log value.

Enable check boxes to activate log fields as required.

Parameter	Description
LAN_PORT_3_NAME=	Logs the Ethernet port name.
LAN_PORT_3_SPEED=	Logs the Ethernet connection speed. Valid values are: • **10 Mbit/s Full Duplex** • **10 Mbit/s Half Duplex** • **100 Mbit/s Full Duplex** • **100 Mbit/s Half Duplex** • **1 Gbit/s Full Duplex** • **No Link**

Parameter	Description
LAN_PORT_3_IPADDRESS=	Logs the Ethernet port IP address.
LAN_PORT_3_GATEWAY=	Logs the network gateway IP address.
LAN_PORT_3_SUBNET_MASK=	Logs the IP network's subnet mask.
LAN_PORT_3_MACADDRESS=	Logs the Ethernet port MAC address.
LAN_PORT_3_STATE=	Logs the Ethernet connection state. Valid values are: • **Active** • **WARN:Inactive**
LAN_PORT_3_TRAFFIC_IN=	Logs speed of traffic received by the Ethernet port. Values are reported in kbps, Mbps or Gbps, as appropriate.
LAN_PORT_3_TRAFFIC_OUT=	Logs speed of traffic transmitted by the Ethernet port. Values are reported in Kbps, Mbps or Gbps, as appropriate.
LAN_PORT_3_CPU_TRAF_IN_STATE=	Logs whether the flow of data into the CPU is satisfactory. Valid values are: • **OK** • **WARN:LOW DATA** • **FAIL**
LAN_PORT_3_CPU_TRAF_OUT_STATE=	Logs whether the flow of data out of the CPU is satisfactory. Valid values are: • **OK** • **WARN:LOW DATA** • **FAIL**
LAN_PORT_3_LINK_STATE=	Logs the Ethernet link state. Valid values are: • **OK** • **WARN:DOWN**

Logging - SFP

The **Logging SFP** page shows SFP message types relating to fitted SFP modules: Log field names and current log values are listed in the *Log Field* and *Log Value* columns respectively. Information on several parameters can be made available to a logging device connected to the RollCall network. Logging must be configured and enabled; see Logging - Configuration on page 88.

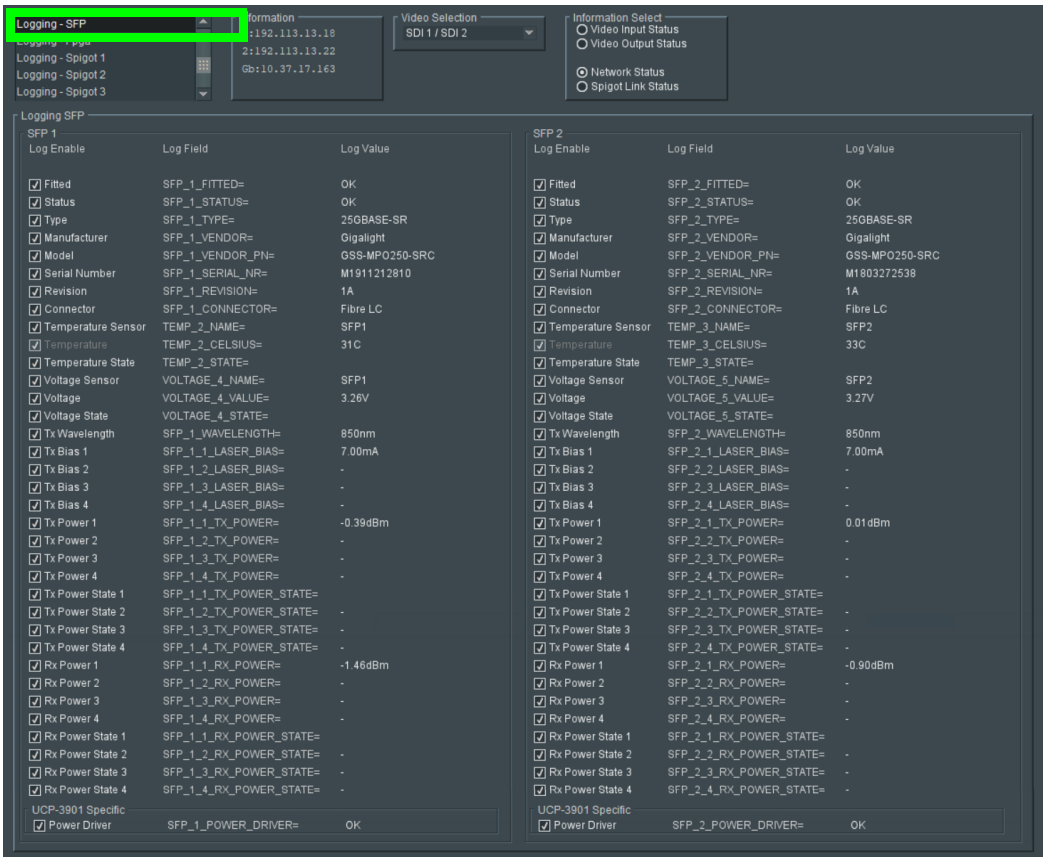


Figure 5 - 30: *Logging - SFP Page*

The logging page comprises three columns for each SFP:

Logging Page Column	Description
Log Enable	Select the check boxes that correspond to the parameters for which log information should be collected.
Log Field	Displays the name of the logging field.
Log Value	Displays the current log value.

Enable check boxes to activate log fields as required.

Parameter	Description
SFP_*N*_FITTED=	Logs presence of (Q)SFP. Valid values are: • **OK** • **Missing**
SFP_*N*_STATUS=	Logs status reported by the (Q)SFP. Valid values are: SFPs • **OK** • **WARN:Temp** • **WARN:VCC** • **WARN:TX BIAS** • **WARN:RX BIAS** • **WARN:Laser** • **WARN:TEC Curr** • **FAIL:SFP Not Ready** • **FAIL:RX LOS - RX Failure** • **FAIL:TX Fault - TX Failure** • **FAIL:RX LOL - RX Loss of Lock** • **FAIL:TX LOL - TX Loss of Lock**

Parameter	Description
SFP_*N*_STATUS= (continued)	QSFPs • **OK** • **WARN:Temp** • **WARN:VCC** • **WARN:RX PWR LO** • **WARN:RX PWR HI** • **WARN:TX PWR LO** • **WARN:TX PWR HI** • **FAIL:SFP Not Ready** • **FAIL:RX LOS - RX Failure** • **FAIL:TX LOS - TX Failure** • **FAIL:EQ Fault - EQ Failure** • **FAIL:RX LOL - RX Loss of Lock** • **FAIL:TX LOL - TX Loss of Lock** • **FAIL:Temp** • **FAIL:VCC** • **FAIL:RX PWR LO** • **FAIL:RX PWR HI** • **FAIL:TX BIAS LO** • **FAIL:TX BIAS HI** • **TX PWR LO** • **TX PWR HI**
SFP_*N*_TYPE=	Logs (Q)SFP identifier from device.
SFP_*N*_VENDOR=	Logs (Q)SFP manufacturer from device.
SFP_*N*_VENDOR_PN=	Logs (Q)SFP model number from device.
SFP_*N*_SERIAL_NR=	Logs the card serial number, which consists of an S followed by eight digits.
SFP_*N*_REVISION=	Logs manufacturer revision number.
SFP_*N*_CONNECTOR=	Logs connector type.
TEMP_*N*_NAME=	Logs temperature sensor name.
TEMP_*N*_CELSIUS=	Logs current temperature sensor reading.

Parameter	Description
TEMP_*N*_STATE=	Logs temperature sensor state. Valid values are: • **WARN:Disabled** - Temperature sensor disabled. • **WARN:Low** - Low, but in tolerance. • **WARN:High** - High, but in tolerance. • **OK** • **FAIL:Low** - Low and out of tolerance. • **FAIL:High** - High and out of tolerance.
VOLTAGE_*N*_NAME=	Logs voltage sensor name.
VOLTAGE_*N*_VALUE=	Logs current voltage reading.
VOLTAGE_*N*_STATE=	Logs temperature sensor state. Valid values are: • **OK** • **WARN:Low** - Low, but in tolerance. • **WARN:High** - High, but in tolerance.
SFP_*N*_WAVELENGTH=	Logs transmit wavelength in nm.
SFP_*N*_*X*_LASER_BIAS=	Logs bias level in mA.
SFP_*N*_*X*_TX_POWER=	Logs transmit power level in dBm.
SFP_*N*_*X*_TX_POWER_STATE=	Logs transmit power level. Valid values are: • **OK** • **WARN:Low** - Low, but in tolerance. • **WARN:High** - High, but in tolerance. • **FAIL:Low** - Low and out of tolerance. • **FAIL:High** - High and out of tolerance.
SFP_*N*_*X*_RX_POWER=	Logs receive power level in dBm.
SFP_*N*_*X*_RX_POWER_STATE=	Logs receive power level. Valid values are: • **OK** • **WARN:Low** - Low, but in tolerance. • **WARN:High** - High, but in tolerance. • **FAIL:Low** - Low and out of tolerance. • **FAIL:High** - High and out of tolerance.
SFP_N_POWER_DRIVER=	Power supply to the SFP is **OK** or **FAIL**.

Where N is the input/(Q)SFP number and X is the lane. To identify SFP 1 / 2, see Rear Panel and Connectors on page 24.

Logging - FPGA

The **Logging FPGA** page shows FPGA messages reporting temperature and voltages for an FPGA device on the UCP-3901 Card. Information on several parameters can be made available to a logging device connected to the RollCall network. Logging must be configured and enabled; see Logging - Configuration on page 88.

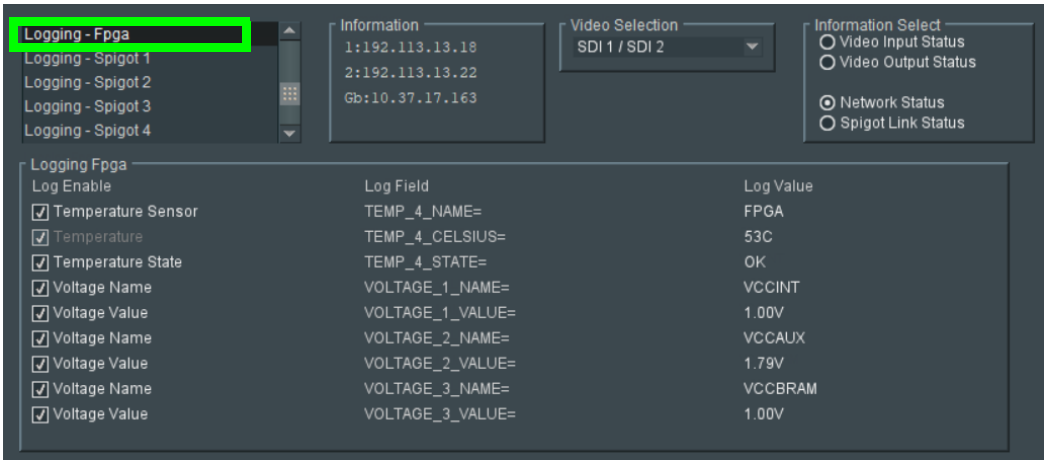


Figure 5 - 31: *Logging - FPGA Page*

The logging page comprises three columns:

Logging Page Column	Description
Log Enable	Select the check boxes that correspond to the parameters for which log information should be collected.
Log Field	Displays the name of the logging field.
Log Value	Displays the current log value.

Enable check boxes to activate log fields as required.

Parameter	Description
TEMP_*N*_NAME=	Reports temperature sensor name.
TEMP_*N*_CELSIUS=	Reports current temperature sensor reading.
TEMP_N_STATE=	FPGA temperature: **OK** or **FAIL**.
VOLTAGE_*N*_NAME=	Voltage sensor name.
VOLTAGE_*N*_VALUE=	Reports current voltage reading.

Where N is the input number.

Logging - Spigot 1 to n

The **Logging - Spigot** pages are used to select the fields to be enabled for each available spigot. Depending on whether the spigot is an input or an output, the appropriate log fields are shown. Logging must be configured and enabled; see Logging - Configuration on page 88.

An additional field is provided for you to optionally specify a name for the input/output.

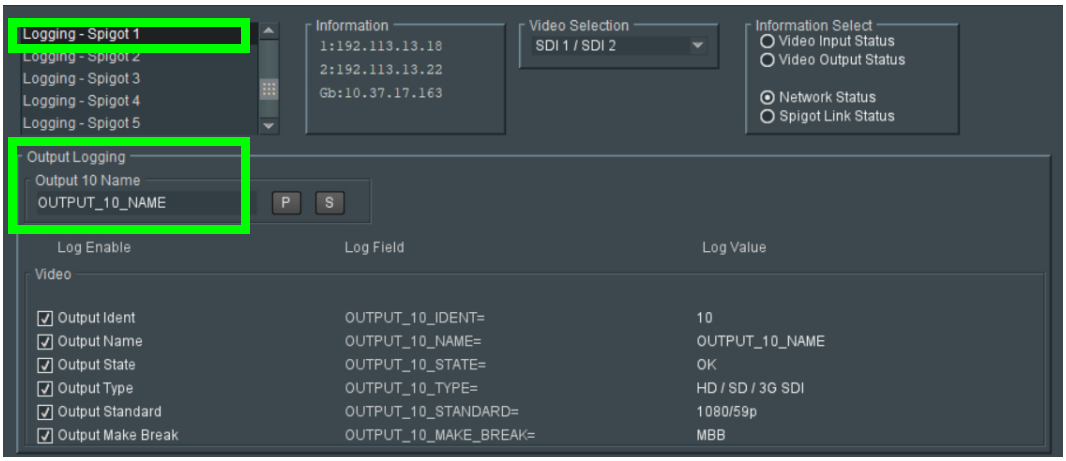


Figure 5 - 32: *Input Spigot Logging Page*

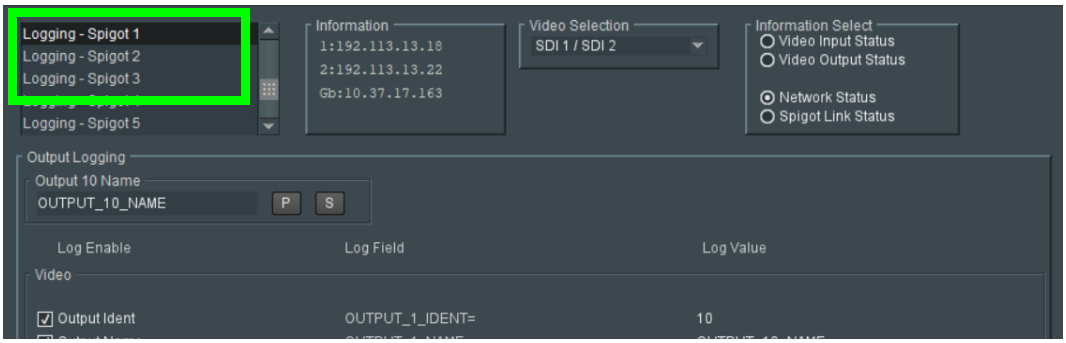


Figure 5 - 33: *Output Spigot Logging Page*

The logging page comprises three columns:

Logging Page Column	Description
Log Enable	Select the check boxes that correspond to the parameters for which log information should be collected.
Log Field	Displays the name of the logging field.
Log Value	Displays the current log value.

Enable check boxes to activate log fields as required.

Parameter	Description
INPUT_*N*_IDENT=	System-defined identifier for the input, based on the rear ID.
INPUT_*N*_NAME=	Name of the input, as defined on the **Setup** page. See Setup on page 115.
INPUT_*N*_STATE=	Valid values are: • **OK**: input signal good. • **FAIL**: input signal not detected.
INPUT_*N*_TYPE=	HD/SD/3G SDI
INPUT_*N*_STANDARD=	PAL/NTSC/625 Mono/525 Mono
INPUT_N_STEAM=	Status of the spigot streaming mode: **DUAL**, **SINGLE**, **A** or **B**. See Input Spigots on page 81 and Output Spigots on page 85.
OUTPUT_*N*_IDENT=	Name of the output as shown on the rear panel. See 12G/3G/HD/SD-SDI I/O – Serial digital video inputs / outputs (4) on page 26 and 3G / HD / SD SDI I/O – Serial digital video inputs / outputs (12) on page 26.
OUTPUT_*N*_NAME=	Name of the output that you have defined.
OUTPUT_*N*_STATE=	Valid values are: • **OK**: output signal good. • **FAIL**: output signal not detected. • **WARN:Freeze** • **WARN: Pattern** • **WARN:Black**
OUTPUT_*N*_TYPE=	Valid values are: • **SD SDI** • **HD SDI** • **HD/SD/3G SDI**
OUTPUT_*N*_STANDARD	PAL/NTSC/625 Mono/525 Mono
OUTPUT_*N*_MAKE_BREAK	Logs how changes to an output's destination will be made. • **MBB**: Make before Break causes the new destination to buffer data before connection to the previous destination is broken; this results in a smoother transition, but requires more bandwidth. • **BBM:** Break before Make simply swaps the output's destination without buffering.

Where N is the input/output number.

Logging - NMOS

The **Logging - NMOS** pages are used to select the fields to be logged for the card's NMOS connection to the registry. Information on several parameters can be made available to a logging device connected to the RollCall network. Logging must be configured and enabled; see Logging - Configuration on page 88.

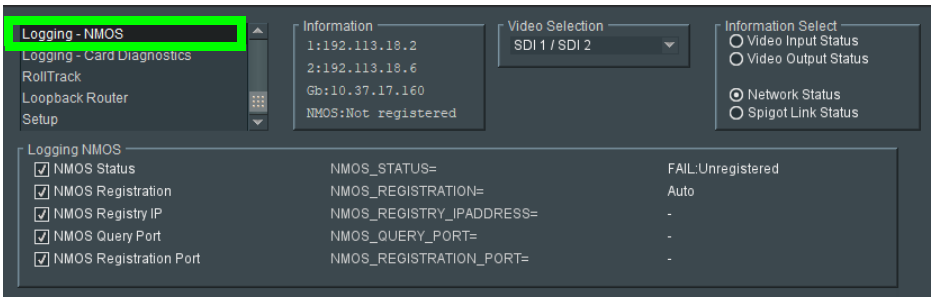


Fig. 5-34: Logging - NMOS Page

The logging page comprises three columns:

Logging Page Column	Description
Log Enable	Select the check boxes that correspond to the parameters for which log information should be collected.
Log Field	Displays the name of the logging field.
Log Value	Displays the current log value.

Parameter	Description
NMOS_STATUS=	Displays the current NMOS status. Valid values are: • **OK:Off** - NMOS functionality is disabled. • **OK:Registered** - the module has been successfully added to the NMOS registry. • **WARN:Registering** - the module is currently being registered. • **FAIL**:**Unregistered** - the registration process has failed.
NMOS_REGISTRATION=	The current UCP-3901's NMOS registry connection mode: **Auto:** automatic discovery of the NMOS registry using DNS Service Discovery (DNS-SD), as described in AMWA IS-04 NMOS Discovery and Registration Specification v1.2. **Static:** manually specified NMOS registry values for address, registration port and query port. See NMOS on page 58 for information on these settings.
NMOS_REGISTRY_IPADDRESS=	The current NMOS registry's IP Address being used to connect to the NMOS registry.

Parameter	Description
NMOS_QUERY_PORT=	The current port number being used to connect to the NMOS registry for making queries.
NMOS_REGISTRATION_PORT=	The current port number being used to connect to the NMOS registry for making device registrations.

Logging - Card Diagnostics

The **Logging Card Diagnostics** page is used to view log fields of the UCP-3901 Card and select those log fields to be enabled. Information on several parameters can be made available to a logging device connected to the RollCall network. Logging must be configured and enabled; see Logging - Configuration on page 88.

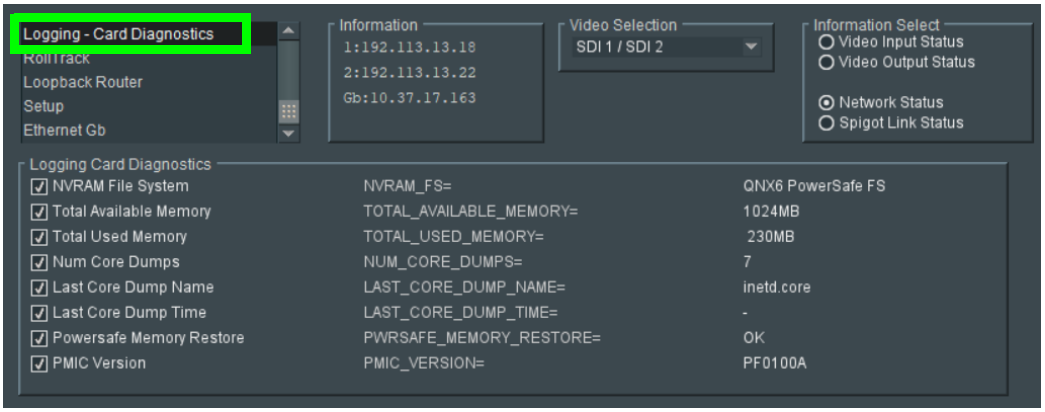


Figure 5 - 35: *Logging - Card Diagnostics Page*

The logging page comprises three columns:

Logging Page Column	Description
Log Enable	Select the check boxes that correspond to the parameters for which log information should be collected.
Log Field	Displays the name of the logging field.
Log Value	Displays the current log value.

Enable check boxes to activate log fields as required.

Parameter	Description
NVRAM_FS=	Logs whether the installed file system is QNX6 PowerSafe or FAT32.
TOTAL_AVAILABLE_MEMORY=	Logs total amount of CPU memory available to the card, in bytes.
TOTAL_USED_MEMORY=	Logs amount of CPU memory used by the card, in bytes.
NUM_CORE_DUMPS=	Logs number of times a core dump has been performed as a result of an application crash.
LAST_CORE_DUMP_NAME=	Logs name of last application to crash.
LAST_CORE_DUMP_TIME=	Logs time of last core dump performed as a result of an application crash.

Parameter	Description
PWRSAFE_MEMORY_RESTORE=	Logs where system memory was restored from. Valid values are: • **FAT32** - restored from FAT32. • **OK** - restored from QNX6 PowerSafe. • **FAIL** - memory restoration failed.
PMIC_VERSION=	Logs name of the on-board power management chip.

RollTrack

The **RollTrack** page sets up RollTrack setting for the UCP-3901 Card to allow information to be sent, through the RollCall network, to other compatible units connected on the same network.

The **Source** window lists the RollTrack sources:

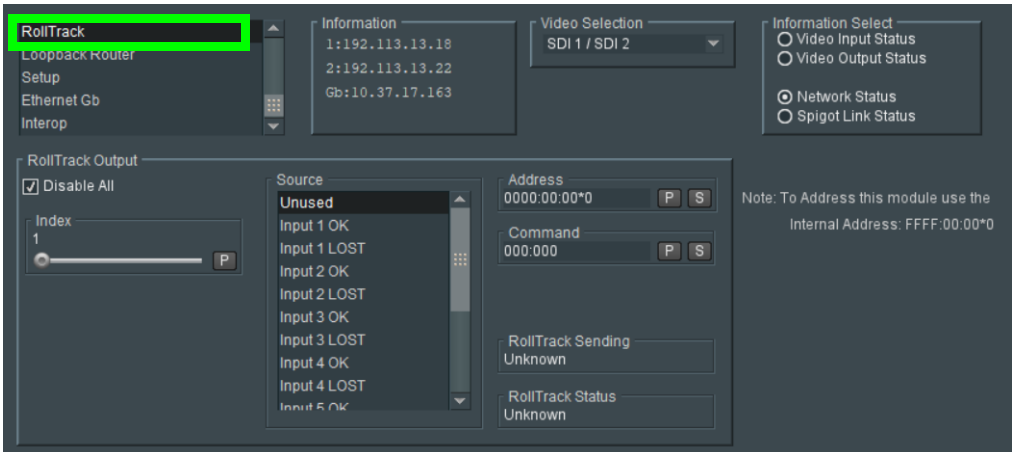


Figure 5 - 36: *Source Pane*

Parameter	Description
Disable All	When checked, all RollTrack items are disabled.
Index	This slider allows up to 32 distinct RollTrack outputs to be set up. Dragging the slider selects the RollTrack Index number, displayed below the slider. Clicking **P** selects the default preset value.
Source	The source of information that triggers transmission of data is selected with this control. Dragging the slider selects the RollTrack source, displayed below the slider. Clicking **P** selects the default preset value. When no source is selected, **Unused** is displayed. • **Unused:** No RollTracks sent. • **Input N OK:** Input N is good. • **Input N LOST:** Input N is bad. *Where N is the input number.*

Parameter	Description
Address	Enter the destination RollCall address for the selected RollTrack Output **Index**. The address may be changed by typing the new destination into the text field, then clicking S to save the selection. Clicking P returns to the default preset destination. The RollTrack address consists of four sets of numbers, for example, **0000:10:01*99**: • The first set, **0000**, is the network segment code number. • The second set, **10**, is the number identifying the (enclosure/mainframe) unit. • The third set, **01**, is the slot number in the unit. • The fourth set, **99**, is a unique identifier number that you define for the destination unit in a multi-unit system. This ensures only the correct unit will respond to the command. If left at **00**, an incorrectly fitted unit may respond inappropriately.
Command	This item enables a command to be sent to the selected destination unit. Enter the RollCall command (RollCall command number and command value) for the selected RollTrack Output **Index** destination. The command may be changed by typing a code in to the text field, and then selecting S to save the selection. Clicking P returns to the default preset command. A RollTrack command consists of two sets of numbers, for example: **84:156**: The first number, **84**, is the actual RollTrack command. The second number, **156**, is the value sent with the RollTrack command.
Sending	A message is displayed here when the unit is actively sending a RollTrack command. Possible messages are: • **String:** A string value is beingsent. • **Number:** A number value is beingsent. • **No:** The message is not being sent. • **Yes:** The message is being sent.
Status	A message is displayed here to indicate the status of the currently selected RollTrack index. Possible RollTrack Status messages are: **OK:** RollTrack message was sent and received successfully. **Unknown:** RollTrack message has been sent but transmission has not yet completed. **Timeout:** RollTrack message has been sent but acknowledgment not received. This could be because the destination unit is not at the location specified. **Error:** RollCall error. **Bad:** Broken RollCall packet. **Disabled:** RollTrack sending is disabled.

Loopback Router

The **Loopback Router** page is used to control a basic, internal 'IP routing' facility, which will loop IP flows from source spigots back into destination spigots. This is not used in normal operation. looped-back flows are not transmitted externally: The loop-back routing is all local to the UCP-3901 Card.

Figure 5 - 37: *Loopback Router Page*

To use the Loopback Router:

1. Use the matrix radio buttons to specify which inputs should be routed to which outputs.
2. Select the **Video Flow to Use** - SMPTE-2022, 2110-20, or VC2 (VC2 is currently unsupported).
3. Select the **Primary** + **Secondary** IP fabric to use (main/backup).
4. When set as required, set **Enable Router Control** to activate routing.

Setup

The **Setup** page displays basic information about the card, such as the serial number and software version. This information may be required by Grass Valley Support if technical assistance is needed. Use the functions on the page to restart the card or to return all settings to their factory or default settings.

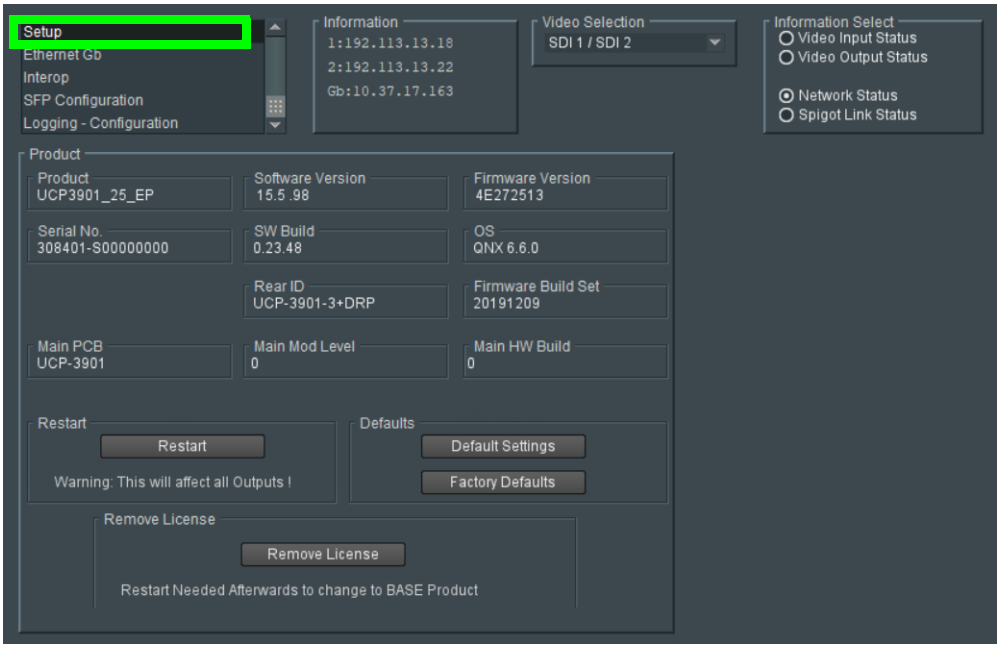


Figure 5 - 38: *Setup Page*

The **Setup** pane displays technical information on the UCP-3901. You may be asked for these details by Grass Valley support if you need technical assistance.

Parameter	Description
Product	Name of the card.
Software Version	Currently installed software version number.
Firmware Version	Currently installed firmware version number.
Serial No.	Card serial number.
SW Build	Factory software build number. This number identifies all parameters of the card.
OS	Operating system version number.
Rear ID	Rear panel type. See also Rear Panel and Connectors on page 24.
Firmware Build Set	FPGA Firmware build date.
Main PCB	Printed Circuit Board version number.
Main Mod Level	Main PCB modification level.
Main HW Build	Factory main hardware build number.

Parameter	Description
Restart	Power-cycles the card. This will produce disturbances on the output picture. **Note:** Restarting the card will affect all outputs.
Defaults	Provides options to reset the card to its defaults. • **Default Settings:** All settings are reset to their default values, *except* for network configuration and IP addresses. • **Factory Defaults:** All settings are reset to their default values, *including* network configuration and IP addresses.
Remove Licenses	Click to remove any license currently enabled on the card. A restart is required for this to take effect.

Ethernet Gb

The **Ethernet Gb** page configures the card's **MANAGEMENT** Ethernet connector port, found on the card's rear panel. See Rear Panel and Connectors on page 24.

The management port handles card configuration and upgrade, as well as NMOS IS-04 and IS-05 communications with the NMOS registry.

The **Ethernet Gb** page shows details and status for the **MANAGEMENT** Ethernet connector port. The UCP-3901 defaults to use DHCP for the **MANAGEMENT** Ethernet port address negotiation, but this can be overridden and a static IP address can be specified if required.

The Ethernet configuration for this port can also be set through the frame's control panel. This is useful when the card is first installed in the frame, to make it quickly operational. See Local control using the Densité frame control panel to set the Card's IP Addresses on page 29.

Only make changes to the Ethernet settings during off hours as any settings change will take the card offline for up to 30 seconds.

See Ethernet Pages 1 and 2 on page 62 to configure the media Ethernet configurations.

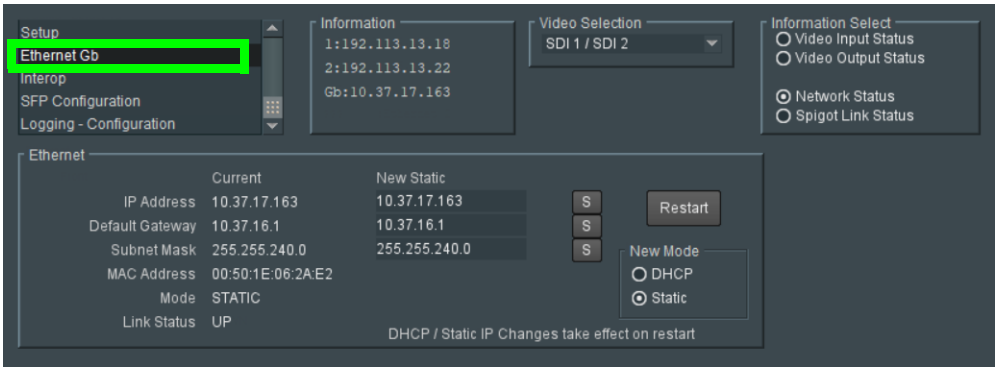


Figure 5 - 39: *Ethernet Gb Page*

Parameter	Description
Ethernet Pane	The Ethernet pane displays details of the Gb network interface, and allows a static IP address to be defined. **IP Address:** When Mode is set to **Static**, set the card's IP address. **Default Gateway:** When Mode is set to **Static**, set the network switch's IP address. **Subnet Mask:** When Mode is set to **Static**, set the subnet mask for your network. Enter information as required, then click **S** to save. New settings are applied when **Restart** is clicked.
New Mode	Set the Ethernet port's connection mode. **DHCP:** The Ethernet port uses automatic configuration obtained from the network's DHCP server. **Static:** You set a fixed Ethernet port configuration (**IP Address**, **Default Gateway**, and **Subnet Mask**). New settings are applied when **Restart** is clicked.

Parameter	Description
Restart	Click when the New Mode setting is changed for this to take effect. Only make this change during off hours as this can take up to 30 seconds to complete.
MAC Address	Shows the Ethernet port's MAC Address.
Mode	Shows the Ethernet port's current operating mode (**DHCP** or **Static**). See **New Mode** to set the operating mode.
Link Status	Shows the Ethernet port's connections status with the network switch. **UP:** Connection successful **DOWN:** Connection failed

Interop

The **Interop** page allows certain parameters to be changed in order to improve interoperability with third-party equipment, including disabling extended headers, and setting payload types.

Figure 5 - 40: *Interop Page*

Parameter	Description
Stream Synchronization Controls	**Audio:** • **Extended Headers** - Set to use extended headers in the RTP audio stream. • **RTP to PTP** - Set to synchronize RTP to PTP. • **Nominal Delay** - Set to set nominal delay at the spigot. **Meta:** • **Extended Headers** - Set to use extended headers in the RTP metadata stream. • **RTP to PTP** - Set to synchronize RTP to PTP. • **Nominal Delay** - Set to set nominal delay at the spigot. • **RTP** - Set to use RTP timestamps only to synchronize metadata to video.
Meta Frame Delay	Allows a frame delay for metadata received on the spigots shown to be set. Use the sliders to adjust as required. Click **P** to use the preset default value.
RTP Payload Types	Payload Selection: • **Set 1/Set 2** - Select the appropriate set of standards to be used. The set contents are displayed on the **Payload Format** pane.
Payload Format	Hexadecimal code used to identify payload types: **SMPTE2022:** SMPTE2022 payload type. **RFC4175:** RFC4175 payload type. **VC2:** VC2 payload type. VC2 is currently unsupported. **Audio:** Audio payload type identifier. **Data:** Metadata payload type.
Video	VC2 Compression: Select the compression ratio to be used from the drop-down list. **Note:** VC2 is not currently supported.

SFP Configuration

The **SFP Configuration** page allows various SFP parameters of the installed SFP cartridges to be adjusted, if required.

The page panel has two sections (**SFP 1 Compatibility Control** and **SFP 2 Compatibility Control**); one for each SFP cage. The configuration of the **SFP 1 Compatibility Control** is the same as the **SFP 2 Compatibility Control**. Only the configuration of the **SFP 1 Compatibility Control** is shown below. To identify SFP 1 / 2, see Rear Panel and Connectors on page 24.

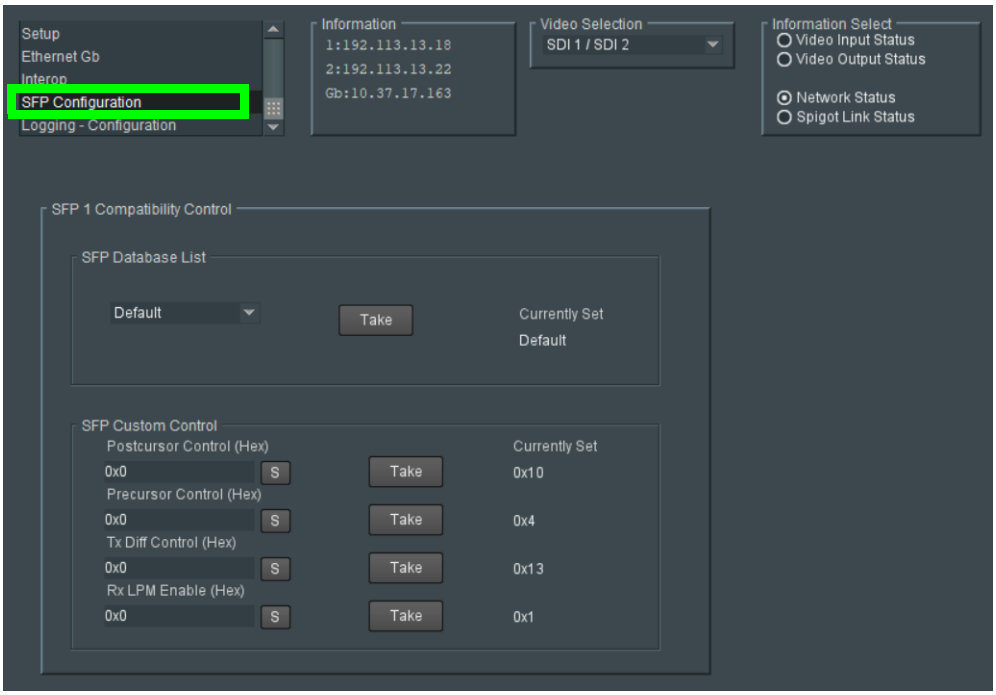


Figure 5 - 41: *SFP Configuration Page*

The majority of SFPs will operate correctly with UCP-3901 cards without any need for adjustment. Some, however, may need to have card parameters set a little differently.

If difficulties are encountered with an SFP not working as expected, proceed as follows:

1. Select the appropriate SFP type from the **SFP Database List**, and click **Take**. Verify whether the SFP is now working correctly; if so, no further action is required.
2. If the SFP is still not working properly, select **Custom** from the **SFP Database List**. This allows all the parameters shown to be adjusted as required. Make changes and click **Take** to apply them.
3. When a working configuration is found, the parameter values can be saved by clicking **S** beside each field.

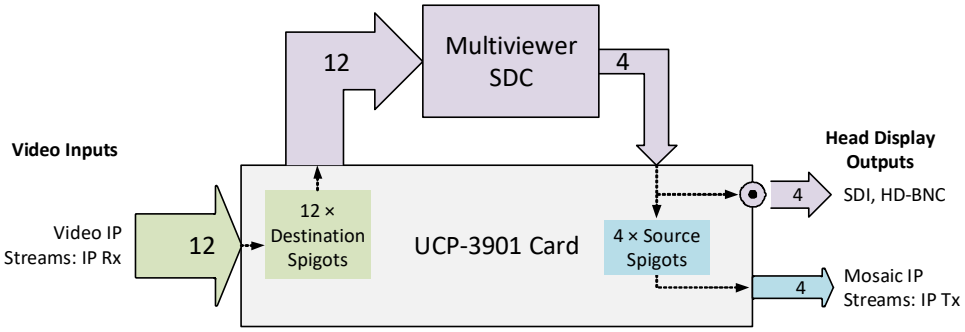
6 Getting Started with the Multiviewer

Multiviewer SDC Overview

Architecture

The Multiviewer SDC comprises two software interfaces that are individually configured:

- the Multiviewer SDC software
- that runs on top of the UCP-3901 Card's input/output hardware.UCP-3901 Card



Video IP streams are transmitted from or received at 'spigots' and may be sent/received on redundant networks. Destination spigots receive IP streams (IP Rx) and source spigots send IP Streams (IP Tx). The UCP-3901 Card has the following functional inputs and outputs:

- 12 × destination spigots for the Multiviewer video IP stream inputs (IP Rx).
- Multiviewer head outputs:
  - 4 × source spigots for mosaic IP stream outputs (IP Tx).
  - 4 × mosaic SDI video HD-BNC copy outputs available on the rear panel. See 12G/3G/HD/SD-SDI I/O – Serial digital video inputs / outputs (4), on page 26 and 3G / HD / SD SDI I/O – Serial digital video inputs / outputs (12), on page 26.

Multiviewer Input Scaling

There are 12 image scaling blocks within the multiviewer. This means that:

- There is only one scaling block per input.
- An input can only appear one time on any head display output.

Grass Valley Orbit

The Grass Valley Orbit software tool is used to configure Grass Valley products. RollCall templates may be viewed and used through Orbit.

Third Party Devices

Third-party system using a Grass Valley IQTIC card and the Grass Valley open-API 'SDC-01' protocol.

Reference Timing

The UCP-3901's rear panel has an analog video reference input labeled **REF** which can be used to lock the Multiviewer SDC's display outputs and is used as the reference for the video inputs. See REF – External Analog Reference, on page 27.

PTP can also be used as the reference source for the Video IP inputs.

To set the reference input configuration, see **Genlock** in Configuration, on page 155.

Video Wall Design

The layout and style of the Multiviewer SDC multiviewer video walls are designed with the Grass Valley Orbit software application. Wall designs are stored as individual projects (Grass Valley Orbit projects), which are then pushed to an Multiviewer SDC device for use.

Multiple wall layout designs may be generated and stored on a PC. Different wall designs can then be pushed to (or pulled from) the multiviewer for different Multiviewer SDC monitoring applications.

Orbit multiviewer projects for an Multiviewer SDC device should have a 'IQ Multiviewer project' project type. See Figure 6-1.

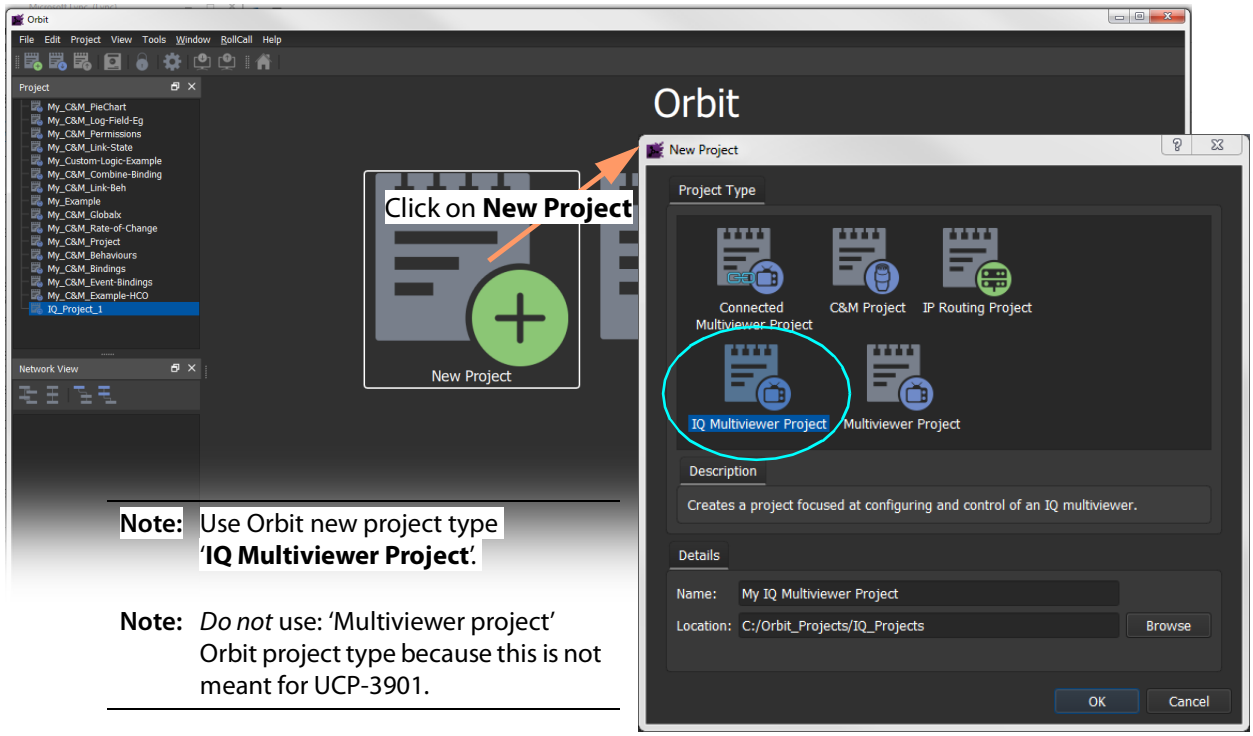


Fig. 6-1: New Orbit Project for an IQ Multiviewer

Orbit

Introduction

The Grass Valley Orbit tool is used to define the appearance of the multiviewer video wall deployed on a Multiviewer SDC with an Orbit multiviewer project.

The Orbit tool (with an IP routing license) may also be used to configure the IP input and output spigots of the module in a media network, using an Orbit IP routing project.

Orbit Projects

All layout information, settings and design information is stored in an Orbit project.

Projects can be created from scratch, opened from PC storage or pulled from a device. A project may be viewed and edited in Orbit in 'design mode'. When editing is complete, the project can be saved to the local PC storage and pushed to a device that Orbit is connected to.

Project Names

The project name is used as an identifier by Orbit. Project names should be meaningful, concise and unique for each device (for each multiviewer).

When a project is opened in Orbit, the project name may be edited, if required. This forms a new, separate Orbit project.

Note: If a default project has been pulled from a multiviewer, re-name the project before pushing it back to the multiviewer.

CAUTION

Local projects, projects on devices, or copies of projects that have the same project name are treated as being versions of the same project by Orbit.

Opening an Orbit Multiviewer Project

Orbit aims to keep a project up to date. If there are any differences between a project open in Orbit and the same-named project on a connected device, then you must resolve the difference by choosing between projects before proceeding to edit the project.

Multiviewer Projects

Specific IQ multiviewer projects are used for IQUCP-MV multiviewer applications.

Aspects of a multiviewer project include: user management, video walls, graphical tiles, graphical widgets, on-screen appearance styling, and deploying a project.

Getting Started Introduction

This section describes a quick set up procedure to carry out basic setting up of the UCP-3901 and basic exercising of the Multiviewer SDC.

The UCP-3901 Card from the factory must be licensed to carry out one of the software-defined core functions it is capable of. A new UCP-3901 Card contains all available software-defined cores, including the Multiviewer SDC, but no licenses are present.

A new module defaults to the Essence Processing SDC functionality and will need to be licensed for the Multiviewer SDC in order to be used as a multiviewer.

Getting Started Procedure

The procedure below carries out some basic setting up of a UCP-3901 Card to configure it be a Multiviewer SDC; this includes selecting the multiviewer core and setting up Ethernet interfaces. The procedure will then describe how to configure the Multiviewer SDC for receiving and sending video IP streams and modifying the multiviewer video wall.

This procedure includes:

- STEP 1: Preliminary Multiviewer SDC Configuration, on page 127.
- STEP 2: UCP-3901 Media Interface(s) Setup (Video IP Streams), on page 129.
- STEP 3: Make a Change to the Video Wall, on page 131.

Assumptions

It is assumed that:

- The UCP-3901 is new and from the factory.
- The UCP-3901 Card has been installed into the frame. See UCP-3901 Card Installation and Operation, on page 19.
- A control network is available to configure the card. See Connections and Cabling, on page 33.
- A media network is available to:
  - source video IP streams for the module; and
  - receive multiviewer head display output video IP streams from the module.
- You have established a RollCAll connection with the card. See First Time Connection to the UCP-3901 Card with RollCall, on page 37.
- The multiviewer license has been installed on the card. See Available Upgrade Licenses, on page 15 for a list of available licenses. See Installing a License into an UCP-3901, on page 188 to install the license(s).
- The firmware in the UCP-3901 has been upgraded to the latest available firmware. See Upgrading the UCP-3901's SDC Application, on page 183.

Default Multiviewer SDC Video Wall

The Multiviewer SDC is shipped with a default Orbit multiviewer project. Its video wall layout displays all multiviewer video inputs. This is shown in Figure 6-2.

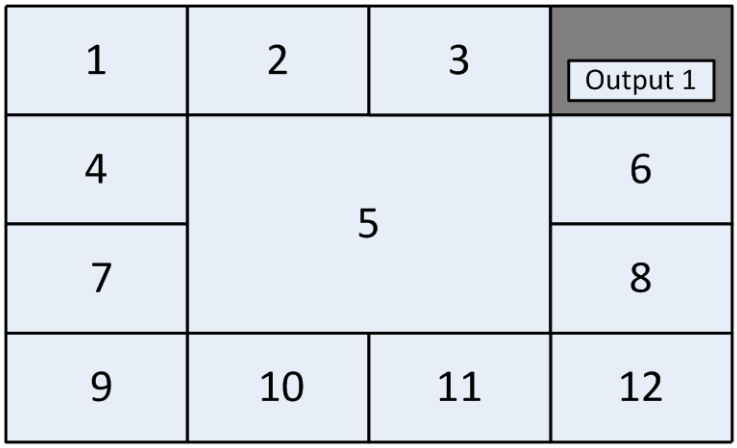


Fig. 6-2: Default Project - Typical Multiviewer Head Display Output showing video inputs 1 to 12

The same layout is repeated across the four head display outputs (Output 1, Output 2, Output 3, Output 4) with the same wall layout.

Note: Re-sizing a video input tile on one output will re-size it on the other outputs because each video input has one scaler.

STEP 1: Preliminary Multiviewer SDC Configuration

To enable the Multiviewer SDC to be fully hosted in a system, ready for further configuration, some preliminary settings need to be set up. This section configures some preliminary settings through RollCall templates.

Configuration items include:

- Basic configuration of the media Ethernet interfaces.
- Video reference selection.
- RollCall settings, including domain.
- Multiviewer head display output video standard selection.

STEP 1.1: Preliminaries - UCP-3901 Templates

This sub-section uses the MANAGEMENT Ethernet interface to access the UCP-3901 Card's RollCall templates.

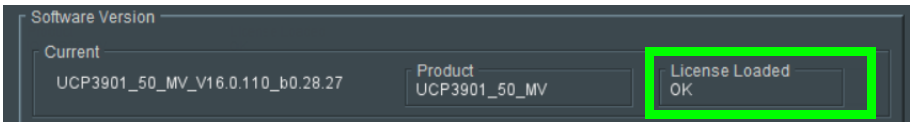
1 Open the UCP-3901 templates with RollCall Control Panel on the default port 2050. See Connecting to the Multiviewer SDC with RollCall, on page 39.

2 In the **Configuration** template (see Configuration, on page 155), configure the following settings.

Genlock: Select the video reference signal to use.

Domain ID: Specify the RollCall **Domain ID** to use and click **Take**.

Software Version: Under License Loaded, the status is **OK**.



3 In the **Ethernet 1** and **Ethernet 2** templates, in the *Ethernet* panel, define the following for the SFP1 and SFP2 rear Ethernet interface for the media networks. See also Ethernet Pages 1 and 2, on page 62.

- DHCP/Static addressing mode, and so on.
- IP address,
- default gateway IP address,
- subnet mask,

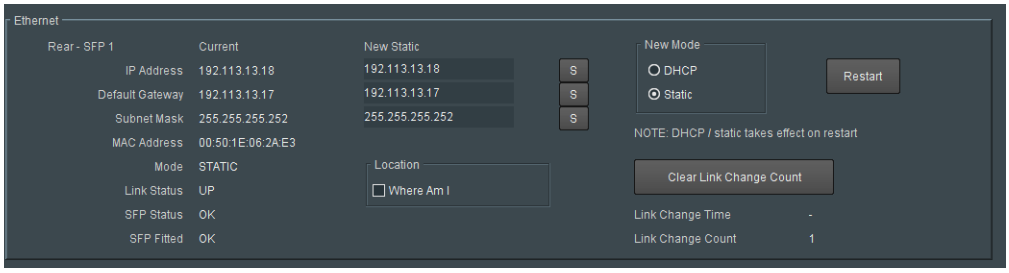


Fig. 6-3: Ethernet Pane Example

4 In the **Time Sync Configuration** template (see Time Sync Configuration, on page 50), configure the:

- **PTP Network Interface** to use; and the
- **PTP Configuration** items, including **PTP Domain**, **PTP Delay Request Frequency** and **PTP Multicast** IP address.

5 Click **Restart** and wait for the module to reboot (approximately 75 seconds).

Wait for the module to restart and the SFP-1 and SFP-2 rear Ethernet interfaces are now ready to be used in a target system. The Multiviewer SDC RollCall templates should now be accessible through the media network SFP-1/SFP-2 interfaces.

Note: The IP routing *multicast IP addresses* are *not* yet set up. This is done later in this procedure, in STEP 2: UCP-3901 Media Interface(s) Setup (Video IP Streams), on page 129.

6 Proceed to STEP 1.2: Preliminaries - Multiviewer SDC Templates, on page 128.

STEP 1.2: Preliminaries - Multiviewer SDC Templates

This sub-section uses RollCall templates to configure the Multiviewer SDC specific settings.

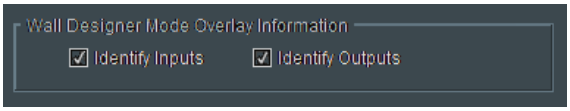
1 Open the UCP-3901 templates with RollCall Control Panel on port 2051. See Connecting to the Multiviewer SDC with RollCall, on page 39.

2 In the **System-Setup** template, configure settings as shown below.

Setting	Action
RollCall Settings / RollCall Network	Select the RollCall network to use.
RollCall Settings / RollCall Unit	Select the RollCall unit number to use.
RollCall Settings / Domain ID	Specify the RollCall Domain ID to use.
Output Format / Selection	Select the required multiviewer head display output video format.
Information	If required, enter a name, location, and/or notes about the module. This may be done at a later time.

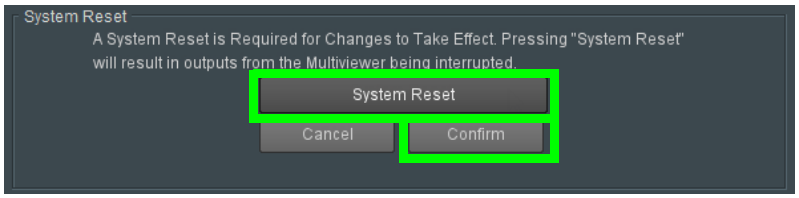
3 In the **Layout** template:

- Select **Identify Inputs**; and
- Select **Identify Outputs**.



This will add an overlay onto the head display inputs and outputs, to help identify head display outputs (1 to 4) and the video inputs (1 to 12) as they are numbered. This is useful during initial set up of a module. The overlays can be turned off later without a system restart being required.

4 Return to the **System-Setup** template. Click **System Reset** and then click **Confirm**.



The module restarts for all the settings changes to take effect. Wait for the module to complete its restart (approximately 75 seconds).

STEP 2: UCP-3901 Media Interface(s) Setup (Video IP Streams)

After the rear SFP-1 and SFP-2 Ethernet interfaces are set up in STEP 1: Preliminary Multiviewer SDC Configuration, on page 127, the various spigots of the UCP-3901 need configuring for:

- Sending Spigots 1 to 4. These are the source spigots - these transmit multiviewer head display output video IP streams.
- Receiving Spigots 5 to 16. These are the Destination spigots - these receive multiviewer input video IP streams.

Setting up may be done:

- Automatically with 'Orbit for IP Routing' (through SFP-1 or SFP-2).
  (See the Grass Valley 'Orbit for IP Routing' user manual, 'Getting Started' chapter.

Or:

- Manually through a media network connection (through SFP-1 or SFP-2).
  (See Manual Configuration of the Media Interfaces, on page 130.)

Manual Configuration of the Media Interfaces

Source spigot settings are defined on **Spigot 1** to **Spigot 4**. Destination spigot settings are defined on **Spigot 5** to **Spigot 16**.

1. Open the UCP-3901 templates with RollCall Control Panel on the default port 2050. See Connecting to the Multiviewer SDC with RollCall, on page 39.
2. In the **Spigot 1** to **Spigot 4** templates (see Spigot 1 to 4 (Multiviewer Head Outputs), on page 166) configure the following settings for both the primary and secondary flows.
   - For video flows, set the **Flow Type** to 2110-20.
   - For audio flows, set the **Flow Type** to 2110-30.
   - For all Flows, configure the following settings:
     - Multicast IP address.
     - Multicast IP port.
     - Source IP address.
     - Source IP port.
     - Flow type.

     For each parameter, set the value in the **New** column and click S to save the details.
3. In the **Spigot 5** to **Spigot 16** templates (see Spigot 5 to 16 (Multiviewer Inputs), on page 166) configure the following settings for both the primary and secondary flows.
   - For video flows, set the **Flow Type** to 2110-20.
   - For audio flows, set the **Flow Type** to 2110-30.
   - For metadata flows, set the **Flow Type** to 2110-40.
   - For all Flows, configure the following settings:
     - Multicast IP address.
     - Multicast IP port.
     - Source IP address.
     - Source IP port.
     - Flow type.

     For each parameter, set the value in the **New** column and click S to save the details.
4. Click **Take** on a Spigot template when all spigot setting changes are done in the template. This restarts the module.

Once the module has restarted, the new spigot settings are applied and spigots are set to transmit and receive the multicast video IP streams.

STEP 3: Make a Change to the Video Wall

This sub-section uses uses the GV Orbit Client to get the video wall from a module, make a change and push it back to the module.

Introduction

This sub-section will:

- Get the Orbit multiviewer project from the Multiviewer SDC. This is the factory default project. See Get Orbit Multiviewer Project from the Multiviewer SDC, on page 131.
- Make a simple, visible change to the video wall. See Quick Edit of Project, on page 134.
- Push the amended project back to the unit and see the change. See Push a Project from Orbit to a Device, on page 137.
- Pull a project from the Multiviewer SDC. See Pull a Project into Orbit from a Device, on page 139.

Assumptions

This sub-section assumes that:

- The UCP-3901 is connected to a media network and receiving/sending video IP streams.
- IP addresses of the UCP-3901's media Ethernet interfaces are known.
- Orbit is installed on a client computer connected to the media network. (**Note:** A Orbit license is not required for basic GV Orbit operation.)

Get Orbit Multiviewer Project from the Multiviewer SDC

To get the Multiviewer SDC's Orbit multiviewer project:

1 Run Orbit and click **File** > **New project**.

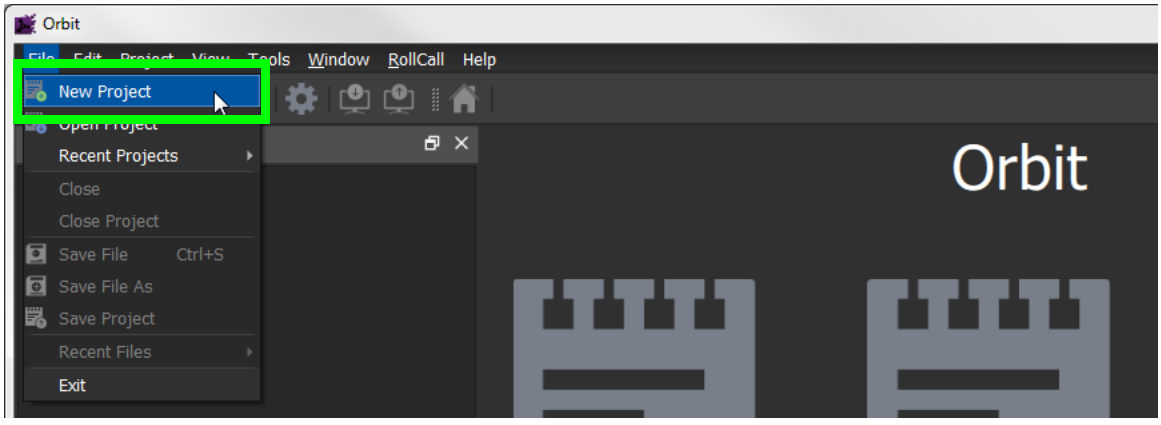


Fig. 6-4: Orbit File > New Project

2 Select **Connected Multiviewer Project**.

3 Browse to a new, empty folder and click **Choose**.

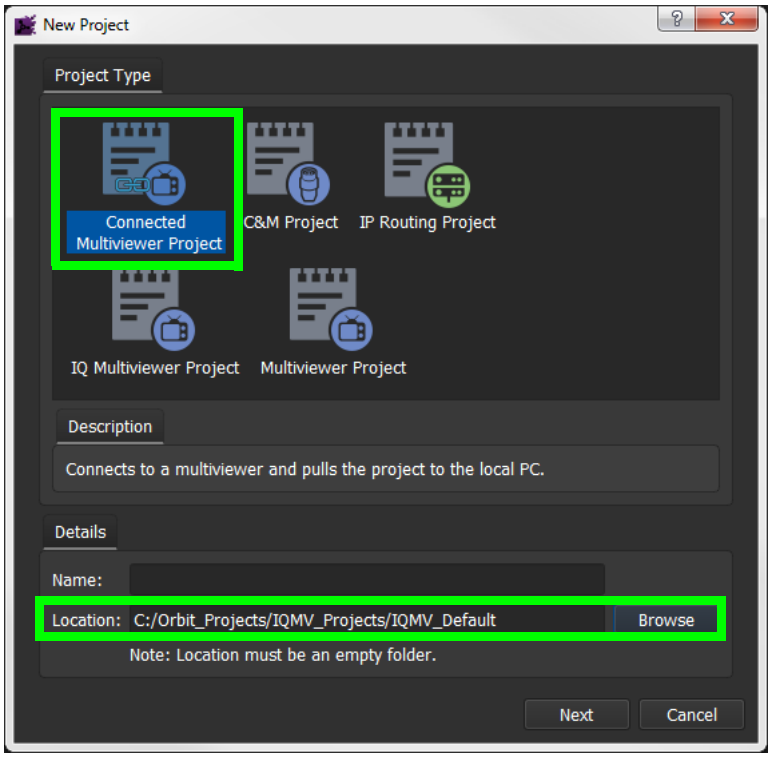


Fig. 6-5: New Project Dialog - Connected Multiviewer Project

4 Click **Next**.
All accessible multiviewer devices are listed.

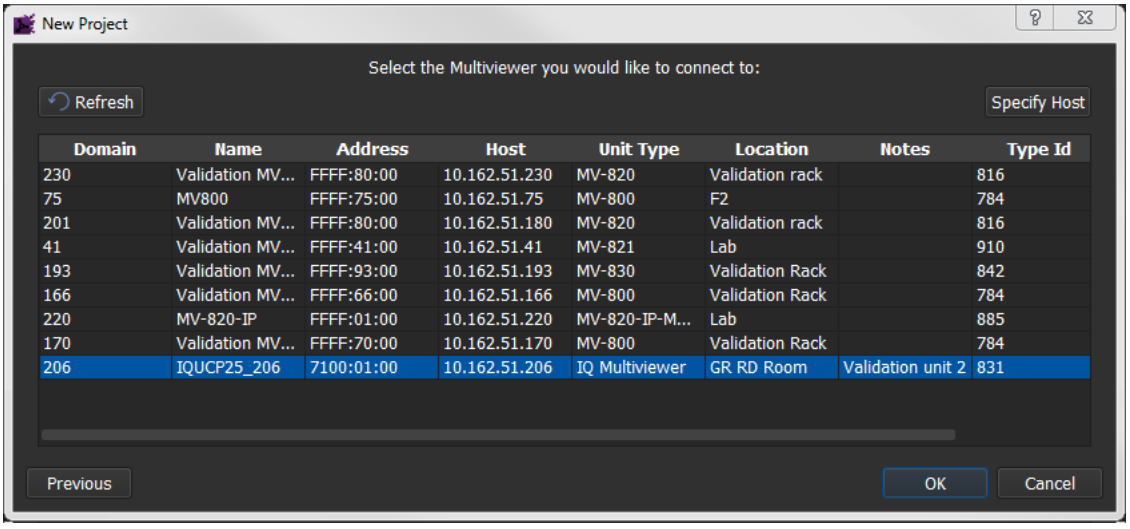


Fig. 6-6: New Project Dialog - Multiviewer List

5 Select a device in the list and click **OK**.
If a device is not listed, then:
6 Click **Specify Host** and enter the device's RollCall **domain** number and **IP address**.
7 Click **Refresh**.

8 Select the device in the new list and click **OK**.

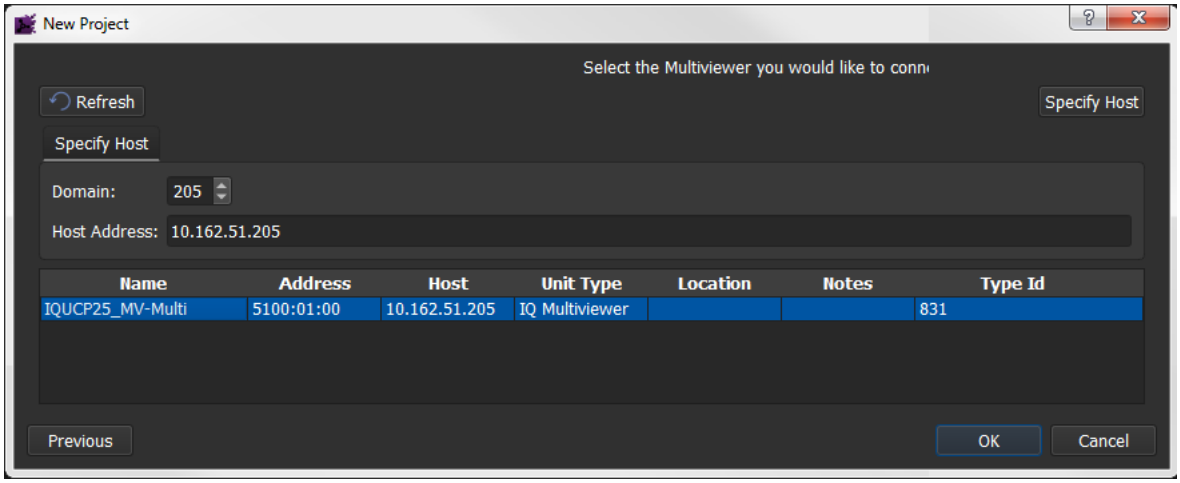


Fig. 6-7: New Project Dialog - Multiviewer List

Orbit connects to the device and pulls the Orbit multiviewer list from the device.

9 At the login dialog, enter the appropriate project **Username** and **Password**.
Note: For the default project on a factory device, this is 'admin' and 'admin'.

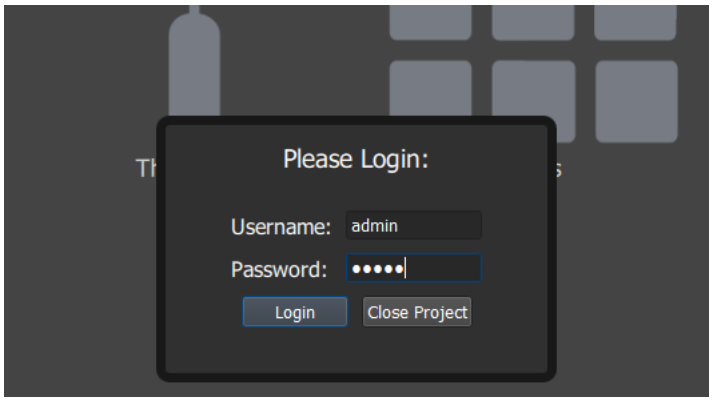


Fig. 6-8: Login Dialog

10 Click **Login**.

A new Orbit project has been created from a connected multiviewer and opened in Orbit.

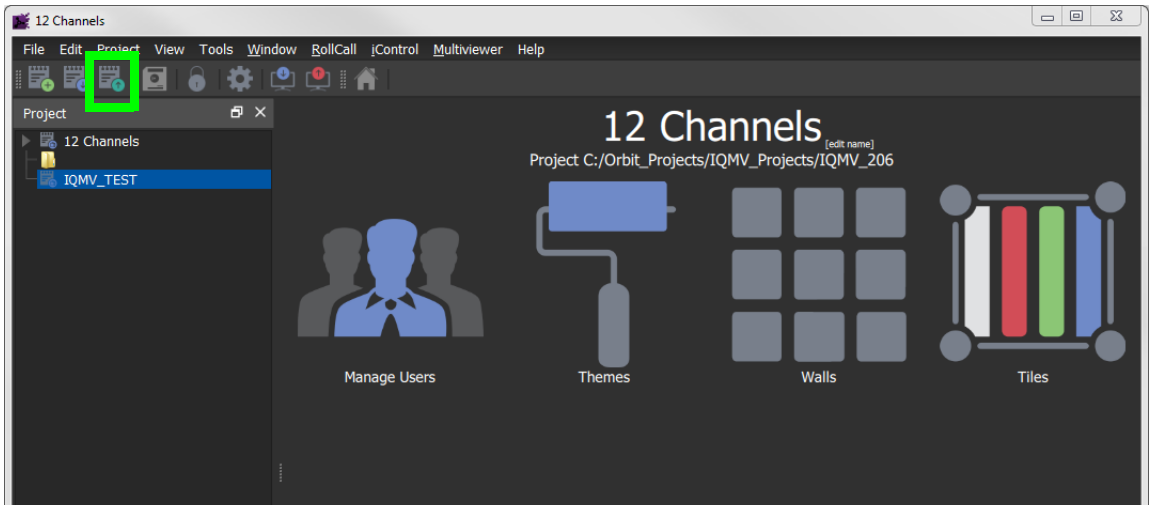


Fig. 6-9: Project Open in Orbit

To save the project on the local computer in the previously-specified folder:

11 Click **File** > **Save Project** in the main menu,
or click the **Save Project** icon in the main tool bar.

Quick Edit of Project

To make a visible change to the project:

1 Click the large **Walls** icon and select a wall item in the list, for example, 'Output 1'.
The selected wall is opened in a Wall Editor.

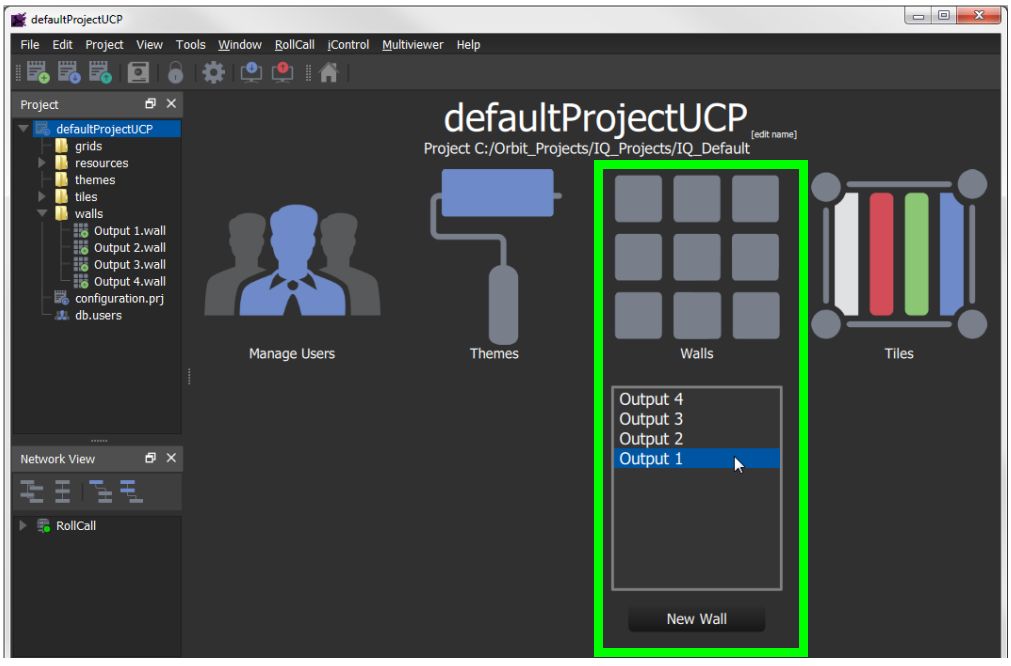


Fig. 6-10: Project Open in Orbit

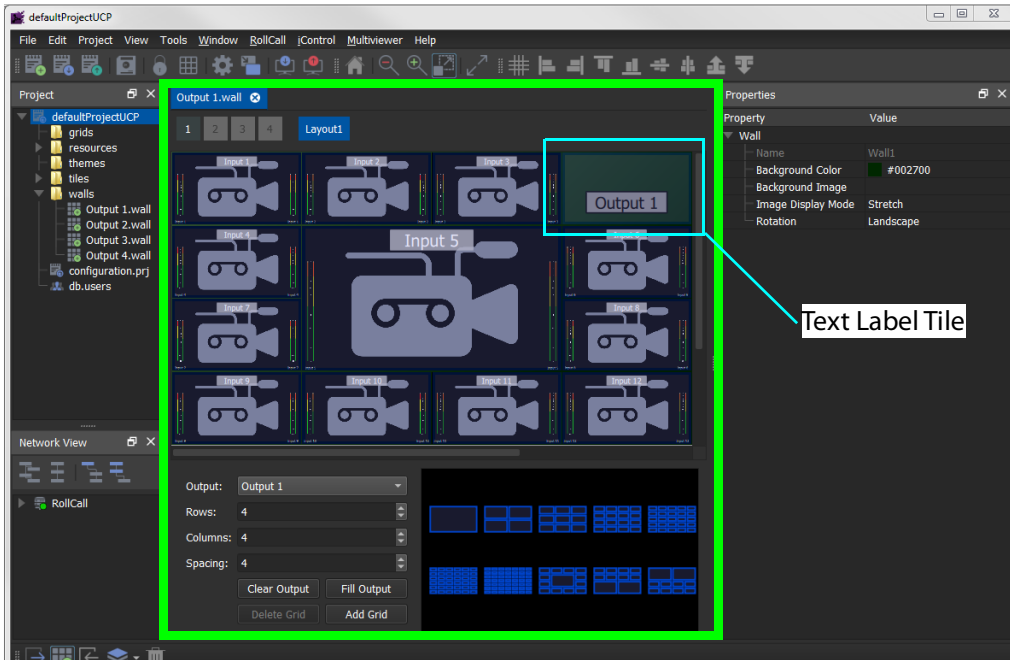


Fig. 6-11: Wall Editor

2 Double-click on the **Text Label Tile**.
The tile is opened in the **Tile Editor**.

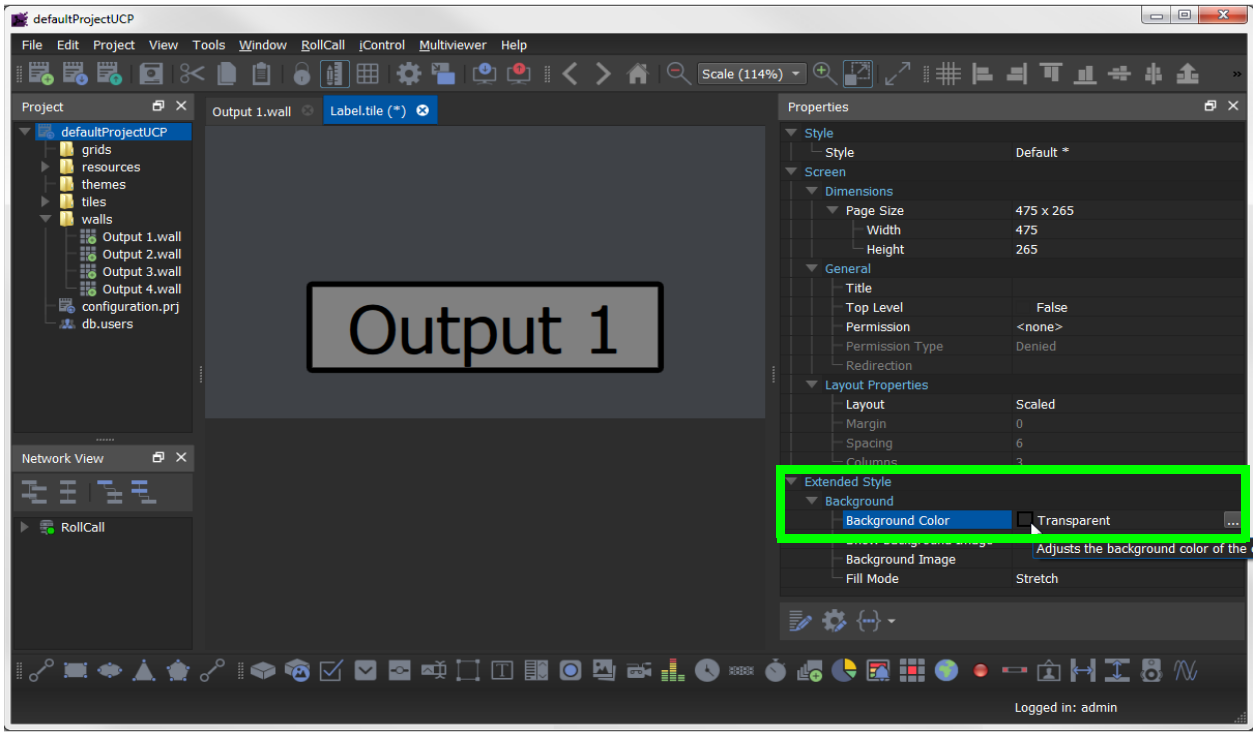


Fig. 6-12: Tile Editor

To make a change the tile:

3 Click on the tile background.

4 In the **Properties** box, select the 'Extended Style > Background Color' property.

5 Click on the ... icon to show the **Background Color** dialog. See Figure 6-13 on page 136.

6 Select a color and click **OK**.

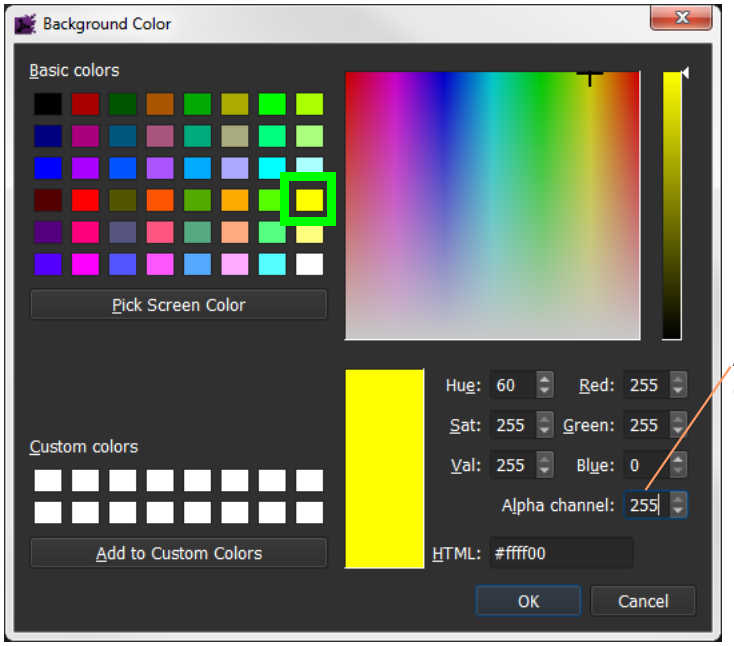


Fig. 6-13: Color Picked

7 Click the **Save File** icon in the main tool bar to save the tile change.

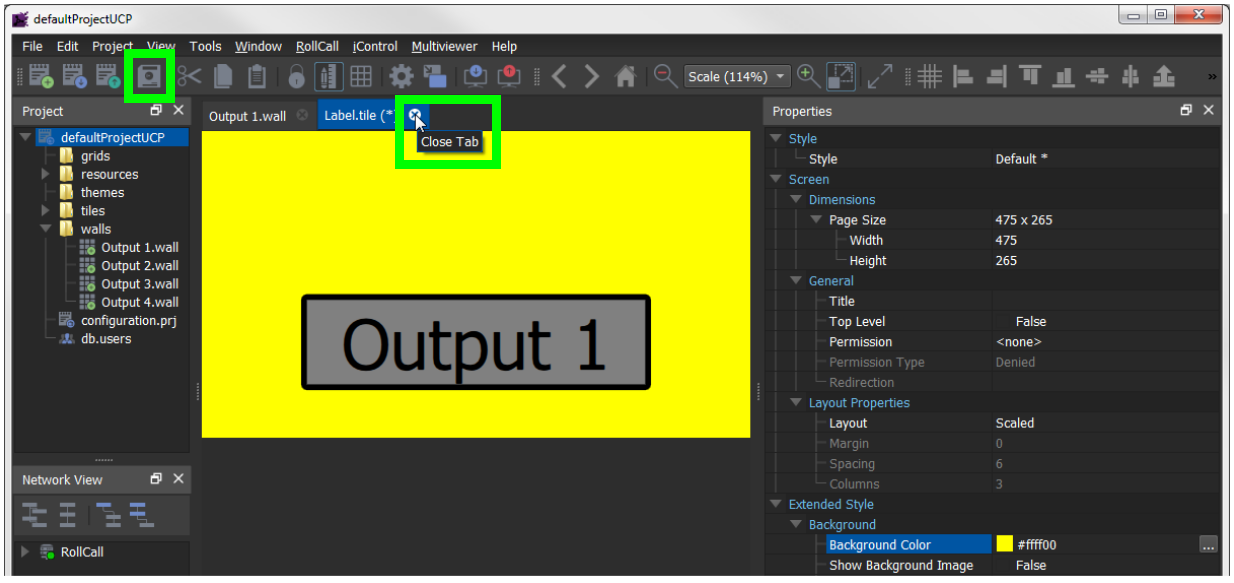


Fig. 6-14: Tile with New Background Color

8 Click on the x on the tile tab to close the tile.

9 Click on the **Save Project** icon in the main tool bar to save all changes.

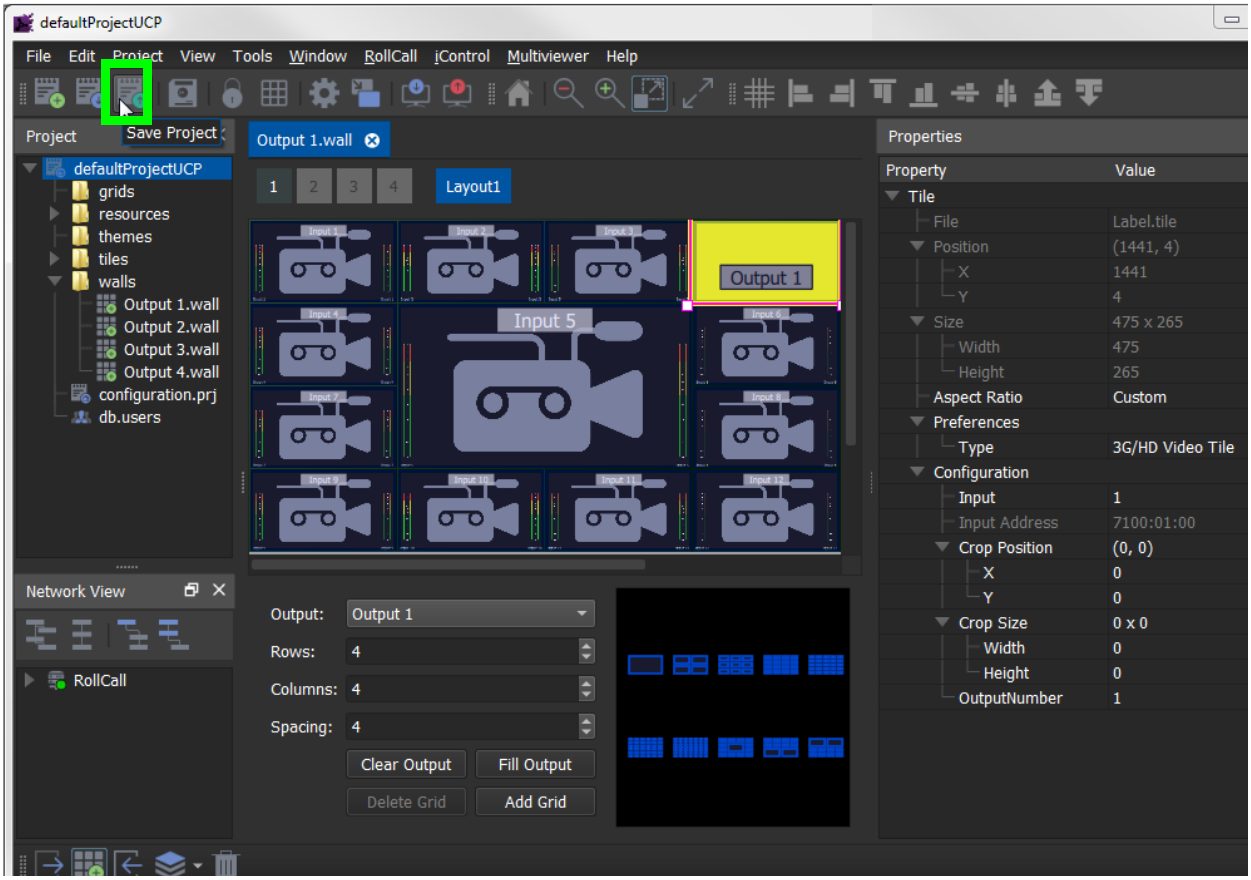


Fig. 6-15: Changed Wall 1

Push a Project from Orbit to a Device

To push a project from Orbit onto a multiviewer:

1 Open a project in Orbit and click **Multiviewer** > **Properties**.

2 If the multiviewer details require changing, enter the target device's:

- IP address;
- RollCall network number and unit number; and
- Domain ID.

3 Click **OK**.

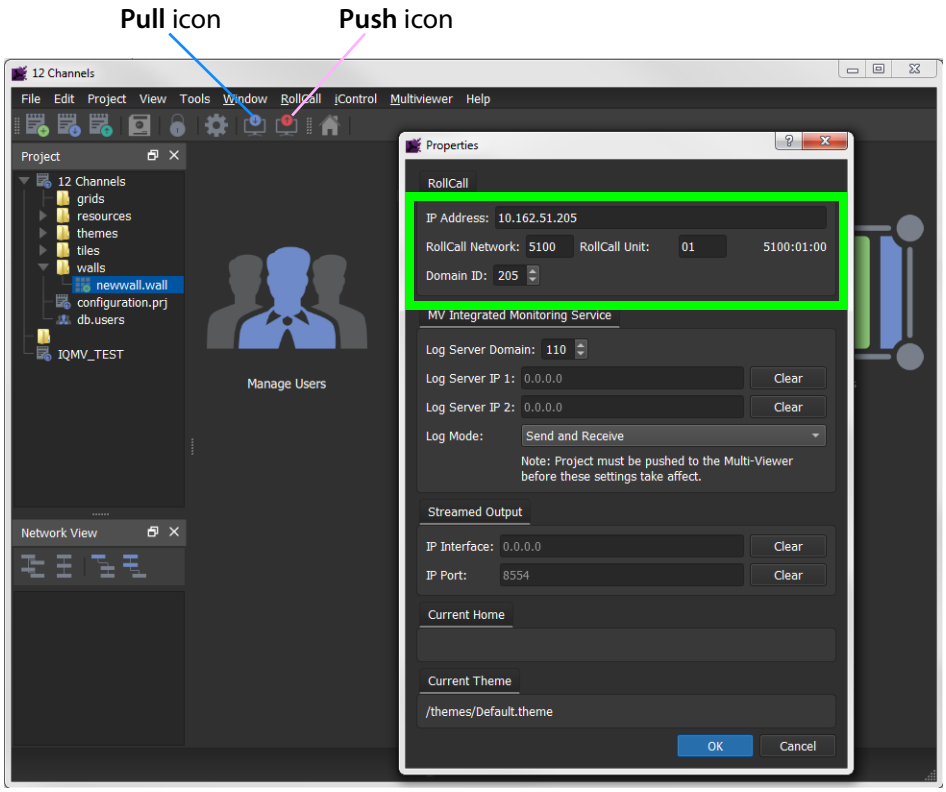


Fig. 6-16: Pull/Push Icons and Multiviewer > Properties Dialog

To push a project from Orbit to the device:

4 Click the **Push** icon in the main menu.

5 Select the project in the **Choose Projects** dialog (see Figure 6-17) and click **OK**.
The project is pushed to the device.

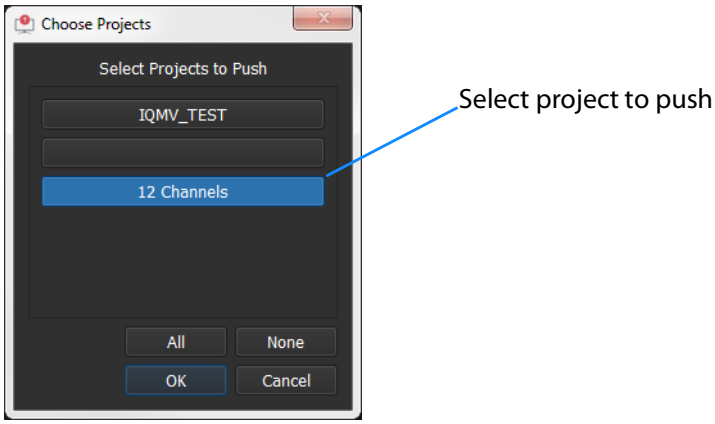
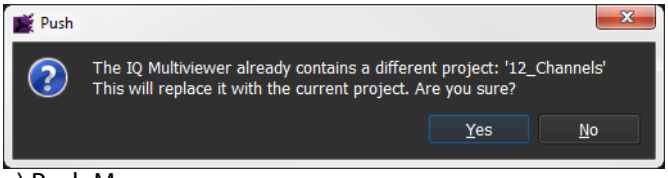


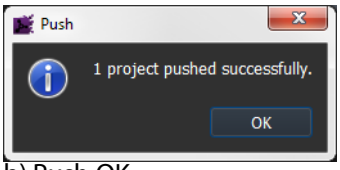
Fig. 6-17: Choose Projects Dialog

If the device already has a project of the same name, then a dialog is shown (see Figure 6-18a). Click 'Yes' to overwrite with the project from Orbit.

When the push is complete a 'pushed successfully' message is shown. See Figure 6-18b.



a) Push Message



b) Push OK.

Fig. 6-18: Push Messages

The project is now running on the target device. The tile background color is changed.

Pull a Project into Orbit from a Device

This may be useful during 'getting going': To pull a project into Orbit from a device:

1. Open a multiviewer project in Orbit and click **Multiviewer** > **Properties**.
2. If the multiviewer details require changing, enter the target device's:
   - IP address;
   - RollCall network number and unit number; and
   - Domain ID.

   Click **OK**.
3. Click the **Pull** icon in the main menu.
4. Select the project in the **Choose Projects** dialog (see Figure 6-19) and click **OK**.
   The project is pulled from the device.

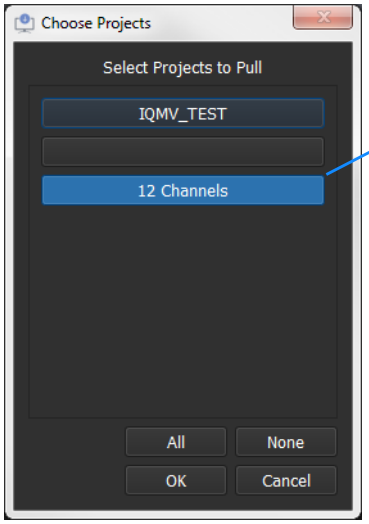


Fig. 6-19: Choose Projects Dialog

5 When the pull is complete a 'pulled successfully' message is shown. See Figure 6-20.

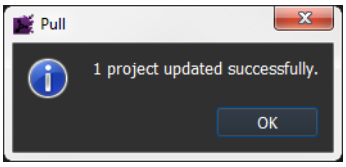


Fig. 6-20: Pull Message

The Orbit project of the same name in as the one pulled from the device has now been updated. It is now the same as that on the device.

Multiviewer Video Wall

Multiviewer video wall layouts are designed and managed with the Grass Valley Orbit application. Please refer to the published Orbit documentation for instruction about how to use Orbit in multiviewer applications. This manual assumes the reader is familiar with the Orbit software and only outline information is given.

Basic Video Wall

Multiviewer video wall layouts are designed with the Grass Valley Orbit application and are called 'Orbit projects'. These multiviewer projects can be pushed to the Multiviewer SDC, to be deployed and the video wall can be viewed on the multiviewer head outputs.

Video wall layouts can be pulled from a Multiviewer SDC and modified and pushed back.

The form and appearance of a video wall design on a multiviewer device may be changed through the use of Orbit 'walls', 'layouts' and 'themes'.

Procedure:

The procedure for video wall design and deployment is similar to the procedure for Grass Valley's MV-8 Series of multiviewers (MV-800 etc).

A 'basic video wall' is described in the Orbit documentation and includes:

Initial Screen	Orbit Initial screen.
New Project	Creating a new project, IQ Multiviewer Project/Connected Multiviewer Project.
Existing Project	Opening an existing project.
Recent Projects	Opening a recent Orbit project.
Project Home Screen	The Orbit project home screen.
Basic Wall	Using Orbit to create a basic video wall layout.
Wall Layouts	Demonstration of different wall layouts within the same Orbit multiviewer project.
Wall Themes	Demonstration of applying different themes to the same wall layout.

For further Orbit instruction and details on using Orbit for multiviewer wall layouts, see the published "Orbit - Introduction" and "Orbit for Multiviewers" user manuals.

TSL Support

TSL Protocol Tally Settings

TSL protocols are used widely throughout the industry for communication between a TSL Tally controller and Under Monitor Displays (UMDs). The protocol enables tally lamp control and text label data to be carried to each UMD device.

A TSL Tally controller handles the tally data in a video system and provides TSL Tally control information to each UMD. The Multiviewer SDC supports two TSL protocols: TSL 3.1 and TSL 5.0. Initial TSL support settings are described here.

Setting up the multiviewer to work with a TSL tally-based system involves the following steps:

- Specify how the multiviewer gets the TSL Tally message information.
  See Specifying Multiviewer TSL Tally Mode, on page 142.
- Specify index parameters for each UMD on the video wall.
  See Specifying Index Parameters for each UMD, on page 143.

Specifying Multiviewer TSL Tally Mode

The multiviewer may get its TSL Tally information in one of two modes:

- **Server Mode** - Multiviewer SDC listens for Tally messages.
  Specify the Multiviewer SDC IP address and network port to receive Tally messages on.
- **Client Mode** - Multiviewer SDC reads Tally messages from a Tally controller.
  Specify the IP address and network port number of the Tally controller.

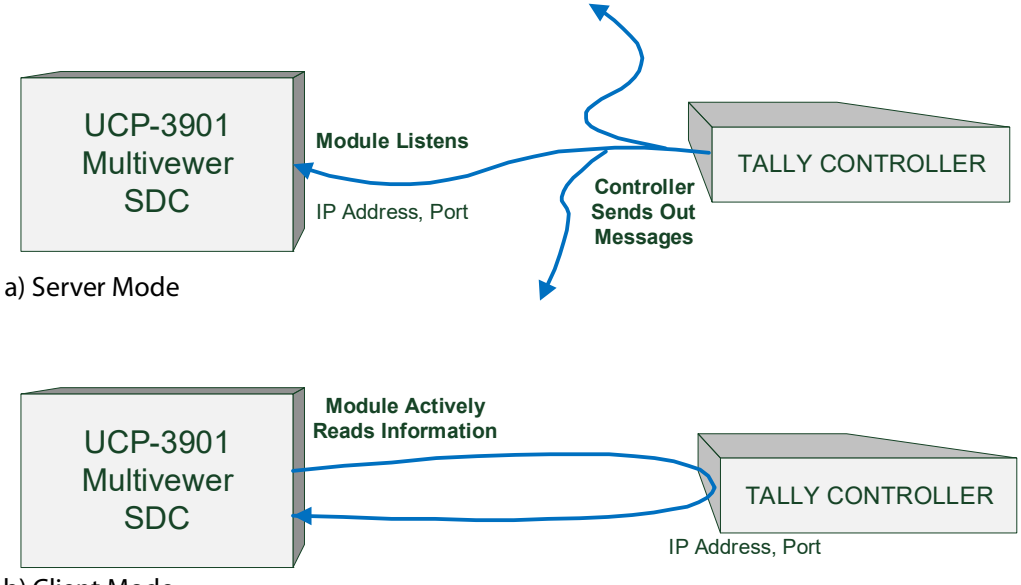


Fig. 6-21: TSL Protocol Operating Modes

The RollCall Control Panel application is used to configure the TSL screen settings. See RollCall Layout, on page 176.

Specifying Index Parameters for each UMD

Use the Grass Valley Orbit application to set the properties of each UMD in a video tile on the video wall layout. The properties differ between TSL Protocol 3.1 and 5.0.

The style of the UMD widget can be selected with the **Preferences** > **UMD Style** property.

The index parameters used by each UMD are specifiable in the UMD properties. Values can be set manually or values can be automatically assigned as part of assigning inputs to video tiles. (Refer to Orbit documentation.)

UMD Properties - TSL Protocol Version 3.1

TSL Protocol 3.1 is the original TSL protocol for sending data over a serial comms connection or through Ethernet. The multiviewer supports an Ethernet connection.

Each multiviewer monitor screen is addressed with a Display address. Each UMD associated with a video tile must have its **3.1 Display Address** property set up.

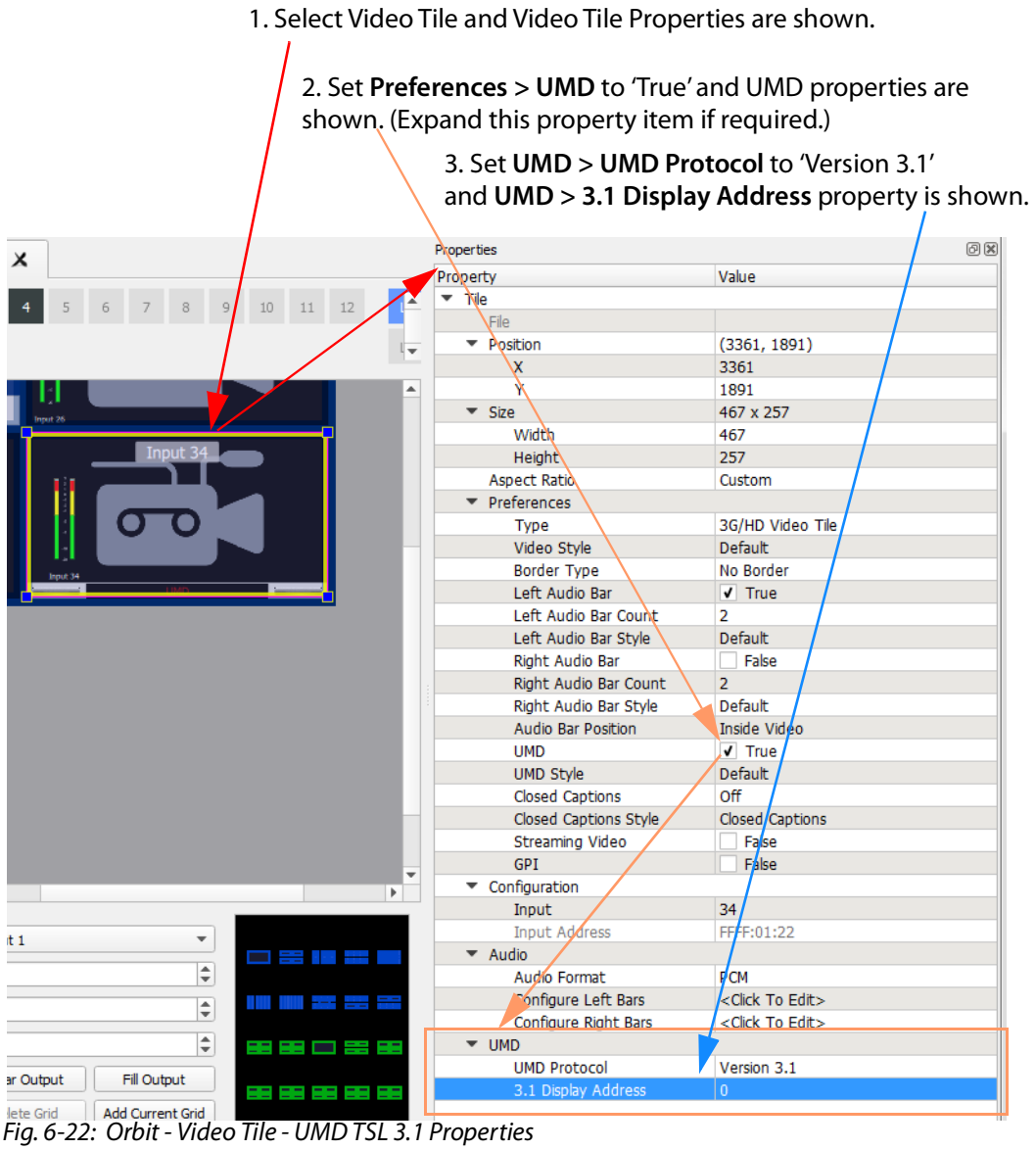


Fig. 6-22: Orbit - Video Tile - UMD TSL 3.1 Properties

UMD Properties - TSL Protocol Version 5.0

TSL Protocol 5.0 is a 16-bit protocol, introduced to handle multiviewer display devices over Ethernet. It supports ASCII or Unicode character sets, and data is sent as UDP or TCP/IP over Ethernet.

Each multiviewer monitor screen is addressed by a Screen Index and each UMD within it by a Display Index. Each UMD associated with a video tile must have two parameters set up:

- **5.0 Screen Index** - Index number (address) of each display monitor. (16-bit, $FFFF reserved. 0 = not used.)
- **5.0 Display Index** - Index number for each UMD in a display. (16-bit, $FFFF reserved. 0-based.)

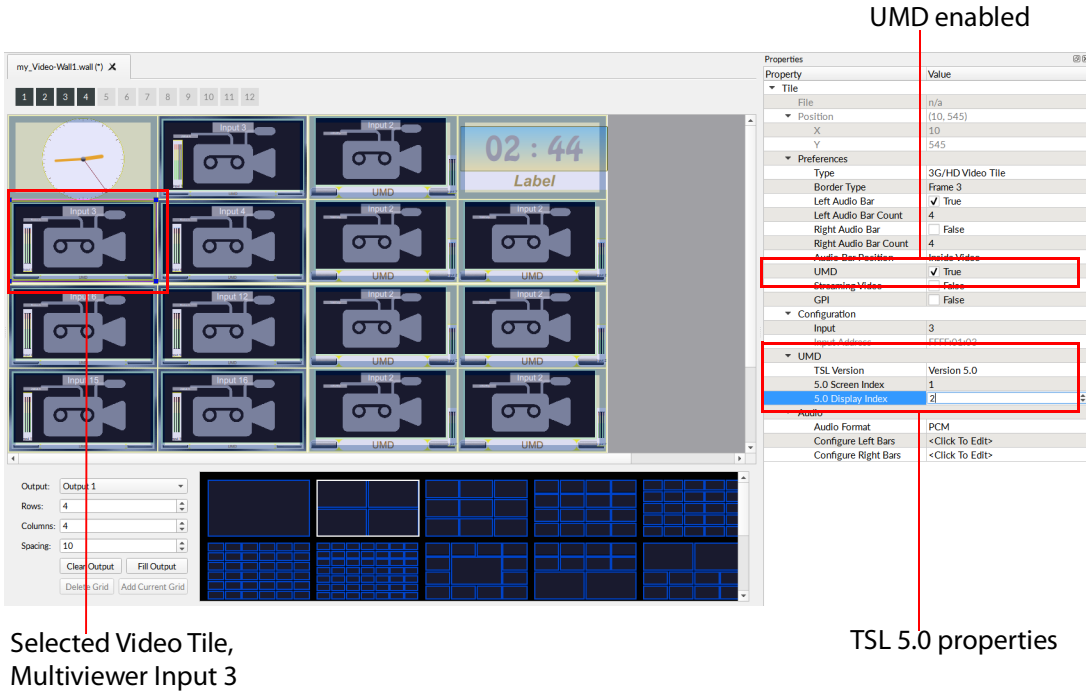


Fig. 6-23: Orbit - Video Tile - UMD TSL 5.0 Properties

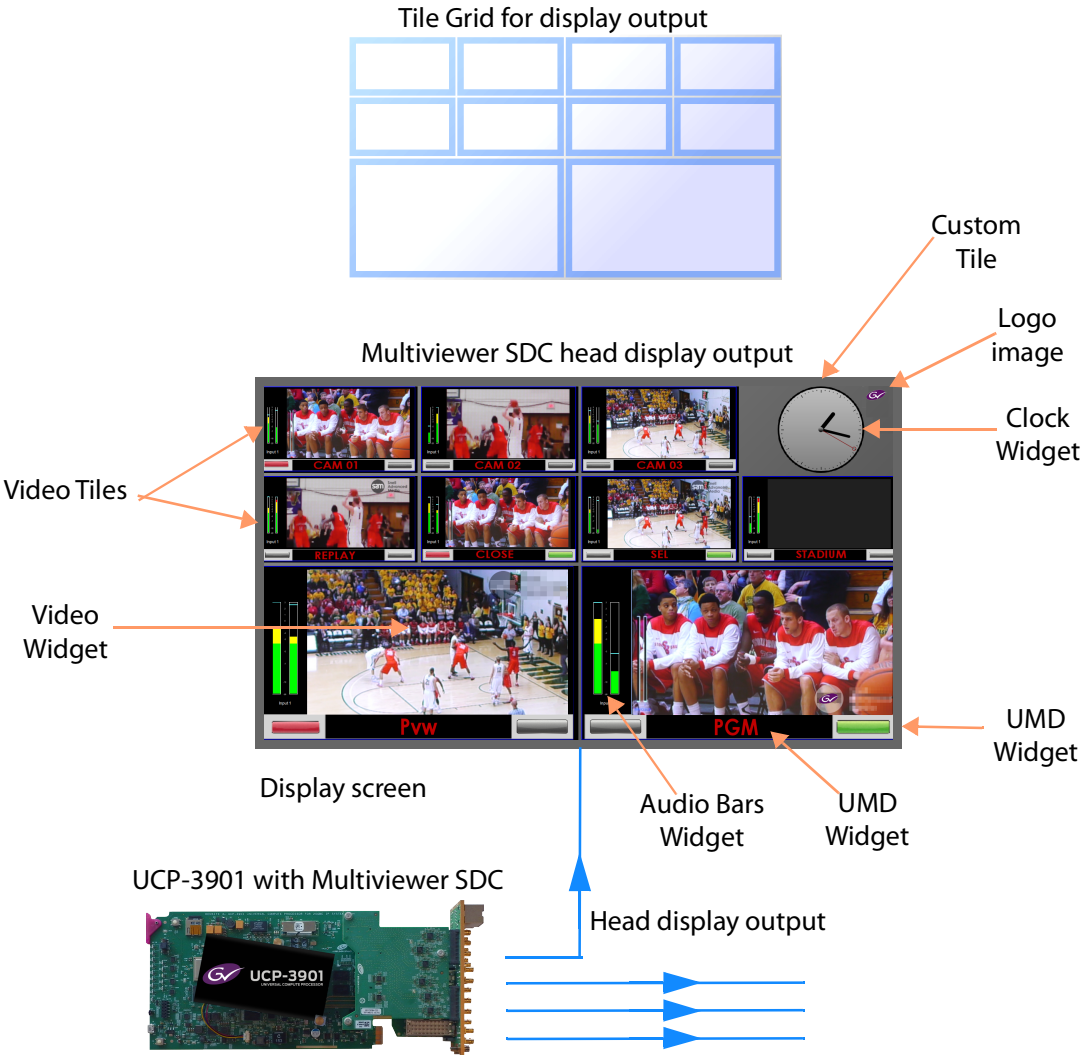


Fig. 6-24: Monitor Display Screen

Terminology

Multiviewer Terminology

The following table lists the multiviewer terminology used when designing multiviewer video walls with the GV Orbit software tool for the Multiviewer SDC.

Term	Definition
Wall, Video Wall	One or more monitor display screens configured to form one large screen.
Display Screen	Display area of one individual monitor/display device.
Theme	The style and appearance of the video wall and its screen elements. A Theme is a set of widget styles which can be applied to a project. Each widget may have one or more specific styles. Using themes, a video wall may be tailored to conform to a house style.
Style	Each Widget can have several appearances, styles. Styles are changes to a widget's appearance and do not affect its function. Styles can be grouped under themes.
Tile	A rectangular area on a video wall screen, usually displaying video inputs and other supporting information. For example, a tile may display a video picture with audio level and other related status information. Other information may be displayed in tiles, for example, time, images, labels and/or text.
Tile Grid	A multiviewer video wall screen is divided up into rectangular areas; various sizes and arrangements are possible. A tile grid can be used in Orbit for quick-positioning of tile arrangements on a wall.
Fine Grid	A fine grid on an Orbit screen is used for the fine-positioning of graphical elements. For example, for positioning Tiles on a wall or Widgets on a tile.
Widget	On-screen graphical elements used to display information on tiles. There are one or more widgets on a tile. Displayed information includes: Audio sound level, Time, Text labels. Widget types include: Audio bars, Clocks, Images, Labels, Lines, Tally LEDs, Timers, UMDs, Video and Web sources.
Head Display Output, Display Output	A 1080P or 720P output from the Multiviewer SDC; this can be SDI video (HD-BNC) or a video IP stream. Each head display output is connected to a monitor display that forms all or part of a multiviewer video wall. There are four head display outputs on an Multiviewer SDC.

Term	Definition
Video Input	One of 12 video inputs to the Multiviewer SDC.
Multiviewer Input	One of 12 video inputs to the multiviewer block within the Multiviewer SDC.

IP Routing Terminology

Term	Definition
Control network	Typically an Ethernet network dedicated for device control.
COTS	Commercial Off-The-Shelf. Refers to hardware that is not specific to an industry, but is generic and readily available. In this case, it is high-performance IT switching equipment,.
Destination	Receiver of one or more flows. Destination spigot.
Essence	A general term used to describe a component of a media signal. Video, Audio and Metadata are all essences.
Fabric	Term for the networks that can make up a redundant network system, Fabric "A" and Fabric "B".
FEC	Forward Error Correction. A technique for controlling errors in data transmission where the sender encodes message in a redundant way by using an error-correcting code. The redundancy allows the receiver to detect and correct errors.
Flow	Another term for an elementary IP stream, usually a sequence of real-time data sent as an RTP IP data stream. For example, TR-03 describes how a media stream (e.g. an original SDI stream) may be sent as three flows: Video, Audio and Ancillary essence data.
IEEE 1588	A Precision Time Protocol (PTP) to synchronize distributed clocks to within 1 microsecond through Ethernet networks. PTP runs on IP networks, transferring precision time to slave devices through a 1 GHz virtual clock (time base). It is used to synchronize TR-03 elementary streams.
IGMPv3	Internet Group Management Protocol. Communications protocol used in IP multicasting by client IP devices and an IP router to establish multicast group membership. The routing function of a traditional video router can be replicated with a IP Network Router Controller deice and a COTS IP Switch which supports the IGMPv3 protocol.
In-Band Control	Sending control messages for an IP routing system in the media IP network fabric.
IP Stream	Real-time data (for example, video and/or audio) sent over a network.

Term	Definition
IP Flow	Flows form a stream. There may be Video and Audio IP flows in an IP stream.
IP Router	A network device that forwards data packets between computer networks.
IP Switch	A network device that allows packet communications between two or more networked devices, thus forming a *computer network*. An IP switch uses packet switching to receive and forward data to the destination device.
LLDP	Link Layer Discovery Protocol (LLDP). This is an open IP protocol used in IEEE 802.1ab to discover a network device's identity and abilities, and to make physical network topology information available. Information is readable through standard network management protocols, such as SNMP.
MAC Address	Media Access Control (MAC) address is a unique 48-bit identifier assigned to a network interface connection of a network device. For example: 5C-26-0A-39-21-EE.
Media network	A high-capacity network dedicated to carrying high bit rate media.
Multicast Stream	A one-to-many IP stream. Devices receiving the stream subscribe to the multicast stream's IP address.
Network	A group of two or more Ethernet-enabled systems linked together through IP. In the case of broadcast video IP network, a local area network optimized for the transfer and broadcast of real-time, high bandwidth video IP streams
Out-of-Band Control	Method of sending control messages for an IP routing system in a separate *management* control network.
RFC-4175	TR-03 uses Internet Engineering Task Force's (IETF) RFC-4175 to pack (uncompressed) active video lines into an RTP IP stream.
RollCall	Grass Valley control and monitoring system.
RollCallv3	Traditional Grass Valley RollCall messages in the Grass Valley RollCall control and monitoring system product.
RollCall+	New extension to Grass Valley RollCall. Uses RollCall+ Domains to separate data flow types. Used in MV-8 series Multiviewers, UCP-3901 and in IP Routing control and configuration.
RTP	Real-time Transport Protocol. An IP standard which specifies a way to manage the real-time transmission of multimedia data over a network.

Term	Definition
SDI	Serial Digital Interface. A method for packing real-time media (uncompressed video, audio and metadata essences) into a digital serial bit stream and sending it over a low-latency, point-to-point electrical link (typically a coaxial cable).
SMPTE 2022-6	A transport protocol for the real time transport of high bit-rate video/audio data over IP networks, where the entire payload of the SDI signal is encapsulated as one IP stream. Designed to be applied to television transport for broadcast production and is not intended for emission purposes.
SMPTE 2022-7	A standard for the seamless reconstruction of a stream from the transmission of two streams of identical content over potentially diverse paths. Enables cost-effective redundant network operation. Two network are used and a full stream is sent on each network. A receiving device can switch between two received streams and recover the content of the original full stream.
SMPTE 2110	A standard for an extensible RTP IP streams (essence streams, including uncompressed video) referenced to a common clock. Includes support for a variable raster size (up to 32Kx32K pixels), HDR, and a variety of color sampling schemes, bit depths and frame-rates.
Source	Originator of one or more flows. Source spigot.
Spigot	A generic term for a source or a destination of one or more flows.
Stream	Term usually associated with delivery of constant, real-time media (e.g. Audio, Video) over IP networks with a stream of data packets.
TR-03	A Video Services Forum (VSF) Technical Recommendation concerning the transport of time-related uncompressed media over IP. Carriage of video, audio and ancillary data in separate elementary streams to provide greater flexibility in the production of media.
TR-04	A Video Services Forum (VSF) Technical Recommendation concerning the transport of media streams and elementary streams over a network.

7 Multiviewer SDC

This section contains information on using an UCP-3901 card running the Multiviewer (MV) SDC, through RollCall.

For help with the general use of the RollCall application, open the user manual by clicking the  button on the main RollCall toolbar.

Feature Summary - UCP-3901 with Multiviewer SDC

General Features

Video Inputs:

- 12 video inputs.
- SFP/QSFP cages for video IP streams over Ethernet.
- Standards supported: SMPTE 2022-6/7, SMPTE 2110-20/30/40.
- Resolution: SD/1080p/1080i/720p 50/59.94; 4K UHD through "quad-link" quadrants or signal-interleaved as '2SI'.

Multiviewer Head Display Outputs:

- 4 × head display outputs.
- SDI HD-BNC copies.
- SFP/QSFP cages for video IP streams.
- Standards supported: SMPTE 2110.
- Resolution: 1080p, 4K UHD support with four outputs used together as 'quad-link'.
- Reference Timing:
  - Using IEEE-1588v2 (PTP), compliant with SMPTE 2059-2.

Multiviewer Video Walls:

- Drag and Drop objects onto the screen layout.
- Adjustable layering, transparencies and fine-positioning.
- Additionally display web pages, automation play lists, device status screens etc.
- Monitoring of video, audio and metadata.
- UMD and tally support, on a video tile-by-tile basis.
- On-screen Clocks and Timers, with TRP support.

Multiviewer SDC Configuration Interfaces

The Multiviewer SDC has two separate configuration interfaces.

- UCP-3901 Card Configuration. This is configured on IP port 2050. See RollCall Templates - UCP-3901 Card Configuration on IP port 2050, on page 152
- Multiviewer SDC Configuration. This is configured on IP port 2051. See RollCall Templates - Multiviewer SDC Configuration on IP port 2051, on page 171

RollCall Templates - UCP-3901 Card Configuration on IP port 2050

This section describes each RollCall template of the UCP-3901 Card.

- RollTrack, on page 168
- Loopback Router, on page 168
- Setup, on page 169
- Ethernet Gb, on page 169
- Interop, on page 169
- Interop, on page 169
- SFP Configuration, on page 169
- HDR Control, on page 170

For Multiviewer SDC templates, see RollCall Templates - Multiviewer SDC Configuration on IP port 2051, on page 171.)

UCP-3901 Card Information Display

The **Information** display pane appears at the top of each page, and shows basic information on the input, standard and status of the card. The information to be displayed is defined on the **Video Selection** and **Information Select** panes to the right of the **Information** display.

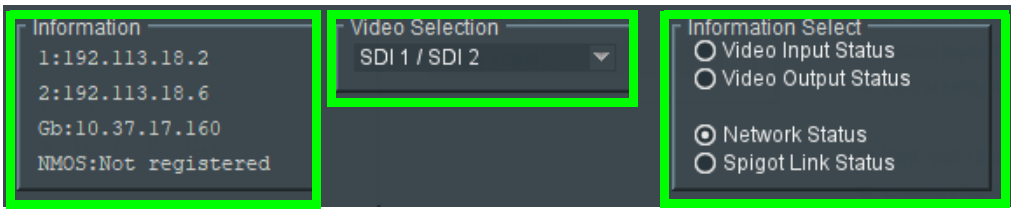


Figure 7 - 1: *Information and Selection Panes*

Selecting the Information to Display

- Select the inputs to display data for from the **Video Selection** drop-down list.
- Select **Video Input Status**, **Video Output Status**, **Network Status**, or **Spigot Link Status** from the **Information Select** pane as required.

The selected information type is displayed on the **Information** display pane.

Note:
- 'Video inputs' are considered to be video signals from the Multiviewer SDC. Thus, 'SDI 1' to 'SDI 4' 'video inputs' are the Multiviewer SDC's mosaic display outputs.
- 'Video outputs' are considered to be video signals to the Multiviewer SDC. Thus, 'SDI 1' to 'SDI 12' 'video outputs' are the Multiviewer SDC's 12 multiviewer video inputs.

Configuration

The **Configuration** page allows basic card parameters to be set.

Fig. 7-2: Configuration page

Note: SDC functionality options are also set here. See Upgrading the UCP-3901's SDC Application, on page 183 and Installing a License into an UCP-3901, on page 188 for more information.

Parameter	Description
SDI IO	Displays how input and output spigots are currently configured: **4 In - 12 Out** for Multiviewer SDC. Explanation: • **4 In** - 4 × Multiviewer SDC multiviewer mosaic head outputs come from the Multiviewer SDC function and go into the UCP-3901 Card. These four channels will use source spigots. • **12 Out** - 12 × Multiviewer SDC multiviewer inputs come from the UCP-3901 Card and go into the Multiviewer SDC function. These 12 channels will use destination spigots. See *Card Firmware/Software Version*, below, for information on how to change this.
Where Am I	Causes the front-edge and rear panel LEDs to flash, allowing the card to be easily identified.
Genlock	Select **Genlock** type: • **Network** - use the network's PTP clock. See Time Sync Configuration, on page 158 for further configuration settings. • **External Reference** - use the reference signal found at the **REF** connector on the card's rear panel. See Rear Panel and Connectors, on page 24. • **Freerun** - card is using its own clock with no reference to any other source.
GUID	Displays the absolute unique identifier associated with the Multiviewer SDC.
Domain	RollCall+ uses domains to partition a network; only nodes on the same domain can communicate with one another. A domain is uniquely identified with a number and a friendly name/alias. Set an ID as required, then press **Take** to confirm the change.
Interface Configuration	Displays the IP address for each of the Ethernet interfaces.

Parameter	Description
Card Firmware / Software Version	Each software version contains multiple firmware images. These allow different spigot input/output and flow standard combinations to be selected. For an Multiviewer SDC, the firmware configures the UCP-3901 Card inputs and outputs. **Note:** Selecting a firmware version is *not* normally required for Multiviewer SDC. **Note**: **Restore** and **Restart** buttons are displayed only when an item not currently installed is selected. Click **Restart** to restart the card and implement any changes made. See Upgrading the UCP-3901's SDC Application, on page 183 for how to change the SDC application.
Installed 25G / 50G Licensed Options	Shows the currently installed licensed card options. See See Installing a License into an UCP-3901 on page 188 for how to install a license.

Time Sync Configuration

The **Time Sync Configuration** page allows selection of the source signal to be used for synchronizing IP flows through the Multiviewer SDC, and the configuration of any properties associated with the relevant source. To use PTP, first set **Genlock** to **Network**. See Configuration, on page 155.

The configuration of this page is the same as for Essence Processing. See Time Sync Configuration, on page 50.

Multiviewer Configuration

The **Multiviewer Configuration** page configures Multiviewer SDC-related settings on the UCP-3901 Card.

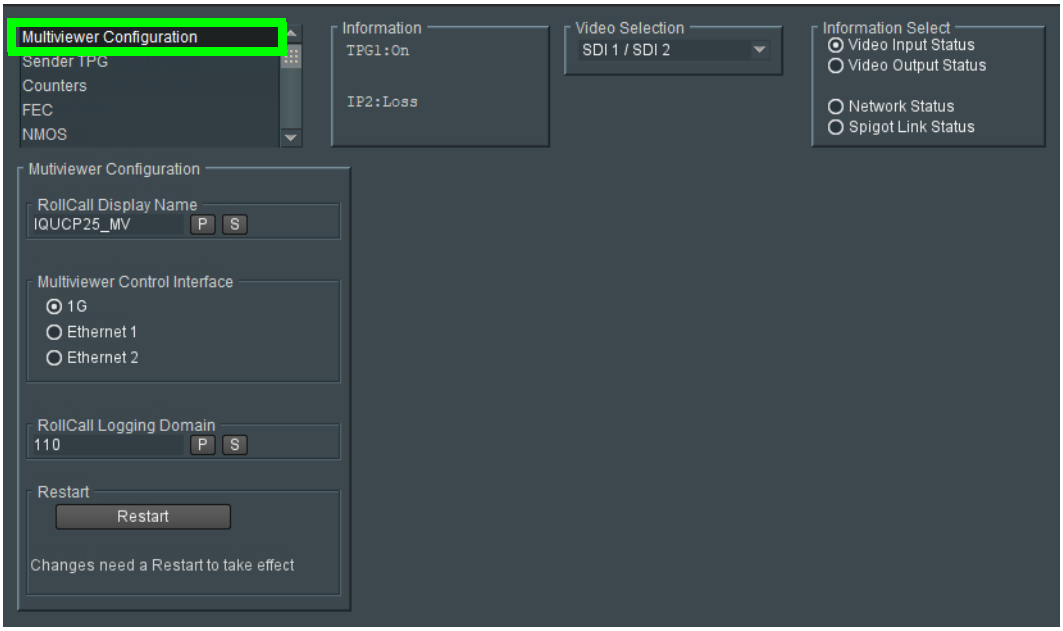


Fig. 7-3: Multiviewer Configuration page

Parameter	Description
RollCall Display Name	Name to be displayed (for example, in RollCall Control Panel) for the Multiviewer SDC RollCall pages. Enter information as required, then click S to save. New settings are applied when **Restart** is clicked.
Multiviewer Control Interface	Select the control interface to use to configure the Multiviewer SDC. • **1G** - Rear panel **MANAGEMENT** Ethernet interface. • **Ethernet 1** - Rear panel **SFP1** Ethernet interface. • **Ethernet 2** - Rear panel **SFP2** Ethernet interface. The Multiviewer SDC interface uses port 2051. See Rear Panel and Connectors, on page 24. See also Connecting to the Multiviewer SDC with RollCall, on page 39. New settings are applied when **Restart** is clicked.
RollCall Logging Domain	Enter RollCall domain to use for logging data (by the UCP-3901 Card). Click S to save. New settings are applied when **Restart** is clicked.
Restart	Click to restart the Multiviewer SDC in order to apply any changes made in this page to take effect.

Sender TPG (Test Pattern Generator)

The **Sender TPG** page allows test patterns to be applied on a spigot-by-spigot basis at source spigots (senders of IP streams). The video test pattern is moving color bars.

> **Note:** The test patterns appear at IP outputs only. They do not appear at the rear panel HD-BNC outputs.

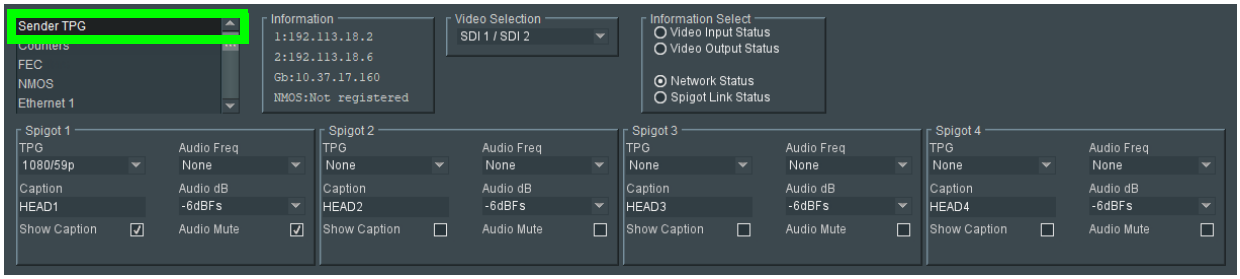


Figure 7 - 4: *Sender TPG Page*

The following options are available for each spigot:

Parameter	Description
TPG	Select the video standard of the moving color bars test pattern to apply to the spigot from the drop-down list. Select **None** to turn off the test pattern. **Note:** Different video standards may be selected for the test pattern, if required. But, for normal operation, the multiviewer head display outputs from the Multiviewer SDC support high resolution video standards. Refer to Multiviewer SDC IP Video Inputs, on page 204.
Audio Freq	Select the audio frequency to apply to the spigot from the drop-down list.
Caption	Type a caption (max 19 characters) to optionally be displayed with the test pattern.
Audio dB	Select the dB level to apply to the spigot from the drop-down list.
Show Caption	Set to enable the overlay the caption on the test pattern.
Audio Mute	Set to mute the audio tone.

If a test pattern is applied, either a pattern or a tone, the spigot cannot be used for streaming any other IP flow.

Counters

The **Counters** page allows you to clear various global counters on UCP-3901 Card pages. These count various types of error conditions that might occur.

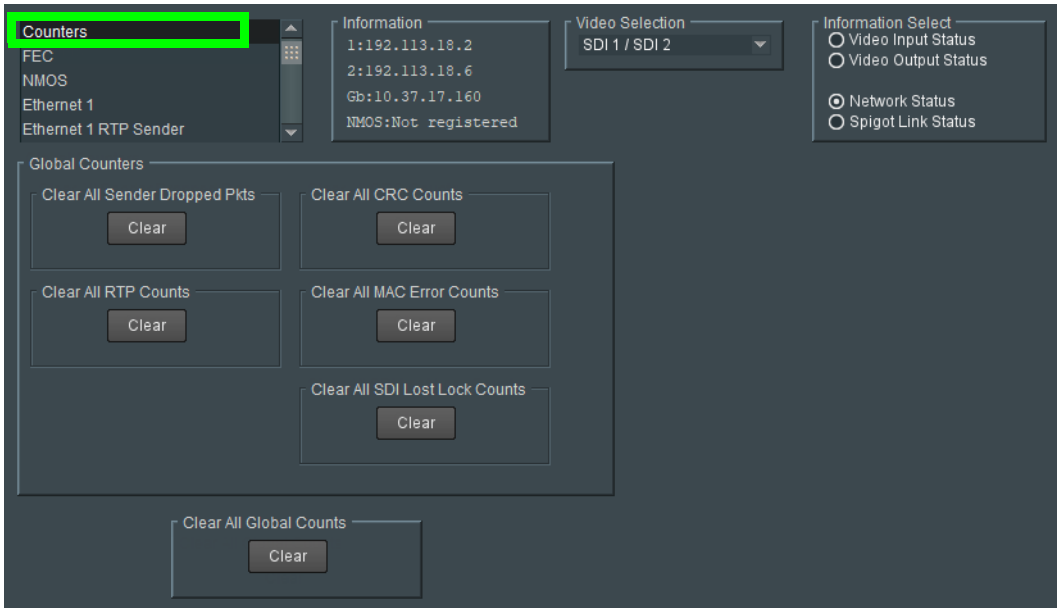


Fig. 7-5: Counters page

Parameter	Description
Clear All Sender Dropped Pkts	Counts the number of data packets an IP sender has had to drop. For example, if an IP connection were over-subscribed, a sender may drop data packets to prevent the total IP sending bandwidth being exceeded.
Clear All CRC Counts	These count any SDI video CRC errors in the *internal* Multiviewer SDC multiviewer head display output video signals (that is from the Multiviewer SDC to the UCP-3901 Card).
Clear All RTP Counts	Counts jumps in an Real-time Transport Protocol (RTP) packet ID sequence in an IP flow. This indicates any lost, dropped or out-of-sequence RTP packets. These counters are found on RTP Receiver and Ethernet pages.
Clear All MAC Error Counts	Counts packets marked as bad, for example, for a data packet CRC error. Such an error is normally also accompanied by an RTP error because a packet would be dropped.
Clear All SDI Lost Lock Counts	Counts the number of times an (internal) SDI signals to the Multiviewer SDC comes and goes. These counters are found on the sending spigots pages, 'Spigot 1' to 'Spigot 4'.
Clear All Global Counts	Clear all above counts.

FEC

The FEC page allows Forward Error Correction (FEC) Clause 74 (FC) and Clause 108 (RS) functionality of IEEE 802.3[2] to be enabled. FEC performance logging and statistics are also available. The variety of FEC to be used is selected through the Card Firmware/Software Version options on the Configuration page; see Configuration, on page 155 for more information.

The configuration of this page is the same as for Essence Processing. See FEC, on page 56.

NMOS

The **NMOS** page allows various NMOS parameters to be set, allowing the UCP-3901 to inter-operate with other equipment through an NMOS registry. NMOS must be used with SMPTE ST 2110 stream transport only.

The configuration of this page is the same as for Essence Processing. See NMOS, on page 58.

Ethernet Pages 1 and 2

Ethernet 1 and **Ethernet 2** are the Multiviewer's high speed media ports. **Ethernet 1** is identified as **SFP1** and **Ethernet 2** is identified as **SFP2** on the card's rear panel. See Rear Panel and Connectors, on page 24.

The **Ethernet** pages show details and status for each of the Multiviewer's high speed media network interfaces. The UCP-3901 defaults to use DHCP for Ethernet port address negotiation, but this can be overridden and a static IP address can be specified if required.

The Ethernet configuration for these ports can also be set through the frame's control panel. This is useful when the card is first installed in the frame, to make it quickly operational. See Local control using the Densité frame control panel to set the Card's IP Addresses, on page 29.

See Ethernet Gb, on page 169 for information on the **MANAGEMENT** Ethernet connector.

The configuration of this page is the same as for Essence Processing. See Ethernet Pages 1 and 2, on page 62.

2. Ensure the network switch you plan to use supports CL91-RS-FEC. For example, for Cisco products, see https://www.cisco.com/c/en/us/td/docs/switches/datacenter/aci/apic/sw/kb/b_Cisco_ACI_and_Forward_Error_Correction.html.

Ethernet 1 and 2 RTP Sender

The **RTP Sender** page displays the amount of data transmitted, on a spigot-by-spigot basis. Units are megabits per second.

The Multiviewer SDC transmits mosaic head display output video IP data packets on spigots 1 to 4 only.

The configuration of this page is the same as for Essence Processing. See Ethernet 1 and 2 RTP Sender, on page 65.

Ethernet 1 and 2 RTP Receiver

The **Ethernet 1 RTP Receiver** and **Ethernet 2 RTP Receiver** pages display information on a spigot-by-spigot basis about:

- the amount of data received;
- packet loss; and
- any unwanted multicast traffic.

The Multiviewer SDC receives video IP data packets on spigots 5 to 16.

The configuration of this page is the same as for Essence Processing. See Ethernet 1 and 2 RTP Receiver, on page 66.

Ethernet RTP Receiver Video Stats

The **Ethernet RTP Receiver Video Stats** page displays information on the reception of video IP flows on network interfaces 1 and 2 on a spigot-by-spigot basis.

The Multiviewer SDC receives video IP data packets on spigots 5 to 16.

The configuration of this page is the same as for Essence Processing. See Ethernet RTP Receiver Video Stats, on page 68.

Ethernet RTP Receiver Audio Stats

The **Ethernet RTP Receiver Audio Stats** page displays information on the reception of audio IP flows on network interfaces 1 and 2 on a spigot-by-spigot basis.

The Multiviewer SDC receives video IP data packets on spigots 5 to 16.

The configuration of this page is the same as for Essence Processing. See Ethernet RTP Receiver Audio Stats, on page 69.

Ethernet RTP Receiver Meta Stats

The **Ethernet RTP Receiver Meta Stats** page displays information on the reception of metadata IP flows on network interfaces 1 and 2 on a spigot-by-spigot basis.

The Multiviewer SDC receives video IP data packets on spigots 5 to 16.

The configuration of this page is the same as for Essence Processing. See Ethernet RTP Receiver Meta Stats, on page 70.

Link Control

The **Link Control** page allows 4K UHD spigots to be aggregated and synchronized by the UCP-3901 Card: input video IP streams (destination spigots, 5 to 16) or Multiviewer SDC multiviewer head display outputs (source spigots 1 to 4). Inputs/outputs can be set to be single or quad-link.

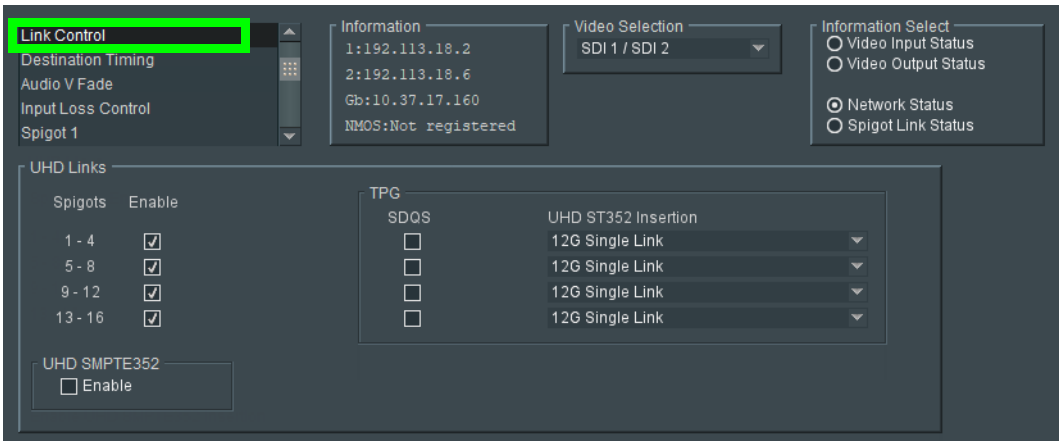


Figure 7 - 6: *Link Control page*

Parameter	Description
Spigots	When **Enable** is set, this show the 4 spigots that are to be used for the quad link signals. These spigots must be configured for HD signals. See Spigot 1 to 4 (Multiviewer Head Outputs), on page 166 and Spigot 5 to 16 (Multiviewer Inputs), on page 166. On the rear panel, see 3G / HD / SD SDI I/O – Serial digital video inputs / outputs (12), on page 26 to know on which BNC input / output each spigot is available.
Enable	Enable the spigots to be used for UHD Quad Links as required. Note that these controls are not available when using 12G.
TPG / SDQS	Set the quad link mode: • Deselect the **SDQS** check boxes as required to use two-sample Interleave (2SI). See Configuring the Streams for use with 4K UHD Two-Sample Interleave Division, on page 72. • Set the **SDQS** check boxes as required to use Square Division signals. See Configuring the Streams for use with 4K UHD SQD, on page 73.

Parameter	Description
TPG / UHD ST352 Insertion	Set the ST352 ancillary data type according to how the TPG data is to be output. • **None:** For no ancillary data. • **12G Quad Link:** For ST425 output over quad links. • **12G Single Link**: For ST2082-10 output over a single link. See *SMPTE 2082: 12G-SDI Bit-Serial Interfaces*, *SMPTE 425: Bit-Serial Interfaces at 3 Gb/s* and *SMPTE 352: Payload Identification Codes For Serial Digital Interfaces* for further information.
UHD SMPTE352 Enable	Inserts the same time-stamp information into each of the four quad-linked video IP output streams, when quad-link is used.

Destination Timing

The **Destination Timing** page allows genlock timing on each receiver spigot to be adjusted, in order to synchronize the IP signal with the house reference.

For the Multiviewer SDC, spigots 5 to 16 are configured as destination spigots, as they receive video IP streams.

The configuration of this page is the same as for Essence Processing. See Destination Timing, on page 76.

Audio V Fade

The **Audio V Fade** page configures an audio V-fade for each video input IP stream (for example, at receiving or destination spigots). When the video input switches to another source, an audio V-fade can be used to reduce audio disturbances at switch-over. When **Enable** is set, the audio will fade down on input loss and perform an audio V fade (down then up) during input switching.

For the Multiviewer SDC, spigots 5 to 16 are configured as destination spigots, as they receive audio IP streams.

The configuration of this page is the same as for Essence Processing. See Audio V Fade, on page 77.

Input Loss Control

The **Input Loss Control** page allows control of the card's response to signal loss from the internal multiviewer, spigots 1 to 4.

Figure 7 - 7: *Input Loss Control Page*

Options upon signal loss are:

Option	Operation
Freeze	Picture will freeze.
Black	Picture will cut to black.
TPG	Not available.

Spigot Pages

A separate page is provided for each of the active spigots.

- **Spigots 1 to 4** source up to 4 video IP signals. These form the multiviewer head display (mosaic) output video IP streams.
- **Spigots 5 to 16** receive up to 12 video IP signals. These are multiviewer video inputs 1 to 12.

> **Note:** The pages shown here may differ from those seen on your particular system, depending on the model and configuration of your UCP-3901 card.

On the rear panel, see 12G/3G/HD/SD-SDI I/O – Serial digital video inputs / outputs (4), on page 26 and 3G / HD / SD SDI I/O – Serial digital video inputs / outputs (12), on page 26 to know on which BNC input / output each spigot is available.

Spigot 1 to 4 (Multiviewer Head Outputs)

The **Spigot** pages 1 to 4 configure the multiviewer's head output (mosaic) streams.

The configuration of these pages are the same as for Essence Processing, though only audio and video essences can be configured. See Input Spigots, on page 81.

Spigot 5 to 16 (Multiviewer Inputs)

The **Spigot** pages 5 to 16 configure the multiviewer's input streams.

The configuration of these pages are the same as for Essence Processing. See Output Spigots, on page 85.

Logging - Configuration

The **Logging Configuration** page sets the destination logging server, if required.

The configuration of this page is the same as for Essence Processing. See Logging - Configuration, on page 88.

Logging - SDI Info

The **Logging - SDI Info** page shows SDI log message types.

The configuration of this page is the same as for Essence Processing. See Logging - SDI Info, on page 89.

Logging - System

The **Logging System** page shows system message types.

The configuration of this page is the same as for Essence Processing. See Logging - System, on page 91.

Logging - Network

The **Logging Network** page shows MEDIA network message types.

The configuration of this page is the same as for Essence Processing. See Logging - Network, on page 96.

Logging - Network 1G

The **Logging Network** page shows MANAGEMENT network message types.

The configuration of this page is the same as for Essence Processing. See Logging - Network - 1G, on page 99.

Logging - SFP

The **Logging SFP** page shows SFP message types relating to the installed SFP modules.

The configuration of this page is the same as for Essence Processing. See Logging - SFP, on page 101.

Logging - FPGA

The **Logging FPGA** page shows FPGA messages reporting temperature and voltages for an FPGA device on the Multiviewer SDC.

The configuration of this page is the same as for Essence Processing. See Logging - FPGA, on page 105.

Logging - Spigot 1 to 16

Note: A Multiviewer SDC:

- Sends out up to 4 video IP multiviewer head streams on (source) spigots 1 to 4.
- Receives up to 12 video IP multiviewer input streams on (destination) spigots 5 to 16.

The **Logging - Spigot** pages are used to view and select the Spigot log fields to be enabled for each available spigot.

The configuration of this page is the same as for Essence Processing. See Logging - Spigot 1 to n, on page 106.

Logging - NMOS

The **Logging - NMOS** pages are used to select the fields to be logged for the card's NMOS connection to the registry.

The configuration of this page is the same as for Essence Processing. See Logging - NMOS, on page 108.

Logging - Card Diagnostics

The **Logging Card Diagnostics** page is used to view log fields of the Multiviewer SDC and select those log fields to be enabled.

The configuration of this page is the same as for Essence Processing. See Logging - Card Diagnostics, on page 110.

RollTrack

The **RollTrack** page sets up RollTrack settings for the UCP-3901 Card allowing information action events to be triggered by the state of multiviewer head display outputs on spigots 1 to 4.

The configuration of this page is the same as for Essence Processing. See RollTrack, on page 112.

Loopback Router

The **Loopback Router** page is used to control a basic, internal 'IP routing' facility, which will loop IP flows from source spigots back into destination spigots. This is not used in normal operation.

The configuration of this page is the same as for Essence Processing. See Loopback Router, on page 114.

Setup

The **Setup** page displays basic information about the Multiviewer SDC, such as the serial number and software build number. This information may be required by Grass Valley Support if technical assistance is needed. Use the functions on the page to restart the card or to return all settings to their factory or default settings.

The configuration of this page is the same as for Essence Processing. See Setup, on page 115.

Ethernet Gb

The **Ethernet Gb** page configures the card's **MANAGEMENT** Ethernet connector port, found on the card's rear panel. See Rear Panel and Connectors, on page 24.

The management port handles card configuration and upgrade, as well as NMOS IS-04 and IS-05 communications with the NMOS registry.

The **Ethernet Gb** page shows details and status for the **MANAGEMENT** Ethernet connector port. The UCP-3901 defaults to use DHCP for the **MANAGEMENT** Ethernet port address negotiation, but this can be overridden and a static IP address can be specified if required.

The Ethernet configuration for this port can also be set through the frame's control panel. This is useful when the card is first installed in the frame, to make it quickly operational. See Local control using the Densité frame control panel to set the Card's IP Addresses, on page 29.

The configuration of this page is the same as for Essence Processing. See Ethernet Gb, on page 117.

See Ethernet Pages 1 and 2, on page 162 to configure the media Ethernet configurations.

Interop

The **Interop** page allows certain parameters to be changed in order to improve interoperability with third-party equipment, including disabling extended headers, and setting payload types.

The configuration of this page is the same as for Essence Processing. See Interop, on page 119.

SFP Configuration

The **SFP Configuration** page allows various parameters of fitted SFP transceiver module(s) to be adjusted, if required. The majority of SFP transceiver modules will operate correctly with the Multiviewer SDC without any need for adjustment. Some SFP transceiver modules, however, may need to have some SFP parameters adjusted.

The configuration of this page is the same as for Essence Processing. See SFP Configuration, on page 121.

HDR Control

The **HDR Control** page allows multiviewer input HDR essences to be configured (spigots 5 to 16).

The configuration of this page is the same as for Essence Processing. See HDR Control, on page 74.

RollCall Templates - Multiviewer SDC Configuration on IP port 2051

Introduction

RollCall templates for the Multiviewer SDC described here are accessed through IP port 2051 (see Connecting to the Multiviewer SDC with RollCall, on page 39). The templates are used to configure and control the Multiviewer SDC. Configuration/control is done using RollCall Control Panel, part of the Grass Valley RollCall Suite. The Multiviewer SDC multiviewer configuration is typically performed once after Multiviewer SDC installation.

RollCall Control Panel may be used to configure and control various Multiviewer SDC items, including:

- selection of video wall layouts;
- monitoring alarm status;
- acknowledging alarms; and
- control of timer widgets on the video wall.

RollCall templates for the Multiviewer SDC

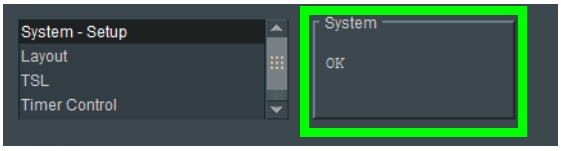
This section describes the RollCall templates for the Multiviewer SDC. See also Navigating Pages in the RollCall Template, on page 44.

- System - Setup, on page 173
- Layout, on page 176
- TSL, on page 179
- Timer Control, on page 181
- Timer Request Protocol, on page 182

For UCP-3901 Card templates, see RollCall Templates - UCP-3901 Card Configuration on IP port 2050, on page 152.

Multiviewer SDC System Information Display

The **System** box displays the Multiviewer SDC system status at the top of each template page.



- **OK** - the Multiviewer SDC multiviewer is working correctly.
- **Fail** - the Multiviewer SDC multiviewer has a problem.
- **Restart Required** - the Multiviewer SDC application requires a restart. This is required after making changes in the template for certain configuration changes to take effect.

System - Setup

Note: The Multiviewer SDC multiviewer must be **System Reset** for any saved setting changes on this template page to take effect. See Carrying Out a System Reset, on page 175.
This should only be done during off hours when the system is not in use. Booting takes about 75 seconds to complete during which the card will be unavailable.

The **System-Setup** template (see Figure 7-8) comprises various information boxes which display basic information about the Multiviewer SDC multiviewer (for example, system status, product name and software version). It is also used to setup the following Multiviewer SDC system details:

- System reset of the Multiviewer SDC multiviewer.
- RollCall settings.
- Multiviewer monitor output format.
- Multiviewer name.

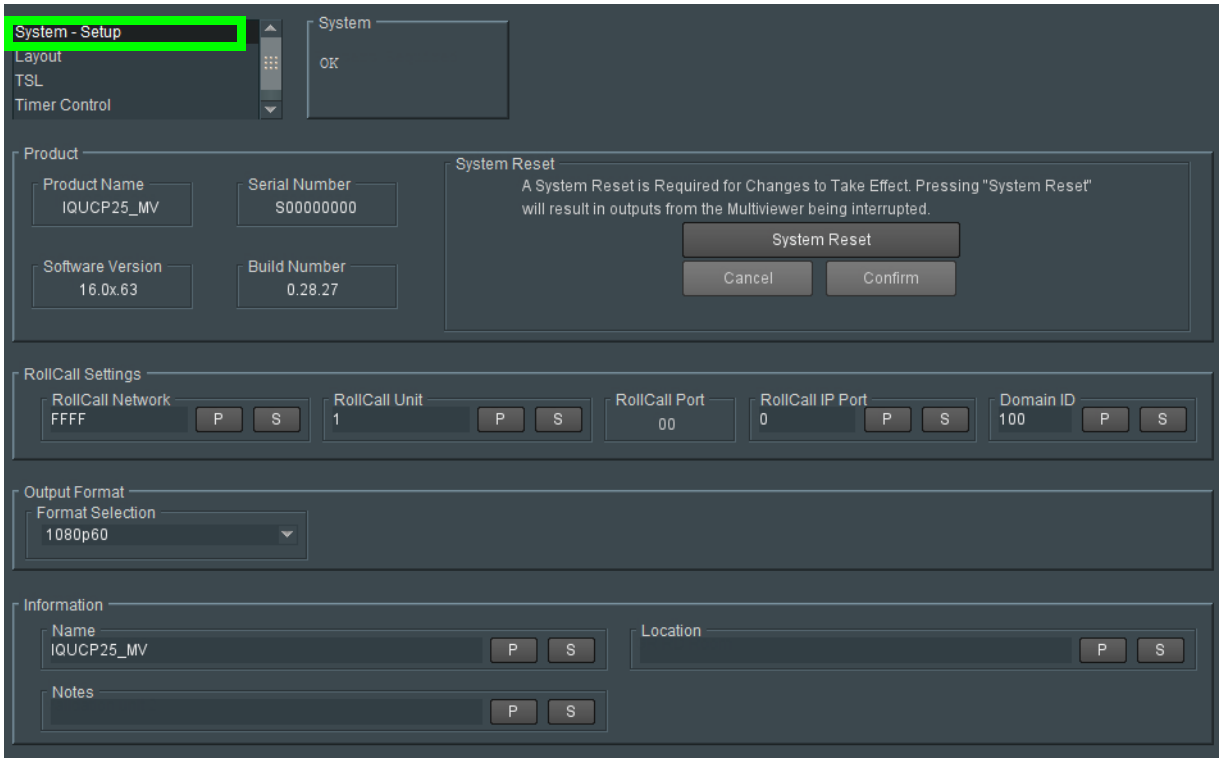


Fig. 7-8: System Setup Template

Parameter	Description
Product Name	Shows the name of the module. For example, 'IQUCP25_206'.
Serial Number	Shows the Multiviewer SDC's serial number.

Parameter	Description
Software Version	Shows the currently installed Multiviewer SDC software version number.
Build Number	Shows the build number of the currently installed Multiviewer SDC software.
System Reset	Reboots the UCP-3901 Card. This is used to make any **System-Setup** template configuration setting changes take effect. Performing a system reset makes the multiviewer use the new settings. A system reset reboots the multiviewer by *effectively* powering it down and then powering it back up: This will produce a picture disturbance on all multiviewer head display outputs and network connections. A reboot takes approximately 75 seconds.
RollCall Settings	The RollCall settings in the **System-Setup** template are used to allow Grass Valley Orbit software applications to control the Multiviewer SDC and should normally be changed if you have multiple Multiviewer SDC running on UCP-3901 Cards on the same RollCall network.
RollCall Network	Enter the RollCall network number. The network number forms part of the unit's RollCall address; this is *not* an IP network address. See About the RollCall Address, on page 175 for more information.
RollCall Unit	Enter the RollCall unit number. The unit number must be unique for each Multiviewer being configured. The initial default value is **01**. See About the RollCall Address, on page 175 for more information.
RollCall Port	This parameter is not used.
RollCall IP Port	This parameter is not used.
Domain ID	Enter RollCall domain ID. See About the RollCall Domain ID, on page 175 for more information.
Output Format	The **Output Format** of multiviewer head display outputs is set for *all* of the multiviewer display outputs. All outputs share the same format.
Format Selection	Select the display output format. **Note:** 4K/UHD Output: When driving a 4K/UHD monitor, each Multiviewer SDC head display output drives one quadrant of the UHD monitor. Some 4K/UHD monitors have four 1080P inputs, so they can be fed from four Multiviewer SDC 1080p outputs. If this is not the case, a separate adapter must be used to convert four Multiviewer SDC display outputs to a single 4K signal suitable for the monitor.
Information Box	These are text fields which allow you to enter the name, location and notes about your multiviewer unit, for future reference. To enter/modify text in the text box, type directly into the editable text field and click S. To return to the default text, click P.
Name	You can give your multiviewer a meaningful name, making it easier to identify by its role or purpose. Maximum 32 characters. Click S or press **return** to save the name locally.

Parameter	Description
Location	You can specify the multiviewer's location details, to make it easier to find where the multiviewer is located in the future. Maximum 64 characters. Click S or press **return** to save the name locally.
Notes	You can enter extra notes and information about the multiviewer here. Up to 64 characters can be displayed in the notes field. Click S or press **return** to save the name locally.

Carrying Out a System Reset

Once all changes in the **System-Setup** template have been done, carry out a system reset. During off hours when the system is not in use:

1 Click on the **System Reset** button. The **Confirm** button becomes active.

2 Click **Confirm** to perform a system reset.
Or click **Cancel** to abort the system reset.

Booting takes about 75 seconds to complete during which the card will be unavailable.

About the RollCall Address

Note: RollCall address:

This is not an IP network address.

A RollCall address has the form: NNNN:UU:PP

where:
NNNN is the RollCall network number.
UU is the RollCall unit number.
PP is the multiviewer input number (01, 02, and so on).

About the RollCall Domain ID

Note: RollCall Domain ID:

RollCall uses the concept of domains to partition a RollCall network. Only those RollCall-enabled devices on the same RollCall Domain can communicate with one another.

A domain is uniquely identified with a **Domain ID** number. **Domain ID** is also used by Orbit software when connecting to an Multiviewer SDC.

- The **Domain ID** can typically be left at its default value, 100. (Reserved for multiviewer RollCall traffic.)
- To reset the **Domain ID** to the default value of 100 click on the P button.

To set the **Domain ID**, enter the Domain ID number in the text box and click S to locally save the new setting.

Layout

The **Layout** template allows you to select which multiviewer video wall layout to apply to each multiviewer head display output. You can also use a RollCall soft- or hard-panel to remotely control which video wall layout is used.

The on-screen transition between two wall layouts is selectable; it can be:

- a simple cut; or
- a fade through black.

Video walls are designed in the Orbit application and different wall layouts may be generated for the same wall. These are all contained within an GV Orbit multiviewer project.

- Each *video wall* in an Orbit multiviewer project has a **Name** property which is set to *Wall 1*, *Wall 2*, and so on. You can edit the wall name in GV Orbit.
- Each *wall layout* in an GV Orbit multiviewer project has a **Name** property which is set to *Layout1*, *Layout2*, and so on. You cannot edit this.

The wall layout to be used for each wall can be selected in the respective drop-down box of the **Layout** template.

Note:	Wall layout names are case-sensitive.

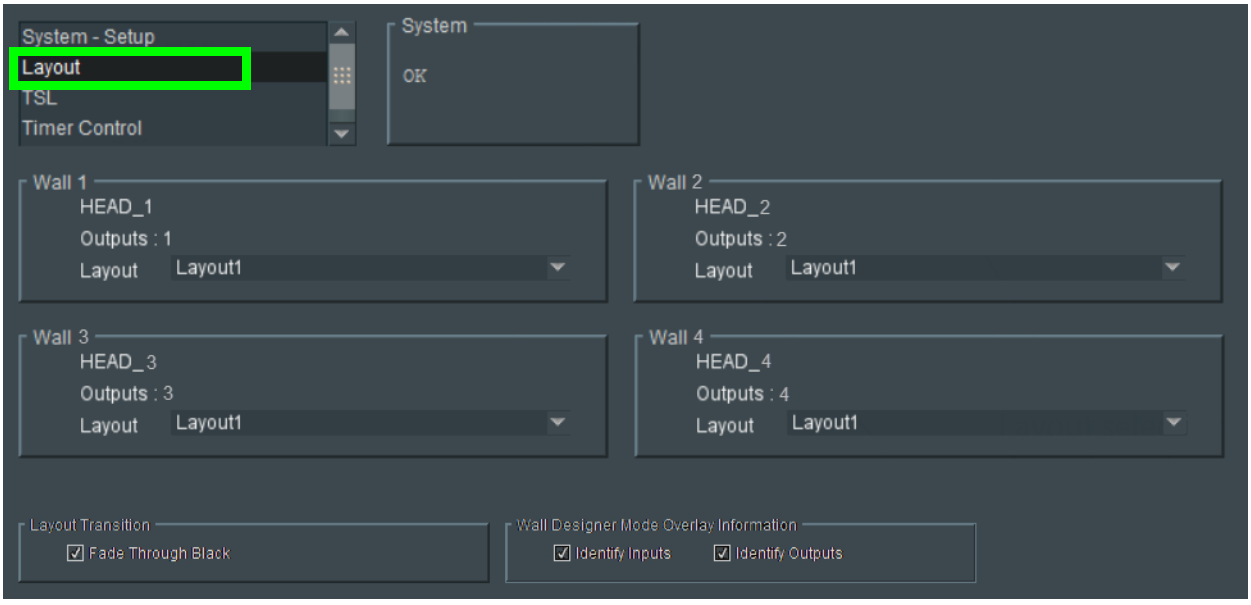
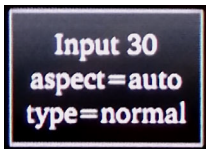
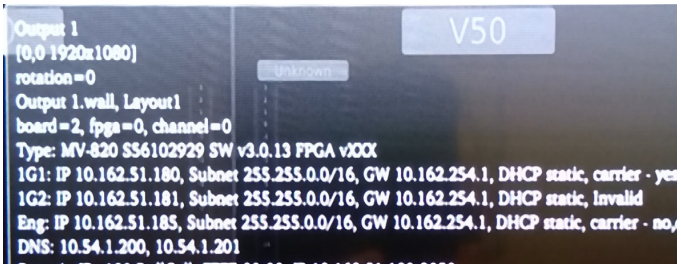
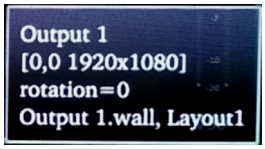


Fig. 7-9: Layout Template

Table 7-1: Layout and Controls Settings

Setting	Description
Wall N:	Wall number, as defined in the Orbit multiviewer project. (1... up to 12.)
Wall name	Wall name, as defined in the Orbit multiviewer project.
Outputs	Head display output number(s) associated with the wall.

Table 7-1: Layout and Controls Settings (continued)

Setting	Description
Layout	Select the wall layout to use from the drop-down list.
Layout Transition:	
Fade Through Black	Controls the type of on-screen transition seen when changing between wall layouts. • Select for fade down to black, then fade up to new layout. • Deselect for a cut from current to new wall layout.
Wall Designer Mode Overlay Information:	Controls the display of overlay information on each multiviewer head display output (Multiviewer software 2.16.16 or later). See Figure 7-10.
Identify Inputs	Select to display overlay information which identifies each video input on each video tile on the head display output screen. 
Identify Outputs	Select to display overlay information which identifies each head display output screen (1... up to 12). The overlay appears in the bottom right-hand side of each output. • Immediately after this **Identify Output** feature is enabled, the overlay information shown about the outputs is extensive:
	
	After 20 seconds, the overlay reverts to showing only brief output information, as shown in Figure 7-10. 

Identify Inputs:
An overlay which identifies a video input in a video wall tile.

Identify Outputs:
An overlay which identifies each multiviewer head display output.

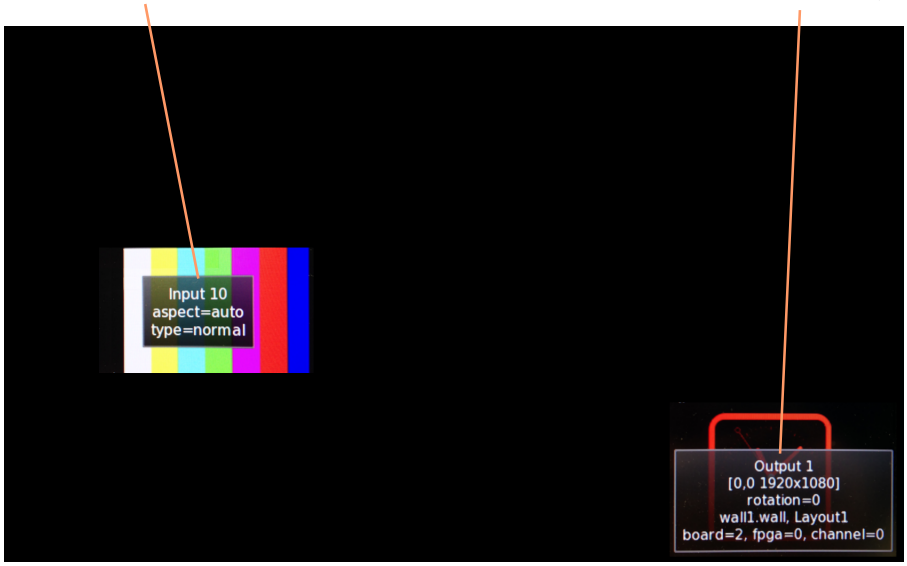


Fig. 7-10: Multiviewer Head Display Output Overlays

TSL

The **TSL** template allows you to select settings related to Multiviewer SDC support of the TSL protocol.

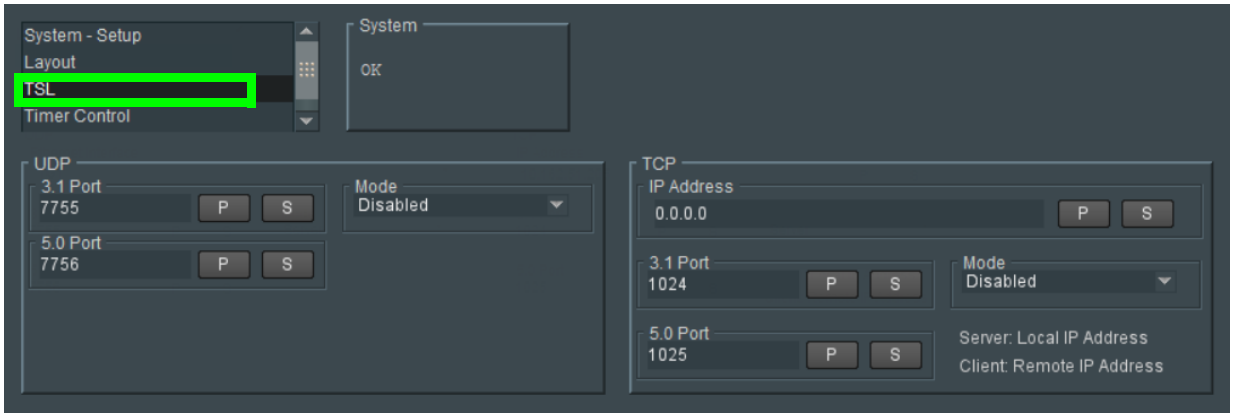


Fig. 7-11: TSL Template

TSL protocol is supported in TSL Server Mode or TSL Client Mode, see TSL Support, on page 142.

For two types of Ethernet protocols (UDP and TCP), you can separately set up IP address and network port information.

Table 7-2: TSL Mode Settings

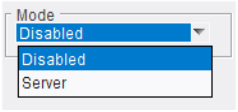
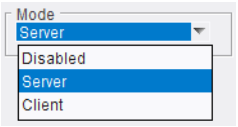
Setting	Description
UDP:	
Ethernet Interface	Select Ethernet port to use - port1 (1G1) or port 2 (1G2).
3.1 Port	Enter the IP port to receive TSL 3.1 messages on.
5.0 Port	Enter the IP port to receive TSL 5.0 messages on.
Mode	Select “Server”, or “Disabled”. 
TCP:	
IP Address	For **Server** Mode: Enter the local IP address of the Multiviewer SDC to be used for TSL messages. For **Client** Mode: Enter the IP address of the remote TSL Controller in the system.
3.1 Port	Enter IP port to receive TSL 3.1 messages on.

Table 7-2: TSL Mode Settings (continued)

Setting	Description
5.0 Port	Enter IP port to receive TSL 5.0 messages on.
Mode	Select "**Server**", "**Client**" or "Disabled". 

Enter information as required, then click S to save.

Timer Control

The **Timer Control** template allows you to set up timers on a video wall and then remotely control them with a RollCall soft- or hard-panel. For example, to remotely start and stop the timers.

The template is shown in Figure 7-12 and, for each **Timer**, the settings shown in Table 7-3 are available.

Fig. 7-12: Timer Control Template

Table 7-3: Timer Control Settings

Setting	Description
Running	Start / stop the timer. • Set to start the timer. • De-select to stop the timer.
Reset	Select to reset the timer.
(Target time)	Enter the timer's target time. When the target time is changed, the timer is reset. Target time format: HH:MM:SS For example,12:30:00
Count Up / Count Down	Select to reset the timer and count up / down.

Note: On the multiviewer video wall, **Timers** are implemented with **Timer** widgets.
All **Timer** widget on-screen styling and the configuration of trigger points and so on are set up through the GV Orbit application.

Timer Request Protocol

The **Timer Request Protocol** template allows you to define the IP address of an 'eTimer' server device and the IP port number to use. The protocol used is the Plura™ Timer Request Protocol.

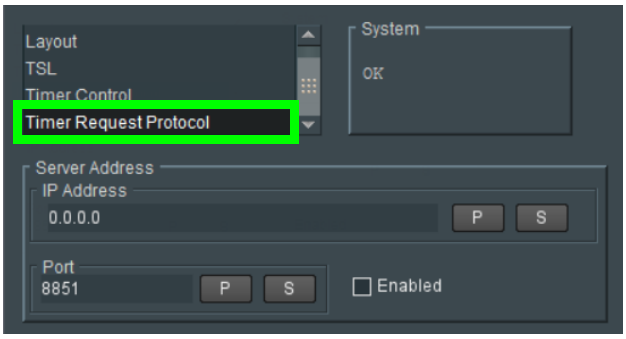


Fig. 7-13: Timer Request Protocol Template

Table 7-4: RollCall Timer Request Protocol Settings

Setting	Description
IP Address	Set the IP Address of an 'eTimer' server device then press S.
Port	Set the associated port number to use for Timer Request Protocol messages.
Enabled	Select to enable use of Timer Request Protocol messages.

Enter information as required, then click S to save.

Note: Configuring an 'eTimer':

An Orbit Timer widget can be configured on a video wall tile in GV Orbit to be connected to an 'eTimer' service.

8 Maintenance & Troubleshooting

Maintenance

Saving and Restoring an UCP-3901's Configuration

The UCP-3901's configuration can be saved to your local disk, which is useful in the case you need to return to a previous state. Saving an UCP-3901's configuration is also used as a preventive measure before a firmware upgrade, so that you can downgrade if necessary and quickly restore the configuration.

Save and restore are found by right-clicking the unit name in the Network Browser.

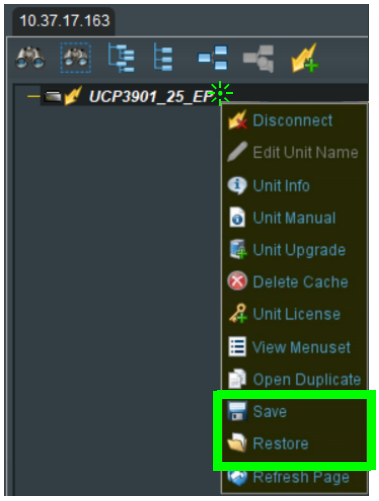


Fig. 8-1: UCP-3901 Menu

For more information about how to use save and restore, see the *RollCall Control Panel User Manual*, available for download from the Grass Valley website. See Related Documentation, on page 14.

Upgrading the UCP-3901's SDC Application

The following is required to proceed:

- A Microsoft Windows PC that:
  - has Internet connectivity.
  - has network connectivity with the UCP-3901.
  - has RollCall software installed.
- UCP-3901 firmware files.

A SDC Application upgrade package is supplied by Grass Valley Technical Support and comprises a set of data and installer files. The package is associated with an UCP-3901 software version number, for example, 14.35.80

To obtain an upgrade software package, contact Grass Valley Technical Support. See Grass Valley Technical Support, on page 210.

The UCP-3901 card software upgrading process follows the standard process for card upgrades with Grass Valley RollCall Control Panel. For more details, see the:

- RollCall Control Panel User Manual.
- RollMechanic Operator's Manual.

See Related Documentation, on page 14.

A SDC Application upgrade is done in the following stages in RollCall:

- **Stage 1:** To add/import the upgrade package to RollCall Control Panel, on page 184.
- **Stage 2:** To install the upgrade on the UCP-3901, on page 185.
- **Stage 3:** To delete RollCall's cache for the UCP-3901, on page 187.

To add/import the upgrade package to RollCall Control Panel

1 Save the supplied upgrade package(s) to a network location that can be accessed by the Control Panel. Upgrade packages are supplied in a compressed file format (.zip) and they should not be extracted.

2 Click **Import New Upgrades** button in the main toolbar.

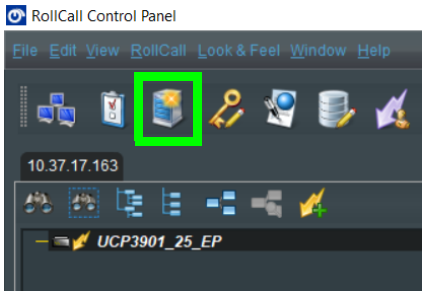


Fig. 8-2: Import new Upgrades

The RollCall Upgrade Packages dialog displays. The left-hand panel displays all currently available upgrades, grouped by unit type.

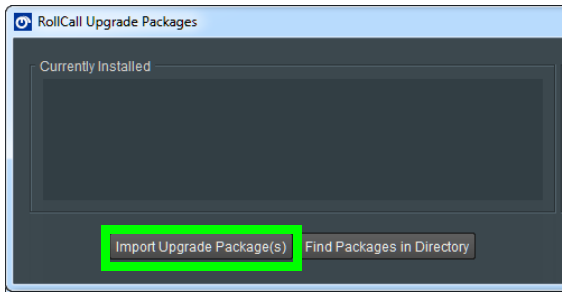


Fig. 8-3: Upgrade Packages

3 Click the **Import Upgrade Package** button.

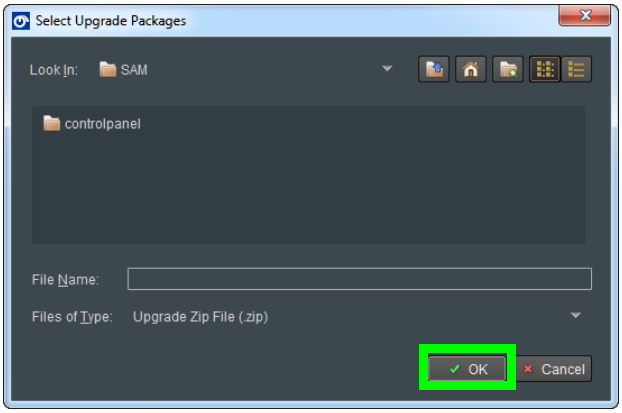


Fig. 8-4: Select Upgrade Package

4 Browse to the folder containing the upgrade package.

5 Select the upgrade package and click OK.

When the package has been imported, it is added to the list of available upgrades, and units may be upgraded accordingly. See To install the upgrade on the UCP-3901, on page 185.

To install the upgrade on the UCP-3901

A unit can only be upgraded if an appropriate upgrade package is available. See To add/import the upgrade package to RollCall Control Panel, on page 184.

1 Right-click on the unit name in the Network Browser.

The unit menu displays.

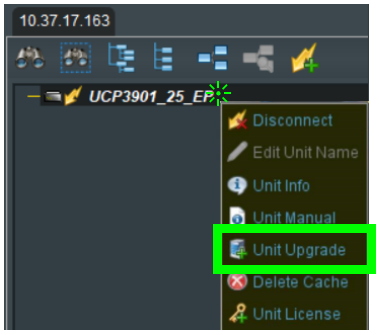


Fig. 8-5: UCP-3901 Menu

2 Click on **Unit Upgrade** from the unit menu.

The **Unit Upgrade** dialog displays.

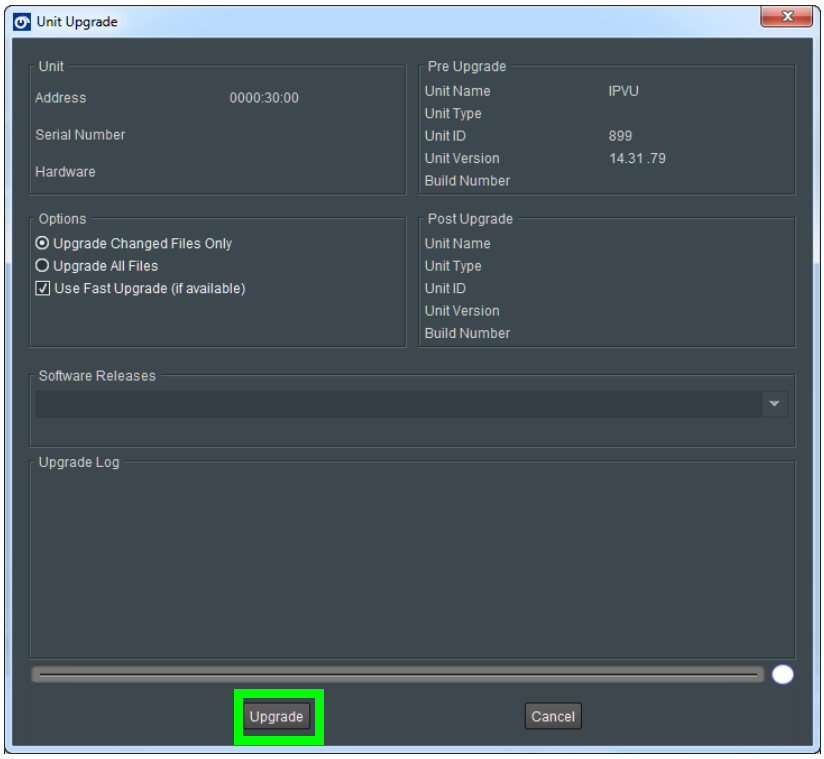


Fig. 8-6: Unit Upgrade Dialog

The following elements and options are available:

- **Unit** - This panel displays the unit address, serial number, and hardware version (if available).
- **Pre Upgrade** - This panel displays the unit name, unit type, unit ID, unit version and loader version of the unit before the upgrade.
- **Options** - When changing the SDC to another software application (for example, from EP to MV), you must select **Upgrade all files**. Otherwise, it is recommended that the **Upgrade Changed Files Only** setting is used to ensure a fast upgrade. However, some units may ignore this setting, and always upgrade all files.
- **Post Upgrade** - After completion of the upgrade, this panel displays the new unit name, unit type, unit ID, unit version and loader version.
- **Software Releases** - This drop-down list shows all of the software releases available for the unit type. Note that before any releases can be shown, software releases must be imported using the Import new Upgrades function available from the main toolbar. See To add/import the upgrade package to RollCall Control Panel, on page 184.
- **Release Notes** - If release notes are available, clicking this button displays them. If release notes are not available, this button is not displayed.
- **Upgrade Log** - This displays the progress of the upgrade.

- **Cancel** - This closes the Unit Upgrade dialog. If an upgrade is in progress, confirmation of this action is requested.
- **Upgrade** - see below.
- **Import upgrade from unit** - This creates a software release from the version currently on the unit. Note that this option is only displayed if the unit's version is not already in the list of software releases.

3 Select a software version from the **Software Release** dropdown.

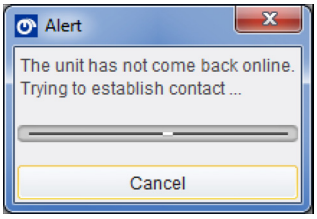
4 Click **Upgrade**.

This starts the upgrade process. The Densité status LED alternates between red and green during the upgrade process. See Front Card-edge Interface, on page 19.

Prior to the upgrade process beginning, a check is made to see whether the unit's current version is available in the list of software releases. If not, a dialog displays prompting to save the unit's current software release before upgrading.

> **Note:** The control panel cannot be used while performing an upgrade.

At the end of the upgrade, if the unit does not come back online, a dialog displays.



Further attempts are made to establish contact with the unit until it either, comes back online, or the Cancel button is pressed. Cancelling this operation has no effect on the success or otherwise, of the upgrade operation.

To delete RollCall's cache for the UCP-3901

If the upgrade changes any RollCall menu, then these UCP-3901 menus in RollCall may be empty or configuration information is missing or incoherent. Always delete RollCall's cache for the UCP-3901 after an upgrade.

1 In RollCall, right-click UCP-3901 and select Delete Cache.

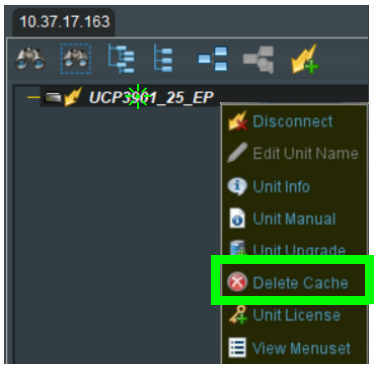


Fig. 8-7: UCP-3901 Menu

2 Close and restart RollCall.

Installing a License into an UCP-3901

A UCP-3901 can have additional features that can only be used if they are licensed; see Available Upgrade Licenses, on page 15. Licenses give access one of the UCP-3901 software-defined core (SDC) functions at a time. Licenses are provided as small zip files; the license key within the file is tied to the serial number of the particular UCP-3901 module for which it has been purchased. Some licenses also use a password. Licenses must be installed to RollCall and then loaded onto the card, which activates the new SDC functionality. Use the License Viewer to manage these licenses. Each platform has a tab at the top of the License Viewer, and the licenses relevant to a platform display in the appropriate tab.

The license files for the UCP-3901 are supplied upon purchasing a license from Grass Valley. They are small .zip files. Store the .zip files in a network location that can be accessed by the Control Panel. To obtain a license, contact Grass Valley Technical Support. See Grass Valley Technical Support, on page 210.

The process of installing a license to an UCP-3901 follows the standard process for a hardware card with licenses administered by Grass Valley's RollCall.

For more details about importing and installing license files, please see the:

- RollCall Control Panel User Manual.
- RollMechanic Operator's Manual.

See Related Documentation, on page 14.

The license key within the file is tied to the Serial Number of a particular UCP-3901 module. Some licenses use a password.

An UCP-3901 is licensed is installed in two stages in RollCall:

- **Stage 1:** To import license files to the RollCall Control Panel, on page 188
- **Stage 2:** To install the License on the UCP-3901, on page 189

To import license files to the RollCall Control Panel

1 Copy the license zip file from Grass Valley to a convenient place, such as the Windows Desktop.

2 Start RollCall, open the **Edit** menu, and select **Licenses**. The License Viewer is displayed.

3 Open the **UCP Licenses** tab, and click **Import Licenses**.

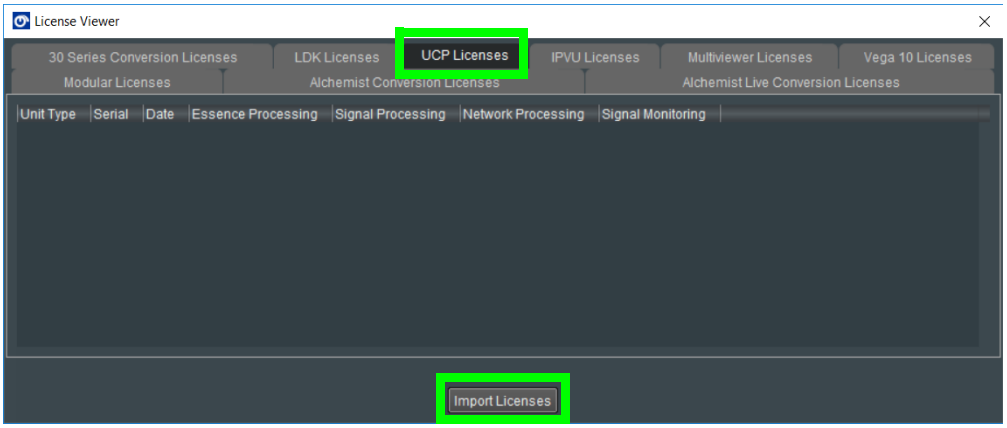


Fig. 8-8: RollCall License Viewer: Import new License

A Windows Browse dialog is displayed.

4 Browse to the zip file's location, select the file, and click **OK**.

5 The license is imported into RollCall, and the license details are displayed on the License Viewer.

6 Click **OK** to close the summary.

After importing licenses, they can be installed to individual UCP-3901s using the Unit License option. See To install the License on the UCP-3901, on page 189.

To install the License on the UCP-3901

1 Right-click on the unit, and click on Unit License to open the Unit License dialog.

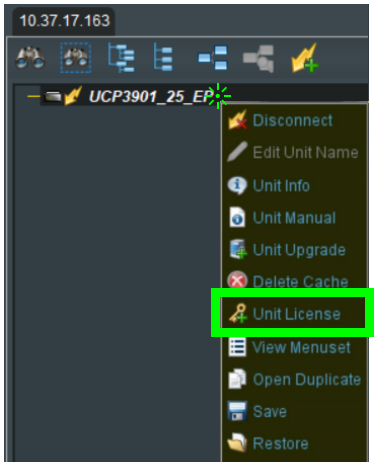


Fig. 8-9: UCP-3901 Menu

The Unit License dialog displays the currently installed licenses for both 3G and Licensed Options as well as any available licenses in the licensing database.

2 Select the licenses to install and click on Install Licenses.

3 In the confirmation dialog that displays, click **Yes** to install the licenses. To cancel the operation, click **No**.

A confirmation dialog displays, prompting for the module to be restarted. The licenses will not be valid until the module is restarted.

4 Click **Yes**.

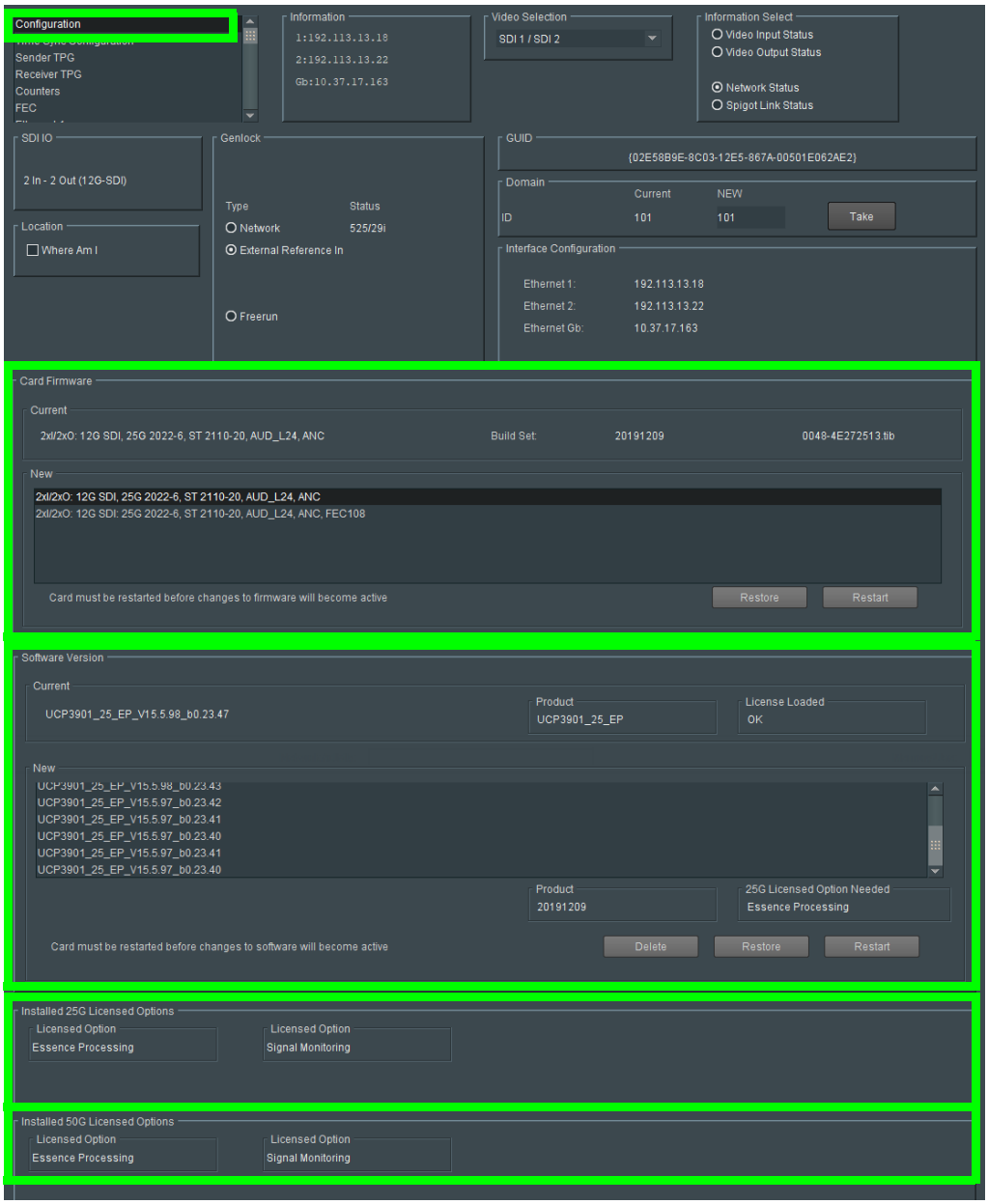
The Unit License dialog closes. When the unit has restarted the new licenses will be active.

Loading (Selecting) Software Version on the UCP-3901

The UCP-3901 Card is a generic card and its functionality is set by the licensing that has been enabled on it and by selecting a software version. A UCP-3901 Card may have more than one license and software version (for example, Essence Processing and another application).

The required functionality is selected by selecting the corresponding licensed software version on the card.

1 Start RollCall, and open the **Configuration** page. See Configuration, on page 48. Scroll down so that the **Card Firmware**, **Software Version**, **Installed 25G Licensed Options**, **Installed 50G Licensed Options** and panes can be seen.



- The **Card Firmware** pane displays the firmware option currently loaded. Other available firmware versions are displayed in the **New** pane.
- The **Software Version** pane displays details of the currently loaded SDC license. Alternative SDCs available for loading are displayed in the **New** pane.
- The **Installed 25G / 50G Licensed Options** panes show all installed licenses.

See Configuration on page 48 for more information.

To change the software version being used

1 Select the required SDC from the **Software Version** > **New** pane

Click **Restore** to return to the current software version in effect.

2 Click **Restart**. The module will reboot, and start with the new SDC functionality. Booting takes about 75 seconds to complete.

3 Select any required options from the **Card Firmware** > **New** pane, if available. Click **Restart** once more if any options are selected.

4 In the **Configuration** template, check that the current software version shows as **Licensed OK**.

The module is now ready to use.

Field Repairs

Field Replaceable Units

The following components are Field Replaceable Units (FRUs). The repair procedure is to swap in a new (known good) component to restore system operation.

Description	Grass Valley Part Number	See
Cooling fan	UCP-3901-FAN	Cooling Fan Operational Assessment, on page 193
Micro-SD Card	93-03084-010	Replacing the Micro-SD Card, on page 197
UCP-3901 Card UCP-3901 Rear Panel	-	See UCP-3901 Ordering Information, on page 15
SFP cartridge	-	See Supported SFP28 Cartridges, on page 16.

There are no user-serviceable parts within these components except for the UCP-3901 Card in which the heatsink cooling fan or the Micro-SD card can be replaced. See Cooling Fan Operational Assessment, on page 193 and Replacing the Micro-SD Card, on page 197.

Contact Technical Support to order an FRU. See Grass Valley Technical Support, on page 210.

Replacing Cards

Use a field-supplied Phillips #2 screwdriver to remove and install rear panels. All cards and rear panels can be installed with the frame power on.

Each card has connectors which plug into a mid-frame mother board for distribution of power and for connection to the controller card, and a second connector which plugs directly into the rear panel to support rear panel connections.

> IMPORTANT
> The rear panel must be installed before a UCP-3901 Card is inserted into the frame.
> The UCP-3901 Card must be removed from the frame before the rear panel can be removed.

Replacing a rear panel

To replace a rear panel in a Densité frame

1. If a card is already installed in a modular card slot served by the rear panel you are changing, remove it first (see Removing a card, on page 193).
2. Remove the existing rear panel (either blank or belonging to an existing card) by releasing the captive screws at the bottom.

   There may be several captive screws, depending on the card type.

3 Position the new panel and secure it in place with the captive screw(s) at the bottom.

Removing a card

To remove a card

1 Open the front door of the frame.
2 Lift up the card ejector handle on the front of the card you want to remove, to lever the connectors apart, and then use the handle to pull the card straight out of the modular card slot.
3 Close the front door of the frame.

Installing a Card

Note: The rear panel must be installed before the card. See Replacing a rear panel on page 192.

See Installation of the Rear Connector Panel and Card, on page 23.

Cooling Fan Operational Assessment

A cooling fan has moving parts that, over time, can wear out. In the final stages of fan wear out, the fan makes a distinctive sound and it rotates at a slower speed, thereby reducing airflow which undermines its ability to remove heat from the UCP-3901. Under this condition, fan replacement is required.

Also, dust contained in the ambient air can accumulate on the fan and on surfaces around the fan and heatsink, thereby reducing airflow, and preventing air from coming into direct contact with the heatsink surfaces which undermines the ability to remove heat from the UCP-3901. Under this condition, cleaning is necessary and fan replacement may be required.

Some diagnostic procedures may interrupt normal system operation. Changing the UCP-3901's cooling fan will interrupt normal system operation. Down time can be minimized by swapping in another known good UCP-3901 to restore system operation quickly. Schedule these maintenance operations during off hours when the system is not in use.

Diagnostics

The UCP-3901's electronic circuitry generates heat that must be shed by forcing air to move across heat-generating components. Reduced air flow or high ambient temperature results in heat build-up within temperature-sensitive components within the UCP-3901. This can cause unexpected behavior such as glitches or even a system freeze or shutdown. The UCP-3901 self-diagnoses high temperature conditions by raising critical temperature and fan alarms.

Critical temperature and fan alarms are reported through the following mechanisms:

- The fan and critical temperature alarms are reported in RollCall in the Alarms Configuration panel. For this, the **Fan Status Check** alarm must be enabled. See Logging - System, on page 91 for more information.

- A UCP-3901's Densité status LED flashes red due to this condition (note that the Status LED can also flash due to other conditions).

The fan alarm indicates that the fan:

- Is not rotating fast enough due to wear and thus it may not provide enough cooling.
- Has become unplugged from Power Connector **J14**. See Cooling Fan Replacement Procedure, on page 195.

A fan alarm must be addressed right away. A critical temperature alarm can be ignored if it is accompanied by a fan alarm as the root cause is the fan not rotating fast enough.

Otherwise, if the fan is running properly according to the fan alarm, then the *Critical Temperature Alarm Corrective Actions* steps should be taken.

Critical Temperature Alarm Corrective Actions

If the fan alarm is inactive and the critical temperature alarm is active (see **TEMP_N_STATE=** in Logging - FPGA, on page 105), then undertake the following diagnostic steps in the following order:

1. Confirm that the room temperature is within UCP-3901's operating temperature range specification. If necessary, take corrective actions by, for example, increasing the amount of air conditioning made available to the Densité frame.
2. Confirm that air flow around the Densité frame is not obstructed. If necessary, take corrective actions by, for example, removing obstructions or rerouting cables around and away from the Densité frame.
3. When the previous corrective actions do not eliminate an critical temperature alarm, verify that the UCP-3901's onboard fan is working correctly. See Fan Noise below.

Fan Noise

Over time, a fan's performance (operating speed) can degrade which may raise critical temperature and fan alarms. Under this circumstance, a fan may emit a rough-sounding lower pitched sound as compared to the sound that other healthier fans emit. To confirm that the UCP-3901 has an abnormally-sounding fan, during off hours when the system is not in use, eject the UCP-3901 card from the frame to verify that the distinctive sound stops and take corrective actions (see below).

Fan Alarm and Fan Noise Corrective Actions

When a fan alarm is raised, it must be addressed right away. During off hours when the system is not in use, eject the UCP-3901 card from the frame and inspect the UCP-3901's fan assembly: remove any accumulated dust and dirt from within the UCP-3901 with compressed air and remove any obstruction to the fan's ability to freely rotate.

Re-apply power to the UCP-3901 and restore system operation to see if the fan alarm becomes inactive.

The UCP-3901's onboard circuitry monitors the fan motor's rotational speed to detect that the fan is rotating fast enough to provide sufficient cooling; it raises a fan alarm when the fan's rotational speed has gone below a factory-set threshold.

When the UCP-3901's fan is not rotating fast enough (as detected by a fan alarm), is making abnormal noises, or is not rotating at all, the fan is worn out and it must be replaced with a new one.

Replacing the UCP-3901's Fan

Fan Replacement Kit

The replacement fan kit is available by contacting Technical Support. See Grass Valley Technical Support, on page 210.

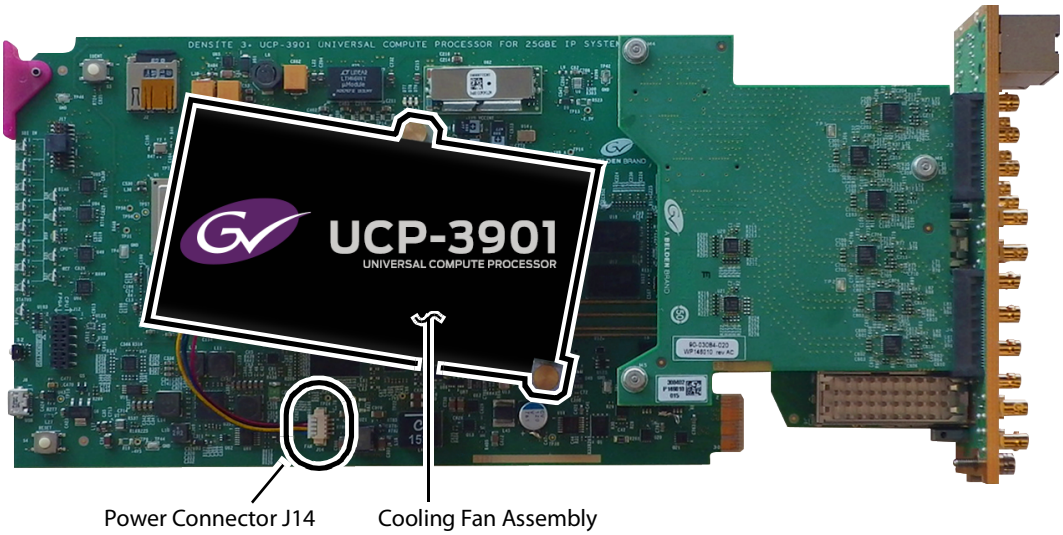
Required Tools

The following field-supplied material is required:

- Compressed air to remove dust from the UCP-3901.
- Needle-nose pliers to separate push pins from the PCB.
- Curved tweezers to disconnect the fan's power connector from the UCP-3901's main board.
- Anti-static bag or anti-static work surface to reduce the possibility of electrostatic discharge damage to the UCP-3901's electronics.

Cooling Fan Replacement Procedure

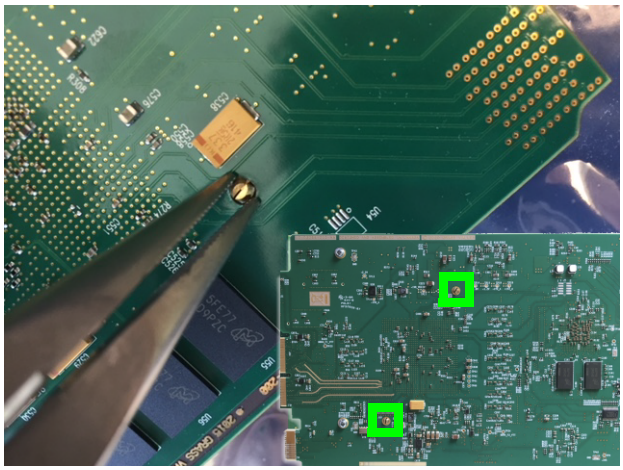
The cooling fan is located on the UCP-3901 PCB card.



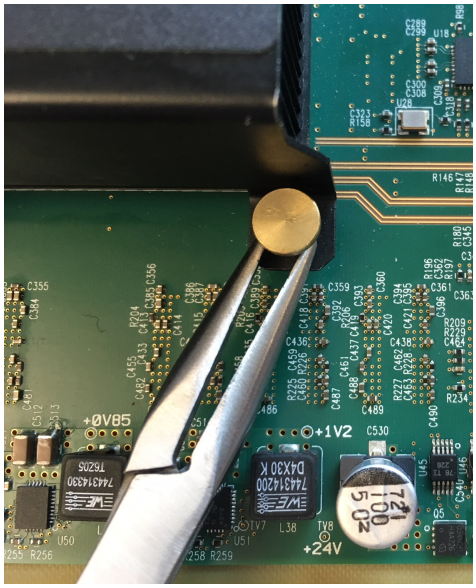
To remove a fan

1. During off hours when the system is not in use, eject the UCP-3901 card from the Densité frame.
2. Flip the UCP-3901 card over to the non-fan side on an anti-static bag or anti-static mat so that you can see the rear (solder side) of the card.

3 Using needle-nose pliers, compress the two pushpins so that they unlatch. Push the pin through the card to release it from the assembly.

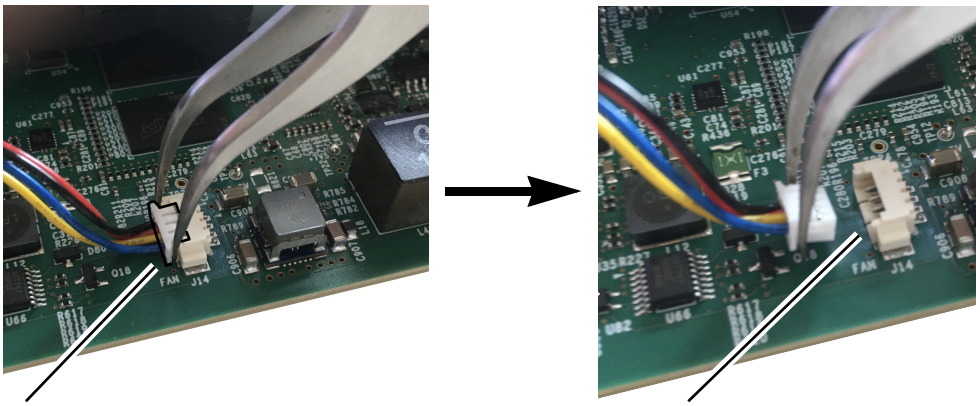


4 Flip the card back to the component (fan) side. Insert the pliers under the one of the pushpin heads. Press down on the center of the fan assembly to prevent it from flipping on its side and gently pry the pin from the heatsink assembly. Repeat for the second pushpin.



5 Using curved tweezers, disconnect the fan power connector plug, very carefully; gently wiggle the connector plug from the socket (jack). Do not pull on the wires. If the wires

are routed through wire holders, remove the wires from the holders first, before disconnecting.



Fan Power Connector Plug

Fan Power Connector Jack J14

6 Dispose of the failed fan assembly.

7 Remove any accumulated dust from the UCP-3901 card with compressed air.

To install the new fan

1 Place the fan assembly on the heatsink and align the two pushpins with their respective holes on the card.

2 Press down on the fan assembly to hold it in place and press the pushpins into the holes until they lock into place.

3 Connect the power connector for the replacement fan assembly to the **J14** jack on the card.

4 Insert the UCP-3901 card into the Densité frame.

5 Put the UCP-3901 into operation and confirm that the critical temperature and fan alarms are now reported in RollCall as being normal. For this, ensure that:

- The **Fan Status Check** alarm is inactive. See Logging - System, on page 91 for more information. If the **Fan Status Check** alarm is active, ensure the fan is plugged into Power Connector **J14**.
- The critical temperature alarm is inactive. See **TEMP_N_STATE=** in Logging - FPGA, on page 105 for more information.

Replacing the Micro-SD Card

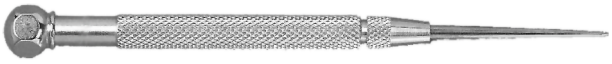
When the UCP-3901 does not boot, the Micro-SD card must be replaced. Note that using a blank Micro-SD card will not work. The Micro-SD card must be pre-loaded with firmware and other files. First call Technical Support to order part number **93-03084-010**. See Grass Valley Technical Support, on page 210.

When replacing a UCP-3901 card for maintenance purposes, you can remove the Micro-SD card from the old UCP-3901 card and then install it on the new UCP-3901 card. This transfers the old card's configuration to the new card so that the replacement UCP-3901 card becomes plug & play with your current installation.

Tools Required

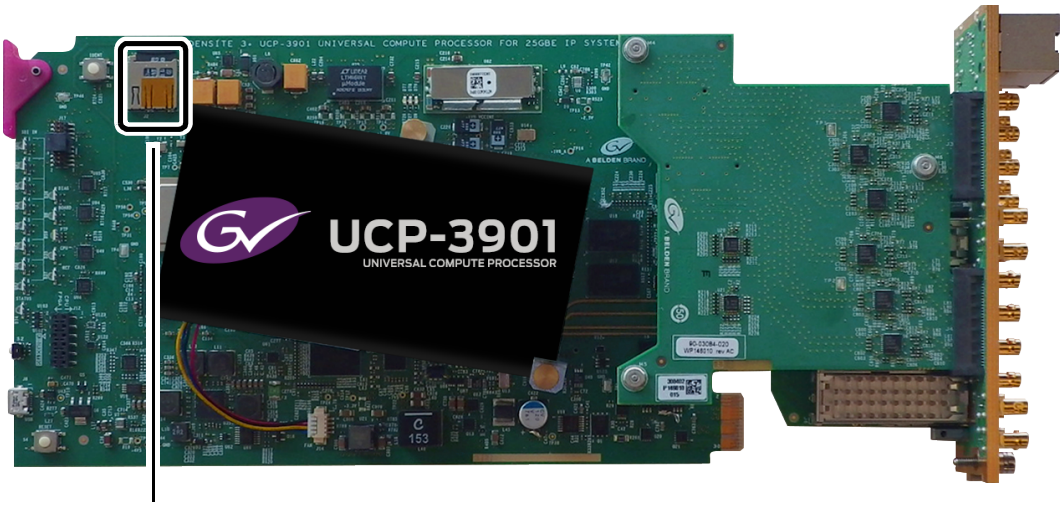
The following tools are required to open and service the UCP-3901.

- Scribe or an unfolded paper clip.



Replacing the UCP-3901's Micro-SD Card

1 During off hours when the system is not in use, eject the UCP-3901 card from the Densité frame.
2 Place the UCP-3901 on an anti-static bag or anti-static work surface.
3 Use a scribe to remove the micro-SD card: use the pointed tip to push the card out of the socket. The micro-SD card is located on the UCP-3901 PCB card.



Micro-SD Card and Socket

4 Insert the replacement micro-SD card into the micro-SD card socket.
5 Insert the UCP-3901 card into the Densité frame.

Troubleshooting

Following a methodical process of elimination, try the following steps.

1 Are you using the latest UCP-3901 firmware? To upgrade an UCP-3901's firmware, see Upgrading the UCP-3901's SDC Application, on page 183.
2 The Status Indicators on the UCP-3901 show if it is powered and these indicators provide troubleshooting information. See Front Card-edge Interface, on page 19.
3 All alarms and operational statuses can be seen from Rollcall Logging pages. These pages provide the live status of the card. Theses statuses are also logged when using a Log Server. See Logging Pages, on page 88.
4 Make sure the fiber connectors are clean, as the problem is often related to dust obstructing the light at the fiber connections. See Keep Fiber Connections Clean, on page 200.
5 Use another fiber connection.

6 Swap components of the UCP-3901 with known working components, one component at a time in a systematic fashion to further isolate the issue. For example, swap the SFP transceiver cartridges or use a different port on the network switch.

Further troubleshooting.

Problem	Possible solutions…
SFP n Status LED is blue flashing even with a fiber present	Make sure you are using the right multimode fiber type. By convention, the cable should be orange. Make sure the fiber connector is properly seated in the SFP cartridge. Make sure the media network switch is a powered-up. Make sure the total loss in the optical path is not greater than 2.5 dB, due to any combination of factors mentioned here. Measure the loss if necessary. Check the fiber for any damage. The fiber cannot have small circumference loops. Check the fiber connectors for dirt and debris. See Keep Fiber Connections Clean, on page 200. Make sure your fiber length is within the range of the media network switch and of the SFP cartridge's specification. Note: depending on fiber type, and if splices are done on your fiber, the actual maximum usable length will be reduced.
Densité status LED is off	Make sure the card in fully inserted into the frame and that the frame is powered.
Interpretation of status LEDs	Status LEDs show the UCP-3901's current operating status. See Front Card-edge Interface, on page 19 for more information.
After the UCP-3901 has had its firmware upgraded, the menus for UCP-3901 in RollCall are empty or configuration information is missing or incoherent	See To delete RollCall's cache for the UCP-3901, on page 187.
The card does not boot: the Densité status LED stays red	Call Technical Support. See Grass Valley Technical Support, on page 210. Technical Support may instruct you to replace the Micro-SD card. For the procedure to do this, see Replacing the Micro-SD Card, on page 197.

When contacting Grass Valley Technical Support, they may ask for product information. This is found in the **Setup** pane. See Setup, on page 115.

Testing if Network Redundancy (SMPTE ST 2022-7) is Working

During off hours when the system is not in use, you can verify that network redundancy (SMPTE ST 2022-7) is working.

1 Set the **Flow Type** to 'none' in the Spigot configuration screen for the primary stream to test the secondary stream and vice versa. Note that the **Flow Type** is set to SMPTE ST 2110 for either the primary stream or the secondary stream to allow traffic to flow on one of the SFP channels at a time.

Set the stream's Flow Type in	See
Essence Processing Inputs	Input Spigots, on page 81.
Essence Processing Outputs	Output Spigots, on page 85.
Multiviewer Inputs	Spigot 5 to 16 (Multiviewer Inputs), on page 166
Multiviewer Outputs	Spigot 1 to 4 (Multiviewer Head Outputs), on page 166

2 Click **Save** to start the test.

3 Perform this test on both the card's input and output spigots.

4 To restore normal operation, set the **Flow Type** to SMPTE ST 2110 for the primary stream and the secondary stream for all input and output spigots.

Keep Fiber Connections Clean

Safety First:

- Never assume a fiber is dark. Never look directly into the end of a fiber cable. All people in the area must wear laser safety glasses with side shields.
- Installing connectors on a fiber requires special handling procedures. Read and follow the fiber and connector manufacturer's instructions.

The physical interface between the optical fiber and the fiber port of the SFP cartridge is the critical point in the system. The fiber and the optical port must be accurately aligned – that's the job of the connector plugs and sockets – and be in intimate contact with no obstructions. This is your job. The small size of the fiber, and the even smaller size of the fiber core, means that even common dust particles can seriously impair the transfer of light from one fiber to another.

There are a variety of cleaning solutions available to help you maintain good fiber network performance. For best results, it should be possible for you to perform a visual inspection of the fiber ends to verify cleanliness.

Grass Valley strongly urges you to select a cleaning method that meets your needs, and to use it rigorously and consistently.

A few tips:

- When an optical fiber is disconnected from the SFP module's optical port, always:
  - Insert a dust plug into the empty SFP module's optical port.
  - Install caps on the open end of the fiber optic cable.

This keeps airborne particles from settling on the fiber end or in the SFP module's optical port.

- Keep your dust plugs and caps clean – always store them in a sealed container to prevent the transfer of dust to the fiber connectors when used in the future.
- Always follow the instructions carefully when cleaning – abrasions on the fiber ends can degrade system performance significantly.
- A visual inspection will ensure that particles and liquid residue have been removed.
- If it's still dirty, clean it again.

Note: The SFP module's optical ports cannot be cleaned.
If dust enters the SFP module's optical port to the point where performance degrades, the corrective action is to replace the damaged SFP module with a new one.

9 Technical Specifications

Essence Processing (EP) Inputs/Outputs

EP SDC Signal Inputs

3G/HD/SD-SDI Inputs	Up to 16 (0/4/8/12/16)
12G-SDI Inputs (4:2:0)	Up to 4 (0/4)
Electrical	Transport Stream
Connector/Format	HD-BNC/75Ω panel jack on standard connector panel
Conforms to	12G-SDI to SMPTE ST2082-10, mode 1 or ST425-5 3G-SDI to SMPTE 424M/425M level A compatible HD-SDI to SMPTE292M/274M/296M SD-SDI to SMPTE259M-C
Input cable length	Belden 4794A @ UHD / 12G - 60m Belden 1694A @ 2HD / 3G - 120m Belden 1694A @ HD / 1.5G - 165m Belden 1694A @ SD / 270M - 400m
Return loss	• >15 dB up to 1.5 GHz • >10 dB from 1.5 GHz to 3 GHz

EP SDC Signal Outputs

3G/HD/SD-SDI Outputs	Up to 16 (16/12/8/4/0)
12G-SDI Outputs (4:2:0)	Up to 4 (0/4)
Electrical	Transport Stream
Connector/Format	HD-BNC/75Ω
Conforms to	12G-SDI to SMPTE ST2082-10, mode 1 or ST425-5 3G-SDI to SMPTE 424M/425M level A compatible HD-SDI to SMPTE292M/274M/296M SD-SDI to SMPTE259M-C

Multiviewer (MV) Inputs/Outputs

Multiviewer SDC IP Video Inputs

Video Standards	1080p50/59.94/60 (UHD-1 Quad-link) 1080p50/59.94/60 (3G-A) 1080i50/59.94/60 (SMPTE ST274) 1080sF23.98/24/25/29.97/30, 1080p23.98/24/25/29.97/30 720p23.98/24/25/29.97/30/50/59.94/60 (SMPTE ST296) 525i59.94, 625i50
Number of supported streams	See Supported Multiviewer Media Network Input Capacity, on page 17.
Conforms to	2022-6, -7 2110-20, -30, -40.
Scalers	One per multiviewer input

Multiviewer SDC Multiviewer IP Head Display Outputs

Video Standards	1080p50/59.94/60 (UHD-1 Quad-link) 1080p50/59.94/60
Number of heads	4
Conforms to	2022-6, -7 2110-20, -30

Multiviewer SDC Multiviewer SDI Head Display Outputs

Video Standards	1080p50/59.94/60 (UHD-1 Quad-link) 1080p50/59.94/60
Electrical	Transport Stream
Connector/Format	HD-BNC/75Ω
Conforms to	3G-SDI to SMPTE 424M/425M level A compatible HD-SDI to SMPTE292M/274M/296M

Ethernet Management Port

Physical	RJ-45
Speed	10MB, 100MB, or 1GB
Ethernet	IEEE 802.3.ab
Addressing	DHCP (default) or static

Essence Processing (EP) Ethernet Media Ports SFP1 & SFP2

Physical	4 × SFP28 Ethernet cartridge slots. UCP-3901 25Gb: SFP+ 2 x 25GbE UCP-3901 50Gb: 2 x 50GbE QSFP, or 1 x QSFP with two lanes of 50GbE
Addressing	DHCP (default) or static
Connector/Format	See Supported SFP28 Cartridges, on page 16.
Conforms to	IEEE 802.3by - 25 Gigabit Ethernet over fiber IEEE 802.3 - 25 Gigabit Ethernet over twinaxial cables[a] ST2110-10/20/30 SMPTE-291M/IETF RTP Payload for Ancillary Data VC-2 AES67 IEEE-1588v2/SMPTE-2059-2
FEC	The UCP-3901 supports clause 74 (Base-R) and clause 108 (RS) FEC. Ensure the network switch you plan to use supports FEC error correction that you are planning to use for your network.
Video Standards	2160p60, 2160p59, 2160p50 (ST2082-10, mode1 or ST425-5) 1080p60, 1080p59, 1080p50 (SMPTE ST274) 1080i30, 1080i29, 1080i25 (SMPTE ST274) 720p60, 720p59, 720p50 (SMPTE ST296) 625i25, 525i29 (SMPTE ST125)
Latency	IP Sender: < 1 line (ignoring compression codec latency) IP Receiver: N->(N+1) frames* *This is dependent on the setting N, currently 0/1/2/3, for the number of frames of delay applied in the packet store buffer. With N=0, the minimum delay is approximately 32 lines by default.

a. Note that when using a 50Gbps breakout cable, ensure that the network switch supports this feature.

Multiviewer (MV) Ethernet Media Ports SFP1 & SFP2

Physical	4 × SFP28 Ethernet cartridge slots. UCP-3901 25Gb: SFP+ 2 x 25GbE UCP-3901 50Gb: 2 x 50GbE QSFP, or 1 x QSFP with two lanes of 50GbE
Addressing	DHCP (default) or static

Connector/Format	See Supported SFP28 Cartridges, on page 16.
Conforms to	IEEE 802.3by - 25 Gigabit Ethernet over fiber IEEE 802.3 - 25 Gigabit Ethernet over twinaxial cables[a] ST2110-10/20/30 SMPTE-291M/IETF RTP Payload for Ancillary Data VC-2 AES67 IEEE-1588v2/SMPTE-2059-2
FEC	The UCP-3901 supports clause 74 (Base-R) and clause 108 (RS) FEC. Ensure the network switch you plan to use supports FEC error correction that you are planning to use for your network.
Video Standards	2160p60, 2160p59, 2160p50 (ST2082-10, mode1 or ST425-5) 2160p60, 2160p59, 2160p50 in quad-link for multiviewer output only 1080p60, 1080p59, 1080p50 (SMPTE ST274) 1080i30, 1080i29, 1080i25 (SMPTE ST274) 720p60, 720p59, 720p50 (SMPTE ST296) 625i25, 525i29 (SMPTE ST125)

a. Note that when using a 50Gbps breakout cable, ensure that the network switch supports this feature.

RollCall Features

Status	Input and Output status
User memories	None

Communication

RollCall/RollCall+	Through the gateway or directly through the rear SFP
RollTrack controls	On/off, Index, Source, Address, Command, Status, Sending

Status LEDs

Card edge indicators	See Front Card-edge Interface, on page 19 for more information.

Power Consumption

Power Consumption	UCP-3901-25-EP: 55 Watts UCP-3901-50-EP: 55 Watts UCP-3901-25-MW: 55 Watts UCP-3901-50-MW: 55 Watts

A Installing the SFP Ethernet Module

Introduction

Installing and removing the SFP output interface cartridge requires special care. This annex describes the process.

Rear panels incorporate one or two SFP interface(s). The interface consists of two parts:

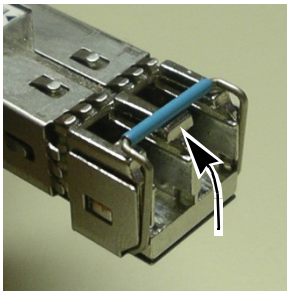
- A socket on the rear panel into which an SFP interface module is plugged
- An SFP (Small Form-factor Pluggable) module that performs output medium translation to which connections are made for optical fibers, coaxial copper, and so on.

CAUTION

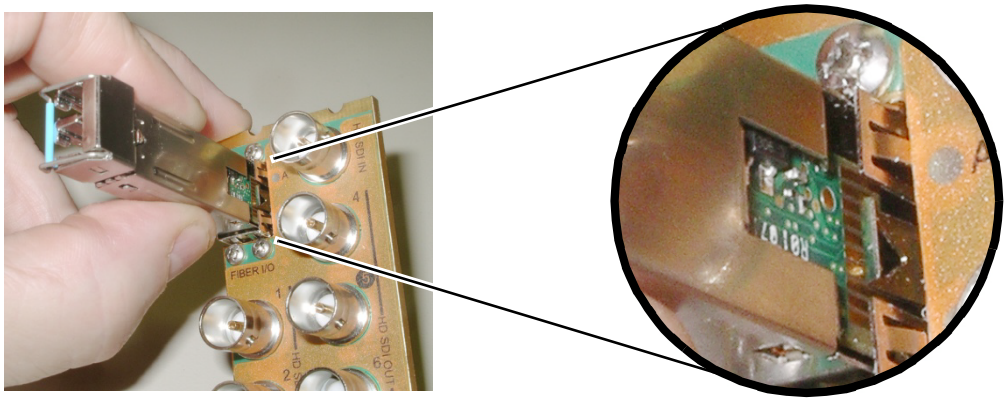
- SFP fiber Transmitter modules contain a class 1 laser, which emits invisible radiation whenever the module is powered up. Because the SFP is hot-swappable, the module may be powered up as soon as it is installed.
- DO NOT LOOK INTO AN OPERATING SFP FIBER MODULE'S CONNECTORS, AS EYE DAMAGE MAY RESULT.
- The SFP module is sensitive to electrostatic discharge (ESD). It is recommended that you use an ESD-preventive wrist strap grounded to the GV Node chassis while handling the SFP module.
- SFP modules are subject to wear, and their useful lifetime is reduced each time they are inserted or removed. Do not remove them more often than is absolutely necessary.
- Never remove or install an SFP fiber module with the fiber optic cables connected. Damage to the cables could result.
- The presence of dust and debris can seriously degrade the performance of an optical interface. It is recommended that you insert a dust plug into the SFP fiber module whenever a fiber optic cable is not connected.

Installing an SFP module

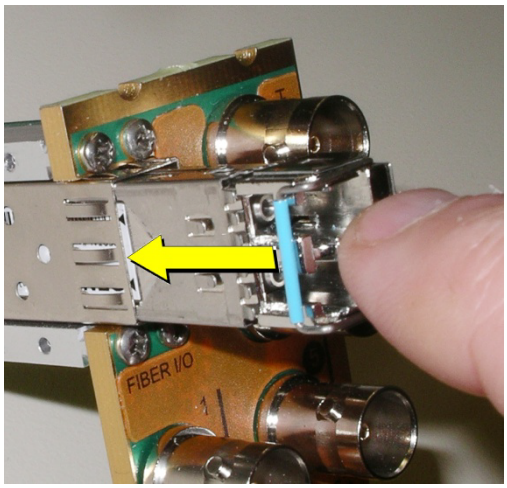
1 Make sure that the bale clasp lever is in the closed position.



2 Position the SFP module so that the recessed slot is lined up with the tab side of the socket.



3 Slide the module straight into the socket, and push gently until it clicks into position.



Connecting the fiber optic cables

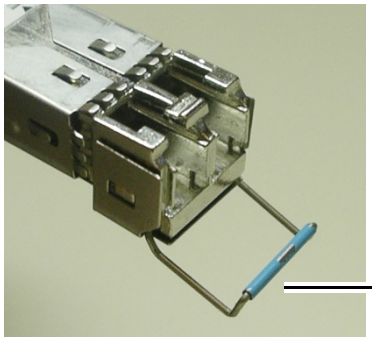
1 Remove the dust plug from the SFP module if present
2 Verify that the exposed end of the optical fiber in the LC connector is clean
   • Carefully remove any debris if necessary.
3 Plug the LC-terminated fiber optic cable into the SFP module

Removing the fiber optic cables

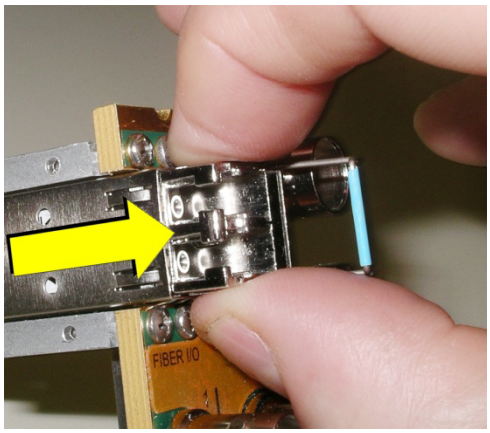
1 Grasp the LC fiber optic connector that is plugged into the SFP module, and pull it straight out to disengage the optical fiber from the SFP.
   • Never pull the fiber optic cable itself, as irreversible damage may occur.
2 Insert a dust plug into the SFP module.
3 Install caps on the open end of the fiber optic cable.

Removing the SFP module

1 Move the bale clasp lever to the open position.



2 Grasp the SFP module between your thumb and forefinger, and pull it straight out of the slot.



- Do NOT pull on the bale clasp lever to remove the module, as it is easily damaged.
- You may find that you need to wiggle the module, or perhaps push it into the slot a bit, before it will release and slide out.

3 For fiber optic models, insert a dust plug into the SFP module.

Grass Valley Technical Support

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

www.grassvalley.com/support/

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

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