



SPECTRADYNAMICS, INC.



**PPS-2RM-A
1 PPS GENERATOR**

Operating Manual

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1.0 Introduction

The PPS-2RM-A is a 1 pulse-per-second (1 PPS) generator. This instrument requires a sinewave input signal of 1 MHz, 5 MHz, or 10 MHz to generate 1 PPS signals.

The PPS-2RM-A generates two 1 PPS outputs with adjustable pulse width. The input frequency and pulse width can be set using DIP switch configurations. The 1 PPS output can be synchronized to an external event. The synchronization is good to $\pm 1/2$ of the input clock cycle. The outputs are designed to drive low impedance loads and long 50 or 75-ohm cables. The channel-to-channel delay differences are less than 500 ps.

The PPS-2RM-A is housed in a 1U, 19-inch rackmount enclosure and operates from 100 to 240 VAC mains source and optionally from a +12 to +36 VDC power source. Instruments not equipped with the DC operation option will have a black plastic cover in place of the DC connector on the rear panel. When both AC and DC power sources are connected, the instrument will automatically switch to DC operation upon loss of AC power, using a Schottky diode network and charge storage capacitors to ensure uninterrupted, glitch-free operation.

PPS-2RM Options:

* The DC operation option may be ordered by appending "-DC" to the instrument part number at the time of ordering.

Part Number	Description
PPS-2RM-A	One generator, two outputs. Connectors are located on the back panel
PPS-2RM-B	Two generators, two outputs per generator Connectors are located on the back panel
PPS-2RM-B1	Two generators, two outputs per generator Connectors are located on the FRONT panel

2.0 Safety and Preparation for Use

The instrument is intended for indoor use only and must not be operated outdoors or in wet conditions. It may be installed in a standard 19-inch instrumentation rack or used on a laboratory bench, with an accessible power disconnect available in case of emergency.

Inspect the instrument and power cords for damage before use. Do not operate with covers removed, and disconnect all power sources prior to servicing.

Servicing must be carried out by qualified personnel and never performed alone; another person trained in first aid or resuscitation must be present. Follow ESD safety precautions during service.

2.1 Electrical Safety

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

AC power

This instrument is designed to operate with 100 to 240 VAC, 47 to 63 Hz power source and has a detachable three-wire power cord for connection to grounded AC power sources. The enclosure 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.

DC power

Instruments equipped with a RM12BRD-6PH DC connector on the rear panel can also operate from a +12 to +36 VDC power source. The pin configuration for the connector is as follows:

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



DC Mating Connector

RM12BPE-6S

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

To guarantee optimal performance, use a DC power supply with the following specifications.

DC Supply voltage	+12 to +36 VDC, 1.0 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

2.0 Safety and Preparation for Use

Applying AC voltage to the instrument's DC power connector may cause injury or death to personnel, cause irreparable damage to the instrument, and voids all warranties.

Fuses

A 3.0 Ampere 250 V 5X20 mm slow-blow fuse is used for 100 to 240 VAC operation.

A 2.0 Ampere 250 V 5X20 mm slow-blow fuse is used for +12 to +36 VDC operation.

Only replace fuses with the same type and specifications.

2.2 Instrument Safety

In addition to observing power limits and operating conditions, use the instrument correctly to prevent accidents and maintain optimal performance.

Input RF Signals

The PPS-2RM-A requires an input signal of 1 MHz, 5 MHz, or 10 MHz to generate 1 PPS signals. Power level must be in the range of +3 dBm to +13 dBm.

Input 1 PPS Signals

The 1 PPS synchronization signals must conform to TTL specifications (0 to 5 V).

Absolute maximum ratings

Input RF Power	+20 dBm Maximum
Voltage at the RF Input	+50 V Maximum
Voltage at 1 PPS input	-0.7 VDC to +5.5 VDC
Reverse Voltage at 1 PPS output	-0.7 VDC to +5.5 VDC

2.3 General Specifications and Environmental Conditions

AC Power	100 to 240 VAC, 15 W Max, 47 to 63 Hz
DC Power	12 to 36 VDC, 0.6 A
Operating Temperature	0 to +50 °C
Overvoltage Category	OVC II
Pollution Degree	PD 2
Rackmount Chassis	1U H, 19" W, 14" D
Relative Humidity	5% to 95% Non-condensing
Storage Temperature	-10 to +75 °C
Weight	11 lb
Altitude	5000 m
Indoor use only	

3.0 Input Frequency Configuration

The **PPS-2RM-A** is factory configured for **10 MHz** operation. Should a 1 MHz or 5 MHz operating frequency be required, the instrument must be opened to access DIP switch S5. Prior to proceeding, review Section 2.0 — Safety and Preparation for Use.

Accessing DIP Switch S5

1. Disconnect all power sources from the instrument.
2. Remove the top cover of the instrument.
3. Locate the aluminum bracket cover in the middle section of the instrument.
4. Locate DIP switch S5 on the PPS module.
5. Adjust the switch settings according to the following table.

DIP SW 1	DIP SW 2	FREQUENCY
ON	ON	10 MHz
ON	OFF	5 MHz
OFF	ON	1 MHz
OFF	OFF	RESERVED

4.0 Pulse Width Configuration

The instrument can be configured for different pulse widths. **The default configuration for the unit is 25.6 μ s pulse-width.**

Should a different pulse-width selection be required, the instrument must be opened to access the DIP switch S5. Prior to proceeding, review Section 2.0 - Safety and Preparation for Use.

Accessing DIP Switch S5

1. Disconnect all power sources from the instrument.
2. Remove the top cover of the instrument.
3. Locate the aluminum bracket cover in the middle section of the instrument.
4. Locate DIP switch S5 on the PPS module.
5. Adjust the switch settings according to the following table.

DIP SW 3	DIP SW 4	DIP SW 5	1 MHz pw	5 MHz pw	10 MHz pw
OFF	OFF	OFF	4.096 ms	819.2 μ s	409.6 us
OFF	OFF	ON	2.048 ms	409.6 μ s	204.8 μ s
OFF	ON	OFF	1.024 ms	204.8 μ s	102.4 μ s
OFF	ON	ON	512 μ s	102.4 μ s	51.2 μ s
ON	OFF	OFF	256 μs	51.2 μs	25.6 μs
ON	OFF	ON	64 μ s	12.8 μ s	6.4 μ s
ON	ON	OFF	16 μ s	3.2 μ s	1.6 μ s
ON	ON	ON	4 μ s	0.8 μ s	0.4 μ s

5.0 Front Panel Description



AC POWER

The AC POWER LED turns on when AC power is applied to the instrument.

DC POWER

The DC POWER LED turns on when DC power is supplied to the instrument.

On units not equipped with the DC operation option, the LED will remain off during normal operation.

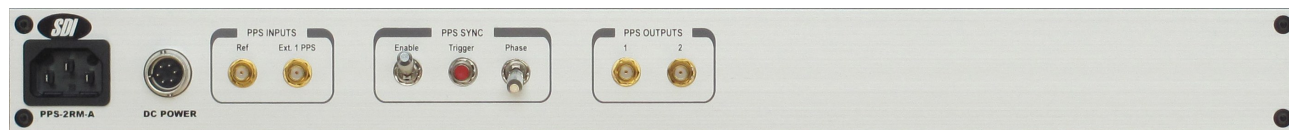
EXT PPS

The LED flashes on the rising edge of the 1 PPS input (external synchronization signal)

PPS

The LED flashes on the rising edge of the two 1 PPS generated signals.

6.0 Back Panel Description



AC POWER

The PPS-2RM-A is designed to operate on 100 to 240 VAC.

DC POWER

Instruments equipped with the DC power option can operate on DC from +12 to +36 VDC.


PPS 1 INPUTS

Ref - Receives a sine-wave input signal of 1 MHz, 5 MHz, or 10 MHz. Power level must be in the range of +3 dBm to +13 dBm.

Ext. 1PPS - Receives a 1 PPS synchronization input. The 1 PPS signal must conform to TTL specifications.

PPS 1 SYNC

Enable - When the switch is positioned to “Enable” selection, the 1 PPS output will have the possibility to be synchronized to an external 1 PPS signal.

 After a synchronization event this switch should be returned to off / down position to prevent accidental synchronization.

Trigger - When synchronization is enabled and a 1 PPS signal is present on the Ext. 1 PPS input the 1 PPS synchronization event can be triggered by the push button. Only one synchronization will occur for each trigger.

Phase - Selects the reference clock edge of the synchronization event.

Enable position - The 1 PPS will be synchronized to the next reference clock rising edge after the incoming synchronization PPS input.

Down position - The 1 PPS will be synchronized to the reference clock falling edge that occurred before the incoming synchronization PPS input.

 Toggling the Phase switch will cause loss of synchronization.

PPS Outputs

1 and 2 - Two 1 PPS outputs will be available at the SMA connectors labeled 1, 2.

7.0 Installation

The PPS-2RM-A may be mounted in a standard 19-inch instrument rack or operated on a laboratory bench.

The instrument is supplied with a standard IEC power cord compatible with North American, Chinese, or European outlets. Units acquired with the DC operation option also include a RM12BPE-6S DC connector for DC cable preparation. Refer to the connector pin configuration on page 2.

Locate the AC POWER entry module on the rear of the enclosure and connect the power cord. If a DC power cable has been prepared, locate the DC input connector on the rear of the enclosure and connect the cable.

Disconnecting both the AC and DC power cords is the only way to remove power from the instrument. Always install the equipment in a location that allows for easy and safe access to disconnect power in case of an emergency.

8.0 Operation

To operate the instrument, plug the AC power cord into an appropriate AC power outlet. The AC POWER LED on the front panel will illuminate, confirming that AC power is being supplied to the instrument.

DC power is optional and serves as a backup source in the event of an AC power outage. If the DC power is connected, the DC POWER LED located on the front panel will illuminate. Instruments equipped with the DC power option are designed to automatically switch from AC to DC operation using a Schottky diode network and charge storage capacitors, ensuring uninterrupted, glitch-free operation.

Connect the 10 MHz input signal (factory configured signal) to the SMA connector on the back panel labeled Ref under the PPS INPUTS. The instrument will generate one pulse per second signals at each of the output ports. The PPS LED located on the front panel will flash on the rising edge of each pulse.

Synchronization to an external event

To synchronize the output pulses to an external event, connect the external reference pulse signal to the SMA connector labeled Ext. 1PPS. Enable the synchronization sequence by moving the Enable switch to the Enable position. Use the Trigger button to activate the synchronization sequence on the next rising edge of the Ext. 1PPS input. Only one synchronization event occurs per push of the Trigger button.

The 1 PPS will be synchronized to the reference clock signal rising edge after the incoming synchronization PPS input when the switch labeled Phase is in the up position. When the Phase switch is in the down position, the 1 PPS will be synchronized to the reference clock falling edge that occurred before the incoming synchronization PPS input. It is important to turn off the synchronization enable switch by moving it to the down position to disable further inadvertent synchronization events.

9.0 Troubleshooting

Before troubleshooting the instrument, review Section 2.0 Safety and Preparation for Use. Troubleshooting must be performed by qualified personnel and never alone; a second person trained in first aid or resuscitation must be present at all times. ESD safety precautions must be followed throughout the service procedure.

If the issues below cannot be resolved using the troubleshooting steps provided, contact technical support:

Technical Support

Tel: +1 (303) 665-1852

Fax: +1 (303) 604-6088

Email: support@spectradynamics.com

www.spectradynamics.com

AC POWER LED does not turn on.

Disconnect the power cord and check the main AC power fuse and power cord for damage. If the fuse is blown, replace it with one of the same type and rating. If the fuse blows again, or if the cause of the blown fuse is unknown, contact SDI.

DC POWER LED does not turn on.

If the instrument is not equipped with the DC operation option, the DC POWER LED will remain off during normal operation.

If the unit is equipped with the DC operation option and the LED does not illuminate, disconnect the DC power cable and check the main DC power fuse and cable for damage. If the fuse is blown, replace it with one of the same type and rating. If the fuse blows again, or if the cause of the blown fuse is unknown, contact SDI.

PPS LED does not turn on.

Verify that an RF reference signal is being supplied to the instrument. Ensure the reference frequency is set to 1 MHz, 5 MHz, or 10 MHz in accordance with the frequency configuration. Verify that the reference signal power level is within the range of +3 to +13 dBm. Confirm that the frequency configuration DIP switch settings are correctly set. If the signal and configuration are verified correct and the LEDs remain off, contact SDI for repair.

EXT PPS LED not turn on.

Verify that the 1 PPS input signal supplied to the instrument conforms to TTL signal levels. If the input signal is verified correct and the LEDs remain off, contact SDI for repair.

10.0 Specifications

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Rise time	10 - 90 %	-	1.5	2	ns
Fall time	10 - 90 %	-	1.5	2	ns
Differential delay	Channel - Channel	-	200	500	ps
Impedance	input	-	50	-	Ohms
	output	-	10	-	
Input High Level	Input signal into 50 ohm load	2	-	5	V
Input Low Level	Input signal into 50 ohm load	-0.7	-	0.8	
Output High Level	50 ohm load	3	4	5	V
Output Low Level	50 ohm load	-	0.1	0.2	
Input Signal Level	1 MHz, 5 MHz, and 10 MHz	0	+7	+13	dBm
External Sync. Error	1 MHz	-	+/- 500	-	ns
	5 MHz	-	+/- 100	-	
	10 MHz	-	+/- 50	-	
Temperature-delay Coefficient	0 - 50 °C	-	3	5	ps/°C

All tests done at 10 MHz and +13 dBm input unless otherwise specified.

11.0 Cleaning and Decontamination Instructions

Ensure that all required electrical safe work practices are followed before cleaning the instrument.

1. Disconnect all power cords before cleaning to prevent electrical shock or damage.
2. Allow all surfaces to cool before cleaning.
3. Use lint-free microfiber cloths to clean exterior surfaces. Avoid abrasive cloths, towels or paper towels.
4. Avoid aerosol sprays, bleaches, or abrasive cleaning agents.
5. Never spray cleaners directly onto the instrument or its connectors.
6. Clean connectors using a lint-free swab or cloth lightly moistened with 99% isopropyl alcohol.
7. Ensure the instrument is clean and completely dry before reconnecting power.



12.0 Warranty and Service

Warranty

SpectraDynamics, Inc. (SDI) warrants the instrument to be free from defects in materials and workmanship under normal operating conditions, as specified, for a period of one (1) year from the date of original shipment from SDI.

SDI's sole obligation and liability under this warranty shall be limited exclusively to the repair or replacement, at SDI's sole discretion, of any product that does not conform to the stated specifications. In no event shall SDI be liable for any transportation charges, installation costs, or any direct, indirect, incidental, special, or consequential damages of any kind, including but not limited to loss of use, loss of data, or loss of profits, whether based on contract, tort, or any other legal theory, arising out of or in connection with the use or performance of the product.

This warranty shall be rendered null and void if the product has been subjected to misuse, neglect, accident, operation beyond its rated capacity, unauthorized modification, substitution of parts not approved by SDI, or any alteration or repair performed by parties other than SDI that, in SDI's sole and reasonable judgement, materially and adversely affects the product.

SDI makes no other warranty, express or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. This warranty sets forth SDI's entire liability and the buyer's exclusive remedy with respect to the product. No employee, agent, distributor, or representative of SDI is authorized to modify, extend, or otherwise alter the terms and conditions of this warranty in any way, nor to make any representations or warranties beyond those expressly stated herein.

Service

Servicing must be performed by qualified personnel and never alone; a second person trained in first aid or resuscitation must be present at all times. ESD safety precautions must be followed throughout the service procedure.

Contact SDI with any questions or to request an RMA if a repair is needed.

SpectraDynamics, Inc.
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Fax: (303) 604-6088
support@spectradynamics.com
www.spectradynamics.com



SPECTRADYNAMICS, INC

EU Declaration of Conformity

In accordance with EN ISO/IEC 17050-1:2010

This declaration is issued under the sole responsibility of the manufacturer.

Manufacturers Name: SpectraDynamics Inc
Manufacturers Address: 1849 Cherry St Unit 2
Louisville, CO. USA.
<https://www.spectradynamics.com/>

Product: **Pulse Per Second Generator**

Model: **PPS-2RM including options:
A, B, B1 and DC.**

The object of the declaration described above is in conformity with the relevant Union harmonization Legislation:

Application of Council Directives:

EMC	2014/30/EU
RoHS 2	2011/65/EU
Low Voltage Directive	2014/35/EU

Standards:

EMC	BS EN IEC 61326-1:2021- Basic environment BS EN IEC 55011:2016+A2:2021 - Emissions
RoHS 3 Technical Documentation Safety Requirements	BS EN IEC 63000:2018 IEC 61010-1:2010+AMD1:2016 - Safety requirements for measurement, control and laboratory use Part 1: General requirements.

We, the undersigned, hereby declare that the equipment specified in this declaration conforms to the above Directives and Standards.

Franklin Ascarrunz, President
November 07, 2025