GV grass valley

Kameleon Frames
2000T1 and 2000T3 MODELS

Instruction Manual
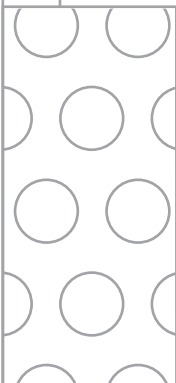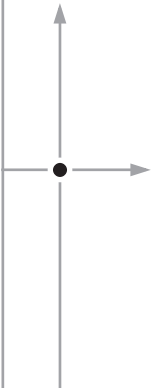
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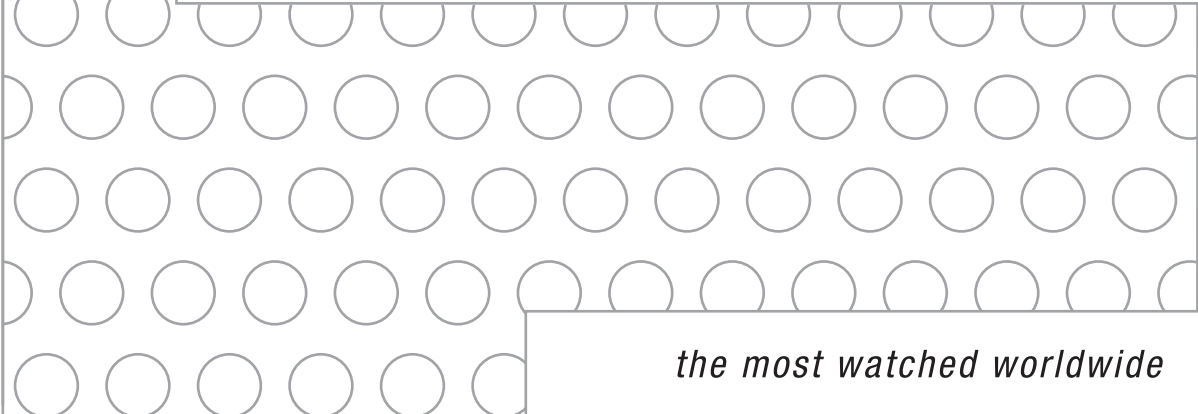
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Grass Valley Web Site

The www.thomsongrassvalley.com web site offers the following:

Online User Documentation — Current versions of product catalogs, brochures, data sheets, ordering guides, planning guides, manuals, and release notes in .pdf format can be downloaded.

FAQ Database — Solutions to problems and troubleshooting efforts can be found by searching our Frequently Asked Questions (FAQ) database.

Software Downloads — Software updates, drivers, and patches can be downloaded.

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Preface

About This Manual

This manual provides installation, configuration, operation, and safety and regulatory information for the Newton Modular Control system rack mount and software control panels for controlling Gecko 8900 Series and Kameleon 2000 Series modular products.

Regulatory Notices

Certifications and Compliances

FCC Emission Control

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by Grass Valley Group can affect emission compliance and could void the user's authority to operate this equipment.

Canadian EMC Notice of Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'emet pas de bruits radioélectriques dépassant les limites applicables aux appareils numeriques de la classe A préscrites dans le Règlement sur le brouillage radioélectrique édicte par le ministère des Communications du Canada.

EN55022 Class A Warning

For products that comply with Class A. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Canadian Certified Power Cords

Canadian approval includes the products and power cords appropriate for use in the North America power network. All other power cords supplied are approved for the country of use.

Canadian Certified AC Adapter

Canadian approval includes the AC adapters appropriate for use in the North America power network. All other AC adapters supplied are approved for the country of use.

Laser Compliance

Laser Safety Requirements

The device used in this product is a Class 1 certified laser product. Operating this product outside specifications or altering from its original design may result in hazardous radiation exposure, and may be considered an act of modifying or new manufacturing of a laser product under U.S. regulations contained in 21CFR Chapter1, subchapter J or CENELEC regulations in HD 482 S1. People performing such an act are required by law to recertify and reidentify this product in accordance with provisions of 21CFR subchapter J for distribution within the U.S.A., and in accordance with CENELEC HD 482 S1 for distribution within countries using the IEC 825 standard.

Laser Safety

Laser safety in the United States is regulated by the Center for Devices and Radiological Health (CDRH). The laser safety regulations are published in the "Laser Product Performance Standard," Code of Federal Regulation (CFR), Title 21, Subchapter J.

The international Electrotechnical Commission (IEC) Standard 825, "Radiation of Laser Products, Equipment Classification, Requirements and User's Guide," governs laser products outside the United States. Europe and member nations of the European Free trade Association fall under the jurisdiction of the Comite European de Normalization Electrotechnique (CENELEC).

For the CDRH: The radiant power is detected trough a 7 mm aperture at a distance of 200 mm from the source focused through a lens with a focal length of 100 mm.

For IEC compliance: The radiant power is detected trough a 7 mm aperture at a distance of 100 mm from the source focused through a lens with a focal length of 100 mm.

FCC Emission Limits

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may no cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation. This device has been tested and found to comply with FCC Part 15 Class B limits for a digital device when tested with a representative laser-based fiber optical system that complies with ANSI X3T11 Fiber Channel Standard.

Certification

Category	Standard	Designed/tested for compliance with:
Safety	UL1950	Safety of Information Technology Equipment, including Electrical Business Equipment (Second edition, 1993).
	IEC 950	Safety of Information Technology Equipment, including Electrical Business Equipment (Second edition, 1991).
	CAN/CSA C22.2, No. 950-93	Safety of Information Technology Equipment, including Electrical Business Equipment.
	EN60950	Safety of Information Technology Equipment, including Electrical Business Equipment.

Safety Summary

Read and follow the important safety information below, noting especially those instructions related to risk of fire, electric shock or injury to persons. Additional specific warnings not listed here may be found throughout the manual.

WARNING **Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.**

Safety Terms and Symbols

Terms in This Manual

Safety-related statements may appear in this manual in the following form:

WARNING **Warning statements identify conditions or practices that may result in personal injury or loss of life.**

CAUTION Caution statements identify conditions or practices that may result in damage to equipment or other property, or which may cause equipment crucial to your business environment to become temporarily non-operational.

Terms on the Product

The following terms may appear on the product:

DANGER — A personal injury hazard is immediately accessible as you read the marking.

WARNING — A personal injury hazard exists but is not immediately accessible as you read the marking.

CAUTION — A hazard to property, product, and other equipment is present.

Symbols on the Product

The following symbols may appear on the product:

Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

Indicates that user, operator or service technician should refer to product manual(s) for important operating, maintenance, or service instructions.

This is a prompt to note fuse rating when replacing fuse(s). The fuse referenced in the text must be replaced with one having the ratings indicated.

Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.

Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.

Indicates that static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Warnings

The following warning statements identify conditions or practices that can result in personal injury or loss of life.

Dangerous voltage or current may be present — Disconnect power and remove battery (if applicable) before removing protective panels, soldering, or replacing components.

Do not service alone — Do not internally service this product unless another person capable of rendering first aid and resuscitation is present.

Remove jewelry — Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.

Avoid exposed circuitry — Do not touch exposed connections, components or circuitry when power is present.

Use proper power cord — Use only the power cord supplied or specified for this product.

Ground product — Connect the grounding conductor of the power cord to earth ground.

Operate only with covers and enclosure panels in place — Do not operate this product when covers or enclosure panels are removed.

Use correct fuse — Use only the fuse type and rating specified for this product.

Use only in dry environment — Do not operate in wet or damp conditions.

Use only in non-explosive environment — Do not operate this product in an explosive atmosphere.

High leakage current may be present — Earth connection of product is essential before connecting power.

Dual power supplies may be present — Be certain to plug each power supply cord into a separate branch circuit employing a separate service ground. Disconnect both power supply cords prior to servicing.

Double pole neutral fusing — Disconnect mains power prior to servicing.

Use proper lift points — Do not use door latches to lift or move equipment.

Avoid mechanical hazards — Allow all rotating devices to come to a stop before servicing.

Cautions

The following caution statements identify conditions or practices that can result in damage to equipment or other property

Use correct power source — Do not operate this product from a power source that applies more than the voltage specified for the product.

Use correct voltage setting — If this product lacks auto-ranging power supplies, before applying power ensure that the each power supply is set to match the power source.

Provide proper ventilation — To prevent product overheating, provide equipment ventilation in accordance with installation instructions.

Use anti-static procedures — Static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Do not operate with suspected equipment failure — If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.

Ensure mains disconnect — If mains switch is not provided, the power cord(s) of this equipment provide the means of disconnection. The socket outlet must be installed near the equipment and must be easily accessible. Verify that all mains power is disconnected before installing or removing power supplies and/or options.

Route cable properly — Route power cords and other cables so that they ar not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.

Use correct power supply cords — Power cords for this equipment, if provided, meet all North American electrical codes. Operation of this equipment at voltages exceeding 130 VAC requires power supply cords which comply with NEMA configurations. International power cords, if provided, have the approval of the country of use.

Use correct replacement battery — This product may contain batteries. To reduce the risk of explosion, check polarity and replace only with the same or equivalent type recommended by manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Troubleshoot only to board level — Circuit boards in this product are densely populated with surface mount technology (SMT) components and application specific integrated circuits (ASICS). As a result, circuit board repair at the component level is very difficult in the field, if not impossible. For warranty compliance, do not troubleshoot systems beyond the board level.

Kameleon 2000 Series Frames

Introduction

Kameleon 2000T1 and 2000T3 frame models support Kameleon multifunction and 2000 Series modules, as well as 8900 modules with the 2000A89 Adapter. These modules provide a wide range of analog and digital processing including signal distribution, format conversion, and HDTV up and down conversion. They are designed to handle a wide variety of signal types: HDTV, SDTV, Analog, AES, and Data. The line of Wideband Distribution Amplifiers provide an easy upgrade path from SD to HD video.

The high-bandwidth frames provide flexible I/O with each module type installed. Front-installed modules are connected to rear I/O modules that provide the connector type required for the application. To minimize signal losses resulting from the higher speed HDTV signals, front-to-rear module connections are direct rather than through the motherboard (refer to).

The Kameleon 2000 Series features include:

- Wide bandwidth performance handling HDTV, SDTV, up and down conversion, analog audio and video, and compressed data formats,

- Twelve media modules in a three rack unit (3 RU) 2000T3 frames or four in the one rack unit (1 RU) 2000T1frames,

- Ethernet interface with 2000NET module installed,

- Genlock timing with 2000GEN module installed,

- Mid-plane design enabling flexible I/O,

- Hot-swappable power supplies,

- Sufficient cooling and power for any combination of modules and conditions,

- Compatibility with selected 8900 modules when using the 2000A89 adapter module, and

- Loop-through frame reference input on the 2000T3 Series frames.

Module Slots

2000T3 frame model architecture allows for up to 12 media modules in the front slots shown in Figure 1. The front modules connect to rear I/O modules that allow selection of various connector types. The 2000T1 frame models have four front and four rear module slots.

Note   Some rear modules are dual height and require 2 slots. This will affect the number of actual modules that can be installed in the frame. Refer to the specific module manual for more information.

Figure 1. 2000T3 and 2000T1 Frame Slots
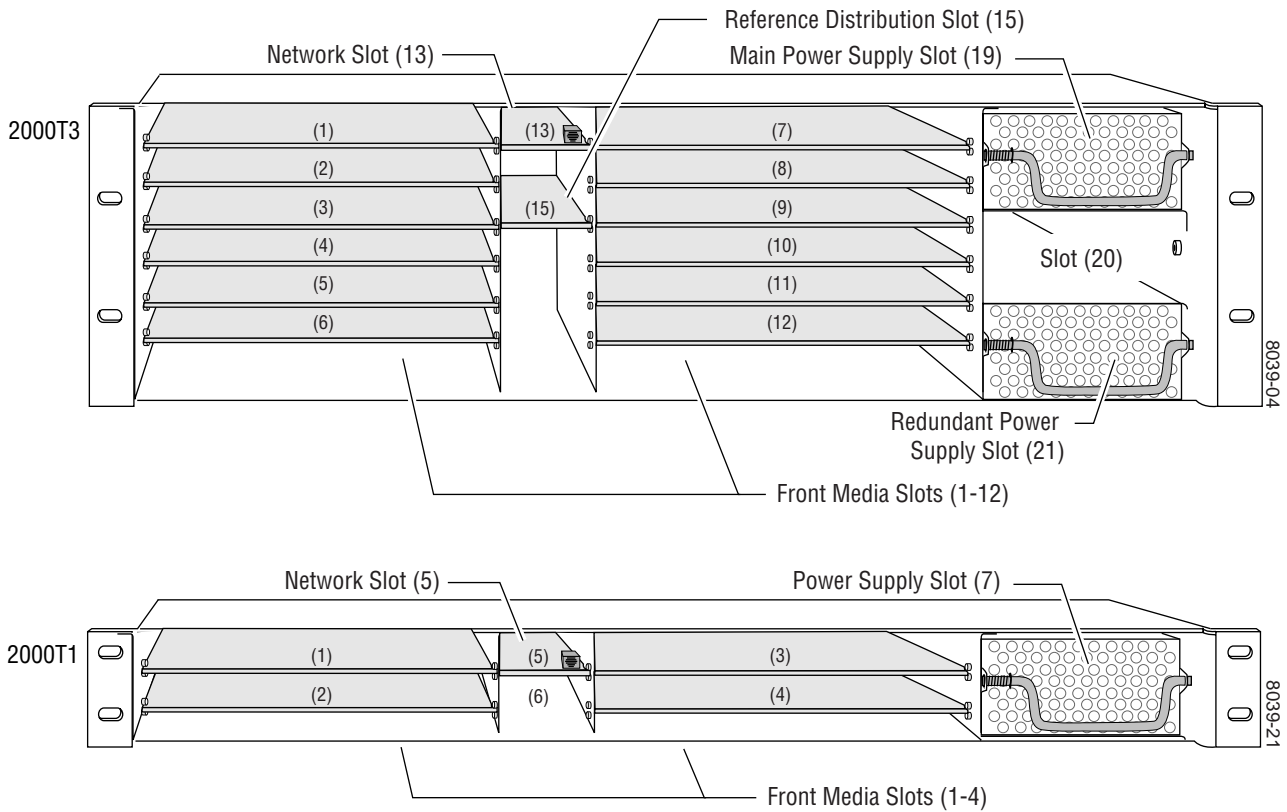
The rear slots (Figure 2) accept either passive I/O connector modules (dedicated to front modules) or standalone active rear-slot media modules. The center section houses network and timing reference modules.

Note   In the 2000T3 frame, center slots 14, 16, 17, and 18 are not functional. Even though some versions of the frame have board-edge guides for these slots, they should not be used.

Figure 2. 2000T3 Frame Rear and Interior View

Mid-frame
motherboard
with power and
communication buses

Front-rear module
direct connection
cutout

Open frame area
for front-rear module
direct connection

Six rear
module slots

Network
and reference
input connections

Six rear
module slots

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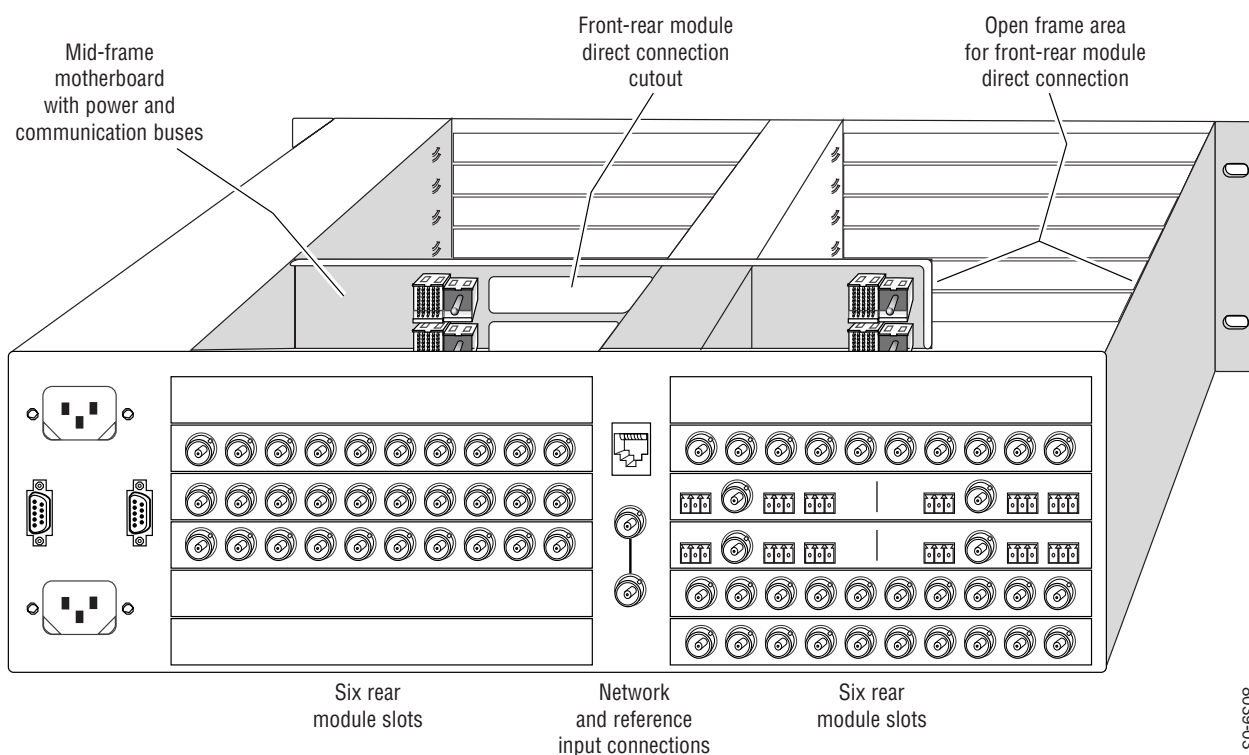
An optional redundant power supply (2000PS) can be installed in the 2000T3 frames in addition to a fan sled for providing cooling requirements.

The 2000 frame mid-frame motherboard provides intermodule connectivity.

A 2000 frame can house selected 8900 Series modules by using the 2000A89 adapter module. Refer to the 2000A89 Instruction Manual for a list of supported 8900 modules.

2000 Series Frame Options

A number of options can be ordered for 2000T1 and 2000T3 frames.

Table 1 contains model numbers and descriptions for the 2000T1 and 2000T3 frames and frame options.

Table 1. 2000 Series Frames and Frame Options

| Model Number	Description
2000T1D	1 RU frame with dual redundant 130W power supply
2000T1DN	1 RU frame with dual redundant 130W p/s and 2000NET module
2000T1DNG	1 RU frame with dual redundant 130W p/s, 2000NET and 2000GEN module
2000T3	3 RU frame with single 240W power supply
2000T3N	3 RU frame with single 240W p/s and 2000NET module
2000T3NG	3 RU frame with single 240W p/s, 2000NET and 2000GEN module
2000FAN	Fan sled for 3RU frame (required for >150 W frame loading
2000EMI	Blank rear covers for both 1 RU and 3 RU frames
2000PS	Replacement or redundant 240W power supply for 2000T3 frames
2000PS1	Replacement dual redundant 130W power supply for 2000T1 frames
2000NET	Network Interface Module for Ethernet I/F required for Newton control panel, adds frame sync functionality, web browser and remote control.
2000GEN	Genlock module for 1 RU and 3 RU frames, required for Kameleon KAM-AV and KAM-SD modules
2000A89	8900 Module Adapter

Power Supply Options

The 2000 Series module power usage varies greatly from less complex analog to higher complexity digital circuitry. To handle these power requirements, the 2000T1 and 2000T3 model frame power supply options include:

• Spare or replacement 130 Watt dual redundant power supplies for the 2000T1 frames (2000PS1D),

• Redundant 240 Watt power supply for the 2000T3 frame (2000PS), and

• Fan sled containing two fans for cooling the 2000T3 frame in applications where installed modules require > 150W of power (2000FAN).

When the 2000T3 Series frame is loaded with modules that require greater than 150 Watts of power and only one power supply sled is installed, a fan module is required for adequate cooling. The 2000FAN sled normally resides between the two power supply slots shown in Figure 3. If extra cooling is desired and the frame operates on only one power supply sled, a second fan sled can be placed in either power supply slot. Refer to *Power, Cooling, and Module Capacity* on page 22.

Figure 3. T3 Frame Fan Module Slot
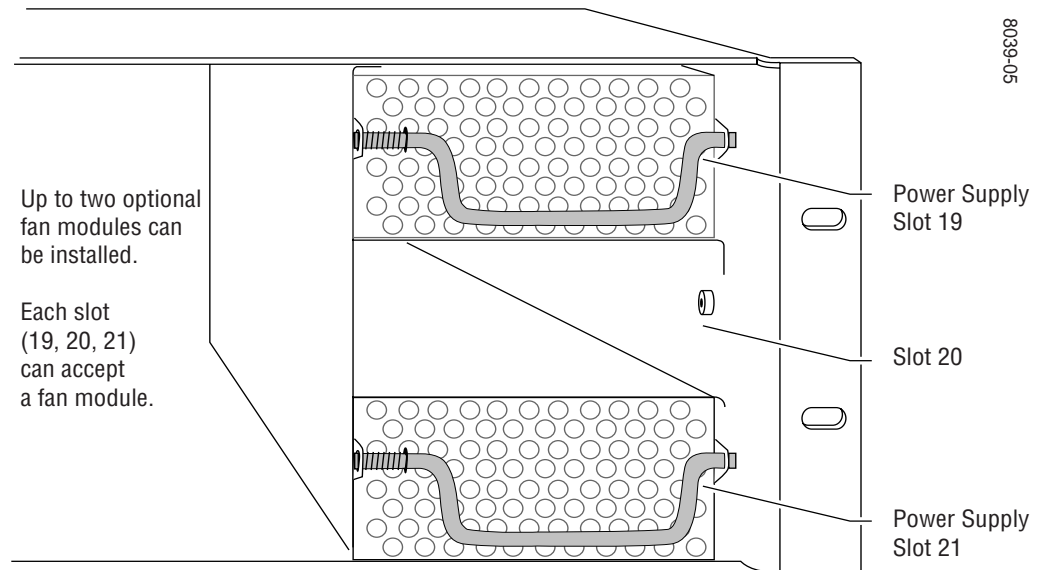
Monitoring and Control

The 2000 Series frame offers extensive control and monitoring capability when the 2000 Network Interface Module option (2000NET) is added.

The 2000NET Network Interface Module supports the frame connections for:

- Frame Health alarm relay (2000T3 frames only),

- Frame network configuration serial port, and

- Ethernet 10Base-T connection for Grass Valley Modular Control and Monitoring System (web browser-based GUI) and Newton Control System.

The 2000NET module also provides DIP switches for enabling and disabling alarms, and LED indicators for quick diagnostics of alarm conditions related to temperature, power supply health, frame bus communications and module error reporting. For detailed information on the 2000NET module and GUI refer to the 2000NET Network Interface Module Instruction Manual available on-line.

Genlock Timing

A 2000GEN Genlock Timing module is available for providing clock and pulse timing references from a reference black burst for distribution to the 2000T1 and 2000T3 frame modules (2000GEN). This module is required for frames with Kameleon KAM-AV, KAM-SD, KAM-HD, and KAM-XM modules installed. The 2000GEN module can be ordered separately or comes with the 2000T1DNG or 2000T3NG model frames.
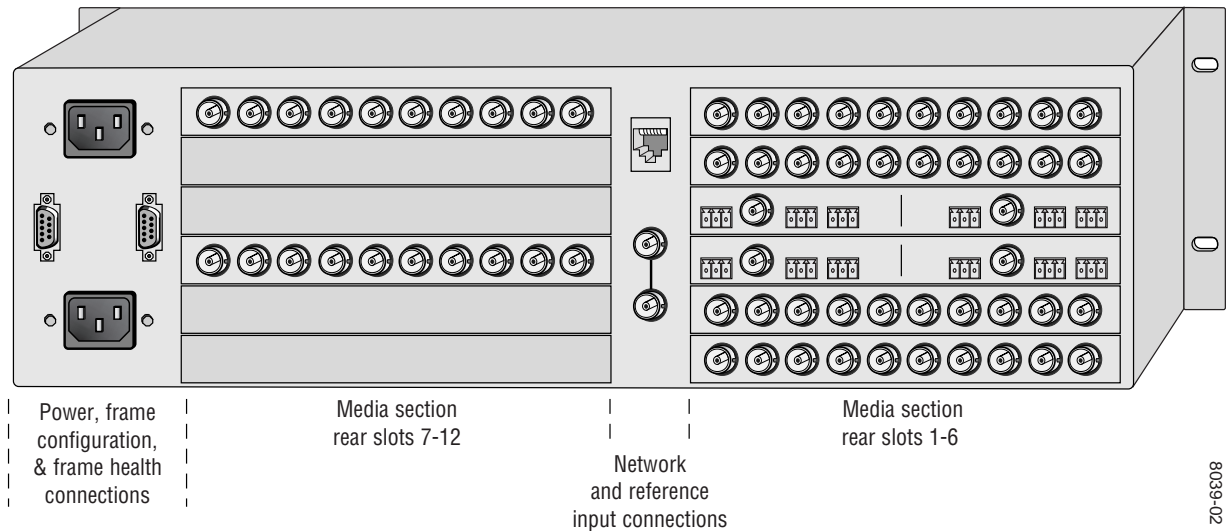
Other Frame Options

Other frame options include:

• 2000A89 adapter for installing Gecko 8900 modules in the 2000 frames, and

• 2000EMI blank plates can be ordered for installing in unused frame positions for both the 2000T1 and 2000T3 frames.

2000T3 Frame Connections

The rear of the 2000T3 frame provides twelve rear media or passive I/O module slots that support various combinations of connectors for input/output functions. Specific input/output functions are determined by the module type installed (see Figure 4). Some rear modules require two slots. 2000EMI blanks can be installed in unused cell locations.

Figure 4. 2000T3 Module I/O Connectors

Power, frame configuration, & frame health connections

Media section rear slots 7-12

Network and reference input connections

Media section rear slots 1-6

8039-02

The power/configuration/GPI section of the frame (Figure 5) provides AC power plug connections and two DB9 connectors for Network Configuration (J101) and Frame Health alarm relay (J103).

The network and reference connection section provides Ethernet RJ-45 connector (J104), and loop-through reference input BNCs (J106 and J107).

Figure 5. 2000T3 Power/Communication Connectors

Power, Frame Configuration, and Frame Health Connectors

J1

SER 1 CONFIG

SER 3 GPI

J101

J103

J2

GND

8039-13
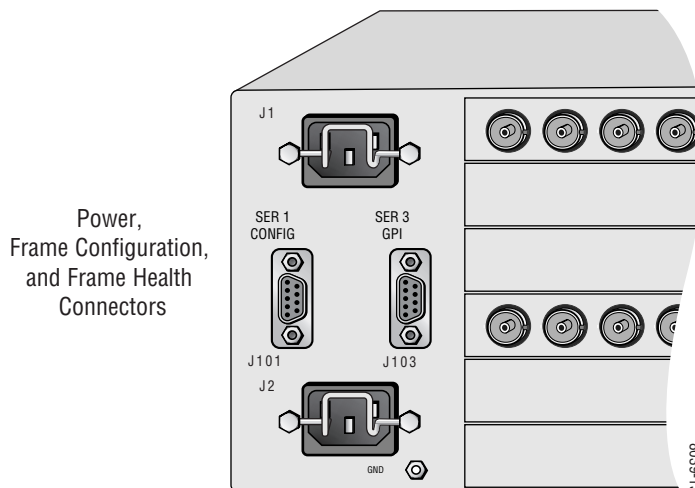
2000T1 Frame Connections

The rear of the 2000T1 frame provides four rear media or passive I/O module slots that support various combinations of connectors for input/output functions. Specific input/output functions are determined by the module type installed (see Figure 6). Some modules require two slots. 2000EMI blanks can be installed in unused cell locations.

Figure 6. 2000T1 Module I/O Connectors
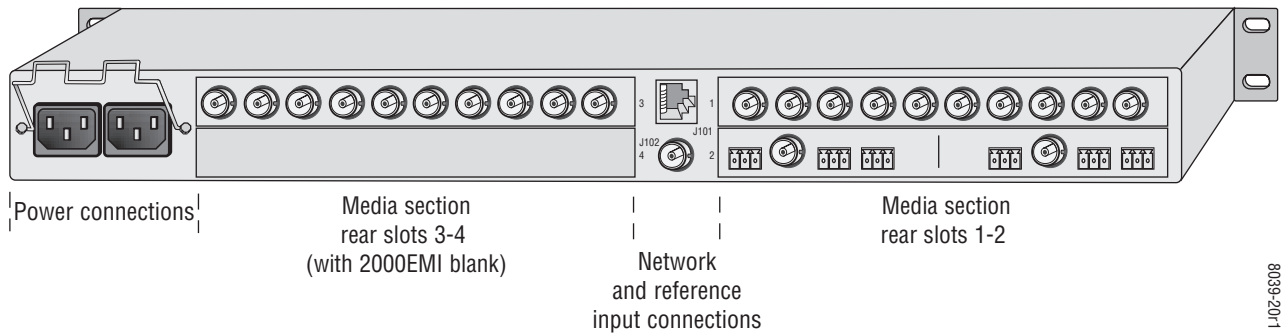
The power section of the frame provides:

• AC power plug connections and cord retention clip.

The network and reference connection section provides:

• Ethernet RJ-45 connector (J101), and

• Reference input BNC (J102) internally terminated into 75 Ω.

Power, Cooling, and Module Capacity

The 2000T3 frame and the optional fan module provide a great deal of flexibility in the type of modules that can be installed. The frame can support both conventional low power analog DAs and higher power serial digital modules with all modules performing to their full specifications.

Note   The maximum number of modules shown reflects the cooling capacity of the power supply/fan configuration rather than the power capacity of the power supplies. Module capacity figures assume no other media modules are in the frame.

Table 2 provides maximum power usage per module slot for adequate cooling in the frame. Frame, power supply and fan configurations are described for the 2000T3 and the 2000T1 frames with 2000NET, 2000GEN, and front media modules.

Table 2. Power, Cooling, and Module Capacity of 2000 Frames

Capacity Calculated	2000T1with Dual Power Supply Sled	2000T3 with Single Power Supply Sled	2000T3 with Two Power Supply Sleds	2000T3 with Single Power Supply Sled and a Fan Assembly
Power (W)	95 W	165 W	212 W	240W
Recommended maximum power per front module to ensure adequate cooling	16 W	12 W	17.5 W	16 W
Recommended maximum power per rear module to ensure adequate cooling	8 W	6 W	8 W	8 W
Recommended maximum slot power to ensure adequate cooling	20 W	12 W	17.5 W	17.5 W
Power supply load dissipated by power supply sled	4.6 W (fans)			
Power supply load dissipated by fan module	N/A	4.6 W		
Recommended maximum 2000NET module slot power to ensure adequate cooling	5 W	5 W		
Recommended maximum2000GEN module slot power to ensure adequate cooling	5 W	5 W		
Recommended maximum front media module slot power to ensure adequate cooling	Refer to specific module instruction manual for power usage and maximum recommended modules per frame.			

Installation

Introduction

This section contains information about:

- Rack mounting the frame,

- Module installation,

- Monitoring frame health, and

- Serial configuration port connection.

After carefully unpacking this equipment, check the box for power cords and other hardware, and examine the equipment for damage. Any damage should be promptly reported to the carrier.

The frames are designed to mount in a standard 19-inch equipment rack and require a depth of 21.5 inches (546 mm) plus cabling space. The 2000T3 frame requires a vertical space of 5.25 inches (134 mm). The one rack unit 2000T1 frame requires 1.75 inches (44.45 mm) of vertical space.

Rack Mounting the Frame

Use the rear support hardware to help support the weight of the frame. Refer to Figure 7 while following these steps to install either the 2000T3 or 2000T1 frame (3 RU 2000T3 frame shown). You will need rack mount screws to fit the front and rear rack rails.

1. Remove and discard the existing pan-head machine screw on each side of the frame.

Note The 2000T1 frame uses this screw location (on the power supply side) for attaching a ground cable. See *Grounding* on page 27.

2. Attach the frame support plates to each side of the 2000 frame using three 10 mm machine screws (provided) on each side.

3. Secure the rear rack plates to the rack at the appropriate locations using customer-supplied rack mounting screws.

4. Lift the frame into the rack and slide the frame support plates into the open slots of the rack plates.

5. Secure the frame front to the equipment rack using four customer-supplied rack mounting screws.

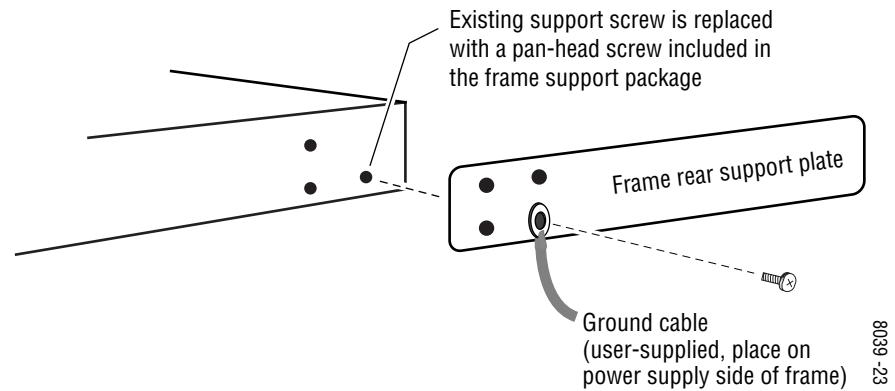*Figure 7. Frame Support and Rack Mounting (one side shown)*

Remove and discard the existing support screw

Frame support plate

10 mm machine screws provided

Rear rack plate
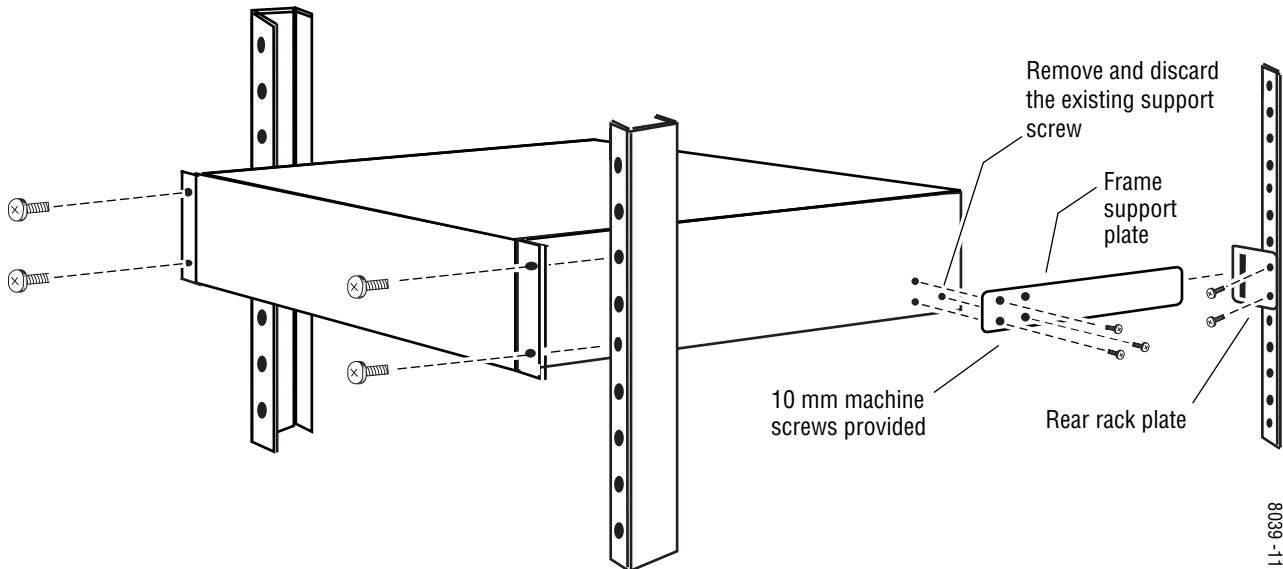
8039 -11

Grounding

The 2000T3 frame provides a frame grounding post below the AC plug receptacles. To ground the 1 RU 2000T1 frame, remove the existing pan head screw on the power supply side of the frame (see Figure 8) and attach a ground cable using a 10 mm machine screw (provided with rear frame support hardware). The ground cable may be installed with the rear support plate as shown or directly to the frame if the support option is not used.

Figure 8. Grounding the 2000T1 Frame

Existing support screw is replaced
with a pan-head screw included in
the frame support package

Frame rear support plate

Ground cable
(user-supplied, place on
power supply side of frame)

8039-23

Power Supplies

There are two types of 2000 Series power supplies — one for use in the 3 RU 2000T3 frame (model 2000PS) and one for use in the 1 RU 2000T1 frame (model 2000PS1D).

CAUTION   Check the label at the power supply connector end to verify the type of supply before installing it in the frame. Keying is used to prevent the insertion of the wrong supply. Damage to the power supply and frame can result from forcing the wrong supply into the frame.

Power supplies are shipped separately and should be installed after the frame is in the equipment rack. In the 2000T3 frame, the top and bottom frame slots (19 and 21) on the right side are allocated for 2000PS power supply sleds (see Figure 9). The 2000PS sled is keyed for use in the 2000T3 frame only. If the frame has only one power supply sled, it should reside in slot 19 for maximum cooling. Up to two optional fan modules can be installed in slots 19, 20, or 21. All three slots will accept a fan module.

*Figure 9. 2000 Series Frame*
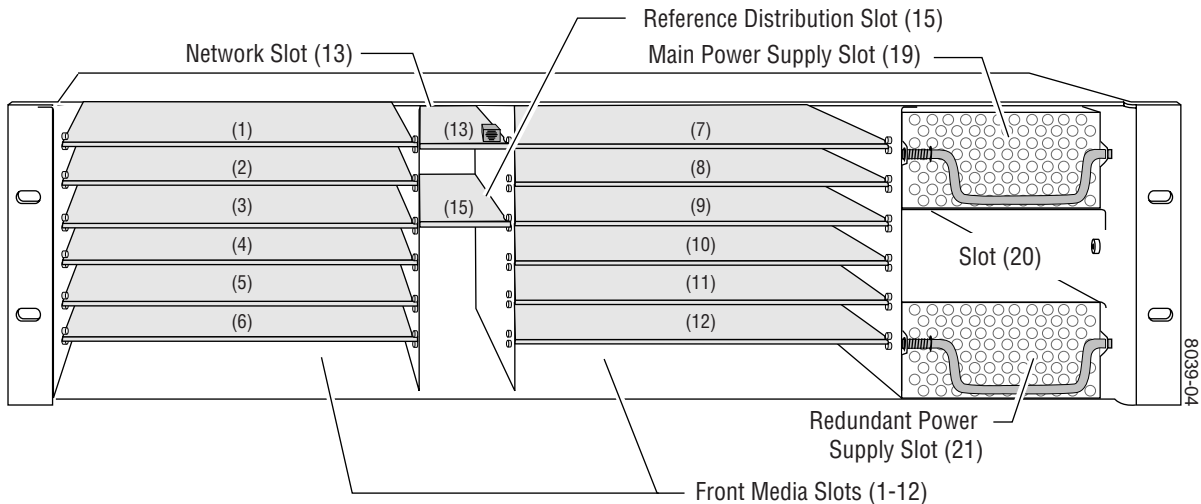
The 1 RU 2000T1 frame uses the single supply sled 2000PS1D containing a primary and redundant power module. This supply is keyed for insertion into the 2000T1 frame only.

To install a power supply:

1. Remove the frame front cover.

2. Slide the supply sled into the desired slot holding the spring tensioned locking handle to the left (see Figure 10 on page 29).

3. Lock the supply in place. The handle locking pins slide into the slot in the side of the frame.

Figure 10. Power Supply Locking Pin

8039-10

Power
supply
locking
slot
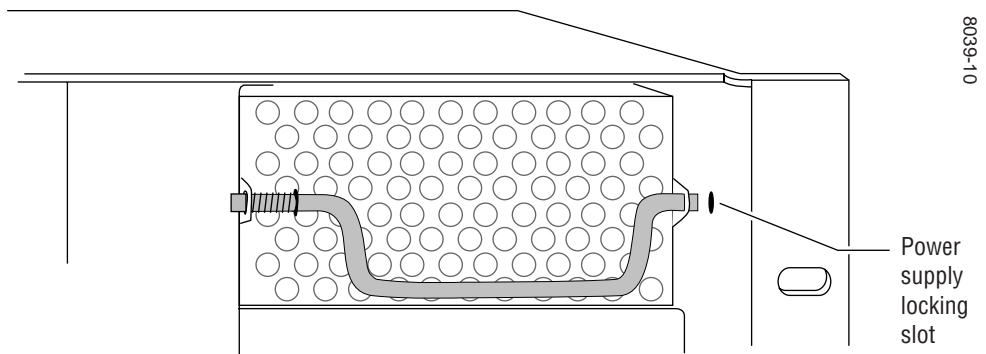
Module Installation

There are twelve front slot and twelve rear slot locations in the 2000T3 frame to accommodate either analog or digital modules (refer to Figure 9 on page 28). The 1 RU 2000T1 holds four front and four rear modules (see Figure 11). If a front slot module is installed, an appropriate rear connector module must be installed in the associated rear slot.

Note   Some rear modules are dual height and require 2 slots. This will affect the number of actual modules that can be installed in the frame. Refer to the specific module manual for more information.

Input and output configuration is determined by the design of the module installed. Refer to the appropriate module instruction manual for input/output configuration information for specific modules.

In the 2000T3 frame, the top slot of the center section (slot 13) is dedicated to the 2000NET Network Interface Module. The 2000T1 slot #5 accepts the 2000NET module. This module provides intraframe and network communication and monitoring including the alarm reporting. For additional information concerning monitoring and control, refer to the *2000NET Network Interface Module Instruction Manual*.

Note   Center slots 14, 16, 17, and 18 are not used in the 2000T3 frame. Even though some versions of the frame have board-edge guides for these slots, they should not be used.

Figure 11. 2000T1 Frame Front

Network Slot (5)

Power Supply Slot (7)

(1)   (5)   (3)
(2)   (6)   (4)

8039-21

Front Media Slots (1-4)
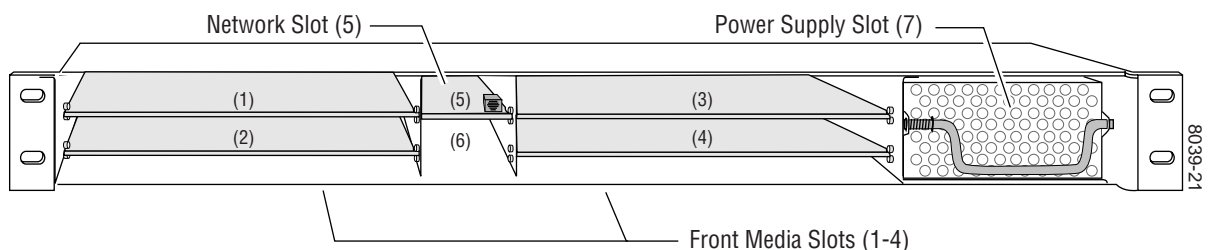
Rear Modules

When installing a front and rear media module pair, the rear module should be installed first. When a front slot active module is installed, it requires a passive connector module in the associated rear module slot. The passive rear module allows flexibility in selection of I/O connectors.

Note   Connector configuration overlays are available for many 2000 modules that use the standard Coax Passive Rear Module (Coax PRM) with ten BNC connectors. These overlays are found at the back of the module instruction manual.

Figure 12 illustrates a passive rear connector module. The installation procedure is the same for active and passive rear modules.

Figure 12. Typical 2000 Series Rear Module Installation
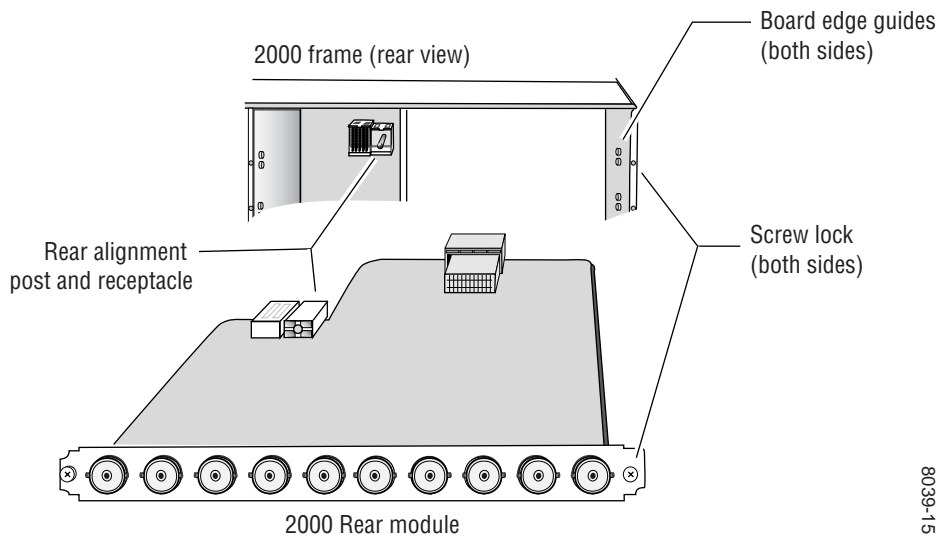
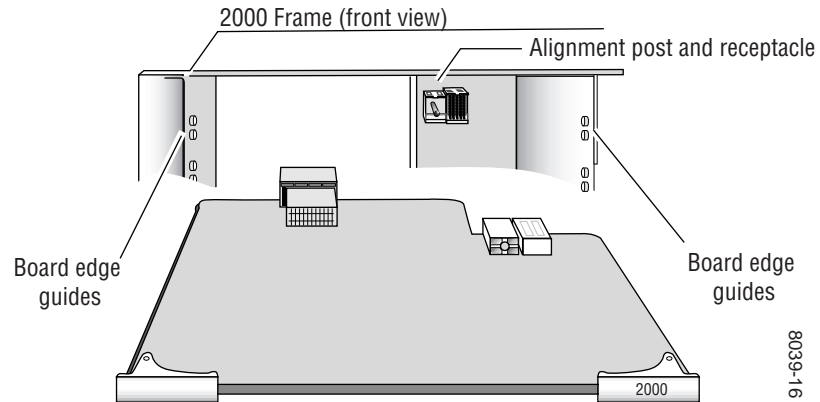To install a rear module, follow these steps:

1. Hold the module component side up. Insert the right edge of the module between the right side board edge guides and slide the module into the frame until the left edge enters the left guides.

2. Slide the module in and verify that the module connector seats properly against the backplane.

3. Press the outside edges of the rear connector plate to fully seat the module. Use a crosshead screwdriver to tighten the captive screws at each side.

Front Modules

Figure 13 illustrates a front media module installation.

Figure 13. Typical 2000 Series Front Module Installation

To install a front module in the frame, follow these steps:

1. Hold the module component side up. Insert the left edge of the module between the left side board edge guides and slide the module into the frame until the right edge enters the right guides.

2. Verify that the module connector seats properly against the backplane and the rear module connector.

Note   If the rear module is a dual height version, make sure the front module is inserted in the correct slot to meet the rear connectors.

3. Press the ejector tabs to seat the module in place.

Reference Inputs

The 2000T3 frame's Reference input (see Figure 14) uses loop-through connectors.

Figure 14. Frame Loop-though Reference Input

Network
and reference
input connections

8039-02
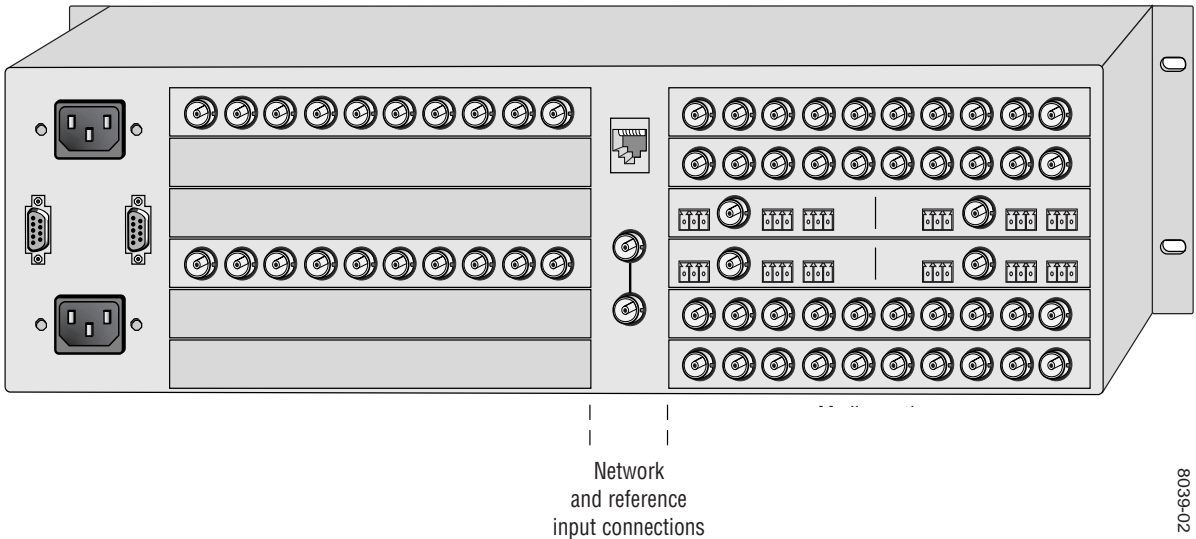
If not used for looping, the loop-through input should be externally terminated. The recommended termination for serial digital signals is CANARE BCP-TA (or equivalent).

Performance of looping inputs to equipment other than Grass Valley equipment has not been verified; monitor signal quality carefully when configuring such a system.

In the 2000T1 frame, the Reference input is a single BNC that is internally terminated into 75Ω.

For more information about the reference input, see the 2000GEN Module Instruction Manual.

Figure 15. 2000T1 Reference Input

(with 2000EMI blank)

Network
and reference
input connections

8039-20r1
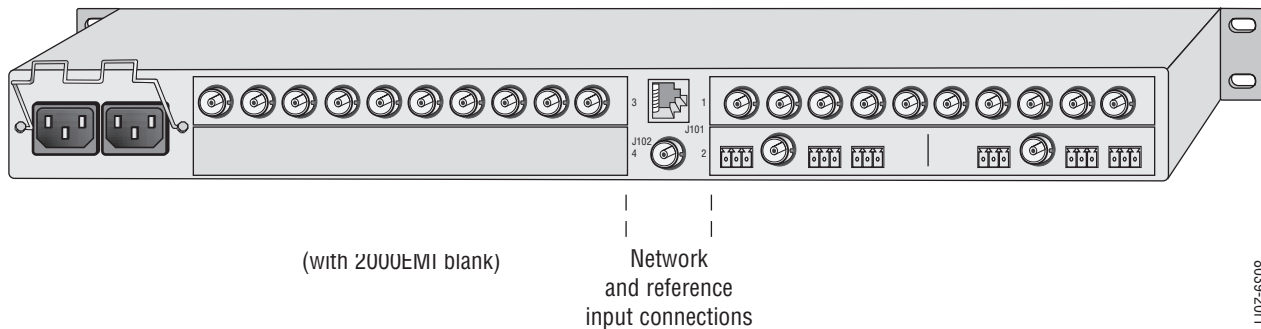
Frame Health Alarm Connector (2000T3 only)

The frame health alarm provides a relay closure that will act as an alarm trigger for a user-supplied alarm circuit. The relay is accessed through connector J103 SER3/GPI shown in Figure 16.

The frame health alarm responds to conditions enabled on the 2000NET Network Interface module with DIP switches S1 and S2 as given in Table 3. This information from the module is also available over the network to an SNMP monitoring system as described in detail in the 2000NET Instruction Manual.
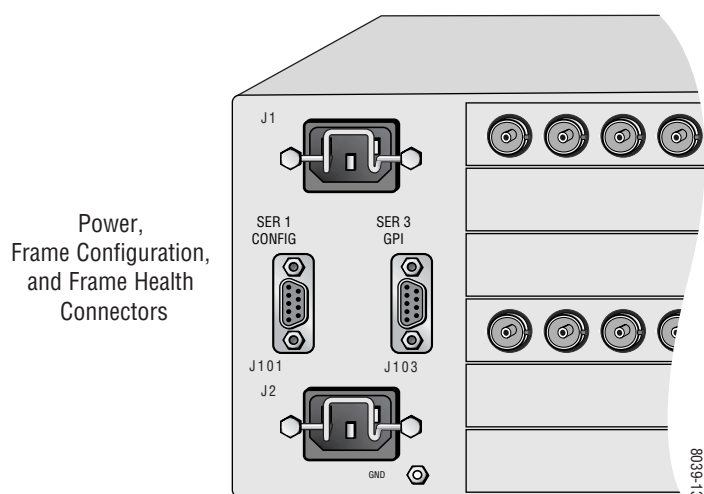
Figure 16. Frame Health Alarm Connector Location

Table 3. 2000NET Configuration DIP Switches, S1 and S2

S1 Segment	Left Position (open)	Right Position (closed)
1	PS1 fault reporting enabled	PS1 fault reporting disabled
2	PS2 fault reporting enabled	PS2 fault reporting disabled
3	PS3 fault reporting enabled	PS3 fault reporting disabled
4	PS4 fault reporting enabled	PS4 fault reporting disabled
5	(Currently not used)	
6	Fan fault reporting enabled	Fan fault reporting disabled
7	Module fault reporting enabled	Module fault reporting disabled
8	Frame Bus fault reporting enabled	Frame Bus fault reporting disabled
S2 Segment	**Left Position (open)**	**Right Position (closed)**
1	Asynchronous Status Enabled (enabled alarms are reported over SNMP)	SNMP Reporting is disabled except for Over Temp alarm
2	Net module remote control enabled	Net module remote control disabled
3	(Currently not used)	
4	Frame remote control enabled	Frame remote control disabled
5-8	(Currently not used)	

A number of frames can be coupled together as one alarm circuit. Refer to Figure 17 for a typical alarm circuit interconnect diagram.

Figure 17. Frame Health Alarm Relay Connections
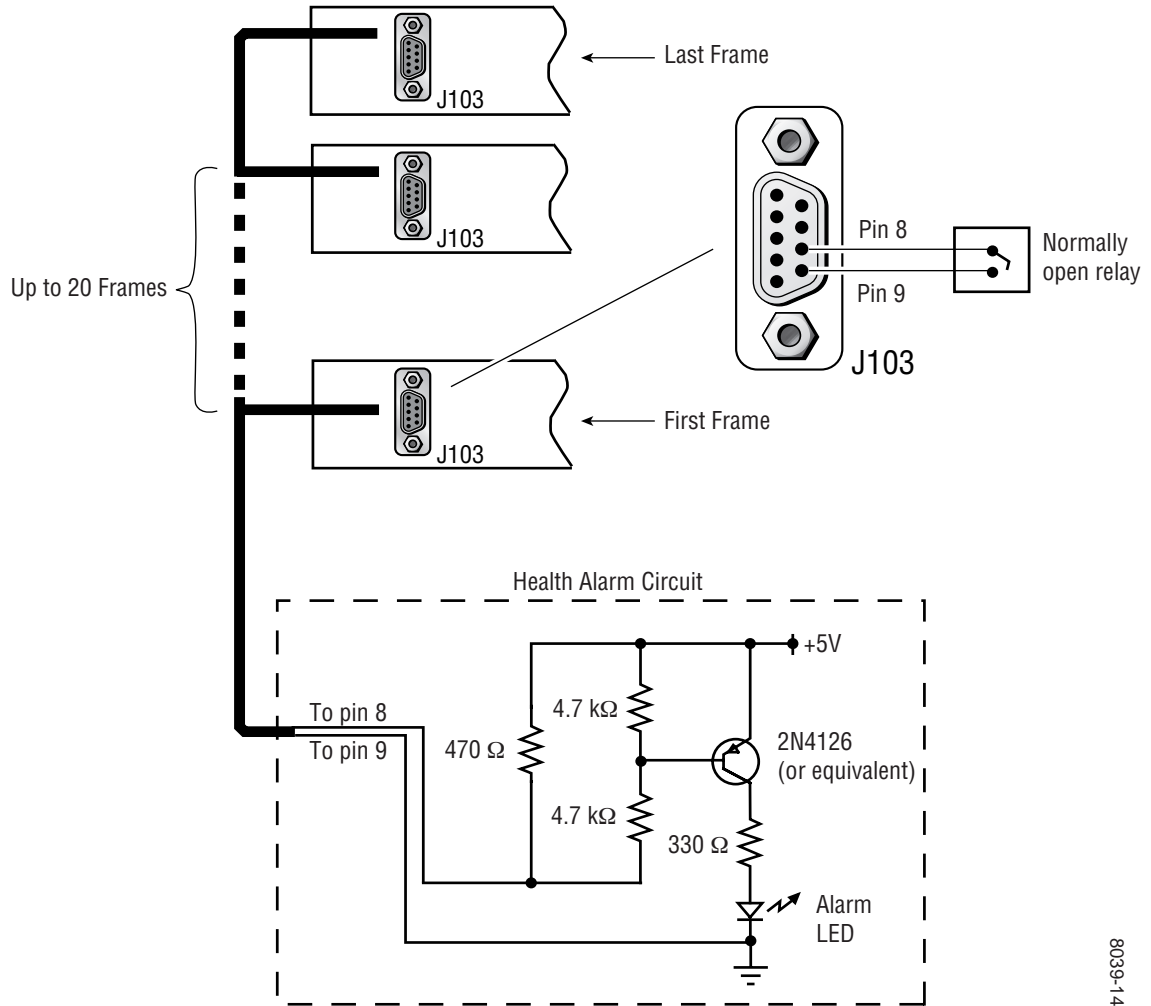
Serial Configuration Port Connection

On the 2000T3 frame, the female DB9 connector J101 is used to connect a computer running terminal emulation to initially configure the frame for networking. The 2000NET Network Interface Module is required to support this connection. In the 2000T1 frame, the RJ-45 connector on the front of the 2000NET is used for this function. Refer to the 2000NET Network Interface Module Instruction Manual for details.
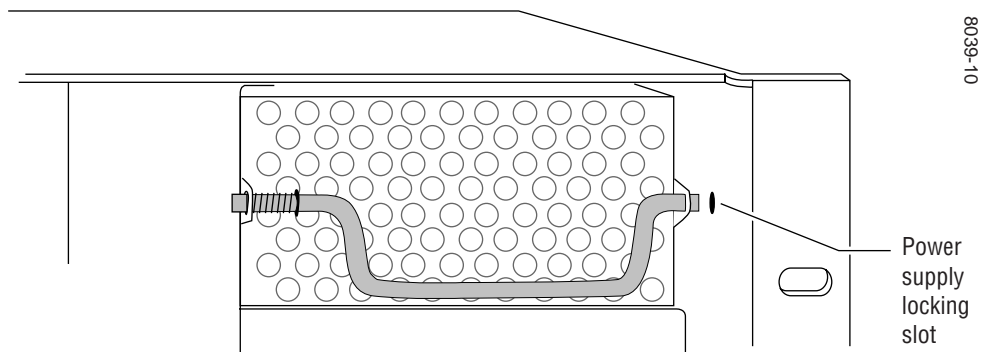
Power Up

Introduction

This section contains information about:

- Power Connections

- Applying Power

CAUTION   Verify that the power supplies are fully seated in their slots. The handle locking pins slide into a locking slot in the side of the frame (see Figure 18).

Figure 18. Power Supply Locking Pin


8039-10

Power supply locking slot

Power Connections

The 2000 Series frames and optional redundant power supplies are shipped with the proper power cords for 120V or 240V operation. Line voltage selection is not required for this power supply. The power cord connector type shipped is determined by the shipment's destination.

For each power supply installed, AC power is fed through a line cord to a socket (J1 and J2) on the rear of the frame (see Figure 19, 2000T3 frame shown).

Figure 19. AC Power Connectors
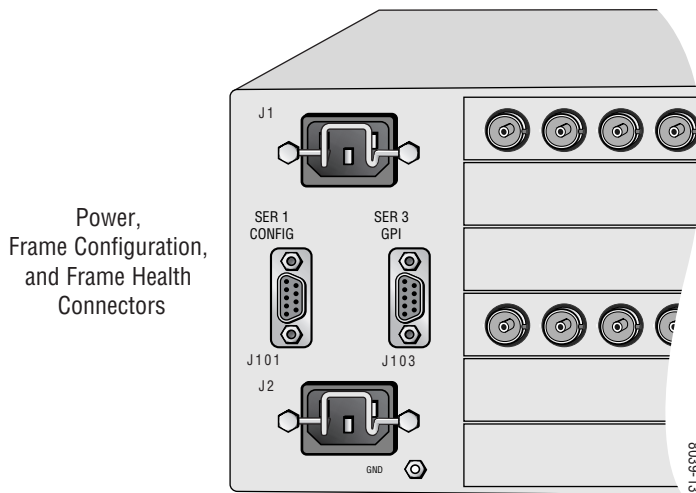
Note	For the most effective use of redundant power, ensure that each power supply cord is plugged into a separate branch circuit.

Line Cord Retainer Clip

To help prevent accidental loss of power, the AC line cord is held in place by a retainer clip (see Figure 20). The 2000T1 frame uses a double cord retainer clip.

Figure 20. Cord Retainer Clips
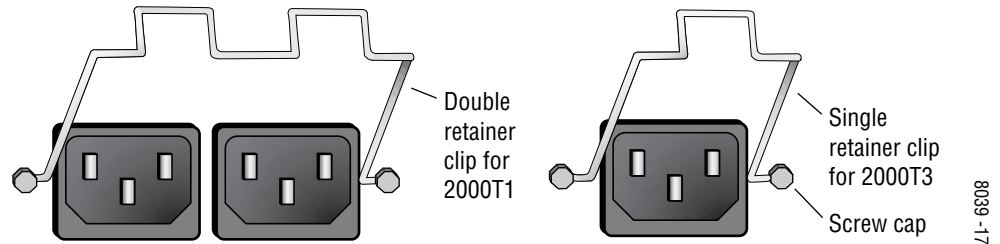
To properly install the line cord, follow these steps:

1. Ensure that the retainer clip is inserted properly into the holes of the screw caps.

2. Lift the retainer clip and plug the power cord into the receptacle.

3. Drop the retainer clip onto the power cord so the plug cannot be pulled from its receptacle.
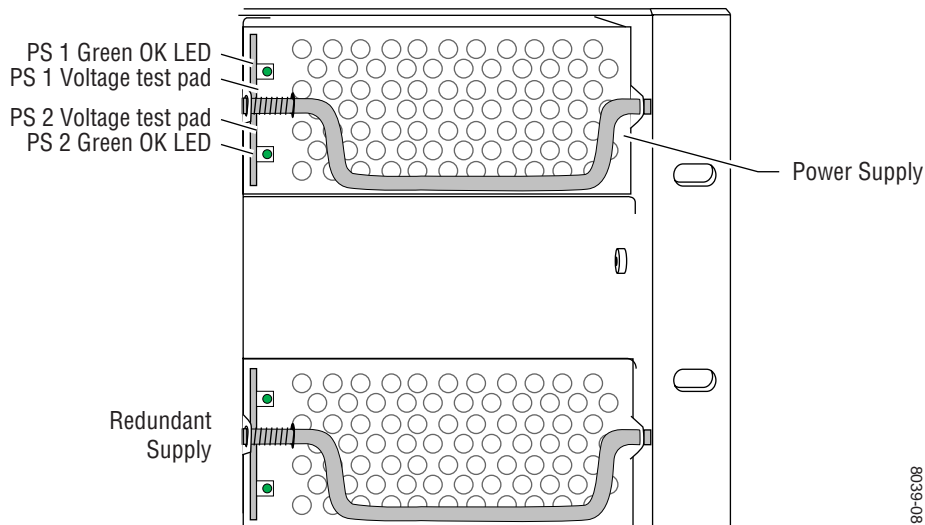
Applying Power

Upon applying power to the frame, verify that the green power LEDs for each power supply sled are illuminated. Each power supply sled has a power LED for each of its supplies (PS 1 and PS 2).

If the frame has a fan module and a 2000NET module installed, check the red FAULT LED on the front cover. It should go off if the fans are operating correctly and no other frame faults are detected by the 2000NET module.

Note   The Fault LED is on while the 2000NET module is booting. It may take up to 45 seconds to extinguish.

The power supply LEDs may require several seconds to display correct status after power is applied.

Figure 21. Power Indicator LEDs and Test Pads (2000T3 frame shown)

PS 1 Green OK LED
PS 1 Voltage test pad

PS 2 Voltage test pad
PS 2 Green OK LED

Power Supply

Redundant
Supply

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Other indicator LEDs can be viewed on the optional 2000NET module with the front cover removed. If you have a 2000NET module installed in the frame, see the *2000NET Network Interface Module Instruction Manual* for indicator details.

Specifications

Introduction

This section discusses specifications for the 2000 Series frames and the 2000PS and 2000PS1D power supplies. Refer to the module instruction manual for the specifications for the 2000NET Network Interface Module or a specific media module.

Frame Specifications

See Table 4 for a list of the 2000 Series frame specifications. Specifications are subject to change without prior notice.

Table 4. 2000 Series Frame Specifications

Parameter	Value
Frame Health Alarm Relay (2000T3 only)	
Connector type	DB9 9-pin female (pins 8 and 9))
Maximum current	1 A
Maximum voltage	28 V
Contact resistance	100 mΩ typical
Open state	Frame status good
Closed state	Fault or no power to the frame
2000T3 Front Cover Indicators	
Upper power supply PS 1 & PS 2	Green LEDs — Both ON indicates correct operation
Lower power supply PS 1 & PS 2	Green LEDs — Both ON indicates correct operation
Fault (requires 2000NET module)	Red LED — ON indicates an error or failure
2000T1 Front Cover Indicators	
Power supply PS 1 & PS 2	Green LEDs — Both ON indicates correct operation
Fault (requires 2000NET module)	Red LED — ON indicates an error or failure

Table 4. 2000 Series Frame Specifications - (continued)

Parameter	Value
Operating Conditions	
Operating temperature range	0 to 40 degrees C
Non-operating temperature range	-10 to +70 degrees C
Humidity	Up to 90% non-condensing
Mechanical	
Height	2000T3 – 3RU, 5.25 inches (133.0 mm) 2000T1 – 1RU, 1.75 inches (44.45 mm)
Width	19 inches (483 mm)
Depth	21 inches (533 mm)
2000T3 weight with no modules	1 power supply – 26 lb (11.8 kg) 2 power supplies – 28.5 lb (12.9 kg)
2000T1 weight with no modules	15.5 lb (7.0 kg)
Power	
Inputs	Two independent AC inputs
Connector type	IEC with cord retention
Agency Compliance	
UL 1950	
EN60950	
CSA-C22.2 NO. 950-93	
IEC950	

Power Supply

See Table 5 for a list of power supply specifications. Specifications are subject to change without prior notice.

Table 5. 2000PS Power Supply Specifications

Parameter	Value
Inputs	
Voltage range	90 to 132 V, 180 to 264 V, single phase
Frequency	47 Hz to 63 Hz
Input power	240 W maximum
Line current max. load	6.6 A with power to both power supplies on the sled
Inrush current	Maximum 40 A at 264 VAC at cold start
Outputs	
Voltage/current	+23.75 V @ 9.17 A
Load range	0.0 to 9.17 A for +24 V
Load/line regulation	± 1% for loads from nominal to maximum .3% varying line voltage from 90 to 132 VAC and 180 to 264 VAC at full load.
Over voltage protection	Limit at 30 V ±2 V
Overshoot	Less than 3%
Power factor correction	Complies with EN61000-3-2 Class D

Table 6. 2000PS1D Power Supply Specifications

Parameter	Value
Inputs	
Voltage range	90 to 132 V, 180 to 264 V, single phase
Frequency	47 Hz to 63 Hz
Input power	130 W maximum
Line current max. load	
Inrush current	Maximum 40 A at 264 VAC at cold start
Outputs	
Voltage/current	+23.75 V @ 5.4 A
Load range	0.0 to 5.4 A for +24 V
Load/line regulation	± 1% for loads from nominal to maximum
Over voltage protection	Limit at 30 V ±2 V
Overshoot	Less than 3%
Power factor correction	Complies with EN61000-3-2 Class D

Section 4 — Specifications

Service

Introduction

This section contains general frame service information concerning:

- Power supply monitoring and troubleshooting,

- Power supply and fan replacement, and

- Maintenance.

For specific module service information, refer to the individual module manuals.

CAUTION Servicing equipment which is still under warranty may result in that warranty being void. Contact your Grass Valley distributor or Grass Valley Customer Support before servicing.

WARNING **Failure to disconnect power before servicing equipment may result in severe shock or burns. Be sure to disconnect the power cord(s) before servicing the equipment.**
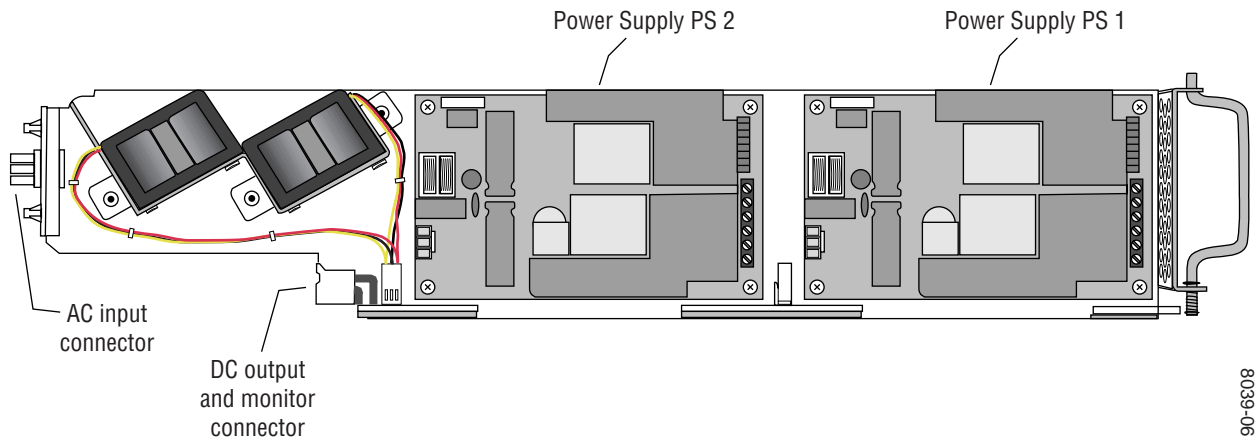
Power Supplies

The Grass Valley 2000 Series Power Supply sleds are designed to carry two 24V power supplies. The two supplies are load-sharing in the 2000T3 and redundant in the 2000T1 frame. In the 3 RU 2000T3 frame, a second power supply sled can be added for redundancy. The 2000PSD1 supply for the 1 RU 2000T1 frame is a dual redundant supply.

Line voltage selection is not required for the 2000 Series power supplies. They adjust automatically to accept between 90 to 132 V or 180 to 264 VAC through the AC line cord connected to the rear of the frame. The supply delivers regulated +24 VDC to each module installed in the frame. One power supply is capable of powering a full frame of modules. When a redundant power supply sled is installed in a 2000T3 frame, internal isolation diodes ensure automatic power supply backup.

The power supply sled with two power supplies and cooling fans is illustrated in Figure 22. The 2000PSD1 sled is keyed to insert in the 2000T1 frame only. The 2000PS sled is keyed to insert in the 2000T3 frame only.

Figure 22. Power Supply module

Monitoring Power Supplies and Fans

If the 2000NET Network Interface Module is installed, power supply and fan monitoring is available through the frame health relay (2000T3 frame only) and the remote control and monitoring system (GUI).

CAUTION Always verify that the power supplies are fully seated in their slots. The locking pin on the supply handle should lock into the hole on the side of the frame (see Figure 23).

Figure 23. Power Supply Locking Pin

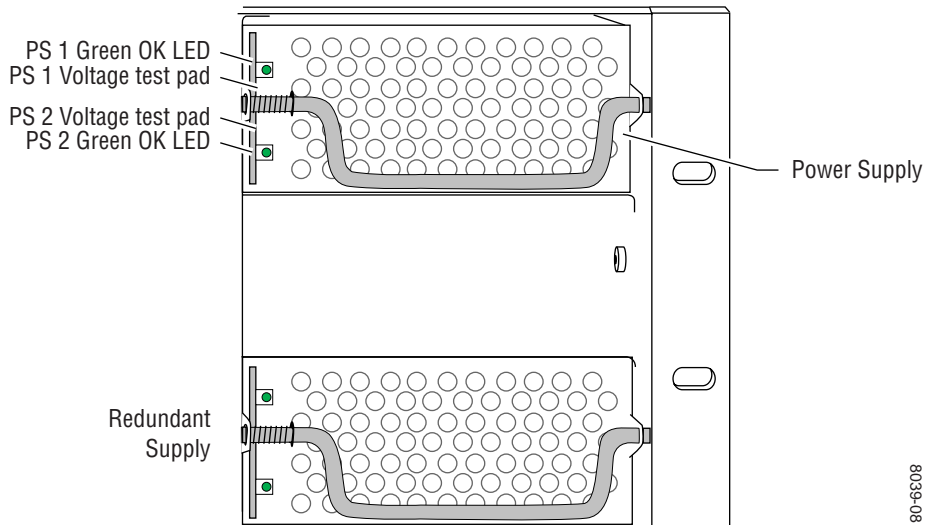
Power supply locking slot
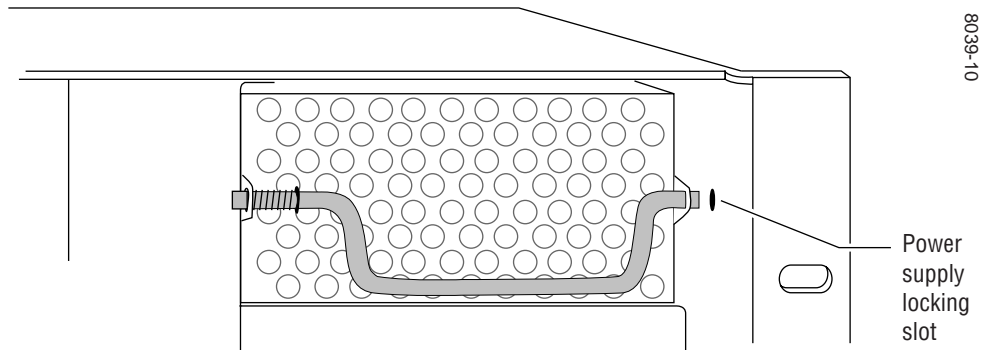
Troubleshooting

Use the following sequence of simple checks in the event of problems with your 2000 Series power supply. If the problem cannot be determined, contact your Grass Valley distributor or the Grass Valley Customer Support.

CAUTION Equipment may contain static-sensitive components. Use properly grounded test equipment and work only in static protected areas to avoid damage.

1. Check Associated Equipment.
Before proceeding with troubleshooting, check that the equipment connected to the 2000 Series frame is operating correctly. Check all input signals to the frame to be sure they are present; make sure cables are not defective and are properly connected.

2. Check Power.
Check the LEDs on the power supply front panel. The two green LEDs should be illuminated when power is applied. If not, check that the power cable is connected to a source of power. Verify whether there is power available at the power main. If any LED still does not light, use a voltmeter to verify that the +24V is truly not present at the associated testpoint (checking for a failed LED). If the voltage does not register on the testpoint (see Figure 24), replace the power supply with a known-good supply.

Figure 24. Power Supply Voltage Testpoints

PS 1 Green OK LED
PS 1 Voltage test pad
PS 2 Voltage test pad
PS 2 Green OK LED

Power Supply

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3. Check Control Settings.
If there is any question about the correct function or operation of any control, refer to the appropriate module manual. If proper control settings do not help, go on to the next check.

4. Module Exchange.
If spare modules are available, module exchange is the most efficient method of localizing a problem. This is especially true if you are not familiar with the internal operation of the 2000 Series or its modules.

5. Visual Checks.
Visually check modules in which the trouble appears to be located. Many problems can be located by visible indication, such as connectors not seated or loose cables.

6. Check Voltages.
Begin by looking at the block diagrams located in each module manual. This will provide a quick understanding of the module. Use an oscilloscope or voltmeter to check that the voltages are correct.

Fan Replacement

A fan failure is reported through the 2000NET module (if present) to the Health Alarm Relay (2000T3 frame only) as a simple alarm closure. Using the GUI you can select the frame status display to see Fan Status and click on the suspect power supply sled to see which fan is reporting a failure (see the *2000NET Network Interface Module Instruction Manual* for details).

If a fan needs to be replaced, contact Grass Valley Customer Support to order the appropriate replacement fan. To install a new fan, refer to Figure 25 while performing the following:

1. Remove the frame front cover and slide the power supply sled out.

   CAUTION   Do not leave the 2000T3 front cover off the frame for extended periods when the frame is powered.

2. Remove the appropriate connector (J4 or J3) from the power distribution board.

3. Remove the fan assembly bracket by removing the three hex nuts and interior star washers and lifting both fans from the sled.

4. Remove the two crosshead retainer screws from the corners of the fan bracket for the defective fan.

5. Install the replacement fan, replace the fan assembly, and re-connect the fan lead wires.

6. Install the power supply module in the frame and replace the front cover.

Figure 25. Fan Replacement
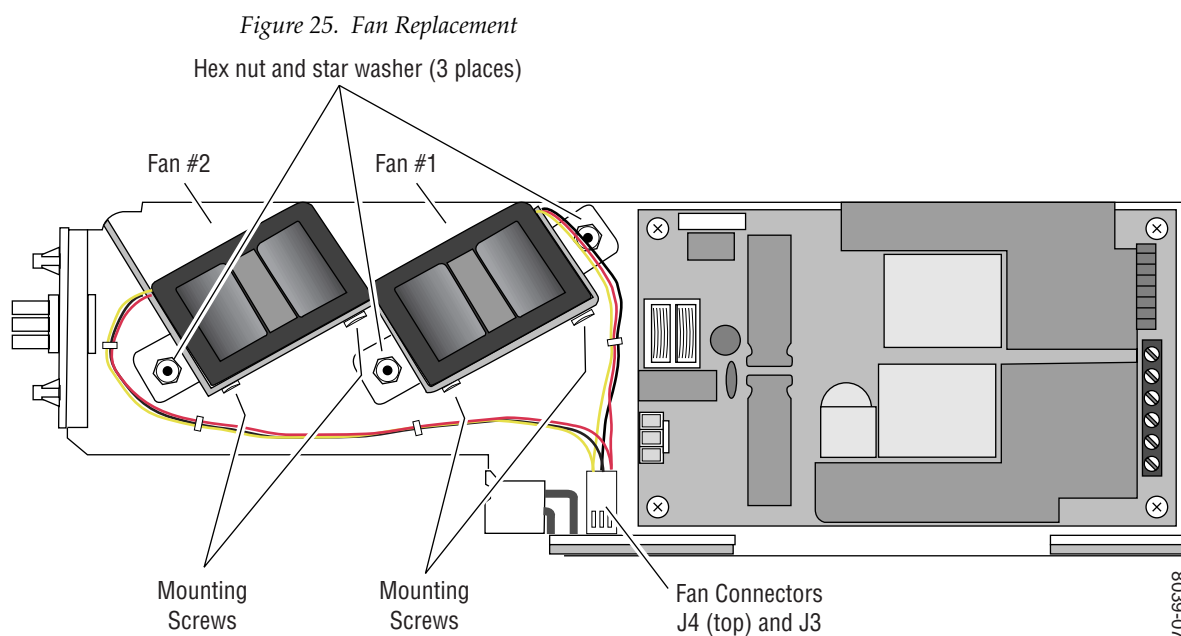
Maintenance

Each of the 2000 Series frames has a filter located on the inside of the front cover. This filter should be cleaned as needed. The filter is easily removed by pulling it straight out of the cover. The keying of the cutouts in the filter maintains the proper front/back orientation. Use a vacuum on the front side of the cover to remove dust. If it becomes necessary to replace the filter, you can order a replacement from Grass Valley Customer Support.

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