SPECTRADYNAMICS, INC.

Pulse Distribution Amplifier
PD5-RM-B
OPERATING MANUAL

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The PD5-RM-B is a TTL pulse distribution amplifier that accepts one input and provides five outputs. The outputs are designed to drive low impedance loads and long 50 or 75-ohm cables. The propagation delay through the amplifier is typically 10 ns. The channel-to-channel delay differences are less than 1 ns. The small propagation delay characteristics and low temperature coefficient of delay are essential for the distribution of high quality timing signals. The instrument is available in a 1.72" X 19" X 14" rack mountable enclosure.

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 has been setup to operate on 100 to 120 VAC and a line frequency of 50 to 60 Hz. The unit can be converted to operate on a line voltage of 220 to 240 VAC.

Fuse
A 0.5 Ampere 250V slow-blow fuse is used for 100 – 120 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.

Operation
To operate the unit, locate the AC power entry connector on the rear panel and connect the power cable. When power is applied to the unit, a red led located on the front panel, labeled “AC Power”, should light up.

The Front Panel

AC Power

The led is on when power is applied to unit and the unit is operating properly.

DC Power LED

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

1PPS LED

The LED will flash on the falling edge of the 1 PPS output signal.

The Back Panel

AC POWER ENTRY MODULE

The PD5-RM-B is configured to operate on 100 to 120 VAC.

1 PPS Input

Pulse input. The input signal should conform to TTL levels.

Outputs

Distribution amplifier output. The outputs are designed to drive 50 ohm cables. The outputs provide a 2 volt peak-to peak signal into a 50 ohm load.

Battery Backup Module

Description
The battery backup module allows the PD5-RM-B 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 effected 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 24VDC 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	2A 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, locate the AC power entry connector on the rear panel and connect the power cable. When power is applied to the unit, a red led located on the front panel, labeled “on”, should light up. Connection of the +24 VDC supply is optional. If the +24 VDC supply is connected a red led on the front panel labeled DC Power connector will turn on.

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 front +24VDC connector is wired as follows:
Pin 1 +V (Internal supply voltage for monitoring purpose **do not use !**)
Pin 2 GND (Internal supply voltage for monitoring purpose **do not use !)**
Pin 3 -V (Internal supply voltage for monitoring purpose **do not use !)**
Pin 4 24VDC GND return
Pin 5 +24VDC power
Pin 6 Chassis GND /Earth GND

Operation

To operate the unit, locate the power entry module on the rear of the enclosure. Make sure that the line voltage selection is correct and connect the power cord. Plug the unit into an appropriate power outlet. A red LED on the front panel will turn on. Attach a cable with the signal to be distributed to the rear panel connector labeled **1 PPS Input**. A red LED on the front panel will flash on the falling edge of each output pulse.

Although the device was designed to distribute precision one pulse per second signals, it may be used to distribute pulses up to a frequency of 100 MHz. The propagation delay is under 12 ns, and the channel-to-channel delay difference is less than 1 ns.

Specifications

The rise and fall times were tested with a TTL input signal at 100 kHz.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Rise time	10 - 90 %	-	3	4	ns
Fall time	10 - 90 %	-	3	4	ns
Propagation delay	50 ohm load	-	10	12	ns
Differential delay	Channel - Channel		200	500	ps
Impedance	input output		50 10		Ohms
Input High Level Input Low Level	Input signal into 50 ohm load Input signal into 50 ohm load	2 -0.7	- -	5 0.8	V
Output High Level Output Low Level	50 ohm load 50 ohm load	2 -	2.4 0.4	- 0.5	V
Temperature-delay Coefficient	0 - 50 ºC 25 - 35 ºC		3 3	5	ps/ºC

Warranty

The PD5-RM-B 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 an PD5-RM-B 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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