

87421/22A Power Supply

Operating and Service
Manual



Agilent Part Number: 87421-90001
Printed in USA
April 2001
Supersedes: September 1998

Notice

The information contained in this document is subject to change without notice.

Agilent Technologies makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Agilent Technologies assumes no responsibility for the use or reliability of its software on equipment that is not furnished by Agilent Technologies.

This document contains proprietary information which is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without prior written consent of Agilent Technologies.

Restricted Rights Legend

Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 for DOD agencies, and subparagraphs (c)(1) and (c)(2) of the Commercial Computer Software Restricted Rights clause at FAR 52.227-19 for other agencies.

Agilent Technologies, Inc.
Santa Rosa Systems Division
1400 Fountaingrove Parkway
Santa Rosa, CA 95403-1799, U.S.A.

Warranty

Certification

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (NIST, formerly NBS), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

Warranty

This Agilent Technologies system product is warranted against defects in materials and workmanship for a period corresponding to the individual warranty periods of its component products. Instruments are warranted for a period of one year. During the warranty period, Agilent Technologies will, at its option, either repair or replace products that prove to be defective.

Warranty service for products installed by Agilent and certain other products designated by Agilent will be performed at Buyer's facility at no charge within Agilent service travel areas. Outside Agilent service travel areas, warranty service will be performed at Buyer's facility only upon HP's prior agreement and Buyer shall pay HP's round trip travel expenses. In all other areas, products must be returned to a service facility designated by HP.

For products returned to Agilent for warranty service, Buyer shall prepay shipping charges to Agilent and Agilent shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Agilent from another country.

Agilent warrants that its software and firmware designated by Agilent for use with an instrument will execute its programming instructions when properly installed on that instrument. Agilent does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY. The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. AGILENT SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCLUSIVE REMEDIES. THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. AGILENT SHALL

NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

Assistance

Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products.

For assistance, call your local Agilent Technologies Sales and Service Office (refer to [“Service and Support”](#) on page v).

Service and Support

By internet, phone, or fax, get assistance with all your test and measurement needs.

Online assistance: www.agilent.com/find/assist

United States

(tel) 1 800 452 4844

Latin America

(tel) (305) 269 7500

(fax) (305) 269 7599

Canada

(tel) 1 877 894 4414

(fax) (905) 282-6495

Europe

(tel) (+31) 20 547 2323

(fax) (+31) 20 547 2390

New Zealand

(tel) 0 800 738 378

(fax) (+64) 4 495 8950

Japan

(tel) (+81) 426 56 7832

(fax) (+81) 426 56 7840

Australia

(tel) 1 800 629 485

(fax) (+61) 3 9210 5947

Asia Call Center Numbers

Country	Phone Number	Fax Number
Singapore	1-800-375-8100	(65) 836-0252
Malaysia	1-800-828-848	1-800-801664
Philippines	(632) 8426802 1-800-16510170 (PLDT Subscriber Only)	(632) 8426809 1-800-16510288 (PLDT Subscriber Only)
Thailand	(088) 226-008 (outside Bangkok) (662) 661-3999 (within Bangkok)	(66) 1-661-3714
Hong Kong	800-930-871	(852) 2506 9233
Taiwan	0800-047-866	(886) 2 25456723
People's Republic of China	800-810-0189 (preferred) 10800-650-0021	10800-650-0121
India	1-600-11-2929	000-800-650-1101

Safety and Regulatory Information

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. This product has been designed and tested in accordance with international standards.









WARNING

The **WARNING** notice denotes a hazard. It calls attention to a procedure, practice, or the like, that, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

CAUTION

The **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

Instrument Markings

	When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.
	This symbol indicates hazardous voltages.
	The laser radiation symbol is marked on products that have a laser output.
	This symbol indicates that the instrument requires alternating current (ac) input.
	The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.
	The CSA mark is a registered trademark of the Canadian Standards Association.
1SM1-A	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 11, Clause 4).
	This symbol indicates that the power line switch is ON.
	This symbol indicates that the power line switch is OFF or in STANDBY position.

**Safety Earth
Ground**

This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

Before Applying Power

Verify that the product is configured to match the available main power source as described in the input power configuration instructions in this manual. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

**Safety and Regulatory Information
Manufacturer's Declaration**

Note

Note

This is to certify that this product meets the requirements specified in IEC 1010 and IEC Publication 348, Safety Requirements for Electronic Measuring Apparatus. It has been supplied in a safe condition for indoor use only and may occasionally be subjected to temperatures between +5 and -10 celsius without degradation of its safety. The present data sheet contains some information and warnings which have to be followed by the user to ensure safe operation and to retain the product in safe condition. The main plug shall be inserted in a socket outlet provided with a protective earth contact. The protective action must not be negated by the use of an extension cord without a protective conductor. **Warning:** Any interruption of the protective conductor inside or outside the product or disconnection of the protective earth terminal is likely to make the equipment dangerous. Intentional interruption is prohibited. This product has been designed to be safe under the following environmental conditions: indoor use; altitude up to 2000 meters; temperature range expanded to include 0 to +55 Celsius; maximum relative humidity 80% up to 31 degrees Celsius decreasing linearly to 50% relative humidity at 40 degrees Celsius; mains supply voltage fluctuations not to exceed $\pm 10\%$ of nominal voltage; transient over voltage category II for the main ac supply voltage; pollution degree two. If the equipment is used in a manner not specified by Agilent Technologies, the protection provided by the equipment may be impaired.

Model 87422A

Declaration of Conformity

DECLARATION OF CONFORMITY

According to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name:

Agilent Technologies Co. Agilent Technologies Co. (Malaysia)

Manufacturer's Address:

1400 Fountaingrove Parkway Santa Rosa, CA 95403-1799 USA	Bayan Lepas Free Industrial Zone 11900 Penang Malaysia
--	--

Declares that the products

Product Name: Amplifiers with power supplies

Model Number: 83006A, 83017A, 83018A,
83020A, 83050A, 83051A,
87421A and 87422A

Product Options: This declaration covers all options of the above products.

Conform to the following product specifications:

Safety: IEC 61010-1:1990 + A1:1992 + A2:1995 / EN 61010-1:1993 +A2:1995
CAN/CSA-C22.2 No. 1010.1-92

EMC: CISPR 11:1990/EN 55011:1991 Group 1, Class A
IEC 801-2:1984/EN 50082-1:1992 4 kV CD, 8 kV AD
IEC 801-3:1984/EN 50082-1:1992 3 V/m, 27-500 MHz
IEC 801-4:1988/EN 50082-1:1992 0.5 kV sig. lines, 1 kV power lines

Supplementary Information:

The products herewith comply with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carry the CE-marking accordingly.



Greg Pfeiffer
Quality Engineering Manager
Santa Rosa, CA, USA
20 March 2001



Tan San Aen
Quality Engineering Manager
Penang, Malaysia
28 March 2001

For further information, please contact your local Agilent Technologies sales office, agent or distributor.

87421/22A Power Supply

The 87421A and 87422A power supplies are universal input, dc switching power supplies designed to provide the bias voltages needed to operate microwave system amplifiers.

87421A Power Supply

The 87421A is a 25 watt, ± 12 V dc power supply designed to power the 83006A, 83017A, and 87415A microwave system amplifiers.

- The power supply includes an AC power cord with protective ground for connection to 90-240 Vac.
- Also included is a 2 meter cable with a 3-pin connector on one end and a D-subminiature connector (83006-60005) on the other end for direct connection to the microwave system amplifiers.

The 87421A may also be used to provide bias voltages for the 83440C high speed lightwave converter. Using the 83440-60009 lightwave converter power supply adapter, the 87421A becomes a compact convenient power supply for use with the lightwave converter.

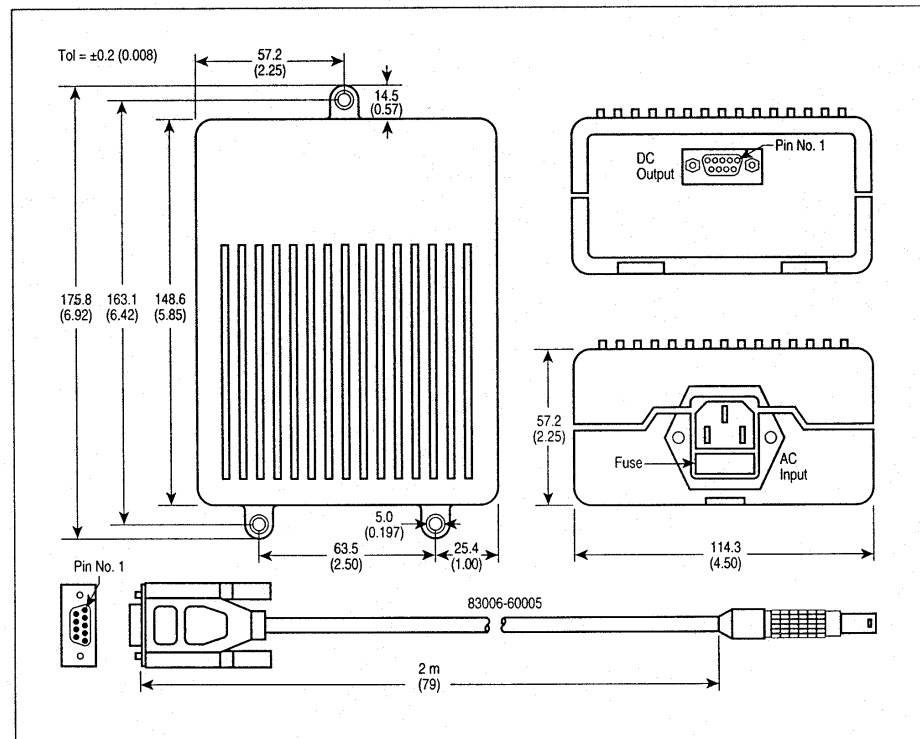


Figure 1 87421A Power Supply Diagram

87422A Power Supply

The 87422A is a 90 watt, ± 15 V power supply designed to power the 83020A microwave system power amplifier. One additional ± 12 V dc output is provided to power a preamplifier such as the 83006A or 83017A.

The power supply includes an AC power cord with protective ground for connection to 90-240 Vac and two 2 meter cables:

- one cable (83006-60005) with a 3-pin connector on one end and a D-subminiature connector on the other end
- one cable (87422-60001) for direct connection to the 83020A amplifier

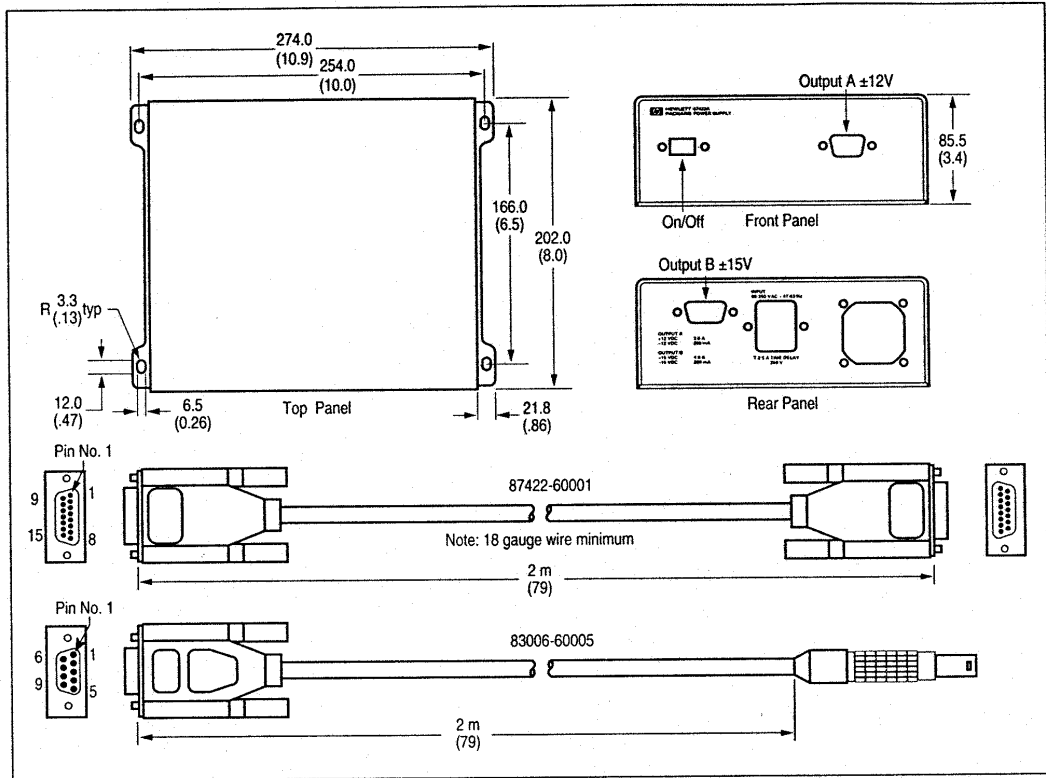


Figure 2 87422A Power Supply Diagram

Specifications

Table 1 Specifications

Product Specifications		
Model Number	87421A	87422A
Output voltage/current	+ 12 V at 2 A - 12 V at 200 mA	+ 15 V at 4.0 A -15V at 20 mA +12V at 2 A -12V at 200mA
Output power	25 W	90 W
Line regulation	0.1%	0.1%
Load regulation (20% to full load)	2.0%	1.0%
Output ripple	25 mV RMS max	25 mV RMS max
Output noise	2% peak to peak max	2% peak to peak max
Overvoltage limit protected	Yes	Yes
Short circuit protection	Current limited for overload and short circuit protection. Normal operation returns upon removal of overload.	Current limited for overload and short circuit protection. Normal operation returns upon removal of overload.
General Specifications		
AC input voltage	90-250 Vac, 50/60 Hz	90-240 Vac, 50/60 Hz
Fuse	1 A, slow blow	T 3.15 A
Weight	0.9 kg (2.0 lb)	2.1 kg (4.6 lb)
Shipping Weight	1.8 kg (4.0 lb)	3.2 kg (7.0 lb)
Environment Specifications		
Operating temperature	0 ⁰ C to +55 ⁰ C full load	0 ⁰ C to +55 ⁰ C full load
Storage temperature	-40 ⁰ C to +70 ⁰ C	-40 ⁰ C to +70 ⁰ C
Product Safety		
	CAN/CSA 234 IEC 1010 UL 1950	CAN/CSA 234 IEC 1010 UL 1950

×

Operating and Service

Operating Instructions

To operate the power supplies, connect the power supplies output to the amplifier dc input with the cable provided. The power supplies include a power cord with protective ground for connection to 90-240 Vac.

Mounting holes are provided as shown in the diagrams. The power supplies may be mounted in any orientation with user supplied hardware.

NOTE

- To ensure continued compliance to product safety and EMC specifications, connect the power supplies to an amplifier only with the cable provided.
- Do not attempt to modify or extend the dc output cable. Contact your local Agilent Technologies Sales and Service office for help with special applications requiring longer cables.

Fuse Replacement

The power supplies have a fuse located next to the IEC appliance inlet. If it is necessary to replace the fuse, disconnect the power supply from both AC power and the amplifier. Using a slotted screw driver, open the fuse cover and replace the fuse.

Service Information

The power supplies contain no user serviceable parts (with the exception of the fuse). If service is required, contact your nearest Agilent Technologies Service Center. Refer to [“Service and Support” on page v](#).

Available Instruments and Accessories

- 83006A microwave system amplifier 0.01-26.5 GHz
- 83017A microwave system amplifier 0.5-26.5 GHz
- 83018A microwave system amplifier 2-26.5 GHz
- 83020A microwave system power amplifier 2-26.5 GHz
- 87415A microwave system amplifier 2-8 GHz
- 83440C high speed lightwave converter dc-20 GHz, 1000-1600 nm
- 83440-60009 lightwave converter power supply adapter