Continuum DVP™
eXtra Dense QAM Array
System Guide

For Your Safety

Explanation of Warning and Caution Icons

Avoid personal injury and product damage! Do not proceed beyond any symbol until you fully understand the indicated conditions.

The following warning and caution icons alert you to important information about the safe operation of this product:

You may find this symbol in the document that accompanies this product. This symbol indicates important operating or maintenance instructions.

You may find this symbol affixed to the product. This symbol indicates a live terminal where a dangerous voltage may be present; the tip of the flash points to the terminal device.

You may find this symbol affixed to the product. This symbol indicates a protective ground terminal.

You may find this symbol affixed to the product. This symbol indicates a chassis terminal (normally used for equipotential bonding).

You may find this symbol affixed to the product. This symbol warns of a potentially hot surface.

You may find this symbol affixed to the product and in this document. This symbol indicates an infrared laser that transmits intensity-modulated light and emits invisible laser radiation or an LED that transmits intensity-modulated light.

Important

Please read this entire guide. If this guide provides installation or operation instructions, give particular attention to all safety statements included in this guide.

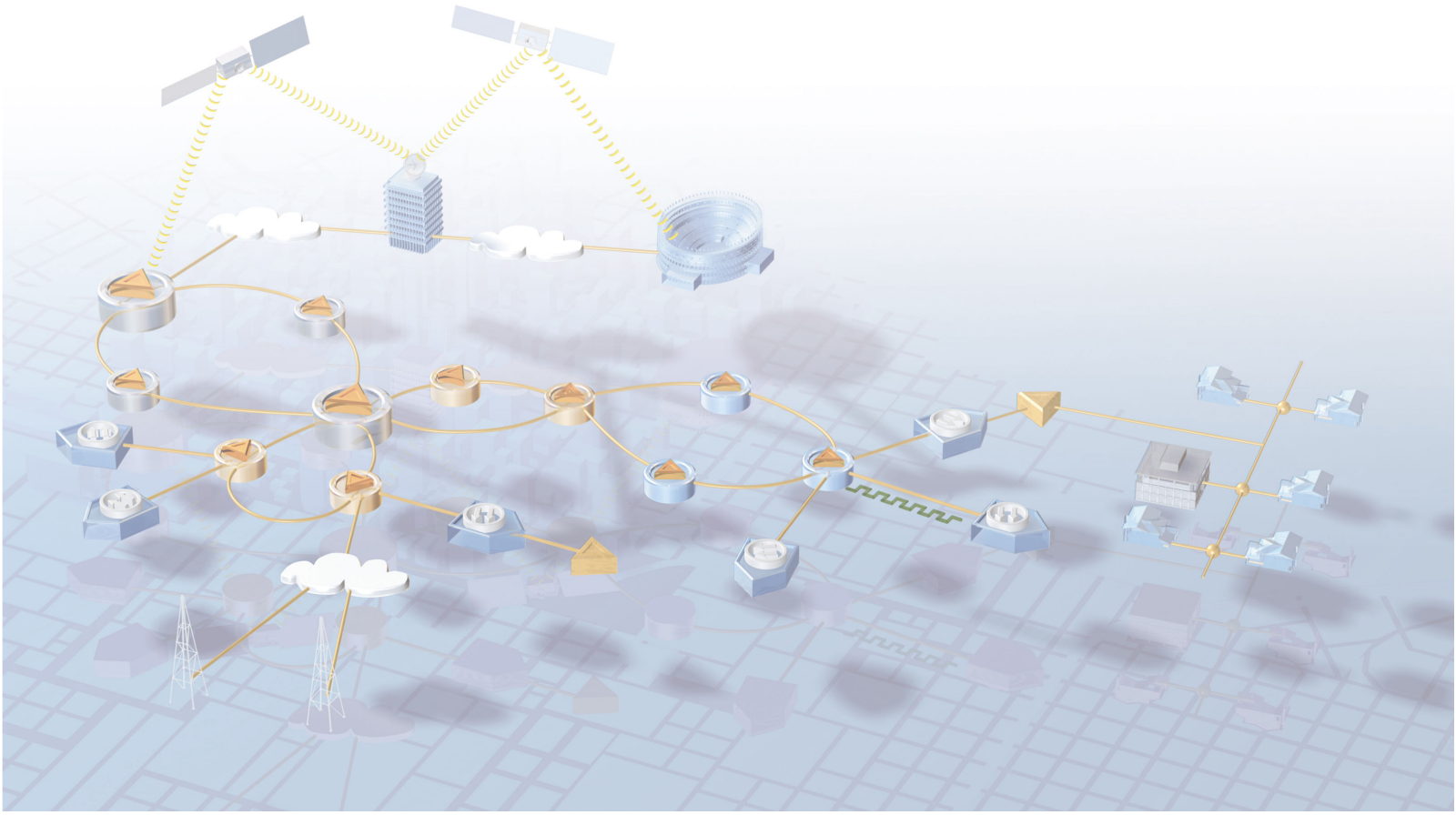
Scientific-Atlanta

Bringing the Interactive Experience Home™

Scientific Atlanta

Continuum DVP™ eXtra Dense QAM Array

System Guide



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Important Safety Instructions

Read and Retain Instructions

Carefully read all safety and operating instructions before operating this equipment, and retain them for future reference.

Follow Instructions and Heed Warnings

Follow all operating and use instructions. Pay attention to all warnings and cautions in the operating instructions, as well as those that are affixed to this equipment.

Terminology

The terms defined below are used in this document. The definitions given are based on those found in safety standards.

Service Personnel - The term *service personnel* applies to trained and qualified individuals who are allowed to install, replace, or service electrical equipment. The service personnel are expected to use their experience and technical skills to avoid possible injury to themselves and others due to hazards that exist in service and restricted access areas.

User and Operator - The terms *user* and *operator* apply to persons other than service personnel.

Ground(ing) and Earth(ing) - The terms *ground(ing)* and *earth(ing)* are synonymous. This document uses ground(ing) for clarity, but it can be interpreted as having the same meaning as earth(ing).

Electric Shock Hazard

This equipment meets applicable safety standards. Refer to this equipment's data sheet for details about regulatory compliance approvals.

> ⚠ **WARNING!**
>
> **To reduce risk of electric shock, perform only the instructions that are included in the operating instructions. Refer all servicing to qualified service personnel only.**

Electric shock can cause personal injury or even death. Avoid direct contact with dangerous voltages at all times. The protective ground connection, where provided, is essential to safe operation and must be verified before connecting the power supply.

Know the following safety warnings and guidelines:

- **Dangerous Voltages**
  - Only qualified service personnel are allowed to perform equipment installation or replacement.
  - Only qualified service personnel are allowed to remove chassis covers and access any of the components inside the chassis.
- **Grounding**
  - Do not violate the protective grounding by using an extension cable, power cable, or autotransformer without a protective ground conductor.
  - Take care to maintain the protective grounding of this equipment during service or repair and to re-establish the protective grounding before putting this equipment back into operation.

Continued on next page

Important Safety Instructions, Continued

Installation Site

When selecting the installation site, comply with the following:

- **Protective Ground** - The protective ground lead of the building's electrical installation should comply with national and local requirements.
- **Environmental Condition –** The installation site should be dry, clean, and ventilated. Do not use this equipment where it could be at risk of contact with water. Ensure that this equipment is operated in an environment that meets the requirements as stated in this equipment's technical specifications, which may be found on this equipment's data sheet.

Installation Requirements

⚠ WARNING:

THIS INSTALLATION SHOULD BE MADE BY A QUALIFIED SERVICE PERSON AND SHOULD CONFORM TO ALL LOCAL CODES.

Equipment Placement

⚠ WARNING:

Avoid personal injury and damage to this equipment. An unstable mounting surface may cause this equipment to fall.

To protect against equipment damage or injury to personnel, comply with the following:

- Install this equipment in a restricted access location.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other equipment (including amplifiers) that produce heat.
- Place this equipment close enough to a mains AC outlet to accommodate the length of this equipment's power cord.
- Route all power cords so that people cannot walk on, place objects on, or lean objects against them. This may pinch or damage the power cords. Pay particular attention to power cords at plugs, outlets, and the points where the power cords exit this equipment.
- Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with this equipment.
- Make sure the mounting surface or rack is stable and can support the size and weight of this equipment.
- The mounting surface or rack should be appropriately anchored according to manufacturer's specifications. Ensure this equipment is securely fastened to the mounting surface or rack where necessary to protect against damage due to any disturbance and subsequent fall.

Ventilation

This equipment has openings for ventilation to protect it from overheating. To ensure equipment reliability and safe operation, do not block or cover any of the ventilation openings. Install the equipment in accordance with the manufacturer's instructions.

Continued on next page

Important Safety Instructions, Continued

Rack Mounting Safety Precautions

Mechanical Loading

Make sure that the rack is placed on a stable surface. If the rack has stabilizing devices, install these stabilizing devices before mounting any equipment in the rack.

> ⚠ **WARNING:**
>
> **Avoid personal injury and damage to this equipment. Mounting this equipment in the rack should be such that a hazardous condition is not caused due to uneven mechanical loading.**

Reduced Airflow

When mounting this equipment in the rack, do not obstruct the cooling airflow through the rack. Be sure to mount the blanking plates to cover unused rack space. Additional components such as combiners and net strips should be mounted at the back of the rack, so that the free airflow is not restricted.

> ⚠ **CAUTION:**
>
> **Installation of this equipment in a rack should be such that the amount of airflow required for safe operation of this equipment is not compromised.**

Elevated Operating Ambient Temperature

Only install this equipment in a humidity- and temperature-controlled environment that meets the requirements given in this equipment's technical specifications.

> ⚠ **CAUTION:**
>
> **If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, consideration should be given to installing this equipment in an environment compatible with the manufacturer's maximum rated ambient temperature**.

Handling Precautions

When moving a cart that contains this equipment, check for any of the following possible hazards:

> ⚠ **WARNING:**
>
> 
>
> **Avoid personal injury and damage to this equipment! Move any equipment and cart combination with care. Quick stops, excessive force, and uneven surfaces may cause this equipment and cart to overturn.**

- Use caution when moving this equipment/cart combination to avoid injury from tip-over.

Continued on next page

- If the cart does not move easily, this condition may indicate obstructions or cables that may need to be disconnected before moving this equipment to another location.
- Avoid quick stops and starts when moving the cart.
- Check for uneven floor surfaces such as cracks or cables and cords.

Grounding

This section provides instructions for verifying that the equipment is properly grounded.

Safety Plugs (USA Only)

This equipment is equipped with either a 3-terminal (grounding-type) safety plug or a 2-terminal (polarized) safety plug. The wide blade or the third terminal is provided for safety. Do not defeat the safety purpose of the grounding-type or polarized safety plug.

To properly ground this equipment, follow these safety guidelines:

- **Grounding-Type Plug** - For a 3-terminal plug (one terminal on this plug is a protective grounding pin), insert the plug into a grounded mains, 3-terminal outlet.

  Note: This plug fits only one way. If this plug cannot be fully inserted into the outlet, contact an electrician to replace the obsolete 3-terminal outlet.

- **Polarized Plug** - For a 2-terminal plug (a polarized plug with one wide blade and one narrow blade), insert the plug into a polarized mains, 2-terminal outlet in which one socket is wider than the other.

  Note: If this plug cannot be fully inserted into the outlet, try reversing the plug. If the plug still fails to fit, contact an electrician to replace the obsolete 2-terminal outlet.

Grounding Terminal

If this equipment is equipped with an external grounding terminal, attach one end of an 18-gauge wire (or larger) to the grounding terminal; then, attach the other end of the wire to a ground, such as a grounded equipment rack.

Safety Plugs (European Union)

- **Class I Mains Powered Equipment –** Provided with a 3-terminal AC inlet and requires connection to a 3-terminal mains supply outlet via a 3-terminal power cord for proper connection to the protective ground.

  Note: The equipotential bonding terminal provided on some equipment is not designed to function as a protective ground connection.

- **Class II Mains Powered Equipment –** Provided with a 2-terminal AC inlet that may be connected by a 2-terminal power cord to the mains supply outlet. No connection to the protective ground is required as this class of equipment is provided with double or reinforced and/or supplementary insulation in addition to the basic insulation provided in Class I equipment.

  Note: Class II equipment, which is subject to EN 50083-1, is provided with a chassis mounted equipotential bonding terminal. See the section titled **Equipotential Bonding** for connection instructions.

Continued on next page

Important Safety Instructions, Continued

Equipotential Bonding

If this equipment is equipped with an external chassis terminal marked with the IEC 60471-5020 chassis icon (⏚), the installer should refer to CENELEC standard EN 50083-1 or IEC standard IEC 60728-11 for correct equipotential bonding connection instructions.

AC Power

Important: If this equipment is a Class I equipment, it must be grounded.

- If this equipment plugs into an outlet, the outlet must be near this equipment, and must be easily accessible.
- Connect this equipment only to the power sources that are identified on the equipment-rating label normally located close to the power inlet connector(s).
- This equipment may have two power sources. Be sure to disconnect all power sources before working on this equipment.
- If this equipment **does not** have a main power switch, the power cord connector serves as the disconnect device.
- Always pull on the plug or the connector to disconnect a cable. Never pull on the cable itself.
- Unplug this equipment when unused for long periods of time.

Connection to –48 V DC/–60 V DC Power Sources

If this equipment is DC powered, refer to this equipment's specific installation instructions in this manual or in companion manuals in this series for connection to nominal -48 V DC/-60 V DC power sources.

Circuit Overload

Know the effects of circuit overloading before connecting this equipment to the power supply.

> ⚠ **CAUTION:**
>
> **Consideration should be given to the connection of this equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of information given on the equipment-rating label should be used when addressing this concern.**

General Servicing Precautions

> ⚠ **WARNING:**
>
> **Avoid electric shock! Opening or removing this equipment's cover may expose you to dangerous voltages.**

Be aware of the following general precautions and guidelines:

- **Servicing** - Refer all servicing to qualified service personnel. Servicing is required when this equipment has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into this equipment, this equipment has been exposed to rain or moisture, does not operate normally, or has been dropped.

Continued on next page

- **Wristwatch and Jewelry** - For personal safety and to avoid damage of this equipment during service and repair, do not wear electrically conducting objects such as a wristwatch or jewelry.
- **Lightning -** Do not work on this equipment, or connect or disconnect cables, during periods of lightning.
- **Labels** - Do not remove any warning labels. Replace damaged or illegible warning labels with new ones.
- **Covers -** Do not open the cover of this equipment and attempt service unless instructed to do so in the instructions. Refer all servicing to qualified service personnel only.
- **Moisture** - Do not allow moisture to enter this equipment.
- **Cleaning** - Use a damp cloth for cleaning.
- **Safety Checks** - After service, assemble this equipment and perform safety checks to ensure it is safe to use before putting it back into operation.

Electrostatic Discharge

Electrostatic discharge (ESD) results from the static electricity buildup on the human body and other objects. This static discharge can degrade components and cause failures.

Take the following precautions against electrostatic discharge:

- Use an anti-static bench mat and a wrist strap or ankle strap designed to safely ground ESD potentials through a resistive element.
- Keep components in their anti-static packaging until installed.
- Avoid touching electronic components when installing a module.

Fuse Replacement

To replace a fuse, comply with the following:

- Disconnect the power before changing fuses.
- Identify and clear the condition that caused the original fuse failure.
- Always use a fuse of the correct type and rating. The correct type and rating are indicated on this equipment.

Continued on next page

Lithium Battery

For equipment with a lithium battery, observe the following rules:

- Do not dispose of used batteries through the regular garbage collection system, but follow the local regulations. The batteries may contain substances that could be harmful to the environment.
- Replace batteries with the same or equivalent type recommended by Scientific-Atlanta.
- Insert batteries correctly. There may be a risk of explosion if the batteries are incorrectly inserted.
- When disposing of this equipment, remove the batteries and dispose of them separately in accordance with local regulations.
- Do not recharge the batteries or expose them to temperatures above 100°C (212°F).

> ⚠ **CAUTION:**
>
> **RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.**

Electromagnetic Compatibility Regulatory Requirements

This equipment meets applicable electromagnetic compatibility (EMC) regulatory requirements. Refer to this equipment's data sheet for details about regulatory compliance approvals. EMC performance is dependent upon the use of correctly shielded cables of good quality for all external connections, except the power source, when installing this equipment.

- Ensure compliance with cable/connector specifications and associated installation instructions where given elsewhere in this manual.

Otherwise, comply with the following good practices:

- Multi-conductor cables should be of single-braided, shielded type and have conductive connector bodies and backshells with cable clamps that are conductively bonded to the backshell and capable of making 360° connection to the cable shielding. Exceptions from this general rule will be clearly stated in the connector description for the excepted connector in question.
- Ethernet cables should be of single-shielded or double-shielded type.
- Coaxial cables should be of the double-braided shielded type.

EMC

Where this equipment is subject to USA FCC and/or Industry Canada rules, the following statements apply:

Continued on next page

FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device according to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this 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.

Industry Canada – Industrie Canadienne Statement

Industry Canada ICES-003: This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Industrie Canadienne ICES-003: Cet appareil numèrique de la Class A respecte toutes les exigences du Règlement sur le matèriel brouilleur du Canada.

CENELEC/CISPR Statement with Respect to Class A Information Technology Equipment

This is a Class A equipment. In a domestic environment this equipment may cause radio interference in which case the user may be required to take adequate measures.

Modifications

This equipment has been designed and tested to comply with applicable safety, laser safety, and EMC regulations, codes, and standards to ensure safe operation in its intended environment. Refer to this equipment's data sheet for details about regulatory compliance approvals.

Do not make modifications to this equipment. Any changes or modifications could void the user's authority to operate this equipment.

Modifications have the potential to degrade the level of protection built into this equipment, putting people and property at risk of injury or damage. Those persons making any modifications expose themselves to the penalties arising from proven non-compliance with regulatory requirements and to civil litigation for compensation in respect of consequential damages or injury.

Accessories

Use only attachments or accessories specified by the manufacturer.

Laser Safety

Introduction

This equipment contains an infrared laser that transmits intensity-modulated light and emits invisible radiation.

Warning: Radiation

 **WARNING:**

- **Avoid personal injury! Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.**
- **Avoid personal injury! The laser light source on the equipment emits invisible laser radiation. Avoid direct exposure to the laser light source.**

- Do not apply power to the equipment if the fiber is unmated or unterminated.
- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light that is emitted from an unterminated fiber.
- Do not view an activated fiber with optical instruments (e.g., eye loupes, magnifiers, microscopes).
- Use safety-approved optical fiber cable to maintain compliance with applicable laser safety requirements.

Warning: Fiber Optic Cables

 **WARNING:**

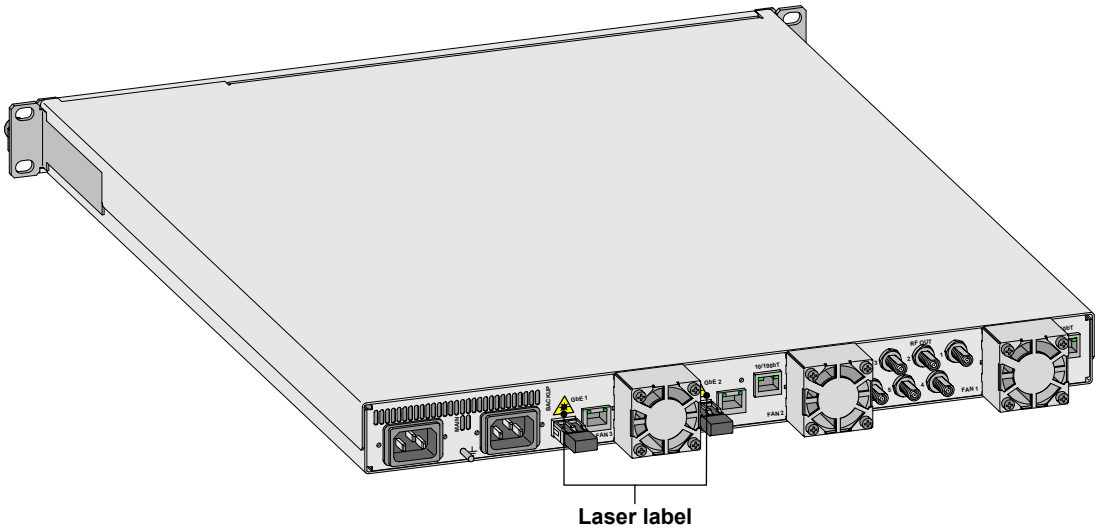
Avoid personal injury! Qualified service personnel may only perform the procedures in this document. Wear safety glasses and use extreme caution when handling fiber optic cables, particularly during splicing or terminating operations. The thin glass fiber core at the center of the cable is fragile when exposed by the removal of cladding and buffer material. It easily fragments into glass splinters. Using tweezers, place splinters immediately in a sealed waste container and dispose of them safely in accordance with local regulations.

Continued on next page

Laser Safety, Continued

The following laser safety precautions are applicable to the equipment. According to the type of optical transmitter inside the equipment, there are different laser safety precautions. Information about the optical transmitter installed inside the equipment is available on the equipment identification label. A laser label that clearly indicates the laser aperture is affixed to the equipment's rear panel.

The following illustration displays the location of the laser label on the equipment's rear panel.

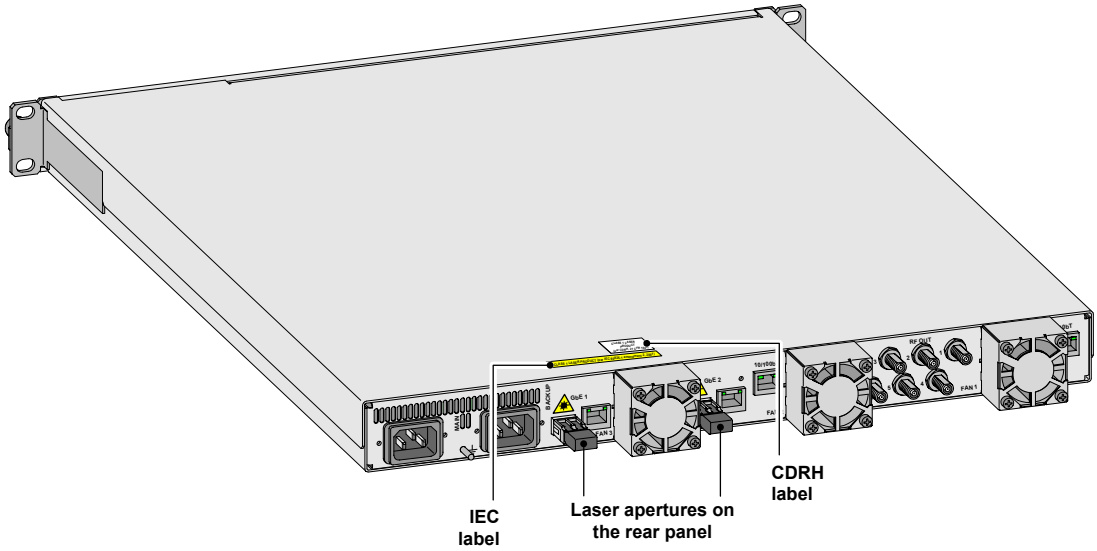


Depending upon whether you are located in Europe (IEC-standard) or in the U.S. (CDRH-standard), there are different laser safety precautions. For more information about the equipment's laser output, refer to the equipment's data sheet.

Continued on next page

Class 1 and Class I Labels

The following illustrations show the class 1 and class I labels attached to the housing, according to the standards.



In Accordance with the IEC Standard

The SFP modules used in the Continuum DVP eXtra Dense QAM Array system are classified in class 1 laser products according to IEC 60825-1, 1997 amendment 2001.

The label below is attached to the top cover and the package of class 1 laser product.

CLASS 1 LASER PRODUCT (per IEC 60825-1 amendment 2, 2001)

In Accordance with the CDRH Standard

The SFP modules used in the Continuum DVP eXtra Dense QAM Array system are classified in class I laser product per CDRH, 21 CFR 1040 Laser Safety requirements.

For the CDRH standard, a certification label is attached to the top cover of each product classified in class I. See also the product ID label affixed to each product.

CLASS I LASER PRODUCT
(per CDRH, 21 CFR 1040)

Preface

About This Guide

Introduction

This guide provides the information to install, operate, and troubleshoot the Continuum DVP™ eXtra Dense QAM Array system.

Audience

This guide is intended for *users* (*operators*) and *service personnel* who are responsible for the installation, operation, and service of the Continuum DVP eXtra Dense QAM Array system. For further information about the definition of operator and service personnel, refer to the safety guidelines and precautions earlier in this manual.

Related Publications

Refer to the following Scientific-Atlanta publications for more information

- *Reference Note: Continuum DVP – Dual QAM Card*, part number 4003391

Document Version

This is the third release of this guide. Following table provides the changes to this guide.

Description	See Topic
Device security feature added	Chapter 1, **Describing the Continuum DVP eXtra Dense QAM Array system**, topic **The Embedded Graphical User Interface**
	Chapter 3**, Operation,** topic **Accessing the Embedded Graphical User Interface**

Chapter 1
Describing the Continuum DVP eXtra Dense QAM Array system

Overview

Introduction

This chapter describes the Continuum DVP™ eXtra Dense QAM Array (XDQA) system and presents a summary of the Continuum DVP XDQA equipment.

In This Chapter

This chapter contains the following topics.

Continuum DVP eXtra Dense QAM Array System

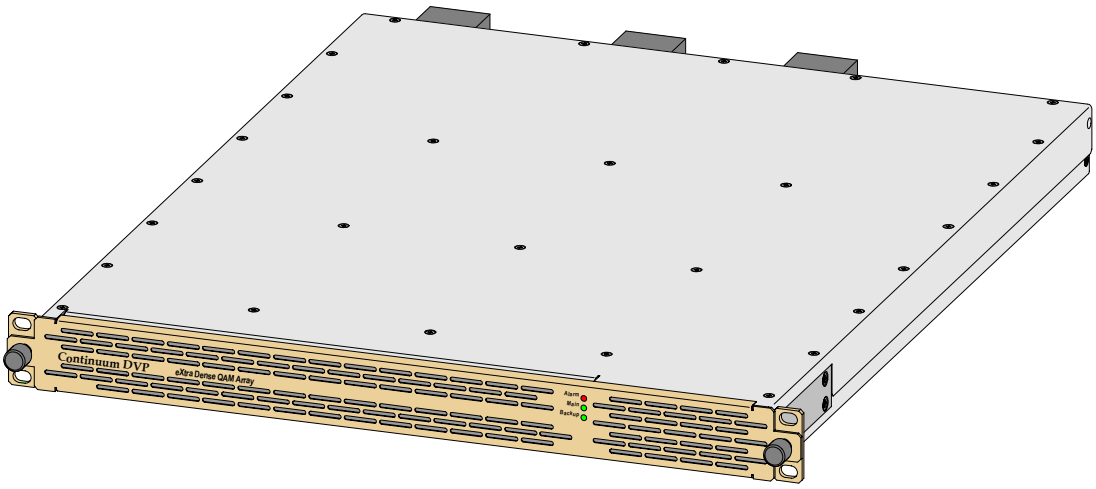
Introduction

The Continuum DVP™ eXtra Dense QAM Array (XDQA) system is a compact QAM array designed for QAM modulation and RF up-conversion of video streams in Video On Demand (VOD) solutions.

The ITU-B version XDQA system supports a maximum output bitrate of 514.5 Mbps encoded (12 x 5.361 Mbaud/256 QAM) of which 466 Mbps useful and the DVB version supports a maximum output bitrate of 660 Mbps (615 Mbps useful). Each of the six RF output ports provides two adjacent RF output channels.

The compact modular design allows you to customize your VOD application for up to 188 VOD streams (3 Mbps, 8Mhz, 256 QAM) according to your specific needs.

The following illustration shows the Continuum DVP XDQA system.



For redundancy reason, the Continuum DVP XDQA can be equipped with two power supply units. This features automatic backup switching without service interruption.

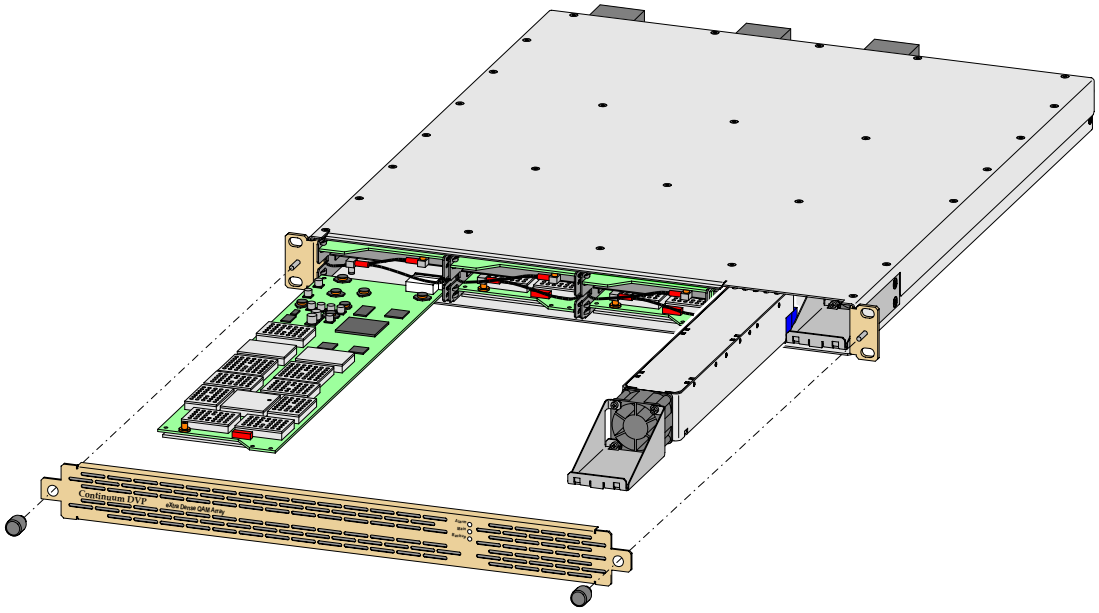
The Continuum DVP XDQA supports GbE loop-through. By cascading of two devices 24 QAM channels are fitted in 2 RU, which fill a full GbE.

Continued on next page

Modular Concept

The Continuum DVP XDQA system is a fully modular concept built around a 1 RU high housing. The flexible modular concept ensures easy system capacity upgrades.

The following illustration is a view of a Continuum DVP XDQA system.



The following Continuum DVP XDQA equipment is available:

- -48 V dc or 100 – 240 V ac Power Supply Unit (PSU)
- Dual QAM Card

Continued on next page

Features and Benefits

The main features and benefits are:

- Ultra Compact design, 12 QAM channels in 1 RU height
- Supports 64 and 256 QAM
- QAM Modulation according to DVB (ITU-A), OpenCable (ITU-B) and Japan (ITU-C)
- Fully agile from 45 to 870 MHz (channel edges within that range)
- Ready for DVB real-time Scrambling of all major CA Systems (DVB version only)
- Compliant with Motorola Pre-Scrambling
- Hot swappable, auto-configurable QAM cards containing two QAM channels on a single RF connector
- 2 Redundant GbE Inputs for interfacing with VOD Servers
- Easy setup using a Web browser
- Works with all major VOD servers brands
- Modular design allowing easy upgrade and maintenance
- Dedicated Ethernet ports for CA System and Management System
- Low power consumption
- Self-cooling system for efficient space usage (stackable)
- SNMP management interface
- Redundant, Hot pluggable Power Supply

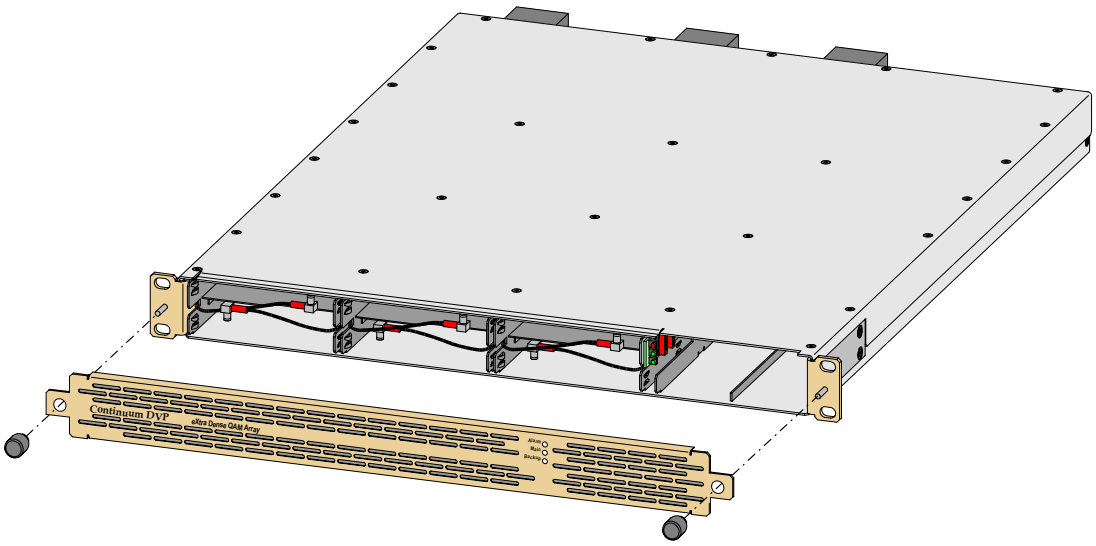
Continuum DVP eXtra Dense QAM Array Housing

General

The Continuum DVP Extra Dense QAM Array housing is a compact, modular 1RU high 19-inch housing provided with a system controller/input board, which controls the Dual QAM Cards in the housing. This system controller/input board is equipped with an integrated network interface for system management and control. This board is provided with 4 Gigabit Ethernet (GbE) ports, viz.: 2 optical and 2 electrical ports. The electrical ports are equipped with RJ-45 type connectors and the optical GbE ports can be configured with SFP type laser module.

The fans mounted at the back of the device and in the PSU modules create an optimal airflow inside the housing by which the Continuum DVP XDQA system does not require an open rack space above nor underneath.

The following illustration is a front view of an empty Continuum DVP XDQA housing.



Features and Benefits

The main features and benefits are:

- 1 RU high
- Modular design for easy expansion, upgrade and maintenance
- Two power supply slots
- Six Dual QAM Card slots
- Self-cooling system for efficient space usage (stackable)

Continued on next page

LED Indicators

The following table describes the LED indicators on the front panel.

Label	Type	Description
ALARM	Red	Indicates a pending alarm or error detected by the processor.
	Green	Status OK
MAIN	Red	The main power supply is inactive.
	Green	Illuminates if the main power supply is active.
	Extinguished	No main power supply is available.
BACKUP	Red	The backup power supply is inactive.
	Green	Illuminates if the backup power supply is active.
	Extinguished	No backup power supply is available.

Connectors

The following table describes the connectors on the rear panel.

Label	Type	Description
RF OUT 1 - 6	F	RF output
GbE 1-2	RJ-45 (electrical) SFP (optical)	IP input
Ethernet 10BT	RJ-45	10Base-T Ethernet port to set the IP address of both ports and to manage the device
Ethernet 10/100BT	RJ-45	10/100Base-T Ethernet port to manage the device

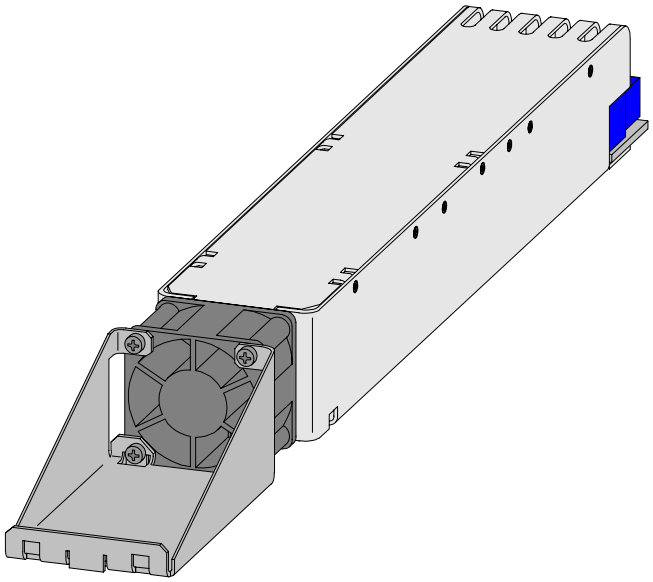
Additional Information

For more information about the Continuum DVP eXtra Dense QAM Array housing specifications, see Appendix A, **Technical Specifications**.

Continuum DVP eXtra Dense QAM Array Power Supply Unit

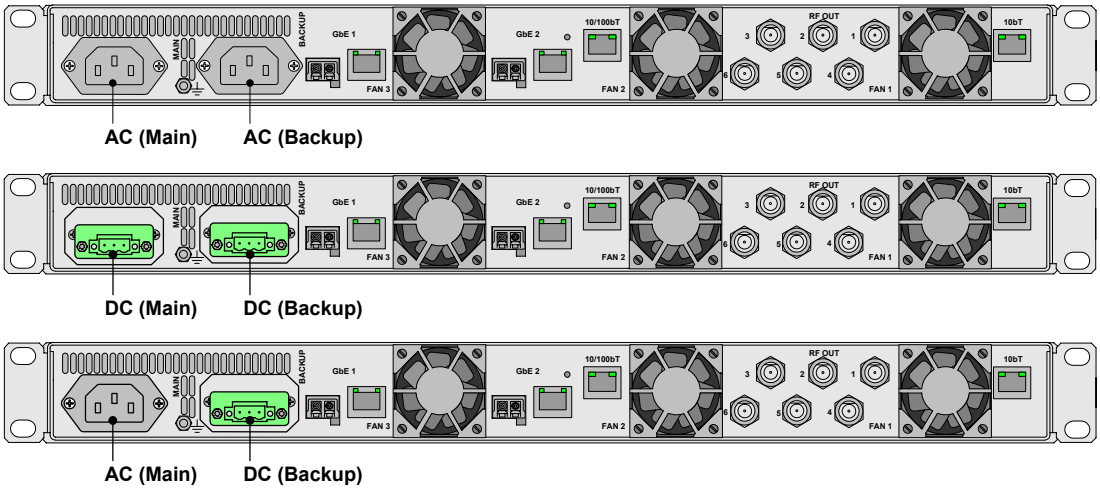
General

The extra Dense QAM Array has 1+1 redundancy concept. This means the system can tolerate the removal or failure of one of the power supplies and remains fully operational. Each power supply generates a 12V dc supply voltage, capable of supplying the whole unit. The following illustration shows a XDQA Power Supply Unit (PSU).



Two PSU versions are available, a 100 - 240V ac version (part number 1001815) and a DC version (part number 1001773).

Following power supply configurations are possible: AC-AC, DC-DC, or AC-DC.



For more information about the XDQA PSU specifications, see Appendix A, **Technical Specifications**.

Continued on next page

Features and Benefits of the AC Version PSU

The standard features and benefits are:

- Universal AC input
- Max output power 17A
- 80% typical efficiency
- Hot pluggable
- Current sharing based on droop method.
- Power Factor Corrected. EN 61000-3-2 compliant.
- 1 isolated fully protected 12V DC output.

Features and Benefits of the DC Version PSU

The standard features and benefits are:

- Universal DC input. (-36 - -72V DC)
- Max output power 17A.
- 75% typical efficiency.
- Hot pluggable.
- Current sharing based on droop method.
- 1 isolated fully protected 12V DC output.

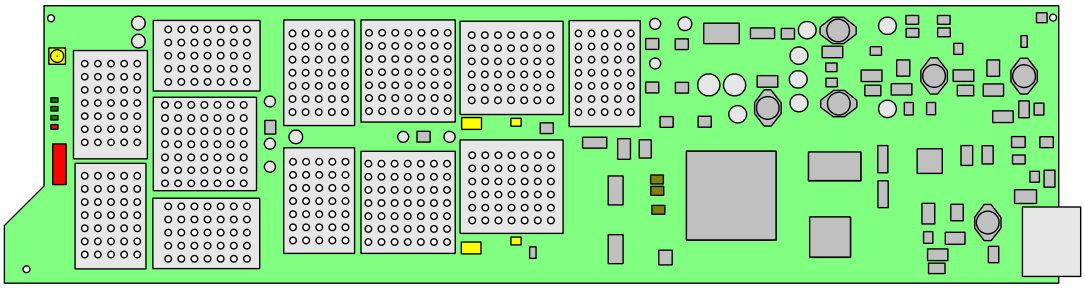
Dense QAM Array Dual QAM Card

General

The Dense QAM Array Dual QAM Card contains two QAM modulators and a single upconverter. The RF output signal contains two combined adjacent QAM channels.

You can install a maximum of six Dual QAM Cards inside the Continuum DVP XDQA housing. When installing a Dual QAM Card in the housing, all settings are automatically loaded from the system controller/input board and the Dual QAM Card is immediately in service.

The following illustration shows the Dense QAM Array Dual QAM Card.



For more information about the Dense QAM Array Dual QAM Card specifications, see Appendix A, **Technical Specifications**.

Features and Benefits

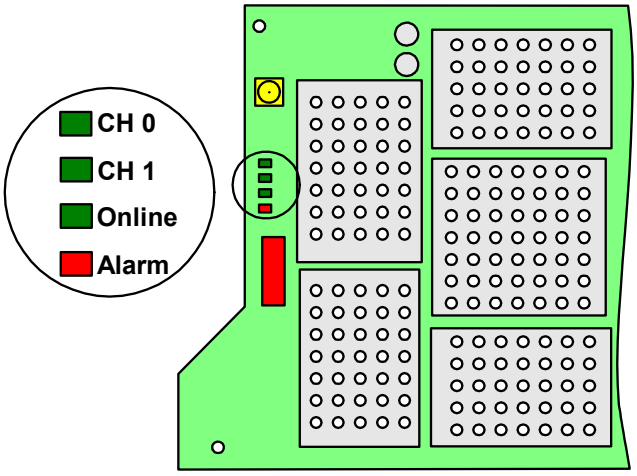
The standard features and benefits are:

- New DirectRF technology significantly reduces the price per stream.
- Works with all major VOD server brands.
- Hot swappable: after insertion, settings for that slot are loaded and the board starts running.
- Extremely low power consumption (10 - 11.5 W).
- QAM modulation (64 & 256) according to DVB (ITU-A), OpenCable (ITU-B) or ITU-C.
- Excellent MER (≥ 41 dB @ RF) and BER (≤ 5.10^{-9} pre FEC and @256 QAM).
- Fully agile from 45 to 870 MHz (channel edges within that range).
- RF specifications exceeding (EURO) DOCSIS

Continued on next page

Indication LEDs

The Dual QAM Card has 4 LEDs, which indicates the status of the board.

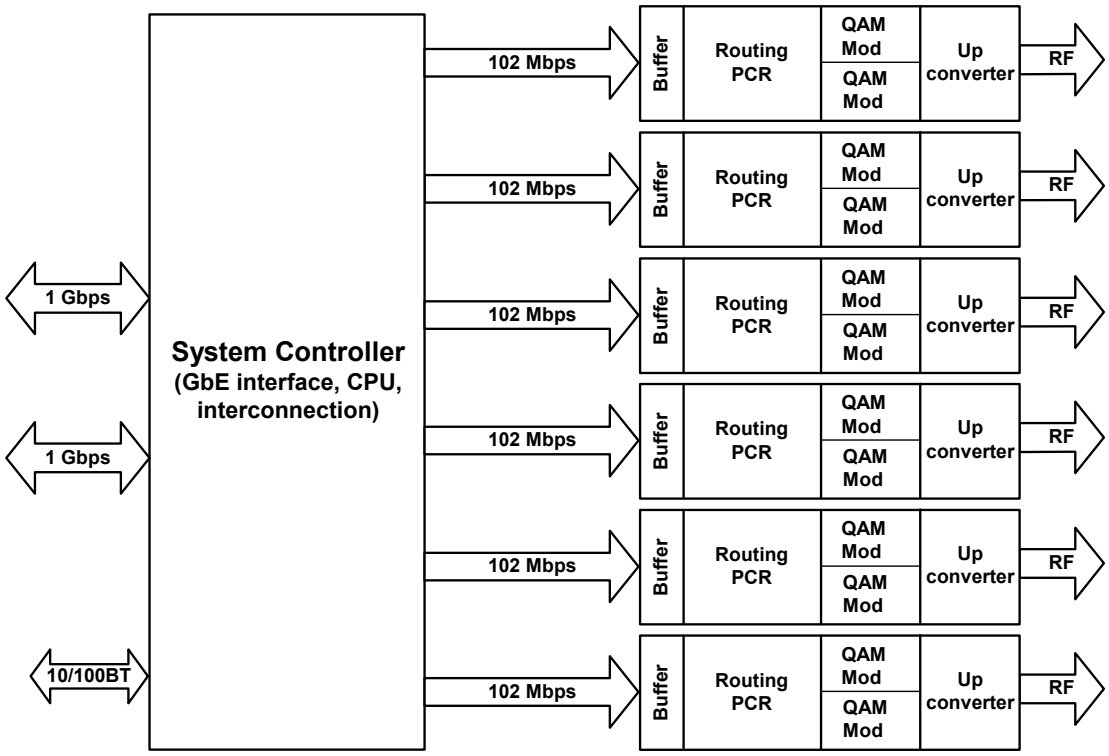


The following table describes the Dual QAM Card LEDs.

LED	Color	Description
CH0	Green	This LED indicates data traffic on channel 0 (lower frequency channel). • Illuminated faintly: the card is powered. • Flashing: indicate data traffic on the channel higher than 1/16 of the full data rate playout.
CH1	Green	This LED indicates data traffic on channel 1 (upper frequency channel). • Illuminated faintly: the card is powered. • Flashing: indicate data traffic on the channel higher than 1/16 of the full data rate playout.
Online	Green	This LED illuminates when a valid signal is present at the output of the Dual QAM Card.
Alarm	Green	The alarm LED indicates if an alarm is present on the Dual QAM Card.

Block Diagram of a Continuum DVP eXtra Dense QAM Array system

The following illustration shows the block diagram of the Continuum DVP XDQA system.



The Continuum DVP XDQA system is provided with two Gigabit Ethernet ports, which receive up to 512 IP-encapsulated MPEG2 Single Program Streams (SPTS)

After de-encapsulating and buffering, the switch engine routes a number of input program streams to the sixteen QAM modulators and creates the necessary PSI tables (PAT and PMT).

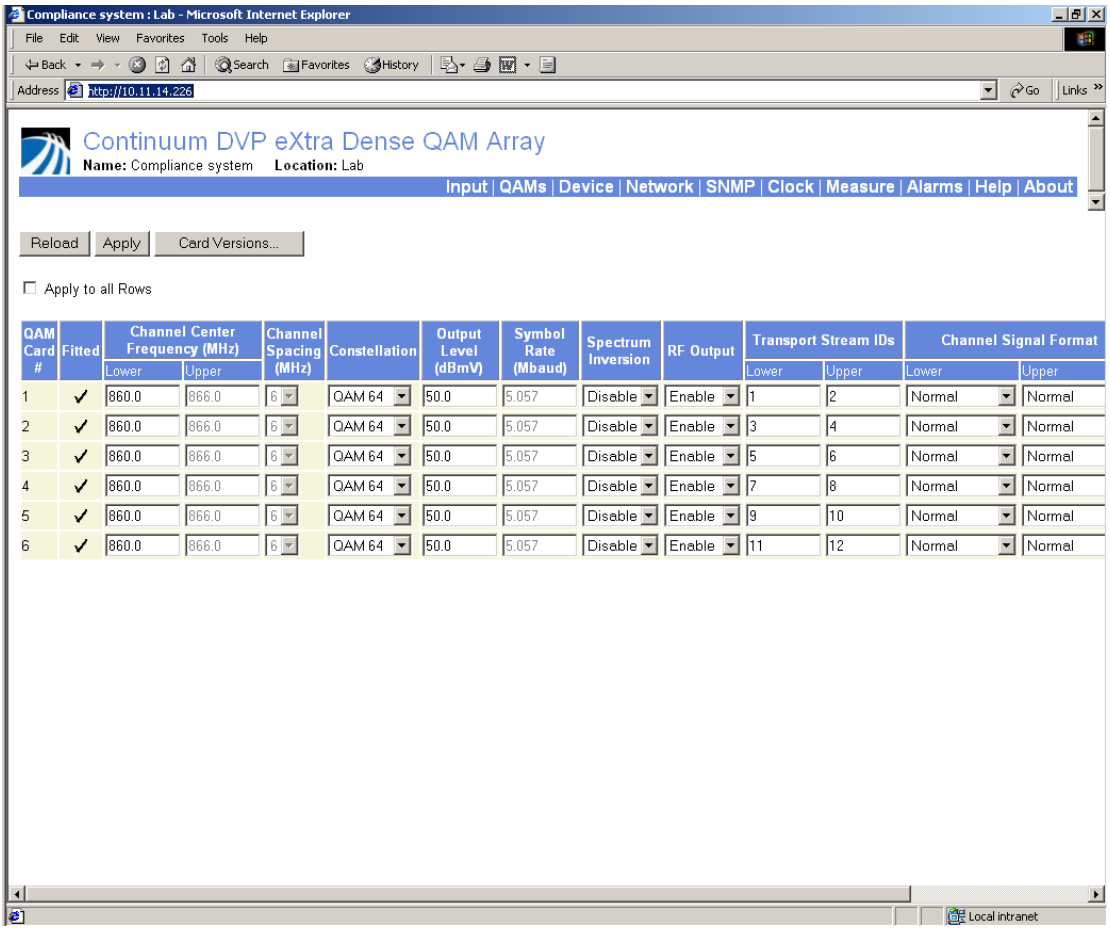
The Dual QAM Cards buffer, re-stamp and route the signals to one of the two QAM modulators on the Dual QAM Cards.

The Embedded Graphical User Interface

Introduction

The Continuum DVP XDQA can be configured and monitored via an embedded graphical user interface (GUI) that can be accessed with a standard web browser.

The following shows the start page of the embedded GUI of the Continuum DVP XDQA.



To access the embedded GUI you have to enter the IP address of the device in the address box of the web browser.

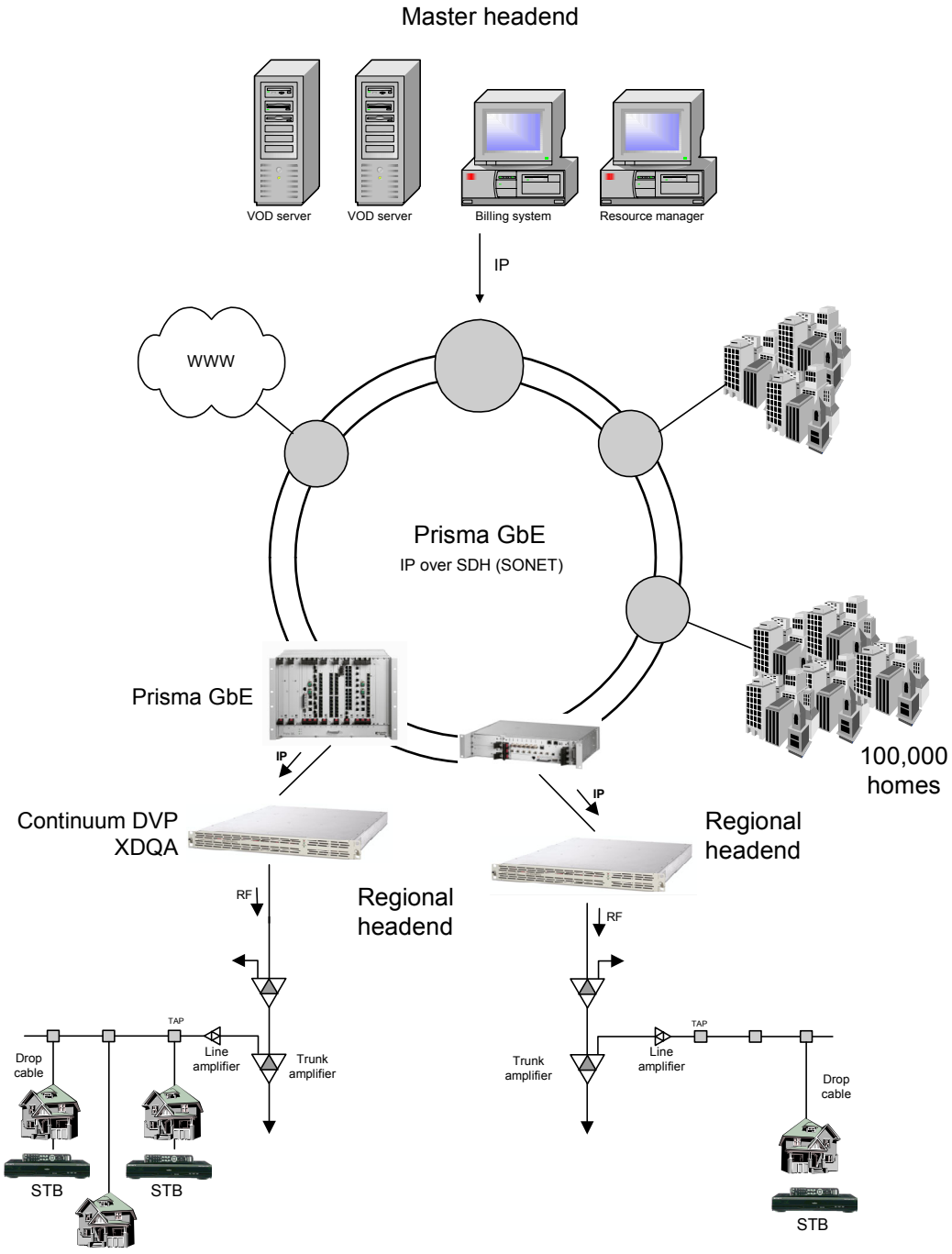
Note: When the security feature of the XDQA system is enabled, a logon page is displayed. After entering the correct username and password the GUI will be opened.

The embedded GUI is provided with an online help. For information concerning the configuration of the Continuum DVP XDQA system please refer to this online help. More information concerning the embedded GUI and the online help can be found in Chapter 3, **Operation**, and topic **The Embedded Graphical User Interface**.

Applications

Description

You can integrate the Continuum DVP Extra Dense QAM Array system into a centralized VOD network infrastructure with a Prisma GbE optical backbone system. The following illustration shows a centralized VOD network.



Continued on next page

When the subscriber selects a movie, the Set Top Box (STB) sends a session set-up request to the master headend. This request contains the movie ID, unique address of the STB and node group to which the STB belongs.

The VOD billing system in the master headend manages the royalties, subscription and business rules. The VOD resource manager manages the network topology, bandwidth availability and system statistics.

The resource manager searches for free addresses to reach the node group in the IP addresses table. After confirmation of the billing system and resource manager, the server sends a confirmation message to the STB.

The STB sends back a request for playing the movie. In the same way the user can pause, rewind, and fast-forward the movie during playback. The server plays out a Single Program Transport Stream (SPTS) to the free UDP and IP addresses selected by the resource manager.

The IP backbone uses the IP address to automatically route the stream to the correct destination. The IP-encapsulated MPEG2 SPTS coming from the Prisma GbE system is de-encapsulated, routed, and further QAM modulated by the Continuum DVP XDQA system

Product Identification

General

Products can be identified by means of the ID label attached to the product.

The following information is available on the label(s).

- Company address
- Model number
- Serial number
- Part number
- Nominal supply voltage
- Maximum current

Under some circumstances you might need this information. For example when a unit is failing, the serial number is necessary for returning your unit.

Chapter 2
Installation

Overview

Introduction

This chapter contains information for technicians installing the Continuum DVP™ eXtra Dense QAM Array (XDQA) system.

Qualified Personnel

Only appropriately qualified and trained personnel should attempt to install, operate, or maintain the Continuum DVP XDQA system.

> ⚠ **CAUTION:**
>
> **Allow only qualified personnel to maintain and service this product. Otherwise, personal injury or equipment damage may occur.**

In This Chapter

This chapter contains the following sections.

Section A
Installing the Continuum DVP eXtra Dense QAM Array Housing

Overview

Introduction

This section explains how to install the Continuum DVP™ eXtra Dense QAM Array Housing in a standard 19-inch rack.

In This Section

This section contains the following topics.

Preparing for Installation

Before You Start

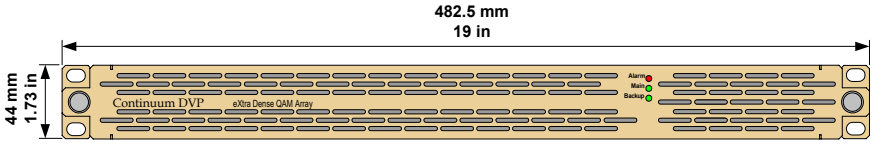
Make sure that the chassis is in good condition and that you have the tools and equipment needed.

Unpacking and Inspecting the Housing

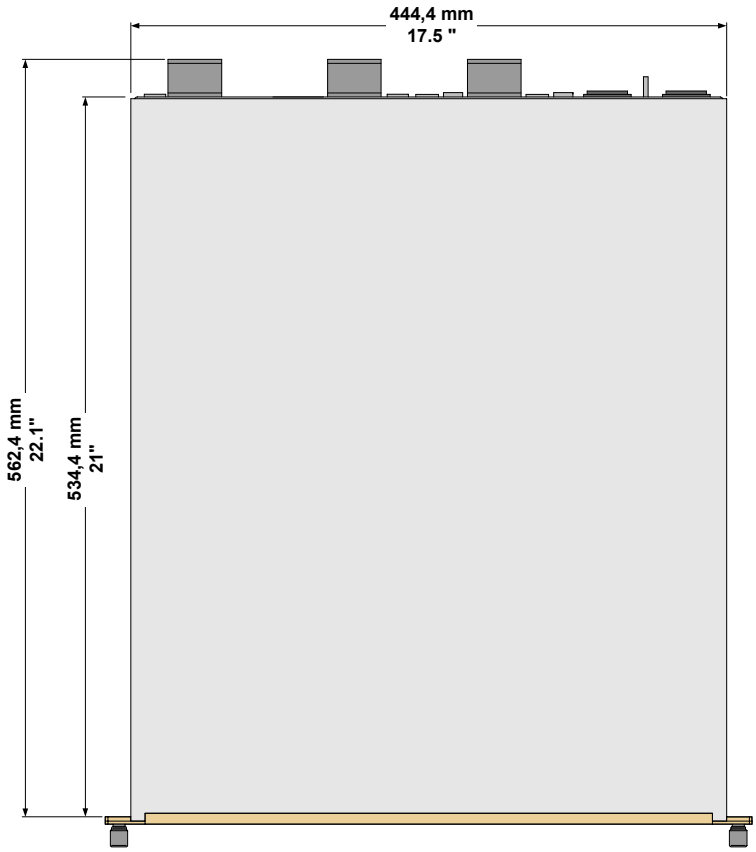
As you unpack the housing, inspect it for shipping damage. If you find any damage, contact the customer services department. Refer to Chapter 5, **Customer Information** further in this manual, for information on contacting the customer services department.

Chassis Dimensions

The following drawing shows the front dimension of the Continuum DVP XDQA Housing.



The following drawing shows the top dimension of the housing.



Rack Mounting the Continuum DVP eXtra Dense QAM Array Housing

Tools and Accessories

You need the following tools and accessories for mounting the unit:

- Screwdriver.
- Rails and screws.

Mounting Requirements

Follow the mounting guidelines below:

- Use 19-inch racks with the appropriate depth.
- Mount the unit adequately to secure optimal operation and reliability.
- Use rack-compatible rails to support the unit properly.
- Pay attention to the mechanical loading and stability to avoid hazardous situations.

To Mount the Continuum DVP XDQA Housing

When you have read the **Rack Mounting Safety Precautions** in topic **Important Safety Instructions**, earlier in this guide, you are ready to install the chassis.

> ⚠ **CAUTION:**
>
> **It is of great importance to place the Continuum DVP XDQA Housing and its components in a conditioned room within the ambient temperature specifications. For more information, see Appendix A, Technical Specifications.**

Perform the following procedure to install the Continuum DVP XDQA Housing.

1. Unpack the housing.

   When unpacking the housing, examine it, the accessories, and the packing material for obvious signs of damage. Check the unit against the delivery/packing note. Retain the packing material, as it is required for warranty shipments and for later inspection by the carrier. Should any item be damaged, notify the carrier and your Scientific-Atlanta representative.

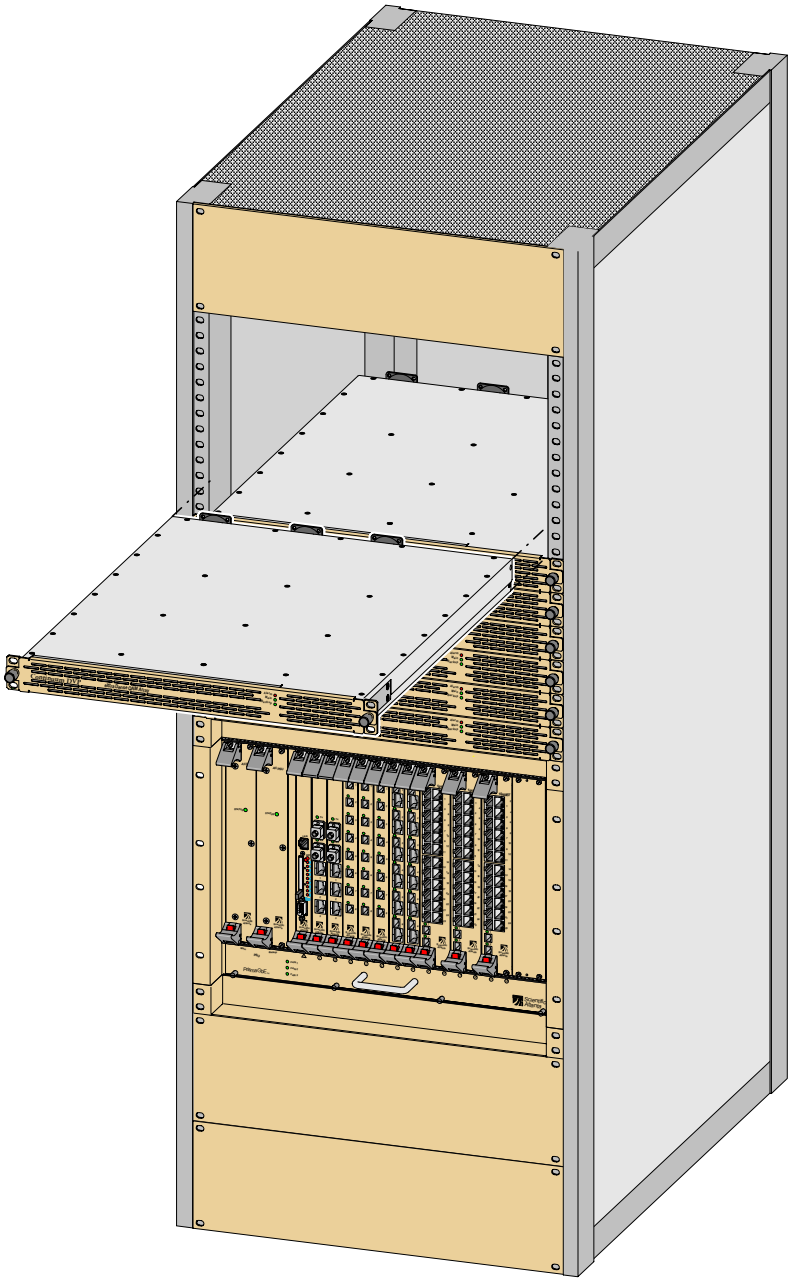
2. Mount the rails in the 19-inch rack to support the housing.

   > ⚠ **CAUTION:**
   >
   > **Installing the Continuum XDQA Housing without rails may result in damage to the device.**

Continued on next page

3. Slide the housing completely in the 19-inch rack.
4. Screw the housing against the 19-inch rack with 4 appropriate screws in the holes of the front panel mounting flanges.

The following illustration shows a 19-inch rack with Continuum DVP XDQA system and Prisma GbE system equipment.



Section B
Installing or Removing Continuum DVP eXtra Dense QAM Array Equipment

Overview

Introduction

This section describes the installation of Continuum DVP™ eXtra Dense QAM Array components in the Continuum DVP XDQA Housing. It is assumed that all safety precautions and guidelines have been followed prior to performing the installation procedures in this chapter.

It is recommended that the entire installation procedure in this chapter is read prior to perform the installation.

In This Chapter

This chapter contains the following topics.

Introduction

Before You Start

Before installing a PSU or a Dual QAM Card into a slot of the Continuum DVP XDQA Housing, review the **Important Safety Instructions** to avoid injuring yourself or damaging the equipment.

Observe the following cautions when installing Continuum DVP XDQA equipment.

> ⚠ **CAUTION:**
>
> **During installation, the connector on the module must line up evenly with the connector inside the module slot. Misalignment may cause the connector pins to bend. When inserting the module into the module slot, ensure that the module is level and the sides slide evenly into the slot.**
>
> **Modules contain static-sensitive devices. Always follow proper electrostatic discharge (ESD) handling procedures (wristband with ground strap and ESD mat) when installing modules in your Continuum DVP XDQA Housing. Follow Electronic Industries Association (EIA) standard EIA-625.**

Environment Acclimatization

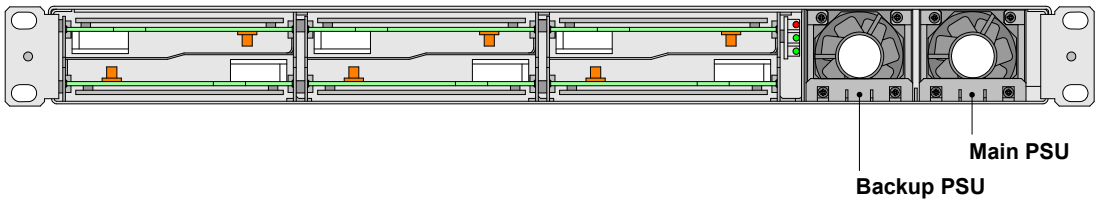
> ⚠ **CAUTIONS:**
>
> **When a Continuum DVP XDQA component is brought from a cold into a warm environment, the component should be acclimated to the environment temperature and humidity conditions for at least 30 minutes. Non-acclimated components may not meet the technical specifications as described.**
> **Inserting of a non-acclimated component into a chassis may result in damage to the component and/or chassis.**

Installing or Removing a Extra Dense QAM Array PSU

Introduction

The XDQA hot pluggable Power Supply Units (PSU) are positioned in the two right most PCB slots of the Continuum DVP XDQA Housing.

The following illustration shows the Dense QAM Array PSU slot.



To Install the eXtra Dense QAM Array PSU

When you have read the **Important Safety Instructions** earlier in this guide, you are ready to install the XDQA PSU in the Continuum DVP XDQA Housing.

Perform the following procedure to install the PSU into the chassis.

1. Unpack the PSU.

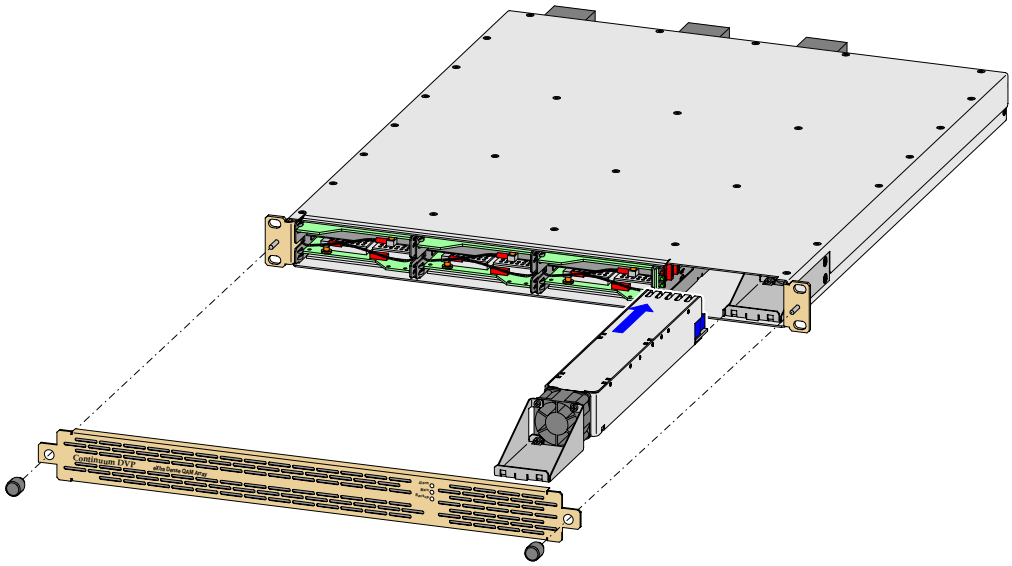
> ⚠ **CAUTION:**
>
> **Follow proper ESD handling procedures.**
> **ESD may cause permanent damage to electronic components.**

When unpacking a unit, examine it, the accessories, and the packing material for obvious signs of damage. Check the unit against the delivery/packing note. Retain the packing material, as it is required for warranty shipments and for later inspection by the carrier. Should any item be damaged, notify the carrier and your Scientific-Atlanta representative.

2. Loosen both screws at the front of the housing and remove the front cover.

Continued on next page

3. Slide the unit in the slot.



4. Push the unit carefully into the PSU back plane connector.
5. Position the front cover on the housing, push both screws of the cover towards the housing and tighten these screws.

To Remove a PSU

When you have read the **Important Safety Instructions** earlier in this guide, you are ready to remove the PSU from the housing.

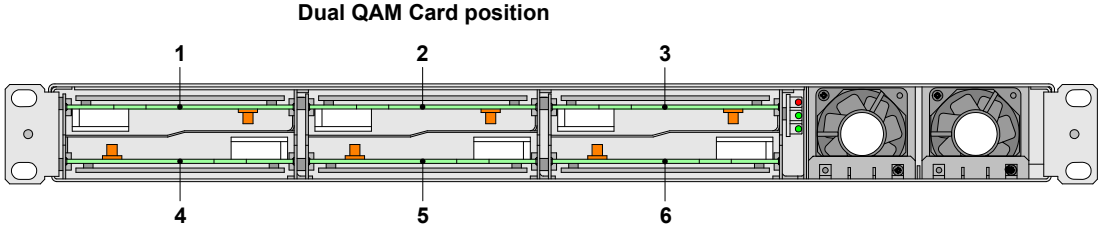
Perform the following steps to remove the PSU from the housing.

1. Loosen both screws at the front of the housing and remove the front cover.
2. Pull out the PSU.
3. Position the front cover on the housing, push both screws of the cover towards the housing and tighten these screws.

Installing or Removing a Dense QAM Array Dual QAM Card

Introduction

The Continuum DVP XDQA Housing contains maximum 6 hot-pluggable Dual QAM Cards. These Dual QAM Cards occupy slot 1 up to slot 6 of the housing. The following illustration shows the 6 Dual QAM Card slots in the housing.



Notes:

- In slot 1 up to 3 of the housing, the Dual QAM Cards are positioned with the parts side down and in slot 4 up to 6 with the parts side up.
- For cooling purposes, install the cards in the order indicated in the illustration above if not all Dual QAM Card positions are occupied with a card.

To Install the Dense QAM Array Dual QAM Card

When you have read the **Important Safety Instructions** earlier in this guide, you are ready to install the Dual QAM Card in the Continuum DVP XDQA Housing.

Perform the following procedure to install the Dual QAM Card into the housing.

1. Unpack the Dual QAM Card.

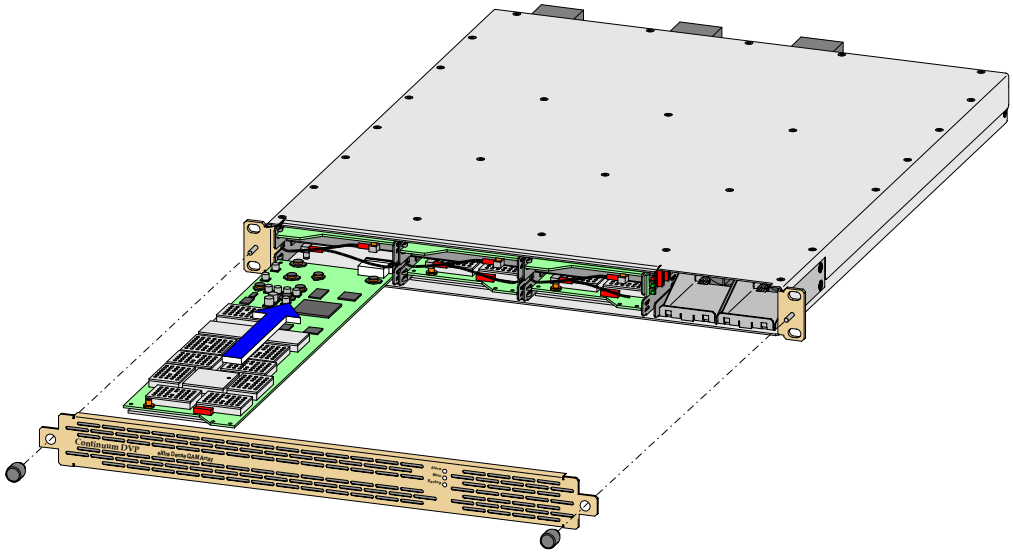
> ⚠ **CAUTION:**
>
> **Follow proper ESD handling procedures.**
> **ESD may cause permanent damage to electronic components.**

When unpacking a unit, examine it, the accessories, and the packing material for obvious signs of damage. Check the unit against the delivery/packing note. Retain the packing material, as it is required for warranty shipments and for later inspection by the carrier. Should any item be damaged, notify the carrier and your Scientific-Atlanta representative.

2. Loosen both screws at the front of the housing and remove the front cover.

Continued on next page

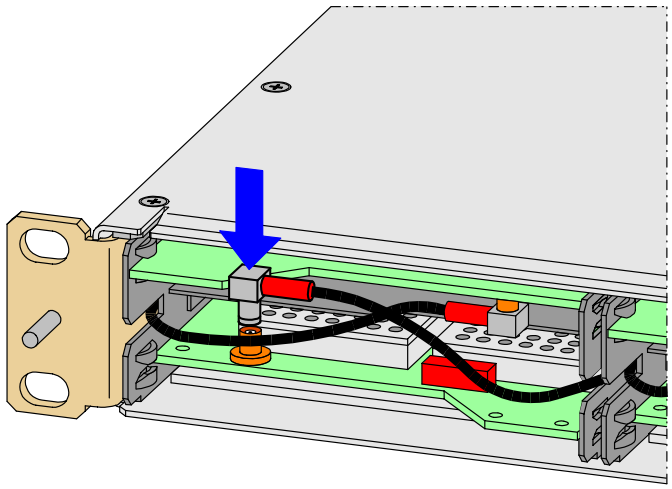
3. Slide the card in the card guides of the slot.



Note: To prevent damaging the board or the cable connectors during board insertion, push or pull gently both cables with connector away from the slot.

4. Push the card carefully into the system controller connector.

5. Connect the cable, with the connector nearest the board connector, to the Dual QAM Card.



6. Position the front cover on the housing, push both screws of the cover towards the housing and tighten these screws.

Note: After a Dual QAM Card insertion during operation of the eXtra Dense QAM Array system, the card loads settings from the system controller board and immediately starts running.

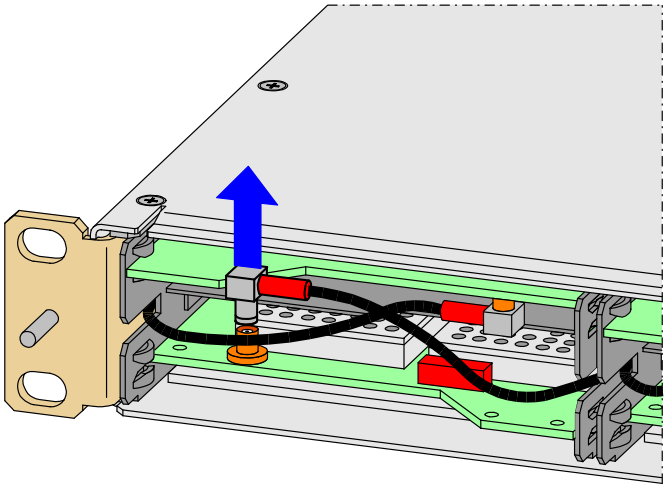
Continued on next page

To Remove a Dense QAM Array Dual QAM Card

When you have read the **Important Safety Instructions** earlier in this guide, you are ready to remove the Dual QAM Card from the housing.

Perform the following steps to remove the Dual QAM Card from the housing:

1. Loosen both screws at the front of the housing and remove the front cover.
2. Disconnect the cable from the connector on the Dual QAM Card.



> ⚠ **WARNING:**
>
> **Pulling out the Card without disconnecting the cable may cause in permanent damage of the card.**

3. Pull out the Dual QAM Card from the housing.

   Note: To prevent damaging the board or the cable connectors during board removal, push or pull gently both cables with connector away from the slot.

4. Position the front cover on the housing, push both screws of the cover towards the housing and tighten these screws.

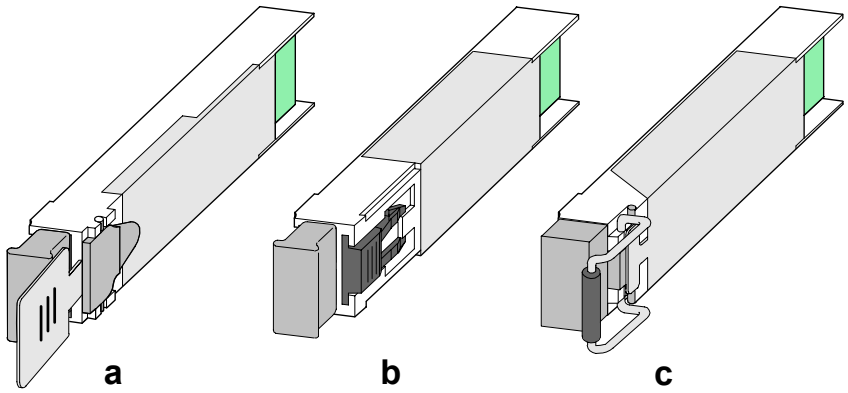
Installing and Removing SFP Laser Modules

Introduction

The Continuum DVP eXtra Dense QAM Array has 2 ports that can be configured with small form-factor pluggable (SFP) laser modules.

The SFP modules have three different types of latching devices used to secure and detach the SFP module from a Gigabit Ethernet port:

- The Tab SFP Modules (detail 'a' in the illustration below)
- The Button SFP Modules (detail 'b')
- The Cam Latch SFP Modules (detail 'c')



⚠ WARNING:

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.

Notes:

- When the cables are extracted from the SFP module, inserting a clean rubber dust plug into the SFP module to protect the module.
- Clean the optic surface of the fiber cables before inserting into a SFP module.

Continued on next page

To install a SFP module into the XDQA Housing

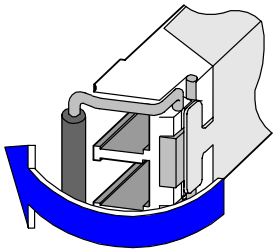
When you have read the **Important Safety Instructions** earlier in this guide, you are ready to install SFP modules into the XDQA Housing.

The following steps explain how to insert a SFP module into the housing.

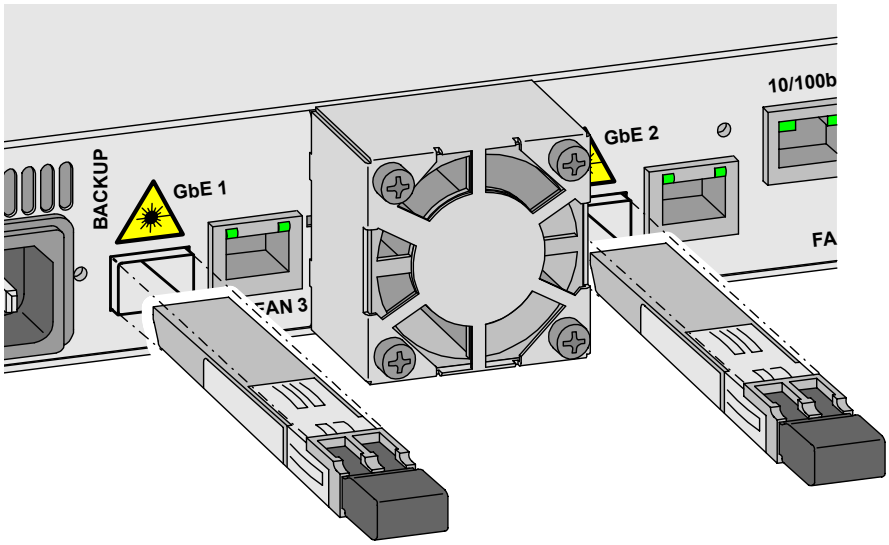
1. Unplug the power cord(s) from the power source(s) to turn off the XDQA system.
2. Slide the SFP module into the SFP housing located at the back of the XDQA Housing.

   Notes:

   - Before inserting a Cam Latch SFP laser module, close the latch, see picture below.



   - When inserting a SFP module into a SFP housing, ensure you firmly press the SFP module into the SFP housing. Gently pull on the SFP module to confirm whether or not the module is locked into its housing.



3. Plug the XDQA Housing power cord to the power source.

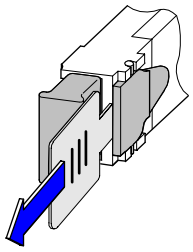
Continued on next page

To Remove a SFP Module from the XDQA Housing

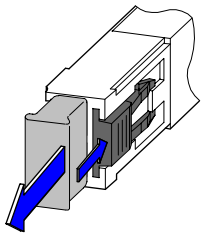
When you have read the **Important Safety Instructions** earlier in this guide, you are ready to remove SFP modules from the XDQA Housing.

The following steps explain how to remove a SFP module from the XDQA Housing.

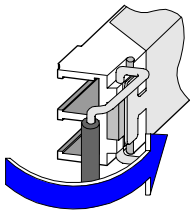
1. Unplug the power cord from the power source to turn off the device.
2. Remove the SFP module from the housing. The procedure depends on the SFP laser module type:
   - **Tab SFP module**: Pull the tab of the SFP module gently until the module disengages from the port, and then pull the SFP module out.



   - **Button SFP modules**: Gently press the actuator/button on the front of the SFP module until it clicks and the latch mechanism activates, releasing the SFP module from the port.



   - **Cam latch SFP modules**: Remove the rubber dust plug from the module if present. Open the latch on the SFP module and then pull the SFP module out.



3. Protect the Laser module by inserting a clean rubber dust plug into the module.

Section C
Connecting Cables

Overview

Introduction

This section explains how to connect the power, the input, and output cables to your Continuum DVP™ eXtra Dense QAM Array Housing.

In This Section

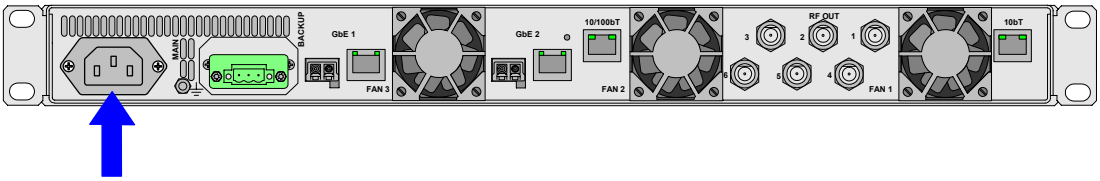
This section contains the following topics.

Connection of Scientific-Atlanta Equipment to AC Power Sources

Connecting the Continuum DVP eXtra Dense QAM Array to an AC Power Source

When you have read the **Rack Mounting Safety Precautions** in topic **Important Safety Instructions**, earlier in this guide, you are ready to connect the Continuum DVP XDQA system to an AC mains inlet.

The following drawing shows the main connector for the AC power supply.



Note: Check if the AC mains source voltage corresponds to the appropriate power input voltage for the unit. This voltage is noted on the back of the Continuum DVP XDQA Housing.

CAUTIONS:

When a Continuum DVP DQA component is brought from a cold into a warm environment, the component should be acclimated to the environment temperature and humidity conditions for at least 30 minutes. Non-acclimated components may not meet the technical specifications as described. Powering up a non-acclimated component may result in damage to the component and/or chassis.

Connection of Scientific-Atlanta Equipment to DC Power Sources

General

Some Scientific-Atlanta products can be powered by dc power supplies. In general two categories of dc power supply systems are considered:

- -48 V dc Nominal Voltage systems with absolute maximum values below 60 Vdc (SELV).
- -48 to –60 V dc Nominal Voltage systems with absolute maximum values below 75 V dc. (NON SELV)

For the allowable nominal voltage, refer to the Ratings/Identification label on your product.

-48 V dc Power Source

For equipment designed to be powered by a –48 V dc power source, and having a Normal Service Voltage Range not exceeding –38 to –58 V dc, the following safety warnings and guidelines apply:

- Independent units and chassis must be connected to the –48 V dc power source either via the mating field wiring connector with screw terminals or via the provided dc power cable. Furthermore, the following applies:
  - Use a listed dc rated Branch Circuit protection in accordance with the wire size, and with a maximum of 15 A current. The circuit protection must be placed in the hot wire.
  - We recommend a minimum of 1.5 mm^2 (or AWG16) for 15 A fusing.
  - The -48 V dc power source must comply with the safety extra-low voltage (SELV) requirements in the UL 1950 (UL60950), CSA C22.2 No. 950, CSA C22.2 No. 60950, EN 60950 and IEC 60950 standards.
  - The -48 V dc power source must be electrically isolated from the AC source in accordance with the standard of the country where you are installing the product.
  - The wire size of the cable used to connect a product to the dc distribution module or bus bar must have the appropriate wire size to avoid overloading.
  - Always wire the protective earth terminal of the dc power supply connector or cable.

Continued on next page

-48 to -60 V dc Power Source

Some Scientific-Atlanta products can be equipped with a dc power supply, which accommodates both -48 V dc and -60 V dc Nominal power supply systems. (Normal Service Voltage Range not exceeding -36 V dc to -72 V dc).

For the allowable nominal voltage, refer to the Ratings/Identification label on your product.

In this case, the device is provided with a dedicated **Mate-N-Lock** type connector. A Power Cord with mating connector is provided in the accessory set of the unit.

For this category of equipment, the safety considerations for handling dangerous voltages are applicable.

> ⚠ **WARNING:**
>
> **Use the same level of safety precautions for this equipment and power source as for the AC power source.**

For units powered by a -60 V dc Nominal power source, observe the following safety warnings and guidelines:

- Use a listed dc rated Branch Circuit protection in accordance with the wire size, and with a maximum of 15 A current. The circuit protection must be placed in the hot wire.
- We recommend a minimum of 1.5 mm^2 (or AWG16) for 15 A fusing.
- The -60 V dc power source must be electrically isolated from the Mains ac source in accordance with the standard of the country where you are installing the product.
- The wire size of the cable used to connect a product to the dc distribution module or bus bar must have the appropriate wire size to avoid overloading.
- Always wire the protective earth terminal of the dc power supply connector or cable.

Continued on next page

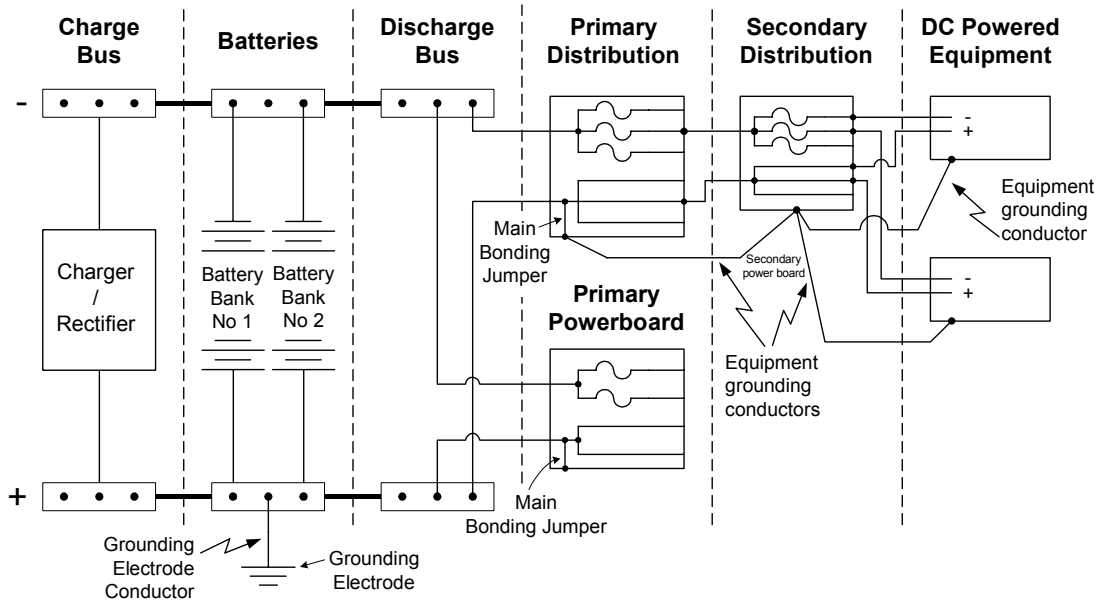
Connection to Centralized DC Power Systems

Only units designed and rated for connection to –48 to –60 Vdc Nominal power sources, and provided with a Mate-N-Lock type of connector are suitable for connection to "Centralized dc Power Systems".

A centralized dc power distribution system (typically -48 V dc) is a power system consisting of open batteries, charger/rectifier circuits, and primary, and secondary distribution equipment intended to provide power to equipment loads. Two types of systems exist:

- **Source earthed dc power systems**, in which the connection to the earthing electrode is located at the source, and separate earthed and protective earth conductors, are provided throughout the system.
- **dc power system earthed at the equipment location**, in which the connection to the earthing electrode is located in the area where the load equipment is to be installed.

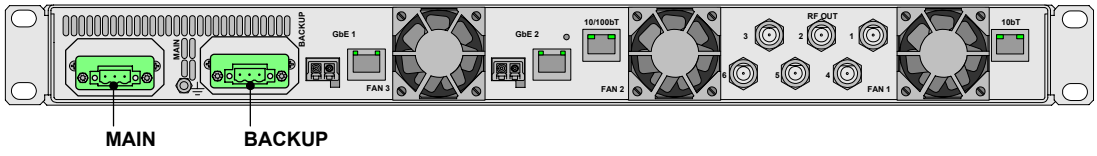
A typical power distribution arrangement is shown below:



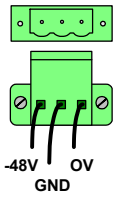
Continued on next page

Connecting the Continuum DVP eXtra Dense QAM Array to an DC Power Source

The following drawing shows the main and backup connector for the -48 V dc power supply.



-48 V DC ComBiCon Power connector with connections



Power cord connector (rear view)

Note: Check if the DC mains source voltage (-36 - -58 V dc) corresponds to the appropriate power input voltage for the unit. This voltage is noted on the back of the chassis.

⚠ WARNING:

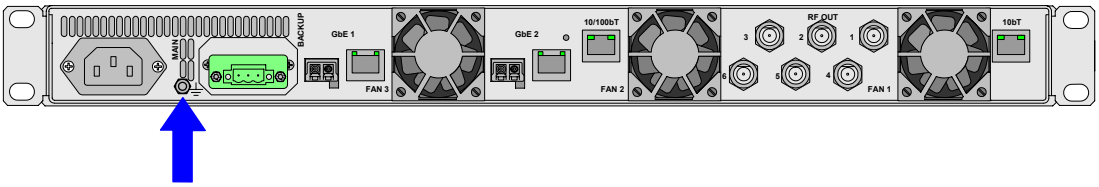
Pay attention to the DC power source connection, wrong polarizing the DC power source may result in damage to the PSU module.

⚠ CAUTIONS:

When a Continuum DVP XDQA component is brought from a cold into a warm environment, the component should be acclimated to the environment temperature and humidity conditions for at least 30 minutes. Non-acclimated components may not meet the technical specifications as described. Powering up a non-acclimated component may result in damage to the component and/or chassis.

Cabling the Bonding Terminal

To Connect the Bonding Terminal



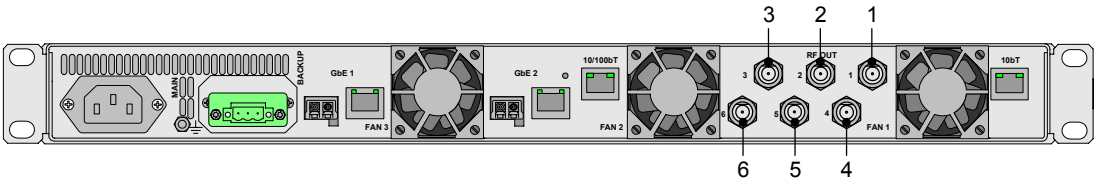
Perform the following steps to connect the bonding terminal.

1. Remove the nut and the washer from the bonding terminal on the back of the Continuum DVP XDQA Housing.
2. Place the eye strap of the bonding wire over the bonding terminal.
3. Replace the washer and the nut.
4. Tighten the nut.

Connecting the Input and Output Cables

RF Output Connectors

The Continuum DVP XDQA Housing is equipped with six RF output connectors. Each RF output is internally connected to a Dual QAM Card by means of a cable.



The RF outputs are F-type connectors. These connectors should only accept a coaxial cable center conductor between 0.56 mm and 1.19 mm in diameter.

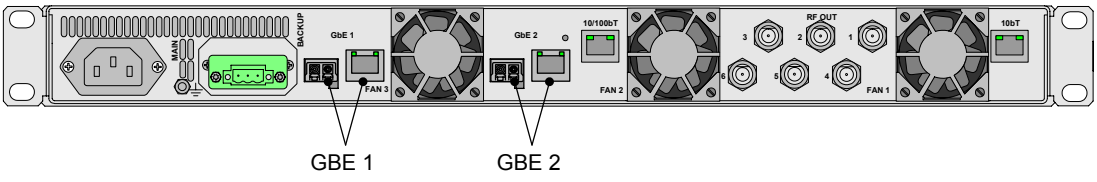
> ⚠ **CAUTION:**
>
> **Coaxial cable center conductor larger or smaller than these diameters should not be used. If used, it may result in damage or loss of signal at the F-type connector.**

Due to the fact that the larger diameter center conductor (e.g. greater than 1.19 mm) will spread the contacts of an F-type connector further apart, once a larger diameter is inserted into a F-type connector, a smaller diameter center conductor should not be used in its place. If used, it may result in loss of signal at the F-type connector.

IP Input Connectors

The Continuum DVP XDQA system contains 4 Gigabit Ethernet ports, viz. 2 electrical and 2 optical ports. The electrical GbE connectors are RJ-45 type connectors. The optical GbE connector type depends of the installed SFP modules.

The following illustration shows the Gigabit Ethernet ports on the rear panel of the Continuum DVP XDQA Housing.



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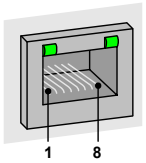
The table below shows the pinout configuration of a Gigabit Ethernet RJ-45 connector.



Pin Number	Name
1	TRD0+
2	TRD0-
3	TRD1+
4	TRD2+
5	TRD2-
6	TRD1-
7	TRD3+
8	TRD3-

Continued on next page

Ethernet Connectors

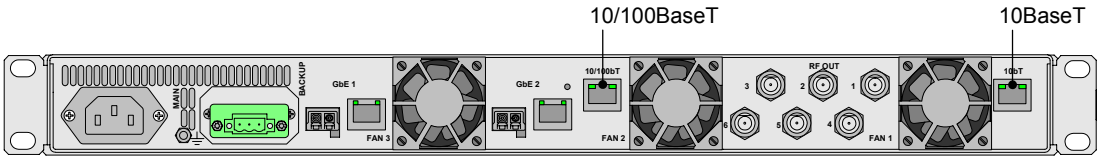
The device is provided with two Ethernet ports, a 10Base-T and a 10/100Base-T Ethernet port. You can only use the 10Base-T Ethernet port to set the IP address. Both Ethernet ports can be used to manage the system.

Two addresses are available for the Continuum DVP eXtra Dense QAM Array device. Each address will have a unique MAC address and an IP address. The default Ethernet ports IP addresses are:

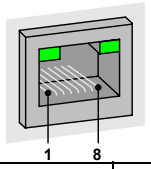
- 10Base-T Ethernet port: 150-158-230-250
- 10/100Base-T Ethernet port: 150-158-231-250

You can assign another IP address to the Ethernet ports using the Scientific-Atlanta IP configuration tool. For more information about assigning an IP address, refer to section A, **Assigning IP Addresses** of chapter 3.

The following illustration shows the Ethernet ports on the rear panel of the Continuum DVP eXtra Dense QAM Array Housing.



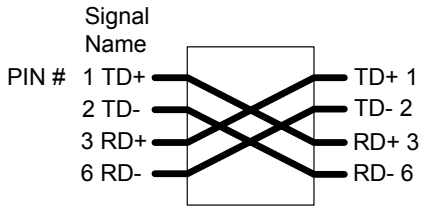
The table below shows the pinning of a 10/100BaseT RJ-45 connector:



Pin	Description (MDIX)	Name	**Pin**	Description (MDI)	Name
1	Receive data +	RD+	1	Transmit data +	TD+
2	Receive data -	RD-	2	Transmit data -	TD-
3	Transmit data +	TD+	3	Receive data +	RD+
4	Not used	-	4	Not used	-
5	Not used	-	5	Not used	-
6	Transmit data -	TD-	6	Receive data -	RD-
7	Not used	-	7	Not used	-
8	Not used	-	8	Not used	-

Continued on next page

Note: You can connect your PC directly to the 10Base-T or 10/100Base-T Ethernet port of the Continuum DVP XDQA housing using an Ethernet crossover cable. The following table gives the pinout configuration of an Ethernet crossover cable.

Pinout Connector 1	Pinout Connector 2	
1	3	
2	6	
3	1	
4	Open	
5	Open	
6	2	
7	Open	
8	Open	

Care and Cleaning of Optical Connectors

Introduction

Optical connectors are cleaned at assembly, but require recleaning when the equipment is installed. Both the connector attached to the bulkhead adapter in the equipment and the jumper connector that will be attached to the bulkhead adapter must be cleaned. This section describes recommended cleaning instructions for both halves of the connection.

Guidelines

Proper care and cleaning of optical connectors is critical to equipment operation. Follow these guidelines when working with optical connectors:

> ⚠ **WARNING:**
>
> **Laser light hazard. Never look into the end of a fiber cable or connector. Failure to observe this danger can result in eye damage or blindness.**

- The working surfaces of optical connectors are highly polished and designed for precision alignment. Keep them microscopically clean and free of scratches.
- Optical power readings and signal quality can seriously degrade if optical connectors or bulkheads are mishandled or allowed to become dirty.
- Optical bulkheads on transmitters and receivers and the connector faces of optical cables are shipped with protective caps. Do not remove caps until ready to make connections.
- Do not touch unprotected optical connector faces. Do not allow dirt to touch the connector to the bulkheads. Small scratches, minute traces of dirt or skin oils can degrade signal quality.

Materials for Cleaning

The following materials are required for cleaning.

- Lint-free Wipes (tissues)
- Ethyl or Isopropyl Alcohol, >91% purity (Do not use a lesser grade. Do not use common rubbing alcohol.)
- Filtered Canned Air
- Lint-free Swabs

Continued on next page

Cleaning of Connectors in a Bulkhead Adapter

Perform the following steps to clean optical connectors in a bulkhead adapter.

1. Remove the protective cap from the bulkhead adapter.
2. Blow dust particles from the interior surface of the bulkhead adapter using filtered canned air as follows:

> ⚠ **CAUTION:**
>
> **Be sure to hold the air can in upright position so that liquid from the can cannot enter the air tube. Do not shake the can. Do not blow air directly on the fiber. Failure to observe this caution may damage the connector or cause contaminants to be placed on the surface being cleaned.**

   - Hold the air can upright. Position the can extension tube approximately 6 inches (15.3 cm) from the surface to be cleaned.
   - Gently blow into the adapter.
3. Swab the bulkhead adapter using a lint-free swab as follows:

> ⚠ **CAUTION:**
>
> **Do not use alcohol less than 91% pure. Do not use common rubbing alcohol. Failure to observe this caution will deposit contaminants on the fiber surface.**

   - Moisten a lint-free swab with > 91% pure ethyl or isopropyl alcohol.
   - Insert the moistened swab into the bulkhead adapter until it touches the interior connector face.
   - Apply light pressure and rotate the swab approximately eight to ten turns.
   - Remove the swab.
   - Insert a dry, lint-free swab and gently turn several times

Continued on next page

4. Blow dust particles from the interior surface of the bulkhead adapter using filtered canned air as follows:

> ⚠ **CAUTION:**
>
> **Be sure to hold the air can in upright position so that liquid from the can cannot enter the air tube. Do not shake the can. Do not blow air directly on the fiber. Failure to observe this caution may damage the connector or cause contaminants to be placed on the surface being cleaned.**

   - Hold the air can upright. Position the can extension tube approximately 6 inches (15.3 cm) from the surface to be cleaned.
   - Gently blow air into the adapter.

5. Insert a recently cleaned connector into the bulkhead adapter.

Cleaning of Connectors Not in a Bulkhead Adapter

Perform the following steps to clean optical connectors that are not installed in a bulkhead adapter.

1. Remove the protective cap from the optical connector.

   Note: Do not reinstall the protective cap after the cleaning procedure. Protective caps are designed to protect the connector ferrule from damage, not to keep the connector clean.

2. Place a dry, lint-free wipe on a solid surface.

> ⚠ **CAUTION:**
>
> **Avoid contamination of lint-free wipes. Handle wipes by the edges. Discard each wipe immediately after use. Failure to observe this caution may result in contaminants on the surface being cleaned.**

3. Place another dry, lint-free wipe on top of the first wipe.

4. Moisten the top wipe with >91% pure ethyl or isopropyl alcohol.

> ⚠ **CAUTION:**
>
> **Do not use alcohol less than 91% pure. Do not use common rubbing alcohol. Failure to observe this caution will deposit contaminants on the fiber surface.**

Continued on next page

5. Gently wipe the connector ferrule and endface. For APC connectors only, wipe with one continuous motion in the direction of the angle.
6. Discard the wipes.
7. Place a dry, lint-free wipe on a solid surface and gently slide the connector endface across the wipe. For APC connectors only, wipe with one continuous motion in the direction of the angle.
8. Blow dust particles from the connector using filtered canned air as follows:

> ⚠ **CAUTION:**
>
> **Be sure to hold the air can in upright position so that liquid from the can cannot enter the air tube. Do not shake the can. Do not blow air directly on the fiber. Failure to observe this caution may damage the connector or cause contaminants to be placed on the surface being cleaned.**

   - Hold the air can upright. Position the can extension tube approximately 6 inches (15.3 cm) from the surface to be cleaned.
   - Gently blow air across the connector end or surface to be cleaned.

9. Promptly insert the connector into the cleaned bulkhead adapter.

Chapter 3
Operation

Overview

Introduction

This chapter describes how to configure and operate the Continuum DVP™ eXtra Dense QAM Array (XDQA) system using a web browser.

In This Chapter

This chapter contains the following topics.

Assigning IP Addresses

Introduction

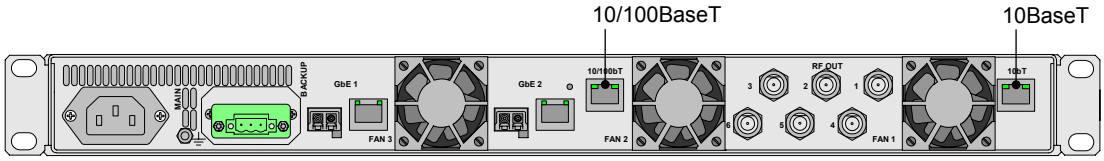
IP Address

The XDQA Housing is equipped with two Ethernet ports, a 10Base-T and a 10/100Base-T Ethernet port. You can only use the 10Base-T Ethernet port to set the IP addresses. Both Ethernet ports can be used to manage the Continuum DVP XDQA system. Each Ethernet port has an address, which will have a unique MAC address and an IP address. The default Ethernet port IP addresses are:

- 10Base-T Ethernet port: 150-158-230-250
- 10/100Base-T Ethernet port: 150-158-231-230

Note: These two Ethernet ports should be connected to a different subnet.

The following illustration shows the Ethernet ports on the back of the XDQA Housing.



In order to establish communication with the XDQA system, you need to assign another IP address from a remote site to the XDQA Ethernet ports. You can assign the IP address using the Scientific-Atlanta IP configuration client and server tool.

About the Scientific-Atlanta IP Configuration Tool

The IP configuration server is a server installed on the system controller board, which starts running immediately at startup of the system controller board. The client runs on a remote computer connected via a network to the XDQA system. When the client starts up the Scientific-Atlanta IP configuration tool it shows a list of available servers that support the protocol. All these devices can be configured using this tool.

Note: The Scientific-Atlanta IP configuration tool can be found on the Client Tools CD-Rom (part number 4000976).

Continued on next page

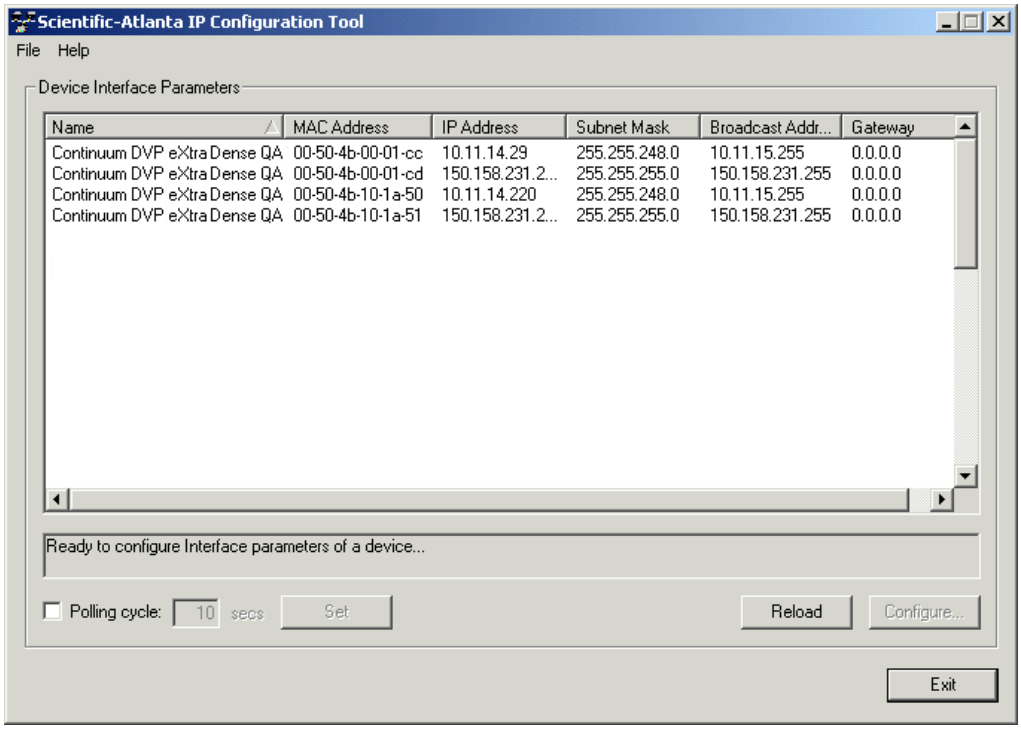
To Assign an IP Address

Perform the following steps to assign an IP address to the XDQA system.

1. Start the Scientific-Atlanta IP Configuration tool on your remote computer.

   Note: Be sure that the client PC and 10Base-T port are connected to the network.

   Result: The tool returns a list of servers that support the protocol with the following information: MAC Address, Name, serial number, IP Address, Subnet Mask address, Broadcast Address, Gateway address.



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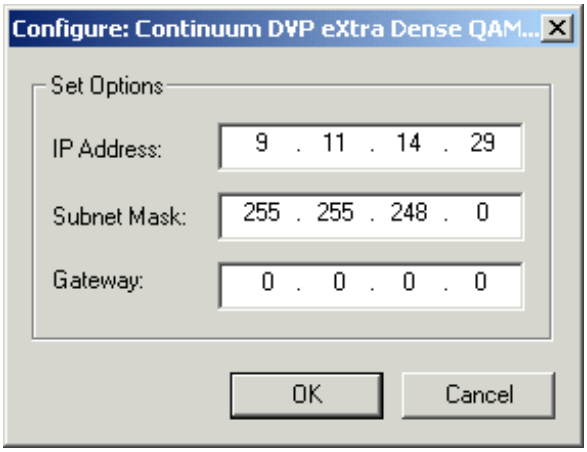
2. Select the device in question and press the **Configure** command button.

   Result: The **Configure** dialog is displayed.



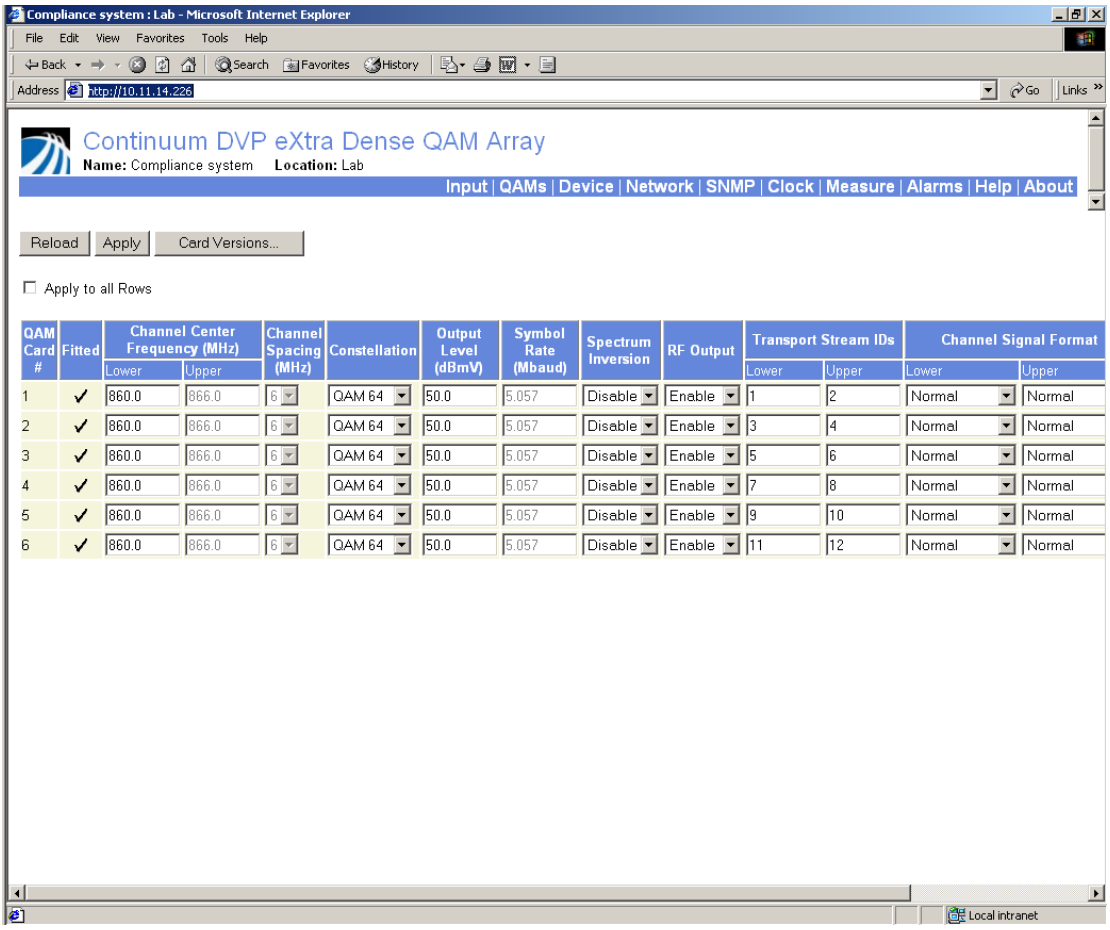
3. Enter the **IP Address**, the **Network Mask**, and the **Gateway** and press **Apply** to confirm or **Cancel** to abort the operation.

Accessing the Embedded Graphical User Interface

Opening the Embedded Graphical User Interface

The Continuum DVP XDQA system can be configured and monitored using an embedded graphical User Interface (GUI). This embedded GUI can be accessed using a standard WEB Brower.

You can upload the embedded GUI by entering the IP address of the XDQA system in the address box of the web browser. The start page of the embedded GUI is displayed. The embedded GUI is provided with an online help to assist the user to configure the XDQA system.



The XDQA system is provided with a security feature to prevent unauthorized access to the XDQA system. When this security feature is enabled a logon page is displayed after entering the IP address of the device. The GUI will be opened after entering a correct username and password. More information concerning the system security configuration can be found in the Online Help of the GUI. Refer to topic **Configuring and Monitoring the Continuum DVP eXtra Dense QAM Array** further in this chapter for more information about the procedure to open the Online Help.

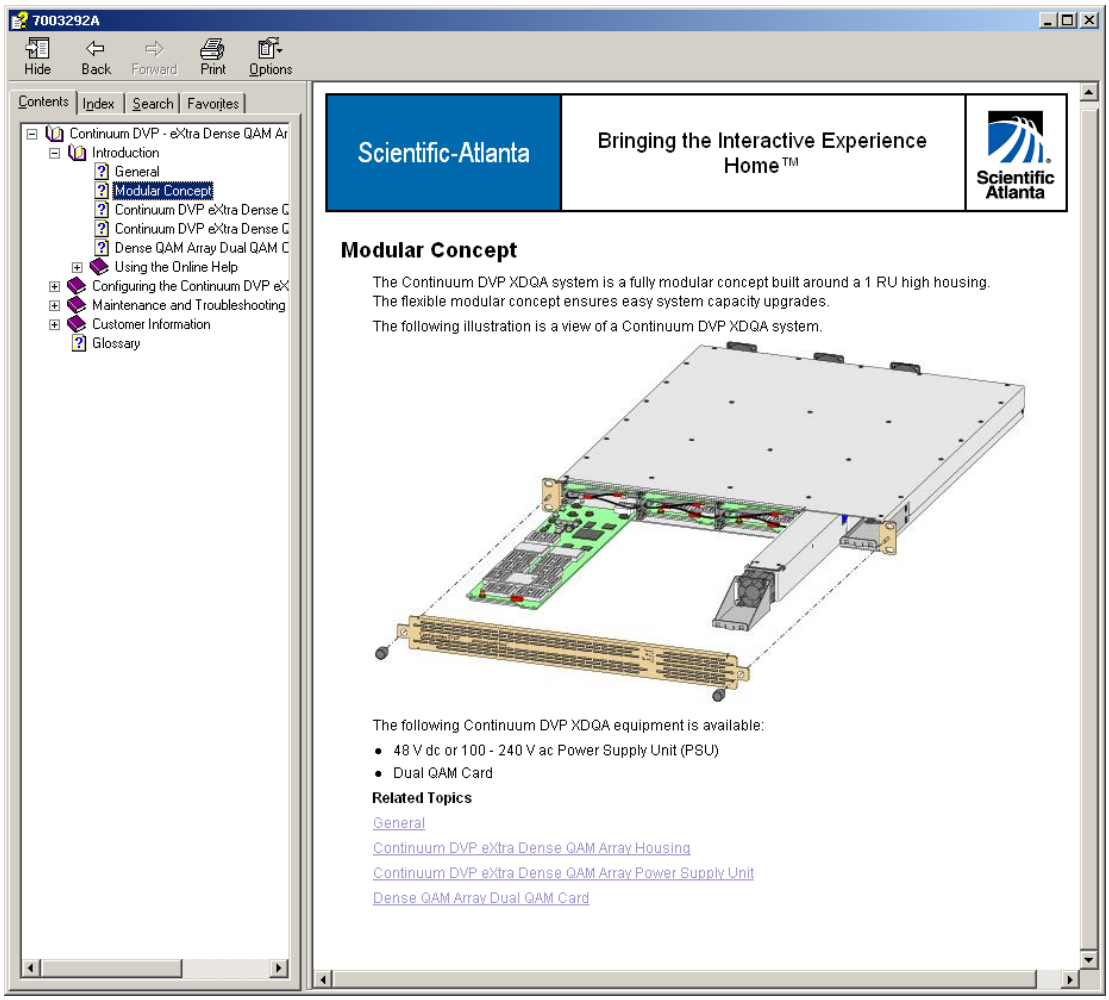
Configuring and Monitoring the Continuum DVP eXtra Dense QAM Array

Introduction

The Continuum DVP XDQA system has to be configured and monitored using the embedded GUI. This embedded GUI is provided with an online help. Please refer to this online help for information concerning the embedded GUI.

Opening the Online Help

By pressing the **Help** link on the embedded GUI of the Continuum DVP XDQA system, you can open the online help file or you can download the file.
The following shows an online help page.



Chapter 4
Maintenance and Troubleshooting

Overview

Introduction

This chapter provides information to assist you in maintaining and troubleshooting your Continuum DVP™ eXtra Dense QAM Array system.

Note: The Continuum DVP eXtra Dense QAM Array system is able to display alarms. Please refer to the online help for more information about the alarm monitoring.

In This Chapter

This chapter contains the following topics.

Maintenance

Maintaining Continuum DVP eXtra Dense QAM Array Equipment

To ensure optimal performance, the following maintenance is recommended.

Frequency	Maintenance Required
Weekly	• Check all parameters.
Quarterly	• Make sure all cables are mated properly. • Inspect cables for stress and chafing. • Make sure all retaining screws are tight.
When needed	• Carefully clean the module with a soft cloth that is dampened with mild detergent.

Continued on next page

Replacing a Fan

A **fan malfunction** alarm indicates that at least one of the fans is malfunctioning.

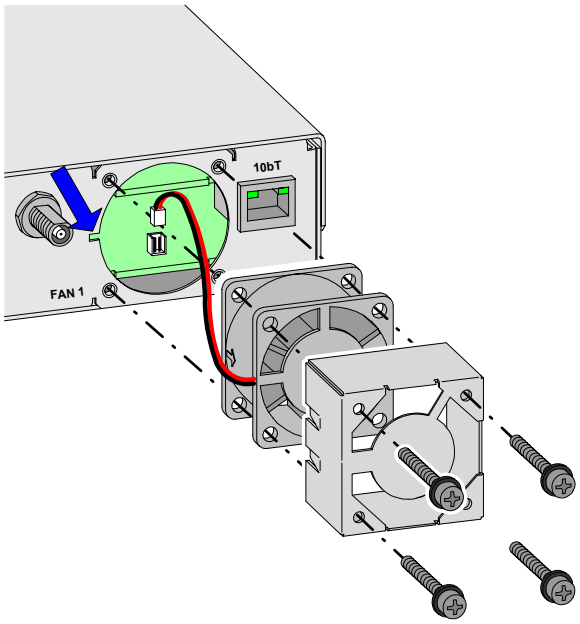
Perform the following steps to replace a fan.

Only appropriately qualified and trained personnel should attempt to install, operate, or maintain the Continuum DVP XDQA system.

> ⚠ **WARNING:**
>
> **Allow only qualified personnel to install this product. Otherwise, personal injury or equipment damage may occur.**

Before starting the fan replacement, review the **Important Safety Instructions** earlier in this guide to avoid injuring yourself or damaging the equipment.

1. Loosen the four screws of the defective fan.
2. Remove the fan with EMC shield cover.
3. Disconnect the fan cable from the PCB.



4. Connect the cable of the new fan (part number 4005563) to the PCB.
5. Position a new fan with EMC shield cover on the chassis with the fan cable in the left hand slot (in the illustration above, indicated with an arrow) of the fan opening.
6. Tighten the four screws (with washers).

Troubleshooting

About

This troubleshooting information describes the most common alarms and gives typical symptoms, causes and items to check before consulting the customer services department.

Equipment Needed

You may need the following equipment to troubleshoot the Continuum DVP eXtra Dense QAM Array system.

- Digital voltmeter

Additional Assistance

If you need additional assistance, call one of our customer services centers or your local sales representative.

Checking LED Indicators

The Continuum DVP eXtra Dense QAM Array Housing contains three multi-colour LED indicators on the front panel.

- MAIN PS LED indicator
- BACKUP PS LED indicator
- ALARM LED indicator

Symptom	Possible Causes	Solutions
MAIN PS LED indicator is off	No MAIN PSU installed	Install a MAIN PSU.
MAIN PS LED indicator illuminates red	MAIN PSU connection is loose.	Check that the main power connection is secure.
	Loss of source power (main PSU)	Check that AC or DC power is present at the power source outlet.
	PSU failure (blown fuse)	Replace the MAIN PSU.
MAIN PS LED indicator illuminates green	MAIN PSU is active.	OK
BACKUP PS LED indicator is off	No BACKUP PSU installed	Install a BACKUP PSU.

Continued on next page

Symptom	Possible Causes	Solutions
BACKUP PS LED indicator illuminates red	BACKUP PSU connection is loose.	Check that the backup power connection is secure.
	Loss of source power (BACKUP PSU)	Check that AC or DC power is present at the power source outlet.
	PSU failure (blown fuse)	Replace the BACKUP PSU.
BACKUP PS LED illuminates green	BACKUP PSU is active.	OK
ALARM LED is on	Pending alarm or error detected by the CPU module.	Troubleshoot the alarm or error message.
All LED indicators illuminates yellow	The device is in startup state.	Please wait.

Chapter 5
Customer Information

Overview

Introduction

This chapter contains information on obtaining product support and returning damaged products to Scientific-Atlanta.

In This Chapter

This chapter contains the following topics.

Product Support

Obtaining Support

IF…	THEN…
you have general questions about this product	contact your distributor or sales agent for product information or refer to product data sheets on www.scientificatlanta.com.
you have technical questions about this product	call the nearest *Technical Support* center or Scientific-Atlanta office.
you have customer service questions or need a return material authorization (RMA) number	call the nearest *Customer Service* center or Scientific-Atlanta office.

Support Telephone Numbers

Use the following table to find the Technical Support and Customer Service telephone numbers in your area.

Region	Assistance Centers	Telephone and Fax Numbers
North America	SciCare™ Broadband Services Atlanta, Georgia United States	• For Technical Support, call: Toll-free 1-800-722-2009 Local 770-236-6943 • For *Customer Service* questions or to request an RMA number, call: Toll-free 1-800-722-2009 Local 770-236-6900 Fax 770-236-5477
Europe	Belgium	• For Technical Support, call: Telephone 32-56-445-197 32-56-445-155 Fax 32-56-445-053 • For *Customer Service* questions or to request an RMA number, call: Telephone 32-56-445-133 32-56-445-118 Fax 32-56-445-051
Asia-Pacific Australia	Hong Kong	Telephone 852-2522-5059 Fax 852-2522-5624

Continued on next page

Region	Assistance Centers	Telephone and Fax Numbers
Brazil	Brazil	• For *Technical Support*, call: Telephone 55-11-3845-9154 ext 230 Fax 55-11-3845-2514 • For *Customer Service* questions or to request an RMA number, call: Telephone 55-11-3845-9154 ext 244 Fax 55-11-3845-2514
South America, other than Brazil	Argentina	Telephone 54-23-20-403340 ext 109 Fax 54-23-20-403340 ext 103
Mexico Central America	Mexico	Telephone 52-55-52-61-8731 ext 8731 Fax 52-55-52-61-8699

Return Products for Repair

Introduction

You must have a return material authorization (RMA) number to return a product. Contact the nearest customer service center and follow their instructions.

Returning a product to Scientific-Atlanta for repair includes the following steps:

- Obtaining a RMA number
- Obtaining a customer service center shipping address
- Packing and shipping the product

Obtaining an RMA Number and Shipping Address

You must have an RMA number to return products.

RMA numbers are valid for 60 days. If you already have a number, but it is older than 60 days, you must contact a customer service representative to revalidate the number. You can return the product after the RMA number is revalidated.

Follow these steps to obtain an RMA number and shipping address.

1. Contact a customer service representative to request a new RMA number or revalidate an existing one.

   Refer to the earlier section titled **Support Telephone Numbers** to find a customer service telephone number in your area.

2. Provide the following information to the customer service representative:

   - Product name, model number, part number, serial number (if applicable)
   - Quantity of products to return
   - A reason for returning the product
   - Your company name, contact, telephone number, email address, and fax number
   - Any service contract details
   - Purchase order number of repair disposition authority, if available

   Result: The customer service representative issues the RMA number and provides the shipping address.

Continued on next page

2. (Continued) **Notes:** If you cannot provide a purchase order number:

- A proforma invoice listing all costs incurred will be sent to you at the completion of product repair.
- Customer service must receive a purchase order number within 15 days after you receive the proforma invoice.
- Products can accrue costs through damage or misuse, or if no problem is found. Products incurring costs will not be returned to you without a valid purchase order number.

3. Proceed to **Packing and Shipping the Product.**

Packing and Shipping the Product

Follow these instructions to pack the product and ship it to Scientific-Atlanta.

1. Are the product's original container and packing material available?

- If **yes,** pack the product in the container using the packing material.
- If **no,** pack the product in a sturdy, corrugated box, and cushion it with packing material.

Important:

- You are responsible for delivering the returned product to Scientific-Atlanta safely and undamaged. Shipments damaged due to improper packaging may be refused and returned to you at your expense.
- Do not return any power cords or accessories.

2. Write the following information on the outside of the container:

- Your name
- Your complete address
- Your telephone number
- RMA number
- Problem description

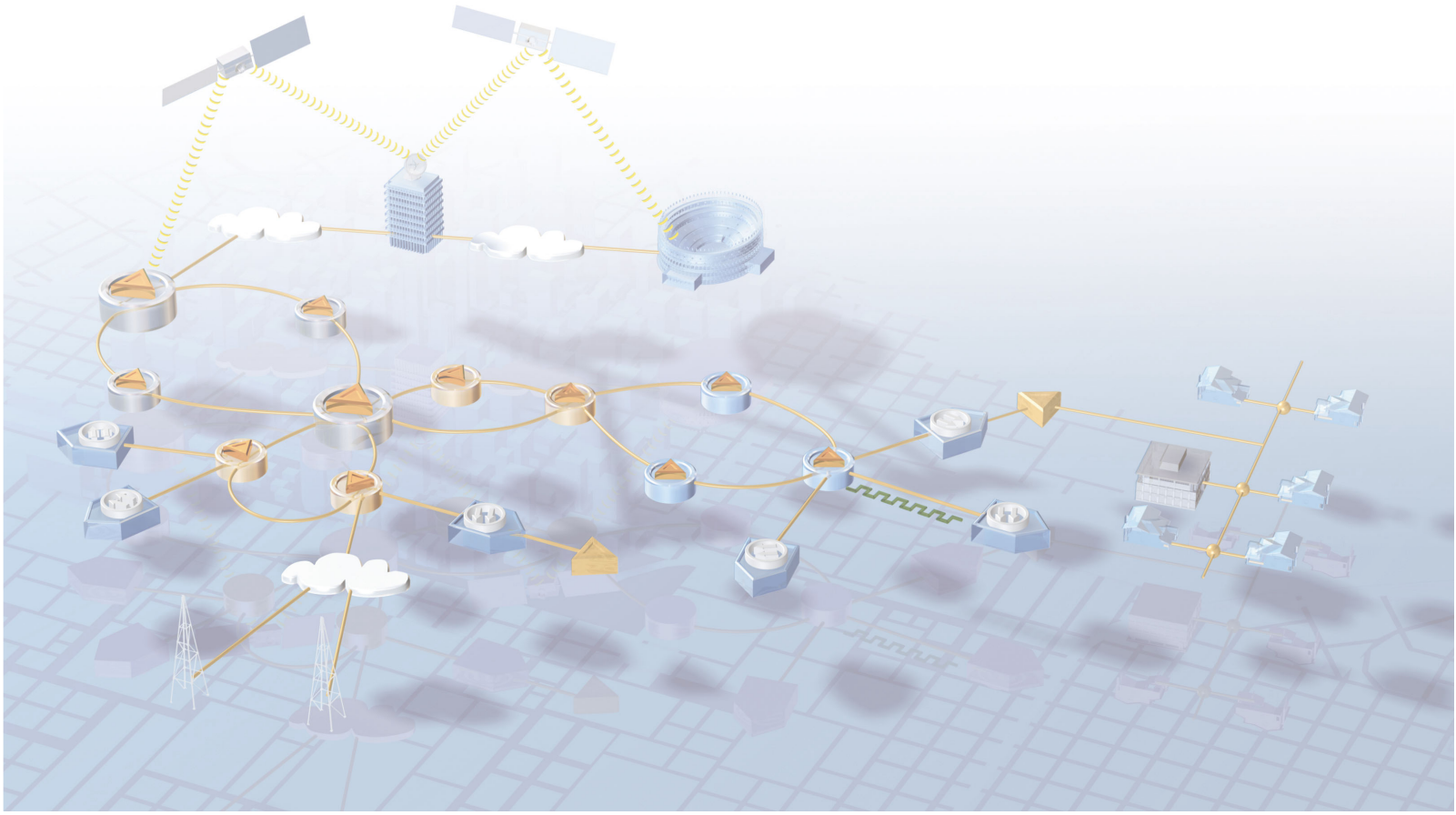
Note: Absence of the RMA number may delay processing of product repair and/or result in the equipment being returned unrepaired. Include the RMA number in all correspondence.

3. Ship the product to the address provided by the customer service representative.

Note: Scientific-Atlanta does not accept freight collect. Be sure to prepay and insure all shipments.

Appendices

Appendix A—Technical Specifications
Appendix B—Video On Demand
Appendix C—Continuum DVP Dense QAM Array MIB



Appendix A
Technical Specifications

Overview

About This Appendix

This appendix presents the Continuum DVP™ eXtra Dense QAM Array (XDQA) system specifications. The specifications of the Continuum DVP XDQA equipment can be found in the Installation and Operation Guides of this equipment.

Note: Technical specifications are subject to change without prior notice.

In This Appendix

This appendix contains the following topics.

General Specifications

Introduction

The following table lists the general specifications of the Continuum DVP Dense QAM Array equipment.

Environmental Specifications

Item	Specification
Ambient temperature range	
• Within specs	10 to 40°C (50 to 104°F)
• Operation	0 to 50°C (32 to 122°F)
• Storage	-20 to 70°C (-4 to 158°F)
Operating humidity	5% to 95%, non-condensing

Physical

Item	Specification
Dimension	
• In mm (H x W x D)	1 RU x 482,6 mm x 600mm
• In inch (H x W x D)	1.75″ x 19″ x 23,62″
Weight	
• Fully loaded	Approx. 7.25 kg (16 lbs)
• Empty housing	Approx. 4.15 kg (9.15 lbs)

Power Supply Specifications

Item	Specification
Power supply (nominal)	100 – 240 V ac ± 10% or –48 V DC
Power consumption (nominal)	< 150 W

Continued on next page

Electrical Specifications

GbE Input Interface

Item	Specification
Number of inputs	1 + 1 (for redundancy)
Connector	Electrical RJ 45 and optical small form factor pluggable (SFP)
Interface type	Gigabit Ethernet according to IEEE 802.3ab (electrical) or IEEE 802.3z (optical)
Data rate	960Mbps
Syntax	CBR MPEG SPTS on UDP (RFC-768)

Management Interface

Item	Specification
Interface type	Ethernet 10Base-T / 10/100Base-T
Connector	2 x RJ 45
Protocols	HTTP, SNMP, HTML, JAVA, FTP

RF Outputs

Item	Specification
Number of outputs	Max. 6 x 1 (each with 2 adjacent QAM channels)
Connector	F-type, 75 Ω
Frequency	
• Range	Channel edges between 45 and 870 MHz (tunable)
• Step size	25 kHz
• Stability	± 3 ppm
• Accuracy	± 3 ppm

Continued on next page

Item	Specification
Channel bandwidth	6, 7 or 8 MHz depending of QAM standard
Level	
• Range	45 to 55 dBmV RMS per QAM channel in 0.5 dB steps
• Stability	± 1 dB
• Accuracy	± 1 dB
RF specs exceeding (EURO) DOCSIS	

Signal Specifications

Item	Specification
Channel encoding	Scrambling, Reed-Solomon, Trellis and Interleaving according to ITU-T Annex A B or C
MER (before equalizer)	≥ 34 dB (at RF)
MER (after equalizer)	≥ 41 dB (at RF)
BER (256 QAM)	≤ 5.10^{-9} (ITU-A/C pre FEC) ≤ 1.10^{-13} (ITU-B pre FEC / post trellis)
Bandwidth	6, 7 or 8 MHz (transmission standard depending)
QAM constellation	64 & 256 QAM

SFP Laser Module Specifications

Part Number	Type	Distance	Wave Length	Mode
4002019-160	WDM	Up to 500m *	850 nm	Multi mode
4002020-160	WDM	Up to 5 km	1310 nm	Single mode
4002021-160	WDM	Up to 25 km	1310 nm	Single mode

Continued on next page

Part Number	Type	Distance	Wave Length	Mode
4002022-160	WDM	Up to 40 km	1550 nm	Single mode
4002023-160	WDM	Up to 70 km	1550 nm	Single mode
4002003-160	CWDM	Up to 40 km	1470 nm	Single mode
4002004-160	CWDM	Up to 40 km	1490 nm	Single mode
4002005-160	CWDM	Up to 40 km	1510 nm	Single mode
4002006-160	CWDM	Up to 40 km	1530 nm	Single mode
4002007-160	CWDM	Up to 40 km	1550 nm	Single mode
4002008-160	CWDM	Up to 40 km	1570 nm	Single mode
4002009-160	CWDM	Up to 40 km	1590 nm	Single mode
4002010-160	CWDM	Up to 40 km	1610 nm	Single mode
4002011-160	CWDM	Up to 70 km	1470 nm	Single mode
4002012-160	CWDM	Up to 70 km	1490 nm	Single mode
4002013-160	CWDM	Up to 70 km	1510 nm	Single mode
4002014-160	CWDM	Up to 70 km	1530 nm	Single mode
4002015-160	CWDM	Up to 70 km	1550 nm	Single mode
4002016-160	CWDM	Up to 70 km	1570 nm	Single mode

Appendix B
Video On Demand

Overview

Introduction

This appendix is an introduction to Video On Demand (VOD) and describes an example of a centralized VOD architecture.

In This Appendix

This appendix contains the following topics.

Introduction

General

The recent developments of high-capacity digital platforms turned Video On Demand (VOD) into a hot topic for service providers deploying a HFC network. VOD provides a choice of several program titles (e.g. movies), which the subscriber can control to give true VCR functionality. The subscriber is able to pause, rewind, fast forward, play or halt the service to resume later on where they left off.

VOD Applications

VOD supports different applications:

- Movies on demand (MOD)
  This is the most common application of VOD. The subscriber has a list of movies to select from whenever he or she wishes. Once bought, the movie is available to the subscriber for viewing with VCR-like controls within 24 hours.
- Subscription based movies (SVOD)
  SVOD allows subscribers to watch movies from a package at any time for a fixed monthly fee. A typical example is a children's programming package that allows children to select and view cartoons.
- After-broadcast programming on demand (ABP)
  In this application the VOD server is used for real time recording of broadcast programs which are available for viewing on demand after their scheduled broadcast time.
- News or weather on demand
  With this service, the viewer can watch previously broadcast news or weather.

Implementing a VOD System

Before making an investment for a VOD system, you should understand today's VOD components and existing technologies. With this knowledge you can start to compare and run test trials. The final choice should be the most cost-effective solution that best meets the needs of your subscribers.

A VOD system consists of four major components:

- VOD server
- Management tools
- Network transport system
- Digital set-top box

Continued on next page

VOD Servers

Video servers are powerful servers that are able to playout huge amounts of video data requests at the same time. They share a single copy of content among subscribers using the data stripping method. Data stripping splits the data into several blocks that are written to separate hard disks. This method increases the output while several parts of the movie are simultaneously read from the disks without causing excessive delay.

Some key performance parameters of VOD servers are:

- Storage capacity
  This specification determines the number of movie titles that can be stored on the video server. Video servers generally configure the hard drives in RAID arrays. The capacity of hard drives is continuously growing and doubles about every 12 months.
- Delivery capacity
  The delivery capacity is the rate at which the video server can play out the video streams.

Management Tools

A System Resource Manager manages the system resources in terms of storage and communication bandwidth. In many cases, subscribers compete for the same popular system resources (popular movies) at the same time. The System Resource Manager must apply an efficient scheme that ensures fairness of allocation.

The Billing Manager communicates transactions to a billing system for the purpose of charging subscribers for the use of VOD services.

Network Transport Systems

There are different options to transport VOD services to your subscriber. The final choice depends on the available distribution network infrastructure, delivery cost per video stream and scalability of the network transport system.

Some examples are:

- SONET/SDH TS transport (e.g. iLynx)
- MPEG-2 over ATM over SONET/SDH
- MPEG-2 over UDP/IP over Gigabit Ethernet over SONET/SDH (e.g. Prisma GbE)

A Centralized VOD System

General

This section shows a VOD system with the video server equipment centralized in the main headend. A Prisma GbE IP backbone and HFC network transport the digital video streams to the subscriber.

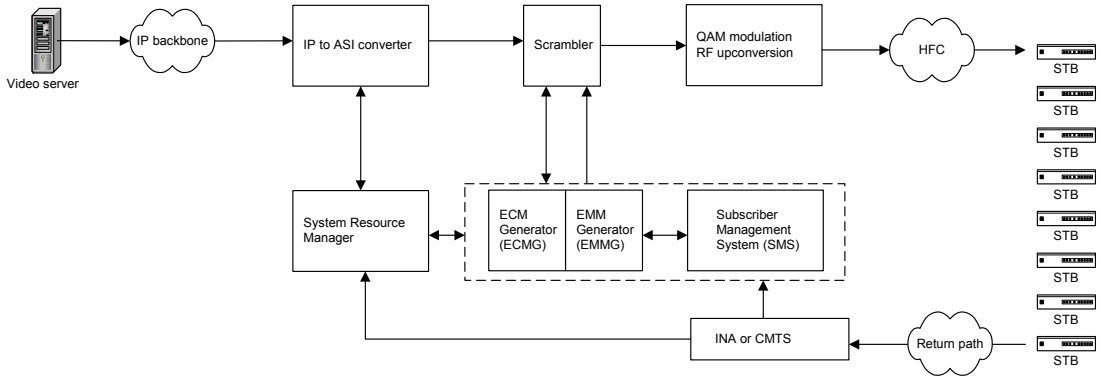
Server Location

There are two common used VOD architectures: the centralized and distributed architecture. The centralized architecture has all video servers located in the main headend while the distributed architecture has video servers in each hub.

Both architectures have pros and cons but the centralized architecture seems a more cost-effective solution for future deployment and system capacity upgrades. To date, the system cost is dominated by the network cost but this cost will continue to fall because of more effective use of optical fiber (DWDM), falling prices of high-capacity technologies such as Gigabit Ethernet, and the development of higher-level SDH/SONET standards. Operational and server costs, which are higher for distributed architectures, will become more important and start to dominate.

Block Diagram

The following illustration shows a centralized VOD system.



Example: Some examples are the Prisma GbE IP backbone, Continuum DVP DQA equipment, Continuum DVP XDQA equipment, Explorer 4000DVB STB.

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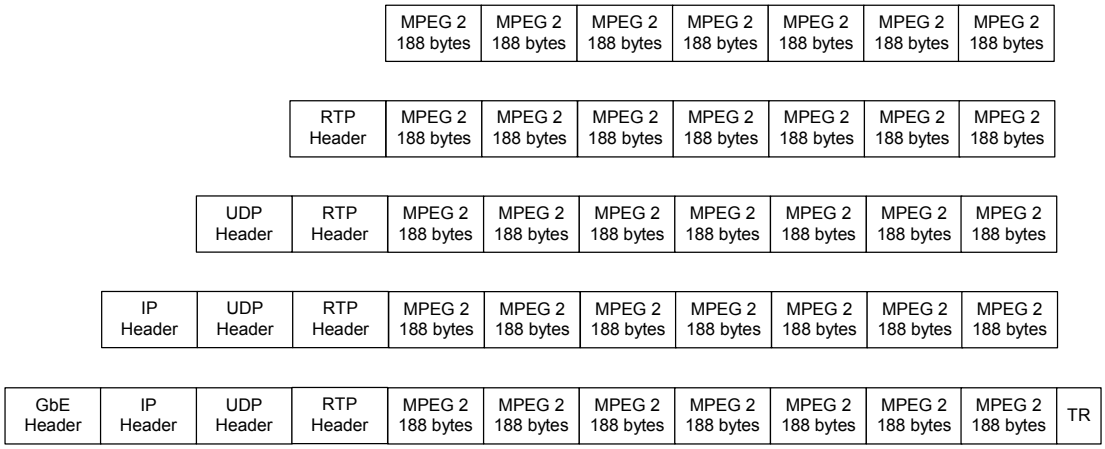
MPEG-2 Video Over IP

The IP technology is used to forward MPEG-2 compressed video streams over a network.

The mapping of MPEG-2 compressed video over IP has recently been standardized in IETF's RFC-2250. This RFC describes how to map an integer amount of MPEG-2 packets to an RTP packet.



In practice, a more simple mapping method is used instead of the one described by RFC-2250. The MPEG-2 packets are directly mapped on UDP.

The stream of MPEG-2 packets is split in groups of an integer number of packets and mapped in the contents field of the UDP frame. The UDP header contains a source and destination port address. VOD applications use the destination UDP port to identify the movie. The UDP frame is mapped in the contents field of an IP frame. The IP header contains the source and destination address, which enables routers and switches to direct the streams to the correct destination.

The Real Time Protocol (RTP) is a generic standard for the transmission of real-time services over IP-based systems.

The User Datagram Protocol (UDP) is commonly used in the IP world to send messages from a source application to a destination application. UDP does not have error correction mechanisms. You can use it for uni-directional messaging such as for real-time transport applications.

Appendix C
The Continuum DVP Dense QAM Array MIB

Viewing the Continuum DVP Dense QAM Array MIB

To view the Continuum DVP Dense QAM Array MIB

In order to build your own GUI, you can make a copy of the Continuum DVP Dense QAM Array MIB, used in the Continuum DVP XDQA, to the hard disk of your PC using the File Transfer Protocol (FTP). The following steps explain how to copy the MIB file.

1. Open a **Command Prompt.**
   - Windows NT, 95, 98: point to **Start**, **Programs**, and **Command Prompt**.
   - Windows 2000: point to **Start, Programs**, **Accessories**, and **Command Prompt**.

   Result: The **Command Prompt** dialog is displayed.

2. Change the drive and directory to which you want to copy the MIB file using **Dos** commands.

3. **Type** "FTP" followed by the IP address of the Continuum DVP eXtra Dense QAM Array system at the command prompt.

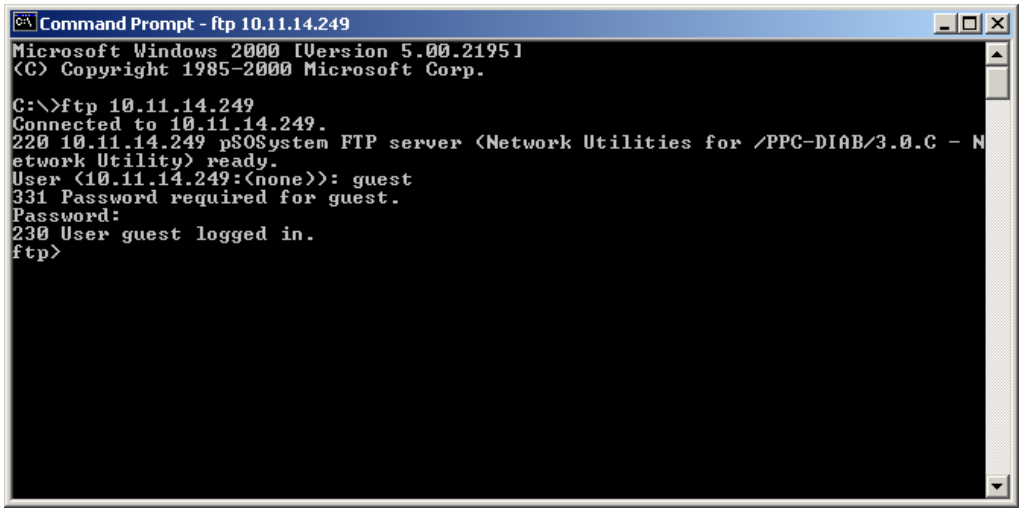
   Result: The system asks a user.

4. Enter "guest" next to the **User <*>:** prompt.

   Result: The system asks the user password.

5. Enter "guest" next to the **Password:** prompt.

   Result: The **FTP>** prompt is displayed.



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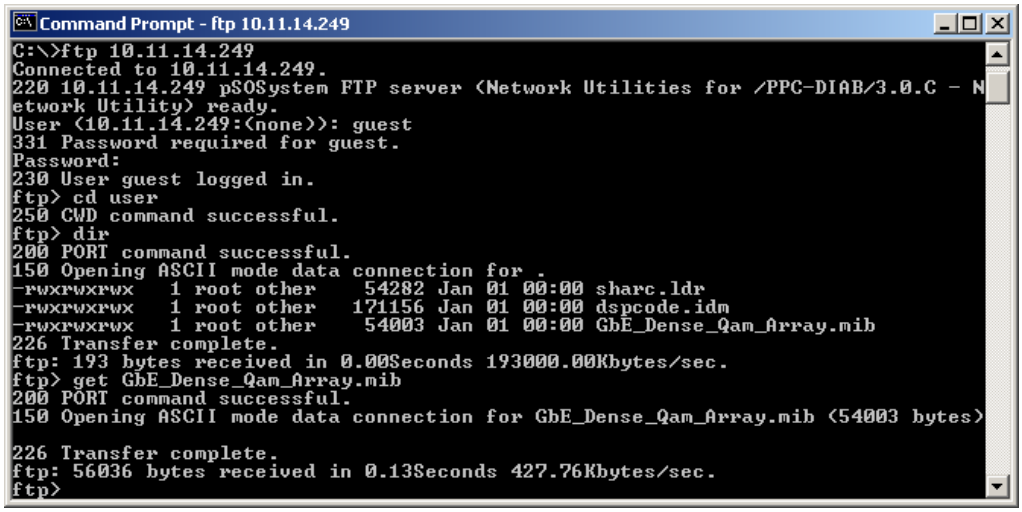
6. Enter case-sensitive "CD user" at the **FTP>** prompt.
7. Enter case-sensitive "get GbE_Dense_Qam_Array.mib" at the **FTP>** prompt.

   Result: The MIB file is copied to the hard disk of your PC.



8. Enter "Bye" at the **FTP>** prompt to leave FTP.
9. Enter "exit" at the command prompt to close the **Command Prompt.**

You can view the MIB file using a text editor.

Glossary

Term, Acronym, Abbreviation	Meaning
ABP	After-Broadcast Programming
AC	Alternating Current
ASI	Asynchronous Serial Interface
ATM	Asynchronous Transfer Mode
AWG	American Wire Gauge
BER	Bit Error Rate
BNC	Bayonet Connector
CSA	Canadian Standards Association
CWDM	Coarse Wave Division Multiplex
DC	Direct Current
DQA	Dense QAM Array
DSP	Digital Signal Processor
DVB	Digital Video Broadcast
DVP	Digital Video Platform
DWDM	Dense Wavelength Division Multiplexing
EIA	Electronics Industry Association
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
FEC	Forward Error Correction
FTP	File Transfer Protocol
GbE	Gigabit Ethernet
GUI	Graphical User Interface
HFC	Hybrid Fibre Coax

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HTML	HyperText Mark-up Language
HTTP	Hyper Text Transfer Protocol
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet Protocol
ISO	International Standards Organisation
ITU	International Telecommunications Union
LED	Light Emitting Diode
MAC	Medium Access Control
MDI	Medium Dependent Interface
MDIX	Medium Dependent Interface, Crossover
MER	Maximum Error Rate
MIB	Management Information Base
MOD	Movies On Demand
MPEG	Moving Pictures Experts Group
PAT	Program Association Table
PC	Personal Computer
PCB	Printed Circuit Board
PMT	Program Map Table
PSI	Program Specific Information
PSU	Power Supply Unit
QAM	Quadrature Amplitude Modulation
RAID	Redundant Array of Inexpensive Disk
RAN	Return Authorization Number
RF	Radio Frequency

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RFC	Request For Comments
RMA	Repair Material Authorization
RMS	Root Mean Square
RTP	Real Time Protocol
RU	Rack Unit
SDH	Synchronous Digital Hierarchy
SELV	Safety Extra Low Voltage
SFP	Small Form-factor Pluggable
SMPS	Switching Mode Power Supply
SNMP	Simple Network Management Protocol
SONET	Synchronous Optical Network
SPTS	Single Program Transport Stream
STB	Set-Top Box
SVOD	Subscription Video On Demand
TS	Transport Stream
UDP	User Datagram Protocol
VCR	Video Cassette Recorder
VOD	Video On Demand
XDQA	EXtra Dense QAM Array
WDM	Wavelength Division Multiplexing

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