SPECTRADYNAMICS, INC.

HIGH PERFORMANCE DISTRIBUTION AMPLIFIER
HPDA-15RM-C
OPERATING MANUAL

SPECTRADYNAMICS, INC • 1849 Cherry St. Unit 2. • Louisville, CO 80027
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Description

The HPDA-15RM-C is a high performance distribution and isolation amplifier. The standard unit contains three HPDA-5 modules. Each module provides five unity gain outputs for every input signal. The HPDA-15RM-C may be modified upon request to contain only two HPDA-5 modules.

The following specifications are valid for any HPDA-15RM-C that provides five unity gain outputs for every input signal. Typical cross-channel isolation is 125 dB and reverse isolation is typically greater than 135 dB. The phase noise of the modules is exceptionally low, typically –150 dBc/Hz @ Fourier frequency of 1 Hz and –172 dBc/Hz @ Fourier frequency greater than 10 kHz. Both the input and output are matched to 50 ohms to obtain better than 25 dB return loss. All outputs are AC coupled and the grounds are DC isolated to reduce the effect of ground loops.

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Safety and Preparation for Use

CAUTION!
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 may be setup to operate on 100-120 or 220-240 VAC and a line frequency of 50 to 60 Hz. **The setup voltage for this HPDA-15RM-C is specified on page 4.**

Fuse
A 0.50 Ampere 250V slow-blow fuse is used for 100-120 VAC operation.
A 0.25 Ampere 250V slow-blow fuse is used for 220-240 VAC operation.
Only replace fuses with the same type and specifications.

Line Cord
The instrument has a detachable, three wire power cord for connection to a grounded 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.

Service
Do not attempt to service or adjust the instrument unless another person, capable of providing first aid or resuscitation, is present. Contact SDI for any questions or repairs.

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The Front Panel

AC Power LED
The AC POWER LED will turn on when AC power is applied to unit and the unit is operating properly.

DC Power LED
The DC POWER LED is on when DC power is applied to unit and the unit is operating properly.

Monitor LED
The MONITOR LED of each module will turn on if all the output signals to the corresponding module are greater than +7 dBm.

The Back Panel

AC POWER ENTRY MODULE
The HPDA-15RM-C is configured to operate on:

- ❑ 100-120 VAC
- ❑ 220-240 VAC

DC POWER ENTRY MODULE
Optional Battery Backup Connector for +24 VDC Backup power source.

SMA INPUTS
The standard HPDA-15RM-C contains three amplifier modules each having one input SMA connector. If you acquired a modified unit with only two HPDA modules the back panel will contain only two SMA input connectors. The signal to be distributed should be connected to the corresponding SMA jack labeled INPUT.

SMA OUTPUTS
There are five SMA OUTPUTS for each SMA INPUT. Any output may be used to drive the input of another distribution module. The five outputs of each amplifier module are DC isolated from the chassis ground to prevent ground loops. Make sure that the amplifier ground does not float to a potential greater than 50 VDC from the chassis ground. An output ground potential greater than 50 VDC will damage the amplifier and could cause injury or death to personnel.

Battery Backup Module

Description

The battery backup module allows the HPDA-15RM-C instrument to be powered by a +24 VDC power source in case of loss of the main AC power. The switch from AC to DC supply operation is affected by a Schottky diode network and charge storage capacitors to ensure glitch free operation. The +24 VDC power source connector is located on the back panel of the instrument. The +24 VDC ground is not connected to the instrument case ground internally, however both ground connections are available at the DC power connector and may be connected together at this point.

DC Voltage

The +24 VDC may be used as backup power to prevent loss of signal during power outages. The DC power supply should be able to provide +24 VDC at 2A. For optimum performance the following specifications should be used for the power supply.

DC Supply	+24 VDC, 2 A
Line regulation	+/- 0.05% for a 10% line change
Load regulation	+/- 0.05% for a 50% load change
Output ripple	< 5mV peak-to-peak
DC Fuse	2.0 Ampere 250V slow-blow

Fuse

A 2.0 Ampere 250V slow-blow fuse is used for +24 VDC operation.
Replace fuses with the same type and specifications

Service

Do not attempt to service or adjust the instrument unless another person, capable of providing first aid or resuscitation, is present. Contact SDI for any questions or repairs.

Operation

To operate the unit on DC power, locate the DC power entry connector on the rear panel and connect the power cable. When DC power is applied to the unit, the LED located on the front panel labeled DC POWER should light up. **Connection of the +24 VDC supply is optional**.

DC Connector

WARNING!
DO NOT APPLY AC VOLTAGE TO THIS UNIT THROUGH THE 6 PIN CONNECTOR ON THE REAR OF THE UNIT!
Failure to follow these directions will cause injury or death to personnel, cause irreparable damage to the instrument and void all warranties.

WARNING!
DO NOT REVERSE THE POLARITY OF THE SUPPLY VOLTAGE!
Reversing the polarity of the power supply will cause damage to the unit and void all warranties.

WARNING!
The chassis of the instrument is internally connected to DC ground.

The +24 VDC connector is wired as follows:
Pin 1 NC
Pin 2 NC
Pin 3 NC
Pin 4 +24 VDC GND return
Pin 5 +24 VDC power
Pin 6 Chassis GND / Earth GND

Operation

This unit is designed to operate only with the specified AC voltage on page 4 and +24 VDC. For conversion to a different voltage of operation contact SpectraDynamics, Inc.

To operate the unit, locate the AC power entry module on the rear of the enclosure and/or the DC connector and connect the power cord(s). Plug the unit into an appropriate power outlet. The LED on the front panel labeled AC POWER will turn on when you apply the AC voltage. If you also apply the DC voltage the LED labeled DC POWER on the front panel should light up. Attach the signal to be distributed to one of the SMA input connectors on the back panel. Any HPDA-15RM-C output may be used to drive the input of another distribution module.

Absolute Maximum Ratings

Input power	+20dBm Maximum
Reverse Power	+20dBm Maximum
Input DC Voltage	10 VDC Maximum
Output DC Voltage	50 VDC Maximum
Storage Temperature	-10 to +75 ºC
Operation Environment	0 to +50 ºC
Rack Mount Chassis	1U H, 19“ W, 14” D

Specifications

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Max. Input Power	1 dB compression	16	17	-	dBm
Bandwidth	+/- 1 dB	1 - 20	-	-	MHz
Gain	@ 5 MHz	-	-	+/- 0.5	dB
Impedance	input output	- -	50 50	- -	Ohms
Return Loss	input(S11) 5MHz output(S22) 5MHz	- -	-35 -25	-25 -25	dB
Distortion	+13 dBm +16 dBm	- -	-45 -40	-40 -	dBc
Isolation	output to output output to input	120 120	126 135	- -	dB
Phase Noise	1 Hz 10 Hz 1 kHz 10 kHz	- - - -	-150 -165 -171 -172	-147 -157 -169 -170	dBc/Hz
Temperature-delay Coefficient	0 - 50 ºC 25 - 35 ºC	- -	3 1.5	5 -	ps/ºC

All tests done at 5 MHz and +13 dBm input unless otherwise specified.

Warranty

The HPDA-15RM-C 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 HPDA-15RM-C 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.

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