
Cobalt Digital Inc.

8321

openGear® 2RU Frame and
Power Supply (PS-8300)

User Manual



8321-OM
Version: 1.1

open**Gear**

OpenGear® 2RU Frame and Power Supply (PS-8300) User Manual

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Important Regulatory and Safety Notices

Before using this product and any associated equipment, refer to the “Important Safety Instructions” listed below so as to avoid personal injury and to prevent product damage.

Products may require specific equipment, and /or installation procedures be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these Specific requirements.

Symbol Meanings



This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.



Warning

The symbol with the word “**Warning**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.



Caution

The symbol with the word “**Caution**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



Notice

The symbol with the word “**Notice**” within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.



**Warning
Hazardous
Voltages**

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product enclosure that may be of sufficient magnitude to constitute a risk of shock to persons.



**ESD
Susceptibility**

This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

Important Safety Instructions

Read these instructions.

Keep these instructions.

Heed all warnings.

Follow all instructions.



Warning

The safe operation of this product requires that a protective earth connection be provided. A grounding conductor in the equipment's supply cord provides this protective earth. To reduce the risk of electrical shock to the operator and service personnel, this ground conductor must be connected to an earthed ground.

Use only power cords specified for this product and certified for the country of use. Refer to the Product Power Cord Requirement Section that follows.

Do not defeat the safety purpose of the grounding-type plug. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit in to your outlet, consult an electrician for replacement of the obsolete outlet.

Protect the power cord from being walked on or pinching particularly at plugs, convenience receptacles, and point where they exit from the apparatus.



Warning

Indoor Use: "WARNING – TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPERATUS TO RAIN OR MOISTURE"

Do not use this apparatus near water.

Do not block any ventilation openings. Install in accordance with manufacturer's instructions.

Do not install near heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

Only use attachments/accessories specified by the manufacturer.

Unplug this apparatus during lightning storms or when unused for long periods of time.

Clean only with a dry cloth.



Warning

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



Warning

Certain parts of this equipment still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing.



Caution

To reduce the risk of fire, replacement fuses must be the same type and rating.



Caution

Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after servicing.



Warning

This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained within the product's power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair.

Product Power Cord Requirements



North American Line Voltages 100 - 120 Volts

This product is supplied with certified 10A/125V SVT type supply cords.

Conductors are color coded white (neutral), black (line) and green or green/yellow (ground).

Operation of this equipment at line voltages exceeding 130V requires that alternative supply cords with appropriate voltage and current ratings be used



International Line Voltages 200 - 240 Volts

This product has been designed for use with certified IEC 320- C13 10A/250V - **H03 VV-F3G 1.10mm²** type line cord.

International product orders are supplied with a certified 10A/250V line cords, utilizing a molded 3-pin IEC 320-C13 type connector at one end and stripped conductors on the other. One line cord is provided. Conductors are CEE color coded; blue (neutral), brown (line), and green/yellow (ground).

Installation by a qualified Electrician, of an appropriately approved A/C wall plug certified for the country of use, is required.

Alternatively, other IEC 320 C-13 type power cords may be used, provided that they meet the necessary safety certification requirements for the country in which they are to be used. Refer to the correctly specified line cord above.

EMC Notices

US FCC Part 15

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



Changes or modifications to this equipment not expressly approved by Cobalt Digital Inc. could void the user's authority to operate this equipment.

CANADA

This Class "A" digital apparatus complies with Canadian ICES-003.

EUROPE

This equipment is in compliance with the essential requirements and other relevant provisions of **CE Directive 93/68/EEC**.

INTERNATIONAL

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002** and found to comply with the limits for a Class A Digital device.



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

Maintenance/User Serviceable Parts

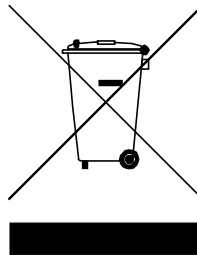
Routine maintenance to this Cobalt Digital Inc. product is not required. This product contains no user serviceable parts. If the frame does not appear to be working properly, please contact Technical Support using the numbers listed under the “Contact Us” section on the last page of this manual. All Cobalt Digital Inc. products are covered by a generous 5-year warranty and will be repaired without charge for materials or labor within this period. See the “Warranty and Repair Policy” section in this manual for details.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

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

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



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Cobalt Digital Inc. for more information on the environmental performances of our products.

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Introduction

In This Chapter

This chapter contains the following sections:

- A Word of Thanks
- Overview
- Features
- Documentation Terms

A Word of Thanks

Congratulations on choosing the **openGear® 2RU Frame and Power Supply (PS-8300)**. The Cobalt Digital Inc. **openGear®** line includes video decoders and encoders, audio embedders and de-embedders, distribution amplifiers, format converters, and much more. Cobalt Digital Inc. **openGear®** modular conversion gear will meet your signal conversion needs now, and well into the future.

Should you have questions or concerns pertaining to the installation or operation of your frame, please contact Cobalt Digital Inc. (Contact information is supplied on the back cover of this manual.) Our technical staff is always available for consultation, training, or service.

Overview

The 8321 is a 2RU modular frame, designed to accommodate up to 20 cards of the **openGear®** product family.

Modular Frame Architecture

For applications with BNC connectors or where other types of I/O connections are necessary (such as twisted-pair audio or fiber interfaces), the frame also supports slot-dependent rear modules. Rear modules can be ordered with cards, and are easy and quick to install.

Note: Refer to card product manuals or catalog/web pages for rear modules available for the cards being installed.

Robust Power Supplies

The 8321 frame can accommodate two front-loaded PS-8300 power supplies. Although a single power supply can fully power a loaded frame, the addition of a second (optional) power supply gives the frame full power redundancy. Each power supply is fed by a separate power cord, which is held in position to guard against accidental power loss.

Each power supply contains an independent cooling fan, status LED, and a front-mounted power switch.

Each frame comes standard with one PS-8300 power supply.

Optional Cooling Fans

The frame has been designed with an advanced cooling architecture to increase ventilation.

For applications where the total card load is less than 40 Watt, the 8321 can be used without cooling fans. Frames should be mounted with 1RU empty space between frames.

For applications where frames are mounted directly above or below other equipment, or where the total card power load is greater than 40 Watt, an optional cooling fan kit must be added. These front-door mounted fans provide forced air cooling for all cards, and additional cooling for the power supplies. An intelligent fan controller adjusts fan speed with changes in frame power loading. Particular attention has been paid to frame acoustics in order to keep fan noise to a minimum.

Additional Frame Accessories

To help reduce mechanical stress due to cable weight, a rear frame support bracket (FSB-8321) is also available.

Important

For long-term reliability and increased product lifespan, total dissipation of all cards installed in a 2RU frame must not exceed 40 Watt total without the use of the Cooling Fan Module. Refer to the section, “**Ventilation and Cooling**,” in this manual, for details.

Features

- 2RU Frame houses up to 20 cards
- Can house any mix of analog, digital, video and audio cards in the same frame
- Heavy-duty hinged front panel lowers to allow easy card insertion
- Durable powder-coat paint finish
- Aluminum construction reduces overall weight
- Two independent looping Reference Inputs feed all card slots
- SMPTE alarm interface for simple monitoring
- Ethernet port for optional networked control
- Robust 150 Watt Power Supply with integral cooling fan (120 Watts available for user slots)
- Optional redundant power supply is hot-swappable for 24/7 operation
- Power switch is accessible from front of the rack frame
- Power supplies are replaceable from the front of the frame without requiring rear-frame access
- Separate power cords to each supply for power feed redundancy
- PowerLock cord retainer mechanism guards against accidental power loss
- Optional Cooling Fan Module for increased ventilation and enhanced reliability
- Fan Fail and Error Indicator LEDs on front of the frame (available with optional Cooling Fan Module)
- Optional Ethernet based Frame Controller for remote setup, monitoring, and control
- 5-year transferable warranty

Documentation Terms

The following terms are used throughout this guide:

- **“Frame”** refers to the frames that house the 8200 series cards.
- All references to **8321** also include the **8321-C** version with the cooling fan option. Refer to the section **“Cooling Features”** for details.
- **“Operator”** and **“User”** both refer to the person who uses the frame.
- **“System”** and **“Video system”** refers to the mix of interconnected digital and analog production and terminal equipment in which the frame operates.

Installation and Setup

In This Chapter

This chapter contains the following sections:

- Static Discharge
- Unpacking
- Installing the Frame
- Power Supply PS-8300 and Power Cable
- Fault Reporting
- Improving Performance
- Ventilation and Cooling
- Cable Connections
- Rear I/O Modules

Static Discharge

Whenever handling the frame and other related equipment, please observe all static discharge precautions as described in the following note:



**ESD
Susceptibility**

Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always exercise proper grounding precautions when working on circuit boards and related equipment.

Unpacking

Unpack each frame you received from the shipping container, and check the contents against the packing list to ensure that all items are included. If any items are missing or damaged, contact your sales representative directly.

Installing the Frame

The frame frame mounts in the rack frame by means of four rack screws fastened through the front mounting flanges. This should normally be sufficient to carry the load, including the weight of accompanying cables. However, in certain applications such as mobile truck installations, it may be desirable to also support the rear of the frame. The optional FSB-8321 Rear Support Bars and Brackets are specifically engineered to compensate for extra load stress. Refer to the section “**Installing the Rear Support Bars and Brackets**” of this manual for installation instructions. The Ordering Information section at the end of this manual provides contact information for acquiring this equipment.

Note the following installation requirements:

- **Rack Units:** 2 RU
- **Height:** 3.5 inches (8.89 cm)
- **Depth:** 15.625 inches (40 cm)
- **Rack:** standard 19 inch wide equipment rack

Install the frame for maximum stability during operation and in such a way as to allow adequate ventilation. Ensure that adequate space exists behind the frame and on the right side of the frame for airflow exhaust. The location of the frame should be accessible, dry, and dust free.

Power Supply PS-8300 and Power Cable

The frame comes standard with one PS-8300 power supply, with a second optional power supply available for redundancy. For redundancy, and in applications where the equipment is used in a critical signal path, we recommend that two power supplies be used in the frame. One A/C power cable has been provided with each power supply ordered.

For further redundancy, each power cord should be connected to a separate power source for protection against failure of the A/C power circuit. Reliability will also be improved when using redundant supplies as each supply shares the load. In the event of one power supply failure, card power is seamlessly transferred to the other redundant power supply. Although the power supply is "hot-swappable," turning the power supply off before inserting or removing it from the frame will increase the lifespan of the connectors.

Installing the Frame Power Supply

The power supply plugs into the right-hand section of the chassis. The universal power supply supports all worldwide AC power voltages, and no power adjustments are required. The secondary (redundant) power supply, if ordered, is already installed in the frame.

Use the following procedure to install the power supply:



Warning



**Warning
Hazardous
Voltages**

1. Carefully unpack the power supply from its box, and retain all packing material for future use, if required.
2. Align the power supply into an unused power slot on the right side of the frame.
3. Push the power supply in firmly to ensure a tight connection at the rear of the frame.

Note

In case of a power supply failure, contact your **openGear®** dealer.

The PS-8300 is a power factor corrected supply, capable of working with all world AC standards (100-240V). The supply has an indicator LED on the front, and an error detection circuit that will indicate the conditions described in Table 1.

Table 1. Status LED Descriptions

LED	Color	Display and Description
Fault	Red	When lit, an alarm condition is occurring on a card. (CFM-8321 option)
Fan Fail	Red	When lit, a fan on the frame door or PS-8300 is stalled. (CFM-8321 option)
Power Supply	Green/ Red	When lit green, the PS-8300 is operating normally. When flashing red: <ul style="list-style-type: none">• There is an output over or under voltage condition on the PS-8300• There is no A/C; assumed that the second supply is operating normally

Fault Reporting

If the optional CFM-8321 module is installed, the error conditions listed in Table 1 above will trigger the SMPTE 269M fault reporting circuit, and the signal will be sent to the Fault BNC on the back of the frame. Refer to the section “**Fault Report Connector**” in this chapter and “**SMPTE 269M Fault Reporting Option**” for further details.

Improving Performance

To improve performance and reliability, the PS-8300 has an on-board fan. Under high load conditions (>40 Watt), the optional CFM-8321 Cooling Fan Module must be added for increased ventilation.

Ventilation and Cooling

This frame has been specially engineered to minimize internal heat buildup and thus improve card reliability. However, for long-term reliability and increased product life of the frame (without the Cooling Fan Module installed), it is recommended that the total power dissipation of all cards installed in the frame should not exceed 40 Watt, and to leave an empty 1RU panel space above and below the frame for improved heat dissipation. For information on the power dissipation of cards, please refer to specific card information in the Product Catalog or visit our website.

For applications using less than 40 Watt in a non-ventilated frame, but where the individual card power consumption is greater than 8 Watt, the cards should be evenly distributed in the frame. This will prevent the creation of concentrated heat, or unbalanced heat-rise areas, in the frame.

For applications that require greater heat dissipation, or where the card power consumption is greater than 40 Watt, it is necessary to use the 8321-C frame (with Cooling Fan Module installed), or to install the CFM-8321 Cooling Fan Module field upgrade option. When the Cooling Fan Module is installed, the frame and PS-8300 can supply up to 120 Watt of card power. Under these ventilated conditions, there is **no requirement for extra spacing** between the frames. The 8321-C (or 8321 with CFM-8321 option) can be stacked one on top of the other, a feature that is highly desirable in densely crowded rack frame environments.



Notice

For reliable performance, it is recommended that the frame door not be opened for longer than 5 minutes when using the Cooling Fan Module option on frames loaded with more than 40 Watt.

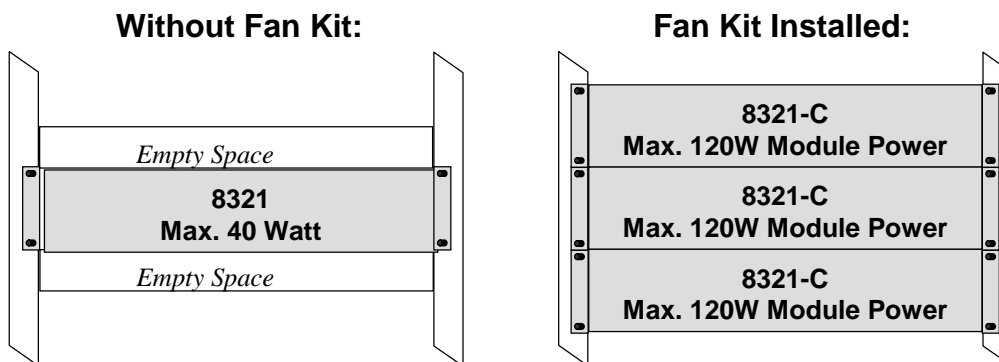


Figure 1. Cooling Fan Module Frame Stacking Options

Cable Connections

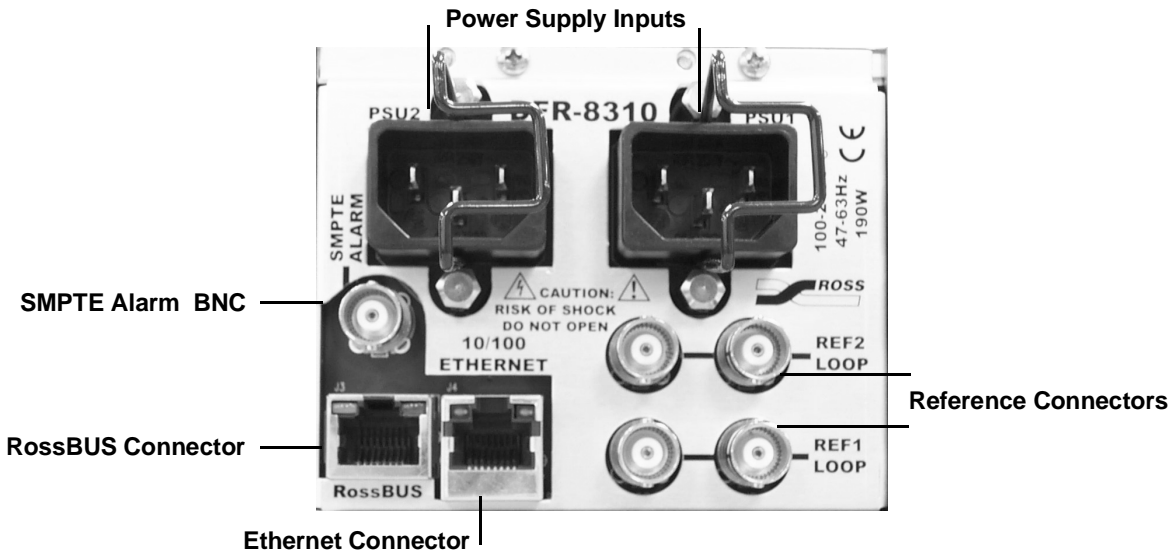


Figure 2. Frame Cable Connectors

Power Cable Connection

Use the following procedure to connect the power cable:

1. Connect the supplied power cable's three prong male connector to an AC outlet.
2. Connect the cable's female IEC connector to the frame socket marked **PSU 1**.
3. If the **Redundant Power Supply** option is installed, repeat step 1 and 2, plugging the second IEC connector into **PSU 2**.
4. Each AC connector includes a Powerlock, which is designed to retain the power cable connector. Clip the Powerlock over the shoulder of the inserted AC cable end.
- 5.



Note — In some countries, it may be necessary to supply the correct mains supply cord. Use only an approved IEC 320 C-13 type A/C line cord rated for a minimum 10A at 250V and certified for the country of use.

Further, the safe operation of this product requires that a protective earth connection be provided. This protective earth is provided by the grounding conductor in the equipment's supply cord. To reduce the risk of electrical shock to operator and service personnel, this ground conductor must be connected to an earthed ground.

Rear I/O Modules

Depending on the frame model you purchased, there may be variations in the BNC rear I/O modules connected to it. If the frame was ordered with cards requiring custom rear I/O modules, the appropriate modules will be installed at the factory or included with the card modules.

Note: Refer to card product manuals or catalog/web pages for rear modules available for the cards being installed.



Figure 4. BNC/Twisted-Pair Rear I/O Module

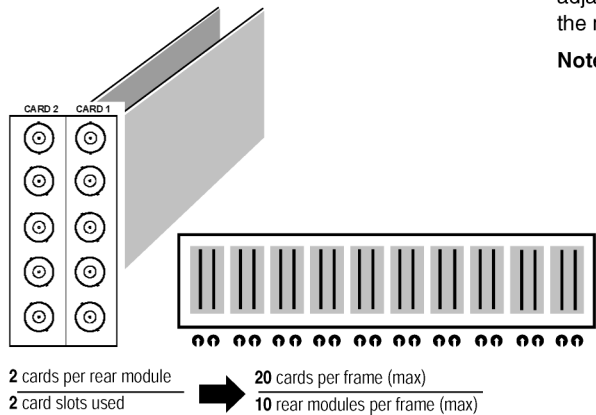


Figure 5. 10 BNC Rear I/O Module



Figure 6. Blank Rear I/O Module

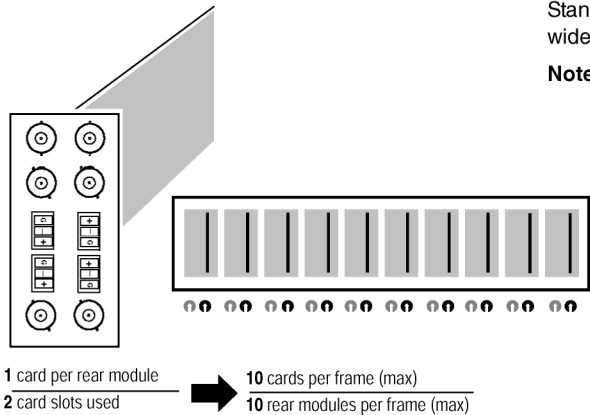
Split Rear Module



Split Rear Module occupies 2 card slots, but also accommodates 2 card in adjacent slots. In this manner, for a frame fitted entirely with split rear modules, the maximum 20-card frame capacity can be achieved.

- Notes:**
- Split rear modules are available only for the following Cobalt cards: 9001, 9002, 9011, 9015, 9021, 9071, 9081, 9082, 9083, 9084, 9085, 9251, 9305, 9321, 9322, 9323, 9361, 9362, 9381, 9821.
 - Split rear modules accommodate BNC-terminated signals. Split rear module will typically not accommodate the maximum number of signals a card can carry and should be considered. (For example, when an RM20-9001-A/S split rear module is used with the 9001 distribution amplifier, 4 outputs per card are available instead of the card maximum of 9 outputs when using a standard rear module.)
 - In all cases, maximum frame power budget of 120 Watts for user slot total must be considered when planning frame build-out.

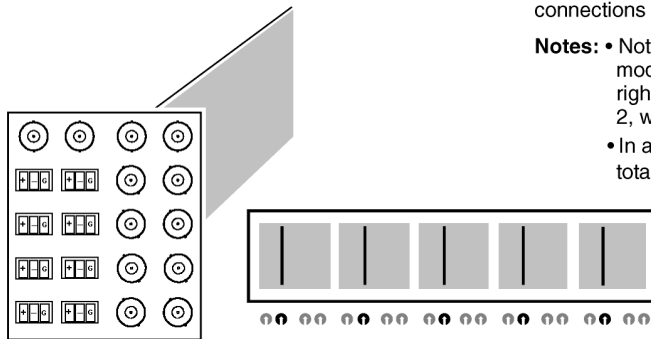
Standard-Width Rear Module



Standard-Width Rear Module occupies 2 card slots and can accommodate BNC and wired connections such as balanced audio and GPIO connections. Standard-width rear modules are available for all Cobalt cards, and offer a wide variety of signals accommodation choices in the smallest space.

- Notes:**
- Not all slots can be fitted with cards when using a standard-width rear module (for example, when a standard-width module is fitted in the right-most frame position (viewed from rear), first available slot is slot 2, with slot 1 not being available).
 - In all cases, maximum frame power budget of 120 Watts for user slot total must be considered when planning frame build-out.

Double-Width Rear Module



1 card per rear module
4 card slots used

➔ 5 cards per frame (max)
5 rear modules per frame (max)

Double-Width Rear Module occupies 4 card slots and can accommodate a very high degree of signal count and types, including multiple BNC and wired connections such as balanced audio and GPIO connections.

Notes:

- Not all slots can be fitted with cards when using a double-width rear module (for example, when a double-width module is fitted in the right-most frame position (viewed from rear), first available slot is slot 2, with slot 1 not being available).
- In all cases, maximum frame power budget of 120 Watts for user slot total must be considered when planning frame build-out.

Rear I/O Module Installation

If you received a custom rear I/O module for your **openGear®** card, you will need to install the I/O module in your frame before you can connect cables.

Use the following procedure to install rear modules in the frame:

1. Ensure that the frame is properly installed according to instructions in the section “**Installing the Frame**” of this manual.
2. On the rear of the frame, locate the card frame slot.
3. As shown in Figure 7, seat the bottom of the DFR-RM-82xx in the seating slot at the base of the frame’s back plane.

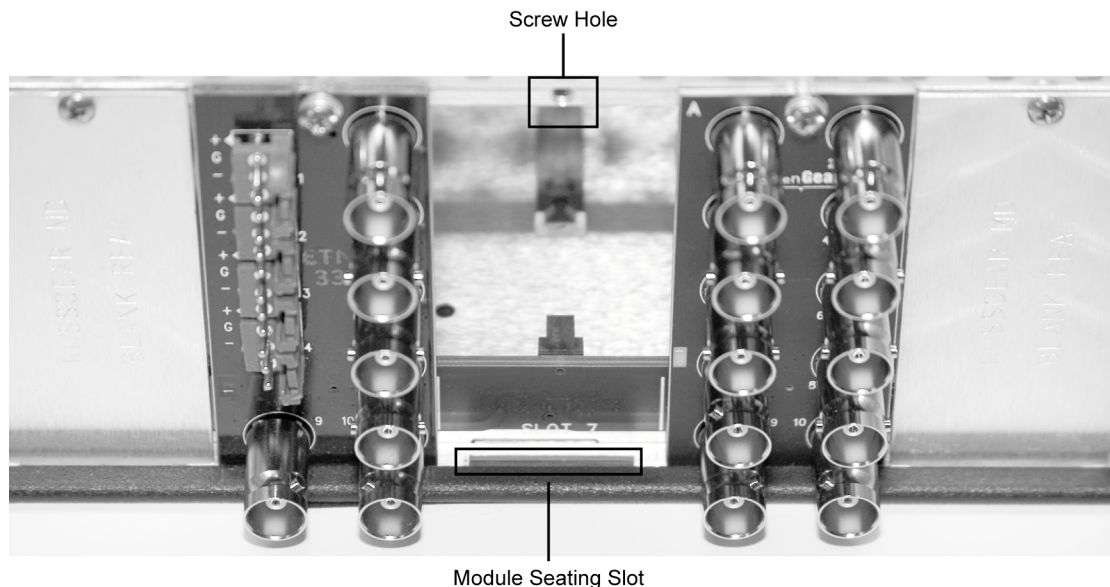


Figure 7. Rear Module Installation

4. Align the top screw of the DFR-RM-82xx with the screw hole on the top edge of the backplane.
5. Using a Phillips driver and the supplied screw, fasten the DFR-RM-82xx panel to the backplane. Do not over tighten.
6. Ensure proper frame cooling and ventilation by having all rear frame slots covered with rear I/O modules or blank metal plates. If you need blanks, see the chapter, “**Ordering Information**” and contact your sales representative.

SMPTE Alarm Connector

The SMPTE Alarm BNC connector may be wired to an external alarm system for reporting alarms in SMPTE 269M format. The circuit can drive a 20mA alarm load. For more details on this type of system, refer to the document *ANSI/SMPTE 269M - 1999*, available from SMPTE. Refer also to page 19-20, “**SMPTE Fault Reporting Option**,” for further details.

openBUS Connector

This RJ45 connector is used to exchange information data from cards installed in the frame to an external monitoring/control system. Only cards having the openBUS interface will be able to be monitored and controlled this way. This is reserved for future use with **openGear®** products.



Notice

Connect only openBUS compatible devices and cables on this connector otherwise damage can occur to the frame or to the incompatible device.

Ethernet Connector

This RJ45 connector is used to connect the optional MFC-8320-N frame controller card to an external Ethernet network. This standard 10/100Base-TX RJ45 Ethernet connector is used to exchange information with an external monitoring/control system over an Ethernet network. The optional MFC-8320-N is required to bridge the external Ethernet network to the local openBUS for monitoring and control of cards installed in the 8320 frame. Only cards having the openBUS interface will be able to be monitored and controlled this way.

Note

Use up to 100 meters of CAT5 Fast Ethernet cable or better to connect the frame to an external Ethernet hub or switch.

The Ethernet port does not have AutoMDIX support and its RJ45 connector is wired as a Network Interface Card (NIC).

The Ethernet port does not provide Power-over-Ethernet (PoE).

Dual Reference Connectors

Two sets of looping BNC inputs are provided to accept two independent reference signals:

- Analog black
- Tri-level sync
- AES/DARS reference

This feature distributes one or two reference signals to all cards in the frame. Cards which need an external reference use this master reference signal in place of taking the signal from one of the card BNCs. This provides for ease of installation and reduction in reference cabling requirements. If this signal is required, it will be mentioned in the Installation section of the particular card's Owner's Manual.

If only one reference type is required for the frame, connect it to the REF-1 BNC. If the reference is not being looped to another frame or device, ensure that the Loop Ref BNC is terminated.

SMPTE 269M Fault Reporting Option

In This Chapter

This chapter contains the following sections:

- Overview
- Frame Connections
- Details

Overview

The SMPTE 269M Fault Reporting system, also known as a SMPTE “alarm,” provides an indication if one or more frame cards encounter a fault or an abnormal condition. This option is available when a Network Controller Card is installed in the Frame Controller Slot. The MFC-8320 is included if the frame has cooling fans in the front door. The individual card(s) can report fault conditions to the Network Controller Card, which in turn outputs to a BNC connector on the 8321 series frame. When the frame connection is interfaced with a customer-designed system of LEDs or audible alarms, faults can be traced to a specific frame when a card fault occurs within that frame.

Frame Connections

The SMPTE 269M Fault Reporting connection on 8321 series frames is provided by the **FAULT** BNC connector, for interfacing with a customer-designed alarm system.

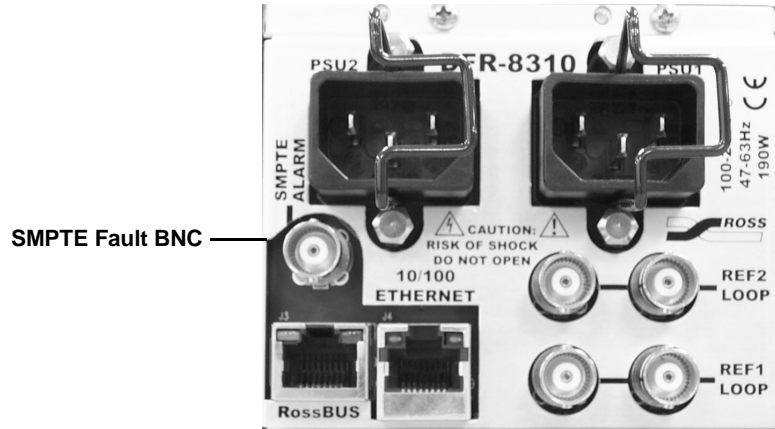


Figure 8. SMPTE 269M Alarm Reporting Frame Connections

Details

The fault report contacts are closed when the card detects an internal failure or a power loss condition. The fault report contacts are closed for about 2 milliseconds every 16 ms to report any error for which SMPTE fault reporting has been enabled.

Some internal failures may include:

- Hardware failure of any card or power supply.
- Loss of AC power to any power supply
- “Soft” errors from any card setup to detect and report such errors

For additional information on alarm system design, refer to the SMPTE document *ANSI/SMPTE 269M - 1999*.

Important Notes:

The power dissipation of each product installed in this frame is indicated in the Specifications section of the documentation provided with each module. For long-term reliability and increased product life, it is recommended that the total dissipation of all modules installed in a 8321 frame should not exceed 40 Watt total without the CFM-8321, and 120 Watt total with the CFM-8321. In addition, frames without the CFM-8321 should be provided with one rack unit of empty space above and below each frame for ventilation.

Please see the Ventilation and Cooling section in this product's Owner's Manual for further information and options for higher load applications requiring greater heat dissipation.

Frame Features

In This Chapter

This chapter contains the following sections:

- Cooling Features
 - Installing the Cooling Fan Module
 - Cooling Fan Functions and User Controls
 - Installing the Controller Card
 - Functions of the Controller Card
 - Controls and LEDs of the Controller Card
- Remote Control Networking Features
 - Installing the Network Controller Card
 - Ethernet Setup
 - Functions of the Network Controller Card
 - Controls and LEDs of the Network Controller Card
- DashBoard and DashBoard Lite Control System Software
- SNMP Monitoring and Control
- Rear Support Bars and Brackets
 - Installing the Rear Support Bars and Brackets

Cooling Features

The standard 8321 frame can be also be ordered as the 8321-C version, with the Cooling Fan Module installed as original equipment from the factory. However, for customers wishing to increase the ventilation on their standard 8321 frames, the optional CFM-8321 Cooling Fan Module is available as a field upgrade kit.

The CFM-8321 module consists of a fan board, which installs in the frame door, and a controller card, which installs in a designated frame slot. The controller may be either an MFC-8320, which provides fan control and local alarm monitoring, or an MFC-8320-N, which provides fan control, alarm monitoring, and support for remote monitoring and control via Ethernet. Installation instructions are provided in this chapter for both types of controller cards.

Installing the Cooling Fan Module

This section includes instructions on installing the Fan Board component of the CFM-8321 module and an outline of the Functions and User Controls of the module. After you install the CFM-8321 module, you must install the MFC-8321 or the MFC-8321-N controller card.

Fan Board Installation Instructions

Use the following figure and procedure to install the Fan Board component of the CFM-8321:

1. Open the CFM-8321 package and remove the components. Verify that all necessary components are included.
 - Fan PCB 8321A-016
 - Fan Filter S985-006
 - 8 nuts 650-007
 - 8 washers 960-025
 - MFC-8321(-N) Frame Controller Card
2. Turn frame power off.
3. Open the frame door.
4. Carefully remove the door from the frame by unscrewing the two screws that attach the door to the extender arms.
5. Place the frame door inside up on a clean antistatic workspace.
6. Insert the Fan Filter with the panhandle over the smaller fan vents and the cut corner adjacent to the LED pipes already on the door. Gently push the filter down so the mounting bolts pass through cleanly.
7. Place a washer on each of the 8 mounting bolts.
8. Align the Fan PCB with the fans up so the LED pipes pass through their board holes.
9. Ensure the Alarm Mute button clears its door hole and that the Fault and Fan Fail LEDs clear their door holes while you slowly press the Fan PCB down onto the 8 mounting bolts. See Figure 11 for details on these item locations.
10. On the frame door, check that the Alarm Mute button pushes in and out without binding.

11. Tighten the 8 nuts until they just make contact with the rubber grommets on the 8321A-016 Fan PCB. Do not over tighten.
12. Reconnect the door to the frame extender arms with the two screws from step 4.

This completes the procedure to install the Fan Board component of the CFM-8321 module. Next you will learn about the CFM-8321 functions and user controls.

Cooling Fan Functions and User Controls

The CFM-8321 provides LED and Alarm switching controls to the front edge of the 8321 frame door. Refer to Table 4 for details on LED functions for the MFC-8320 controller card.

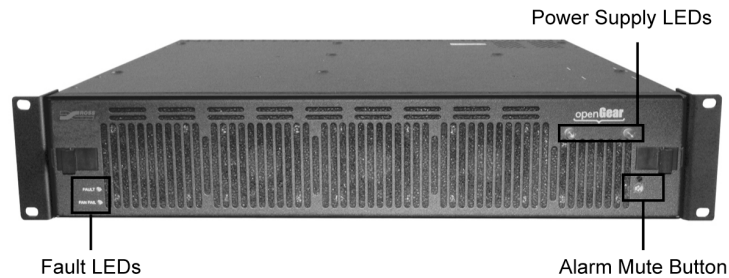


Figure 10. Frame Door Features

Next you will install an MFC-8320-N controller card. Refer to the appropriate section for installation instructions for your specific controller card.

Installing the Controller Card

Use the following procedure to install the MFC-8320 controller card component of the CFM-8320:



Figure 11. MFC-8320 Fan Controller Card and Unscrewed Retaining Screw

1. With the frame door open, unscrew the MFC-8320 Card Retaining Screw (Part No. 850-040) enough to eliminate any protrusion into the card guide slot on the right of

the screw. If necessary, remove any cards from the frame that would interfere with easy access and lines of sight.

2. Insert the MFC-8320 frame controller card, with the component side out as shown in Figure 11, into the card guides along the dividing wall between slot 20 and the PS-8300 section of the frame, ensuring the card does not touch the Card Retaining Screw.
3. Slide the card in the slot until firmly seated and so the Card Retaining Screw hole on the bottom front edge aligns with the mounted nut beside the bottom guide slot.
4. Tighten the Card Retaining Screw through the mounted nut and the MFC-8320 Card Retaining Screw hole, to ensure the card does not move from the slot.
5. Close the door, power up the frame, and check the operation of the fans. If the fans do not operate, verify that the MFC-8320 is seated properly in the frame backplane and is aligned to the Fan PCB when the door is closed.

This completes the installation of the MFC-8320 controller card for the CFM-8320 Cooling Fan Module. Next you will learn the general functions and controls available on the MFC-8320 controller card.

Functions of the Controller Card

The MFC-8320 controller card component of the CFM-8320 performs several functions:

- Monitors frame power usage and sets the fan speed accordingly (higher power consumption requires higher fan speed for adequate cooling). The fans always run at maximum speed for 5 seconds after the fan door is closed, then adjust to the appropriate level based on power consumption.
- Monitors the frame door and PS-8300(s) to ensure that fans in all units are operating correctly.
- Monitors the fan door and notifies the user if it is left open too long.
- Monitors the status of other cards in the frame via the internal bus.
- Generates alarms if any of the monitored functions develop errors.

Controls and LEDs for the Controller Card

This section provides information on the jumpers, buttons and LEDs for the MFC-8320 controller card.

The location of the LEDs and controls for fan, alarm, and communication activity are shown in the following figures.

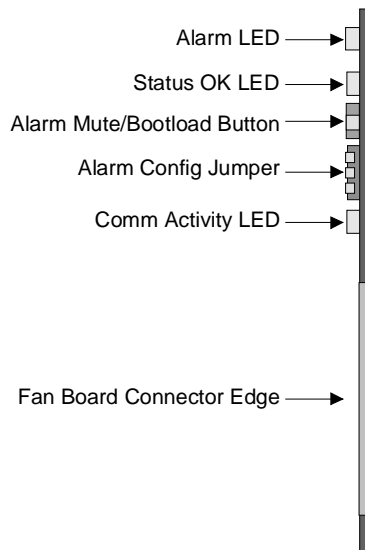


Figure 12. MFC-8320 Card Edge Controls

MFC-8320 Alarm Configuration Jumper

The Alarm Configuration Jumper enables or disables the audio alarm signal. The Alarm LED will still be lit if alarm conditions are occurring, but the audio will be off.

- Set to position 1-2 to enable the audio alarm
- Set to position 3-4 to disable the alarm

Alarm Mute Button

If the optional CFM-8320 Cooling Fan Module is installed, there is an Alarm Mute Button on the right side of the frame door front. If a card, that is in the frame, is reporting an error, pressing the Alarm Mute Button will mute the audio alarm until another fault condition occurs.

Remote Control Networking Features

This section includes instructions for installing the MFC-8320-N controller card for the CFM-8320 module.

Note: Refer to Cobalt® reference guide COMPASS™ Remote Control User Guide”

(PN 9000RCS-RM) for thorough information and step-by-step instructions for setting up network remote control of COMPASS™ cards using DashBoard™ and the Network Controller Card. This guide provides information for setting up remote control using MFC-8320-N Network Controller Cards.

Installing the Network Controller Card

Perform the physical installation of the MFC-8320-N controller card for the CFM-8320 using the steps provided in the section “**Installing the Controller Card**” of this manual. Once the controller card is installed, you can proceed to the section below to set up the Ethernet connection for your card.

Ethernet Setup

Refer to Cobalt® reference guide Remote Control User Guide (PN 9000RCS-RM) for step-by-step instructions for setting up network remote control of COMPASS™ cards using DashBoard™. Download a copy of this guide by clicking on the Support>Documents>Reference Guides link at www.cobaltdigital.com and then select DashBoard Remote Control Setup Guide as a download.

Functions of the Network Controller Card

The MFC-8320-N controller card component of the CFM-8320 performs several functions:

- Monitors frame power usage and sets the fan speed accordingly (higher power consumption requires higher fan speed for adequate cooling). The fans always run at maximum speed for 5 seconds after the fan door is closed, then adjust to the appropriate level based on power consumption.
- Monitors the frame door and PS-8300(s) to ensure that fans in all units are operating correctly.
- Monitors the fan door and notifies the user if it is left open too long.
- Monitors the status of other cards in the frame via the internal bus.
- Generates alarms if any of the monitored functions develop errors.
- Provides an Ethernet connection to allow remote monitoring and control of the frame.

Controls and LEDs for the Network Controller Card

This section provides information on the controls and LEDs for the MFC-8320-N controller card. These are similar to the controls and LEDs on the MFC-8320, with some additional LEDs and DIP switches. The location of the controls are shown in the following figures.

The LED indicators and controls for fan, alarm, and communication activity are shown in the following figure.

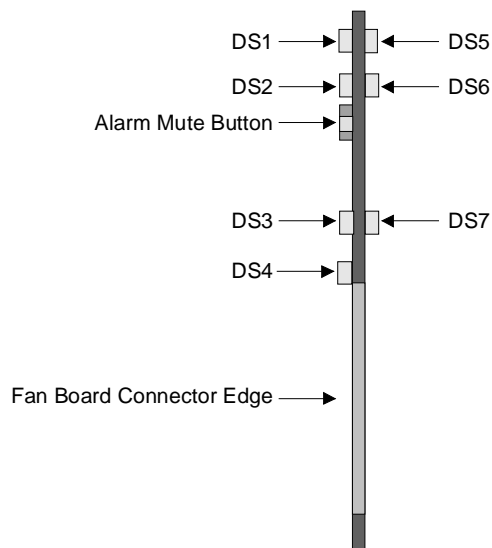


Figure 14. MFC-8320-N Card Edge Controls

DIP Switches on the MFC-8320-N

The following DIP Switches are located on the MFC-8320-N controller card.

DIP_1 Switch

DIP_1 switch disables the audio alarm signal as follows:

- **ON** — This setting disables the audio alarm.
- **OFF** — This setting enables the audio alarm.

DIP_2 to DIP_7 Switches

DIP_2 to DIP_7 switches are not used.

DIP_8 Switch

DIP_8 switch sets the default IP Address of the MFC-8320-N controller card as follows:

- **ON** — This setting enables the card to use the default IP Address of 192.168.1.1.
- **OFF** — This setting enables the card to use the IP Address configured by the user.

Buttons on the MFC-8320-N

The following buttons are located on the MFC-8320-N controller card.

Alarm Mute/Bootload Button

When a card in the frame is reporting an error, pressing the Alarm Mute Button will mute the audio alarm until another fault condition occurs. This button is also used as a bootload button for factory service in the unlikely event of a complete card failure. The bootload process is further described in pages 36-37, “**Service Information.**”

Reset Button

This button is used to restart both of the onboard processors: the fan control processor and the communications processor. The communications processor requires approximately 30 seconds to restart and re-establish network communications.

MFC-8320-N LEDs

The front edge of the MFC-8320-N, and the CFM-8320 in the frame door, have LED indicators for cooling module fan, alarm, and communication activity.

The CFM-8320 provides LED and Alarm switching controls to the front edge of the 8320 frame door.

LED displays and descriptions are provided in the following table:

Table 4. MFC-8320-N Controller Card LED Descriptions

LED	Color	Location	Display and Description
Alarm	Red	DS1	When lit, an alarm condition is occurring in the frame.
Status OK	Green	DS2	When lit, the fan control process is operating correctly.
Comm. Activity	Yellow	DS3	When lit, the card is communicating within the frame.
Processor	Red	DS4	This LED flashes red briefly when the card is first powered up. If lit at any other time, this LED indicates that the communications processor is not running.
Error	Red	DS5	This LED is lit when the MFC-8320-N card is first powered up and the card is booting up. The LED turns off once boot up is complete. If this LED is lit during normal operation, it indicates that the communications software is not running correctly. You must restart the processor by pressing the RESET button.
Transmitting	Green	DS6	When lit, the MFC-8320-N card is transmitting messages on the internal communications bus.
Receiving	Yellow	DS7	When lit, the MFC-8320-N card is receiving messages via the internal bus.
Fault	Red		When lit, a SMPTE alarm condition is occurring in the frame.
Fan Fail	Red		When lit, a fan on the frame door or PS-8300 is stalled.
Power Supply	Green/Red		When lit Green, the PS-8300 is operating normally. When flashing Red: <ul style="list-style-type: none"> there is an output over or under voltage condition on the PS-8300 there is no A/C; provided that the second supply is operating normally

DashBoard and DashBoard Lite Control System Software

You can use the DashBoard or DashBoard Lite Control Systems to monitor and control your frames and controller cards from a computer. The DashBoard software and manual can be downloaded from the Cobalt Digital Inc. website.

SNMP Monitoring and Control

The MFC-8320-N Network Controller card provides optional support for remote monitoring and control of your frame and its cards using SNMP (Simple Network Management Protocol), which is compatible with many third-party monitoring and control tools. This section describes how to enable this feature and how to configure the SNMP software on the card.

Enabling SNMP

You must obtain a license key from Cobalt Digital Inc. to enable SNMP support.

Use the following procedure to obtain your license key:

1. Request a license key from your distributor or at **sales@cobaltdigital.com**, quoting the 8-character hardware-ID provided on the page.
2. Open the **Frame Configuration Page** for the frame using DashBoard. **OR**
Point your web browser to the IP address of the frame.
3. Select the tab titled **SNMP Configuration**.
If SNMP has not been enabled, this page will ask you to enter a license key.
4. Enter the license key in the field provided.
5. Click **Submit**.
After a valid license key has been entered, the frame displays the SNMP configuration page.

This completes the procedure to enable the SNMP agent on the frame.

Configuring SNMP

The SNMP agent on the frame will accept SNMP GET and SET requests on the default SNMP port (161), using SNMP version 1 or SNMP version 2c. The SNMP commands will send SNMP traps to one or more notification targets, with user-configurable address, port, and protocol version number.

Use the following procedure to configure your SNMP Agent:

1. Open the configuration page for the frame using DashBoard. **OR**
Point your web browser to the IP address of the frame.
2. Select the tab titled **SNMP Configuration**.
3. Set the required parameters as follows:
 - **Read Community String** — Enter the SNMP password for GET requests.
 - **Write Community String** — Enter the SNMP password for SET requests.
4. To add a trap/notification target, specify the following:
 - **Target IP address** — Enter the IP address to which traps should be sent.
 - **Port number** — Enter the UDP port number to which traps should be sent.
 - **SNMP version** — Enter the protocol version to be used for traps to this target.
 - **Target community string** — Enter the community string.
5. Click **Add** to add the target to the list.

Operating Tip

To remove a trap/notification target, select the target in the list, and click **Delete**.

6. Click the **Submit** button to configure the frame.

This completes the procedure to configure your SNMP Agent.

Rear Support Bars and Brackets

Under normal conditions, mounting the frame to the front of the rack with four rack screws should be sufficient to carry the load, including the weight of accompanying cables. The optional FSB-8321 Rear Support Bars and Brackets are specifically engineered to compensate for extra load stress associated with certain applications, such as mobile truck installations, to also support the rear of the frame.

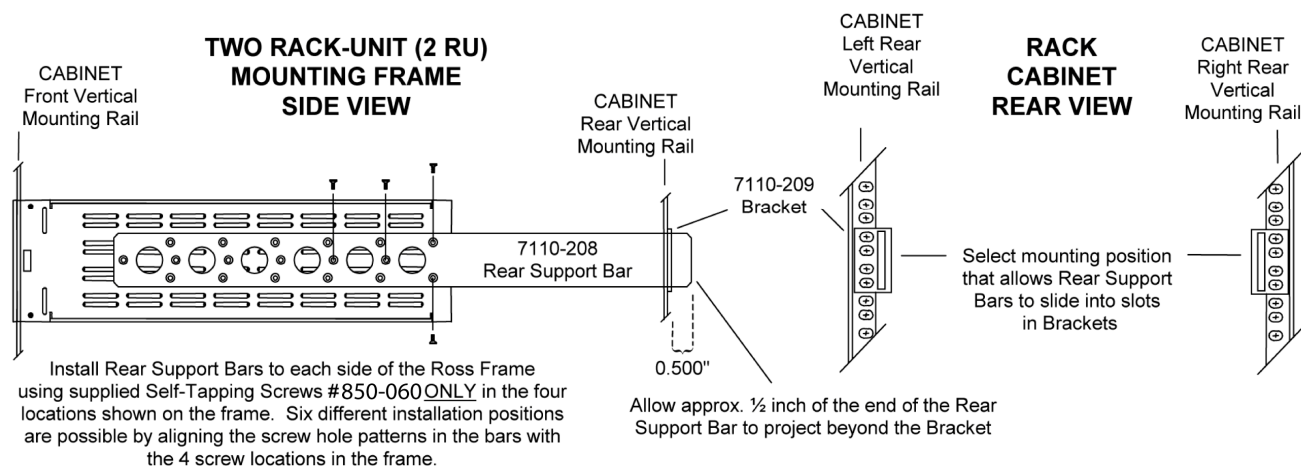


Figure 15. FSB-8320 Rear Support Bars and Brackets Diagram

Installing the Rear Support Bars and Brackets

Use the following procedure to install the FSB-8321 rear support bars and brackets:

1. The rear support bars can be attached to the frame in six possible positions; refer to Figure 15. Choose the position that suits the cabinet depth that will give approximately a 1/2 inch (0.5") projection beyond the rear vertical mounting rails. Using four screws per bar, as shown in the illustration, fasten one bar to each side of the frame.
2. Mount the frame to the front rails of the rack cabinet using four rack screws fastened through the front mounting flanges.
3. At the rear of the cabinet, slide the bracket slots over the rear of the support bars and secure to the cabinet rear rails with two rack screws each.

This completes the procedure to install the FSB-8320 rear support bars and brackets.

Specifications

This section includes the Technical Specifications table for the 8321 series frame.

8321 Series Frame Technical Specifications

Category	Parameter	Specification
PS-8300 Power Supply	Input	100-240VAC, 47-63Hz, 190W
	Output 1	+12V, $\pm 10\%$, 0.5A – 12.5A
	Output 2	-7.5V, $\pm 10\%$, 0A - 1.5A
	Total	Sum of both outputs not to exceed 150W maximum
Rack Frame Mechanical	Height	2RU 3.5" (8.89cm)
	Width	19" (48.26cm)
	Depth	17" (43.18cm)
	Weight, with 1 PS-8300	13lbs (5.90kg)
Frame Card Slots	Number of Slots	20
	Max Power: +12V Rail	2.0A (24W)
	Max Power: -7.5V Rail	0.2A (1.5W)
	Total	120W, total power consumption not to exceed 24W maximum per card slot
Frame Controller and Fans	Max Power: +12V Rail	1.5A (18W)
	Max Power: -7.5V Rail	0.2A (1.5W)
	Total	19.5W maximum
Comm I/O Controller	Max Power: +12V Rail	0.2A (2.4W)
	Max Power: -7.5V Rail	0.2A (1.5W)
	Total	3.9W maximum
Reference Inputs	Number of Inputs	2 looping
	Level	1Vpp nominal
	Signal	Analog video sync (black burst or tri-level), or AES/EBU DARS
	Impedance	75ohm terminating
	Return Loss	>30dB to 30MHz
	Max DC on Ref Input	$\pm 1V$
Environmental	Ambient temperature range	0 °C to 40 °C
	Humidity, non condensing	<95%

Specifications are subject to change without notice.

Service Information

In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Frame Controller Alarm Mute/Bootload Button
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this product is not required. In the event of problems with your frame, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your products distributor, or the Technical Support department at the numbers listed under the “Contact Us” section at the end of this manual.

1. **Visual Review** – Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the card, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check** – Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Input Signal Status** – Verify that source equipment is operating correctly and that a valid signal is being supplied.
4. **Output Signal Path** – Verify that destination equipment is operating correctly and receiving a valid signal.
5. **Unit Exchange** – Exchanging a suspect unit with a unit that is known to be working correctly is an efficient method for localizing problems to individual units.

Frame Controller Alarm Mute/Bootload Button

In the unlikely event of a complete card failure, you may be instructed by a Cobalt Digital Inc. Technical Support specialist to perform a complete software reload on the MFC-8320 frame controller card.

Use the following procedure to reload the software:

1. Eject the card.
2. Press and hold the Alarm Mute/Bootload button, while re-inserting the card into the frame.
3. Release the button.

The STATUS OK LED will flash GREEN while the card is waiting for a new software load.

If a new software load is not sent to the card within 60 seconds, the card will attempt to restart with it's last operational software load.

Software loads can be sent to the Network Controller Card via the connection to the openBUS on the rear of the frame.

Warranty and Repair Policy

Cobalt Digital Inc. Limited Warranty

This product is warranted to be free from defects in material and workmanship for a period of five (5) years from the date of shipment to the original purchaser, except that 4000, 5000, 6000, 8000 series power supplies, and Dolby® modules (where applicable) are warranted to be free from defects in material and workmanship for a period of one (1) year.

Cobalt Digital Inc.'s ("Cobalt") sole obligation under this warranty shall be limited to, at its option, (i) the repair or (ii) replacement of the product, and the determination of whether a defect is covered under this limited warranty shall be made at the sole discretion of Cobalt.

This limited warranty applies only to the original end-purchaser of the product, and is not assignable or transferrable therefrom. This warranty is limited to defects in material and workmanship, and shall not apply to acts of God, accidents, or negligence on behalf of the purchaser, and shall be voided upon the misuse, abuse, alteration, or modification of the product. Only Cobalt authorized factory representatives are authorized to make repairs to the product, and any unauthorized attempt to repair this product shall immediately void the warranty. Please contact Cobalt Technical Support for more information.

To facilitate the resolution of warranty related issues, Cobalt recommends registering the product by completing and returning a product registration form. In the event of a warrantable defect, the purchaser shall notify Cobalt with a description of the problem, and Cobalt shall provide the purchaser with a Return Material Authorization ("RMA"). For return, defective products should be double boxed, and sufficiently protected, in the original packaging, or equivalent, and shipped to the Cobalt Factory Service Center, postage prepaid and insured for the purchase price. The purchaser should include the RMA number, description of the problem encountered, date purchased, name of dealer purchased from, and serial number with the shipment.

Cobalt Digital Inc. Factory Service Center

2406 E. University Avenue

Urbana, IL 61802 USA

www.cobaltdigital.com

Office: (217) 344-1243

Fax: (217) 344-1245

Email: info@cobaltdigital.com

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Ordering Information

In This Chapter

Your **openGear**[®] Two Rack Unit Frame and Power Supply (PS-8300) is a part of the **openGear**[®] family of products.

Standard Equipment

- **8321-C** Digital Products Frame and Power Supply with Cooling Fans (2RU, holds 20 cards maximum)

Optional Equipment

- **PS-8300 openGear**[®] Power Supply, 150W (redundancy option power supply for Cobalt Digital Inc. 8321 series 2RU digital product frames)
- **MFC-8320-N openGear**[®] 2RU Frame Controller with Network Interface (upgrade controller card with Ethernet communication capability for use with 8321 frames)

Notes:

Contact Us

Contact Cobalt Digital Inc.

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	Fax	217.344.1245
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