User's Manual
SD375 Dynamic Analyzer II
Part Five

Legacy Manual

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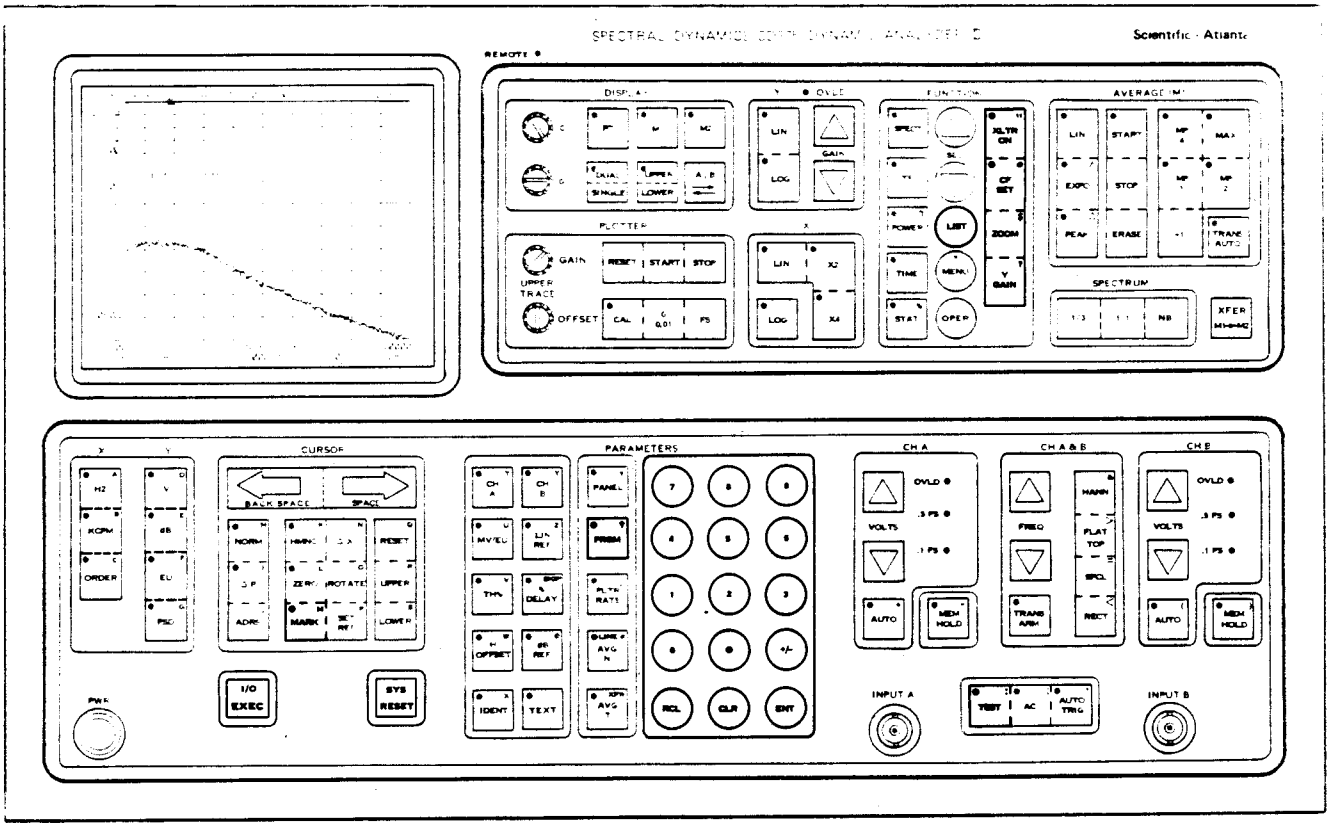
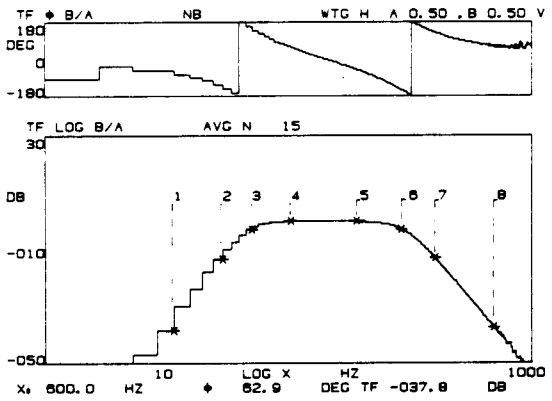
3.4.8 Special Features — The MARK, LIST, TEST, PRGM, SYS RESET, I/O EXEC Touch Controls, the PARAMETERS Group Keypad and the Translator Option Touch Controls



The MARK and LIST Touch Controls

This touch control provides a means for selecting and listing up to eight data points on the display. The selected data points will appear, on the display, as intensified dots. Figure 3-40 is an example of a display using the MARK feature to select special points on the display data. The list that accompanies the sample display lists both the X and Y axes values for each marked data point. In addition, the upper-trace phase angle value for each corresponding data point is also listed.

The sample display in Figure 3-40 shows the transfer function gain and phase characteristics of a bandpass filter. The marked data points in Figure 3-40 reveal some important characteristics about the frequency response of the filter. For instance, the roll-up and roll-down slopes of the filter skirts in dB per octave are defined by points 1 and 2 and points 7 and 8. Points 3 and 6 define the - 3 dB points of the bandpass corner frequencies and points 4 and 5 define points within the flat bandpass region of the filter. All of this information about the filter is available from just two data displays.



1. TF & ◆

ID 00007

1	X₁	10.0	HZ	◆	-058.8	DEG TF	-038.4	DB
2	X₂	20.0	HZ	◆	-125.2	DEG TF	-013.9	DB
3	X₃	30.0	HZ	◆	180.9	DEG TF	-003.3	DB
4	X₄	50.0	HZ	◆	59.5	DEG TF	-000.2	DB
5	X₅	115.0	HZ	◆	-049.6	DEG TF	-000.2	DB
6	X₆	200.0	HZ	◆	-150.0	DEG TF	-002.9	DB
7	X₇	300.0	HZ	◆	128.5	DEG TF	-013.5	DB
8	X₈	600.0	HZ	◆	62.9	DEG TF	-037.8	DB

Figure 3-40. MARK Data and MARK Listing Examples

Operation of the MARK feature is as follows: First, move the cursor to the *first* desired data point, press MARK, then press ENT. Use this same procedure for the remaining MARK entries (up to 8 can be entered). To display the corresponding list of selected MARK entries, press MARK, then press the FUNCTION group LIST touch control. A MARK listing as shown in Figure 3-40 will appear on the display. To exit the MARK listing mode, press the FUNCTION group OPER touch control. This is the basic operation of the MARK feature. Before you get started, there are some things you should know about the feature

- To clear *all* MARK entries, press MARK, then press CLR. To clear a single MARK entry, press MARK, the corresponding number of the MARK entry on the keypad, then press CLR.

- When you change from one display selection to another, you must display the menu *first*, before making the display selection. If this procedure is not used when the first MARK entry is made, the instrument will default to the last display where MARK entries were made.

- As previously stated, each time a MARK entry is made an intensified dot will appear, on the display, at the selected MARK entry. When another display is selected, the intensified dots from the previous MARK entry will *still* be present.

- When making MARK entries for a new display, and another MARK listing already exists from a previous display, you should press MARK then CLR first, to prevent previous MARK entries from appearing on the new MARK listing.

- If you press MARK, then RCL the instrument cycles through all active MARKs and updates the stored MARK entries.

The TEST Touch Control

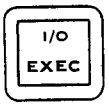
When this touch control is pressed (LED lit), an internally generated square wave is substituted for the externally applied input signal or signals. The fundamental of this tonal has an amplitude of -10 dB from full scale and is located at cell 256 for all frequency ranges. This signal is used by the instrument during a self test and is selected by the operator while performing the operational checkout in Section IV.

The PRGM Touch Control

The PRGM touch control is used to control and operate the special "programs" built-in to the SD375 via their respective menus. A master list of the programs available can be displayed by pressing PRGM, then MENU (Figure 3-41). Six of the nine programs menu items are used with the various options available for the SD375. Items 2, 3 and 4 are for the "-3" option, item 6 is for the "-4" option and Items 7 and 8 are for the "-2" option. Access to the menus for each of the option items is available only when the option is installed. If one of the various option items is selected without the option installed, the display will blank and the statement "OPTION AVAILABLE" will appear on the display.

Item Number 1, the ARTIFICIAL INTEGRATION MENU provides single and double integration/-differentiation with display and cursor readouts in Engineering Units. Item number 9, the INTEGRATION CHAN SELECT menu is used in conjunction with the ARTIFICIAL INTEGRATION MENU and is for selection of the channel (CH B) or channels (CH A & B) upon which artificial integration is to be applied. Item Number 5 is the self-test feature and is described in paragraph 3.4.8.2.

Figure 3-41 is an example of the PROGRAMS master list and shows the related menus and sub-menus for each item. Selection of each item is the same for all the items; press PRGM, press the corresponding number of the item on the PARAMETERS group keypad, then press MENU. The touch control sequence for selection of each item is included in Figure 3-41.



The I/O EXEC Touch Control

This touch control is used with the "-3" option. Refer to Item Number 4 in Figure 3-41 and note that the I/O MENU has three related sub-menus. These three sub-menus are used for I/O parameter changes/entries and I/O port assignments. Once I/O parameter selections are made on one of the sub-menus, pressing the I/O EXEC touch control *executes* the selected I/O program.

The SYS RESET Touch Control

The SYS RESET touch control performs the following function: If for some reason (loose internal connection, unusual power interrupt, etc.) the analyzer should experience a lock-up condition, normal operation can usually be re-established by pressing the SYS RESET touch control. The SD375 will go through a panel sequence that ends up at the last active panel configuration prior to lock-up.

1. ∫, ∫∫, Ŷ, Y

PRGM 1 MENU

9. INTEGRATION CHAN SELECT

PRGM 9 MENU

PROGRAMS

1. ∫, ∫∫, Ŷ, Y
2. DIGITAL PLOTTER
3. PRINTER INTERFACE
4. I/O MENU
5. SELF TEST
6. SIGNAL SOURCE
7. OCTAVE WTG
8. OCTAVE SHAPING
9. INTEGRATION CHAN SELECT

ARTIFICIAL INTEGRATION MENU

- 1. NORMAL
  2. ∫ UNITS
  3. ∫∫ UNITS
  4. ∫ MM/SEC
  5. ∫∫ MM
  6. ∫ IN/SEC
  7. ∫∫ IN
  8. Ŷ
  9. Y

INTEGRATION CHAN SELECT

- 1. CH B ONLY
  2. CH A & CH B

USE PRGM 9. FOR CHAN SELECT

2. DIGITAL PLOTTER

PRGM 2 MENU

PROGRAMS

1. ∫, ∫∫, Ŷ, Y
2. DIGITAL PLOTTER
3. PRINTER INTERFACE
4. I/O MENU
5. SELF TEST
6. SIGNAL SOURCE
7. OCTAVE WTG
8. OCTAVE SHAPING
9. INTEGRATION CHAN SELECT

DIGITAL PLOTTER MENU

- 1. ANALOG PLOT
  2. DIGITAL PLOT
  3. GRIDS
  4. ANNOTATION
  5. TRACE
  6. TRACE OVERLAY: DASHED VECTOR

3. PRINTER INTERFACE

PRGM 3 MENU

PROGRAMS

1. ∫, ∫∫, Ŷ, Y
2. DIGITAL PLOTTER
3. PRINTER INTERFACE
4. I/O MENU
5. SELF TEST
6. SIGNAL SOURCE
7. OCTAVE WTG
8. OCTAVE SHAPING
9. INTEGRATION CHAN SELECT

OPTION NOT AVAILABLE AT THIS TIME

4. I/O MENU

PRGM 4 MENU

PROGRAMS

1. ∫, ∫∫, Ŷ, Y
2. DIGITAL PLOTTER
3. PRINTER INTERFACE
4. I/O MENU
5. SELF TEST
6. SIGNAL SOURCE
7. OCTAVE WTG
8. OCTAVE SHAPING
9. INTEGRATION CHAN SELECT

I/O MENU

- 1. REQUEST SERVICE
  2. MODIFY I/O PARAMETERS
  3. SEND
  4. RECEIVE
  5. RESET I/O

I/O PARAMETERS

- 1. CONTROLLING PORT: PANEL CTL ONLY
- 2. PRIMARY ADDRESS: 1
  3. IEEE MODE: TALK ONLY
  4. COMPOSITE DATA: CALCULATED
  5. FLOATING PT: DEC FORMAT
  6. BYTE CODING: BINARY
  7. SERIAL HANDSHAKE: HARDWARE
  8. DUPLEXING: QUIET
  9. AUTO LINE FEED: ON
  10. BAUD RATE: 9600
  11. BITS/SERIAL BYTE: 7
  12. PARITY: NONE
  13. STOP BITS: 2

SEND DATA PARAMETERS

1. DATA GROUP: 18 ID BLOCK
2. PORT: IEEE
- 3. BYTE CODING: ASCII (ALWAYS)
  4. DATA FORMAT: DEC FORMAT
  5. DUPLEXING: QUIET

RECEIVE DATA PARAMETERS

- 1. DATA GROUP: 20 SCI MASK/ERROR
  2. PORT: IEEE
  3. BYTE CODING: BINARY
  4. DATA FORMAT: DEC FORMAT
  5. DUPLEXING: QUIET

Figure 3-41. PRGMS Master List Examples

5. SELF TEST

PROGRAMS

1. I, II, ☿, ♀
2. DIGITAL PLOTTER
3. PRINTER INTERFACE
4. I/O MENU
5. SELF TEST → SELF TEST
6. SIGNAL SOURCE
7. OCTAVE WTG
8. OCTAVE SHAPING
9. INTEGRATION CHAN SELECT

* 1. OFF
2. ON

7. OCTAVE WTG

PROGRAMS

1. I, II, ☿, ♀
2. DIGITAL PLOTTER
3. PRINTER INTERFACE
4. I/O MENU
5. SELF TEST
6. SIGNAL SOURCE
7. OCTAVE WTG → OCTAVE ACST WTG MENU
8. OCTAVE SHAPING
9. INTEGRATION CHAN SELECT

* 1. FLAT
2. A
3. C
4. A OVERALL ONLY
5. C OVERALL ONLY

6. SIGNAL SOURCE

PROGRAMS

1. I, II, ☿, ♀
2. DIGITAL PLOTTER
3. PRINTER INTERFACE
4. I/O MENU
5. SELF TEST
6. SIGNAL SOURCE → SIGNAL SOURCE
7. OCTAVE WTG
8. OCTAVE SHAPING
9. INTEGRATION CHAN SELECT

* 1. BAND LIMITED
2. BROAD BAND
3. SINGLE FREQ

USE CHA VOLTS SELECT:

OUTPUT LEVEL 0.50 V

8. OCTAVE SHAPING

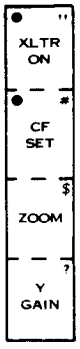
PROGRAMS

1. I, II, ☿, ♀
2. DIGITAL PLOTTER
3. PRINTER INTERFACE
4. I/O MENU
5. SELF TEST
6. SIGNAL SOURCE
7. OCTAVE WTG
8. OCTAVE SHAPING → OCTAVE SHAPING MENU
9. INTEGRATION CHAN SELECT

* 1. OFF
2. ON

Figure 3-41. PRGMS Master List Examples (Continued)

3.4.8.1 The Translator Option touch Controls



The translator option provides six zoom (i.e., frequency magnification) factors — 2, 5, 10, 20, 50, and 100 for each analysis range. A zoom factor of 100, for example, increases the frequency resolution by 100 times the normal baseband resolution and, at the same time, improves the signal-to-noise ratio of the measurement.

The XLTR ON Touch Control

When this touch control is pressed (LED lit), the translator is turned on and the center position of the zoom window is automatically established by the cursor location. If the cursor is moved, the window is automatically relocated in reference to the new cursor location. The cursor always indicates the window's center frequency while the lower and upper window edge frequencies are annotated at the left and right corners of the display grid.

The CF SET Touch Control

When the CF SET touch control is pressed (LED lit), the window position is locked at the current cursor position and the cursor can now be moved to any point within the window for high resolution frequency readout. The ΔP cursor feature can now be used to read the rms level of the signal within the zoom window.

The ZOOM Touch Control

This touch control is used to select the zoom factor. Zoom selection is in ascending order only. For example, if a zoom factor of 10 is selected, and you want to select a zoom factor of 2, you will have to step to a zoom factor of 100, then press the ZOOM touch control once more to return to a zoom factor of 2.

The Y GAIN Touch Control

This touch control selects a translator gain of 1, 2, 4 or 8 to recover the dynamic range lost when zooming in with a narrow window on a portion of a broadband spectrum. This gain is inserted prior to spectrum analysis of the windowed signal and permits detection of signal amplitudes more than 80 dB down from full scale.

3.4.8.2 SELF TEST — HOW TO USE IT — WHAT IT DOWS

Self Test is a built-in feature that tests 95% of the SD375's circuitry. The signal used during the Self Test is the same test signal that can be selected by pressing the front-panel TEST touch control. The TEST signal is located at cell 256 with an amplitude of -10 dB from full scale. The amplitude and cell location of the TEST signal remains constant, regardless of the selected frequency range.

Performing a Self Test

The Self Test procedure should be performed just before, and then just after performing the Operational Checkout procedure located in Section IV. Also, a Self Test should be performed upon initial receipt of the instrument.

The Self Test procedure can be performed by pressing the following touch controls in the indicated sequence:

PARAMETERS Group

1. Press PRGM
2. Press 5

FUNCTION Group

1. Press MENU, and the following menu will be displayed:

```
SELF TEST

* 1.   OFF
  2.   ON
```

Self Test can now be initiated by using either of two methods:

First method:

FUNCTION Group

1. Using the SEL UP/DOWN touch controls, press the one pointing DOWN. The asterisk on the menu will move to selection 2, ON.
2. Press OPER. This initiates the Self Test.

Second method:

PARAMETERS Group

1. Press 2
2. Press ENT. The asterisk will move to selection 2, ON.

FUNCTION Group

1. Press OPER. This initiates the Self Test.

Once the OPER touch control is pressed, (after using either method of selection as previously described) the Self Test will be in progress indicated by a rapid change of displays and a rapid change in touch control selection. The initial front-panel setup that the Self Test function uses as a starting point (you can't see it, you'll just have to take my word for it) is the same as a PANEL, 0, RCL front panel as described in this section and Section IV.

The entire test sequence is performed on each channel, the first being Channel A. After the Self Test sequence is performed on both channels, the following list will be displayed on the crt:

SELF TEST

CH A	**CH B**
1. P	1. P
2. P	2. P
3. P	3. P
4. P	4. P
5. P	5. P
6. P	6. P
7. P	7. P
8. P	8. P

The results of each test for each channel are indicated by either a "P" for pass or a "F" for fail as shown in the list. There are seven tests for each channel. Test eight indicates a Time Out failure. This is what is meant by a Time Out failure: The Self Test procedure takes about 20 seconds to complete; 10 seconds per channel. A maximum of 20 seconds is allowed for the completion of a test on *each* channel. If all the tests for a single channel are not completed within 20 seconds, the remaining tests will be set to "F" including Test 8 which indicates a Time Out failure, or more precisely, all the tests were not completed within the alloted amount of time. If there are any "F"'s on the list of Self Test results, the list will remain on the display until any front-panel touch control is pressed. If the Self Test results in all "P"'s, the Self Test list will remain on the display for about 10 seconds and then the instrument will return to the front-panel setup that was present immediately prior to initiating the Self Test.

Description of the Self Test

Test #1 — Real Time Spectrum

The front-panel TEST signal is checked every 40 cells using the ΔP mode. The acceptable limits are as follows:

Cell Number	Minimum	Maximum
40	—	−50 dB
80	—	−49 dB
120	—	−48 dB
160	—	−47 dB
200	—	−47 dB
240	—	−47 dB
280	−10.5 dB	−9.5 dB
320	—	−9.5 dB
360	—	−9.5 dB
400	—	−9.5 dB

Test #2 — M1 Average

Ten averages of the TEST signal are taken, and then M1 is checked in the same way as in Test #1.

Test #3 — Transfer to M2

The resulting M1 test data is transferred to M2. M2 is then checked as in Test #1.

Test #4 — +1 Averaging

+1 is operated twice. M1 is then checked again, as in Test #1.

Test #5 — M1 Erase

The contents of M1 are erased. The cursor value at cell 400 in the ΔP mode is checked for exactly −70 dB.

Test #6 — Volts, EU and PSD

The cursor is checked at cell 256 for various Y-axis units using 100 MV/EU sensitivity as shown in the following list.

Units	VOLTS	EU	PSD
Minimum	.299	3.078	.252
Maximum	.335	3.402	.308

Test #7 — Translator

The cursor is placed at cell 256 and then the Translator is turned on. The cursor is checked at the center of the display for a value of −10.5 dB to −9.5 dB. When the check is completed, the Translator is turned off. If the Translator is not installed, the test is skipped and the results will always be a "P".

Test #8 — Test Time Out

If the Self Test timer times out before a test is complete, Test #8 will be set to "F" and any previous tests that were not completed will also be set to "F".

Electronics Exercised by Self Test

The following list is a summary of the circuitry that is tested on each circuit card involved in the Self Test. Following the summary are specific areas that are involved in each test.

Tests #1-7

Circuit Cards A1 and A2 — The low Pass Filters are exercised. This comprises 80% of the circuitry on the A1 and A2 cards.

Circuit Card A6 — The Timing and Control circuits are exercised. This comprises 61% of the circuitry on the A6 card.

Circuit Card A7 — The Input Memory circuits are exercised. This comprises 90% of the circuitry on the A7 card.

Circuit Card A8 — The Z80 Control Processor is exercised. This comprises 100% of the circuitry on the A8 card.

Circuit Card A10 — The Multiplier circuits are exercised. This comprises 100% of the circuitry on the A10 card.

Circuit Card A11 — The Microprogram circuitry is exercised. This comprises 100% of the circuitry on the A11 card.

Circuit Card A12 — The Arithmetic circuits are exercised. This comprises 95% of the circuitry on the A12 card.

Circuit Card A13 — The Processor Memory and Video Refresh circuits are exercised. This comprises 60% of the circuitry on the A13 card.

Circuit Card A14 — The Dot Cursor and Display Control circuits are exercised. This comprises 80% of the circuitry on the A14 card.

Circuit Card A15 — The Memory Address circuits are exercised. This comprises 100% of the circuitry on the A15 card.

Circuit Card A16 — The Video Interface circuits are exercised. This comprises 100% of the circuitry on the A16 card.

Circuit Card A18 — The Front-Panel Interface circuits are exercised. This comprises 95% of the circuitry on the A18 card.

Test #2

The Ensemble Counter circuitry on circuit card A12 is exercised. This comprises 5% of the circuitry on this card. The Average Memory circuitry on circuit card A13 is exercised which comprises 20% of the circuitry on the A13 card.

Test #3

The M2 Memory circuitry on circuit card A13 is exercised. This comprises 20% of the circuitry on the A13 card.

Tests #4 & 5

These two tests are the same as Test #2 except different areas of the Z80 Microprogram PROM are exercised.

Test #6

This test exercises different areas of the Signal Processing Program.

Test #7

The Translator circuitry on circuit card A4 is exercised. This comprises 99% of the circuitry on the A4 card. The Translator circuitry on circuit card A5 is exercised. This comprises 100% of the circuitry on the A5 card.

Electronics Not Exercised by Self Test

The Input Conditioning circuitry, which comprises 20% of the circuitry on circuit cards A1 and A2, is not tested.

The 100 kHz Filter circuitry, which comprises 100% of the circuitry on circuit card A3, is not tested.

The Translator Overload Indicator, which comprises 1% of the circuitry on circuit card A4, is not tested.

The Memory Hold and Transient Capture circuitry, which comprises 39% of the circuitry on circuit card A6, is not tested.

The Zero and Rotate circuitry, which comprises 10% of the circuitry on circuit card A7, is not tested.

The Digital I/O circuitry, which comprises 100% of the circuitry on circuit card A9, is not tested.

The Harmonic, Display Mode and Line Cursor circuitry, which comprises 20% of the circuitry on circuit card A14, is not tested.

The External Averaging and Transient Capture Switches, which comprise 5% of the circuitry on circuit card A18, is not tested.

3.5 Rear Panel Functional Description

Figure 3-42 is a rear view of the SD375. The following paragraphs briefly describe the function of each of the rear-panel connectors, switches and power input components.

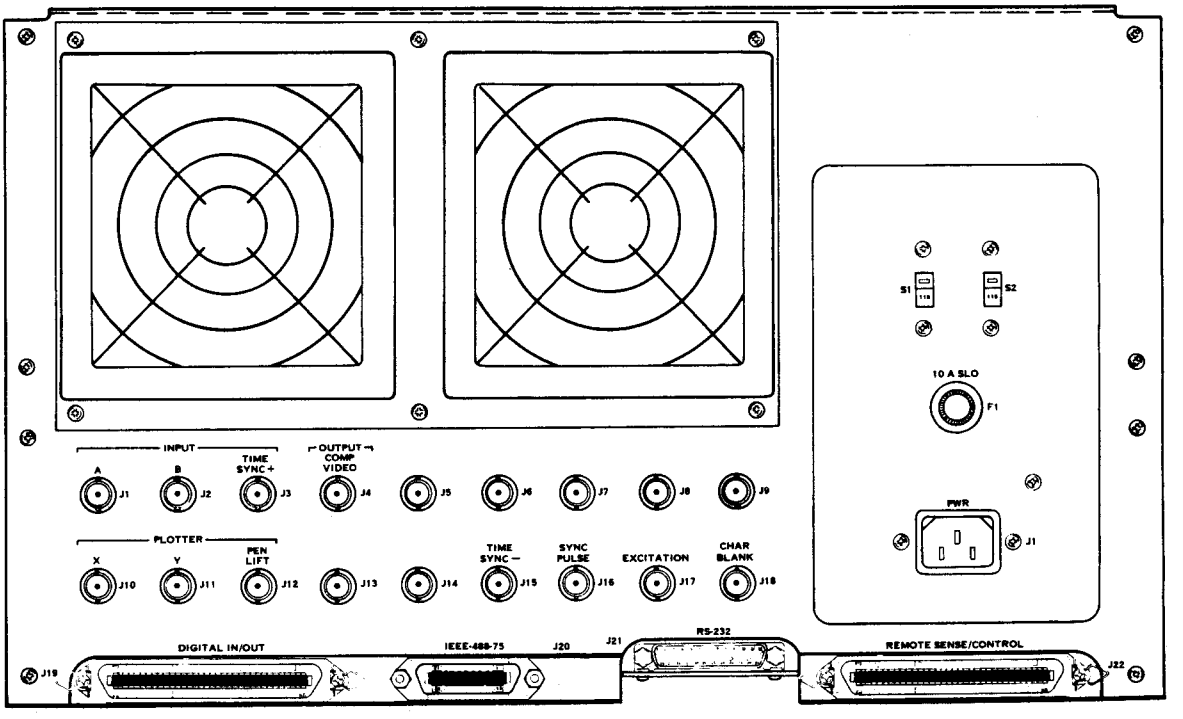
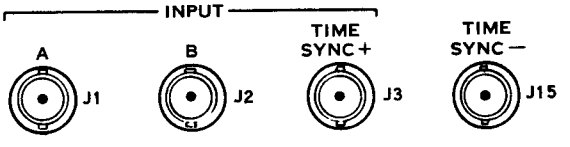


Figure 3-42. SD375 Rear Panel

3.5.1 INPUT Group



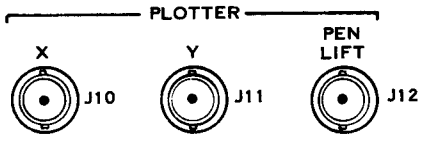
A and B BNC Connectors (J1 and J2)

These connectors accept input analog data signals for analysis for both Channels A and B. J1 is Channel A and J2 is Channel B. These connectors are connected in parallel with the front-panel INPUT A and INPUT B BNC connectors.

TIME SYNC + and TIME SYNC — BNC Connectors (J3 and J15)

Accepts an external TTL level sync pulse (TIME SYNC +, positive-going pulse; TIME SYNC —, negative-going pulse) for initiating the data load for Time Sync Averaging/Sync Spectrum functions. Sync Spectrum is a result of a single FFT performed on the Time Sync Average.

3.5.2 PLOTTER Group



X BNC Connector (J10)

Provides the X-axis output signal for an external X-Y recorder. X-axis output corresponding to cursor location is available at this output.

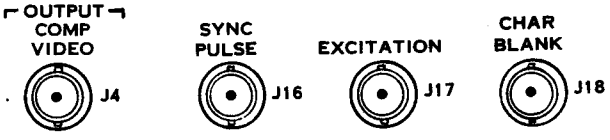
Y BNC Connector (J11)

Provides the Y-axis output signal for an external X-Y recorder. Y-axis output corresponding to cursor location is available at this output.

PEN LIFT BNC Connector (J12)

Provides contact closure to lower the pen on the X-Y recorder when the front-panel PLOTTER group START touch control is pressed.

3.5.3 OUTPUT Group



COMP VIDEO Connector (J4)

Provides a composite video signal for use with an external raster scan display or video hard copy recorder that requires a composite signal.

SYNC PULSE BNC Connector (j16)

This output is part of the -4 (SSG) option. The Synchronous Signal Generator option produces a sequence length which matches the memory period of the analyzer. The SYNC PULSE signal provides a trigger output coincident with the start of each sequence.

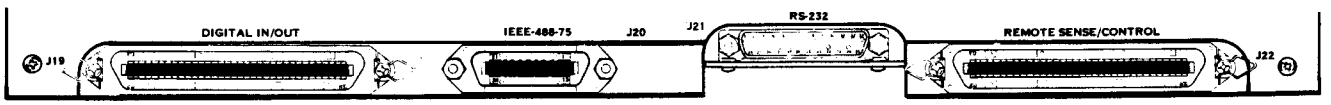
EXCITATION BNC Connector (J17)

This connector is the output for the -4 (SSG) option. This option provides a convenient signal source of broadband white noise, band limited pseudo-random noise and single sinewave analog outputs.

CHAR BLANK BNC Connector (J18)

When the output of this connector is grounded, all of the display alphanumerics will be blanked.

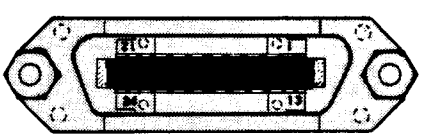
3.5.4 Multipin Connector Group



DIGITAL IN/OUT Multipin Connector (J19)

Not used at this time.

IEEE 488-1975 Multipin Connector (J20)

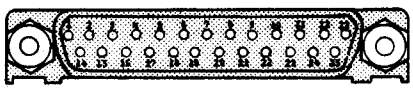


This is a 24-pin Amphenol connector which satisfies the requirements of Section 4 of IEEE Std. 488-1975. Provides interface with various IEEE devices. Refer to Table 3-3 for pin assignments.

Table 3-3. IEEE 488-1975 Multipin Connector Pin Assignments

Pin	Assignment	Pin	Assignment
1	DI01	13	DI05
2	DI02	14	DI06
3	DI03	15	DI07
4	DI04	16	DI08
5	E01	17	RDN
6	DAV	18	GND B
7	NRFD	19	GND B
8	NDAC	20	GND B
9	IFC	21	GND B
10	SRQ	22	GND B
11	ATN	23	GND B
12	GND B	24	GND B

RS-232 Multipin Connector (J21)

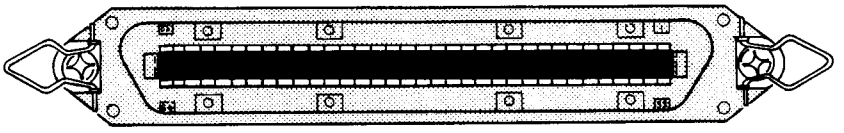


This is a 25-pin Amphenol connector which satisfies RS-232C requirements. Refer to Table 3-4 for pin assignments.

Table 3-4. RS-232 Multipin Connector Pin Assignments

Pin	Assignment	Pin	Assignment
1	Chassis GND	13	not used
2	Transmit DATA	14	not used
3	Received DATA	15	not used
4	RTS	16	not used
5	CTS	17	not used
6	DSR	18	not used
7	Analog GND	19	not used
8	not used	20	DTR
9	not used	21	not used
10	not used	22	not used
11	not used	23	not used
12	not used	24	not used

REMOTE SENSE/CONTROL Multipin Connector (J22)



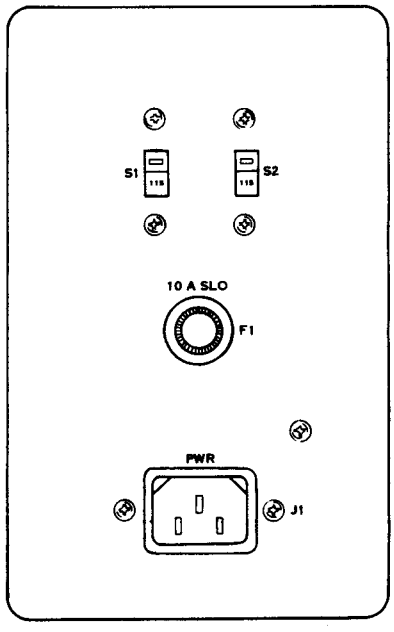
This connector is used with the various peripherals available for use with the SD375; i.e., TEK 4632 Hard Copy Recorder, SD346 Signature Ratio Adapter and an external raster scan display. In addition, connections are provided for remote control of specific data acquisition modes; i.e., averaging and transient capture. Refer to Table 3-5 for pin assignments.

Table 3-5. Remote Sense/Control Multipin Connector Pin Assignments

Pin	Assignment
1	ERASE
2	START/AVERAGE
3	TRANS CAP AUTO
4	+1
5	MEM HOLD A
6	EXT TRANS CAPT ARM
7	not used
8	MEM HOLD B
9	EXT SAMP FREQ
10	SEL EXT SAMP FREQ
11	not used
12	EXT TRANS CAPT SEL
13	EXT TRANS CAPT TRIG
14	not used
15	not used
16	not used
17	not used
18	STOP
19	not used
20	not used
21	not used
22	SEL SD346
23	not used
24	not used
25	not used
26	not used
27	not used
28	not used
29	not used
30	not used
31	not used
32	not used

Pin	Assignment
33	not used
34	not used
35	not used
36	not used
37	not used
38	not used
39	not used
40	not used
41	not used
42	not used
43	not used
44	not used
45	not used
46	TV VERT RETRACE
47	SD420 VIDEO
48	HORIZ DRIVE
49	HORIZ BLANK
50	not used
51	not used
52	not used
53	not used
54	not used
55	not used
56	not used
57	not used
58	not used
59	not used
60	not used
61	GND B
62	GND B
63	GND B
64	not used

3.5.5 Power Group



115/230 Switches (S1 and S2)

Provides switching of primary power input circuits for either 115 Vac or 230 Vac operation. Proper input voltage to be applied shows in the switch windows. Both switches must always be set to the same position.

Fuseholder (F1)

Accepts a 3AG type SLO-BLO, 10A, fuse.

PWR Connector (J1)

Accepts 3-wire plug and cable for applying 115/230 Vac, 47-65 Hz primary input power. Center terminal is chassis ground. Belden No. 17250 power cord is supplied for 115 Vac operation.

3.5.6 Preliminary Powering

The SD375 is designed to operate on either 115 Vac or 230 Vac, therefore, before applying power to the instrument, the following steps should be accomplished:

a. Check the rear panel transformer slide switches to ensure that they are in the proper position for the line voltage to be used. Both switches must be set to the same position.

b. Ensure that the proper size fuse is installed in the fuse holder on the rear panel. This should be a 10A SLO-BLO fuse for both 115 Vac and 230 Vac.

c. Ensure that the cooling fan inlet is free from obstructions that could reduce air flow.

After the proper voltage and fuse have been selected, insert the power cord and connect it to the primary power source. Press the front-panel PWR pushbutton/indicator. The indicator will light indicating that the instrument is on.

SECTION IV

OPERATIONAL CHECKOUT

4.1 INTRODUCTION

The following paragraphs contain an operational checkout of the Model SD375. This procedure should be accomplished before and after calibration or maintenance is performed. It is also recommended as a performance check upon receipt of the instrument. The operator should become thoroughly familiar with the front and rear panel descriptions in Section III of this manual.

4.1.1 Initial Setup

Equipment required for the checkout is listed in Table 4-1. Instruments with equal or better operational characteristics may be substituted.

Table 4-1. Equipment Required

Name	Model No.	Manufacturer
Oscillator	4200A	Krohn-Hite
RMS Voltmeter	3400A	Hewlett Packard
Frequency Counter	5302A/5300A	Hewlett Packard
Band Pass Filter	3202	Krohn-Hite
Random Noise Generator	GR1381	General Radio

a. Apply power to all units and allow approximately five minutes warm-up time before proceeding.

b. Press the following PARAMETERS group touch controls in sequence: PANEL, 0, RCL. The front panel and display will appear as shown in Figures 4-2 and 4-3.

c. Interconnect the Signal Generator, RMS Voltmeter and Frequency Counter to the instrument as shown in Figure 4-1.

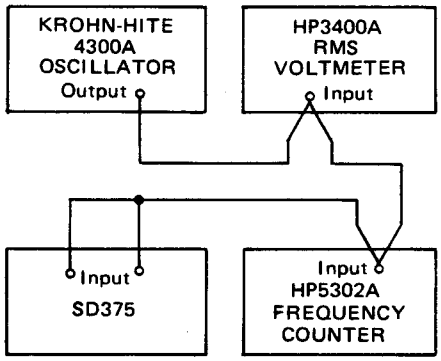


Figure 4-1. Initial Test Equipment Interconnect.

d. Adjust the Display C (Contrast) and G (Grid) controls for the best presentation. Press the CURSOR group, Y Units, V touch control.

e. Adjust the Signal Generator to provide a 4 kHz (± 200 Hz) sine wave at an amplitude of 1 Vrms (± 30 mVrms).

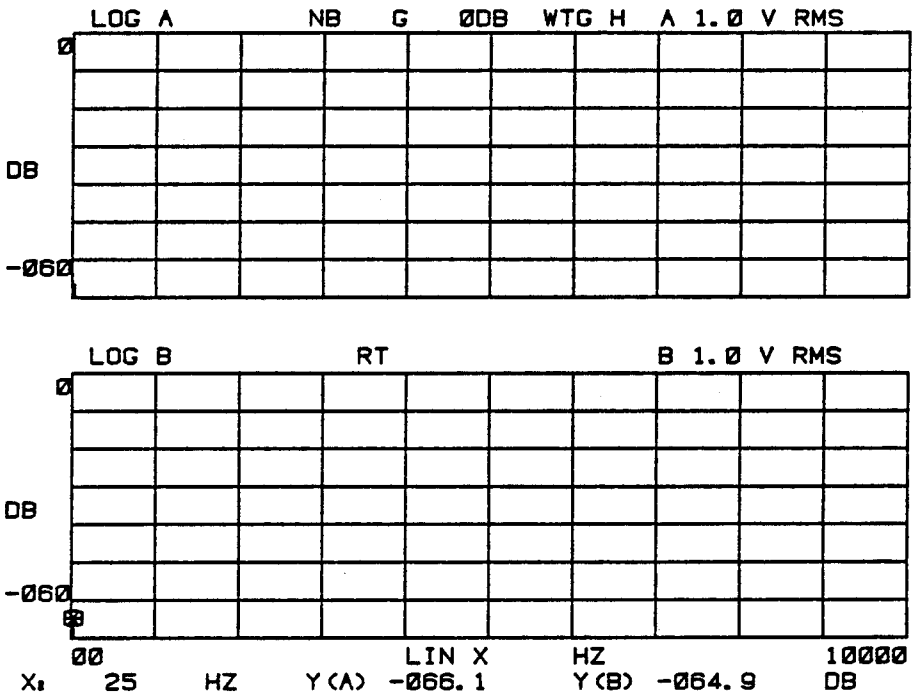


Figure 4-2. Typical PANEL, 0, RCL Display.

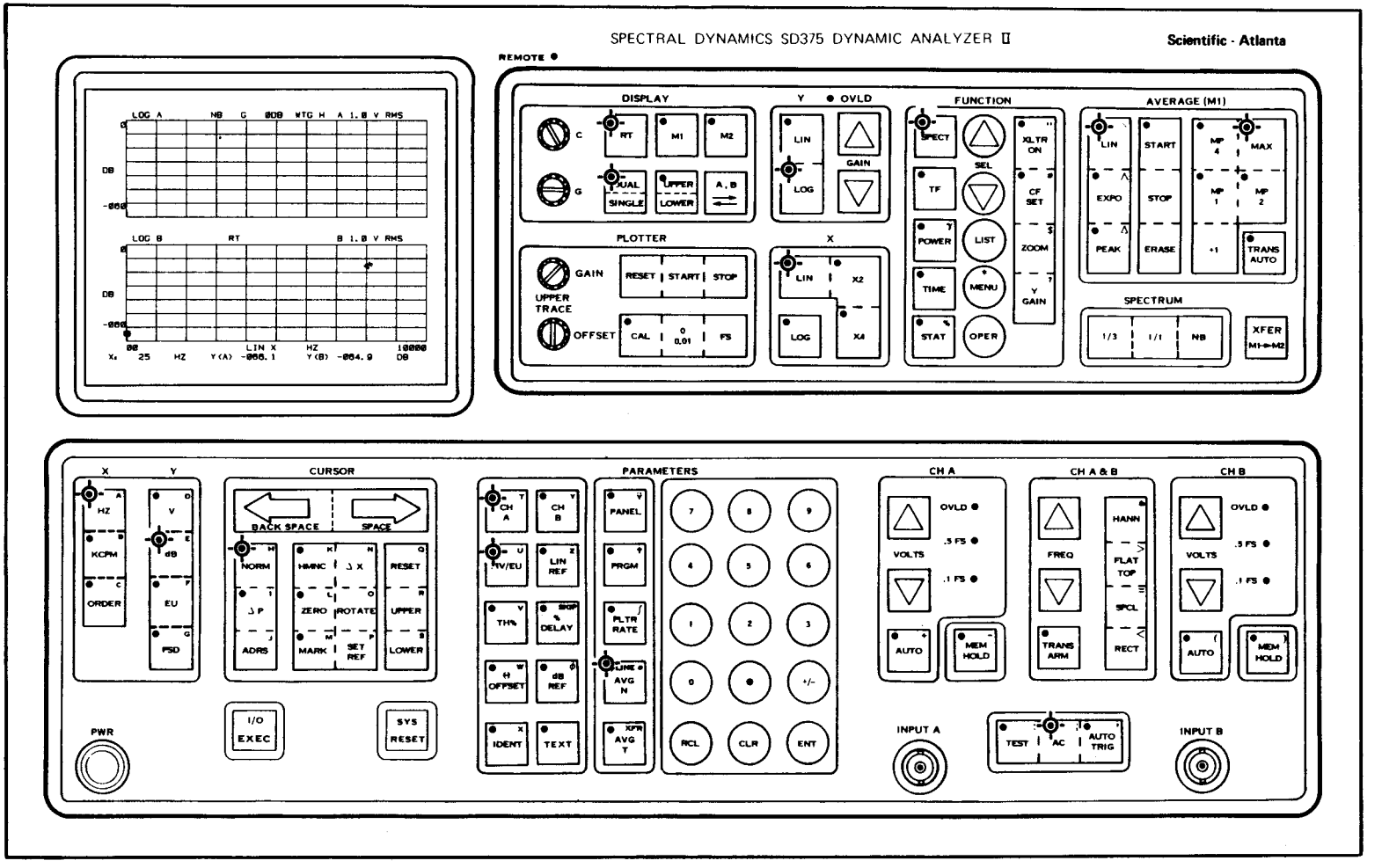
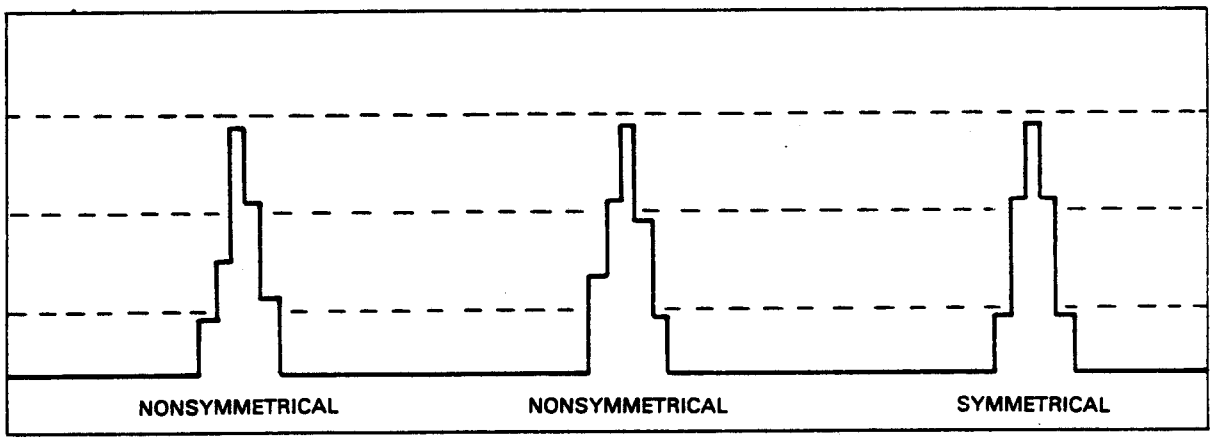


Figure 4-3. Front Panel Description of the Initial PANEL, 0, RCL Condition. LED's with this indication -⊙- should be lighted during Initial PANEL 0 RCL.

f. Observe a full scale display on both channels. Adjust the frequency of the input signal for a symmetrical display as shown in Figure 4-4. Readjust the amplitude of the input signal to 1 Vrms (± 30 mVrms).



NOTE

CURSOR readout of nonsymmetrical signals will result in out of tolerance or invalid rms or dB values. If the signal is nonsymmetrical adjust the output frequency of the oscillator for symmetry.

Figure 4-4. Nonsymmetrical and Symmetrical Signals

g. Bring the cursor to the peak of the waveform on the SPECT A display. The display should appear as shown in Figure 4-5. Observe the Y (A) and Y (B) display readouts. They should read from 9.7 E-1 to 1.03 Vrms.

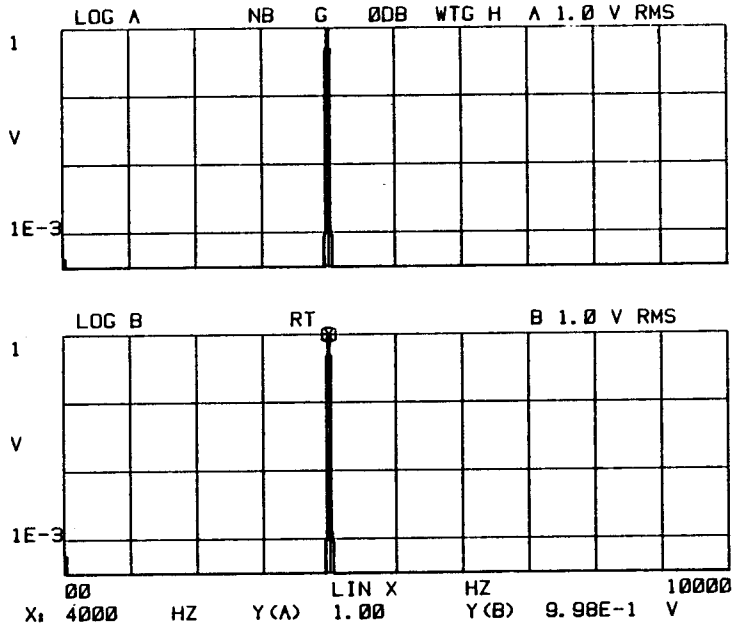


Figure 4-5. Initial Front Panel Display

4.1.2 Input Level and Linearity Check

a. Press the CURSOR group, Y units, dB touch control. The alphanumerics and scaling should change to dB.

b. Using the CH A and CH B VOLTS touch controls, select an input level for both channels of 0.01 Vrms.

c. Adjust the output of the oscillator so that when the cursor is placed at the peak of either waveform, the Y-axis reading for both channels will be 0 dB (± 0.2 dB).

d. Using the CH A and CH B VOLTS touch controls, select each input level from 0.01 Vrms to 20 Vrms and verify the Y-axis values for each input level as listed in Table 4-2.

Table 4-2. Input Level vs. Y-Axis Values

Input Level	Y-Axis Value
0.01	0 dB (± 0.2 dB)
0.02	−6 dB (± 1.0 dB)
0.05	−14 dB (± 1.0 dB)
0.10	−20 dB (± 1.0 dB)
0.20	−26 dB (± 1.0 dB)
0.50	−34 dB (± 1.0 dB)
1.00	−40 dB (± 1.0 dB)
2.00	−46 dB (± 1.0 dB)
5.00	−54 dB (± 2.0 dB)
10.00	−60 dB (± 3.0 dB)
20.00	−66 dB (± 6.0 dB)

4.1.3 Frequency Range and Hz Readings.

a. Press the following PARAMETERS group touch controls in sequence: PANEL, 0, RCL.

b. Press the INPUT group TEST touch control.

c. Press the CURSOR group ADRS touch control. Press the following PARAMETERS group touch controls in sequence: On the numbered keyboard select the number 256 and then press ENT.

d. The display will appear as shown in Figure 4-6. The cursor should be at the peak of the spectrum (either trace).

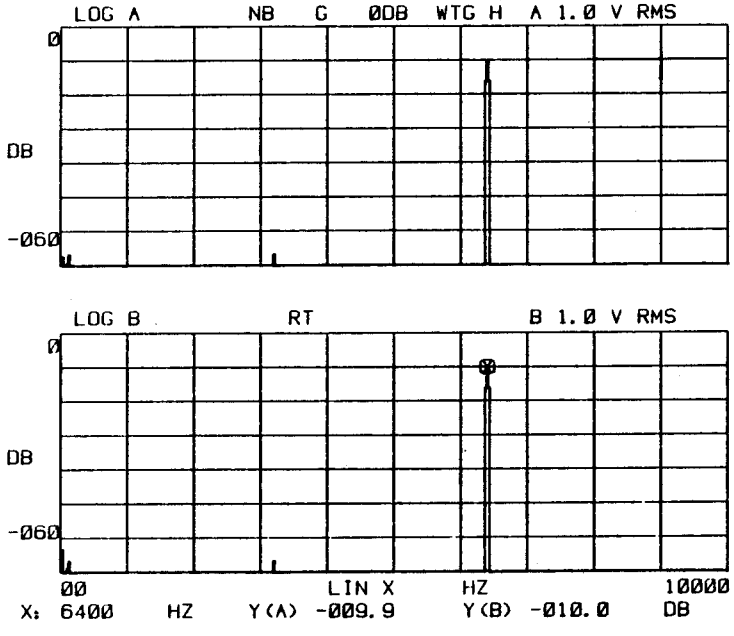


Figure 4-6. Frequency Range Sample Display

e. Using the INPUT group CH A & B, FREQ touch controls, select the 100 kHz range.

f. Read and verify the cursor X-axis value. The X-axis value should correspond with the first reading in Table 4-3.

g. Using the INPUT group CH A & B, FREQ touch controls, select each frequency range from 100000 Hz to 1.000 Hz and compare the X-axis values on the display to the X-axis values listed in Table 4-3.

Table 4-3. Frequency Range vs. X-Axis Values

Frequency Range	X-Axis Value (Hz)
100000	64000
50000	32000
40000	25600
20000	12800
10000	6400
5000.0	3200.0
4000	2560
2000	1280
1000.0	640.0
500.00	320.00
400	256
200.0	128.0
100.00	64.00
50.000	32.000
40.0	25.6
20.00	12.80
10.000	6.400
5.0000	3.2000
4.00	2.56
2.000	1.280
1.0000	0.6400

4.1.4 Cursor Controls and X-Y Readings

a. Press the following PARAMETERS group touch controls in sequence: PANEL, 0, RCL.

b. Using the INPUT group CH A and CH B, VOLTS touch controls, select the 2 Vrms level for both channels.

c. Apply a 1 kHz, 2 Vrms signal to the INPUT group INPUT A and INPUT B BNC connectors.

d. Adjust the Signal Generator for a symmetrical display. (Refer to Figure 4-4).

e. Press the CURSOR group LOWER touch control. Using the CURSOR group LEFT/RIGHT touch controls, move the cursor to the peak of the spectrum on the display.

f. Using the PARAMETERS group touch controls, press the following touch controls in the indicated sequence:

1. CH A, MV/EU, 10, ENT
2. CH B, MV/EU, 20, ENT
3. PANEL, 7, ENT
4. PANEL, 7, RCL

g. Using the CURSOR group X and Y units touch controls, press the X units KCPM touch control and the Y units EU touch control.

h. Press the CURSOR group ADRS touch control. On the PARAMETERS group numbered keyboard, press 20 and then press ENT.

i. On the CURSOR group, press the ΔX touch control, and then press SET REF.

j. Press the CURSOR group ADRS touch control. On the PARAMETERS group numbered keyboard, press 110 and then press ENT. Compare the display with Figure 4-7.

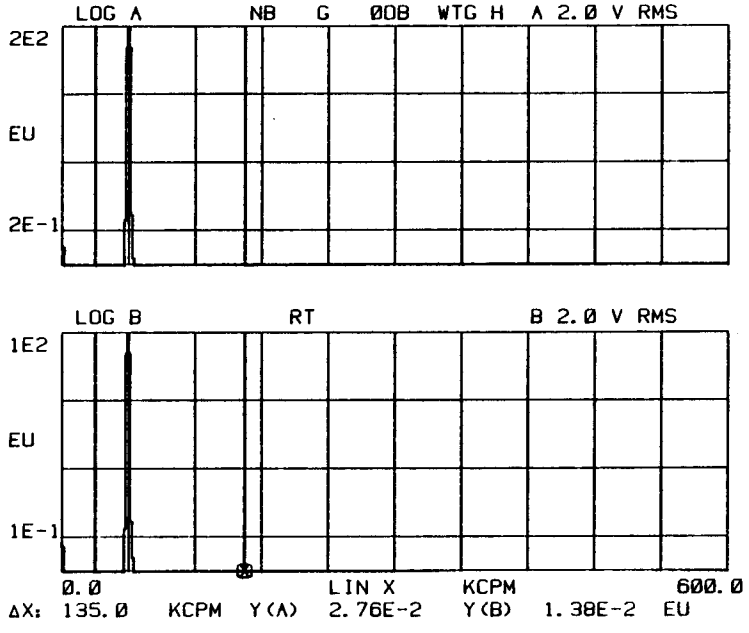


Figure 4-7. Cursor Control ΔX and SET REF Sample Display

k. Press the CURSOR group ΔP touch control and compare the display with Figure 4-8.

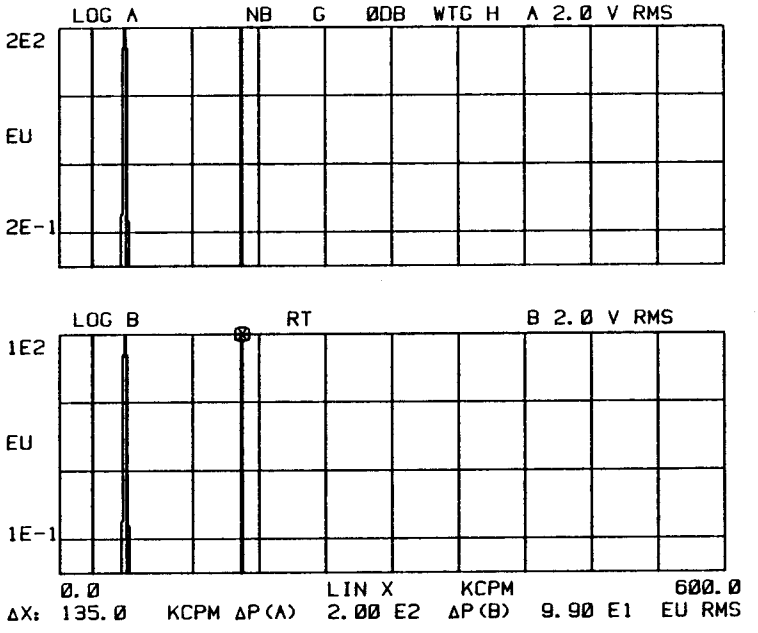


Figure 4-8. Cursor Control ΔP Sample Display

l. De-energize the SD375 and disconnect all the test equipment from the instrument.

4.1.5 Arithmetic Function Check

NOTE

The Y-axis values resulting from the following checks will vary slightly from the Y-axis values on the corresponding figures. This is normal.

a. Connect the Random Noise Generator and Band Pass Filter to the SD375 as shown in Figure 4-9.

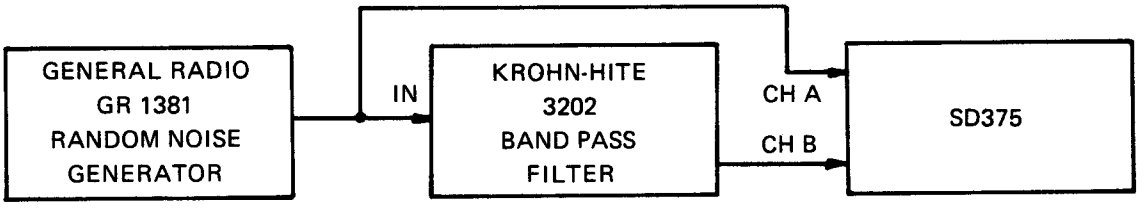


Figure 4-9. Arithmetic Function Test Equipment Interconnection

b. Energize the SD375 and the test equipment.

c. Press the following PARAMETERS group touch controls in sequence: PANEL, 0, RCL.

d. Using the INPUT group CH A and CH B, VOLTS touch controls, select the 1 Vrms level for channel A, and the 0.5 Vrms level for channel B.

e. Adjust the Random Noise Generator for a 50 kHz pass band and 3σ clipping.

f. There are two identical filter adjustments on the front-panel of the 3202 Band Pass Filter. Adjust the filter control on the left, first, for 400 Hz HIGH PASS. Next, adjust the filter control on the right for 3 kHz LOW PASS.

g. Adjust the Random Noise Generator and the Band Pass Filter for a no overload condition on the SD375.

h. Using the PARAMETERS group touch controls, press the following touch controls in the indicated sequence:

   1. CH A, MV/EU, 10, ENT

   2. CH B, MV/EU, 20, ENT

   3. AVG T, 65, ENT

   4. AVG N, 25, ENT

i. Press the DISPLAY group M1 touch control.

j. In the AVERAGE (M1) group, press the following touch controls in the indicated sequence: LIN, ERASE, START.

k. Press the CURSOR group ADRS touch control. Press the following PARAMETERS group touch controls in sequence: On the numbered keyboard select the number 117 and then press ENT and compare the display with Figure 4-10.

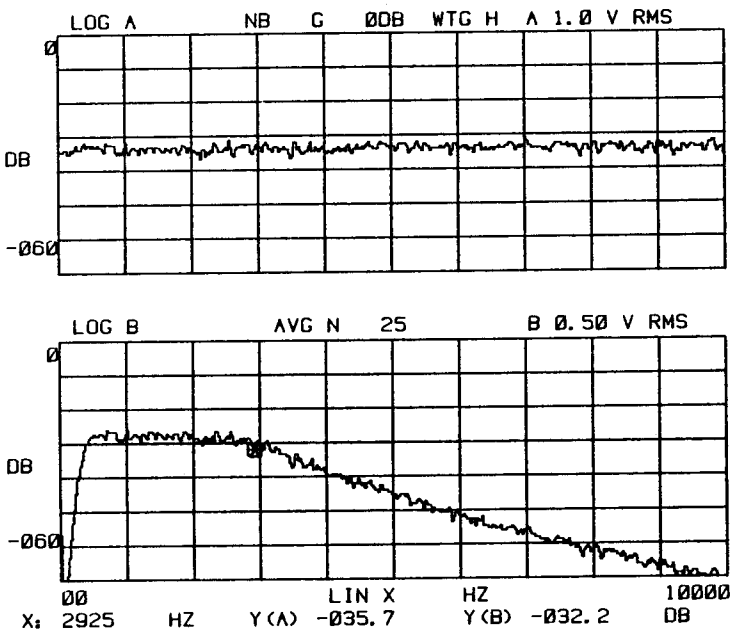


Figure 4-10. Initial Setup Display, ADRS 117, (2925 Hz), AGV N 25.

4.1.5.1 Spectrum Mode

a. Press the CURSOR group, Y units, V touch control. On the DISPLAY group Y touch controls, select +20 dB using the GAIN UP/DOWN touch controls. On the DISPLAY group X touch controls, press LOG. Compare the display with Figure 4-11.

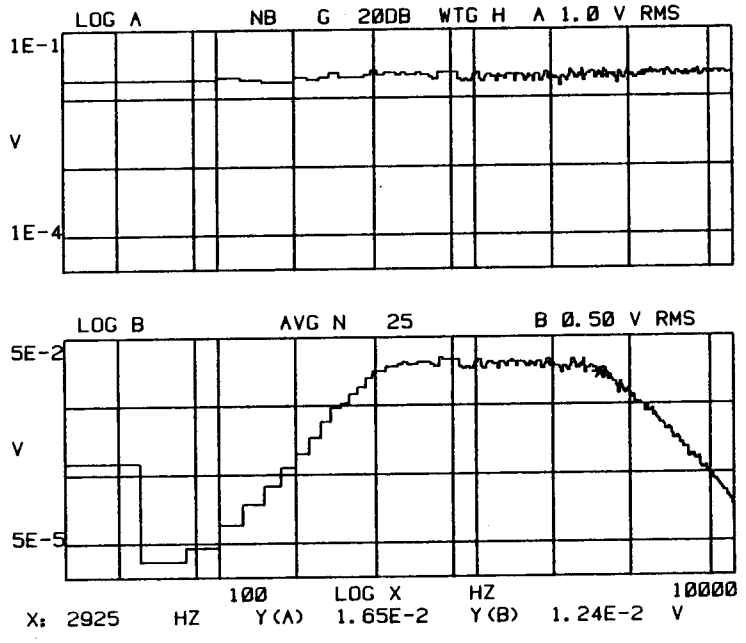


Figure 4-11. Display SPECT A & B: Y Units V, Y GAIN +20 dB, LOG X.

b. Press the following touch controls in the indicated sequence:

FUNCTION Group

1. Press SPECT (it should already be selected)
2. Press MENU

PARAMETERS GROUP

1. Press 2
2. Press ENT (the asterisk on the SPECTRUM MENU should move to selection 2 (GAA & GBB)

FUNCTION Group

1. Press OPER

CURSOR Group

1. Press Y units EU
2. Press NORM
3. Press ADRS

PARAMETERS Group

1. Press 95
2. Press ENT

DISPLAY Group

1. Using the Y-GAIN UP/DOWN touch controls, select 0 dB
2. Press the X, LIN touch control

Compare the display with Figure 4-12.

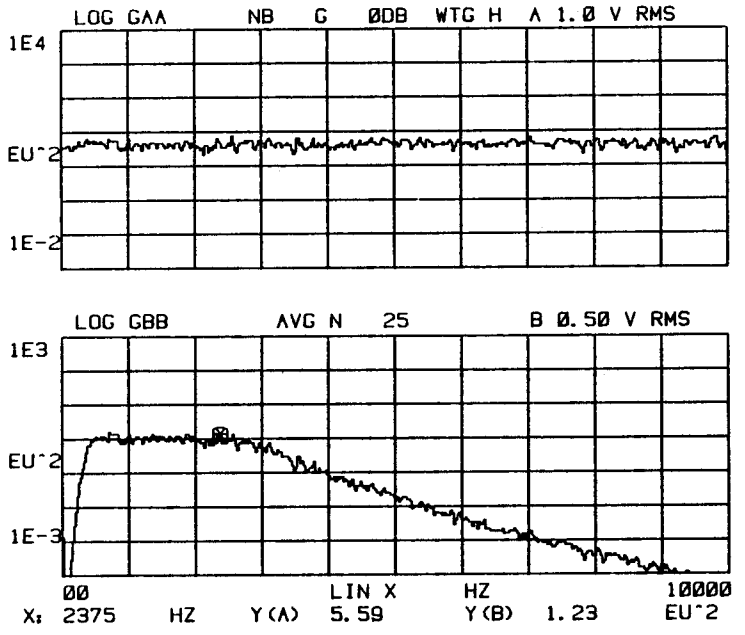


Figure 4-12. Display SPECT GAA & GBB: Y-Units, EU — NORM — ADRS 95 — Y GAIN, 0 dB — LIN X

c. Press the following touch controls in the indicated sequence:

FUNCTION Group

1. Press MENU

PARAMETERS Group

1. Press 3

2. Press ENT (the asterisk on the SPECTRUM MENU should move to selection 3, RATIO)

FUNCTION Group

1. Press OPER

Compare the display with Figure 4-13.

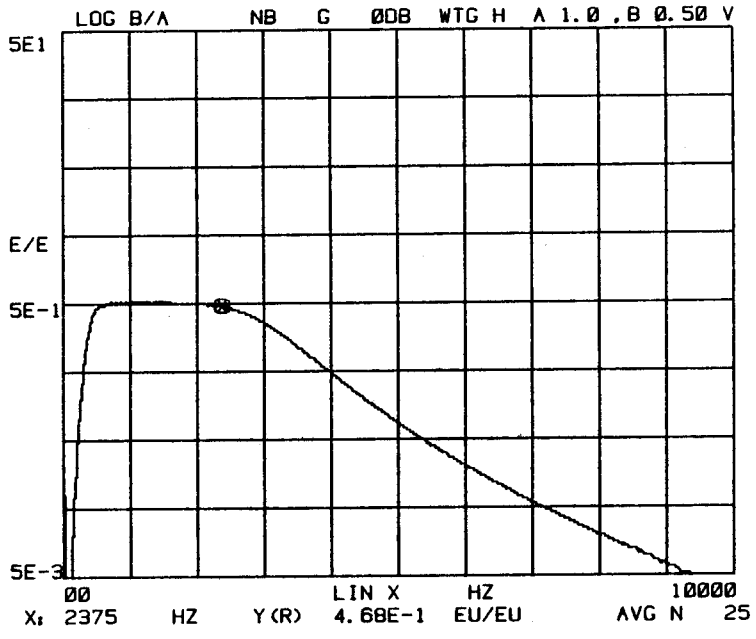


Figure 4-13 Display RATIO: X Units Hz.

d. Press the DISPLAY group $\overset{A,B}{\rightleftharpoons}$ touch control and compare the display with Figure 4-14.

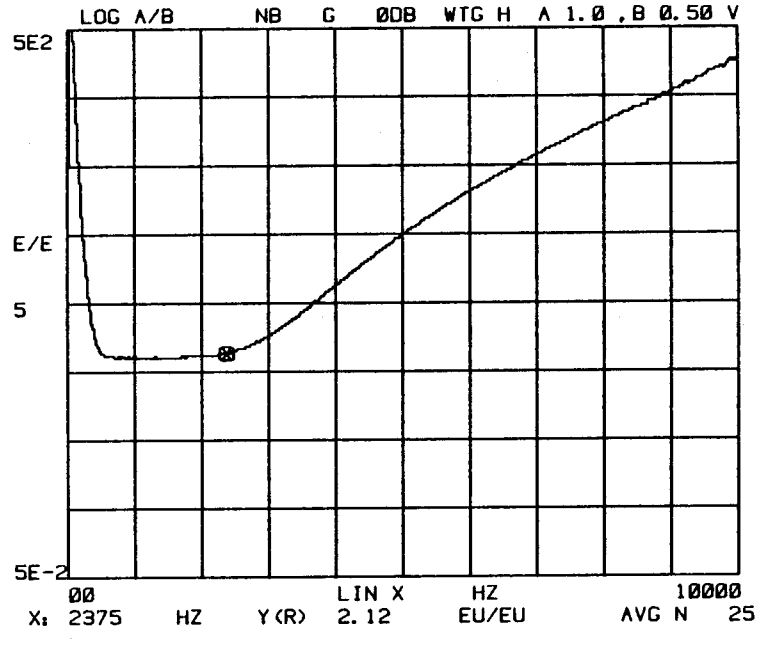


Figure 4-14. Display RATIO: Interchange A and B

e. Press the following touch controls in the indicated sequence:

FUNCTION Group

1. Press MENU

PARAMETERS Group

1. Press 4

2. Press ENT. The asterisk on the SPECTRUM MENU should move to selection 4, B-A. Annotation in the upper left hand corner of the display will read LOG A-B as you have already pressed $\overset{A,B.}{\rightleftarrows}$

FUNCTION Group

1. Press OPER

CURSOR Group

1. Press Y Units, dB

Compare the display with Figure 4-15.

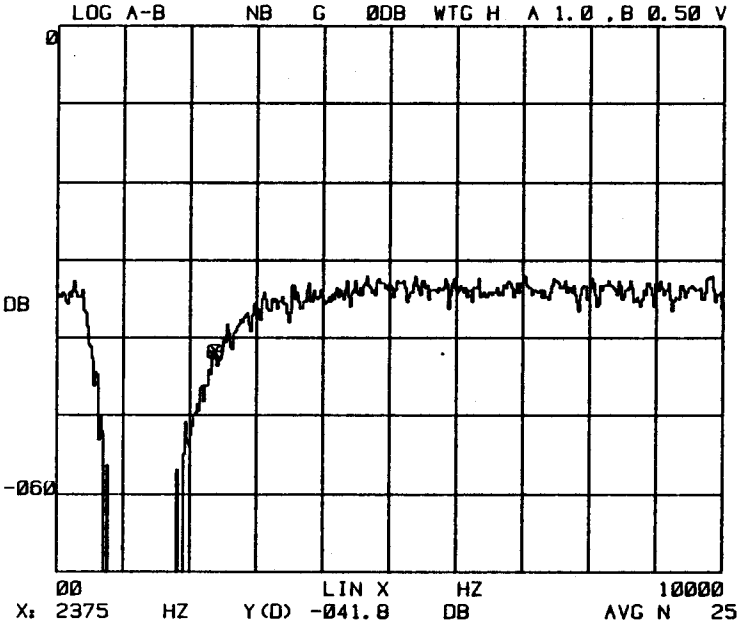


Figure 4-15. Display SPECT A-B: Y Units dB.