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COHERENT SPECTRUM ANALYZER

MODEL 251 CONTROLLER USER GUIDE

MODEL 251
CONTROLLER
User Guide

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COHERENT SPECTRUM ANALYZER

MODEL 251 CONTROLLER USER GUIDE

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COHERENT SPECTRUM ANALYZER

MODEL 251 CONTROLLER USER GUIDE

GENERAL DESCRIPTION

The Model 251 Spectrum Analyzer Controller is designed to be used in conjunction with Model 216 or 240 Optical Spectrum Analyzers. In the internal ramp (INT) mode, the Model 251 moves one of the two spherical mirrors inside the Spectrum Analyzer by providing controlled modulation of a ramp voltage to a piezoelectric crystal. This ramp has a continuously variable amplitude, offset and risetime, all adjustable by front panel controls. The Detector Output of the Spectrum Analyzer is coupled to an internal amplifier in the Model 251. (This signal represents the spectral profile of the input light beam.) An External Trigger signal for the user's oscilloscope which controls blanking of the output signal during the ramp retrace is also available as an output. When used in external (EXT) mode, the MODEL 251 provides an output signal which is directly proportional to the input signal for external control of the ramp shape and timing. The MODEL 251 is used in external (EXT) mode to drive the reference mirror of an interferometer for computerized wavefront analysis by 70/EE or 70/S.

OPERATION

The operating controls and electrical connections for the Model 251 are shown in Figures 1 and 2. The following sections discuss each control and its function.

FRONT PANEL CONTROLS (See Figure 1)

1. POWER ON SWITCH - The button is depressed to energize the unit. The power button is lighted when the unit is powered up.

2. SWEEP EXPANSION - The Frequency Sweep (Risetime) of the ramp generator may be expanded by 2,5,10,20 or 50. The variable risetime control is adjusted until two orders of the spectrum being analyzed corresponds to 10 divisions of your oscilloscope or chart recorder. The scope or chart recorder is thus calibrated to read 0.1 FSR per division. As you expand the sweep in steps of 2, 5, 10 etc. you may read the horizontal display out as .05, .02, .01, etc. FSR per division.

3. AMPLITUDE - The DC voltage swing of the ramp is continuously adjustable from 0 to 250 volts using the AMPLITUDE control. The distance a piezoelectric element is scanned is determine by the AMPLITUDE control.

4. OFFSET - The DC voltage, upon which the ramp rides, is continuously adjustable

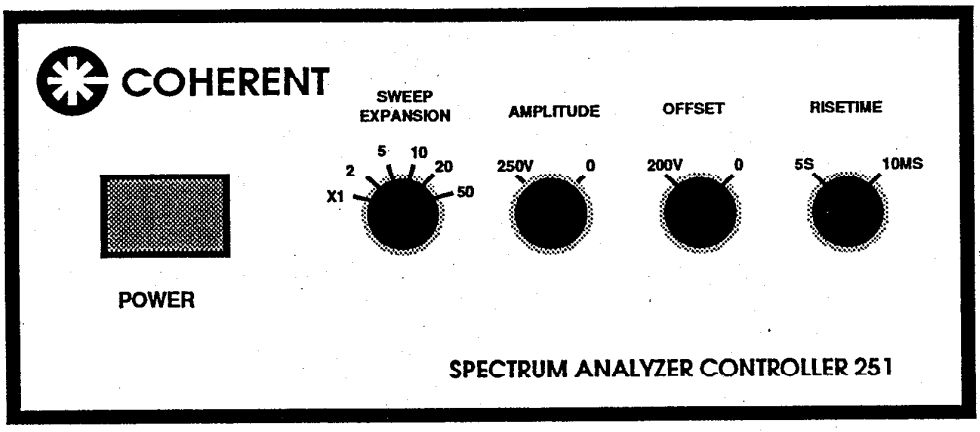


Fig. 1 Front Panel

from 1 to 200 volts using the OFFSET control. Fine control over the inter-mirror spacing or translation of a piezoelectrically controlled transducer is achieved using the OFFSET control.

5. RISETIME - The risetime (slope) of the ramp output is continuously adjustable from 10 ms to 5 seconds using the RISETIME control.

REAR PANEL CONTROLS (See Figure 2)

1. DETECTOR IN - The low voltage output signal from the photodetector is connected to the internal amplifier at the DETECTOR IN BNC connector.

2. DETECTOR OUT - The amplified signal from the photodetector is available at this connector for viewing on an oscilloscope or chart recorder. The detector output is blanked during the retrace cycle of the driving ramp voltage. This blanking procedure eliminates confusing spectral data which normally is displayed during the mirror return period.

3. RAMP OUT - The high voltage ramp and DC offset signals are available at this BNC connector. This connector is of the high voltage type which requires a mating high voltage plug for operation. This prevents the accidental connection of high voltage to an unprotected piece of equipment. (This high voltage cable is supplied with the instrument).

4. SCOPE TRIG/IN REFERENCE - When viewing the output signals via an

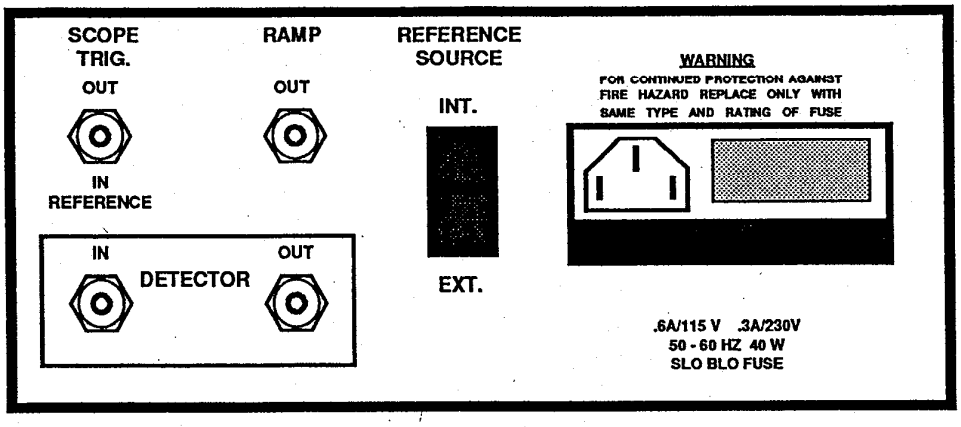


Fig. 2 Rear Panel

oscilloscope, it is advantageous to externally trigger the scope. This external trigger signal is obtained from the Model 251 via the scope trigger BNC connector (IN REFERENCE).

5. REFERENCE SOURCE

   A. The INT mode allows the internal circuitry to provide, via RAMP OUT, a ramp waveform with adjustable amplitude and rise time.

   B. The EXT mode allows the user to input into the controller, via IN REFERENCE, a signal which is desirable to be used in a particular operating system. This signal is amplified and shaped, by the front panel controls, and then is available at the RAMP OUT connector.

SELECTION OF OPERATING VOLTAGE (See Figure 3)

The Model 251 may be operated at 100, 120, 220, or 240 volts at 50 or 60 hertz. When shipped, the Model 251 is set up in advance to operate on the customer's specified voltage. If no voltage was specified on the customer's order, 120 volts is assumed. ALWAYS check the operating voltage setting before connecting the AC power to the unit! If it is necessary to select and/or change the unit's operating voltage, perform the following procedure:

1. Turn controller off and unplug it.

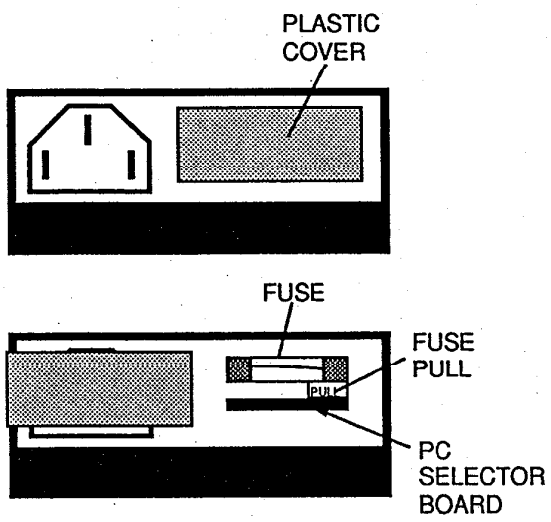


Fig. 3 Operating Voltage Selection

2. Unplug the AC power cord from the controller's back panel.

3. Slide the CLEAR PLASTIC WINDOW next to the AC POWER cord receptacle on the controller's back panel to the left, thus covering the receptacle and exposing the FUSE and PC SELECTOR BOARD.

4. Draw the fuse extractor labeled "FUSE PULL" to the left and remove fuse.

5. Using a small pair of pliers, remove the PC SELECTOR BOARD found underneath the fuse mounting.

6. Firmly re-insert the PC SELECTOR BOARD with the desired operating voltage facing up on its LEFT side.

7. Return the fuse extractor to its normal position and insert the proper fuse required to handle the new operating voltage. Fuse rating requirements are found on the controller back panel.

8. Slide the CLEAR PLASTIC WINDOW back to its original position and re-inset the AC power cord.

SPECIFICATIONS

GENERAL

Input Voltage	100, 120, 220, 240 VAC, 50 - 60 Hz
Total Power Required	Approximately 15 watts

RAMP GENERATOR

Rise Time of Ramp	10 ms - 5 sec ± 10%
Ramp Amplitude	0 - 250 Volts
DC Offset	0 - 200 Volts
Fall Time of Ramp	10 ms ± 10%
Ramp Linearity	1.5%
Sweep Expansion Ranges	1X, 2X, 5X, 10X, 20X, 50X

DETECTOR AMPLIFIER

Input Resistance	100 Ω
Transfer Characteristics	
(Current source R_S > 100K Ω)	E_{OUT} (in volts) = 50 (I_{IN}) (in amps)
(Voltage source R_S <100 Ω)	E_{OUT} (in volts) = (10^3 v/v) (I_{IN}) (in amps)
Max. Input Current	± 100 μa
Max. Input Voltage	± 10 mv (R_S < 100 Ω)
Output Resistance	10K Ω (amplifying) 300 Ω (blanking)
Blanking Attenuation	Typically 80 db
Cut Off Frequency	80 Khz (typical)

WARRANTY

The seller warrants to the original Buyer each item manufactured by it to be free from defects in material and workmanship for a period of time and under such conditions as specified in the Seller's warranty for the individual product, or for twelve (12) months from delivery if a warranty for the Individual product is not specified. Major sub-systems manufactured by other firms but integrated into the Seller's systems are covered by the original Manufacturer's warranty. The Seller's liability under valid warranty claims is limited to repair or replacement at the Seller's plant or the Buyer's location, all at the option of the Seller.

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All claims under warranty must be made promptly after occurence of circumstances giving rise thereto, must be received within the applicable warranty period by the Seller, and shall be subject to the terms and conditions stated herein. Such claims should include the product serial number, the date of shipment, and a full description of the circumstances giving rise to the claim. Before any products are returned for repair and/or adjustment, authorization for the Seller for the return and instructions as to how and where these Products should be shipped must be obtained. Any product returned to the Seller for examination and/or warranty repair shall be sent prepaid via the means of transportation indicated as acceptable by the Seller. The Seller reserves the right to reject any warranty claim on any item that has been shipped by non-acceptable means of transportation. When any product is returned for examination and inspection, or for any other reason, the Buyer and its shipping agency shall be responsible for all damage resulting from improper packing or handling, and for loss in transit, notwithstanding any defect of non-conformity in the Product. In all cases, the Seller has sole responsibility for determining the cause and nature of failure, and the Seller's determination with regard thereto shall be final.

If it is found the Seller's Product has been returned without cause and is still servicable, the Buyer will be notified and the Product returned at the Buyer's expense, in addition, a charge for testing and examination may, in the Seller's sole discretion, be made on products so returned.

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