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Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018  
Web site: **www.blackbox.com** E-mail: **info@blackbox.com**



## *Dynamic Fiber Conversion System 19-Module Power Chassis*



## User Manual

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1000 Park Drive · Lawrence, PA 15055-1018  
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## TRADEMARKS

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### FEDERAL COMMUNICATIONS COMMISSION AND CANADIAN DEPARTMENT OF COMMUNICATIONS RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to be cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.*

### NORMAS OFICIALES MEXICANAS (NOM)

#### ELECTRICAL SAFETY STATEMENT

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico debe ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
  - A: El cable de poder o el contacto ha sido dañado; u
  - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
  - C: El aparato ha sido expuesto a la lluvia; o
  - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
  - E: El aparato ha sido tirado o su cubierta ha sido dañada.

## 4.4 Hot Attachment of DC Power Supply

- Unpack the power supply carefully. Inspect for any damage. If any damage is observed, do not use the power supply and call 724-746-5500 to report the damage immediately and request a replacement unit.
- Align the guide rails on the chassis with the rails in the bottom of the power supply; slide in the power supply ensuring that the power supply is seated firmly against the backplane and tighten the thumb screws securely with a screwdriver.
- Locate the 48VDC circuit breaker and make sure that the switch is in the OFF position.
- Reconnect the 48VDC power source to the DFCS power supply.
- Locate the 48VDC circuit breaker and switch the circuit breaker to the ON position.
- Watch and listen to the fan in the rear of the power supply to ensure it is powered.
- Save the packing material of the new power supply for return shipment of the faulty power supply or for future reuse.

## 5.0 SPECIFICATIONS

Model	19-Module AC	19-Module DC
Model Number	LMC3004A (1 PS) LMC3005A (2 PS)	LMC3007A (1 PS) LMC3008A (2 PS)
Module Capacity	19	19
Power Supply Capacity	1, 2, or 3 Power Supplies	1, 2, or 3 Power Supplies
Power Requirements	100-240VAC, 2.0A, 50/60Hz	+/- 48VDC, 3.0A
Dimensions	W:17.15"xD:14.0"xH:3.5"	W:17.15"xD:14.0"xH:3.5"
Weight	16 lbs (LMC3004A) 18.5 lbs (LMC3005A)	16 lbs (LMC3007A) 18.5 lbs (LMC3008A)
Compliance	UL, CE, FCC Class A, NEBS Level 3	UL, CE, FCC Class A, NEBS Level 3
Temperature - Operating - Storage	0 to 50 C -40 to 80 C	0 to 50 C -40 to 80 C
Humidity (non-condensing)	0-90%	0-90%
Altitude	0-10,000 ft	0-10,000 ft
MTBF (hrs)	38,000 (1PS) 295,000 (2PS)	38,000 (1PS) 295,000 (2PS)

- ❑ Power Supply 1 (PS1) refers to the power supply on the right (as viewed from the front). Power Supply 2 (PS2) refers to the power supply in the middle. Power Supply 3 (PS3) refers to the power supply on the left (as viewed from the front).
- ❑ LED being ON indicates that the power supply is supplying power. LED being OFF indicates that the power supply is not present. Blinking LED indicates that a power supply is installed but does not supply power because it is not properly connected to a power source or because it is faulty.
- ❑ Once you determine that your AC plug is connected properly to an AC wall outlet, and the power supply LED is still not ON, determine which is the failing power supply unit and proceed to the next step.
- ❑ Remove the AC power cord of the faulty power supply from the wall outlet.
- ❑ Remove the AC power cord of the faulty power supply from the power supply unit.
- ❑ Using a screwdriver, loosen the 2 thumb screws securing the power supply to the main chassis (refer to Fig 4.).
- ❑ Remove the failing power supply.

#### **4.2 Hot Attachment of AC Power Supply**

- ❑ Unpack the power supply carefully. Inspect for any damage. If any damage is observed, do not use the power supply and call 724-746-5500 to report the damage immediately and request a replacement unit.
- ❑ Align the guide rails on the chassis with the rails in the bottom of the power supply; Slide the power supply in, ensuring that the power supply is seated firmly against the backplane and tighten the thumb screws securely with a screwdriver.
- ❑ Plug the AC cord to the back of the power supply.
- ❑ Plug the AC cord to the AC wall outlet.
- ❑ Watch and listen to the fan in the rear of the power supply to ensure it is powered.
- ❑ Save the packing material of the new power supply for return shipment of the faulty power supply or for future reuse.

#### **4.3 Hot Removal of DC Power Supply**

- ❑ Determine which power supply is faulty by observing the status of the LEDs in the *DFCS* MGT or viewing the status from the network management software.
- ❑ Power Supply 1 (PS1) refers to the power supply on the right (as viewed from the front). Power Supply 2 (PS2) refers to the power supply in the middle. Power Supply 3 (PS3) refers to the power supply on the left (as viewed from the front).
- ❑ LED being ON indicates that the power supply supplies power. LED being OFF indicates that the power supply is not present. Blinking LED indicates that a power supply is installed but does not supply power because it is not properly connected to a power source or because it is faulty.
- ❑ Once you determine that your DC source is connected properly, and the power supply LED is still not ON, determine which is the failing power supply unit and proceed to the next step.
- ❑ Locate the 48VDC circuit breaker, and switch the circuit breaker to the OFF position
- ❑ Remove the DC power cables of the faulty power supply from the *DFCS* power supply unit.
- ❑ Using a screwdriver, loosen the 2 thumb screws securing the power supply to the main chassis (refer to Fig 5.).
- ❑ Remove the failing power supply.

# Dynamic Fiber Conversion System 19-Module Power Chassis User Manual

## **1.0 GENERAL DESCRIPTION**

The Dynamic Fiber Conversion System (DFCS) 2U (3.5 inch) 19-Module Power Chassis is powered by up to three (3) hot-swappable and redundant universal AC or 48VDC power supplies and can accommodate up to 19 DFCS media converters. It is ideal for enterprise Local Area Network (LAN) or Metropolitan Area Network (MAN) applications where managed media converters with high density and small rack-footprint (2U) are important.



**Fig 1. 19-Module chassis (modules not included)**

This User Manual describes the following models:

<b>DFCS 19-Module Power Chassis Options</b>		
<b>Configuration</b>	<b>19-Module AC</b>	<b>19-Module DC</b>
<b>One (1) Power Supply</b>	LMC3004A	LMC3007A
<b>Two (2) Power Supplies</b>	LMC3005A	LMC3008A
<b>Spare Power Supply</b>	LMC3006P	LMC3009P

### **1.1 Terms**

- Backplane** A printed circuit board which is permanently mounted inside the chassis and is populated with receptacle connectors into which modules are inserted.
- Module** A DFCS plug-in card positioned into a slot location and inserted into a backplane connector.
- Module-Guide** A mechanical channel, guiding module insertion into a backplane connector.
- Slot** A single chassis position consisting of a backplane connector and its associated module-guides.
- “A” Link** A backplane slot-to-slot connection that provides Ethernet connectivity

between adjacent slots (sometimes referred to as “A” Backplane Link).

**“A” Port** An interface on a module capable of Ethernet traffic via the backplane’s “A” Link.

**“B” Link** A backplane slot-to-slot connection that provides Ethernet connectivity between adjacent slots (sometimes referred to as “B” Backplane Link).

**“B” Port** An interface on a module capable of Ethernet traffic via the backplane’s “B” Link.

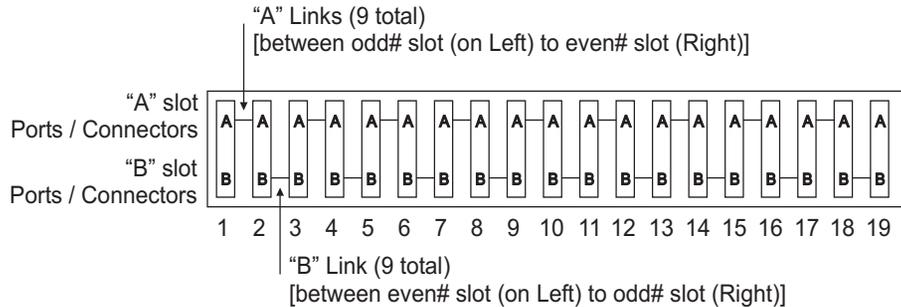
## 1.2 Mechanical Description

The 19-Module chassis consists of any combination of one to three AC or DC power supplies. As can be seen from the model table above, four models have been pre-configured with one and two power supplies. Any other combinations of AC and DC power supplies are permitted. The power supplies provides power to the chassis’ 19 backplane connectors.

## 1.2 Backplane Architecture

The chassis features 19 module slots numbered 1 (left-most positioned slot) through 19 (right-most positioned slot). As modules are inserted into the chassis slots, they are seated into the slot connectors.

The “A” and “B” Links provides Ethernet connectivity between adjacent slots.



**Fig 2. 2-Module Backplane Architecture**

Fig 2. depicts the chassis’ backplane architecture including the “A” and “B” Links. The “A” Links connect between odd numbered slots on left to even numbered slots on right (i.e. 1-2,3-4,5-6,7-8,9-10,11-12,13-14,15-16,17-18).

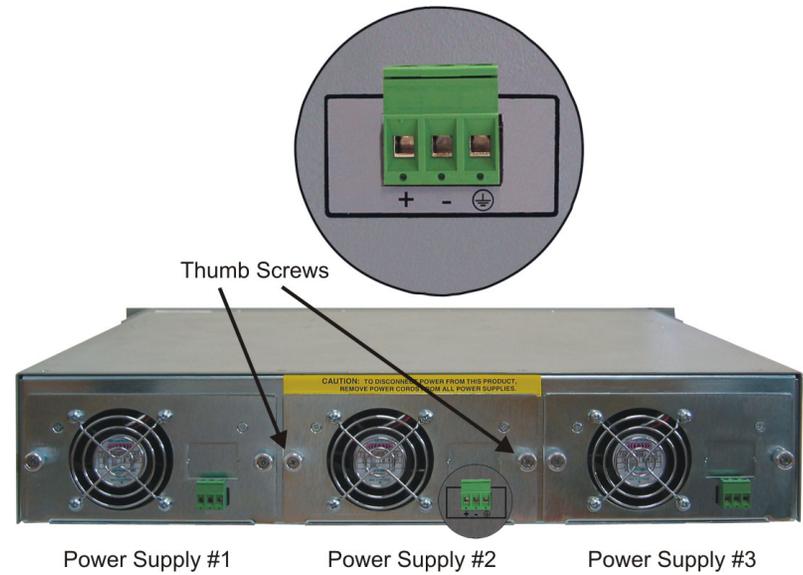
The “B” Links connect between even numbered slots on left to odd numbered slots on right (i.e. 2-3,4-5,6-7,8-9,10-11,12-13,14-15,16-17,18-19).

When modules with “A” and “B” Port capabilities are inserted into the adjacent chassis slots, they can connect to each other via the backplane links and create flexible network architectures that meet the user’s requirements.

**Note that not all modules support and have backplane ports. To find about each specific module’s backplane port configuration, refer to the specific module’s documentation.**

**WARNING:** Note the wire colors used in making the positive, negative and ground connections. Use the same color assignment for the connection at the circuit breaker.

- Connect the power wires to the circuit breaker and switch the circuit breaker ON.



**Fig 5. 19-Module Chassis with three Installed DC Power Supplies**

## 4.0 POWER SUPPLY REPLACEMENT

**CAUTION:** To remove power from the chassis, remove power cord from all power supplies.

**WARNING!!!**

**NEVER ATTEMPT TO OPEN THE CHASSIS OR SERVICE THE POWER SUPPLY OR FAN MODULE. OPENING THE CHASSIS MAY CAUSE SERIOUS INJURY OR DEATH. THERE ARE NO USER REPLACEABLE OR SERVICEABLE PARTS IN THIS UNIT.**

The power supplies are hot swappable and can be replaced without shutting the chassis down. However, when removing and replacing a power supply unit, the following steps must be strictly followed in order to prevent serious injury or death or serious damage to your equipment. Removal of power supplies or cards will result in access to hazardous energy.

### 4.1 Hot Removal of AC Power Supply

- Determine which power supply is faulty by observing the status LEDs on the DFCS MGT or viewing the status from the network management software.

**WARNING:** Only a DC power source that complies with safety extra low voltage (SELV) requirements can be connected to the DC-input power supply.

- When rack-mounting this equipment, the rack should be appropriately earth-grounded.

**WARNING REGARDING EARTHING GROUND:**

- This equipment shall be connected to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode is connected.
- This equipment shall be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system shall not be earthed elsewhere.
- The DC supply source is to be located within the same premises as this equipment.
- There shall be no switching or disconnecting devices in the earthed circuit conductor between the DC source and the earthing electrode conductor.

- The operating temperature of this equipment is 0 to 50 degrees C. If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack must not exceed the maximum rated 50 degrees C temperature.
- Installation of the equipment should be such that the air flow in the front and back of the unit is not compromised or restricted.
- Installing this equipment into a rack in such a way as to make it unstable **may cause injury or death**. Always make sure that the rack you are installing this equipment into is properly secured, stable, balanced and designed to carry the weight and weight distribution of this equipment.
- Never use this equipment to carry any weight except its own. Never use it as a shelf to support the weight of other equipment.

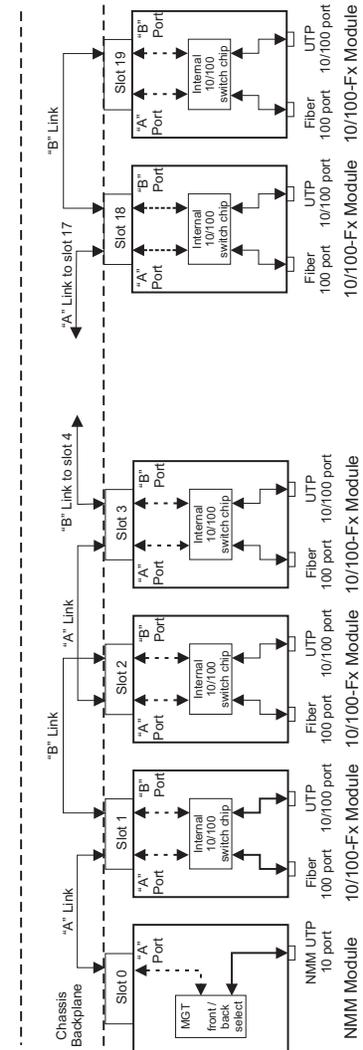
**3.4 DC Powered Chassis Mounting and Cabling**

- If rack mounting the chassis to a 19" standard rack, first attach the two enclosed "L" shaped rack mounting brackets to the chassis using the enclosed screws.
- If rack mounting, mount and attach the chassis (after the mounting brackets are installed) to the rack using the appropriate rack mounting screws (not provided).
- Ensure that the 48VDC circuit breaker can supply 3 Amps of current.
- Locate the 48VDC circuit breaker and switch the 48VDC circuit breaker to the OFF position.
- Prepare a power cable using a three conductor insulated wire (not supplied) with a 14 AWG gage. Cut the power cable to the length required.
- Strip approximately 3/8 of an inch of insulation from the power cable wires.
- Connect the power cables to the DFCS Chassis by fastening the stripped ends to the 48VDC connector.

This chassis architecture facilitates a variety of applications including unmanaged, out-of-band managed, in-band managed and multi-port configurations.

**1.3 Application Example**

**1.3.1 Out-of-Band Managed 10/100Mbps Converter Application**



**Fig 3. Out-of-Band Managed 10/100Mbps Converter Application**

Fig 3. depicts an out-of-band managed 10/100 converter application. In this application which is typical for a Central Office (CO) or a network core, a 19-Module

chassis is loaded with 10/100 UTP to fiber converters that convert UTP cabling originating at a core switch to fiber and distributing the fiber in a star configuration to different customers.

Out-of-band management is desirable in this applications since it facilitates secure monitoring, configuration and trap notification of a large number of converter modules in the chassis.

This application uses 18 10/100 modules for UTP to fiber conversion and a SNMP Management Module (MGT) for management. All modules are plugged into the 19-Module chassis.

The 10/100 converter module is designed as a 4-port-switch with two front-plane Ethernet ports (100Base-Fx fiber and 10/100Base-T/Tx UTP) and two 10/100 Ethernet backplane ports (“A” and “B” Ports). In this application, the “A” and “B” Ports are disabled to provide isolation between the modules.

The MGT features a 10Mbps Ethernet “A” Port. In this application, its “A” port is disabled and connectivity to the management network is performed via the MGT’s front-plane Ethernet port.

It is important to emphasize that in this type of application, the “A” and “B” Ports of all of the 10/100 converters must be disabled to facilitate user data privacy by isolating the converters from each other and from the “A” and “B” Links.

It should also be noted that in this configuration, in addition to data privacy infringement, enabling the “A” and “B” Links will cause a broadcast storm (since the modules create closed loops through the switch) or partitioning of some of the data paths by the switch.

The management data flows between the MGT front-plane (out-of-band) and any secure and dedicated management network hardware.

This configuration provides the network administrator with the ability to provide multi-customer service using a single chassis which is securely managed.

## **2.0 UNPACKING, VISUAL INSPECTION AND INVENTORY**

Review the contents. The following items should be included:

- DFCS* 19-Module Power Chassis
- 2 Rack mounting “L” brackets and 12 screws
- 1 Power supply for model LMC3004A(AC) / LMC3007A(DC)
- 2 Power supplies for model LMC3005A(AC) / LMC3008A(DC)
- One power cord for each AC Power supply
- User Manual

Inspect equipment and immediately report any damage or discrepancies to Black Box at 724-746-5500. If equipment is damaged, do not apply power to the module.

## **3.0 SITE PREPARATION AND INSTALLATION**

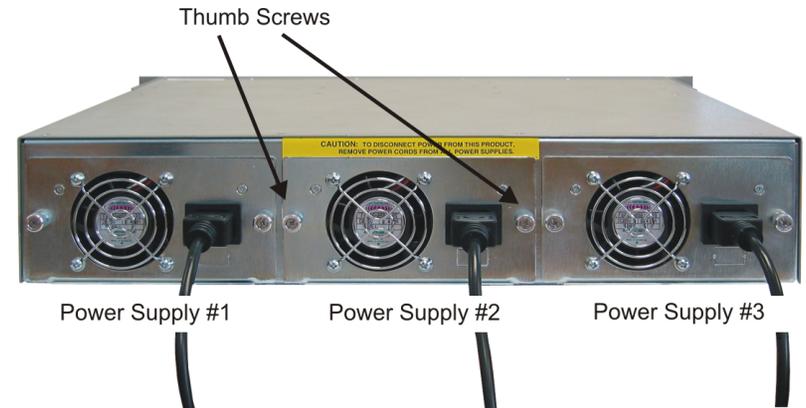
### **3.1 AC Powered Chassis Site Preparation**

- Power source should be available within 5 ft. of the chassis and installed per the National Electrical Code, ANSI/NFPA-70.

- This equipment requires 100-240VAC, 2.0A, 50/60Hz. Appropriate overloading protection should be provided on all AC power source outlets utilized.
- When rack-mounting this equipment, the rack should be appropriately earth-grounded.
- The operating temperature of this equipment is 0 to 50 degrees C. If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack must not exceed the maximum rated 50 degrees C temperature.
- Installation of the equipment should be such that the air flow in the front and back of the unit is not compromised or restricted.
- Installing this equipment into a rack in such a way as to make it unstable **may cause injury or death**. Always make sure that the rack you are installing this equipment into is properly secured, stable, balanced and designed to carry the weight and weight distribution of this equipment.
- Never use this equipment to carry any weight except its own. Never use it as a shelf to support the weight of other equipment.

### **3.2 AC Powered Chassis Mounting**

- If rack mounting the chassis to a 19” standard rack, first attach the two enclosed “L” shaped rack mounting brackets to the chassis using the enclosed screws.
- If rack mounting, mount and attach the chassis (after the mounting brackets are installed) to the rack using the appropriate rack mounting screws (not provided).
- Attach the AC power cords (provided for each Power Supply) to the back of each Power Supply and plug into the AC outlets. The fans should immediately begin to run and any installed *DFCS* modules will illuminate the power LED.



**Fig 4. 19-Module Chassis with three Installed AC Power Supplies**

### **3.3 DC Powered Chassis Site Preparation**

- Power source should be available within 5 ft. of the chassis. The over current protection for the connection with centralized DC shall be provided in the building installation and shall be a UL listed breaker rated at 20A, and installed per the National Electrical Code, ANSI/NFPA-70.
- This equipment requires 48VDC/3.0 Amps power. Appropriate overloading protection should be provided on all DC power source outlets utilized.