SPECTRADYNAMICS, INC

CSDA-1 ALL OPTIONS
CLOCK SIGNAL DISTRIBUTION AMPLIFIER
OPERATING MANUAL

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Clock Signal Distribution Amplifier Operating Manual, CSDA-1 Series.
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CSDA-1 Series:R0-2025MD

Contents

1.0 Description

The CSDA-1 is a high performance clock signal distribution and isolation amplifier that is available in several configurations to provide distribution for 1 PPS and RF signals. Some of the configurations also provide multiplication and division for the RF signals. Please refer to the product table on the following page to identify the available configurations.

Any CSDA-1 configuration may be used in laboratory systems or time scale applications where phase stability is of paramount importance. All outputs are AC coupled and the grounds are DC isolated to reduce the effect of ground loops.

Pulse Distribution
The 1PPS distribution module provides five buffered outputs designed to drive low impedance loads and long 50 or 75 ohm cables. The module features small propagation delay, small channel-to-channel differential delay, and low temperature coefficient of delay that are essential for the distribution of high quality timing signals.

RF Distribution
All RF modules are designed to distribute state-of-the-art atomic frequency standards. Each of the modules provide five buffered copies of the input signal ensuring maximum isolation between individual outputs and exceptional low phase noise.

Multiplication and Distribution
The part numbers CSDA-1, CSDA-1C and CSDA-1D are equipped with a multiplication module and take a 5 MHz input signal to provide five or ten buffered outputs at 10 MHz.

- Recommended input frequency for these options is 5 MHz +/- 250 kHz, +13 dBm +/- 2 dB for best performance of the multiplier.

Division and Distribution
Part number CSDA-1E is equipped with a frequency divider that takes a 10 MHz input signal and provides five buffered outputs at 5 MHz. It also provides five buffered copies of the 10 MHz input signal.

- Recommended input frequency for this option is 10 MHz +/- 250 kHz, +13 dBm +/- 2 dB for best performance of the frequency divider.

All CSDA-1 output power levels are monitored and compared to a preset threshold of +7 dBm. Output signal levels below +7 dBm will not trigger the signal detection circuit that turns on the monitor LED, however the RF output signals are still available.

The CSDA-1 series is housed in a 19-inch rackmount, 1U enclosure designed to be powered by a 100 to 240 VAC mains source and/or by a +12 to +36 VDC power source. The DC power source may be used as a main power source for the instrument or in conjunction with the AC power as a backup power supply in the case of loss of main AC power. The instrument is designed to automatically switch from AC to DC power supply to ensure uninterrupted, continuous operation.

1.0 Description

CSDA-1 Configuration Options

Part Number	Module 1	Module 2	Module 3
CSDA-1	1 PPS input Five buffered outputs	5 MHz input Five buffered outputs	Input from module two Five 10 MHz outputs
CSDA-1A	1 PPS input Five buffered outputs	1-50 MHz input Five buffered outputs	Input from module two Five buffered outputs
CSDA-1B	1 PPS input Five buffered outputs	1-50 MHz input Five buffered outputs	1-50 MHz input Five buffered outputs
CSDA-1C	1 PPS input Five buffered outputs	1 PPS input Five buffered outputs	5 MHz input Five 10 MHz outputs
CSDA-1D	1 PPS input Five buffered outputs	5 MHz input Five 10 MHz outputs	5 MHz input Five 10 MHz outputs
CSDA-1E	1 PPS input Five buffered outputs	10 MHz input Five 5 MHz outputs	10 MHz from module two Five buffered outputs
CSDA-1F	1 PPS input Five buffered outputs	1 PPS input Five buffered outputs	1-50 MHz input Five buffered outputs

1 PPS Distribution

The pulse distribution modules may be manufactured with either a 10 or 50 ohm output impedance. The 10 ohm output impedance option provides a 4.3 volt peak-to-peak signal into a 50 ohm load. The 50 ohm output impedance option provides a 2.6 volt peak-to-peak signal into a 50 ohm load. Complete specifications can be found on page 10.

RF Distribution

RF distribution modules with more than five outputs, as well as the distribution modules that include a frequency multiplier or frequency divider, have slightly different specifications. Please refer to specification tables on pages 11 to 14.

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

RF Distribution with Multiplication and Division

- Frequency input bandwidth and power levels are recommended to achieve the best performance of these distribution modules on page 1.
- Output levels below +7 dBm will not turn on the signal monitor LED and will degrade the signal to noise ratio of the provided signals.

2.0 Safety and Preparation for Use

All CSDA-1 are designed for indoor use only and are not intended for operation outdoors or in a wet environment. Instruments may be mounted in a standard 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, 28W, 47 to 63 Hz, power source. DC Operation with +12 to +36 VDC, +1.1 Amperes is also possible.

Fuse

A 3.0 Ampere 250 V slow-blow fuse is used for 100 to 240 VAC operation.
A 3.0 Ampere 250 V slow-blow fuse is used for +12 to +36 VDC operation.
Only replace fuses 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 CSDA-1.

DC Power

The instrument has a RM12BRD-6PH DC connector on the back panel with the following 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)

Please note that 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.

2.0 Safety and Preparation for Use

Requirements for the external DC power supply

The following specifications should be used to ensure optimal performance:

DC Supply voltage	+12 to +36 VDC, 1.1 Amperes
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 DC connector on the back panel

Verify that the connector from the DC power supply has the correct pin configuration. 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.

2.2 Instrument Safety and Preparation for Use

1 PPS Signals

The 1 PPS signal to be distributed should conform to TTL specifications. Make sure that only TTL level (0 to 5 V) signals are applied to the 1PPS INPUT Connector. Do not apply negative voltages as they will damage the pulse distribution amplifier.

RF Signals

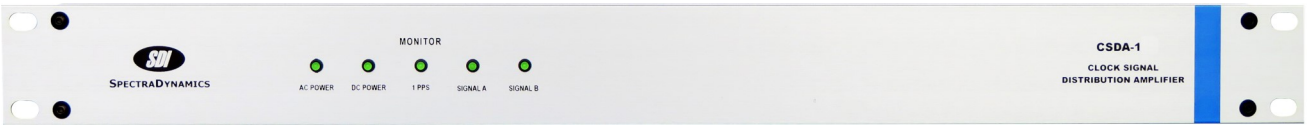
The recommended power level for the different RF signals are specified on page 2 below the configuration options table. Please refer to that information prior to operating any CSDA-1.

All RF outputs are DC isolated from the chassis ground to prevent ground loops. These outputs are rated to a maximum of +50 V.

Absolute Maximum Ratings

Voltage at 1 PPS input	-0.7 VDC to +5.5 V
Reverse Voltage at 1 PPS output	-0.7 VDC to +5.5 V
Input RF Power	+20 dBm Maximum
Reverse RF Power	+20 dBm Maximum
Voltage at the RF Input	+50 V Maximum
Voltage at the RF Output	+50 V Maximum
Input DC Supply Voltage	+36 V Maximum

3.0 Front Panel Description



The front panel picture shown on this page offers a generalized representation of the various CSDA-1 options.

AC POWER
Every CSDA-1 option features an AC power LED that lights up when AC power is applied to the unit.

DC POWER
Every CSDA-1 option features a DC power LED that lights up when DC power is applied to the unit.

1 PPS
The 1PPS monitor LED flashes on the falling edge of the 1PPS output signals.
The **CSDA-1C** and **CSDA-1F** options feature two 1PPS distribution modules, and each includes two 1PPS monitor LEDs.

SIGNAL A
The monitor LED labeled SIGNAL A in the picture is labeled differently for some CSDA-1 options. All Signal LEDs provide a visual state of the RF output signal levels. Output signal levels greater than +7 dBm will turn on the monitor LED.

SIGNAL B
The monitor LED labeled SIGNAL B in the picture is also labeled differently for some CSDA-1 options. All Signal LEDs provide a visual state of the RF output signal levels. Output signal levels greater than +7 dBm will turn on the monitor LED.

4.0 Back Panel Description

The back panel picture shown on this page is a general representation of the various CSDA-1 options.

AC Power
All CSDA-1 options are configured to operate on 100 to 240 VAC.

DC Power
All CSDA-1 options may also operate on DC power from +12 to +36 VDC as the main power supply. If the instrument 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.

1 PPS INPUT.
The 1 PPS signal to be distributed must conform to TTL levels (0-5 V) and may be connected to any SMA connector label 1 PPS INPUT for the different options of CSDA-1.

1 PPS OUTPUTS.
Five buffered outputs will be provided per each 1 PPS input.

RF INPUTS

5 MHz (CSDA-1, CSDA-1C, CSDA-1D). The 5 MHz signal to be multiplied and distributed should be connected to any SMA connector labeled 5 MHz Input. The recommended power level for the input signal to be multiplied is +13 dBm +/- 2 dB to guarantee the best performance of the X2 multiplier.

10 MHz (CSDA-1E). A 10 MHz input signal with power level of +13 dBm +/- 2 dB should be connected to the SMA connector label 10 MHz for proper operation of the frequency divider.

1 to 50 MHz (CSDA-1A, CSDA-1B, CSDA-1F). The 1 to 50 MHz signal to be distributed should be connected to the SMA connector label INPUT.

RF OUTPUTS:
The RF outputs, for the different options of CSDA-1, are labeled with the specific output frequency or as A or B OUTPUTS, and are available on the back panel except for the CSDA-1E that features SMA connectors on the front panel.

5.0 Installation

Any CSDA-1 may be mounted in a standard 19-inch instrument rack or may be operated on a laboratory bench.

Detaching the AC power cord is the only option of disconnecting the unit from the AC mains supply. **Always install the equipment in a place that allows access to easily and safely disconnect the AC mains connector in case of emergency.**

The CSDA-1 ships with a standard North American, European, or Chinese AC power cord and a RM12BPE-6S DC connector for the user to prepare a DC power cable following the connector configuration on page 3.

Connecting Power

Locate the AC Power entry module on the rear of the enclosure and connect the AC power cord. If a DC power cord was prepared you may also connect it to the instrument.

6.0 Operation

To operate any CSDA-1, plug the AC power cord into an appropriate AC power outlet. You may also connect the DC power cable to an appropriate DC power supply.

Providing DC power to any CSDA-1 is optional and used as backup power in the event of AC power outages. The instrument is designed to automatically switch from AC to DC power operation using a Schottky diode network and charge storage capacitors to avoid any glitches and ensure uninterrupted continuous operation.

Once AC POWER is supplied to any CSDA-1, the AC POWER LED on the front panel labeled AC POWER will turn on. If DC POWER is also applied the DC POWER LED located on the front panel will turn on.

1 PPS Clock Signal Distribution

Attach a cable with the 1PPS signal to be distributed to the SMA connector labeled 1PPS INPUT. The corresponding monitor LED on the front panel will flash on the falling edge of each output pulse and five buffered outputs per input will be available at the SMA connectors labeled 1PPS OUTPUTS.

Although the device was designed to distribute precision one pulse per second signals, it may be used to distribute pulses with a repetition rate up to 100 MHz.

RF Clock Signal Distribution

Provide the correct RF signal with recommended power level to any SMA connector labeled 5 MHz INPUT, 10 MHz IPUT or INPUT according to the CSDA-1 option you have. The monitor LEDs on the front panel will light up if the output level signals are +7 dBm or higher. The RF outputs will be available at the SMA connectors label OUTPUTS.

CSDA-1, CSDA-1C and CSDA-1D.

Provide 5 MHz +13 dBm +/- 2 dB to guarantee the best performance of the X2 multiplier. 10 MHz will be available at the SMA output connectors.

CSDA-1E.

Provide 10 MHz +13 dBm +/- 2 dB for proper operation of the frequency divider.
5 MHz will be available at the SMA output connectors.

CSDA-1A, CSDA-1B, CSDA-1F.

Provide a frequency within the range of 1 to 50 MHz
Buffered outputs will be available at the SMA output connectors.

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 the power cords and remove the top cover. Check the main AC power fuse and power cord. If the fuse is blown, replace it with same type and rating. Please contact SDI if the fuse blows again or if the event that caused the fuse to blow is not known.

DC POWER LED does not turn on.
Disconnect the power cords and remove the top cover. Check the main DC power fuse and power cord. If the fuse is blown, replace it with same type and rating. Please contact SDI if the fuse blows again or if the event that caused the fuse to blow is not known.

MONITOR LEDs are off.
Verify that the PPS signal conforms to TTL specifications (0 to 5 V).

Verify that the RF signal provided to the instrument is greater than +7 dBm.

Verify if signals are present at all outputs.

If the PPS signal conforms to TTL specifications or the power level of the RF signal provided is greater than +7 dBm but the Monitor LEDs remain off, the instrument will need to be returned for repair.

RF input signals with power level under +7 dBm
Power levels under +7 dBm will not turn on the Monitor LEDs, but the RF modules will continue to function.

CSDA-1A, CSDA-1B, CSDA-1F:
If the RF modules still provide the correct frequency output, you may continue to use the instrument.

CSDA-1, CSDA-1C, CSDA-1D, CSDA-1E:
Instruments with multiplier or divider modules may not meet specifications at this power level.

8.0 General specifications and environmental conditions

Indoor use only

AC Input Voltage Range	100 to 240 VAC, 28 W, 47 to 63 Hz
DC Input Voltage Range	12 to 36 VDC, 1.1 A
Humidity	5% to 95% Non-condensing
Altitude	2000 m
Operating Temperature	0-50 °C
Overvoltage category	OVC II
Pollution degree	PD 2
Maximum relative humidity	90 %, non-condensing
Storage temperature	-10 to +75 ºC
Rackmount chassis	1U H, 19“ W, 14” D
Weight	10 lbs.

9.0 Specifications for CSDA-1 options

9.1 1PPS Distribution Module, valid for all CSDA-1 options

- The first module for all CSDA options is a 1PPS distribution module
- The second module for the CSDA-1C and CSDA-1F is also a 1PPS distribution module.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Rise time	10 - 90 %	-	0.8	0.9	ns
Fall time	10 - 90 %	-	0.8	0.9	ns
Propagation delay	50 ohm load	-	7	9	ns
Differential delay	Channel - Channel	-	100	200	ps
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
Frequency range	50% duty cycle	0	100	105	MHz
Temp-delay Coefficient	0 - 50 ºC	-	3	5	ps/ºC
Pulse Distribution Amplifiers are manufactured with 50 ohm input impedance and 10 ohm output impedance					
Impedance	Input Output	- -	50 10	- -	Ω
Output High Level Output Low Level	50 ohm load, 10 ohm output 50 ohm load, 10 ohm output	3.6 -	4.3 0.1	5.0 0.2	V
The following specifications are for a Pulse Distribution Module with 50 ohm input and output impedance To select this option, please add "-Opt 50/50" to your order.					
Impedance	Input Output	- -	50 50	- -	Ω
Output High Level Output Low Level	50 ohm load, 50 ohm output impedance 50 ohm load, 50 ohm output impedance	2.4 -	2.6 0.1	2.8 0.2	V

Rise and fall times are tested with a TTL input signal at 100 kHz.

9.0 Specifications for CSDA-1 options

9.2 CSDA-1
Second Module: 5 MHz input, 5 MHz outputs

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Max Input Level	1 dB compression	16	17	-	dBm
Bandwidth	**+/- 1 dB (Due to X2 Multiplier)**	**0.5**	**0.6**	**1**	MHz
Gain	@ 5 MHz	0	0.5	1	dB
Impedance	Input Output	- -	50 50	- -	Ω
Return Loss	Input (S_{11}) Output(S_{22})	-	-27 -30	-25 -25	dB
Distortion	+13 dBm	-	-45	-42	dBc
Isolation	Output to output Output to input	120 130	130 140	- -	dB
Phase Noise Referred to the input	1 Hz 10 Hz 100 Hz >10 kHz	- - - -	-150 -160 -170 -170	-147 -157 -167 -169	dBc/Hz
Temp-delay Coefficient	0 - 50 ºC	-	1.5	3	ps/ºC

Third Module: 5 MHz input, 10 MHz outputs

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Output Power Level	5 MHz input +13 dBm	-	14	15	dBm
Bandwidth	+/- 1 dB	0.5	0.6	1	MHz
Impedance	Output	-	50	-	Ω
Return Loss	Output(S_{22})	-	-30	-25	dB
Distortion	+13 dBm	-	-45	-42	dBc
Isolation	Output to output	120	130	-	dB
Phase Noise - Referred to the Input	1 Hz 10 Hz 100 Hz >10 kHz	- - - -	-148 -158 -165 -170	-146 -156 -161 -166	dBc/Hz
Temp-delay Coefficient	0 - 50 ºC	-	5	10	ps/ºC

9.0 Specifications for CSDA-1 options

9.3 CSDA-1A
Second and Third Modules: 1-50 MHz input, ten buffered outputs.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Max Input Level	1 dB compression	17	18	-	dBm
Bandwidth	+/- 1 dB		1-50	-	MHz
Gain	@ 5 MHz	0	0.2	0.5	dB
Impedance	Input Output	- -	50 50	- -	Ω
Return Loss	Input (S_{11}) Output(S_{22})	-	-35 -35	-30 -30	dB
Distortion	+13 dBm	-	-45	-40	dBc
Isolation	Output to output Output to input	130 140	140 145	- -	dB
Phase Noise Referred to the input	1 Hz 10 Hz 100 Hz >10 kHz	- - - -	-150 -160 -169 -169	-147 -157 -167 -167	dBc/Hz
Temp-delay Coefficient	0 - 50 ºC	-	1.5	3	ps/ºC

9.4 CSDA-1B
Second and Third Modules: 1-50 MHz input, five buffered outputs per module.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Max Input Level	1 dB compression	17	18	-	dBm
Bandwidth	+/- 1 dB	-	1-50	-	MHz
Gain	@ 5 MHz	0	0.2	0.5	dB
Impedance	Input Output	- -	50 50	- -	Ω
Return Loss	Input (S_{11}) Output(S_{22})	-	-35 -35	-30 -30	dB
Distortion	+13 dBm	-	-48	-45	dBc
Isolation	Output to output Output to input	130 140	140 145	- -	dB
Phase Noise Referred to the input	1 Hz 10 Hz 100 Hz >10 kHz	- - - -	-155 -165 -170 -171	-150 -160 -168 -170	dBc/Hz
Temp-delay Coefficient	0 - 50 ºC	-	1.5	3	ps/ºC

9.0 Specifications for CSDA-1 options

9.5 CSDA-1C
Third Module: 5 MHz input, 10 MHz outputs

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Max Input Level	1 dB compression	13	15	-	dBm
Bandwidth	+/- 1 dB	0.5	0.6	1	MHz
Output Level	5 MHz input +13 dBm	11	14	15	dBm
Impedance	Input Output	- -	50 50	- -	Ω
Return Loss	Input (S_{11}) Output(S_{22})	-	-25 -30	-20 -25	dB
Distortion	+13 dBm	-	-45	-42	dBc
Isolation	Output to output Output to input	120 130	130 140	- -	dB
Phase Noise Referred to the input	1 Hz 10 Hz 100 Hz >10 kHz	- - - -	-150 -160 -170 -171	-147 -157 -167 -169	dBc/Hz
Temp-delay Coefficient	0 - 50 ºC	-	5	10	ps/ºC

9.6 CSDA-1D
Second and Third Modules: 5 MHz input, 10 MHz outputs each

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Max Input Level	1 dB compression	13	15	-	dBm
Bandwidth	+/- 1 dB	0.5	0.6	1	MHz
Output Level	5 MHz input +13 dBm	11	14	15	dBm
Impedance	Input Output	- -	50 50	- -	Ω
Return Loss	Input (S_{11}) Output(S_{22})	-	-25 -30	-20 -25	dB
Distortion	+13 dBm	-	-45	-42	dBc
Isolation	Output to output Output to input	120 130	130 140	- -	dB
Phase Noise Referred to the input	1 Hz 10 Hz 100 Hz >10 kHz	- - - -	-150 -160 -170 -171	-147 -157 -167 -169	dBc/Hz
Temp-delay Coefficient	0 - 50 ºC	-	5	10	ps/ºC

9.0 Specifications for CSDA-1 options

9.7 CSDA-1E
Second Module: 10 MHz input, 5 MHz outputs.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Max Input Level	1 dB compression	13	14	15	dBm
Bandwidth	+/- 1 dB	0.5	0.6	1	MHz
Output Level	10 MHz input +13 dBm	11	14	15	dBm
Impedance	Input Output	- -	50 50	- -	Ω
Return Loss	Input (S_{11}) Output(S_{22})	-	-30 -25	-20 -20	dB
Distortion	+13 dBm	-	-45	-40	dBc
Isolation	Output to output Output to input	120 130	130 140	- -	dB
Phase Noise Referred to the input	1 Hz 10 Hz 100 Hz >10 kHz	- - - -	-133 -146 -160 -169	-130 -143 -157 -169	dBc/Hz
Temp-delay Coefficient	0 - 50 ºC	-	1.5	3	ps/ºC

CSDA-1E
Third Module: Buffered 10 MHz outputs.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Bandwidth	+/- 1 dB	0.5	0.6	1	MHz
Gain	@ 10 MHz	0	0.2	0.5	dB
Impedance	Input Output	- -	50 50	- -	Ω
Return Loss	output(S_{22})	-	-25	-20	dB
Distortion	+13 dBm	-	-45	-42	dBc
Isolation	output to output	120	130	-	dB
Phase Noise	1 Hz 10 Hz 100 Hz >10 kHz	- - - -	-148 -158 -165 -170	-146 -156 -161 -166	dBc/Hz
Temp-delay Coefficient	0 - 50 ºC	-	1.5	3	ps/ºC

9.0 Specifications for CSDA-1 options

9.8 CSDA-1F

Third Module: 1-50 MHz input, five buffered outputs.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Max Input Level	1 dB compression	17	18	-	dBm
Bandwidth	+/- 1 dB	-	1-50	-	MHz
Gain	@ 5 MHz	0	0.2	0.5	dB
Impedance	Input Output	- -	50 50	- -	Ω
Return Loss	Input (S_{11}) Output(S_{22})	-	-35 -35	-30 -30	dB
Distortion	+13 dBm	-	-48	-45	dBc
Isolation	Output to output Output to input	130 140	140 145	- -	dB
Phase Noise Referred to the input	1 Hz 10 Hz 100 Hz >10 kHz	- - - -	-155 -165 -170 -171	-150 -160 -168 -170	dBc/Hz
Temp-delay Coefficient	0 - 50 ºC	-	1.5	3	ps/ºC

10.0 Cleaning and Decontamination Instructions

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

1. If possible, disconnect power before cleaning to prevent electrical shock or damage.
2. If possible, allow hot surfaces to cool before cleaning.
3. Lint-free, microfiber cloths are recommended to attract dust and dirt without leaving particles behind. Avoid abrasive cloths, towels, or paper towels.
4. For instruments with touchscreen, a screen wipe designed to remove grime and dust is recommended to clean the screen and avoid damage to the screen.
5. Avoid aerosol sprays, bleaches, or abrasives.
6. Never spray cleaners directly onto equipment or on displays.

11.0 Warranty and Service

Warranty

The CSDA-1 is warranted to be free of defects under normal operating conditions, as specified, for one year from date of 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 CSDA-1 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. Any alterations or repair voids the warranty. Contact SDI with any questions or to request an RMA if a repair is needed.

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CE

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, U.S.A. https://www. spectradynamics.com/
Product:	**Clock Signal Distribution Amplifier**
Model:	**CSDA-1** **Including options: A, B, C, D, and E.**

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

Application of Council Directives:

EMC 2014/30/EU

Standards:

BS EN IEC 61326-1:2021
Electrical Equipment for measurement, control and laboratory use.

BS EN 55011:2016+A2:2021
Industrial, scientific, and medical equipment
Radiated and Conducted emissions, Class A

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

Signature:

Franklin Ascarrunz, President
March 10, 2023. Louisville, Colorado