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**ULTRIX-FR12 User Guide**

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  - offer the best product quality and support
2. Make Cool Practical Technology
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## Ross Video Code of Ethics

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

# ULTRIX-FR12 · User Guide

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## Patents

Patent numbers US 7,034,886; US 7,508,455; US 7,602,446; US 7,802,802 B2; US 7,834,886; US 7,914,332; US 8,307,284; US 8,407,374 B2; US 8,499,019 B2; US 8,519,949 B2; US 8,743,292 B2; GB 2,419,119 B; GB 2,447,380 B; and other patents pending.

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## Safety Notices

Refer to the “**Important Regulatory and Safety Notices**” document that accompanied your product.

## Statement of Compliance

This product has been determined to be compliant with the applicable standards, regulations, and directives for the countries where the product is marketed.

Compliance documentation, such as certification or Declaration of Compliance for the product is available upon request by contacting [techsupport@rossvideo.com](mailto:techsupport@rossvideo.com). Please include the product; model number identifiers and serial number and country that compliance information is needed in request.

## EMC Notices

### United States of America - FCC Part 15

This equipment has been tested and found to comply with the limits for a class A Digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a Commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### Canada

This Class A device complies with Canadian ICES-003 and part 15 of the FCC Rules.

Cet appareil numérique de la classe “A” est conforme a la norme NMB-003 du Canada.



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**Notice** — *Changes or modifications to this equipment not expressly approved by Ross Video Ltd. could void the user’s authority to operate this equipment.*

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## European Union

This equipment is in compliance with the essential requirements and other relevant provisions established under regulation (EC) No 765/2008 and Decision No 768/2008/EC referred to as the “New Legislative Framework”.



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

## Australia/New Zealand

This equipment is in compliance with the provisions established under the Radiocommunications Act 1992 and Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2008.

## Korea

This equipment is in compliance with the provisions established under the Radio Waves Act.

Class A equipment (Broadcasting and communications service for business use).

This device is a business-use (Class A) EMC-compliant device. The seller and user are advised to be aware of this fact. This device is intended for use in areas outside home.

| Type of Equipment  | User's Guide  |
|--|---|
| A급 기기<br>(업무용 방송통신기자재)   | 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.   |
| Class A Equipment<br>(Industrial Broadcasting & Communication Equipment) | This equipment is <b>Industrial (Class A) electromagnetic wave suitability equipment</b> and seller or user should take notice of it, and this equipment is to be used in the places except for home. |

## International

This equipment has been tested under the requirements of CISPR 22:2008 or CISPR 32:2015 and found to comply with the limits for a Class A Digital device.



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

## Warranty and Repair Policy

The ULTRIX-FR12 systems are backed by a comprehensive one-year warranty on all components.



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If an item becomes defective within the warranty period Ross will repair or replace the defective item, as determined solely by Ross.

Warranty repairs will be conducted at Ross, with all shipping FOB Ross dock. If repairs are conducted at the customer site, reasonable out-of-pocket charges will apply. At the discretion of Ross, and on a temporary loan basis, plug in circuit boards or other replacement parts may be supplied free of charge while defective items undergo repair. Return packing, shipping, and special handling costs are the responsibility of the customer.

This warranty is void if products are subjected to misuse, neglect, accident, improper installation or application, or unauthorized modification.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profit). Implied warranties, including that of merchantability and fitness for a particular purpose, are expressly limited to the duration of this warranty.

This warranty is TRANSFERABLE to subsequent owners, subject to Ross' notification of change of ownership.

## Environmental Information

The equipment may contain hazardous substances that could impact health and the environment.

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

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



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration. You can also contact Ross Video for more information on the environmental performances of our products.

This appliance may contain a Coin type battery which should not be treated as household waste.

To ensure that the battery will be treated properly use the appropriate take-back systems in your area. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

## Security and Privacy

If you would like more information on how Ross Video security and privacy practices have been applied to ULTRIX-FR12, what you should know about maintaining security of this product, and how we can partner with you to ensure security throughout this product's life-cycle, contact [techsupport@rossvideo.com](mailto:techsupport@rossvideo.com).

Ross Video has implemented reasonable administrative, technical, and physical safeguards to help protect against security incidents and privacy breaches involving a Ross Video product provided those products are used in accordance with Ross Video instructions for use. However, as systems and threats evolve, no system can be protected against all vulnerabilities and we consider our customers the most important partner in maintaining security and privacy safeguards. If you have any concerns, we ask that you bring them to our attention, and we will investigate. Where appropriate, we will address the issue with product changes, technical bulletins and/or responsible

disclosures to customers and regulators. Ross Video continuously strives to improve security and privacy throughout the product life-cycle using practices such as:

- Privacy and Security by Design
- Product and Supplier Risk Assessment
- Vulnerability and Patch Management
- Secure Coding Practices and Analysis
- Vulnerability Scanning
- Access Controls appropriate to Customer Data
- Incident Response
- Clear paths for two-way communication between customers and Ross Video

If you would like to report a potential product related privacy or security issue (incident, breach, or vulnerability), contact [techsupport@rossvideo.com](mailto:techsupport@rossvideo.com).

## Company Address



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# Introduction

This guide covers the configuration and operation of the Ross Video ULTRIX-FR12.

- ★ If you are configuring an ULTRIX-(NS)-FR1, ULTRIX-(NS)-FR2, or ULTRIX-(NS)-FR5 router, refer to the ***ULTRIX-FR1, ULTRIX-FR2, and ULTRIX-FR5 User Guide***.
- ★ For information on creating and managing databases for your routing system, refer to the ***Ultrix and Ultricore Database Guide***.

The following chapters are included:

- **“Introduction”** summarizes the guide and provides important terms, and conventions.
- **“Before You Begin”** provides general information to keep in mind before operating your ULTRIX-FR12.
- **“Getting Started”** provides an overview of creating connection points between the ULTRIX-FR12 and devices in your routing system, describes the role of a database in your routing system, and provides a generalized work flow of configuring a database.
- **“Menu Navigation Overview”** outlines the two methods for accessing the ULTRIX-FR12 menu system.
- **“Navigating the Product Info Interfaces”** outlines how to navigate the Product Info interfaces in DashBoard, and summarizes the tabs, menus, and fields in those interfaces.
- **“Navigating the System Interfaces”** outlines how to navigate the System interfaces in DashBoard, and summarizes the tabs, menus, and fields for each System tree node.
- **“Navigating the Device Configuration Interfaces”** summarizes the interfaces that define the physical outputs, inputs, and communication ports of the ULTRIX-FR12 router.
- **“Using a DashBoard Client Computer”** describes how to navigate the menu system via a DashBoard client computer.
- **“Using the Touchscreen”** summarizes the touchscreen menu system.
- **“Access for DashBoard Clients”** outlines how to specify which DashBoard clients on your network can access and connect to your ULTRIX-FR12.
- **“Role-Based Access Control”** outlines the use of Role-Based Access Control (RBAC) within the DashBoard software application for the ULTRIX-FR12.
- **“Specifying the Reference Format”** summarizes how to specify the default reference format for the ULTRIX-FR12, and configure the reference trigger for the router.
- **“Specifying the Time Source”** outlines how to choose the time/date source via an NTP Server in your facility, or you can set the device time to match the computer which is running the current DashBoard client.
- **“Software License Keys”** summarizes the available software licensed features, and how to install a software key for a licensed feature.
- **“Enabling a Service”** outlines how to enable a communication service (protocol) as the first step in creating a connection point to external devices.
- **“Configuring the AUX Ports”** summarizes how to configure the physical connections, including populated SFP ports, on a blade.
- **“UltraSync Configuration”** summarizes how to assign an UltraSync license to an input port, and then configure the UltraSync settings for that port.
- **“UltraClean Configuration”** outlines how to configure the Clean Switch mode for an output port, and the Clean Switch timing window.
- **“UltraSRC Configuration”** outlines how to assign an UltraSRC license to a router input.

- **“Ultrimix-Dante Setup”** provides information on installing the Ultrimix-Dante license, and configuring it for the ULTRIX-FR12 routing system.
- **“Configuring an Audio Matrix”** summarizes how to enable the audio matrix, the audio mapping options when using SDI embedded audio or MADI signals, how to set the audio transition mode for an audio channel.
- **“ULTRIMIX-MXR”** summarizes the ULTRIMIX-MXR licensed feature.
- **“UHD Gearbox Configuration”** provides an overview of the Gearbox feature, explains how to assign router inputs to a UHD Gearbox group, and assign the de-multiplexed signals to a Gearbox group.
- **“ULTRIX-IP-IO Setup”** outlines how to configure receivers and senders for the ULTRIX-FR12 to be used in video and audio streaming when an ULTRIX-IP-IO blade is installed in a slot of an ULTRIX-FR12.
- **“ULTRIX-IPX-IO Setup”** outlines how to configure receivers and senders for the ULTRIX-FR12 to be used in video and audio streaming when an ULTRIX-IPX-IO blade is installed in the router and an Ultrix-IP license is enabled.
- **“ULTRIX-SFP-IO Setup”** outlines how to configure the ports of the ULTRIX-SFP-IO blade.
- **“UltriProc Setup”** provides information on the SDR/HDR conversion and Color Correction options available when one of the UltriProc licenses is enabled on an ULTRIX-FR12.
- **“UltriStream Setup”** provides information on the UltriStream licensed features for the ULTRIX-FR12.
- **“Managing your ULTRIX-FR12 Settings”** outlines how to import and export archived files (\*.ufs) of your ULTRIX-FR12 settings.
- **“Monitoring the Hardware”** summarizes the status fields for monitoring the power, the internal chassis fans, and the ports.
- **“Monitoring the Communications”** summarizes how to verify communications status of the ULTRIX-FR12.
- **“Glossary”** provides a definitions of commonly used terms and conventions for this guide.

If you have questions pertaining to the operation of ULTRIX-FR12, contact us at the numbers listed in **“Contacting Technical Support”**. Our technical staff is always available for consultation, training, or service.

## Related Publications

It is recommended to consult the following Ross documentation before installing and configuring your ULTRIX-FR12:

- ***DashBoard User Manual***, Ross Part Number: 8351DR-004
- ***Ultracore BCS User Guide***, Ross Part Number: 2201DR-106
- ***Ultrix Quick Start Guides***, Ross Part Number: 2101DR-002, 2101DR-502
- ***Ultrix and Ultracore Database Guide***, Ross Part Number: 2201DR-109
- ***ULTRIX-FR1, ULTRIX-FR2, and ULTRIX-FR5 Installation Guide***, Ross Part Number: 2101DR-003
- ***ULTRIX-FR1, ULTRIX-FR2, and ULTRIX-FR5 User Guide***, Ross Part Number: 2101DR-004
- ***ULTRIX-FR12 Installation Guide***, Ross Part Number: 2101DR-603
- ***ULTRIX-FR12 Quick Start Guide***, Ross Part Number: 2101DR-602
- ***Ultrix SFP Modules Guide***, Ross Part Number: 2101DR-008
- ***Walkabout Application Note***, Ross Part Number: 2201DR-003

## Documentation Conventions

Special text formats are used in this guide to identify parts of the user interface, text that a user must enter, or a sequence of menus and sub-menus that must be followed to reach a particular command.

### Interface Elements

Bold text is used to identify a user interface element such as a dialog box, menu item, or button. For example:

In the **Save As** dialog, click **OK**.

### User Entered Text

Courier text is used to identify text that a user must enter. For example:

In the **Language** box, enter `English`.

### Referenced Guides

Italic text is used to identify the titles of referenced guides, manuals, or documents. For example:

For more information, refer to the ***ULTRIX-FR12 Installation Guide***.

### Menu Sequences

Menu arrows are used in procedures to identify a sequence of menu items that you must follow. For example, if a step reads "**File > Save As**," you would click the **File** menu and then click **Save As**.

### Important Instructions

Star icons are used to identify important instructions or features. For example:

★ An error message displays when an object overlaps a tile or when one tile overlaps another in the workspace.

## Contacting Technical Support

At Ross Video, we take pride in the quality of our products, but if problems occur, help is as close as the nearest telephone.

Our 24-hour Hot Line service ensures you have access to technical expertise around the clock. After-sales service and technical support is provided directly by Ross Video personnel. During business hours (Eastern Time), technical support personnel are available by telephone. After hours and on weekends, a direct emergency technical support phone line is available. If the technical support person who is on call does not answer this line immediately, a voice message can be left and the call will be returned shortly. This team of highly trained staff is available to react to any problem and to do whatever is necessary to ensure customer satisfaction.

- **Technical Support:** (+1) 613-652-4886
- **After Hours Emergency:** (+1) 613-349-0006
- **E-mail:** [techsupport@rossvideo.com](mailto:techsupport@rossvideo.com)
- **Website:** <http://www.rossvideo.com>



# Before You Begin

An effective routing system takes careful planning. Routing systems may consist of many devices either located within the same facility, or across multiple locations. Routing devices (routers) must connect and communicate with each other and any control system devices all on a high speed network.

## Powering the ULTRIX-FR12

The ULTRIX-FR12 requires powering from multiple Ultripower units. These Ultripower units must power cycle together. The Ultracore BCS has a feature to group up to 4 Ultripower units. When the user toggles the group output state, the grouped units will follow suit. It is important that an Ultripower group be configured prior to DC cable connection between the Ultripower units and the ULTRIX-FR12 chassis.



**Notice** — *The Ultripower units must be configured prior to connecting the power connections to the ULTRIX-FR12 chassis.*

### For More Information on...

- configuring the Ultripower Group feature, refer to the **ULTRIX-FR12 Quick Start Guide**, **ULTRIX-FR12 Installation Guide**, and the **Ultracore BCS User Guide**.
- cabling the ULTRIX-FR12 to multiple Ultripower units, refer to the **ULTRIX-FR12 Quick Start Guide** the **ULTRIX-FR12 Install Guide**, and the **Ultripower Quick Start Guide**.

## General Workflow

The generalized workflow of configuring your ULTRIX-FR12 is to:

1. Configure the network interface settings for the ULTRIX-FR12.
2. Establish DashBoard connectivity.
3. Configure the ULTRIX-FR12 system settings.
4. Establish connection to an Ultracore BCS.

★ The ULTRIX-FR12 supports a maximum of 25 DashBoard clients with 50 other TCP/IP connections (remote control panels, third-party control systems, etc.).

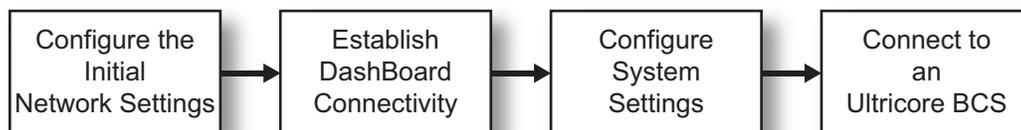


Figure 1 Process for Configuring an ULTRIX-FR12

## Configure the Initial Network Settings

Walkabout is a DashBoard system for network device discovery. The ULTRIX-FR12 supports the Walkabout system for configuration of its IP settings. Once you establish communications over Ethernet between the ULTRIX-FR12 and DashBoard, you can proceed to use the interfaces in DashBoard that enable Ultrix to communicate with the other devices in your routing system.

The ULTRIX-FR12 network settings may be changed by either the Walkabout interface, or the ULTRIX-FR12 touchscreen. A complete network setting requires a static IP address, a network mask

address, and a gateway address. These should be supplied by your IT Department for the ULTRIX-FR12.

### To configure the initial network settings

1. Refer to the **ULTRIX-FR12 Quick Start Guide** to connect via the default network settings.
2. Use Walkabout to assign the static IP address, network mask address, and gateway address as supplied by your IT Department. Refer to **"Using Walkabout to Assign the Initial IP Address to the Router"**.

## Establish DashBoard Connectivity

The ULTRIX-FR12 displays as a device node in the Basic Tree View in the window of your DashBoard client. Much like other Ultrix routers, you access the interfaces and menus of ULTRIX-FR12 by first selecting its node in the Basic Tree View to display the router in the DashBoard window. Each node of the tree opens to reveal one or more sub-nodes, giving access to the features for your router.

### To establish DashBoard connectivity

1. Launch DashBoard on a client computer connected to the same subnet as your ULTRIX-FR12.
2. Manually add the ULTRIX-FR12 to the Basic Tree View of DashBoard. Refer to **"Adding the ULTRIX-FR12 to the Tree View in DashBoard"**.
3. Display the ULTRIX-FR12 interfaces in the DashBoard window. Refer to **"Navigating the DashBoard Menu System"**.

★ Ross Video recommends a Memory Allocation of at least 4GB in DashBoard to ensure reliable operation. Refer to the DashBoard User Guide for details on setting the Memory Allocation value.

## Configure the ULTRIX-FR12 System Settings

Configuring the routing system with an ULTRIX-FR12 is dependent on the type of blades installed in your router, the license keys that are enabled, and the types of devices that will be included in the routing system.

Consider the following for every routing system:

- **"Specifying a Default Reference Format"**
- **"Specifying the Time Source"**
- **"Installing a License Key"**

Consider the following when configuring your inputs:

- **"Configuring the AUX Ports"**
- **"Configuring UltriSync for an Input Port"**

Consider the following when configuring your outputs:

- **"Configuring the AUX Ports"**
- **"Configuring Clean Switch Mode for an Output Port"**
- **"Assigning an Ultriscape Head to a Physical Router Output"**
- **"UHD Gearbox Configuration"**

Consider the following for systems that require network streaming:

- **"ULTRIX-IPX-IO Setup"**
- **"ULTRIX-SFP-IO Setup"**

Consider the following for systems that include audio:

- “**UltriSRC Configuration**”
- “**Ultrimix-Dante Setup**”
- “**Configuring an Audio Matrix**”

## Device Communication Setup

A single ULTRIX-FR12 can communicate with external devices such as remote control panels, Ross NK devices, and automation devices running third-party protocols. You must establish communications with the devices the ULTRIX-FR12 is connected to and define how they are connected. Each external device must have a connection point defined. For those devices that are not directly connected to your network, such as Ross NK Series routers and remote control panels, you must supply their connection information (port number) in the routing system database.

### For More Information on...

- communication with external devices, refer to “**Getting Started**” and “**Enabling a Service**”.
- configuring the routing system database, refer to the ***Ultrix and Ultracore Database Guide***.

## Connect to an Ultracore BCS

The Ultracore BCS acts as a primary controller for one or more ULTRIX-FR12 as well as legacy Ross NK series devices. A connection is made from the controlling Ultracore BCS panel to each ULTRIX-FR12. The controlling Ultracore BCS (primary) contains the full database configuration for the entire operation of the routing system.

All client devices, such as a remote control panel (RCP) or third-party controllers, must be configured for and communicate with the primary Ultracore BCS. Any ULTRIX-FR12 configured as a client device will only accept control commands via the Ultracore BCS. To configure an ULTRIX-FR12 as a client device, the Remote Controller Mode must be first enabled on the ULTRIX-FR12.

An Ultracore BCS with the Ultrix-IP license enables the video senders/receiver endpoints to be reported as available ports to the router database. The video senders/receivers are seen as part of a single video-IP matrix, and the audio senders/receivers are part of a single audio-IP matrix.

- ★ When a video sender stream is active and the video format changes on the SDI input of that stream, the Ultracore BCS will automatically detect the update and then updates all the receivers subscribed to that sender. This allows the existing streams to adapt.

## Setup Overview

1. Set up any licensing requirements for the ULTRIX-FR12.
2. Set up any UltriScape requirements for the ULTRIX-FR12.
3. Enable Remote Controller Mode on the ULTRIX-FR12.
4. Create a database within the Ultracore BCS to accommodate the I/O of the ULTRIX-FR12.
5. Create a connection point from the Ultracore BCS to the ULTRIX-FR12. Refer to the ***Ultracore BCS User Guide*** for details.
6. Edit the Ultracore BCS database to map logical source and destinations to ULTRIX-FR12 inputs/outputs, and any UltriScape heads/PIPs. Refer to the ***Ultrix and Ultracore Database Guide***.

## I/O Module Configuration

The ULTRIX-FR12 routers handle high-bandwidth, broadcast-quality, digital video and audio signals, and embedded audio signals. Digital video signals can be 12G<sup>1</sup>, 3G, high definition, or standard definition. The total number of inputs and outputs depends on the number and type of blades installed in the chassis.

This user guide outlines how to configure the ULTRIX-FR12 when installed with one or more of the following blades:

- ULTRIX-HDX-IO
- ULTRIX-IP-IO
- ULTRIX-IPX-IO
- ULTRIX-SFP-IO

### For More Information on...

- the options for the physical input and output ports, refer to “**Configuring the SDI I/O Ports**” and “**Configuring the AUX Ports**”.
- configuring the ULTRIX-IP-IO ports, refer to “**ULTRIX-IP-IO Setup**”.
- configuring the ULTRIX-IPX-IO ports, refer to “**ULTRIX-IPX-IO Setup**”.
- configuring the ULTRIX-SFP-IO ports, refer to “**ULTRIX-SFP-IO Setup**”.
- the audio features of the ULTRIX-FR12, refer to “**Configuring an Audio Matrix**”.
- configuring an UHD Gearbox, refer to “**UHD Gearbox Configuration**”.
- the ULTRIX-MODX-IO blade, refer to the ***ULTRIX-MODX-IO User Guide***.
- the Ross SDPE blade, refer to the Ross Video SDPE user documentation.

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1. Requires installing an Ultrispeed license key for each slot. Refer to the ***ULTRIX-FR12 User Guide*** for details.

# Getting Started

A single ULTRIX-FR12 can communicate with external devices such as remote control panels, Ross NK devices, and automation devices running third-party protocols.

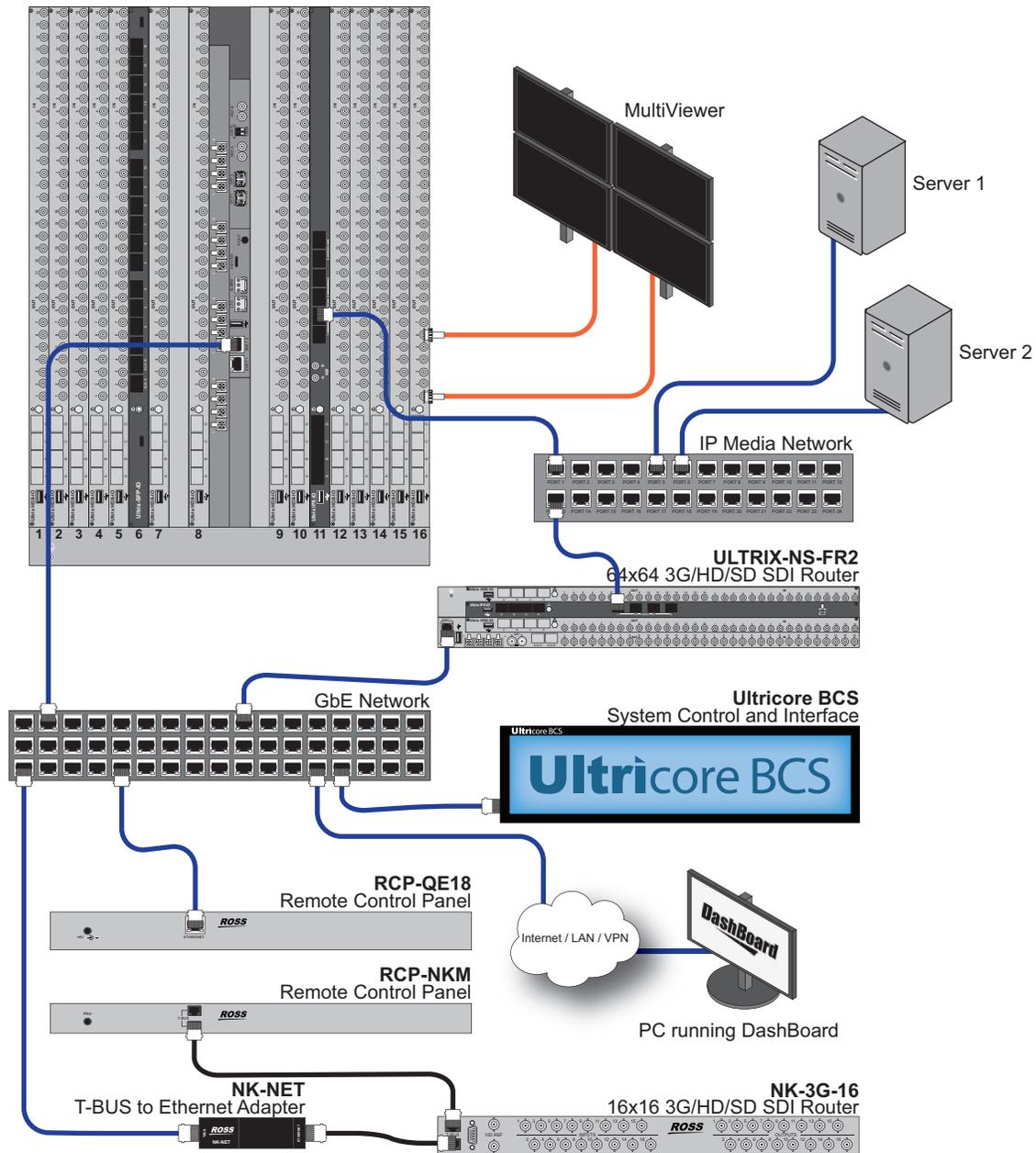


Figure 2 Example of System Connectivity Options with an ULTRIX-FR12

## Overview

Communication between an external device and the ULTRIX-FR12 is over Ethernet via an established **connection point**. A connection point defines the interface and the protocol to be used for communications. By default, ULTRIX-FR12 runs several server connections points for incoming control/communications. Client connection points from the router to the external device is configured using the options in the ULTRIX-FR12 Connections interface of DashBoard. This step is only required if external routing systems are connected to the ULTRIX-FR12.

### For More Information on...

- server connections points, refer to the *Ultracore BCS User Guide* and *Ultrix and Ultracore Database Guide*.

## Device Discovery in DashBoard

Once the ULTRIX-FR12 displays in the Tree View of DashBoard, it can communicate with other DashBoard Connect devices.

When DashBoard is launched, devices such as openGear frames and Ross routers, are listed and made available in the Tree View. DashBoard uses the open SLP protocol to locate devices on the same network as the computer running the DashBoard client software. There are two methods for adding a device to the Tree View in DashBoard: using the auto-connect feature of DashBoard or manually adding a device by specifying the IP address of the device. Both methods are described in more detail in the *DashBoard User Guide*.

- ★ Third-party device information is not automatically retrieved. These devices must be added manually.

## Communications between ULTRIX-FR12 and the Devices in a Routing System

While DashBoard enables you to locate devices in your network, an Ultracore BCS is used to configure a database to establish communications with the devices and define how they are connected (a connection point). Each external device must have a connection point defined in the database. For those devices that are not directly connected to your network, such as Ross NK Series routers and remote control panels, you must supply their connection information (port number) in the database. Once this information is entered into the database, the device matrices, inputs, and outputs can be managed via the database.

### For More Information on...

- creating and managing databases for your ULTRIX-FR12, refer to the *Ultrix and Ultracore Database Guide*.

## ULTRIX-FR12 Control with Third-Party Systems

ULTRIX-FR12 may be controlled by third-party control or automation systems via the following protocols:

- Ember+
- GVG Series 7000 (native)
- NVISION NP16 ethernet
- NVISION NP0010 serial
- Probel SW-P-08
- RossTalk
- SNMP
- TSL UMD v3.1
- TSL UMD v4.0
- TSL UMD v5.0

### For More Information on...

- the third-party protocols the ULTRIX-FR12 supports, refer to “**Enabling a Service**”.

## Assigning an IP Address to the ULTRIX-FR12

Once the ULTRIX-FR12 is physically installed and cabled to your facility network, you will need to assign it an initial static IP address to enable DashBoard to locate it on your network. After the initial IP address is set, you can choose to change it as required by your facility practices.

Updating the network settings is the first task to accomplish once the physical installation is completed. There are two methods outlined in this section:

- **Walkabout** — use the Walkabout application, running on a DashBoard client computer in your network.
- **ULTRIX-FR12** — use the touchscreen on the ULTRIX-FR12 front door.

## Using Walkabout in DashBoard

Walkabout is a Ross router utility operating within DashBoard that enables you to configure the network settings for Ross routers, remote control panels, and other devices. Once a valid connection is established with Walkabout, the router is listed in the Tree View of DashBoard and available for monitoring and configuration using the options in DashBoard.

ULTRIX-FR12 supports a basic configuration mode via the Walkabout system for initial configuration of IP settings. Use Walkabout to:

- specify device IP settings and names
- specify a name for your routing system
- specify the system role (e.g. primary, backup, device)
- select a system to join from a list of valid system names assigned to controllers
- set communications server from a list of valid communication server devices (or IP)

Establishing an initial IP address enables DashBoard to communicate with the router and update the Basic Tree View with the ULTRIX-FR12 nodes. This section outlines how to assign the IP address via the Walkabout application running on a DashBoard client computer.

- ★ After you edit a cell in the **Walkabout** table, it is recommended to wait approximately 1 minute, then click **Refresh** to apply the new settings.

### To assign the initial static IP address for the ULTRIX-FR12

1. Ensure that the DashBoard client computer is connected to the same subnet as your ULTRIX-FR12.
2. Launch DashBoard.
3. From the DashBoard client main toolbar, select **File > Show Walkabout**.  
The DashBoard window displays the **Walkabout** table.
4. Click **Refresh**, located at the bottom of the Walkabout tab, to ensure the list in the Walkabout interface is current.
5. In the **Walkabout** table, find the entry for the ULTRIX-FR12 you want to configure.
- ★ A factory default ULTRIX-FR12 will display ULTRIX-FR12 in the **Name** field and an IP address of 192.168.20.140.
6. Use the **Name** field to assign a unique identifier to the ULTRIX-FR12 router.  
This will also be the name displayed in the Tree View of DashBoard.
7. To assign a new IP address:
  - a. Double-click the **Address** field.
  - b. Enter the IP address supplied by your IT Department for this device.

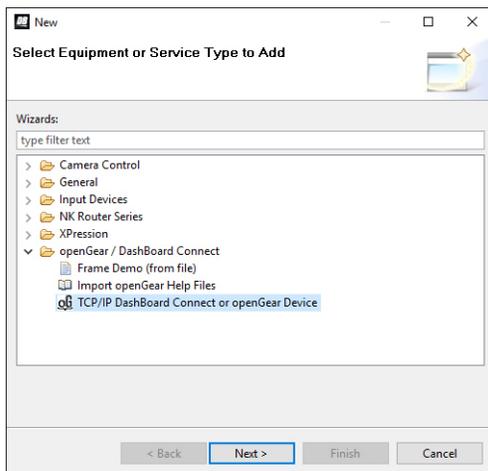
- c. Press **Enter** to save the new address.
8. Ensure the **Netmask** field is set to match your network requirements.
9. Use the **Gateway** field to specify the IP address for connection outside of the local area network (LAN).
10. Click **Reboot** in the row of the **Walkabout** table for the ULTRIX-FR12.  
The router reboots and the new settings are applied.

## Adding the ULTRIX-FR12 to the Tree View in DashBoard

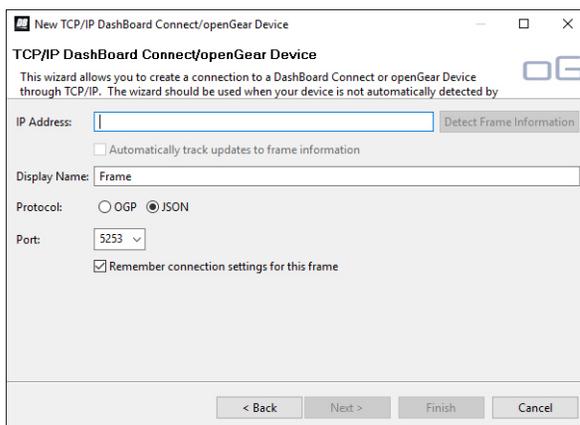
Once you have assigned the ULTRIX-FR12 a static IP address, you can then manually add it to the Tree View in DashBoard. Manually adding the ULTRIX-FR12 displays its node in the Tree View, granting you access to the ULTRIX-FR12 interfaces.

### To manually add the ULTRIX-FR12 to the Tree View in DashBoard

1. In the **Basic Tree View** toolbar of DashBoard, click **+**.  
The **Select Equipment or Service Type to Add** dialog opens.
2. Expand the **openGear/DashBoard Connect** node.



3. Select **TCP/IP DashBoard Connect or openGear Device**.
4. Click **Next >**.  
The **TCP/IP DashBoard Connect/openGear Device** dialog opens.
5. Select the **JSON** radio button as the **Protocol**.



6. Enter the IP address for the router in the **IP Address** field that you assigned in **“To assign the initial static IP address for the ULTRIX-FR12”**.
7. Perform one of the following steps:
  - In the text fields provided, enter the display name for the ULTRIX-FR12, and port of the panel you wish to add; or
  - Click **Detect Frame Information** to automatically retrieve the connection details.
8. Click **Finish**.

## Enabling Remote Controller Mode on the ULTRIX-FR12

Before establishing a connection point between the Ultracore BCS and the ULTRIX-FR12, the ULTRIX-FR12 must have its Remote Controller Mode enabled. This allows the ULTRIX-FR12 to be controlled by the Ultracore BCS in the routing system. Routing commands are issued to the Ultracore BCS via remote control panels, external protocols or DashBoard soft panels. The ULTRIX-FR12 will ignore routing commands not originating from the primary while in Remote Controller Mode.

### To enable the Remote Controller Mode on the ULTRIX-FR12

1. In the Tree View, double-click the **Product Info** node for the ULTRIX-FR12.  
The Product Info interface displays in the DashBoard window.
2. Select the **Setup** tab.
3. Select the **Remote Controller Mode** box.
4. Reboot the ULTRIX-FR12 to apply the new setting.

## Connecting the Ultracore BCS and the ULTRIX-FR12

The ULTRIX-FR12 requires a connection point to the primary Ultracore BCS of your routing system. This will provide the physical inputs and outputs of the router to the Ultracore BCS database. These input and outputs ports can then be mapped to logical source and destinations within the database.

- ★ A connection point is created using the Ultracore BCS. Do not create a connection from the ULTRIX-FR12 to the Ultracore BCS. Refer to the ***Ultracore BCS User Guide*** for details on creating connection points.

Before establishing a connection point from the Ultracore BCS to the ULTRIX-FR12:

- Assign a unique device name to the ULTRIX-FR12. This allows identification of the ULTRIX-FR12 throughout the setup process.
  - Ensure that ULTRIX-FR12 configuration (licensing, port configuration, etc.) is done via its sub-nodes within the DashBoard tree.
  - Configure the UltraScape Multiviewers via the UltraScape node within the DashBoard tree of the ULTRIX-FR12 that physically hosts that Multiviewer.
- ★ UltraScape PiP and head destination mapping is required in the Ultracore BCS database for each UltraScape Head in use. The procedure is the same as the UltraScape configuration for a stand-alone ULTRIX-FR12. Refer to the ***UltraScape User Guide*** for details.

## Creating a Database for the Routing System

A database determines how a signal/route can be made from input to output. Once the ULTRIX-FR12 is set to Remote Controller Mode, you will need to configure databases to manage the inputs and outputs of your routing system. You can create as many databases as required, but only one database can be active at one time.

★ Databases are created using the Database Manager interface on the Ultracore BCS. Refer to the **Ultracore BCS User Guide** and **Ultrix and Ultracore Database Guide** for details on creating databases that include the ULTRIX-FR12.

The generalized work flow of configuring a database is:

1. Create a new (blank) database on the Ultracore BCS using the options in the Database Manager interface.
2. Establish connection points to external devices (clients). To enable an Ultracore BCS to function as the 'primary' of the routing system, you must establish communications with the ULTRIX-FR12 it is connected to.
3. Verify the available IN/OUT ports to ensure correct system connections. The default port naming convention of `frame.slot.port.type` may be overwritten (if required) at this stage.
4. Create levels.
5. Create destination labels and assign physical ports to the labels.
6. Create source labels and assign physical ports to the labels.
7. Define a soft panel or establish a connection from a remote control panel (RCP).
8. Create source labels and assign physical ports to the labels.
9. Define a soft panel or establish a connection from a remote control panel (RCP).

## Database Overview

A database determines if a signal/route can be made from input to output. For a given level, if there is a physical port mapped, for the same physical device, in both the Source and Destination interfaces, and the Ultracore BCS has the level enabled, then a crosspoint switch can be issued and executed on the router(s).

**Table 1** outlines a database with four levels. Level 1 has mapped valid Sources and Destinations, and the level is enabled on the Ultracore BCS.

**Table 1 Example of a Multi-Level Database Setup**

|  | Level 1        | Level 2        | Level 3        | Level 4        |
|--|----------------|----------------|----------------|----------------|
| Is a physical source assigned?             | ✓              | X <sup>a</sup> | ✓              | ✓              |
| Is a physical destination assigned?        | ✓              | ✓              | X <sup>b</sup> | X              |
| Is the Level enabled on the Ultracore BCS? | ✓              | ✓              | ✓              | X              |
| Can a switch be executed?                  | ✓ <sup>c</sup> | X <sup>d</sup> | X <sup>d</sup> | X <sup>d</sup> |

- a. An entry is not present in the corresponding Level column of the Source interface.
- b. An entry is not present in the corresponding Level column of the Destinations interface.
- c. A switch will be executed.
- d. A switch will not be executed. Physical ports from the same logical matrix must be entered in the same control level before a connection can be made.

### For More Information on...

- databases for your routing system, refer to the **Ultrix and Ultracore Database Guide**.

# Menu Navigation Overview

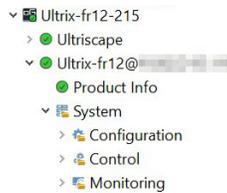
There are two methods for accessing the ULTRIX-FR12 menu system: via a DashBoard client running on a computer connected to the same subnet as the ULTRIX-FR12, or via the touchscreen of the ULTRIX-FR12 door. This chapter summarizes both methods.

★ The procedures in this guide are based on using a DashBoard client computer and not the front panel touchscreen.

## Using a DashBoard Client Computer

The ULTRIX-FR12 displays as a node in the Basic Tree View in the window of your DashBoard client. Much like other Ultrix routers, you access the interfaces and menus of ULTRIX-FR12 by first selecting its node in the Basic Tree View to display the router in the DashBoard window.

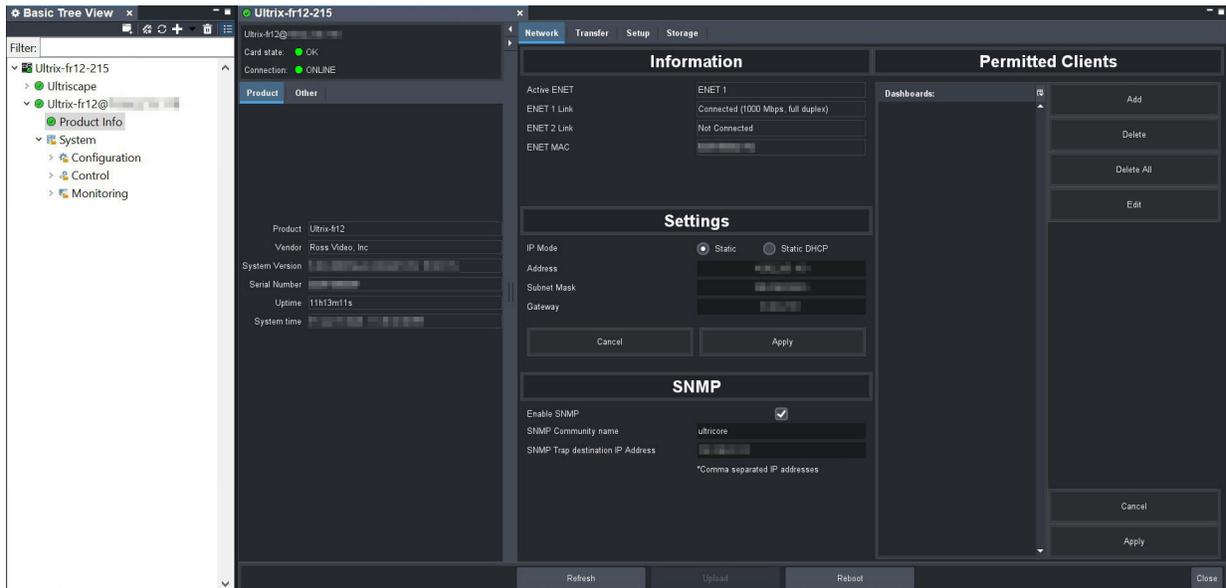
**Figure 3** illustrates an ULTRIX-FR12 tree in the Basic Tree View.



*Figure 3 Example of the ULTRIX-FR12 Tree View*

★ The Databases sub-node is disabled when Remote Control mode is enabled on the ULTRIX-FR12 and the router is controlled by an Ultracore BCS.

**Figure 4** illustrates an ULTRIX-FR12 displayed in the DashBoard client window after the user double-clicked the **Product Info** sub-node.



*Figure 4 Example of the ULTRIX-FR12 > Product Info Window*

### For More Information on...

- navigating the DashBoard menu system, refer to **“Using a DashBoard Client Computer”**.
- the tabs, menus, and fields in DashBoard, refer to **“Navigating the Product Info Interfaces”**.

## Using the Front Door Touchscreen

The ULTRIX-FR12 front panel touchscreen enables you to quickly access the Device Configuration interfaces. From here you can define the physical outputs, inputs, and communication ports of the ULTRIX-FR12. You can also monitor the overall status of the ULTRIX-FR12, or just the status of a specific signal path or port on the rear panel.

### For More Information on...

- navigating the touchscreen menus, refer to **"Using the Touchscreen"**.

# Navigating the Product Info Interfaces

This chapter summarizes the Product Info interfaces (formerly the System Status interfaces in software versions prior to v6.1).

## Overview

The Product Info interface provides hardware information, IP address settings, and general database management for your router. **(Figure 5)** The interface is organized into two distinct areas in the DashBoard window: Status tabs (located on the left), and Configuration tabs (located on the right).

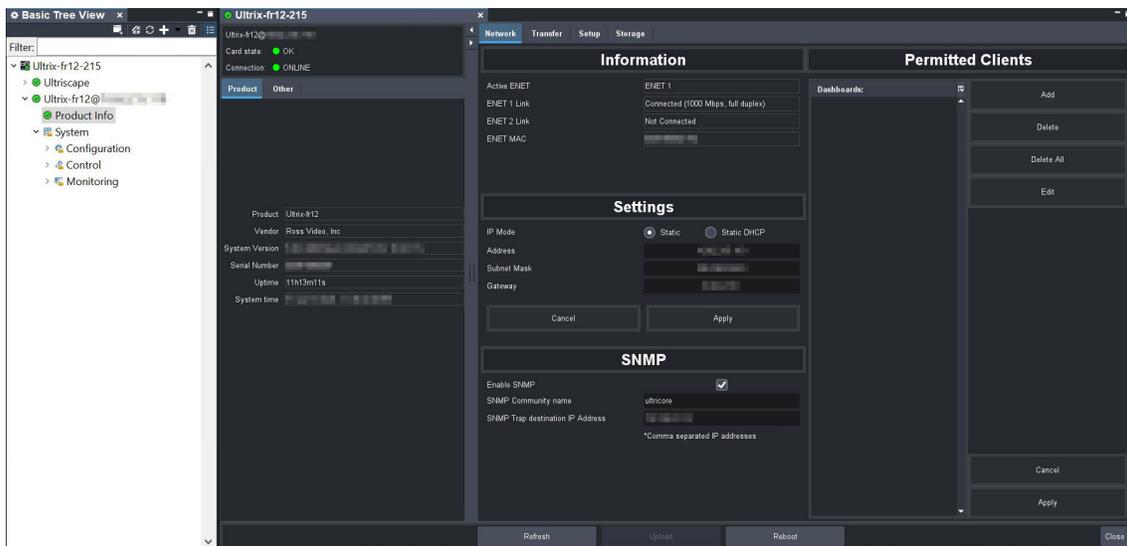


Figure 5 Example of a Product Info Interface

## Status Tabs

The Status tabs display read-only information about the ULTRIX-FR12 hardware and software.

### Product Tab

**Table 2** summarizes the read-only information displayed in the Product tab.

Table 2 Product Tab

| Item           | Parameters | Description                                       |
|----------------|------------|---|
| Product        |            | Indicates the ULTRIX-FR12 product name            |
| Vendor         |            | Indicates the supplier/manufacturer of the router |
| System Version |            | Indicates the build version of the ULTRIX-FR12    |
| Serial Number  |            | Indicates the serial number of the ULTRIX-FR12    |

**Table 2 Product Tab (Continued)**

| Item        | Parameters                | Description   |
|-------------|---------------------------|---|
| Uptime      | #h #m #s                  | Indicates the number of hours since the last reboot of the ULTRIX-FR12  |
| System Time | DD mm dd yyyy<br>hh:mm:ss | Indicates the current date based on the ULTRIX-FR12 internal clock (if no connection to an NTP Server is available) where: <ul style="list-style-type: none"><li>• DD represents the calendar day</li><li>• mm represents the month</li><li>• dd represents the day</li><li>• yyyy represents the year</li><li>• hh:mm:ss represents the current local time</li></ul> |

### Other Tab

**Table 3** summarizes the read-only information displayed in the Other tab.

**Table 3 Other Tab**

| Item                   | Parameters | Description   |
|------------------------|------------|---|
| Frontend Software Date | <number>   | Read-only information used by Ross Technical Support. |
| Backend Software Date  | <number>   |   |
| Device FW Rev          | <number>   |   |

## Configuration Tabs

The Configuration tabs are located on the right side of the DashBoard window. This series of tabs provide network setup options for the ULTRIX-FR12.

### Network Tab

**Table 4** summarizes the fields and menus displayed in the Network tab.

**Table 4 Network Tab**

| Item                           | Parameters       | Description  |
|--------------------------------|------------------|--|
| <b>Information (Read-only)</b> |                  |  |
| Active ENET                    | ENET #           | Indicates which Ethernet port on the router is the primary ULTRIX-FR12 network connection  |
| ENET # LINK                    | Connected (x, y) | Indicates that a valid network link is configured on the specified Ethernet port of the ULTRIX-FR12 where: <ul style="list-style-type: none"><li>• x represents the connection speed in number of Mbps</li><li>• y represents the link type (e.g. full duplex)</li></ul> |
|                                | Not Connected    | Ethernet communications for the ULTRIX-FR12 router are invalid. The Ethernet cable may be disconnected on the rear panel or the Ethernet network may be down or experiencing problems.   |

**Table 4 Network Tab (Continued)**

| Item                             | Parameters   | Description  |
|----------------------------------|--|--|
| ENET MAC                         | <number>   | Indicates the MAC address for the ULTRIX-FR12 router   |
| <b>Settings</b>                  |  |  |
| Address                          | ###.###.###.#<br>##  | Specifies the IP address for the ULTRIX-FR12 router  |
| Subnet Mask                      | ###.###.###.#<br>##  | Specifies the subnet mask for the ULTRIX-FR12 router   |
| Gateway                          | ###.###.###.#<br>##  | Specifies the gateway for communication outside of the local area network (LAN)  |
| Cancel                           | Ignores any unsaved changes made to the Address, Subnet Mask, and Gateway settings and reverts back to the current running values. |  |
| Apply                            | Updates the Address, Subnet Mask, and Gateway settings   |  |
| <b>Services</b>                  |  |  |
| SSH                              | Selected   | Enables the ability to log onto the ULTRIX-FR12 via an SSH server.<br><br>Secure Shell (SSH) Login is a client-server protocol used by system administrators to securely log onto remote systems and execute commands over an unsecured network. SSH may also be used by Technical Support for advanced troubleshooting. |
|                                  | Cleared  | Disables this service  |
| FTP                              | Selected   | Enables the ability to communicate with the ULTRIX-FR12 over an FTP connection   |
|                                  | Cleared  | Disables this service  |
| Walkabout                        | Selected   | Enables the ULTRIX-FR12 to communicate with devices in the Walkabout system. Refer to <b>“Using Walkabout in DashBoard”</b> .  |
|                                  | Cleared  | Disables this service  |
| Change                           | Applies changes to the settings in the Services menus  |  |
| <b>SNMP<sup>a</sup></b>          |  |  |
| Enable SNMP                      | Selected   | Enables the SNMP Agent on the ULTRIX-FR12  |
|                                  | Cleared  | Disables the SNMP Agent on the ULTRIX-FR12   |
| SNMP Community Name              | #  | Specifies the SNMP Agent identifier for communications. For stronger security, it is strongly recommended that users set their own community string.   |
| SNMP Trap Destination IP Address | ###.###.###.#<br>##  | Specifies the target address the ULTRIX-FR12 sends SNMP traps to   |
| <b>Permitted Clients</b>         |  |  |

**Table 4 Network Tab (Continued)**

| Item        | Parameters   | Description   |
|-------------|--|---|
| DashBoards: | ###.###.###.#<br>##  | Lists the IP address of each DashBoard client that is allowed to communicate with this ULTRIX-FR12 router |
| Add         | Enables you to add a new DashBoard client to the Permitted Clients list  |   |
| Delete      | Deletes the selected DashBoard client from the Permitted Clients list  |   |
| Delete All  | Clears all entries in the Permitted Clients list   |   |
| Edit        | Enables you to modify the selected entry in the Permitted Clients list   |   |
| Cancel      | Ignores any unsaved changes made to the Permitted Clients list and reverts back to the current running values. |   |
| Apply       | Updates the Permitted Clients list settings  |   |

- a. Requires the Ultracore-SNMP license key.

## Transfer Tab

**Table 5** summarizes the sub-tabs displayed on the Transfer tab.

**Table 5 Transfer Tab**

| Section                       | Item                         | Parameters   | Description   |
|-------------------------------|------------------------------|--|---|
| <b>Ultracore Database Tab</b> |                              |  |   |
| Export                        | Database                     | <name>   | Selects the database to be exported                         |
|                               | Save As:<br>(read-only)      | *.uda  | Automatically updates with the name of the database archive |
| Export                        | Browse...                    | Enables you to save or re-name the database to a specific location |   |
|                               | Apply                        | Click to begin exporting the file to specified location            |   |
| Import                        | Archive File:<br>(read-only) | *.uda  | Indicates the last file that was selected for restore       |
|                               | Browse...                    | Enables you to specify the database to import                      |   |
|                               | Retrieve Database As:        | <name>   | Indicates the file currently selected for importing         |
|                               | Apply                        | Click to begin the import  |   |
| <b>Ultriscape Layout Tab</b>  |                              |  |   |
| Export                        | Layout                       | <layout name>  | Selects the layout to be exported                           |
|                               | Save As...<br>(read-only)    | *.lay  | Automatically updates with the name of the layout archive   |
|                               | Browse...                    | Enables you to save or re-name the layout to a specific location   |   |
|                               | Apply                        | Click to begin exporting the file to the specified location        |   |

**Table 5 Transfer Tab (Continued)**

| Section                               | Item                    | Parameters   | Description   |
|---------------------------------------|-------------------------|--|---|
| Import                                | Layout File (read-only) | *.lay  | Indicates the last layout file that was imported                  |
|                                       | Browse...               | Enables you to specify the layout to import                          |   |
|                                       | Retrieve Layout As:     | <layout name>  | Indicates the file currently selected for importing               |
|                                       | Apply                   | Click to send the file to the device                                 |   |
| <b>ULTRIX-FR12 Frame Settings Tab</b> |                         |  |   |
| Export                                | Save As: (read-only)    | *.ufs  | Automatically updates with the name of the frame settings archive |
|                                       | Browse...               | Enables you to save or re-name the frame file to a specific location |   |
|                                       | Apply                   | Click to begin exporting the file to the specified location          |   |
| Import                                | Settings File:          | *.ufs  | Indicates the last frame file that was imported                   |
|                                       | Browse...               | Enables you to specify the frame file to import                      |   |
|                                       | Apply                   | Click to send the file to the device                                 |   |

## Setup Tab

**Table 6** summarizes the options displayed in the Setup tab.

**Table 6 Setup Tab**

| Item                               | Parameters   | Description  |
|------------------------------------|--|--|
| <b>Device Identification</b>       |  |  |
| Device Name                        | <name>   | Provides a unique identifier for the router in the Tree View of DashBoard  |
| System Name                        | <name>   | Provides a unique identifier for the routing system  |
| <b>Log Settings</b>                |  |  |
| Logging                            | Selected   | Enables the router to update the entries in the System > Monitoring > Logs interface                             |
|                                    | Cleared  | Disables this feature  |
| Output Debug Messages              | Selected   | Only use this feature under the guidance of Ross Technical Support.  |
|                                    | Cleared  |  |
| <b>DashBoard Interface</b>         |  |  |
| DashBoard Timeout                  | 30-300s  | Sets the maximum number of seconds that DashBoard waits until it queries ULTRIX-FR12. The default is 70 seconds. |
| Update                             | Applies the new value in the DashBoard Timeout menu. |  |
| <b>Password Protected Settings</b> |  |  |

**Table 6 Setup Tab (Continued)**

| Item  | Parameters   | Description   |
|---|--|---|
| Protect all licensed features with a password | Selected   | Enables the password-protected feature that prevents unauthorized changes to license keys. When the Port License tab is locked, users require a password to access/edit the license key information.  |
|   | Cleared  | Disables this feature (the Port License tab is editable). This is the default.  |
| Change Password...                            | Enables you to specify a password at least 8 characters long. It is recommended to change the password from the default value that is assigned at the factory. |   |
| <b>Status</b>                                 |  |   |
| Status (read-only)                            | mm/dd/yy<br>ERROR:<br>Duplicate device name [abc] for ID [#]   | Reports when multiple devices, with the same name, are communicating with the ULTRIX-FR12 router where: <ul style="list-style-type: none"> <li>• <b>mm/dd/yy</b> represents the date of the error</li> <li>• <b>[abc]</b> represents the device name</li> <li>• <b>[#]</b> represents the ID number assigned to the device</li> </ul> |
|   | Clear  | Clears the Status field entry   |
| <b>Ultracore Profile Settings</b>             |  |   |
| User Credentials                              | Selected   | All users have full access to all settings and interfaces of the ULTRIX-FR12. This is the default.  |
|   | Cleared  | Users must enter their credentials as defined by the Ultracore Profiles feature.  |
| User Profiles                                 | Selected   | Users must enter their credentials as defined by the Ultracore Profiles feature   |
|   | Cleared  | All users have full access to all settings and interfaces of the ULTRIX-FR12. This is the default.  |
| <b>Routing Behavior</b>                       |  |   |
| Salvo/Multi-Crosspoint Take Completion        | Require All Crosspoints  | The Take operation will fail entirely if any destinations are locked or protected   |
|   | Best Effort  | The Take operation will be performed for any valid routes and fail for locked or protected routes   |

Storage Tab

**Table 7** summarizes the read-only displayed in the Storage tab.

**Table 7 Storage Tab**

| Item     | Parameters | Description                                     |
|----------|------------|---|
| Internal | OK         | There are no storage space issues detected      |
|          | WARNING    | Less than 20% of the storage space is available |
|          | CRITICAL   | Less than 10% of the storage space is available |
| SD Card  | OK         | There are no storage space issues detected      |

# Navigating the System Interfaces

The System interfaces enable you to define the physical outputs, inputs, and communication ports of the ULTRIX-FR12 router. The System tree includes three sub-nodes: Configuration, Control, and Monitoring. This chapter describes how to navigate the System interfaces in DashBoard, and summarizes the tabs, menus, and fields for each System tree node.

## Configuration Tree Overview

Expanding the top **Configuration** node enables you to access the sub-nodes that manage the available devices in your routing system that are auto-detected by your Ultrix router. (**Figure 6**)



Figure 6 Example of an Expanded System > Configuration Tree View

Double-click the ULTRIX-FR12 sub-node to display the Device Configuration interface in the DashBoard window. (**Figure 7**)

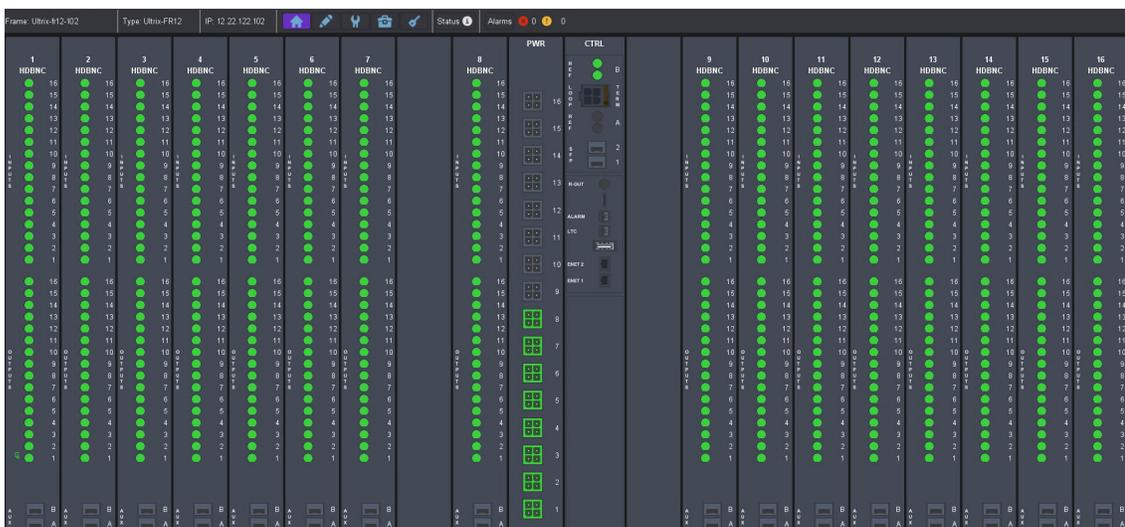


Figure 7 Example of the Device Configuration Window

The Device Configuration menus are accessed by clicking the corresponding button on the top toolbar of the interface: Frame View, Port Configuration, Frame Configuration, SFP Configuration, and Licenses. This section briefly summarizes each interface.

### For More Information on...

- the Device Configuration interface, refer to “**Navigating the Device Configuration Interfaces**”.

## Connections Interfaces

The System > Connections interfaces enables you to define the connection points in your routing system. The interface is organized into three tabs: Incoming Connections, Services, and Protocol Servers. The following sub-sections outline each tab.

★ Prior to software version 5.6, the Connections interface tabs and fields were included in the Third-Party Matrices interfaces.

### For More Information on...

- defining connection points to external devices, refer to “**Enabling a Service**”.

## Incoming Connections Tab

The Incoming Connections table lists the connection details of remote client devices under the supervision of the active database currently communicating with the router. (**Figure 8**)

| Communication        | Details | Device ID   | Name  | Protocol  |
|----------------------|---------|-------------|---|-----------|
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | Dashboard   | Dashboard                                   | CGP       |
| TCP   ip: [redacted] |         | RIPNative49 | (BCS Controller or Ultrixcore) Ultrix_TCP_5 | RIPNative |
| TCP   ip: [redacted] |         | RIPNative50 | (BCS Controller or Ultrixcore) Ultrix_TCP_1 | RIPNative |

Figure 8 Example of Entries in a Connections > Incoming Connections Interface

**Table 8** summarizes the fields displayed in the Incoming Connections tab.

**Table 8 Connections — Incoming Connections**

| Item          | Parameters    | Description  |
|---------------|---------------|--|
| Communication | tcp           | The device is communicating over a network connection. Note that the DashBoard client computer, the router, and the external device must be on the same network. |
|               | ip: #         | Specifies the IP Address of the device on the network  |
|               | ip: localhost | Specifies that the device is the router you are currently configuring  |
|               | port:#####    | Specifies the ethernet port the devices is associated with on the network  |
|               | TBUS   port:  | The device is communicating via the specified T-Bus port   |
| Description   | <text>        | Provides a short textual description of the device   |

**Table 8 Connections — Incoming Connections (Continued)**

| Item      | Parameters     | Description   |
|-----------|----------------|---|
| Device ID | <name>         | Specifies the external device for the connection point  |
| Name      | <name>         | Assigns a unique identifier for the device in the routing system. This name is also used when matrices are defined in the system. |
| Protocol  | GVG Native     | The device uses the third-party GVG protocol to communicate   |
|           | NVISION        | This device communicates via the third-party NVISION protocol   |
|           | OGP            | This device uses the openGear Protocol to communicate   |
|           | Probel SW-P-08 | The device communicates via the Probel SW-P-08 protocol   |
|           | Ross NK        | The device uses the Ross NK protocol to communicate (T-Bus or TCP only)   |
|           | TSL UMD v3.1   | The device uses TSL UMD protocol version 3.1  |
|           | TSL UMD v4.0   | The device uses TSL UMD protocol version 4.0  |
|           | TSL UMD v5.0   | The device uses TSL UMD protocol version 5.0  |
|           | Ultrix         | The device uses the Ross Ultrix protocol to communicate (TCP only)  |

## Services Tab

The Services tab lists the available communications protocols and provides options for enabling/disabling each protocol for the router.

**Table 9** summarizes the options displayed on the **Services** tab.

**Table 9 Connections — Services**

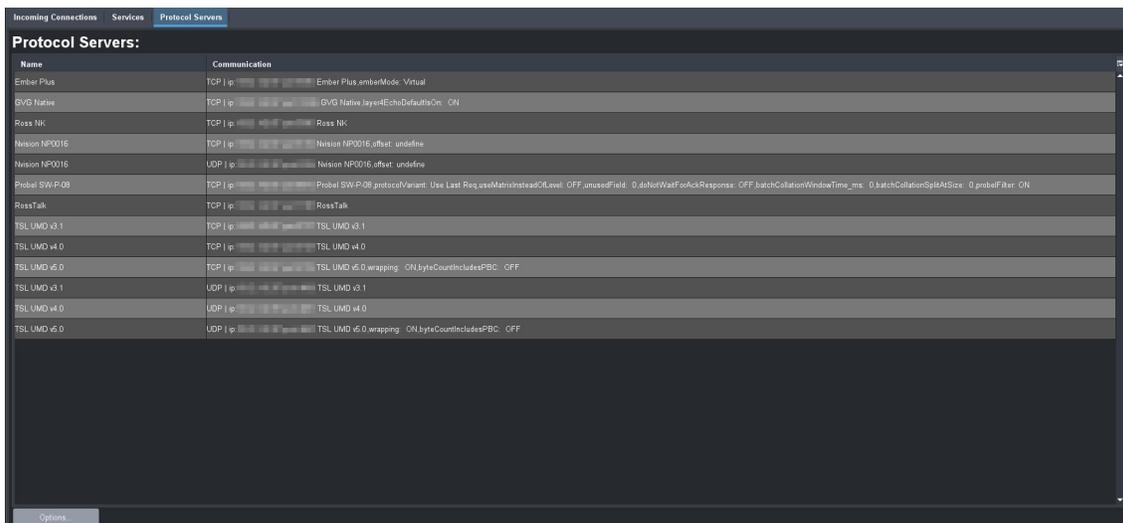
| Item        | Description  |
|-------------|--|
| SSH service | Enables the ability to log onto the primary device via an SSH server. Secure Shell (SSH) Login is a client-server protocol used by system administrators to securely log onto remote systems and execute commands over an unsecured network. SSH may also be used by Technical Support for advanced troubleshooting. |
| FTP service | Enables the ability to communicate with the ULTRIX-FR12 over an FTP connection   |
| Walkabout   | Enables the primary device to communicate with devices in the Walkabout system   |
| Ember Plus  | Enables the primary device to communicate with a third-party control system via the Ember+ media distribution protocol   |
| GVG Native  | Enables the primary device to communicate via the GVG Series 7000 Native protocol and is available over an RS-422 or RS-232 serial connection, as well as ethernet connection.   |

**Table 9 Connections — Services (Continued)**

| Item                      | Description   |
|---------------------------|---|
| Nvision                   | Enables the primary device to communicate via a limited sub-set of the NVISION serial NP0010 protocol, and the NVISION NP16 Ethernet protocol.<br>Requires the Ultracore-NVISION license.   |
| Probel SW-P-08            | Enables the primary device to communicate via the Probel SW-P-08 protocol. This protocol is available over an RS-422 or RS-232 serial connection, as well as an ethernet connection.  |
| RossTalk                  | Communications via the RossTalk protocol (a plain text based protocol that allows control of Ross Video equipment)  |
| TSL                       | Enables the primary device to communicate via the TSL UMD v3.1, TSL UMD v4.0, and TSL UMD v5.0 protocols.   |
| NK                        | Select this option if there are Ross NK series devices or signal types the primary device itself does not handle.<br>The Ross NK series devices must be connected to the Ethernet network by virtue of an Ross NK-IPS or NK-NET devices to enable communication with the primary device.  |
| Upgrades & Support Access | Remote access and upgrades are disabled by default (the Upload button is disabled in the DashBoard interfaces). Remote upgrades may optionally be enabled through DashBoard via this option.<br><br>★ On bootup or power cycle, this option will default back to disable (box is unselected). You must select the box again if you wish to enable web access and firmware upgrades after a bootup or power cycle. |

## Protocol Servers Tab

The Protocol Servers tab lists the currently active servers running in the routing system. **(Figure 9)** This tab is auto-populated based on the external devices on the same network as your primary device.



*Figure 9 Example of the Connections > Protocol Servers Interface*

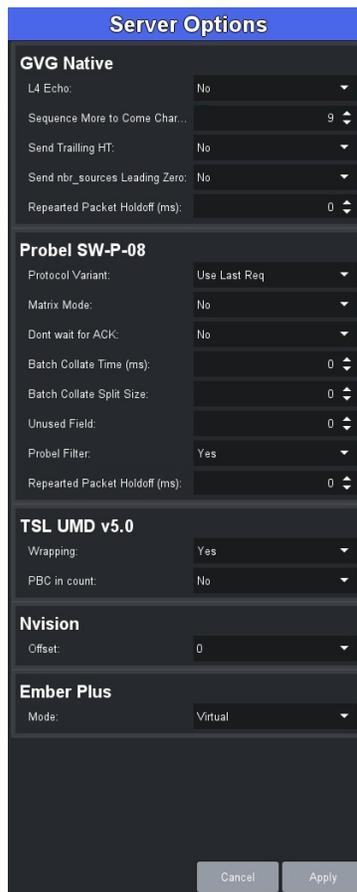
**Table 10** summarizes the fields displayed in the **Protocol Servers** tab.

**Table 10 Connections — Protocol Servers**

| Item          | Description  |
|---------------|--|
| Name          | Indicates the unique identifier for the device in the routing system. This name is also used when matrices are defined in the system |
| Communication | Indicates the communication protocol, IP Address, Port Number, and configuration details of the device.                              |

## Server Options Dialog

Click **Options** (located in the bottom left corner) to display the **Server Options** dialog. (**Figure 10**) This dialog provides additional settings for the supported protocol servers.



*Figure 10 Example of the Services > Server Options Dialog*

**Table 11** summarizes the fields displayed in the **Server Options** dialog.

**Table 11 Connections — Protocol Servers > Server Options**

| Item              | Parameters | Description  |
|-------------------|------------|--|
| <b>GVG Native</b> |            |  |
| L4 Echo           | No         | The Ethernet Layer 4 acknowledge is disabled. This is the default. |
|                   | Yes        | The Ethernet Layer 4 acknowledge is enabled                        |

**Table 11 Connections — Protocol Servers > Server Options (Continued)**

| Item                                       | Parameters   | Description  |
|--|--------------|--|
| Sequence More to Come Character            | #            | Enables the user to assign a number to the <code>seq_flag</code> field in a packet that will indicate more messages to come. The default value is 9.<br>A value of 0 (zero) indicates the last or only packet. |
| Send Trailing HT                           | Yes          | Includes the trailing <HT> character (Horizontal Tab (0x09)) in the packet   |
|  | No           | The trailing <HT> character is not included in the packet  |
| Send <code>nbr_sources</code> Leading Zero | Yes          | Always forces the <code>nbr_sources</code> field to be 2 ASCII characters (e.g. 1 becomes 01). This supports fragmentation of large message streams.   |
|  | No           | Allows the <code>nbr_sources</code> field to be a single ASCII character   |
| Repeated Packet Holdoff (ms)               | #            | ULTRIX-FR12 detects repeated identical packets, and will skip processing if the packets are repeated within the specified delay. The default is 0.   |
| <b>Probel SW-P-08</b>                      |              |  |
| Protocol Variant                           | Use Last Req | The Ultrix will respond using protocol variant (extended/non-extended) as per the received request format. This is the default.  |
|  | Non-Extended | Ultrix will always replay using non-extended formatting  |
|  | Extended     | Ultrix will respond with extended formatting   |
| Matrix Mode                                | No           | Ultrix will use information from the LEVEL section of the protocol to control Ultrix levels  |
|  | Yes          | Ultrix will use information from the MATRIX_ID section of the protocol to control Ultrix levels  |
| Do not wait for ACK                        | No           | Ultrix will wait for message acknowledgments between connect responses. This is the default  |
|  | Yes          | Ultrix will not wait for message acknowledgments between connect responses   |
| Batch Collate Time (ms) <sup>a</sup>       | #            | Wait up to 100 milliseconds for multiple commands received before processing. The default is 0 (which disables this feature).  |
| Batch Collate Split Size (# of commands)   | #            | Wait up to 100 received commands before processing. The default is 0 (which disables this feature).  |
| Unused Field                               | #            | Send number (0-15) in either Level or Matrix field - which ever is not used as per Matrix Mode setting. The default is 0.  |
| Probel Filter                              | Yes          | Probel SW-P-08 crosspoint tally responses are provided when there are no status changes resulting from the crosspoint connect message.   |
|  | No           | Removes the Probel Crosspoint Switch filter  |

**Table 11 Connections — Protocol Servers > Server Options (Continued)**

| Item                         | Parameters | Description  |
|------------------------------|------------|--|
| Repeated Packet Holdoff (ms) | #          | Ultrix detects repeated identical packets, and will skip processing if the packets are repeated within the specified delay. The default is 0.  |
| <b>TSL UMD v5.0</b>          |            |  |
| Wrapping                     | No         | The DLE/STX wrapping is not enabled. This is the default.  |
|                              | Yes        | Enables the DLE/STX wrapping for TCP/IP transport  |
| PBC in Count                 | No         | Packet Byte Count is not included in total byte count. This is the default.  |
|                              | Yes        | Packet Byte Count is included in total byte count  |
| <b>Nvision</b>               |            |  |
| Offset                       | 0          | The Ultrix level matches the NVISION level   |
|                              | 1          | The Ultrix level is the NVISION level plus 1   |
| <b>Ember+</b>                |            |  |
| Mode                         | Virtual    | Each level is represented by a Matrix and the Labels will be the one defined in the Destinations and Sources interfaces  |
|                              | Physical   | The whole router is represented as a single Matrix and the physical socket labels are used. The external control system using Ember+ commands bypasses the virtual IO mapping and directly controls the Ultrix physical socket connections. Therefore the Ultrix should not be switched by any other devices |

- a. When the Batch Collate Split Size and Batch Collate Time are both active, the option that occurs first will release the batch, and the Batch Collate Split Size and the Collate Time values are reset.

## System Monitoring Interfaces

The System > Monitoring node provides access to the Logs and Alarm Configuration interfaces. (Figure 11)

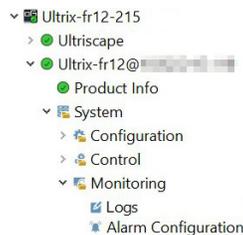


Figure 11 Example of an Expanded System > Monitoring Nodes

### Logs

To display the Logs interface, double-click its sub-node in the Ultrix > System > Monitoring tree.

There are four logs that can be viewed from the Logs interface: Controller Communications Log, System Log, DashBoard Communications Log, and Audit Log. The read-only information displayed in the logs is used by Ross Technical Support for diagnostic and troubleshooting purposes.

## Alarm Configuration

To display the Alarm Configuration interface, double-click its sub-node in the Ultrix > System > Monitoring tree.

The Alarm Configuration interface enables you to manage what types of alarm conditions to monitor for each slot and port that is populated in your Ultrix router. The options on the Alarming Config tab are organized into two sub-tabs based on the type of signal: Video and Audio. Each tab is summarized in the following sections.

★ This tab only displays when accessing an Ultrix.

### Video Alarms Sub-tab

The Video Alarms sub-tab is organized into a table where each row represents a specific slot and port in the Ultrix router chassis. Each column provides an option for monitoring a specific aspect of the video signal associated with that port. (**Figure 12**)

| ID                       | Video Black              | Video Black Hysteresis (s) | Video Freeze             | Video Freeze Hysteresis (s) | Video LOS                | Video LOS Hysteresis (s) | Video Format | Video Format Hysteresis (s) | Caption Format | Caption Format Hysteresis (s) |
|--------------------------|--------------------------|----------------------------|--------------------------|-----------------------------|--------------------------|--------------------------|--------------|-----------------------------|----------------|-------------------------------|
| slot1_AUXA-in[1]_sdi_ch1 | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_AUXB-in[1]_sdi_ch1 | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_AUXC-in[1]_sdi_ch1 | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_AUXD-in[1]_sdi_ch1 | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[1]_sdi_ch1       | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[2]_sdi_ch1       | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[3]_sdi_ch1       | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[4]_sdi_ch1       | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[5]_sdi_ch1       | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[6]_sdi_ch1       | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[7]_sdi_ch1       | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[8]_sdi_ch1       | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[9]_sdi_ch1       | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[10]_sdi_ch1      | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[11]_sdi_ch1      | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[12]_sdi_ch1      | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[13]_sdi_ch1      | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |
| slot1_e[14]_sdi_ch1      | <input type="checkbox"/> | 5                          | <input type="checkbox"/> | 5                           | <input type="checkbox"/> | 5                        | Alarm Off    | 5                           | Alarm Off      | 5                             |

Figure 12 Example of the Alarming Config > Video Alarms Sub-tab

**Table 12** summarizes the columns displayed in the Video Alarms sub-tab.

**Table 12 Alarming Config — Video Alarms Sub-Tab**

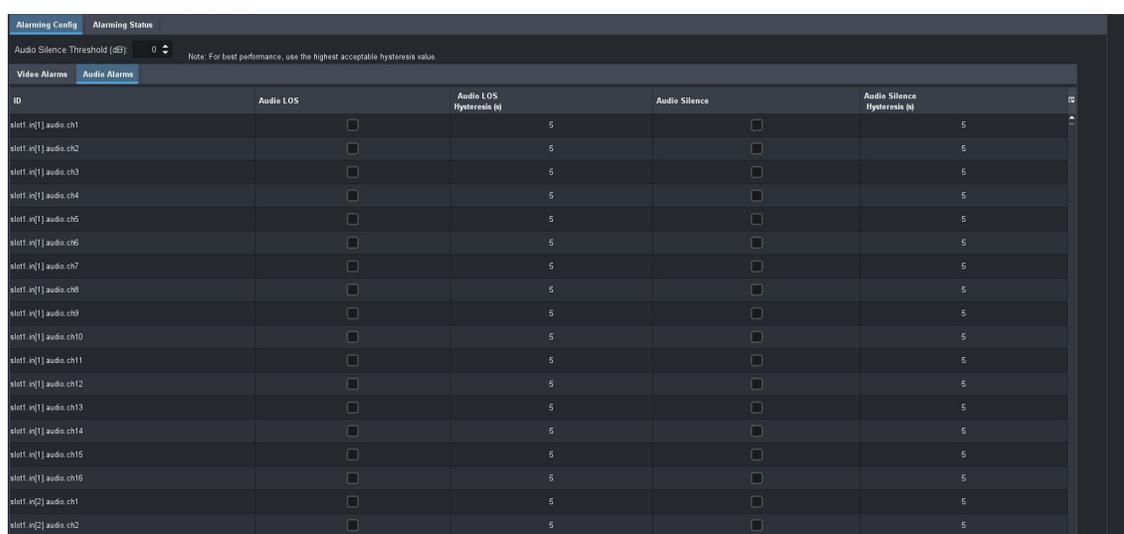
| Item                        | Description   |
|-----------------------------|---|
| ID (read-only)              | Specifies the actual sockets (inputs and outputs) of a router (or matrix) using the nomenclature of <code>slot.port.video.ch</code> |
| Video Black                 | Reports an error when the current signal of the port is set to black  |
| Video Black Hysteresis (s)  | Sets the maximum number of seconds that DashBoard waits before reporting that the signal from this port is set to black             |
| Video Freeze                | Reports an error when the video signal, on this specific port, is frozen to the last valid frame of video                           |
| Video Freeze Hysteresis (s) | Sets the maximum number of seconds that DashBoard waits before reporting a frozen video signal on the specified port                |
| Video LOS                   | Reports an error when a loss of signal occurs on the specified port   |
| Video LOS Hysteresis (s)    | Sets the maximum number of seconds that DashBoard waits before an error is reported after a loss of a valid signal on this port     |
| Video Format                | Reports an error when the video format of the signal is unsupported   |

**Table 12 Alarming Config — Video Alarms Sub-Tab (Continued)**

| Item                          | Description   |
|-------------------------------|---|
| Video Format Hysteresis (s)   | Sets the maximum number of seconds that DashBoard waits before an error is reported when an unsupported video format is detected on this port                     |
| Caption Format                | Reports an error when the video signal does not include a valid Closed Captioning packet  |
| Caption Format Hysteresis (s) | Sets the maximum number of seconds that DashBoard waits before an error is reported when the closed caption packet is invalid in the signal on the specified port |

### Audio Alarms Sub-tab

The Audio Alarms sub-tab enables you to select what audio signals to monitor for audio error conditions. **(Figure 13)**



*Figure 13 Example of the Alarming Config > Audio Alarms Sub-tab*

**Table 13** summarizes the columns displayed in the Audio Alarms sub-tab.

**Table 13 Alarming Config — Audio Alarms Sub-Tab**

| Item                         | Description   |
|------------------------------|---|
| Audio Silence Threshold (dB) | Audio below the specified threshold value is considered silent  |
| ID (read-only)               | Specifies the audio channel (inputs and outputs) of a router (or matrix) using the nomenclature of <code>slot.port.audio.ch</code>                            |
| Audio LOS                    | Reports an error when a loss of the specified audio channel occurs  |
| Audio LOS Hysteresis (s)     | Sets the maximum number of seconds that DashBoard waits before an error is reported when a loss of this audio channel occurs                                  |
| Audio Silence                | Reports an error when this audio channel is set to silence in the embedded audio signal   |
| Audio Silence Hysteresis (s) | Sets the maximum number of seconds that DashBoard waits before an error is reported when the specified audio channel is silenced in the embedded audio signal |

## Alarming Status Tab

The Alarming Status tab reports error messages as defined by the settings in the Alarming Config tabs. The tab is organized into a table where the left column displays the available virtual ports. Selecting a port displays the detected error condition(s) for that port. (**Figure 14**)

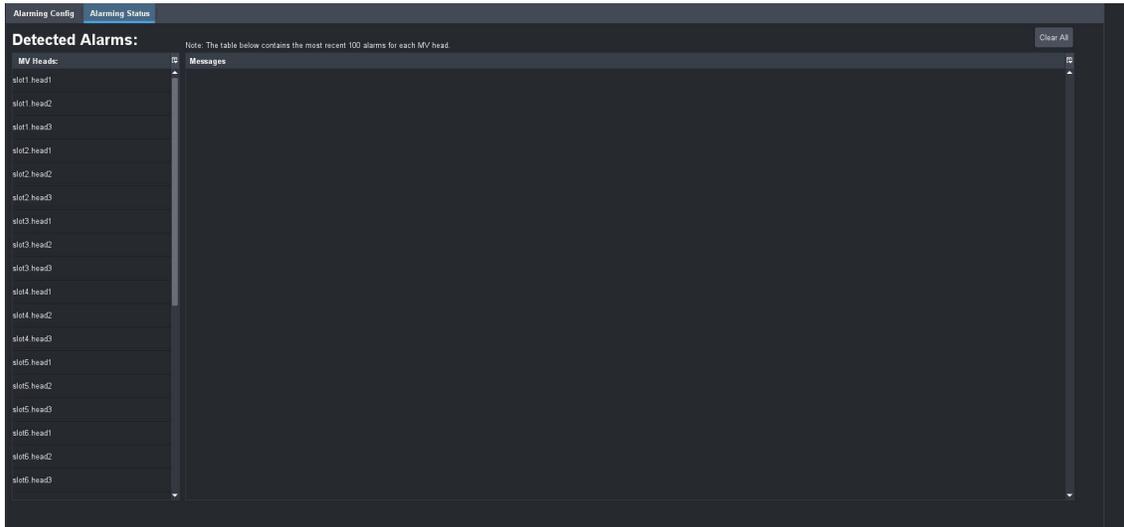


Figure 14 Example of the Alarming Status Tab

# Navigating the Device Configuration Interfaces

The Device Configuration interfaces enable you to define the physical outputs, inputs, and communication ports of the ULTRIX-FR12 router. You can also monitor the overall status of the ULTRIX-FR12 router, or just the status of a specific signal path or port on the rear panel. This chapter briefly summarizes each Device Configuration interface.

## Overview

The Device Configuration interfaces are accessed via the System > Configuration tree in DashBoard. (Figure 15)

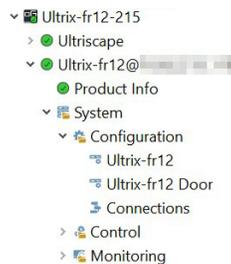


Figure 15 Example of an Expanded System > Configuration Tree View

## ULTRIX-FR12 Node

Double-click the first ULTRIX-FR12 sub-node to display the Device Configuration interface in the DashBoard window. (Figure 16)

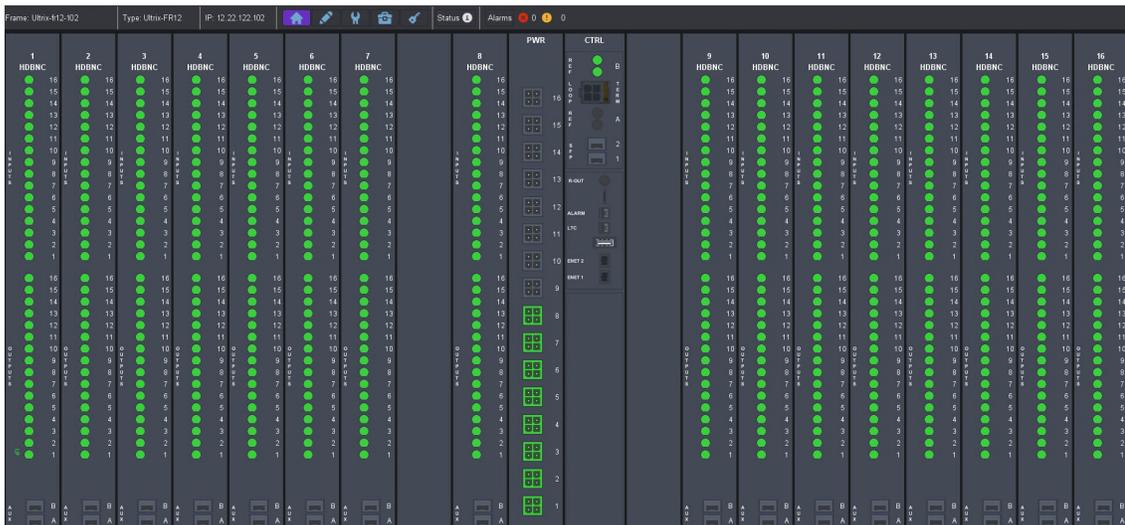


Figure 16 Example of the Device Configuration Window

The Device Configuration menus are accessed by clicking the corresponding button on the top toolbar of the interface: Frame View, Port Configuration, Frame Configuration, SFP Configuration, and Licenses. This section briefly summarizes each interface.

## Navigation Toolbar

A toolbar always displays at the top of each Configuration interface. **(Figure 17)** From this toolbar you can quickly monitor the overall status, verify the IP address, and navigate between the Device Configuration interface. This section outlines the read-only fields and buttons on the toolbar (from left to right).

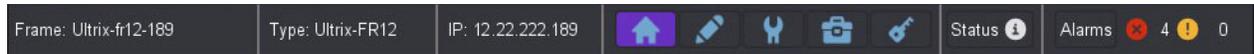


Figure 17 Example of the Navigation Toolbar

**Table 14** outlines the read-only fields and buttons on this toolbar.

**Table 14 Configuration — Toolbar**

| Item  | Parameters | Description   |
|---|------------|---|
| Frame   |            | Reports the unique identifier assigned to the router  |
| Type  |            | Reports the model of the router   |
| IP  |            | Reports the current TCP/IP network address assigned to the router   |
|    |            | Displays the home page (frame view) that includes a map of the router rear panel. Selecting a blade displays the options for that blade. Selecting one or more ports display the options for the port(s). Refer to <b>“Frame View Interface”</b> for details. |
|    |            | Displays the configuration options for the ports on the rear panel. Refer to <b>“Port Configuration Interface”</b> for details.   |
|  |            | Displays the global configuration options for the router, such as network settings, specifying a reference source, and enabling alarms. Refer to <b>“Frame Configuration Interface”</b> for details.  |
|  |            | Displays the options to configure an ULTRIX-SFP-IO blade or a port that is populated with an SFP module. Refer to <b>“SFP Configuration Interface”</b> for details.   |
|  |            | Displays options for managing the license keys for your router. Refer to <b>“Licenses Interface”</b> for details.   |
| <b>Status</b>   |            |   |
|  |            | Reports the current number of issues or changes logged  |
| <b>Alarms</b>   |            |   |
|  |            | Indicates the total number of warnings (red) the router is currently reporting  |
|  |            | Indicates the total number of cautions (yellow) the router is currently reporting   |

## Frame View Interface

The Frame View page provides a map of the rear panel. (Figure 18) The number of slots and the available connections depends on the router model and the type of blade(s) installed in each slot. Colors and icons indicate port status.

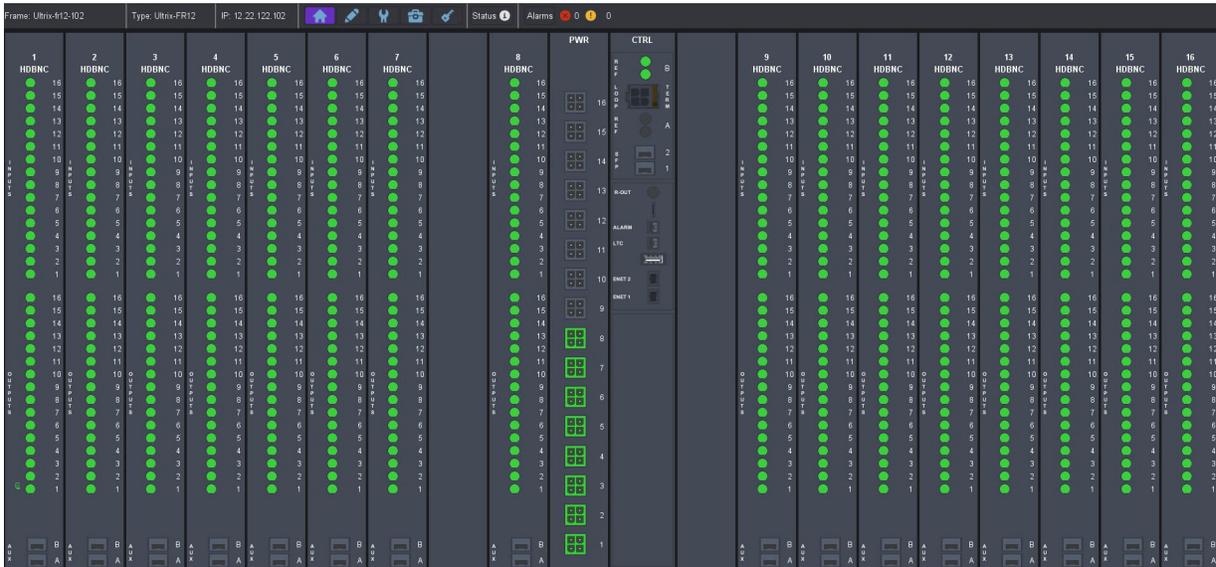


Figure 18 Example of the ULTRIX-FR12 Frame View Page in Dashboard

The top row of the router map represents the power connections (left side), and any UCCI blades installed (right side). Selecting a power connector displays the Frame Configuration > Fans & Power tab.

Each subsequent row represents a populated slot in the chassis. Selecting a slot displays its options in the Port Configuration page.

Selecting a port displays its options and status on the Port Configuration page. When a port is selected, its label (located under the port image) is lit blue. Refer to “Port Configuration Interface” for information on the types of menus and fields on this page.

Each port is lit green, yellow, or red to indicate its status:

- Red — no signal is present or is a type/format that is not supported.
- Yellow — an SDI signal is present without embedded audio.
- Green — an SDI signal is present with embedded audio.

Selecting any other ports navigates directly to the relevant configuration and status page.

## Port Configuration Interface

The Port Configuration page reports individual I/O port status and settings. Selecting a slot updates the table for all installed ports. Selecting a port displays only the options for that port (the label under the port icon is lit blue). You can also choose to filter the information displayed in the table (e.g. only inputs, or only outputs).

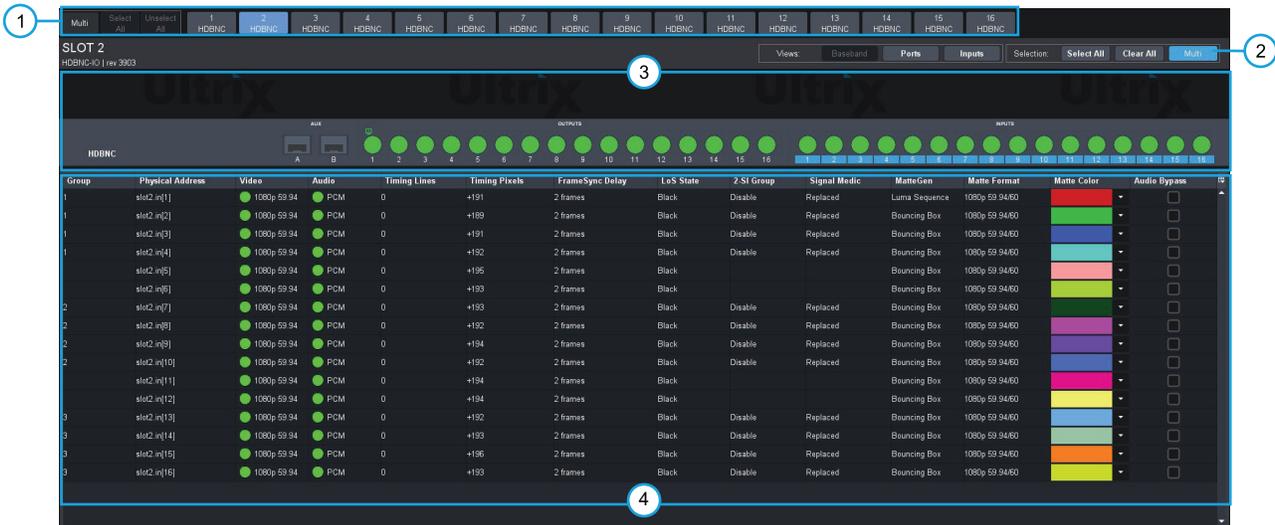


Figure 19 Example of the ULTRIX-FR12 Port Configuration Page

- |                    |                             |
|--------------------|-----------------------------|
| 1) Populated Slots | 3) Slot Map                 |
| 2) View Options    | 4) Port Configuration Table |

### 1. Populated Slots

A row of buttons representing the slots available on the rear panel. Selecting a button displays the options specific to that slot. This provides quick I/O module selection to view status and port configuration. **Figure 19** shows that Slot 2 was selected.

### 2. View Options

The Views options in this area enable you to filter the information displayed on the Port Configuration page. Choose from the following:

- › Baseband/IP — Toggle this button to select between baseband (SDI) signals or IP signals (blade dependent).
- ★ The IO Module option is also available when there is at least one ULTRIX-MODX-IO blade installed. Refer to the **ULTRIX-MODX-IO User Guide** for details.
- › Ports/Channels — Toggle this button to select between primary signal view (SDI) or embedded audio channel view.
- › Inputs/Outputs — Toggle this button to specify the type of port to display in the table.
- › Select All — Select this button to change the port view to see all ports of a specific type (input or output).
- › Clear All — Select this button to clear the port view to allow individual port selection.
- › Multi — Select this button to apply more than one View option.

### 3. Slot Map

This area provides a graphic representing the physical ports of the selected slot. Select a port image to display its details in the Port Configuration Table. A port label is highlighted in blue when the table displays information specific to that port. The color of the port denotes its signal status as follows:

- › Red — no signal present or is of type not supported.
- › Yellow — an SDI signal is present but does not include embedded audio.
- › Green — an SDI signal is present and includes embedded audio.
- › Gray — the port is not in use or it is not populated with an SFP module.

A port may also display a character above it:

- › **D** — the port is currently assigned to Ultrimix-Dante.
- › **i** — the port is currently assigned as part of a Gearbox quad-link group.
- › **M** — the port is currently assigned as an UltraScape (Multiviewer) output.
- › **/** — the port is currently configured with UltraSync (frame sync) license.

Select individual ports to toggle port details list. The port identifying number/letter is highlighted when included in the port details list.

★ Selecting a non-signal port (such as a power connector, or reference port) opens the status and configuration page for the port type.

#### 4. Port Configuration Table

A table that displays details on each port for the selected slot. The columns and rows depend on the blade type that populates the slot. Refer to the following sub-sections for blade-specific details. The table is filtered by the selections made via the **View Options**. For example, to monitor/configure a single audio input:

- a. From the **Selection Options**, click **Clear All**.
- b. From the **Views Options**, click **Channels**.
- c. Select the required I/O port.

The table updates to display only the selected port. You may add more ports to view simply by selecting them on the rear panel graphic display.

### SDI-IO Blades

Selecting any blade (HD-BNC, SFP, HDX, etc.) using the buttons located in the Populated Slots selection bar, displays the Port Configuration table for the selected blade. The location of the port is reported at the top of the page. **Figure 20** shows the page for an HD-BNC I/O blade installed in Slot 2 with only the information for the inputs displayed.

| Group | Physical Address | Video       | Audio | Timing Lines | Timing Pixels | FrameSync Delay | LoS State | 2-SI Group | Signal Medic | MatteGen      | Matte Format   | Matte Color           | Audio Bypass             |
|-------|------------------|-------------|-------|--------------|---------------|-----------------|-----------|------------|--------------|---------------|----------------|-----------------------|--------------------------|
| 1     | slot2_in[1]      | 1080p 59.94 | PCM   | 0            | +191          | 2 frames        | Black     | Disable    | Replaced     | Luma Sequence | 1080p 59.94/60 | [Red Swatch]          | <input type="checkbox"/> |
| 1     | slot2_in[2]      | 1080p 59.94 | PCM   | 0            | +189          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Green Swatch]        | <input type="checkbox"/> |
| 1     | slot2_in[3]      | 1080p 59.94 | PCM   | 0            | +191          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Cyan Swatch]         | <input type="checkbox"/> |
| 1     | slot2_in[4]      | 1080p 59.94 | PCM   | 0            | +192          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Blue Swatch]         | <input type="checkbox"/> |
| 1     | slot2_in[5]      | 1080p 59.94 | PCM   | 0            | +195          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Magenta Swatch]      | <input type="checkbox"/> |
| 1     | slot2_in[6]      | 1080p 59.94 | PCM   | 0            | +193          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Yellow Swatch]       | <input type="checkbox"/> |
| 2     | slot2_in[7]      | 1080p 59.94 | PCM   | 0            | +193          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Dark Green Swatch]   | <input type="checkbox"/> |
| 2     | slot2_in[8]      | 1080p 59.94 | PCM   | 0            | +192          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Purple Swatch]       | <input type="checkbox"/> |
| 2     | slot2_in[9]      | 1080p 59.94 | PCM   | 0            | +194          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Light Blue Swatch]   | <input type="checkbox"/> |
| 2     | slot2_in[10]     | 1080p 59.94 | PCM   | 0            | +192          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Dark Blue Swatch]    | <input type="checkbox"/> |
| 2     | slot2_in[11]     | 1080p 59.94 | PCM   | 0            | +194          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Pink Swatch]         | <input type="checkbox"/> |
| 2     | slot2_in[12]     | 1080p 59.94 | PCM   | 0            | +194          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Light Yellow Swatch] | <input type="checkbox"/> |
| 3     | slot2_in[13]     | 1080p 59.94 | PCM   | 0            | +192          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Light Blue Swatch]   | <input type="checkbox"/> |
| 3     | slot2_in[14]     | 1080p 59.94 | PCM   | 0            | +193          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Light Green Swatch]  | <input type="checkbox"/> |
| 3     | slot2_in[15]     | 1080p 59.94 | PCM   | 0            | +196          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Orange Swatch]       | <input type="checkbox"/> |
| 3     | slot2_in[16]     | 1080p 59.94 | PCM   | 0            | +193          | 2 frames        | Black     | Disable    | Replaced     | Bouncing Box  | 1080p 59.94/60 | [Yellow Swatch]       | <input type="checkbox"/> |

Figure 20 Example of Port Configuration Interface — HD-BNC I/O Blade

**Table 15** summarizes the columns that may display on the Port Configuration page.

**Table 15 Port Configuration Tab**

| Item                                  | Parameters  | Description  |
|---------------------------------------|---|--|
| Physical Address                      | Reported as Frame.Slot.Port.Type.Channel<br>Lists the physical ports, in ascending order, of the ULTRIX-FR12. Each row represents a port. |  |
| Video                                 | #   | If a port is used for video signals, this field indicates the type of video (e.g. HD, 3G, UHD, etc.).  |
| Audio                                 | #   | If a port is used for audio signals, this field indicates the type of audio detected (e.g. PCM, AES etc.).   |
| Timing Lines (read-only)              | #   | Reports the value of timing difference between input and frame reference in number of lines.   |
|                                       | Detecting   | The timing difference is being detected; updates the field approximately every 33 seconds.   |
|                                       | Async   | There is no timing relationship between the input signal and the frame reference.  |
| Timing Pixels (read-only)             | #   | Reports the value of timing difference between input and frame reference in number of pixels.  |
|                                       | Detecting   | The timing difference is being detected; updates the field approximately every 33 seconds.   |
|                                       | Async   | There is no timing relationship between the input signal and the frame reference   |
| Frame Sync Delay                      | # frame(s)  | Specifies the frame buffer size for the selected input port  |
| LoS State <sup>a</sup>                | Black   | Sets the input to black during the loss of signal  |
|                                       | Freeze  | Sets the input to the last valid frame of video before the loss of signal  |
| 2-SI Group                            | Enable  | Gearbox is available on the indicated I/O Group in groups of 4 consecutive I/O. For example, selecting Enable in the row for slot1.in[1] creates a Gearbox group from slot1.in[1] to slot1.in[4].<br>Note that I/O Groups for Gearbox are defined in the table using colored backgrounds. In <b>Figure 19</b> , the first Gearbox group is set in dark red, the second group is set in dark green. |
|                                       | Disable   | The indicated I/O is not included in a Gearbox configuration   |
| Signal Medic (read-only) <sup>b</sup> | Not available   | This port does not support the Gearbox feature.  |
|                                       | Good  | This port is included in a Gearbox setup.  |
|                                       | Replaced  | This port can be included in a Gearbox setup but is currently not included in the 12G link.  |

**Table 15 Port Configuration Tab (Continued)**

| Item                            | Parameters    | Description  |
|---------------------------------|---------------|--|
| Matte Gen                       | Disable       | Disable an internally generated test pattern. This is the default.   |
|                                 | Static        | Generates a static color matte   |
|                                 | Bouncing Box  | Generates a static color matte with a complimentary colored moving box   |
|                                 | Luma Sequence | Generates a luminance shifting sequence based on chosen color  |
| Matte Format                    | #             | Specifies the signal format of the generated test pattern. If you select Auto, the test pattern automatically matches the incoming signal type.  |
| Matte Color                     | #             | Specifies the color of the test signal   |
| Audio Bypass                    | Selected      | When Audio Bypass is enabled for an input, the audio will follow the SDI regardless of any individual audio channel routing or configuration on the output.<br><br>The individual channels of an input in Bypass mode are still de-multiplexed and available for audio routing via the audio matrix. |
|                                 | Cleared       | Disables this feature  |
| Sub-Image ID                    | 3G            | Some legacy equipment does not accept a 2SI SMPTE-352 payload identifier for quad-link SDI. You may need to select this if you are connecting legacy equipment to the specified output on the ULTRIX-FR12.   |
|                                 | 2SI           | Set the SMPTE-352 payload identifier to 2SI for quad-link.   |
| Clean Switch Status (read-only) | Locked        | The specified output is locked to its input.   |
|                                 | Not Locked    | The specified output is not locked to its input.   |
| Clean Switch                    | Selected      | Clean Switch is applied to the specified output. The Clean Switch Delay value is applied.  |
|                                 | Cleared       | Clean Switch is not applied to the specified output.   |
| Clean Switch Mode               | Reference     | Clean Switch is based on the reference signal available on the REF port of the router  |
|                                 | Input         | Clean Switch is based on the input signal available on the specified port of the router  |
| Clean Switch Delay              | #             | Specifies the Clean Switch buffer depth. Select between 1/16 to full line to clean switch between signals with slight timing offsets.  |

- a. This affects UltraScape and routed destinations.
- b. Use this field to replace a missing 3G signal when one or more of the four 3G signals for a Gearbox configuration are unavailable.

## ULTRIX-IP-IO and ULTRIX-IPX-IO Blades

When an ULTRIX-IP-IO or ULTRIX-IPX-IO blade is installed in a router slot, there are options to map to the sender, and receiver streams the port will manage. Refer to “**ULTRIX-IP-IO Setup**” or “**ULTRIX-IPX-IO Setup**” for details.

**Table 16** summarizes the options in the Port Configuration page for the ULTRIX-IP-IO and ULTRIX-IPX-IO blades.

**Table 16 Port Configuration — ULTRIX-IP-IO or ULTRIX-IPX-IO**

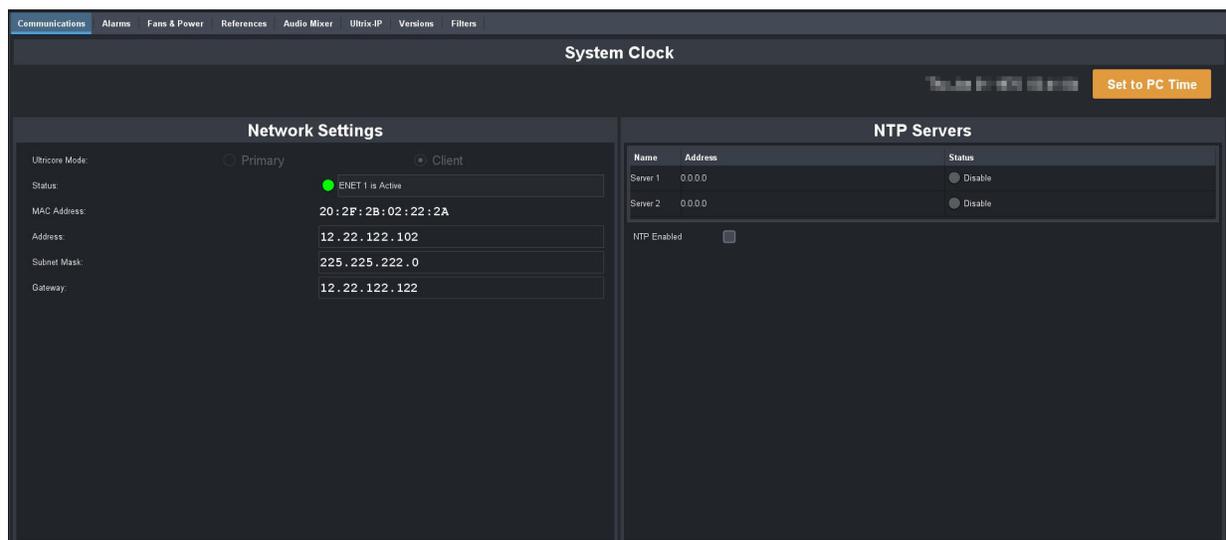
| Item                           | Parameters        | Description   |
|--------------------------------|-------------------|---|
| Port Status (read-only)        | OK (Green)        | The selected port is ready to accept stream setting changes   |
|                                | NOT READY (Red)   | Failure to communicate with the port. The router will continue to re-establish connection with the port until it is successful. |
| Sender Bandwidth (read-only)   | # of 25Gb used    | Reports the amount of data the router is currently transmitting on the specified port   |
| Receiver Bandwidth (read-only) | FREE              | Reports the amount of data the router is currently receiving on the specified port  |
| <b>Senders</b>                 |                   |   |
| Port                           | slot.port.type.ch | Specifies the ULTRIX-IP-IO port when subscribing to streams   |
| Name                           | <text>            | Specifies a unique identifier for the sender stream   |
| Type                           |                   | Indicates whether the stream includes video or audio data   |
| Signal Format                  | #                 | Indicates the video format detected on the stream   |
| Codec                          | #                 | Specifies the AES67 standard that the ULTRIX-IP-IO will default to for all IP-based audio sender streams                        |
| Channels                       | #                 | Specifies the maximum number of audio channels available for configuration within the specified stream                          |
| Transport IP                   | #                 | Specifies the IP address for the stream   |
| UDP Port                       | #                 | Indicates the port associated with the IP address and the communication protocol for the stream                                 |
| Redundancy                     |                   | Indicates if Redundancy Mode (protection switching) is enabled for the specified ULTRIX-IP-IO port                              |
| Session ID                     | #                 | Indicates the ID number assigned to the ULTRIX-IP-IO within the system  |
| Stream ID                      | #                 | Indicates the ID number assigned to the specific stream within the system   |
| Alarm Severity                 |                   | Indicates any detected errors for the specific stream   |
| Alarm Description              |                   |   |
| <b>Receivers</b>               |                   |   |
| Port                           | slot.port.type.ch | Specifies the ULTRIX-IP-IO port for the receiver stream   |

**Table 16 Port Configuration — ULTRIX-IP-IO or ULTRIX-IPX-IO (Continued)**

| Item              | Parameters  | Description  |
|-------------------|---|--|
| Name              | <text>  | Specifies a unique identifier for the receiver stream  |
| Type              |   | Indicates whether the stream includes video or audio data  |
| Signal Format     | #   | Indicates the video format detected on the stream  |
| Codec             | #   | Specifies the AES67 standard that the ULTRIX-IP-IO will default to for all IP-based audio receiver streams |
| Channels          | #   | Specifies the maximum number of audio channels available for configuration within the specified stream     |
| Transport IP      | #   | Specifies the IP address for the stream  |
| UDP Port          | #   | Indicates the port associated with the IP address and the communication protocol for the stream            |
| Redundancy        | #   | Indicates if Redundancy Mode (protection switching) is enabled for the specified ULTRIX-IP-IO port         |
| Session ID        | #   | Indicates the ID number assigned to the ULTRIX-IP-IO within the system                                     |
| Stream ID         | #   | Indicates the ID number assigned to the specific stream within the system                                  |
| Alarm Severity    | Indicates any detected errors for the specific stream |  |
| Alarm Description |   |  |

## Frame Configuration Interface

The Frame Configuration page is organized into a series of sub-tabs that provide options for configuring the global settings of the router. **(Figure 21)** The Communications tab is selected by default.



*Figure 21 Example of a Frame Configuration Page*

## Communication Tab

The Communications tab shows the network settings and Network Time Protocol (NTP) settings. You can also monitor the status of the Ethernet connection of the ULTRIX-FR12. From here you can verify the network settings of the active Ethernet port on the router, and view the mode of the control system (primary/client). Refer to **“Before You Begin”** for details.

## Alarms Tab

From the Alarms tab you can specify what components the ULTRIX-FR12 monitors such as the power supplies, fans, network status, the SD Card, the chassis battery, and the interior chassis temperature.

By default, the ULTRIX-FR12 monitors the following components (these options are enabled):

- System Error
- Temperature
- Primary Power
- Redundant Power
- SD Card Presence
- Battery
- Storage Space
- Slot # Fan (the specific I/O Fan Module located on the front panel and behind the grill)
- Exhaust Fan # (one of two fans inside the Exhaust Fan Module located on the rear panel and above the power connectors)
- Front Panel #<sup>1</sup> (one of the fans located inside the chassis and under the Crosspoint Module)

The Alarms tab also displays read-only State column that reports the status of each enabled alarm using color indicators which vary in severity from green (valid), yellow (caution), to red (alarm). For example, if the SD Card status is set to red in the Alarms tab, an SD Card is not detected or the SD Card not mounted correctly inside the chassis.

## Fans & Power Tab

The Fans & Power tab displays read-only fields that report on the fan status and PSU connections of the ULTRIX-FR12. Color indicators vary in severity from green (valid), yellow (caution), to red (alarm). In the case of multiple messages, the most severe alarm is reported for a single row in the tables.

**Table 17** summarizes the fields and menus displayed in the Fans & Power tab.

**Table 17 Frame Configuration — Fans & Power**

| Item        | Parameters | Description   |
|-------------|------------|---|
| <b>Fans</b> |            |   |
| Fan Name    | Slot #, x  | Indicates the specific fan within the chassis where # represents the physical slot and x the location (front, middle, back) |

---

1. Fan 1 refers to the first two fans located on the left side of the fan bank. Fan 2 refers to the last 3 fans in the fan bank.

**Table 17 Frame Configuration — Fans & Power (Continued)**

| Item                     | Parameters        | Description  |
|--------------------------|-------------------|--|
| Fan State                | Active (Green)    | Indicates that the chassis core components <sup>a</sup> temperature is within the normal range (below 70°C (158°F)) and the fans are running without errors detected           |
|                          | Inactive (Yellow) | The chassis fan is not currently enabled or installed.   |
|                          | Warning (Red)     | An error condition is detected on the chassis fan and an alarm is raised. Verify that the fan is installed correctly.  |
| Fan Speed (%)            | #                 | Indicates the current speed of the chassis fans  |
| Fan Speed State          | OK (Green)        | The fans are running at the specified Minimum Fan Speed value  |
|                          | Caution (Yellow)  | Indicates that at least one chassis core component temperature is between 70°C and 80°C (158°F and 176°F). The Minimum Fan Speed value is overridden.                          |
|                          | Warning (Red)     | Indicates that at least one chassis core component temperature is above 80°C (176°F). The Minimum Fan Speed value is overridden and the fans are running at the maximum speed. |
| Minimum Fan Speed        | 40-100            | Sets the speed of the interior chassis fans. This value will be overridden when a chassis core component is detected to be at a temperature above 70°C (158°F).                |
| <b>Power Supplies</b>    |                   |  |
| PSU                      | #                 | Indicates the specific power supply unit within the chassis. This matches the silk-screen on the chassis and the rear panel map on the Frame View page.                        |
| Power State              | Active (Green)    | Normal operation; no hardware errors associated with the PSU   |
|                          | Inactive (Yellow) | A hardware error is detected on the specified PSU. Verify that the PSU is correctly installed, and that power is available.  |
|                          | Warning (Red)     | Indicates the minimum number of PSU <sup>b</sup> are not detected  |
| Ultracool Server Enabled | Selected          | Enables the ability for the router to accept control connections from an Ultracool.  |
|                          | Cleared           | Disables this feature. Select this option if your routing system does not include an Ultracool.  |

a. This term refers to the installed I/O blades (e.g. HDBNC-IO, HDX-IO, ULTRIX-IP-IO, ULTRIX-SFP-IO).

b. The ULTRIX-FR12 requires connections to at a minimum of two Ultripower units. Refer to the **ULTRIX-FR12 Installation Guide** for details.

## References Tab

The References tab is organized into two areas: Detect References, and Triggers.

- The Detect References area displays read-only fields that report the status on the reference signal.
- The Triggers area provides options for configuring the reference signal for the routing system. From this table you can configure up to four reference triggers which then can be assigned to the inputs and outputs of the router. Refer to “**Specifying a Default Reference Format**” and “**Configuring a Reference Trigger for the ULTRIX-FR12**” for details.

## Audio Mixer Tab

Configures the inbuilt audio mixer (if an ULTRIMIX-MXR license is enabled on the frame). Refer to “**ULTRIMIX-MXR**” for details on configuring the settings on this tab.

## Ultrix-IP Tab

- ★ The Ultrix-IP settings are only available when at least one ULTRIX-IP-IO or ULTRIX-IPX-IO blade is installed in the router chassis.

The Ultrix-IP tab provides options for monitoring and configuring the individual SFP+ ports, the transport protocol, and PTP settings that are required for the streaming of video and/or audio. The options are organized into sub-tabs: Port Bandwidth, IP System, Port Network, PTP, NMOS, and LLDP. **Table 18** summarizes the fields and menus displayed on the Ultrix-IP tabs.

**Table 18 Frame Configuration — Ultrix-IP**

| Item   | Parameters         | Description  |
|--|--------------------|--|
| <b>Port Bandwidth</b>  |                    |  |
| This tab provides an estimate of the actual bandwidth of the Ethernet links: <ul style="list-style-type: none"><li>• all packets received on the Ethernet links (media and processor traffic)</li><li>• transmit bandwidth (packets sent from the processor to the Ethernet links)</li><li>• receive bandwidth (packets sent on the link and forward to the processor)</li></ul> This tab also provides counters for the receive errors, transmit errors, packet size ranges, and general bytes. |                    |  |
| <b>IP System</b>   |                    |  |
| This tab reports on the media traffic, whether the router port is enabled to send SMPTE ST 2022-7 streams within a protection switching network, the Ember+ connection status, and the DNS status. When using an ULTRIX-IPX-IO, you can also set the Link Speed.   |                    |  |
| <b>Port Network</b>  |                    |  |
| Port   | slot $x$ .port $y$ | Specifies the port on the ULTRIX-IP-IO or ULTRIX-IPX-IO blade you are configuring where: <ul style="list-style-type: none"><li>• <math>x</math> represents the physical slot that the blade is installed in</li><li>• <math>y</math> represents the physical port on the blade</li></ul> |
| Link   | UP                 | A valid network connection is detected on this port  |
|  | DOWN               | The port is experiencing a connection error to the network   |
| Speed (Gbps)   | #                  | Indicates that the link is operating at the specified speed  |

**Table 18 Frame Configuration — Ultrix-IP (Continued)**

| Item        | Parameters        | Description  |
|-------------|-------------------|--|
| MAC Address | #:#:#:#:#:        | Indicates the MAC Address currently assigned to the ULTRIX-FR12 router for the specified port  |
| FEC         | #                 | Reports if your module includes a built-in FEC (DR/FR/LR)  |
| IP Mode     | Static            | The user manually supplies the network settings for the specified blade port   |
|             | DHCP              | Automates the assignment of the network settings for the specified blade port. This is the default.  |
| IP          | ###.###           | Indicates the IP Address currently assigned to the selected blade port. The default is 128.0.0.0 <port #>.   |
| Subnet Mask | ###.###           | Indicates the subnet mask for the specified blade port. The default is 255.255.255.0.  |
| <b>PTP</b>  |                   |  |
| Profile     | IEEE 1588 Default | The ULTRIX-IP timing uses the IEE1588 standard   |
|             | AES67 Media       | The ULTRIX-IP timing uses the AES67 Media standard   |
|             | SMPTE ST 2059-2   | The ULTRIX-IP timing uses the SMPTE ST 2059-2 standard. This is the default.   |
| Domain      | #                 | Specifies that the ULTRIX-IP is within the specified group of clocks in your network   |
| Priority 1  | #                 | Assigns the first priority level to the ULTRIX-IP during a Grandmaster election where a value of: <ul style="list-style-type: none"> <li>• 1 is the highest priority</li> <li>• 255 is the lowest priority</li> </ul> This is applicable when the Slave Only is set to False     |
| Priority 2  | #                 | Assigns the secondary priority level to the ULTRIX-IP during a Grandmaster election where a value of: <ul style="list-style-type: none"> <li>• 1 is the highest priority</li> <li>• 255 is the lowest priority</li> </ul> This is applicable when the Slave Only is set to False |
| Slave Only  | True              | Defines the ULTRIX-IP as a follower only device in the system; the ULTRIX-IP cannot be used as a Grandmaster or Master device  |
|             | False             | The ULTRIX-IP can be used as a Grandmaster or Master device  |
| Slot        | slotx.porty       | Specifies the port on the ULTRIX-IP-IO or ULTRIX-IPX-IO blade you are configuring where: <ul style="list-style-type: none"> <li>• <b>x</b> represents the physical slot that the blade is installed in</li> <li>• <b>y</b> represents the physical port on the blade</li> </ul>  |
| State       | LOCKED            | Status of PTP on the system  |
|             | FREE RUN          |  |

**Table 18 Frame Configuration — Ultrix-IP (Continued)**

| Item   | Parameters  | Description  |
|--|---|--|
| Grand Master ID                                | #   | Reports the ID number assigned to the Grandmaster within the system  |
| Priority #                                     | #   | Standard PTP fields used to determine who wins a PTP election  |
| Clock Class                                    | #   | Standard PTP field that states the class of the clock used on the system   |
| Offset from Master                             | #   | Correction time offset from the master in nanoseconds  |
| Mean Path Delay                                | #   | Average time in nanoseconds it takes a packet to traverse end to end from the PTP master   |
| Steps Removed                                  | #   | Specifies how long the ULTRIX-IP will wait for a delay request   |
| Port   | slot $x$ .port $y$  | Specifies the port on the ULTRIX-IP-IO or ULTRIX-IPX-IO blade you are configuring where: <ul style="list-style-type: none"> <li>• <math>x</math> represents the physical slot that the blade is installed in</li> <li>• <math>y</math> represents the port on the blade</li> </ul> |
| Status   | Slave   | Status of PTP on the interface   |
|  | Listening   |  |
| Link   | Up  | The link for the specified port is valid   |
|  | Down  | The link for the specified port is invalid (fails)   |
| Sync Interval                                  | #   | Specifies often the ULTRIX-IP port sends Sync messages   |
| Announce Interval                              | #   | Specifies how often the ULTRIX-IP sends Announce messages  |
| Announce Receipt Timeout                       | #   | Controls how long the ULTRIX-IP port will wait before declaring the Grandmaster absent and initiating a new election   |
| <b>NMOS</b>                                    |   |  |
| Control Access Interface<br>NMOS Service Ports | Indicates the ports that are enabled for NMOS communication |  |
|  | IS-04   | Specifies the port the NMOS IS-04 Node service is listening on   |
|  | IS-05   | Specifies the port the NMOS IS-05 Connection service is listening on   |
|  | IS-08   | Specifies the port the NMOS IS-08 Connection service is listening on   |
|  | IS-10   | Specifies the port the NMOS IS-10 Connection service is listening on   |
| RDS > Discovery                                | RDS   | Allows the user to set an RDS IP in the Registry Service Address field and forces the router to register to a specific RDS   |
|  | mDNS  | The router uses mDNS to automatically register in an RDS on the network with the lowest priority   |

**Table 18 Frame Configuration — Ultrix-IP (Continued)**

| Item  | Parameters | Description  |
|---|------------|--|
| Security  |            | Indicates whether the Security Options are configured for the port. Refer to <b>"NMOS IS-10 Setup"</b> .   |
| Auth. Server  |            | Indicates if the port is configured to register to a specific NMOS IS-10 Authorization Server on the network. Refer to <b>"NMOS IS-10 Setup"</b> . |
| DNS Domain  |            | Indicates the network domain the port is subscribed to   |
| <b>LLDP (read-only)</b>   |            |  |
| The Link Layer Device Protocol (LLDP) tab reports which device/port is connected to each media ethernet (eth#) interface available on the ULTRIX-IP and ULTRIX-IPX blades. When a is blank, the external device has not provided that status. |            |  |

## Versions Tab

This tab summarizes the firmware and what is installed in each slot of the router.

## Filters Tab

Use the options in the Filters tab to determine what information is reported/monitored based on the signal type.

## SFP Configuration Interface

The SFP Configuration page is applicable when:

- at least one ULTRIX-SFP-IO blade is installed; or,
- at least one AUX port is populated in a router chassis.

Click  to display the SFP Port Configuration page. From this interface you can configure each populated AUX and/or SFP port on the blade. This interface is organized into two sub-tabs: AUX Settings and SFP Settings. (Figure 22)

### For More Information on...

- the physical SFP ports of your router, refer to the **ULTRIX-FR12 Installation Guide**.

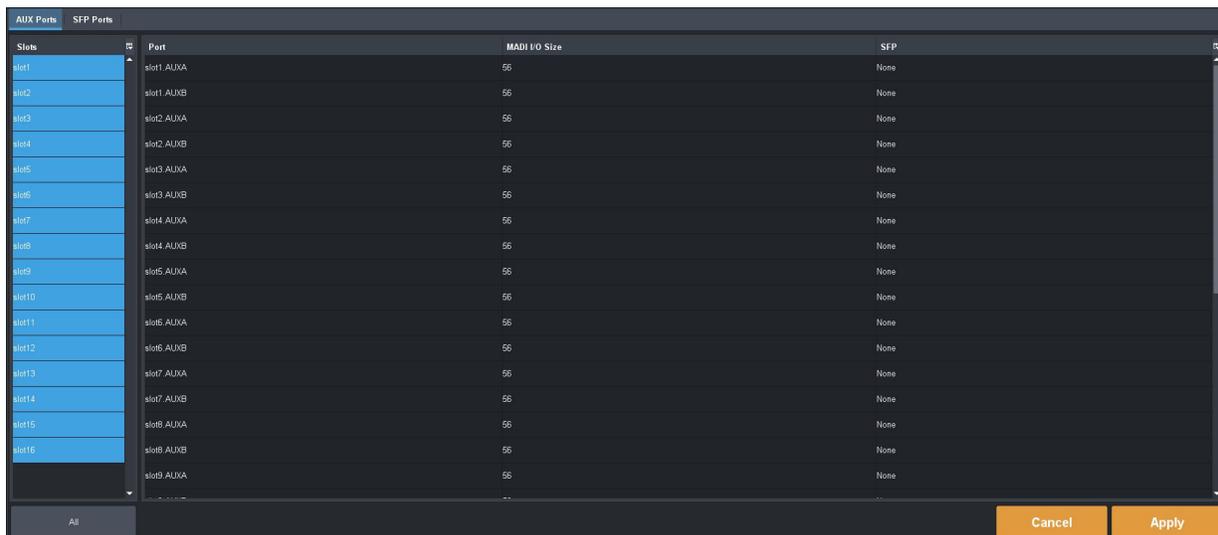


Figure 22 Example of the SFP Configuration Page

## AUX Ports Tab

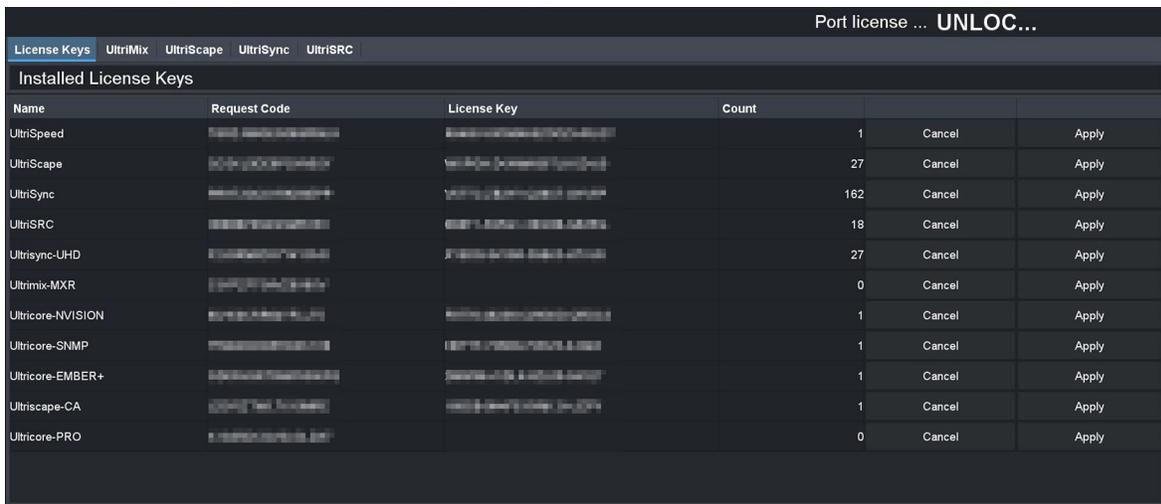
The information in the AUX Ports tab is organized into two areas: a table on the left that lists the slots with available AUX ports, and a table on the right that provides details on each SFP port of a selected slot. Each row of the table reports the port name, type of SFP module installed, and the number of MADl channels set for that SFP (if applicable). Refer to **“Configuring an AUX Port”**.

## SFP Ports Tab

The information in the SFP ports tab is organized into two areas: a table on the left that lists the slots with available SFP ports, and a table on the right that provides details on each SFP port of a selected slot. Each row of the table reports the port name, and type of SFP module installed. Refer to **“Configuring an AUX Port”**.

## Licenses Interface

The Licenses page displays a tab for each enable license on your router. (**Figure 23**)



The screenshot shows the 'Licenses' page with a 'Port license ... UNLOC...' header. Below the header is a tabbed interface with 'License Keys' selected. The main content is a table titled 'Installed License Keys' with columns: Name, Request Code, License Key, and Count. Each row also has 'Cancel' and 'Apply' buttons. The table lists various license keys such as UltraSpeed, UltraScape, UltraSync, UltraSRC, Ultrisync-UHD, Ultrix-MXR, Ultracore-NVISION, Ultracore-SNMP, Ultracore-EMBER+, Ultracore-CA, and Ultracore-PRO.

| Name              | Request Code | License Key | Count | Cancel | Apply |
|-------------------|--------------|-------------|-------|--------|-------|
| UltraSpeed        | [REDACTED]   | [REDACTED]  | 1     | Cancel | Apply |
| UltraScape        | [REDACTED]   | [REDACTED]  | 27    | Cancel | Apply |
| UltraSync         | [REDACTED]   | [REDACTED]  | 162   | Cancel | Apply |
| UltraSRC          | [REDACTED]   | [REDACTED]  | 18    | Cancel | Apply |
| Ultrisync-UHD     | [REDACTED]   | [REDACTED]  | 27    | Cancel | Apply |
| Ultrix-MXR        | [REDACTED]   | [REDACTED]  | 0     | Cancel | Apply |
| Ultracore-NVISION | [REDACTED]   | [REDACTED]  | 1     | Cancel | Apply |
| Ultracore-SNMP    | [REDACTED]   | [REDACTED]  | 1     | Cancel | Apply |
| Ultracore-EMBER+  | [REDACTED]   | [REDACTED]  | 1     | Cancel | Apply |
| Ultracore-CA      | [REDACTED]   | [REDACTED]  | 1     | Cancel | Apply |
| Ultracore-PRO     | [REDACTED]   | [REDACTED]  | 0     | Cancel | Apply |

Figure 23 Example of the Licenses Page

★ The Licenses page takes up to 35 seconds to register any changes to the table entries.

## License Keys Tab

Use the fields in this tab to manage the licenses for your router. From here you can view which licensed features on which slots are enabled, and enter license keys for new features. Refer to **“Software License Keys”** for details.

## Ultrix Mix Tab

Use the options on this tab to enable or disable embedded audio support per slot. Refer to **“Configuring an Audio Matrix”** for details.

## UltraScape Tab

The UltraScape tab reports on the number of UltraScape licenses installed, and the number of UltraScape Heads enabled on the ULTRIX-FR12 router. From this tab, you can assign an UltraScape Head to a physical OUT socket on the router. Refer to **“UltraScape Configuration”** for details.

★ At least one UltraScape license must be installed for a slot before you can assign an UltraScape Head to a router output in that slot.

The UltraScape tab is organized into three columns:

- **Head** — read-only fields that report the physical address name of an UltraScape output.
- **Port** — used to enable/assign an UltraScape Head.
- **Format** — used to select the an UltraScape output format.

## UltraSync Tab

The UltraSync tab reports on the number of UltraSync-3G and UltraSync-UHD licenses installed, and the number of slots with the licensed enabled on the ULTRIX-FR12 router. The UltraSync tab is organized into three columns:

- **Port** — read-only fields that report the physical address name of an ULTRIX-FR12 router output.
  - **3G License** — used to enable the UltraSync-3G on the specified port.
  - **UHD License** — used to enable the UltraSync-UHD on the specified port.
- ★ The UltraSync-UHD is only available for the following ports of a slot: AUXB-in[1] or in[1], in[5] or in[6], and in[11] or in[12].

## UltraSRC Tab

The UltraSRC tab reports on the number of UltraSRC licenses installed, and the number of AUX ports with the licensed enabled on the ULTRIX-FR12 router. The UltraSRC tab is organized into two columns:

- **Port** — read-only fields that report the physical address name of the ULTRIX-FR12 AUX port.
- **License** — used to enable the UltraSRC on the specified port.

## UltraProc Tab

The UltraProc tab is organized into two tables: the left table provides the options for selecting the data rate and assigning the license to an I/O type. The table on the right lists the available ports and provides the option to enable/disable the UltraProc feature. Refer to “**UltraProc Setup**” for details.

## UltraStream Tab

The UltraStream tab lists the available slots that this license can be assigned to, the type of blade, and the port name. The License column provides the option to enable/disable the license for each slot. Refer to “**UltraStream Setup**” for details.

- ★ UltraStream is only available for the AUX D ports on the supported blades.

## Ultrimix-Dante Tab

The Ultrimix-Dante tab reports on the number of Ultrimix-Dante licenses installed, and the number of AUX C ports with the licensed enabled on the ULTRIX-FR12 router. The Ultrimix-Dante tab is organized into three columns:

- ★ The Ultrimix-Dante is supported on the ULTRIX-HDX-IO and ULTRIX-MODX-IO blades only.
  - **Slot** — read-only fields that report the physical slot number of the ULTRIX-FR12 AUX C port.
  - **Port** — read-only fields that report the physical address name of the ULTRIX-FR12 AUX C port.
  - **License** — used to enable the Ultrimix-Dante on the specified port.
- ★ The UltraStream and the Ultrimix-Dante licenses cannot be enabled on the same slot. By enabling an Ultrimix-Dante license on a slot, you will be prevented from enabling an UltraStream license on that slot until you disable the applied Ultrimix-Dante license. Refer to “**Ultrimix-Dante Setup**” for details.



# Using a DashBoard Client Computer

This chapter describes how to navigate the menu system via a DashBoard client computer.

★ The procedures in this guide are based on navigation via a DashBoard client computer.

## Updating the Network Settings

★ This section is not applicable if your router is already set to the correct IP address.

Once you establish initial communications with the ULTRIX-FR12, and it displays in the DashBoard Tree View, you may wish to review or change the IP Address and other settings according to your facility network requirements.

★ This procedure requires a reboot of the router.

### To update the network settings for the ULTRIX-FR12

1. Locate the Ultrix in the Tree View of DashBoard.
  2. Expand the **Ultrix** node to display a list of sub-nodes in the Tree View.
  3. Double-click the **Product Info** node.
  4. Select the **Network** tab.
  5. Locate the **Settings** area.
  6. Edit the fields as required.
- ★ Do not assign the ULTRIX-FR12 to an IP address in the range of 192.168.12.0-192.168.12.255. These are reserved addresses.
7. Click **Apply**.
  8. Click **Reboot**. This button is located at the bottom of the window.

## Re-naming the ULTRIX-FR12 via DashBoard

If you installed multiple ULTRIX-FR12 routers in your system, each router must have a unique name assigned to it. This ensures that the router is easily identifiable in the Walkabout interface and uniquely identifies its inputs and outputs in the DashBoard interfaces.

Throughout the DashBoard interface, actual sockets (inputs and outputs) of a router (or matrix) are referred to by hierarchical dotted notation: **Frame.Slot.Port.Type.Channel** where **Frame** identifies the physical router chassis housing the matrix/matrices. By default, each ULTRIX-FR12 ships with the name "ULTRIX-FR12" automatically set. By re-naming each router, you are providing a unique identifier for the sockets within the router system.

★ Changing the router name *after* database configuration takes time to propagate through the system, and for DashBoard to reconnect, resuming stable system operation. Sufficient time must be allowed when making this change before attempting to use the system. This time will vary depending on features, matrix size, and configuration. The router name is typically assigned during initial commission and very rarely ever changed again.

★ This procedure requires a reboot of the router.

## To re-name the ULTRIX-FR12 via Dashboard

1. In the Tree View of Dashboard, double-click the **Product Info** node.  
The **System Interfaces** display in the Dashboard window.
  2. Select the **Setup** tab.
  3. Use the **Device Name** field to specify the new name for the ULTRIX-FR12.
- ★ ULTRIX-FR12 does not support Unicode characters.
4. Press **Enter** to apply the new name.
  5. Click **Reboot**.
- ★ It may take several seconds or more for the ULTRIX-FR12 node name to update in the Tree View of Dashboard.

## Navigating the Dashboard Menu System

The Dashboard client software enables you to monitor and configure your ULTRIX-FR12. The ULTRIX-FR12 interfaces are accessed by expanding the ULTRIX-FR12 node in the Dashboard Tree View and selecting the appropriate sub-node. Several of the interfaces are organized in a table layout with a toolbar on the bottom, and a toolbar on the left side of the tab.

This section provides an overview of the ULTRIX-FR12 menus that are referenced in this user guide.

### For More Information on...

- the UltriScape interfaces, refer to the ***UltriScape User Guide***.
- the database interfaces, refer to the ***Ulrix and Ultracore Database Guide***.
- the soft panel interfaces, refer to the ***Ulrix and Ultracore Database Guide***.

## Overview

ULTRIX-FR12 groups the configuration, monitoring, and operating features in the Basic Tree View of the Dashboard client window. (**Figure 24**) Each node of the tree opens to reveal one or more sub-nodes, giving access to the features for your router.

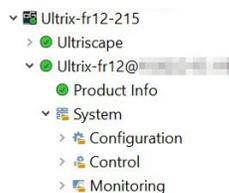


Figure 24 Example of the ULTRIX-FR12 Nodes in a Dashboard Window

ULTRIX-FR12 includes the following interfaces, as separate nodes, in the Basic Tree View.

## UltriScape Node

The first node provides access to the UltriScape Layout Editor, and UltriScape Head interfaces. UltriScape is the integrated Multiviewer for the ULTRIX-FR12. Use the UltriScape Layout Editor to manage the layouts and the UltriScape Head to assign sources to the UltriScape Head outputs. You must have at least one UltriScape license key installed to access the UltriScape interfaces. Refer to the ***UltriScape User Guide*** to learn more about this feature.

## Product Info Interface

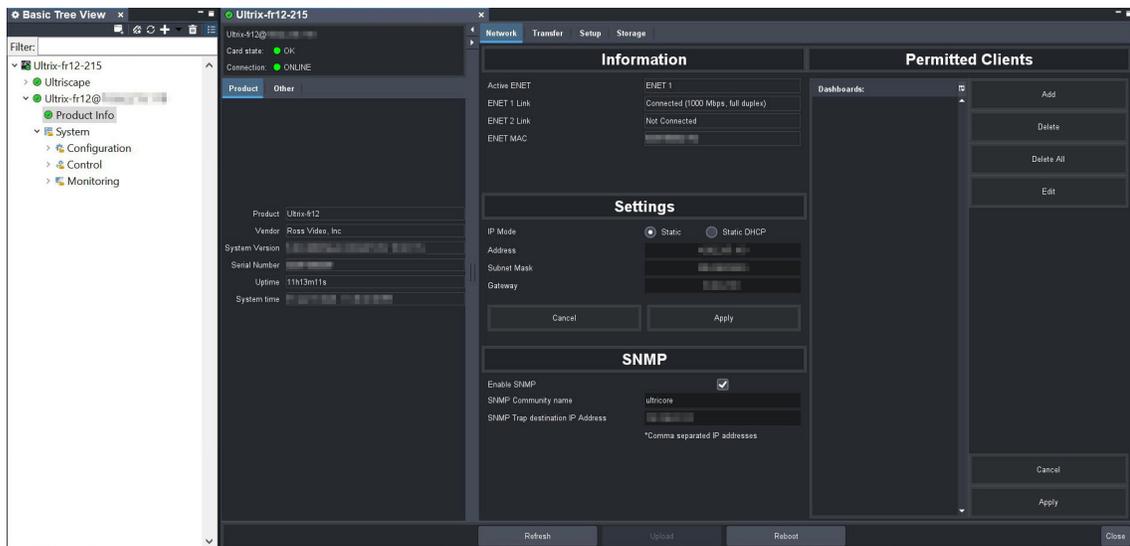
Double-clicking the Product Info node displays two types of tabs within the same DashBoard window: Status (read-only) tabs located on the left, and a series of Configuration tabs located on the right. This interface is similar to an openGear® card tab system.

★ Database configuration is done via the Ultracore BCS interfaces. Refer to the ***Ultracore BCS User Guide*** for details.

The Product Info interface provides hardware information, IP Address settings, and general setup options for your router. Double-clicking the Product Info sub-node displays the Status (read-only) tabs, and a series of Configuration tabs.

### To access the Product Info interface in DashBoard

1. Launch DashBoard on your desktop.
2. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
3. Expand the **ULTRIX-FR12** node to display a list of sub-nodes in the Tree View.
4. Double-click the **Product Info** sub-node.



### For More Information on...

- the tabs and menus in the Product Info interface, refer to “**Navigating the Product Info Interfaces**”.

## System Interfaces

Expand the System tree to display three sub-nodes:

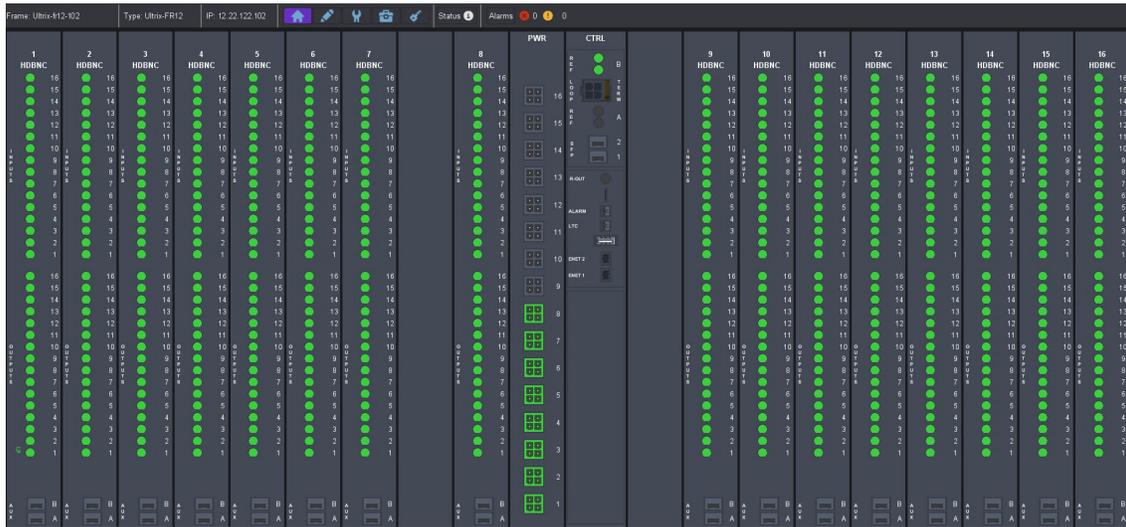
- Configuration
- Control
- Monitoring

The Configuration interfaces enable you to define the physical outputs, inputs, and communication ports of the ULTRIX-FR12 router. You can also monitor the overall status of the ULTRIX-FR12 router, or just the status of a specific signal path or port on the rear panel.

### To access the Configuration interfaces in DashBoard

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.

3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.



6. Select a button from the toolbar to display that interface in the DashBoard window.  
In the above example,  was selected and is now highlighted in purple.

**For More Information on...**

- the System interfaces, refer to **“Navigating the System Interfaces”**.

# Using the Touchscreen

The ULTRIX-FR12 front panel touchscreen enables you to quickly access the Device Configuration interfaces. From here you can define the physical outputs, inputs, and communication ports of the ULTRIX-FR12. You can also monitor the overall status of the ULTRIX-FR12, or just the status of a specific signal path or port on the rear panel.

★ Only the Device Configuration interface can be access via the touchscreen at this time.

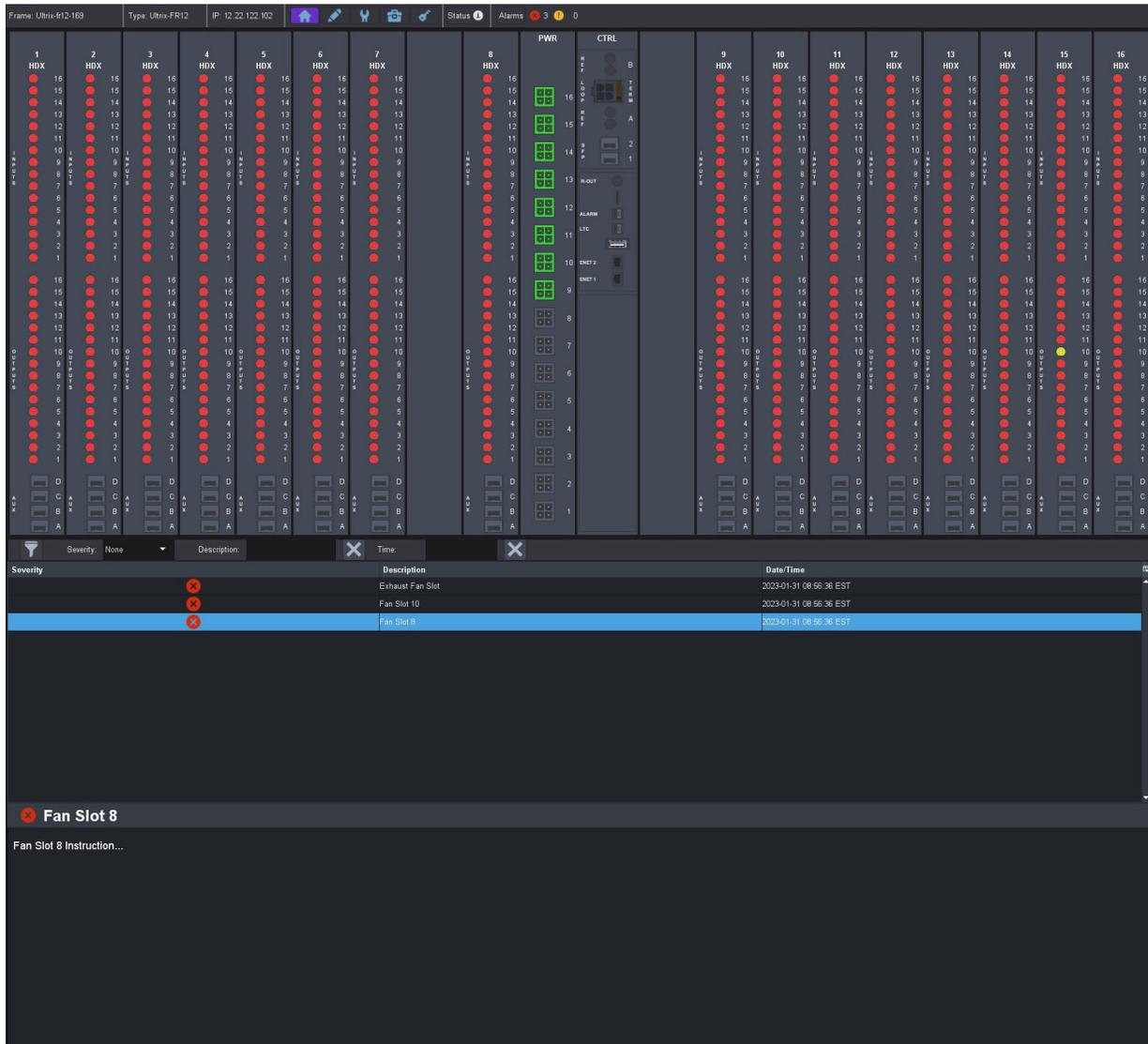


Figure 25 Example of Navigating the ULTRIX-FR12 Front Panel Touchscreen

## Navigating the ULTRIX-FR12 via the Touchscreen

Navigating the Device Configuration interfaces via the touchscreen is like navigation via a DashBoard client computer.

- Tap a button to access that interface.
- Tap an error message to display additional information about the error condition.



# Access for DashBoard Clients

You can specify which DashBoard clients on your network can access and connect to your ULTRIX-FR12.

- ★ Ross Video strongly encourages use of static IP addresses throughout systems using its equipment. A network device which acquires its address through DHCP is not guaranteed to always be assigned to the same IP address. In this case, use of DHCP could result in DashBoard client PCs being denied access to the Ultrix system.

## Creating a Permitted Clients List for an ULTRIX-FR12

By default, the **Permitted Clients** list is blank, allowing all DashBoard clients on your network to connect to your ULTRIX-FR12. But you can choose which specific clients can connect to the router by editing the **Permitted Clients** list to include the IP addresses of specific clients.

### To enable access for a DashBoard client

1. In the Tree View of DashBoard, double-click the **Product Info** node.  
The Product Info interface displays in the DashBoard window.
  2. Select the **Network** tab.
  3. Locate the **Permitted Clients** area of the **Network** tab.
  4. Click **Add** in the Permitted Clients area.  
The **Add Address** dialog opens.
  5. Use the **IP Address** field to specify the IP Address of the DashBoard client you wish to grant access to your ULTRIX-FR12.
- ★ IPV6 addresses and computer names are not currently supported for this list.
6. Click **Apply**.  
The **Add Address** dialog closes.  
The **Dashboards** list in the Permitted Clients area updates to display the specified IP Address.
  7. Repeat steps 4 to 6 for each DashBoard client you want to allow access.
- ★ Ensure that the IP Address for your DashBoard client machine is also added.
8. Click **Apply** in the Permitted Clients area to apply the changes.

### To disable access for a DashBoard client

1. In the Tree View of DashBoard, double-click the **Product Info** node.  
The Product Info interface displays in the DashBoard window.
  2. Select the **Network** tab.
  3. From the **Dashboards** list, select the IP Address for the DashBoard client you want to disable access for.
- ★ Do not delete the IP Address for your DashBoard client machine.
4. Click **Delete** in the Permitted Clients area of the **Network** tab.
  5. Click **Apply** in the Permitted Clients area to apply the change.



# Role-Based Access Control

This chapter outlines the use of Role-Based Access Control (RBAC) within the DashBoard software application for the ULTRIX-FR12.

★ This feature requires software version 6.1.0 or higher.

## Before You Begin

Ensure the following:

- The Ross Platform Manager and appropriate licenses are purchased to use RBAC features.
- The RPM Server is configured and added to DashBoard.
- The permissions for the devices in your routing system are defined via the Ross Platform Manager.

### For More Information on...

- configuring the Ross Platform Manager and Server, refer to the *DashBoard RPM User Guide*.
- the Ultracore Profiles feature, refer to the *Ultrix and Ultracore Database Guide*.

## Enabling RBAC for an ULTRIX-FR12

The RBAC feature determines access to an individual devices (Ultrix or Ultracore) via a DashBoard instance (client). Once RBAC is enabled, any DashBoard without RPM will not be allowed to connect to the device unless the user enters a 'master password'.

- If a DashBoard instance has RPM and the account for the current user is configured to allow access to the device, the user will be able to continue using the device.
- If the user does not have access, the device will be disconnected from DashBoard until a user with access rights is signed-in.

### To enable RBAC on an ULTRIX-FR12

1. Launch DashBoard.
  2. Locate the ULTRIX-FR12 node in the Tree View.
  3. Expand the ULTRIX-FR12 node to display a list of sub-nodes.
  4. Expand the ULTRIX-FR12 sub-node.
  5. Double-click the **Product Info** sub-node.
- The Product Info interface displays.
6. Select the **Setup** tab.
  7. Locate the **RPM Role Based Access Control Required** area.
  8. Click **Role Based Access Settings**.

The Change RBAC Settings dialog opens.

9. From the **RPM Role Based** options, select **On**.

★ The **RPM Role Based** is set to **Off** by default.

10. Use the **Client Master Password** field to specify the text string a user can enter to gain access to this device when RPM is not present in DashBoard or if DashBoard is unable to connect to the RPM Server.

11. Click **Done**.

- The Change RBAC Settings dialog closes.
- On the Setup tab, the **RPM Role Based Access Control Required** field now reports **On**.

#### To verify that RBAC is enabled

1. Close the **Product Info** interface in DashBoard.
2. Locate the device node in the DashBoard Tree View.
3. Right-click the device node.
4. Select **Disconnect**.

The device node displays a grayed out icon.

5. Right-click the device node.
6. Select **Connect**.

The device node displays with a lock icon. Any user attempting to access this device will be prompted to enter the password specified in step 10 in the previous procedure.

## Accessing a Device with RBAC Enabled

Once the ULTRIX-FR12 is accessed through DashBoard are configured to require connection to an authenticated DashBoard instance (client), connection requests from unauthenticated sources are declined. A Lock icon displays next to the ULTRIX-FR12 node in the Basic Tree View to indicate that RBAC is enabled for that device. If RBAC is enabled but your system is not using an RPM Manager or Server or the RPM Server is unavailable, you will need to enter a Client Master Password to gain access to the device. This section outlines how to use a Client Master Password to access a device when RBAC is enabled.

★ If RPM is used, access to the device is based on the privileges of the current user signed into DashBoard.

#### For More Information on...

- managing access control in DashBoard, refer to the ***DashBoard RBAC User Guide***.

#### To access an ULTRIX-FR12 when RBAC is enabled

1. Locate the ULTRIX-FR12 node in the Tree View of DashBoard.

Notice that the node displays an icon with a lock symbol.

2. Double-click the ULTRIX-FR12 node.

The Password dialog opens.

3. Enter the password as defined in step 10 of **“To enable RBAC on an ULTRIX-FR12”**.
4. Click **Login**.

The Password dialog closes and the ULTRIX-FR12 node displays a green icon and its tree nodes are accessible.

★ Entering an incorrect password denies access and the device icon is lit red.

# Specifying the Reference Format

This chapter summarizes how to specify the default reference format for the ULTRIX-FR12, and configure the reference trigger for the router.

## Specifying a Default Reference Format

If you did not connect a reference source signal to the **REF** port on the ULTRIX-FR12 rear panel, you can still configure a Default Reference format using the options in the Frame Configuration interface. Note that this Default Reference setting only applies to start-up with no reference source connected.

Keep the following in mind:

- If you connect a valid reference source to the **REF** port, it will take precedence over the Default Reference setting.
- If the connected reference source becomes unavailable, the ULTRIX-FR12 will use the last known good reference format until a re-boot or power cycle occurs (at which time the Default Reference setting will be applied).
- If the ULTRIX-FR12 does not have a valid reference signal connected to it, UltraScape still needs a reference to output correctly. Specifying the Default Reference Format provides an internal reference signal of either NTSC or PAL rates to allow UltraScape to still output with no system reference signal connected.

### To specify the default reference format for the ULTRIX-FR12

1. Expand the **Devices** node.
2. Double-click the node for your ULTRIX-FR12 router.  
The **Device Configuration** interface opens.
3. Select .  
The **Frame Configuration** page opens.
4. Select the **References** tab.
5. Use the **Detect Reference** area to manage the reference formats for the ULTRIX-FR12.

## Configuring a Reference Trigger for the ULTRIX-FR12

If multiple reference formats will be fed into the ULTRIX-FR12, you can configure a reference trigger with a custom switching point. This is useful when you will be manually changing the reference signal format that is fed into the **REF** port on the ULTRIX-FR12 rear panel.

- ★ A variety of switching points across the routing switchers may be required to deal with the range of digital video formats that are available.

### For More Information on...

- cabling the reference source for your router, refer to the ***ULTRIX-FR12 Installation Guide***.
- monitoring the reference status, refer to ***"Monitoring the Reference Signal"***.

### To configure the reference trigger for the router

1. Expand the **Devices** node.
2. Double-click the node for your ULTRIX-FR12.  
The **Device Configuration** interface opens.

3. Select .

The **Frame Configuration** page opens.

4. Select the **References** tab.

5. Locate the **Triggers** area in the **References** tab.

The **Detected** field indicates the format of the reference signal connected to the REF port on the router.

6. Use the **SDI Video Format** field to select the switch timing that will be used by the router when switching inputs/outputs.

7. If you selected **Custom** in step 6, use the **Custom** field to specify the time (number of microseconds) from the start of the custom switching line to the actual switching event. The maximum value is 65,535ms.

8. Repeat steps 6 and 7 to configure additional triggers as required.

# Specifying the Time Source

The ULTRIX-FR12 requires an external time source in order to accurately report the time-of-day. The options in the Frame Configuration interface enable the selection of time/date source via an NTP Server in your facility, or you can set the device time to match the computer which is running the current DashBoard client.

## Using an NTP Server as the Time Source

★ Before proceeding, contact your IT Department to learn the IP address(es) of the NTP server(s) in your facility.

### To specify an NTP Server as the time source for the ULTRIX-FR12

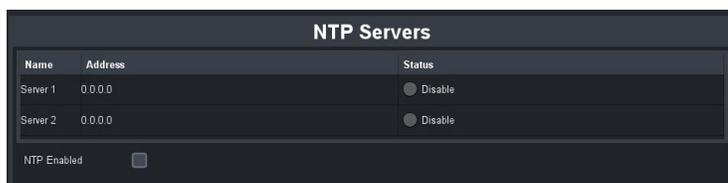
1. Expand the **Devices** node.
2. Double-click the node for your ULTRIX-FR12 router.

The **Device Configuration** interface opens.

3. Select .

The **Frame Configuration** page opens and the **Communications** tab is automatically selected.

4. Locate the **NTP Servers** area on the **Communications** tab.



5. If you are using one NTP server, enter the IP address in the **Address** field of the **Server 1** row.
6. If using a backup NTP server:
  - a. Enter the IP address of the first NTP server in the **Address** field of the **Server 1** row.
  - b. Enter the IP address of the backup NTP server in the **Address** field of the **Server 2** row.
7. Select the **NTP Enabled** box.
8. Verify that the **Status** field(s) in the **NTP Servers** table report a valid connection to the listed IP address(es). You may need to refresh the interface as follows:
  - a. Close the **Device Configuration** interface.
  - b. Re-open the **Device Configuration** interface by repeating steps 1 to 2 to update the field(s).

## Using a DashBoard Client Computer as the Time Source

This section outlines how to set the ULTRIX-FR12 to the local time without using an NTP Server. Instead, you will set the time to the values reported by the DashBoard client computer you are using.

★ The time the ULTRIX-FR12 reports is not linked to this computer. It is a once off setting of the time to match the computer time when the **Set to PC Time** button is selected on the ULTRIX-FR12 interface. If the DashBoard client computer time changes, you will need to update the time reported on the router by repeating the procedure below.

## To specify the DashBoard client computer as the time source for the ULTRIX-FR12

1. Expand the **Devices** node.
2. Double-click the node for your ULTRIX-FR12 router.  
The **Device Configuration** interface opens.
3. Select .  
The **Frame Configuration** page opens and the **Communications** tab is automatically selected.
4. Locate the **NTP Servers** area on the **Communications** tab.
5. Click **Set to PC Time**.  
This button is located in the top right corner of the **Communications** tab.

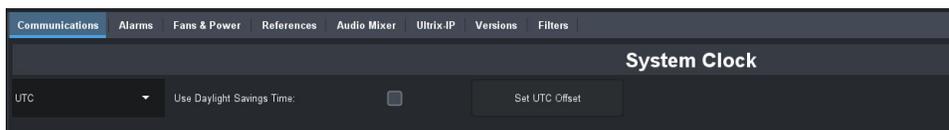
## Configuring a Timing Offset

You can choose to offset the Ultrix Product Info and Device interfaces with respect to UTC Time or Daylight Saving Time. Note that the UTC offset does not include any Daylight Saving offset that may be in force. The Daylight Saving Time is enabled separately.

★ At startup, the UTC Offset is set to 0 to ensure the displayed time matches the system time.

### To specify an offset

1. Expand the **Devices** node.
2. Double-click the node for your ULTRIX-FR12 router.  
The **Device Configuration** interface opens.
3. Select .  
The **Frame Configuration** page opens and the **Communications** tab is automatically selected.
4. Locate the time offset options at the top of the **System Clock** area.



5. To specify an UTC offset, select your current time zone offset from the **UTC** drop-down menu.  
Once set, the offset will be added or subtracted based off of the system clock, including NTP.
6. To add one hour to the currently selected UTC Offset (and enable Daylight Saving Time to the clocks displayed in the System Clock and Device interfaces), select the **Use Daylight Saving Time** box.
7. Click **Set UTC Offset** to apply your changes.

# Configuring the SDI I/O Ports

ULTRIX-FR12 is capable of switching video signals<sup>1</sup> from 270Mbps to 12Gbps<sup>2</sup>. This format flexibility permits SD, HD, 3G and UHD video signals to be used seamlessly in the same system. ULTRIX-FR12 also comes complete with an audio matrix side-chain to enable multiplexing, de-multiplexing, channel swapping and processing of the SDI embedded audio.

This chapter provides a general overview of the available options when configuring the SDI I/O and AUX ports on the ULTRIX-HDX-IO and ULTRIX-HDBNC-IO blades.

## For More Information on...

- the options available on the Port Configuration interface, refer to “**Port Configuration Interface**”.
- configuring the UHD Gearbox, refer to “**UHD Gearbox Configuration**”.
- configuring the ULTRIX-IP-IO ports, refer to “**ULTRIX-IP-IO Setup**”.
- configuring the ULTRIX-IPX-IO ports, refer to “**ULTRIX-IPX-IO Setup**”.
- configuring the ULTRIX-SFP-IO ports, refer to “**ULTRIX-SFP-IO Setup**”.
- configuring the ULTRIX-MODX-IO ports, refer to the ***ULTRIX-MODX-IO User Guide***.
- the audio features of the ULTRIX-FR12, refer to “**Configuring an Audio Matrix**”, “**ULTRIMIX-MXR**”, and “**Ultrimix-Dante Setup**”.

## Using the Device Configuration Interface

The Device Configuration interface in DashBoard enable you to define the physical outputs, inputs, and communication ports of the ULTRIX-FR12. You can also monitor the overall status of the router, or just the status of a specific signal path or port on the rear panel. Use the top toolbar of the interface to navigate the interfaces for configuring your blades and ports on the router.

-  **Port Configuration** — reports individual I/O port status and settings. Selecting a slot updates the table for all installed ports. Selecting a port displays only the options for that port (the label under the port icon is lit blue).
-  **SFP Configuration** — configure each populated AUX port on the blade. Also provides options for configuring ports on the ULTRIX-SFP-IO blade.

## For More Information on...

- the Device Configuration interface, refer to “**Navigating the Device Configuration Interfaces**”.

Throughout the DashBoard interface, actual sockets (inputs and outputs) of a router (or matrix) are referred to by hierarchical dotted notation: `Frame.Slot.Port.Type.Channel` where:

- `Frame` identifies the physical router chassis housing the matrix/matrices.
- `Slot` identifies which slot in the matrix the socket is located in.
- `Port` identifies the physical input or output socket.
- `Type` identifies the generic signal type (e.g. SDI, audio).
- `Channel` identifies the audio channel within an SDI stream.

These designators may be assigned more user friendly names if required. Refer to the ***Ultracore and Ultrix Database Guide*** for details.

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1. SMPTE standard rates.  
2. Requires the UltriSpeed license.

## Configuring an AUX Port

The various modules available for ULTRIX-FR12 provide SFP+ slots for expansion of the base module I/O blade. Refer to the *Ultrix SFP Modules Guide* for a list of available SFP modules from Ross Video.

Keep the following in mind:

- The ULTRIX-SFP-IO blade only supports MADI in the AUX A and AUX B ports.
- The ULTRIX-IP-IO blade supports Ultriscape outputs (SDI video) only on AUX 1 and AUX 2.
- The ULTRIX-IPX-IO blade supports Ultriscape outputs (SDI video) only on AUX A and AUX B.
- ★ Some licensed features require access to specific AUX ports on the blade.

### Before You Begin

You may also need to install an:

- UltraSpeed license for each slot that includes an SFP-HDB-IN-12G and/or SFP-HDB-OUT-12G.
- UltraScape license for each AUX port that will be used to provide an UltraScape head output.
- UltraSRC license for each AUX port configured for asynchronous MADI input.

### Configuring an AUX Port

Once the SFP module is installed in an AUX port, you must specify the port type. Select SDI Video for video SFP types, or MADI for audio SFP types. MADI audio SFP types allow you to specify the channel quantity (either 56 or 64) as per your facilities' standard.

The **SFP Configuration** interface is organized into two sub-tabs: AUX ports, and SFP ports. The AUX Ports tab lists all the AUX ports for all blades in the ULTRIX-FR12 chassis. The SFP Ports tab lists all the ULTRIX-SFP-IO blade ports.

#### For More Information on...

- configuring an AUX port on the ULTRIX-MODX-IO blade, refer to the *ULTRIX-MODX-IO User Guide*.
- configuring an SFP port on the ULTRIX-SFP-IO blade, refer to “**Configuring an SFP Port**”.

#### To configure an AUX port

1. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
2. Expand the **Systems** sub-node.
3. Expand the **Configuration** sub-node.
4. Double-click the **ULTRIX-FR12** node.

The **Device Configuration** interface opens.

5. Select .

The **SFP Configuration** page opens with the AUX Ports tab selected.

6. From the **Slots** table, select the router slot for the port you want to configure.  
The tab updates to display a list of available ports based on the slot(s) selected.
7. Locate the row for the port you want to configure.
8. In the SFP column, select either SDI Video or MADI as appropriate for the fitted port.
9. Click **Apply** to save your changes.

## Configuring the SDI I/O Ports

The Port Configuration interface displays the available SDI configuration options in a table format. Use the top toolbar to select a specific blade, or click Multi to select multiple blades of the same type. Use the Views toolbar to filter the table rows. For example, in **Figure 26** the user is viewing the ULTRIX-HDX-IO blade in slot 3, but has filtered the table to display only the Input Ports.

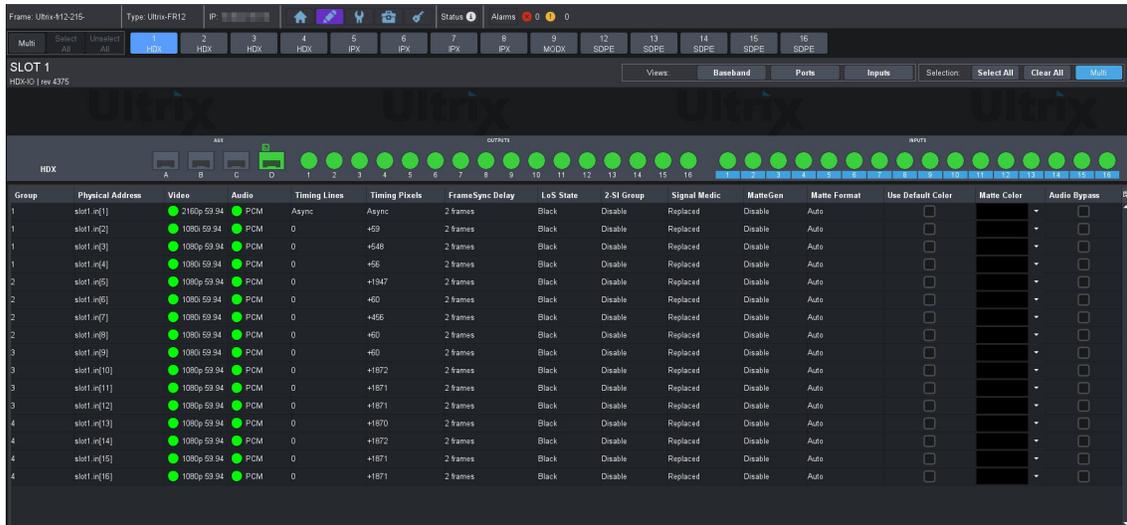


Figure 26 Example of an ULTRIX-HDX-IO Blade in the Port Configuration Interface

This section outlines the options in the Port Configuration interface for the ULTRIX-FR12 based on the Views settings. Some options may depend on the blade type and installed license keys.

### Baseband View

When in Baseband view, you can choose to view options based on the port or channel, and signal type (inputs or outputs).

Baseband > Ports > Inputs View

**Table 19** summarizes the options when Views is set to Baseband > Ports > Inputs. (**Figure 26**)

**Table 19 Port Configuration — Views > Baseband > Ports > Inputs**

| Item              | Parameters    | Description  |
|-------------------|---------------|--|
| Group             | #             | Indicates the Gearbox group where Group 1 is the first in the blade  |
| Physical Address  | slot#.port[#] | Lists the physical ports, in ascending order, of the ULTRIX-FR12 router. Each row represents a port.       |
| Video (read-only) | #             | If a port is used for video signals, this field indicates the video format                                 |
| Audio (read-only) | #             | If a port is used for audio signals, this field indicates the type of audio detected (e.g. PCM, AES etc.). |

**Table 19 Port Configuration — Views > Baseband > Ports > Inputs (Continued)**

| Item                                  | Parameters    | Description   |
|---------------------------------------|---------------|---|
| Timing Lines (read-only)              | #             | Reports the value of timing difference between input and frame reference in number of lines.  |
|                                       | Detecting     | The timing difference is being detected; updates the field approximately every 33 seconds.  |
|                                       | Async         | There is no timing relationship between the input signal and the frame reference.   |
| Timing Pixels (read-only)             | #             | Reports the value of timing difference between input and frame reference in number of pixels.   |
|                                       | Detecting     | The timing difference is being detected; updates the field approximately every 33 seconds.  |
|                                       | Async         | There is no timing relationship between the input signal and the frame reference  |
| Frame Sync Delay                      | # frame(s)    | Specifies the frame buffer size for the selected input port   |
| LoS State <sup>a</sup>                | Black         | Sets the input to black during the loss of signal   |
|                                       | Freeze        | Sets the input to the last valid frame of video before the loss of signal   |
| 2-SI Group                            | Enable        | Gearbox is available on the indicated I/O Group in groups of 4 consecutive I/O. For example, selecting Enable in the row for slot1.in[1] creates a Gearbox group from slot1.in[1] to slot1.in[4].<br>Note that I/O Groups for Gearbox are defined in the table using colored backgrounds. |
|                                       | Disable       | The indicated I/O is not included in a Gearbox configuration  |
| Signal Medic (read-only) <sup>b</sup> | Not available | This port does not support the Gearbox feature.   |
|                                       | Good          | This port is included in a Gearbox setup.   |
|                                       | Replaced      | This port can be included in a Gearbox setup but is currently not included in the 12G link.   |
| Matte Gen <sup>c</sup>                | Disable       | Disable an internally generated test pattern. This is the default.  |
|                                       | Static        | Generates a static color matte  |
|                                       | Bouncing Box  | Generates a static color matte with a complimentary colored moving box  |
|                                       | Luma Sequence | Generates a luminance shifting sequence based on chosen color   |
| Matte Format                          | #             | Specifies the signal format of the generated test pattern. If you select Auto, the test pattern automatically matches the incoming signal type.   |
| Use Default Color                     | Selected      |   |
|                                       | Cleared       |   |
| Matte Color                           | #             | Specifies the color of the test signal  |

**Table 19 Port Configuration — Views > Baseband > Ports > Inputs (Continued)**

| Item         | Parameters | Description  |
|--------------|------------|--|
| Audio Bypass | Selected   | When Audio Bypass is enabled for an input, the audio will follow the SDI regardless of any individual audio channel routing or configuration on the output.<br>The individual channels of an input in Bypass mode are still de-multiplexed and available for audio routing via the audio matrix. |
|              | Cleared    | Disables this feature  |

- a. This affects UltraScape and routed destinations.
- b. Use this field to replace a missing 3G signal when one or more of the four 3G signals for a Gearbox configuration are unavailable.
- c. This option is not available on the AUX C and AUX D ports of the ULTRIX-IPX-IO.

Baseband > Ports > Outputs View

**Table 20** summarizes the options when Views is set to Baseband > Ports > Outputs.

**Table 20 Port Configuration — Views > Baseband > Ports Outputs**

| Item                            | Parameters    | Description   |
|---------------------------------|---------------|---|
| Group                           | #             | Indicates the Gearbox group where Group 1 is the first in the blade   |
| Physical Address (read-only)    | slot#.port[#] | Lists the physical ports, in ascending order, of the ULTRIX-FR12 router. Each row represents a port.  |
| Video (read-only)               | #             | If a port is used for video signals, this field indicates the video format  |
| Audio (read-only)               | #             | If a port is used for audio signals, this field indicates the type of audio detected (e.g. PCM, AES etc.).  |
| 2-SI Group                      | Enable        | Gearbox is available on the indicated I/O Group in groups of 4 consecutive I/O. For example, selecting Enable in the row for slot1.in[1] creates a Gearbox group from slot1.in[1] to slot1.in[4].<br>Note that I/O Groups for Gearbox are defined in the table using colored backgrounds. |
|                                 | Disable       | The indicated I/O is not included in a Gearbox configuration  |
| Sub-Image ID                    | 3G            | Some legacy equipment does not accept a 2SI SMPTE-352 payload identifier for quad-link SDI. You may need to select this if you are connecting legacy equipment to the specified output on the ULTRIX-FR12.  |
|                                 | 2SI           | Set the SMPTE-352 payload identifier to 2SI for quad-link.  |
| Clean Switch Status (read-only) | Locked        | The specified output is locked to its input.  |
|                                 | Not Locked    | The specified output is not locked to its input.  |

**Table 20 Port Configuration — Views > Baseband > Ports Outputs (Continued)**

| Item               | Parameters | Description   |
|--------------------|------------|---|
| Clean Switch       | Selected   | Clean Switch is applied to the specified output. The Clean Switch Delay value is applied.   |
|                    | Cleared    | Clean Switch is not applied to the specified output.  |
| Clean Switch Mode  | Reference  | Clean Switch is based on the reference signal available on the REF port of the router   |
|                    | Input      | Clean Switch is based on the input signal available on the specified port of the router   |
| Clean Switch Delay | #          | Specifies the Clean Switch buffer depth. Select between 1/16 to full line to clean switch between signals with slight timing offsets.   |
| Trigger            | #          | Specifies which reference signal trigger to use. Refer to the user guide for your router.   |
| Transition         | Cut        | The audio input channel is immediately switched to its selected output. A transition to or from Dolby® will always be a Cut transition regardless of what the Transition setting is set to. |
|                    | V Fade     | The original audio input channel fades down to silence followed by the new input channel fades up from silence to unity gain level  |
|                    | X Fade     | The original audio input channel fades down to silence as the new input fades up from silence, and both will be mixed   |
|                    | Cut Fade   | The original audio input channel cuts to silence and the new input fades up from silence to unity gain level  |
|                    | Fade Cut   | The original audio channel fades down to silence and the new input is cut in at unity gain level.   |
|                    | Quiet Cut  | The original audio channel performs a V Fade transition with a 5ms duration   |
| Duration (ms)      | #          | Specifies the length of the audio fade, in milliseconds, between audio transitions  |

**Table 21** summarizes the columns that display when Views is set to Baseband > Channels > Inputs.

**Table 21 Port Configuration — Views > Baseband > Channels > Inputs**

| Item               | Parameters  | Description   |
|--------------------|---|---|
| ID (read-only)     | slot#.port[#].ch                                      | Auto-generated identifier for the channel where: <ul style="list-style-type: none"> <li>slot# represents which slot in the matrix the socket is located in</li> <li>port[#] identifies the physical input or output socket</li> <li>ch identifies the audio channel within an SDI stream</li> </ul> For example, slot1.out[4].audio.ch10. |
| Label (read-only)  | <text>  | Reports the text label that identifies the port in other interfaces of the database. This virtual label is used instead of the slot.port.type.channel format for logical label assignment.<br>For example, you might re-name the port: slot1.AUXA.audio.ch1 to OUT AES 1.   |
| Signal (read-only) | Provides status information on the specified channel. |   |
| Gain (dB)          | #   | Provides a +/- 20dB gain range in 0.50dB increments. If you have added a gain to an input channel, the gain value specified for the output channel is an addition.<br>For example, if you set the gain for an input to 10dB, then specify a gain of 2dB on the output, the total gain will be 12dB on the final output                    |
| Invert             | Selected  | Inverts the polarity of the audio signal for the selected channel   |
|                    | Cleared   | Disables this feature   |
| Sum                | Selected  | Sum two adjacent audio channels. Each selected channel will carry the average of the two input channels $((A+B)/2)$ .<br>Select the Sum box for the first channel. The Sum box for the second channel is automatically selected.<br>When the input is summed, the original signals are no longer available for output.                    |
|                    | Cleared   | Disables this feature   |
| Audio Delay (ms)   | #   | Applies up to 500ms of delay per channel. Note that an UltriSync license must be enabled to the port.   |

Baseband > Channels > Outputs View

**Table 22** summarizes the columns that display when Views is set to Baseband > Channels > Outputs.

**Table 22 Port Configuration — Views > Baseband > Channels > Outputs**

| Item               | Parameters  | Description   |
|--------------------|---|---|
| ID (read-only)     | slot#.port[#].type.ch                                 | Auto-generated identifier for the channel where: <ul style="list-style-type: none"> <li>slot# represents which slot in the matrix the socket is located in</li> <li>port[#] identifies the physical input or output socket</li> <li>type identifies the generic signal type (e.g. audio)</li> <li>ch identifies the audio channel within an SDI stream</li> </ul> For example, slot1.out[4].audio.ch10. |
| Label (read-only)  | <text>  | Reports the text label that identifies the port in other interfaces of the database. This virtual label is used instead of the slot.port.type.channel format for logical label assignment.<br>For example, you might re-name the port: slot1.AUXA.audio.ch1 to OUT 1.   |
| Signal (read-only) | Provides status information on the specified channel. |   |
| Gain (dB)          | #   | Provides a +/- 20dB gain range in 0.50dB increments. If you have added a gain to an input channel, the gain value specified for the output channel is an addition.<br>For example, if you set the gain for an input to 10dB, then specify a gain of 2dB on the output, the total gain will be 12dB on the final output  |
| Invert             | Selected  | Inverts the polarity of the audio signal for the selected channel   |
|                    | Cleared   | Disables this feature   |
| Sum                | Selected  | Sum two adjacent audio channels. Each selected channel will carry the average of the two input channels $((A+B)/2)$ .<br>Select the Sum box for the first channel. The Sum box for the second channel is automatically selected.<br>When the input is summed, the original signals are no longer available for output.  |
|                    | Cleared   | Disables this feature   |
| Tone Mode          | Enable  | Enable test tones for the specified channel   |
|                    | Disable   | Disables this feature   |
| Tone Freq          | #   | Specifies the type of test tone to embed in the output  |

## Loss of Input Signal

If the input signal is absent, the output is automatically set to SDI black and ULTRIX-FR12 uses the last known and valid video format detected on the output. This feature is similar to a “squelch” control. High-speed digital devices will try to lock to any signal. If there is no direct input, they will try to equalize noise (to a point), possibly resulting in down-stream equipment having issues with a non-valid SDI stream. If there is a router input that is either not terminated, or the upstream device outputs a non-valid signal, then the input is forced to SDI black.



# Software License Keys

The ULTRIX-FR12 includes software options that license functions and features. This chapter outlines the available software licensed features, and how to install a software key for a licensed feature.

## Before You Begin

When installing a software license key on the ULTRIX-FR12:

- You must have the DashBoard client installed and communicating with the ULTRIX-FR12 that you wish to install the key for.
- Ensure that you are using DashBoard version 9.13 or higher. This information is available by selecting **Help > About DashBoard** from the DashBoard main toolbar.

## License Keys Overview

**Table 23** provides a brief summary on the types of licensed features available for the ULTRIX-FR12.

★ The per slot UltraMix license comes standard with every ULTRIX-FR12.

**Table 23 List of ULTRIX-FR12 Licensed Features**

| License         | Description  |
|-----------------|--|
| Ultrimix-Dante  | Enables 64 x 64 input/output audio channels via ethernet on the AUX C port of an ULTRIX-HDX-IO or ULTRIX-MODX-IO blade   |
| ULTRIMIX-MXR    | Enables the configuration and use of audio mixer soft panels.  |
| UltraProc-3DLUT | A license that enables color correction, Proc Amps, and HDR conversion on Ultrix I/Os but also enables SDR/HDR conversion with a 3D-LUT RGB Cube file. Only applicable to ULTRIX-HDX-IO or ULTRIX-MODX-IO blades.  |
| UltraProc       | A license that enables color correction, Proc Amps, and HDR conversion on Ultrix I/Os; can be assigned to inputs or outputs. Only applicable to ULTRIX-HDX-IO or ULTRIX-MODX-IO blades.  |
| UltraScape      | Each license enables one Multiviewer Head (output) per slot. Each slot supports up to three Multiviewer Heads.   |
| UltraSpeed      | Enables the use of UHD 12Gbps SDI signaling on all slots of the ULTRIX-FR12.<br>The 12Gbps SDI signaling through an SFP module installed in an AUX port is also supported. You must order the SFP module separately.<br>This license is required if you wish to configure a UHD Gearbox. |
| UltraSRC        | A per input license enabling Sample Rate Conversion (SRC) on MAD1 audio inputs. This allows MAD1 inputs that are not synchronized to the frame reference.  |
| UltraSync       | A per input 3G frame sync license enabling alignment to router sync.   |

**Table 23 List of ULTRIX-FR12 Licensed Features (Continued)**

| License           | Description  |
|-------------------|--|
| Ultrisync-UHD     | A per input frame sync license to support UHD video rates. Each slot supports up to 3 Ultrisync-UHD ports.<br>Applicable only to the ULTRIX-HDX-IO and ULTRIX-SFP-IO blades. |
| Ultriscape-CA     | Enables the display of CEA-608, CEA-708, and OP-47 closed caption data on a Multiviewer Head.  |
| Ultricore-EMBER+  | Enables the use of the EMBER+ protocol for video and audio streaming via an ULTRIX-IP-IO blade.  |
| Ultricore-NVISION | Enables the use of the NVISION protocol on all slots of the ULTRIX-FR12.   |
| ULTRICORE-PRO     | Provides full Ultricore Profiles support on the ULTRIX-FR12.   |
| Ultricore-SNMP    | Enables basic SNMP monitoring of the ULTRIX-FR12.  |

## Installing a License Key

Ross Video uses license keys to control user access to specific ULTRIX-FR12 features. You can obtain a key for an ULTRIX-FR12 licensed feature from Ross Video Technical Support.

### To install an ULTRIX-FR12 license key

1. Launch the DashBoard client.
  2. Locate the ULTRIX-FR12 node in the Tree View.
  3. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
  4. Expand the **Devices** node.
  5. Double-click the node for your ULTRIX-FR12 router.  
The **Device Configuration** interface opens.
  6. Select .  
The **Licenses** page opens with **License Keys** sub-tab automatically selected.
  7. Make a note of the character string in the **Request Code** field for the license you wish to enable.
  8. Contact Ross Video Technical Support using the information found in "**Contacting Technical Support**".
    - a. When you speak to your Technical Support representative, tell them your name, your facility name, and the **Request Code** from step 7.
    - b. You will be given a License Key for the licensed feature.
  9. Enter the provided License Key in the applicable **License Key** field of the **Licenses** tab.
- ★ You can also right-click on the row for the License Key you are installing, and copy the Request Code to or paste the License Key from the Microsoft® Windows® clipboard.
10. Click **Apply** in the row for the License Key you entered in step 9.
  11. Verify that the **Count** field is updated to report each installed License Key.

### To activate a license for a specific slot/head

1. Install the license key as outlined in the procedure **“To install an ULTRIX-FR12 license key”**.
2. In the **Licenses** sub-tab, select the license sub-tab.
  - Each row in the tab represents a slot and UltraScape head in the router (with slot 1 as the topmost slot in the router).
  - The Port column in the tab represents the I/O or output for the head.
- ★ Click **Clear Offline Ports** to hide the I/O ports if the slot does not have a blade installed. Click **Show Offline Ports** to list those ports in the tab columns.
  - The Format column represents the video format assigned to that port or head.
3. In the **Port** column, select the cell for the port or UltraScape head you want to enable.  
A drop-down menu displays that lists the available ports.
4. Select **Enable** to apply the license.

### Removing a License Key

When you want to move an ULTRIX-FR12 licensed feature from one slot to another in the same router, you must first disable the ULTRIX-FR12 feature on the current router.

- ★ Removing a License Key also removes user access to all of the ULTRIX-FR12 features associated with that License Key.

#### To remove a license key

1. Launch the DashBoard client.
2. Locate the ULTRIX-FR12 node in the Tree View.
3. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
4. Expand the **Devices** node.
5. Double-click the node for your ULTRIX-FR12 router.  
The **Device Configuration** interface opens.
6. Select .  
The **License Keys** sub-tab is automatically selected.
7. To remove a license key for a specific slot:
  - a. Select the sub-tab for the license type you want to remove.  
Each row in the sub-tab represents a slot in the ULTRIX-FR12. Each column represents a type of licensed feature.
  - b. Select **Disable** to remove the license for a selected slot.
- ★ If available, click **Disable All** to remove all the licenses of this type from all slots.
- ★ If you wish to apply the same license key to another slot, follow the steps outlined in **“Installing a License Key”**.
8. To remove a license key from the router:
  - a. On the License Keys sub-tab, located the row for the licensed feature you want to remove.
  - b. Click **Cancel** in the row.

## Locking Access to the Licenses

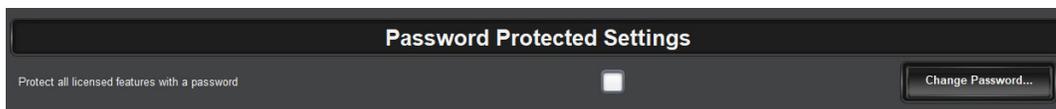
The ULTRIX-FR12 includes a password-protected feature that prevents unauthorized changes to license keys. When the License tab is locked, users require a password to access/edit the license key information. This feature is disabled by default (the License tab is editable).

### Enabling the Port License Lock

To lock the tab, you must enable the Password Protected settings in the Product Info > Setup tab.

#### To enable the lock on the Port License tab

1. In the Tree View of DashBoard, double-click the **Product Info** node.  
The Product Info interface displays in the DashBoard window.
2. Select the **Setup** tab.
3. In the **Password Protected Settings** area, select the **Protect all Licensed features** with a password box.



4. Click **Apply** at the bottom of the **Setup** tab.

### Changing the Password

It is recommended to change the password from the default value that is assigned at the factory.

★ A password must be at least 8 characters long.

#### To change the password

1. Click **Change Password**.  
The **Enable Password Protection** dialog opens.
2. If you are changing the password from the default value:
  - a. In the **Password** field, type `r0ssUltrix`.
  - b. Click **Apply**.  
The **Change Password** dialog opens.
3. If you are changing the password from a value other than the default:
  - a. In the **Password** field, type the character string for the current password.
  - b. Click **Apply**.  
The **Change Password** dialog opens.
4. Use the **Password** field to type the current password.
5. Use the **New Password** field to type the character string for the new password.
6. Use the **Confirm Password** field to type the same character string you entered in step 5.
7. Click **Apply**.  
The **Change Password** dialog closes and the **Port License** tab is now locked.

### Unlocking the Port Licenses via Password

A user can unlock the Port License tab by clicking the **Unlock** button and entering a password.

### To unlock the Port Licenses tab via password

1. Launch the DashBoard client.
  2. Locate the ULTRIX-FR12 node in the Tree View.
  3. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
  4. Expand the **Devices** node.
  5. Double-click the node for your ULTRIX-FR12 router.  
The **Device Configuration** interface opens.
  6. Select  .
  7. Click **Unlock...** .  
The **Protected Access** dialog opens.
  8. In the **Password** field, type the password as defined in step 5 of the procedure “**To enable the lock on the Port License tab**”.
  9. Click **Apply**.  
The **Protected Access** dialog closes and the **Licenses** tab is now editable.
- ★ To re-lock the **Licenses** tab, click **Lock**.



# Enabling a Service

The ULTRIX-FR12 supports a set of third-party communications protocols that allow the router to communicate with devices in your routing system. Before creating a connection point to each device, you must first enable the required protocol(s) on the ULTRIX-FR12, and configure any settings required for communication. This chapter outlines how to enable a communication service (protocol), and configure the additional settings on the router for each protocol (if required). A summary of the supported commands is also provided.

If you have questions about the operation of your Ross devices, contact us at the numbers listed in “**Contacting Technical Support**”. Our technical staff is always available for consultation, training, or service.

## Enabling a Communication Service

Use the options in the System > Configuration > Connections > Services interface to enable or disable each required service (protocol). This will enable your router to communicate with an external device that uses the enabled third-party protocol.

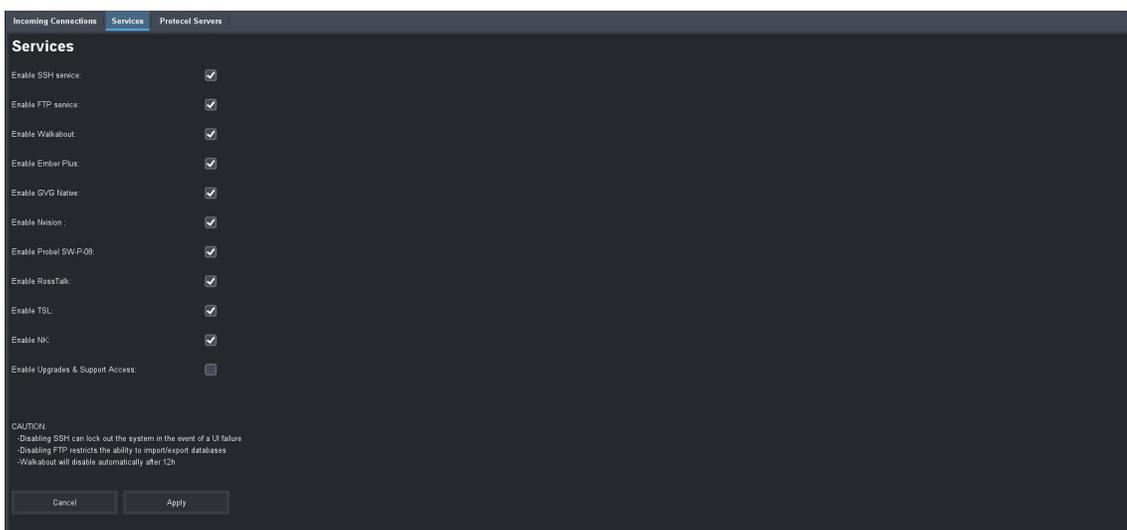
### To enable a service

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **Connections** sub-node.

The Connections interface opens in the DashBoard window with the Incoming Connections tab automatically selected.

6. Select the **Services** tab.

The Services tab lists the available communications protocols and provides options for enabling/disabling each protocol for the router.



- ★ Some services require that a license key is also enabled on your router. Refer to “**Software License Keys**” for details.

7. Enable or disable a service by selecting or clearing the associated box. Choose from the following:
  - SSH service — Enables the ability to log onto the ULTRIX-FR12 via an SSH server. Secure Shell (SSH) Login is a client-server protocol used by system administrators to securely log onto remote systems and execute commands over an unsecured network. SSH may also be used by Ross Technical Support for advanced troubleshooting.
  - FTP service — Enables the ability to communicate with the ULTRIX-FR12 over an FTP connection.
  - Walkabout — Enables the ULTRIX-FR12 to communicate with Ross Video devices in the Walkabout system.
  - Ember Plus — Enables the ULTRIX-FR12 to communicate with a third-party control system via the Ember+ media distribution protocol.
  - GVG Native — Enables the ULTRIX-FR12 to communicate via the GVG Series 7000 Native protocol and is available over an RS-422 or RS-232 serial connection, or ethernet connection.
  - Nvision — Enables the ULTRIX-FR12 to communicate via a limited sub-set of the NVISION serial NP0010 protocol, and the NVISION NP16 ethernet protocol.
  - Probel SW-P-08 — Enables the ULTRIX-FR12 to communicate via the Probel SW-P-08 protocol. This protocol is available over an RS-422 or RS-232 serial connection, as well as an ethernet connection.
  - RossTalk — Communications via the RossTalk protocol (a plain text based protocol that allows control of Ross Video equipment).
  - TSL — Enables the ULTRIX-FR12 to communicate via the TSL UMD v3.1, TSL UMD v4.0, and TSL UMD v5.0 protocols.
  - NK — Enable this option if there are Ross NK series devices or signal types the ULTRIX-FR12 itself does not handle. The Ross NK series devices must be connected to the ethernet network by virtue of an Ross NK-IPS or NK-NET devices to enable communication with the ULTRIX-FR12.
- ★ Select the Enable Upgrades & Support Access option if you wish to upgrade the ULTRIX-FR12 or as directed by Ross Technical Support. This option is disabled by default.
8. Click **Apply**.

## Configuring the Service Settings

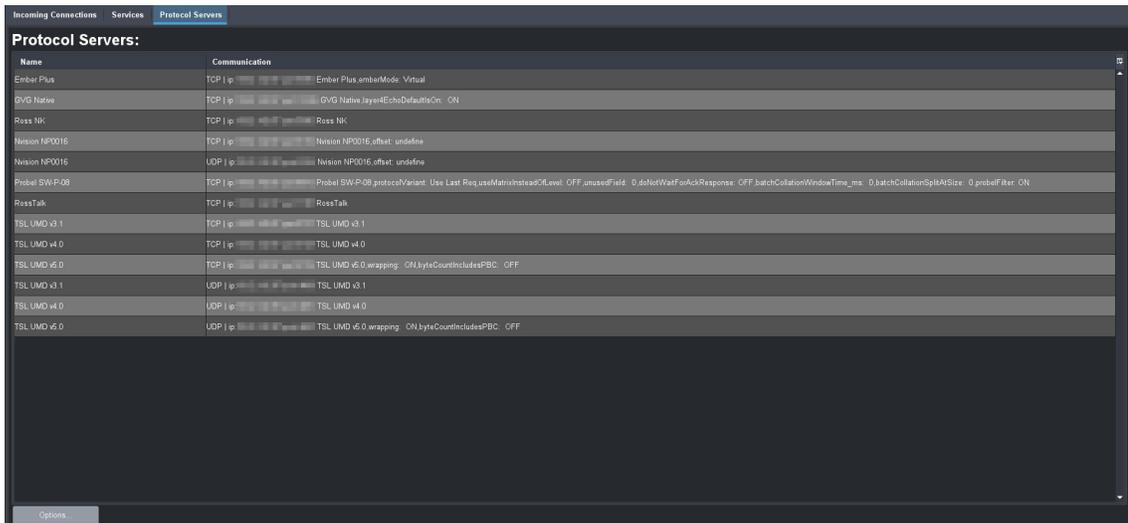
The Protocol Servers tab lists the currently active servers running in the routing system. This tab is auto-populated based on the external devices on the same network as your router and using the protocols enabled in the Services tab. Some services require you to configure additional settings on the router. This section briefly summarizes those additional settings.

### For More Information on...

- the supported protocols, refer to “**Third-Party Protocols**”.

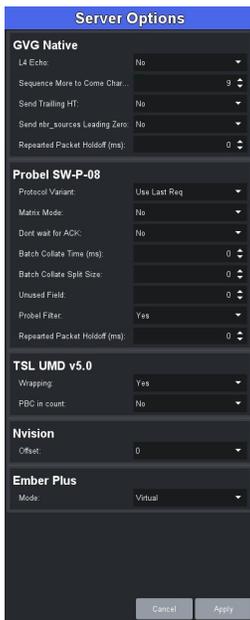
### To configure the protocol settings

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **Connections** sub-node.
6. Select the **Protocol Services** tab.



7. Click **Options** (located in the bottom toolbar).

The **Server Options** dialog opens.



8. Locate the options for the third-party protocol you wish to configure for communications.

9. Refer to the following sections for a summary of the settings based on the protocol.

10. Click **Apply**.

The **Server Options** dialog closes and the new settings are applied.

## Third-Party Protocols

The ULTRIX-FR12 control system is able to control third-party matrix devices. Two popular routing protocols are available to enhance compatibility: GVG Series 7000 and Probel SW-P-08.

You must define an interface for the system to access third-party matrix devices. The connection point must be compatible with the settings of the external device you are trying to control.

Before proceeding, ensure that you have the following connection specifics:

- Communication protocol
- Communication type (TCP/IP or serial<sup>1</sup>)

## Ethernet Communication

The Ethernet interfaces to these protocols are automatically started with ULTRIX-FR12 and no further configuration is necessary. However, you must configure your external control systems to match the settings outlined in **Table 24**. The **Protocol Options** are outlined with the respective protocol details in the following sections.

The ULTRIX-FR12 router can communicate with third-party external devices via a TCP connection. By default, ULTRIX-FR12 provides a server process for the following Ethernet protocols:

**Table 24 Supported Protocols — Ethernet Connection**

| Protocol               | Default Port           |
|------------------------|------------------------|
| GVG Native Series 7000 | TCP: 12345             |
| Probel SW-P-08         | TCP: 8910              |
| RossTalk               | TCP: 7788              |
| TSL UMD v3.1           | TCP: 5727<br>UDP: 4490 |
| TSL UMD v4.0           | TCP:5728<br>UDP: 4491  |
| TSL UMD v5.0           | TCP: 5729<br>UDP: 4492 |

## Serial Communication

ULTRIX-FR12 may communicate directly with third-party devices using a native serial protocol. A USB-to-Serial converter must be used to give the ULTRIX-FR12 a serial communication port. Refer to **Table 25** for information on the supported protocols.

- ★ Only USB-serial devices based on these chip-sets are supported: FTDI Chip, Belkin, Prolific PL 2303, and Silicon Labs CP210x.

**Table 25 Supported Protocols — Serial Connections**

| Protocol               | Type           | Settings |           |        |           |
|------------------------|----------------|----------|-----------|--------|-----------|
|                        |                | Baud     | Data Bits | Parity | Stop Bits |
| GVG Native Series 7000 | RS232 or RS422 | 38400    | 8         | None   | 1         |
| Probel SW-P-08         | RS232 or RS422 | 38400    | 8         | None   | 1         |
| TSL UMD v3.1           | RS422 or RS485 | 38400    | 8         | Even   | 1         |
| TSL UMD v4.0           | RS422 or RS485 | 38400    | 8         | Even   | 1         |
| TSL UMD v5.0           | RS422 or RS485 | 38400    | 8         | Even   | 1         |

- ★ A serial connection point must be implemented on ULTRIX-FR12 before communications can start. The settings may be changed from the protocol defaults to suit your requirements. The **Protocol Options** are outlined with the respective protocol details in the following sections.

1. Only available natively. Serial connections from Ultrix requires an external USB-serial converter.

## GVG Series 7000 Native Protocol Commands

ULTRIX-FR12 supports the GVG Series 7000 Native protocol and is available over an RS-422 or RS-232 serial connection, as well as ethernet connection.(**Table 26**)

**Table 26 Default GVG Native Connection Types**

| Setting         |                    |
|-----------------|--------------------|
| <b>Serial</b>   |                    |
| Connection Type | RS422 or RS232     |
| Baud            | 38400              |
| Data Bits       | 8                  |
| Parity          | None               |
| Stop Bits       | 1                  |
| <b>Ethernet</b> |                    |
| Port (incoming) | 12345              |
| Port (outgoing) | 12345 <sup>a</sup> |

a. For outgoing connections, port 12345 is the default value but is user configurable.

**Table 27** summarizes the settings in the **Protocol Options** dialog for the GVG Series 7000 Native protocol.

**Table 27 Protocol Options — GVG Series 7000 Native**

| Option                          | Setting | Notes  |
|---------------------------------|---------|--|
| L4 Echo                         | Yes     | Send command acknowledgments on protocol layer 4 (Ethernet only)   |
|                                 | No      | Do not send acknowledgments. This is the default.  |
| Sequence More to Come Character | #       | Enables the user to assign a number to the <code>seq_flag</code> field in a packet that will indicate more messages to come. The default value is 9.<br>A value of 0 (zero) indicates the last or only packet. |
| Send Trailing HT                | Yes     | Includes the trailing <HT> character (Horizontal Tab (0x09)) in the packet   |
|                                 | No      | The trailing <HT> character is not included in the packet  |
| Send nbr_sources Leading Zero   | Yes     | Always forces the <code>nbr_sources</code> field to be 2 ASCII characters (e.g. 1 becomes 01). This supports fragmentation of large message streams.   |
|                                 | No      | Allows the <code>nbr_sources</code> field to be a single ASCII character   |
| Repeated Packet Holdoff (ms)    | #       | ULTRIX-FR12 detects repeated identical packets, and will skip processing if the packets are repeated within the specified delay. The default is 0.   |

## To send GVG Native commands to ULTRIX-FR12

1. Create a network connection to the ULTRIX-FR12 router on TCP/IP **Port 12345**.
2. A successful connection will be displayed in the listed client devices under the Device Configuration interface.
3. Refer to **Table 28** for a list of GVG Native Protocol commands that ULTRIX-FR12 supports.

**Table 28 GVG Native Protocol Commands**

| Message   |   |   |
|---|---|---|
| Command   | Description   | Notes   |
| BK[,parameter]  |   |   |
| BK,D  | Force next QD command to return status of all destinations                              | Clears the flags associated with the D,no_parameter command. After BK,D is sent, the next QD,no_parameter command will result in destination statuses or all destinations being returned. |
| BK,E  | Request status of level 4 echo setting  |   |
| BK,E,ON   | Set level 4 echo to on  | An err=00 response will be returned for successful commands that do not generate their own response (eg. Take commands).<br>This is a per session setting.                                |
| BK,E,OFF  | Set level 4 echo to off (default)   | No response will be given for commands that do not generate their own response.   |
| PR,dest_name,level_bitmap                                     | Protects a specific destination from having its source changed                          | ER error-code response is currently not supported.  |
| QC[,dest_name]  | Query Combined Destination status by name   |   |
| QD[,dest_name]  | Query Destination status by name  | No information is returned for unmatched destination levels   |
| Qd[,dest_name]  | Query Destination status by name  | Sets response src_name to NO_XPT for unmatched destination levels   |
| Qi,destIndex,lvIndex  | Query Destination status by index <sup>a</sup>  |   |
| Qi,destIndex,lvIndex  | Query Destination status by index <sup>a</sup>  | The srcIndex returned will be 0xfffe if an error condition applies to the crosspoint being reported.  |
| Qj[,destIndex]  | Query Destination status by index <sup>a</sup>  | No information is returned for unmatched destination levels   |
| Qj  | Query Destination status by index <sup>a</sup>  | Sets response srcIndex to 0xFFFE for unmatched destination levels   |
| QN,parameter  |   |   |
| QN,S  | Query source names/labels   | As defined inactive database  |
| QN,D  | Query destination names/labels  | As defined inactive database  |
| QN,L  | Query level names/labels  | As defined inactive database  |
| QN,IS   | Query names via source index <sup>a</sup>   |   |
| QN,ID   | Query names via destination index <sup>a</sup>  |   |
| QT  | Query date and time <sup>a</sup>  |   |
| TA,dest_name,nbr_sources,src_name_entry1[,...src_name_entryn] | Takes sources (on specified levels) to specified destination, by name rather than index | Src_name_entryn = src_name,level_bitmap   |
| TD,dest_name,src_name_entry                                   | Takes same source to all or specified levels  | Src_name_entryn = src_name[,levelbitmap]<br>No levelbitmap=all destination levels   |
| TI,destIndex,srcIndex[,levelIndex]                            | Request take by index with level index <sup>a</sup>                                     |   |

**Table 28 GVG Native Protocol Commands (Continued)**

| Message  |  |   |
|--|--|---|
| Command  | Description  | Notes   |
| TJ,destIndex,nbr_sources,srcIndex,level_bitmap[,...,srcIndex,level_bitmap] | Takes sources (on specified levels) to specified destinations by index rather than name; allows breakaways |   |
| TS,salvo_name  | Request Take Salvo   | TS,salvo_name                                       |
| UP,dest_name,level_bitmap  | Removes Protect from specified destination   | ER, error-code response is currently not supported. |

- a. Zero-based hex logical index numbering.

**For More Information on...**

- these commands, refer to the GVG protocol documentation.

## Rosstalk Commands

The Rosstalk protocol is a plain text based protocol that allows control of Ross Video equipment.

★ Each command should be terminated by a carriage return and a line feed (CR/LF).

**To send Rosstalk commands to ULTRIX-FR12**

1. Create a network connection to the ULTRIX-FR12 router on **Port 7788**.
2. At the prompt, enter the commands you wish to send. Refer to **Table 29** for a list of supported commands.

**Table 29 Rosstalk Protocol Commands**

| Message  |  |   |
|--|--|---|
| Command  | Description  | Notes   |
| GPI ##   | Execute the salvo number corresponding to the numerical ## extension of the command  | For example, GPI 04 triggers the salvo <salvo_name>[4] as listed in the ULTRIX-FR12 database  |
| TIMER ##:RUN   | Request Timer ID to start/resume   |   |
| TIMER ##:STOP  | Request Timer ID to stop   |   |
| TIMER ##:PAUSE   | Request Timer ID to pause  |   |
| TIMER ##:END   | Request Timer ID to end  |   |
| TXTLABEL ID:<id>; TEXT:<text>; BGCLR:<bgcolor>; TXTCLR:<textcolor> | <p>Where:</p> <ul style="list-style-type: none"> <li>• &lt;id&gt; is a unique "rosstalk id" associated with an Ultriscape Rosstalk display object. This field is compulsory.</li> <li>• &lt;text&gt; is the text to be displayed. This field is optional.</li> <li>• &lt;bgcolor&gt; is the background color of the text label. Specified in comma separated RGB format using 2 byte hex values (eg RR,GG,BB). This field is optional.</li> <li>• &lt;textcolor&gt; is the text color of the text label. Specified in comma separated RGB format using 2 byte hex values (eg RR,GG,BB). This field is optional.</li> </ul> | <p>There is a 20 character maximum. Messages with only the id field will be ignored. The following is an example of a message:<br/>TXTLABEL ID:25; TEXT:CAM1;<br/>BGCLR:0x00,0x00,0x00;<br/>TXTCLR:0xFF,0xFF,0xFF</p> <p>Note that &lt;bgcolor&gt; and &lt;textcolor&gt; are specified as R,G,B triplet. For example:</p> <ul style="list-style-type: none"> <li>• 255,255,255 or 0xff,0xff,0xff is white</li> <li>• 0,0,0 or 0x0,0x0,0x0 is black</li> <li>• 255,0,0 or 0xff,0x0,0x0 is red</li> </ul> |

**Table 29 RossTalk Protocol Commands (Continued)**

| Message  |   |   |
|--|---|---|
| Command  | Description   | Notes   |
| XPT D:<dest> S:<source> I:<user_id> [L:<levels>] | <p>Crosspoint command for a router TAKE where:</p> <ul style="list-style-type: none"> <li>• &lt;dest&gt; is the logical destination ID from the active database (1-based)</li> <li>• &lt;source&gt; is the logical source ID from the active database (1-based)</li> <li>• &lt;user_id&gt; is the numeric user/panel ID that will be used to request the switch</li> <li>• &lt;levels&gt; is an optional parameter specifying comma-separated list of 1-based level IDs to switch (for breakaway, e.g. L:1,2,4). If no levels are specified, a follow switch (all valid levels) is requested.</li> <li>• &lt;levels&gt; supports ranges specified by two numbers separated by dash (e.g. L:1-16)</li> </ul> | <p>Range start value must be less than the end value</p> <p>Single levels and ranges can be mixed in the list (eg. L:1,3,4-8,12-17)</p> <p>There are no spaces between numbers or ranges</p> <p>Invalid numbers or improperly specified ranges will be ignored</p> <p>An argument is separated from its value using a single colon (:)</p> <p>Command arguments are separated single spaces</p> <p>The arguments may be specified in any order, (e.g. these are equivalent: XPT D:1 S:4 I:2 and XPT S:4 I:2 D:1)</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• ID 7 requesting to switch Dest 2 to Source 1 on Levels 1,3,5 and 12-16</li> <li>• XPT I:7 D:2 S:1 L:1,3,5,12-16</li> </ul> |

**For More Information on...**

- adding a RossTalk label to an Ultriscope layout, refer to the ***Ultriscope User Guide***.

**Using RossTalk with UltraScope Clock Objects**

**Table 30** outlines the supported RossTalk commands for UltraScope Clock state control and reporting messages where:

- **id** represents the unique “global clock id” associated with a clock time source. Note that more than one clock display element may point to the same time source clock id.
- **state** represents the current or requested state for the clock / time source. Valid state values are:
  - › run — the clock (or timer/stopwatch) is running. The time-of-day clocks always reports ‘run’.
  - › stop — the clock is in a stopped state and reflects the default time for its type (e.g. timer: full timer value, stopwatch: 0:0:0.0). This is only valid for stopwatch/timer type.
  - › pause — the clock is paused and displays the current time value. When returned to ‘run’ it will resume counting from the current time value. This is only valid for stopwatch/timer type.
  - › end — a timer has counted fully down and reached 0 time remaining. This is only valid for timer type notifications/responses.
  - › set — assigns the timer value to “value”.

**Table 30 UltraScope Clocks — Supported RossTalk Commands**

| Received Message        |                                  |
|-------------------------|----------------------------------|
| Command                 | Description                      |
| TIMER id:RUN            | Request Timer ID to start/resume |
| TIMER id:STOP           | Request Timer ID to stop         |
| TIMER id:PAUSE          | Request Timer ID to pause        |
| TIMER id:END            | Request Timer ID to end          |
| TIMER id:SET:hh:mm:ss.s | Request to set Timer value       |

## Probel SW-P-08 Protocol Commands

ULTRIX-FR12 supports the Probel SW-P-08 protocol and is available over an RS-422 or RS-232 serial connection, as well as ethernet connection. **Table 31** provides the default values for this protocol.

**Table 31 Default Probel SW-P-08 Connection Types**

| Setting         |                   |
|-----------------|-------------------|
| <b>Serial</b>   |                   |
| Connection Type | RS422 or RS232    |
| Baud            | 38400             |
| Data Bits       | 8                 |
| Parity          | None              |
| Stop Bits       | 1                 |
| <b>Ethernet</b> |                   |
| Port (incoming) | 8910              |
| Port (outgoing) | 8910 <sup>a</sup> |

a. For outgoing connections, port 8910 is the default value but is user configurable.

**Table 32** summarizes the settings in the **Protocol Options** dialog for the Probel SW-P-08 protocol.

**Table 32 Protocol Options — Probel SW-P-08 Protocol**

| Option           | Setting          | Notes   |
|------------------|------------------|---|
| Protocol Variant | Non-extended     | Use non-extended commands only  |
|                  | Extended         | Use extended commands only  |
|                  | Use Last Request | Use command set as per last received command format (e.g. if received a non-extended command, reply in a non-extended format). This is the default. |
| Matrix Mode      | Yes              | Swap matrix and level fields  |
|                  | No               | Do not swap matrix and level fields. This is the default.   |
| Unused Field     | #                | Send number (0-15) in either Level or Matrix field - which ever is not used as per Matrix Mode setting. The default is 0.                           |

**Table 32 Protocol Options — Probel SW-P-08 Protocol (Continued)**

| Option                          | Setting             | Notes   |
|---------------------------------|---------------------|---|
| Do not wait for ACK             | Yes                 | ULTRIX-FR12 will not wait for message acknowledgments between connect responses   |
|                                 | No                  | ULTRIX-FR12 will wait for message acknowledgments between connect responses. This is the default.   |
| Batch Collate Time <sup>a</sup> | # milliseconds      | Wait up to 100 milliseconds for multiple commands received before processing. The default is 0 (which disables this feature).                 |
| Batch Collate Split Size        | # received commands | Wait up to 100 received commands before processing. The default is 0 (which disables this feature).   |
| Repeated Packet Holdoff (ms)    | #                   | Ultrix detects repeated identical packets, and will skip processing if the packets are repeated within the specified delay. The default is 0. |

a. When both Batch Collate Split Size and Batch Collate Time are both active, the option that occurs first will release the batch, and the Batch Collate Split Size and the Collate Time values are reset.

**Table 33** lists the Probel SW-P-08 Serial Protocol commands the ULTRIX-FR12 supports.

**Table 33 Probel SW-P-08 Native Protocol Commands**

| Cmd ID | Request Message Description                  | Cmd ID | Response Message Description          | Notes  |
|--------|--|--------|---------------------------------------|--|
| 01     | Crosspoint Interrogate                       | 03     | Crosspoint Tally                      | Get single crosspoint status   |
| 02     | Crosspoint Connect                           | 04     | Crosspoint connected                  | Take single crosspoint   |
| 10     | Protect Interrogate                          | 11     | Protect Tally                         | Get destination protect status   |
| 12     | Protect Connect                              | 13     | Protect connected                     | Set destination protect  |
| 14     | Protect Disconnect                           | 15     | Protect dis-connected                 | Turn off destination protect   |
| 17     | Protect Device Name Request                  | 18     | Protect Device Name Response          | Get name of device that hold protect   |
| 19     | Protect Tally Dump Request                   | 20     | Protect Tally Dump                    | Get all protect status   |
| 21     | Crosspoint Tally Dump Request                | 22, 23 | Crosspoint Tally Dump                 | Get all crosspoint status<br>Cmd22: Byte max dest 191<br>Cmd23: Word max. dest. 65535              |
| 97     | Implementation Request                       | 98     | Implementation Status                 | Get list of commands supported   |
| 100    | All Source Names Request                     | 106    | Source Name Response                  | Get all source names (8 char. max.)  |
| 101    | Single Source Name Request                   | 106    | Source Name Response                  | Get single source names (8 char. max.)   |
| 102    | All Destination Association Name Request     | 107    | Destination Association Name Response | Get destination names (8 char. max.)   |
| 103    | Single Destination Association Names Request | 107    | Destination Association Name Response | Get single destination name (8 char. max.)   |
| 104    | All UMD Labels Request                       | 108    | UMD Label Response                    | Only one set of labels is currently supported. UMD Labels replicate source labels. (16 char. max.) |
| 105    | Single UMD Labels Request                    | 108    | UMD Label Response                    | Get single source label (16 char. max.)  |

**Table 33 Probel SW-P-08 Native Protocol Commands (Continued)**

| Cmd ID   | Request Message Description                   | Cmd ID | Response Message Description                              | Notes                                      |
|----------|---|--------|---|--|
| 120      | Crosspoint Connect On Go Group Salvo          | 122    | Crosspoint Connect On Go Group Salvo Acknowledge          | Add crosspoint to preset group             |
| 121      | Crosspoint Go Group Salvo                     | 123    | Crosspoint Go Done Group Salvo Acknowledge                | Switch/clear preset group                  |
| 124      | Crosspoint Salvo Group Interrogate            | 125    | Crosspoint Group Salvo Tally                              | Preset group status                        |
| EXTENDED |   |        |   |  |
| 129      | Extended Crosspoint Interrogate               | 131    | Extended Crosspoint Tally                                 | Get crosspoint status                      |
| 130      | Extended Crosspoint Connect                   | 132    | Extended Crosspoint Connected                             | Take single crosspoint                     |
| 138      | Extended Protect Interrogate                  | 139    | Extended Protect Tally                                    | Get destination protect status             |
| 140      | Extended Protect Connect                      | 141    | Extended Protect Connected                                | Protect a destination                      |
| 142      | Extended Protect Disconnect                   | 143    | Extended Protect Disconnected                             | Turn off protect for a destination         |
| 147      | Extended Protect Tally Dump                   | 148    | Extended Protect Tally Dump Message                       | Get all protect status for given level     |
| 149      | Extended Crosspoint Tally Dump                | 151    | Extended Crosspoint Tally Dump Word Message               | Get destination status for given level     |
| 228      | Extended All Source Names                     | 234    | Extended Source Name Response                             | Get source names (8 char max.)             |
| 229      | Extended Single Source Name                   | 234    | Extended Source Name Response                             | Get single source name (8 char max.)       |
| 230      | Extended All Destination Association Names    | 235    | Extended Destination Association Names Response           | Get all destination names (8 char. max.)   |
| 231      | Extended Single Destination Association Name  | 235    | Extended Destination Association Names Response           | Get single destination name (8 char. max.) |
| 232      | Extended Single UMD Label Request             | 236    | Extended UMD Labels Response                              | Get all source labels (16 char. max.)      |
| 233      | Extended Single UMD Label Request             | 236    | Extended UMD Labels Response                              | Get single source label (16 char. max.)    |
| 248      | Extended Crosspoint Connect On Go Group Salvo | 250    | Extended Crosspoint Connect On Go Group Salvo Acknowledge | Preset group acknowledge                   |
| 124      | Crosspoint Group Salvo Interrogate            | 253    | Extended Crosspoint Group Salvo Tally                     | Preset group status                        |

## NVISION Commands

This section outlines the NVISION protocol commands supported by ULTRIX-FR12.

★ Ensure that the Ultracore-NVISION license is installed for your router. Refer to “**Installing a License Key**” for details.

**Table 34** summarizes the settings in the **Protocol Options** dialog for the NVISION protocol.

**Table 34 Protocol Options — NVISION Protocol**

| Option | Setting | Notes   |
|--------|---------|---|
| Offset | 0       | The ULTRIX-FR12 level matches the NVISION level   |
|        | 1       | The ULTRIX-FR12 level is the NVISION level plus 1 |

## NVISION NP16 Ethernet Protocol

ULTRIX-FR12 supports the NVISION NP16 Ethernet protocol. **Table 35** outlines the default values for the ULTRIX-FR12 when using NP16.

**Table 35 Default Connection Types — NVISION NP16**

| Setting  |      |
|----------|------|
| TCP Port | 5194 |

### NP16 Commands

The NP16 protocol defines the message format: Protocol ID | Sequence Number | byte count | Command

Each field consists of a 32bit number where:

- Protocol ID — 0x0000000C (Router Control Protocol)
- Sequence number — controller generated and added to ULTRIX-FR12 response message
- byte count — total number of bytes in message including header (<8176)
- Command — refer to **Table 36**

★ The protocol is zero based, meaning that destination 0 in the protocol relates to destination ID#1 in ULTRIX-FR12. This is true for sources, destinations, and level values.

Refer to **Table 36** for a list of supported NP16 commands.

**Table 36 NP16 Protocol Commands**

| Message     |                              |   |
|-------------|------------------------------|---|
| Command     | Description                  | Notes   |
| 0x0000 0050 | Performs a TAKE              |   |
| 0x0000 0051 | Set Output LPR               | Sets or releases a lock or protect on a destination |
| 0x0000 0052 | Get Status of Outputs        | Retrieves the crosspoint status                     |
| 0x0000 0059 | Router Partition Information |   |
| 0x0000 005E | Crosspoint Tally             | Retrieves the crosspoint status                     |
| 0x0000 0070 | Machine Control Take         | Format 1 only                                       |

## NVISION NP0010 Serial Protocol

ULTRIX-FR12 supports a limited sub-set of the NVISION serial NP0010 protocol.

**Table 37** outlines the default values for the ULTRIX-FR12 for an NP0010 serial connection.

**Table 37 Default Connection Types — NVISION NP0010**

| Setting         |                                   |
|-----------------|-----------------------------------|
| Connection Type | RS232, RS422                      |
| Baud            | 9600, 19200, 38400, 56700, 115200 |
| Data Bits       | 8                                 |
| Parity          | No                                |
| Stop Bits       | 1                                 |

Refer to **Table 38** for a list of supported NP0010 commands.

**Table 38 NP0010 Protocol Commands**

| Message |                                  |  |
|---------|----------------------------------|--|
| Command | Description                      | Notes  |
| 0x50    | Take                             | Non-timestamped version only                   |
| 0x51    | Destination status               | Get destination status                         |
| 0x55    | Lock destination                 | Assert a destination lock                      |
| 0x56    | Protect destination              | Assert a destination protect                   |
| 0x58    | Release destination lock/protect | Releases the destination lock and protect      |
| 0x66    | Destination LPR state            | Get destination locked/protect/released status |

## TSL UMD Protocol v3.1 Commands

**Table 39** outlines the default values for the ULTRIX-FR12 when using TSL UMD v3.1.

**Table 39 Default Connection Types — TSL UMD v3.1**

| Setting         |       |
|-----------------|-------|
| <b>Serial</b>   |       |
| Connection Type | RS422 |
| Baud            | 38400 |
| Data Bits       | 8     |
| Parity          | Even  |
| Stop Bits       | 1     |
| <b>Ethernet</b> |       |
| TCP Port        | 5727  |
| UDP Port        | 4490  |

## Protocol Implementation

ULTRIX-FR12 implements the protocol with the following structure: DisplayID | Control | DisplayData.

**Table 40** lists the TSL UMD Protocol v3.1 commands the ULTRIX-FR12 supports.

**Table 40 TSL UMD Protocol v3.1 Commands**

| Protocol Breakdown | Description                                | UltraScape System Use                           |
|--------------------|--|---|
| Display Address    | 0 - 126 display identification enumeration | DisplayID associated with source or destination |
| Control Byte       |  |   |
| Bit 0              | Tally 1 status (1=on, 0=off)               | Tally 1 (Red) <sup>a</sup>                      |
| Bit 1              | Tally 2 status                             | Tally 2 (Green) <sup>a</sup>                    |
| Bit 2              | Tally 3 status                             | Not used  |
| Bit 3              | Tally 4 status                             | Not used  |
| Bits 4-5           | Brightness value                           | Not used  |
| Bit 6              | Reserved                                   | Not used  |

**Table 40 TSL UMD Protocol v3.1 Commands (Continued)**

| Protocol Breakdown | Description                           | UltriScape System Use |
|--------------------|---------------------------------------|-----------------------|
| Bit 7              | 0                                     | Not used              |
| Display Data       | 16 ASCII display characters (20h-3Eh) | UMD display text      |

- a. Green/Red may be swapped by configuring the Global Tally Settings in the UltriScape Head interface.

Refer to **Table 41** when using TSL UMD v3.1 and configuring PiP Tallies in an UltriScape Head.

**Table 41 UltriScape Tally Display — TSL UMD v3.1**

| Red Tally | Green Tally | Display                  |
|-----------|-------------|--------------------------|
| ON        | ON          | RED IS ON                |
| ON        | OFF         | RED IS ON                |
| OFF       | ON          | GREEN IS ON              |
| OFF       | OFF         | OFF (no tallies are lit) |

## TSL UMD Protocol v4.0 Commands

**Table 42** outlines the default values for the ULTRIX-FR12 when using TSL UMD v4.0.

**Table 42 Default Connection Types — TSL UMD v4.0**

| Setting         |       |
|-----------------|-------|
| <b>Serial</b>   |       |
| Connection Type | RS422 |
| Baud            | 38400 |
| Data Bits       | 8     |
| Parity          | Even  |
| Stop Bits       | 1     |
| <b>Ethernet</b> |       |
| TCP Port        | 5728  |
| UDP Port        | 4491  |

## Protocol Implementation

ULTRIX-FR12 implements the protocol with the following structure: Header | Control | DisplayData | VBC | XData.

**Table 43** lists the TSL UMD Protocol v4.0 commands the ULTRIX-FR12 supports.

**Table 43 TSL UMD Protocol v4.0 Commands**

| Protocol Breakdown | Description                    | UltriScape System Use                           |
|--------------------|--------------------------------|---|
| Header             | 0x80 + 0 - 126 display address | DisplayID associated with source or destination |
| Control Byte       |                                |   |

**Table 43 TSL UMD Protocol v4.0 Commands (Continued)**

| Protocol Breakdown | Description                             | UltraScape System Use  |
|--------------------|---|--|
| Bit 0              | Tally 1 status (1=on, 0=off)            | Not used   |
| Bit 1              | Tally 2 status                          | Not used   |
| Bit 2              | Tally 3 status                          | Not used   |
| Bit 3              | Tally 4 status                          | Not used   |
| Bit 4-5            | Brightness value                        | Not used   |
| Bit 6              | 0=display data, 1=command data          | Display data only (0)  |
| Bit 7              | 0                                       | Not used   |
| Display Data       | 16 ASCII display characters (20h - 7Eh) | UMD display text   |
| <b>VBC</b>         |   |  |
| Bits 3-0           | Byte count of XData                     |  |
| Bits 6-4           | Minor protocol version (v4.0=0)         |  |
| Bit 7              | 0                                       |  |
| <b>XData1</b>      |   |  |
| Bits 0-1           | Right Hand tally value <sup>a</sup>     | Not implemented  |
| Bits 2-3           | Text display value <sup>a</sup>         | Sets text background color   |
| Bits 4-5           | Left hand tally value <sup>a</sup>      | Displayed in either border or text background; can be either or both |
| Bit 6              | Reserved                                |  |
| Bit 7              | 0                                       |  |
| <b>XData2</b>      |   |  |
| Bits 0-1           | Right Hand tally value                  | Not implemented  |
| Bits 2-3           | Text display value                      | Not implemented  |
| Bits 4-5           | Left hand tally value                   | Not implemented  |

a. Where 0=off, 1=Red, 2=Green, 3=Amber

## TSL UMD Protocol v5.0 Commands

**Table 44** outlines the default values for the ULTRIX-FR12 when using TSL UMD v5.0.

**Table 44 Default Connection Types — TSL UMD v5.0**

| Setting         |       |
|-----------------|-------|
| <b>Serial</b>   |       |
| Connection Type | RS422 |
| Baud            | 38400 |
| Data Bits       | 8     |
| Parity          | Even  |
| Stop Bits       | 1     |
| <b>Ethernet</b> |       |
| TCP Port        | 5729  |
| UDP Port        | 4492  |

**Table 45** summarizes the settings in the **Protocol Options** dialog for the TSL UMD v5.0 protocol.

**Table 45 Protocol Options — TSL UMD v5.0 Protocol**

| Option             | Setting | Notes  |
|--------------------|---------|--|
| Wrapping           | Yes     | Wrap commands for TCP mode   |
|                    | No      | Do not wrap commands (UDP mode). This is the default.                                    |
| PBC in Count Value | Yes     | Include the Packet Byte Count field when calculating the byte count value                |
|                    | No      | Do not include the Packet Byte Count field in the byte count value. This is the default. |

## Protocol Implementation

ULTRIX-FR12 implements the protocol with the following structure: PBC | Ver. | Flags | Screen | DMSG (Index, Control, Length, Text).

**Table 46** lists the TSL UMD Protocol v5.0 commands the ULTRIX-FR12 supports.

**Table 46 TSL UMD Protocol v5.0 Commands**

| Protocol Breakdown | Description                         | UltriScape System Use                           |
|--------------------|-------------------------------------|---|
| PBC                | Total byte count of packet          |   |
| Ver.               | Minor version number (0=v5.00)      |   |
| Flags              |                                     |   |
| Bit 0              | 0=ASCII strings, 1=UTF-16LE         |   |
| Bit 1              | 0=display data, 1=screen control    | Display data only (0)                           |
| Bits 2-7           | Reserved (0)                        | Not used  |
| Screen             | 16bit Screen ID                     | ScreenID associated with source or destination  |
| DMSG               |                                     |   |
| Index              | 16bit Display Address               | DisplayID associated with source or destination |
| Control            |                                     |   |
| Bits 0-1           | Right hand tally value <sup>a</sup> | Sets right-hand tally indicator color           |
| Bits 2-3           | Text display value <sup>a</sup>     | Sets text background and border color           |
| Bits 4-5           | Left hand tally value <sup>a</sup>  | Sets left-hand tally indicator color            |
| Bits 6-7           | Brightness value (0-3)              | Not implemented                                 |
| Bits 8-14          | Reserved (0)                        |   |
| Bit 15             | 0=display data, 1=command data      | Display data only (0)                           |
| Length             | Byte count of text                  |   |
| Text               | Text as defined by Flag 0 setting   | UMD display text                                |

a. Where 0=Off, 1=Red, 2=Green, 3=Amber

## Enabling SNMP Support

ULTRIX-FR12 routers running software version 3v4 or higher provide optional support for remote monitoring and control of your router using SNMP (Simple Network Management Protocol). This protocol is compatible with many third-party monitoring and control tools.

- ★ The MIB file provides SNMP traps for the configurable alarms on ULTRIX-FR12 as well as on the power supplies and fans.

## Enabling SNMP Support

The SNMP Agent on the ULTRIX-FR12 uses SNMP version 2 to allow queries of the configured system alarms, and state changes to configured alarms will be sent out as SNMP traps to the specified Trap Destination IP Address(es).

- ★ Whenever the options in the SNMP area are edited, the SNMP Agent is restarted on the ULTRIX-FR12 router. It can take up to 10 seconds for all monitored states to be updated. This latency only applies once on startup.

The SNMP monitoring and control feature for your ULTRIX-FR12 is a software option that you enable in the Product Info > Network tab.

### To enable SNMP support on the ULTRIX-FR12

1. Verify that the Ultracore-SNMP license key is installed for the ULTRIX-FR12. Refer to “**Installing a License Key**” for details.
2. In the Tree View of DashBoard, double-click the **Product Info** node under the ULTRIX-FR12 node.  
  
The Product Info interface displays in the DashBoard window.
3. Select the **Network** tab.
4. Locate the **SNMP** area of the tab.
5. Select the **Enable SNMP** box.
6. Ensure that the Alarms you want to monitor via SNMP are also enabled on the ULTRIX-FR12. Refer to “**Monitoring the Hardware**”.

### To configure the SNMP Agent using DashBoard

1. In the Tree View of DashBoard, double-click the **Product Info** node under the ULTRIX-FR12 node.  
  
The Product Info interface displays in the DashBoard window.
2. Select the **Network** tab.
3. Locate the **SNMP** area of the tab.
4. Use the **SNMP Community Name** field to specify the SNMP password for GET requests.
  - ★ The default SNMP Community Name is `ultracore`. For stronger security, it is strongly recommended that users set their own community string.
5. Use the **SNMP Trap Destination IP Address** field to specify the target address to which traps should be sent.  
  
An example of a valid target is provided in the **SNMP** area.
  - ★ A maximum number of six strings are displayed in the **SNMP Trap Destination IP Address** field at one time. If at the maximum number, you must select a string from the field and delete it before adding a new target entry.
6. Press **[Enter]** to apply the changes.

## Ember+ Registration and Discovery

This section provides information on the setup and operation for the ULTRIX-FR12 to communicate with a third-party control system via the Ember+ media distribution protocol.

## Establishing a Connection

### To establish a connection between the Ember+ client and the ULTRIX-FR12

1. Configure your network streams as outlined in “**ULTRIX-IP-IO Setup**”.
2. Configure your router database as outlined in the *Ultrix and Ultricore Database Guide*.
3. Install the Ultricore-EMBER+ license on the ULTRIX-FR12. Refer to “**Installing a License Key**”. This enables the ULTRIX-FR12 to start an Ember+ server and listen to incoming connections.
4. Add the ULTRIX-FR12 in the Ember+ control system interface using the IP Address assigned to the ULTRIX-FR12.
5. In the Ember+ controls system, set the TCP port to 9000 for the ULTRIX-FR12.

## Specifying the Operation Mode

ULTRIX-FR12 can be controlled via Ember+ in two modes: Virtual Mode (table mapped IO) or Physical Mode (direct socket control).

### To specify the Ember+ operation mode on the ULTRIX-FR12

1. Display the **Connections** interface for ULTRIX-FR12.
2. Click **Options** in the **Protocol Servers** area.  
The **Server Options** dialog opens.
3. Use the **Ember Plus** menu to specify the operation mode required by your Ember+ control system. Choose from the following:
  - **Virtual Mode** — each level is represented by a Matrix and the Labels will be the one defined in the Destinations and Sources tabs.
  - **Physical Mode** — the whole router is represented as a single Matrix and the physical socket labels are used. The external control system using Ember+ commands bypasses the virtual IO mapping and directly controls the ULTRIX-FR12 physical socket connections. Therefore the ULTRIX-FR12 should not be switched by any other devices.
4. Click **Apply** to close the dialog.
5. Click **Apply** at the bottom of the **Connections** tab to apply the new setting.

## Supported Commands

The ULTRIX-FR12 supports the `Get Directory` and `Connect` commands. The router is represented using the Ember+ Matrix object including Labels. This allows the Ember+ control system to see the number of levels, number of sources and destinations and their labels, the per destination status, and issue switch commands.

- ★ If you make changes to the router database (such as levels, destinations and sources) after establishing communications, you may need to refresh the connection.

# Configuring the AUX Ports

ULTRIX-FR12 is capable of switching video signals<sup>1</sup> from 270Mbps to 12Gbps<sup>2</sup>. This format flexibility permits SD, HD, 3G and UHD video signals to be used seamlessly in the same system. This chapter summarizes how to configure the populated AUX and SFP ports, on a blade.

## For More Information on...

- the options on the Port Configuration interface, refer to **“Port Configuration Interface”**.
- configuring the UHD Gearbox, refer to **“UHD Gearbox Configuration”**.
- configuring the ULTRIX-IP-IO ports, refer to **“ULTRIX-IP-IO Setup”**.
- configuring the ULTRIX-IPX-IO ports, refer to **“ULTRIX-IPX-IO Setup”**.
- configuring the ULTRIX-SFP-IO ports, refer to **“ULTRIX-SFP-IO Setup”**.
- the ULTRIX-MODX-IO blades, refer to the **ULTRIX-MODX-IO User Guide**.
- the audio features, refer to **“Configuring an Audio Matrix”**, **“ULTRIMIX-MXR”**, and **“Ultrimix-Dante Setup”**.

## Configuring an AUX Port

The various SFP modules available for ULTRIX-FR12 provide SFP+ slots for expansion of the ULTRIX-HDX-IO blade. Refer to the **Ultrix SFP Modules Guide** for a list of available SFP modules from Ross Video.

Keep the following in mind:

- The ULTRIX-SFP-IO blade only supports MADI in the AUX A and AUX B ports.
- The ULTRIX-IP-IO blade only supports Ultriscape outputs (SDI video) on AUX 1 and AUX 2.
- The ULTRIX-IPX-IO blade only supports Ultriscape outputs (SDI video) on AUX A and AUX B.
- The AUX B port on the supported blades is required by the UltraStream license. Refer to **“UltraStream Setup”** for details.
- The AUX C port on the supported blades is by for the Ultrimix-Dante license. Refer to **“Ultrimix-Dante Setup”** for details.

## Before You Begin

You will also need to install an:

- UltraSpeed license for each slot that includes an SFP-HDB-IN-12G and/or SFP-HDB-OUT-12G.
- UltraScape license for each AUX port that will be used to provide an UltraScape head output.
- UltraSRC license for each AUX port configured for asynchronous MADI input.
- The UltraStream and the Ultrimix-Dante licenses cannot be enabled on the same slot. By enabling an Ultrimix-Dante license on a slot, you will be prevented from enabling an UltraStream license on that slot until you disable the applied Ultrimix-Dante license. Specifying the SFP Type

Once the SFP module is installed in a port, you must specify the port type. Select SDI Video for video SFP types, or MADI for audio SFP types. MADI audio SFP types allow you to specify the channel quantity (either 56 or 64) as per your facilities' standard.

The **SFP Configuration** interface is organized into two sub-tabs: AUX Ports, and SFP Ports. The AUX Ports tab lists all the AUX port settings for all blades in the ULTRIX-FR12 chassis. The SFP Ports tab lists all the ULTRIX-SFP-IO blade port settings.

---

1. SMPTE standard rates.  
2. Requires the UltraSpeed license.

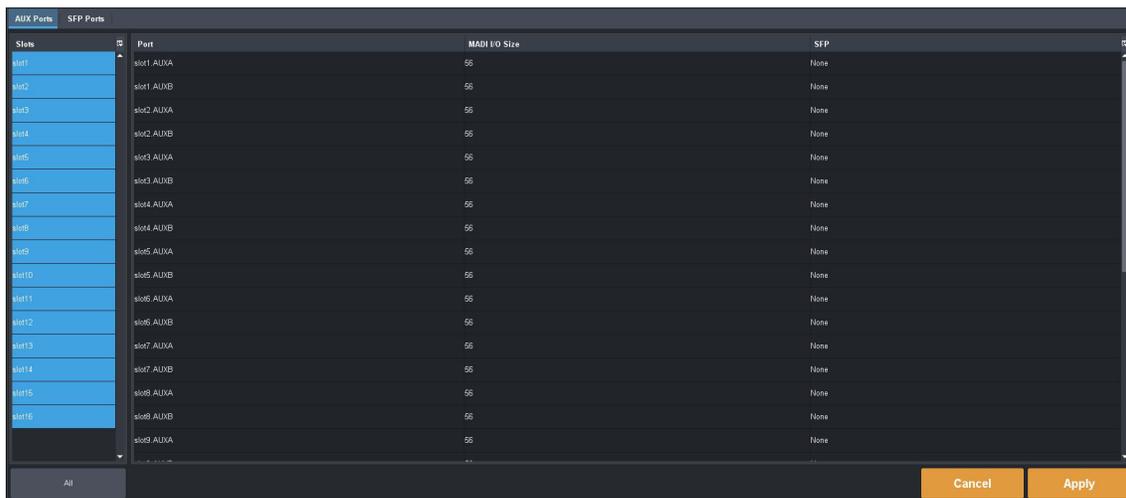
### For More Information on...

- configuring the SFP ports, refer to “**ULTRIX-SFP-IO Setup**”.

### To specify the port function

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select  .

The **SFP Configuration** page opens with the AUX Ports tab automatically selected.



| Slot   | Port       | MDI I/O Size | SFP  |
|--------|------------|--------------|------|
| slot1  | slot1_AUXA | 55           | None |
| slot2  | slot1_AUXB | 55           | None |
| slot3  | slot2_AUXA | 55           | None |
| slot4  | slot2_AUXB | 55           | None |
| slot5  | slot3_AUXA | 55           | None |
| slot6  | slot3_AUXB | 55           | None |
| slot7  | slot4_AUXA | 55           | None |
| slot8  | slot4_AUXB | 55           | None |
| slot9  | slot5_AUXA | 55           | None |
| slot10 | slot5_AUXB | 55           | None |
| slot11 | slot6_AUXA | 55           | None |
| slot12 | slot6_AUXB | 55           | None |
| slot13 | slot7_AUXA | 55           | None |
| slot14 | slot7_AUXB | 55           | None |
| slot15 | slot8_AUXA | 55           | None |
| slot16 | slot8_AUXB | 55           | None |
| slot17 | slot9_AUXA | 55           | None |

7. From the **Slots** table, select the router slot for the port you want to configure.  
The tab updates to display a list of available ports based on the slot(s) selected.
8. Locate the row for the port you want to configure.
9. In the **SFP** column, specify the function of the port.  
★ The available options depend on the license(s) enabled on each slot and the type of blade.
10. Click **Apply** to save your changes.

## Loss of Input Signal

If the input signal is absent, the output is automatically set to SDI black and ULTRIX-FR12 uses the last known and valid video format detected on the output. This feature is similar to a “squelch” control. High-speed digital devices will try to lock to any signal. If there is no direct input, they will try to equalize noise (to a point), possibly resulting in down-stream equipment having issues with a non-valid SDI stream. If there is a router input that is either not terminated, or the upstream device outputs a non-valid signal, then the input is forced to SDI black.

# UltraSync Configuration

UltraSync allows the re-timing of asynchronous or time offset input signals to the frame reference. UltraSync is a per input feature and requires a license for each input that will be used by the UltraSync.

## Licenses Overview

There are two license types that are based on the data rates.

### UltraSync

This license allows for SDI data rates up to 3Gbps (1080p). This license is available on AUX A, AUX B, and Inputs 1-16 (a maximum of 18 ports).

### UltraSync-UHD

This license allows the Frame Sync to operate at up to 12Gbps (2160p) data rates. This license is available for the ULTRIX-HDBNC-IO, ULTRIX-HDX-IO, or ULTRIX-SFP-IO blades only.

- This license is available on 3 inputs per ULTRIX-HDBNC-IO or ULTRIX-SFP-IO blade:
  - › AUX B or Input 1
  - › Input 5 or Input 6
  - › Input 11 or Input 12
- On the ULTRIX-HDX-IO, this license is provides the following port assignments (with a maximum of 16 ports):
  - › AUX A or Input 1, Input 2-4
  - › AUX B or Input 5, Input 6-8
  - › AUX C or Input 9, Input 10-12
  - › AUX D or Input 13, Input 14-16

## Before You Begin

Ensure to:

- Monitor the video input signals via the **Timing Lines** and **Timing Pixels** fields in the **Port Configuration** page. These fields report the amount of detected timing offset (in lines and pixels respectively) between the incoming signal and the frame reference signal. The timing fields are updated every 15 seconds. This information is useful in deciding where to install an UltraSync license as follows:
  - › If there is an input that is out of time with regards to the frame reference, then it would be beneficial to synchronize it with the frame reference.
  - › If the timing is +/- half-line, then UltraClean can accommodate the synchronization. The amount of pixels per line depends on the video standard being used. For example, 1080p is actually 1920x1080 pixels (nominally) so 1920 pixels makes one line.
- Install one (or more) UltraSync licenses. Refer to **"Installing a License Key"**.
- Verify that the video source signals are the same format as the frame reference.

## Configuring UltraSync for an Input Port

UltraSync allows configuration of the frame buffer size between 1 frame and 2 frames. Data is clocked out of the buffer using the frame reference, thus timing arbitrarily timed input signals to a common clock. The size of the buffer can determine its resilience to incoming signal disturbances.

### To assign an UltraSync license to an input port

1. Install the license key as outlined in the procedure “**Installing a License Key**”.
2. From the **Device Configuration** interface, select .  
The **License** page displays with the **License Keys** tab selected.
3. Select the **UltraSync** tab.  
Each row in the tab represents a port on the ULTRIX-FR12 with each column a type of UltraSync license.
4. Select the box in the applicable **License** column for the port you want to enable an UltraSync license for.

### To configure the UltraSync settings for an input port

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
  2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
  3. Expand the **Systems** sub-node.
  4. Expand the **Configuration** sub-node.
  5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
  6. Select .
  7. In the **Physical Address** column, locate the row for the input port you wish to configure.
  8. In the **FrameSync Delay** column, select the buffer size for the required port. Choose from the following:
    - **1 frame** — ensures a short delay (up to 1 frame) in router throughput, but is susceptible to incoming stream disturbances like a non-clean upstream switch.
    - **2 frames** — delays the signal between 1 and 2 frames depending on signal to reference timing offset. If an incoming signal is corrupted at a line or single frame rate, then a 2 frame buffer can repeat the last known good frame for the corrupted frame thus ensuring a clean output.
- ★ If there is a 1 or 2 frame timing difference between the audio and video, try setting the FrameSync Delay to 1 frame to minimize the difference.

# UltraClean Configuration

UltraClean allows users to enable a Clean Switch mode and apply a line buffer (delay) on a per output basis. Incoming video is buffered based on the timing of the input, and is then output based on the timing of the ULTRIX-FR12 system reference (including any offsets added in the Triggers setup). Users can then switch between inputs that are not perfectly co-timed without perceiving any glitches of the incoming data. Video source timing must remain within the buffer to properly switch between sources (buffer depth is user-configurable).

## Before You Begin

Ensure that:

- All video sources must be the same video format, locked to the same reference, and vertically timed to within the selected Clean Switch window.
- Reference triggers are correctly configured. The trigger format for the selected trigger must match the input video format or an equivalent custom trigger set up to comply with RP-168 Switch point. Refer to “**Configuring a Reference Trigger for the ULTRIX-FR12**” for details on setting up a reference trigger.

## Notes on Timing

It is possible that you may find a discrepancy on an output from ULTRIX-FR12 when trying to set the horizontal time to zero with respect to the reference.

This is because there is a certain amount of latency through the ULTRIX-FR12 router even with Clean Switch disabled for the port. Due to our industry leading internal processing engine which supplies advanced features, a certain amount (though minimal) of delay should be expected. This should not pose a problem for most digital downstream equipment. If you do encounter a problem, we recommend using an external line sync device (such as our SFS-8622 openGear card) to zero time the ULTRIX-FR12 output.

While it may be technically possible to zero time (horizontally) the output of the ULTRIX-FR12 router, it is not recommended for the following reasons:

- While you can zero time the output if you disable Clean Switch for that output, there will still be a large timing window that you have to exceed in order to get the output timing to re-sync. This is due to the line sync is always enabled even though it is put into a very low line length mode (resulting in a small the timing window). As a result, every timing adjustment applied to the input is ignored on the output until the window is exceeded. Once it is exceeded, the output timing jumps. You will need to adjust the timing incrementally until the timing is set to zero. This is further complicated during a power cycle where the timing may not be exactly zero as the window may have moved slightly on re-boot.
- The frame syncs output timing is hard coded to match the timing of a synchronous input that is zero timed at the input to the router.

It is recommended that all synchronous inputs to the router be zero timed to the inputs of the router instead of trying to zero time the router outputs.

## Configuring Clean Switch Mode for an Output Port

The Clean Switch mode uses the input signal timing to decide when a frame of active picture begins.

### To configure the Clean Switch mode for an output port

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .
7. In the **Physical Address** column, locate the row for the output port you wish to configure.
8. To enable Clean Switch mode for an output, select the **Clean Switch** box for the output you want to configure.
9. Use the **Clean Switch Mode** menu to specify timing source. Choose from the following:
  - **Reference** — The Clean Switch is based on the reference signal available on the REF port of the router.
  - **Input** — The Clean Switch is based on the input signal available on the specified port of the router.

### To configure the Clean Switch timing window

1. Navigate to the **Port Configuration** interface as outlined in the procedure “**To configure the Clean Switch mode for an output port**”.
  2. In the **Physical Address** column, locate the row for the output port you wish to apply a delay to.
  3. Click in the **Clean Switch Delay** cell for the output you want to configure.  
A drop-down menu displays.
  4. Use the drop-down menu to specify the buffer size to apply.
- ★ This will effectively delay the signal up to the amount specified minus signal-to-reference offset for a maximum delay of the chosen setting.
  - ★ Select Full Line to add one full line of delay to the output. This will align the output horizontally with the reference but with one full line delayed vertically (two lines when using 3G Level B). This option is useful if you want a horizontally timed output.

# UltraSRC Configuration

The UltraSRC license is a per port license enabling Sample Rate Conversion for MADI audio inputs. The sample rate conversion will re-sample incoming MADI up to 48kHz. This allows MADI sources that are not reference locked to the ULTRIX-FR12.

## To assign an UltraSRC license to an input port

1. Install the license key as outlined in the procedure “**Installing a License Key**”.
2. From the **Device Configuration** interface, select .
3. Select the **UltraSRC** tab.

Each row in the tab represents a physical AUX SFP port on the ULTRIX-FR12. Each column in the second table represents a type of licensed feature and indicates whether it is enabled for that input.

4. Select the box in the **License** column for the physical port you want to enable an UltraSRC license for.



# Ultrix-Dante Setup

The Ultrix-Dante license provides 64 x 64 input/output audio channels accessible via ethernet on the AUX C port of the ULTRIX-HDX-IO and ULTRIX-MODX-IO blades. It utilizes the Audinate® Dante® proprietary IP-based audio transport system. This chapter provides information on installing the Ultrix-Dante license, and configuring it for the ULTRIX-FR12 routing system.

★ The Ultrix-Dante license requires Ultrix router software version 5.6.0 or higher.

## Overview

The Audinate Dante system provides a centralized control via the Dante Controller, a software application available on Microsoft® Windows® and MacOS®. This system manages the transport over the IP link, and presents users with a cross-connect interface that allows control of the channel routing only. IP control is managed by the Dante controller.

Ultrix identifies the Dante channels as a single pipeline consisting of 64 input and 64 output channels. Ultrix-Dante enables the ULTRIX-FR12 router to include Audinate Dante audio inputs and outputs into the Ultrix routing matrix. Audio sources from a Dante network can be configured as inputs into the ULTRIX-FR12 router. The ULTRIX-FR12 router can also output audio channels to the same Dante network.

The Ultrix-Dante license is supported on the following routers:

- ULTRIX-NS-FR1
- ULTRIX-NS-FR2
- ULTRIX-NS-FR5
- ULTRIX-FR5
- ULTRIX-FR12

★ The AUX B audio channels are not available for use when Ultrix-Dante is enabled on a blade. AUX B can still be used to route SDI video.

## Features

The Ultrix-Dante license provides the following features:

- Licensable on the ULTRIX-HDX-IO and ULTRIX-MODX-IO blades only
- Provides 64 input and 64 output Audinate Dante channels via the AUX C port on the blade
  - › non-redundant only
  - › requires a GigE Copper SFP
  - › on a separate network from UltraStream (the GigE SFP in the AUX D port of the same blade)
- AUX C audio channels are added to the routing database (we recommend separate databases for the AUX B and AUX C maps)
- Sampling Frequency of 48kHz
- Support for the L24, and L16 codecs (linear PCM only)
- Capable of bridging different timing domains between the Dante network and Ultrix reference
- Dante latency (Link-offset) available: 2ms, 3ms, 4ms, 5ms, and 10ms
- IP connection management via the Dante controller
- AES67 mode is enabled by default

## Before You Begin

Ensure the following:

- You have access to the computer running the Dante Controller application to assign audio receivers and transmitters to the Ultrix router blade(s). Refer to the Audinate website for details.
- The AUX C port on the router blade is populated with an **SFP-RJ45-1G** module. Refer to the **Ultrix SFP Modules User Guide** for specifications.
- Your facility IT Department provided the required network settings for each AUX C port you plan to enable for the Ultrimix-Dante license for.
- The UltraStream and the Ultrimix-Dante licenses cannot be enabled on the same slot. By enabling an Ultrimix-Dante license on a slot, you will be prevented from enabling an UltraStream license on that slot until you disable the applied Ultrimix-Dante license.
- When Ultrimix-Dante is enabled on a slot, the UltraSRC license state cannot be changed.
- It is recommended to create separate databases for AUX B and AUX C before installing an Ultrimix-Dante license.
- Ultrimix-Dante utilizes an ASRC (Asynchronous Sample Rate Converter) to bridge the Dante clock domain (PTP) to the Ultrix clock domain. Both the Dante and Ultrix networks have the same 48kHz sampling frequency.

## Installing an Ultrimix-Dante License

Ross Video uses license keys to control user access to specific features. You can obtain a key for a licensed feature from Ross Video Technical Support. Use the key to assign an Ultrimix-Dante license to a supported blade in the Ultrix router.

### To install an Ultrimix-Dante license key

1. Launch the DashBoard client.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node.  
The **Device Configuration** interface opens.
6. Select .  
The **Licenses** page opens with **License Keys** sub-tab automatically selected.
7. Make a note of the character string in the **Request Code** field for the Ultrimix-Dante license.
8. Contact Ross Video Technical Support using the information listed in “**Contacting Technical Support**”.
  - a. When you speak to your Technical Support representative, tell them your name, your facility name, and the **Request Code** from step 7.
  - b. You will be given a License Key for the Ultrimix-Dante.
9. Enter the provided License Key in the applicable **License Key** field of the **Licenses** tab.
- ★ You can also right-click on the row for the License Key you are installing, copy the Request Code to or paste the License Key from the Microsoft Windows clipboard, and click **Yes**.
10. Click **Apply** in the row for the License Key you entered in step 9.
11. Verify that the **Count** field is updated to report each installed Ultrimix-Dante License Key.

## To activate an Ultrimix-Dante license for a specific slot

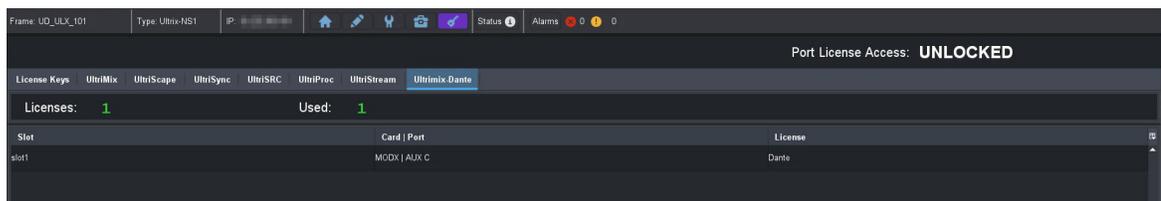
1. In the **Licenses** interface, select the **Ultrimix-Dante** sub-tab.

The interface is organized into a table with three columns. The left column (Slot) lists the available slots that the license can be assigned to. The center column (Card | Port) lists the type of blade and the port name. The right column (License) provides the option to enable/disable the license for the specified slot.

- ★ All Dante capable blades use the AUX C port for Ultrimix-Dante.
2. Verify that the top **Licenses** read-only field reports the total number of purchased Ultrimix-Dante licenses for the router.
  3. In the table, locate the row for the slot you wish to enable the Ultrimix-Dante license.

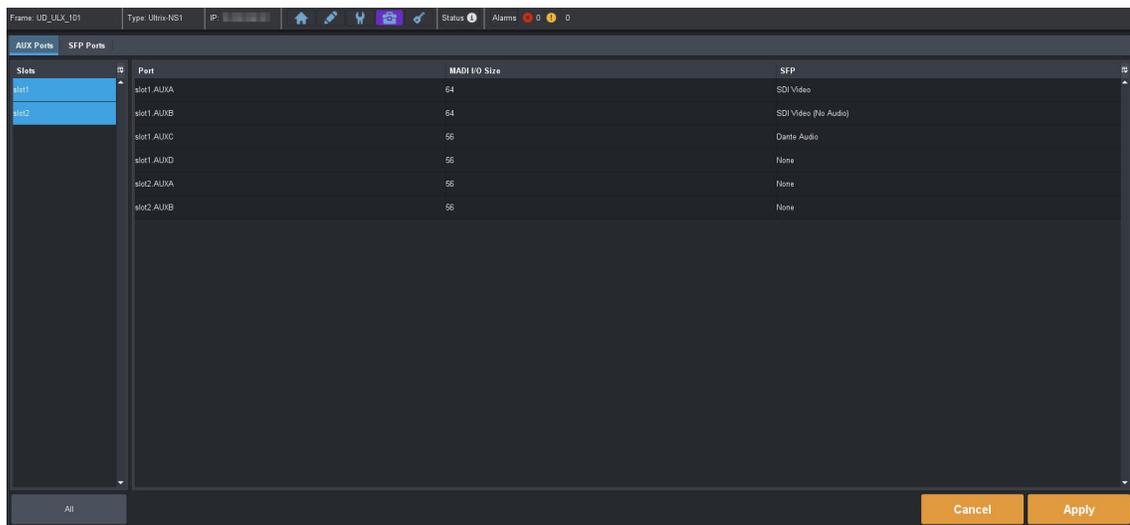
- ★ The FLEX slot of the ULTRIX-FR5 does not support Ultrimix-Dante.

4. Use the **License** column to select **Dante** for the slot.



Once the license is activated on the blade:

- AUX C on the SFP Configuration > AUX Ports interface has its SFP setting set to Dante Audio.
- If AUX B was assigned to SDI Video, there is no change to the SFP setting.
- If AUX B was assigned to MADI, it is now set to None. The SDI Video will still map to SDI Video (but without audio).



## Accessing the Ultrimix-Dante Interface

Once an AUX C port is assigned to Dante Audio, you can access the Ultrimix-Dante settings via the Dashboard **Port Configuration** tab. The Port Configuration > Views > Ultrimix-Dante option for that

slot is now editable. This interface is used to configure the Ultrimix-Dante network settings, view performance metrics, and then monitor it during operation.

### To display the Ultrimix-Dante interface

1. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
2. Expand the **Systems** sub-node.
3. Expand the **Configuration** sub-node.
4. Double-click the **ULTRIX-FR12** node.

The **Device Configuration** interface opens.

5. Select .

The **Port Configuration** page opens.

6. From the Slot toolbar (at the top of the **Port Configuration** page), select the button for the slot you enabled the license on.
7. Perform one of the following:

- Set the **Views** to **Ultrimix-Dante**; or
- Select the **AUX C** port on the blade map of the **Home** page .

The Port Configuration page updates to display the Ultrimix-Dante interface.

### Overview

The Ultrimix-Dante interface is organized into three areas: an I/O map of the selected blade (top), a table listing the configured channels (left pane), and options for configuring and monitoring the Ultrimix-Dante channels for the selected AUX C port (right pane). A toolbar at the bottom reports status messages.

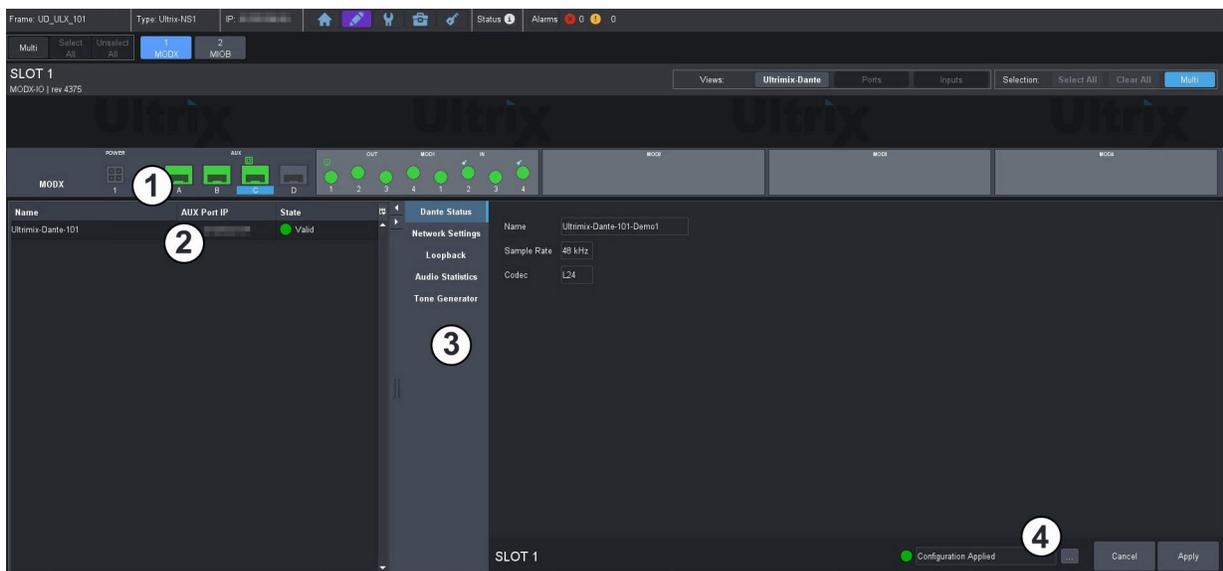


Figure 27 Example of the Port Configuration > Ultrimix-Dante Areas

#### 1. Blade I/O Map

The top includes a map of the ports available on the selected blade. Note that the AUX C port in the UI changes color based on the state of the SFP connection and license status (green when the connection is valid, and red for error conditions). When **View** is set to **Ultrimix-Dante**, the AUX C port is automatically selected on the Blade I/O Map and any other port is not selectable from this map. A small icon displays over the AUX C port when an Ultrimix-Dante license is enabled.

- › A green icon indicates that the license is enabled and the port is populated with a valid SFP module.
- › A red icon indicates that the license is enabled but an SFP module is not plugged into the port.
- › A gray icon indicates that the license is not enabled.

## 2. Status Table

The left panel includes a read-only table that reports the selected slot that includes the licensed Dante channel(s) on AUX C. Refer to **Table 47** for more information.

## 3. Configuration Options

The right panel includes the following tabs:

- › Dante Status — reports read-only information from the Dante Controller.
  - › Network Settings — provides options for configuring the network settings for an AUX C port. Refer to **Table 49**.
  - › Loopback — options for configuring the audio loopback mode for each AUX C port. This is an advanced feature used to troubleshoot your connections.
  - › Audio Statistics — reports read-only information about the Dante receiver and transmitter channels for the AUX C port. This is an advanced feature used to monitor your connections.
  - › Tone Generator — provides options for troubleshooting the Dante channels.
- ★ The Ultrimix-Dante tabs are disabled (grayed out) when a blade is selected that does not have an Ultrimix-Dante license enabled.

## 4. Configuration Status Toolbar

The toolbar is located in the bottom right corner and includes a status field and two buttons.

- › The status field reports the status of changes made in the Ultrimix-Dante tabs and menus. A status indicator can vary in severity from green (valid), yellow (caution), to red (alarm).
- › Select  to view details on the current status message.
- › Click **Apply** to save any changes made to the Ultrimix-Dante tabs and menus.

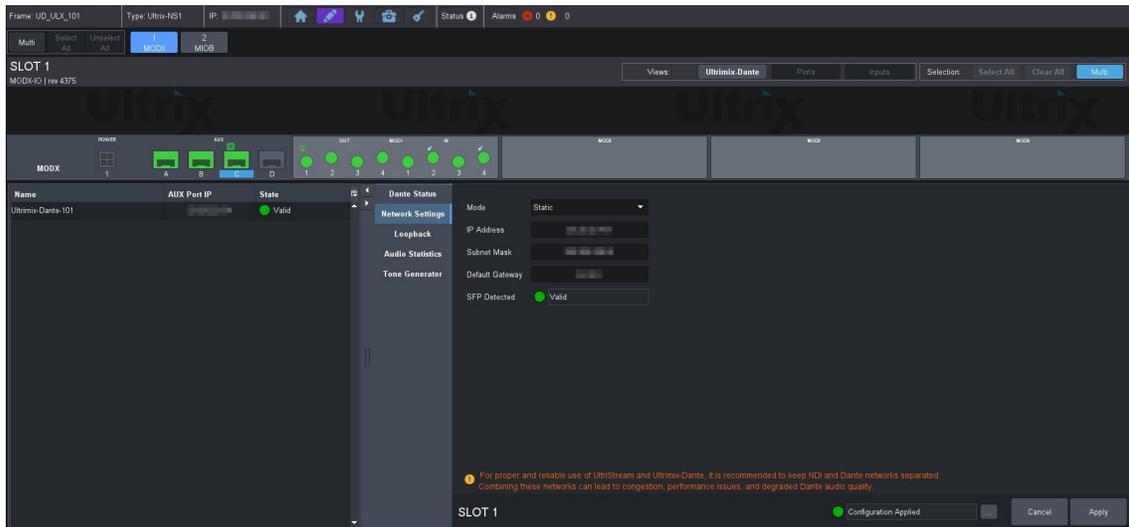
# Network Configuration

The Dante channel are transmitted and received via the **AUX C** port on each supported Ultrix blade. This first requires you to specify how the IP address for the port is assigned (Static or DHCP). Both methods are described below.

- ★ When using UltraStream and Ultrimix-Dante, ensure that your NDI and Dante networks are separated. Combining these networks can lead to congestion, performance issues, and degraded Dante audio quality.
- ★ Contact your network administrator if difficulties or problems are experienced when assigning IP addresses.

### To configure the network settings for the AUX C port

1. Display the Ultrimix-Dante interface as outlined in “**To display the Ultrimix-Dante interface**”.
2. Select the **Network Settings** sub-tab.



3. If you are manually configuring the network settings:
  - a. Use the **Mode** menu to select **Static**.
  - b. Use the **IP Address** field to specify the new static IP Address for the AUX C port.  
This is the IP Address that is used by the ULTRIX-FR12 router in the Dante network.
  - c. Use the **Subnet Mask** field to specify the subnet mask for the AUX C port.
  - d. Use the **Default Gateway** field to specify the gateway for communications outside of the local area network (LAN) the ULTRIX-FR12 will use.
4. If you want the network settings for the AUX C port to be automatically obtained, and DHCP service is available on your control network, select **DHCP** from the **Mode** menu. This is the default mode.
- ★ Verify that a DHCP server is running in your network before setting the Mode to DHCP.
5. Verify that the **SFP Detected** field reports that a supported SFP module is installed in the AUX C port and its status is valid.
6. Click **Apply** to save the new settings.

## Configuring a Dante Connection

This section briefly outlines how to establish communication between the ULTRIX-FR12 router and your Dante network. It is recommended to consult the Dante Controller user documentation for configuration details.

### Assigning Dante Channels to the ULTRIX-FR12 Router

This section briefly outlines how to use the Dante Controller software to route the IP audio channels, select the Codec protocol, and configure the latency settings for the ULTRIX-FR12 connection.

#### To configure the Dante controller settings for Ultrix-Dante

1. Launch the **Dante Controller** application.
2. Select the **Routing** tab.

The Dante Controller window displays a matrix of Dante Receivers and Dante Transmitters.

- Dante Receivers — all the destinations on the Dante network that you can route audio to.
  - Dante Transmitters — all the sources on the Dante network that you can route audio from.
3. On the matrix, select the audio source (Transmitter) that you want to route to the destination (Receiver) by clicking on the box where they intersect.

A check-mark is shown to confirm that the routing has been made.

4. Display the **Device View** for the Ultrix router.
5. Select the **Device Config** tab.
6. Assign the Codec and Latency values as required by your routing system.

## Audio Routing Overview

Once Ultrimix-Dante is configured, and connections are made via the Dante Controller, you can route the audio channels via the Ultrix database. This is done like any other routing on Ultrix as follows:

- The Dante audio channels are made available via AUX C.
- The AUX B audio channels will not be available while Dante channels are in use.
- This will be reflected by an addition of AUX C channels for SOURCES and DESTS in the Ultrix database and issuing take errors for AUX B connections when Ultrimix-Dante is enabled.

### For More Information on...

- databases for your routing system, refer to the ***Ultrixcore Ultrix Database Guide***.

## DashBoard Menus Overview

This section briefly summarizes the read-only fields, menus, and editable fields available when an Ultrimix-Dante license is applied to a supported router blade, and the **Views** is set to **Ultrimix-Dante**. (Figure 28)

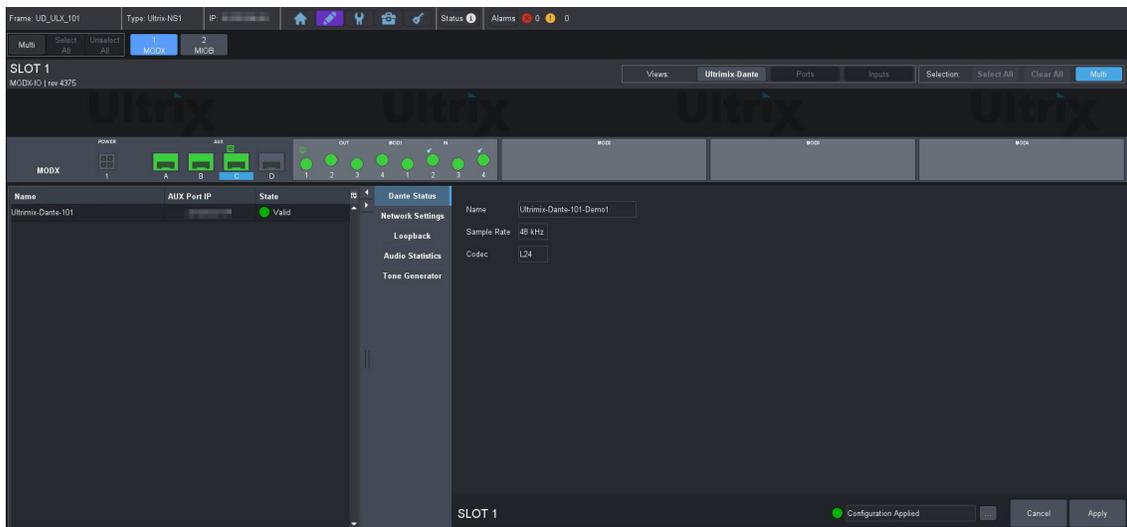


Figure 28 Example of the Ultrimix-Dante > Dante Status Tab in Dashboard

## Status Table

**Table 47** summarizes the read-only fields displayed in the table located in the left pane of the **Port Configuration** tab.

**Table 47 Ultrimix-Dante — Status Table**

| Item        | Parameters  | Description  |
|-------------|---|--|
| Name        | Reports the identifier assigned to the Dante connection |  |
| AUX Port IP | Reports the IP address assigned to this AUX C port      |  |
| State       | Green   | <ul style="list-style-type: none"><li>• The Ultrimix-Dante license is enabled</li><li>• A valid SFP module is installed in this AUX port</li><li>• The link for the AUX C port is valid</li><li>• The Dante connection is operating correctly without errors</li></ul> |
|             | Red   | The Ultrimix-Dante license is enabled but an SFP is not installed in this AUX C port   |
|             | Gray  | <p>One of the following is occurring:</p> <ul style="list-style-type: none"><li>• the Dante connection is no longer valid</li><li>• the Ultrimix-Dante license is not enabled for this slot</li><li>• the Dante connection encountered an error</li></ul>              |

## Dante Status Tab

**Table 48** summarizes the read-only fields displayed in the **Port Configuration > Ultrimix-Dante > Dante Status** tab.

**Table 48 Ultrimix-Dante — Dante Status Tab**

| Item              | Parameters | Description  |
|-------------------|------------|--|
| Name              | <text>     | Reports the name of the ULTRIX-FR12 router within the Dante network  |
| Sample Rate (kHz) | #          | The average number of audio samples sent in a second   |
| Codec             | L16        | Specifies the Codec used to encode the audio data in your Dante network. The Dante Controller labels this value as "Encoding". |
|                   | L24        |  |

## Network Settings Tab

The Network Settings tab is used to the AUX C port for communication on the Dante network. This is required before you can stream Dante audio through Ultrimix-Dante.

**Table 49** summarizes the options displayed in the **Port Configuration > Ultrimix-Dante > Network Settings** tab.

**Table 49 Ultrimix-Dante — Network Settings**

| Item                     | Parameters    | Description  |
|--------------------------|---------------|--|
| Mode                     | Static        | The user manually supplies the network settings for the AUX C port   |
|                          | DHCP          | Automates the assignment of the network settings for the AUX C port. This is the default.  |
| IP Address               | #             | Specifies the IP address assigned to the AUX C port. This address is used to communicate with the devices in your Dante network.   |
| Subnet Mask              | #             | Specifies the subnet mask for the AUX C port   |
| Default Gateway          | #             | Specifies the gateway for communications outside of the local area network (LAN)   |
| SFP Detected (read-only) | Valid (Green) | The SFP in the AUX C port is supported, correctly installed, and operational   |
|                          | Invalid (Red) | One of the following is occurring with the SFP in the AUX C port: <ul style="list-style-type: none"> <li>• the SFP does not support audio streaming</li> <li>• the SFP is not operational</li> <li>• the SFP is not installed correctly</li> </ul> |

## Advanced Features

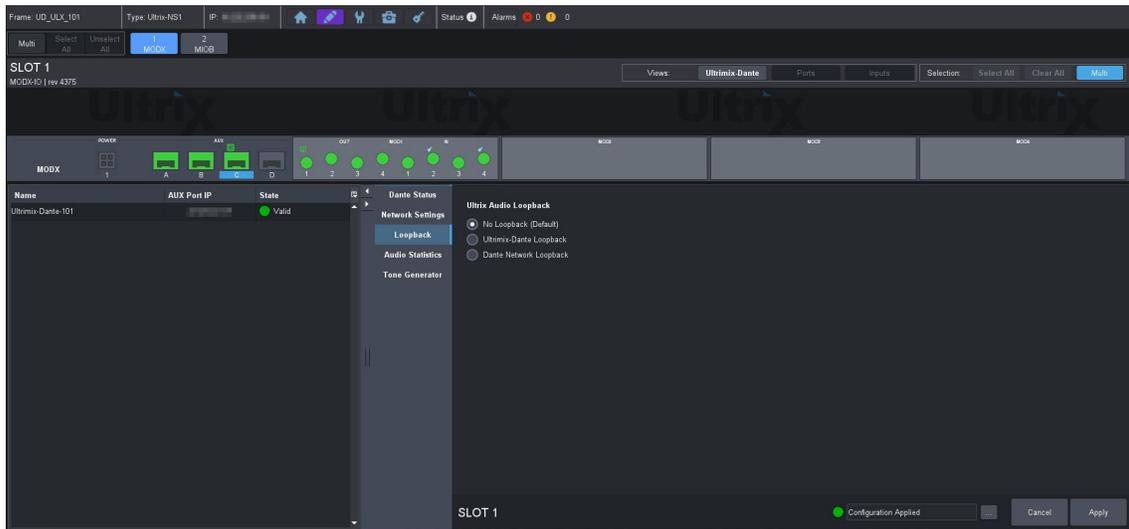
This section briefly outlines troubleshooting and monitoring options for Ultrimix-Dante.

### Configuring the Loopback Mode for Ultrimix-Dante

The Loopback tab allows you to troubleshoot your Dante audio data path by enabling loopback at various points in the Ultrix routing system.

#### To configure the Ultrimix-Dante loopback mode

1. Display the Ultrimix-Dante interface as outlined in **“To display the Ultrimix-Dante interface”**.
2. Select the **Loopback** sub-tab.



3. Select one of the following:
  - **No Loopback** (Default Audio) — The Dante audio channel is not routed back to its source.
  - **Ultrix-Dante Loopback** — the incoming Rx data is routed to the transmitter channel at the recovered clock rate.
  - **Dante Network Loopback** — the incoming Rx data is routed to the transmitter channel as it becomes available.
4. Click **Apply** to save the new settings.

## Monitoring the Audio Status

This **Audio Statistics** tab allows you to monitor communications and status about the Dante network as well as the Dante data path. Enable this tab when monitoring the Dante Controller connection for troubleshooting purposes.

**Table 50** summarizes the read-only information displayed in the **Port Configuration > Ultrix-Dante > Audio Statistics** tab.

**Table 50 Ultrix-Dante — Audio Statistics**

| Item                        | Description   |
|-----------------------------|---|
| Show Metrics                | Determines if the Audio Statistics tab displays the status of the Dante Controller connection. The default is Hide Metrics. |
| Hide Metrics                |   |
| <b>Network</b>              |   |
| Bandwidth (%)               | Reports the amount of audio data the Ultrix router is currently receiving via the Dante network                             |
| Bandwidth (Mbps)            |   |
| Packets                     |   |
| Bytes                       |   |
| Errors                      | Reports the total number of error packets detected on this Dante instance   |
| Drops                       | Reports the total number of dropped packets detected on this Dante instance   |
| <b>Dante Audio (RX, TX)</b> |   |

**Table 50 Ultrimix-Dante — Audio Statistics (Continued)**

| Item                 | Description  |   |
|----------------------|--|---|
| Frame Count          | The number of frames detected in a sample of this Dante audio instance |   |
| FIFO Underflow Alarm | No Alarm (Green)   | Data is being written to the FIFO without errors          |
|                      | Alarm (Red)  | The FIFO cannot provide the requested data as it is empty |
|                      | N/A  | The Dante audio instance is not configured                |
| FIFO Overflow Alarm  | No Alarm (Green)   | Data is being written to the FIFO without errors          |
|                      | Alarm (Red)  | The FIFO is full and new data cannot be written to it     |
|                      | N/A  | The Dante audio instance is not configured                |

## Inserting Test Tones

The **Tone Generator** tab allows you to insert generated tones onto transmit channels as well as verify the status of the generated tone on the receive channel. This is useful for creating an external loopback test where an external device or network sends back the data it receives from Ultrimix-Dante. If required, you can also inject errors into the transmit path to verify if the connections are operating correctly.

**Table 51** summarizes the options displayed in the **Port Configuration > Ultrimix-Dante > Tone Generator** tab.

**Table 51 Ultrimix-Dante — Tone Generator**

| Item   | Parameters   | Description  |
|--|--|--|
| <b>Tone Generator Enable</b>   |  |  |
| Disabled - Default Audio   | Selected   | The Rx and Tx have valid data as configured by the user. This is the default |
| Enabled - Tx Tone Audio  | Selected   | All channels coming out AUX C will include the internally generated tone     |
| <b>Tone Channel Lock Status</b>  |  |  |
| Reports if a valid tone is received on the specified Rx channels, validating that the Tx tone is received correctly. Note that only RX channels 0 and 1 are checked. |  |  |
| Channel #  | Locked (Green)   | Valid tone on Rx channel   |
|  | Unlocked (Red)   | No valid tone on Rx channel  |
|  | Not Configured (Gray)  | Tone is not enabled  |
| <b>Cumulative Channel 1/0 Error Counters</b>   |  |  |
| Reports the error count on the Rx channels. Can be used alone or with Error Injection.   |  |  |
| LSB 4 Bits [0:3]   | Errors are seen on lower bits. This represents a small scale degradation of signal quality.  |  |
| MSB 20 Bits [4:23]   | Errors are seen on higher bits. This represents a significant degradation of signal quality. |  |
| <b>Error Injection</b>   |  |  |

**Table 51 Ultrimix-Dante — Tone Generator (Continued)**

| <b>Item</b>       | <b>Parameters</b>                                  | <b>Description</b>   |
|-------------------|--|--|
|                   |  | Manually Inject Errors on the specified Tx channel. This can be used in conjunction with Error counters above if there exists a remote loopback. |
| Channel Selection | Select the Tx channel to inject the error on       |  |
| Inject Errors     | Injects a single error on the specified Tx channel |  |

# Configuring an Audio Matrix

The UltraMix sub-system provides advanced audio integration, including the ability to embed and de-embed audio on all of the inputs and outputs of the router. Users also have complete flexibility to process, swap, sum, mute, or route any discrete or embedded audio input to any output. UltraMix is perfect for applications where audio is constantly changing, and it can be added as needed without throwing away any initial investment in the system.

The ULTRIX-FR12 includes the following features:

- 16 AES audio channels coming from each input SDI video stream
- Asynchronous processing of all audio channels
- Support for MADI on the AUX ports when a SFP-MADI-COAX, SFP-MADI-850MM, or SFP-MADI-1300MM is installed
- Audio channel status Dolby® bit capture and overwrite capabilities

## Audio Routing Overview

The ULTRIX-FR12 manages high-bandwidth, broadcast-quality, digital video and audio signals, and embedded audio signals. The ULTRIX-FR12 can perform signal processing functions like audio shuffling and insert into and extra from MADI streams.

Each SDI I/O allows for up to 1 stream of 16 channels of 48kHz sampled, 24bit audio, for a total of 16 channels. If there are audio channels that are received at a higher rate than 48kHz, the number of channels is limited.

## Before You Begin

Keep the following in mind when using the UltraMix feature:

- By default, all embedded audio is de-multiplexed at each input and passed through processing (proc-amps) and the audio matrix.
- Each input has an Audio Bypass configuration option. When Audio Bypass is enabled for an input, the audio will follow the SDI regardless of any individual audio channel routing or configuration on the output. The individual channels of a input in Bypass mode are still de-multiplexed and available for audio routing via the audio matrix.
- Re-mapping of all audio channels from source to destination with transitions is available
- Audio processing controls are available for each audio channel (gain, sum, invert, tone insert)
- Audio summing of any two adjacent channel pairs is available (1 + 2, 3 + 4, 5 + 6, etc.)

## Enabling the Audio Matrix

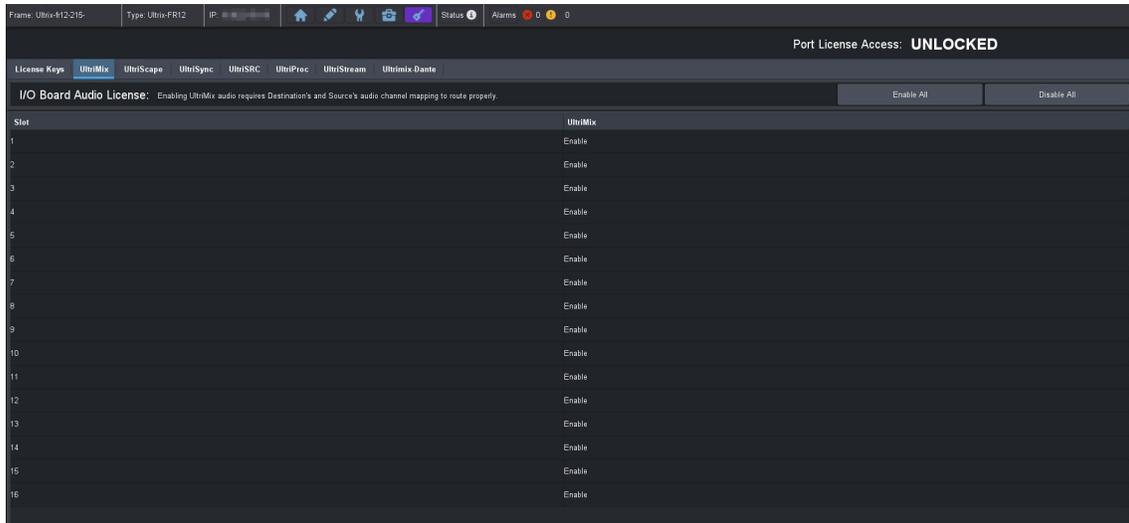
You must enable the audio matrix (UltraMix) before you can map the individual audio channels.

★ It is recommended to enable/disable the UltraMix feature before database configuration.

### To enable the audio matrix

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.

5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select  .  
The **Licenses** page opens with **License Keys** sub-tab automatically selected.
7. Select the **UltraMix** sub-tab.



8. Locate the row for the slot you wish to enable the UltraMix feature for.
9. From the **UltraMix** column, select **Enable**.
10. Repeat steps 8 and 9 as required.

## Audio Matrix Routing and Processing

**Table 52** summarizes the audio mapping options when using SDI embedded audio or MADI signals.

**Table 52 Audio Mapping Options**

| Source        |                          | Destination   |                           | Result  |
|---------------|--------------------------|---------------|---------------------------|---|
| Audio Mapping | Input Proc Amp Available | Audio Mapping | Output Proc Amp Available |   |
| EMB           | ✓                        | EMB           | ✓                         | Switches based on logical configuration (with full breakaway support)   |
| EMB, PT       | ✓                        | EMB           | ✓                         | Switches logical configuration (but passes through each channel defined as pass-through from the SDI input content) |
| EMB, DS       | ✗                        | EMB           | ✗                         | Switches logical configuration (but mutes for each channel that has “disconnect” defined)                           |
| EMB           | ✓                        | MADI          | ✓                         | Follows breakaway operation based on logical mapping  |

**Table 52 Audio Mapping Options (Continued)**

| Source        |                          | Destination   |                           | Result  |
|---------------|--------------------------|---------------|---------------------------|---|
| Audio Mapping | Input Proc Amp Available | Audio Mapping | Output Proc Amp Available |   |
| EMB, PT       | ✓                        | MADI          | X                         | Switches logical configuration (but passes through each channel defined as pass-through from the SDI input content) |
| EMB, DS       | X                        | MADI          | X                         | Switches logical configuration (but mutes for each channel that has “disconnect” defined)                           |
| MADI          | ✓                        | MADI          | ✓                         | Switches based on logical configuration (with full breakaway support)   |
| MADI, PT      | ✓                        | MADI          | X                         | Not Valid   |
| MADI, DS      | X                        | MADI          | X                         | Switches logical configuration (but mutes for each channel that has “disconnect” defined)                           |

### Table Legend

|      |   |
|------|---|
| ✓    | Feature is enabled/available or SDI embedded audio is mapped to audio levels. |
| X    | Feature is not enabled/available or no audio levels are mapped                |
| EMB  | Source or destination is mapped for SDI embedded audio channels               |
| MADI | Source or destination is mapped for MADI audio channels                       |
| PT   | ‘passthrough[1].audio’ is defined for some or all source levels               |
| DS   | ‘disconnect[1].audio’ is defined for some or all source levels                |

### Notes on Using the Audio Bypass

- Selecting Audio Bypass in the Device Configuration interface forces the embedded audio of the input SDI stream to bypass the audio routing section and be routed with the SDI to a Destination for all embedded audio channels.
- Selecting Audio Bypass in the Device Configuration interface for MADI inputs or outputs results in a non-valid situation where MADI channels cannot be routed.

## MADI Overview

Multi-channel Audio Digital Interface (MADI) is the industry standard for the transmission of up to 64 audio channels on a single cable. The ULTRIX-FR12 supports the following SFP module options that provide the ability to route discrete MADI:

- **SFP-MADI-COAX** — the AUX port can receive and transmit MADI signals of 125Mbps over 75Ω coaxial cables via HD-BNC connectors.
- **SFP-MADI-850MM, SFP-MADI-1300MM** — the AUX port can receive and transmit MADI optical signals as defined in SMPTE 297-2006.

### For More Information on...

- the specifications for your SFP module, refer to the **Ultrix SFP Modules Guide**.

### Before You Begin

Ensure an SFP module that supports MADI is physically installed in an AUX port of the ULTRIX-FR12.

- ★ Downstream equipment of the ULTRIX-FR12 MADI output may report signal on all channels due to ULTRIX-FR12 setting status bits. This is to ensure maximum equipment compatibility.

## Configuring an AUX Port for MADI

Each SFP module that supports MADI includes an IN (Rx) connector and an OUT (Tx) connector.

- ★ External MADI devices must be timed to the ULTRIX-FR12 reference signal unless an UltriSRC license is enabled for a given SFP port.

### For More Information on...

- on the input and output connections for your module, refer to the *Ultrix SFP Modules Guide*.

### MADI Inputs

A MADI input source is identified in the routing system using the nomenclature **Frame.Slot.Port.Type.Channel**. For example, `ultrix.slot4.AUXA-in1.audio.ch5` where **AUXA** represents the physical **AUX** port the SFP module is installed, and **ch5** represents Channel 5 in the MADI signal.

- ★ You must define the MADI input channels in the database for your ULTRIX-FR12 to route the individual MADI channels. Refer to the *Ultrixcore BCS User Guide* for details.

### MADI Outputs

A MADI output source is identified in the routing system using the nomenclature **Frame.Slot.Port.Type.Channel**. For example, `ultrix.slot4.AUXB-out1.audio.ch64` where **AUXB** represents the physical **AUX** port the SFP module is installed in, and **ch64** represents Channel 64 in the MADI signal.

- ★ You must define the MADI output channels in the database for your ULTRIX-FR12 to route the individual MADI channels. Refer to the *Ultrixcore BCS User Guide* for details.

## Specifying the Audio Transition Mode

You can specify an audio transition mode for each audio channel output.

### To set the audio transition mode for an audio channel

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .

The **Port Configuration** page opens.

7. Select the I/O Module (slot) containing the output(s) you wish to configure.
8. Select **Outputs** from the **Views** toolbar.

The **Port Configuration** page updates to display the options for the selected outputs.

9. Use the **Transition** field to set the audio transition mode for the audio channel. Choose from the following:
  - **Cut** — The audio input channel is immediately switched to its selected output. A transition to or from Dolby® will always be a Cut transition regardless of what the Transition setting is set to.
  - **V Fade** — The original audio input channel fades down to silence followed by the new input channel fades up from silence to unity gain level.
  - **X Fade** — The original audio input channel fades down to silence as the new input fades up from silence, and both will be mixed.
  - **Cut Fade** — The original audio input channel cuts to silence and the new input fades up from silence to unity gain level.
  - **Fade Cut** — The original audio channel fades down to silence and the new input is cut in at unity gain level.
  - **Quiet Cut** — The original audio channel performs a V Fade transition with a 5ms duration.
10. Use the **Duration** field to specify the length of the audio transition in milliseconds.

## Applying Proc Amps to the Embedded Audio Input

The ULTRIX-FR12 includes Processing Amplifiers (Proc Amps) for the audio inputs. For each audio channel of an input signal, you can set the Bypass Mode, invert selected channels, and sum two adjacent audio channels or apply audio delay. The Proc Amp settings are applied before going through the audio matrix.

### To set up processing of the embedded audio input

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select  .  
The **Port Configuration** page opens.
7. From the ULTRIX-FR12 rear panel map, select the port for the audio input you wish to process.  
The **Port Configuration** tab updates to display the audio options for the selected input.
8. Select the **Audio Bypass** box to prevent breakaway switching of untimed sources. The router will alarm when the audio signal becomes asynchronous to the reference signal provided on the **REF** port of the router.
- ★ Select the **Audio Bypass** box if the input is asynchronous to other inputs. This will avoid any improper mapping of the associated audio channels onto other asynchronous outputs.
9. To apply a gain to a channel, use the associated **Gain** field to select a value between -20dB and 20dB.
10. To invert a channel, select the associated **Invert** box.
11. To sum two adjacent audio channels, select the **Sum** box for the first channel.  
The **Sum** box for the second channel is automatically selected.
- ★ Each selected channel will carry the average of the two input channels  $((A+B)/2)$ . When the input is summed, the original signals are no longer available for output.

12. Apply up to 500ms of delay per channel.
- ★ The audio delay feature requires an UltraSync license applied to the port.
13. If required, repeat steps 7 to 12 for each audio input you want to configure.

## Applying Proc Amps to the Embedded Audio Outputs

The ULTRIX-FR12 also includes Processing Amplifiers (Proc Amps) for the audio outputs. Proc Amp adjustments are applied in the following order:

1. **Gain** — This option provides a +/- 20dB gain range in 0.50dB increments. If you have added a gain to an input channel, the gain value specified for the output channel is an addition. For example, if you set the gain for an input to 10dB, then specify a gain of 2dB on the output, the total gain will be 12dB on the final output.
2. **Invert** — This option enables you to invert the polarity of the audio signal for the selected channel.
3. **Sum** — This option enables the selected channels to carry the average of the specified channels  $((A+B)/2)$ .

### To configure the embedded audio outputs

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .  
The **Port Configuration** page opens.
7. From the ULTRIX-FR12 rear panel map, select the port for the output you wish to configure.  
The **Port Configuration** interface updates to display the audio options for the selected output.
8. Use the **Trigger** menu to specify which reference signal trigger to use. Refer to “**Configuring a Reference Trigger for the ULTRIX-FR12**” for details.
9. To apply a gain to a channel, use the associated **Gain** field to select a value between -20dB and 20dB.
10. To invert a channel, select the associated **Invert** box.
11. To two adjacent audio channels, select the **Sum** box for the first channel.  
The **Sum** box for the second channel is automatically selected.
- ★ Each selected channel will carry the average of the two channels  $((A+B)/2)$ . When the output is summed, the original signals are no longer available for output.
12. To insert a test tone into a channel:
  - a. Use the **Tone Freq** menu to specify the type of test tone to embed in the output.
  - b. Use the **Tone Mode** menu to enable test tones for that channel.
13. Repeat steps 7 to 12 for each channel you wish to configure.

# ULTRIMIX-MXR

The ULTRIMIX-MXR licensed feature is a virtual audio mixer that can be configured up to 128×64. It can be partitioned into smaller mixers so you can have multiple instances within the frame.

The ULTRIMIX-MXR has access to every input in the system, and its outputs can be routed to any output in the frame, providing tremendous flexibility for audio work-flows. Each input has a 4-band parametric equalizer, noise gate and compressor/limiter. In addition, ULTRIMIX-MXR has 128 direct outputs for simple audio processing as part of its standard feature set. It is controllable via a DashBoard user interface as well as application-specific panels for both the Ultritouch-2 and Ultritouch-4 control panels.

★ The ULTRIMIX-MXR licensed feature is enabled and configured on the ULTRIX-FR12 via its DashBoard interface. An Ultricore BCS is required to route the outputs.

## Key Features

- Licensed in 32×16 blocks
- Multiple licenses can be purchased to build a maximum size of 128×64
- 4 Band Parametric EQ per input
- Noise Gate per input
- Compression/Limiter per input
- DashBoard control
- Ultritouch-2 and Ultritouch-4 panel support

## Flexible Mapping

Any Ultrix audio input (embedded SDI, MADI, or IP based) may be routed to any mixer input, and any mixer output may be routed to any audio output channel. You may route any audio signal within Ultrix via any mixer input. Also, the mixer outputs may be routed to any Ultrix audio destination, including back into the mixer.

Each ULTRIMIX-MXR license provides an I/O (Input/Output) block of 32 inputs by 16 outputs. A maximum of 4 licenses provides an I/O block of 128 inputs by 64 outputs. The ULTRIMIX-MXR may be partitioned into smaller blocks to provide multiple small audio mixers.

**Figure 29** is an example of one audio mixer (one license) with 64 stereo inputs (128 channels) and 32 stereo outputs (64 channels). **Figure 30** is an example of partitioning to obtain two smaller independent ULTRIMIX-MXR I/O blocks. Each partition is stereo 32×16.

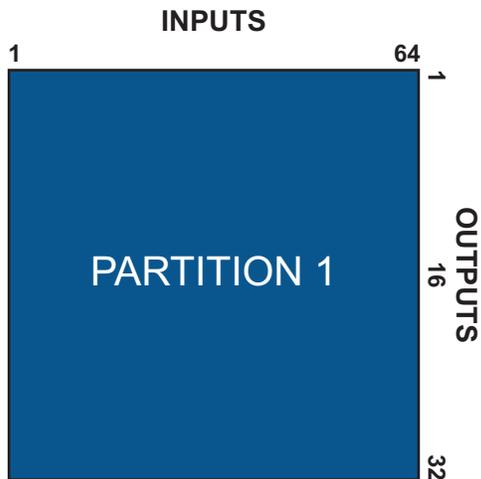


Figure 29 One Audio Mixer — 64x32

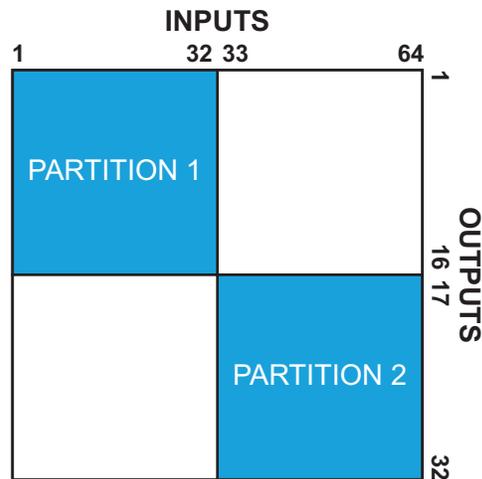


Figure 30 Two Audio Mixers — Each 32x16

## Soft Panels

An Audio Mixer soft panel type allows for real-time adjustment of audio levels and audio processing, and provides a familiar interface similar to other audio consoles. The Home View of an audio mixer soft panel is divided into channel strips. **(Figure 31)**

★ Each channel strip is a stereo pair (i.e. two audio channels). Similarly, each output bus is a stereo pair.



Figure 31 Example of an Audio Mixer (Desktop) Soft Panel

## Setup Overview

The following sections summarize how to set up an audio mixer soft panel. This requires you to:

1. Install a ULTRIMIX-MXR license(s) for each audio mixer partition you require.
2. Specify the audio mixer I/O partitions.
3. Create sources and destinations with audio mixer I/O mappings.
4. Load the audio mixer soft panel to your desktop or an Ultritouch panel.

## Installing the License Key for an Audio Mixer

Install the ULTRIMIX-MXR software license for the ULTRIX-FR12 as outlined in “Installing a License Key”.

## Configure the Audio Mixer I/O Partitions

Each ULTRIMIX-MXR license provides a block of audio mixer Inputs and Outputs (I/O). The block size is determined by how many ULTRIMIX-MXR licenses are enabled. This I/O block may be partitioned to create smaller independent mixers.

For example, an Ultrix with all four ULTRIMIX-MXR licenses enabled will yield a single audio mixer with an I/O matrix of 64 stereo inputs × 32 stereo outputs. The **Device Configuration** interface in DashBoard enables you to create the following matrices based on how you want to partition the inputs and outputs:

- 1 Mixer where the mixer is a 64×32 (stereo)
  - 2 Mixers where each mixer is a 32×16 (stereo)
  - 4 Mixers where each mixer is a 16×8 (stereo)
  - 8 Mixers where each mixer is a 8×4 (stereo)
- ★ It is strongly recommended to configure your audio mixer partitions at the same time as configuring the other ports for your router. Changes to mixer partition is a major operation due to existing mixer I/O maps in sources and destinations are no longer valid, and mixer partition assigned to a mixer panel may no longer be available.

## Master and Monitor Outputs

Each partition has two defined outputs named Master and Monitor. The physical outputs the Master and Monitor buses are assigned to is user configurable. By default, Master is assigned to the first output bus and Monitor is assigned to the last output bus of the partition.

For example, an Ultrix with one ULTRIMIX-MXR license allows a single block of 32×16 audio mixer I/O. This equates to a possible mixer with 16 stereo inputs and 8 stereo outputs, or buses. By default, a single partition on this I/O block will set the Master bus to mixer I/O OUT 1 and the Monitor bus to OUT 8.

With Master set to bus OUT 1 and Monitor set to bus OUT 8, this leaves the remaining 6 outputs as Auxiliary (AUX) buses.

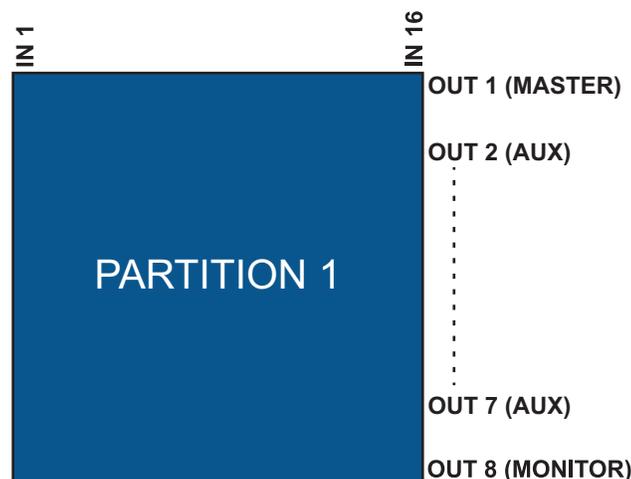


Figure 32 Master and Monitor Outputs within a Partition

The Master and Monitor buses operate in conjunction as follows;

- The Monitor bus follows the Master unless a channel strip has SOLO activated.
- When no channel strip SOLO is activated, the Monitor bus has the same audio mix as the Master bus.
- When a channel strip SOLO is activated, the Monitor bus mutes other channels except for those in SOLO mode. The SOLO button is highlighted (this applies whether the active bus is Master or an AUX).
- Any Master channel strip with SOLO activated does NOT affect the Master bus.
- Multiple channel strip SOLOs are allowed, and they all appear in the Monitor simultaneously.
- Selecting the SOLO Clear button will clear all currently active SOLO channel strips.

The SOLO mode on an auxiliary bus operates differently as there is no specific monitoring bus output for the Auxiliary buses.

- Any channel strip with SOLO activated will MUTE the other channels on that AUX bus.
- When an AUX strip SOLO is activated, the Monitor bus has the same audio mix as an AUX bus with SOLO activated.

## Configure the Audio Mixer Partitions

The number of default partitions is determined by the license key you installed.

### To configure an audio mixer partition

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .  
The **Frame Configuration** page opens.
7. Select the **Audio Mixer** tab.
8. Click **Audio Mixer Partitions**.
9. Use the **Mixer Partition** menu to specify the number and types of audio partitions you require.
10. Click **Apply**.

## Mapping the Sources and Destinations for the Audio Mixer

An Audio Mixer Fill Tool is provided in the Destination and Source interfaces to help quickly map the audio mixer I/O. The Audio Mixer Fill tool enables you to specify:

- one or more partitions to create destinations/sources based on the I/O available in those selected partition(s).
- the starting audio level for the I/O mapping for each destinations/sources.
- how many audio levels for each destinations/sources.
- a prefix for each destinations/sources and a starting number (if there are more than one destination).

## Before You Begin

When mapping your audio mixer I/O:

- **Mixer Inputs** (channel strips) are mapped to **Router Destinations**
- **Mixer Outputs** (output strips) are mapped to **Router Sources**

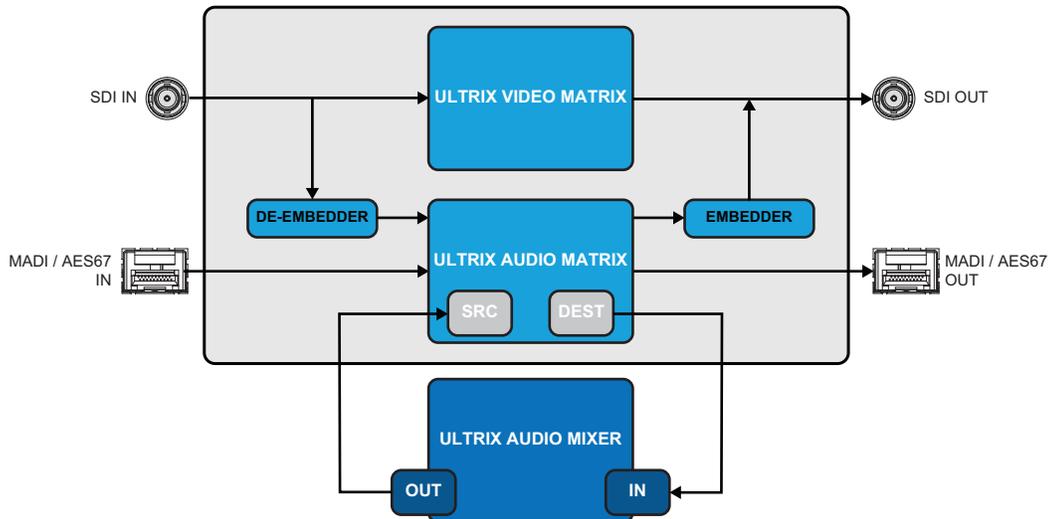


Figure 33 Block Diagram of Mapping Audio Mixer I/O to Router Destinations and Sources

## Mapping the Router Destinations to the Audio Mixer Inputs

The Audio Mixer Fill Tool prevents a user from mapping I/Os from two different mixers into one logical matrix since each source/destination can have I/O mappings from only one mixer partition.

By default, the Audio Mixer Fill Tool assigns consecutive mixer inputs across the table starting at the defined Starting Level and continuing each level column for the channels per Destination quantity. Note the chosen Channels per destination setting will impact the total number of logical labels created. For example, when creating mixer input logical label for a 64x32 mixer, a setting of Quad will result in 32 logical destinations (mixer inputs) created or 32 destinations x 4 levels (Quad) with 128 mixer inputs (64 stereo channel strips).

- ★ When mapping stereo pairs, each channel strip in the soft panel Home View represents a stereo pair with the first strip automatically assigned to the first pair of the selected partition. For example, slot0.mixer-in[1] and slot0.mixer-in[2] is mapped to Channel strip 1, and slot0.mixer-in[3] and slot0.mixer-in[4] is mapped to channel strip 2 etc. This is also true for the mixer outputs.

### To map the destinations to the audio mixer

1. Display the Database nodes as outlined in the *ULTRICORE BCS User Guide*.
2. Double-click the **Destinations** sub-node.
3. Select an entry point in the **Destinations** tab from where the new audio mixer assignments will begin.
4. Click **Edit > Audio Mixer Fill**.  
The **Fill Audio Mixer** dialog opens.
5. Select the **Include** box for each audio mixer partition you want to add router destinations for.
6. Use the **Starting Level** field to specify the starting audio level for the I/O mapping for each destination.
7. Use the **Channels per Destination** menu and field to specify how many audio levels for each destination.

- ★ If you selected **Custom**, use the provided field to specify the number of audio levels for each destination.
- 8. When mapping multiple destinations, specify a prefix for each destinations and a starting number as follows:
  - a. Select **Insert New Destinations**.
  - b. In the **Name** field, type a label prefix. Enter a trailing space to ensure a space between the prefix and the numerical counter.
  - c. Use the **Starting** menu to select the cell of the row for the entry point. The new entries will be inserted *below* this row.
- 9. Click **Apply**.

The dialog closes and the **Destinations** tab updates with the newly created and insert labels with assignments.

## Mapping the Router Sources to the Audio Mixer Outputs

- ★ When mapping sources, ensure to use the same mixer partition(s) that was selected in step 5 of **"To map the destinations to the audio mixer"**.

### To map the inputs for an audio matrix

1. Display the **Database > Sources** node as outlined in the *Ultrixcore BCS User Guide*.
2. Select an entry point in the **Sources** tab from where the new audio mixer assignments will begin.
3. Click **Edit > Audio Mixer Fill**.

The **Fill Audio Mixer** dialog opens.
4. Select the **Include** box for each audio matrix you want to add router source to.
5. Use the **Starting Level** field to specify the starting audio level for the I/O mapping for each source.
6. Use the **Channels per Source** menu and field to specify how many audio levels for each source.
- ★ If you selected **Custom**, use the provided field to specify the number of audio levels for each source.
7. When mapping multiple sources, specify a prefix for each source and a starting number as follows:
  - a. Select **Insert New Source**.
  - b. In the **Name** field, type a label prefix. Enter a trailing space to ensure a space between the prefix and the numerical counter.
  - c. Use the **Starting** menu to select the cell of the row for the entry point. The new entries will be inserted *below* this row.
8. Click **Apply**.

The dialog closes and the **Sources** tab updates with the newly created and insert labels with assignments.

## Using an Audio Mixer Soft Panel

By default, two audio mixer soft panels are available for use in the ULTRIX-FR12 > System > Control tree:

- **Audio Mixer** — a soft panel suitable for a desktop monitor where multiple rows of channel strips are possible.
- **4RU Audio Mixer** — a soft panel formatted for an Ultritouch-4 hard panel.

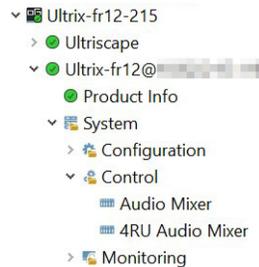


Figure 34 Example of the Device Tree View

Keep the following in mind:

- The audio mixer soft panel does not display a **Take** button. A crosspoint switch occurs automatically after each destination/source selection is made by the user on the soft panel.
- For consistent crosspoint status reporting, the levels for an audio mixer soft panel are assigned to database audio levels only.
- the Drawer window is populated with a right-side **Mixer Output** window, a left-side **Mixer Selection** window, and a right-side **Mixer Filters** window.

## Soft Panel Features

The panel UI design are similar to Ultritouch approach where UI sections are categorized into UI windows. These UI windows can be placed in main display and/or drawers.

## Home View Window

The channel strips are placed from left to right, and the output strips are placed at the far right.

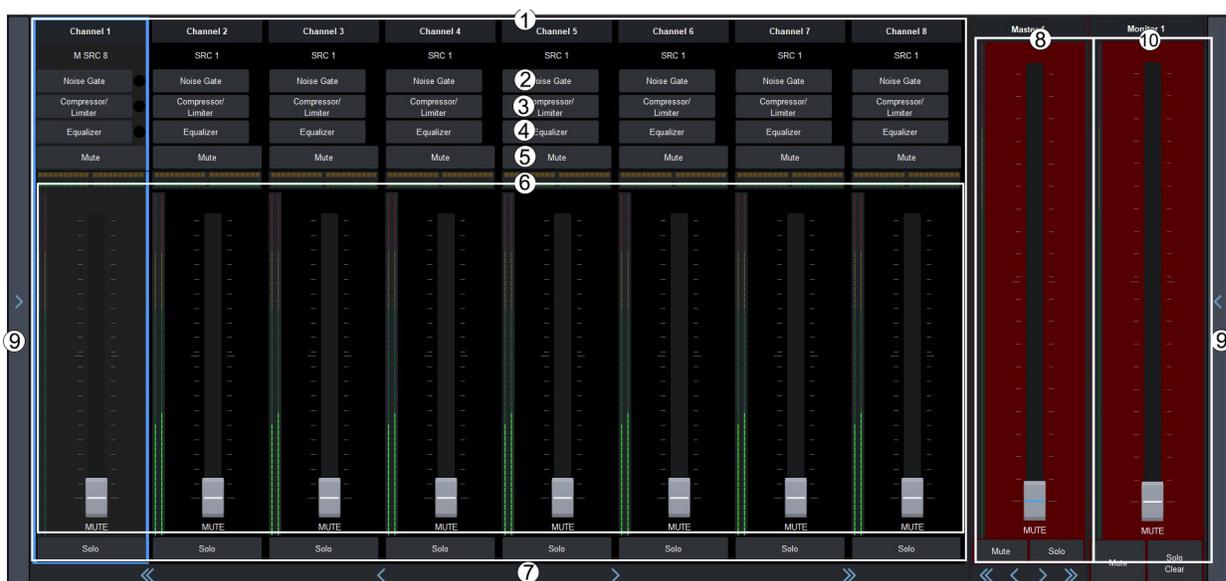


Figure 35 Example of an Audio Mixer Soft Panel

## 1. Channel Strips

Each strip controls the input from that audio channel and are color coded for where the audio comes from. Each strip includes the name of the audio channel and the router source assigned to it. Clicking the router source name opens the router source selection drawer window if defined.

## 2. Noise Gate

Opens the Noise Gate page in the Audio Filters window. Refer to “**Noise Gate**” for details.

## 3. Compressor/Limiter

Opens the Compressor/Limiter page in the Audio Filters window. Refer to “**Compressor/Limiter**” for details.

## 4. Equalizer

Opens the Equalizer page in the Audio Filters window. Refer to “**Equalizer**” for details.

## 5. Mute

Turn off the audio from this source. This does not change the level.

## 6. Audio Fader and Meter

Adjust the level of the audio from the source.

## 7. Solo, Solo Clear

The solo action is dependent on the current mixer output.

- › Master output — Selecting solo will route that channel to the defined Monitoring output. It does not affect the master output. Only those channels with solo activated will be connected to the Monitoring output. If no channels have solo activated, the monitoring output follows the Master output.
- › Aux outputs — Selecting solo MUTES all other inputs to the selected output bus.

Any channels with solo active will illuminate the **Solo Clear** button - even channels not currently visible.

Clicking **Solo Clear** disables any solo action for the selected output bus.

## 8. Output Strips

The output channel strip fader controls the over-all level for that mixer output. Use the scroll bar at the bottom of the mixer output drawer window to select a mixer output bus.

## 9. Drawers

A navigation drawer is available on the left and right sides of the interface. Tap the drawer icon once to open a pane that provides access to additional menus and functions of your soft panel. Tap the drawer icon again to close the pane. The contents of a drawer is determined when the soft panel was configured.

## 10. Monitor Strip

The Master layer also has a Monitor output and level. By default, the Monitor strip reports the status of the last channel pair of the partition.

## Audio Filters

The audio filters are located in the right drawer of the soft panel. The following audio filters are available for each channel strip: audio equalizer, noise gate, and compressor/limiter.

- ★ At the top of each audio filter setting is a Clipping indicator to warn you if clipping is occurring in the Equalizer stage (EQ) or Compressor/Limiter stage (CL).

## Equalizer

The audio equalizer (EQ) allows you to enhance the sound quality of audio sources. An independent equalizer is available for every audio fader in the system and allows for adjustment in four bands (low-shelf, mid-range, high mid-range, and high-shelf).

★ You can adjust the EQ settings using the EQ graph or the specific slider control.

### To configure an equalizer

1. Expand the drawer on the right-side of the window.
2. Click **Audio Filters**.
3. Click **Equalizer**.

In the example below, the **Audio Filters** window displays in the right drawer.



4. Select an audio channel to modify.

In the example above, the user is modifying Channel 1.

5. Use the **Low Shelf** slider to adjust the gain of the low frequency band.

★ You can also move the L point around on the graph to adjust the low shelf values.

- **Gain** — set the audio level of the frequency band (-20dB to 20dB).
- **Max Freq** — set the maximum frequency that you want the low shelf audio band limited to (20Hz to 1kHz).

6. Use the **Midrange 1** slider to adjust the gain of a midrange frequency band.

★ You can also move the M1 point around on the graph to adjust the midrange 1 values. The dot below the M1 allows you to adjust the Q ratio.

- **Gain** — set the audio level of the frequency band (-20dB to 20dB).
- **Center Freq** — set the middle frequency of the audio band (20Hz to 20kHz).
- **Q** — set the bandwidth of the Q ratio filter (0.51 to 9.91). Note that adjusting the bandwidth also changes the frequency range the filter affects.

7. Use the **Midrange 2** slider to adjust the gain of a midrange frequency band.

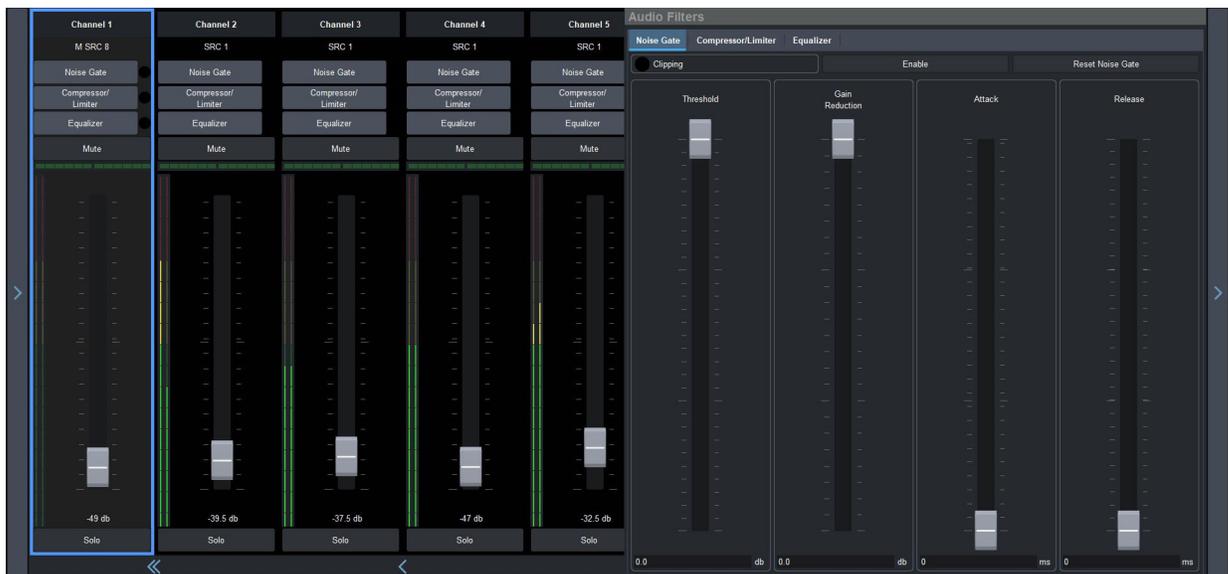
- ★ You can also move the M2 point around on the graph to adjust the midrange 2 values. The dot below the M2 allows you to adjust the Q ratio.
  - **Gain** — set the audio level of the frequency band (-20dB to 20dB).
  - **Center Freq** — set the middle frequency of the audio band (20Hz to 20kHz).
  - **Q** — set the Q ratio.
- 8. Use the **High Shelf** slider to adjust the gain of the high frequency band.
- ★ You can also move the H point around on the graph to adjust the high shelf values.
  - **Gain** — set the audio level of the frequency band (-20dB to 20dB).
  - **Min Freq** — set the minimum frequency that you want the high shelf audio band limited to (20kHz to 1kHz).

## Noise Gate

A noise gate allows a signal above a certain selected threshold to pass through. Noise gates are typically used to reduce unwanted external sounds, and/or reduce natural channel noise.

### To configure the noise gate

1. Expand the drawer on the right-side of the window.
2. Click **Audio Filters**.
3. Click **Noise Gate**.



4. Select an audio channel to modify.  
In the example above, the user is modifying Channel 1.
5. Use the **Threshold** slider to specify the level at which the gate opens.
6. Use the **Gain Reduction** slider to
7. Use the **Attack** slider to specify how quickly sounds louder than the threshold are affected.
8. Use the **Release** slider to specify how quickly sounds softer than the threshold are affected.
9. Select the **Enable Clipping** to
- ★ Click **Reset Noise Gate** to return all Noise Gate settings to the default values.

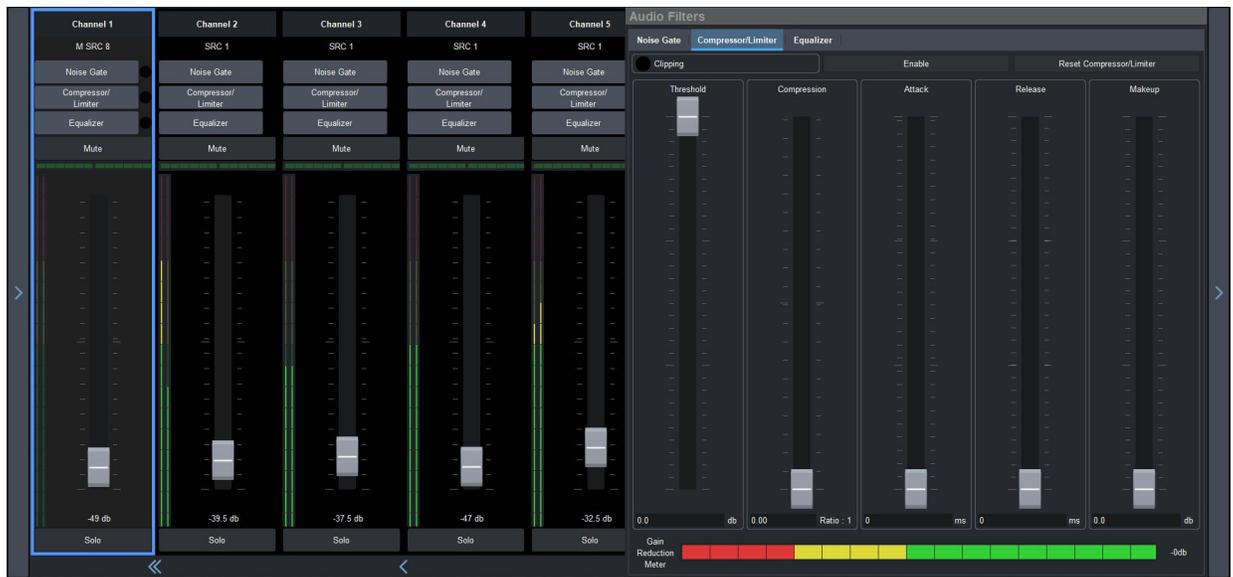
## Compressor/Limiter

The audio compressor allows you to restrict audio levels from passing a threshold level. These are often used to prevent digital clipping of audio levels that are too high for output equipment. Once the threshold is reached, the compressor starts to reduce the gain at a specific ratio. The higher the compression ratio, the harsher the reduction in gain. The compression continues until the audio level falls below the threshold. You can adjust how quickly the compressor is applied once the threshold is surpassed as well as how long after the level drops below the threshold that the compressor is still applied.

- ★ The compressor is said to be acting as a limiter when the compression ratio is set very high, or to infinity, and the attack time is set very low. This has the effect of causing a very abrupt flattening of the audio level once the threshold is reached.

### To configure the Compressor/Limiter settings for the audio matrix inputs

1. Expand the drawer on the right-side of the window.
2. Click **Audio Filters**.
3. Click **Compressor/Limiter**.



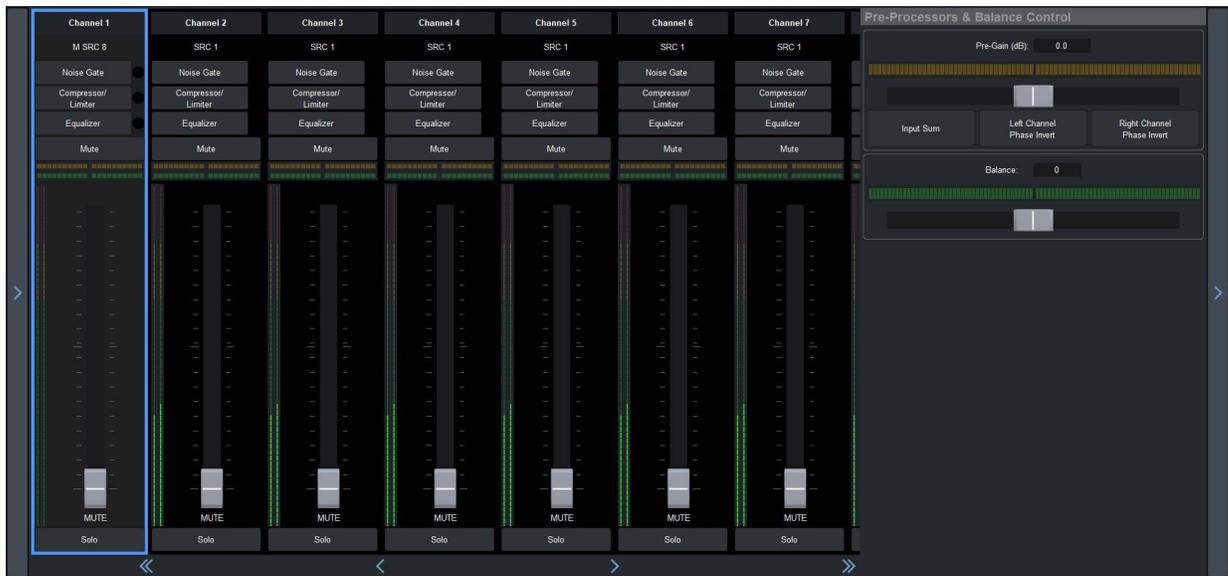
4. Select an audio channel to modify.  
In the example above, the user is modifying Channel 1.
5. Use the **Threshold** slider to select the level (dB) at which the compressor is applied.
6. Use the **Compression** slider to select the ratio for the amount of compression you want to apply. The higher the ratio the more compression is applied to lower the level. At infinity the audio level is limited to the threshold.
7. Use the **Attack** slider to select the amount of time (ms) you want to pass between the level surpassing the threshold and the full compression ratio being applied.
8. Use the **Release** slider to select the amount of time (ms) you want to pass between the level falling below the threshold and the compression ratio returning to 1:1 (no compression applied).
9. Use the **Makeup** slider to increase the gain of the audio after compression.

## Adjusting the Balance an Audio Source

Adjusting the balance of an audio source adjusts the volume of the left and right stereo channel. For example, as you move the Balance slider to the right the volume of the right channel is increased and the volume of the left channel is decreased.

### To adjust the balance of an audio source

1. Expand the drawer on the right-side of the window.
2. Click **Pre-Processors**.
3. Locate the **Balance Control**.



4. Select an audio channel to modify.  
In the example above, the user is modifying Channel 1.
5. Use the slider in the **Balance** area to adjust the volume of the left and right stereo channel.

## Audio Processing Options

The audio mixer panel enables you to adjust the gain and phase invert, individually, each of the audio sources.

### To configure the audio proc-amps for an audio source

1. Expand the drawer on the right-side of the window.
2. Click **Pre-Processors**.
3. Select an audio channel to modify.
4. Use the **Pre-Gain** field to specify the amount of gain (dB) applied to the input channel.
5. To invert a channel:
  - Click **Left Channel Phase Invert** to invert the audio signal of the left channel.
  - Click **Right Channel Phase Invert** to invert the audio signal of the right channel.
6. Click **Input Sum** to sum the left and right input channels. Both channels will carry the average  $((A+B)/2)$  of the two input (Left and Right) channels.

## Displaying the Audio Mixer Soft Panel

The audio mixer soft panels are only available in DashBoard. You can load a soft panel to the DashBoard window on your PC, or to an Ultritouch panel. Both methods are presented here.

### To load an audio mixer soft panel to a desktop

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Control** sub-node.
5. Double-click the node for the audio mixer soft panel.

The selected soft panel opens in the DashBoard window of your PC.

### To load an audio mixer soft panel to an Ultritouch

1. On the Ultritouch hard panel display, tap .

The **All Connections** interface displays.

2. Tap the router you want to control via the Ultritouch.
3. Tap the second button.

The panel updates to display the router hierarchy much like the tree view in the router menu system.

4. Tap **Soft Panels**.

A list of available soft panels displays.

5. Tap the audio mixer soft panel for the ULTRIX-FR12.

6. Tap **Open**.

The Ultritouch interface updates to display the selected soft panel.

## Notes on Audio Mixing via a Soft Panel

If your audio mixer soft panel includes partitions, you can switch between matrices as follows:

1. Expand the left drawer to display the **Mixer Selection** window.
2. Click the **Partition** button for the required mixer (partition).
  - The channel strips and output strips are auto-populated.
  - The mixer inputs are automatically routed to the mixer outputs.
  - The soft panel recognizes a take transition from an external panel.

## Audio Mixer Operation

This section provides examples two possible audio mixer setups: a generic system and one with direct outputs.

### Generic Setup

This example assumes the following generic setup seen in **Table 53**. Note that generic physical IO names shown for brevity.

**Table 53 Example Mapping for Router Sources and Destinations**

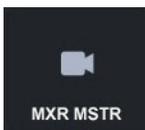
|                    | Video            | A1                     | A2                     |
|--------------------|------------------|------------------------|------------------------|
| <b>Source</b>      |                  |                        |                        |
| SRC1               | slot1.in[1].sdi  | slot1.in[1].audio.ch1  | slot1.in[1].audio.ch2  |
| SRC2               | slot1.in[2].sdi  | slot1.in[2].audio.ch1  | slot1.in[2].audio.ch2  |
| SRC3               | slot1.in[3].sdi  | slot1.in[3].audio.ch1  | slot1.in[3].audio.ch2  |
| ...                | ...              | ...                    | ...                    |
| MXR MSTR           |                  | slot0.mixer-out[1]     | slot0.mixer-out[2]     |
| MXR AUX1           |                  | slot0.mixer-out[3]     | slot0.mixer-out[4]     |
| ...                | ...              | ...                    | ...                    |
| <b>Destination</b> |                  |                        |                        |
| Dest1              | slot1.out[1].sdi | slot1.out[1].audio.ch1 | slot1.out[1].audio.ch2 |
| Dest2              | slot1.out[2].sdi | slot1.out[2].audio.ch1 | slot1.out[2].audio.ch2 |
| Dest3              | slot1.out[3].sdi | slot1.out[3].audio.ch1 | slot1.out[3].audio.ch2 |
| ...                | ...              | ...                    | ...                    |
| MXR IN1            |                  | slot0.mixer-in[1]      | slot0.mixer-in[2]      |
| MXR IN2            |                  | slot0.mixer-in[3]      | slot0.mixer-in[4]      |
| ...                | ...              | ...                    | ...                    |

**To perform a simple route of audio mixer channels**

1. To route a mixer output to a destination:
  - a. Choose a destination to receive the mix.



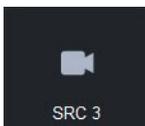
- b. Choose a source for the destination.



2. To route a source audio to a mixer input:
  - a. Select the mixer input.



- b. Select the required source.



With these route operations, we have routed the output of the Mixer Master bus (assuming Master is set to **Out1** in the mixer partition settings), to our router destination **DST 1**, and then routed audio channels 1 and 2 (as the mixer map is only configured for two channels in this example), of our router source **SRC 3** to the mixer Channel strip 1.

Or, to look at it another way; audio channels 1 and 2 on router destination **DST 1** are connected to the mixer Master bus. The Master bus has router source **SRC 3** audio channels 1 and 2 via Channel strip 1.

3. To add another source to the mix:
  - a. Select another mixer input.



- b. Select the source of the extra channels.



After this route, audio mixer Channel strip 2 receives the audio channels 1 and 2 of **SRC 2**. The **MXR MSTR** can have a mix of **SRC 3** channels 1 and 2, and **SRC 2** channels 1 and 2. Channel strip faders 1 and 2 control the mix of their respective sources. The Mixer Master fader controls the overall level of the mix.

## Using Audio Mixer Direct Outputs

ULTRIMIX-MXR provides a direct channels strip output (pre-fader). This allows the use of the equalizer, compressor/limiter, and noise gate without requiring the effects to be routed through a mix bus.

In this example, we assume the mapping seen in **Table 54**.

**Table 54 Example Mapping for Router Sources and Destinations**

|                    | Video           | A1                                    | A2                        |
|--------------------|-----------------|---------------------------------------|---------------------------|
| <b>Source</b>      |                 |                                       |                           |
| SRC1               | slot1.in[1].sdi | slot1.in[1].audio.c<br>h1             | slot1.in[1].audio.c<br>h2 |
| SRC2               | slot1.in[2].sdi | slot1.in[2].audio.c<br>h1             | slot1.in[2].audio.c<br>h2 |
| SRC3               | slot1.in[3].sdi | slot1.in[3].audio.c<br>h1             | slot1.in[3].audio.c<br>h2 |
| ...                | ...             | ...                                   | ...                       |
| FX1                |                 | slot0.mixerd <sup>a</sup> -out[<br>1] | slot0.mixerd-out[2<br>]   |
| FX2                |                 | slot0.mixerd-out[3<br>]               | slot0.mixerd-out[4<br>]   |
| ...                | ...             | ...                                   | ...                       |
| <b>Destination</b> |                 |                                       |                           |

**Table 54 Example Mapping for Router Sources and Destinations**

|         | Video            | A1                     | A2                     |
|---------|------------------|------------------------|------------------------|
| Dest1   | slot1.out[1].sdi | slot1.out[1].audio.ch1 | slot1.out[1].audio.ch2 |
| Dest2   | slot1.out[2].sdi | slot1.out[2].audio.ch1 | slot1.out[2].audio.ch2 |
| Dest3   | slot1.out[3].sdi | slot1.out[3].audio.ch1 | slot1.out[3].audio.ch2 |
| ...     | ...              | ...                    | ...                    |
| MXR IN1 |                  | slot0.mixer-in[1]      | slot0.mixer-in[2]      |
| MXR IN2 |                  | slot0.mixer-in[3]      | slot0.mixer-in[4]      |
| ...     | ...              | ...                    | ...                    |

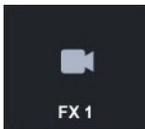
- a. The “d” in the mixer physical label represents Direct Out.

With the above mapping, we can feed the output of the filters (noise gate, equalizer, compressor/limiter) to any destination.

1. Route a channel strip direct output to a destination:
  - a. Select the required destination.



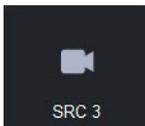
- b. Select an output of the mixer as the source.



2. Route a source to the channel strip:
  - a. Select a mixer input as a destination for the source.



- b. Select the required source.



With these route operations, we have routed the direct outputs of mixer Channel strip 1 to our router destination **DST1**, and then routed audio channels 1 and 2 of our router source **SRC3** to the mixer Channel strip 1.

Or, to look at it another way; audio channels 1 and 2 on router destination **DST1** are connected to router source **SRC3** audio channels 1 and 2 via mixer Channel strip 1 filters (gate, compressor/limiter, and equalizer). The settings of the filters will effect the audio channels 1 and 2 of destination **DST1**.

# UHD Gearbox Configuration

The ULTRIX-FR12 provides maximum performance and quality with standard configurations supporting data rates up to 12Gbps. In addition, you can purchase the UltraSpeed software license that enables 12Gbps performance throughout every signal path within the router. When combined with the inherent capabilities within the router, the UltraSpeed license also enables routing of the emerging single link UHD (50Hz, 60Hz) standard alongside Quad-link UHD signals, and seamlessly switch these signals back and forth to each other.

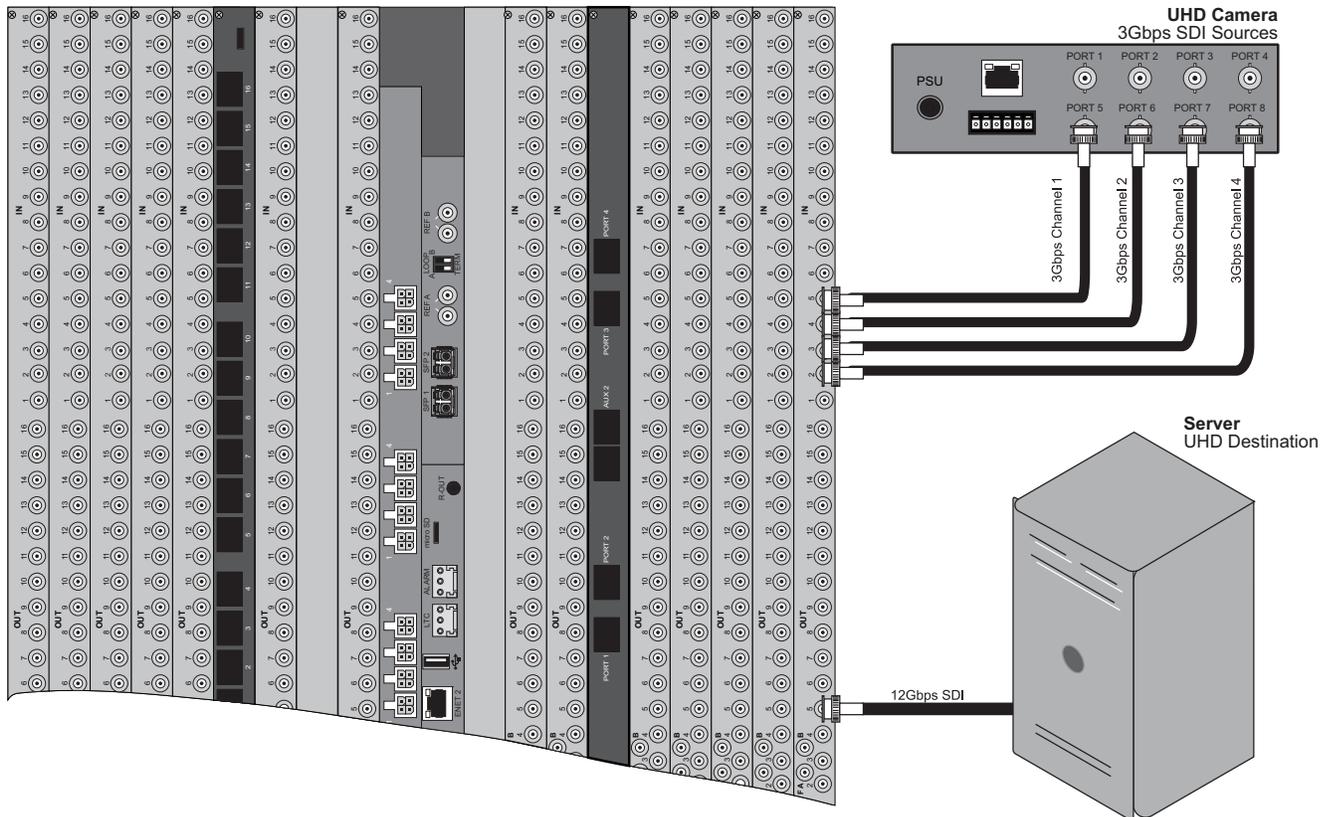
- ★ The ULTRIX-FR12 Gearbox function supports the two sample interleave (2SI) format of quad link. Note that Square Division Quad Split is not implemented.

## Example Setup for Multiplexing

Assign Gearbox Group 1 on the ULTRIX-FR12 to be 4:1 (multiplex four 3Gbps inputs into a single 12Gbps output). The router OUT 1 BNC is the combined signal of IN 1-4. The OUT 2, 3, and 4 BNCs are reserved by the system.

**Table 55 Example Mapping for Multiplexing**

| Name               | Channel 1     | Channel 2    | Channel 3    | Channel 4    |
|--------------------|---------------|--------------|--------------|--------------|
| <b>Source</b>      |               |              |              |              |
| QUAD IN            | slot16.in[1]  | slot16.in[2] | slot16.in[3] | slot16.in[4] |
| <b>Destination</b> |               |              |              |              |
| 12G OUT            | slot16.out[1] |              |              |              |



*Figure 36 Example of Gearbox Workflow of an ULTRIX-FR12 — Multiplexing to a 12Gbps Signal*

## Example Setup for De-multiplexing

Assign Gearbox Group 1 on the ULTRIX-FR12 to be 1:4 (de-multiplex a single 12Gbps input into four 3Gbps outputs). The router OUT 1, 2, 3, and 4 BNCs are the split output signals.

**Table 56 Example Mapping for De-multiplexing**

| Name               | Channel 1     | Channel 2     | Channel 3     | Channel 4     |
|--------------------|---------------|---------------|---------------|---------------|
| <b>Source</b>      |               |               |               |               |
| 12G IN             | slot16.in[4]  |               |               |               |
| <b>Destination</b> |               |               |               |               |
| QUAD OUT           | slot15.out[1] | slot15.out[2] | slot15.out[3] | slot15.out[4] |

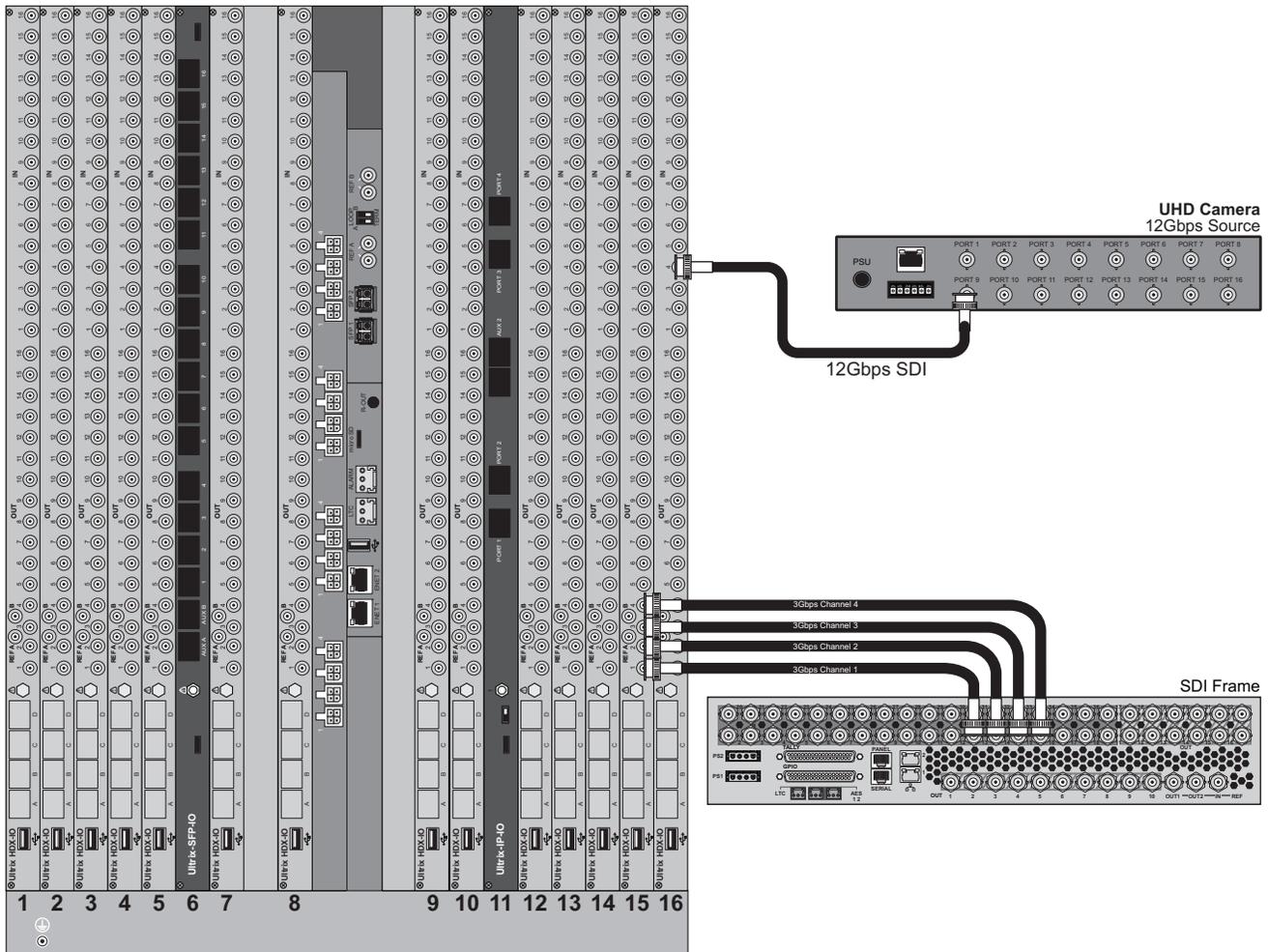


Figure 37 Example of Gearbox Workflow of an ULTRIX-FR12 — De-multiplexing a 12Gbps Signal

## Gearbox Overview

A Gearbox is a group of four consecutive inputs or four consecutive outputs that are automatically grouped together in the routing system database. The first port of the Gearbox group is used for routing and UltraScape, while the remaining three ports in the group are reserved but not used.

- When you enable a Gearbox input group, the ULTRIX-FR12 multiplexes the signals of the four 3Gbps Level A channels together.
- When you enable a Gearbox output group, the ULTRIX-FR12 takes the signals of the four 3Gbps Level A channels together and provides a single 12Gbps signal to an output.

The most common application of a Gearbox is when there are quad channels coming in and out of the ULTRIX-FR12. The first channel is used as the port for those I/O to define single level of logical I/O while only the audio on the first channel is available.

### For More Information on...

- cabling for a Gearbox application, refer to the ***ULTRIX-FR12 Installation Guide***.

## Signal Medic

The Signal Medic is a function that attempts to ‘repair’ the incoming Gearbox signal group if one of the four input stream is temporarily interrupted. The Signal Medic will replace the missing stream with an interpolated version derived from the other incoming signals.

### For More Information on...

- the Signal Medic options, refer to **Table 15**.

## Gearbox Timing

The ULTRIX-FR12 Gearbox requires all four of the input signals be within 350ns of each other. Cable lengths to the Gearbox input should be as matched as practicable.

### For More Information on...

- the cable length specifications, refer to the ***ULTRIX-FR12 Installation Guide***.

## Configuring the ULTRIX-FR12 for Multiplexing Quad Input Signals

When I/O ports are enabled for a Gearbox, the first port of the group is the designated port for mapping (the other three ports of the group are reserved but not used).

## Before You Begin

Complete the following steps before configuring the ULTRIX-FR12 to multiplex a 12Gbps signal:

1. Install the UltraSpeed software license for the ULTRIX-FR12 that will multiplex the four 3Gbps into one 12Gbps signal.
2. Set up a connection between the external device that will provide the four 3Gbps input signals and the ULTRIX-FR12, ensuring the four input signals are cabled to the ULTRIX-FR12 rear panel as outlined in **Table 57**.

**Table 57 Gearbox Mapping — Default Input Groups**

| Group | Channel 1    | Channel 2    | Channel 3    | Channel 4    |
|-------|--------------|--------------|--------------|--------------|
| 1     | slot#.in[1]  | slot#.in[2]  | slot#.in[3]  | slot#.in[4]  |
| 2     | slot#.in[7]  | slot#.in[8]  | slot#.in[9]  | slot#.in[10] |
| 3     | slot#.in[13] | slot#.in[14] | slot#.in[15] | slot#.in[16] |

3. Set up a connection between the ULTRIX-FR12 and the external device that will receive the 12Gbps signal.
4. Make a note of the physical **IN** BNCs on the ULTRIX-FR12 that will receive the 3Gbps signals.
5. Make a note of the physical **OUT** BNC on the ULTRIX-FR12 that will transmit the 12Gbps signal.

## Assigning Physical Router Inputs to a Gearbox Group

The Gearbox inputs are automatically arranged in groups of four (e.g. slot1.in[1] to slot 1.in[4] is one group). You can enable up to four Gearbox groups per ULTRIX-FR12 slot.

### To assign router inputs to a UHD Gearbox group

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.

6. Select .

The **Port Configuration** page opens.

7. From the top toolbar, select the slot that the UltraSpeed license was installed for.
8. In the **Physical Address** column, locate the first input port in the Gearbox group you wish to configure for multiplexing four 3Gbps signals.
9. In the **2-SI Group** column, click the cell for the first input port of the Gearbox group.

A drop-down menu opens.

10. Select **Enable**.

The new setting is applied to the selected port and the three associated ports in the same Gearbox group. Note that only the first input in the Gearbox group (e.g. slot1.in[1]) will display in the **Matrix I/O** lists.

## Assigning a Multiplexed 12Gbps Signal in the Database

You can assign the new 12Gbps signal in the routing system database much like assigning an input of any other signal type. However, the new 12Gbps signal is now the first input in the Gearbox group (e.g. slot1.in[1]) to a Destination in the database.

The original 3Gbps signals will still display in the Matrix I/O lists in the routing system database and can still be managed as individual sources in the database.

Example of a Gearbox Database for Inputs

**Table 58** provides an example of mapping the Gearbox inputs in a database.

**Table 58 Example of Gearbox Input Database Mapping**

| Source Name  | SDI                  | Level A1               | Level A2               |
|--------------|----------------------|------------------------|------------------------|
| GearBox In 1 | Slotx.in[1].sdi.ch1  | Slotx.in[1].audio.ch1  | Slotx.in[1].audio.ch2  |
| GearBox In 2 | Slotx.in[7].sdi.ch1  | Slotx.in[7].audio.ch1  | Slotx.in[7].audio.ch2  |
| GearBox In 3 | Slotx.in[13].sdi.ch1 | Slotx.in[13].audio.ch1 | Slotx.in[13].audio.ch2 |

### For More Information on...

- managing the sources in a database, refer to the *Ultracore BCS User Guide*.

## Configuring the ULTRIX-FR12 for De-multiplexing a 12Gbps Signal

The ULTRIX-FR12 is capable of de-multiplexing a 12Gbps SDI sources into four separate 3Gbps SDI output signals.

### Before You Begin

Ensure the following steps are completed before configuring the router to de-multiplex a 12Gbps signal:

1. Install the UltraSpeed software license for the ULTRIX-FR12 that will de-multiplex the 12Gbps signal.
2. Set up a connection between the external device that will provide the 12Gbps signal to the ULTRIX-FR12 router.
3. Setup a connection between the ULTRIX-FR12 and the external device that will receive the four 3Gbps signals.
4. Make a note of the physical **IN** BNC on the ULTRIX-FR12 that will receive the 12Gbps.
5. Make a note of the physical **OUT** BNCs on the ULTRIX-FR12 that will transmit the processed 3Gbps signals.

## Configuring the ULTRIX-FR12 for De-multiplexing a 12Gbps Signal

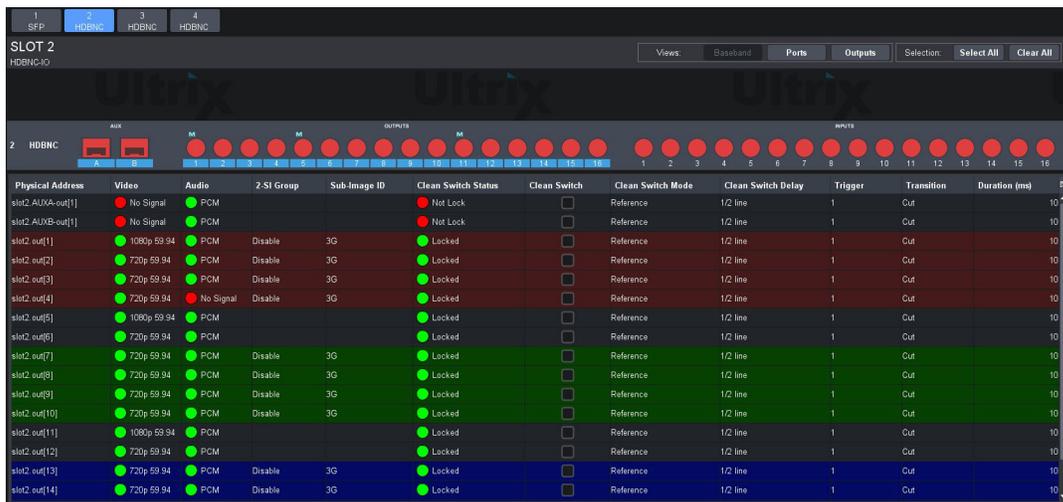
De-multiplexing an 12Gbps signal produces four 3Gbps SDI signals. These SDI signals can then be assigned to separate ULTRIX-FR12 outputs.

### To assign the de-multiplexed signals to a Gearbox group

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select  .

The **Port Configuration** page opens.

7. From the top toolbar, select the slot for the Gearbox group.
8. From the Views area of the tab, click the last button and select **Outputs** from the **I/O** dialog.  
The **Port Configuration** page updates to displays the ports configured as **Outputs** for the slot.



9. In the **Physical Address** column, locate the first output port in the Gearbox group you wish to configure for multiplexing.
10. In the **2-SI Group** column, click the cell for the first output port of the Gearbox group. A drop-down menu opens in the column.
11. Select **Enable**.  
The new setting is applied to the selected port and the three associated ports in the same Gearbox group.

### Assigning the De-multiplexed 12Gbps Signal to a Destination in the Database

You can assign the new 3Gbps signals as outputs in the routing system database much like assigning a destination of any other signal type. Refer to the **Ultrixcore BCS User Guide** for details on configuring destinations in your database.

You can still assign the original 12Gbps signal as a source in the routing system database much like assigning a source of any other signal type. Refer to the **Ultrixcore BCS User Guide** for information on managing the sources in a database.

### Example of a Gearbox Database for Outputs

**Table 59** provides an example of mapping the Gearbox outputs in a database.

**Table 59 Example of Gearbox Output Database Mapping**

| Destination Name | SDI                   | Level A1                | Level A2                |
|------------------|-----------------------|-------------------------|-------------------------|
| GearBox Out 1    | Slotx.out[1].sdi.ch1  | Slotx.out[1].audio.ch1  | Slotx.out[1].audio.ch2  |
| GearBox Out 2    | Slotx.out[7].sdi.ch1  | Slotx.out[7].audio.ch1  | Slotx.out[7].audio.ch2  |
| GearBox Out 3    | Slotx.out[13].sdi.ch1 | Slotx.out[13].audio.ch1 | Slotx.out[13].audio.ch2 |

# ULTRIX-IP-IO Setup

This chapter outlines how to configure receivers and senders for the ULTRIX-FR12 to be used in video and audio streaming when an ULTRIX-IP-IO blade is installed in a slot of an ULTRIX-FR12.

- ★ The ULTRIX-IP-IO supports multicast IP Addresses in the range of 225.x.x.x to 239.x.x.x. Note that some addresses in this range are reserved by IANA.

## For More Information on...

- the installation and cabling of the ULTRIX-IP-IO, refer to the *ULTRIX-FR12 Installation Guide*.

## What are Receivers, Senders, and Streams?

The following terms may be used throughout this chapter:

### Device

A physical, virtual, or software application that may include multiple sources, destinations, senders, or receivers.

### Flow

The continuous raw media content. It can contain more than one essence (e.g. an audio flow can contain multiple channels, and an SDI flow may contain audio and video essences).

A flow is independent of the transport protocol. For example, 48kHz LPCM audio is a flow; AES67 is one type of stream which can carry the flow.

Flows cannot generally be passed around natively, and need to be encapsulated in a stream. Flows from the same source are considered “editorially equivalent”, but may be encoded differently. For example, a video source may be encoded as 4:2:2 YCbCr uncompressed, 4:4:4 RGB uncompressed, and h.265 encoded. Each of these would be a separate flow from a common source.

### Receiver

An element within a device that receives exactly one stream, which contains one flow from a network.

### Sender

An element within a device which presents exactly one flow, packaged as a stream onto a network.

### Stream

One flow, encapsulated within a transport protocol. Examples include SMPTE ST 2022-6, SMPTE ST 2110-20 Video, or SMPTE ST 2110-30 Audio.

## Before You Begin

This section provides information to keep in mind before setting up Ultrix-IP streams.

- ★ Each ULTRIX-IP-IO blade has four ENET ports with 25Gb bandwidth per port. The ports are grouped into two pairs where the first pair is ENET 1 and ENET 2; the second pair is ENET 3 and ENET 4.

## Audio Streams

Keep the following in mind when setting up audio IP streams:

- Each ENET pair can support a maximum of 8 audio streams.
- Only ENET 1 and ENET 3 support audio streams at this time.
- ENET 2 and ENET 4 are used only for redundant audio streams.
- Each audio stream can carry from 1 to 16 channels.

## Video Streams

Keep the following in mind when setting up video IP streams:

- The ULTRIX-IP-IO supports multicast IP Addresses in the range of 225.x.x.x to 239.x.x.x for video and audio.
- When using 1080p or lower video formats, each ENET pair can support up to 8 video streams with a maximum of 16 streams per ULTRIX-IP-IO blade.
- When using UHD 6G formats (2160p 30/29.97/25Hz), each ENET pair can support up to 4 video streams with a maximum of 8 streams per ULTRIX-IP-IO blade.
- When using UHD 12G formats (2160p 60/59.94/50Hz), each ENET pair can support up to 4 video streams with a maximum of 8 streams per ULTRIX-IP-IO blade. If the Redundant option is enabled for the ENET pair, up to 4 video streams (2 streams in the first port and 2 redundant streams in the second port) are available.
- When using a mix of UHD 6G and 12G formats, each ENET pair can support up to 4 video streams. For example, 3x12G streams and 1x6G stream.

## Redundant Streams

The ULTRIX-IP-IO blade also provides protection switching as per SMPTE 2022-7. This option can be enabled for each pair on the blade.

Keep the following in mind when setting up redundant streams:

- You will need to assign a unique IP address to each stream (primary and secondary).
- ENET 2 is reserved for redundant streams when the Redundant option is enabled for that ENET pair.
- ENET 4 is reserved for redundant streams when the Redundant option is enabled for that ENET pair.
- When an ENET pair is in redundant mode, the stream must be added to the first port of the ENET pair (ENET 1 or ENET 3) and a duplicate (secondary) stream is automatically added to the second port (ENET 2 or ENET 4 respectively).

## Automatic Sender Session Description Protocol (SDP) Updates

When a sender stream is active and its SDI input video format changes to a different and valid format, if the new format is allowed by the session (as defined by the Adaptive Input Allowed Input Rates setting) and results in an overall system valid configuration (no Ultrix-IP bandwidth limit will be exceeded), the sender stream will update itself to use this new format, generating a new version of its SDP. The Session and NMOS IDs do not change when the sender stream SDP update is performed. This allows the existing streams to adapt so that the Ultrix-IP does not need to track new streams. This feature is always enabled and cannot be disabled.

Ultrix-IP monitors all active connections on the system and when senders are updated, the system will issue a connection update to all affected receivers with the latest information about the sender (the updated SDP description). When using an Ultricore BCS, the Ultricore BCS automatically updates the receivers when the subscribed sender changes.

This feature is helpful to avoid receivers to be configured with a stale version of the associated sender. If the parameters of a sender change, an SDP update is triggered, which is then forwarded to all receivers affected by the identified update.

### Quick Updates when Streaming from the Ultracore BCS

When the format of the SDI input video changes, the Ultrix-IP updates its own sender and SDP, and the Ultracore BCS is notified of this change. The Ultracore BCS then issues a connection update to all receivers using this sender. The ST 2110 stream and SDP file are also updated and the video sender resumes with the new format.

### Protection from Invalid Video Scenarios

If a loss of signal occurs, an automatic SDP update will not occur. In addition, when an input with a non-matching frame rate is detected, an alarm in DashBoard is raised. The SDP file remains unchanged, but the sender does not transmit the packets. This prevents the entire system from switching to an invalid video format or unstable video input.

### Using any Supported Control Protocol

The advertised SDP file updates to reflect a valid video format change through all supported control protocols, including NMOS, Ember+, and DashBoard advertised network streams. This enables the Ultrix-IP to use the new SDP file, and enables the user to update the connections of any active receivers to the new format without having to recreate the sender streams.

### Requirements

To take advantage of this feature, you will need to:

- Configure the receivers and senders and ensure they are active on the router. If a sender is disabled (not active), the incoming changes on the router port of the ULTRIX-IP-IO blade will not cause any change on the active configuration.
- When configuring the senders, specify the video format(s) you want to stream via the **Adaptive Input Allowed Input Rates** option for each applicable ULTRIX-IP-IO blade port.

## Overview

The generalized work flow of configuring your ULTRIX-IP-IO is:

1. Download and install the latest version of the DashBoard client software.
2. Contact your IT department for the required IP addresses for your ULTRIX-IP-IO ports.
3. Cable the ULTRIX-IP-IO ports.
4. Configure the protocol settings for the ULTRIX-IP-IO.
5. Configure the Port Network settings.
6. Define the Network Stream Groups.
7. Specify the timing requirements for the ULTRIX-IP-IO.
8. Configure the sender streams for the ULTRIX-IP-IO.
9. Make your connections.
10. Continue to set up your database as outlined in the *Ultracore BCS User Guide*.

## Configure the Protocol Settings

The Ultrix-IP supports media distribution based on NMOS, and Ember+. This section outlines the configuration steps for each protocol.

★ Any changes made to the ULTRIX-IP-IO settings requires a frame reboot.

### Configuring the NMOS Settings

The Network Media Open Specifications (NMOS) is enabled by default on the device if one or more ULTRIX-IP-IO blades are present. The ULTRIX-FR12 will automatically look for advertised NMOS registries using mDNS and will publish the Device Name and other info in the Frame Configuration > Ultrix-IP > NMOS interface. You can also choose to register the ULTRIX-FR12 when using Registry Service Discovery (RDS).

#### To configure the NMOS settings

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .  
The **Frame Configuration** page opens.
7. Select the **Ultrix-IP** tab.  
The **Port Network** sub-tab is automatically selected in the left toolbar.
8. Select the **NMOS** tab on the left toolbar.
9. Use the **Static RDS** box to determine how the router will register in an RDS system.
  - Selecting the box allows the user to set an RDS IP in the Registry Service Address field and forces the router to register to this specific RDS.
  - Clearing the box configures the router to use mDNS to automatically register in an RDS on the network with the lowest priority.
10. Use the **Channel Mapping** field to specify the port used for the RDS.
11. Use the **Connection Port** field to specify the port the NMOS IS-05 Connection service is listening on.
12. Use the **Node Port** field to specify the port the NMOS IS-04 Node service is listening on.
13. Click **Apply** to save your changes.

### Ember+ Communications

Each ULTRIX-IP-IO blade provides two Ember+ ports for controllability. One port will export the first 8 streams and the second port provides access from streams 9 to 16. The Ember+ port will be available on Port 9095 for the IP address assigned to each ULTRIX-IP-IO ports 1 and 3. If accessing it through the Ultrix Frame Configuration > Ultrix-IP System interface, the ports will be distributed based on slot position as follows:

- Streams 1-8 to Port 500x8
  - Streams 9-16 to Port 500x9
- where **x** is the router slot that the ULTRIX-IP-IO is installed in.

- ★ If the ULTRIX-FR12 includes two ULTRIX-IP-IO blades, and the intention is to control it via Ember+, a total of 4 Ember+ port connections are needed.

To establish a connection between the Ember+ client and the ULTRIX-FR12, you will need to:

1. Add the ULTRIX-FR12 in the Ember+ client interface using the IP Address assigned to the ULTRIX-FR12.
2. Enable SDP patching with the Ember+ client to establish video and audio receivers on the ULTRIX-FR12.
3. Ensure that all network streams have a consistent audio channel count.

### Establishing a Connection

Ensure that SDP patching is enabled with the Ember+ client to establish receivers on the ULTRIX-FR12.

- ★ ULTRIX-FR12 implements BESS v1.1 for Ember+ support to communicate with third-party controllers.

### Mapping

You will need to configure the Senders, and then use the Ember+ controller interface (e.g. Lawo VSM) to map the sources to the targets. Refer to the documentation that came with your Ember+ controller for details.

## Configuring the Port Network

By assigning an IP Address to each port of the ULTRIX-IP-IO blade, you are able to uniquely identify it on the network and control it via the DashBoard interface. Each port can be configured separately for media traffic.

- ★ All ENET ports are set to DHCP by default.

### To assign the network settings for an ULTRIX-IP-IO port

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.

6. Select .

The **Frame Configuration** page opens.

7. Select the **Ultrix-IP** tab.

The **Port Network** sub-tab is automatically selected in the left toolbar.

8. In the **Ultrix-IP Port Network** table, locate the row for the slot#.port# you wish to configure.
9. If you are manually configuring the Ethernet settings:
  - a. Click the cell in the **IP Mode** column and select **Static**.
  - b. Use the **IP** field to specify the static IP Address for the port. This is the IP Address that is used to control and communicate with the specified port.
  - c. Use the **Subnet Mask** field to specify the subnet mask for the port.

- d. Use the **Gateway** field to specify the gateway for communications outside of the local area network (LAN) the ULTRIX-IP-IO will use.
10. If you want the network settings for the port to be automatically obtained, and DHCP service is available on your control network, click the cell in the **IP Mode** column and select **DHCP**.
11. Click **Apply** to save the new settings.
12. Repeat this procedure for the second port you wish to configure.
13. Click **Reboot** to apply the new settings. This button is located at the bottom of the interface.  
The ULTRIX-FR12 is temporarily taken off-line during the reboot.
14. Verify the new settings reported on the Frame Configuration status fields.

## Configuring the Timing Settings

The Ultrix supports the Precision Time Protocol (PTP) as defined in the **IEEE 1588-2008** standard and the **SMPTE ST-2059** specification.

- ★ The ULTRIX-FR12 behaves only as a follower. The ULTRIX-FR12 cannot be used as a Boundary Clock or Grandmaster.

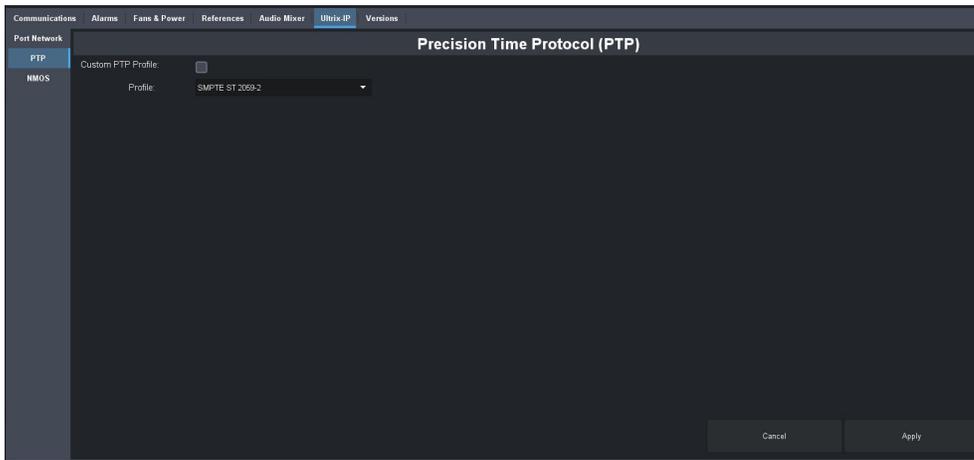
## Configuring the PTP Settings

You can synchronize the ULTRIX-FR12 to real-time clocks of other devices in the same network. You create a profile (use the default settings or create a custom profile) that identifies the ULTRIX-FR12 to the Grandmaster clock.

- ★ There are several criteria that PTP clocks compare to determine who will be master and who will be follower (called the Best Master Clock Algorithm, or BMCA), and they are evaluated in order: Priority1, clock class, accuracy, scaled log variance, Priority2, clock ID (similar to the MAC address). Practically, Priority1 is the only setting configured on all clocks to control the outcome of the Grandmaster election. If Priority1s are equal, the next criterion is evaluated (clock class) and the criteria are evaluated in succession until a Grandmaster is determined.

### To configure a PTP default profile for the ULTRIX-FR12

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .  
The **Frame Configuration** page opens.
7. Select **Ultrix-IP > PTP**.



- Use the **Profile** menu to specify the standard/specification used for PTP. The default is SMPTTE ST 2059-2.

★ The **Domain** is automatically set if the **Custom PTP Profile** is not selected.

- Click **Apply**.

### To create a custom PTP profile for the ULTRIX-FR12

- Select .

The **Frame Configuration** page opens.

- Select **Ultrix-IP > PTP**.
- Select the **Custom PTP Profile** box.
- Use the **Domain** menu to specify the sub-domain the PTP clock is assigned to. The default is 127.

★ There can be multiple PTP domains operating concurrently within a network. The domain is a field in all PTP message headers. Messaging between entities are segregated by domain (e.g. the ULTRIX-FR12 is an endpoint configured for domain 128 and ignores messages from a neighboring clock configured for domain 127).

## Configuring the PTP Settings for a Specific Port

Once you create a PTP profile for the Ultrix, you may want to uniquely define the PTP settings for each ULTRIX-IP-IO port.

### To configure the PTP settings for a specific port

- In the **Ultrix-IP > PTP** tab of the **Frame Configuration** page, select the **Custom PTP Profile** box for the required port.
- Use the **Name** field to assign a unique identifier to the port.
- Use the **Sync Interval** field to specify the number of seconds at which synchronization messages are sent from the master clock to the specified ULTRIX-IP-IO port.
- Use the **Announce Interval** field to specify the rate of announce messages that the specified ULTRIX-IP-IO port requests from the master clock during a unicast session.
- Use the **Announce Receipt Timeout** field to specify the number of seconds the specified ULTRIX-IP-IO port waits for an announce interval message before timing out.
- Click **Apply**.

## Enabling Redundant Mode

The ULTRIX-IP-IO enables a user to protect their streams to ensure mission critical operation. Using SMPTE ST 2022-7, they can run the same video and audio over two separate, redundant networks in case an error occurs.

★ This section is only applicable if your system requires protection switching.

### Before You Begin

Ensure that:

- your source is capable of sending SMPTE ST 2022-7 streams
- the ULTRIX-FR12 is set up within a protection switching network

### Enabling the Redundant Mode

By default, the Redundant mode is disabled.

#### To enable the Redundant Mode for an ENET pair

1. Select .

The **Frame Configuration** page opens.

2. Select the **Ultrix-IP** tab.

The **Port Network** sub-tab is automatically selected in the left toolbar.

3. In the **Ultrix-IP Port Network** table, locate the ENET pair you wish to configure.

Each row in the table is an ENET port on an installed ULTRIX-IP-IO blade.

4. Select the **Redundant** box for the ENET pair you wish to configure for protection switching.
5. Click **Apply**.

### Configuring the ULTRIX-FR12 for Protection Switching

You will need to assign a unique IP address to each stream (primary and redundant) in the same multicast range

#### To configure the Ultrix for protection switching

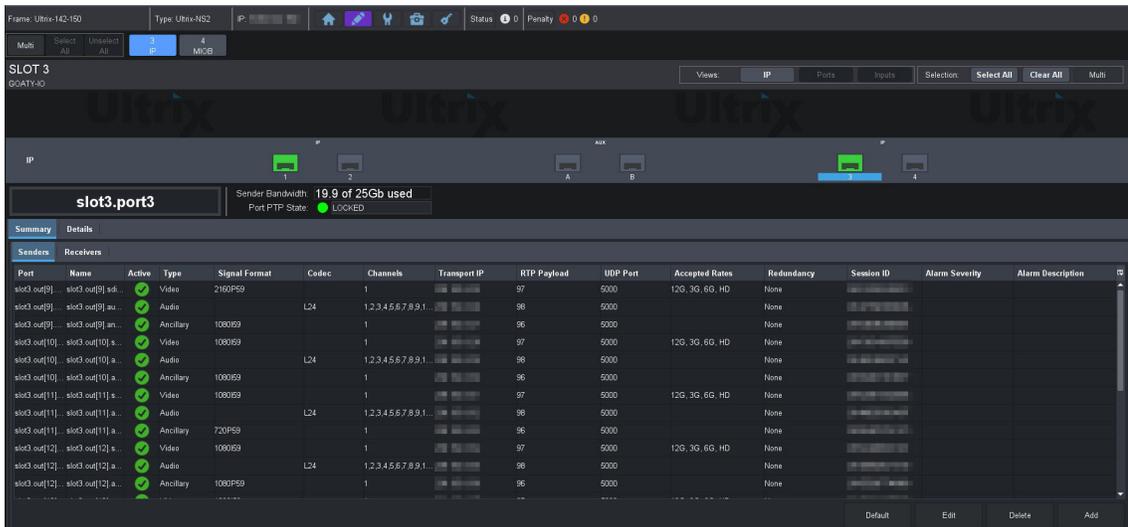
1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.

6. Select .

The **Port Configuration** page opens.

7. Select the first port of the ENET pair you enabled the Redundant mode for in the router rear panel map, located at the top of the **Port Configuration** page.

The **Port Configuration** page updates to display the Summary, and Details tabs for the port. The port label, on the router panel map, also displays with a light-blue background. In the example below, the user selected slot3.port3 to configure.



8. Configure the primary Senders as outlined in “**Configuring the Senders**”.
9. Configure the redundant Sender stream for the ENET pair as follows:
  - a. In the **Details > Senders** tab, select the first port of the ENET pair you enabled Redundant Mode for.
  - b. Click **Edit**. This button is located in the bottom right corner of the tab. The **Edit Senders** dialog opens.
  - c. Use the **Secondary IP** menus to specify the IP address for the secondary (redundant) stream. Ensure that it is the same IP Address as the primary stream.
  - d. Use the **Secondary UDP** port to specify the UDP port for the secondary (redundant) stream. Ensure that it is not the same value as the primary stream.
  - e. Click **OK**.
  - f. Verify the new settings are reported in the Redundancy column of the Senders tab.
10. Configure the primary Receivers as outlined in “**Configuring the Receivers**”.
11. Configure the redundant Receiver stream as follows:
  - a. Select **Details > Receivers**.
  - b. Select the row for the first port of the ENET pair you enabled Redundant Mode for.
  - c. Click **Edit**.
  - d. Use the **Secondary IP** menus to specify the IP address for the secondary (redundant) stream. Ensure that it is the same IP Address as the primary stream.
  - e. Use the **Secondary UDP** port to specify the UDP port for the secondary (redundant) stream. Ensure that it is not the same value as the primary stream.
  - f. Click **OK**.
  - g. Verify the new settings are reported in the Redundancy column of the Receivers tab.

## Configuring the Senders

You will need to specify the IP encapsulation properties for the active video and audio. For each input signal, you need to specify the IP encapsulation properties for the active video and audio. A sender stream on the ULTRIX-IP-IO can be configured with any multicast IP address in the range of 225.x.x.x to 239.x.x.x.

- ★ Make note of the bandwidth allocation for the ULTRIX-IP-IO port to determine the available capacity of the port. You can add as many streams to fill up the 25Gb bandwidth of the selected ENET port. Once that maximum is reached, new streams will not be accepted and updates will only be accepted if the new bandwidth used does not exceed 25Gb.

### To display the Senders tab for a port in Dashboard

1. Locate the ULTRIX-FR12 in the Tree View of Dashboard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. On the router rear panel map, locate the required ULTRIX-IP-IO slot.
7. Select the port on the ULTRIX-IP-IO slot you wish to configure.

The **Port Configuration** page updates to display the options for the port with the Summary tab automatically selected.

8. Select the **Senders** sub-tab.

### To add advertised sender streams

1. Click **Default**. This button is located in the bottom right corner of the **Senders** sub-tab.

The **Setup Default Senders** dialog opens.

2. Use the **IP Address** field to specify the IP range for the sender.  
In the above example, the user entered 239.8.7.1 as the starting point for the sender streams. Each subsequent advertised stream after this IP Address (e.g. 239.8.7.2, 239.8.7.3, 239.8.7.4 etc.) will be added to the Senders tab.
3. Use the **UDP Port** field to specify the RTP port for the advertised stream.
4. Use the **Video RTP Payload** and **Audio RTP Payload** fields to specify the Real-time Transport Protocol (RTP) payload IDs used by that sender stream.
5. Use the **Video Format** field to specify the video format of the signal available for the advertised stream.
6. Use the options in the **Adaptive Input Allowed Input Rates** area to specify the video formats that the stream is allowed to follow should the input SDI video format change while the sender is enabled.

- ★ This is not a bandwidth reservation. If a sender is set to allow 12G inputs, it is not guaranteed that it would follow that video format as all device setups is constrained by the available bandwidth on the Ethernet side. If the new video input is valid, but the overall system configuration is invalid, the sender will be updated but an alarm is still raised to the user to alert of a video mismatch.
- ★ When the sender is updated, all protocols or interfaces that advertise it will be updated with a new configuration set and SDP. This includes NMOS, Ember+, and all DashBoard tabs where the sender is visible.

7. Use the **Audio Codec** field to specify the audio compression format for the advertised stream.
8. Use the **Audio Channels** field to specify the maximum number of audio channels in each stream.
9. Select the **Add Ancillary Stream** box to include the ST 2110-40 ancillary data.
10. Click **OK**.

The **Setup Default Senders** dialog closes and the Senders tab updates to list the sender streams advertised using the IP Address specified in step 2.

- ★ Make a note of the automatically assigned label in the **Name** field for each stream. This name will be used in the database to represent the specific stream as an output (destination).

### To manually add a sender stream

1. Click **Add**. This button is located in the bottom right corner of the tab.  
The **Add Senders** dialog opens.
2. Use the **IP Address** field to specify the sender.  
The audio and ancillary (ANC) data will receive the selected IP address with one for audio and the second for the ANC.
3. Edit the **UDP Port** to specify the source port to transmit the data.
4. Use the **Type** menu to select the type of stream that will be available at the specified IP Address.
- ★ It is recommended to not edit the **UDP Port** field as this field is auto-populated by the advertised stream.
5. Use the **Output** menu to assign the SDI input signal to the sender stream.
6. If you selected **Video & Audio**, or **Video** in step 4, use the **Video Format** menu to specify the video format of the signal available to the sender.
7. Use the options in the **Adaptive Input Allowed Input Rates** area to specify the video formats that the stream is allowed to follow should the input SDI video format change while the sender is enabled.
- ★ This is not a bandwidth reservation. If a sender is set to allow 12G inputs, it is not guaranteed that it would follow that video format as all device setups is constrained by the available bandwidth on the Ethernet side. If the new video input is valid, but the overall system configuration is invalid, the sender will be updated but an alarm is still raised to the user to alert of a video mismatch.
- ★ When the sender is updated, all protocols or interfaces that advertise it will be updated with a new config set and SDP. This includes NMOS, Ember+, and all DashBoard tabs where the sender is visible.
8. If you selected **Video & Audio**, or **Audio** in step 4:
  - a. Use the **Audio Codec** menu to specify the audio compression format for the sender.
  - b. Use the **Audio Channels** menu to specify the maximum number of audio channels in the specified stream.
9. Click **OK**.

The **Add Senders** dialog closes and the new stream is added to the Senders tab.

- ★ Make a note of the automatically assigned label in the **Name** field for the stream. This name will be used in the database to represent the specific stream as an output (destination).

### To edit a sender stream

1. Select the row for the sender stream you wish to edit in the Senders tab.
2. Click **Edit**.
3. Edit the fields as required.

- ★ The fields with yellow backgrounds are read-only and cannot be edited.

4. Click **OK**.

## Configuring the Receivers

Receivers are the representation of connections on the router and report the information related to all traffic that is received. Receivers can be manually created by manually specifying the IP and UDP ports of the sender on the **Port Configuration** tab, but usually the process of managing receivers is done by the external network device.

This section outlines what is currently present/active on the **Port Configuration** tab and outlines how to manually specify receivers on the router using this interface.

### To display the Receivers tab for a port in Dashboard

1. Locate the ULTRIX-FR12 in the Tree View of Dashboard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. On the router rear panel map, locate the required ULTRIX-IP-IO slot.
7. Select the port on the ULTRIX-IP-IO slot you wish to configure.

The **Port Configuration** page updates to display the options for the port with the Summary tab automatically selected.

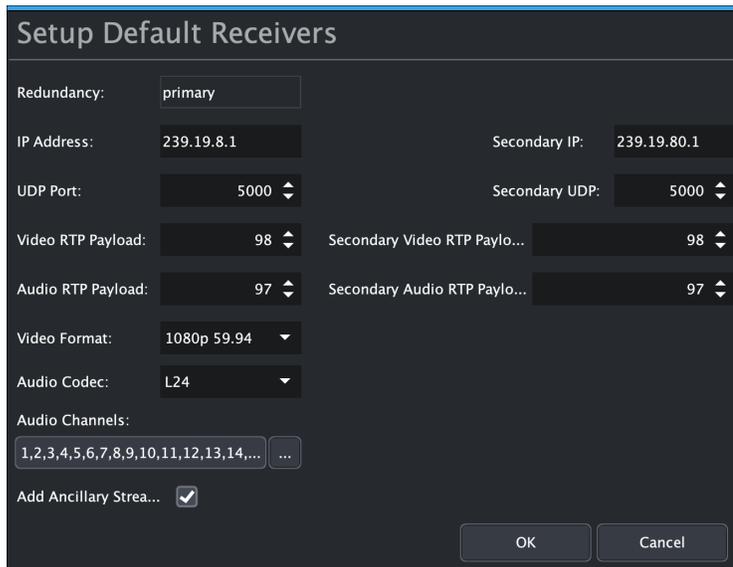
8. Select the **Receivers** sub-tab.

| Port           | Name              | Active | Type      | Signal Format | Timing Mode | Link Offset (µs) | Codec | Channels             | Transport IP | RTP Payload | UDP Port | Redundancy | Session ID | Alarm Severity | Alarm Description |
|----------------|-------------------|--------|-----------|---------------|-------------|------------------|-------|----------------------|--------------|-------------|----------|------------|------------|----------------|-------------------|
| slot3 in[1]... | slot3 in[1] sd... | ✓      | Video     | 2160P99       | Frame Sync  |                  |       | 1                    |              | 97          | 5000     | None       |            |                |                   |
| slot3 in[1]... | slot3 in[1] au... | ✓      | Audio     |               |             |                  | L24   | 1,2,3,4,5,6,7,8,9... |              | 98          | 5000     | None       |            |                |                   |
| slot3 in[1]... | slot3 in[1] an... | ✓      | Ancillary | 2160P99       | Frame Sync  |                  |       | 1                    |              | 96          | 5000     | None       |            |                |                   |
| slot3 in[2]... | slot3 in[2] sd... | ✓      | Video     | 1080P59       | Frame Sync  |                  |       | 1                    |              | 98          | 5000     | None       |            |                |                   |
| slot3 in[2]... | slot3 in[2] au... | ✓      | Audio     |               |             |                  | L24   | 1,2,3,4,5,6,7,8,9... |              | 98          | 5000     | None       |            |                |                   |
| slot3 in[2]... | slot3 in[2] an... | ✓      | Ancillary | 1080P59       | Frame Sync  |                  |       | 1                    |              | 96          | 5000     | None       |            |                |                   |
| slot3 in[3]... | slot3 in[3] sd... | ✓      | Video     | 1080P59       | Frame Sync  |                  |       | 1                    |              | 97          | 5000     | None       |            |                |                   |
| slot3 in[3]... | slot3 in[3] au... | ✓      | Audio     |               |             |                  | L24   | 1,2,3,4,5,6,7,8,9... |              | 98          | 5000     | None       |            |                |                   |
| slot3 in[3]... | slot3 in[3] an... | ✓      | Ancillary | 1080P59       | Frame Sync  |                  |       | 1                    |              | 96          | 5000     | None       |            |                |                   |
| slot3 in[4]... | slot3 in[4] sd... | ✓      | Video     | 1080P59       | Frame Sync  |                  |       | 1                    |              | 97          | 5000     | None       |            |                |                   |
| slot3 in[4]... | slot3 in[4] au... | ✓      | Audio     |               |             |                  | L24   | 1,2,3,4,5,6,7,8,9... |              | 98          | 5000     | None       |            |                |                   |
| slot3 in[4]... | slot3 in[4] an... | ✓      | Ancillary | 1080P59       | Frame Sync  |                  |       | 1                    |              | 96          | 5000     | None       |            |                |                   |

## To add a series of receivers

1. In the **Receivers** sub-tab, click **Default**.

The **Setup Default Receivers** dialog opens.



2. Use the **IP Address** field to specify the IP range for the receiver.

In the above example, the user entered 239.19.8.1 as the starting point for the receiver streams. Each subsequent advertised stream after this IP Address (e.g. 239.19.8.2, 239.19.8.3, 239.19.8.4 etc.) will be added to the Receivers tab.

3. Use the **UDP Port** field to specify the RTP port the receivers will use.
4. Use the **Video Format** field to specify the video format of the signal the receivers will output.
5. Use the **Audio Codec** field to specify the audio compression format for the receiver streams.
6. Use the **Audio Channels** field to specify the maximum number of audio channels in each stream.
7. Click **OK**.

The **Setup Default Receivers** dialog closes and the Receivers tab updates to list the receiver streams using the IP Address specified in step 2.

- ★ Make a note of the automatically assigned label in the **Name** field for each stream. This name will be used in the database to represent the specific stream as an input (source).

## To manually add a single receiver

1. In the **Receivers** tab, click **Add**. This button is located in the bottom right corner of the tab.

The **Add Receivers** dialog opens.

2. Use the **IP Address** menu to specify the IP Address for the transport stream for the receiver.
3. Use the **UDP port** menu to specify the UDP port number of the transport stream for the receiver.
4. Use the **Type** field to specify the type of signal.

- ★ Selecting **Video+Audio** automatically creates table entries for one video and multiple audio streams.

5. If you selected **Video** or **Video+Audio** in step 4, use the **Video Format** field to specify the video format for the stream.

6. If you selected **Audio** or **Video+Audio** in step 4, use the **# of Audio Channels** field to specify the audio channels in the stream.
7. Use the **Transport IP** field to specify the UDP IP address of the transport stream for the signal.
8. Click **OK** to create a new entry in the **Receivers** tab.

The **Add Receivers** dialog closes and the **Receivers** tab updates with the new receiver stream.

- ★ Make a note of the automatically assigned label in the **Name** field for the stream. This name will be used in the database to represent the specific stream as an input (source).

## Troubleshooting

**Table 60** provides brief explanations for some common stream setup messages.

**Table 60 Troubleshooting the Error Messages**

| Error Message   | Cause  |
|---|--|
| Cannot set default due to maximum allowable streams has reached           | ENET pair has reached the maximum number of allowable streams  |
| Cannot add 2160P59 video due to maximum allowable UHD streams has reached |  |
| Primary and Secondary UDP port cannot be the same                         | When in Redundant mode, the primary and secondary streams must have the same IP address but different UDP ports assigned.  |
| This IP port does not have enough bandwidth to add 2160P29 video stream   | The ENET port has reached the maximum 25G bandwidth.   |
| slot#.port# is a redundant IP port. It is reserved for redundant senders. | The ENET pair is in Redundant mode and you cannot edit the second port (ENET 2 or ENET 4) of the pair.   |
| UHD video must be assigned to output 1, 2, 3, 4, 9, 10, 11, or 12.        | The UHD video stream (6G or 12G) format must be assigned to one of the inputs/outputs 1-4 or 9-12.   |
| Address x.x.x.x is being used by slotx.out[y].#.chz                       | Each stream must have a unique network address   |
| Video Format mismatch detected  | The input video format does not match those selected/enabled in the <b>Adaptive Input Allowed Input Rates</b> setting of the sender stream, or the input is invalid. |

## Using Senders and Receivers in the Database

Throughout the DashBoard interface, the senders and receiver streams (outputs and inputs respectively) of a router (or matrix) are referred to by hierarchical dotted notation:

**Slot.Port[x].Type.Channel** where:

- **Slot** identifies which slot in the router chassis the ULTRIX-IP-IO blade is located in.
- **Port[x]** identifies the physical port on the ULTRIX-IP-IO blade.
- **Type** identifies the generic signal type (e.g. SDI, audio).
- **Channel** identifies the audio channel within the stream. If the stream is video, the channel number is fixed to 1.

- ★ These designators may be assigned more user friendly names if required by editing the **Port Labels** interface.

The screenshot shows the 'Senders' tab in the Port Configuration Interface for 'slot1.port1'. The interface displays a table of active senders with the following columns: Port, Name, Active, Type, Signal Format, Codec, Channels, Transport IP, RTP Payload, UDP Port, Accepted Rates, Redundancy, Session ID, Alarm Severity, and Alarm Description. The table lists 14 senders, including Video, Audio, and Ancillary types, with various signal formats and codecs. The 'Accepted Rates' column shows values like '12G, 3G, 6G, HD'. The 'Redundancy' column is set to 'Primary' for all entries. The 'Port PTP State' is indicated as 'LOCKED'.

| Port       | Name         | Active  | Type      | Signal Format | Codec | Channels        | Transport IP | RTP Payload | UDP Port | Accepted Rates  | Redundancy | Session ID | Alarm Severity | Alarm Description |
|------------|--------------|---------|-----------|---------------|-------|-----------------|--------------|-------------|----------|-----------------|------------|------------|----------------|-------------------|
| slot1_out1 | slot1_out[1] | Enabled | Video     | 720P59        |       | 1               |              | 97          | 5000     | 12G, 3G, 6G, HD | Primary    |            |                |                   |
| slot1_out1 | slot1_out[1] | Enabled | Audio     |               | L24   | 1,2,3,4,5,6,7,8 |              | 98          | 5000     |                 | Primary    |            |                |                   |
| slot1_out1 | slot1_out[1] | Enabled | Ancillary | 720P59        |       | 1               |              | 96          | 5000     |                 | Primary    |            |                |                   |
| slot1_out2 | slot1_out[2] | Enabled | Video     | 720P59        |       | 1               |              | 97          | 5000     | 12G, 3G, 6G, HD | Primary    |            |                |                   |
| slot1_out2 | slot1_out[2] | Enabled | Audio     |               | L24   | 1,2,3,4,5,6,7,8 |              | 98          | 5000     |                 | Primary    |            |                |                   |
| slot1_out2 | slot1_out[2] | Enabled | Ancillary | 720P59        |       | 1               |              | 96          | 5000     |                 | Primary    |            |                |                   |
| slot1_out3 | slot1_out[3] | Enabled | Video     | 720P59        |       | 1               |              | 97          | 5000     | 12G, 3G, 6G, HD | Primary    |            |                |                   |
| slot1_out3 | slot1_out[3] | Enabled | Audio     |               | L24   | 1,2,3,4,5,6,7,8 |              | 98          | 5000     |                 | Primary    |            |                |                   |
| slot1_out3 | slot1_out[3] | Enabled | Ancillary | 720P59        |       | 1               |              | 96          | 5000     |                 | Primary    |            |                |                   |
| slot1_out4 | slot1_out[4] | Enabled | Video     | 720P59        |       | 1               |              | 97          | 5000     | 12G, 3G, 6G, HD | Primary    |            |                |                   |
| slot1_out4 | slot1_out[4] | Enabled | Ancillary |               | L24   | 1,2,3,4,5,6,7,8 |              | 98          | 5000     |                 | Primary    |            |                |                   |

Figure 38 Example of Senders in the Port Configuration Interface



# ULTRIX-IPX-IO Setup

This chapter outlines how to configure receivers and senders for the ULTRIX-FR12 router to be used in video and audio streaming when an ULTRIX-IPX-IO blade is installed in a slot of an ULTRIX-FR12 router chassis.

★ The ULTRIX-IPX-IO supports multicast IP Addresses in the range of 225.x.x.x to 239.x.x.x. Note that some addresses in this range are reserved by IANA.

## For More Information on...

- the installation and cabling of the ULTRIX-IPX-IO, refer to the ***ULTRIX-FR12 Installation Guide***.

## What are Receivers, Senders, and Streams?

The following terms may be used throughout this chapter:

### Device

A physical, virtual, or software application that may include multiple sources, destinations, senders, or receivers.

### Flow

The continuous raw media content. It can contain more than one essence (e.g. an audio flow can contain multiple channels).

A flow is independent of the transport protocol. For example, 48kHz LPCM audio is a flow; AES67 is one type of stream which can carry the flow.

Flows cannot generally be passed around natively, and need to be encapsulated in a stream. Flows from the same source are considered “editorially equivalent”, but may be encoded differently.

### Receiver

An element within a device that receives exactly one stream, which contains one flow from a network.

### Sender

An element within a device which presents exactly one flow, packaged as a stream onto a network.

### Stream

One flow, encapsulated within a transport protocol. Examples include SMPTE ST 2110-20 Video, SMPTE ST 2110-30 Audio, or SMPTE ST 2110-40 ANC.

## Before You Begin

This section provides information to keep in mind before setting up ULTRIX-IPX-IO streams.

- ★ Each ULTRIX-IPX-IO blade has four QSFP28 ports (ETH1-ETH4) with 100Gb or 25Gb bandwidth per port.

## Hardware

The Ultrix software currently supports:

- 100Gb QSFP28 transceiver modules based on 4x25Gb NRZ optical lanes, either requiring no FEC or RS(528,514) KR4 FEC, for multi-mode or single-mode fibers, up to power class 7 (5W). For example, 100GBASE-SR4, 100GBASE-SWDM4, 100GBASE-PSM4, 100GBASE-CWDM4, 100GBASE-4WDM-10/20/40, 100GBASE-CLR4, 100GBASE-LR4.
  - 100Gb QSFP28 transceiver modules based on 1x100Gb PAM4 optical lane, either requiring no FEC or providing built-in RS(544,514) KP4 FEC, for multi-mode or single-mode fibers, up to power class 7 (5W). Compliant with the 100G Lambda MSA, including built-in RS(544,514) KP4 FEC. For example, 100GBASE-DR, 100GBASE-FR, 100GBASE-LR.
  - 100Gb QSFP28 transceiver modules based on 4x25Gb NRZ over shielded balanced copper cabling, requiring RS(528,514) KR4 FEC. For example, 100GBASE-CR4.
- ★ Contact Ross Technical Support about other QSFP28 transceiver modules not listed above.

## Audio Streams

Keep the following in mind when setting up the ULTRIX-IPX-IO streams:

- The blade supports a maximum of 4 audio streams<sup>1</sup> per video essence (64 audio streams per blade) only through the first ENET pair ETH1/ETH2 when used with a stand-alone router.
- The ULTRIX-IPX-IO is compliant with the SMPTE ST 2110-30 Levels A and C (partial). This results in 1 to 8 channels at 1ms packet time, or 1 to 16 channels at 125µs packet time.
- The Packet Time is a global setting per ULTRIX-IPX-IO slot for all receivers and senders.

## Video and ANC Streams

Keep the following in mind when setting up video and ANC IP streams:

- Each ENET pair can support up to 8 redundant video/ANC streams with a maximum of 16 streams per ULTRIX-IPX-IO blade.

## Protection Switching (SMPTE 2022-7)

The ULTRIX-IPX-IO blade also provides protection switching as per SMPTE 2022-7. This option must be enabled globally to enable/disable it for any pair of two streams on the blade.

Keep the following in mind when setting up redundant streams:

- You will need to assign a unique IP address to each stream (primary and secondary).
- Video and ANC streams 1 to 8 are mapped to ETH1 as the primary stream and ETH2 as the secondary stream.
- Video and ANC stream 9 to 16 are mapped to ETH3 as the primary stream and ETH4 as the secondary stream.
- All 64 audio streams are mapped to ETH1 as the primary stream and ETH2 as the secondary stream.

---

1. Supports 1, 2, or 4 audio streams per video essence.

## Automatic Sender Session Description Protocol (SDP) Updates

When a sender stream is active and its input video format changes to a different and valid format, if the new format is allowed by the session (as defined by the Adaptive Input Allowed Input Rates setting) and results in an overall system valid configuration (no ULTRIX-IPX-IO bandwidth limit will be exceeded), the sender stream will update itself to use this new format, generating a new version of its SDP. The Session and NMOS IDs do not change when the sender stream SDP update is performed. This allows the existing streams to adapt so that the ULTRIX-IPX-IO does not need to track new streams. This feature is enabled by default.

- ★ You can disable this feature by deselecting all Adaptive Input Allowed Input Rates (HD, 3G, 6G, 12G) and selecting a single video format. Only that format will be announced and transmitted. Any other format will stop packet transmission and no SDP updates will occur. Switching between sources with the same video format is still allowed.

This feature is helpful to avoid receivers to be configured with a stale version of the associated sender. If the parameters of a sender change, an SDP update is triggered, which is then forwarded to all receivers affected by the identified update.

- ★ When using an Ultracore BCS, the Ultracore BCS automatically updates the receivers when the subscribed sender changes.

### Quick Updates when Streaming from the Ultracore BCS

When the format of the input video changes, the ULTRIX-IPX-IO updates its own sender and SDP, and the Ultracore BCS is notified of this change. The Ultracore BCS then issues a connection update to all receivers using this sender. After notifying the Ultracore BCS, the video sender resumes with the new format.

### Protection from Invalid Video Scenarios

When an input with a non-matching frame rate is detected, an alarm in DashBoard is raised. The SDP file remains unchanged, but the sender does not transmit the packets. This prevents the entire system from switching to an invalid video format or unstable video input.

### Using any Supported Control Protocol

The advertised SDP file updates to reflect a valid video format change through all supported control protocols, including NMOS, Ember+, and DashBoard advertised network streams. This enables the ULTRIX-IPX-IO to use the new SDP file, and enables the user to update the connections of any active receivers to the new format without having to recreate the receiver connection manually when the sender changes.

### Requirements

To take advantage of this feature, you will need to:

- Include an Ultracore BCS in the routing system to identify the sender SDP change and update all receivers associate with that SDP.
- Configure the receivers and senders and ensure they are active on the router. If a sender is disabled (not active), the incoming changes on the router port of the ULTRIX-IPX-IO blade will not cause any change on the active configuration.
- When configuring the senders, specify the video format(s) you want to stream via the **Adaptive Input Allowed Input Rates** option.

## Overview

The generalized work flow of configuring your ULTRIX-IPX-IO is:

1. Download and install the latest version of the DashBoard client software.
2. Contact your IT department for the required IP addresses for your ULTRIX-IPX-IO ports.
3. Cable the ULTRIX-IPX-IO ports.
4. Configure the protocol settings for the ULTRIX-IPX-IO.
5. Specify the timing requirements for the ULTRIX-IPX-IO.
6. Configure the streams for the ULTRIX-IPX-IO.
7. Continue to set up your database as outlined in the ***Ultrix and Ultracore Database Guide***.

## Setups with an Ultracore BCS

An Ultracore BCS with the Ultracore-IP license enables the video senders/receiver endpoints to be reported as available ports to the router database. The video and ancillary senders/receivers are seen as part of a single video-IP matrix, and the audio senders/receivers are part of a single audio-IP matrix.

- ★ When a video sender stream is active and the video format changes on the input of that stream, the Ultracore BCS will automatically detect the update and then updates all the receivers subscribed to that sender. This allows the existing streams to adapt.

Refer to the ***Ultracore BCS User Guide*** for details.

## Connectivity Overview

Connectivity is defined by the optical modules, fiber cables, and ethernet switch in your system that includes the ULTRIX-IPX-IO. This section provides examples of simplified workflows where an ULTRIX-IPX-IO is connected to an 25G switch or an 100G switch.

### Connectivity with an 25G Ethernet Switch

Be aware that the ULTRIX-IPX-IO provides one 25G link on each QSFP28 Ethernet connector.

**Figure 39** shows a simplified workflow where the ULTRIX-IPX-IO provides bi-directional communication via four QSA (QSFP to 25G SFP adapter) using fiber cables connected to two 25G ethernet switches.

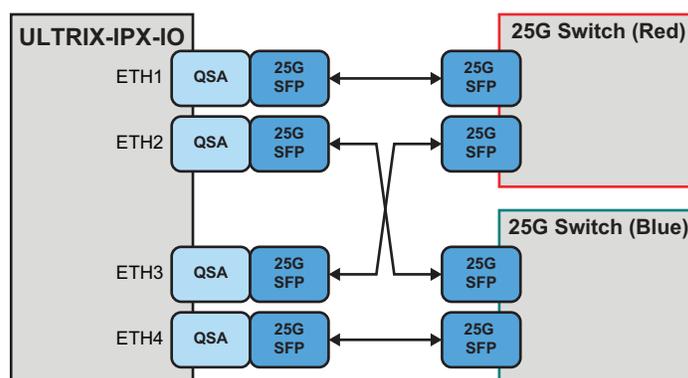


Figure 39 Workflow — QSA/SPF to SFP (25G Switches)

**Figure 40** shows a simplified workflow where the ULTRIX-IPX-IO provides bi-directional communication via four 100G QSFP using breakout fiber cables connected to two 25G ethernet switches. In this workflow, the breakout cable fibers 2 to 4 are unused.

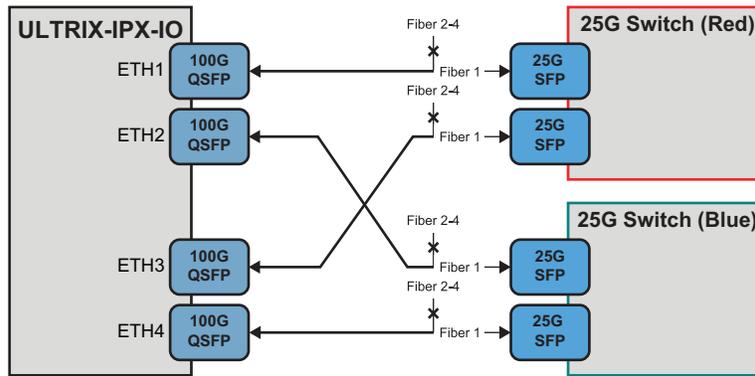


Figure 40 Workflow — QSFP/Breakout to SFP (25G Switches)

## Connectivity with an 100G Ethernet Switch

When using an 100G QSFP, ensure that it is a 4x25G physical or optical lanes type. For example, 100G-SR4, 100G-CDWM4, etc.

**Figure 41** shows a simplified workflow where the ULTRIX-IPX-IO provides bi-directional communication via four 100G QSFP using fiber cables connected to two 100G ethernet switches.

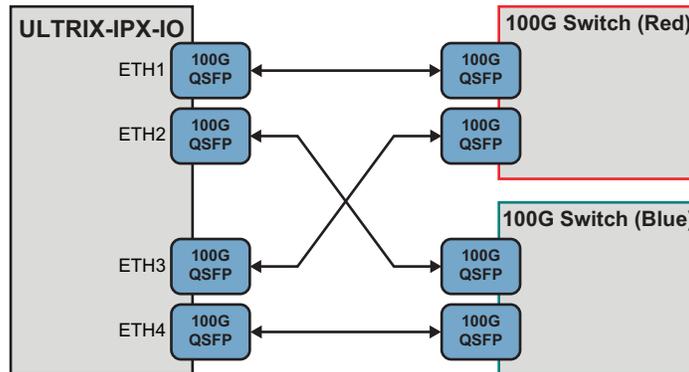


Figure 41 Workflow — QSFP to QSFP 100G Switch with Breakout

**Figure 42** shows a simplified workflow where the ULTRIX-IPX-IO provides bi-directional communication via four QSA (QSFP to 25G SFP adapter) using fiber cables connected to a 100G ethernet switch. Notice that this workflow does not support a redundant switch. If a separate networks is required, configure primary/secondary ports to different VLANs or subnets.

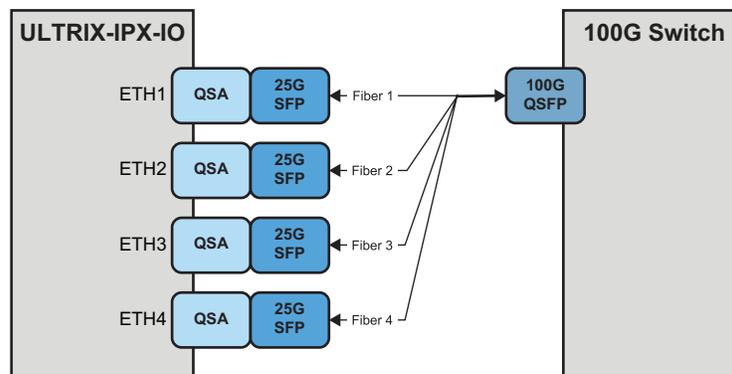


Figure 42 Workflow — QSA/SFP to Breakout/QSFP and 100G Switch with Breakout

# Setting the Link Speed for an ULTRIX-IPX-IO

This section outlines how to set the link speed for an ULTRIX-IPX-IO.

## Before You Begin

Keep the following in mind:

- Refer to **Table 61** for the bandwidth reservation based on link speed.

**Table 61 Bandwidth Reservations — Link Speed**

| Link Speed | SMPTE 2110 | CPU Traffic |
|------------|------------|-------------|
| 100G       | 98.5 Gbps  | 1.5 Gbps    |
| 25G        | 23.5 Gbps  | 1.5 Gbps    |

- When the Link Speed is set to 25G:
  - › Only one 25G link per connector.
  - › All inputs and outputs can process UHD.
  - › Restriction to assign UHD is given by bandwidth reservation. See **Table 62**.
  - › For other formats, the restriction is up to 8 in/out per ENET pair.

**Table 62 UHD I/O per ETH Pair — 25G Link Speed**

| UHD Video Format | Max. Number of In/Out per ENET Pair |     |
|------------------|-------------------------------------|-----|
|                  | 100G                                | 25G |
| 2160p 60Hz       | 8                                   | 2   |
| 2160p 59.94Hz    | 8                                   | 2   |
| 2160p 50Hz       | 8                                   | 2   |
| 2160p 30Hz       | 8                                   | 4   |
| 2160p 29.97Hz    | 8                                   | 4   |
| 2160p 25Hz       | 8                                   | 5   |

## Setting the Link Speed

This setting is retained after software upgrades, reboots, and power cycles.

### To set the link speed for an ULTRIX-IPX-IO

1. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
2. Expand the **Systems** sub-node.
3. Expand the **Configuration** sub-node.
4. Double-click the **ULTRIX-FR12** node.  
The **Device Configuration** interface opens.
5. Select .  
The **Frame Configuration** page opens.
6. Select the **Ultrix-IP** tab.

7. Select the **IP System** tab on the left toolbar.

| Port Network | Slot             | Boar...   | Redu... | Total... | Redu... | Ember+  | Emb... | DNS      | DNS ... | DNS Servers | Link Speed | Pack... | Telnet  | System Time Refe... | Session ID Seed | IGMP... | IGMP... |
|--------------|------------------|-----------|---------|----------|---------|---------|--------|----------|---------|-------------|------------|---------|---------|---------------------|-----------------|---------|---------|
| PTP          | Slot 1 (eth1...) | Ultrix-IP | Enabled | 27       | 24      | Enabled | 9095   | Disab... |         |             | 100G       | 125     | Enabled | PTP                 |                 | Enabled | SSM     |
| NTP          | Slot 1 (eth1...) | Ultrix-IP | Enabled | 25       | 24      | Enabled | 9095   | Disab... |         |             | 100G       | 125     | Enabled | PTP                 |                 | Enabled | SSM     |
| NMOS         | Slot 3 (eth3...) | Ultrix... | Enabled | 69       | 23      | Enabled | 9095   | Disab... |         |             | 100G       | 125     | Enabled | PTP                 |                 | Enabled | SSM     |
| LLDP         |                  |           |         |          |         |         |        |          |         |             |            |         |         |                     |                 |         |         |

8. Locate the row for the router slot/ENET pair you wish to configure.
9. Click the cell in the **Link Speed** column to select the link speed. The default is 100G.
10. Monitor the restart of the ULTRIX-IPX-IO blade.
11. Select the **Port Network** tab and verify that the **Speed** column now reports the correct link speed for the port(s).

## Configure the Protocol Settings

The ULTRIX-IPX-IO supports media distribution based on NMOS, and Ember+. This section outlines how to configure each protocol.

★ Changes made to the ULTRIX-IPX-IO settings may require a frame reboot.

### Configuring the NMOS Settings

The Network Media Open Specifications (NMOS) is enabled by default on the device if one or more ULTRIX-IPX-IO blades are present. The ULTRIX-FR12 router will automatically look for advertised NMOS registries using mDNS and will publish the Device Name and other info in the Frame Configuration > ULTRIX-IPX-IO > NMOS tab. You can also choose to register the router when using Registry Service Discovery (RDS).

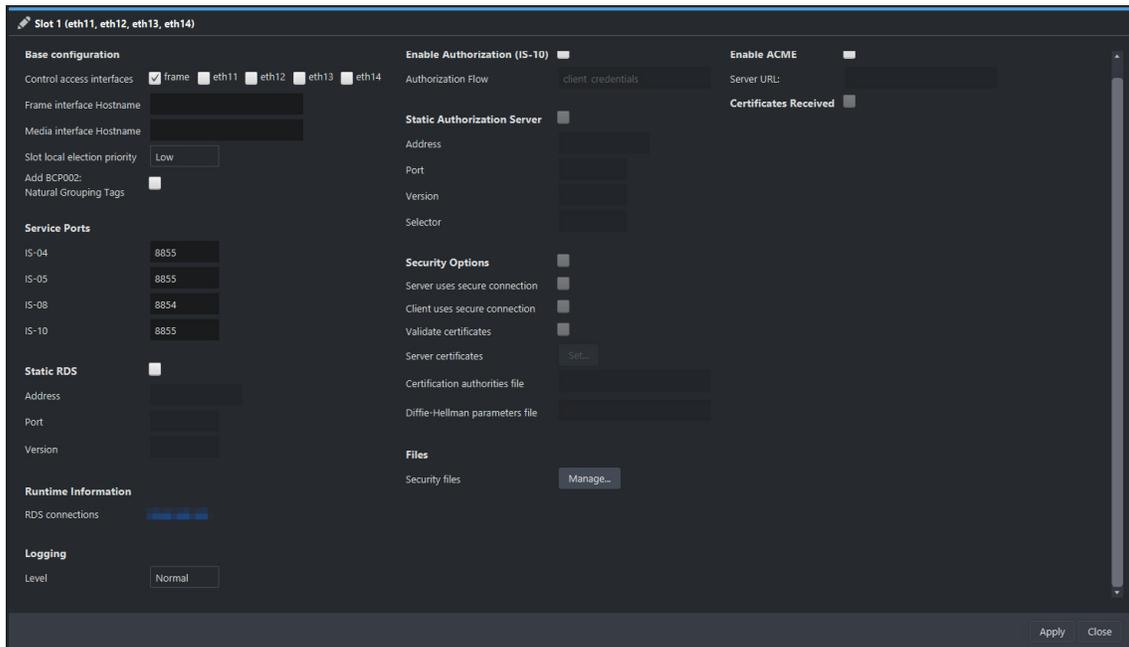
#### To configure the NMOS settings

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .

The **Frame Configuration** page opens.

7. Select the **Ultrix-IP** tab.
8. Select the **NMOS** tab on the left toolbar.
9. Select the row for the router slot you wish to configure.

The NMOS dialog opens for the selected slot. In the following example, the user selected Slot 1.



★ It is not recommended that your media network and management network use the same subnet.

10. Use the **Control Access Interfaces** options to enable or disable control via each port.
11. Select the **Add BCP-022-01** box to enable AWA BCP-002-01 natural grouping of NMOS resources by the ULTRIX-FR12. This option is disabled by default.
12. Use the **Service Ports** fields to specify each TCP port as follows:
  - Use the IS-04 field to specify the port the NMOS IS-04 Node service is listening on.
  - Use the IS-05 field to specify the port the NMOS IS-05 Connection service is listening on.
  - Use the IS-08 field to specify the port the NMOS IS-08 Connection service is listening on.
  - Use the IS-10 field to specify the port the NMOS IS-10 Connection service is listening on.
13. To force the ULTRIX-FR12 to register to a specific Registry Service Discovery on the network:
  - a. Select the **Static RDS** box.
  - b. Use the **Address** field to set the static IP that the router will use to register to this specific RDS.
  - c. Use the **RDS Port** field to specify the port used for the RDS.
  - d. Use the **RDS Version** field to specify the version of the NMOS registry API.

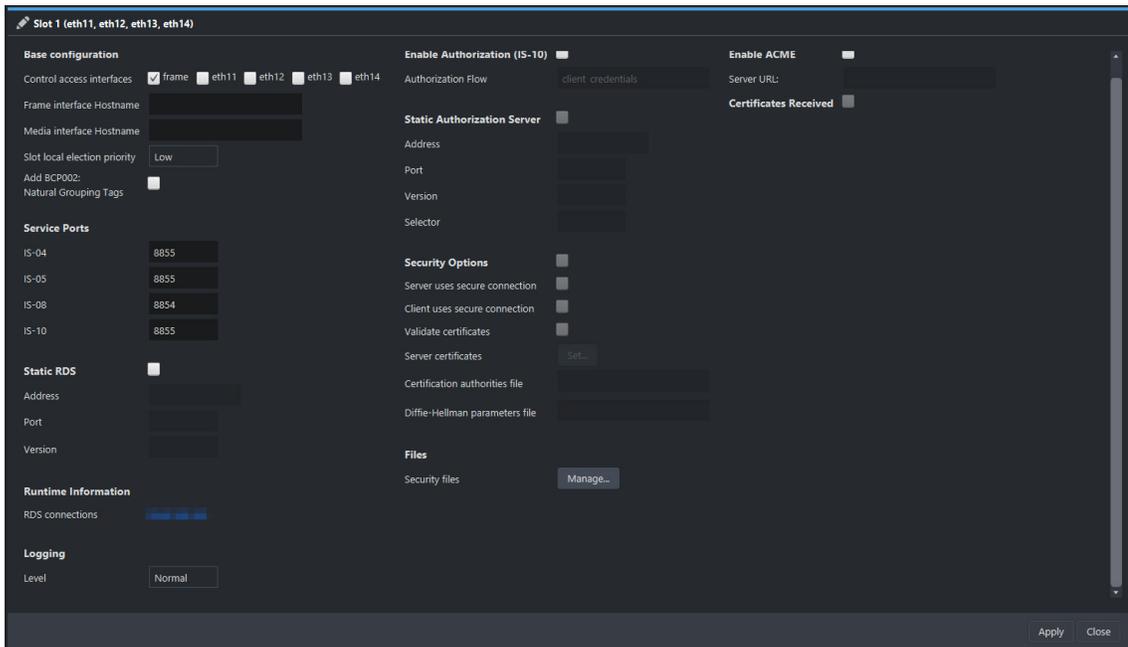
## NMOS IS-10 Setup

The following procedure is only applicable if you have both an NMOS Authorization Server and an RDS that is enabled for secure communication via NMOS IS-10.

### To configure the ULTRIX-IPX-IO for NMOS IS-10

1. From the **Frame Configuration** page, select **Ultrix-IP > NMOS**.
2. Select the row for the router slot you wish to configure.

The NMOS dialog opens for the selected slot. In the following example, the user selected Slot 1.



3. Select the **Enable Authorization** box to enable NMOS IS-10 Authorization for the router on this slot.
4. Use the **Authorization Flow** field to define which mode the device will use to authenticate with the Authorization Server.
5. To force the ULTRIX-FR12 to register to a specific NMOS IS-10 Authorization Server on the network:
  - a. Select the **Static Authorization Server** box.
  - b. Use the **Address** field to set the static IP that the ULTRIX-FR12 router will use to connect to the Authorization Server.
  - c. Use the **Port** field to specify the port used for NMOS IS-10.
  - d. Use the **Version** field to specify the version of the NMOS IS-10 registry API.
  - e. Use the **Selector** field to define the location for the registry API. Refer to the IS-10 specification for details.
6. Use the Security Options to define the NMOS IS-10 secure communication:
  - **Server uses secure connection** — select this option if the ULTRIX-FR12 router will use secure communication when it is the server and will receive connection requests from an Ultracore BCS or other controller device.
  - **Client uses secure connection** — select this option if the ULTRIX-FR12 router will use secure communication when the router is the client (for the registration with RDS and Authorization server).
  - **Validate certificates** — select this option only when troubleshooting communication issues. This will enable the system setup to bypass the actual validation of the client provided certificates. This option should not be selected for production services.
  - **Server certificates** — Click **Set** to open a dialog to set the server certificates by creating entries that references the uploaded security files based on its types/Algorithm used. The files are uploaded via the Security files field. The files are used by the server to validate certificates and it needs to have a key algorithm, private keys, and certificate chain file.

7. Use the **Files > Security files > Manage** to upload security files as follows:
  - The categories are pre-defined and not all are required for all setups. For example, some systems might not need a Diffie-Hellman file but most systems will require a Certificates authorities.
  - Once these files are uploaded, they become available for the user to select via the Security Options > Certificates authorities file field and the Diffie-Hellman parameters file field.

### To enable ACME support

1. Select the **Enable ACME** box.
2. Use the **Server URL** field to type the IP address of the ACME server the ULTRIX-FR12 will connect to.
3. Select the **Certificate Received** box to enable the Ultrix router to report when a valid ACME certificate is sent by the NMOS device. The status is reported in the ACME column on the main page of the NMOS tab.

## Ember+ Communications

If the Ultrixcore-EMBER+ license is enabled, each ULTRIX-IPX-IO blade provides 16 streams via one port. The Ember+ port will be available on Port 9095 for the IP address assigned to each ULTRIX-IPX-IO port. If accessing it through the Ultrix Frame Configuration > Ultrix-IP > System interface, the ports will be distributed based on slot position as follows:

- Streams 1-16 to Port 50xx8 where **xx** is the router slot that the ULTRIX-IPX-IO is installed in.

To establish a connection between the Ember+ client and the ULTRIX-FR12, you will need to:

1. Add the ULTRIX-FR12 in the Ember+ client interface using the IP Address assigned to the ULTRIX-FR12 router.
2. Enable SDP patching with the Ember+ client to establish video and audio receivers on the ULTRIX-FR12.
3. Ensure that all network streams have a consistent audio channel count.

### Establishing a Connection

Ensure that SDP patching is enabled with the Ember+ client to establish receivers on the ULTRIX-FR12.

- ★ ULTRIX-FR12 implements BESS v1.1 for Ember+ support to communicate with third-party controllers.

### Mapping

You will need to:

1. Configure the sender sessions in DashBoard.
2. Use the Ember+ controller interface (e.g. Lawo VSM) to map the sources to the targets. Refer to the documentation that came with your Ember+ controller for details.

## Configuring the Port Network

By assigning an IP Address to each QSFP28 port of the ULTRIX-IPX-IO blade, you are able to uniquely identify it on the network and control it via the DashBoard interface. Each QSFP28 port can be configured separately for media traffic.

### To assign the network settings for an ULTRIX-IPX-IO port

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .

The **Frame Configuration** page opens.

7. Select the **Ultrix-IP** tab.
  8. Select the **Port Network** sub-tab.
  9. Locate the row for the slot#.port# you wish to configure.
- ★ All QSFP28 ports are set to DHCP by default.
10. If you are manually configuring the network settings:
    - a. Click the cell in the **IP Mode** column and select **Static**.
    - b. Use the **IP Address** field to specify the static IP Address for the port. This is the IP Address that is used to control and communicate with the specified port.
    - c. Use the **Subnet Mask** field to specify the subnet mask for the port.
  11. To select the FEC mode:
    - a. Select the cell in the FEC column.
    - b. Perform one of the following:
      - Select the FEC mode that matches the ULTRIX-IPX-IO port and the corresponding switch port; or
      - Select Disabled for modules with built-in FEC (DR/FR/LR).
- ★ Whenever possible, it is recommended to set the FEC mode to Disabled to improve PTP performance. Should you need to enable FEC due to poor transceiver/fiber performance, you can set the FEC mode to reed-solomon. Note that the ULTRIX-IPX-IO does not support fire-code FEC.
12. If you want the network settings for the port to be automatically obtained, and DHCP service is available on your control network, click the cell in the **IP Mode** column and select **DHCP**.
  13. Repeat this procedure for each QSFP28 port you wish to configure.
  14. Verify the new settings reported on the Frame Configuration status fields.

## Configuring the Timing Settings

The Ultrix supports the Precision Time Protocol (PTP) as defined in the **IEEE 1588-2008** standard and the **SMPTE ST-2059** specification.

★ The Ultrix behaves only as a follower and cannot be used as a Boundary Clock or Grandmaster.

### Configuring the PTP Settings

You can synchronize the ULTRIX-FR12 to real-time clocks of other devices in the same network. You create a profile (use the default settings or create a custom profile) that identifies the ULTRIX-FR12 to the Grandmaster clock.

- ★ There are several criteria that PTP clocks compare to determine who will be master and who will be follower (called the Best Master Clock Algorithm, or BMCA), and they are evaluated in order: Priority1, clock class, accuracy, scaled log variance, Priority2, clock ID (similar to the MAC address). Practically, Priority1 is the only setting configured on all clocks to control the outcome of the Grandmaster election. If Priority1s are equal, the next criterion is evaluated (clock class) and the criteria are evaluated in succession until a Grandmaster is determined.

### To configure a PTP default profile for the ULTRIX-FR12

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .  
The **Frame Configuration** page opens.
7. Select the **Ultrix-IP** tab.
8. Select the **PTP** sub-tab.
9. Use the **Profile** menu to specify the standard/specification used for PTP. The default is SMPTE ST 2059-2.

- ★ The **Domain** is automatically set.

10. Click **Apply**.

### To create a custom PTP profile for the ULTRIX-FR12

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .

The **Frame Configuration** page opens.

7. Select **Ultrix-IP > PTP**.
8. Use the **Profile** menu to select a standard/specification used for PTP.
9. Change the settings according to PTP parameters used by the system.

- ★ There can be multiple PTP domains operating concurrently within a network. The domain is a field in all PTP message headers. Messaging between entities are segregated by domain (e.g. the Ultrix is an endpoint configured for domain 128 and ignores messages from a neighboring clock configured for domain 127).

## Configuring the PTP Settings for a Specific Port

Once you create a PTP profile for the Ultrix, you may want to uniquely define the PTP settings for each QSFP28 port.

### To configure the PTP settings for a specific port

1. From the **Frame Configuration** page, select **Ultrix-IP > PTP**.
2. Locate the **PTP Ports** area of the **PTP** tab.
3. Locate the row for the port you wish to configure.
4. Use the **Sync Interval** field to specify the number of seconds at which synchronization messages are sent from the master clock to the specified ULTRIX-IPX-IO port.
5. Use the **Announce Interval** field to specify the rate of announce messages that the specified ULTRIX-IPX-IO port requests from the master clock during a unicast session.
6. Use the **Announce Receipt Timeout** field to specify the number of seconds the specified ULTRIX-IPX-IO port waits for an announce interval message before timing out.
7. Click **Apply**.

## Specifying an NTP Server as the Time Source

You can choose to use an NTP Server as the system time source for an ULTRIX-IPX-IO blade.

- ★ The media time source is always provided by PTP.
- ★ Before proceeding, ensure the ULTRIX-FR12 is configured to access the NTP Server in your facility. Refer to “**Using an NTP Server as the Time Source**” for details.

### To specify an NTP Server as the time source for an ULTRIX-IPX-IO

1. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
2. Expand the **Systems** sub-node.
3. Expand the **Configuration** sub-node.
4. Double-click the **ULTRIX-FR12** node.  
The **Device Configuration** interface opens.
5. Select .  
The **Frame Configuration** page opens.
6. Select the **Ultrix-IP** tab.
7. Select the **NTP** sub-tab.  
The sub-tab lists each ULTRIX-IPX-IO slot as a separate row.
8. Locate the row for the required ULTRIX-IPX-IO slot you wish to enable NTP as the time source.
9. Select the **Enabled** box for that row.

## Configuring the Senders

You will need to specify the IP encapsulation properties for the active video and audio. For each sender output, you need to specify the IP encapsulation properties for video, audio, and ancillary sender streams. A sender stream on the ULTRIX-IPX-IO can be configured with any multicast IP address in the range of 225.x.x.x to 239.x.x.x.

- ★ Make note of the bandwidth allocation for the ULTRIX-IPX-IO port to determine the available capacity of the port. You can add a maximum of 8 video sessions per ETH port. Once that maximum is reached, new streams will not be accepted and updates will only be accepted if the new bandwidth used does not exceed 100Gb.

- ★ The stream count for each ENET redundant pair is 8+8. The first ENET pair (ETH1 and ETH2) transports output streams 1 to 8, while the second ENET pair (ETH3 and ETH4) transports output streams 9 to 16.

### To display the Add Senders menu for a port in Dashboard

1. Locate the ULTRIX-FR12 in the Tree View of Dashboard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. On the router rear panel map, locate the required ULTRIX-IPX-IO slot.
7. Select the port on the ULTRIX-IPX-IO slot you wish to configure.

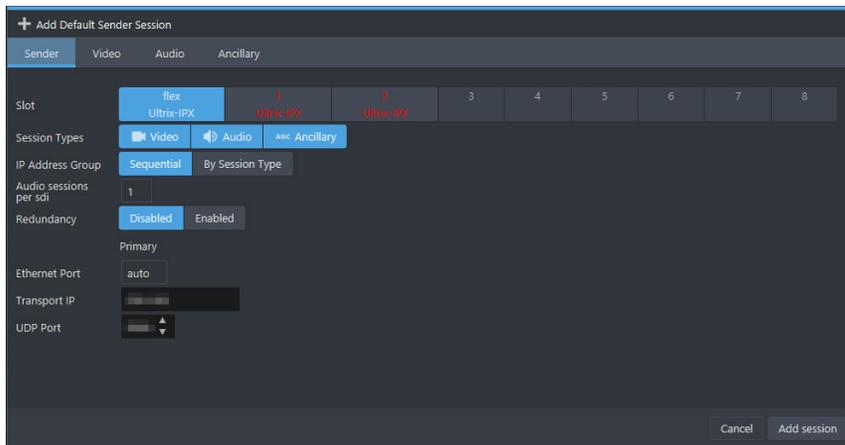
The **Port Configuration** page updates to display the options for the port with the Summary tab automatically selected.

8. Click **Add Senders**.

### To add advertised sender streams

1. From the **Add Senders** menu, click **Default**.

The **Add Default Sender Session** dialog opens.



2. Use the **Transport IP** field to specify the IP range for the sender.
  3. Use the **UDP Port** field to specify the RTP port for the advertised stream.
  4. Use the **Session Types** options to select the type of stream that will be available at the specified IP Address.
  5. Use the **RTP Payload** field to specify the Real-time Transport Protocol (RTP) payload IDs used by that sender stream.
  6. If you selected **Video** in step 4:
    - a. Use the **Video Format** field to specify the video format of the signal available for the advertised stream.
    - b. Use the options in the **Adaptive Rates** area to specify the video formats that the stream is allowed to follow should the input SDI video format change while the sender is enabled.
- ★ This is not a bandwidth reservation. If a sender is set to allow 12G inputs, it is not guaranteed that it would follow that video format as all device setups is constrained by the available bandwidth

on the Ethernet side. If the new video input is valid, but the overall system configuration is invalid, the sender will be updated but an alarm is still raised to the user to alert of a video mismatch.

★ When the sender is updated, all protocols or interfaces that advertise it will be updated with a new configuration set and SDP. This includes NMOS, Ember+, and all DashBoard tabs where the sender is visible.

7. If you selected **Audio** in step 4:

a. Select the number of **Audio sessions per sdi** from 1 to 4.

b. Select the **Audio** tab from the dialog toolbar.

c. For each session:

- Use the **Audio Channels** to select the audio channels to be transported by each audio stream. One audio channel can be transported in multiple sessions.
- Use the **Audio Codec** to specify the audio encoding format for each audio stream.
- Use the **RTP Payload** to specify the Real-time Transport Protocol (RTP) payload IDs used by each audio stream.

8. If you selected **Ancillary** in step 4:

a. Select the **Ancillary** tab from the dialog toolbar.

b. Use the **RTP Payload** field to specify the Real-time Transport Protocol (RTP) payload IDs used by that sender stream.

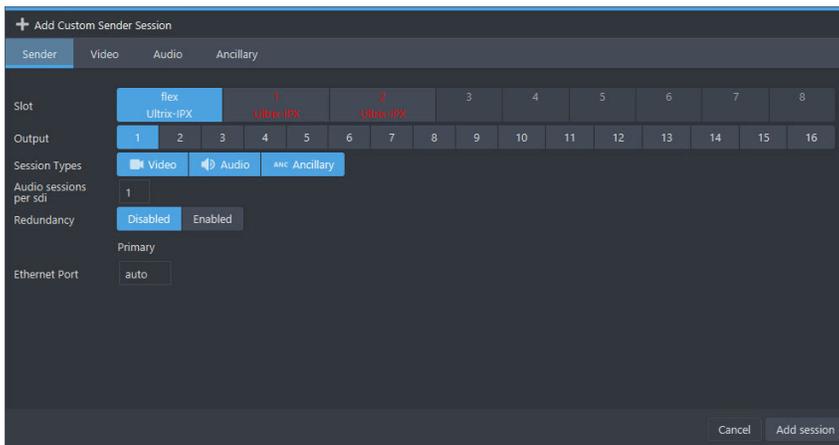
9. Click **Add session**.

The **Add Default Sender Session** dialog closes and the **Port Configuration** page updates to list the sender streams advertised using the IP Address specified in step 2.

### To manually add a sender stream

1. From the **Add Senders** menu, click **Custom**.

The **Add Sender Session** dialog opens.



2. Use the **Output** options to assign the SDI input signal to the sender stream.

3. Use the **Session Types** options to select the type of stream that will be available at the specified IP Address.

4. Use the **Transport IP** field to specify the sender.

The audio and ancillary (ANC) data will receive the selected IP address with one for audio and the second for the ANC.

5. Edit the **UDP Port** to specify the source port to transmit the data.

6. If you selected **Video** in step 3:
  - a. Select the **Video** tab from the dialog toolbar.
  - b. Use the **Transport IP** field to specify the sender.
  - c. Edit the **UDP Port** to specify the source port to transmit the data.
  - d. Use the **RTP Payload** field to specify the Real-time Transport Protocol (RTP) payload IDs used by that sender stream.
  - e. Use the **Adaptive Rates** options to specify the video formats that the stream is allowed to follow should the input SDI video format change while the sender is enabled.
- ★ This is not a bandwidth reservation. If a sender is set to allow 12G inputs, it is not guaranteed that it would follow that video format as all device setups is constrained by the available bandwidth on the Ethernet side. If the new video input is valid, but the overall system configuration is invalid, the sender will be updated but an alarm is still raised to the user to alert of a video mismatch.
- ★ When the sender is updated, all protocols or interfaces that advertise it will be updated with a new configuration set and SDP. This includes NMOS, Ember+, and all DashBoard tabs where the sender is visible.
7. If you selected **Audio** in step 3:
  - a. Select the number of **Audio sessions per sdi** from 1 to 4.
  - b. Select the **Audio** tab from the dialog toolbar.
  - c. For each session:
    - Use the **Audio Channels** to select the audio channels to be transported by each audio stream. One audio channel can be transported in multiple sessions.
    - Use the **Audio Codec** to specify the audio encoding format for each audio stream.
    - Use the **RTP Payload** to specify the Real-time Transport Protocol (RTP) payload IDs used by each audio stream.
    - Use the **Transport IP** field to specify the sender for the audio stream.
    - Edit the **UDP Port** to specify the source port to transmit the audio data.
8. If you selected **Ancillary** in step 3:
  - a. Select the **Ancillary** tab from the dialog toolbar.
  - b. Use the **Transport IP** field to specify the sender for the ancillary stream.
  - c. Edit the **UDP Port** to specify the source port to transmit the ancillary data.
  - d. Use the **RTP Payload** field to specify the Real-time Transport Protocol (RTP) payload IDs used by that sender stream.
9. Click **Add Sender Session**.

The **Add Senders Session** dialog closes and the **Port Configuration** page updates to list the sender streams advertised using the IP Address specified in step 4.

## Configuring the Receivers

Receivers are the representation of connections on the router and report the information related to all traffic that is received. Receivers can be manually created by manually specifying the IP and UDP ports of the sender on the **Port Configuration** tab, but usually the process of managing receivers is done by the external network device.

- ★ The ULTRIX-FR12 supports one-to-many connections (where one source can be routed to multiple targets) via ST-2110 multicast distribution. This enables you assign the same transport IP

to multiple receivers of the same type. Note that you must still assign a unique IP for each sender stream configured.

This section outlines what is currently present/active on the **Port Configuration** tab and outlines how to manually specify receivers on the router using this interface.

### To display the Add Receivers menu for a port in Dashboard

1. Locate the ULTRIX-FR12 in the Tree View of Dashboard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. On the router rear panel map, locate the required ULTRIX-IPX-IO slot.
7. Select the port on the ULTRIX-IPX-IO slot you wish to configure.

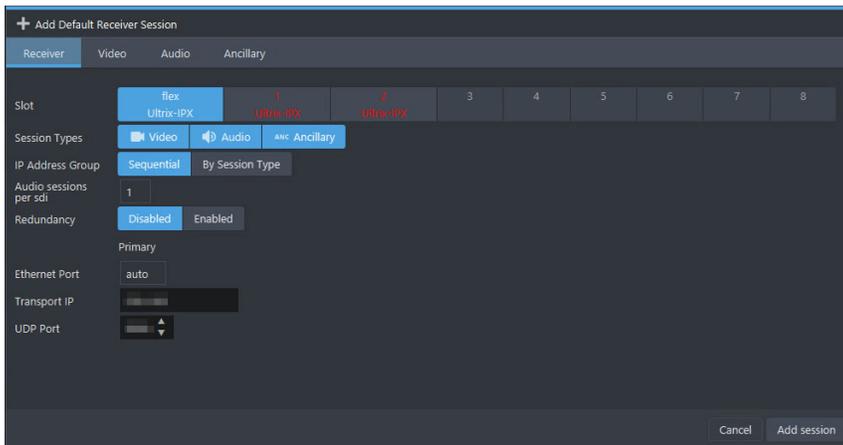
The **Port Configuration** page updates to display the options for the port with the Summary tab automatically selected.

8. Click **Add Receivers**.

### To add a series of receivers

1. From the **Add Receivers** drop-down menu, select **Default**.

The **Add Default Receiver Session** dialog opens.



2. Use the **Session Types** options to specify the type of signal the streams will include.
3. Use the **IP Address Grouping** options to specify how to define the series of receiver streams.
4. Use the **Transport IP** field to specify the IP range for the receiver.
5. Use the **UDP Port** field to specify the RTP port the receivers will use.
6. If you selected **Video** in step 4:
  - a. Select the **Video** tab from the dialog toolbar.
  - b. Verify the **Video Format** field reports the video format of the signal the receivers will output.
  - c. Use the **Timing Mode** options to determine whether the stream output will be aligned to the router reference, or if a timing offset is applied to timestamps in the sender's RTP packets.
  - d. Verify that the **IP Preview** field reports the correct IP range.
7. If you selected **Audio** in step 4:

- a. Select the number of **Audio sessions per sdi** from 1 to 4.
- b. Select the **Audio** tab from the dialog toolbar.
- c. For each session:
  - Use the **Audio Channels** to select the audio channels to be transported by each audio stream. One audio channel can be transported in multiple sessions.
  - Use the **Audio Codec** to specify the audio encoding format for each audio stream.
  - Use the **RTP Payload** to specify the Real-time Transport Protocol (RTP) payload IDs used by each audio stream.
  - Use the **Link Offset** field to set the timing offset value used by this receiver.
8. If you selected **Ancillary** in step 4:
  - a. Select the **Ancillary** tab from the dialog toolbar.
  - b. Verify the **Ancillary Format** field reports the format of the signal the receivers will output.
  - c. Use the **Timing Mode** options to determine whether the stream output will be aligned to the router reference, or if a timing offset is applied to timestamps in the sender's RTP packets.
  - d. Verify that the **IP Preview** field reports the correct IP range.
9. Click **Add session**.

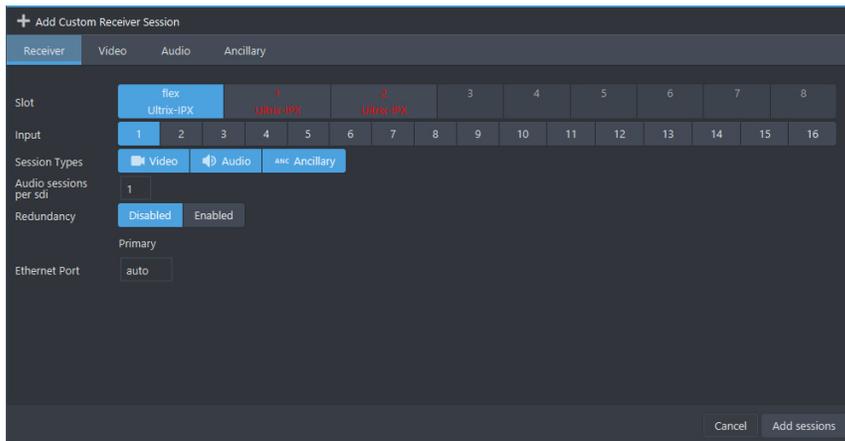
The **Add Default Receiver Session** dialog closes and the **Port Configuration** page updates to list the receiver streams advertised using the IP Address specified in step 4.

### To manually add a receiver session

1. From the **Add Receivers** drop-down menu, select **Custom**.

The **Add Receiver Session** dialog opens.

- ★ Click **SDP** to add receivers manually by providing the sender SDP instead of the Transport IP, UDP port, etc.



2. Use the **Input** options to assign the SDI output signal to the receiver stream.
3. Use the **Session Types** options to specify the type of signal.
- ★ Selecting both **Video** and **Audio** automatically creates table entries for one video, one ancillary, and up to four audio streams.
4. If you selected **Video** in step 5:
  - a. Select the **Video** tab from the dialog toolbar.
  - b. Use the **Video Format** field to specify the video format for the stream.

- c. Use the **Timing Mode** options to determine whether the stream output will be aligned to the router reference, or if a timing offset is applied to timestamps in the sender's RTP packets.
  - d. Use the **Transport IP** field to specify the UDP IP address of the transport stream for the signal.
  - e. Use the **UDP port** menu to specify the UDP port number of the transport stream for the receiver.
5. If you selected **Audio** in step 5:
  - a. Select the number of **Audio sessions per sdi** from 1 to 4.
  - b. Select the **Audio** tab from the dialog toolbar.
  - c. For each session:
    - Use the **Audio Channels** to select the audio channels to be transported by each audio stream. One audio channel can be transported in multiple sessions.
    - Use the **Audio Codec** to specify the audio encoding format for each audio stream.
    - Use the **RTP Payload** to specify the Real-time Transport Protocol (RTP) payload IDs used by each audio stream.
    - Use the **Link Offset** field to set the timing offset value used by this receiver.
6. If you selected **Ancillary** in step 5:
  - a. Select the **Ancillary** tab from the dialog toolbar.
  - b. Use the **Video Format** field to specify the video format for the stream.
  - c. Use the **Timing Mode** options to determine how a timing offset is applied on the stream.
  - d. Use the **Transport IP** field to specify the UDP IP address of the transport stream for the signal.
  - e. Use the **UDP port** menu to specify the UDP port number of the transport stream for the receiver.
7. Click **Add session**.

The **Add Receiver Session** dialog closes and the **Port Configuration** page updates to list the new receiver stream.

## Configuring the Redundant Mode for SMPTE ST-2022-7

The ULTRIX-IPX-IO enables a user to protect their streams to ensure mission critical operation. Using SMPTE ST 2022-7, they can run the same video, audio, and ancillary over two separate, redundant networks in case an error occurs.

★ This section is only applicable if your system requires protection switching.

### Before You Begin

Ensure that:

- your source is capable of sending SMPTE ST 2022-7 streams
- the Ultrix is set up within a protection switching network

### Enabling the Redundant Mode

★ By default, the Redundant mode is disabled for each session.

### To enable the Redundant Mode for a session pair

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .

The **Frame Configuration** page opens.

7. Select the **Ultrix-IP** tab.
8. Select the **IP System** sub-tab.
9. In the top table, locate the primary port for the protection switching pair.  
Each row in the table is a port on an installed ULTRIX-IPX-IO blade.
10. Select the **Redundancy** box for the pair you wish to configure for protection switching.
11. Click **Apply**.

### Configuring the ULTRIX-FR12 for Protection Switching

You will need to assign a unique IP address to each stream (primary and redundant).

#### To configure the Ultrix for protection switching

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .

The **Port Configuration** page opens.

7. Configure the primary sender stream as outlined in **“Configuring the Senders”** and set the **Redundancy to Enabled**.
8. Configure the secondary sender stream as outlined in **“Configuring the Senders”** and set the **Redundancy to Enabled**.
  - a. Use the **Secondary IP** menus to specify the IP address for the secondary (redundant) stream. Ensure that it is not the same IP address as the primary stream.
  - b. Use the **Secondary UDP** port to specify the UDP port for the secondary (redundant) stream. Note that the secondary UDP port can be the same as the primary stream.
9. Configure the primary receiver stream as outlined in **“Configuring the Receivers”** and set the **Redundancy to Enabled**.
10. Configure the secondary receiver stream as outlined in **“Configuring the Receivers”** and set the **Redundancy to Enabled**.
  - a. Use the **Secondary IP** menus to specify the IP address for the secondary (redundant) stream. Ensure that it is not the same IP address as the primary stream.
  - b. Use the **Secondary UDP** port to specify the UDP port for the secondary (redundant) stream. Note that the secondary UDP port can be the same as the primary stream.

## Troubleshooting

**Table 63** provides brief explanations for some common stream setup messages.

**Table 63 Troubleshooting the Error Messages**

| Error Message   | Cause   |
|---|---|
| Cannot set default due to maximum allowable streams has reached           | ENET pair has reached the maximum number of allowable streams.  |
| Cannot add 2160P59 video due to maximum allowable UHD streams has reached |   |
| Primary and Secondary UDP port cannot be the same                         | When in Redundant mode, if the primary and secondary streams have the same IP address, the UDP ports must be different.   |
| This IP port does not have enough bandwidth to add a new stream           | The port has reached the maximum 100G bandwidth.  |
| slot#.port# is a redundant IP port. It is reserved for redundant senders. | The ENET pair is in Redundant mode and you cannot edit the second port (ENET 2 or ENET 4) of the pair.  |
| Address x.x.x.x is being used by slotx.out[y].#.chz                       | Each stream must have a unique network address.   |
| Video Format mismatch detected  | The input video format does not match those selected/enabled in the <b>Adaptive Input Allowed Input Rates</b> setting of the sender stream, or input is not valid.  |
| 100G link is down   | One of the following is occurring: <ul style="list-style-type: none"><li>• The cable and/or optical module is not properly connected.</li><li>• There is an FEC setting mismatch between the ULTRIX-IPX-IO and switch endpoints. If your module includes a built-in FEC (DR/FR/LR), the ULTRIX-IPX-IO FEC Mode must be set to Disabled. Refer to “<b>Configuring the Port Network</b>”.</li></ul> |



# ULTRIX-SFP-IO Setup

This chapter outlines how to utilize the ports of the ULTRIX-SFP-IO blade when it is installed in a slot of an ULTRIX-FR12.

## For More Information on...

- the installation and cabling of the ULTRIX-SFP-IO, refer to the **ULTRIX-FR12 Installation Guide**.

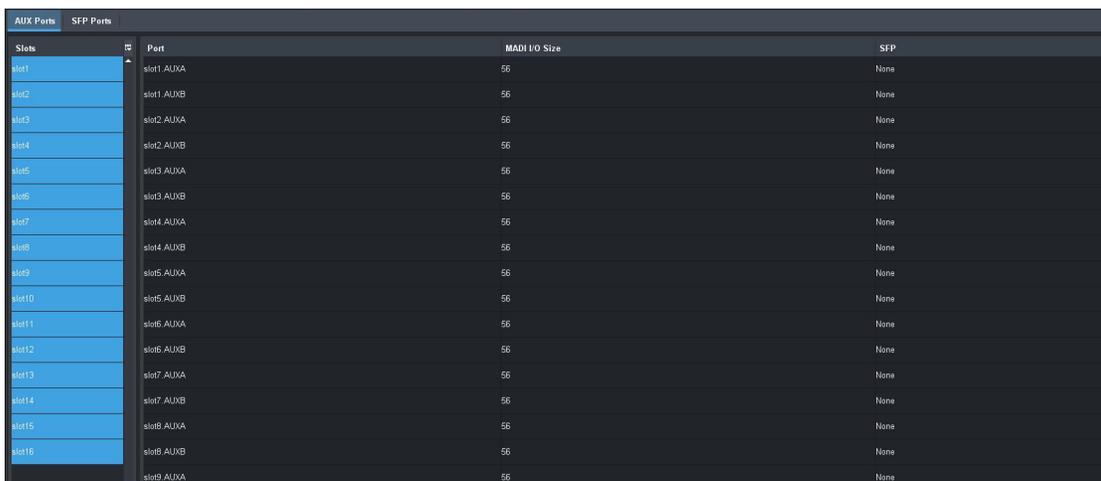
## Overview

The ULTRIX-FR12 automatically detects when the ULTRIX-SFP-IO blade is installed. Each signal is made available in the ULTRIX-FR12 routing system much like those available via the standard IN and OUT HD BNCs for each slot. The signals are initially named using the standard Frame.Slot.Port.Type.Channel nomenclature where Port is reported as the physical AUX and/or SFP port on the ULTRIX-FR12 rear panel that the module is installed in. The options in the SFP Configuration interface for a module are the same as those for video and audio signals on the BNCs.

- ★ MADI SFP modules are only supported in the AUX A and AUX B ports.

## For More Information on...

- the supported modules for the ULTRIX-SFP-IO blade, refer to the **ULTRIX-FR12 Installation Guide** and **Ultrix SFP Modules Guide**.



| Slots  | Port       | MADI I/O Size | SFP  |
|--------|------------|---------------|------|
| slot1  | slot1_AUXA | 56            | None |
| slot2  | slot1_AUXB | 56            | None |
| slot3  | slot2_AUXA | 56            | None |
| slot4  | slot2_AUXB | 56            | None |
| slot5  | slot3_AUXA | 56            | None |
| slot6  | slot3_AUXB | 56            | None |
| slot7  | slot4_AUXA | 56            | None |
| slot8  | slot4_AUXB | 56            | None |
| slot9  | slot5_AUXA | 56            | None |
| slot10 | slot5_AUXB | 56            | None |
| slot11 | slot6_AUXA | 56            | None |
| slot12 | slot6_AUXB | 56            | None |
| slot13 | slot7_AUXA | 56            | None |
| slot14 | slot7_AUXB | 56            | None |
| slot15 | slot8_AUXA | 56            | None |
| slot16 | slot8_AUXB | 56            | None |
|        | slot9_AUXA | 56            | None |

Figure 43 Example of the SFP Configuration Interface

## Before You Begin

You may also need to install an:

- UltraSpeed license if the ULTRIX-SFP-IO includes an SFP-HDB-IN-12G, SFP-FIBER-12G, and/or SFP-HDB-OUT-12G.
- UltraScape license for each port that will be used to provide an UltraScape head output.
- UltraSRC license for each AUX port configured for asynchronous MADI input.

## Configuring an SFP Port

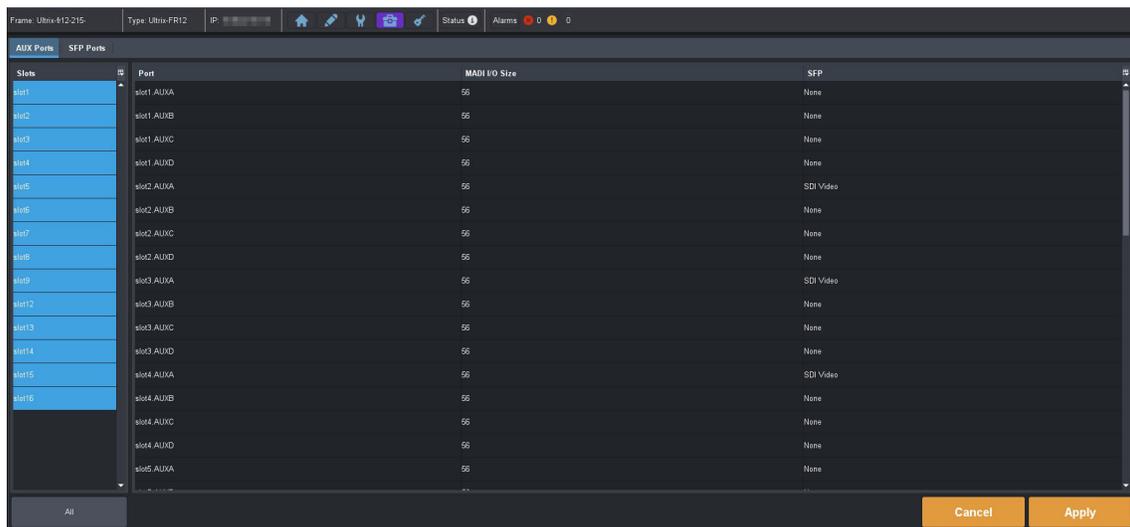
Once the SFP module is installed in a port, you must specify the port type. Select SDI video for video SFP types, or MADI for Audio SFP types. MADI audio SFP type allow you to specify the channel quantity - either 56 or 64 as per your facilities' standard.

The SFP Configuration interface is organized into two sections: AUX settings, and SFP settings. The AUX Settings lists all the AUX port settings for all blades in the frame. The SFP Settings list all the SFP I/O port settings.

### To configure the settings for an SFP port

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .
7. Select the tab appropriate to the port location you wish to configure.
8. From the **Slots** table on the left, select the required ULTRIX-SFP-IO blade.
- ★ Click **ALL**, located under the Slots list, to display the available ports.

The **Settings** table updates to display the port name, and the type of signals for each populated port.



| Slot   | Port       | MADI I/O Size | SFP       |
|--------|------------|---------------|-----------|
| slot1  | slot1_AUXA | 56            | None      |
| slot2  | slot1_AUXB | 56            | None      |
| slot3  | slot1_AUXC | 56            | None      |
| slot4  | slot1_AUXD | 56            | None      |
| slot5  | slot2_AUXA | 56            | SDI Video |
| slot6  | slot2_AUXB | 56            | None      |
| slot7  | slot2_AUXC | 56            | None      |
| slot8  | slot2_AUXD | 56            | None      |
| slot9  | slot3_AUXA | 56            | SDI Video |
| slot10 | slot3_AUXB | 56            | None      |
| slot11 | slot3_AUXC | 56            | None      |
| slot12 | slot3_AUXD | 56            | None      |
| slot13 | slot4_AUXA | 56            | SDI Video |
| slot14 | slot4_AUXB | 56            | None      |
| slot15 | slot4_AUXC | 56            | None      |
| slot16 | slot4_AUXD | 56            | None      |
| slot17 | slot5_AUXA | 56            | None      |

9. Locate the row for the port you want to configure.
10. In the **SFP** column for the port, specify the type of signal the port will provide.
11. If applicable, use the **MADI I/O Size** menu for the AUX port to specify the input and output configuration for the port.
- ★ MADI is only available in the AUX ports. The SFP I/O ports 1-16 does not support MADI I/O.
12. Click **Apply** to save your changes.

### To monitor an SFP port

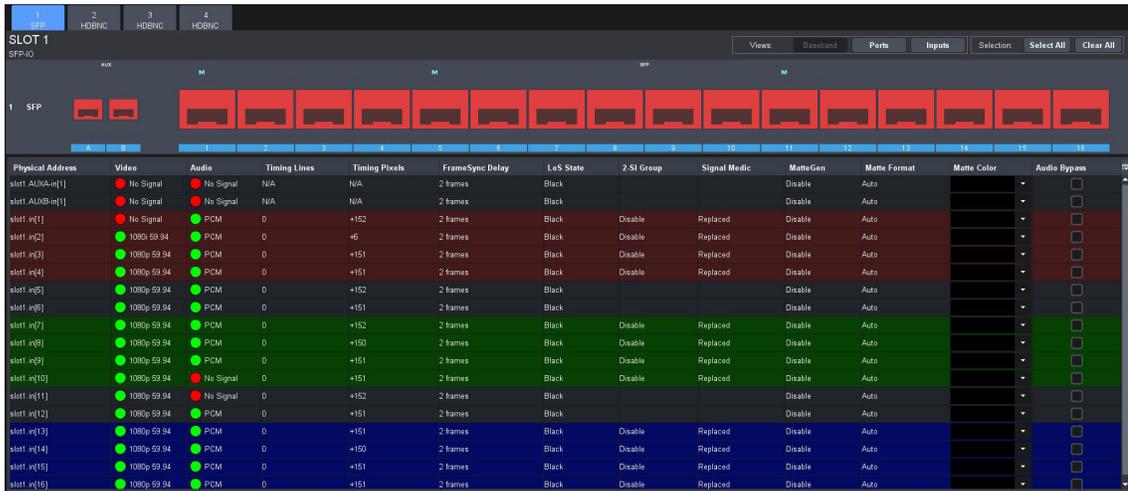
1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.

- Expand the **Systems** sub-node.
- Expand the **Configuration** sub-node.
- Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
- Select .

The **Port Configuration** page opens.

- Select the button for the slot that houses the port you want to verify.

In the example below, the user selected Slot 1.



| Physical Address | Video       | Audio     | Timing Lines | Timing Pixels | FrameSync Delay | LoS State | 2-SI Group | Signal Metric | Matte Gen | Matte Format | Matte Color | Audio Bypass             |
|------------------|-------------|-----------|--------------|---------------|-----------------|-----------|------------|---------------|-----------|--------------|-------------|--------------------------|
| slot1_AUX0-in[1] | No Signal   | No Signal | N/A          | N/A           | 2 frames        | Black     |            |               | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_AUX0-in[1] | No Signal   | No Signal | N/A          | N/A           | 2 frames        | Black     |            |               | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[1]      | No Signal   | PCM       | 0            | +152          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[2]      | 1080p 59.94 | PCM       | 0            | 46            | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[3]      | 1080p 59.94 | PCM       | 0            | +151          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[4]      | 1080p 59.94 | PCM       | 0            | +151          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[5]      | 1080p 59.94 | PCM       | 0            | +152          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[6]      | 1080p 59.94 | PCM       | 0            | +151          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[7]      | 1080p 59.94 | PCM       | 0            | +152          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[8]      | 1080p 59.94 | PCM       | 0            | +150          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[9]      | 1080p 59.94 | PCM       | 0            | +151          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[10]     | 1080p 59.94 | No Signal | 0            | +151          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[11]     | 1080p 59.94 | No Signal | 0            | +152          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[12]     | 1080p 59.94 | PCM       | 0            | +151          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[13]     | 1080p 59.94 | PCM       | 0            | +151          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[14]     | 1080p 59.94 | PCM       | 0            | +150          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[15]     | 1080p 59.94 | PCM       | 0            | +151          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |
| slot1_in[16]     | 1080p 59.94 | PCM       | 0            | +151          | 2 frames        | Black     | Disable    | Replaced      | Disable   | Auto         |             | <input type="checkbox"/> |

- Select the SFP port you want to verify.

The label under the selected port is now lit blue and the page updates with information about the port. In the example above, the user is monitoring all ports on the blade.



# UltraProc Setup

This chapter provides information on the SDR/HDR conversion and Color Correction options available when one of the UltraProc licenses is enabled on an ULTRIX-FR12 router.

★ The UltraProc licenses are supported on the ULTRIX-HDX-IO or ULTRIX-MODX-IO blades only.

## Overview

There are two UltraProc licenses available: UltraProc and UltraProc-3DLUT.

### UltraProc

This license allows you to perform color correction, Proc Amps, and HDR conversion on Ultrix I/Os. An UltraProc can be assigned to either inputs or outputs. An UltraProc license key is required for each selected I/O that will be used by the UltraProc.

UltraProc color correction is performed in the Y'CbCr color space or by RGB Color Correctors in the RGB color space. It is additive, allowing you to apply any combination of SDR/HDR and RGB Color Corrector based adjustment to a video signal.

An UltraProc license provides the following SDR/HDR conversion features:

- Built-in HDR/SDR conversion
- Selecting a Tone Mapping mode
- SDI output Y/C clipper to pass/clip extended super-black or super-white ranges
- RGB Color Correction
- Independent ProcAmp controls for the video input and for the video output of the UltraProc
- SDI output Y/C clipper to pass/clip extended super-black or super-white ranges
- SDR/HDR transfer characteristic and colorimetry information inserted into the SDI video 352M payload identifier

### UltraProc-3DLUT

The UltraProc-3DLUT license also allows you to perform color correction, Proc Amps, and HDR conversion on Ultrix I/Os but also enables SDR/HDR conversion with a 3D-LUT RGB Cube file including:

- BT.709 and BT.2020 colorimetry/transfer characteristics for Y/C RGB conversion
- Preloaded 3D-LUT RGB Cube files library from BBC (14 files) and NBCU (6 files)
- Ability to load custom 3D-LUT RGB Cube files to perform custom conversions
- Support for Narrow Range (Type I) and Full Range (Type III) 3D-LUT RGB Cube files

### SDR/HDR Conversion

Each UltraProc license supports dynamic range and colorimetry/transfer characteristics conversion from/to any of these standards:

- BT.709 SDR
- BT.2020 SDR
- BT.2020 HLG
- BT.2020 PQ
- BT.2020 S-Log3
- BT.2020 SR Live

The video input dynamic range and colorimetry/transfer characteristics settings can be manually configured or can be automatically detected from the SDI video input 352M payload identifier.

The video output dynamic range and colorimetry/transfer characteristics settings can be manually configured or can be automatically set to follow the SDI video input dynamic range and colorimetry/transfer characteristics.

The SDR/HDR conversion also offers the following options:

- Display light or scene light conversion
- Direct mapping or tone (up/down) mapping
- RGB Color Correction with adjustment controls for gamma, lift, gain, and offset

## Installing an UltraProc License

Ross Video uses license keys to control user access to specific features. You can obtain a key for a licensed feature from Ross Video Technical Support. Each UltraProc license provides one proc amp engine that can be assigned to one physical port on the router. This section outlines how to install an UltraProc license and is applicable to both license types.

### To install an UltraProc license key

1. Launch the DashBoard client.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node.

The **Device Configuration** interface opens.

6. Select .

The **Licenses** page opens with **License Keys** sub-tab automatically selected.

7. Make a note of the character string in the **Request Code** field for each UltraProc license type you wish to install.
  8. Contact Ross Video Technical Support using the information listed in “**Contacting Technical Support**”.
    - a. When you speak to your Technical Support representative, tell them your name, your facility name, and the **Request Code** from step 7.
    - b. You will be given a License Key for the UltraProc.
  9. Enter the provided License Key in the applicable **License Key** field of the **Licenses** tab.
- ★ You can also right-click on the row for the License Key you are installing, and copy the Request Code to or paste the License Key from the Microsoft® Windows® clipboard.
10. Click **Apply** in the row for the License Key you entered in step 9.
  11. Verify that the **Count** field is updated to report each installed License Key.

### To activate an UltraProc license for a specific port

1. Install the license key as outlined in the procedure “**To install an UltraProc license key**”.
2. In the **Licenses** interface, select the **UltraProc** sub-tab.

The interface is organized into two tables: the left table provides the options for selecting the data rate and assigning the license to an I/O type. The table on the right lists the available ports and provides the option to enable/disable the UltraProc feature.

3. For the first slot, use the **Max Data Rate** menu to specify the mode. Choose from the following:
  - **3G** — UltraProc operates at data rates up to 3Gbps<sup>1</sup>. The license is available on the even numbered inputs (Input 2, 4, 6, 8, 10, 12, 14, 16) or outputs (Output 2, 4, 6, 8, 10, 12, 14, 16) per blade.
  - **UHD Mode** — UltraProc operates at data rates up to 6Gbps<sup>2</sup> and 12Gbps<sup>3</sup>. The license is available on 4 inputs (Input 2, Input 6, Input 10, Input 14) or 4 outputs per blade (Output 2, Output 6, Output 10, Output 14). This mode also requires an UltraSpeed license.
4. Use the **Assignment** menu to specify the slot I/O the UltraProc will apply to.
5. Use the **Mode** column, select the license type to apply. Choose from the following:
  - **Disable** — an UltraProc license is not assigned and the options are unavailable for this slot I/O.
  - **Enabled HDR** — assigns an UltraProc license to this slot I/O. An UltraProc license can be assigned to any of the individual Proc Amps in the slot, either to Inputs or Outputs, and UHD or 3G.
  - **Enable 3D LUT** — assigns an UltraProc-3DLUT license to this slot I/O. An UltraProc-3DLUT license can be assigned to any of the 8 individual Proc Amps in the slot, either to Inputs or Outputs, and UHD or 3G.
6. In the **Port** column, select the physical port you want to apply the UltraProc license to.
7. Select **Enable** to apply the UltraProc license to that port.

In the following example, the user applied 1 UltraProc and 1 UltraProc-3DLUT license in slot2, assigned the Max Data Rate to UHD, assigned the UltraProc licenses to the inputs, and enabled the slot2.proc1, and slot2.proc7 UltraProc engines.

| ID          | Max Data Rate | Assignment | HDR Licenses | 3D LUT Licenses | Mode            | Port         |
|-------------|---------------|------------|--------------|-----------------|-----------------|--------------|
| slot2       | UHD           | Inputs     | 0            | 2               | Enable - 3D LUT | slot2_in[2]  |
| slot2.proc1 |               |            |              |                 | Enable - 3D LUT | slot2_in[2]  |
| slot2.proc2 |               |            |              |                 | Disable         | slot2_in[4]  |
| slot2.proc3 |               |            |              |                 | Enable - 3D LUT | slot2_in[6]  |
| slot2.proc4 |               |            |              |                 | Disable         | slot2_in[8]  |
| slot2.proc5 |               |            |              |                 | Disable         | slot2_in[10] |
| slot2.proc6 |               |            |              |                 | Disable         | slot2_in[12] |
| slot2.proc7 |               |            |              |                 | Disable         | slot2_in[14] |
| slot2.proc8 |               |            |              |                 | Disable         | slot2_in[16] |

## Accessing the UltraProc Settings

The UltraProc settings are accessed via the Dashboard **Port Configuration** tab.

### To display the UltraProc interface

1. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
2. Expand the **Systems** sub-node.

1. 720p 50/59.94/60Hz, 1080i 50/59.94/60Hz, and 1080p 50/59.94/60Hz
2. 2160p 23.98/24/25/29.97/30Hz
3. 2160p 50/59.94/60Hz

- Expand the **Configuration** sub-node.
- Double-click the **ULTRIX-FR12** node.  
The **Device Configuration** interface opens.
- Select .

The **Port Configuration** page opens.

★ You can also click the port with an UltraProc license on the blade map of the **Home** page  to display the UltraProc interface.

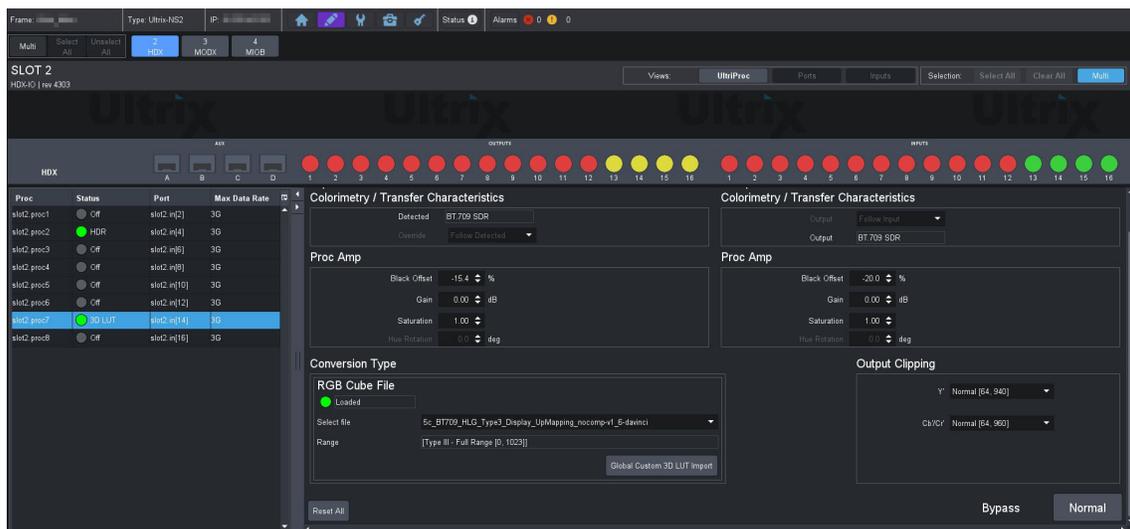
- Toggle the first option in **Views** to **UltraProc**.
- Toggle the last option in **Views** to **Inputs**.

The **SDR/HDR Conversion** sub-tab is automatically selected.

★ A green icon displays next to a port when an UltraProc license is enabled. The example in step 8 shows that an UltraProc-3DLUT license is enabled on Input 14 of slot 2 in an ULTRIX-NS-FR2.

- From the table in the left pane, select the row for the UltraProc engine to configure.

In the example below, the user selected `slot2.proc7` that is assigned to `slot2.in[14]`.



**Table 64** summarizes the options displayed in the **SDR/HDR Conversion** sub-tab for each UltraProc engine.

**Table 64 UltraProc — SDR/HDR Conversion**

| Item   | Parameters   | Description   |
|--|--|---|
| <b>Input &gt; Colorimetry / Transfer Characteristics</b> |  |   |
| Detected (read-only)                                     | Reports the colorimetry/transfer characteristics of the input to the UltraProc |   |
| Override   | BT.709 SDR   | HD colorimetry/transfer characteristics, Standard Dynamic Range       |
|  | BT.2020 SDR  | UHD wide colorimetry/transfer characteristics, Standard Dynamic Range |

**Table 64 UltraProc — SDR/HDR Conversion (Continued)**

| Item  | Parameters      | Description  |
|---|-----------------|--|
| Override  | BT.2020 HLG     | UHD wide colorimetry/transfer characteristics, Hybrid Log-Gamma dynamic range  |
|   | BT.2020 PQ      | UHD wide colorimetry/transfer characteristics, Perceptual Quantizer dynamic range  |
|   | BT.2020 SLOG3   | UHD wide colorimetry/transfer characteristics, Sony® S-Log3 dynamic range  |
|   | BT.2020 SR Live | Wide color gamut recommended for UHD TV1 video signals, Sony® standard range   |
|   | Follow Detected | Automatically extracts the dynamic range and colorimetry information from the SDI video input 352M payload identifier and adjusts the SDR/HDR conversion accordingly   |
| <b>Input &gt; Proc Amp</b>                                |                 |  |
| Black Offset  | %               | Adjusts the Luma (Y) black offset of the SDI input   |
| Gain  | #               | Adjusts the Luma and Chroma (Y/C) gain of the SDI input  |
| Saturation  | #               | Adjusts the intensity of the input color   |
| Hue Rotation <sup>a</sup>                                 | #               | Adjusts the input hue level where: <ul style="list-style-type: none"> <li>• increasing the hue rotation turns the color wheel clockwise;</li> <li>• decreasing the hue rotation turns the color wheel counter-clockwise</li> </ul> |
| <b>Output &gt; Colorimetry / Transfer Characteristics</b> |                 |  |
| Output  | BT.709 SDR      | HD colorimetry/transfer characteristics, Standard Dynamic Range  |
|   | BT.2020 SDR     | UHD wide colorimetry/transfer characteristics, Standard Dynamic Range  |
|   | BT.2020 HLG     | UHD wide colorimetry/transfer characteristics, Hybrid Log-Gamma dynamic range  |
|   | BT.2020 PQ      | UHD wide colorimetry/transfer characteristics, Perceptual Quantizer dynamic range  |
|   | BT.2020 SLOG3   | UHD wide colorimetry/transfer characteristics, Sony® S-Log3 dynamic range  |
|   | BT.2020 SR Live | Wide color gamut recommended for UHD TV1 video signals, Sony® standard range   |

**Table 64 UltraProc — SDR/HDR Conversion (Continued)**

| Item   | Parameters  | Description   |
|--|---|---|
| Output   | Follow Input  | Automatically follows the dynamic range and colorimetry information as defined in the Input area. In that case, no SDR/HDR conversion is performed but the RGB Color Correction processing is still available.                      |
| Output (read-only)                                   | Reports the 352M payload identifier in the SDI video output, and the colorimetry/transfer characteristics   |   |
| <b>Output &gt; Proc Amp</b>                          |   |   |
| Black Offset   | %   | Adjusts the Luma (Y) black offset of the SDI output streams   |
| Gain   | #dB   | Adjusts the Luma and Chroma (Y/C) gain of the SDI output streams  |
| Saturation   | #   | Adjusts the lightness of the output color   |
| Hue Rotation <sup>b</sup>                            | #   | Adjusts the output hue level where: <ul style="list-style-type: none"> <li>• increasing the hue rotation turns the color wheel clockwise;</li> <li>• decreasing the hue rotation turns the color wheel counter-clockwise</li> </ul> |
| <b>Conversion Type &gt; Tone Mapping<sup>c</sup></b> |   |   |
| Display Light  | <p>Uses the EOTF of the SDI input dynamic range and colorimetry/transfer characteristics to convert the SDI input electrical signal to the Display Light units.</p> <p>Uses the inverse EOTF of the SDI output dynamic range and colorimetry/transfer characteristics to convert the Display Light units to the SDI output electrical signal.</p> |   |
| Scene Light  | <p>Uses the inverse EOTF of the SDI input dynamic range and colorimetry/transfer characteristics to convert the SDI input electrical signal to Scene Light units.</p> <p>Uses the EOTF of the SDI output dynamic range and colorimetry/transfer characteristics to convert the Scene Light units to the SDI output electrical signal</p>          |   |
| Direct Mapping, 1-to-1 No Scaling                    | Performs a straight conversion, without dynamic range compression or expansion, and without colorimetry/transfer characteristics compression or expansion   |   |
| Direct Mapping, BT.2408 Scaling                      | Performs a conversion as defined in <b>ITU-BT.2408</b>  |   |
| <b>RGB Cube File<sup>d</sup></b>                     |   |   |
| Status   | Cube File Not Used (Green)  | The Select File menu is set to [None]   |
|  | Valid file (Green)  | The last Cube file selected using the RGB Cube file menu is imported and valid  |

**Table 64 UltraProc — SDR/HDR Conversion (Continued)**

| Item                        | Parameters  | Description   |
|-----------------------------|---|---|
| Status                      | Invalid file (Red)  | An error occurred importing the last selected Cube file.<br>Verify that the file is in a supported format (*.cube)  |
| Select File                 | [None]  | An RGB Cube file is not currently loaded to this proc engine  |
|                             | <filename.cube>   | Indicates the last Cube file loaded to the card. Note that loading a RGB Cube File disables the DashBoard Tone Mapping options Display/Scene light and Direct/Tone Mapping Methods.                     |
| Range                       | Type I - Normal Range [64, 960]   | Scales the SDI input signal level [64,940] to drive the 3D-LUT input processing range [0,1023] and will scale the 3D-LUT output processing range [0,1023] back to the SDI output signal level [64,940]. |
|                             | Type III - Full Range [0,1023]  | Drives the full 10-bit SDI input signal level directly to the 3D-LUT input processing range [0,1023] and will scale the 3D-LUT output processing range [0,1023] to the SDI output signal level [0,1023] |
| Global Custom 3D LUT Import | Click this button to display a dialog that lists the custom *.cube files that are available to import to the specified UltraProc engine |   |
| <b>Output Clipping</b>      |   |   |
| Y'                          | Normal [64,940]   | Limits any processed luminance data to be between 64 and 940 in the active picture region of the video, coming out of the proc amp  |
|                             | Super White [64,1019]   | Limits any processed luminance data to be between 64 and 1019 in the active picture region of the video, coming out of the proc amp   |
|                             | Super Black [4,940]   | Limits any processed luminance data to be between 4 and 940 in the active picture region of the video, coming out of the proc amp   |
| Y'                          | Extended Luma [4,1019]  | Limits any processed luminance data to be between 4 and 1019 in the active picture region of the video, coming out of the proc amp  |

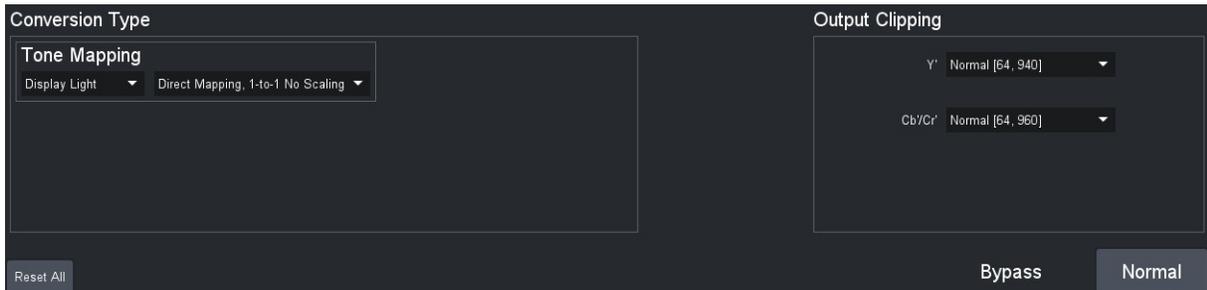
**Table 64 UltraProc — SDR/HDR Conversion (Continued)**

| Item          | Parameters   | Description   |
|---------------|--|---|
| Cb'/Cr'       | Normal [64,960]  | Limits the gain of the blue color difference and the gain of the red color difference data to be between 64 and 960 in the active picture region of the video, coming out of the proc amp |
|               | Wide Color [5,1019]  | Limits the gain of the blue color difference and the gain of the red color difference data to be between 5 and 1019 in the active picture region of the video, coming out of the proc amp |
| Reset All     | Returns all editable settings on the <b>SDR/HDR Conversion</b> sub-tab to the default values   |   |
| <b>Bypass</b> |  |   |
| Bypass        | The video input is passed through without modifications  |   |
| Normal        | The router is processing the video input through the SDR/HDR converter, and the RGB Color Corrector, and performing the target transform |   |

- a. This option requires an UltraProc license.
- b. This option requires an UltraProc license.
- c. This option requires an UltraProc license.
- d. These options require an UltraProc-3DLUT license.

## Bypassing the Video Correction Settings

You can choose to bypass the video correction settings by clicking **Normal** (located in the bottom right corner of the **SDR/HDR Conversion** tab). Note that Normal is the default.



*Figure 44 Location of the Bypass and Normal Buttons*

When **Normal** is selected, the router port processes the video input through the SDR/HDR converter, the RGB Color Corrector, and performs the target transform.

When **Bypass** is selected, the router port passes through the video input without modifications.

## Dynamic Range and Colorimetry/Transfer Characteristics Setup

UltraProc performs the SDR/HDR dynamic range and colorimetry/transfer characteristics conversion as specified in the **Input** and **Output** areas of the **SDR/HDR Conversion** tab. (Figure 45 and Figure 46).

The default Input > Colorimetry/Transfer Characteristics > Override > Follow Detected setting automatically extracts the dynamic range and colorimetry information from the SDI video input 352M payload identifier and adjusts the SDR/HDR conversion accordingly.

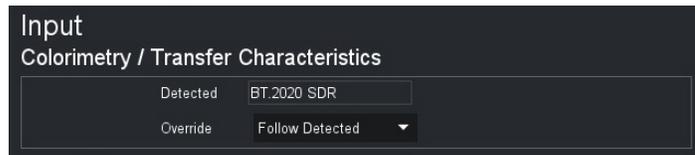


Figure 45 Example of the Video Correction > Input Area

The default Output > Colorimetry/Transfer Characteristics > Follow Input setting automatically follows the dynamic range and colorimetry information as defined in the Input area. In that case no SDR/HDR conversion is performed but the other video processing featured such as the Proc Amps and the RGB Color Correction are still available.

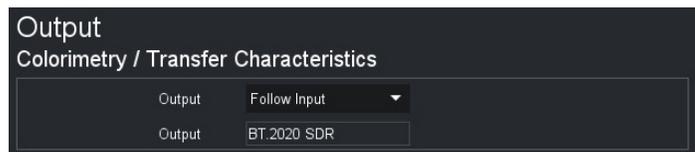


Figure 46 Example of the Video Correction > Output Area

The other options are common to both the **Input** and the **Output** and are used to force a specific SDR/HDR conversion. The following options are available:

- BT.709 SDR — HD colorimetry/transfer characteristics, Standard Dynamic Range
  - BT.2020 SDR — UHD wide colorimetry/transfer characteristics, Standard Dynamic Range
  - BT.2020 HLG — UHD wide colorimetry/transfer characteristics, Hybrid Log-Gamma dynamic range
  - BT.2020 PQ — UHD wide colorimetry/transfer characteristics, Perceptual Quantizer dynamic range
  - BT.2020 S-LOG3 — UHD wide colorimetry/transfer characteristics, Sony® S-Log3 dynamic range
  - BT.2020 SR Live — UHD wide colorimetry/transfer characteristics recommended for UHDTV1 video signals, Sony® standard range
- ★ An alarm is generated if the dynamic range and colorimetry information extracted from the SDI video input 352M payload identifier does not match the specific SDR/HDR conversion as defined by the user.

## Proc Amps Setup

UltraProc offers two independent Proc Amps. The **Input Proc Amp** is located upstream of the SDR/HDR conversion and the **Output Proc Amp** is located downstream of the SDR/HDR conversion. Both Proc Amps offer the same controls. (Figure 47)

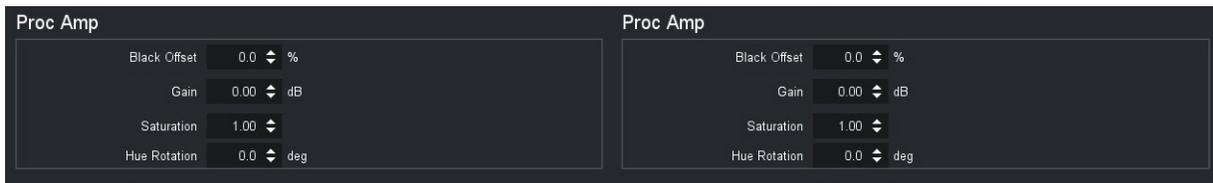


Figure 47 Example of the Input Proc Amp (left) and Output Proc Amp (right) Settings

The Proc Amp settings are cumulative and are executed in this sequence for each input or output:

1. **Black Offset** — adjusts the Luma (Y) black offset of the SDI input or output signal. The value is reported as a percentage of the full black to white signal amplitude with an adjustment range from -20% to +20%, in steps of 0.1%.
2. **Gain** — adjusts the Luma and Chroma (Y/C) gain of the SDI input or output signal. The value is reported in dB with an adjustment range from -20dB to +20dB, in steps of 0.01dB.
3. **Saturation** — adjusts the intensity level of the SDI input or output color.
4. **Hue Rotation** — adjust the hue levels. Increasing the hue rotation turns the color wheel clockwise, and decreasing the hue rotation turns the color wheel counter-clockwise. This option is not available with the UltraProc-3DLUT license.

## Selecting a Tone Mapping Conversion Option

The Tone Mapping feature provides two SDR/HDR conversion light options: Display Light or Scene Light. (Figure 48)

★ Tone Mapping is not available with the UltraProc-3DLUT license.

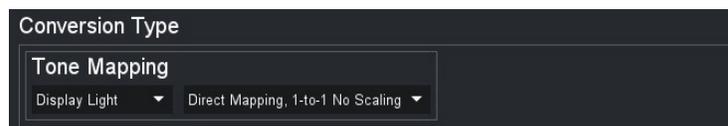


Figure 48 Example of the Tone Mapping Settings

### Display Light

The common reference for the transform is the visible light as emitted by a display monitor. When set to Display Light conversion, the router:

1. Uses the EOTF of the SDI input dynamic range and colorimetry/transfer characteristics to convert the SDI input electrical signal to the Display Light units.
2. Uses the inverse EOTF of the SDI output dynamic range and colorimetry/transfer characteristics to convert the Display Light units to the SDI output electrical signal.

### Scene Light

The common reference for the transform is the visible light as diffused by the ambient scene. When set to Scene Light conversion, the router:

1. Uses the inverse EOTF of the SDI input dynamic range and colorimetry/transfer characteristics to convert the SDI input electrical signal to Scene Light units.
2. Uses the EOTF of the SDI output dynamic range and colorimetry/transfer characteristics to convert the Scene Light units to the SDI output electrical signal.

## Selecting a Tone Mapping Option

The UltriProc built-in SDR/HDR conversion mapping options are:

- Direct Mapping, 1-to-1 No Scaling
- Direct Mapping, BT.2408 Scaling

### Direct Mapping, 1-to-1 No Scaling

This Direct Mapping option performs a straight conversion, without dynamic range compression or expansion, and without colorimetry/transfer characteristics compression or expansion. This means that when a HDR input stream is converted to an SDR output stream, all HDR source pixels that are outside the output SDR dynamic range or colorimetry/transfer characteristics will be clipped, losing luminance and/or color information.

### Direct Mapping, BT.2408 Scaling

This Direct Mapping option performs a conversion as defined in **ITU-BT.2408**.

## Video Output Clipping Setup

UltriProc provides the options to enable or clip super-blacks and super-whites on the SDI video output Luma (Y') stream. Super-blacks are often found in common color bar test patterns such as the ITU-R BT.814 HDR PLUGE and others. Super-whites may be created when down converting HDR to SDR, where the HDR highlights will be mapped in the 100% to 109% SDR super-white range. Super-blacks and super-whites can also be created with the UltriProc gain and offset controls.

**Figure 49** shows the Output Clipping > Y' settings.

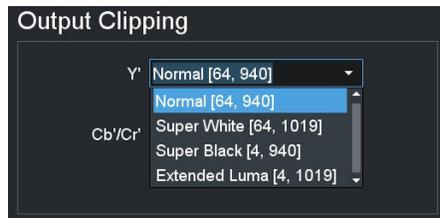


Figure 49 Example of Video Correction > SDR/HDR Conversion > Output Clipping

- ★ An option to allow extended Chroma (Cb'/Cr') is also available but will rarely be used in practice to maintain interoperability with other equipment.

## SDR/HDR Conversion with 3D-LUT RGB Cube Files

- ★ The UltriProc-3DLUT license is required to access the NBCU and BBC 3D-LUT libraries.

The UltriProc SDR/HDR built-in conversion engine offers limited tone mapping and inverse tone mapping options. To expand the capability, Ross Video offers a set of pre-loaded 3D-LUT RGB Cube files, each one designed to meet specific conversion requirements. It is also possible for the user to load custom 3D-LUT RGB cube files for specific applications.

If you decide to perform a SDR/HDR conversion using a 3D-LUT RGB Cube file, then the proprietary SDR/HDR transform is natively programmed into the 3D-LUT file. You still need to configure

correctly the DashBoard **SDI Input** and the **SDI Output** options as the BT.709 or BT.2020 colorimetry information are required by UltriProc to:

- convert the Y/C to RGB values,
- drive the RGB 3D-LUT input, and then
- convert the RGB 3D-LUT output back to Y/C.

## Loading a 3D LUT RGB Cube File

The DashBoard **Conversion Type > RGB Cube File > Select File** option allows you to select and load one RGB Cube file stored locally on the ULTRIX-FR12.

- ★ Loading a **RGB Cube File** disables the DashBoard **Tone Mapping** options Display/Scene light and Direct/Tone Mapping Methods, and the Proc Amps > Hue Rotation setting. The corresponding Input and Output Gamuts (Override and Output), and Range Type are automatically selected. You cannot manually select these parameters.

## Importing a Custom 3D LUT Cube File

- ★ This feature is available each Proc Amp instance that has been assigned an UltriProc-3DLUT license.

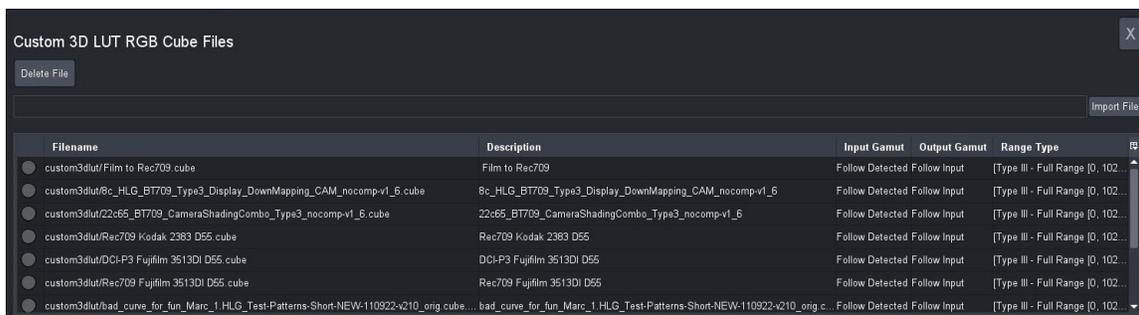
An UltriProc-3DLUT license also enables you to upload a custom 3D LUT Cube file (to a maximum number of 25 files) to the Ultrix router, specify its input / output colorimetry and transfer function, and range type. Once loaded, a file:

- becomes accessible to all UltriProc engines operating in 3D LUT mode within that same router.
- will automatically be added to the list of RGB cube files for loading.
- automatically applies the input and output colorimetry/transform settings defined by the user in the Import table.

### To import a custom 3D LUT Cube file

1. Locate the **Conversion Type > RGB Cube File** area.
2. Click **Global Custom 3D LUT Import**.

The Custom 3D LUT RGB Cube Files dialog opens.



| Filename  | Description  | Input Gamut     | Output Gamut | Range Type                        |
|---|--|-----------------|--------------|-----------------------------------|
| <input type="radio"/> custom3dlut/Film to Rec709.cube   | Film to Rec709   | Follow Detected | Follow Input | [Type III - Full Range [0, 102... |
| <input type="radio"/> custom3dlut/8c_HLG_BT709_Type3_Display_DownMapping_CAM_nocomp-v1_6.cube   | 8c_HLG_BT709_Type3_Display_DownMapping_CAM_nocomp-v1_6 | Follow Detected | Follow Input | [Type III - Full Range [0, 102... |
| <input type="radio"/> custom3dlut/22c65_BT709_CameraShadingCombo_Type3_nocomp-v1_6.cube   | 22c65_BT709_CameraShadingCombo_Type3_nocomp-v1_6       | Follow Detected | Follow Input | [Type III - Full Range [0, 102... |
| <input type="radio"/> custom3dlut/Rec709 Kodak 2383 D55.cube  | Rec709 Kodak 2383 D55                                  | Follow Detected | Follow Input | [Type III - Full Range [0, 102... |
| <input type="radio"/> custom3dlut/DCI-P3 Fujifilm 3513DI D55.cube   | DCI-P3 Fujifilm 3513DI D55                             | Follow Detected | Follow Input | [Type III - Full Range [0, 102... |
| <input type="radio"/> custom3dlut/Rec709 Fujifilm 3513DI D55.cube   | Rec709 Fujifilm 3513DI D55                             | Follow Detected | Follow Input | [Type III - Full Range [0, 102... |
| <input type="radio"/> custom3dlut/load_curve_for_fun_Marc_1_HLG_Test-Patterns-Short-NEW-110922-x210_orig.cube...load_curve_for_fun_Marc_1_HLG_Test-Patterns-Short-NEW-110922-x210_orig.c... |  | Follow Detected | Follow Input | [Type III - Full Range [0, 102... |

3. Click **Import File**.

The Open File dialog opens.

4. Navigate to the required cube file.
5. Click **Open**.

The Progress dialog opens to indicate the status of the file import.

6. If required, edit the settings according to the expected cube file characteristics: Description, Input Gamut, Output Gamut, and Range Type.

7. Close the Custom 3D LUT RGB Cube Files dialog.

- ★ Click **Delete File** to remove unused cube files. This will display a dialog that lists the engines that the selected file is currently loaded to. Select the engine(s) you wish to delete the cube file from, and then click **Unload and Delete** to remove the file.

## Specifying the 3D-LUT RGB Cube File Type

A 3D-LUT Cube File is designed to process a specific input/output signal range. The DashBoard option **Range** provides two processing signal ranges:

- Type I – Normal Range [64,940]
- Type III – Full Range [0,1023]

- ★ The pre-loaded 3D-LUT RGB Cube files library, most BBC Cube files, and all NBCU Cube files are of Type III.

The **Type I Normal Range** scales the SDI input signal level [64,940] to drive the 3D-LUT input processing range [0,1023] and will scale the 3D-LUT output processing range [0,1023] back to the SDI output signal level [64,940]. This means that a **Type I** 3D-LUT Cube file will clip super-blacks or super-whites on the SDI input and will not be able to generate super-blacks or super-whites on the SDI output.

The **Type III Full Range** will drive the full 10-bit SDI input signal level directly to the 3D-LUT input processing range [0,1023] and will scale the 3D-LUT output processing range [0,1023] to the SDI output signal level [0,1023]. This means that a Type III 3D-LUT Cube file will be able to process super-blacks and super-whites on the SDI input and will be able to generate super-blacks and super-whites on the SDI output.

- ★ To allow super-blacks or super-whites on the SDI video output stream, the **Video Output Clipping** option must be set to the **Extended Luma [4,1019]** range.

As described above, the functionality of the **Type I Normal Range** 3D-LUT RGB Cube file is a subset of the functionality of the **Type III Full Range**. For that reason, most applications will be using the **Type III Full Range** 3D-LUT RGB Cube file.

## Pre-Loaded RGB Cube Files Library

The UltriProc-3DLUT license provides a library of pre-loaded 3D-LUT RGB Cube files from the BBC and NBCU.

### 3D-LUT RGB Cube Files from BBC

These 3D-LUT files are designed and copyrighted by the BBC and are available under license. Refer to **Table 65** for details on the available files.

**Table 65 Pre-loaded 3D-LUT RGB Cube Files — BBC**

| BBC LUT # | Conversion and Filename Info  |
|-----------|---|
| 1         | BT.2100 PQ 1000 cd/m <sup>2</sup> to BT.2100 HLG, Type III<br>File: BBC/ 1e_PQ1000_HLG_Type3_Transcode_nocomp-v1_7.cube                   |
| 2         | BT.2100 PQ 4000 cd/m <sup>2</sup> to BT.2100 HLG, Type III<br>File: BBC/ 2e_PQ4000_HLG_Type3_Transcode_nocomp-v1_7.cube                   |
| 3         | BT.709 SDR to BT.2100 HLG direct-mapping, Type I, display-light<br>File: BBC/ 3a_BT709_HLG_Type1_Display_DirectMapping_nocomp-v1_7.cube   |
|           | BT.709 SDR to BT.2100 HLG direct-mapping, Type III, display-light<br>File: BBC/ 3c_BT709_HLG_Type3_Display_DirectMapping_nocomp-v1_7.cube |

**Table 65 Pre-loaded 3D-LUT RGB Cube Files — BBC (Continued)**

| BBC LUT # | Conversion and Filename Info  |
|-----------|---|
| 4         | BT.709 SDR to BT.2100 HLG direct-mapping, Type III, scene-light<br>File: BBC/ 4-1a_BT709_HLG_Type3_Scene_DirectMapping_nocomp-v1_7.cube                                 |
| 5         | BT.709 SDR to BT.2100 HLG up-mapping, Type III, display-light<br>File: BBC/ 5c_BT709_HLG_Type3_Display_UpMapping_nocomp-v1_7.cube                                       |
| 6         | BT.709 SDR to BT.2100 HLG up-mapping, Type III, scene-light<br>File: 6-1a_BT709_HLG_Type3_Scene_UpMapping_nocomp-v1_7.cube  |
| 7         | BT.2100 HLG to BT.2100 PQ 1000 cd/m <sup>2</sup> , Type III<br>File: BBC/ 7c_HLG_PQ1000_Type3_Transcode_nocomp-v1_7.cube  |
| 8c        | BT.2100 HLG to BT.709 SDR down-mapping, Type III, display-light<br>File: HLG_BT709_Type3_Display_DownMapping_CAM_nocomp-v1_7.cube                                       |
| 9         | BT.2100 HLG to BT.709 SDR down-mapping, Type III, display-light, with SDR super-whites<br>File: BBC/ 9c_HLG_BT709_Type3_Display_DownMapping_SuperWhite_nocomp-v1_7.cube |
| 10        | BT.2020 S-Log3 to BT.2100 HLG, Type II, scene-light (use DashBoard Type III option)<br>File: BBC/ 10a_S-Log3-100pc_HLG_Type2_Scene_Transcode_nocomp-v1_7.cube           |
| 11        | “SR Live” S-Log3 to BT.2100 HLG, Type II, scene-light (use DashBoard Type III option)<br>File: BBC/ 11a_S-Log3-200pc_HLG_Type2_Scene_Transcode_nocomp-v1_7.cube         |
| 17        | BT.2020 SDR to BT.2100 HLG direct-mapping, Type III, display-light, graded content<br>File: BBC/ 17c_BT2020_HLG_Type3_Display_DirectMapping_nocomp-v1_7.cube            |
| 18        | BT.2020 SDR to BT.2100 HLG up-mapping, Type III, display-light, graded content<br>File: BBC/ 18c_BT2020_HLG_Type3_Display_UpMapping_nocomp-v1_7.cube                    |
| 19        | BT.2100 HLG to BT.2100 HLG Traditional Camera Look, Type III<br>File: BBC/ 19c_HLG_Camera_to_TraditionalLook_Type3_Conversion_nocomp-v1_7.cube                          |

### 3D-LUT RGB Cube Files from NBCU

These 3D-LUT files are designed and copyrighted by the NBC Universal (NBCU) and are publicly available free of use. A sub-set of the NBCU 3D-LUT files are pre-loaded as part of the UltriProc-3DLUT license. Refer to **Table 66** for details on the available files.

**Table 66 Pre-loaded 3D-LUT RGB Cube Files — NBCU**

| NBCU LUT # | Conversion and Filename Info  |
|------------|---|
| 1          | BT.709 SDR to BT.2100 HLG, Type III, display-light, direct-mapping<br>File: NBC/ 1-NBCU_SDR2HLG_DL_v1.1.cube          |
| 2          | BT.709 SDR to BT.2100 HLG, Type III, display-light, up-mapping<br>File: NBC/ 2-NBCU_SDR2HLG_SL_v1.cube                |
| 3          | BT.2100 HLG to BT.709 SDR, Type III, display-light, down-mapping<br>File: NBC/ 3-NBCU_HLG2SDR_DL_v1.1.cube            |
| 4          | BT.709 SDR to BT.2100 PQ, Type III, display-light, up-mapping<br>File: NBC/ 4-NBCU_SDR2PQ_DL_v1.cube                  |
| 5          | BT.2100 PQ to BT.709 SDR, Type III, display-light, down-mapping<br>File: NBC/ 5-NBCU_PQ2SDR_DL_v1.cube                |
| 7          | BT.2100 HLG 1000 cd/m <sup>2</sup> to BT.2100 PQ, Type III, display-light<br>File: NBC/ 7-NBCU-HLG2PQ_1000nit_v1.cube |

## RGB Color Correction

This section outlines the controls that UltraProc provides to perform basic RGB color correction.

★ RGB color correction is available with an UltraProc or UltraProc-3DLUT license.

### Overview

Under the DashBoard **Port Configuration** interface, the **Color Correction** sub-tab provides controls to perform basic RGB color correction functions.

#### To display the Color Correction interface

1. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
2. Expand the **Systems** sub-node.
3. Expand the **Configuration** sub-node.
4. Double-click the **ULTRIX-FR12** node.

The **Device Configuration** interface opens.

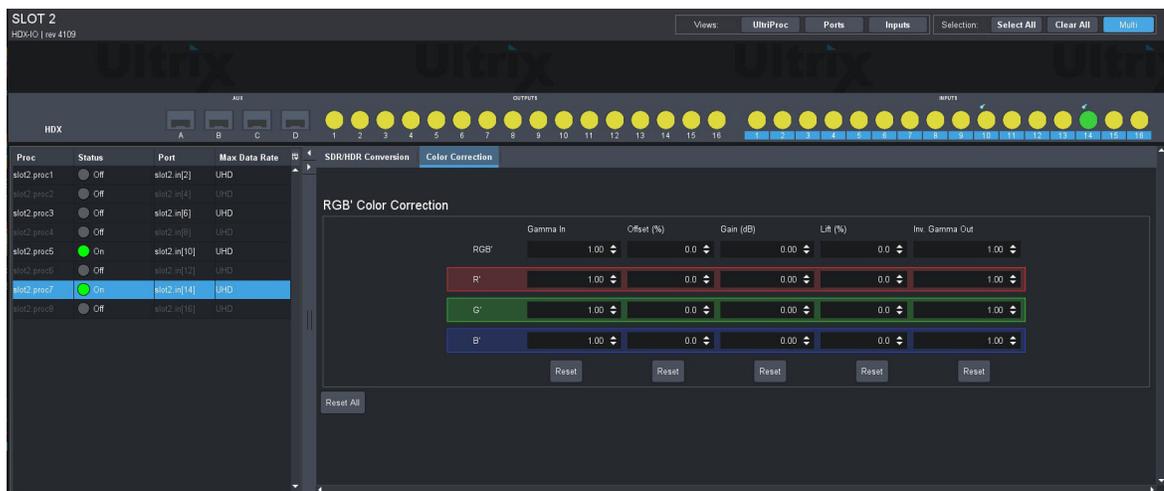
5. Select  .

The **Port Configuration** page opens.

6. Set the **Views** to **UltraProc**.
7. Select the **Color Correction** sub-tab.

★ You can also click the port with an UltraProc license on the blade map of the **Home** page  to display the UltraProc interface.

8. From the table in the left pane, select the row for the UltraProc engine to apply the RGB color correction.



**Table 67** summarizes the options displayed in the **Color Correction** sub-tab.

**Table 67 UltraProc — Color Correction**

| Item                        | Parameters | Description  |
|-----------------------------|------------|--|
| <b>RGB Color Correction</b> |            |  |
| RGB                         |            | Enables you to adjust the Red, Blue, and Green color components simultaneously |

**Table 67 UltraProc — Color Correction (Continued)**

| Item           | Parameters | Description  |
|----------------|------------|--|
| R              |            | Enables you to adjust the red color component independently of the other components                      |
| G              |            | Enables you to adjust the green color component independently of the other components                    |
| B              |            | Enables you to adjust the blue color component independently of the other components                     |
| Gamma In       | #          | Applies a gamma function to the RGB' stream  |
| Offset (%)     | #          | Adjusts the black offset of the RGB' stream  |
| Gain (dB)      | #          | Adjusts the gain of the RGB' stream  |
| Lift (%)       | #          | Lifts the black level of the RGB' stream, while applying a gain to keep the peak white at the same level |
| Inv. Gamma Out | #          | Applies an inverse gamma function to the RGB' stream   |

## Using the RGB Color Corrector

Controls are available for the grouped RGB' and for individual R', G', and B' components. The color correction processing is performed as indicated by the prime symbol, in the nonlinearly coded (gamma-corrected) components of the video output.

The RGB Color Corrector processing functions are cumulative and are executed in this sequence:

1. **Gamma In** — applies a Gamma function to the RGB' stream.
2. **Black Offset** — adjusts the black offset of the RGB' stream. The unit is in percentage of the full black to white signal amplitude with an adjustment range from -20% to +20%, in steps of 0.1%.
3. **Gain** — adjusts the gain of the RGB' stream. The unit is in dB with an adjustment range from -20dB to +20dB, in steps of 0.01dB.
4. **Black Lift** — lifts the black level of the RGB' stream, while applying a gain to keep the peak white at the same level. The unit is in percentage of the full black to white signal amplitude with an adjustment range from -20% to +20%, in steps of 0.1%.
5. **Gamma Out** — applies an inverse Gamma function to the RGB' stream.

## Monitoring the Color Conversion

The when **Views** is set to **UltraProc**, on the **Port Configuration** interface, a table displays in the left pane that provides status information. (Figure 50)

| Proc        | Status | Port         | Max Data Rate |
|-------------|--------|--------------|---------------|
| slot2_proc1 | Off    | slot2.in[2]  | UHD           |
| slot2_proc2 | Off    | slot2.in[4]  | UHD           |
| slot2_proc3 | Off    | slot2.in[6]  | UHD           |
| slot2_proc4 | Off    | slot2.in[8]  | UHD           |
| slot2_proc5 | On     | slot2.in[10] | UHD           |
| slot2_proc6 | Off    | slot2.in[12] | UHD           |
| slot2_proc7 | On     | slot2.in[14] | UHD           |
| slot2_proc8 | Off    | slot2.in[16] | UHD           |

*Figure 50 Example of the Monitoring Entries on the Port Configuration > UltraProc Interface*

Table 68 summarizes the status table entries.

**Table 68 Port Configuration — UltraProc Status Table**

| Item  | Description  |
|---|--|
| <b>Proc</b>   |  |
| slotx.proc# or<br>flex.proc# or<br>slotx.MODy.proc# | Reports the status of the UltraProc licenses where: <ul style="list-style-type: none"> <li>• x represents a router slot</li> <li>• # represents the UltraProc engine (one UltraProc license key)</li> <li>• y represents a module installed in an ULTRIX-MODX-IO blade of the slot</li> </ul>              |
| <b>Status</b>                                       |  |
| On (Green)  | The UltraProc engine is enabled, the signal on the port is valid, and the Bypass mode is set to <b>Normal</b>  |
| Input Mismatch (Yellow)                             | A change in the Input > Colorimetry / Transfer Characteristics > Override setting is detected  |
| Rate Mismatch (Yellow)                              | The License > Max Data Rate is set to 3G, but an UHD (6Gbps or 12Gbps) signal is detected  |
| Off (Gray)  | The UltraProc engine is disabled and not assigned to a port  |
| <b>Port</b>   |  |
| slotx.y[z] or<br>flex.y[z] or<br>MODx.y[z]          | Reports the status of the port assigned to an UltraProc engine where: <ul style="list-style-type: none"> <li>• x represents the slot in the router the port is located in</li> <li>• y represents the signal direction (in or out)</li> <li>• z represents the physical connector on the router</li> </ul> |
| <b>Max Data Rate</b>                                |  |
| 3G  | UltraProc operates at data rates up to 3Gbps <sup>a</sup> . The license is available on the even numbered inputs (Input 2, 4, 6, 8, 10, 12, 14, 16) or outputs (Output 2, 4, 6, 8, 10, 12, 14, 16) per blade.  |
| UHD   | UltraProc operates at data rates up to 6Gbps <sup>b</sup> and 12Gbps <sup>c</sup> . The license is available on 4 inputs (Input 2, Input 6, Input 10, Input 14) or 4 outputs per blade (Output 2, Output 6, Output 10, Output 14). This mode also requires an UltraSpeed license.                          |

a. 1080p 50/59.94/60Hz

b. 2160p 23.98/24/25/29.97/30Hz

c. 2160p 50/59.94/60Hz

## UltraProc for SmartCore

This section applies when using SmartCore to create custom Ultritouch soft panels with the UltraProc features.

### For More Information on...

- the SmartCore feature, refer to the **Ultricore BCS User Guide**.

## Widgets Overview

There are three UltraProc widgets available for SmartCore:

- Color Correct (The `ultriproccolor` widget)
- Conversion (The `ultriproconversion` widget)

- ProcAmps (The ultriprocamps widget)

### Color Correct

This widget includes the RGB Color Corrector processing functions.

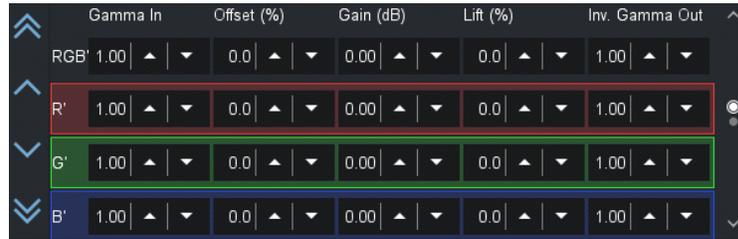


Figure 51 Example of the Color Correct Widget on an Ultritouch

### Conversion

This widget includes the following functions: Colorimetry/Transfer Characteristics (input/output), Conversion (RGB Cube Files, Tone Mapping), and Output Clipping.

★ You cannot import a RGB cube file from SmartCore.

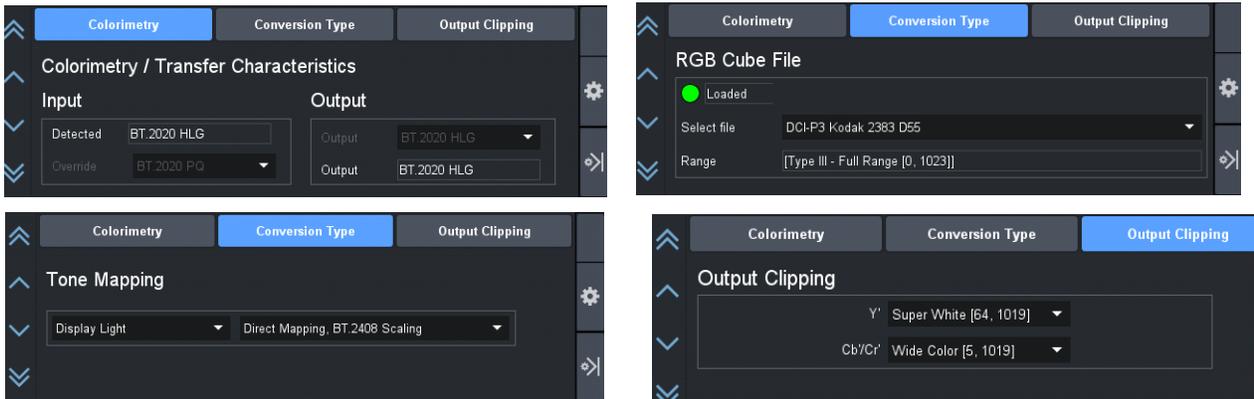


Figure 52 Examples of the Available Conversion Widgets

### ProcAmps

This widget includes the Input Proc Amps, and Output Proc Amps.

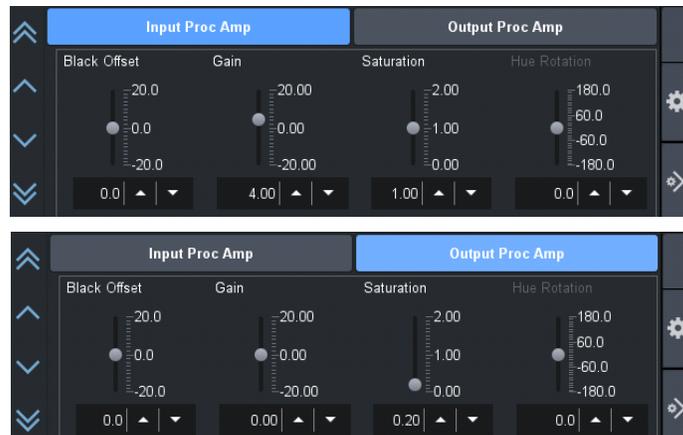


Figure 53 Example of the Input and Output Proc Amp Widgets

## Adding an UltriProc to the SmartCore Product Catalog

There are two methods for adding an UltriProc catalog to the SmartCore interface: by importing an \*.xlsx file with the parameters and widgets, or manually adding the catalog. This section briefly outlines both methods.

Keep the following in mind:

- Decide which UltriProc engine you would like to control in SmartCore and take note of their IDs. This information is available in the router's License > UltriProc interface.
- The following is an example of an \*.xlsx file to import an UltriProc catalog.

| UAP Product Definition |                    |            |                 |
|------------------------|--------------------|------------|-----------------|
| ProductName            | UltriProc          |            |                 |
| ProductType            | Ultrix             |            |                 |
| Manufacturer           | Ross Video Ltd     |            |                 |
| CommsType              | opengear-json      |            |                 |
| NumChannels            | 1                  |            |                 |
| WidgetName             | ultriprocolor      |            |                 |
| ControlType            | video              |            |                 |
| ControlSubType         | Color Correct      |            |                 |
| NumControls            | 1                  |            |                 |
| ParamOid               | ParamConstraint    | ParamLabel | ParamSignalType |
| slot2.proc1            |                    |            | video           |
| WidgetName             | ultriproconversion |            |                 |
| ControlType            | video              |            |                 |
| ControlSubType         | Conversion         |            |                 |
| NumControls            | 1                  |            |                 |
| ParamOid               | ParamConstraint    | ParamLabel | ParamSignalType |
| slot2.proc1            |                    |            | video           |
| WidgetName             | ultriprocamps      |            |                 |
| ControlType            | video              |            |                 |
| ControlSubType         | Proc Amps          |            |                 |
| NumControls            | 1                  |            |                 |
| ParamOid               | ParamConstraint    | ParamLabel | ParamSignalType |

When manually adding an UltriProc to SmartCore:

1. In the **Product Catalog** tab, click **Add** in the **Product Data** toolbar.
  - Use the Model Name to assign a unique identifier to this product. For example, enter the label for the required UltriProc engine.
  - Set the Product Type to Ultrix.
  - Set the Channels to 1.
  - Set the Comms Type to opengear-json.
2. Click **Add** in the **Widget Data** toolbar.
  - Set the Enter Widget Name to one of the UltriProc widgets. See **"Widgets Overview"**.
  - Set the Control type to video.
  - Set the Sub-control type to conversion.
  - Set the Number of Controls to 1.
3. Click **Add** in the **Parameter Data** toolbar for a selected WidgetID.
  - Set the Param OID to the slot and proc engine ID. For example, `slot2.proc1`.
4. In the **Data Manager** tab, click **Add** to connect to an Ultrix Frame and attach a Product Data entry.
  - Set the Device Name to `Ultrix_slot#.proc#`. For example, `Ultrix_slot2.proc1`.

- Set Product to UltraProc.
  - Use the Device IP field to specify the IP address of the Ultrix router.
  - Click Get Details to auto-populate the remaining fields.
5. In the **Signal Path Manager** tab, click **Assign**.
- Use the Select Device menu to select the device added in step 4.
  - Set the Product Type to UltraProc.
  - Set the Select Channel to 0.

## Soft Panels for UltraProc

You can create a soft panel that displays one or two UltraProc windows.

### To create a soft panel for UltraProc

1. Create an Ultritouch PB soft panel and ensure to include:
  - the UltraProc assigned Sources and Destinations for control.
  - a drawer window assigned to Presets.

This will auto reveal the UltraProc Presets for control from an Ultritouch panel when selecting a source or destination that has a SmartCore template attached.

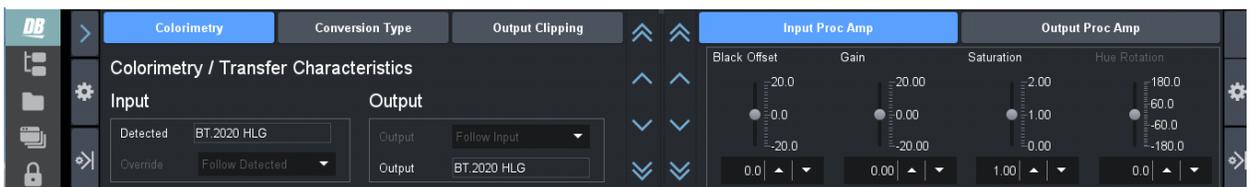
2. If desired, rename button labels by editing the Widget Data > Control Sub Type menu from the User Assigned Parameter (UAP) menu.
3. To display two sets of SmartCore presets, add another Preset to the Home View Config > Drawer Window options for the panel.

### To access the UltraProc options on a soft panel

1. Load the soft panel to your Ultritouch.
2. Click  to display the UltraProc options.
3. Select from Color Correct, Conversion, or Proc Amps.



4. Click  to display the UltraProc Control menu.



# UltraStream Setup

This chapter provides information on the UltraStream licensed features for the ULTRIX-FR12 routers.

- ★ The UltraStream license is supported on the ULTRIX-HDX-IO and ULTRIX-MODX-IO blades only.
- ★ The UltraStream license requires router software version 5.2.0 or higher.

## Overview

The UltraStream licensed feature provides the ability to encode one NDI stream of a configured UltraScape Multiviewer Head per ULTRIX-HDX-IO or ULTRIX-MODX-IO blade.

- ★ The Multiviewer Head for the video source must be one from the same blade that is transmitting the NDI stream. For example, a licensed ULTRIX-MODX-IO blade in Slot 1 cannot send an NDI stream of a Multiviewer Head from a licensed ULTRIX-HDX-IO blade in Slot 2.

An UltraStream license is supported on the following routers:

- ULTRIX-NS-FR1
- ULTRIX-NS-FR2
- ULTRIX-NS-FR5
- ULTRIX-FR5
- ULTRIX-FR12

## Features

An UltraStream license provides the following features:

- Configure and send one full bandwidth NDI Stream (encode only)
- Video source for the stream can be selected from any Multiviewer Head of the licensed blade<sup>1</sup>
- Supports Unicast transport modes only
- Provides monitoring of the encode stream state and video format
- Configure the names for NDI device alias, stream, and group(s)
- Assign Static or DHCP IP addresses

## Before You Begin

Ensure the following:

- The AUX D port on the blade is populated with an **SFP-RJ45-1G** module. Refer to the **Ultrix SFP Modules User Guide** for specifications.
- Your facility IT Department provided the required network settings to be assigned to the AUX D port you plan to enable for the UltraStream license for.
- The UltraScape Head(s) are enabled and configured as outlined in the **UltraScape User Guide**.
- The UltraStream and the Ultrimix-Dante licenses cannot be enabled on the same slot. By enabling an UltraStream license on a slot, you will be prevented from enabling an Ultrimix-Dante license on that slot until you disable the applied UltraStream license.

---

1. Requires an UltraScape license.

## Installing an UltraStream License

Ross Video uses license keys to control user access to specific features. You can obtain a key for a licensed feature from Ross Video Technical Support. Use the key to assign an UltraStream license to a supported blade in the Ultrix router.

### To install an UltraStream license key

1. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
2. Expand the **Systems** sub-node.
3. Expand the **Configuration** sub-node.
4. Double-click the **ULTRIX-FR12** node.

The **Device Configuration** interface opens.

5. Select .

The **Licenses** page opens with **License Keys** sub-tab automatically selected.

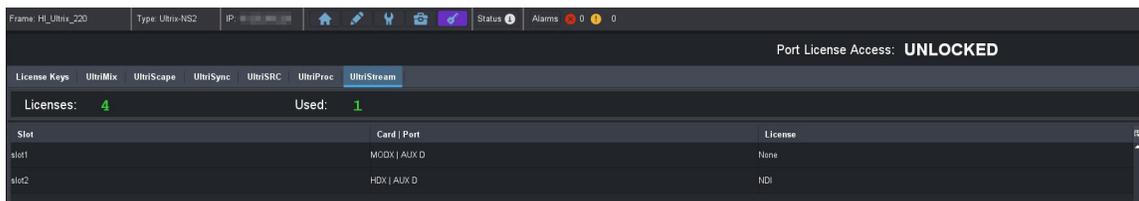
6. Make a note of the character string in the **Request Code** field for the UltraStream license.
7. Contact Ross Video Technical Support using the information listed in “**Contacting Technical Support**”.
  - a. When you speak to your Technical Support representative, tell them your name, your facility name, and the **Request Code** from step 6.
  - b. You will be given a License Key for the UltraStream.
8. Enter the provided License Key in the applicable **License Key** field of the **Licenses** tab.
- ★ You can also right-click on the row for the License Key you are installing, copy the Request Code to or paste the License Key from the Microsoft® Windows® clipboard, and click **Yes**.
9. Click **Apply** in the row for the License Key you entered in step 8.
10. Verify that the **Count** field is updated to report each installed UltraStream License Key.

### To activate an UltraStream license for a specific blade

1. In the **Licenses** interface, select the **UltraStream** sub-tab.

The interface is organized into a table with three columns. The left column (Slot) lists the available slots that the license can be assigned to. The center column (Card | Port) lists the type of blade and the port name. The right column (License) provides the option to enable/disable the license for the specified slot.

- ★ All NDI capable blades use the AUX D port for UltraStream.



2. Verify that the top **Licenses** read-only field reports the total number of purchased UltraStream licenses for the router. In the example above, there are a total of 4 licenses purchased with 1 in use.
3. In the table, locate the row for the slot you wish to enable the UltraStream license.
4. Use the **License** column to select **NDI** for the slot.

## Accessing the UltraStream Interface

Once an UltraStream license is enabled for a slot, you can access the UltraStream settings via the DashBoard **Port Configuration** tab.

### To display the UltraStream interface

1. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
2. Expand the **Systems** sub-node.
3. Expand the **Configuration** sub-node.
4. Double-click the **ULTRIX-FR12** node.

The **Device Configuration** interface opens.

5. Select .

The **Port Configuration** page opens.

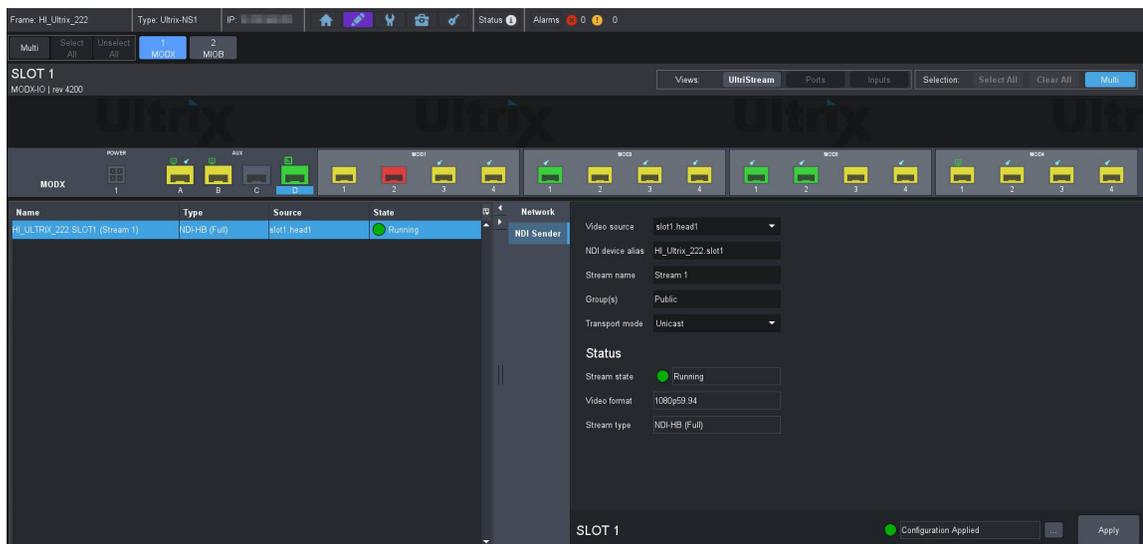
6. From the Slot toolbar (at the top of the **Port Configuration** page), select the button for the slot you enabled the license on.

7. Perform one of the following:

- Set the **Views** to **UltraStream**; or
- Click the **AUX D** port on the blade map of the **Home** page .

The Port Configuration page updates to display the UltraStream interface. In the following example, the ULTRIX-MODX-IO blade in Slot 1 was selected.

- ★ An NDI icon displays above an AUX D port when a license is enabled.



## Overview

The UltraStream interface is organized into three areas: an I/O map of the selected blade (top), a table listing the configured streams (left pane), and options for configuring the UltraStream for the selected AUX D port (right pane). (**Figure 54**)

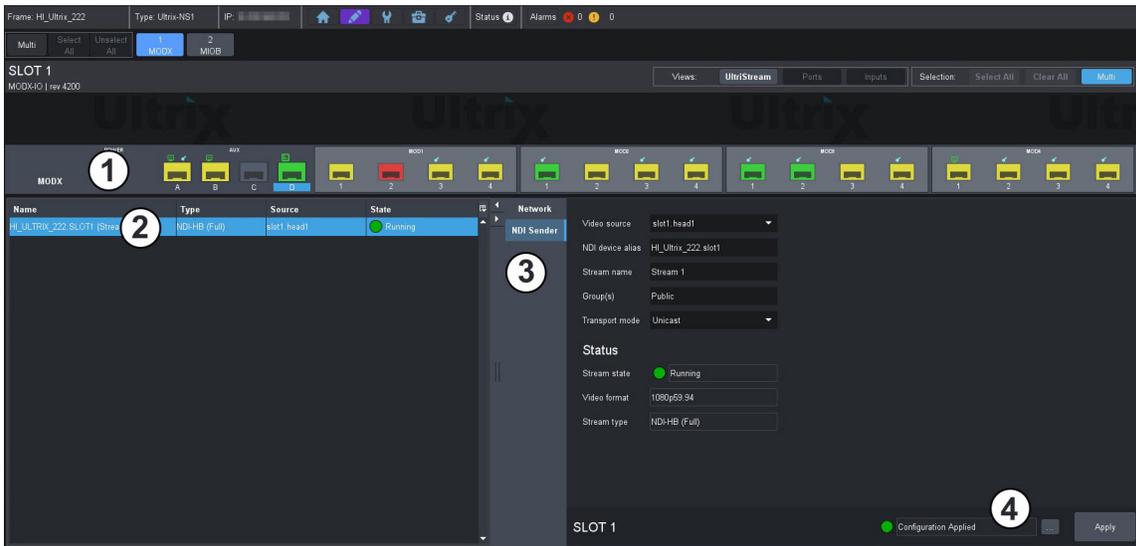


Figure 54 Example of the Port Configuration > UltraStream Areas

## 1. Blade I/O Map

The top includes a map of the ports available on the selected blade. Note that the AUX D port in the UI changes color based on the state of the NDI stream (green when the stream is valid, and red for error conditions). When **View** is set to **UltraStream**, the AUX D port is automatically selected on the Blade I/O Map and any other port is not selectable from this map. A small NDI icon displays over the AUX D port when an UltraStream license is enabled.

## 2. Status Table

The left panel includes a read-only table that lists the licensed stream(s) on AUX D. Each table row represents a stream and reports the Name, Type, Source, and State for that stream. Refer to **Table 69** for more information.

★ Only one stream can be configured at this time.

## 3. Configuration Options

The right panel includes two tabs:

- › Network — provides options for configuring the network settings for AUX D. Refer to **Table 70**.
- › NDI Sender — provides options for configuring the NDI encoded stream, and read-only fields used to monitor the encoding status. Refer to **Table 71**.

★ When a blade is selected that does not have an UltraStream license enabled, the UltraStream > Network and the UltraStream > NDI Sender tabs are disabled (grayed out).

## 4. Configuration Status Toolbar

The toolbar is located in the bottom right corner and includes a status field and two buttons.

- › The status field reports the status of changes made in the UltraStream tabs and menus. A status indicator can vary in severity from green (valid), yellow (caution), to red (alarm).
- › Select  to view details on the current status message.
- › Click **Apply** to save any changes made to the UltraStream tabs and menus.

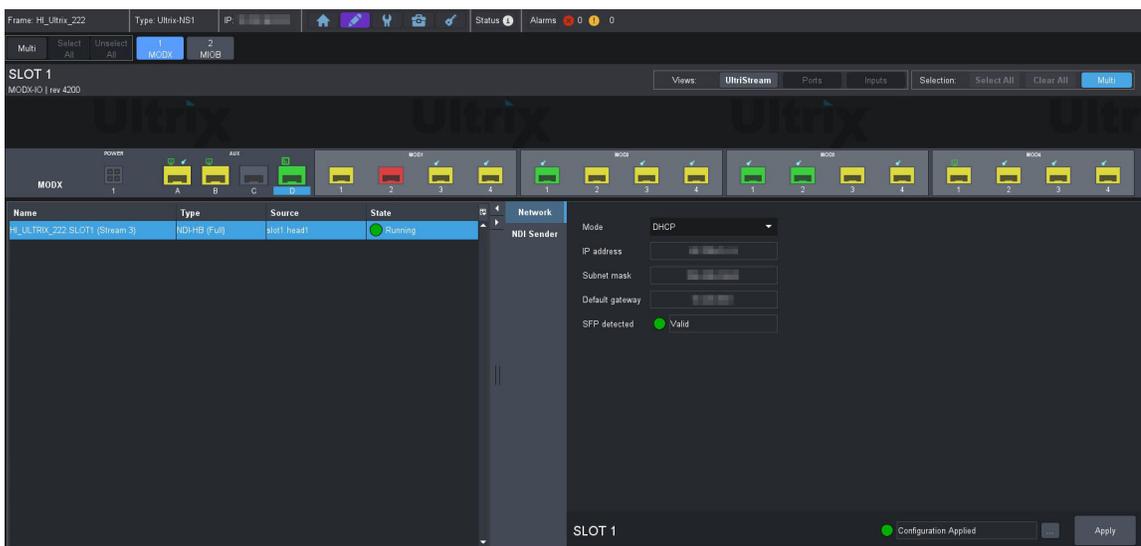
## Network Configuration

The encoded NDI Stream will be transmitted via the **AUX D** port on the blade. This first requires you to specify how the IP address for the port is assigned (Static or DHCP). Both methods are described below.

- ★ When using UltraStream and Ultrimix-Dante, ensure that your NDI and Dante networks are separated. Combining these networks can lead to congestion, performance issues, and degraded Dante audio quality.
- ★ Contact your network administrator if difficulties or problems are experienced when assigning IP addresses.

### To configure the network settings for the AUX D port

1. Display the UltraStream interface as outlined in **“To display the UltraStream interface”**.
2. Select the **Network** sub-tab.



3. If you are manually configuring the network settings:
  - a. Use the **Mode** menu to select **Static**.
  - b. Use the **IP Address** field to specify the new static IP Address for the AUX D port.

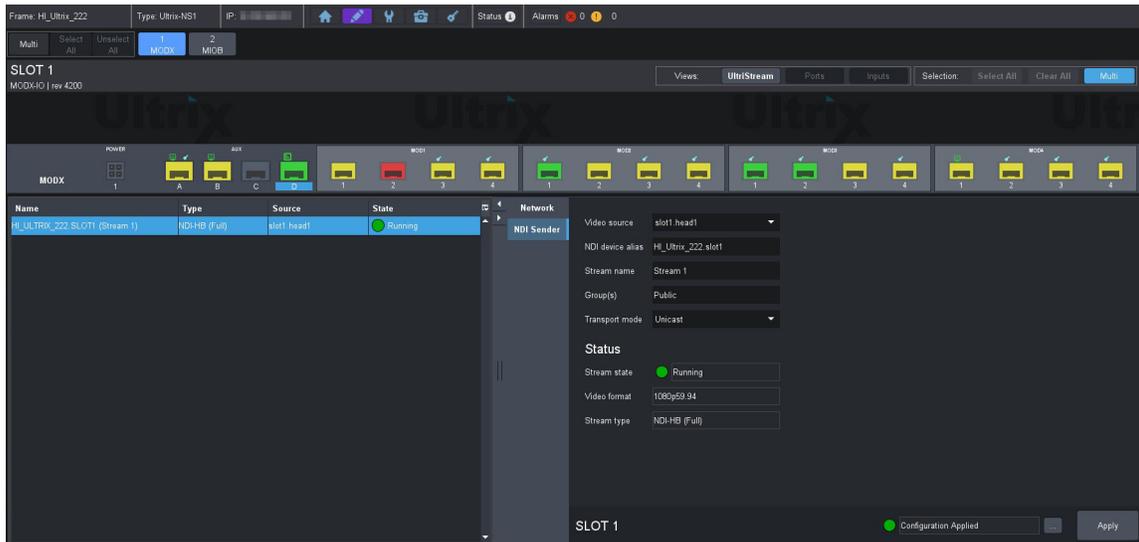
This is the IP Address that is used by the NDI protocol and Unicast transport to stream the video source.
  - c. Use the **Subnet Mask** field to specify the subnet mask for the AUX D port.
  - d. Use the **Default Gateway** field to specify the gateway for communications outside of the local area network (LAN) the ULTRIX-FR12 will use.
4. If you want the network settings for the AUX D port to be automatically obtained, and DHCP service is available on your control network, select **DHCP** from the **Mode** menu. This is the default mode.
- ★ Verify that a DHCP server is running in your network before setting the Mode to DHCP.
5. Click **Apply** to save the new settings.

## Configuring an NDI Sender Stream

- ★ Configuration for UltraStream is saved across a reboot or power cycle of the ULTRIX-FR12 router and reapplied on boot.

### To configure an NDI Sender stream

1. Display the UltraStream interface as outlined in “To display the UltraStream interface”.
2. Select the **NDI Sender** sub-tab.



3. Use the **Video source** menu to specify the Multiviewer Head to encode on a slot. The list displays only those Multiviewer Heads that are enabled.
4. Use the **NDI device alias** field to specify a new name that will override the host name.  
The alias name applies to the video stream on the AUX D interface. By default, the name uses the nomenclature of the router name (e.g. “HI\_Ultri\_223”), followed by the slot (e.g. slot3).
5. Use the **Stream name** field to specify a unique identifier for the stream when it appears on the network. For example, HI\_Ultri\_223\_SLOT1A.  
The NDI device alias and Stream name values uniquely identify a stream in the NDI protocol. For example, a NDI Monitor tool discovers a stream named HI\_ULTRIX\_223.SLOT1A(RC01), where the NDI device alias is HI\_ULTRIX\_223.SLOT1A and the Stream name is RC01.
6. Use the **Group(s)** field to specify a group the NDI stream belongs to. If there are multiple groups, use a comma between the names. For example, Group A,group2,my\_group.  
Only viewers that belong to the same group can view the stream. For example, NDI Access Manager defines NDI Studio Monitor can view streams from the Public group.
- ★ The **Transport Mode** menu is automatically set to **Unicast**. The AUX D port applies the User Datagram Protocol (UDP), R-UDP, or TCP for NDI encoding to a single stream.
7. Click **Apply** to save the new settings.

## DashBoard Menus Overview

This section briefly summarizes the read-only fields, menus, and editable fields available when an UltraStream license is applied to a router blade, and the **Views** is set to **UltraStream**.

## Status Table

**Table 69** summarizes the read-only fields displayed in the table located in the left pane of the **Port Configuration** tab when **Views** is set to **UltraStream**.

**Table 69 UltraStream — Status Table**

| Item   | Parameters  | Description  |
|--------|---|--|
| Name   | Reports the identifier assigned to the stream using the nomenclature of <code>NDI device alias name(stream name)</code> . |  |
| Type   | Reports the type of compression used for NDI encoding   |  |
| Source | Reports the video source that is selected in the NDI Sender tab   |  |
| State  | Running (Green)   | The sender stream is operating correctly without errors and the link for the AUX D port is valid   |
|        | Stopped (Red)   | One of the following is occurring: <ul style="list-style-type: none"><li>• the sender stream is no longer running</li><li>• the sender stream encountered an error</li></ul> |

## Network Tab

**Table 70** summarizes the options displayed in the **Port Configuration > UltraStream > Network** tab. This tab provides options for configuring the Network (AUX D port) settings.

**Table 70 UltraStream — Network**

| Item                     | Parameters    | Description  |
|--------------------------|---------------|--|
| Mode                     | Static        | The user manually supplies the network settings for the AUX D port   |
|                          | DHCP          | Automates the assignment of the network settings for the AUX D port. This is the default.  |
| IP address               | #             | Specifies the IP address assigned to the AUX D port.<br>This address is used to communicate with devices on your streaming network.  |
| Subnet mask              | #             | Specifies the subnet mask for the AUX D port   |
| Default gateway          | #             | Specifies the gateway for communications outside of the local area network (LAN)   |
| SFP detected (read-only) | Valid (Green) | The SFP in the AUX D port is valid and operational   |
|                          | Invalid (Red) | One of the following is occurring with the SFP in the AUX D port: <ul style="list-style-type: none"><li>• the SFP is incompatible with UltraStream</li><li>• the SFP is not operational</li><li>• the SFP is not installed in the port</li></ul> |

## NDI Sender Tab

**Table 71** summarizes the options displayed in the **Port Configuration > UltraStream > NDI Sender** tab. This tab provides configuration options and read-only information about the NDI Encoder.

**Table 71 UltraStream — NDI Sender**

| Item                      | Parameters      | Description  |
|---------------------------|-----------------|--|
| Video source              | None            | Stops the NDI video stream. Select this option if you need to stop the video stream from the associated Multiviewer Head.  |
|                           | slot#.head#     | Specifies which Multiviewer Head to encode on a slot for the encoded sender stream. The list displays only those Multiviewer Heads that are enabled.   |
| NDI device alias          | <text>          | Assigns a unique identifier to the video stream on the selected AUX D port. The maximum is 30 characters.<br><br>The default value contains the DashBoard System > Device name (e.g. "HI_Ultrix_222"), followed by the slot name (e.g. slot1). For example, "HI_Ultrix_222.slot1". |
| Stream name               | <text>          | Assigns a unique identifier to the stream. The maximum is 30 characters. You can specify a hard-coded name (<text>).   |
| Group(s)                  | <text>          | Assign a unique identifier to indicate a specific group to send the encoded stream as part of (or a comma-separated list of multiple groups, such as Group A, group 2, my_group).<br><br>The default is Public.  |
| Transport mode            | Unicast         | The NDI stream will automatically be transmitted with an appropriate Unicast transport mechanism (UDP or TCP)  |
| <b>Status (read-only)</b> |                 |  |
| Stream state              | Running (Green) | The sender stream is operating correctly without errors and the link for the AUX D port is valid   |
|                           | Stopped (Red)   | One of the following is occurring: <ul style="list-style-type: none"> <li>the sender stream is no longer running</li> <li>the sender stream encountered an error</li> </ul>  |

**Table 71 UltraStream — NDI Sender (Continued)**

| Item         | Parameters    | Description   |
|--------------|---------------|---|
| Video format | #             | Reports the encoded video format. Verify that this matches the format assigned to the specified Multiviewer Head in the Video source menu. Refer to <b>Table 72</b> . |
|              | N/A           | The sender stream is unavailable. Verify that the link is valid and is running without errors.  |
| Stream type  | NDI-HB (Full) | The stream uses NDI High Bandwidth compression (or Full Bandwidth)  |

## Multiviewer Output Formats

**Table 72** lists the resulting NDI encoded Multiviewer output format per Ultrix input reference and Multiviewer head format selection.

**Table 72 NDI Encoded Output Format**

| Ultrix Input Reference Format | Multiviewer Head Output Format |                  |             |
|-------------------------------|--------------------------------|------------------|-------------|
|                               | 1080p                          | 1080i / 1080i-LC | 2160p UC    |
| 1080p 25                      | 1080p 50                       | 1080i 50         | 1080p 50    |
| 720p 25                       | 1080p 50                       | 1080i 50         | 1080p 50    |
| 720p 50                       | 1080p 50                       | 1080i 50         | 1080p 50    |
| PAL                           | 1080p 50                       | 1080i 50         | 1080p 50    |
| 1080i 59.94                   | 1080p 59.94                    | 1080i 59.94      | 1080p 59.94 |
| 1080p 23.98                   | 1080p 59.94                    | 1080i 59.94      | 1080p 59.94 |
| 1080p 29.97                   | 1080p 59.94                    | 1080i 59.94      | 1080p 59.94 |
| 720p 59.94                    | 1080p 59.94                    | 1080i 59.94      | 1080p 59.94 |
| 720p 23.98                    | 1080p 59.94                    | 1080i 59.94      | 1080p 59.94 |
| NTSC                          | 1080p 59.94                    | 1080i 59.94      | 1080p 59.94 |
| 1080i 60                      | 1080p 60                       | 1080i 60         | 1080p 60    |
| 1080p 30                      | 1080p 60                       | 1080i 60         | 1080p 60    |
| 720p 24                       | 1080p 60                       | 1080i 60         | 1080p 60    |
| 720p 30                       | 1080p 60                       | 1080i 60         | 1080p 60    |
| 720p 60                       | 1080p 60                       | 1080i 60         | 1080p 60    |



# Managing your ULTRIX-FR12 Settings

The **Product Info > Transfer** interface provides options to import and export archived files (\*.ufs) of your ULTRIX-FR12 frame settings to another ULTRIX-FR12.

The \*.ufs file captures the settings of the Device Configuration interface except for:

- database configuration
- UltriScape layouts
- device name
- network settings
- NTP server settings
- installed license keys

★ This feature requires DashBoard v8.2 or higher.

## For More Information on...

- the settings available in the Device Configuration interface, refer to the “**Navigating the Device Configuration Interfaces**”.

## Exporting the Frame Settings

You create an archive of your frame settings using the options in the **Product Info > Transfer** tab.

### To export your frame settings to an archived file

1. In the Tree View of DashBoard, double-click the **Product Info** node.  
The Product Info interface displays in the DashBoard window.
2. Select the **Transfer** tab.
3. Select the **ULTRIX-FR12 Frame Settings** sub-tab.
4. Locate the **Export** area on the tab.
5. Click **Browse...** to specify the name and location to save the \*.ufs file to.  
The **Save As** read-only field updates with the selected path and file name.
6. Click **Apply**.  
The **Downloading Archive** dialog opens to report the status of the export.

## Importing a Frame Settings File

You must re-boot the ULTRIX-FR12 to apply the settings of the imported \*.ufs file.

### To import an ULTRIX-FR12 Frame Settings file

1. In the Tree View of DashBoard, double-click the **Product Info** node.  
The Product Info interface displays in the DashBoard window.
2. Select the **Transfer** tab.
3. Select the **ULTRIX-FR12 Frame Settings** sub-tab.
4. Locate the **Import** area.

5. Select the \*.ufs file you wish to import as follows:

a. Click **Browse...**

The **Open** dialog opens.

b. Use the **Open** dialog to specify the \*.ufs file to import.

c. Click **Open** to close the dialog and load the file.

6. Click **Apply**.

The **Uploading Archive** dialog opens to report the status of the transfer.

# Monitoring the Hardware

This chapter summarizes the Device Configuration interface in DashBoard which provides status fields for monitoring the power, the internal chassis fans, and the ports.

## For More Information on...

- the alarms via the System > Monitoring node, refer to “**System Monitoring Interfaces**”.

## PSU Alarms

Each PSU port on the ULTRIX-FR12 rear panel can be monitored via Frame Configuration interface.

### Enabling the Alarms for the Router PSU Ports

You can customize the monitoring of the PSU by selecting which units to monitor and display an alarm message when the unit is not detected. The Alarms table fields in the Frame Configuration interface vary in severity from green (valid), yellow (caution), to red (alarm). DashBoard reports the most severe alarm for a single field.

## For More Information on...

- the messages displayed in the Fans & Power tab, refer to “**Fans & Power Tab**”.

### To monitor the PSU status of an ULTRIX-FR12

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select .

The **Frame Configuration** page opens.

7. Select the **Alarms** tab.

8. To add a new item to monitor:

★ The ULTRIX-FR12 has an option of triggering a GPI contact closure for use with external equipment. Select the **Alarm Relay** box to activate for each alarm type required.

- a. Click the **Type** cell in a row that is not assigned to monitor. The row will report “**Not Configured**” with a yellow indicator in the **State** cell.
- b. Select a power supply to monitor from the drop-down menu. Choose from the following:
  - › **PSU #** — Monitors the specified PSU port on the ULTRIX-FR12 rear panel.
  - › **Primary Power** — Monitors the main power connection (non-PSU port specific) to the ULTRIX-FR12 rear panel and determines whether a sufficient number of power supplies are connected and operating for the router to run reliably (one Ultripower).
  - › **Redundant Power** — Monitors additional power supplies connected to the ULTRIX-FR12 rear panel. When the Primary PSU is unavailable and no other PSU ports are in use, an alarm message will be raised to indicate that in the event of a power loss on the primary PSU, the router will lose power..

9. Refer to **Table 73** for a summary of the possible messages displayed in the Alarms status fields.

**Table 73 Alarms — Status Messages**

| Item            | Parameters              | Description  |
|-----------------|-------------------------|--|
| System Error    | OK (Green)              | The last re-boot (power cycle) of the router was successful and no errors are detected.  |
|                 | Failed (Red)            | The last re-boot/power cycle of the router failed. You must re-boot/power cycle the router. If the issue still persists, contact Ross Technical Support. |
| None            | Not Configured (Yellow) | The row in the table is not currently monitoring any component of the ULTRIX-FR12 router.  |
| PSU #           | OK (Green)              | Normal operation; no hardware errors associated with the PSU port; at least one Ultripower connection is detected  |
|                 | Failed (Red)            | Indicates the minimum number of PSU are not detected. Select the <b>Fans &amp; Power</b> tab for more information.                                       |
| Primary Power   | OK (Green)              | Normal operation; no hardware errors associated with the PSU; at least one Ultripower connection is detected   |
|                 | Failed (Red)            | Indicates the minimum number of PSU are not detected   |
| Redundant Power | OK (Green)              | Indicates extra PSU are detected/available; normal operation; no hardware errors associated with the PSU   |
|                 | Failed (Red)            | Indicates the minimum number of PSU are not detected   |
| Temperature     | OK (Green)              | Indicates that the chassis core components temperature is within the normal range  |
|                 | Warning (Yellow)        | Indicates that at least one chassis core component temperature is between 75°C and 80°C (167°F and 176°F)  |
|                 | Failed (Red)            | Indicates that at least one chassis core component temperature is above 80°C (176°F)   |
| Battery         | OK (Green)              | The battery installed in the chassis is operating normally.  |
|                 | Warning (Yellow)        | The battery power is between 1.5V and 2.7V.  |
|                 | Failed (Red)            | The battery power is below 1.5V and requires replacement. Refer to " <b>Monitoring the Battery</b> ".  |

## Monitoring the Fans

There are three types of ULTRIX-FR12 fans that can be monitored from the Alarms tab:

- Slot # Fan — the specific I/O Fan Module located on the front panel and behind the grill.
- Exhaust Fan # — the Exhaust Fan Module is located on the back panel, just above the power supplies. The module includes two interior fans. Each fan inside the Exhaust Fan Module can be monitored. If a fan fails, you must replace the Exhaust Fan Module.
- ★ The Exhaust Fans may not be present on all hardware.
- Front Panel # — refers to the bank of five fans located inside the chassis and under the Crosspoint Module. Fan 1 refers to the first two fans located on the left side of the fan bank. Fan 2 refers to the last 3 fans in the fan bank.
- ★ The Fans & Alarms tab enables you to monitor the individual fans for each slot in the back panel.

**Table 74 Alarms — Fans**

| Parameters    | Description   |
|---------------|---|
| OK (Green)    | Normal operation; no hardware errors are associated with the specified fan  |
| x/y           | Indicates the fan speed in RPM where: <ul style="list-style-type: none"><li>• x represents the current speed</li><li>• y represents the maximum speed</li></ul> |
| Stalled (Red) | Indicates the specified fan is not running correctly.<br>★ Contact Ross Technical Support if a fan reports an error.  |

## Setting the Chassis Fan Speed

The ULTRIX-FR12 enables you to control the cooling fan speed of the interior chassis fans for optimum cooling.

### To set the fan speed

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select  .  
The **Frame Configuration** page opens.
7. Select the **Fans & Power Supplies** tab.
8. Use the **Minimum Fan Speed** slider to specify how fast the fans the will run.

## Monitoring the Internal Memory

The **Device Configuration** interface enables you to monitor the flash storage space of your ULTRIX-FR12 router. This is useful when managing a large number of databases or during upgrades.

### To monitor the flash storage space

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.
6. Select  .  
The **Frame Configuration** page opens.
7. Select the **Alarms** tab.

8. To enable the **Storage Space** alarm:
  - a. Click the **Type** cell in a row that is not assigned to an item to monitor. The row will report "Not Configured" with a yellow indicator in the **State** cell.
  - b. Select **Storage Space**.
9. Refer to **Table 75** for a summary of the possible messages displayed in the **Storage Space** status field.

**Table 75 Alarms — Flash Storage**

| Parameter | Description                                    | Solution   |
|-----------|--|--|
| OK        | Database and layout storage space is available |  |
| WARNING   | Database and layout storage space is low       | <ul style="list-style-type: none"> <li>• Export unused databases and layouts as outlined in the <b>Ultracore BCS User Guide</b>; or</li> <li>• Delete unused databases as outlined in the <b>Ultracore BCS User Guide</b></li> </ul> |
| CRITICAL  | Database and layout storage is nearly depleted |  |

## Monitoring the SD Card

The **Device Configuration** interface provides a method for monitoring the physical state of the SD Card within the ULTRIX-FR12 chassis.

### To monitor the physical state of the SD Card

1. Locate the ULTRIX-FR12 in the Tree View of DashBoard.
2. Expand the ULTRIX-FR12 node to display a list of sub-nodes in the Tree View.
3. Expand the **Systems** sub-node.
4. Expand the **Configuration** sub-node.
5. Double-click the **ULTRIX-FR12** node to open the **Device Configuration** interface.  
The **Frame Configuration** page opens.
6. Select the **Alarms** tab.
7. To enable the **SD Card Presence** alarm:
  - a. Click the **Type** cell in a row that is not assigned to an item to monitor. The row will report "Not Configured" with a yellow indicator in the **State** cell.
  - b. Select **SD Card Presence**.
8. Refer to **Table 76** for a summary of the possible messages displayed in the **SD Card Presence** status field.

**Table 76 Alarms — SD Card Presence**

| Parameters | Description  |
|------------|--|
| OK (Green) | There are no SD Card issues detected   |
| FAIL       | The SD Card is not properly installed in the router chassis. Contact Ross Technical Support. |

## Monitoring the Ethernet LEDs on the Back Panel

Each RJ45 connector on the ULTRIX-FR12 back panel include two LEDs that report the ethernet communication activity and speed. Refer to the **ULTRIX-FR12 Installation Guide** for LED locations on the ULTRIX-FR12 rear panel.

**Table 77** provides basic LED descriptions.

**Table 77 ENET Port LEDs**

| LED                    | Status   | Description  |
|------------------------|----------|--|
| ENET # - Link/Activity | Green    | When lit green, this LED indicates a valid link is established on the specified ENET port.   |
|                        | Flashing | When flashing green, this LED indicates communication activity is occurring on the specified ENET port.  |
|                        | Off      | When unlit, this LED indicates an invalid link is detected on the specified ENET port. Verify the cable connection on the rear module port and your network connections. |
| ENET # - Port Speed    | Green    | When lit green, this LED indicates the ENET Port communication speed is at 1Gbps.  |
|                        | Yellow   | When lit orange, this LED indicates the ENET Port communication speed is at 100Mbps.   |
|                        | Off      | When unlit, this LED indicates the ENET Port communication speed is at 10Mbps.   |



# Monitoring the Communications

This chapter summarizes how to verify communications on an Ethernet port, and the overall communication status of the ULTRIX-FR12.

## Monitoring the Network Status

The Ethernet ports on the ULTRIX-FR12 rear panel are used to connect to an Ethernet network for communications. An ENET port is set to active when ULTRIX-FR12 automatically detects a valid network link on the port. When a valid link is detected on both ports, the ENET 1 port is set to active and is the primary connection.

- ★ There are two ENET ports on the ULTRIX-FR12 rear panel. A fail-over feature enables the ULTRIX-FR12 router to automatically use the second ENET port when the primary ENET connection is lost or unavailable.

### To verify the communication status of an Ethernet Port via DashBoard

1. Expand the **Devices** node.
2. Double-click the node for your ULTRIX-FR12 router.  
The **Device Configuration** interface opens.
3. Select .  
The **Frame Configuration** page opens.
4. Locate the **Status** field in the **Network Settings** area.  
This field reports which **Ethernet** port is currently active.
5. Refer to **Table 78** for a summary of the possible messages displayed in the **Status** field.

**Table 78 Frame Configuration — Status Field**

| Item   | Parameters               | Description  |
|--------|--------------------------|--|
| Status | ENET # is Active (Green) | Ethernet communications for the specified port are valid. The specified ENET port on the ULTRIX-FR12 rear panel is the currently active (in use).  |
|        | Inactive (Red)           | Ethernet communications for the router are invalid. The following conditions may be occurring: <ul style="list-style-type: none"><li>• The ethernet cables are disconnected from the rear panel.</li><li>• A valid network connection may be unavailable.</li><li>• The IP Address is for the router is no longer valid.</li></ul> |

## Monitoring the ULTRIX-FR12

The Product Info node displays an indicator that varies in severity from green (valid) to red (alarm). This indicator reports the most severe alarm the ULTRIX-FR12 is experiencing. The types of alarms the ULTRIX-FR12 reports is configured via the **Frame Configuration > Alarms** tab.

When you hover your mouse cursor over a red Product Info node in the Tree View of DashBoard, as seen below, a tool tip displays with a brief error message. The message and indicator continue to report an error until the condition is addressed or the alarm is disabled.

## Using the System Logs in DashBoard

An entry in each log includes a timestamp, a code number, and a description. Messages are written to the log when significant changes occur in the operation of the ULTRIX-FR12 router. These could include: changes to video, reference, audio or time inputs; power-on or reboot cycles; configuration changes that can have an effect on the routing path; alarm conditions.

### To access the system logs in DashBoard

1. In the Tree View of DashBoard, expand the **System** node under the ULTRIX-FR12 node.
2. Expand the **Monitoring** node.
3. Double-click the **Logs** sub-node.  
The **Logs** interface opens.
4. To view the log for communications between ULTRIX-FR12 and other devices, select **Controller Communications Log**.
5. To view the communication log for ULTRIX-FR12 only, select **System Log**.
6. To view the log for executed tasks in DashBoard for the router, select **DashBoard Communications Log**.
7. Click **Refresh** to update the entries for the currently selected log.

# Glossary

The following terms are used throughout this guide:

**Breakaway** — an act of performing a switch on only some of the signals grouped together under one label.

**Connection Point** — setting to define a communication connection between an ULTRIX-FR12 and a device in the routing system.

**Crosspoint** — a switch within a matrix. For example, the connection of signal IN 1 to OUT 1 requires one crosspoint.

**Destination** — a label applied to a router output (or group of outputs).

**Device** — a physical, virtual, or software application that may include multiple sources, destinations, senders, or receivers.

**Flow** — the continuous raw media content. It can contain more than one essence (e.g. an audio flow can contain multiple channels, and an SDI flow may contain audio and video essences). A flow is independent of the transport protocol. For example, 48kHz LPCM audio is a flow; AES67 is one type of stream which can carry the flow. Flows cannot generally be passed around natively, and need to be encapsulated in a stream. Flows from the same source are considered “editorially equivalent”, but may be encoded differently. For example, a video source may be encoded as 4:2:2 YCbCr uncompressed, 4:4:4 RGB uncompressed, and h.265 encoded. Each of these would be a separate flow from a common source.

**Hard Panel** — a physical hardware panel of buttons that is used to control the routing system.

**Head** — An OUT port on the ULTRIX-FR12 router that is assigned as an UltriScope (Multiviewer) output.

**IP Address** — a setting that defines the Internet protocol address of a device within a network.

**Label** — text that is used by control displays to identify a signal as an input or output.

**Level** — refers to a section of a routing system. For example, a video router would be one level and an audio router would be a second level.

**Logical (virtual) Label** — a name for a group of routing system inputs or outputs.

**Logical (virtual) Routing** — the action of switching a group of otherwise unrelated signals via a common label (name).

**Macro** — a recorded sequence of Remote Control Panel operations (local to the panel).

**Map** — a table that defines the allocation of names (labels) to router input and output sockets.

**Matrix** — the part of the routing system that performs the actual signal switching tasks.

**Partition** — matrices may be partitioned to behave as smaller independent matrices.

**Picture in Picture (PIP)** — a sub-picture in an UltriScope (Multiviewer) output.

**Receiver** — an element within a device that receives exactly one stream, which contains one flow from a network.

**Remote Control Panel (RCP)** — a physical hardware panel of buttons that is used to control the routing system.

**Resource** — a source or destination of a router configuration; an external device providing some conversion functionality for use within the routing control system.

**Salvo** — a system wide sequence of matrix control operations and crosspoint actions.

**Sender** — an element within a device which presents exactly one flow, packaged as a stream onto a network.

**Stream** — one flow, encapsulated within a transport protocol. Examples include SMPTE ST 2022-6, SMPTE ST 2110-20 Video, or SMPTE ST 2110-30 Audio (AES67).

**Soft Panel** — a DashBoard interface that represents a panel of buttons that is used to control the routing system.

**Source** — a label applied to a router input (or group of inputs).

**T-Bus** — the Ross Video proprietary routing communication method via a defined physical interface.

**UltraClean** — clean switch functionality of the ULTRIX-FR12 routers.

**Ultracore** — refers to the Ultracore-CC and the Ultracore-BCS unless otherwise stated.

**UltraMix** — SDI embedded audio manipulation sub-system of the ULTRIX-FR12 routers.

**UltraScope** — licensed Multiviewer option for ULTRIX-FR12 routers.

**UltraSpeed** — licensed 12Gbps SDI video option.

**UltraSync** — a per input licensed frame synchronizer.

**ULTRIX-FR1** — refers to all versions of the ULTRIX-FR1 router unless otherwise noted.

**ULTRIX-FR2** — refers to all versions of the ULTRIX-FR2 router unless otherwise noted.

**ULTRIX-FR1-NS** — refers to the next generation of the ULTRIX-FR1 router. This router displays the Ultrix logo on the front door with a blue dot in the “i”.

**ULTRIX-FR2-NS** — refers to the next generation of the ULTRIX-FR2 router. This router displays the Ultrix logo on the front door with a blue dot in the “i”.