installation guide

ADTRAN®

Total Access
Rackmount 6-Amp PS/BC
Installation and Maintenance Guide

Document Number: 61180043L2-5E
CLEI: VAPUKTOC_ _
June 2010

Technical Publications
CarrierNetworkDivision

Trademarks

Any brand names and product names included in this document are trademarks, registered trademarks, or trade names of their respective holders.

To the Holder of this Document

The contents of this document are current as of the date of publication. ADTRAN® reserves the right to change the contents without prior notice.

In no event will ADTRAN be liable for any special, incidental, or consequential damages or for commercial losses even if ADTRAN has been advised thereof as a result of issue of this document.

About this Document

This document provides instructions for the installation and maintenance of the Rackmount 6-Amp PS/BC. The intended audience for this information is the craftperson responsible for the installation and maintenance of the equipment. These instructions assume familiarity with the intended use of the equipment, basic required installation skills, and knowledge of local and accepted safety practices.

901 Explorer Boulevard
P.O. Box 140000
Huntsville, AL 35814-4000
United States
(256) 963-8000

Revision History

Revision	Date	Description
D	June 2005	Revise to remove Dual PS/BC Jumper Cable.
E	June 2010	Revise Alternate Mounting instructions.

Revision Functional Description

This document updates the Alternate Mounting instructions (see "Alternate Mounting" on page 1-7) to reflect the addition of rack mounting using an ADTRAN-supplied kit.

Conventions

The following typographical conventions are used in this document:

This font indicates a cross-reference link.

This font indicates screen menus, fields, and parameters.

THIS FONT indicates keyboard keys (ENTER, ESC, ALT). Keys that are to be pressed simultaneously are shown with a plus sign (ALT+X indicates that the ALT key and X key should be pressed at the same time).

This font indicates references to other documentation and is also used for emphasis.

`This font` indicates on-screen messages and prompts.

`This font` indicates text to be typed exactly as shown.

This font indicates silk-screen labels or other system label items.

This font is used for strong emphasis.

Hazard Classifications

The following hazard classifications are used in this document:

DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury. CAUTION can also be used to alert against unsafe practices associated with events that could lead to personal injury.

NOTICE

Notice call-outs indicate a potentially hazardous situation not related to personal injury, such as messages related to property damage only.

NOTE

Notes inform the user of additional, but essential, information or features.

Icons

The following icons are used throughout the ADTRAN document suite:

Training

ADTRAN offers training courses on our products. These courses include overviews on product features and functions while covering applications of ADTRAN product lines. ADTRAN provides a variety of training options, including customized training and courses taught at our facilities or at customer sites.

For inquiries concerning training, contact ADTRAN:

Training Phone: 800-615-1176, ext. 6303

Training Fax: 256-963-6217

Training Email:training@adtran.com

Contents

Scope of this Guide 1

In this Guide 1

Introduction 2

Features 2

Description 3

Single or Dual Battery 3

PS/BC Mounting Location 3

Battery Disconnect Protection Circuit 3

DC Over Voltage Protection 3

Alarm Relays 4

Fuse 4

LED Status Indicators 4

Compliance 4

Installation 5

Shipping Contents 5

Mounting the PS/BC 6

Alternate Mounting 7

Rack Mounting 7

Provisioning 7

Wiring Descriptions 8

Ground 8

120 VAC Power Input 8

DC Power Output 8

PS/BC to Battery Configurations 8

Battery Charge/Discharge 9

Alarm Wiring 10

Operation 11

Maintenance 12

Fuse 12

Specifications 13

Appendix A

Warranty A-1

Warranty and Customer Service A-1

ADTRAN Sales A-1

ADTRAN Technical Support A-1

ADTRAN Repair/CAPS A-1

Repair and Return Address A-1

Figures

Figure 1.Total Access PS/BC 1
Figure 2.PS/BC Mounted On Battery Pack 6
Figure 3.Wiring Block Diagrams 8

Tables

Table 1.LED Descriptions 4
Table 2.Power Factor and Efficiency 10
Table 3.PS/BC Specifications 10

Total Access

6-Amp Rackmount PS/BC

Scope of this Guide

This guide contains important pre-installation and installation instructions for installing the ADTRAN Total Access Rackmount 6-Amp Power Supply Battery Charger (PS/BC, P/N 1180043L2). Craft personnel should review this entire guide as part of installation planning.

In this Guide

This guide contains the topics listed in Table 1.

Table 1. Topic List

Topic	See Page
Introduction	3
Description	3
Installation	5
Wiring Descriptions	8
Operation	11
Maintenance	12
Specifications	13

Introduction

The PS/BC rectifier is part of the Total Access Rackmount AC Power Supply/Backup Battery System (APS/BBS). It is designed to work in conjunction with one or two ADTRAN backup battery packs (P/N 1175044L1).

Figure 1 illustrates the PS/BC (P/N 1180043L2) right and left side panels.

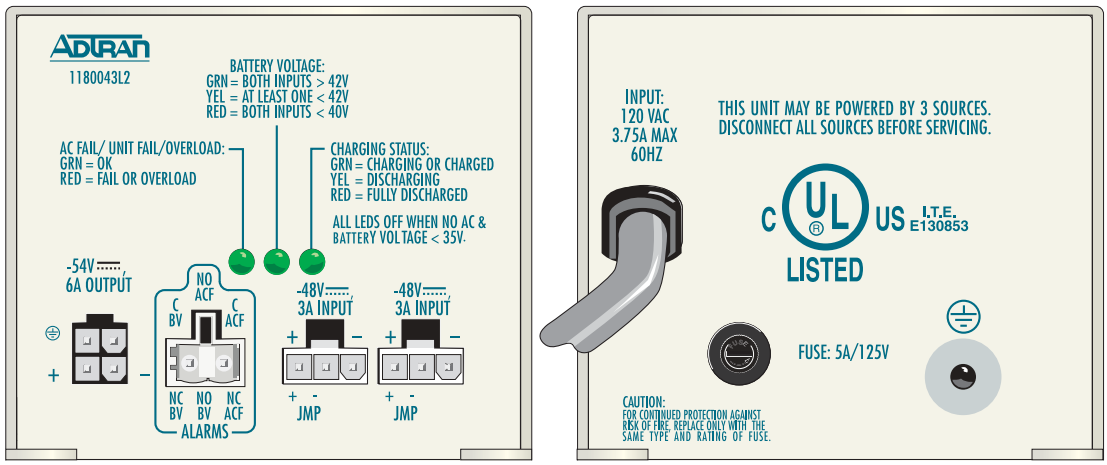


Figure 1. Total Access PS/BC

Features

The Total Access PS/BC features include the following:

- –54 VDC at 6-amps output for multiple use
- Modular connections for two backup battery packs
- Modular power output connection
- LED status for VAC, VDC, and battery charging
- Full battery recharge in less than eight hours
- Two PS/BC configuration options available
- Fuse protection
- Positive ground
- Battery Pack mounting hardware included
- Completely automatic operation
- Multiple protection features
- Uninterrupted power output if backup battery connected
- Meets NEBS Level 3 (all requirements of GR-63-CORE and GR-1089-CORE)
- FCC and UL 60950 compliant

Description

Originally designed for the Total Access 1500 system, the PS/BC can be used in any application using 120 VAC input, and requiring up to –54 VDC, 6-amps output.

In the Total Access 1500 configuration, the rectifier performs AC to DC conversion and, when used with the dual battery, provides up to eight hours of backup power for a fully populated Total Access 1500 bank (96 FXS circuits) with up to 50 percent off-hook circuits at any one time.

For general use, the rectifier receives AC power from a standard 120 VAC wall outlet and converts this to –54 VDC, 6-amp output to the designated load plus recharging the single or dual battery, or maintaining battery at peak charge. Each battery has four series connected 12 volt rechargeable cells.

Single or Dual Battery

Each battery string is rated for 3 amps of current and 7 amp-hours of capacity. Dual batteries are required if the load exceeds these ratings during AC power failure (backup battery mode).

PS/BC Mounting Location

The PS/BC normally mounts to the associated battery pack. The unit can also mount to a special bracket within a cabinet, or mount external to a cabinet against a wall.

Battery Disconnect Protection Circuit

During battery operation a protection circuit disconnects battery from the main output when battery voltage drops below 39 VDC, preventing over discharge. When AC returns, the main output provides regulated –54 VDC, batteries recharge, and the system returns to normal. Refer to "LED Status Indicators" on page 4.

After the protection circuit initiates, the LEDs remain on (red), continuing to slowly drain the battery. When battery voltage drops to 35 VDC, all load is removed from the battery. If AC power will not be available for an extended period (several days), disconnect the battery to prevent unnecessary discharge.

DC Over Voltage Protection

The PS/BC has a protection circuit that disables the rectifier to protect the load from a high output voltage caused by rectifier failure. The backup battery or redundant PS/BC supports the load in this instance. The over voltage event can permanently disable the PS/BC. Confirm this by performing the following procedure:

1. Disconnect the PS/BC from the AC source.
2. Wait 30 minutes minimum.
3. After 30 minutes plug back into the AC source.
4. If the unit has recovered, the **AC FAIL/UNIT FAIL/OVERLOAD** LED will turn on green and the unit returns to service. If the LED does not turn on green, replace the PS/BC.

Alarm Relays

There are two uncommitted alarm relays associated with PS/BC operation, as follows:

- AC Fail (ACF): Alarms if AC fails, the rectifier overloads, or the rectifier fails
- Battery Low Voltage (BV): Alarms if either or both battery voltage drops below 42 VDC

Fuse

A standard 5×20 mm 5-amp fuse adjacent to the AC power cord protects AC power feed overload in case of rectifier failure.

LED Status Indicators

A set of three PS/BC multi color LEDs provide status for AC, DC, and battery charge conditions. See Table 2 for LED descriptions. Descriptions are also labeled on the PS/BC.

Table 2. LED Descriptions

LED	Status		Description
AC FAIL/UNIT FAIL/OVERLOAD	●	Green	Normal 120 VAC operation
	●	Red	AC fail or rectifier overload or fail
BATTERY VOLTAGE	●	Green	Battery 1 and Battery 2 greater than 42 VDC
	●	Yellow	Battery 1 or Battery 2 less than 42 VDC
	●	Red	Battery 1 and Battery 2 less than 40 VDC
CHARGING STATUS	●	Green	Battery 1 and Battery 2 charged or recharging
	●	Yellow	Battery 1 or Battery 2 discharging
	●	Red	Battery 1 and Battery 2 fully discharged
All LEDs	○	Off	AC lost, Battery less than 35 VDC

Note:Descriptions are the same for a single battery.

Safety and Regulatory Compliance

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

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

Installation

CAUTION

Electrostatic discharge (ESD) can damage electronic modules. When handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

After unpacking the Total Access PS/BC, inspect it for damage. If damage has occurred, file a claim with the carrier, then contact ADTRAN Customer Service. Refer to "Appendix A, Warranty" for further information. If possible, keep the original shipping container for returning the PS/BC for repair or for verification of shipping damage.

Shipping Contents

The contents include the following items:

- Rackmount 6-Amp Power Supply Battery Charger
- *Total Access Rackmount 6-Amp PS/BC Installation and Maintenance Guide* (P/N 61180043L2-5)
- Appropriate wiring:
  - PS/BC to AC source (hardwired)
  - PS/BC to load
  - PS/BC alarm output
- Battery Pack mounting hardware

Separately purchased Rack Mounting Kits for the PS/BC are available for the following racks:

- 19-inch (P/N 1175050L1)
- 23-inch (P/N 1175051L1)

Mounting the PS/BC

The PS/BC housing occupies a nominal area 15.35 inches (with mounting tabs) wide by 3.45 inches high and is designed so the four mounting tab screw holes align to threaded screw holes on the ADTRAN battery pack housing. This procedure assumes that the battery pack is mounted in the designated 19-inch or 23-inch rack. Hardware for mounting the PS/BC to the battery pack is included.

To mount the PS/BC, complete the following steps:

1. Ensure a 120 VAC wall outlet is within reach of the PS/BC 10-foot power cord.
2. Determine the most convenient direction to view the status LEDs and position the PS/BC accordingly.
3. Align the mounting tabs to the threaded mounting holes on the battery pack.
4. Using the included “sems” screws with star washer, mount the PS/BC to the battery pack. Tighten fasteners firmly.

See Figure 2 for a representative example of the PS/BC mounted to the battery.

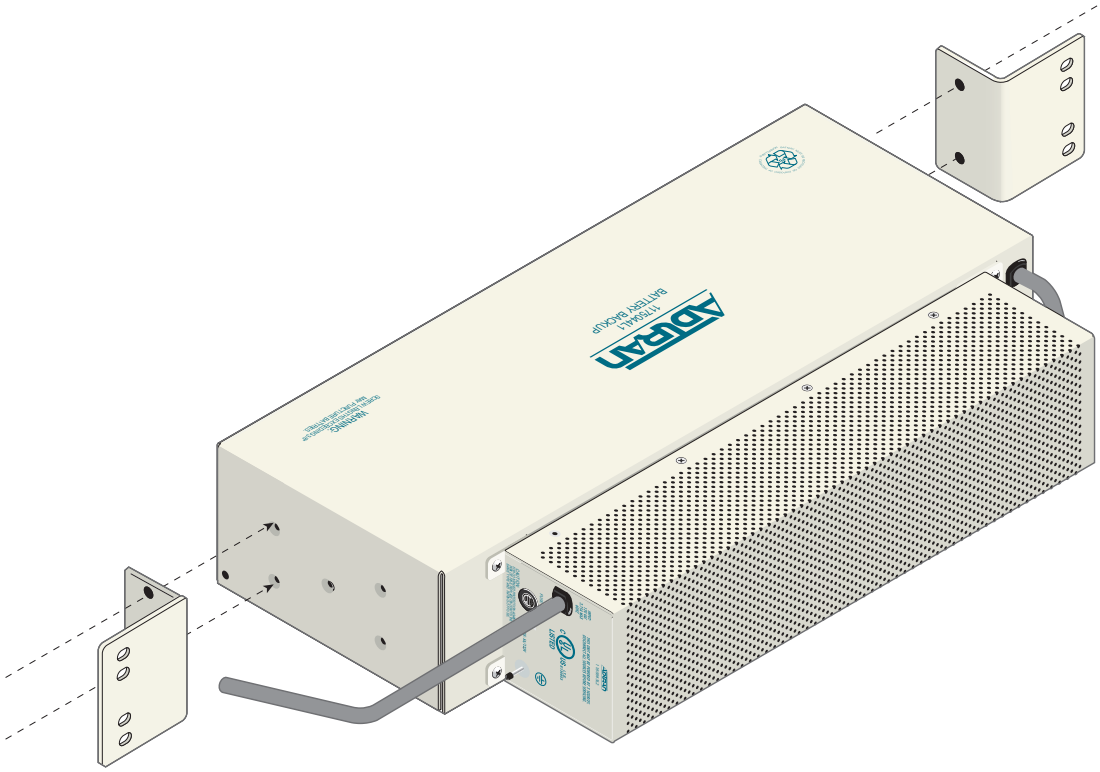


Figure 2. PS/BC Mounted On Battery Pack

Alternate Mounting

There are two alternate mounting methods, as follows:

1. Mounting directly to a wall using customer-supplied wood screws
2. Rack mounting (bracket), using on of the following kits:
   - 19-Inch Rack Mount Kit, P/N 1175050L1
   - 23-Inch Rack Mount Kit, P/N 1175051L1

Rack Mounting

Rack mounting kits can be purchased separately from ADTRAN.

The rack mounting bracket mount location is normally at the battery position when batteries are mounted external to the cabinet. The bracket has threaded mounting holes that align to the PS/BC mounting tabs. The PS/BC can be mounted to either side of the bracket, or two PS/BCs can be mounted, one on each side. Openings in the bracket allow for wire management.

NOTE

When determining the alternate mounting location, ensure supplied cabling reaches the designated termination point, including dressing and lacing.

Provisioning

Aside from various PS/BC and battery mounting and wiring configurations, there are no end user controls, adjustments, or options associated with the PS/BC.

Wiring Descriptions

The wiring required for the single PS/BC and dual battery configuration is included.

CAUTION

All grounds must terminate at a known ground location. Check metal-to-metal contact on all ground connections. Do not stack or combine grounds. Ensure ground circuit continuity.

Ground

A ground post adjacent to the PS/BC fuse is available for frame ground.

WARNING

Do not connect AC power or make battery connections until all other connections have been made for the designated installation and protective covers and shields have been installed.

120 VAC Power Input

AC input is through a 10-foot wire with a three prong grounded plug on the end. The line is hardwired to the PS/BC.

NOTE

In the optional two PS/BC configuration, a fully redundant system requires that each PS/BC have an independent AC source.

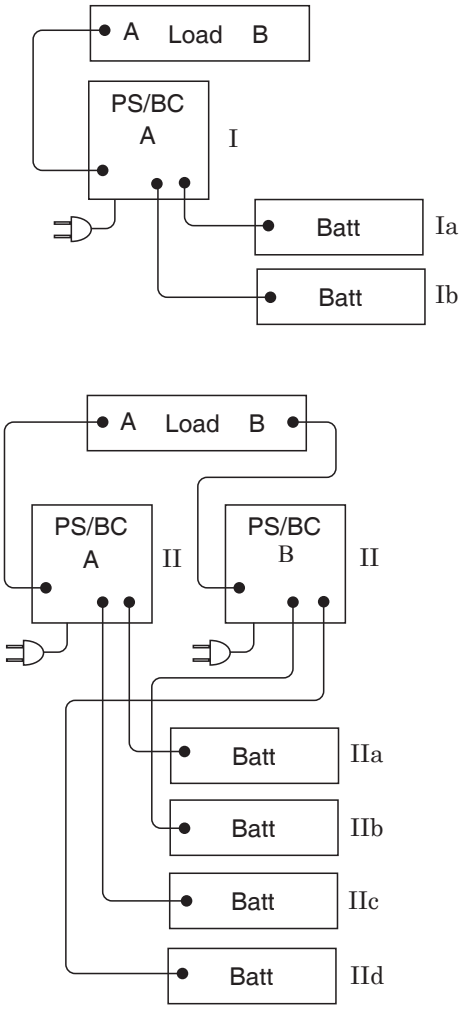
DC Power Output

The 4-foot long, three conductor PS/BC power output wire originates at the **–54V 6A OUTPUT** modular connector and terminates at three #6 ring lugs for customer designated connection. Wire color-code is as follows:

- Red = –54 VDC
- Black = Return
- Green = Ground

PS/BC to Battery Configurations

The basic design configuration consists of one PS/BC with two batteries. A variety of other configurations are possible with more (or less) redundant capability, see Figure 3 for standard configurations I and II.



Configuration I, Ia, Ib
I. PS/BC, no battery.
Ia. PS/BC + 1 battery string.
Ib. PS/BC + 2 battery strings.

Configuration II, IIa, IIb, IIc, IId
II. 2 PS/BC, no battery.
IIa. 2 PS/BC + 1 battery string.
IIb. 2 PS/BC + 2 battery strings.
IIc. 2 PS/BC + 3 battery strings.
IId. 2 PS/BC + 4 battery strings.

This configuration shows adding battery strings alternately to PS/BC A and B. Other wiring configurations are optional.

Figure 3. Wiring Block Diagrams

These would include one or two PS/BCs, none, one, or two batteries, or some combination of PS/BC and battery. The most reliable configuration would be two PS/BCs with two batteries each and with independent AC sources. The two PS/BC outputs would terminate at a single load that has primary and secondary power sharing terminals.

Battery Charge/Discharge

⚠ CAUTION

To prevent battery discharge prior to system operation, do not connect the battery to the PS/BC until the AC power is connected or imminent.

Each battery has a hardwired 6-foot battery charge/discharge wire that originates at the battery housing and terminates at a modular connector. The PS/BC has two mating connector ports each labeled **–48V 3A INPUT**. It does not matter which battery connects to which port.

To prevent heat buildup the battery charge current is limited to 1 amp per battery. This eliminates the need for temperature compensation.

Alarm Wiring

The alarm relay output originates at a modular connector with a 6-foot wire stub. Wiring termination of the output is customer designated. The alarm outputs: AC Fail, Battery Low Voltage, are assigned the following wire color-codes:

- ACF = orange, orange/white
- BV = blue, blue/white

Operation

The PS/BC starts operation when AC or battery power is applied. During operation ambient temperature can increase up to 50°C without affecting output. If ambient temperature increases beyond 50°C, output must be de-rated. At 70°C ambient, output load is limited to 5 amps.

CAUTION

External PS/BC surfaces can become hot during operation above 50°C ambient temperature.

Maintenance

The Total Access PS/BC does not require routine maintenance for normal operation.

ADTRAN does not recommend that repairs be attempted in the field. Repair services may be obtained by returning the defective unit to ADTRAN. Refer to "Appendix A, Warranty" for further information.

Fuse

If the fuse fails, replace with a fuse of identical type and rating.

Specifications

Power Factor specifications for the Total Access PS/BC are listed in **Table 3**. PS/BC specifications are listed in **Table 4**.

Table 3. Power Factor and Efficiency

Power Output vs. Efficiency			
Power Output	Power Factor	Efficiency	Power Dissipation
50 watts	> 98%	> 81%	11 watts
150 watts	> 99%	> 89%	18 watts
325 watts	> 99%	> 91%	29 watts

Table 4. PS/BC Specifications

Specification	Description
Environmental	
Operating Temperature:	–40°C to 50°C
De-rated Operation, Linear:	50°C to 70°C (0.05 amp/°C)
Storage Temperature:	–40°C to 85°C
Relative Humidity:	95% noncondensing
Max Heat Dissipation:	29 watts at 325 watts output 50 watts maximum during overload
Physical	
Height:	3.45 inches
Width:	15.35 inches (with mounting tabs)
Depth:	2.92 inches
Weight:	5.5 pounds
Electrical	
AC Input:	120 Volts, 3.75 amps max, 60 Hz
DC Output:	–54 Volts, 6 amps
Max power up to 50°C:	6 amps
Max power @ 70°C:	5 amps
Power Output:	325 watts
Compliance	
NEBS:	Level 3+
UL:	60950
ETL:	Listed
FCC:	Part 15, Class A
Part Number	
Rackmount 6-Amp Power Supply Battery Charger	1180043L2

Appendix A
Warranty

Warranty and Customer Service

ADTRAN will replace or repair this product within the warranty period if it does not meet its published specifications or fails while in service. Warranty information can be found at www.adtran.com/warranty.

Refer to the following subsections for sales, support, Customer and Product Service (CAPS) requests, or further information.

ADTRAN Sales

Pricing/Availability:

800-827-0807

ADTRAN Technical Support

Pre-Sales Applications/Post-Sales Technical Assistance:

800-726-8663

Standard hours: Monday - Friday, 7 a.m. - 7 p.m. CST
Emergency hours: 7 days/week, 24 hours/day

ADTRAN Repair/CAPS

Return for Repair/Upgrade:

(256) 963-8722

Repair and Return Address

Contact CAPS prior to returning equipment to ADTRAN.

ADTRAN, Inc.
CAPS Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807

installation guide

Carrier Networks Division
901 Explorer Blvd.
Huntsville, AL 35806
U.S.A.
http://www.adtran.com

ADTRAN CUSTOMER CARE
From within the U.S. 1.800.726.8663
From outside the U.S. +1 256.963.8716

PRICING AND AVAILABILITY
1.800.827.0807

Technical Publications
Carrier Network Division