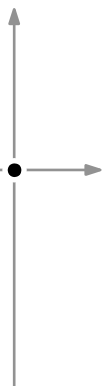


# KDD-PSU

POWER SUPPLY UNIT

## Instruction Manual



071829803  
FEBRUARY 2005

*the most watched worldwide*

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### Grass Valley Web Site

The [www.thomsongrassvalley.com](http://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.

# Table of Contents

1	Preface .....	7
1.1	About This Manual .....	7
2	Regulatory Notices .....	9
2.1	Certifications and Compliances .....	9
2.1.1	FCC Emission Control .....	9
2.1.2	Canadian EMC Notice of Compliance .....	9
2.1.3	FCC Emission Limits .....	9
2.1.4	Certification and Compliance .....	10
3	Safety Summary .....	13
3.1	Safety Terms and Symbols .....	13
3.1.1	Terms in This Manual .....	13
3.1.2	Terms on the Product .....	13
3.1.3	Symbols on the Product .....	14
3.2	Warnings .....	15
3.3	Cautions .....	16
4	Technical Specification .....	17
4.1	Power Supply .....	17
4.2	Environmental Data .....	17
4.3	Mechanical Data .....	17
5	System Overview .....	19
5.1	Introduction .....	19
5.2	DC Power Applications .....	20
5.2.1	Standard Application for Redundancy .....	20
5.2.2	Control Panel Supply .....	21
5.2.3	Multiple DC Power Supply .....	22
6	Installation .....	25
6.1	Pre-Installation Procedures .....	25
6.1.1	System Survey .....	25
6.1.2	Line Voltage .....	25
6.1.3	Safety Requirements .....	25
6.1.4	Installation Tasks .....	26
6.2	Mounting the Power Supply Unit .....	27
6.2.1	General Rack Mounting Instructions .....	27
6.2.2	Rack Mounting Procedure .....	28
6.3	Rear Connectors .....	29
6.4	Pin Assignments .....	31
6.4.1	48V DC Power Out .....	31

7	Service Instructions .....	33
7.1	General.....	33
7.2	Status LEDs .....	33
7.3	Fuses.....	33
7.3.1	Main Fuses.....	33
7.3.2	Internal Fuses on Board RY3781.....	33
7.4	Fan Exchange .....	34

## *Table of Figures*

Figure 1	Redundant Power Supply for one Mainframe and one Control Panel.....	20
Figure 2	Power Supply for Control Panel only .....	21
Figure 3	Separate Power Supply for Control Panel and Mainframe KayakDD-1.....	22
Figure 4	Separate Power Supply for Control Panel and Mainframe KayakDD-2.....	23
Figure 5	KDD-PSU Power Supply Unit with Mounting Accessories.....	28
Figure 6	KDD-PSU Rear Connectors 1 .....	29
Figure 7	KDD-PSU Rear Connectors 2.....	30
Figure 8	Mounting Overview.....	35



## Konformitätserklärung *Declaration of conformity*

Wir  
We THOMSON Broadcast and Media Solutions GmbH  
Business Unit Production Switchers and Effects  
Brunnenweg 9  
D-64331 Weiterstadt  
Germany

erklären in alleiniger Verantwortung, dass das Produkt  
*declare under our sole responsibility that the product*

### RC 3780

External Power Supply for Kayak DD Production Switcher

auf das sich diese Erklärung bezieht, mit folgenden Normen übereinstimmt:  
*to which this declaration relates is in conformity with the following standards:*

EN 55024	2002-11	EN 61000-4-5	2001-12
EN 55022	2000-05	EN 61000-4-6	2001-12
EN 61000-4-2	2001-12	EN 61000-4-11	2001-12
EN 61000-4-3	2001-12		
EN 61000-4-4	2002-07		

entsprechend den Bestimmungen der Richtlinien 89/336/EWG und 73/23/EWG.  
*following the provisions of 89/336/EEC and 73/23/EEC directives.*

General Manager

Wilfried Wüst

Weiterstadt, den 23.1.2004  
.....  
(Ort und Datum der Ausstellung)  
*(place and date of issue)*

(Rechtsgültige Unterschrift)  
*(legal signature)*

Quality Management: (Lothar Schmelz) .....



# ***1 Preface***

## ***1.1 About This Manual***

This KDD-PSU Manual provides installation, configuration, and service information for the External Power Supply for the Thomson Grass Valley KayakDD Digital Production Switchers. This manual is designed for technical personnel responsible for installing and maintaining KayakDD-1 or KayakDD-2 systems.





## ***2 Regulatory Notices***

### **2.1 Certifications and Compliances**

#### **2.1.1 FCC Emission Control**

This equipment has been tested and found to comply with the limits for a Class B 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 Thomson Grass Valley can affect emission compliance and could void the user's authority to operate this equipment.

#### **2.1.2 Canadian EMC Notice of Compliance**

This digital apparatus does not exceed the Class B 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'émet pas de bruits radioélectriques dépassant hors des limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

#### **2.1.3 FCC Emission Limits**

This device complies with Part 15 of the FCC 47 Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation.

### 2.1.4 Certification and Compliance

This product has been evaluated for Electromagnetic Compatibility under the EN 55103-1/2 standards for Emissions and Immunity and meets the requirements for E1/E2 environment.

This product complies with Class B. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

This product has been evaluated and meets the following Safety Certification Standards:

Category	Standard	Designed/tested for compliance with
Safety	ANSI / UL60950	Safety of Information Technology Equipment, including Electrical Business Equipment.
	IEC 60950	Safety of Information Technology Equipment, including Electrical Business Equipment
	CAN/CSA C22.2, No. 60950-00	Safety of Information Technology Equipment, including Electrical Business Equipment.
	Europe: EN 60950	Safety of Information Technology Equipment, including Electrical Business Equipment.
	73/23/EEC	Low Voltage Directive

Category	Standard	Designed/tested for compliance with
EMI	EMC Directive 89/336/EEC via EN 55103-1 and 2	Audio, Video and Entertainment Lighting Control for the European Community.
	EN 55103-1 standards	Electromagnetic compatibility. Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 1 Emissions, Environment E1/E2 EN 55022: Class B Radiated and Conducted Emissions EN 61000-3-2: Power Line Harmonic Emissions, Radiated Magnetic Field Emissions, Peak Inrush Current
	EN55103-2 standards	Electromagnetic compatibility--Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2 Immunity, Environment E1/E2 EN 50082-1: Immunity EN 61000-4-2: Electrostatic Discharge "ESD" Immunity EN 61000-4-3: Radiated RF Electromagnetic Field Immunity EN 61000-4-4: Electrical Fast Transient/Burst "EFT" Immunity EN 61000-4-5: Surge Immunity EN 61000-4-6: Conducted RF Immunity EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Annex A - Radiated Magnetic Field Immunity Note: This only applies to assemblies sensitive to magnetic fields
	US FCC Class B	CISPR Pub. 22 (1985)
	Canada FCC Industry Canada	
	Australia & New Zealand:	AS/NZS 3548



# 3 *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.**

## 3.1 *Safety Terms and Symbols*

### 3.1.1 *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.

### 3.1.2 *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.**

### 3.1.3 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 internal Protective Bounding Conductor (PBC) terminal proper earthing of metal parts auf the unit (EN 60950 / 1.1.13.9).



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

## 3.2 Warnings

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

**WARNING** — To reduce the risk of electrical shock, do not remove cover or back. No user-serviceable parts inside. Refer to qualified service personnel.

- **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 protective 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.

### 3.3 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 are 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.



# 4 *Technical Specification*

## 4.1 *Power Supply*

Line voltage	100V-240V AC +/-10%, power factor corrected
Line frequency	50/60Hz +/- 5%
Power consumption	max. 375W
Leakage current	< 2 mA at 250V AC
DC-OUT	2x 48V DC, total 6A max
EXT BATT IN	12V ... 24V, 0.5A
RAM Recorder buffer voltage:	7V DC, max 300mA. (Only with ext. battery input or AC In)

## 4.2 *Environmental Data*

Storage temperature	-20°C to +70°C (-4°F to 158°F)
Operating temperature	+5°C to +40°C (41°F to 104°F)
Relative humidity	≤ 95% non-condensing
Electromagnetic environment	E2 (according to EN55103-1, -2)

## 4.3 *Mechanical Data*

Height 1RU	44 mm	(1.73 inch)
Width	482 mm	(19 inch)
Depth	240 mm	(9.45 inch)
Weight	2.8 kg	(6.2 lb)



# 5 System Overview

## 5.1 Introduction



Wide range AC power supply providing redundant power for KayakDD production switcher. Power output is sufficient for two KayakDD-1 or one KayakDD-2 system.

External battery voltage can be connected in order to provide uninterrupted buffer voltage for RAM Recorder option.

The package contents:

- 1pc KDD-PSU External Power Supply Unit
- 1pc AC power cord
- Rack mount accessories
- Instruction Manual

There are two lengths of cable to the KayakDD mainframe available:

- 5m (KDD-PSU-CABLE5)
- 20m (KDD-PSU-CABLE20)

To connect a KayakDD Control Panel to the second DC output the following cables can also be used:

- 20m (KDD-PSU-CABLE20)
- 50m (DCPWR-50)
- 100m (DCPWR-100)

**NOTE!**

***In order to ensure the RAM Recorder buffer voltage, the cable length is limited to 20m. The standard KayakDD DC cables are not suitable for buffer voltage supply!***

## 5.2 DC Power Applications

Note! The DC cables in the diagrams below are not included!

### 5.2.1 Standard Application for Redundancy

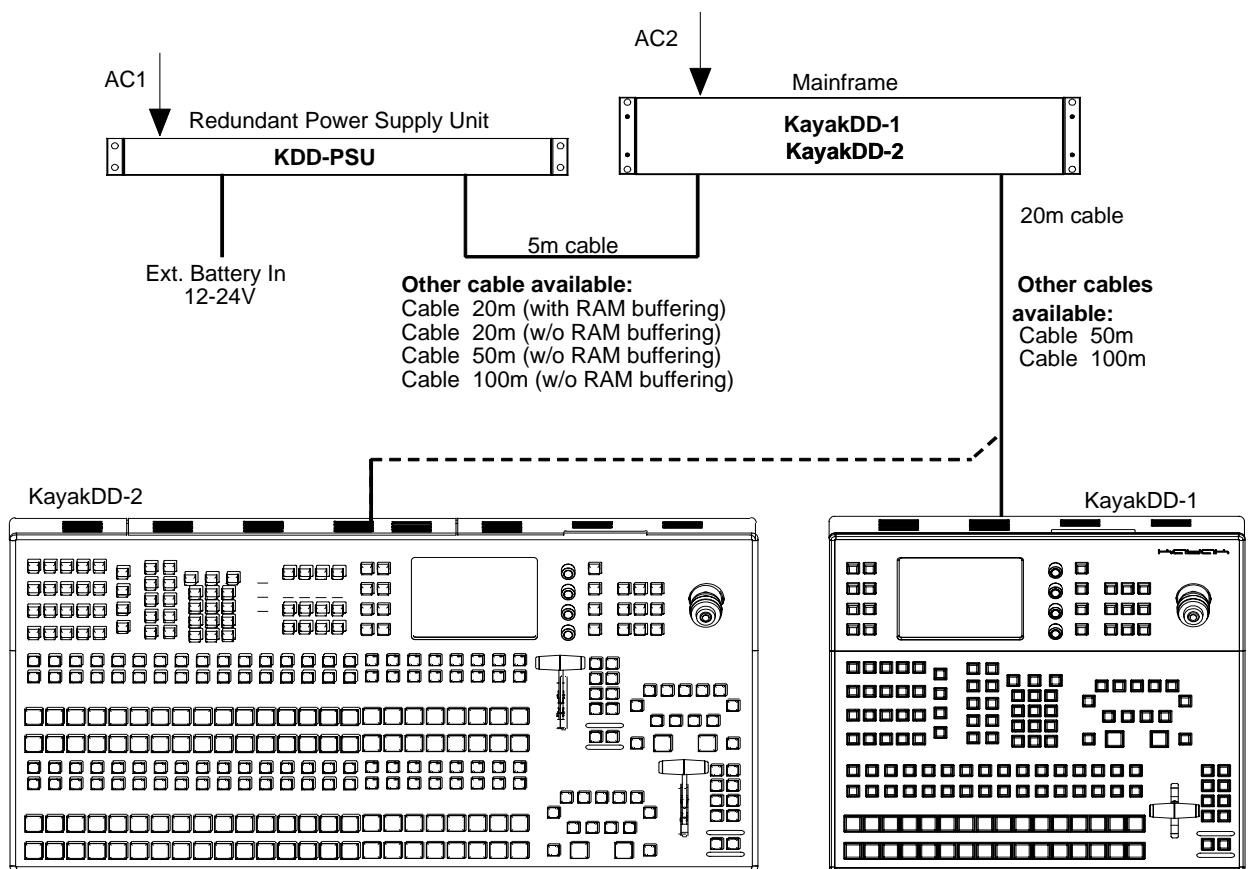


Figure 1 Redundant Power Supply for one Mainframe and one Control Panel

## 5.2.2 Control Panel Supply

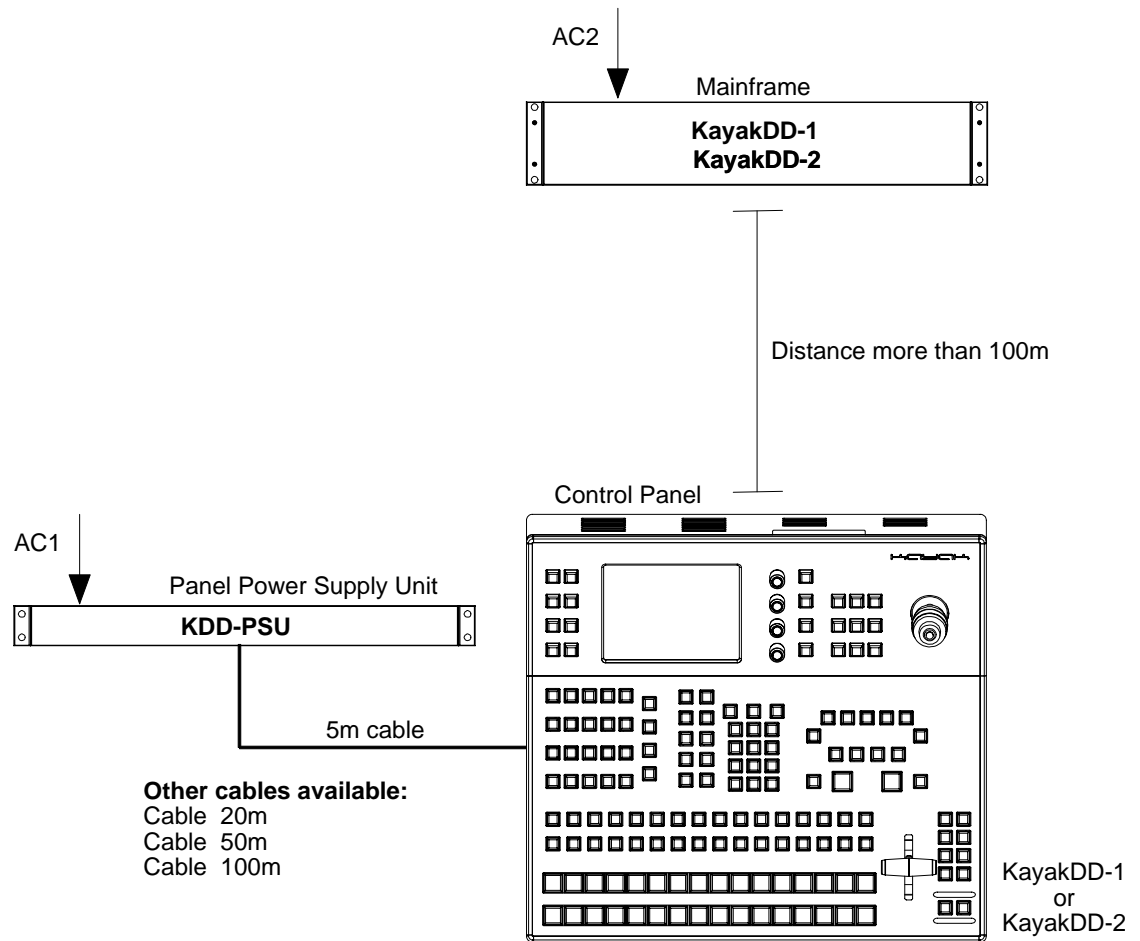


Figure 2 Power Supply for Control Panel only

### 5.2.3 Multiple DC Power Supply

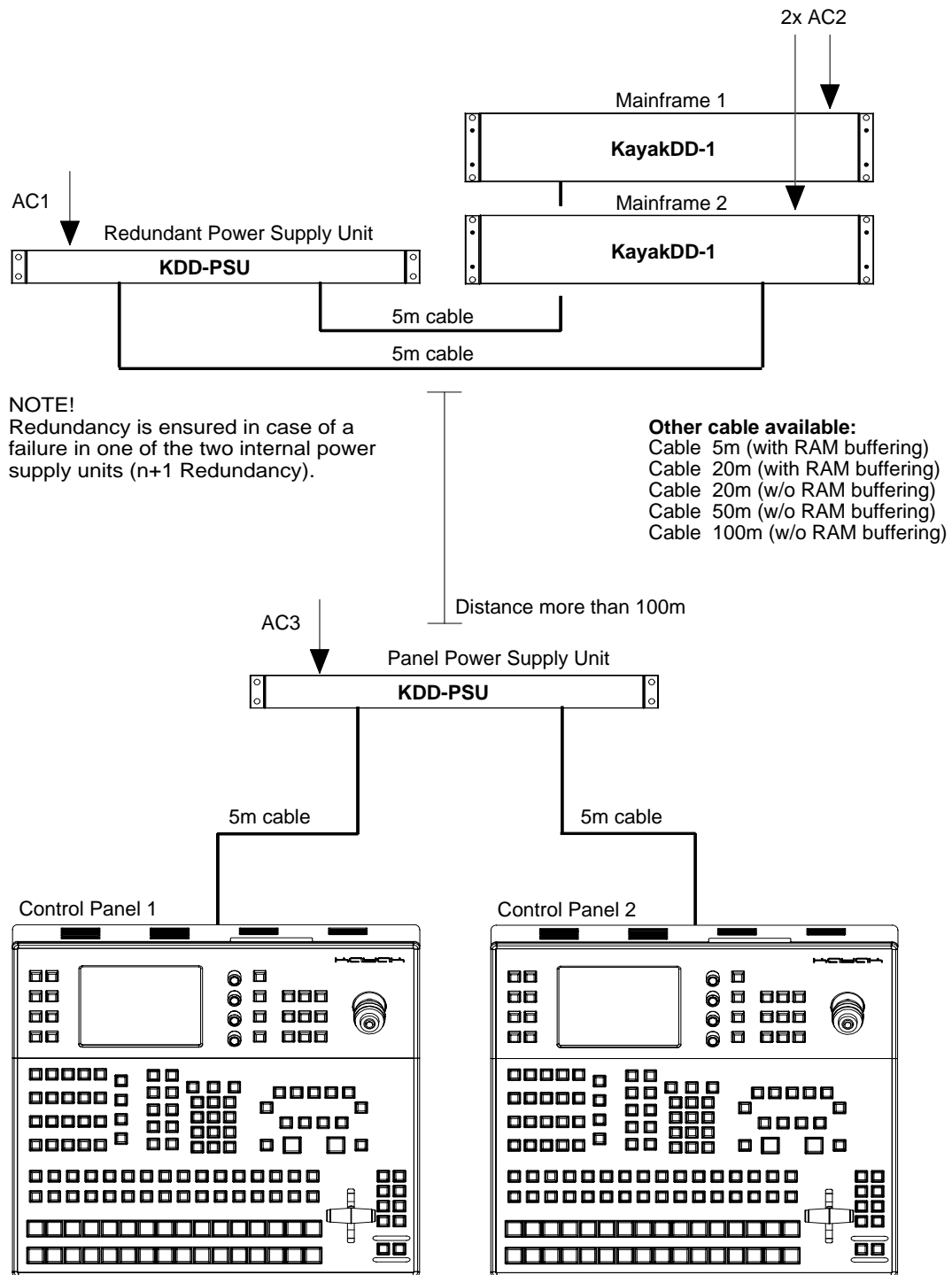


Figure 3 Separate Power Supply for Control Panel and Mainframe KayakDD-1

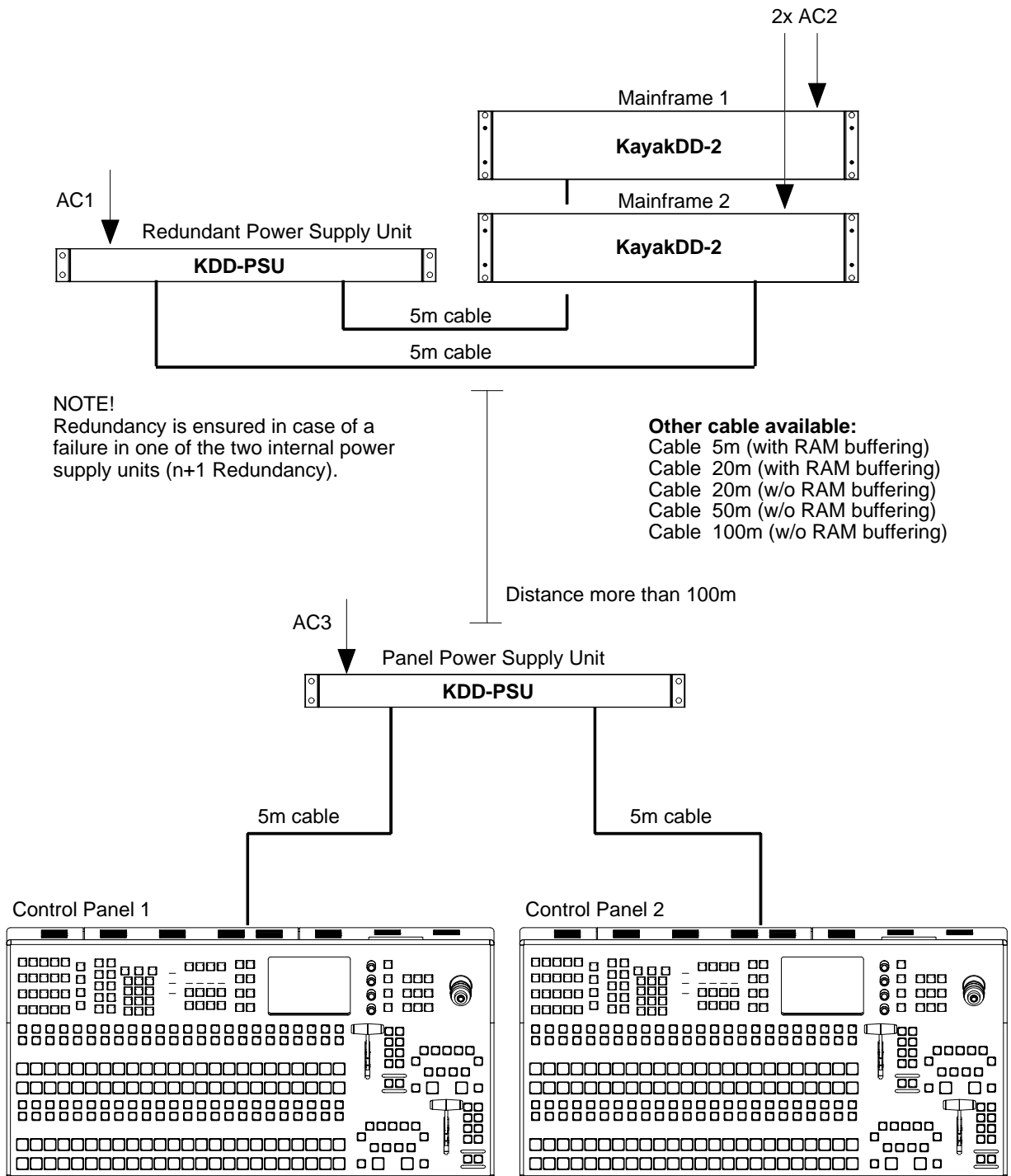


Figure 4 Separate Power Supply for Control Panel and Mainframe KayakDD-2





# **6    *Installation***

This section describes the installation and setup of KDD-PSU Power Supply Unit.

## **6.1    *Pre-Installation Procedures***

Before you physically install the KDD-PSU Power Supply Unit, familiarize yourself with the tools required, physical specifications, and safety and power requirements covered in this section.

### **6.1.1    *System Survey***

Check all parts received against the packing list enclosed with your shipment, and examine the equipment for any shipping damage. Immediately report any missing or damaged items to the carrier and to your Thomson Grass Valley Service Representative.

### **6.1.2    *Line Voltage***

KDD-PSU components utilize wide-ranging power supplies which accommodate 100 - 240V. No switch settings are required, nor are any possible.

### **6.1.3    *Safety Requirements***

To prevent injury or equipment damage, read, understand, and follow all installation safety precautions.

#### **WARNING!**

Electrical potential is still applied to some internal components even when power to the frame is off. To prevent electrical shock when working on this equipment, disconnect the AC line cords from the AC source before working on any internal components. Residual voltage may be present immediately after unplugging the system; wait thirty seconds to allow capacitors to discharge before working on the system.

#### **6.1.4 Installation Tasks**

After completing the Pre-Installation procedures, the recommended installation tasks given in this section are:

1. Unpack the equipment,
2. Install the KDD-PSU Power Supply Unit
3. Connect all cables between KayakDD devices,
4. Connect the power cables.

Power up and configuration is covered in detail in the next sections of this manual.

## **6.2 Mounting the Power Supply Unit**

### **6.2.1 General Rack Mounting Instructions**

- The maximum ambient temperature for this unit is 40°C (104°F).
- Installing the unit in a closed or multi-unit rack assembly, together with other units could increase the maximum ambient for this unit.
- If the unit is installed in a rack, no ventilation openings should be blocked or otherwise covered. Ensure a sufficient amount of airflow. Airflow through KayakDD (front view) is from the left side of the frame to the right side of the frame.
- Mounting of the unit in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- When connecting the unit to the supply circuit be sure that the supply circuit of the rack is not overloaded. For ratings see chapter Technical Specifications.
- The unit must be grounded to a good earth ground using a wire as specified by the local electrical code. This wire is attached to the protective earth connector on the rear.
- When connecting the unit in a closed or multi-unit rack assembly together with other units be sure that the summation of the touch (leakage) currents for each power supply circuit is not higher than 3.5 mA . In this case the rack must be permanently connected with an earth terminal. Earth connection is essential before connecting supply voltage! For details see chapter Technical Specifications.

The Power Supply Unit frame has to be mounted in a rack using the delivered accessories and screws.

## 6.2.2 Rack Mounting Procedure

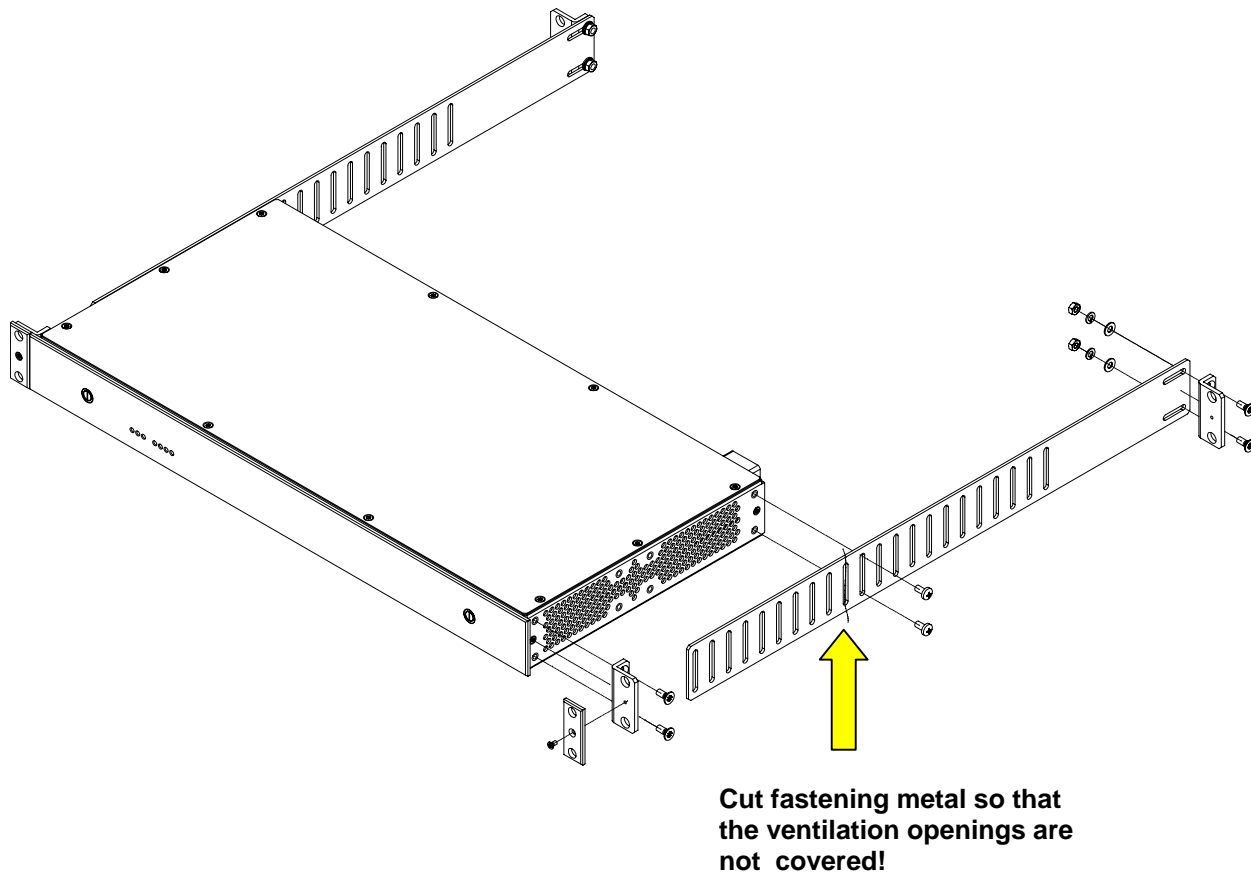


Figure 5 KDD-PSU Power Supply Unit with Mounting Accessories

### 6.3 Rear Connectors

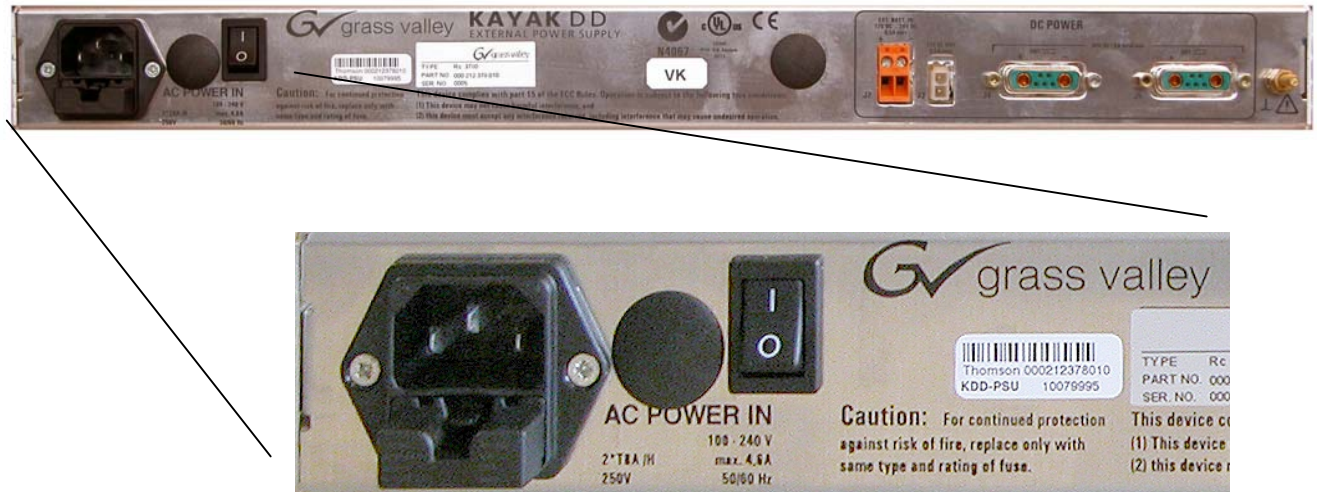


Figure 6 KDD-PSU Rear Connectors 1

Jack	Designation	Note
J1	AC POWER IN	<p>Mains connector (IEC-320, CEE-22) for power supply.</p> <p>Operating Voltage: 100V-240V AC +/-10% wide-range</p> <p><b>Caution!</b></p> <p><b>Double-pole or neutral fusing.</b></p> <p><b>After operation of the protective device, parts of the equipment that remain under voltage might represent a hazard during servicing.</b></p> <p><b>Caution!</b></p> <p><b>For continued protection against risk of fire, replace only with same type and rating of fuse!</b></p> <p><b>2x 8A /T H 250V</b></p>
	AC POWER IN	Power switch

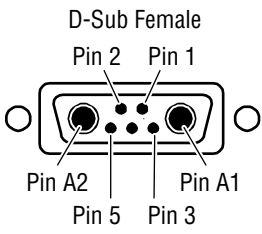


Figure 7 KDD-PSU Rear Connectors 2

Jack	Designation	Note
J2	<b>EXT. BATT IN</b> <b>12V ... 24V DC</b>	Terminal strip for connection to external battery for buffering the RAM-Recorder data
J3	<b>12V DC OUT</b>	For future use!
J4 J5	<b>DC POWER</b>	Two output connectors for DC Power Supply. (High current D-Sub, male). Output voltage: 48V/ total 6A max
	<b>Earth Terminal</b>	Earth terminal for grounding.

## 6.4 Pin Assignments

### 6.4.1 48V DC Power Out

Socket	Pin	Signal
	A1	48 V (+)
	A2	48 V (-)
	1	GND
	2	Return Sense
	3	+7V (RAM Recorder)
	4	-
	5	Future use





# 7 *Service Instructions*

## 7.1 *General*

**WARNING** — To reduce the risk of electrical shock, do not remove cover or back. No user-serviceable parts inside. Refer to qualified service personnel.

## 7.2 *Status LEDs*

The status LEDs on the front of the KDD-PSU shows the state of the external and internal voltages and the operating state of the internal fans:

<b>AC</b>	On = AC Power OK
<b>Ext.Batt</b>	On = External battery voltage is OK
<b>Fans</b>	On = Both internal fans are OK Off = One or both internal fans don't run
<b>48V-1</b>	On = 48 V DC output 1 is OK
<b>48V-2</b>	On = 48 V DC output 2 is OK
<b>12V</b>	On = 12V DC power supply for external Hub is OK (for future use)
<b>7V</b>	On = 7V DC power for RAM Recorder buffering is OK

## 7.3 *Fuses*

- **Double pole neutral fusing** — Disconnect mains power prior to servicing.
- **Use correct fuse** — Use only the fuse type and rating specified for this product.

### 7.3.1 *Main Fuses*

Fuse type: 2x T 8A / H 250V

Manufacturer: WICKMANN 181, SCHURTER SPT 0001.2513  
Order no.: 003 117 300 214

### 7.3.2 *Internal Fuses on Board RY3781*

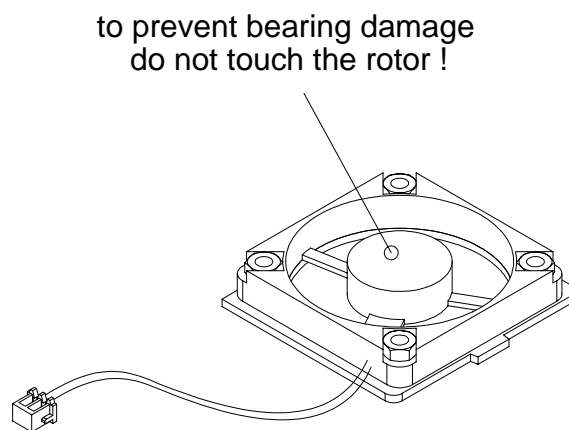
T1, T2 F 7A / 250 V

Manufacturer: LITTLEFUSE 312007 or SCHURTER FSF 0034.5143  
Order no.: 003 117 301 010

## 7.4 Fan Exchange

The exchange of the fan can be carried out as follows:

- Demount the upper cover sheet
- Unplug the fan connection cable
- Pull the fan upwards. The fan is not fastened with screws!
- Insert the new fan in the same way.
- Do no damage the connection cable when inserting the fan.
- Plug the fan connection cable
- Mount the upper cover sheet



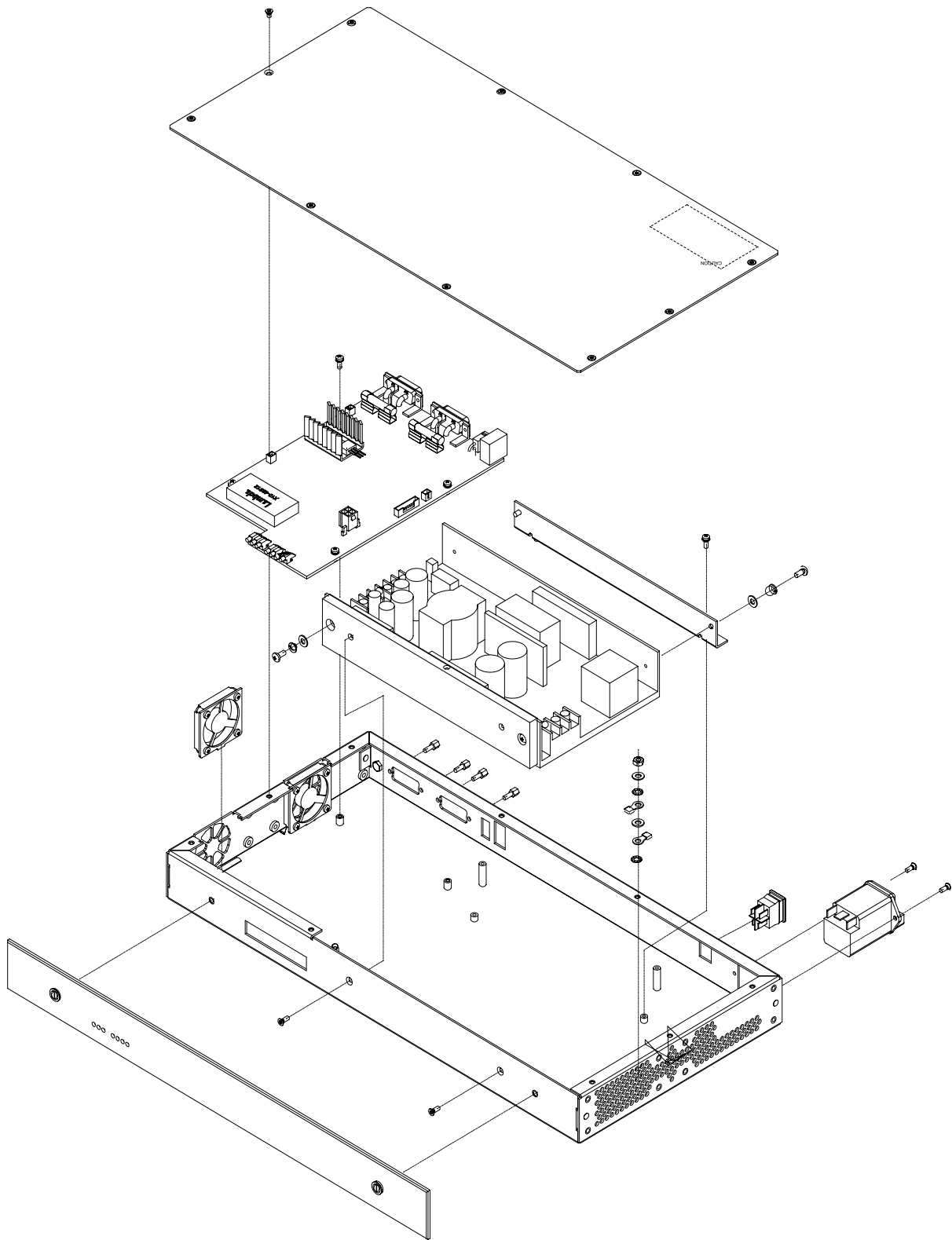


Figure 8 Mounting Overview

