SPECTRADYNAMICS, INC

DA-1G
1 GHz DISTRIBUTION AMPLIFIER
OPERATING MANUAL

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DA-1G 1 GHz Distribution Amplifier Operating Manual

DA-1G:2022MD

Contents

1.0 Introduction

The DA-1G is a general-purpose isolation amplifier designed to distribute frequencies from 700 MHz to 1100 MHz. The input signal is distributed to twelve output channels.

The DA-1G offers 80 dB of channel-to-channel isolation and 85 dB of reverse isolation at a frequency of 1 GHz. The low phase-noise ensures that the distributed signals are not degraded. The outputs have a low VSWR, typically 1.2, to minimize environmental effects on frequency distribution through long transmission lines.

The instrument is equipped with a power level monitor that compares the twelve output power levels to a preset threshold of +7 dBm. If the signal on any output drops below this threshold, the monitor LED located on the front panel will turn off indicating a fault condition. The inputs and outputs are chassis grounded.

The DA-1G is designed to be powered by a 100 to 240 VAC mains source or by a +12 to +36 VDC for instruments acquired with the DC power option. If both AC and DC sources are powering the instrument, the DC source will be used as backup power in case of AC power outages. The instrument is designed to automatically switch from AC to DC supply operation using a Schottky diode network and charge storage capacitors to avoid any glitches and ensure uninterrupted continuous operation.

2.0 Safety and Preparation for Use

The DA-1G was designed for indoor use only and is not intended for operation outdoors or in a wet environment. The instrument may be mounted in a standard 19-inch instrumentation rack or may be used on a laboratory bench.

Inspect the instrument and power cords for damage before first use.

2.1 Electrical Safety and Preparation for Use

Voltages capable of causing injury or death are present in this instrument. Use extreme caution whenever the instrument cover is removed.

Line Voltage

This instrument is designed to operate with a 100 to 240 VAC, 47 to 63 Hz power source.
Optional DC operation with +12 to +36 VDC, +2 Amperes is also possible.

Fuse

A 1.0 Ampere 250V 5X10mm slow-blow fuse is used for 100-240 VAC operation.
A 2.0 Ampere 250V 5X10mm slow-blow fuse is used for the DC power protection.
Only replace fuse with the same type and specifications.

AC Power

The instrument has a detachable three wire power cord for connection to a grounded AC power source. The enclosure of the unit is directly connected to the outlet ground to protect against electrical shock. Always use an outlet with a protective ground and do not disable this safety mechanism. Detaching the AC power cord is the only option of disconnecting the unit from the AC mains supply. Make sure you have access to the rear panel or provide an external accessible AC disconnect means for the DA-1G.

DC Power

If the instrument was acquired with DC operation option, a RM12BRD-6PH(71) connector will be installed on the back panel with the below configuration and a DC mating connector will shipped with the unit to facilitate the elaboration of a DC power cable. Verify that the connector from the external power supply has the required pin configuration.

Pin 1 NC
Pin 2 NC
Pin 3 NC
Pin 4 +12 to +36 VDC power return
Pin 5 +12 to +36 VDC power
Pin 6 Chassis GND /Earth GND

DC connector
RM12BRD-6PH(71)

DC mating connector
RM12BPE-6S(81)

2.0 Safety and Preparation for Use

The power return (pin 4) is NOT connected to the instrument case ground internally, however both ground connections pin 4 and pin 6 are available at the DC power connector and may be connected together at this point.

Requirements for the external DC power supply

The following specifications should be used to ensure optimum performance:

DC Supply voltage	+12 to +36 VDC, 2 Amps
Line regulation	+/- 0.05% for a 10% line change
Load regulation	+/- 0.05% for a 50% load change
Output ripple	< 5 mV peak-to-peak
Pin configuration	Same as RM12BRD-6PH(71) DC connector on the back panel

Verify that the connector from the DC power supply to be used has the correct pin configuration mentioned above. Do not apply AC voltage to the DC power connector. Failure to follow these directions may cause injury or death to personnel, cause irreparable damage to the instrument and voids all warranties.

If you provide DC power to the unit, detaching the DC power cord is the only option of disconnecting the unit from the DC mains supply. Make sure you have access to the rear panel or provide an external accessible DC disconnect means for the instrument.

2.2 Instrument Safety and Preparation for Use

The DA-1G is designed to distribute RF signals with a frequency of 700 to 1100 MHz. Output levels below +7 dBm will trigger a fault condition which can be monitored from the front panel. Input signals must be kept below +20 dBm as greater power levels will damage the unit and void all warranties.

Absolute Maximum Ratings

Input RF Power	+20 dBm Maximum
Reverse RF Power	+20 dBm Maximum
Voltage at the RF Input	+50 VDC Maximum
Voltage at the RF Output	+50 VDC Maximum
Input DC Supply Voltage	+ 36 VDC
Storage Temperature	-10 to +75 ºC
Operation Environment	0 to +50 ºC

3.0 Front Panel Description

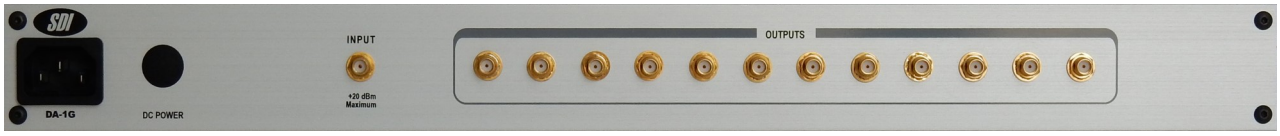
AC Power LED
The AC Power LED turns on when AC power is applied to unit.

DC Power
If the DC Power option is installed, the DC Power LED will be on when DC power is applied to unit.

Monitor LED
The monitor LED will be on if all RF outputs are greater than +7 dBm.

RF signal levels less than +7 dBm will trigger a fault condition and the Monitor LED will not light up. However the DA-1G will still provide twelve buffered copies of the RF input signal.

4.0 Back Panel Description



AC Power
The DA-1G is configured to operate on 100 to 240 VAC.

DC Power
If the DC Power option is installed, this instrument may also operate on DC power from +12 to +36 VDC as the main power supply. When the DA-1G is set up to operate with both AC and DC power sources at the same time the DC power is used as backup power in case of AC power outages.

INPUT
A RF Signal within the range of 700 MHz to 1100 MHz may be connected to the SMA connector labeled INPUT.

OUTPUTS
Twelve buffered copies of the RF input signal will be available at the SMA connectors labeled OUTPUTS. Any DA-1G output may be used to drive the input of another distribution amplifier.

5.0 Installation

The instrument may be mounted in a standard 19-inch instrument rack or may be operated on a laboratory bench.

Connecting Power

The DA-1G ships with a standard North American, European, or Chinese IEC power cord. Locate the AC POWER entry module on the rear of the enclosure and connect the power cord.

The amplifier units that are acquired with the DC operation option are shipped with a DC connector, part number RM12BPE-6S(81), you may prepare a DC power cable with this connector following the connector configuration on page 2.

If you opted to prepare the DC power cable you may locate the DC input connector on the rear of the enclosure and connect the cable.

6.0 Operation

To operate the DA-1G plug the AC power cord into an appropriate AC power outlet. The DC power cable may also be connected to an appropriate DC power supply.

DC power may be used as a main power source for the instrument or in conjunction with the AC power as a backup power supply in case of loss of the main AC power. The instrument is designed to automatically switch from AC to DC power supply to ensure uninterrupted continuous operation.

Once AC power is supplied to the DA-1G, the LED on the front panel labeled AC POWER will turn on. If you also applied DC voltage, the LED labeled DC POWER will also turn on.

The DA-1G is designed to distribute signals from 700MHz to 1100 MHz. The RF input has a 50-ohm input impedance. Provide a signal within the mentioned frequency range to the SMA connector on the back panel labeled INPUT. If the RF signal has a power level greater than +7 dBm, the monitor LED located on the front panel will light up.

Twelve buffered copies of the RF signal provided will be available on the SMA connectors located on the back panel labeled OUTPUTS.

7.0 Troubleshooting

Do not attempt to service or adjust the instrument unless another person, capable of providing first aid or resuscitation, is present.

If there are problems that cannot be resolved by the troubleshooting steps below please contact technical support.

Technical Support
Tel: +1 (303) 665-1852 , Fax: +1 (303) 604-6088
support@spectradynamics.com, www.spectradynamics.com

AC Power LED does not turn on.
Disconnect AC and DC power cords. Remove the top cover. Check the AC power fuse and power cord. If the fuse is blown replace with same type and rating.

DC Power LED does not turn on.
Disconnect AC and DC power cords. Remove the top cover. Check the DC power fuse and power cord. If the fuse is blown replace with same type and rating.

Please contact SpectraDynamics if any of the fuses blows again or if the event that caused the fuse to blow is not known.

Monitor LED is off.
Check to see if the RF signal provided to the instrument is greater than +7 dBm.

Check to see if a signal is present at all outputs of the signal distribution module.

The Monitor LED will remain off with a power lever under +7 dBm, but will still provide five copies of the RF input signal. If the instrument is providing the copies of the input signal you may continue using the DA-1G.

If the power level of the RF signal provided is greater than +7 dBm and the Monitor LED remains off, the instrument will have to be returned for repair.

8.0 Specifications

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Output power level	1 dB compression		13	-	dBm
Bandwidth	+/- 1 dB	800	1100	-	MHz
Gain	@ 1 GHz	-0.5	0.5	1.5	dB
Impedance	Input Output	- -	50 50	- -	Ohms
Return loss	Input (S11) 1 GHz Output (S22) 1 GHz	- -	-25 -25	-20 -20	dB
Distortion	+10 dBm	-	-45	-40	dBc
Isolation	Output to output Output to input	75 80	80 85	- -	dB
Phase noise (+13dBm)	1 Hz 10 Hz 1 kHz 10 kHz	- - - -	-133 -145 -159 -161	-130 -140 -155 -160	dBc/Hz
Temperature Coef-ficient of Propaga-tion Delay		-	1	1.5	ps/K

*All tests done at 1000 MHz and +10 dBm output unless otherwise specified.

Rackmount chassis	1U H, 19“ W, 14” D
Weight	10 lb.
Power consumption	25 Watts
AC Input Voltage Range	90 to 264 VAC, 47 to 63 Hz
DC Input Voltage Range	+12 to +36 VDC, 13 W
Storage temperature	-10 to +75 ºC
Operation environment	0 to +50 ºC
Humidity	5% to 95% Non-condensing

9.0 Warranty and Service

Warranty

The DA-1G is warranted to be free of defects under normal operating conditions, as specified, for one year from date of original shipment from SpectraDynamics, Inc. (SDI). SDI's obligation and liability under this warranty is expressly limited to repairing or replacing, at SDI's option, any product not meeting the said specifications. This warranty shall be in effect for one (1) year from the date a DA-1G is sold by SDI. SDI makes no other warranty, express or implied, and makes no warranty of the fitness for any particular purpose. SDI's obligation under this warranty shall not include any transportation charges or costs of installation or any liability for direct, indirect, or consequential damages or delay. Any improper use, operation beyond capacity, substitution of parts not approved by SDI, or any alteration or repair by others in such manner as in SDI's reasonable judgement affects the product materially and adversely shall void this warranty. No employee or representative of SDI is authorized to change this warranty in any way or grant any other warranty.

Service

Do not attempt to service or adjust the instrument unless another person, capable of providing first aid or resuscitation, is present. Please remember that any alteration or repair may void the warranty. Contact SDI with any questions or to request an RMA if a repair is needed.

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EC Declaration of Conformity

The DA-1G distribution amplifier has been designed and manufactured in accordance with the below referenced Standards and complies with all essential requirements of the Directives listed below.

Directives:

2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

2014/30/EU The Electromagnetic Compatibility Directive and its amending directives.

2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Standards:

EN 55011 2009 + A1: 2010, Product family standard for Industrial, Scientific and Medical (ISM) equipment.

EN 61010-1:2010+A1:2019, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 1: General Requirements

EN 61326-1:2013 Electrical Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 1: General Requirements

CE