HPF-9000

High-Power 20-Slot Frame

Product Manual

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Congratulations on choosing the Cobalt® HPF-9000 High-Power 20-Slot Frame. The HPF-9000 is part of a full line of modular processing and conversion gear for broadcast TV environments. The Cobalt Digital Inc. line includes video decoders and encoders, audio embedders and de-embedders, distribution amplifiers, format converters, remote control systems and much more. Should you have questions pertaining to the installation or operation of your HPF-9000, please contact us at the contact information on the front cover.

Manual No.:	HPF9000-OM
Document Version:	V1.7
Release Date:	January 28, 2016
Description of product/manual changes:	- Correct manual copy to indicate frame communications of 100/1000 Mbps. - Add HPF-9000 dimensional drawings to manual.

Important Safety Instructions

Read these instructions.

Keep these instructions.

Heed all warnings.

Follow all instructions.

Warning

Do not use this apparatus near water.

Clean only with a dry cloth.

Warning

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

Do not defeat the safety purpose of polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

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

Warning

Only use attachments/accessories specified by the manufacturer and in this manual.

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

Warning

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug is damaged, 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

This apparatus shall not be exposed to dripping or splashing. Do not place objects such as water containers on the apparatus.

Warning

The AC mains power receptacle on the rear of the apparatus shall only be connected by means of the power cord supplied with this apparatus. No other devices or cables shall be connected to this connector. If the supplied AC power cord is damaged or lost, it shall only be replaced using the AC power cord specified in this manual or by the manufacturer.

Warning

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.

To reduce the risk of fire, replacement fuses shall be the same type and rating as installed and as specified on the rear label adjacent to the power receptacle fuse holder.

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.

Table of Contents

Chapter 1

Introduction

Overview

This manual provides installation and operating instructions for the HPF-9000 High-Power 20-Slot Frame (also referred to herein as the HPF-9000 or "frame").

This manual consists of the following chapters:

- **Chapter 1, "Introduction"** – Provides information about this manual and what is covered. Also provides general information regarding the HPF-9000.

- **Chapter 2, "Installation and Setup"** – Provides instructions for installing the HPF-9000, installing Rear I/O Modules and cards, and setting up the Network Controller Card.

This chapter contains the following information:

- **Manual Conventions (p. 1-1)**
- **Safety Summary (p. 1-3)**
- **HPF-9000 Functional Description (p. 1-3)**
- **Technical Specifications (p. 1-10)**
- **Warranty and Service Information (p. 1-11)**
- **Contact Cobalt Digital Inc. (p. 1-12)**

Manual Conventions

In this manual, connectors are shown using the exact name shown on the HPF-9000 itself. In this manual, the terms below are applicable as follows:

- **HPF-9000** refers to the HPF-9000 frame that houses the Cobalt® or other openGear®-compliant cards.

- **Device** and/or **Card** refers to an openGear®-compliant card that is installed in the frame.

- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment served by the frame.

- Functions and/or features that are available only as an option are denoted in this manual like this:

Option ⬅➡

Warnings, Cautions, and Notes

Certain items in this manual are highlighted by special messages. The definitions are provided below.

Warnings

Warning messages indicate a possible hazard which, if not avoided, could result in personal injury or death.

Cautions

Caution messages indicate a problem or incorrect practice which, if not avoided, could result in improper operation or damage to the product.

Notes

Notes provide supplemental information to the accompanying text. Notes typically precede the text to which they apply.

Labeling Symbol Definitions

⚠	Important note regarding product usage. Failure to observe may result in unexpected or incorrect operation.
(ESD symbol)	Electronic device or assembly is susceptible to damage from an ESD event. Handle only using appropriate ESD prevention practices. If ESD wrist strap is not available, handle card only by edges and avoid contact with any connectors or components.
(WEEE symbol)	Symbol (WEEE 2002/96/EC) For product disposal, ensure the following: • Do not dispose of this product as unsorted municipal waste. • Collect this product separately. • Use collection and return systems available to you.

Safety Summary

Warnings

! WARNING !	**To reduce risk of electric shock do not remove line voltage service barrier cover on frame equipment containing an AC power supply. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.**

Cautions

CAUTION	**This device is intended for environmentally controlled use only in appropriate video terminal equipment operating environments.**
CAUTION	**Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up. As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.**

HPF-9000 Functional Description

The HPF-9000 is an openGear®-compatible[1] 2RU high-density modular frame offering 360 Watts of net (user) available power in a high-capacity 20-slot format. (Maximum card capacity is determined by card model(s) installed and other factors (see Frame Card Capacity and Rear I/O Modules on page 1-5).

High power-density power supplies (single standard, redundant second optional) and engineered cooling/ventilation design allow 10 high-power cards in a frame (10 x 36 W = 360 W), or 20 medium-power cards in a frame (20 x 18 W = 360W). Separate forced-air cooling paths are provided for the card area and the power supply areas. An intelligent fan controller adjusts fan speed with changes in power supply loading and temperature.

The HPF-9000 can accommodate two front-loaded PSU-9000 power supply modules. Adding a second (optional) supply gives the frame full power redundancy. The PSU-9000 power supply unit is interchangeable as a primary or redundant power supply module, with supplies in either position being hot-swapable. Each power supply contains an independent cooling fan and a front-mounted power switch.

The HPF-FC Network Controller Card (furnished as standard on the HPF-9000 frame) allows Ethernet connectivity to any number of connections for full multi-point control and monitoring via free DashBoard™ software.

The frame is equipped with two independent reference buses that can supply a selected reference to cards within the frame.

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1. openGear® is a registered trademark of Ross Video Limited. DashBoard™ is a trademark of Ross Video Limited.

Primary 360W Power Supply (PSU1)

Network Controller Card

Card User Slot Area
(20 User Slots

Retractable Fan
Door (5 fans)

Optional Redundant 360W
Power Supply (PSU2)
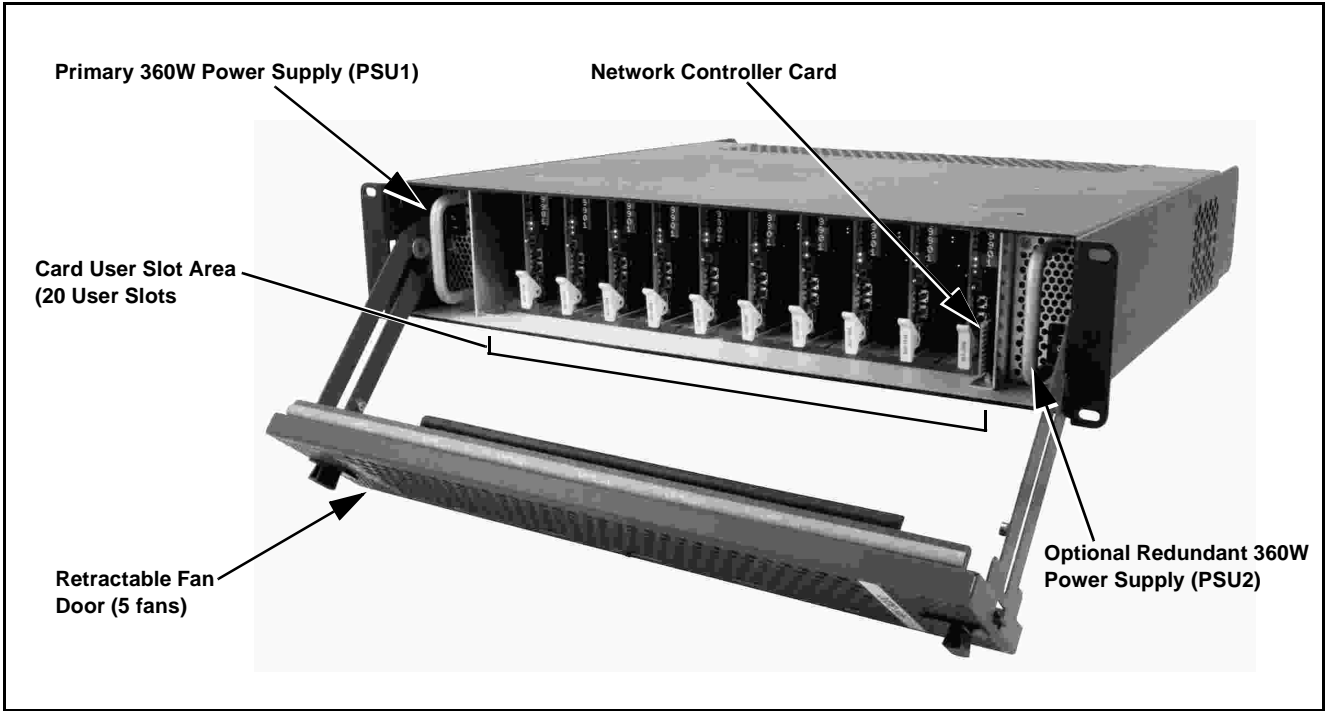
Figure 1-1 HPF-9000 (Front View)

Redundant Power Supply
(PSU2) IEC AC
Line Connector

Primary Power Supply
(PSU1) IEC AC
Line Connector

Network
Ethernet
Connector

Rear I/O Module Area

Dual Looping
Reference
Connectors
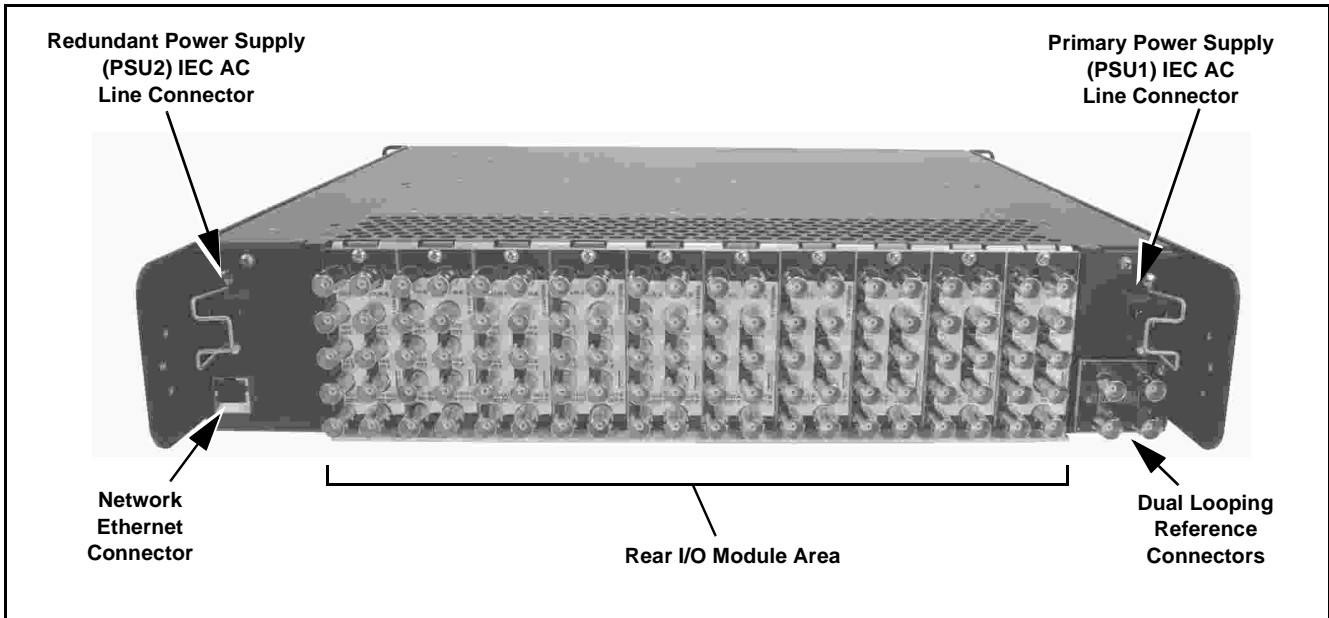
Figure 1-2 HPF-9000 (Rear View)

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Frame Rear I/O Modules

Note: Various Rear I/O Modules for Cobalt® cards are available and described in respective product information for the cards. Rear I/O Modules are not supplied with the HPF-9000 frame.

Cards within the frame physically interface to system video and audio connections using a Rear I/O Module. Figure 1-3 shows a typical Rear I/O Module.

All signal inputs and outputs enter and exit the card via the card edge backplane connector. The Rear I/O Module breaks out the card edge connections to industry standard connections that interface with other components and systems in the signal chain.

In this manner, the particular inputs and outputs required for a particular application can be accommodated using a Rear I/O Module that best suits the requirements. The required input and outputs are broken out to the industry standard connectors on the module.
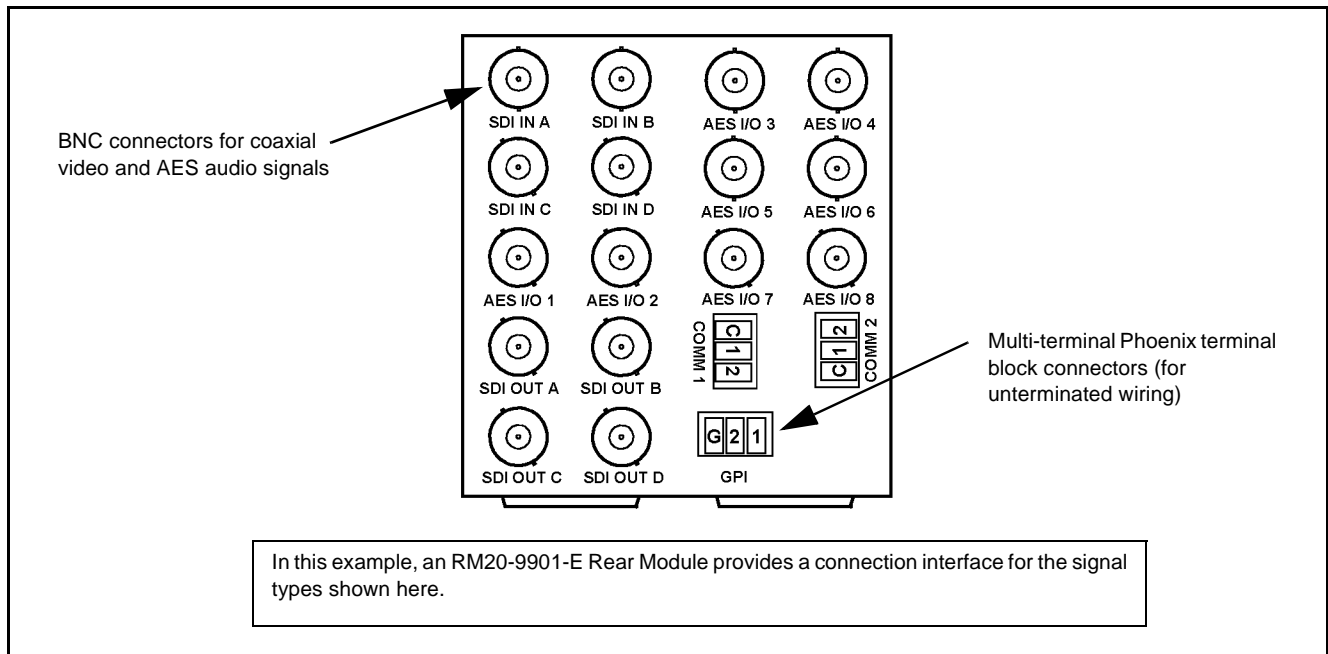
Figure 1-3 Typical Rear I/O Module

Frame Card Capacity and Rear I/O Modules

(See Figure 1-4) Frame card capacity is largely determined by the Rear I/O Modules that mate a card with its rear panel user connections. For example, when using "split" rear modules, the card capacity in the 20-slot frame is greater than possible when using standard rear modules that consume two card spaces. 20-slot frames can be fitted with any mix of the rear module types described here, offering connection break-out that suit requirements while maximizing frame capacity.

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 certain Cobalt cards. Consult our catalog, card Product Manual, or our website for availability of rear modules for particular cards.

• Split rear modules may not in all cases support the maximum number of connections offered by a card. (For example, a 9323 card fitted with a split rear module offers two AES ports vs. four available when using a standard rear module.) Some cards are available with split rear modules using high-density HD-BNC or DIN 1.0/2.3 connectors which allow more connections than with BNC connectors.

• In all cases, maximum frame power budget of 360W for user slot total must be considered when planning frame build-out. If necessary, consult Cobalt Sales for assistance in power planning.

2 cards per rear module   ⟹   **20** cards per frame (max)
2 card slots used   **10** rear modules per frame (max)
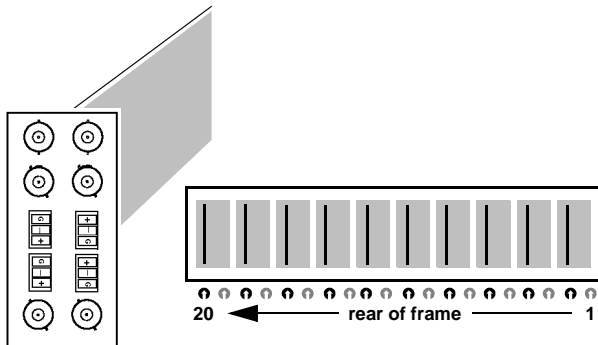
Standard-Width Rear Module

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). **Standard-width rear modules fit even slots unless noted otherwise.**

• In all cases, maximum frame power budget of 360W for user slot total must be considered when planning frame build-out. If necessary, consult Cobalt Sales for assistance in power planning.

1 card per rear module   ⟹   **10** cards per frame (max)
2 card slots used   **10** rear modules per frame (max)

Double-Width Rear Module

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). **Double-width rear modules fit even slots unless noted otherwise.**

• In all cases, maximum frame power budget of 360W for user slot total must be considered when planning frame build-out. If necessary, consult Cobalt Sales for assistance in power planning.
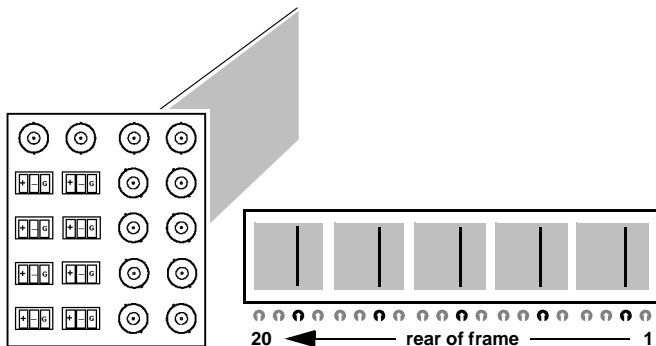
1 card per rear module   ⟹   **5** cards per frame (max)
4 card slots used   **5** rear modules per frame (max)

Figure 1-4 Frame Capacity for Various Rear I/O Module Types

Expansion Rear Module
(Fusion3G® only)

An **Expansion Rear Module** is used in conjunction with a Fusion3G® card equipped to provide optional connections such as analog audio I/O (which is in turn provided by an Expansion piggyback card factory-installed on the base card when this option is ordered). Expansion Rear Modules are identified with "X" in the part number and **must be used in conjunction with a Base Rear Module.**

The expansion rear module installs directly to the **left** of the base Rear Module (as shown viewed from rear), and interfaces with the piggyback card. **Base rear modules fit even slots, with expansion rear module fitting in next even slot to the left unless noted otherwise** (e.g., base in slot 2; expansion in slot 4).

The Fusion3G® base/piggyback card assembly occupies the space identical to that of two regular Fusion3G® cards using two standard-width rear modules.

Note: In all cases, maximum frame power budget of 360W for user slot total must be considered when planning frame build-out. If necessary, consult Cobalt Sales for assistance in power planning.

Fusion3G piggyback card and Expansion Rear Module

Fusion3G base card and Rear Module

1 card assembly per base/expansion rear module combination
4 card slots used

5 card assemblies per frame (max)
5 base/expansion rear modules per frame (max)

exp base

20 ← rear of frame → **1**

Expansion Rear Module installs directly to the **left** of base Rear Module, and interfaces with the piggyback card. In this example, an RM20-9901-XC expansion rear module breaks out analog audio connections provided by Option **+ANA** (analog audio option).

RM20-9901-B Rear Module provides connection break-out for base card functions.

SDI IN A SDI IN B
AES I/O 1 AES I/O 2
AES I/O 3 AES I/O 4
SDI OUT A SDI OUT B
SDI OUT C SDI OUT D
AN-AUDIO I/O

High-Ventilation Rear Module

Ventilation openings allow increased ventilation in installations where normal above-frame ventilation clearance is reduced

High Ventilation (HV) Rear Module occupies 2 card slots and offers coaxial connections using miniaturized connectors (HDBNC or DIN 1.0/2.3). These rear modules have openings to increase ventilation where the normal recommended above-frame ventilation space (1 RU) cannot be accommodated.

Notes: • HV (high-ventilation) rear modules are available only for certain Cobalt cards. Consult our catalog, card Product Manual, or our website for availability of high-ventilation rear modules for particular cards. **This rear module fits even slots unless noted otherwise.**

• (Fusion3G® only) Where a base HV rear module is to be used in conjunction with an expansion rear module, **a companion HV expansion rear module must also be used**. Both base and expansion HV rear modules use card positioning that optimizes air flow across the component surface of the card PCB. Also note that when using an expansion rear module, frame capacity then follows the form as specified in "Expansion Rear Module" above.

• In all cases, maximum frame power budget of 360W for user slot total must be considered when planning frame build-out. If necessary, consult Cobalt Sales for assistance in power planning.

20 ← rear of frame → **1**

1 card per rear module
2 card slots used

10 cards per frame (max)
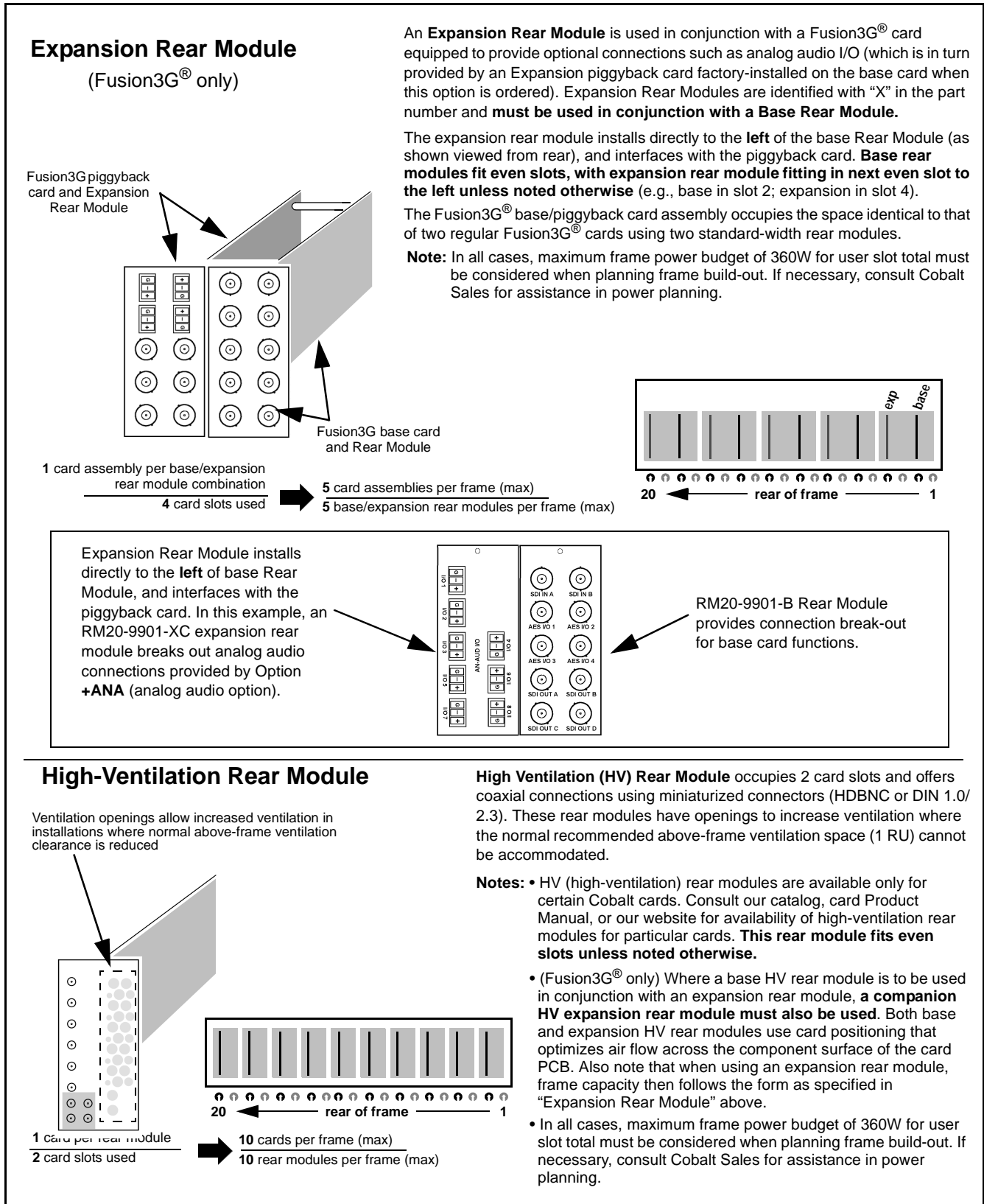**10** rear modules per frame (max)

Figure 1-4 Frame Capacity for Various Rear I/O Module Types (Cont.)

Frame Network Interface

Figure 1-5 shows the user remote control interface options for the frame.

Note: All user control interfaces described here are cross-compatible and can operate together as desired. Where applicable, any control setting change made using a particular user interface is reflected on any other connected interface.

- **DashBoard™ User Interface** – Using DashBoard™, all cards in the HPF-9000 Frame can be controlled from a computer and monitor.

  DashBoard™ allows users to view all frames on a network with control and monitoring for all populated slots inside a frame. This simplifies the setup and use of numerous modules in a large installation and offers the ability to centralize monitoring. Cards define their controllable parameters to DashBoard™, so the control interface is always up to date.

  The DashBoard™ software can be downloaded from the Cobalt Digital Inc. website: www.cobaltdigital.com (enter "DashBoard" in the search window).

- **Cobalt® OGCP-9000, OGCP-9000/CC and WinOGCP Remote Control Panels** – The OGCP-9000, OGCP-9000/CC, and WinOGCP Remote Control Panels conveniently and intuitively provide parameter monitor and control of the cards within the HPF-9000 Frame.

  The remote control panels allow quick and intuitive access to hundreds of cards in a facility, and can monitor and allow adjustment of multiple parameters at one time.

  The remote control panels are totally compatible with the openGear® control software DashBoard™; any changes made with either system are reflected on the other.
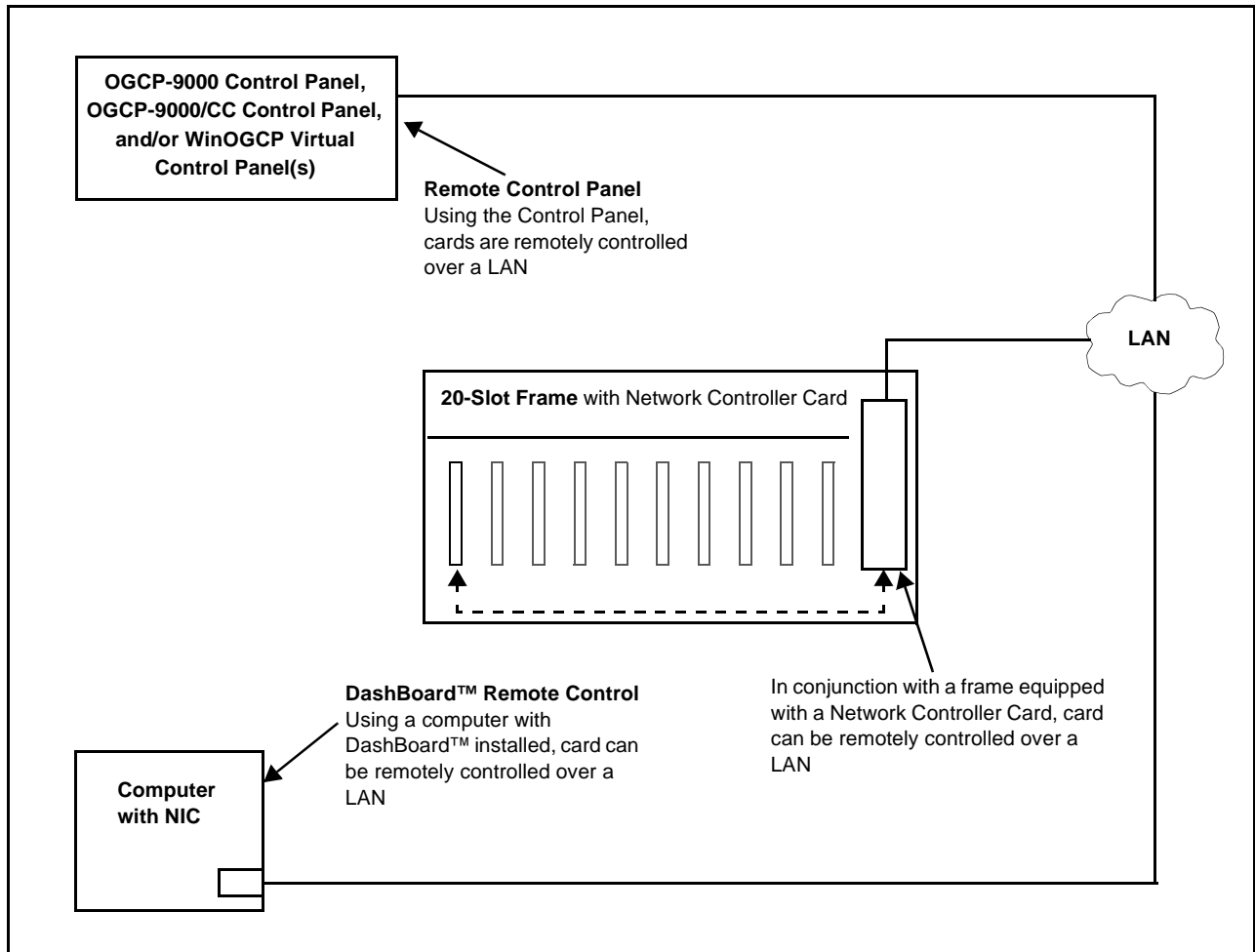
OGCP-9000 Control Panel, OGCP-9000/CC Control Panel, and/or WinOGCP Virtual Control Panel(s)

Remote Control Panel
Using the Control Panel, cards are remotely controlled over a LAN

LAN

20-Slot Frame with Network Controller Card

DashBoard™ Remote Control
Using a computer with DashBoard™ installed, card can be remotely controlled over a LAN

In conjunction with a frame equipped with a Network Controller Card, card can be remotely controlled over a LAN

Computer with NIC

Figure 1-5 User Network Remote Control Interface

Technical Specifications

Table 1-1 lists the technical specifications for the HPF-9000 Frame.

Table 1-1   Technical Specifications

Item	Characteristic
Part number, nomenclature	HPF-9000 High-Power 20-Slot Frame (PN HPF-9000-CN) Includes one PSU-9000 Power Supply Module and HPF-FC Network Controller Card.
Installation/usage environment	Intended for installation and usage in environmentally controlled installation using openGear®-compliant cards and network control.
AC Line Input (per each of 2 (max) PSU IEC inputs)	100-240 VAC, 48-63 Hz, 500 Watts maximum
Environmental: Operating temperature: Relative humidity (operating or storage):	32° – 104° F (0° – 40° C) < 95%, non-condensing
Available user (net) power	360 Watts continuous-operation maximum
Available user card slots	20 maximum
Frame communication	100/1000 Mbps Ethernet with Auto-MDIX.
Physical: Dimensions (WxHxD): Weight (with standard power supply PSU1):	19" x 3.5" (2RU) x 17" (48 cm x 9 cm x 43 cm) (Dimensions include any component projections such as mounting tabs, etc.) 13.9 lbs (6.3 kg)
Reference Video Input	Number of Inputs: Two non-terminating (looping) Frame Reference inputs Signal Level: 1 Vp-p nominal Signal Type: Analog video sync (black burst or tri-level) Impedance: 75 Ω Return Loss: > 30 dB to 30 MHz Allowable Maximum DC on Ref Input: ±1.0 V
Optional accessories	PSU-9000 – Extra (redundant) HPF-9000 frame power supply HPF9000-FSB – Frame support bracket kit

Warranty and Service Information

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

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Champaign, IL 61821 USA	Fax: (217) 344-1245
www.cobaltdigital.com	Email: info@cobaltdigital.com

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Feel free to contact our thorough and professional support representatives for any of the following:

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- Product information and pricing
- Technical support
- Upcoming trade show information

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General Information:	info@cobaltdigital.com
Technical Support:	support@cobaltdigital.com

Installation and Setup

Overview

This chapter contains the following information:

- HPF-9000 Controls and Indicators (p. 2-1)
- Installing the Frame (p. 2-3)
- Installing Rear I/O Modules and Cards (p. 2-9)
- Setting Up Network Remote Control (p. 2-11)
- Setting Network Controller Card to Mute Audible Alarms (p. 2-23)
- Network Controller Card DashBoard Status and Settings Interfaces (p. 2-23)
- Troubleshooting Network/Remote Control Errors (p. 2-29)
- Using a Log for Managing Frames (p. 2-31)

HPF-9000 Controls and Indicators

HPF-9000 Front Panel Controls and Indicators

Figure 2-1 shows and describes the HPF-9000 front panel controls and indicators.

HPF-FC Network Controller Card Indicators

Figure 2-1 shows and describes the HPF-FC card-edge indicators.

Note: These indicators are not used in the normal course of operation. The indicators provide troubleshooting status information as described.

Item	Function
System Fault Indicator	When lit, indicates an alarm condition is occurring on a card within the frame. If this indicator is lit, it is recommended to check the frame controller card in DashBoard for further troubleshooting information.
Alarm Mute Switch	Pressing the Alarm Mute Switch temporarily mutes the audio alarm (approx. 2 minute mute).
FAN FAULT Indicator	When lit, indicates a fan on the frame door or PSU is stalled, or that fan door is not fully closed and latched.

Figure 2-1 HPF-9000 Front Panel Controls and Indicators

Item	Function
OK LED	When lit, card has no detected errors and is receiving power properly.
ERR LED	When lit, indicates an alarm condition is occurring on a card within the frame (mirrors front panel **System Fault** indicator).
MCU LED	MCU status indicator; normal status is blinking.
CAN LED	CAN bus activity indicator. When lit, the HPF-FC card is transmitting messages on the internal communications bus.
ENET LED	Indicates Ethernet communication activity.

Figure 2-2 HPF-FC Network Controller Card Edge Indicators

Installing the Frame

HPF-9000 Dimensional Drawings

Figure 2-3 shows the installation dimensional details for the HPF-9000 frame.
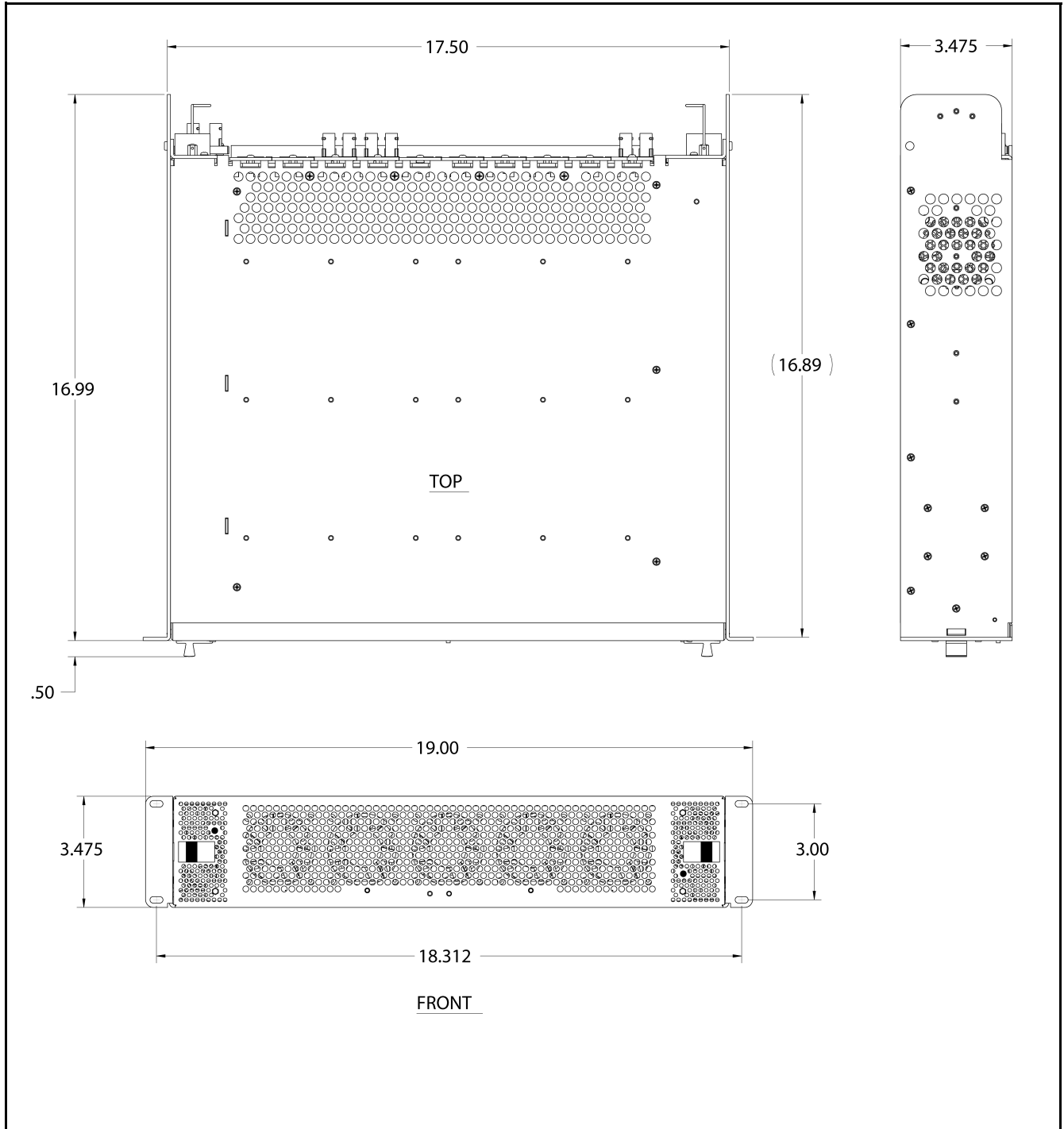
Figure 2-3 HPF-9000 Dimensional Drawings

Frame PSU Power Output Considerations

• The HPF-9000 uses power supply units (PSUs) that provide a 400 W capacity per each supply. Note that with redundant supplies, the power delivery may not be exactly split between the two supplies. The maximum available frame power (net) for frame slots is 360 W total net (18 W per slot when utilizing 20 slots, or 36 W per slot when utilizing 10 slots as used for high power or double-power cards).

Note: Refer to Frame Card Capacity and Rear I/O Modules (p. 1-5) in Chapter 1, Introduction for descriptions of Cobalt rear I/O module types and conventions.

• PSU1 is installed on the left side of the frame (viewed from front); PSU2 is installed on the right side of the frame (viewed from front). Both supplies are identical and interchangeable. They are flipped vertically when installed in respective slots to maintain exhaust out of the rear sides of the chassis.

• DashBoard™ presently reports current output from each PSU in milliamps. The value reported is not directly compatible with the PSU and requires scaling as follows:

$$\frac{\text{DashBoard displayed value}}{262.5} = \text{Actual Current (in Amps)}$$

(Example: 5000/262.5 = 19.05 A)

• Similarly, DashBoard™ presently under-reports power. The displayed value can be corrected as follows:

DashBoard displayed value x 3.81 = Actual Power (In Watts)

(Example: 80W x 3.81 = 305 W)

Ventilation Considerations

• HPF-9000 Power Supply Unit (PSU) cooling is independent and separate from the card cage chassis to help mutually isolate card cage and PSU heat dissipation. PSU exhaust is out the rear sides; obstructions should be minimized in this area.

• Rear I/O Modules (other than "HV High-Ventilation" types identified as "-HV") offer limited secondary exhaust ventilation features, with the primary exhaust ventilation feature being the ventilation holes on the top of the frame. Overall exhaust ventilation may be inadequate if the ventilation holes on the top of the chassis are obscured.

Generally, if the top vent holes have ½ RU or more clearance with spacing between an adjacent chassis installed above the frame, there will adequate cooling ventilation (with the secondary ventilation offered by the Rear I/O Modules being less important). However, if these top vent holes are blocked, and especially with the frame fitted with high power cards installed (>18W in a dual-slot location), high-ventilation Rear I/O Modules with increased exhaust area should be installed. These are available for certain high-power cards and are denoted by an "-HV" identifier in the module part number. Refer to card product information for availability of high-ventilation rear modules for a particular card.

- If several high-power cards (i.e., exceeding 18 W rating) are to installed, where feasible it is recommended to use slot locations such that maximum space is provided between the cards (or interspersed with lower-power cards).

- All slots within the frame are designed to provide similar airflow characteristics; there are no "preferred" locations within the frame.

Status Reporting and Displays Considerations Using DashBoard™

- PSU1 and PSU2 temperature reporting is correct as displayed in DashBoard.

- The front panel status LEDs and switches are configured (from left to right) as follows:

> **PSU1 OK/Fault** LED **|** **Alarm** LED **|** **Silence** switch **|** **Fan Fail** LED **|** **PSU2 OK/Fault** LED
>
> PSU LEDs are bi-color, with **green** indicating normal operation and **flashing red** indicating a fault (e.g., PSU over/under-voltage fault). Front panel LEDs illuminate red only upon an error condition.

- The front-panel PSU1 / PSU2 **OK/Fault** LEDs are currently non-functional. When functional, the LEDs will track with the status displayed by the individual status LEDs located on the front of each PSU.

- If the frame has a very light power load (for example, only the Network Controller card powered), a false alarm may be reported by a PSU **OK/Fault** LED and DashBoard, indicating an open fuse. This is due to one PSU dominating the other and supplying all the power to the frame, effectively resulting in the other PSU supplying none and mimicking the condition of an open output circuit.

Installing Frame in Rack

For normal installations, the HPF-9000 is designed to be supported in a standard EIA-310 19" rack by securing the frame by its four front panel mounting holes only, without added rear support. Select an installation location within the rack considering Ventilation Considerations above.

Note: • The rear frame support brackets are not ideally centered on this revision and may be difficult to install properly.

• Power cord safety retainer clips are not yet available for this product.

Installing Frame Support Brackets   *Option* ▣

Frame Support Bracket kit 9000-FSB provides rear support of the frame that attaches to the 19" rack rear frame rails. **This kit is recommended for any cases where the frame is to be used in mobile applications**, including trucks or equipment cases.

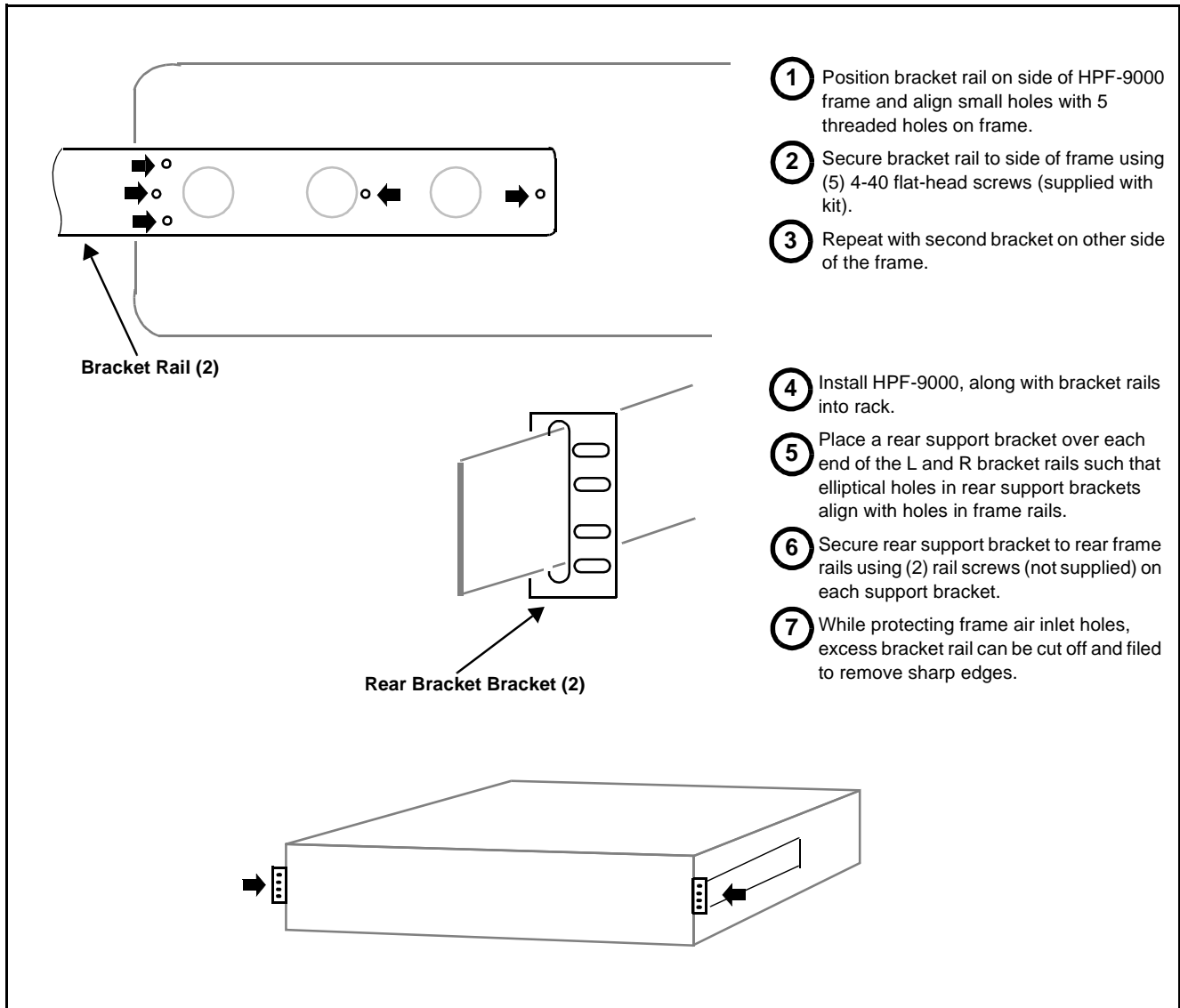Install the support brackets to each side of the HPF-9000 frame as shown in Figure 2-4.

Bracket Rail (2)

1 Position bracket rail on side of HPF-9000 frame and align small holes with 5 threaded holes on frame.

2 Secure bracket rail to side of frame using (5) 4-40 flat-head screws (supplied with kit).

3 Repeat with second bracket on other side of the frame.

4 Install HPF-9000, along with bracket rails into rack.

5 Place a rear support bracket over each end of the L and R bracket rails such that elliptical holes in rear support brackets align with holes in frame rails.

6 Secure rear support bracket to rear frame rails using (2) rail screws (not supplied) on each support bracket.

7 While protecting frame air inlet holes, excess bracket rail can be cut off and filed to remove sharp edges.

Rear Bracket Bracket (2)

Figure 2-4 Frame Support Bracket Kit 9000-FSB Installation

Cable Connections

Power Connections

(See Figure 2-5.) The frame is equipped with an IEC power input receptacle at the left and right sides of the frame rear.

1. Connect supplied power cords to suitable AC power outlet.

Note: • The left receptacle serves the redundant power supply (PSU2) position. Use this connector only if frame is equipped with a redundant power supply.

• If redundant power supply PSU2 is installed, it is recommended to use a facility AC receptacle that is on a separate circuit than that used for standard power supply PSU1. This can help ensure power source redundancy.

Redundant Power Supply
(PSU2) IEC AC
Line Connector

Primary Power Supply
(PSU1) IEC AC
Line Connector

Network
Ethernet
Connector

Card Rear I/O Modules

Dual Looping
Reference
Connectors
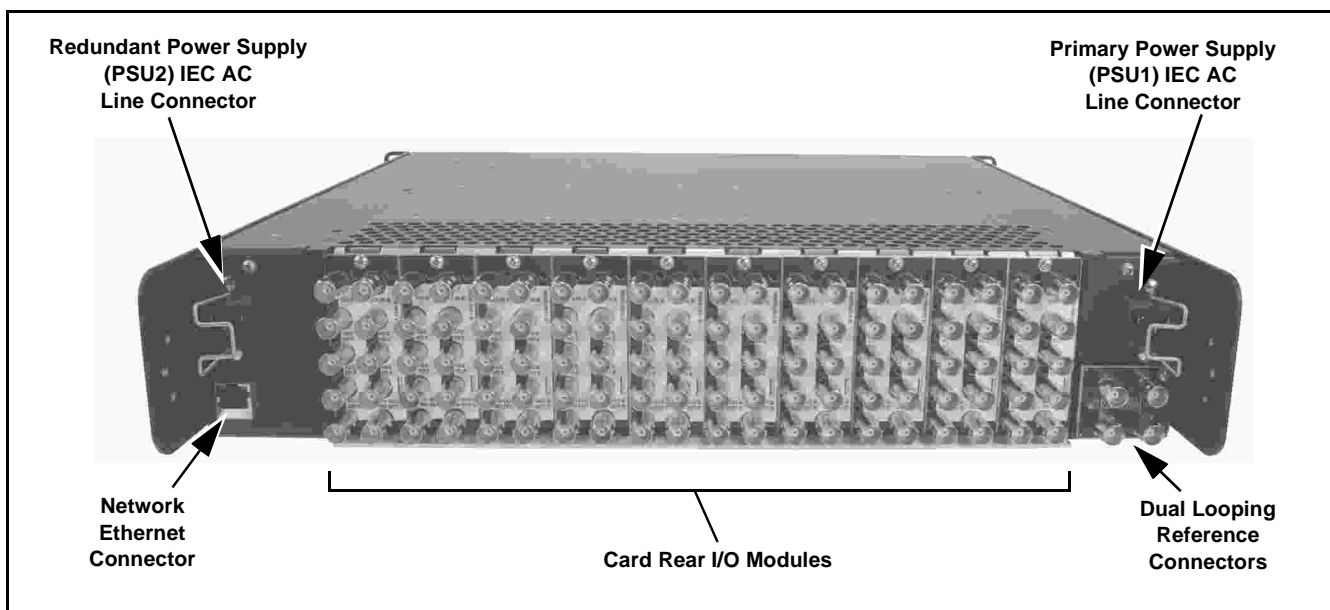
Figure 2-5 HPF-9000 Rear View

2. Each power supply is equipped with its own power switch (located on the front of the power supply). With the switch set to the up position, the power supply is turned on (as verified by the green LED adjacent to the switch).

Network Connection

(See Figure 2-5.) Connect RJ-45 Ethernet network cable to rear panel Ethernet connector. When the frame is powered, connectivity is shown by illuminated indicator on Ethernet receptacle.

Note: The frame Network Control Card must be configured to properly communicate with the card remote control network (DashBoard and/or OGCP/WinOGCP devices). Refer to Setting Up Network Remote Control (p. 2-11) for procedure.

Reference Loop Connections

(See Figure 2-5 and below.) A looping BNC pair is provided for a frame
REF 1 loop and a **REF 2** loop. Connections for the reference inputs are shown
below.

**REF 1
LOOP**

**REF 2
LOOP**

Note: Looping reference connectors can receive
ref input on either connector of the looping
pair. Unless daisy-chained to another
node, an open connector here **must** be
terminated into an appropriate 75Ω
terminator.
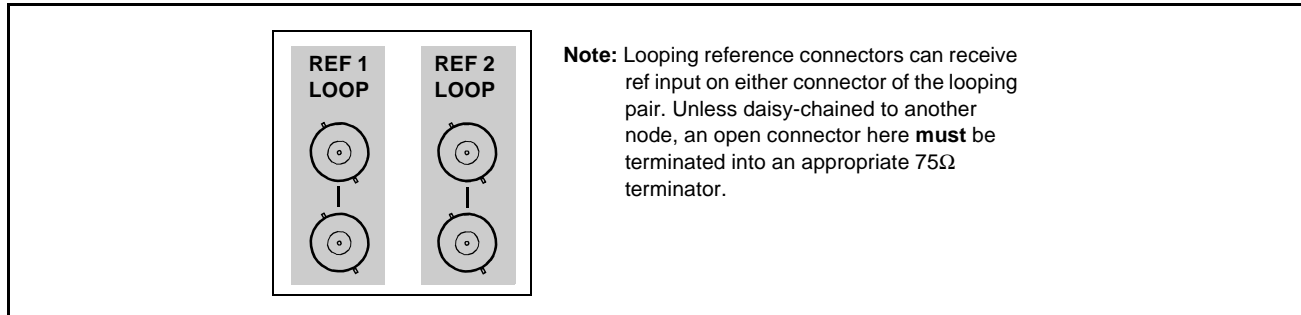
Power Supply Removal/Installation

Your frame is standard-equipped with power supply PSU1 and, optionally,
also PSU2.

Either supply is hot-swapable, and is removed by pulling the supply from the
frame by its handle. Install a power supply by aligning it with its mounting
slot and pushing the supply into the chassis until it is firmly seated.

Network Controller Card Removal/Installation

(See Figure 2-6.) As viewed from the card cage front, the Network Controller
Card occupies a reserved slot and is retained by a screw located at the bottom
front of the card. Loosen the retaining screw to allow card removal. Reverse
this procedure to install and lock the card in its slot.

Network Controller Card

Setup DIP Switch

Card Retainer Screw
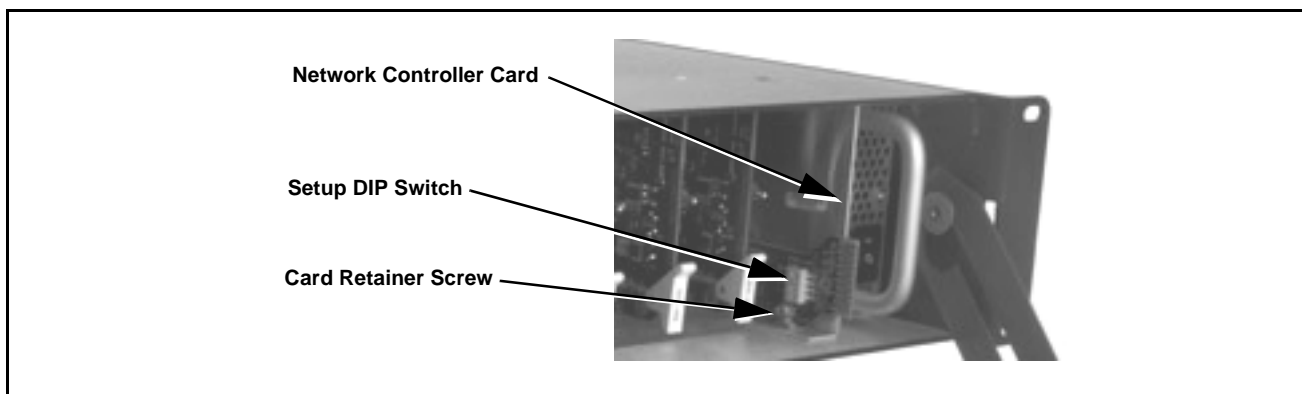
Figure 2-6 Network Controller Card

Installing Rear I/O Modules and Cards

Rear I/O Module Installation

1. On the frame, determine the slot in which the card is to be installed.

2. In the mounting area corresponding to the slot location, install Rear I/O Module as shown in Figure 2-7.

Note: Note that with all rear modules (except for "split" types), an offset of the card edge connector results in the loss of one or more adjacent slots of the two or more slots consumed by the rear module.

Also note that when installing a Fusion3G® card equipped with an expansion card (used for some options such as analog video/audio), the base card occupying slot *n* results in the expansion card occupying slot *n+2*, or 2 slots to the right. (Example: with base card in slot 18, expansion card mates with slot 20.)

Note these considerations when planning card locations within the frame. See Frame Card Capacity in Chapter 1. Introduction for more information.
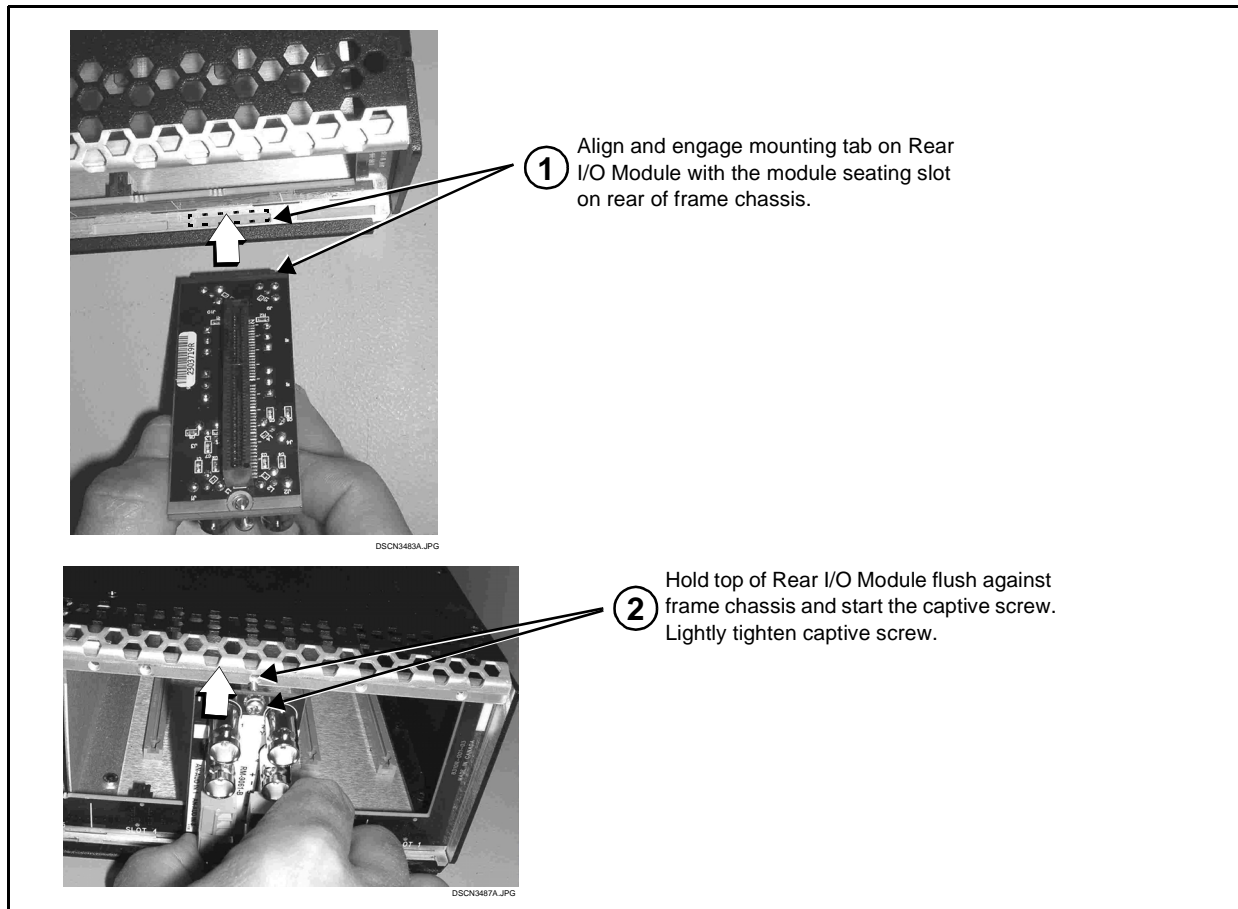
Figure 2-7 Rear I/O Module Installation

User Card Installation

> **Cards contain semiconductor devices which are susceptible to serious damage from Electrostatic Discharge (ESD). ESD damage may not be immediately apparent and can affect the long-term reliability of the device.**
>
> **Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always use proper ESD handling precautions and equipment when working on circuit boards and related equipment.**

CAUTION

Make certain Rear I/O Module(s) is installed before installing the card into the frame slot. Damage to card and/or Rear I/O Module can occur if module installation is attempted with card already installed in slot.

Note: Depending on option(s) ordered, Fusion3G® cards may consist of a main card and a piggyback (expansion) option card. If equipped with a piggyback card, **both cards as a unit** will require simultaneous alignment with slot guides and rear modules in the following steps.

1. Determine the slot in which the card is to be installed.

2. Open the frame front access panel.

3. While holding the card by the card edges, align the card such that the plastic ejector tab is on the bottom.

4. Align the card with the top and bottom guides of the slot in which the card is being installed.

5. Gradually slide the card into the slot. When resistance is noticed, gently continue pushing the card until its rear printed circuit edge terminals engage fully into the rear module mating connector.

CAUTION

If card resists fully engaging in Rear I/O Module mating connector, check for alignment and proper insertion in slot tracks. Damage to card and/or Rear I/O Module may occur if improper card insertion is attempted.

6. Repeat for other cards.

Setting Up Network Remote Control

The HPF-9000 frame and its HPF-FC Network Controller Card uses a standard 100/1000 Mbps Ethernet LAN for communication between the frame containing the Cobalt® cards and the computer running DashBoard™ remote control, or remote control via Cobalt OGCP-9000 Remote Control Panel or WinOGCP.

Before the cards can be used with this remote control, the frame and the remote control devices (e.g., computer running DashBoard™ or remote control panels) must be set up to communicate ("connect") with each other as described in this section.

The flowchart below shows what's required to set up remote control for connecting the cards/frame to a Cobalt® Remote Control Panel or DashBoard™, along with corresponding references to procedures in this section.

Note: • Network Controller Card must be unseated and re-seated to power-down and power-up the card at certain steps in the following procedures. When done with the procedures here, fully install retainer screw as described in Network Controller Card Removal/Installation (p. 2-8).

• The Network Controller Card uses a DIP switch bank to set the card for various network modes. An overview of these settings is shown in Figure 2-8 on page 2-21. However, it is recommended to follow the procedures below to set the card to typical modes.
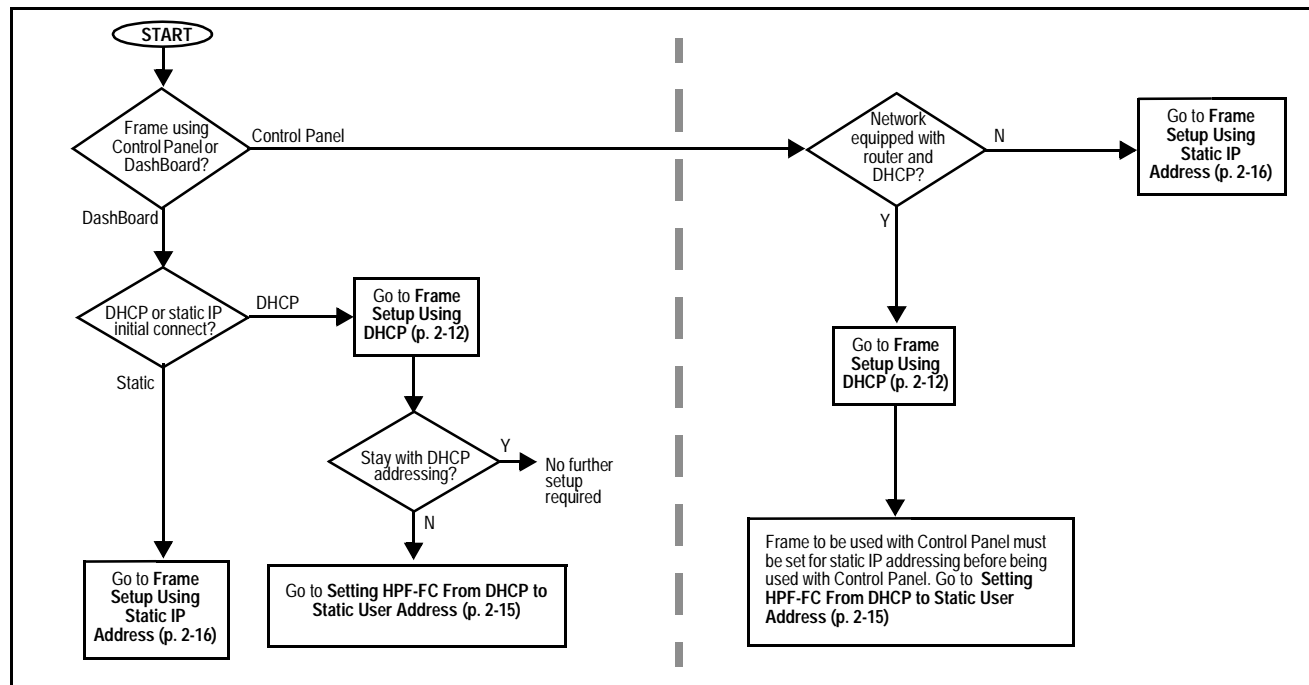
openGear® is a registered trademark of Ross Video Limited. **DashBoard**™ is a trademark of Ross Video Limited.

Frame Setup Using DHCP

DHCP provides the simplest method of connecting frames to the LAN. However, it is typically recommended that frame connections be changed to use static IP addresses after the initial connection is established.

If it is desired to change the address to a static IP address after all frames have been connected in this procedure, follow the instructions in this procedure to change the address to a static IP address after the frame has connected.

▸ Obtain and Install DHCP Server (if not present)

1. If the LAN connecting the frame(s) to DashBoard™ is not already configured with a DHCP server, obtain and install a DHCP server ("TFTP32" or an equivalent is suitable).

▸ Install and Set Up DashBoard™ (if not present)

2. On the computer connected to the frame LAN, go to the Cobalt Digital Inc. website: www.cobaltdigital.com and download DashBoard™. Follow the on-line instructions.

3. Open DashBoard™. Under **Window ➜ Preferences...** make certain Automatic discovery of devices **Enable** button is selected (as shown below).
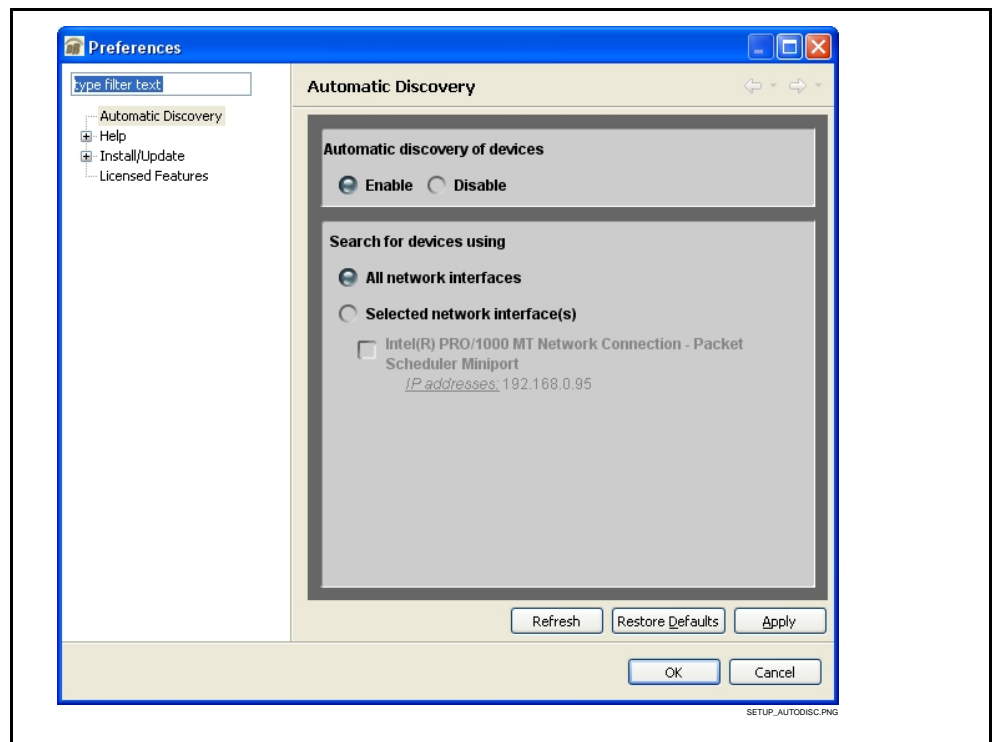
▶ **Set Network Computer for DHCP**

Note: • If connecting multiple frames using DHCP, allow adequate time to correlate the frame's network card serial number and its DHCP-assigned IP address before proceeding to the next frame. If frames are connected too rapidly without considering this, it may be difficult to correlate frame instances in DashBoard™ and the DHCP-assigned addresses with the physical identity of the frames.

• It is recommended to also identify each frame with its network card serial number and its assigned IP address. This can be easily done using the Frame Log Sheet included in the back of this manual. See Managing Frames Using a Log on page 2-31 for more information.

4. On the computer where DashBoard™ is installed, make certain TCP/IP Properties DHCP settings are as follows:

   · **Obtain an IP address automatically**

   · **Obtain DNS Server address automatically**

▶ **Set Network Controller Card for DHCP**

5. Unseat the Network Controller Card.

6. On the Network Controller Card, make certain switches are set to the **IP address assigned by DHCP server** position as shown below.

HPF-FC Card

MFC8320_PCB.JPG

Rear of Card

IP address assigned by DHCP server
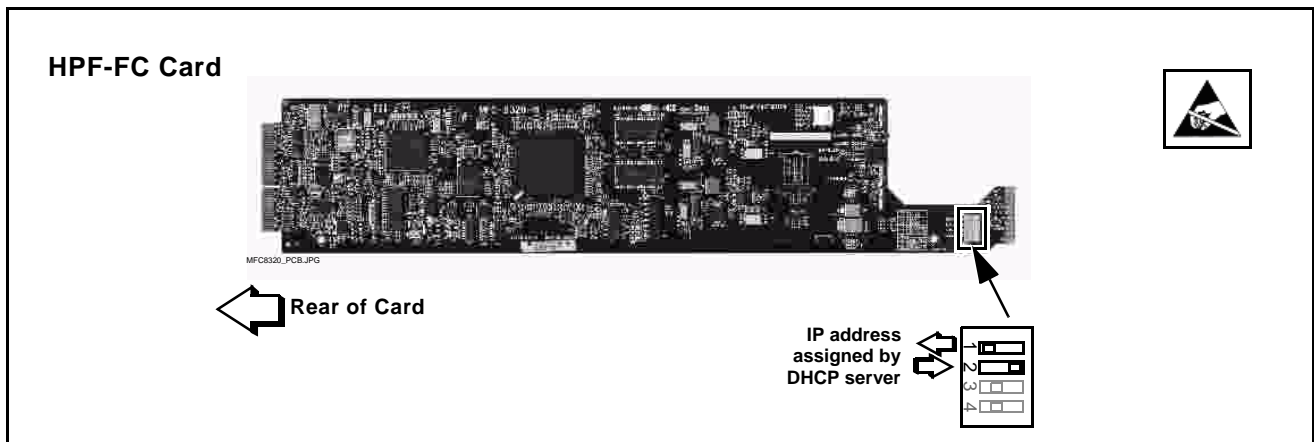
7. Connect the frame to the LAN.

8. Install the network card in the frame and power-up the frame. Wait for the network card to fully boot (red LED turns off).

9. By default, DashBoard™ is set to automatically connect to devices. The frame should now appear in the Basic Tree View pane (added frame "HPF-FC" as shown in the example below).

(If necessary, right-click on the frame and select **Connect**. The frame is now connected to DashBoard™.)

Frame added in DashBoard™

Frame now connected in DashBoard™
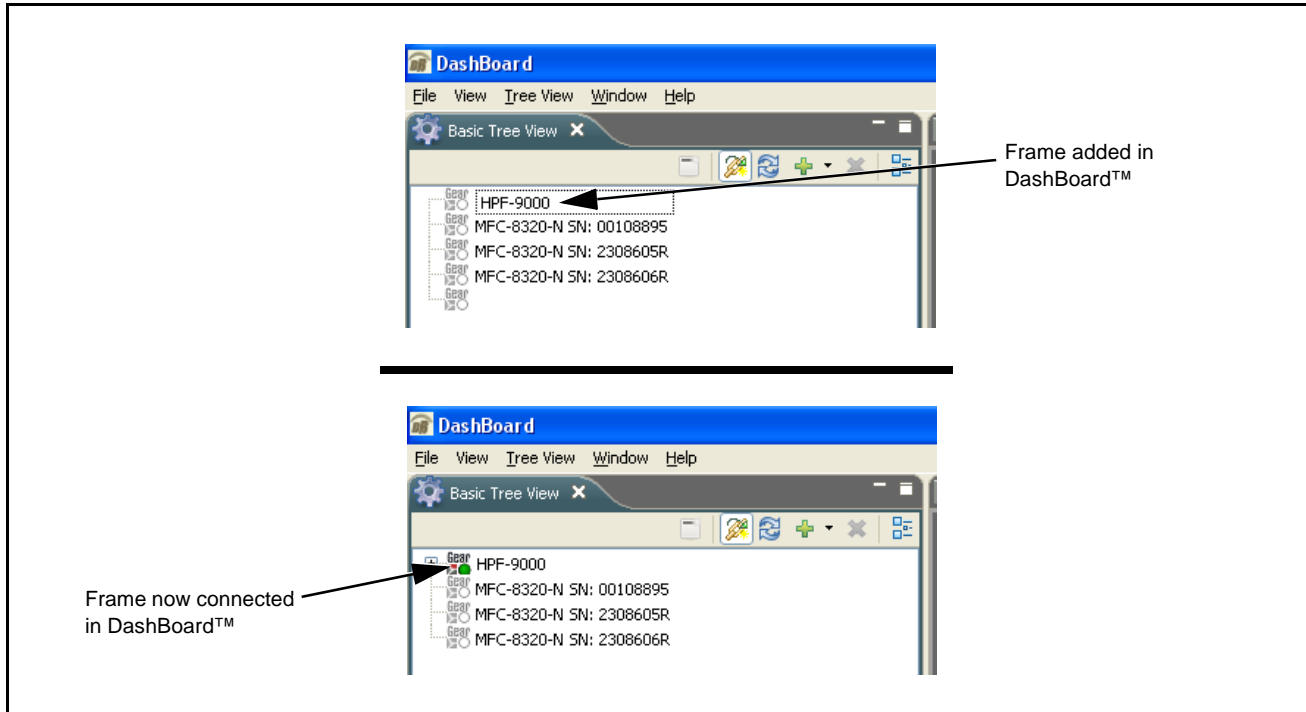
Note: • DashBoard™ may not be able to connect to the frame if firewalls or network segment controls are used between the computer running DashBoard™ and the frame. (DashBoard™ and the network card use TCP/IP and can be used with routers.)

• If DashBoard™ does not discover the added frame as described above, perform frame setup as described in Frame Setup Using Static IP Address on page 2-16. Also note that automatic discovery only works for frames within the subnet.

10. If desired, the frame name displayed in the Basic Tree View pane can be changed as shown on the next page.

Note: In the next step make certain the frame's network card is given a unique name correlating to the frame physical identity.

As shipped, a Network Controller Card and its controlled frame supplied by Cobalt® are identified in DashBoard™ by the card part number as shown in the examples in this section; therefore, no other action needs to be done unless a custom unique name is desired.

Right-click on the **slot containing the network card (slot 0)** to open the network configuration pane and select the **Network** tab.

Click **Modify Network Settings** and enter the desired frame name in the **Frame Name:** field and then click **Apply**.
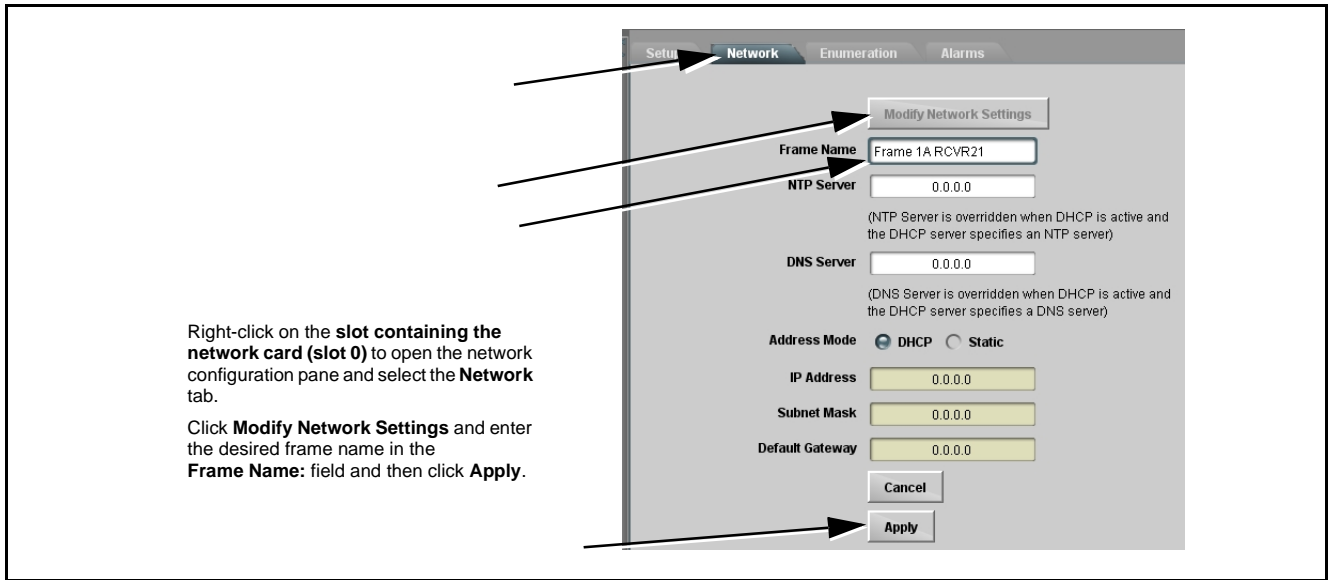
11. Depending on setup desired, proceed as follows:

- To keep setup as **DHCP IP address**, no further setup is required. The frame is now ready to access and control cards.

- To change to **static IP address**, go to Setting HPF-FC From DHCP to Static User Address below.

Setting HPF-FC From DHCP to Static User Address

1. On Network Controller Card **Network** configuration pane, perform the settings shown below.
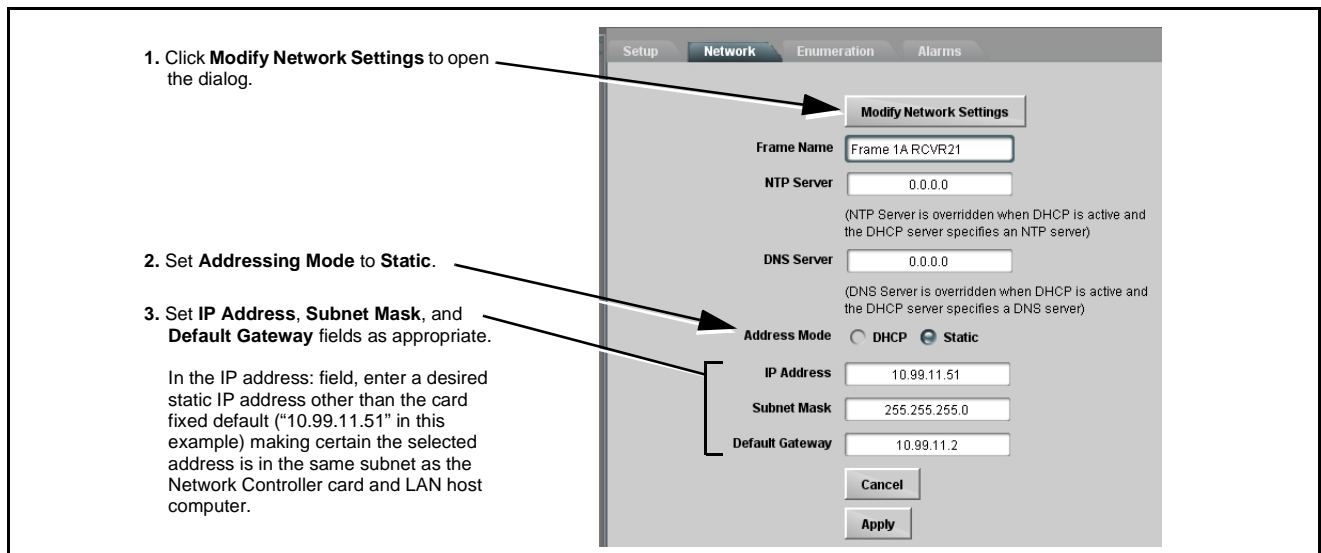
1. Click **Modify Network Settings** to open the dialog.

2. Set **Addressing Mode** to **Static**.

3. Set **IP Address**, **Subnet Mask**, and **Default Gateway** fields as appropriate.

In the IP address: field, enter a desired static IP address other than the card fixed default ("10.99.11.51" in this example) making certain the selected address is in the same subnet as the Network Controller card and LAN host computer.

2. On **Network** configuration pane, click **Apply**.

3. Remove the card from its slot and set DIP switches as shown below.

Rear of Card

IP address assigned by user
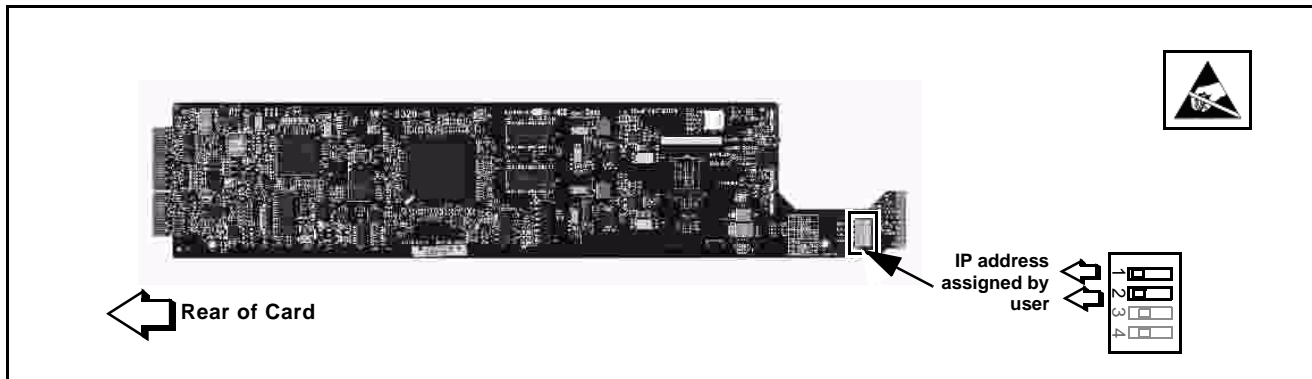
4. Re-insert the card. When the card again comes online, the frame now shows connection to DashBoard™ with the assigned static IP address ("10.99.11.51" as shown in the example below).

New IP address now assigned to frame

Newly assigned IP address
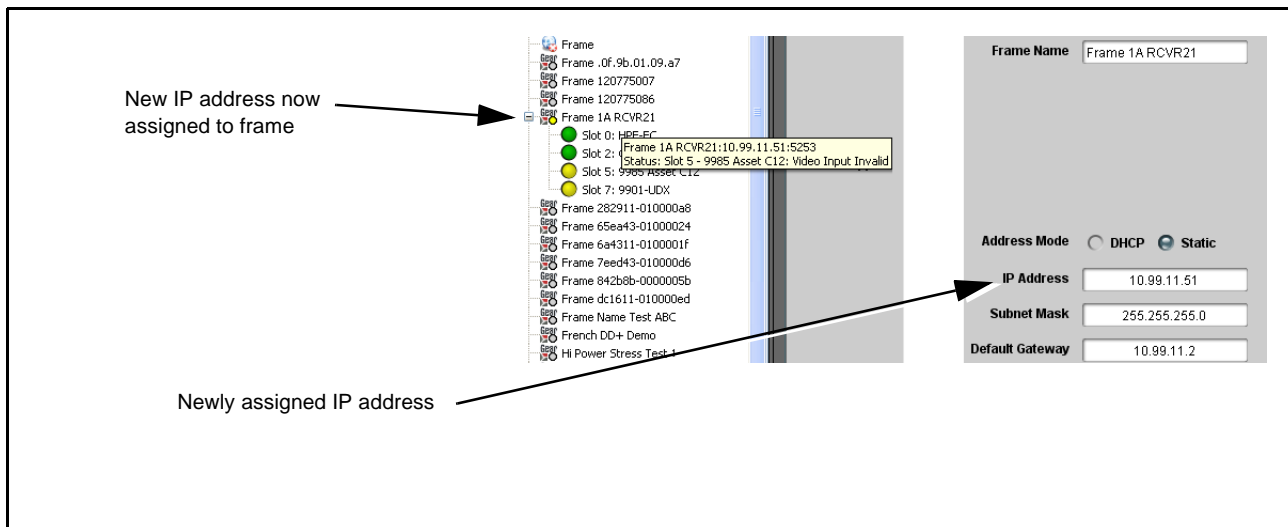
5. The frame is now ready to access and control cards.

Frame Setup Using Static IP Address

This procedure provides instructions for using the manual mode for adding a frame to DashBoard™. In this mode, the frame is set to use a static IP address, and DashBoard™ is set to look for and connect to a specific frame address. This mode is useful where network conditions or resource availability prevent DHCP usage.

Note: If static IP addresses are to be used, carefully follow this procedure. If the procedure is not followed as specified, DashBoard™ may lose all communication with the frame, thereby requiring the procedure to be repeated in its entirety.

▶ **Install and Set Up DashBoard™ (if not present)**

1. If not already performed, install DashBoard™ on the computer connected to the frame LAN as described in step 2 in **Frame Setup Using DHCP** on page 2-12.

2. Open DashBoard™. Under **Window ➤ Preferences...** make certain Automatic discovery of devices **Enable** button is selected (as shown on the next page).
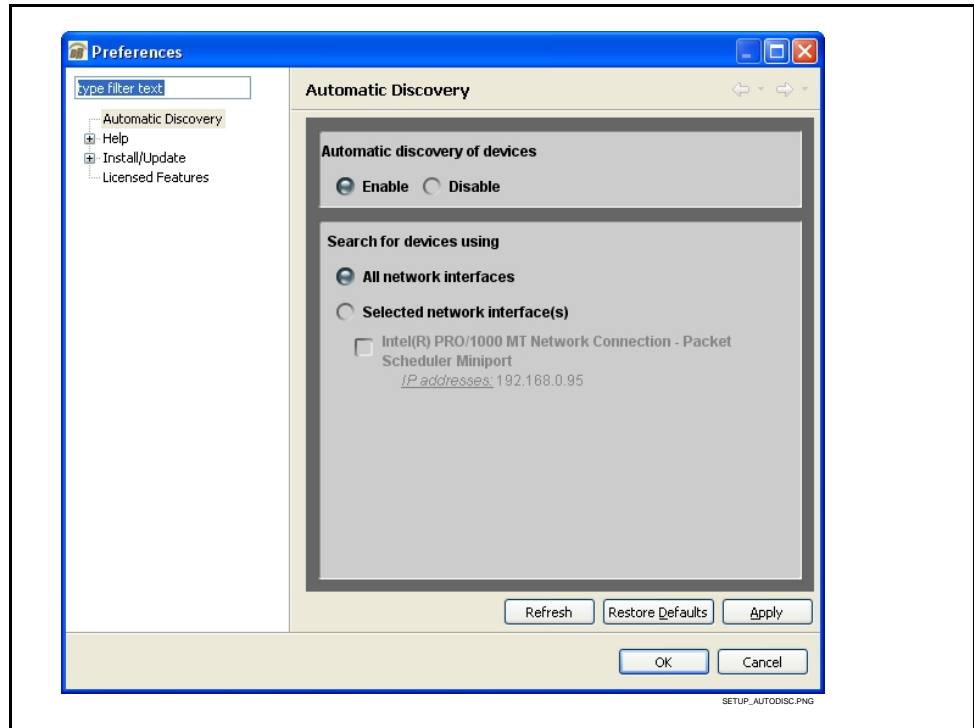
Note: It is recommended to identify each frame with its HPF-FC network card serial number and its assigned IP address. This can be easily done using the Frame Log Sheet included in the back of this manual. Refer to Managing Frames Using a Log on page 2-26 for more information.

▶ **Set Network Computer for Static IP Addressing**

3. As shown below, set the frame LAN computer to add static IP addressing that is on the same network as the network card default static IP address of **192.168.2.x**.

Internet Protocol (TCP/IP) Properties dialog box showing IP address 192.168.2.60 and Subnet mask 255.255.255.0

Set LAN computer to be on same network (1st through 3rd octets of static IP address) of network card fixed default

SETUP_LANPROP2.PNG
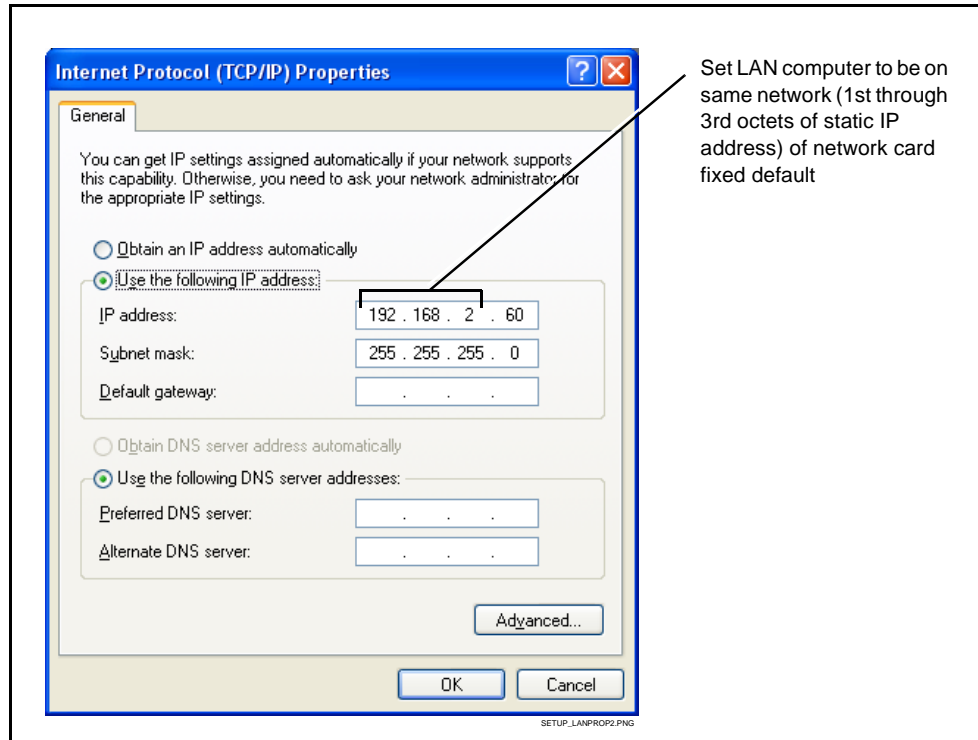
Note: When using a frame static IP address, if not already done it is recommended to isolate the LAN segment containing the frame, the hosting computer, and intermediate hubs or switches from other parts of the network. This prevents a potential conflict between the frame and any other node that might also have this address.

▶ Set Network Controller Card for Initial Factory Fixed IP Address

4. Set network card DIP switch to the **factory fixed static IP address** position as shown below. This establishes the initial connection between the card and the network computer.

MFC8320_PCB.JPG

Rear of Card

8320 factory fixed IP address 192.168.2.1
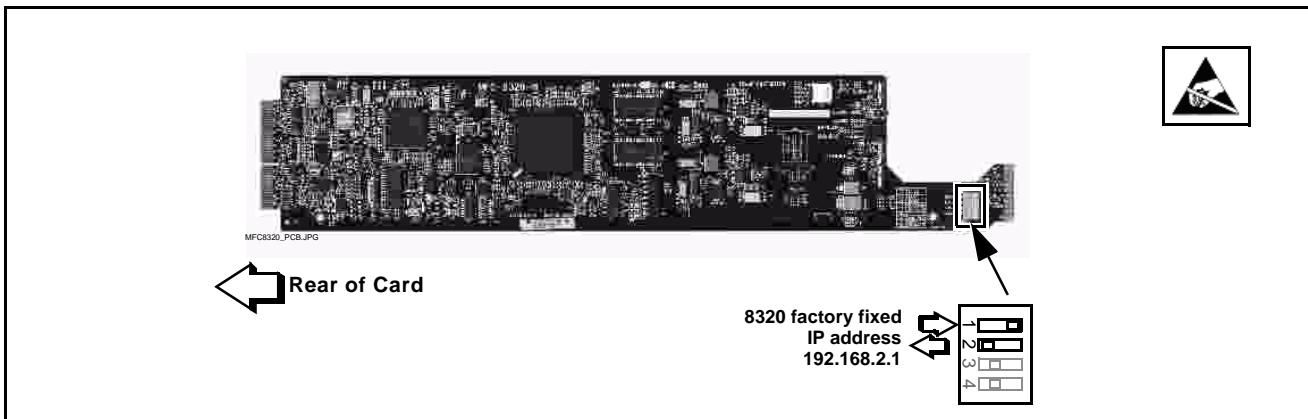
5. Connect the frame to the LAN and power-up the frame.

6. Install the network card in the frame. Wait for the network card to fully reboot (red LED turns off).

7. The added frame should now appear in the Basic Tree View pane. If necessary, right-click on the frame and select **Connect**. The frame is now connected to DashBoard™.

Frame added in DashBoard™

DB_ACCESS1A.PNG

Frame now connected in DashBoard™

DB_ACCESS2A.PNG
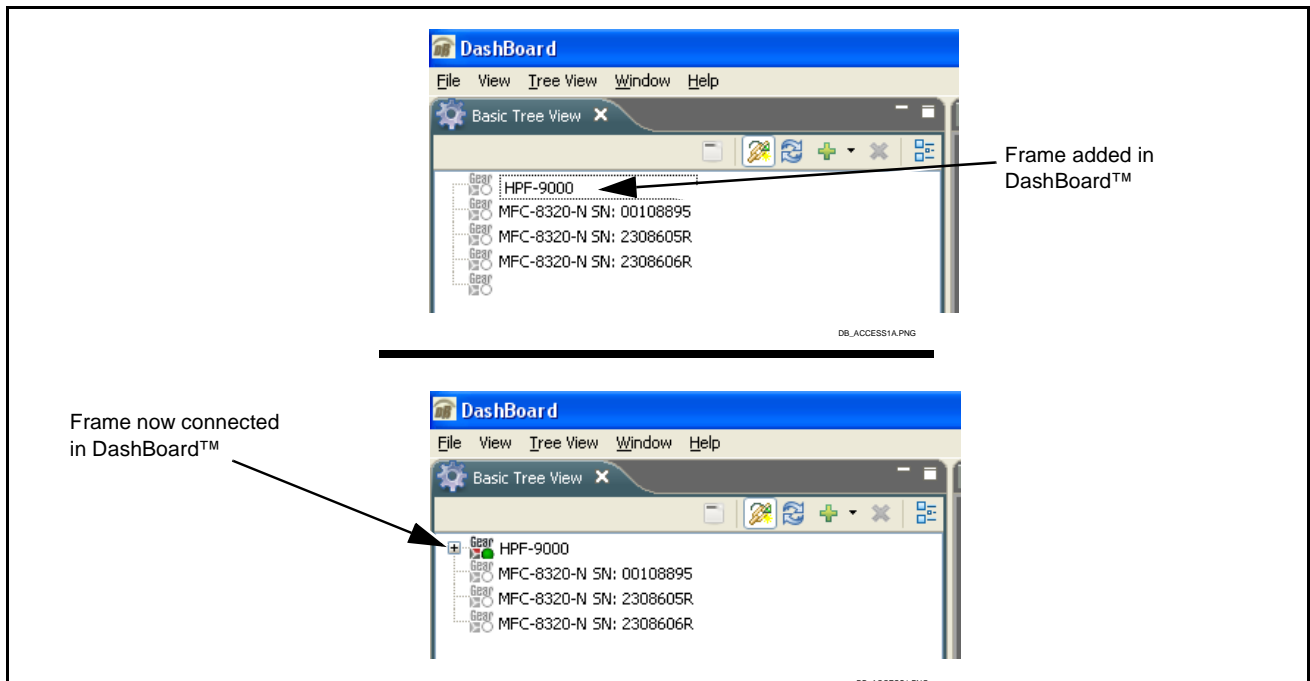
▶ Set Network Controller Card to Desired Unique Static IP Address

Note: If target network is different than that of network card factory default 192.168.2.x, host computer must also be configured for same target network.

8. On Network Controller Card **Network** configuration pane, perform the settings shown below.

1. Click **Modify Network Settings** to open the dialog.

2. Set **Addressing Mode** to **Static**.

3. Set **IP Address**, **Subnet Mask**, and **Default Gateway** fields as appropriate.

In the IP address: field, enter a desired static IP address other than the card factory fixed default ("10.99.16.103" in this example) making certain the selected address is in the same subnet as the network controller card and LAN computer.

Note: At this point, the Network Controller Card can be set for any network that is available on the host computer.

Setup   Network   Enumeration   Alarms

Modify Network Settings

Frame Name HPF-9000
NTP Server   0.0.0.0
(NTP Server is overridden when DHCP is active and the DHCP server specifies an NTP server)
DNS Server   0.0.0.0
(DNS Server is overridden when DHCP is active and the DHCP server specifies a DNS server)
Address Mode ○ DHCP ◉ Static
IP Address   10.99.16.103
Subnet Mask   255.255.255.0
Default Gateway 10.99.16.2
Cancel
Apply

Note: Do not leave the IP address as the factory default 192.168.2.1. If other frame are to be installed later, the IP address being left at default will conflict with subsequent frames installed as described here.

9. On **Network** configuration pane, click **Apply**.

10. Remove the card from its slot and set DIP switches as shown below.

Rear of Card

IP address assigned by user

Note: Time required for card to come back online depends upon amount of frames connected to DashBoard™.

11. Re-insert the card. When the card again comes online, the frame now shows connection to DashBoard™ with the assigned static IP address ("10.99.16.103" as shown in the example on the next page).
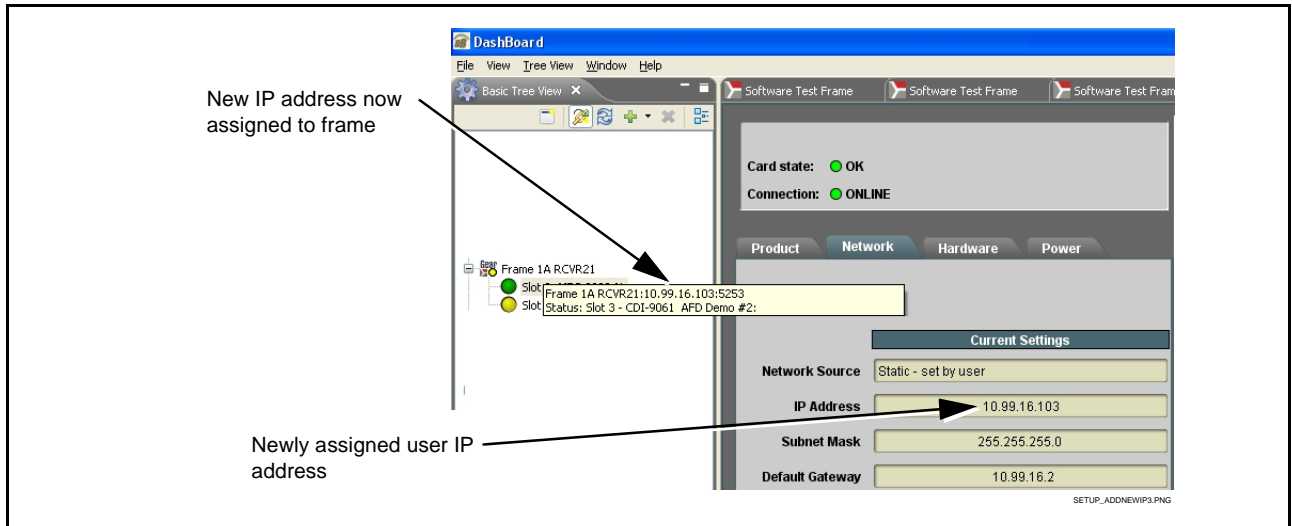
12. The frame is now ready to access and control cards.

Network Controller Card Address Mode Switch

Figure 2-8 is a general reference showing the various network modes available using the card setup DIP switches. For most installations, it is recommended to follow the procedures above for setting up the card network communications. Figure 2-8 shows settings for these modes as well as special alternate modes.
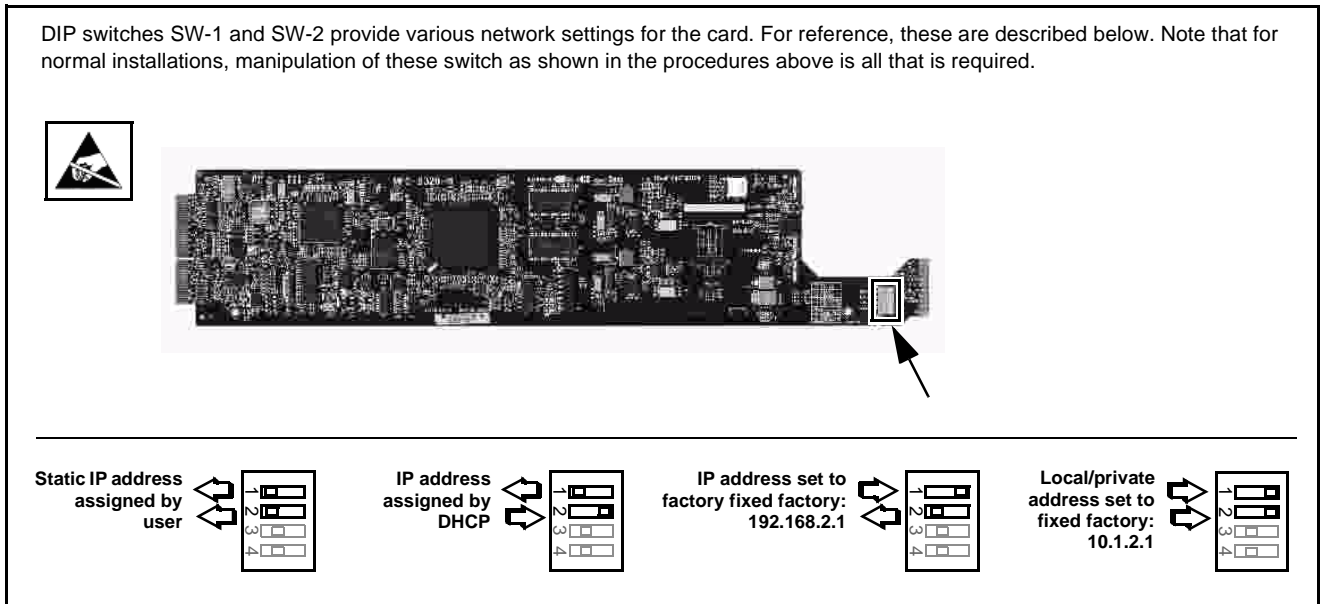
Figure 2-8 Network Controller Card DIP Switch Overview

Setting Network Controller Card/Frame User Access

Via DashBoard, the frame can be set for **Locked** or **Unlocked** password access using the dialog shown below.

For cases where locked access needs to be overridden, the Network Controller Card can be set to ignore locked access using the DIP switch as shown below.
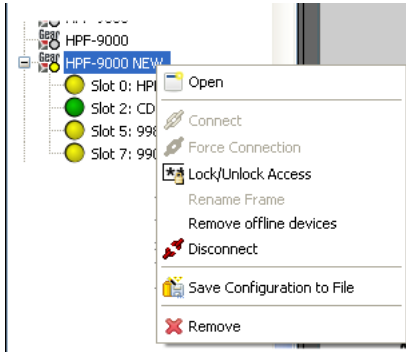
Right-click on the frame in DashBoard Basic Tree View and select **Lock/Unlock Access** to access password set/enable dialog.
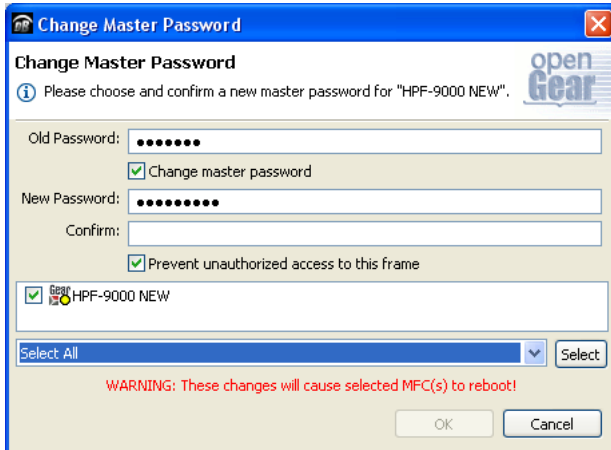
Check **Change master password** and **Prevent unauthorized access to this frame** to enable password-controlled frame access.

In the drop-down list, select targets that are desired to have access control applied.

Click **OK** when done.

OFF (0) position forces user password access to be applied

ON (1) position sets frame to ignore locked access (override) and allow full access to the frame
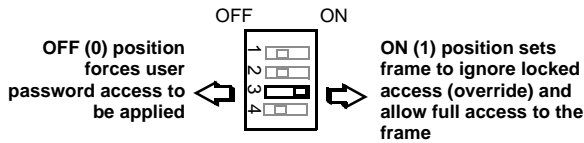
Setting DIP switch position 3 to ON or OFF allows password override as shown.

Setting Network Controller Card to Mute Audible Alarms

The frame has a pushbutton to temporarily mute the "beeper" on the card. However, to persistently mute audible alarms, set the Network Controller Card **ALARM CONFIG** jumper to the **Disabled** position as shown below.
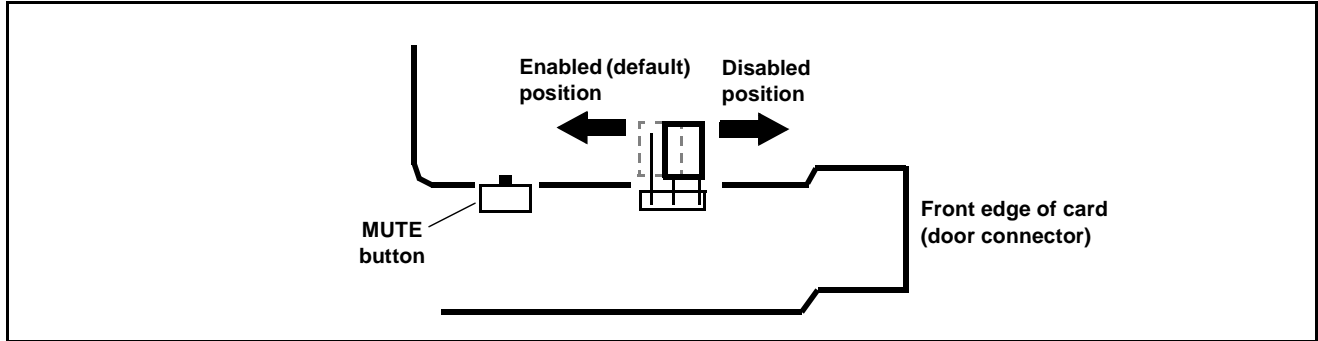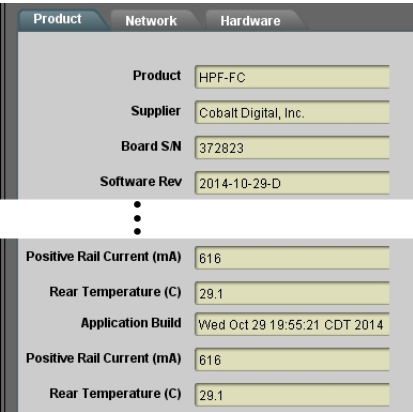
Network Controller Card DashBoard Status and Settings Interfaces

In addition to the **Network** tab described in the sections above for frame network settings, the HFC-FC network controller card provides several status display and auxiliary function setup interfaces as described below.

Frame Info Tabs

The left pane of the network Controller Card DashBoard page provides a status display as shown in Figure 2-9.

Product Display
This displays shows the hardware identifcation of the network card, as well as software revision. It also shows current draw of the network card itself, as well as card rear temperature (adjacent to card controller chips).
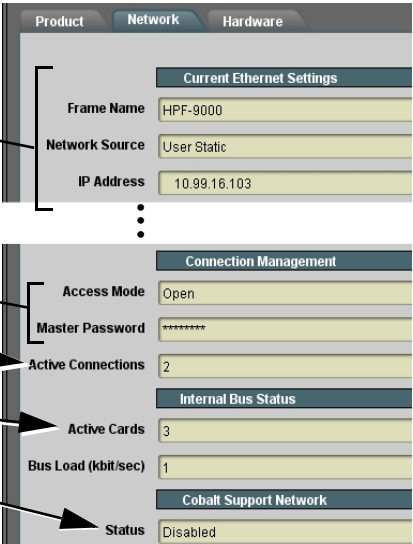
Network Display
This displays shows the current network settings (either user configured static or DHCP assigned status).

Access Mode shows Open or Locked (which requires a password for access). See Setting Network Controller Card/Frame User Access (p. 2-22) for setting frame DIP switch for open or locked access.

Active Connections shows how many DashBoard instances are currently accessing the frame.

Active Cards shows how many cards (user slots 1 thru 20) are currently installed and recognized by the frame.

Cobalt Support Network Status shows whether or not the Cobalt Support VPN connection to the frame is enabled.

Hardware Display
This displays shows the current overall status of the frame hardware and its power supplies.

Audible Alarm shows user setting of alarm mute jumper. See Setting Network Controller Card to Mute Audible Alarms (p. 2-23) for more information.

Frame Model - S/N shows frame model number and S/N. (If network card is installed in a frame other than HPF-9000, "unknown" will be displayed.)

Frame Voltage/Power shows frame rail voltages and positivce rail total power consumed.

Power Supplies Status shows PSU presence for each of two PSU slots, as well as status and current for each PSU. (If either of two PSUs are not installed, "missing" is displayed.)

Fan Door Status shows if fan door is open or closed, and shows fan speed setting and temperature at door air inlet when door is closed. See Frame Setup and Auxiliary Function Control Tabs (p. 2-25) for setting fan speed.
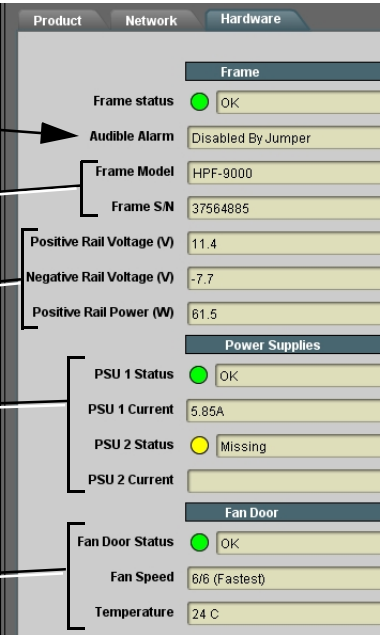
Figure 2-9 Frame Status DashBoard Display

Frame Setup and Auxiliary Function Control Tabs

Table 2-1 individually lists and describes the Setup, Network, Enumeration, and Alarms control tabs. Where helpful, examples showing usage of a function are also provided.

Table 2-1   Frame Setup and Auxiliary Control Descriptions
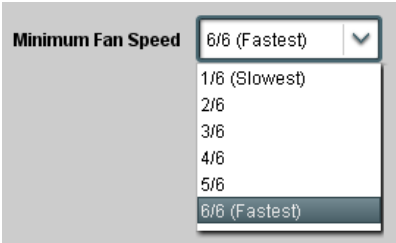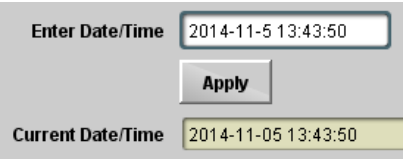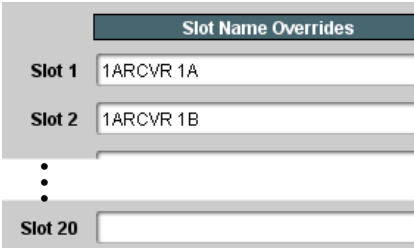
Setup	Provides controls and fields for setting frame fan speed, date/time, and custom override card naming
• **Fan Speed Control** Minimum Fan Speed: 6/6 (Fastest) 1/6 (Slowest) 2/6 3/6 4/6 5/6 6/6 (Fastest)	Allows fan speed to be reduced from default fastest enabled to reduce ambient acoustic noise levels. • **6/6** is maximum setting (full fan speed enabled) • **1/6** is minimum setting (1/6 max fan speed) **Note:** Fan speed minimum setting is automatically overridden in cases where more cooling is determined to be required based on frame power consumption.
• **Restore Factory Defaults Button** Restore Factory Defaults	**Restore Factory Defaults** provides factory reset of all fields and functions. When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation. • Click **Yes** to proceed with the restore. • Click **No** to reject restore. ⚠ Invoking Restore Factory Defaults will result in loss of user settings such as network settings.
• **Identify Frame Button** Identify (Beep and flash FAULT LED)	When pressed, provides a command to connected frame to momentarily identify itself by causing the frame's front panel/door FAULT LED to flash and its beeper to sound (as long as beeper jumper is not set to Mute). Identify function times out automatically in appr. 8 seconds, or can be cancelled by pressing the button again.
• **Frame Date/Time Entry Controls** Enter Date/Time: 2014-11-5 13:43:50 Apply Current Date/Time: 2014-11-05 13:43:50	Allows a running date and time to be entered for the frame and connections displayed in DashBoard. When date/time are entered as desired, press **Apply** to invoke the settings. **Note:** Entry must be entered in format shown to be invoked.
• **Card Name Custom Override Entry** Slot Name Overrides Slot 1: 1ARCVR 1A Slot 2: 1ARCVR 1B ⋮ Slot 20:	Allows user custom names to be entered for cards in user slots 1 thru 20. **Note:** • DashBoard may need Refresh for custom names to appear. • Custom names will only appear in other DashBoard connections where a card is installed in the slot with the custom name.

Table 2-1   Frame Setup and Auxiliary Control Descriptions — continued

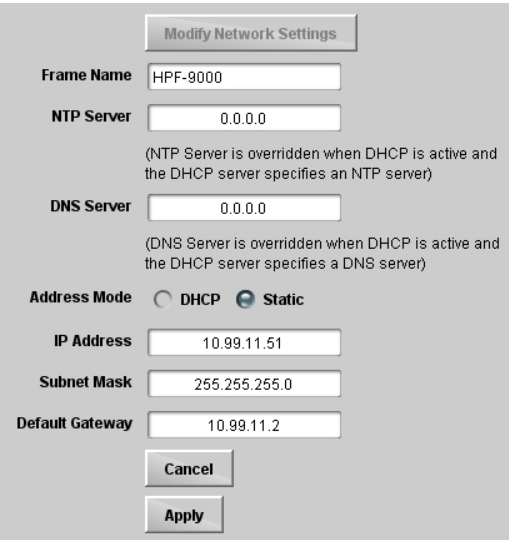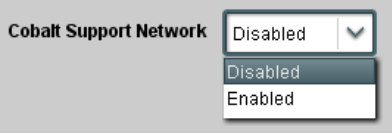|	
Network	Provides controls and fields for setting frame network connection
Note: Most of the controls on this tab provide basic network setup as described in Setting Up Network Remote Control (p. 2-11). Refer to Setting Up Network Remote Control (p. 2-11) for basic network setup or for making changes on a frame already installed.	
• **Modify Setting Button** Modify Network Settings	Opens the dialog fields on this tab for changing network settings.
• **Frame Name/Network Settings Fields** Modify Network Settings Frame Name HPF-9000 NTP Server 0.0.0.0 (NTP Server is overridden when DHCP is active and the DHCP server specifies an NTP server) DNS Server 0.0.0.0 (DNS Server is overridden when DHCP is active and the DHCP server specifies a DNS server) Address Mode ○ DHCP ● Static IP Address 10.99.11.51 Subnet Mask 255.255.255.0 Default Gateway 10.99.11.2 Cancel Apply	Allows setting frame displayed name, addressing mode, NTP/DNS server addresses, and network settings when card is set for static IP address. • **Frame Name** field allows entry of custom frame name. • **NTP** and **DNS Server** fields allow entry of NTP and DNS servers (where used). • **Address Mode** shows currently invoked addressing mode. **Note:** Address mode **must** be selected using card DIP switches as described in Setting Up Network Remote Control (p. 2-11). • **IP Address** and related entry fields allow user static address entry. **Note:** Static IP address and related fields can be changed to connect to other addresses (where supported by host connections) using the entry fields here. However, initial static IP setup (or change from DHCP to static addressing **must** be performed as described in Setting Up Network Remote Control (p. 2-11). • Click **Apply** or **Cancel** to commit or reject and related entry fields allow user static address entry.
• **Cobalt VPN Support Enable** Cobalt Support Network Disabled ▼ Disabled Enabled	Enables or disables a VPN connection from the frame and Cobalt Support where the frame network installation and operation can be viewed, queried, and assessed by Cobalt Support. It is recommended to leave this default setting enabled so that your installation is visible should it need analysis by Cobalt Support.

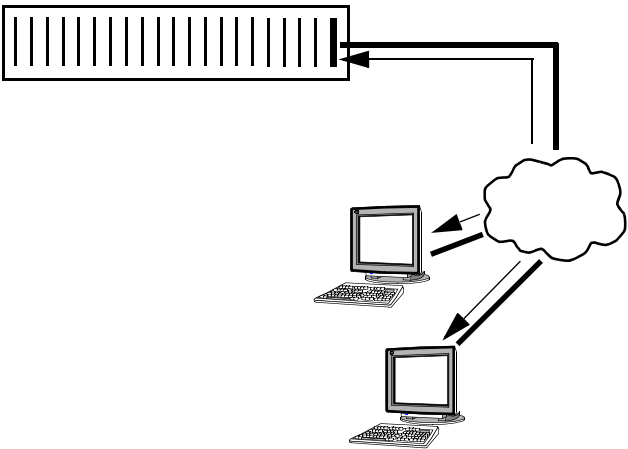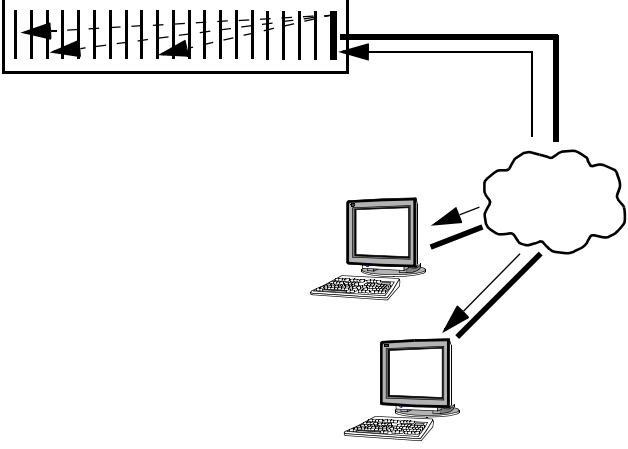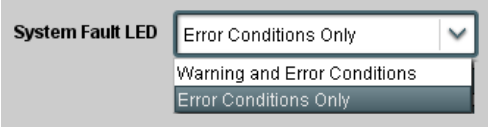*Table 2-1   Frame Setup and Auxiliary Control Descriptions — continued*
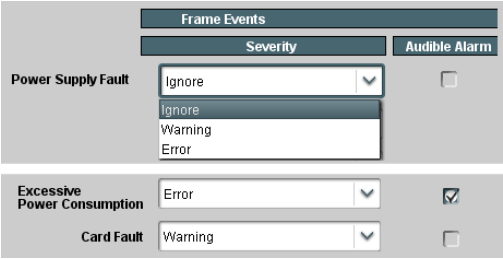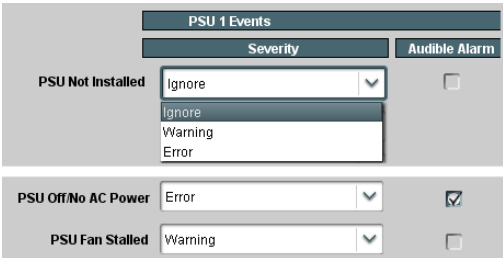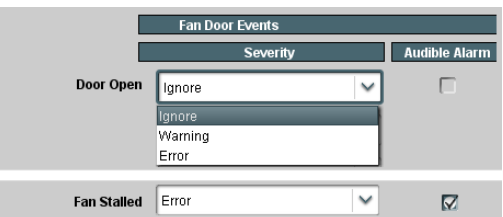
Enumeration	Provides controls for Network Controller Card caching of user card parameters that can enhance DashBoard-to-frame connection speed using enumerated parameter list caching

With user cards enumerated by Network Controller Card, DashBoard instances query for card presence with communication between only the Network Controller Card and DashBoard instances. The frame internal CAN bus is not queried, greatly speeding-up frame reporting and card presence to DashBoard instances. Cache is updated if card parameters change.

Without user cards enumeration, DashBoard instances must query for card presence using communication between the Network Controller Card and DashBoard instances, and additionally then the Network Controller Card and the frame internal CAN bus. This can cause longer delays in frame connection (especially when many DashBoard instances are trying to query the same frame).

• **Parameter Caching Mode Select**

Parameter Caching	Enabled with enumeration; cards visible immediately
	Disabled
	Enabled without enumeration
	Enabled with enumeration; cards visible immediately
	Enabled with enumeration; cards hidden until enumerated

	Product	Enumeration Status	Bus Traffic
Slot 1	9901-UDX	Done (885)	Rx
Slot 2	CDI-9121	Done (30)	Rx
Slot 20			

Selects caching mode as follows:

• **Disabled** – no caching; all queries always go thru CAN bus to cards.

• **Enabled without enumeration**– caching is performed, but an enumerated list is not written.

• **Enabled with enumeration; cards immediately visible**– caching is performed and enumerated list is written. Frame and card presence is visible even for cards not fully enumerated. (This setting provides fastest rendering of frame and cards in DashBoard and is the recommended default setting.) Enumeration list shows write-to-list status.

• **Enabled with enumeration; cards hidden until enumerated**– similar to above, but waits until cards are fully enumerated before displaying a card.

Note: All known instances of Cobalt openGear® cards support network controller card parameter caching. If card will not appear, set Parameter Caching to Disabled. This mode is the same as previous frame network controller card function.

Table 2-1   Frame Setup and Auxiliary Control Descriptions — continued

Alarms	Provides controls for setting the severity escalation of several monitored frame conditions

Note: The following terms are used to denote and escalate alarms using this tab:
    - **Warning/Alert** - item of minor severity that could indicate undesired operation. Propagates **yellow** "LED" in DashBoard.
    - **Error** - item that is completely non-functional or has failed indicating critical severity. Propagates **red** "LED" in DashBoard.	

• **Front-Panel LED Escalation Select**
 	
System Fault LED   Error Conditions Only
              Warning and Error Conditions
              Error Conditions Only
	Selects the severity class(es) that will trigger a frame front-panel LED "on" state as shown.

• **Frame Events Alarm Escalation**
 	
Frame Events
Severity   Audible Alarm
Power Supply Fault   Ignore
     Ignore
     Warning
     Error
Excessive Power Consumption   Error   ☑
Card Fault   Warning
	Sets alarm escalation for various events related to overall frame function as follows:
	
	• **Power Supply Fault** – assesses condition of overall power supply functions (redundant power supply function considered as overall function) and allows escalations settings and audible alarm trigger select.
	
	• **Excessive Power Supply Consumption** – assesses condition of overall power supply output power consumption and allows escalations settings and audible alarm trigger select.
	
	• **Card Fault** – monitors Network Controller Card fault status and allows escalations settings and audible alarm trigger select.
	
	Note: User card fault status is independent of settings and status shown here.

• **PSU Events Alarm Escalation**
 	
PSU 1 Events
Severity   Audible Alarm
PSU Not Installed   Ignore
     Ignore
     Warning
     Error
PSU Off/No AC Power   Error   ☑
PSU Fan Stalled   Warning
	Sets alarm escalation for various events related to frame PSU 1 and PSU 2 as follows:
	
	Note: • PSU 1 and PSU 2 have identical independent controls. Only PSU 1 controls are shown.
	       • If a PSU slot is intended not to contain a PSU (for example, frame with PSU 1 only; no redundant PSU option), set all controls on unused PSU position to **Ignore** to prevent nuisance alerts/errors.
	
	• **PSU Not Installed** – checks for physical presence of recognized PSU and allows escalations settings and audible alarm trigger select.
	
	• **PSU Off/No AC Power** – checks for acknowledge of AC line power to respective PSU and allows escalations settings and audible alarm trigger select.
	
	• **PSU Fan Stalled** – checks for acknowledge of fan operation of respective PSU and allows escalations settings and audible alarm trigger select.

• **Fan Door Events Alarm Escalation**
 	
Fan Door Events
Severity   Audible Alarm
Door Open   Ignore
     Ignore
     Warning
     Error
Fan Stalled   Error   ☑
	Sets alarm escalation for various events related to fan door as follows:
	
	• **Door Open** – checks that fan door is fully latched and allows escalations settings and audible alarm trigger select.
	
	• **Fan Stalled** – checks for acknowledge of operation for all door fans and allows escalations settings and audible alarm trigger select.

Troubleshooting Network/Remote Control Errors

The table below provides network/remote control troubleshooting information. If cards within the frame or remote connections exhibit any of the symptoms listed in the table, follow the troubleshooting instructions provided.
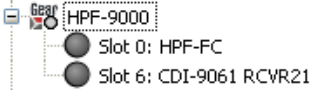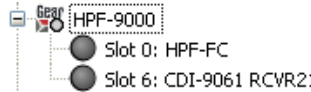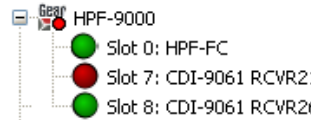
Note: All remote control items described here use industry standard 100/1000 Mbps Ethernet for communication between the Network Card/frame and remote control systems such as DashBoard™.

Standard LAN troubleshooting techniques and practices are applicable to this usage. The RJ-45 receptacle that provides the frame connection to the LAN is equipped with an activity status indicator that can be used to determine activity status.
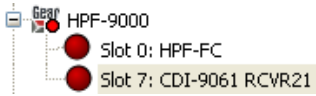
Troubleshooting Network/Remote Control Errors by Symptom

Symptom	Error	Corrective Action
DashBoard™ does not discover newly added frame; newly added frame will not connect to network	• DashBoard™ may not be set to automatically discover added devices	• Make certain DashBoard™ is set to automatically discover devices as specified in Frame Setup Using DHCP on page 2-12. **Note:** The surest method of establishing a connection is to use static addressing using the network card's factory fixed IP address to establish initial connection. When connection is established using factory fixed IP address, the connection can then be changed to a unique IP address in accordance with Frame Setup Using Static IP Address (p. 2-16).
	• Damaged Ethernet cable or cable connector; cable mis-connected	• Make certain the Ethernet cable is properly connected and showing activity on the LAN switch indicators and the **ETHERNET** connector indicator on the frame. Use `ping` to check the connection.
Newly added frame in DashBoard™ that uses static IP address will not activate (icon stays grayed-out)	• Network Card and LAN computer on different networks	• Make certain LAN hosting computer and Network Controller Card are on same network. During setup, computer must use 192.168.2.x network (HPF-FC card) to accommodate the Network Card fixed static IP address.
	• Address conflict with other nodes or another Network Card	• Make certain that the LAN segment containing the frame, the hosting computer, and intermediate hubs or switches is isolated from other parts of the network. • Make certain this Network Card or others have not been left with its address mode switch set to the factory fixed static IP address mode.

***Troubleshooting Network/Remote Control Errors by Symptom — continued***

Symptom	Error	Corrective Action
Previously connected and active frame now shows grayed-out icon in Card Access/Navigation Tree pane for Network Controller Card in DashBoard™. Error randomly occurred with no intervening action. Gear HPF-9000 Slot 0: HPF-FC Slot 6: CDI-9061 RCVR21	Network Controller Card not electrically/physically connected to frame, or communications error	• Make certain the Network Card is properly and fully seated in its frame card slot. Eject the card and reseat the card. • Make certain the frame power supply shows proper operating status. • Make certain the Ethernet cable is properly connected and showing activity on the LAN switch. Use `ping` to check the connection.
Previously connected and active frame now shows grayed-out icon in Card Access/Navigation Tree pane for Network Controller Card in DashBoard™. Error occurred immediately after applying DashBoard™ Network Configuration page changes, or when host computer/network had network setting changes applied. Gear HPF-9000 Slot 0: HPF-FC Slot 6: CDI-9061 RCVR21	DashBoard™ has lost its connection to the frame. If a frame is set in Dashboard™ as using DHCP, **do not** change the setting to static IP address ("Use DHCP: No") without following the **entire** procedure for static address usage (DashBoard™ will not forward from DHCP-assigned addresses to a static address)	• Try removing and re-inserting the network card, and then repeating by closing and opening DashBoard™ again. • Re-establish connection by re-connecting the frame to Dashboard™ using factory fixed static IP address (192.168.2.1 for HPF-FC) as described in Frame Setup Using Static IP Address on page 2-16. Then, reconfigure the frame for DHCP in accordance with the instructions provided in the procedure.

DashBoard™ shows red icon in Card Access/Navigation Tree pane for **user** card (Network Controller Card OK).
 	
Gear HPF-9000
Slot 0: HPF-FC
Slot 7: CDI-9061 RCVR21
Slot 8: CDI-9061 RCVR26
	See "Corrective Action" to the right	• **If other cards in the same frame show connection**, the card showing red icon may not be communicating with Dashboard™. Check the following:
		  • Make certain the card is installed in the intended frame and slot location.
		  • Make certain the card is properly and fully seated in the frame card slot. Eject the card and re-seat the card.
		  • Card may be experiencing error other than network-related. Check the card's status in its Card Info pane.
		
		• **If all other cards in the same frame do not show connection**, the remote control system may not be connecting to the LAN. Check the following:
		  • Make certain the Ethernet cable is properly connected and showing activity on the LAN switch. Use `ping` to check the connection.

Troubleshooting Network/Remote Control Errors by Symptom — continued

Symptom	Error	Corrective Action
DashBoard™ shows red icon in Card Access/Navigation Tree pane for **Network Controller Card**. HPF-9000 　Slot 0: HPF-FC 　Slot 7: CDI-9061 RCVR21	Network Controller Card LAN settings may be incorrect in DashBoard™ Network Configuration screen	• **If cards in another frame display properly**, the remote control system may not be connecting to the frame containing the cards. Check the following: 　• Make certain the IP settings for the frame specified in the DashBoard™ Network Configuration screen agree with the settings for the frame. • **If cards in another frame also do not display properly**, the remote control system may not be connecting to the LAN. Check the following: 　• Make certain the Ethernet cable is properly connected and showing activity on the LAN switch. Use `ping-` to check the connection.
User card inserted in frame does not show up in DashBoard Basic Tree view.	Card may not support enumeration caching by network controller card	See Frame Setup and Auxiliary Function Control Tabs (p. 2-25). To speed-up DashBoard connections to a frame, the Network Controller Card supports user card parameter caching. All known instances of Cobalt openGear® cards support network controller card parameter caching. If card does not appear, set **Setup** > **Parameter Caching** to **Disabled**.
Nuisance DashBoard and/or frame FAULT LED alerts occurring.	Frame alarms unintentionally set to trigger for non-critical conditions	See Frame Setup and Auxiliary Function Control Tabs (p. 2-25) and make certain alarms are not enabled or unnecessarily escalated for non-critical conditions (such as PSU errors for an intentionally blank PSU slot).

Using a Log for Managing Frames

The example below shows how to use the Frame Log Form. Photocopy or print copies of the Frame Log Form on page 2-26 to document the frame correlation to its name in DashBoard™. The form is equipped with on-line form fields that allow the form to be filled out as a PDF soft copy. Save the form page using the Adobe® Acrobat® save options.

SETUP_MULTFRAME_EX.PNG
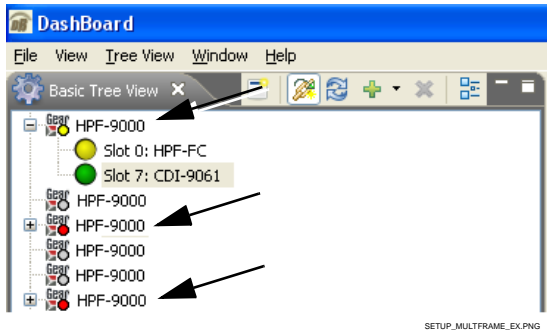
In the example here, each frame's DashBoard™ instance is correlated to its physical identity using the form.

Each rack is identified on the form with a number, with its frames identified with a suffix letter. Additional information such as network ID can also be included.

Using this method of correlating a frame's physical identity with its DashBoard™ name, the frame can be easily located in both DashBoard™ and the physical plant should it need any further attention.

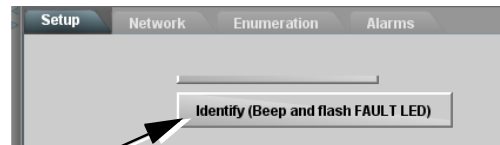| Rack ID | Frame ID | Remote Control System | |
		Network ID	Remarks:
1	1A MFN SN 00108053	☐ DHCP ☒ Static IP ADDR: _192_._168_._1_._15_ Netmask: _255_._255_._255_.0 Gateway: _10_._0_._1_._1_	Post-production backend room 125
1	1B MFN SN 00108767	☐ DHCP ☒ Static IP ADDR: _192_._168_._1_._16_ Netmask: _255_._255_._255_.0 Gateway: _10_._0_._1_._1_	Post-production backend room 125
1	1C MFN SN 09953895	☐ DHCP ☒ Static IP ADDR: _192_._168_._1_._17_	Post-production backend room 125

Log_Example_B.pdf
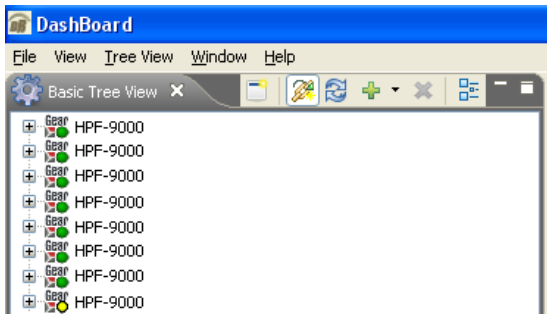
Without an orderly and documented means of connecting frames to the network, many frames may connect with no correlation to the frame's physical identity (especially if DHCP is used without adequate consideration of keeping track of connections). In this example, although the frames are connected to DashBoard™, the frame becomes "lost" from its physical identity.

Also note that in cases where a Network Controller Card does not have a unique name, the only unique identification of the card/frame will be its IP address (which typically may have no correlation to its physical identity).

Note: If a frame becomes "lost" after installation, its instance in DashBoard™ can be identified by opening the frame's fan door, thereby causing an alert (yellow icon) for the corresponding frame in DashBoard™. The frame for which the door was opened can then be correlated to its instance in DashBoard™ by taking note of the instance displaying a "Fan Door Open" alert.

Going the other direction, from DashBoard™ the physical location of a frame can also be identified by pressing the **Identify (Beep and flash FAULT LED)** button on the **Setup** tab. This causes the connected frame's front panel/door FAULT LED to flash and its beeper to sound (as long as beeper jumper is not set to Mute).

Frame Log Form

Use this form to document the frame correlation to its name in DashBoard™. Fill in
the blanks for other information that can also be recorded as desired.

Sheet __ of __

Date: _____

Site: _____

Personnel: _____

Rack ID	Frame ID	Remote Control System	
		Network ID	**Remarks:**
		❏ DHCP ❏ Static IP ADDR: ____.____.____.____ Netmask: ____.____.____.__ Gateway: ____.____.____.____	
		❏ DHCP ❏ Static IP ADDR: ____.____.____.____ Netmask: ____.____.____.__ Gateway: ____.____.____.____	
		❏ DHCP ❏ Static IP ADDR: ____.____.____.____ Netmask: ____.____.____.__ Gateway: ____.____.____.____	
		❏ DHCP ❏ Static IP ADDR: ____.____.____.____ Netmask: ____.____.____.__ Gateway: ____.____.____.____	
		❏ DHCP ❏ Static IP ADDR: ____.____.____.____ Netmask: ____.____.____.____ Gateway: ____.____.____.____	
		❏ DHCP ❏ Static IP ADDR: ____.____.____.____ Netmask: ____.____.____.____ Gateway: ____.____.____.____	
		❏ DHCP ❏ Static IP ADDR: ____.____.____.____ Netmask: ____.____.____.____ Gateway: ____.____.____.____	

Form FLF1 (V1.0)

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