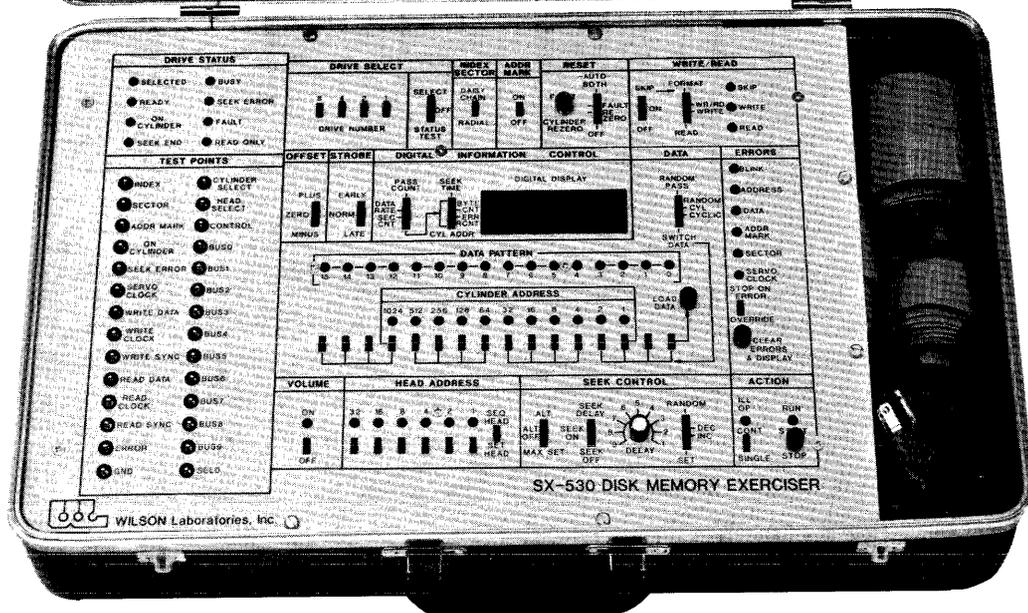


WILSON SX-530



DISK MEMORY EXERCISER FOR HIGH CAPACITY DISK DRIVES

Wilson Laboratories' SX-530 Disk Memory Exerciser is designed primarily for complete off-line testing of all disk drive models with Storage Module (SMD) type interface. It is also designed for use with other Winchester fixed and/or removable cartridge type disk drives including 5¼", 8" or 14" media — for most manufacturers. It can be used for manufacturing QC testing to insure trouble free operation before shipment, QA incoming inspection, field service testing to isolate and repair drive problems, and for engineering evaluation of peripherals. The SX-530 is housed in a portable attache type case enclosure which makes it convenient for all applications.

The SX-530 reads and writes data in four formatted modes using a selection of three fixed data patterns and one user programmable data pattern. Error indicators show the type and location of errors and manual controls permit single step or continuous running with error indication or stop on error capability.

Single steps, seek delay, alternate set, stop on error, offset and marginal strobe control combine to make trouble shooting by the operator a quick and easy function. Trouble shooting operation includes the ability to introduce errors and verify specific areas of drive performance.

Drive variations are accommodated by plug-in interface cards and include the following manufacturers' models: • CDC SMD, MMD, FMD and LARK • FUJITSU (including Eagle) • AMPEX 9300 and DFR • MICRODATA Reflex • MEMOREX • NEC • Storage Technology Corporation • Megavault • Also supports enhanced XSMD, ESMD and 16 MBS and 20 MBS transfer rate drives • ST506/ST412 and other compatible 5¼" drives • SA1000 • ANSI STD X3T9 (8" Hard Disk) • PRIAM DISKOS 3300 • Trident Series, Ball BD and BF Series • Kennedy 5300 • BASF Series • Many other compatible interfaces can be tested.



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OPERATING FEATURES

The SX-530 Console performs four groups of functions.

Drive Setup

Drive Select Four 2-position switches control the Unit Select lines to the drive. They are used to set the drive number of the drive to be SELECTED.

Drive Status Eight indicators monitor status lines from the drive to show the following: UNIT SELECTED, READY, ON CYLINDER, SEEK END, BUSY, SEEK ERROR, FAULT and READ ONLY.

Index Sector A 2-position switch selects either the daisy chain or radial cable as the source of Index and Sector signals.

Offset (SMD) A switch +, 0, -, controls drive offset for margin testing.

Data Strobe An EARLY, NORMAL, LATE switch controls the data strobe for margin testing.

Volume A 2-position switch provides media volume selection command to drives that contain both a fixed and removable disk pack (i.e., CDC CMD or AMPEX DFR).

Test Points Twenty-eight test points are provided on the panel. They are: INDEX, SECTOR, ADDR MARK, ON CYLINDER, SEEK ERROR, SERVO CLOCK, WRITE DATA, WRITE CLK, WRITE SYNC, READ DATA, READ CLK, READ SYNC, ERROR, CYLINDER SELECT, HEAD SELECT, CONTROL, BUS (0 through 9), SEL 0.

Seek Operations

Seek Control A 3-position switch provides write/read operation without seek action, enables seek without delay, or imposes delay.

A variable potentiometer provides user control of delays.

A 4-position switch selects seek mode: SET, INCREMENT, DECREMENT and RANDOM.

A 3-position switch allows setting of Maximum, Alternate, and Single Cylinder address positions.

Head Address Six indicators display the addresses of the head selected (0 to 63) by six binary-select switches. A 2-position switch selects the head addressing mode — Sequential or Set.

Data Operations

Address Mark A 2-position switch in the ON position specifies that the Address Mark is to be written in the header when Formatting and checks that the Address Mark is detected when Reading.

Write/Read A 4-position switch selects FORMAT to write address and data fields, WRITE/READ to read addresses and alternate write/read data field, WRITE to read address and write data field, and READ to read both address and data field.

A 3-position Skip WRITE/READ Control switch is used with FORMAT to write bad

track bit on address; ON enables write-read action; OFF permits seek action without write-read.

Write/Read Flag indicators show when writing or reading is in progress. Skip indicator shows when the address field contains a bad track bit.

Data A 4-position switch selects RANDOM PASS, RANDOM CYLINDER, and CYCLIC (varying continuously through the data field patterns). SWITCH DATA is a 16-bit data pattern loaded from the Cylinder Address switches.

Tester Operational

Reset A 4-position switch enables selection of fault clear or rezero command to be sent by FAULT/REZERO pushbutton or automatically.

Digital Information Control Two 4-position switches control digital display of seven functions by a 5-digit display. The items available for display are: *data rate, sector count, revolution in error, seek time, cylinder address, pass count and byte count.*

Cylinder Address This set of switches and LEDs, when used with the SEEK CONTROL, ALT/MAX SET switch allows the user to perform addressing between Cylinder

Address 0 and 2047 (max).

Errors Indicators show BLINK, which flashes on any error; ADDRESS, which latches on header error; DATA, which latches on data field error; ADDRESS MARK, set if address mark is not found, and SECTOR, set if inconsistent number of sector marks per revolution. SERVO CLOCK indicates if servo clock is not consistent. A 2-position switch allows stop error as it occurs or continue running with indicator showing error has occurred. User compares actual data read with programmed data (bit-by-bit) via LEDs.

FEATURES

- Crystal controlled clock for data timing.
- Integral power supply with over-voltage protection.
- Logic utilizes 130 TTL IC's.

- Supplied in lightweight PVC attache case.
- Manual and cables housed inside case.
- 21 x 13 x 7 inches. Weight 12 pounds.

We Test Better™

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Specifications subject to change without notice.

APPLICATION		REVISION			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	Released	5-5-80	<i>(Signature)</i>
		B	Revised	5-29-80	
		C	Revised	10-15-80	
		D	Revised per Rev G Assy.	4-20-81	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES \pm .XX \pm \pm \pm .XXX \pm	CONTRACT NO.		 WILSON Laboratories, Inc.
	APPROVALS	DATE	
MATERIAL	DRAWN	<i>S.H.P.</i>	5-1-80
	CHECKED	<i>C.W.</i>	5-2-80
FINISH			Product Specification SX-530 Disk Exerciser
			SIZE: A
DO NOT SCALE DRAWING	SCALE		SHEET 1 OF 21

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1.00 GENERAL DESCRIPTION

The SX-530 Disk Exercisor will test many different models of the Winchester technology disk drive. Drive interface variations are accomodated by pluggable I/O cable adapters. Head and cylinder address limits are manually set prior to exercising. Adapter boards include a prom which provides for modifying the header and data field formatting requirements.

The SX-530 accomodates only a single radial cable and thus can exercise only a single drive at a time.

The SX-530 is housed in a suitcase type carrying case. The cover is removable. The remaining base half presents the operator console and includes all electronics.

The power cable and the connected I/O cables are stored in a well at the right of the console. Extra adapters and I/O cables and the operational manual are stored in a compartment in the cover. Adapters are mounted on positive locking nylon standoffs and are easily removed.

Six captive screws allow removal of the console and electronics from the case for quick change of adapters and I/O cables to accomodate different drive interface requirements.

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2.00

FUNCTIONAL DESCRIPTION

SERVO MODES

There are four basic servo modes:

1. SET
2. INC
3. DEC
4. RANDOM

Each of the four basic servo modes can be modified by adding the ALT mode. A variable seek delay is selectable. Cylinder address display shows last cylinder seeked. Seek OFF control provides for writing and reading without seek action.

An ALTSET, MAXSET switch position is used to load the cylinder address switch-selected **alternate** address used in the ALT & SET mode and to load the maximum address necessary in the INC, DEC, and RANDOM seek modes.

HEAD SELECT

There are two modes of head addressing:

1. SET
2. SEQ (Sequenced)

Indicators display the address of the head selected.

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VOLUME SELECT

A select switch and an indicator are provided for those drives which require volume select.

WRITE/READ MODES

There are five modes of data handling and an ON/OFF control for servo action only.

1. READ HEADER AND DATA
2. READ HEADER, WRITE DATA
3. READ HEADER, WRITE/READ DATA CYLINDER
4. READ HEADER, WRITE/READ DATA PASS
5. WRITE HEADER AND DATA (FORMATTING)

A single header is written at the beginning of each track. A single data field fills the remainder of the track. All reading is comparison tested for error.

DATA PATTERNS

There are three data pattern modes:

1. Data composed by a bank of 16 switches.
2. A 16-bit random data pattern.
3. A cyclic pattern continuously varying throughout the data field.

DATA DISPLAY

Sixteen LEDs show either the random data pattern or the first word containing an error bit.

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3.00 CONSOLE DESCRIPTION

Figure 1 depicts the SX-530 console.

3.01 CONFIGURATION CONTROLS

O = LED DISPLAY

@ = PANEL SWITCH

+ = TEST POINT

DRIVE SELECT

8 4 2 1

@ @ @ @

DRIVE NUMBER

Four two-position switches control unit select lines to the drives.

INDEX/SECTOR

DAISY CHAIN

@ RADIAL

Two position switch. Selects daisy chain or radial cable for the source of index and sector signals.

ADDR MARK

ON

@ OFF

Two-position switch. ON requires address mark writing when formatting and address mark detection when reading the header.

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3.02

OPERATION CONTROLS AND INDICATORS

@ START/STOP Push button starts and stops run action.

CONT Two position switch. SINGLE stops run
@ SINGLE after single cycle of operation sel-
ected. CONT continues running until
stopped by START/STOP or by error stop.

O RUN LED shows when the SX-530 is operating.

O ILL OP LED shows when an illegal operation has
been selected.

DRIVE SELECT

SELECT Three-position switch. SELECT sends
@ OFF drive select signal to drive. OFF drops
STATUS TEST select signal to drive. STATUS TEST
lights all drive STATUS LEDS.

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3.03

WRITE/READ CONTROL

- FORMAT Four-position switch selects:

 - @ WR/RD FORMAT-Write address and data fields.
 - WRITE WR/RD-Read address and alternate the
 - READ WRITE/READ of data fields.
 - WRITE-Read address and write data field.
 - READ-Read both address and data field.

- SKIP Four-position switch. SKIP is used

 - @ ON with FORMAT to write bad track bit
 - OFF in address. ON enables write-read action. OFF provides for seek action without write-read.

- @ LOAD DATA LOAD DATA push button loads 16-bit pattern selected by CYLINDER ADDRESS switches.

WRITE/READ INDICATORS

- 0 SKIP LED's show when writing and reading is in process. SKIP LED shows when address field contains bad track bit.
- 0 WR
- 0 RD

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DATA STROBE

EARLY Three-position switch controls data
@ NORMAL strobe within drive (for margin testing).
LATE

3.04 DATA

RANDOM PASS Four-position switch selects one of
RANDOM CYL three data patterns and two modes
CYCLIC of WRITE/READ action for random data
@ SWITCH DATA in the INC and DEC seek modes.
RANDOM PASS writes all cylinders then
reads all cylinders. RANDOM CYL and
all other WRITE/READ modes write
then read each cylinder seeked.

Random data is a 16-bit repeated pat-
tern generated by high speed counting.
CYCLIC data varies continuously through-
out the data field and is a different
pattern for each track. SWITCH DATA
is a 16-bit pattern loaded from the
CYLINDER ADDRESS switches.

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3.05 DATA PATTERN DISPLAY

Sixteen LEDS show the random data pattern generated when running in the RANDOM CYL or RANDOM PASS modes. These LEDS show blurred when running in the CYCLIC and SWITCH DATA modes but a STOP ON ERROR halt will show the last 16-bit read data frame which included the error bit.

3.06 ERROR

- 0 BLINK Flashes on any error.
- 0 ADDRESS Latches on header error.
- 0 DATA Latches on data field error.
- 0 ADDR MARK Set if address mark not found.
- 0 SECTOR Set if inconsistent number of sector marks per revolution.
- 0 SERVO CLOCK Set if inconsistent number of servo clocks per revolution.

- STOP ON ERROR Two-position switch enables stop on error.
- @ OVERRIDE

- CLEAR Push button clears error flags and zeroes the DIGITAL DISPLAY.
- @ ERRORS & DISPLAY

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3.07 SEEK CONTROL

RANDOM Four-position switch selects seek mode.

DEC The selectable seek actions are:

INC SET - repeated seeks to the CYLINDER ADDRESS switch value.

① SET INC - seeks incrementing cylinders.
Drops back to zero after seeking the MAXSET address.

DEC - seeks decrementing cylinders.
Jumps to maximum after seeking zero address.

RANDOM - seeks random cylinder within the MAXSET address.

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SEEK DELAY
@ SEEK ON
SEEK OFF

Three-position switch, OFF position provides for WRITE/READ operation without seek action. ON position enables seek without delay. DELAY position imposes a pot (located to right of switch) controlled variable delay between seeks.

ALT
@ OFF
MAXSET

Three-position switch selects ALT seek mode. MAXSET position sets alternate address for SET + ALT seek mode and sets maximum address for INC, DEC, and RANDOM seek modes.

SERVO OFFSET

PLUS
@ ZERO
MINUS

Three-position switch controls drive offset (for margin testing).

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3.08 CYLINDER ADDRESS CONTROLS & INDICATORS

			1024	512	256	128	64	32	16	8	4	2	1		
			0	0	0	0	0	0	0	0	0	0	0		
@	@	@	@	@	@	@	@	@	@	@	@	@	@	@	@

LED's show last cylinder seeked.

Two-position switches select address for SET and ALT seeks. Additional unmarked switches are used to compose 16-bit SWITCH DATA patterns.

3.09 HEAD ADDRESS CONTROLS & INDICATORS

			32	16	4
			2	1	
			0	0	0
			0	0	0
ON					
OFF	@	@	@	@	@

LED's show head addressed. Two-position switches select head address for SET head mode and limit for SEQ head mode.

SEQ HEAD
 @ SET HEAD

Two-position switch selects head addressing mode: set or sequenced.

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3.10

VOLUME

ON Selects volume. Applicable
@ OFF to those drives which have
volume change capability i.e. final
and removable media.

3.11

RESET

BOTH Four-position switch select fault
@ FAULT clear or rezero command or both to be sent
REZERO by FAULT/REZERO push button. If left
OFF selected the rezero command will be
sent automatically on a SEEK ERROR
STATUS and a fault clear command
will be sent automatically on a
FAULT STATUS.

FAULT Push button sends FAULT/REZERO
@ commands as selected by adjacent four
CYLINDER position switch.
REZERO

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3.12 DIGITAL DISPLAY

Two four-position switches select one of seven values to be displayed. The right switch is enabled when the left switch is at the lowest position.

*PASS COUNT	Displays number of passes through all cylinders in the INC and DEC seek modes.
DATA RATE	Displays servo clock rate in MHZ to .01 MHZ.
SEC CNT	Displays number of sector pulses per revolution.
*SEEK TIME	Displays last seek time (in milliseconds) measured to 0.1 millisecond.
*BYTE CNT	Displays number of bytes pwe revolution.
*ERR RCNT	Counts revolutions in which any error occurred.
CYL ADDR	Shows decimal equivalent of CYLINDER ADDRESS binary LEDS. With SEEK CONTROL at MAXSET, converts CYLINDER ADDRESS switch setting to equivalent decimal value.

*Selection must be made before action occurs.

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3.13 DRIVE STATUS INDICATORS

- 0 SELECTED
 - 0 READY
 - 0 ON CYLINDER
 - 0 SEEK END
 - 0 BUSY
 - 0 SEEK ERROR
 - 0 FAULT
 - 0 READ ONLY
- This indicators monitor the appropriate status lines from the drive.

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3.14 TEST POINTS

- | | |
|---------------|-------------------|
| + INDEX | + CYLINDER SELECT |
| + SECTOR | + HEAD SELECT |
| + ADDR MARK | + CONTROL |
| + ON CYLINDER | + BUS 0 |
| + SEEK ERROR | + BUS 1 |
| + SERVO CLK | + BUS 2 |
| + WRITE DATA | + BUS 3 |
| + WRITE CLOCK | + BUS 4 |
| + WRITE SYNC | + BUS 5 |
| + READ DATA | + BUS 6 |
| + READ CLOCK | + BUS 7 |
| + READ SYNC | + BUS 8 |
| + ERROR | + BUS 9 |
| + GND | + SEL 0 |

4.00 PHYSICAL DESCRIPTION

The SX-530 is housed in a suitcase type carrying case. The case size will be: Length 21", Width 13", and Depth 7". The total weight will not exceed 10 pounds. Figure 2 illustrates an opened SX-530.

The power requirement will be 120 VAC (.75A) or 230 VAC (.375A), 50/60 Hz.

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Accessories supplied with the SX-530, mounted within the cover include:

1. Sets of 6 foot long I/O cables to match drives specified.
2. Instruction Manual
3. One adapter to match drive(s) specified (mounted on main PC board); others available at additional cost.

5.00 ENVIRONMENTAL SPECIFICATIONS

Temperature - 0 to 50°C with 15°C maximum rise per hour.

Relative Humidity - 20 to 80 percent.

Altitude - to 10,000 feet (operating).

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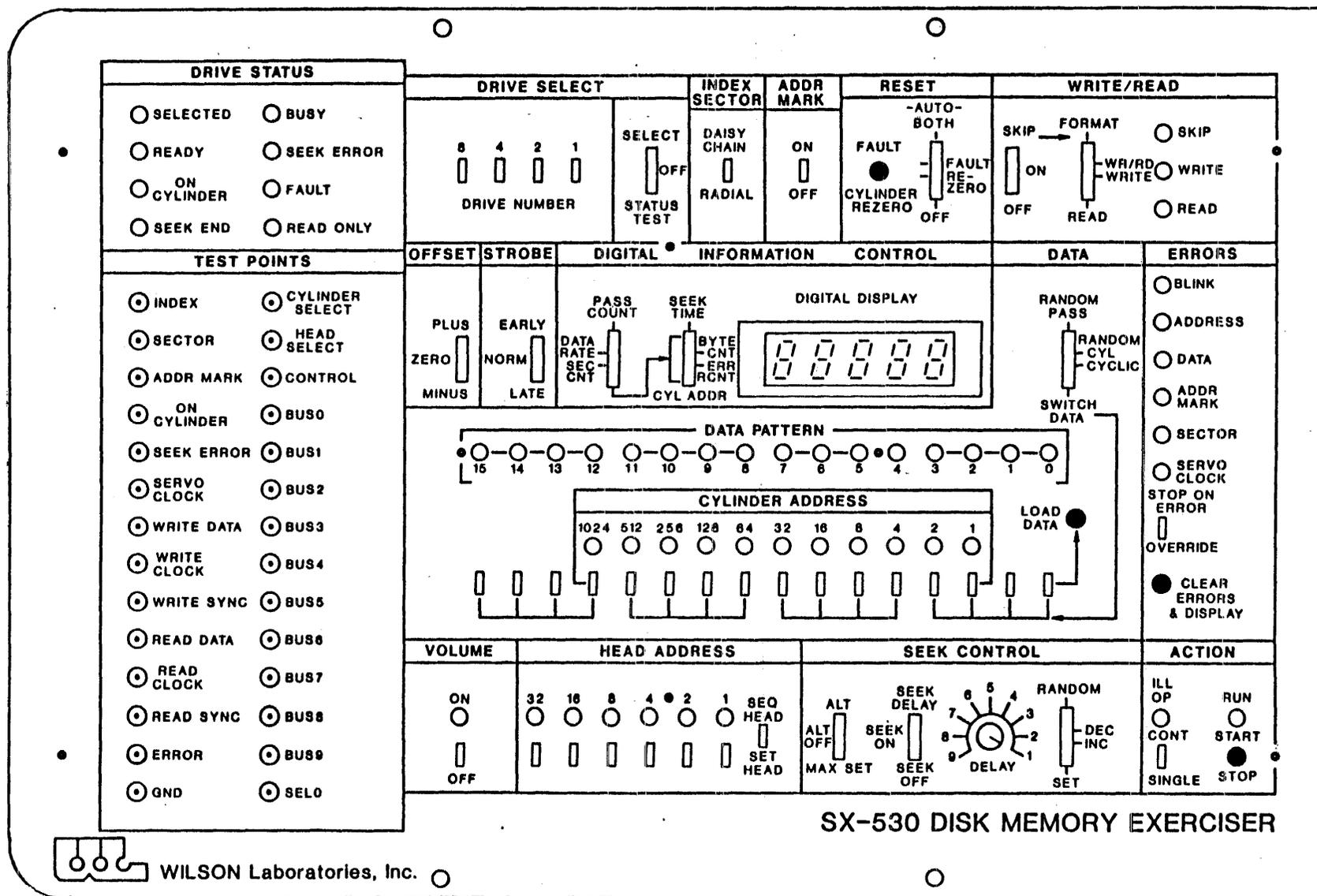


Figure 1: SX-530 FRONT PANEL

SCALE

SIZE

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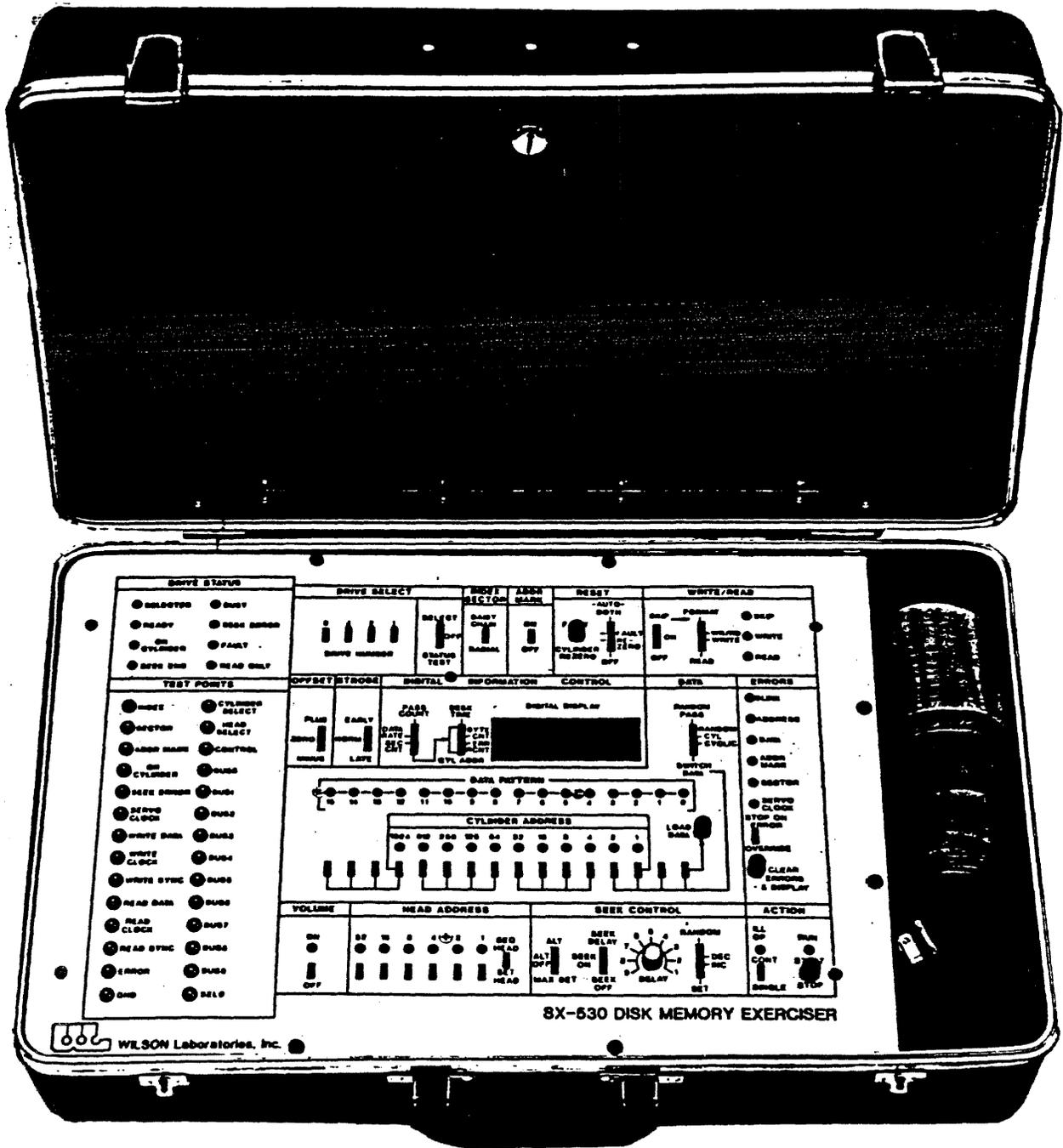


Figure 2: SX-530 DISK MEMORY EXERCISER

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