



Spare Optional Power Supply for the ACXMODH21R DKM Chassis

## Complies with PICMIG Compact PCI specifications.

This highly efficient AC/DC converter with four output voltages was designed specifically for use with the ACXMODH21R DKM Chassis.



### Customer Support Information

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)  
FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax 724-746-0746  
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*CAUTION: Please read these operating instructions carefully before applying power. The warranty is subject to correct input voltages being applied. Repairs or modifications made by anyone other than a qualified technician will void the warranty.*

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### Federal Communications Commission and Industry Canada 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 B 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 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 Industry Canada.

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 Industrie Canada.

## Instrucciones de Seguridad (Normas Oficiales Mexicanas 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 pedestales 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.

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# Chapter 1: Overview

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**CAUTION:** Please read these operating instructions carefully before applying power. The warranty is subject to correct input voltages being applied. Repairs or modifications made by anyone other than a qualified technician will void the warranty.

## 1. Overview

### 1.1 Introduction

The ACXMODH21-PS is a highly efficient AC/DC converter with 4 output voltages, designed specifically for use with the ACXMODH21R DKM Chassis.

The product is fully compliant with the PICMG Compact PCI specification and offers high currents on the 3.3 V and 5 V outputs.

### 1.2 Features

- Input voltage ranges from 90 to 264 VAC.
- Includes four high-current outputs.
- Fully compliant with PICMG Compact PCI specifications.
- High-density design in industry-standard 3 U x 8 HP x 160 mm cassette.
- Highly efficient topology with synchronous rectifiers.
- Remote sense, active current share for three outputs.
- Uses compact PCI compatible signaling.
- Included Or-ing FETs/Diode for true redundant operation.

### 1.3 Components

#### What's Included

- (1) 5-VDC 30-amp internal power supply

#### System Components (sold separately)

- ACXMODH21R (21-Port Chassis)

#### Accessories

- Mating connector/intermediate plate 3 U (optional)

## 2. Specifications

### 2.1 General Specifications

#### General Specifications

Approvals	FCC, CE, UL, RoHS, WEEE
Number of Rack Units	3 U
Power	Source: Internal power supply; Input: 50/60 Hz, 3.5 A max., 250 Watts; Output: 5 VDC, 25 A / 3.3 VDC, 20 A / 12 VDC, 4A
Selection	Output 1: 5.0 VDC, 25 A; Output 2: 3.3 VDC, 20 A; Output 3: 12 VDC, 4 A; Output 4: -12 VDC, 4 A
Dimensions	5"H x 4"W x 3"D (12.7 x 10.2 x 7.6 cm)
Weight	6 lb. (2.7 kg)

### 2.2 Detailed Specifications

#### Detailed Specifications

<b>Input</b>	
Nominal input voltage ( $U_{i\text{nom}}$ )	115/230 VAC
Input voltage with full output power	90–264 VAC
Input frequency	47–63 Hz
Inrush current limitation	115/230 VAC <15/30 A
Input harmonics	IEC/EN 61000-3-2 class A
Power factor	$U_{i\text{nom}}, I_{o\text{nom}} > 0.95$
Efficiency	$U_{i\text{nom}}, P_{o\text{nom}} > 80\%$
<b>Output</b>	
Maximum output currents	$U_{i\text{min}} \dots U_{i\text{max}} (V_{o1}, V_{o2}, V_{o3}, V_{o4})$ 40/40/5.5 /2 A
Output voltage setting accuracy	$U_{i\text{nom}}, 50\% I_{o\text{nom}}, T_c = 25^\circ\text{C} \pm 1\%$ $U_{o\text{nom}}$
Static line and load regulation	$U_{i\text{min}} \dots U_{i\text{max}}, I_{o\text{nom}} / U_{i\text{nom}}, 5 \dots 100\% I_{o\text{max}}$ for V1, V2, V3 (flat load characteristic) $\pm 2\%$ for V4 (droop load characteristic) $\pm 4\%$
Minimum load	No minimum load requirements on V1, V2, V3 For V4 $I_{o3} > 0.75I_{o4}$
Hold-up time	At full load, starting at $U_i = 230\text{ V AC} > 20\text{ ms}$

## Chapter 2: Specifications

### Detailed Specifications (continued)

<b>Output (continued)</b>	
Dynamic load regulation	V1: $\Delta I_o=10\text{ A}$ , $dI_o/dt=2\text{A}/\mu\text{s} \pm 5\% U_{o, \text{nom}}$ , 1 ms V2: $\Delta I_o=10\text{ A}$ , $dI_o/dt=2\text{A}/\mu\text{s} \pm 5\% U_{o, \text{nom}}$ , 1 ms V3: $\Delta I_o=2\text{ A}$ , $dI_o/dt=2\text{A}/\mu\text{s} \pm 5\% U_{o, \text{nom}}$ , 1 ms V4: $\Delta I_o=0.5\text{ A}$ , $dI_o/dt=2\text{A}/\mu\text{s} \pm 5\% U_{o, \text{nom}}$ , 1 ms
Start-up time	$U_{i, \text{nom}}, I_{o, \text{nom}} < 500\text{ ms}$
Output voltage ripple and noise	$U_{i, \text{nom}}, I_{o, \text{nom}}$ , 20 MHz BW <1% or < 60 mV* *whichever is greater
<b>Protection</b>	
Input fuses	Not user accessible (fuses in both lines) 4 AT
Input transient protection	Varistor
Output	no-load, short circuit proof, overload (self recovery) 105...130% $I_{o, \text{nom}}$
Overvoltage protection	Latch style 120... 130% $U_{o, \text{nom}}$
Overload protection	Self recovery 105...130% $I_{o, \text{nom}}$
Overtemperature	Automatic output power derating at $T_c = 90^\circ\text{C}$
<b>Control</b>	
Current share	3 sharing buses for V1, V2, V3; up to 6 units; Droop load characteristic for V4
Remote sense	Available on V1, V2, and V3
Enable	Contact closure to GND extern to start up unit
Inhibit	TTL compatible signal, inhibited at GND or TTL "0"
Power Fail (Fail#)	Indicates pre-diode voltage of any outputs < 90% and/or an input voltage failure ( $U_i < 90\text{ VAC}$ )
Temperature warning (DEG#)	Indicates temperature within $20^\circ\text{C}$ of thermal power derating
Status indication	LEDs: Input OK (green), Output failure (red)
<b>Safety and EMC</b>	
Approvals	EN 60950 (TÜV), UL 1950, cUL 1950
Protection degree	IP 20
Electric strength test voltage	Class I, I/case (basic insulation) 1.5 kV AC
Electric strength test voltage	Class I, I/O (reinforced insulation) 3 kV AC
Electric strength test voltage	Class I, O/case (functional insulation) 0.5 kV AC
Electrostatic discharge	IEC/EN 61000-4-2, level 3 (contact/air) 4/8 kV, criterion B
Electromagnetic field	IEC/EN 61000-4-3, level 3 10 V/m, criterion A
Electr. fast transients/burst	IEC/EN 61000-4-4, level 3 (direct/capacitive) 1/2 kV, criterion B
Surge	IEC/EN 61000-4-5, level 3 (L/L, L/C) 1/2 kV, criterion B
Conducted disturbances	IEC/EN 61000-4-6, level 2 3V, criterion A
Electromagnetic emissions	CISPR 22/EN 55022, conducted / radiated class A/A



Detailed Specifications (continued)

Environmental Specifications	
Operating temperature	$U_{i\text{nom}}, I_{o\text{nom}}$ , cooling by forced air flow with 400 LFM 0...50 °C derating from 50 to 70 °C of 2.5% per °C
Storage temperature	Non-operational -40...85 °C
Relative humidity	Non-condensing 5...95%
Shock	IEC/EN 60068-2-27, 11 ms max. 20 gn
Random vibration	IEC/EN 60068-2-64, 10...2000/200...2000 6 Grms
MTBF	MIL-HDBK-217F Notice 2, GB, 40°C 279.000 h
Mechanical Data	
Mechanical data (H, W, D)	3 U, 8 HP, 160 mm

Pin allocation

Connector: Positronic (PCIH47M400A1)							
Pin <sup>1</sup>	<sup>2</sup>	Signal Name	Description	Pin <sup>1</sup>	<sup>2</sup>	Signal Name	Description
1–4	M	V1	V1 Output	32	M	nc	Not connected
5–12	M	RTN	V1 and V2 Return	33	M	V2SENSE	V2 Remote Sense
13–18	M	V2	V2 Output	34	M	S RTN	Sense Return
19	M	RTN	V3 Return	35	M	V1SHARE	V1 Current Share
20	M	V3	V3 Output	36	M	V3SENSE	V3 Remote Sense
21	M	V4	V4 Output	37	M	Reserved <sup>3</sup>	
22	M	RTN	Signal Return	38	M	DEG#	Degrade Signal
23	M	Reserved	Reserved	39	M	INH#	Inhibit
24	M	RTN	V4 Return	40	M	Reserved <sup>3</sup>	
25	M	Reserved <sup>3</sup>		41	M	V2SHARE	V2 Current Share
26	M	Reserved	Reserved	42	M	FAL#	Fail Signal
27	S	EN#	Enable	43	M	Reserved <sup>3</sup>	
28	M	Reserved <sup>3</sup>		44	M	V3SHARE	V3 Current Share
29	M	NC	Not connected	45	L	CGND	Chassis Ground
30	M	V1SENSE	V1 Remote Sense	46	M	ACN	AC Input Neutral
31	M	Reserved <sup>3</sup>		47	M	ACL	AC Input Line

<sup>1</sup> Pin number illustrated are of the female backplane connector

<sup>2</sup> L=first mate, M=second mate, S=last mate

<sup>3</sup> For future options

### 3. Caution and Notes

#### **CAUTION:**

*These component-level power supplies are intended exclusively for installation within other equipment by an industrial assembly operation or by professional installers. These are Class I power supplies; the ground pin of input connector J1 must be properly connected to earth ground in end use. Component power supplies are to be installed in end-use equipment according to the requirements of the safety standard used for that equipment. These power supplies are not designed to be operated outside of an enclosure which provides a means of mechanical, electrical, and fire protection. To maintain SELV requirements, the outputs should not be connected together in any manner which causes the total output voltage to exceed 60 VDC.*

#### **PROTECTIVE EARTHING:**

*The Power Supply must be properly grounded to mains protective earthing termination at end use.*

#### **FUSING:**

*In case of failure, the Power Supply must be returned to Black Box. There are no user-serviceable parts in the Power Supply.*

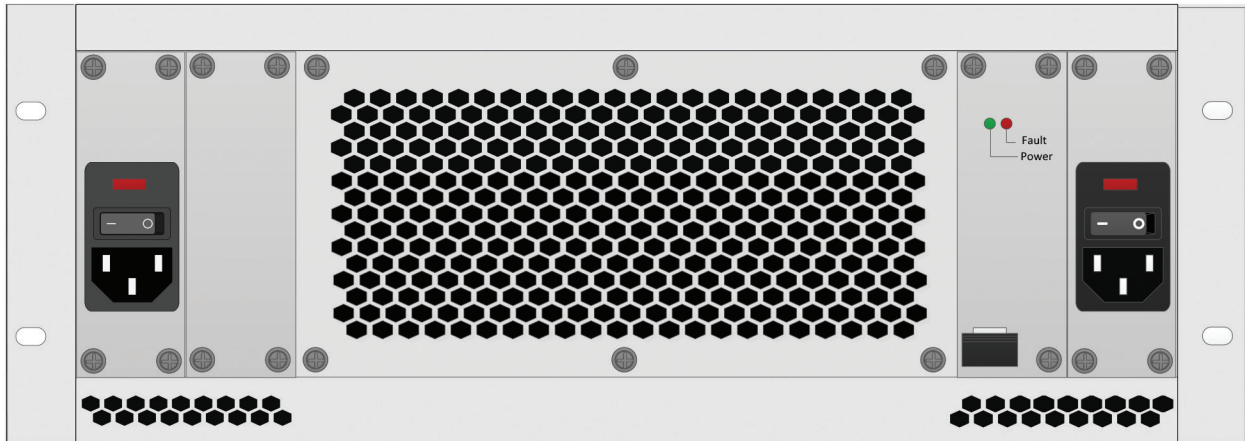
#### **LIMITED WARRANTY:**

*Black Box warrants each power supply of its manufacture for a period of two (2) years from the date of original shipment. This warranty applies to defects in materials and workmanship that result in nonperformance to published specifications.*

*Black Box assumes no liabilities for consequential damages of any kind through the use or misuse of its products by any user. No other obligations are expressed or implied. Please note that the specifications, terms, and conditions stated are subject to change without notice.*

### 4. Installation

You can install the ACXMODH21-PS in the available slot. You will need to remove the screws to remove the blanking plate, then install the ACXMODH21-PS into the slot and push in firmly to establish a good connection. Once installed, secure the power supply with screws and latch. Once installed and secured, you can use the secondary/redundant power input.



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way it should be.



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### About Black Box

Black Box provides an extensive range of networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 60 seconds or less.

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