



Operator's Manual
SD385 NOMAD Portable
Signal Analyzer
Part Three
Legacy Manual

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OPERATOR'S MANUAL

SD385 NOMAD Portable Signal Analyzer

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**INITIAL INSPECTION
AND
SAFETY PRECAUTIONS**

2-1 INTRODUCTION

This section contains instructions for performing an initial inspection of the Model SD385, general safety precautions, instructions on preparation for use, return shipment procedures including repacking instructions for return shipment, procedures for claiming warranty repairs, and a spare parts list consisting of the SD385's major sub-assemblies.

2-2 INITIAL INSPECTION

Although the instrument is thoroughly inspected mechanically and electrically before packing for shipment, it must be inspected upon receipt for damage in transit.

2-2.1 Unpacking

Use care in removing the instrument from its shipping container to prevent damage to the front and rear-panel controls. Save the shipping container and all packing materials until the instrument has been thoroughly inspected for damage and checked for proper operation.

2-2.2 Equipment Furnished

Make sure that each item on the packing list is included with the shipment. Accessory kits may be shipped in separate containers.

2-2.3 Inspection for Physical Damage

Inspect all panels for dents, signs of chipped paint, or scratches. Check for broken or bent connectors, switches, and knobs. Photographs of damage may be helpful in substantiating subsequent claims.

2-2.4 Reshipment Procedure

If the instrument is to be reshipped after receipt, use of the original shipping container and packing materials is recommended. If original packing materials are not available, the following materials should be used:

- a. A double wall carton with a test strength of 350 pounds and of sufficient size to accommodate the required packing.
- b. Heavy paper or sheets of cardboard to protect all surfaces.
- c. Nonabrasive material such as polyurethane or cushioned paper between projecting parts and wall of carton.
- d. At least 4 inches of shock absorbent material such as extra firm polyurethane.

CAUTION

The use of flowable styrofoam packing materials (i.e., popcorn, peanuts, shells and spaghetti), is a leading cause of equipment damage during shipping. Any shipping damage resulting from the use of flowable packing material by the customer will be charged to the customer.

2-2.5 Returned Equipment with Warranty or Damage Claims

If the instrument is found to be damaged in transit or does not operate as specified when received, notify the carrier and the nearest Scientific-Atlanta, Inc., Spectral Dynamics Division sales/service office or representative immediately. The local office will arrange for repair or replacement. A Return Material Authorization (RMA) number will be assigned by the factory to assure identification and tracking of the instrument by Scientific-Atlanta. Be sure to attach a card showing the owner's name, address, telephone number, and a description of the service required.

2-3 SAFETY PRECAUTIONS

The Model SD385 Signal Analyzer presents no hazard to operating personnel if operated in accordance with the instructions contained in this manual.

CAUTION STATIC CAN DAMAGE COMPONENTS

The circuit cards located in the SD385 contain CMOS components that are electrostatic-discharge sensitive (ESDS) devices. Do not handle ESDS components unless a grounding wrist strap is properly worn and grounded. Do not let clothing or plain plastic materials contact or come in close proximity to ESDS devices.

Electrostatic charges are generated and stored on surfaces or ordinary plastics, most common textile garments, ungrounded people's bodies and other commonly unnoticed static generators. If an electrostatic charge passes through an ESDS device, catastrophic failure or performance degradation of the device may result.

2-3.1 Explosion Hazard

Do not operate the instrument in any environment where flammable vapors may exist. Operation of any electrical instrument in such an environment constitutes a definite explosion hazard.

2-3.2 Shock Hazard

When connected to a three-contact power receptacle, the three-conductor ac power cable supplied with the instrument grounds the chassis. This grounding protects the operator from possible injury. To preserve this protection when operating from a two-conductor outlet, use a three-conductor to two-conductor adapter and connect the adapter wire to ground at the power outlet before connecting the instrument. Covers and safety plates should be removed ONLY by QUALIFIED maintenance personnel. Dangerous voltages are present inside this instrument whenever the power cord is connected even when the power switch is off.

2-4 PREPARATION FOR USE

2-4.1 Power Requirements

The SD385 Signal Analyzer is designed to operate on either 115 Vac or 230 Vac. Therefore, before applying power to the instrument, check the following:

- a. There is a voltage selector that is an integral part of the fuseholder and power switch assembly. This assembly is located on the right side of the instrument. Make sure the voltage selector reflects the proper line voltage that is to be used (refer to Figure 2-1).
- b. The fuse in the fuseholder should be a 5 amp Normal-BLO for 115 V operation and 2.5 amp Normal-BLO for 230 V operation.
- c. There is an 8-position DIP switch located on the right side of the instrument. One of these DIP switches is for selecting the display refresh update rate (refer to Figure 2-1). For operation in areas that use 60 Hz ac power, the Display Refresh Select DIP switch should be set to the 60 Hz position. In areas that use 50 Hz power, the DIP switch should be in the 50 Hz position.

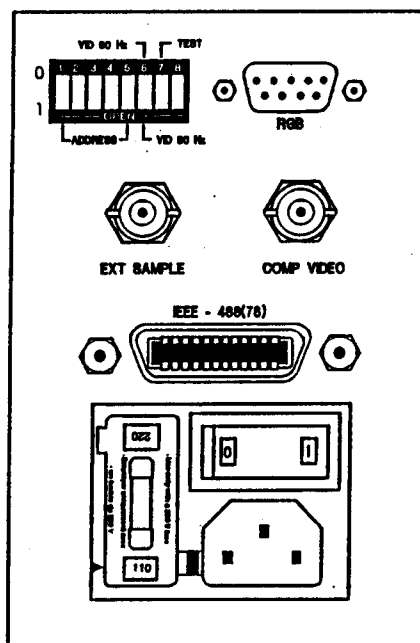


Figure 2-1. Instrument Side Panel Showing the Location of the Voltage Selector, Fuseholder and Display Refresh Select DIP Switch

2-4.2 Mounting

The SD385 is shipped from the factory as a semi-portable bench instrument with trim in place. Rack-mounting would permanently damage the instrument enclosure.

2-4.3 Cooling

The SD385 requires at least 3-1/2" open space above and behind the instrument for proper cooling. Never place anything on top of the instrument.

2-4.4 Precautions for the Optional EL Display

The Optional EL Display is mounted in the instrument cover and is connected to the instrument via a ribbon cable that goes from the front-panel to the instrument cover (refer to Figure 2-2). While care has been taken to guard against damage to the cable by limiting the travel of the instrument cover, removal of the cover-hinges or rough handling of the cable, resulting in a strain being placed on the cable, can cause partial or complete disconnection. Therefore, removal the cover hinges is not recommended. Never pull or yank on the ribbon cable.

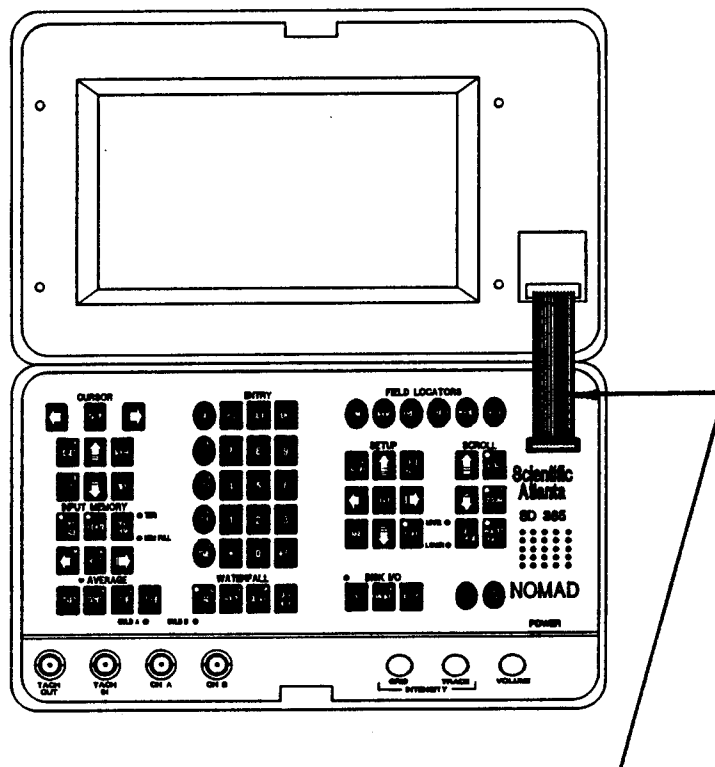


Figure 2-2. Optional EL Display Interconnect Cable

2-5 OPERATOR MAINTENANCE

2-5.1 Introduction

Maintenance performed by the operator consists of cleaning and a visual inspection.

2-5.2 Cleaning

Operator cleaning procedures involve only the exterior surfaces. When the instrument is operating, use only a dry cloth or soft brush. The SD385 is equipped with a LEXAN front panel.

CAUTION

Only recommended cleaning agents should be used for cleaning the LEXAN front panel. Many commercial cleaning agents contain some form of halogenated, aromatic or ammoniated compounds. These agents will damage the LEXAN front panel and should not be used for cleaning. Do not use any air source to remove dust.

The recommended cleaning agents are as follows:

Light cleaning: Denatured alcohol or a mild solution of soap and water.

Heavy cleaning: MS-260 cleaner for plastic, glass and metal. (Miller-Stephenson Chemical Co., Inc.)

- a. Turn the instrument off and disconnect the ac power cord.
- b. Using a soft brush, remove dust from the front panel and the face of the display. Remove dust from connectors, slots, switches and the vent fan grill.
- c. Using the recommended cleaning agents, wipe the front panel and the face of the display.

Table 2-1. SD385 Spare Parts List

Item	Part Number	Quantity
Interactive Assembly	22142600	1 each
Fan Assembly	22150000	1 each
PWA Set	22126000	1 each
Front Panel Assembly	22150500	1 each
Air Filter	22125700	
For SD385-1 Add:		
EL Display	22142500	1 each
EL Cable Assembly	22141003	1 each
Lens	22125900	1 each
For SD385-2 Add:		
Signal Conditioner PWA	22113002	1 each
For SD385-3 Add:		
SRA/TACH PWA	22111400	1 each
For SD385-4 Add:		
Disk Controller PWA	22105700	1 each
Disk Drive	22142400	1 each

OPERATION

3-1 ANALYZER OPERATIONAL OVERVIEW

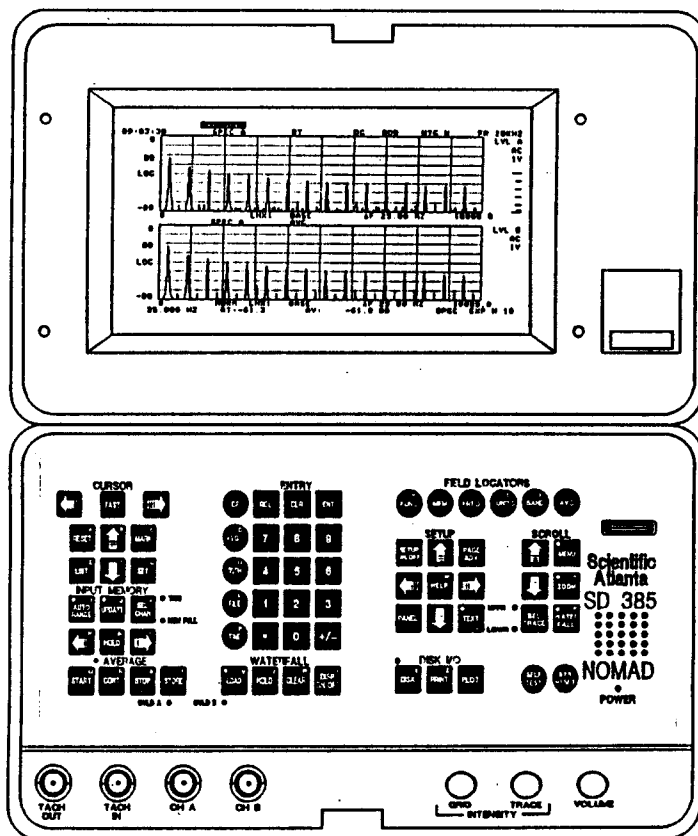


Figure 3-1. SD385 Front Panel

The SD385 is a menu driven instrument. That is, most of the operating functions consist of menus and numerical entry fields controlled by the front panel buttons. When the instrument is first turned on, an introductory message will appear on the display. Located at the bottom of the introductory message (ignoring the rest of the message for now) is the statement "PRESS SELECT TRACE, OR HELP TO CONTINUE." You have to press one of these buttons in order to place the instrument in an operating mode. If the HELP button is pressed first, the HELP feature will be enabled, providing Help messages for the various control fields and front-panel buttons. It's a nice feature, but you still won't be able to operate the instrument. SEL TRACE is the button you want to press to enable the normal operating mode.

Instrument configuration is accomplished by moving a Reverse Video Field (from now on this will be referred to as the "RV") from one control to another using the SETUP group directional buttons (the UP/DOWN/LEFT/RIGHT arrows in the SETUP group). Specifically, "controls" are the annotation statements that surround the data display. Each of these controls are accompanied by a menu. There are, basically, three methods of accessing and changing the controls. All three methods use the SETUP group directional buttons for control selection and the SCROLL group UP/DOWN buttons for menu changes.

The first method might be called the "direct access" method, and is accomplished as follows:

With the RV placed on a control, selection within that control is accomplished by pressing the UP/DOWN arrows in the SCROLL group, or by selecting the control item number on the ENTRY group keypad and then pressing the ENT button (the menus don't have to be displayed to be changed). The only drawback to this method is that a complete knowledge of the contents of each menu is required. However, once you gain experience operating the SD385, you will find this method to be the most convenient.

The second method is almost the same as the first, except the associated control menu is displayed when a change is made. This allows you to see just what is being changed. The second method is accomplished as follows:

As previously mentioned, each control is accompanied by a menu. The related menus are displayed by pressing the SCROLL group MENU button. When the MENU button is pressed, the right half of the data display (inside the grid boundaries) will be blanked and the menu will appear in its place. There is an RV located on the menu itself. This RV is moved from one menu selection to another using the SCROLL group UP/DOWN buttons, or you can press the number that corresponds to the desired menu item from the ENTRY keypad and then press the ENT button. the RV located on the menu will go directly to the desired selection. You will probably want to use this method until you become familiar with the contents of the various control menus.

Since the amount of space available for control is somewhat limited when data displays are on the screen, the same control menus associated with the display controls are also located on "Setup Pages." The third method of control

selection is by accessing these Setup Pages. This method can give the first-time user a better overall picture of all the control menus and numerical entry fields. The following is a brief description of how to access the Setup Pages:

Access to the Setup pages is accomplished by first pressing the SETUP group SETUP ON/OFF button. This same button is used to exit The Setup Pages or the Setup Page listing. The Setup Page listing is the first thing that appears when the SETUP ON/OFF button is pressed, and is titled "PANEL RECALL CONTROL & SETUP PAGE SELECT." With the Setup Page listing on the display, the Setup Pages themselves are accessed by moving the RV on the Setup Page Listing to the desired Setup Page title and then pressing the SCROLL group MENU button.

In addition to containing all of the control menus, the Setup Pages also contain all the various numerical entry controls such as Trigger Threshold, Number of Averages, Zoom Center Frequency, etc. For these selections a numerical value will be assigned using the ENTRY group keypad. The selections made on all of these controls are the configuration of the analyzer.

Basically, you will see one of three things on the SD385 display:

SETUP PAGES (or the Setup page listing)
ANALYZER DISPLAY FUNCTIONS (any data display)
WATERFALL DISPLAY (the Waterfall display capability is a standard feature)

The Waterfall Feature is entered/exited by pressing the WATERFALL group DISP ON/OFF button. The Waterfall display is determined by the setting of the Waterfall Display Mode control and the data contents of the currently selected Waterfall File.

The Analyzer display functions are determined by the selected Function, the data contents of the currently selected display Memory, the Display Trace selection and, if the two channel Option is installed, the selected channel or channels. For example:

Group: SPEC
Function: SPECTRUM
Memory: RT & AVG
Trace: DUAL
Selected Channel: A

The Setup Page shown in Figure 3-2 is an example of Setup Page 3. The Functions on this Setup Page are the priority configurations of the analyzer. Other controls may be blocked out if they are not compatible with the selected function. For example:

Two controls determine the display function of the analyzer. The first is FUNCTION GROUP (SPEC, TIME, STAT with TF, PWR and IFFT included with the 2 channel instruments). Next is selection within a Function Group. For example, the SPECTRUM Function Group has 2 selections on a single channel SD385. These are:

SPECTRUM FUNCTION

1. **SPECTRUM** (FFT'd data from the Input Memory)
2. **1 CH MATH** (Spectrum math functions using Spectrum data from two different memories)

The other single-channel Function groups are:

TIME FUNCTION

1. **TIME & SPEC** (Time and Spectrum)
2. **TIME & PDH** (Time and Probability Density Histogram)
3. **CTIME & TIME** (Compressed Time; i.e., the entire contents of the Input Memory and Time)

STATISTICS FUNCT

1. **PDH** (Probability Density Histogram)
2. **CD** (Cumulative Distribution)

These are the single-channel Function groups. If you have a 2 channel instrument (SD385-2), these three function groups (Spectrum, Time and Statistics) will have additional 2 channel selections. Also, the single channel functions can be selected for single channel operation on either Channel A or Channel B.

The additional 2 channel functions are:

SPECTRUM FUNCTION

1.
2.
3. 2 CH SPECT (Two-channel Spectrum)
4. 2 CH MATH (Spectrum math functions using two channels of Spectrum data)

TIME FUNCTION

1.
2.
3.
4. 2 CH TIME (Two-channel Time)

STATISTICS FUNCT

1.
2.
3. 2 CH PDH (Two-channel Probability Density Histogram)
4. 2 CH CD (Two-channel Cumulative Distribution)

In addition, the 2 channel instruments have three more Function groups. These are:

TRANSFER FUNCTION

1. |TF| & ϕ (Transfer Function and Phase)
2. |TF| & COH (Transfer Function and Coherence)
3. TF RE & IM (Transfer Function Real and Imaginary)

POWER FUNCTION

1. COP & COH (Coherent Output Power and Coherence)
2. |XSPT| & ϕ (Cross Spectrum and Phase)
3. XSP RE & IM (Cross Spectrum Real and Imaginary)

IFFT FUNCTION

1. AUTO-CORR (Auto-correlation)
2. CROSS-CORR (Cross-correlation)
3. IMPULSE-RES (Impulse response)
4. TIM & OUTRES (Time and Output Response)

All of these Function groups (Spectrum, Time, Statistics, Transfer Function, Power and IFFT) are accompanied by Display Memory selections (DISPLAY MEM Menu), unique to the selected function. For example, some of the single channel functions have the capability of displaying the contents of two separate memories, simultaneously, in a dual trace format. An example of this is selection 1 on the SPECTRUM FUNCTION menu. The display Memory menu that accompanies this selection has three dual-trace memory-select combinations. These are:

1. RT & AVG - This selection results in a dual display of Real Time Spectrum data and Averaged Spectrum data from the same channel; i.e., the FFT'd contents of the Input Memory (RT) and the contents of the Average Memory (AVG).
2. RT & STO - This selection results in a dual display of Real Time Spectrum data and Stored-Averaged Spectrum data (the data has to be averaged before it can be stored) from the same channel; i.e., the FFT'd contents of the Input Memory (RT) and the contents of the Storage Memory (STO).
3. AVG & STO - This selection results in a dual display of Averaged Spectrum data and Stored-Averaged Spectrum data; i.e, the contents of the Average Memory (AVG) and the contents of the Storage Memory (STO).

The SEL TRACE button allows the user to select the number of traces to display. This can be 1 or 2 depending upon the selected function and the number of channels being used.

Therefore, the priority settings for the analyzer are:

Function Selection, Memory Selection, Channel Selection and Display Trace Selection.

Waterfall Display

The Waterfall Memory is used to store time sequential records of the analyzer display data. When the Waterfall feature is enabled, the instrument will display the contents of the currently selected Waterfall File. The "Display Mode" selection determines how the contents of the selected Waterfall File will be displayed. WF-CONT and WF-FULL will display as many full records as are set in the RECORDS PER DISPLAY control. "Single" displays are records in the same format the analyzer uses for display. PEAK display is the result of a scan of the file to display the maximum amplitude found at each X-axis location. PROFILE displays the complete file amplitude variation at any single X-axis point.

Acquiring Data

In order to see data on the display, the selected memory must have signal data in it. Basically, data is acquired by pressing one of four buttons:

Front-Panel Button	Source Memory	Display Indication	
UPDATE AVERAGE START AVERAGE STORE	Input Average Storage	RT or INP AVG STO	} Analyzer Memories
WATERFALL LOAD	Waterfall File	FILE X OF X	
			} Waterfall Memory

For the analyzer memories, there are A and B Memories. When you initiate an acquisition into an analyzer memory, the instrument will acquire only into those channels designated by the "Function" number of channels and the SEL CHAN button. For example, pressing AVG START while in single-channel SPECT B will cause only channel B data to be averaged. Channel A Average Memory will be untouched. This allows non-simultaneous average of different channels. The same rule applies to Input Memory UPDATE and STORE.

The STORE operation involves copying the contents of the Average Memory to the Storage Memory simply by pressing the AVERAGE group STORE button.

For the other three operations (UPDATE, AVERAGE START, LOAD WATERFALL) there are controls that determine how the acquisition will occur. These controls are as follows:

UPDATE - Controlled by UPDATE MODE (Control Menu on Setup Page 1):

- UPDATE MODE**
1. FREE RUN
 2. SINGLE(AMP) TRIG
 3. REPEAT(AMP) TRIG
 - *4. SINGLE(EXT) TRIG
 - *5. REPEAT(EXT) TRIG

AVG START - Controlled by AVERAGE MODE and AVERAGE DATA (Control Menus on Setup Page 2):

- | AVERAGE MODE | AVERAGE DATA |
|---------------------|---------------------|
| 1. SUM | 1. TIME |
| 2. EXP | 2. SPEC |
| 3. PK | 3. XPRD |
| 4. + 1 | |

WATERFALL LOAD - Controlled by WATERFALL UPDATE MODE (Control Menu on Setup Page 6):

- UPDATE MODE**
1. MAX
 2. % LEVEL
 3. AVG RCYCL
 4. SECONDS
 5. +1
 - *6. +,- ΔRPM
 - *7. +&- ΔRPM

*These selections will not appear on this menu unless the SRA/TACH Option is installed.

Therefore, each operation can be set up to run at top speed, unsynchronized with anything else until manually stopped by Input Memory HOLD for UPDATE, STOP for AVERAGE and HOLD for WATERFALL, or stopped automatically by synchronizing with some detectable event.

Another important consideration when averaging, is the Average Data selection. This is the control the RV will position itself on when the AVG FIELD LOCATOR button is pressed. The selections on this control menu allow the user to average TIME data, Frequency Magnitude data or complex Frequency data in the background of any display. This setting is limited only by the requirements of the display function. For example. TF & 0 (TRANSFER FUNCTION and PHASE) data cannot be computed from just the magnitude frequency average, so the analyzer will choose complex average when MAG is set in that display.

Additional considerations for Input Memory UPDATE will be TRIG THRESHOLD (level to trigger on an internal trigger), TRIG DELAY, INPUT COUPLING (AC or DC) and SAMPLING SOURCE (to enable Signature Ratio analysis).

Parameters that control Waterfall UPDATE MODE are on Setup Page 6 and include % LEVEL (acquisition occurs when signal amplitude reaches an operator-determined percentage), AVG RCYCL (Waterfall feature controls analyzer Averaging function), SECONDS (Acquisition every X seconds) and, if the SRA/TACH Option is installed, ^RPM (Trigger RPM).

All of these controls are covered in painful detail in the subsections that follow this overview.

Processing Controls

Much of the data processing requires proper calibration settings of the instrument such as Input Level (selected separately for each channel), Frequency Range and FFT Weighting.

Analysis Band selection allows increasing the resolution with ZOOM analysis. Included is a ZOOM MULTIPLIER selection (from 2 to 128 in a binary sequence) and the ability to assign the center frequency either from the front panel or a Setup Page.

Variable transform length is available as 100, 200, 400 or 800 lines. This control is hidden until the RV is placed just to the right of the Analysis Band control. This is shown in Figure 3-3.

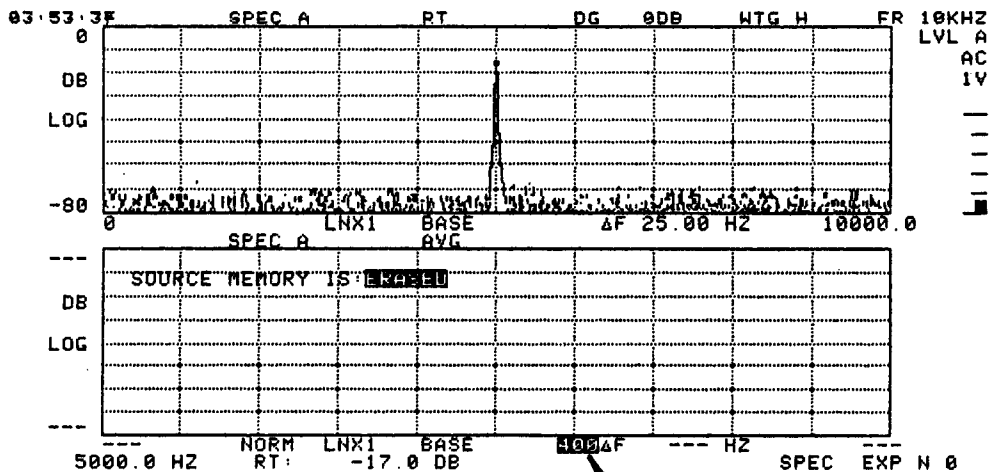


Figure 3-3. Accessing the RESOLUTION Control Menu from the Data Display

The display is also controlled by the selected Y-units (V, EU, DB, DBV, DBR, CEU), Y-units distribution (LIN/LOG) and a selectable log range (window) of 20, 40 or 80 dB.

Similarly, X-axis units variations are available for each domain (Frequency, Time, Amplitude) and the user can select linear expansion or log distribution along the X-axis.

Display Math includes upper-lower trace math (sum, difference, product, ratio) available in single-channel Spectrum (math between two different memories) and two-channel Spectrum (math between two channels). Artificial Integration can be obtained by selecting "CEU" (Compensated Engineering Units) for Y-units on Setup Page 4 and indicating the desired transducer-display relationships on Setup Page 5.

Special Capabilities

A Digital Plotter/ThinkJet(tm) printer feature that operates GPIB interface HP-GL Plotters/ThinkJet(tm) printers to produce quality graphics copies of the display data and annotation (front-panel PLOT or PRINT button).

HELP messages for all the buttons and display controls (front-panel HELP button).

Six complete configuration setups stored in "PANELS" 1-6 via PANEL , #, ENT. These configurations are stored even when power is off and the unit is unplugged, and can be easily recalled by pressing PANEL, #, RCL (front-panel PANEL button).

Optional Capabilities

Data Storage - Built-in disk drive
Signature Ratio Adapter
2 Channel Analysis

3-2 GETTING STARTED

This part of Section III provides proper power-on procedures and additional information on using the Control Menus, Setup Page Listing and Setup Pages.

3-2.1 Power-On Procedures

The first thing you want to do is to check the area of the side panel where the power cord is to be connected and refer to Figure 3-4.

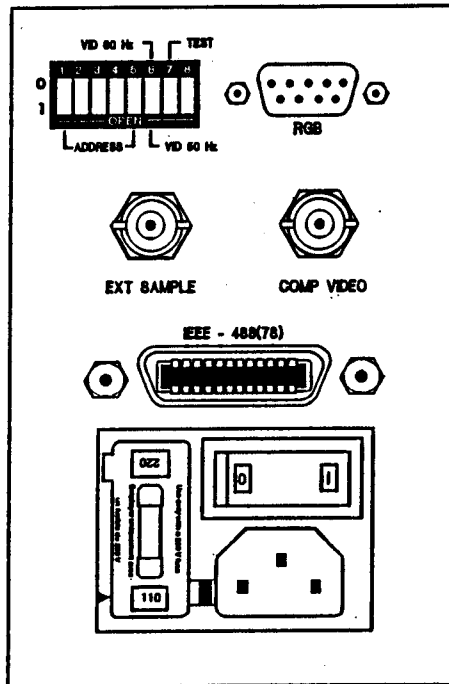


Figure 3-4. Side-Panel Power Group Showing the Location of the ON/OFF Switch, Voltage Selector, Fuse Holder and Power Cord Connection.

Check the fuse holder and make sure the proper fuse is installed (you want to do this with the power cord disconnected). Check the Voltage Selector and make sure that the proper line voltage is selected.

Plug the female end of the power cord into the side-panel power cord receptacle. Don't plug the other end in yet. Refer to Figure 3-5 and the side panel of the SD385 and make sure that the Power Switch is in the 0 position. Plug the other end of the power cord into the power source. Place the Power Switch in the 1 position and make sure the front-panel POWER indicator is lit (green LED).

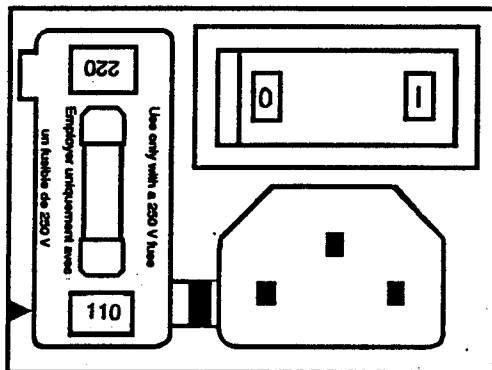


Figure 3-5. Side-Panel Power Switch

When this is accomplished, an introductory statement will appear on the display. Your display should be similar to Figure 3-6.

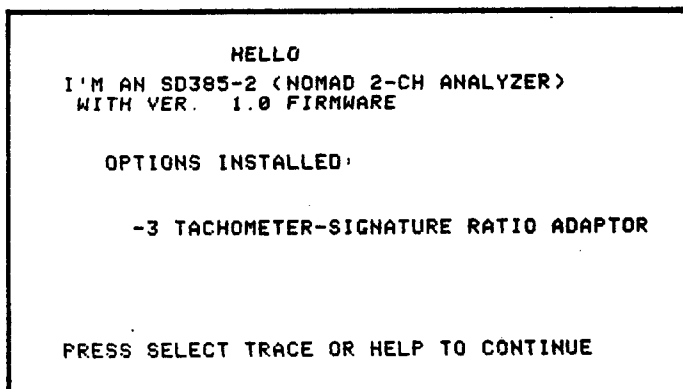


Figure 3-6. Power-On Display

The first line of the message starts off with a pleasant greeting and then indicates the number of channels available in your instrument.

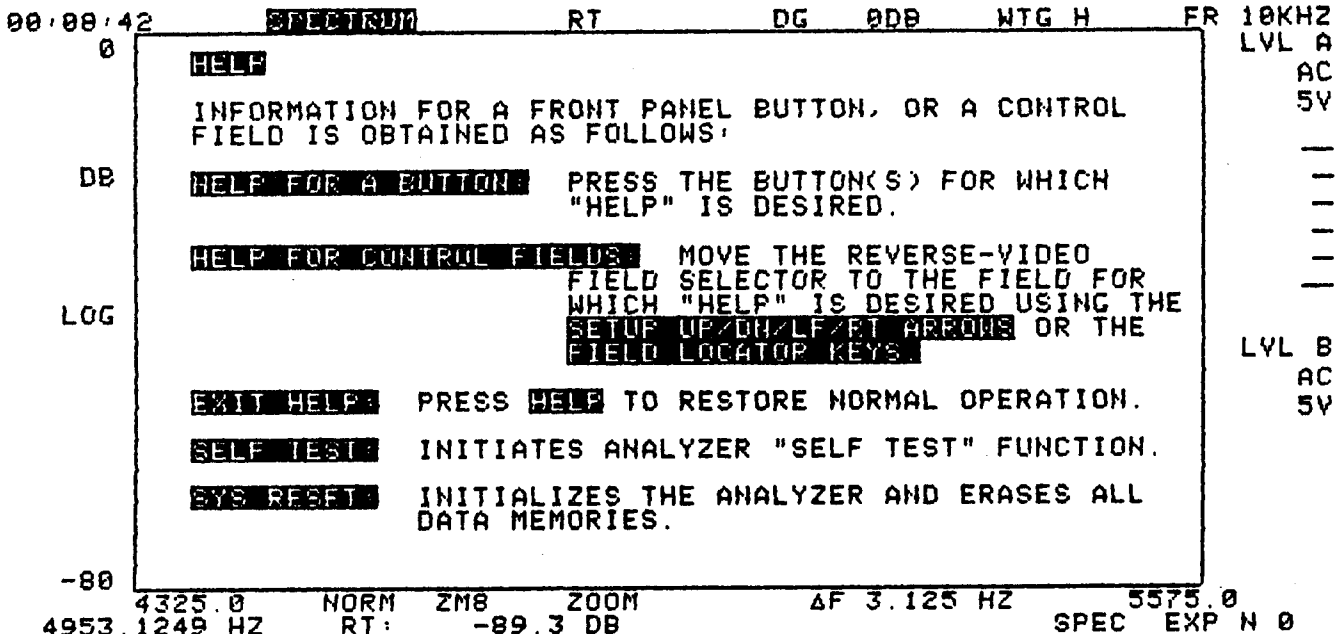
NOTE

The two channel configuration is an option. The operating procedures in this section cover both configurations (1 and 2 channel).

The second line of information on the Power-On Display will have the version number of the firmware in your instrument. The "OPTIONS INSTALLED" statement will have a list of options installed in your instrument. The bottom line of information (PRESS SEL TRACE, or HELP TO CONTINUE) tells you that you have to press one of these front-panel buttons to begin operating the instrument. The following information describes what takes place when one of these buttons is pressed.

Pressing the SEL TRACE button selects the Operating Mode. When this button is pressed, the introductory message will disappear, and the display configuration that appears will be the display configuration that was present the last time the instrument was turned off. For reference purposes, the power-on display used in this description will be a "Panel, 0, Recall" display. This is a fixed factory reference display configuration that can be accessed by pressing the following sequence of front-panel buttons: PANEL, 0, RCL.

Pressing the HELP button enables the HELP feature. HELP is a built-in quick reference feature that allows the user to access over 100 messages containing information for all the front-panel buttons and control fields. When the HELP button is first pressed, the following message will appear on the display:



This is how the feature works:

Help messages for the control fields that surround the display can be accessed by first pressing the HELP button, then moving the RV to the desired control field using either the SETUP group directional buttons or the FIELD LOCATOR group buttons. Pressing any other button (except HELP, SELF TEST or SYS RESET) while HELP is enabled will cause a HELP message for that button or group of buttons to appear on the display. Press the HELP button, again, to exit the HELP feature.

3-3 ACCESSING THE MENUS AND SETUP PAGES

As previously stated, all instrument configuration parameters are accessed via the Control Menus and/or Setup Pages. Changes can be made on the Setup Pages themselves, or by accessing the menus on an individual basis from the data display. The contents of some of the menus will vary depending upon the selected function and the configuration of the selected function. Also, there are some control menus and control fields available only by accessing the Setup Pages. Therefore, the Setup Pages will be described first to familiarize the first-time user with all the control menus and control fields.

As previously described, access to the Setup Pages is accomplished by pressing the SETUP group SETUP ON/OFF button. Initially, this displays the Setup Page Listing (Figure 3-6). The title of this list is "PANEL RECALL CONTROL & SETUP PAGE SELECT." Each selection on the Setup Page Listing has a corresponding Setup Page. The individual Setup Pages are accessed by first selecting the desired Setup Page title on the Setup Page Listing, and then pressing the MENU button. Selection of the Setup Page title from the Listing can be accomplished any one of four ways. Here's how:

First: The SETUP group UP/DOWN buttons, when pressed, will cause the Setup-Page Listing RV to move in the indicated direction with "wraparound" occurring in both directions; i.e., if the RV is on selection 1, pressing the SETUP group UP button will cause the RV to appear at selection 9, and vice-versa.

Second: The SCROLL group UP/DOWN buttons, when pressed, also cause the Setup-Page Listing RV to move in the indicated direction with "wraparound" occurring in both directions (just like the first method).

Third: Press the corresponding number of the desired item on the ENTRY keypad, then press the ENT button.

Fourth: Each time the PAGE ADV button is pressed, the RV on the Setup Page Listing will move to the next selection, in descending order only. However, this feature has "wrap-around". When the last selection on the Setup Page Listing is reached, pressing the PAGE ADV button again returns the RV to the first selection. This last method works either when the Setup Page Listing is being displayed, or when an actual Setup Page is being displayed, and is used, primarily, when displaying the Setup Pages. The PAGE ADV button allows you to step through and view each Setup Page in the same order as they appear on the Setup Page Listing without displaying the Listing. The Setup Pages are displayed/exited by pressing the SCROLL group MENU button (toggles between the Setup Page Listing and the selected Setup Page). Also, you can go directly from a Setup Page to the data display by pressing the SETUP group SETUP ON/OFF button (toggles between the Setup Page Listing or a Setup Page and the data display). This allows you to exit a Setup Page without going back to the Setup Page Listing. However, if you use this method to exit a

Setup Page, the next time the SETUP group SETUP ON/OFF button is pressed, the last setup page selection will reappear (not the Setup Page Listing). If you want the Setup Page Listing to reappear, press the SCROLL group MENU button.

Figure 3-7 is provided as a quick reference guide to familiarize the user with the location of specific setup pages and Setup Page items.

- RECALLABLE

ACQUISITION PAGE

UPDATE MODE: **FREE RUN**

TRIG THRESHOLD:

TRIG DELAY:

B REL. TO A DELAY:

OVERLAP:

AVG STOP ON:

AVG TARGET COUNT:

AVG TARGET TIME:

SAMPLING SOURCE:

INPUT COUPLING: A: B:

UPDATE MODE

1. **FREE RUN**
2. SINGLE(AMP) TRIG
3. REPEAT(AMP) TRIG
4. SINGLE(EXT) TRIG
5. REPEAT(EXT) TRIG

- RECALLABLE

INPUT/PROC

FREQ. RANGE (HZ):

RESOLUTION:

ANALYSIS BAND:

ZOOM MULTIPLIER:

ZOOM CENTER FREQ:

FFT WEIGHTING:

AVERAGE MODE:

AVERAGE DATA:

OCTAVE SHAPING:

OCTAVE WTG:

F.S. INPUT LEVELS: A: B:

- FIXED

IEEE COMMUNICATION

ADDRS: **31**

DEVICE ADDRESS:

FLING PT FORMAT:

INPUT TERMINATOR:

OUTPUT TERMINATOR:

SET DEVICE ADDRESS = 31 TO ENABLE TALK ONLY FOR STAND ALONE PLOTTING.

06:37:43 SPEC A AV

100

V/V

LOG 1

0.01

25.000 HZ NORM LN XI BA

AVG/RT: 1.3

PANEL RECALL CONTROL

PRS

1 2 3 4 5 6 7 8 9 0

PRS - PANEL RECALL TO CHANGE A PRS: SELECT 'SETUP PAGE' INVOKE 'SETUP PAGES' TO EXIT THIS MODE

- RECALLABLE

DIGITAL PLOTTER PAGE

PLOTTING FORMAT: **COPY SCREEN**

PLOT CALIBRATION:

TIME X FULL SCL:

PLOT LIST SELECT:

OVERLAY LINE TYPE:

GRID PEN:

ANNOTATION PEN:

TRACE PEN:

CURSOR PEN:

SET IEEE TO TALK ONLY FOR STAND ALONE PLOTTING.

PLOTTING FORMAT

1. **COPY SCREEN**
2. SCREEN+LIST
3. TRC OVERLAY
4. SIMUL TIME X
5. SIMUL CRSR X

- RECALLABLE

OPTIONS-SRA/TACH & DISK

TACH PARAMETER SELECTIONS - TCH P/R: **000001**

TACH P/R:

PULSE POLARITY:

+/- 0 RPM:

+ & - 0 RPM:

0 RPM THRESHOLD:

SRA PARAMETER SELECTIONS -

FULL SCALE ORDERS:

FULL SCALE RPM:

DATA STORAGE FILE TYPES -

FILE TYPE:

IN/PROCESS CONTROL

10KHZ	ANALYSIS BAND
00 LINES	1. BASE
BASE	2. 200M
2	3. 15 1/3 OCT
5000	4. 5 OCTAVE
TG H	5. 30 1/3 OCT
	6. 10 OCTAVE

MP
PEC
FF
LAT

A: IV B: IV

- RECALLABLE DISPLAY SELECTION PAGE

FUNCTION GROUP		DISPLAY MEM	
1. >SPEC		1. >RT & AVG	
2. TIME		2. RT & STO	
3. STAT		3. AVG & STO	
4. TF			
5. PWR			
6. IFFT			

SPECTRUM FUNCTION		MATH FUNCTION	
1. SPECTRUM		1. RT+AVG	
2. 1 CH MATH		2. RT-AVG	
3. 2 CH SPECT		3. AVG-RT	
4. 2 CH MATH		4. RTXAVG	
		5. RT/AVG	
		6. >AVG/RT	

AVG/RT DG 000 RTG H FR 10KHZ LVL A AC IV

CONTROL & SETUP PAGE SELECTIONS.

1. ANALYSIS CONTROL
2. IN/PROCESS CONTROL
3. DISPLAY SELECTIONS
4. X & Y UNITS CONTROL
5. Y CALIB PARAMETERS
6. WATERFALL CONTROL
7. IEEE COMMUNICATION
8. DIGITAL PLOTTER CTL
9. SRA/TACH & DISK OPT

LVL B AC IV

- RECALLABLE X & Y UNITS PAGE

Y UNITS:	V	Y UNITS	1. V
Y UNITS OPERATOR:	MAG		2. EU
FRQ DOM X UNITS:	HZ		3. DB
TIM DOM X UNITS:	SEC		4. DBV
AMP DOM X UNITS:	V		5. DBR
X-AXIS:	LNK1		6. CEU
Y-AXIS:	LOG		
GRID FORMAT:	FULL		
CURSOR MODE:	NRN		
VERT WINDOW (LG):	0000		
LOG GAIN:	000		
LIN GAIN:	X 1		

CALL STATUS (FIXED OR RECALLABLE)

1. PRESS SETUP 'LF/RT' ARROWS

2. PRESS SETUP 'UP/DN' ARROWS

3. PRESS 'MENU' ON/OFF BUTTON

4. PRESS 'SETUP ON/OFF' KEY

BASE 1.36 V/V 4F 25.00 HZ 10000 0 SPEC EXP N 10

- RECALLABLE Y CALIB PARAMETERS

PHASE (Φ) OFFSET:	0000	ENGLISH/METRIC UNITS	1. ENGLISH
ORBIT CALIBRATION:	EL - X & Y		2. METRIC
ENGLISH/METRIC:	ENGLISH		
DISPLAY TYPE:	G PK		
TRANSDUCER TYPE:	A: G B: G		
VREF:	1.0 1.0		
DB (@ VREF):	0.0 0.0		
EU (@ VREF):	10.0 10.0		
NV/EU:	100.0 100.0		

(SET MV/EU = 0 TO ENABLE EU @ VREF CALC)

- RECALLABLE WATERFALL CONTROL PAGE

UPDATE MODE:	MAX	UPDATE MODE	1. MAX
FILE SIZE:	200	% LEVEL	2. 100
SELECTED FILE #:	FILE 1	AVG RCYCL	3. SECONDS
DISPLAY MODE:	WF-CONT		
RECORDS PER DISPLAY:	85-100		
X GAIN:	1		
VERTICAL GAIN:	32		
HIDDEN LINES:	OFF		
SKEW:	OFF		
% SUPPRESSION:	00		
SECONDS:	3		
% LEVEL:	20		

1. 100%
2. 100%
3. SECONDS
4. +-Δ RPM
5. +-Δ RPM

Figure 3-7. The Setup Pages
3-19/3-20

Figure 3-8 is provided as quick reference guide for the Menu and Control Fields that can be accessed directly from the display. The related Setup Pages are also noted.

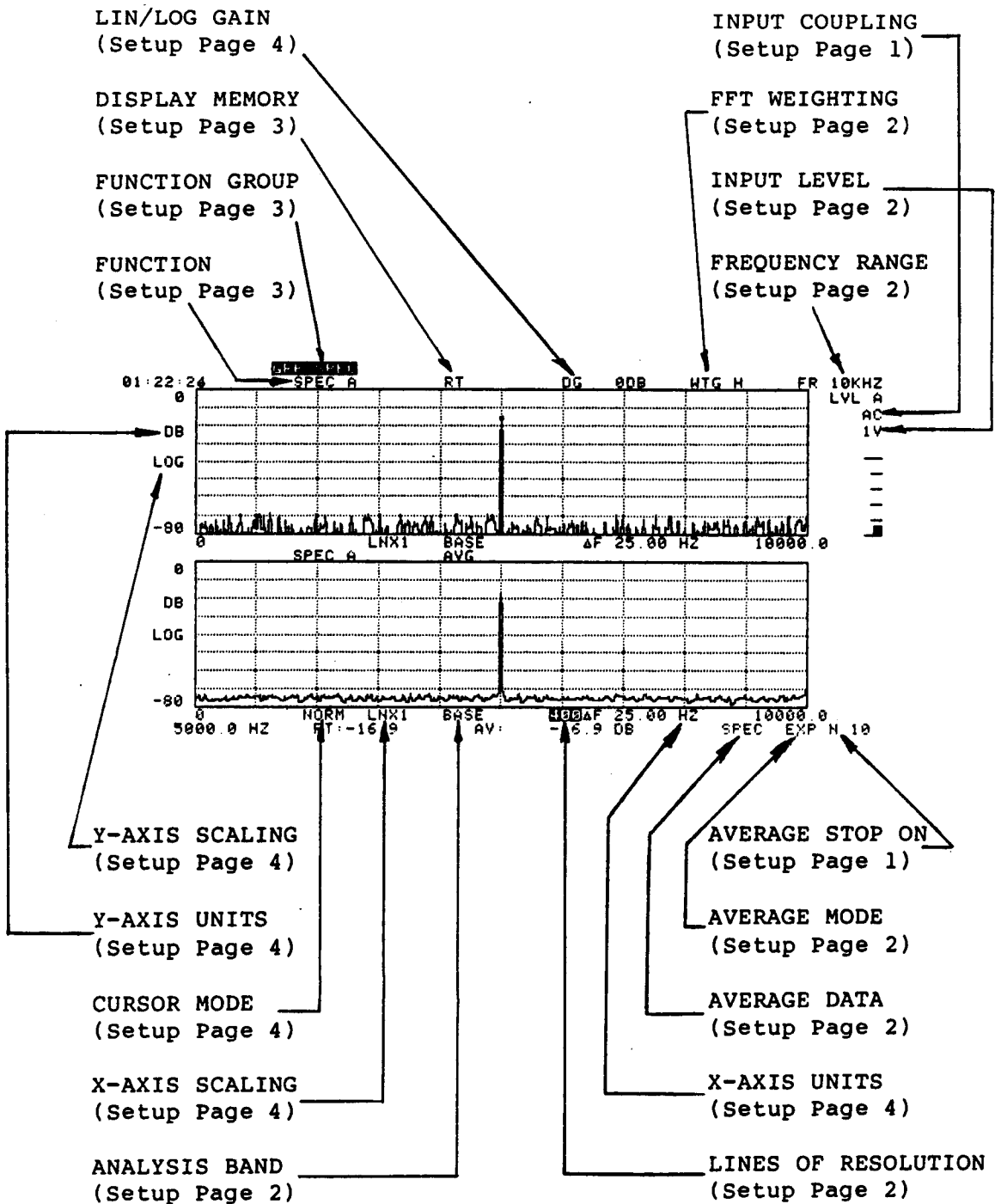


Figure 3-8. Display Controls Accessed by the RV

3-3.1 Setup Page 1 -- ACQUISITION CONTROL

Some of the Controls on this Setup Page can be accessed directly from the data display and front panel without accessing Setup Page 1. Figure 3-ACQSN-1 shows the location of each of the Controls that can be accessed in this manner.

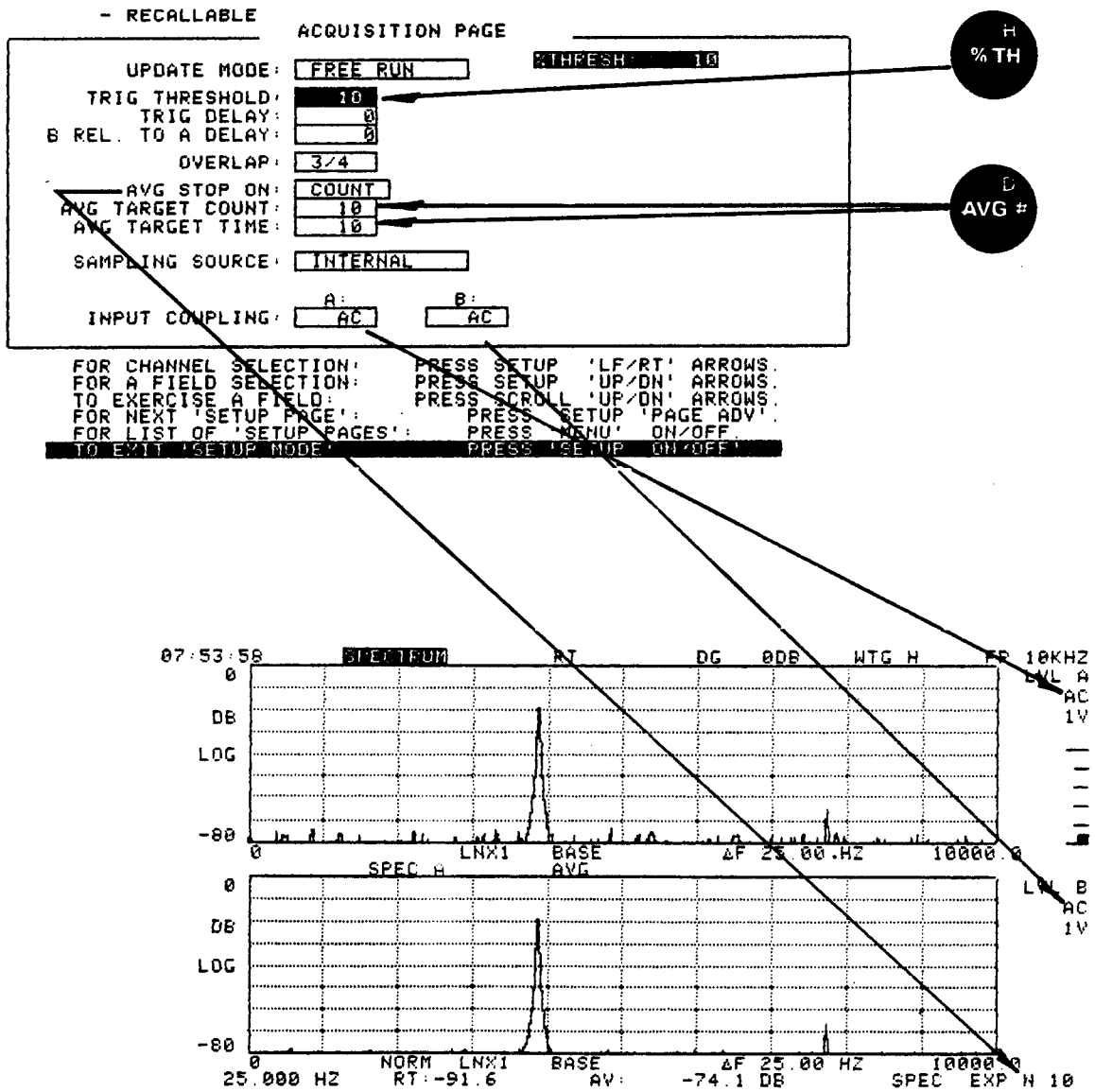


Figure 3-ACQSN-1. ACQUISITION PAGE Control Menus and Numerical Entry Fields that can be Accessed Directly From the Data Display and Front Panel

UPDATE MODE:

- RECALLABLE

ACQUISITION PAGE

UPDATE MODE:	FREE RUN	UPDATE MODE	1. FREE RUN
TRIG THRESHOLD:	10	2. SINGLE(AMP) TRIG	
TRIG DELAY:	0	3. REPEAT(AMP) TRIG	
B REL. TO A DELAY:	0	4. SINGLE(EXT) TRIG	
OVERLAP:	3/4	5. REPEAT(EXT) TRIG	
AVG STOP ON:	COUNT		
AVG TARGET COUNT:	10		
AVG TARGET TIME:	10		
SAMPLING SOURCE:	INTERNAL		
INPUT COUPLING:	A: AC	B: AC	

FOR CHANNEL SELECTION: PRESS SETUP 'LF/RT' ARROWS.
FOR A FIELD SELECTION: PRESS SETUP 'UP/DN' ARROWS.
TO EXERCISE A FIELD: PRESS SCROLL 'UP/DN' ARROWS.
FOR NEXT 'SETUP PAGE': PRESS SETUP 'PAGE ADV'.
FOR LIST OF 'SETUP PAGES': PRESS 'MENU' ON/OFF.
TO EXIT 'SETUP MODE': PRESS 'SETUP' ON/OFF.

Control Menu for Selecting the Update Mode.

This Control Menu and the next three Numerical Entry Fields (TRIG THRESHOLD, TRIG DELAY, B REL TO A DELAY), control what happens when the front-panel UPDATE button is pressed.

- 1. FREE RUN** Input Memory data is acquired at the instrument's update rate. Update rate will vary depending upon the number of channels acquiring data, selected frequency range and selected baseband resolution.
- 2. SINGLE(AMP) TRIG** Transient Capture update mode. Input Memory acquisition is triggered by a user-entered TRIG THRESHOLD (Threshold percentage) level. Each time acquisition occurs, the Input Memory is automatically placed in HOLD. Each acquisition is initiated by pressing the INPUT MEMORY group UPDATE button (Transient arm).
- 3. REPEAT(AMP) TRIG** Transient capture Auto Trig mode. As with Selection 2, Input Memory acquisition is triggered by a user-entered TRIG THRESHOLD (Threshold percentage) level, and each time acquisition occurs, the Input Memory is placed in HOLD. Once the acquired data is displayed, the instrument is then automatically primed for the next trigger, and the TRIG LED will flash for each new acquisition.

4. SINGLE(EXT) TRIG Same as selection 2 except trigger is from an external source via the front-side panel EXT TRIG BNC connector. This selection is available only when the SRA/TACH Option is installed.
5. REPEAT(EXT) TRIG Same as selection 3 except, as with selection 4, trigger is from an external source via the front-panel EXT TRIG BNC connector (same connector). This selection is available only when the SRA/TACH Option is installed.

TRIG THRESHOLD:

- RECALLABLE ACQUISITION PAGE

UPDATE MODE:	FREE RUN	THRESH. 10
TRIG THRESHOLD:	10	
TRIG DELAY:	0	
B REL. TO A DELAY:	0	
OVERLAP:	3/4	
AVG STOP ON:	COUNT	
AVG TARGET COUNT:	10	
AVG TARGET TIME:	10	
SAMPLING SOURCE:	INTERNAL	
INPUT COUPLING:	A: AC B: AC	

FOR CHANNEL SELECTION: PRESS SETUP 'LF/RT' ARROWS.
 FOR A FIELD SELECTION: PRESS SETUP 'UP/DN' ARROWS.
 TO EXERCISE A FIELD: PRESS SCROLL 'UP/DN' ARROWS.
 FOR NEXT 'SETUP PAGE': PRESS SETUP 'PAGE ADV'.
 FOR LIST OF 'SETUP PAGES': PRESS 'MENU' ON/OFF.
 TO EXIT 'SETUP MODE': PRESS 'SETUP' ON/OFF.

Numerical Entry Field for Entering Data Acquisition Level.

This Numerical Entry Field is used to select a threshold (for Transient Capture) that the incoming trigger must equal or exceed for acquisition to occur. The threshold is the entered percentage of twice the F.S. INPUT LEVEL (Setup Page 2). This is because the input level can be expressed as rms when the signal is peak. Since 1 Vrms equals 1.414 Vpk, the display is rounded up to 2 V to avoid clipping. Therefore a 50% Trigger Threshold setting on a F.S. INPUT LEVEL of 1 V will allow acquisition of signals equal to or greater than 1 Vpk only.

TRIG DELAY:

- RECALLABLE ACQUISITION PAGE

UPDATE MODE:	FREE RUN	A DELAY:	0
TRIG THRESHOLD:	10		
TRIG DELAY:	0		
OVERLAP:	3/4		
AVG STOP ON:	COUNT		
AVG TARGET COUNT:	10		
AVG TARGET TIME:	10		
SAMPLING SOURCE:	INTERNAL		
INPUT COUPLING:	A: AC		

FOR A FIELD SELECTION: PRESS SETUP 'UP/DN' ARROWS.
TO EXERCISE A FIELD: PRESS SCROLL 'UP/DN' ARROWS.
FOR NEXT 'SETUP PAGE': PRESS SETUP 'PAGE ADV'.
FOR LIST OF 'SETUP PAGES': PRESS 'MENU' ON/OFF.
TO EXIT 'SETUP MODE': PRESS 'SETUP' ON/OFF.

Numerical Entry Field for Entering Channel A Data Acquisition Delay.

Trigger Delay is a user-entered value that determines the number of samples delayed from trigger detection to the beginning of the actual, held data (delay referenced to CHANNEL A). The delay is positive if data of interest occurs after trigger, or negative if data occurs before trigger. If you have a two channel instrument, and Channel B is selected for a single channel function, then this is Channel B delay. If a two channel function is selected, and relative delay = 0, then this is also Channel B delay.

B REL. TO A DELAY:

- RECALLABLE ACQUISITION PAGE

UPDATE MODE:	FREE RUN	B DELAY:	0
TRIG THRESHOLD:	10		
TRIG DELAY:	0		
B REL. TO A DELAY:	0		
OVERLAP:	3/4		
AVG STOP ON:	COUNT		
AVG TARGET COUNT:	10		
AVG TARGET TIME:	10		
SAMPLING SOURCE:	INTERNAL		
INPUT COUPLING:	A: AC	B: AC	

FOR CHANNEL SELECTION: PRESS SETUP 'LF/RT' ARROWS.
FOR A FIELD SELECTION: PRESS SETUP 'UP/DN' ARROWS.
TO EXERCISE A FIELD: PRESS SCROLL 'UP/DN' ARROWS.
FOR NEXT 'SETUP PAGE': PRESS SETUP 'PAGE ADV'.
FOR LIST OF 'SETUP PAGES': PRESS 'MENU' ON/OFF.
TO EXIT 'SETUP MODE': PRESS 'SETUP' ON/OFF.

Numerical Entry Field for Entering Channel B Data Acquisition Delay.

User-entered value that determines the number of samples (counts) that channel B is delayed relative to channel A. This value can be positive or negative.

OVERLAP:

- RECALLABLE ACQUISITION PAGE

UPDATE MODE:	FREE RUN	
TRIG THRESHOLD:	10	OVERLAP 1. NONE 2. 1/4 3. 1/2 4. 3/4 5. 7/8 6. MAX
TRIG DELAY:	0	
B REL. TO A DELAY:	0	
OVERLAP:	3/4	
AVG STOP ON:	COUNT	
AVG TARGET COUNT:	10	
AVG TARGET TIME:	10	
SAMPLING SOURCE:	INTERNAL	
INPUT COUPLING:	A: AC B: AC	

FOR CHANNEL SELECTION: PRESS SETUP 'LF/RT' ARROWS.
 FOR A FIELD SELECTION: PRESS SETUP 'UP/DN' ARROWS.
 TO EXERCISE A FIELD: PRESS SCROLL 'UP/DN' ARROWS.
 FOR NEXT 'SETUP PAGE': PRESS SETUP 'PAGE ADV'.
 FOR LIST OF 'SETUP PAGES': PRESS 'MENU' ON/OFF.
 TO EXIT 'SETUP MODE': PRESS 'SETUP ON/OFF'.

Control Menu for Selecting Percent of Memory Period Overlap.

Control Menu selections for memory period overlap are in fractional increments. Memory period overlap compensates for data loss due to FFT weighting. Figure 3-ACQSN-2 is an example of each overlap selection.

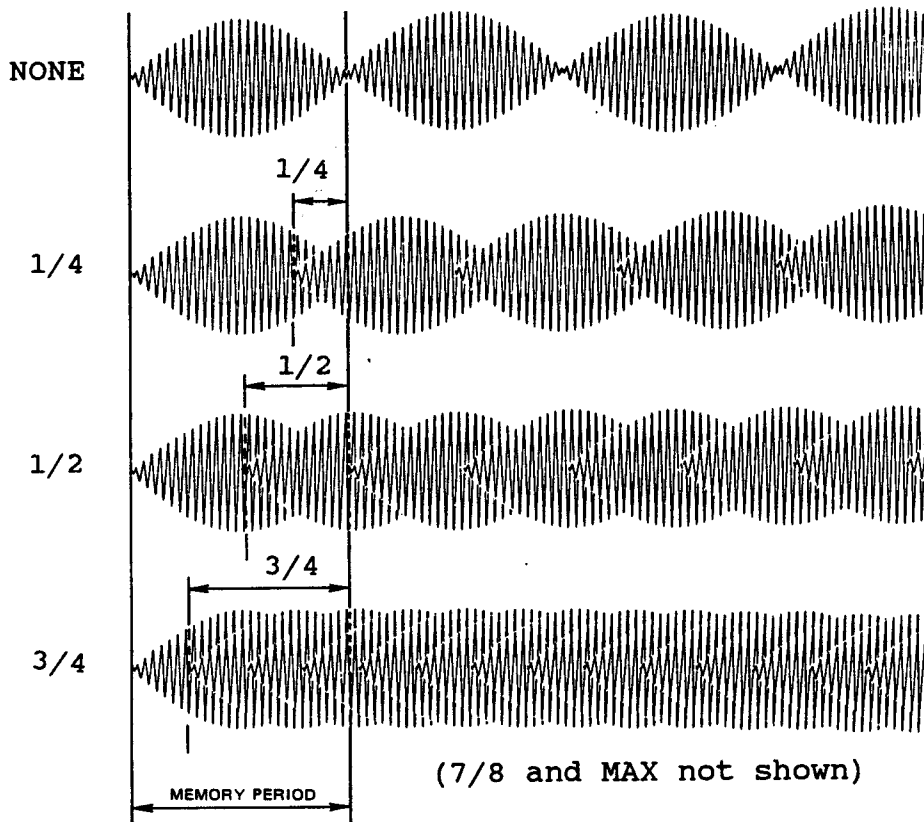


Figure 3-ACQSN-2 Memory Period Overlap Examples

AVG STOP ON:

- RECALLABLE ACQUISITION PAGE

UPDATE MODE:	FREE RUN	AVG STOP ON	1. COUNT - N
TRIG THRESHOLD:	10		2. TIME - T
TRIG DELAY:	0		
B REL. TO A DELAY:	0		
OVERLAP:	3/4		
AVG STOP ON:	COUNT		
AVG TARGET COUNT:	10		
AVG TARGET TIME:	10		
SAMPLING SOURCE:	INTERNAL		
INPUT COUPLING:	A: AC B: AC		

FOR CHANNEL SELECTION: PRESS SETUP 'LF/RT' ARROWS.
FOR A FIELD SELECTION: PRESS SETUP 'UP/DN' ARROWS.
TO EXERCISE A FIELD: PRESS SCROLL 'UP/DN' ARROWS.
FOR NEXT 'SETUP PAGE': PRESS SETUP 'PAGE ADV'.
FOR LIST OF 'SETUP PAGES': PRESS 'MENU' ON/OFF.
TO EXIT 'SETUP MODE': PRESS 'SETUP' ON/OFF.

Control Menu for Selecting the Type of Averaging.

1. COUNT - N This selection specifies averaging is to be performed on a user-entered number of data ensembles.
2. TIME - T This selection specifies averaging is to be performed over a selected time interval.

NOTE

When TIME is selected on the AVG STOP ON menu, the AVG N annotation on the display will count the number of seconds until the AVG TARGET TIME entry is reached. The display will then indicate the number of ensembles averaged during this period.

AVG TARGET COUNT:

- RECALLABLE ACQUISITION PAGE

UPDATE MODE:	FREE RUN	AVG N:	10
TRIG THRESHOLD:	10		
TRIG DELAY:	0		
B REL. TO A DELAY:	0		
OVERLAP:	3/4		
AVG STOP ON:	COUNT		
AVG TARGET COUNT:	10		
AVG TARGET TIME:	10		
SAMPLING SOURCE:	INTERNAL		
INPUT COUPLING:	A: AC B: AC		

Numerical Entry Field for Entering Average Count.

This is where the number of ensembles to be averaged (COUNT-N) are entered. Values are entered via the ENTRY keypad. Any value already present on the AVG N Field will be replaced by the latest user-entered value. There is no need to clear a previously entered value. Once the desired value is selected, pressing the ENT button replaces the previous entry with the new value. The maximum number of counts that can be entered is 2000 for N and 999 for T.

Both this parameter and the next one (AVG TARGET TIME) have a related front-panel button (AVG#) that allows numerical entry without accessing the Setup Page. Which one appears when the button is pressed depends upon the AVG STOP ON selection (COUNT-N or TIME-T).

AVG TARGET TIME:

- RECALLABLE ACQUISITION PAGE

UPDATE MODE:	FREE RUN	AVG T:	10
TRIG THRESHOLD:	10		
TRIG DELAY:	0		
B REL. TO A DELAY:	0		
OVERLAP:	3/4		
AVG STOP ON:	COUNT		
AVG TARGET COUNT:	10		
AVG TARGET TIME:	10		
SAMPLING SOURCE:	INTERNAL		
INPUT COUPLING:	A: AC B: AC		

Numerical Entry Field for Entering Average Time Duration.

SAMPLING SOURCE:

- RECALLABLE ACQUISITION PAGE

UPDATE MODE:	<input type="text" value="FREE RUN"/>	SAMPLING SOURCE
TRIG THRESHOLD:	<input type="text" value="10"/>	1. EXT - SD346
TRIG DELAY:	<input type="text" value="0"/>	2. INTERNAL
B REL. TO A DELAY:	<input type="text" value="0"/>	3. SRA OPTION
OVERLAP:	<input type="text" value="3/4"/>	
AVG STOP ON:	<input type="text" value="COUNT"/>	
AVG TARGET COUNT:	<input type="text" value="10"/>	
AVG TARGET TIME:	<input type="text" value="10"/>	
SAMPLING SOURCE:	<input type="text" value="INTERNAL"/>	
INPUT COUPLING:	A: <input type="text" value="AC"/> B: <input type="text" value="AC"/>	

FOR CHANNEL SELECTION: PRESS SETUP 'LF/RT' ARROWS.
FOR A FIELD SELECTION: PRESS SETUP 'UP/DN' ARROWS.
TO EXERCISE A FIELD: PRESS SCROLL 'UP/DN' ARROWS.
FOR NEXT 'SETUP PAGE': PRESS SETUP 'PAGE ADV'.
FOR LIST OF 'SETUP PAGES': PRESS 'MENU' ON/OFF.
TO EXIT 'SETUP MODE': PRESS 'SETUP' ON/OFF.

Control Menu for Selecting the Source of the Analyzer's Sampling Frequency.

1. EXT - SD346 Sampling frequency provided by an externally connected SD346 Signature Ratio Adapter.
2. INTERNAL SD385 uses its own internally generated sampling frequency.
3. SRA OPTION Optional built-in Signature Ratio. Uses signal from tach digitizer as external sampling frequency generator.

INPUT COUPLING:

- RECALLABLE

ACQUISITION PAGE

UPDATE MODE:	FREE RUN	INPUT COUPLING
TRIG THRESHOLD:	10	1. AC
TRIG DELAY:	0	2. DC
B REL. TO A DELAY:	0	3. ICP
OVERLAP:	3/4	4. TEST
AVG STOP ON:	COUNT	
AVG TARGET COUNT:	10	
AVG TARGET TIME:	10	
SAMPLING SOURCE:	INTERNAL	
INPUT COUPLING:	A: AC	B: AC

FOR CHANNEL SELECTION: PRESS SETUP 'LF/RT' ARROWS.
FOR A FIELD SELECTION: PRESS SETUP 'UP/DN' ARROWS.
TO EXERCISE A FIELD: PRESS SCROLL 'UP/DN' ARROWS.
FOR NEXT 'SETUP PAGE': PRESS SETUP 'PAGE ADV'.
FOR LIST OF 'SETUP PAGES': PRESS 'MENU' ON/OFF.
TO EXIT 'SETUP MODE': PRESS 'SETUP' ON/OFF.

Control Menu for Selecting Input Coupling, ICP Power or the Internally Generated Test Signal.

A selection must be made for each channel when the two-channel Option is installed. The RV is moved back and forth between the Channel A and Channel B Control Fields using the SETUP group LEFT/RIGHT directional buttons.

1. AC Input coupling is ac (-3 dB at 0.7 Hz).
2. DC Input coupling is dc.
3. ICP Selected when input is from Piezoelectric sensing device (Accelerometer or Piezoelectric Velocity Transducer). Provides 4mA to transducer via built-in ICP power supply.
4. TEST Internally generated square wave, 80mV amplitude, frequency range dependent. Used by instrument during SELF-TEST. When this selection is made, or if a SELF-TEST is performed, there should be nothing connected to either front-panel INPUT BNC connector. The Test Signal is present on these BNC connectors.