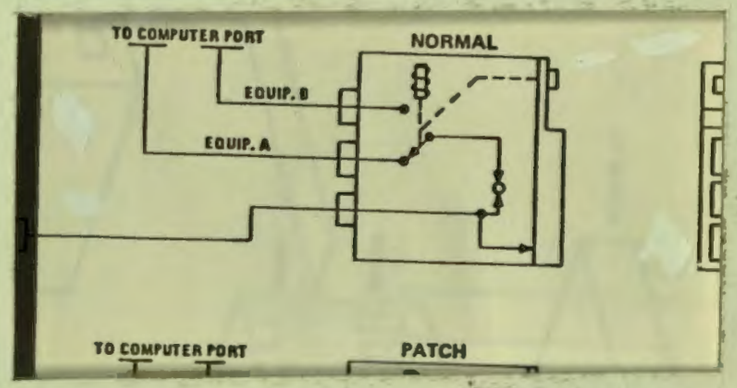
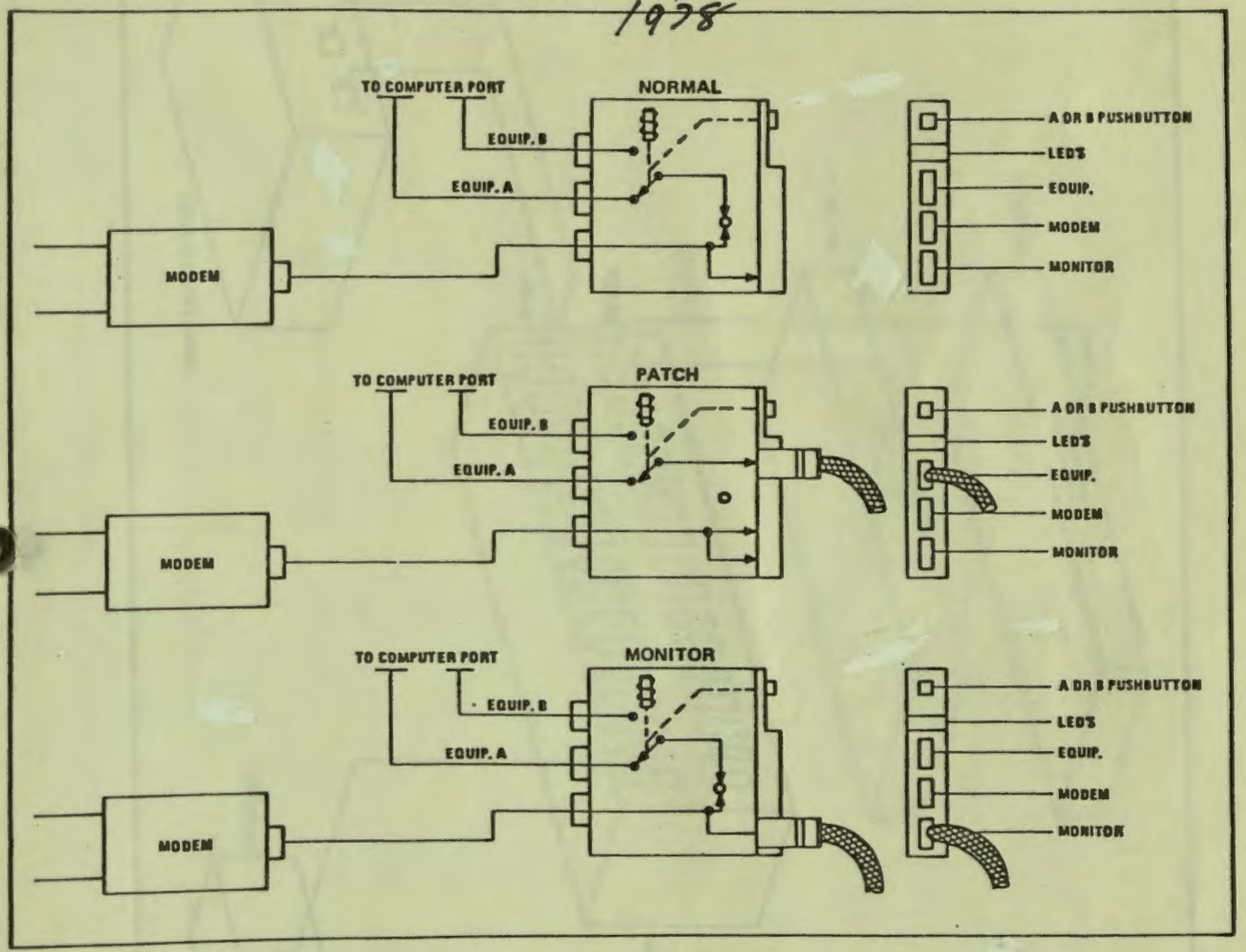
Tim O'Neill



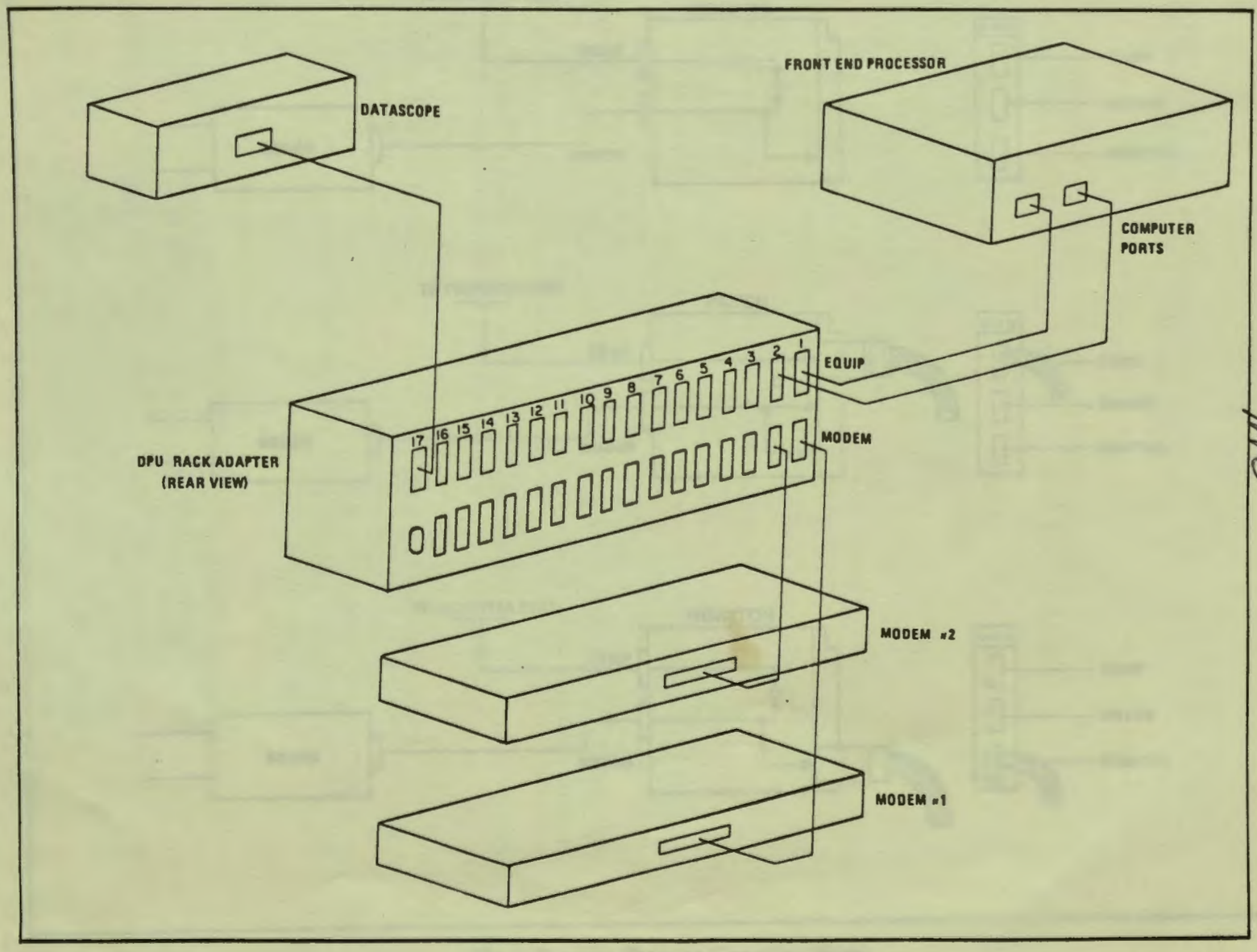
SPECTRON
CORPORATION

Tim O'Neill

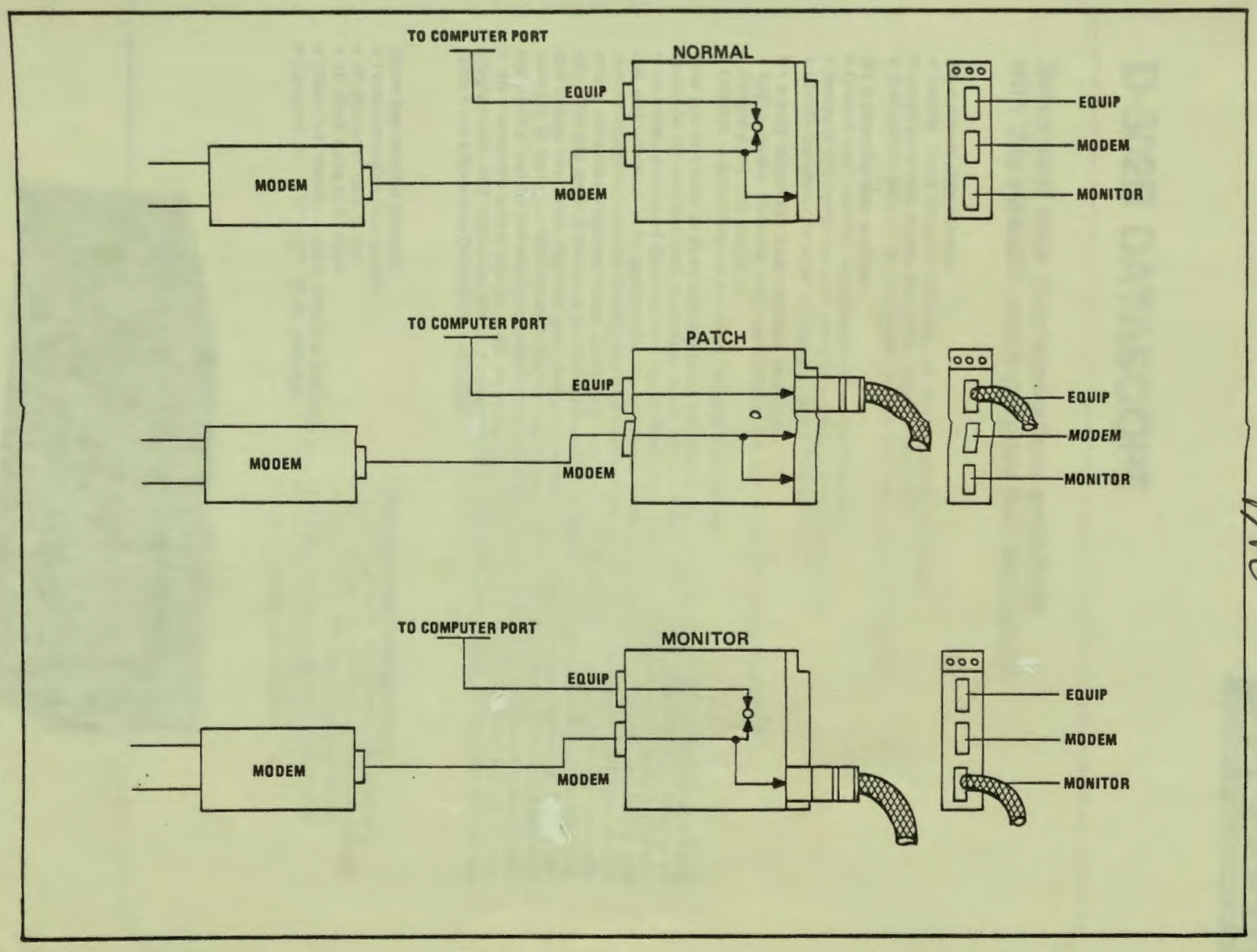
First V.24/RS232 TAPs
1978



Block Diagram Showing Operating Modes



Digital Patch Unit Connections



Block Diagram Showing Operating Modes

SPECTRON CORPORATION

D-502B DATASCOPE

Solve your data communications problems with this versatile, multi-purpose test instrument

It's a simple data monitor
- Simple, direct monitor operation, no "programming" necessary
- Large clear-text display simplifies data interpretation
- Compatible with all line disciplines, codes, and clock rates up to 80 Kbps

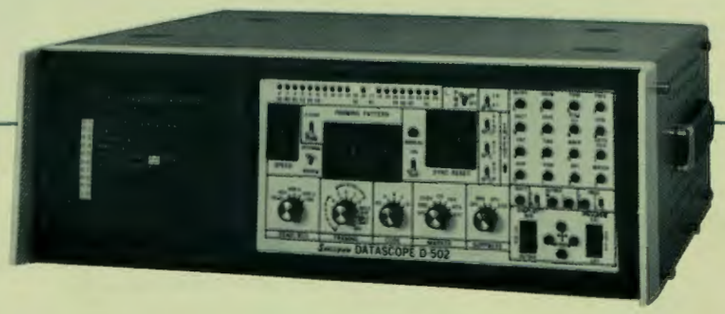
It's a powerful data analyzer
- Extend basic monitor capabilities with simple programs
- Measure line performance — on-line — using actual transmissions
- Locate complex character strings and data exchanges easily

It's a truly interactive data simulator and tester
- Test software, modems, communications lines, and terminals — on-line or off-line
- Simulate any line discipline
- Monitor — simultaneously — both test and response data

Now you can have all three capabilities in one instrument — without sacrificing performance, making operation too sophisticated, or adding unduly to cost. A decade of experience in building the industry's most widely acclaimed data monitors has enabled us to develop an instrument which is both simple to use and universal in its application. As a monitor, it will help you isolate software, hardware, and communications problems, quickly and easily. As a data analyzer, it will make important measurements of line utilization, response times, block error rates — and many more — with equal facility. As a data simulator and tester, it will allow you to test new software without tying up communication facilities; test and debug new lines, modems and terminals off-line without risking adverse effects to the on-line network; or test your lines dynamically varying response times, data rates, etc. to determine the most economical and reliable way to optimize network performance. And best of all, this capability is available in an instrument which can be used as easily by operating and field service personnel as it is by programmers and engineers. Without need for the highly trained equipment specialists, you get full value from a Spectron D-502B DATASCOPE.

Some key monitor features
- Time-correlated FDX display
- 4K character data buffer
- All clock rates to 80 Kbps
- Clear-Text display — HEX, ASCII & EBCDIC
- Compact 5¼" x 16" x 17", 25 lb. package

Some key programming features
- Only 20 simple, yet powerful, instructions
- CRT explains instructions as they are entered
- CRC, LRC & VRC (check and generate)
- Transfer programs to/from tape or line
- 4 program-controlled counters
- 5 program-controlled timers



The Spectron D-502B—It's a simple data monitor . . .

Easy to use by operators, programmers, field service personnel, and e requiring no programming for monitor set-up or function changes.

Simple, clearly labelled front panel controls make the Spectron D-502 versatile, easy to use, cost-effective...and the most widely accepted data communications test instrument in the industry

Monitor set-up is A, B, C easy . . .
A— Select clock **B**— Select sync character **C**— Select framing . . . then monitor!

A
Clock Selection

Toggle switch selects clock source. Internal thumbwheel switch selects internal clock rate — all standard asynchronous rates from 50 bps to 9.6 Kbps (A-P). Modem — clock is derived from modem for all rates up to 80 Kbps.

B
Sync Character Selection

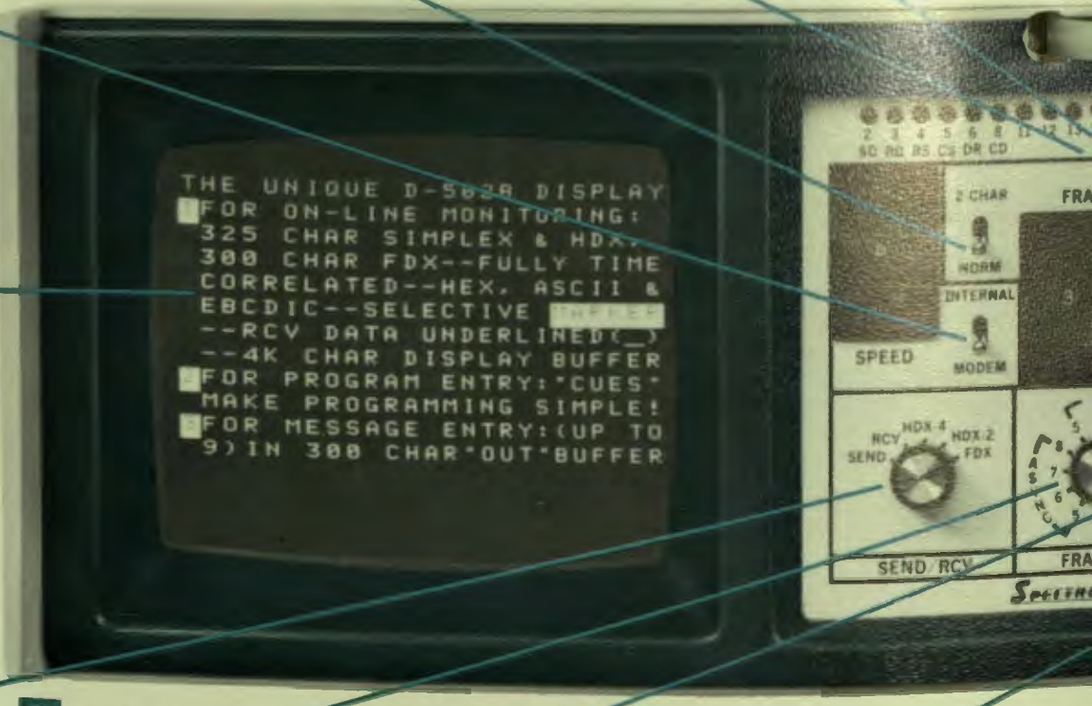
The toggle switch selects NORMAL (two identical sync characters) or 2-CHARACTER (two different sync characters) operation.

Interface Status

Individual LED indicators display the status of all 21 EIA data and control leads.

Sync Reset

Initiates a search for a new sync when MANUAL button is pressed or upon recognition of the character set in the Hex-thumbwheel switches (if enabled by the ON/OFF switch).



Display

Data Display Mode

SEND/RCV switch selects display of Send or Receive data only, Half-Duplex display (either 2 or 4 wire lines), or Full-Duplex display.

C **Character Framing**

FRAMING switch selects asynchronous or synchronous (5, 6, 7 or 8 bits/char), SDLC Direct or NRZI (both sense "FLAG 7E" for Sync). Off disables character synchronization.

Code Selection

CODE switch selects data display in Hexadecimal, ASCII (A), EBCDIC (B), or either of two other optional user-selected codes (C & D).

Marker Selection

MARKER switch allows displayed data to be highlighted when it is of selected Parity, coincident with Carrier Detect or Request-To- signals, or coincident with any signal connected to the External Marker Input jacks (Data so marked may also be sensed under program control.)

ngineers —

B DATASCOPE

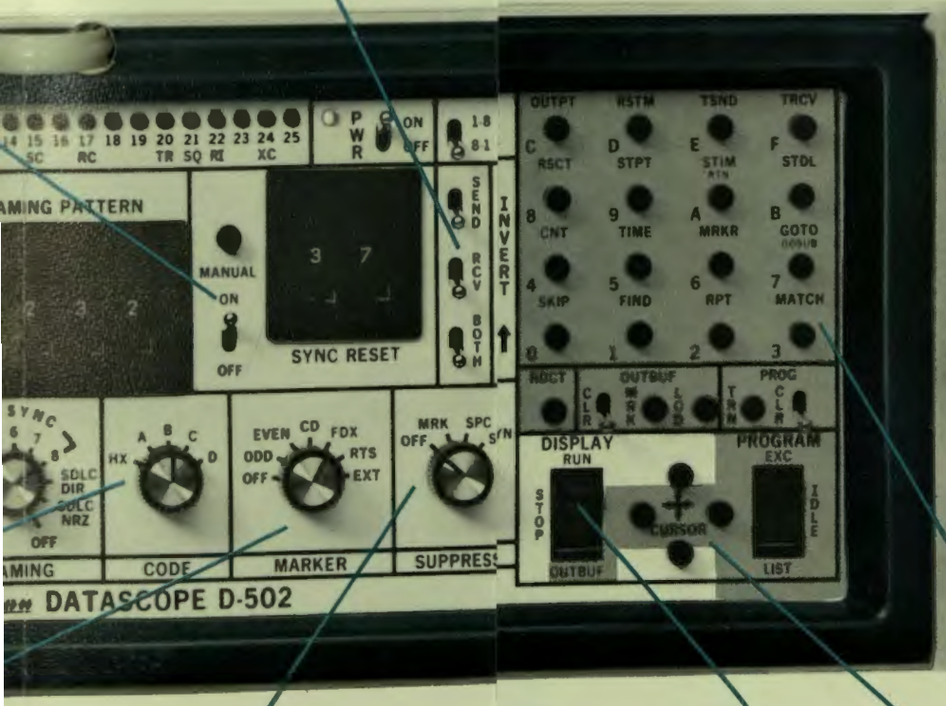
The D-502B DATASCOPE — The Value Leader

Over a decade of experience in building data communications test equipment has gone into the design of the D-502B. DATASCOPES are the most widely accepted instruments in the industry — with good reason. We invented data monitors — and we continue to lead the way with instruments which are versatile, easy to use, and cost-effective. Operators, programmers, field service personnel and engineers all acclaim DATASCOPE's ease of use. Monitor set-up and function changes require no programming — just change the simple, clearly labelled front panel controls.

If you're familiar with any DATASCOPE, you will find the transition to a D-502B is like no transition at all — virtually all monitor controls are identical on all units. This upward compatibility — which makes life a lot easier for our customers — is basic to the Spectron philosophy. Spectron will accept any DATASCOPE in trade or will factory-convert older D-500 Series instruments to D-502B's — more reasons why DATASCOPES are a sound investment. It's not difficult to see why Spectron's D-502B is the value leader.

Bit Invert/Byte Reverse

SEND and RCV switches permit independent bit sense inversion of data (at the interface). BOTH Switch inverts bit sense of both (on display only). 1-8/8-1 Switch reverses the bit order of characters in display (8-1 is normal).



Idle Suppression

Permits synchronous idle characters (Mark, Space, or Sync) to be deleted from the display. (All idle characters are stored in the data buffer for complete analysis.)

Display Control

The monitor display and data buffer are controlled by the DISPLAY rocker switch. Placing the switch in RUN clears the display and data buffer, places the display in monitor mode, and initiates data buffer loading. Placing the switch in STOP terminates data buffer loading, transfers the display to the data buffer, and causes the last 300 data buffer characters to be displayed.

REAR PANEL CONNECTIONS

External Control

MARKER INPUT jacks — Marks display and buffer data on external "Mark" or "Space" levels; SYNC RESET — initiates search for new sync on external "Mark" or "Space" transition; STOP — Stops display on external "Mark" or "Space" transition; MARKER OUT — generates an EIA "Mark" pulse whenever a Stop instruction is executed.

Data Input Connectors

The DATASCOPE is connected between modem and equipment via two parallel-wired EIA RS-232C connectors (DB-25S).

EIA Breakout

24 jacks provide access to all leads of the Bus Mach/RCU EIA input connector. Pins 1 & 7 (grounds) are common, Pins 9 & 10 supply +12 and -12 VDC (respectively) for testing.

Video Output

A BNC connector provides a composite video signal for remote monitor display at distances up to 500 feet.

Power Connector

Operates on 115 or 230 VAC power; voltage selection device is safety-interlocked with fuse access and detachable power cord.

Programming Controls

Not required for data monitor applications.

Vertical Cursor Control

Permits display of the entire data buffer by scrolling.

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Easy to use by operators, programmers, field service personnel, and engineers — requiring no programming for monitor set-up or function changes.

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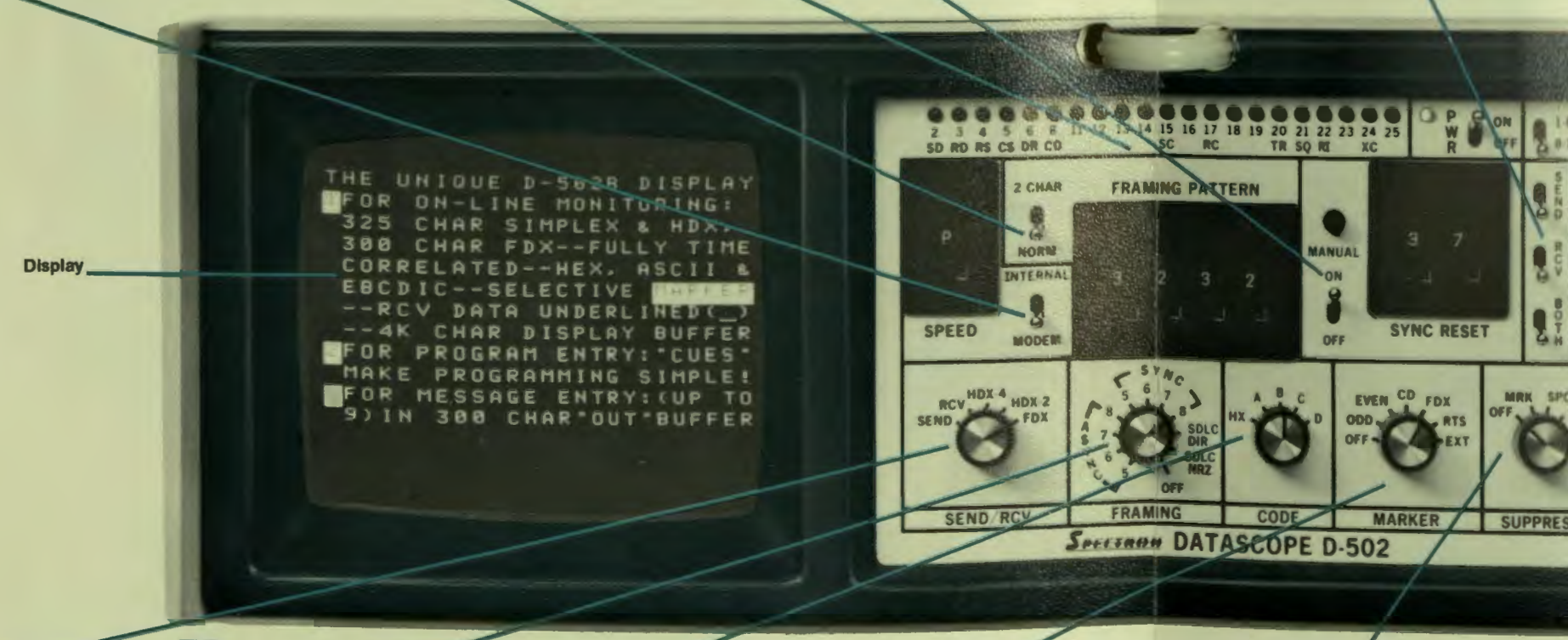

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CODE switch selects data display in Hexadecimal, ASCII (A), EBCDIC (B), or either of two other optional user-selected codes (C & D).

Marker Selection

MARKER switch allows displayed data to be highlighted when it is of selected Parity, coincident with Carrier Detect or Request-To- signals, or coincident with an signal connected to the External Marker Input jacks. (Data so marked may also be sensed under program control.)

Idle Suppression

Permits synchronous idle characters (Mark, Space, or Sync) to be deleted from the display. (All idle characters are stored in the data buffer for complete analysis.)

AND programmable interactive tester!

Programming is A, B, C easy too!

Programming simplicity is the result of Spectron's "user-oriented" design philosophy — hardware is designed to fit the user. DATASCOPES are designed to be used by everyone — not mastered by a few. The simple instruction set is the key. This new programming language has been designed specifically for data communications testing. The high-level language obviates the need for large numbers of program steps or for permanently stored application programs, since most tests can be performed with far fewer steps. There is no need to learn a new programming language or complex machine codes. Each of the 20 instructions is entered by a clearly labelled key and the display guides you in completing each instruction with prompting messages, e.g. "ENTER TIMER NO (1-5)". This simplistic approach to hardware and programming is the result of a decade of experience in data communications and data monitoring. We believe that your time should be spent solving communication problems — not mastering test equipment.

Hex-Keypad for Instruction and Data Entry

Each keystroke either selects or completes an instruction according to prompting messages displayed on the CRT. Each instruction does one or more of the following: 1) operates on data, 2) controls program execution, 3) controls a counter or timer, 4) generates an output message.

Output Instructions

OUTPUT (T/M) — Sends data To Modem or To Terminal. Message is sent 1-9 times or continuously and may have 10 characters specified in the instruction or appended to any of 15 messages in the Output Buffer (up to 1200 characters). Program execution either waits until output is completed or proceeds to next instruction after output commences.

Counter & Timer Instructions

RSCT* & CNT — Specifies one of four counters to be reset, or incremented and tested — program branches when counter equal to specified count (0-9999).
RSTM, STPT & TIME — Specifies one of four timers to be reset, stopped, or started and tested — program branches when timer equal to or greater than specified time (0-59.999 sec.). (Timers stop when program execution halts; are reset when execution starts.)

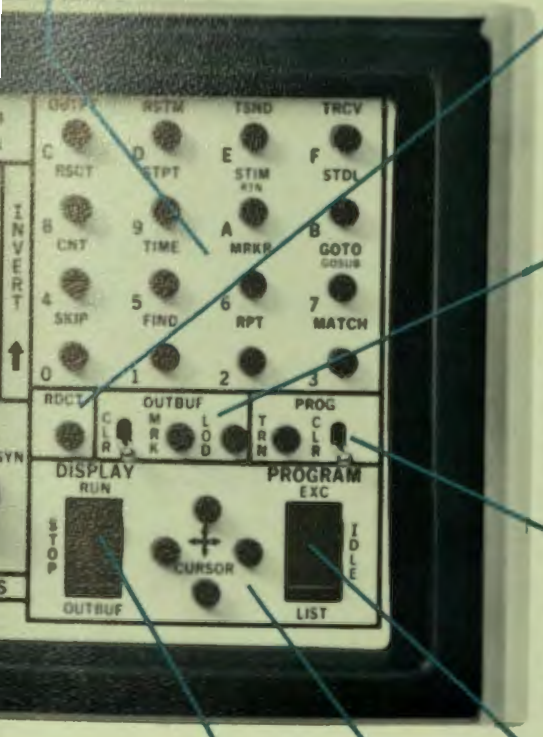
Program Control Instructions

GOTO, GOSUB & RTN — Unconditional branch and subroutine capability.
STIM & STDL — Stops immediate execution — monitor data input stops (Immediate or Delayed).

Data Instructions

TSND & TRCV — Specifies side of line to be tested.
FIND & RPT — Searches for first or last occurrence of a character.
MATCH (& MCHGO) — Tests for character strings — program branches if test fails.
MRKR — Branches if character is "Marked."
SKIP — Ignores one character.

*RSCT may be used to manually reset all counters when not in List mode.



Read Counters & Timers

The RDCT pushbutton switch causes status display of all counters and timers. With the CRC Option, it also enables: CRC/LRC test selection; up to four characters excluded from CRC/LRC calculation; calculation and display of CRC/LRC character(s); and CRC/LRC character(s) are automatically appended to the selected Output Buffer message.

Output Buffer Controls

The Output Buffer may contain up to 1200 message characters (300 standard) — up to 15 separate messages which are delimited by markers. Messages are entered from the Hex-Keypad or the optional ASCII/EBCDIC keyboard attachment. Clear toggle switch clears the Output Buffer. LOAD pushbutton switch causes selected data buffer characters to be loaded into the Output Buffer. MARKER pushbutton causes the cursor-selected character to be marked or un-marked.

Program Transfer

Allows programs to be stored onto tape or output to line, and programs may also be loaded from tape or line. The T-96 Digital Tape Unit or T-511 Tape Unit are ideal for program storage. The Program Storage Adapter (PSA-502) permits program storage and retrieval with low-cost audio tape recorders. PROG CLR switch will clear the program contents without disturbing the output buffer.

Program Control

LIST permits program entry and editing. IDLE allows simple monitor operation without program control, and EXC starts program execution at the cursor location.

Display Control

The Display rocker switch controls the display, data buffer, and programs being executed while in monitor mode. RUN clears the display and data buffer, places the display in monitor mode, and initiates data buffer loading. STOP terminates data buffer loading and program execution — programs may be rerun on data captured. OUTBUF causes the output buffer to be displayed.

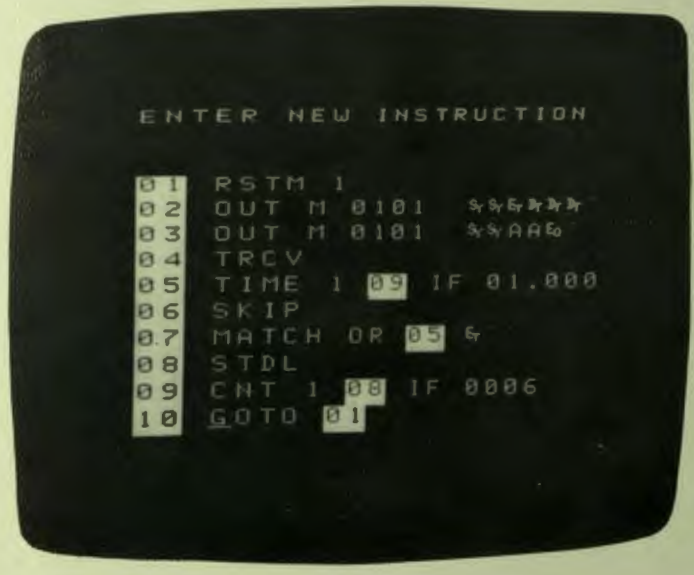
Cursor Controls

Four pushbuttons position a cursor vertically and horizontally. The cursor is a position index for entering and editing programs, loading and marking the output buffer, performing CRC operations, as well as scrolling through the entire data buffer or output buffer.

D-502B Instruction Summary Table

Instruction Format	Branch To (A)?	Buffer Char Passed On	Function
TSND TRCV	NO NO	(SEND data only) (RCV data only)	Test Send Data Test Rcv Data
SKIP FIND (X) RPT (X)	NO NO NO	Next one First (X) Found First non-(X) Found	Ignore One Char Locate 1st (X) Char Locate 1st non-(X) Char
MATCH OR (A): (X_{1-10})	On Mis-match	1st Mis-matched Char	Test for String (X_{1-10})
	Not if Match	Char after last Matched	(may be Stacked)
MCHGO OR (A): (X_{1-10}) (MATCH + GOTO)	On Mis-match	1st Mis-matched Char	Test for String (X_{1-10})
	Not if Match	Char last Matched	(for Async Data)
MRKR (A)	If Char Marked	No Change	Test for Marked Char
OUTPUT (#) (d) (X_{1-10}) OUT M (#) (c,r) (X_{1-10})	NO NO	Rcv Message Output Send Message Output	Output TO Terminal Output TO Modem
CNT (N): (A) IF (C) RSCT (N)	If Count = (C) NO	No Change No Change	Increment & Test Counter (N) Reset Counter (N)
TIME (N): (A) IF (T) STPT (N) RSTM (N)	If Time =(T) NO NO	No Change No Change No Change	Start & Test Timer (N) Stop Timer (N) Reset Timer (N)
STIM STDL	NO NO	None — Pgm Stops No Change	Stop Immediate Stop Delayed (1024 char.)
GOTO (A) GOSUB (A) RET	Un-conditional Un-conditional Un-conditional	No Change No Change No Change	Go to Line (A) Go To Subroutine at (A) Return from Subroutine

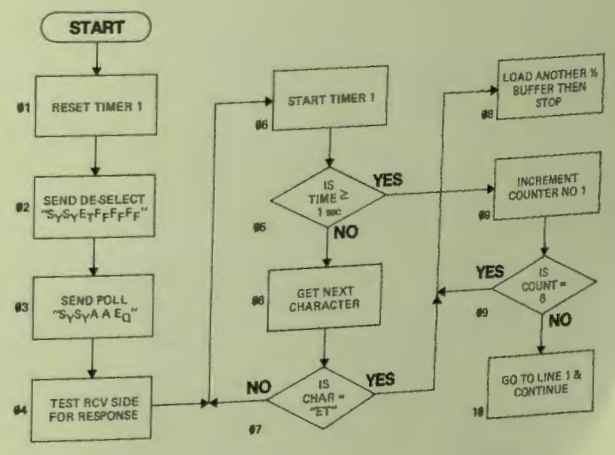
Prompting Messages request the following information to complete Instructions. (X) a single Hex Character; (X_{1-10}) 1 to 10 Hex Characters; (A) Program Line Number (1-69); (N) Counter Number (1-4)/Timer Number (1-5); (C) Count Limit (0000-9999); (T) Time Limit (00.000-59.999 sec.); (#) specifies Message Number (0-Instruction only, 1-9 Instruction + OUTBUF Message specified). Iterations (0-continuous, or 1-9 times), 0-next Line executed AFTER Output, 1-next Line executed after Output starts; (d) CTS Delay 0=On, 1=7.5 ms, 2=50 ms, 3=150 ms, 4=200 ms Delay, (c) Rcv Carrier 1=Switched, 0=Continuous (On); (r) RTS 1=Switched, 0=Continuous (On).



Sample Program — 3275 Polling Sequence with Timeout

Program Function

Terminal AA is polled. If an "End of Text" (ET) response is not returned within one second, it is re-polled. This continues until six attempts have been made, after which program execution stops. The program may be started at Step 01 or 10.



NOTES: RSCT must be pressed before executing the program, since no RSCT program instruction was used to Reset Counter 1. The OUTPUT instruction format is "M" (to Modem) the D-502B is connected to the host modem and simulates a front-end processor.

D-502B DATASCOPE Specifications

DATA INPUT Two parallel-wired EIA RS-232C connectors (DB-25S). Pin 1 (protective ground) and Pin 7 (Signal Ground) are both tied to instrument chassis ground. RCU connector supplies +12 VDC on Pin 9 and -12 VDC on Pin 10

EIA BREAKOUT The BUS MACH/RCU input connector is brought out to 24 tip jacks (0.080" Dia.). Pins 1 & 7 are common (GND jack) with chassis ground

EIA STATUS INDICATORS 21 LED's indicate the status of all input leads except 1, 7, 9 & 10. Lamp ON indicates voltage ≥ +3 V (Zero/Space), OFF indicates voltage ≤ -3 V (One/Mark)

DATA INVERSION INVERT (SEND & RCV) data bit sense inversion of Send and/or Receive data (EIA Status Indicators not affected)

DATA CLOCKING Selected from MODEM (up to 80 Kbps) or INTERNAL source. INTERNAL thumbwheel switch selected rates (bps): A — 50, B — 74.2, C — 110, D — 134.5, E — 150, F — 300, G — 600, H — 1050, I — 1200, J — 1800, K — 2000, L — 2400, M — 3600, N — 4800, O — 7200, P — 9600

DATA SYNCHRONIZATION (Synchronized data is displayed at full brilliance, non-synchronized is displayed at reduced intensity)

FRAMING Selects character sync method and bits/character (Data + Parity + Constant bits)
ASYNCHRONOUS 5, 6, 7 & 8 bits (one Start bit, one or more Stop bits)
SYNCHRONOUS 5, 6, 7 & 8 bits (Sync on FRAMING PATTERN)
SDLC DIRECT Sync on "Flag" (7E), 8 bits/char, no data bit inversions
SDLC NRZI Sync on "Flag" (7E), 8 bits/char, NRZI "1" bit inversions
OFF bits are assembled as 8-bit non-synchronized characters

FRAMING PATTERN (for synchronous data)
NORMAL — Sync established when character occurs twice in succession
2-CHAR — Sync established when two characters (contiguous) occur

SYNC RESET (Data is displayed at reduced intensity)
MANUAL — a pushbutton is provided to force search for new Sync
ON/OFF — enables search for new Sync when selected character occurs (DEFAULT) — search for new Sync always occurs following fourth consecutive character of synchronous line idle (marking)
EXTERNAL — External Control provides + & - SYNC RESET input jacks — force search for new Sync on selected signal transitions

DISPLAY (5" CRT) Characters are formed on an 11 x 15 dot matrix to accommodate alphanumeric characters — two-character mnemonic or graphic symbols, and special fonts used for Monitor and List displays
"Normal" display — white characters on a black background
"Highlighted" display — black characters on a white field
The screen is written in lines of 25 characters (maximum of 15 lines — 375 characters). Receive data is always underlined. Send Data is not underlined

MONITOR DISPLAY FORMATS

ON-LINE OPERATION — RUN MODE SEND/RCV selector determines which side of line is monitored, line control (2 or 4 wire) and display format. On-line data is displayed in a "ripple-down" presentation from left to right and from top to bottom. Two blank lines provide a demarcation as new data is written over older data.
SEND OR RCV — Selects either Send or Receive data
HDX-2 & HDX-4 — HDX-2 displays Send side when RTS high, HDX-4 displays Send or Rcv, depending on which is active (display is a logical "OR" of both slides — garbled if active)
FDX — Both sides displayed simultaneously (300 characters displayed as 6 pairs of lines — Send above Receive.) Note: Display (& Data Buffer) is "elastic" — if Send and RCV data rates are not identical, display is at the faster rate. A "DOT" is inserted in place of a character when the slower side has fallen a full character behind to maintain time correlation

OFF-LINE OPERATION — STOP MODE The last 300 characters received are displayed from the data buffer. The vertical cursor controls are used to "scroll" the display forward or backward through the buffer.

CODES A selector permits viewing data as HEX-Pairs, 7-bit ASCII, EBCDIC, or either of two optional user-selected codes. (ASCII is used for LIST and OUTBUF displays)

DISPLAY MODIFIERS

MARKER (active in RUN mode). Data is marked if coincident with the condition specified by the MARKER selector:
OFF — data not marked
ODD & EVEN — character is of parity specified
CD & RTS — selected signal lead is high throughout the character time
FDX — same as CD/RTS modes except CD Marks RCV & RTS Marks Send (Display must be in FDX or all data is Marked by RTS)
EXT — the External Control provides + & - MRKR IN jacks — Marks data on selected EIA level (±2 char. times).

IDLE SUPPRESS Mark, Space or SYN characters to be excluded from the display — suppression begins after four idle characters and terminates four idle characters prior to next data. Data Buffer is not suppressed.

Bit Order Reversal 8-1/1-8 switch allows reversal of character bit order for displayed data. (8-1, MSB-LSB is normal.)

Both (Bit Sense Invert) Inverts all "Bits" of displayed data

MONITOR CONTROL

DISPLAY Rocker switch places the monitor on-line (RUN) — displays real-time data and loads it into the data buffer. STOP takes the monitor off-line and transfers display to the data buffer. (STOP mode may also be entered via the External Control — + & - STOP jacks force a STOP on selected EIA signal transition.)

Display Cursor Underscore for Send data; underscore is omitted for RCV data. Four pushbuttons allow positioning over the full 300-character field

PROGRAM CONTROL

PROGRAM Rocker switch causes programs to be executed in the EXC position. If the DISPLAY is in RUN, the program will execute on incoming data as it is stored in the data buffer. If DISPLAY is in STOP, the program will rerun on the data buffer contents. The IDLE position allows non-program controlled monitor operation. LIST mode is used for entering programs from the Hex-Keypad or via Program Transfer, program editing, program selection (repositioning the CURSOR allows programs to start at any step of the program), and dumping program and output buffer contents to external tape or to line (via Program Transfer)

Clear Clears program memory (does not affect the output buffer)

Program Transfer Calls instructions to the screen which enable transfer of program and output buffer contents to external tape or to line. Program and output buffer may also be loaded from tape or line

OUTPUT BUFFER CONTROL Placing the DISPLAY switch in the OUTBUF position (Program IDLE) calls the 300-character output buffer contents to the screen. Data may be entered from the Hex-Keypad (or optional keyboard attachment). Data is written at the CURSOR location and the CURSOR steps through the buffer with each entry. All CURSOR controls are active.

Market — The output buffer may be partitioned into nine separate messages (delimited by Markers on the first and last message characters). Markers are applied or removed (from both data buffer and output buffer) at the CURSOR position by pressing the MRK button

Load — The LOD switch causes the output buffer (starting at the OUTBUF CURSOR) to be loaded from the data buffer (from the location of its CURSOR). Send or RCV data will be loaded as determined by the CURSOR

Clear — OUTBUF CLR switch sets buffer contents to idle character

COUNTER & TIMER DISPLAY RDCT (Read Counters & Timers) button displays counter & timer contents and provides access to the CRC Option

Counters — four Counters (1-4) are provided (range 0-9999)

Timers — five Timers (1-5) are provided (range 0-59.999 sec.) Four timers stop when program execution halts and are reset when execution begins. (Timers "wrap" back to 00.000 sec. if not stopped before reaching 59.999 sec.) The fifth timer, an Interrupt Timer, operates independent of the program loop

INSTRUCTION SUMMARY Instructions locate or test data, control and/or test counters or timers, control program execution, or generate output messages. (Tests also control program execution.) Data analysis instructions examine data from one side of the line at a time, beginning with the first character in the data buffer. When no data is available, program execution waits for more. The data buffer is essentially a continuous loop, and the program operates on data as it is loaded into the data buffer. Each instruction passes a character on to the next. Except for data analysis instructions, the same character received from the previous instruction is passed on to the next.

OUTPUTS

Marker Out — The External Control provides a MRKR OUT jack which generates a ≈200 ms pulse (EIA logic "Mark") whenever data buffer loading stops, as a result of programmed STOP or STOP IMMEDIATE instructions or an External Stop.

Video Out — A BNC coaxial connector supplies a composite video signal of the display. Transmission over 75 ohm coax cable will allow viewing on the VM-601 Video Monitor (or equivalent) at distances up to 500 ft.

Dimensions — 5.25" H (13.34 cm) x 16.00" W (40.64 cm) x 17.00" D (43.52 cm)

Weight — less than 25 lbs. (11.3 kg)

Power Requirements — Approx. 120 watts. 115/230 VAC (±10%), 50-60 Hz (operable from 93-107 VAC by internal strapping)

Included Accessories — 6' AC Power Cord, Instruction Manual, 15' Data Set Cable (DSC-2515PP), three each 12" Stacking Tip Plug Jumpers, Protective Front & Rear Covers

WARRANTY — 1 year (material and workmanship)

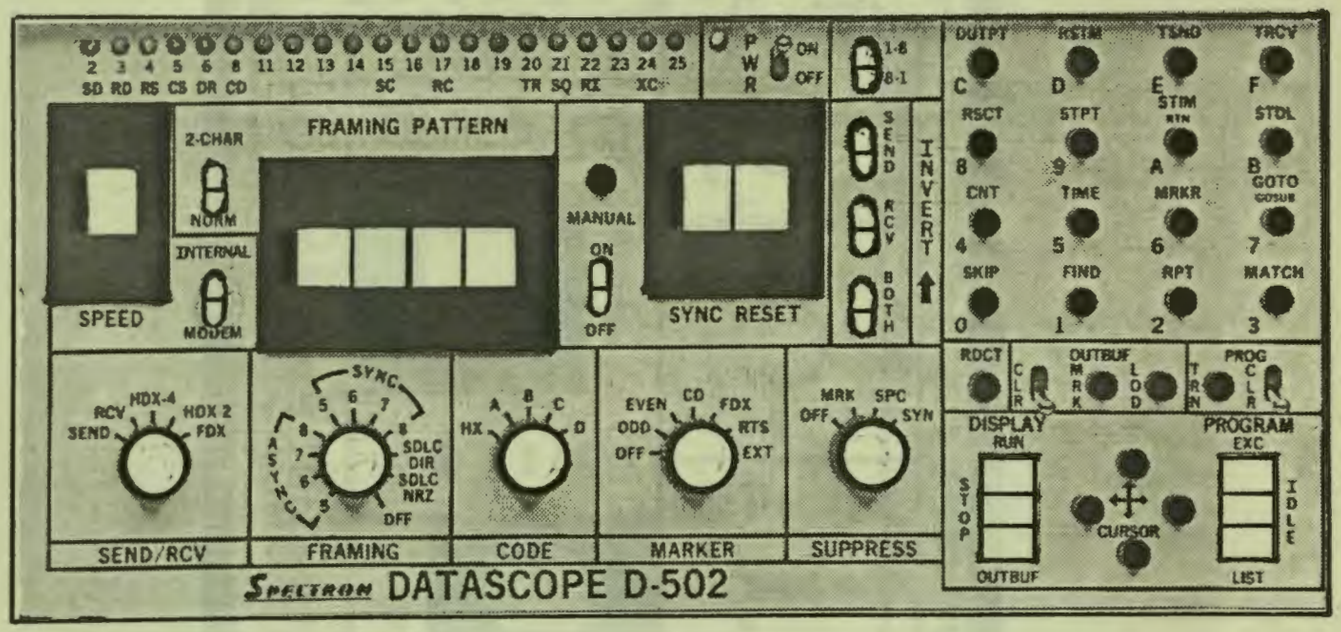
PRICE

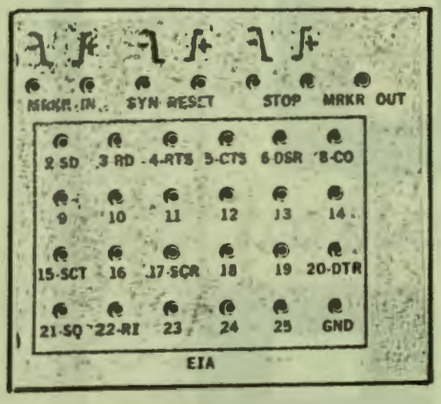
DATASCOPE D-502B	$ 10,800.00
Instrument Options	
Expanded (4K) Data Buffer (2K is Std.)	$ 450.00
CRC-LRC-VRC (calculate/test/generate)	$ 450.00
Additional Character Codes (2 additional — max.)	$ 600.00 to 1,800.00
Expanded (1200) Output Buffer (300 is Std.)	$ 450.00
Accessory Adapter Package — required for Alphanumeric Keyboard, T-96 Digital Tape Unit, and (D-201) Printer Output	$ 250.00
Internal Speed Substitutions — any speed up to 100 Kbps	$ 200.00 plus $ 50/speed
Optional Accessories	
T-511 High-Speed Tape Unit — records FDX Data to 56 Kbps	$ 5,900.00
T-96 Digital Tape Unit — records FDX Data to 9.6 Kbps	$ 3,200.00
Keyboard Attachment — EBCDIC and ASCII (Odd, Even, no Parity)	$ 840.00
PSA-502 — Program Storage Adapter — for storing and retrieving programs	$ 150.00
VM-601 — 12" Display Video Monitor	$ 675.00
SS2-501 — Slide Rack-Mounting Adapter, D-502B easily removed for portable use	$ 220.00
TC-501 — Rugged ABS plastic/aluminum, padded shipping case	$ 225.00
LCC-500 — Leather Carrying Case	$ 175.00
TC-501A — For use with D-502B & T-96 or Keyboard	$ 250.00
RCU Monitor Interfaces (Supplied with compatible Modem Cable)	
RCU-250 — Bell 303 Wide Band Interface	$ 650.00
RCU-250PS — same as RCU-250 except has integral 115 VAC Power Supply	$ 750.00
RCU-235 — CCITT V.35 Interface	$ 650.00
RCU-220 — RS-232C interface (for monitoring at up to 300')	$ 240.00
RCU-TTY — 20/60 ma TTY Current Loop (Polar & Neutral)	$ 135.00
RCU-TTY/HF — Current Loop — Polar and Neutral to 9.6 Kbps	$ 240.00
TC-3 — EIA "T" connector for permanent access "taps"	$ 40.00

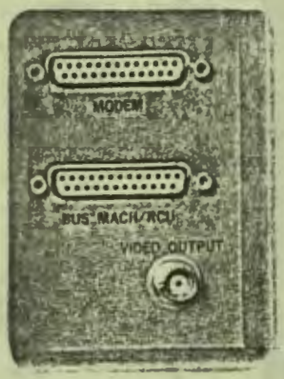
Interactive Connector Units — Permit message Output and Monitor operation on non-RS-232C interfaces. A series of these units are available for the above interfaces. Consult the factory for price and availability.

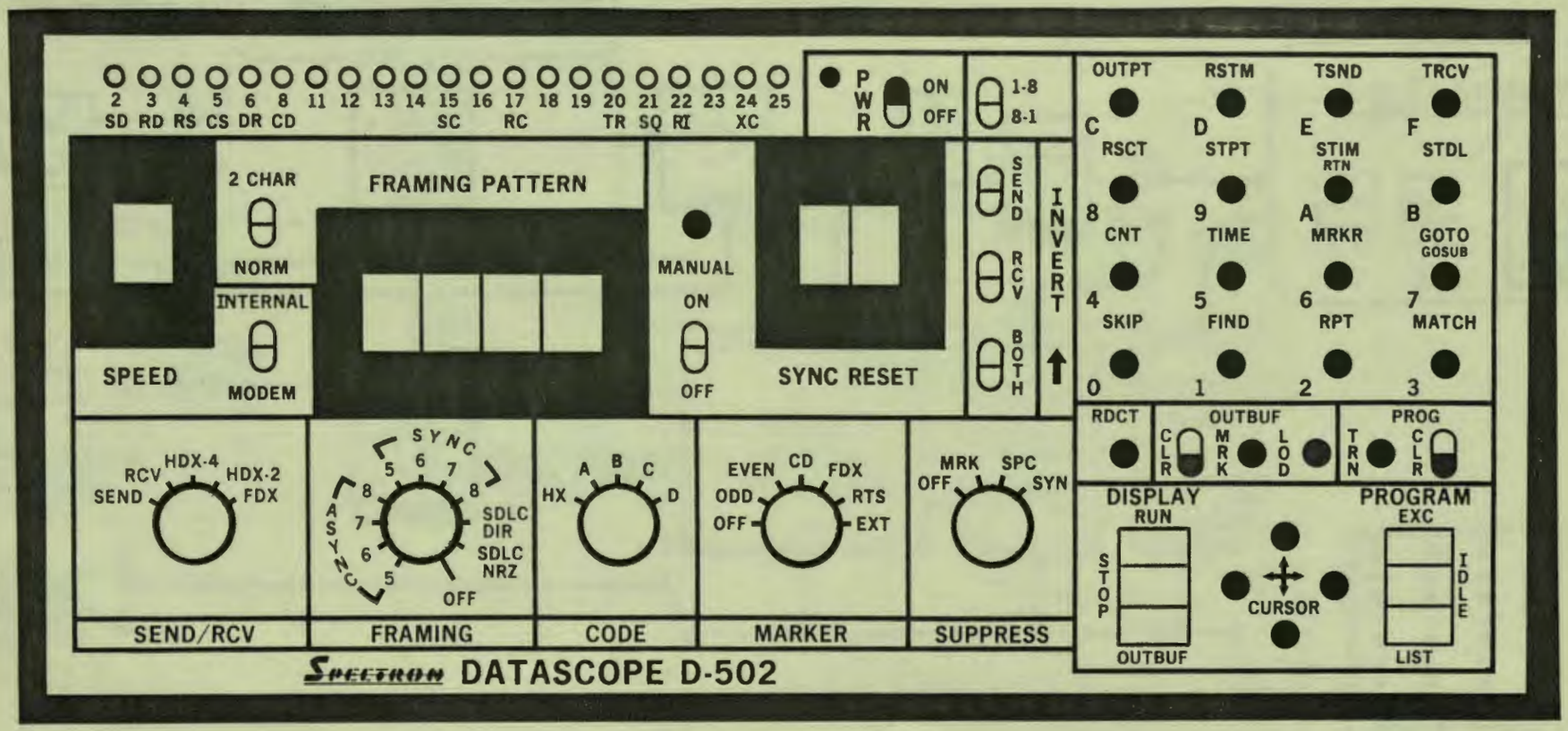
SPECTRON CORPORATION
344 New Albany Road • P. O. Box 620 • Moorestown, NJ 08057
Telephone: 609-234-5700 • TWX: 710-897-1359 • Telex: 83-1488

D-502/501 SET-UP CHART FOR :

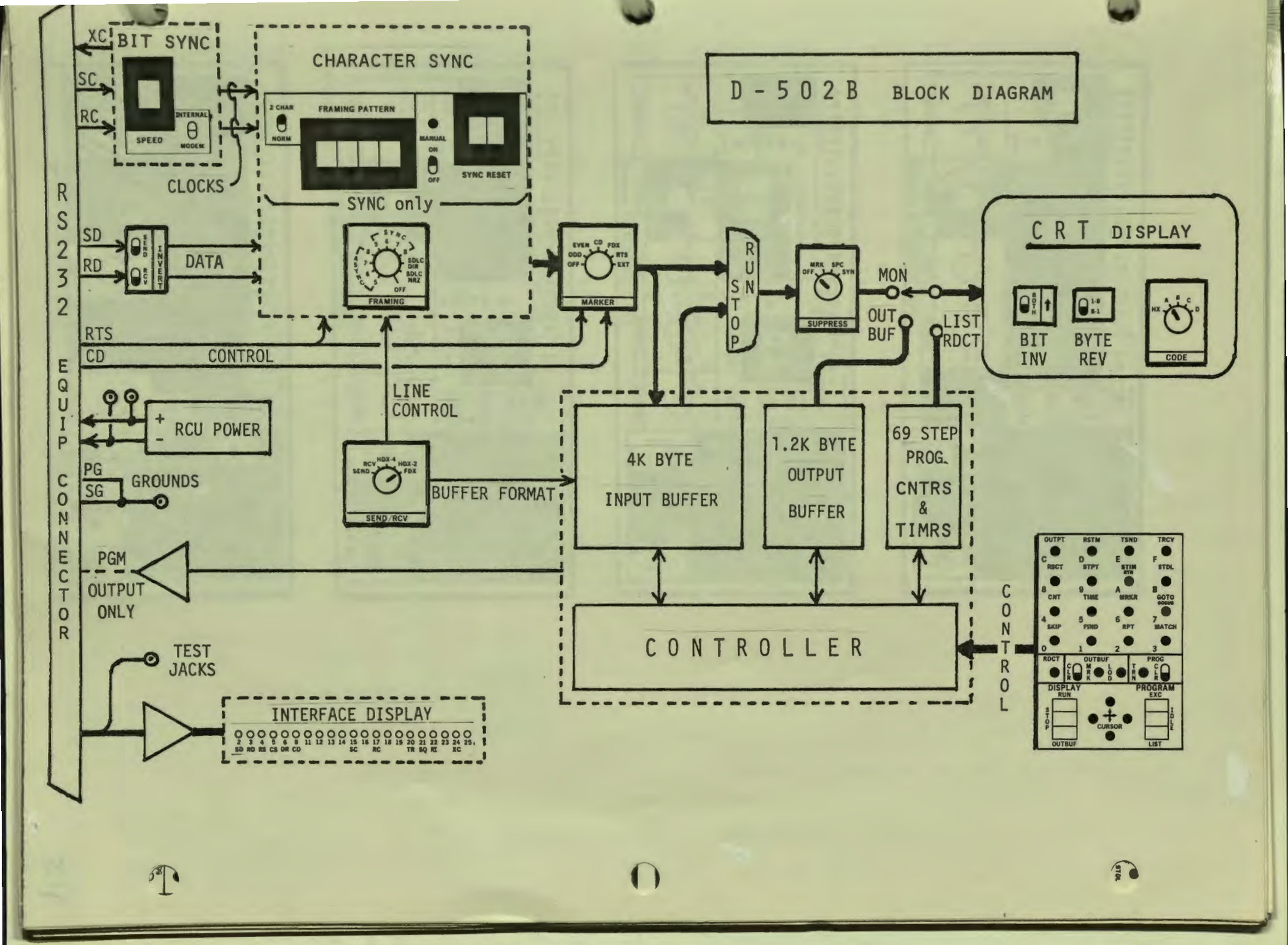


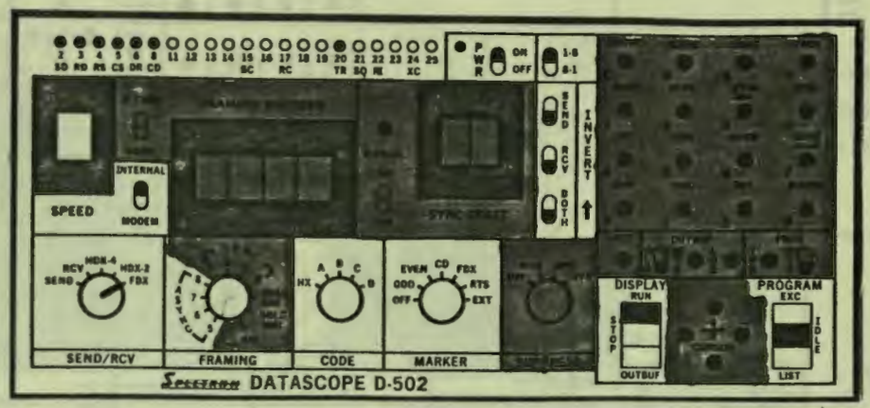


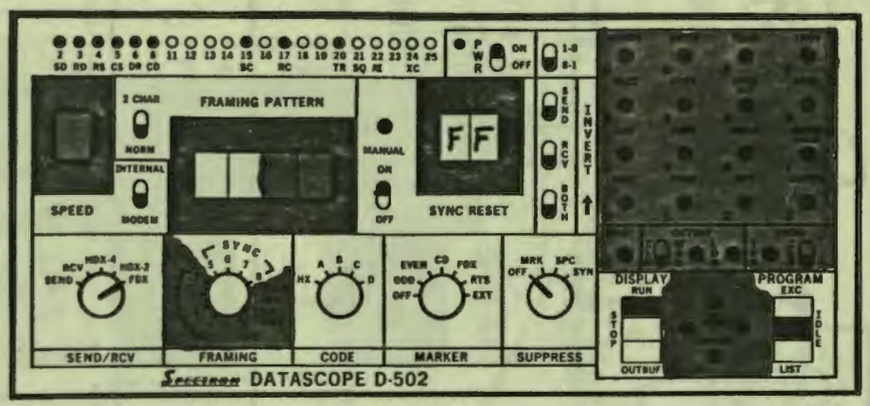


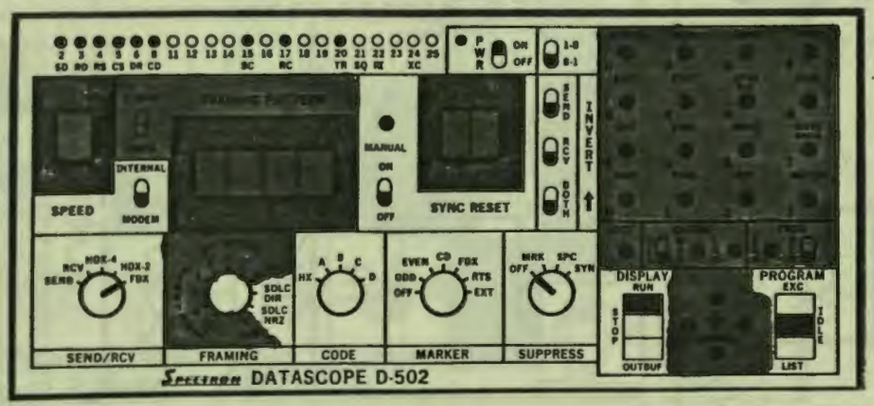


SPECTRON DATASCOPE D-502


D-502B BLOCK DIAGRAM
RS232 EQUIP CONNECTOR
XC
SC
RC
BIT SYNC
SPEED
INTERNAL
MODEM
CLOCKS
CHARACTER SYNC
2 CHAR
NORM
FRAMING PATTERN
MANUAL
ON
OFF
SYNC RESET
SYNC only
SD
RD
SEND
RCV
INVERT
DATA
FRAMING
MARKER
EVEN
ODD
OFF
CD
FDX
RTS
EXT
RUN
STOP
MRK
SPC
SYN
SUPPRESS
MON
OUT BUF
LIST RDCT
CRT DISPLAY
BIT INV
BYTE REV
CODE
RTS
CD
CONTROL
LINE CONTROL
+
-
RCU POWER
PG
SG
GROUNDS
RCV
SEND
HDX-4
HDX-2
FDX
SEND/RCV
BUFFER FORMAT
4K BYTE INPUT BUFFER
1.2K BYTE OUTPUT BUFFER
69 STEP PROG. CNTRS & TIMRS
CONTROLLER
CONTROL
PGM OUTPUT ONLY
TEST JACKS
INTERFACE DISPLAY
OUTPT
RSTM
TSND
TRCV
RDCT
STPT
STIM
STDL
CNT
TIME
MRKR
GOTO
SKIP
FIND
RPT
MATCH
OUTBUF
PROG
DISPLAY
RUN
PROGRAM
EXC
CURSOR
STOP
IDLE
LIST


SPEED
INTERNAL
MODEM
SEND
RCV
BOTH
INVERT
SEND/RCV
FRAMING
CODE
MARKER
DISPLAY
RUN
STOP
OUTBUF
PROGRAM
EXC
IDLE
LIST
SPECTRON DATASCOPE D-502


2 CHAR
NORM
FRAMING PATTERN
MANUAL
ON
OFF
SYNC RESET
SPEED
INTERNAL
MODEM
SEND
RCV
BOTH
INVERT
SEND/RCV
FRAMING
CODE
MARKER
SUPPRESS
DISPLAY
RUN
STOP
OUTBUF
PROGRAM
EXC
IDLE
LIST
SPECTRON DATASCOPE D-502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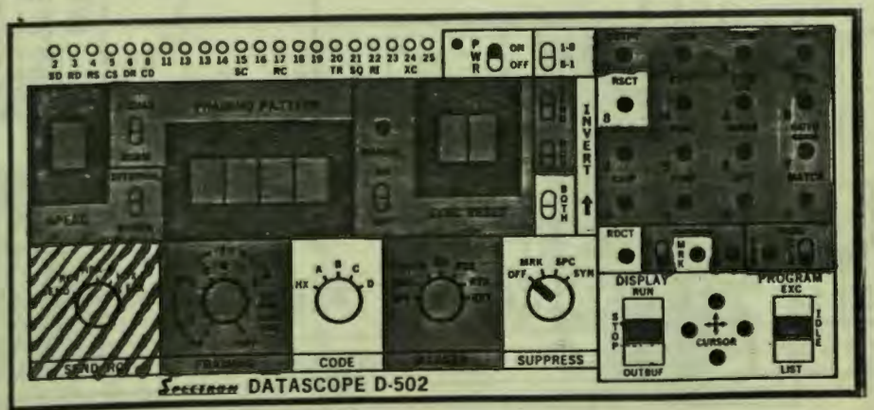
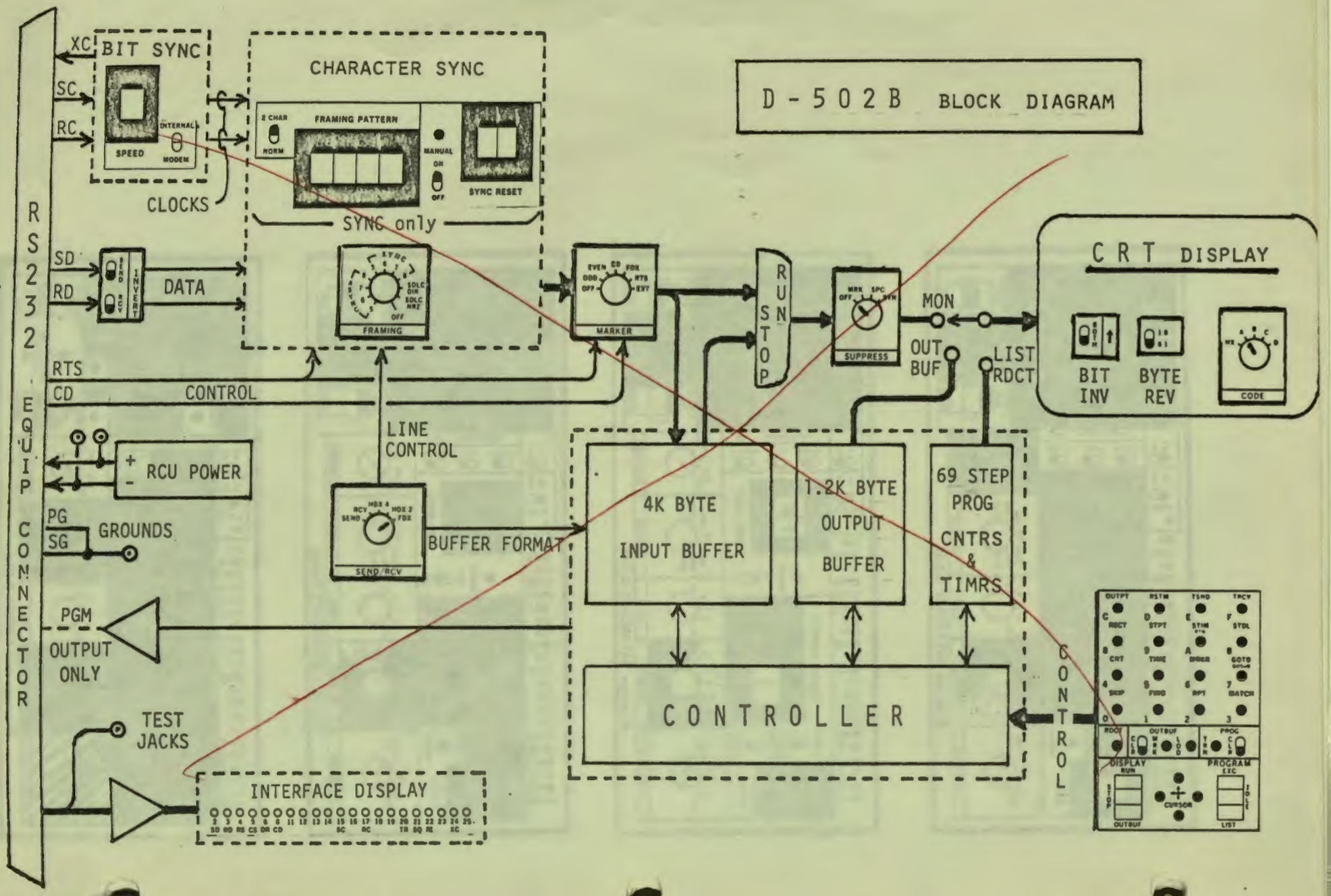
INTERNAL
MODEM
MANUAL
ON
OFF
SYNC RESET
SEND
RCV
BOTH
INVERT
SDLC DNR
SDLC NRZ
SEND/RCV
FRAMING
CODE
MARKER
SUPPRESS
DISPLAY
RUN
STOP
OUTBUF
PROGRAM
EXC
IDLE
LIST
SPECTRON DATASCOPE D-502


RSCT
RDCT
MRK
MATCH
INVERT
BOTH
CODE
SUPPRESS
DISPLAY
RUN
STOP
OUTBUF
CURSOR
PROGRAM
EXC
IDLE
LIST
SPECTRON DATASCOPE D-502


D - 5 0 2 B BLOCK DIAGRAM
RS232 EQUIP CONNECTOR
XC
SC
RC
BIT SYNC
SPEED
INTERNAL
MODEM
CLOCKS
CHARACTER SYNC
2 CHAR
NORM
FRAMING PATTERN
MANUAL
ON
OFF
SYNC RESET
SYNC only
SD
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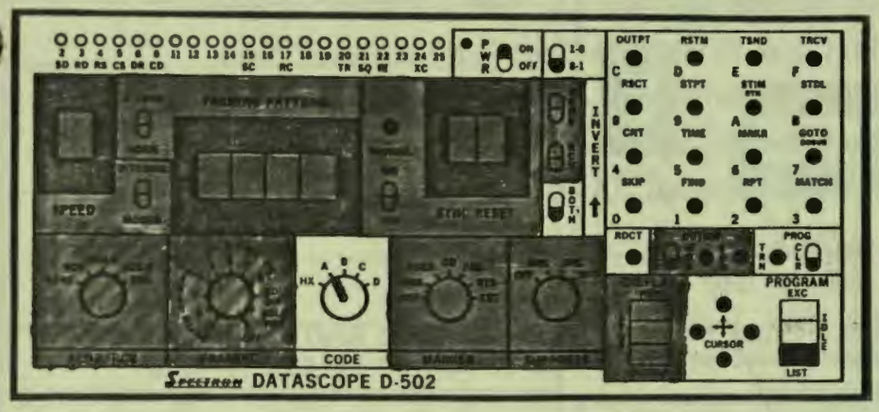
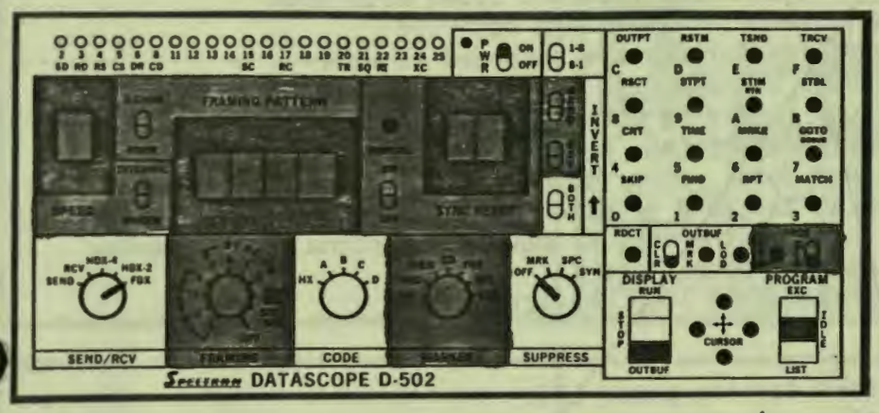
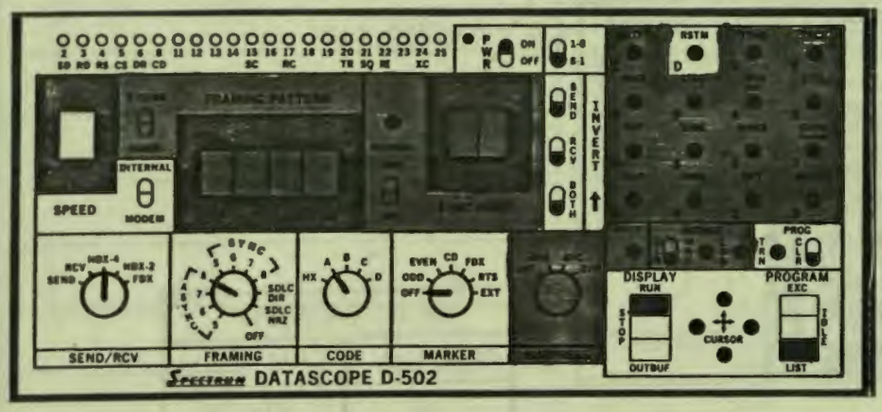
DATA
INVERT
FRAMING
MARKER
RUN
STOP
SUPPRESS
MON
OUT BUF
LIST RDCT
CRT DISPLAY
BIT INV
BYTE REV
CODE
RTS
CD
CONTROL
LINE CONTROL
RCU POWER
PG
SG
GROUNDS
SEND/RCV
BUFFER FORMAT
4K BYTE INPUT BUFFER
1.2K BYTE OUTPUT BUFFER
69 STEP PROG CNTRS & TIMRS
CONTROLLER
CONTROL
PGM
OUTPUT ONLY
TEST JACKS
INTERFACE DISPLAY
DISPLAY RUN
PROGRAM EXC
CURSOR
OUTBUF
LIST



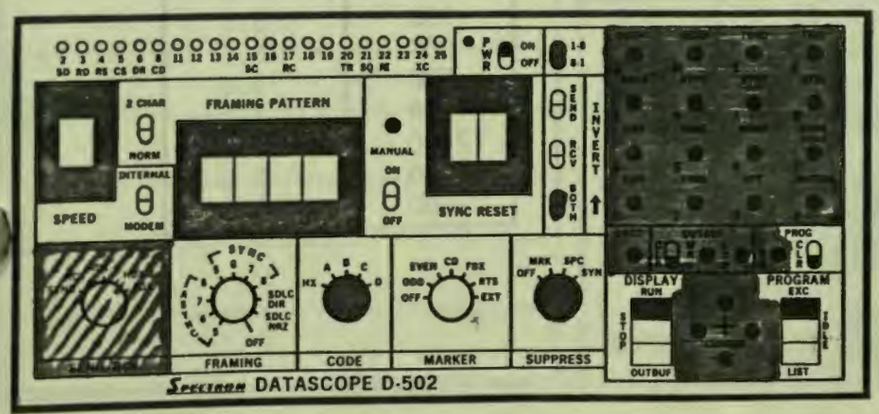
Spectron DATASCOPE D-502



Spectron DATASCOPE D-502



Spectron DATASCOPE D-502



Spectron DATASCOPE D-502

T-96 TAPE UNIT

The T-96 Digital Tape Unit records full-duplex SEND and RECEIVE data together with Carrier Detect and Request-to-Send EIA interface lead status on a standard DC-100 data cartridge at any data rate to 9600 bps. Recording requires only that the appropriate data clock selection be made on the attached Datascope, i.e. INTERNAL (A-P) or MODEM.

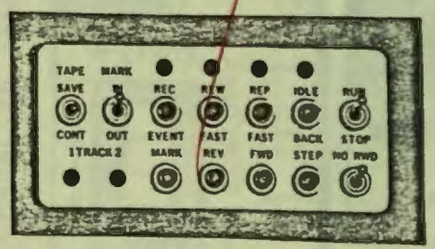
IDLE terminates Record, Rewind, or Replay operations
[unit must be IDLE before Tape may be removed]

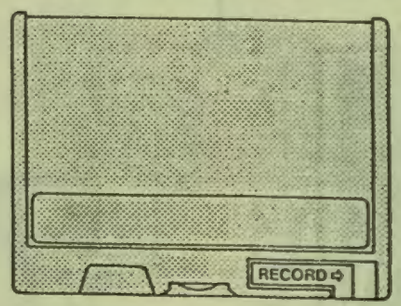
RECORD recording operation begins following an automatic Rewind to the beginning of tape or immediately if the NO REWIND switch is held on when RECORD is pressed
- RUN/STOP freezes the Datascope display without terminating recording
- EVENT MARKER causes "Markers" to be recorded along with data
- MARK IN/OUT if OUT, only manual markers are recorded
  if IN, Datascope markers are recorded as well
- TAPE SAVE/CONT CONT causes endless-loop recording until IDLE
  SAVE stops recording when tape is full

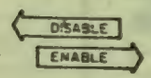
REWIND tape rewinds to beginning of tape and searches forward to the beginning of recorded data, then stops in REPLAY mode

REPLAY tape begins replay at the rate selected by the Datascope SPEED switch
- FAST FORWARD & REVERSE causes the tape to move at 3X normal rate--replay is inhibited during fast operations
- BACK STEP rewinds the tape about 1000 characters

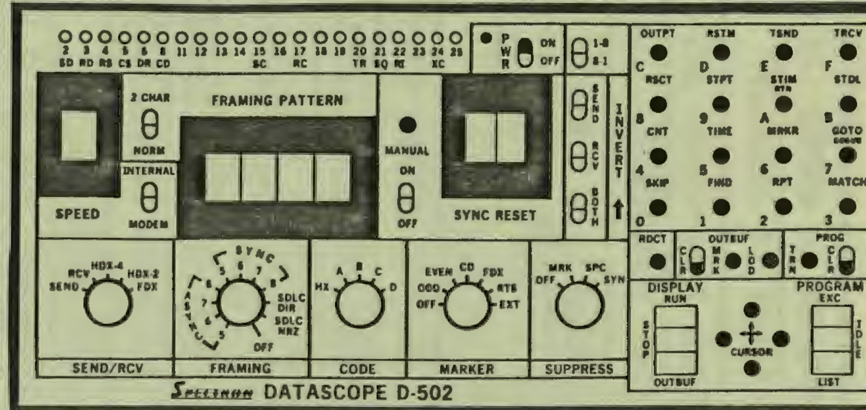
IMPORTANT
- Always remove tapes before turning power off
- Always IDLE the tape before removing
- Never REWIND or REPLAY an un-recorded tape
- Always REWIND before REPLAY after inserting a recorded tape
- Never turn power on when a tape is inserted
- Never force REPLAY past recorded data

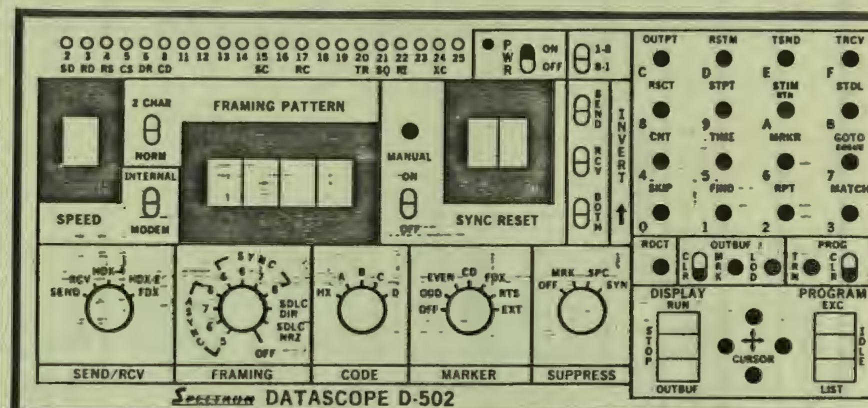






DATA CAPACITY	
RATE bps.	TIME min's
50	103.0
110	47.8
150	36.0
300	18.8
600	10.0
1200	5.8
2400	3.8
4800	2.8
9600	2.3


PWR ON OFF
1-8 8-1
FRAMING PATTERN
2 CHAR NORM
INTERNAL MODEM
SPEED
MANUAL ON OFF
SYNC RESET
SEND RCV BOTH
INVERT
OUTPT RSTM TSND TRCV
RSCT STPT STIM STDL
CNT TIME MRKR GOTO
SKIP FIND RPT MATCH
RDCT OUTBUF PROG
DISPLAY RUN STOP OUTBUF
PROGRAM EXC IDLE LIST
CURSOR
RCV HDX-4 HDX-2 SEND FDX
SYNC SDLC DIR SDLC NRZ OFF
HX A B C D
EVEN CD FDX ODD RTS OFF EXT
MRK SPC OFF SYN
SEND/RCV
FRAMING
CODE
MARKER
SUPPRESS
SPECTRON DATASCOPE D-502


PWR ON OFF
1-8 8-1
FRAMING PATTERN
2 CHAR NORM
INTERNAL MODEM
SPEED
MANUAL ON OFF
SYNC RESET
SEND RCV BOTH
INVERT
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RCV HDX-4 HDX-2 SEND FDX
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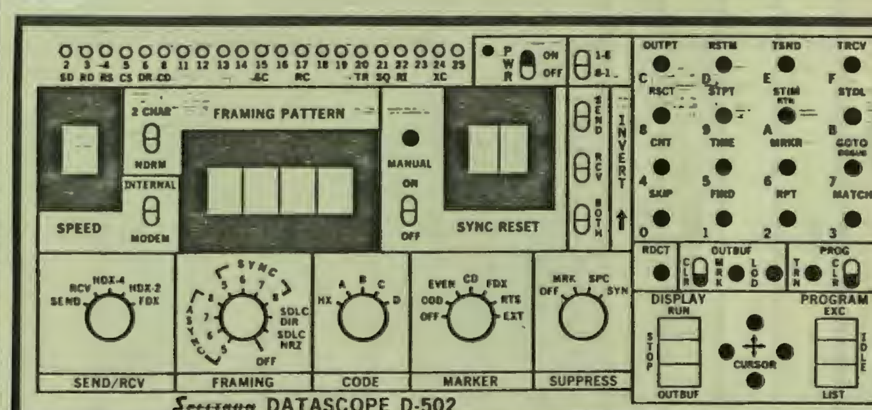
SEND/RCV
FRAMING
CODE
MARKER
SUPPRESS
SPECTRON DATASCOPE D-502


PWR ON OFF
1-8 8-1
FRAMING PATTERN
2 CHAR NORM
INTERNAL MODEM
SPEED
MANUAL ON OFF
SYNC RESET
SEND RCV BOTH
INVERT
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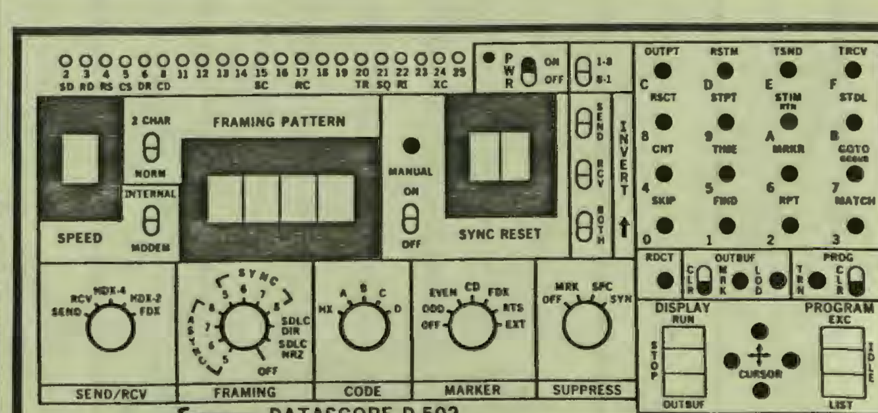
PROGRAM EXC IDLE LIST
CURSOR
RCV HDX-4 HDX-2 SEND FDX
SYNC SDLC DIR SDLC NRZ OFF
HX A B C D
EVEN CD FDX ODD RTS OFF EXT
MRK SPC OFF SYN
SEND/RCV
FRAMING
CODE
MARKER
SUPPRESS
SPECTRON DATASCOPE D-502


PWR ON OFF
1-8 8-1
FRAMING PATTERN
2 CHAR NORM
INTERNAL MODEM
SPEED
MANUAL ON OFF
SYNC RESET
SEND RCV BOTH
INVERT
OUTPT RSTM TSND TRCV
RSCT STPT STIM STDL
CNT TIME MRKR GOTO
SKIP FIND RPT MATCH
RDCT OUTBUF PROG
DISPLAY RUN STOP OUTBUF
PROGRAM EXC IDLE LIST
CURSOR
RCV HDX-4 HDX-2 SEND FDX
SYNC SDLC DIR SDLC NRZ OFF
HX A B C D
EVEN CD FDX ODD RTS OFF EXT
MRK SPC OFF SYN
SEND/RCV
FRAMING
CODE
MARKER
SUPPRESS
SPECTRON DATASCOPE D-502

D-502B INSTRUCTION SUMMARY

INSTRUCTION FORMAT	BRANCH TO (A)?	BUFFER CHAR PASSED ON	FUNCTION
TSND	NO	NEXT SEND CHAR	TEST SEND DATA ONLY
TRCV	NO	NEXT RCV CHAR	TEST RCV DATA ONLY
SKIP	NO	NEXT ONE	IGNORE ONE CHAR
FIND (x)	NO	FIRST (X) FOUND	LOCATE 1ST (X) CHAR
RPT (X)	NO	FIRST NON-(X) FOUND	LOCATE 1ST NON-(X) CHAR
MATCH OR (A):(X_{1-10})	ON MIS-MATCH	1ST MIS-MATCHED CHAR	TEST FOR STRING (X_{1-10}) (MAY BE STACKED)
	NOT IF MATCH	CHAR AFTER LAST MATCHED	
MCHGO (A):(X_{1-10}) MATCH+GOTO	ON MIS-MATCH	1ST MIS-MATCHED CHAR	TEST FOR STRING (X_{1-10}) (FOR ASYNC DATA)
	NOT IF MATCH	CHAR LAST MATCHED	
CNT (N):(A) IF (C)	IF COUNT = (C)	NO CHANGE	INCREMENT AND TEST COUNTER
RSCT (N)	NO	NO CHANGE	RESET COUNTER (N)
TIME (N):(A) IF (T)	IF TIME = (T)	NO CHANGE	START AND TEST TIMER (N)
ITMR :(A) WHEN (T)	WHEN TIME = (T)	NO CHANGE	START INTERUPT TIMER (N-5)
STPT (N)	NO	NO CHANGE	STOP TIMER (N)
RSTM (N)	NO	NO CHANGE	RESET TIMER (N)
RITMR	NO	NO CHANGE	RESET INTERUPT TIMER (N-5)
MRKR (A)	IF CHAR MARKED	NO CHANGE	TEST FOR MARKED CHAR
GOTO (A)	UN-CONDITIONAL	NO CHANGE	GO TO STEP (A)
GOSUB (A)	UN-CONDITIONAL	NO CHANGE	GO TO SUBROUTINE AT (A)
RET	UN-CONDITIONAL	NO CHANGE	RETURN FROM SUBROUTINE
STIM	NO	NO CHANGE - PGM STOPS	STOP IMMEDIATE
STDL	NO	NO CHANGE	LOAD 1024 CHARS THEN STOP
OUT T (#IEDC):(X_{1-10})	NO	NO CHANGE	OUTPUT TO TERMINAL (RCV)
OUT M (#IER) :(X_{1-10})	NO	NO CHANGE	OUTPUT TO MODEM (SEND)

PROGRAM TRANSFERS

PROGTRN TO LINE

SET: SPEED TO "MODEM" OR
AN INTERNAL SPEED
SEND/RCV TO "HDX-4"
FRAMING TO "ASYNC-8"

CONNECT MODEM TO D-502
"MODEM" CONNECTOR

PRESS PROGTRN TO TRANSMIT

PROGTRN FROM LINE

SET: SPEED TO "MODEM"
SEND/RCV TO "HDX-4"
FRAMING TO "ASYNC-8"

CONNECT LINE OUTPUT TO
EITHER D502 CONNECTOR
PRESS "D" WHEN READY

WHEN DESIRED PROGRAM IS
DISPLAYED, PRESS PROGTRN
TO LOAD

PROGTRN TO T-511

SET: SPEED TO "P,INTERNAL"
SEND/RCV TO "HDX-4"
FRAMING TO "ASYNC-8"
CONNECT TAPE INPUT TO
EITHER D502 CONNECTOR
CONNECT D502 "MRKR OUT"
TO TAPE "MRKR IN-"
SET TAPE TO "Ø-11,MODEM"
PRESS "RECORD" AND WAIT
FOR TAPE TO STOP
PRESS PROGTRN TO RECORD

PROGTRN FROM T-511

SET: SPEED TO "MODEM"
SEND/RCV TO "HDX-4"
FRAMING TO "ASYNC-8"

CONNECT TAPE OUTPUT TO
EITHER D502 CONNECTOR
PRESS "D" WHEN READY
THEN REPLAY TAPE NORMALLY
WHEN DESIRED PROGRAM IS
DISPLAYED, PRESS PROGTRN
TO LOAD

PROGTRN TO T-96

SET: SPEED TO "MODEM"
SEND/RCV TO "HDX-4"
FRAMING TO "ASYNC-8"

T-96 MARK SWITCH TO "IN"

PRESS "RECORD" AND WAIT
FOR TAPE TO STOP
PRESS PROGTRN TO RECORD

PROGTRN FROM T-96

SET: SPEED TO "P,INTERNAL"
SEND/RCV TO "HDX-4"
FRAMING TO "ASYNC-8"

PRESS "D" WHEN READY
THEN REPLAY TAPE NORMALLY
WHEN DESIRED PROGRAM IS
DISPLAYED, PRESS PROGTRN
TO LOAD

PROGTRN TO PSA

SET: SPEED TO "F,INTERNAL"
SEND/RCV TO "HDX-4"
FRAMING TO "ASYNC-8"
CONNECT: EIA CABLE FROM
RCU/BUS MACH TO DB-25S
PSA JACKS "AUX TO AUX"
SET PSA/RECORDER = "RECORD"
START TAPE RECORDER
AND WAIT 5 SECONDS
PRESS PROGTRN TO RECORD

PROGTRN FROM PSA

SET: SPEED TO "MODEM"
SEND/RCV TO "HDX-4"
FRAMING TO "ASYNC-8"
CONNECT: EIA CABLE FROM
RCU/BUS MACH TO DB-25S,
PSA JACKS "EAR TO MON."
PRESS "D" WHEN READY
THEN REPLAY TAPE NORMALLY
WHEN DESIRED PROGRAM IS
DISPLAYED, PRESS PROGTRN
TO LOAD

KEY TO D-502 INSTRUCTIONS

(X) A SINGLE HEX CHARACTERS	(X1-10) 1 TO 10 HEX CHARACTERS
(A) PROGRAM STEP NO (01-69)	(N) COUNTR NO (1-4) OR TIMER NO (1-5)
(C) COUNT LIMIT (0000-9999)	(T) TIME LIMIT (00.000-59.999 SEC)
(#) MESSAGE NO (0=INSTRUCTION ONLY),(1-F= INSTRUCTION WITH OUTBUF MSG 1-F)	
(I) ITERATIONS (0=CONTINUOUS),(1-9 ITERATIONS)	
(E) EXECUTION (0=WAITS TIL OUTPUT DONE; 1=GO IMMEDIATELY TO NEXT STEP)	
(R) RTS (0=ON CONTINUOUS; 1=SWITCHED)	
(D) CTS DELAY (0=ON; 1=7.5 MS; 2=50 MS; 3=150 MS; 4=200 MS)	
(C) CD (0=ON CONTINUOUS; 1=SWITCHED)	

INTERNAL SPEEDS

A	50
B	74.2
C	110
D	134.5
E	150
F	300
G	600
H	1050
I	1200
J	1800
K	2000
L	2400
M	3600
N	4800
O	7200
P	9600

CRC OPTION

CRC 1	$X^{16}+X^{15}+X^{2}+1$	CRC/16
CRC 2	$X^{16}+X^{12}+X^{5}+1$	SDLC
CRC 3	$X^{8}+1$	LRC/8 NO PARITY*
CRC 4	$X^{8}+1$	LRC/8 ODD PARITY*
CRC 5	$X^{8}+1$	LRC/8 EVEN PARITY*

* REFERS TO THE LRC CHARACTERS PARITY

1 PRESS & HOLD RDCT
2 PRESS 0 & ENTER EXCLUDED CHRS
3 PRESS 1-5 FOR CRC SELECTION
4 RELEASE RDCT
5 MARK LAST CHAR OF BLOCK (ETX)
6 PLACE CURSOR AT 1ST CHAR
7 PRESS RDCT TO VERIFY CRC

RS-232C INTERFACE SIGNAL DEFINITIONS

VOLTAGE	STATE	CONDTN	FUNCTN	SYMBOL
≥ +3 V	"0"	SPACE	ON	+
≤ -3 V	"1"	MARK	OFF	-

INTERFACE CONFIGURATIONS

CONFIG.	PIN 2 SD	PIN 3 RD	PIN 4 RTS	PIN 5 CTS	PIN 6 DSR	PINS 8 & 21 CD & SQ	SPEED SWITCH	PIN 15 (SCT)	PIN 17 (SCR)	PIN 24 (SCTE)	SD CLOCKED IN BY	RD CLOCKED IN BY	SD CLOCKED OUT BY	RD CLOCKED OUT BY
MONITOR	BRIDGED· SD INPUT	BRIDGED· RD INPUT	BRIDGED· RTS INPUT	BRIDGED· NOT USED	BRIDGED· NOT USED	BRIDGED· CD INPUT	INTERNAL	BRIDGED· NOT USED	BRIDGED· NOT USED	BRIDGED· NOT USED	INTERNAL SEND CLOCK	INTERNAL RCV CLOCK	–	–
							MODEM	BRIDGED CLOCKS SD IN	BRIDGED CLOCKS RD IN	BRIDGED NOT USED	SCT PIN 15	SCR PIN 17	–	–
TO MODEM	DRIVEN SD OUTPUT* (ENABLED BY CTS)	TERMINATED RD INPUT	DRIVEN RTS OUT· PUT*	TERMINATED CTS INPUT (MUST BE ON FOR SD OUT)	TERMINATED NOT USED	TERMINATED CD INPUT	INTERNAL	TERMINATED NOT USED	TERMINATED NOT USED	DRIVEN BY INTERNAL SEND CLOCK	INTERNAL SEND CLOCK	INTERNAL RCV CLOCK	INTERNAL SEND CLOCK	–
							MODEM	TERMINATED CLOCKS SD IN AND OUT	TERMINATED CLOCKS RD IN	DRIVEN CONSTANT LOW	SCT PIN 15	SCR PIN 17	SCT PIN 15	–
TO TERMINAL	TERMINATED SD INPUT	DRIVEN RD OUTPUT	TERMINATED RTS INPUT	DRIVEN CTS OUTPUT	DRIVEN CONTINUOUS HI, ON	DRIVEN CD & SQ OUTPUT*	INTERNAL	DRIVEN BY INTERNAL SEND CLOCK	DRIVEN BY INTERNAL RCV CLOCK, CLOCKS RD OUT	TERMINATED NOT USED	INTERNAL SEND CLOCK	INTERNAL RCV CLOCK	–	INTERNAL RCV CLOCK
							MODEM	DRIVEN BY SCTE, PIN 24	DRIVEN BY INTERNAL RCV CLOCK, CLOCKS RD OUT	TERMINATED CLOCKS SD IN DRIVES SCT, PIN 15	SCTE PIN 24	INTERNAL RCV CLOCK	–	INTERNAL RCV CLOCK

"BRIDGED" MEANS AN INPUT, CONNECTED TO A HIGH IMPEDANCE (ABOUT 30KΩ)
"TERMINATED" MEANS AN INPUT CONNECTED TO A PROPER EIA TERMINATING IMPEDANCE (ABOUT 4KΩ)
"DRIVEN" MEANS AN OUTPUT SUPPLIED FROM AN EIA DRIVER (± 12 VOLTS)
ALL SIGNALS LISTED ABOVE ARE INCLUDED IN THE LED DISPLAY
*INDICATES OUTPUT SIGNALS ALSO INTERNALLY CONNECTED AS DISPLAY AND PROCESSOR INPUTS.

Program Development Rules and Examples

There are two very simple, but very necessary rules to remember anytime a program is written for the 501/502. If these rules are not followed, the program will not give the results expected.

Rule No. 1:

The 501/502 Datascopes are character oriented devices as far as programs are concerned

The line data, which is bit by bit, is blocked into eight (8) bit characters and stored in the main buffer. In the case where less than eight (8) bits are chosen on the framing switch, the required number of fill bits, zero's (0) are added to the data bits to equal eight, then the character is stored. Therefore, anytime an instruction fetches or counts characters, it is doing so on eight (8) bit characters.

Rule No. 2:

The read pointer must be moved by the program instructions such that it is kept within 2K or 4K of the load pointer.

This is the rule that must be followed in order for the program to run. If this rule is not followed, a message will appear telling the user that program execution has been stopped.

To better explain Rule No. 2, the user should be aware that the program runs on stored buffer data only and that the data in the case of a 502 only, will also include output data.

The main buffer, either 2K or 4K, is loaded sequentially from the line into locations pointed to by the load pointer. The load pointer will wrap around the buffer continuously until told to stop by either a program instruction (i.e., STIM or STDL) or by the front panel RUN/STOP switch. The load pointer

is not controllable by any other program instruction and will store a character every time one is present on the line.

The second pointer in the main buffer is called the read pointer. This pointer is totally under program control, and will only increment when an instruction fetches a character. The read pointer starts equal to the load pointer at the instant program execution begins, and then must be kept within the limit of the buffer (i.e., either 2K or 4K) of the load pointer. If the load pointer ever gets a full buffer ahead of the read pointer, such that the next character would overrun the read pointer, program execution is halted and a message appears on the screen telling the operator that his program is incorrect for the incoming data.

The instructions used to increment the read pointer are those which fetch a new character. They are:

1. TSND or TRCV - fetch a new character anytime the one passed to them is from the other side of the line.

2. SKIP - fetches the next character from the same side of line.

3. FIND X - examines each character until one is found to equal X and passes the equal X character to the next instruction.

4. RPT X - examines each character until one is found that doesn't equal X, and passes the first non-equal X character to the next instruction.

5. MATCH or SS x,y,z - compare character with X, if equal fetch next one and compare it with y, if equal, fetch next character and compare with z. If any character fails, send it to step No. SS. On a successful match, fetch the next character and pass it to the next instruction.

6. MCHGO or SS x,y,z - Works like above, except that on a successful match, the last character matched will be given to the next instruction.

These are all of the instructions that fetch characters and, therefore, move the read pointer. These instructions will fetch new characters from the buffer examined. None of the other instructions will fetch any characters or increment the read pointer.

For example, we will use a very simple program and go through the character passing involved.

Example I

Line Data:

SEND FF FF FF 3_2 3_2 4_0 4_0 7_F 7_F 2_D FF FF FF

RCV FF FF FF FF FF FF FF FF FF FF FF FF FF

Program:

Step		
01	TSND	
02	FIND 3_2	
03	RPT 3_2	
04	MATCH or 02	4_0 4_0 7_F 7_F 2_D
05	STIM	

When the program switch is moved to execute, the first send data character is fetched. This moves the read pointer to the next character. The first character fetched (FF) is passed to Step 02, FIND 32, it is compared with 32, found to be not equal. The find instruction fetches the next character (FF) compares it, and finds it not equal. The FIND instruction fetches the next character (FF) which is also not equal. The next character is fetched (32) which equals the X value of the FIND and is, therefore, passed to the next instruction,

RPT 32. The repeat examines the character (32) which is equal to its X value, so the next character is fetched (32). This one is also equal. The next character is fetched (40). This is not equal so it is passed to the next instruction. The MATCH instruction takes the 40 and compares it with the first character in its match string. It is equal, so it fetches the next character (40) and compares it. It is equal, so the next character is fetched (7F) and compared. It matches, so the next one is fetched (7F). It also matches, so the next one is fetched (2D). It also matches. The entire string has now been matched. The MATCH instruction fetches the next character (FF) and passes it on to the next instruction. The next instruction is a STIM which causes the screen to stop with an inverted image display over the first character after the match, which is an (FF).

This example shows the character passing and instruction execution required to keep the read poiner moving and within the limit of one buffer of the load pointer.

Use the same program, but the data flow has changed to the following:

Example II

Line Data:

SEND FF FF FF 3_2 3_2 4_0 4_0 6_0 6_0 2_D F_F F_F

RCV FF FF FF FF FF FF FF FF FF FF FF FF

Program:

Step		
01	TSND	
02	FIND 3_2	
03	RPT 3_2	
04	MATCH or 02	4_0 4_0 7_F 7_F 2_D
05	STIM	

The program begins the same way, by fetching the first (FF) character and passing it to the FIND 32 instruction. The (FF) fails to equal X, therefore the next character (FF) is fetched, which fails. The next (FF) is fetched and also fails. The (32) is fetched which equals the X value of the FIND instruction and is passed on to the RPT 32 instruction. The RPT 32 fetches the next (32) and also is equal. The (40) is fetched and found not equal to X and is passed on to the MATCH. The (40) is equal to the first character of the match string. The next (40) is fetched by the match and is equal to the second character of the match string. The MATCH fetches the (60) and is found not equal. This (60) is then passed to the MATCH default address (02). The program now starts again with the FIND 32 instruction failing on the (60) which was passed to it.

The important thing to remember is that once the read pointer has passed a character it cannot be backed up. Therefore, if a match instruction fails in the middle of its string, all characters before the failed one are not available for any further checks by any instructions.

11.0 DESCRIPTION OF INSTRUCTIONS

User instructions are of three types. Data Analysis Instructions are those that act on data stored in the main buffer; Test and Control Instructions act to test, time, or count events of interest and control DATASCOPE operation; and the Output Instruction establishes the configuration of the EIA interface and delivers output data.

The following discussion is intended to make clear the details of each instruction's function. To do this precisely, the descriptions may include reference to operating program and hardware details (pointers, registers, etc.). These details are included for clarity only and need be of no concern to the user once the function of the instruction is understood. Indeed, the actual implementation of user instructions may be quite different from that implied by these descriptions, but the function of each instruction is nevertheless accurately described.

References to "the buffer" should be taken to mean the main data buffer, unless otherwise specically stated.

11.01 BASIC FACTS

1. The user program that analyzes the stored data stream is actually a background program that runs only when no interrupt is present. However, interrupts result only from the arrival of a new character to be stored, the need to update a timer, or a manual stop, so the user program runs most of the time.

2. Incoming characters from the line or from the D-502B's own output are loaded into the buffer by program interrupt at the location specified by a load pointer.

3. The load pointer progresses sequentially through the buffer and wraps around continuously.

4. The user program takes characters from the buffer location specified by a read pointer.

5. The read pointer progresses sequentially through the buffer, always remaining behind (or abreast of) the load pointer. It is always subject to waiting, if necessary, for the load pointer to advance first if the two pointers are abreast.

6. Because some instructions take longer to execute than others, the read pointer may sometimes fall behind the load pointer. This is especially true at high data rates, where loading the buffer occupies a large part of the available processor time. If the read pointer ever falls

so far behind as to be overtaken by the load pointer, program execution stops automatically and an alarm message is displayed. This condition can sometimes be improved by reprogramming to eliminate the more time-consuming instructions. Relative execution time numbers are therefore shown beside each instruction. Higher numbers indicate the more time-consuming instructions.

7. The program operates on only one side of the line at any time. The desired side of the line must be specified in every user program (by a TSND or TRCV instruction) before the first instruction that operates on data.

11.02 DATA ANALYSIS INSTRUCTIONS

These are instructions that act on the data in the buffer. Each instruction receives a data character passed down to it from the preceding instruction in the program. It may pass on that character to the next instruction or it may discard it and fetch one or more new characters from the buffer, incrementing the read pointer with each character fetched until the current instruction is complete and the proper character is passed to the next instruction in the program. An awareness of this character-passing is essential to the effective use of the D-502B.

TSND -- Establishes the send leg of the line as the one which subsequent instructions will operate. (3)

Examines the character passed down to it by the previous instruction. If that character was from the send leg, it is passed on at once to the next instruction. If not, succeeding characters are fetched from the buffer until a send character is found and passed on.

TRCV -- Causes subsequent instructions to operate on the receive leg of the line. (4)

Operation is the same as TSND except that a receive character is required.

SKIP -- Ignores one character and passes on the next. (2)

Discards the character passed to it by the previous instruction and fetches the next character from the buffer. If that character was from the same side of the line as the one just discarded, it is passed at once to the next instruction. If not, succeeding characters are fetched from the buffer until a character from the "right" side of the line is found and passed on.

FIND X -- Ignores all characters until X is found; passes on the first character that matches with X. (3)

Compares the character passed down to it by the previous instruction with "X", and passes it on to the next instruction if they match. If not, that character is discarded, and the next character is fetched from the buffer. If the new character was from the same side of the line as the one just discarded, it too is tested for a match with "X". If it is from the "wrong" side of the line or if it does not match with "X", it too is discarded, and the process repeats until a character from the "right" side of the line is found that matches with "X". That character is then passed on to the next instruction.

RPT X -- Finds first non-X character and passes it on. (3)

Compares the character passed to it by the previous instruction with "X", and passes it on to the next instruction only if they do not match. If they do match, that character is discarded, and the next character is fetched from the buffer. If the new character was from the same side of the line as the one just discarded, it too is tested for a match with "X". If it is from the "wrong" side of the line or if it matches with "X", it too is discarded, and the process repeats until a character from the "right" side of the line is found that does not match with "X". That character is then passed on to the next instruction.

MATCH OR uv: X, Y, Z, ... -- Matches the string X, Y, Z, ... or jumps to program step uv on a mismatch. (3 ea. char.)

Compares the character passed to it by the previous instruction with "X". If they do not match, the program jumps to step "uv", and the same character is passed on to the next instruction. If they do match, then the next character (from the "right" side of the line) is fetched from the buffer and compared with "Y". Again, a mismatch produces a jump, and the character passed on is the one that failed to match. If the characters did match, then the process is repeated with "Z" and all succeeding characters in the string. The process continues until either a jump occurs or the last character of the string is matched. When this happens, the next character from the "right" side of the line is fetched and passed on to the next instruction. Thus, a mismatch passes on the first character that does not match, while a complete match passes on the character just after the last one in the matching string.

NOTE: The sequence to be matched may be up to 10 characters long, but MATCH instructions may be stacked without (practical) limit. Match instructions may also be "chained" through jumps. Here a limit is imposed by timing considerations, depending on the speed of the data.

MCHGO OR uv: X, Y, Z, ... -- Matches the string X, Y, Z, ... or jumps to program step uv on a mismatch. (3 ea. char.)

This optional form of the MATCH instruction does not wait to fetch a new character from the data stream after completion of the match, but instead passes the last character match to the next instruction and goes on at once with the rest of the program. Thus, when the MATCH and GO option is used, it is necessary to repeat the last character of a previous MCHGO as the first character of the next. Similarly, it may be necessary to insert SKIP instructions to dispose of the redundant character passed by the MATCH and GO option.

The MCHGO option is useful where the very last character in a data stream is to be matched and will not normally be used unless this feature is required. Entry of this instruction in a program requires depression of two push-buttons in sequence: first MATCH, then GOTO. Depression of MATCH lists the normal MATCH instruction; subsequent depression of GOTO changes the listing to MCHGO.

11.03 TEST AND CONTROL INSTRUCTIONS

These instructions are used to test, time, or count events of interest, to reset counters and timers, and to exert absolute (unconditional) control over the system operation and machine status. While these instructions may examine data, they never fetch new characters from the buffer. They always pass on to the next instruction the same character they receive from the previous instruction.

MRKR uv -- Jumps to program step uv when marker occurs. (2)

Examines the marker bit of the character passed to it by the previous instruction. If the marker bit is a "0", the program proceeds to the next step; if a "1", the program jumps to step "uv". (As with all test and control instructions, the same character is passed on to the next instruction.)

CNT c: uv IF mnpr --. (12)

Increments counter "c" then tests count. If count "c" = "mnpr", program jumps to step "uv". If count "c" ≠ "mnpr" program proceeds to next step. Count stops at 9999 -- does not recycle.

RSCT c -- Resets counter "c". (3)

(Counters are not automatically reset when program starts or stops. Counters may be reset individually only by this instruction, or collectively by the RSCT button when the display is stopped.)

TIME t: uv IF mn.prs --. (10)

Tests timer "t", then starts it if it is not already running. If time "t" ≥ "mn.prs" (seconds), program jumps to step "uv". If time "t" < "mn.prs", program proceeds to next step. Timers repeat at 65.535.

CAUTION: The TIME instruction must be executed in order to sense the reading of a timer. Thus the program must provide for execution often enough to ensure sensing a timer before it recycles at 65.535 seconds.

STPT t -- Stops timer "t" without resetting it. (5)

(Timers are all stopped without resetting when the program stops.)

RSTM t -- Resets timer "t" and stops it if it was running. (3)

(Timers are all reset when the program starts.)

Note: Counters are 4-digit decimal. Timers have a resolution of 1 ms and a range of 00.000 to 65.535 seconds (decimal). There are four counters, numbered 1 through 4, and four timers, also numbered 1 through 4.

STIM -- Stop Immediate (2)

Terminates user program and buffer loading at once. To enter this instruction two pushbuttons must be depressed in sequence: first STIM/RET, then 0.

STDL -- Stop Delayed. (2)

Terminates user program at once. Buffer loading continues until Load Pointer is 1024 characters ahead of Read Pointer and then stops.

Note: Empty steps in the program listing will be skipped. A "STIM" will be executed automatically after Step 68.

GOTO uv -- Unconditional jump. (1)

Causes program to jump to step "uv". The character received from the previous instruction is passed to the instruction at the jump address. To enter this instruction in a program two pushbuttons must be depressed in sequence: first GOTO/GOSUB, then 0.

GOSUB uv -- Unconditional jump to a subroutine: (7)

Causes program to jump to step "uv" and store the GOSUB +1 address for use by the companion RET (return) instruction.

The character received from the previous instruction is passed to the instruction at the jump address. To enter this instruction in a program two pushbuttons must be depressed in sequence: first the GOTO/GOSUB, then 1.

RET -- Return from a subroutine. (6)

Returns to the point in the main program from which the companion GOSUB instruction jumped and begins executing with the instruction immediately following the GOSUB. The character received from the previous instruction is passed to that next instruction. To enter the RET instruction in a program, two pushbuttons must be depressed in sequence: first, STIM/RET, then 1.

Note: Subroutine nesting is permissible without (practical) limit. Excessive or incorrect nesting will result in an alarm message when running the program.

11.04 OUTPUT INSTRUCTIONS

The output instruction, in addition to specifying the interface configuration to be used, also contains parameters for selecting: a single message from among the nine which may be defined in the Output Buffer, the number of iterations the instruction must complete before termination, simultaneous execution, the clear-to-send delay where applicable, and switched or continuous carrier. In addition, the output instruction may contain its own message up to ten characters long which precedes the numbered message from the Output Buffer in the transmission sequence.

11.04.01 Entering Output Instructions

Depression of the OUTPT button while in the list mode presents a partial format and an inquiry to the operator as to whether he wishes the TO MODEM or TO TERMINAL configuration. Response is made by depressing either the "E" or "F" button on the keyboard, and the appropriate format is then displayed in full. Continued keying fills in the format as with other instructions, and instruction entry is terminated with the cursor control.

11.04.02 Executing Output Instructions

Output instructions are executed in sequence as they appear in the program listing. After initiation of an output instruction, and depending on the instruction option selected, the program may wait for the output to terminate or go immediately on to the next instruction listed and continue normal execution. The output instruction runs independently to completion and terminates automatically. The output instruction passes the same character to the succeeding instruction as it received from the previous instruction.

11.04.03 Simultaneous Operation

Normally, the output instruction, once initiated, runs simultaneously with subsequent instructions in the program listing (except for other output instructions). However, such simultaneous operation may be undesirable in some situations and may not be possible at high data rates. In this event, an option is provided in the output instruction which allows it to run alone with all other processor activity suppressed (except for timers).

11.04.04 Stacking Output Instructions

If the program encounters a new output instruction before the current one is complete, it waits at that point for the current instruction to output the last character and appends the data from the new output instruction to the previous one without altering the configuration of the previous output instruction.

11.04.05 Output Speed and Framing

Output speed, clock source and framing are selected by front panel switches. Table 1 shows the source of output clock for various situations and configurations.

11.04.06 Interface Configurations

(See paragraph 8.0).

11.04.07 Output Instruction Formats

OUT C #ier .....
OUT C #iedc .....

C = Configuration, M or T (M=To modem; T=To Terminal)

= Message number, 0-9 (0= data from instruction only)

i = Number of iterations, 0-9 (0 = continuous)

e = Program execution during output (0 = Program Waits
1 = Program Runs)

d = CTS Delay (0 = continuous ON; 1 = 7.5 ms; 2 = 50;
3 = 150; 4 = 200)

c = Receive carrier (0 = switched; 1 = continuous ON)

r = RTS (0 = switched; 1 = continuous ON)

Dots indicate empty positions to be filled with data by manual entry. Cues at top of screen guide all entries.

CRC/LRC OPTION

The CRC/LRC option for the Model D-502B provides for the calculation of redundancy-check characters for data stored in either its input buffer or output buffer. The option also provides means for excluding chosen characters from the calculation and for automatically appending the calculated CRC/LRC characters to an output-buffer message. The CRC/LRC types included with the option are those listed below; others will be added as the requirement arises.

Datascope Display Code	Related Polynomial	Common Application
CRC 1	$X^{16} + X^{15} + X^{2} + 1$	CRC/16
CRC 2	$X^{16} + X^{12} + X^{5} + 1$	SDLC
CRC 3	$X^{8} + 1$	LRC/8 no parity*
CRC 4	$X^{8} + 1$	LRC/8 odd parity*
CRC 5	$X^{8} + 1$	LRC/8 even parity*

The sequence of operation to perform CRC/LRC calculation for each buffer is outlined below. Each operation is described in detail in Table 2, which is keyed by step to the following text.

INPUT BUFFER

A. Trap the data of interest in the input buffer.
B. Define the data block for CRC/LRC calculation by inserting a marker on the last character of the block and positioning the cursor under the first character of the block.
C. If any characters are to be excluded from the calculation, enter those characters.
D. Select the CRC/LRC type.
E. Calculate the check characters.

OUTPUT BUFFER

A. Load the wanted data into the output buffer.
B. Define the data block for CRC/LRC calculation by inserting a marker on the last character of the block and positioning the cursor under the first character of the block. Additional markers can be in the output buffer, but only if outside the limits of the CRC/LRC-calculation data block.
C. If any characters are to be excluded from the calculation, enter those characters.
D. Select the CRC/LRC type.
E. Calculate the check characters.
F. If the check characters are to be appended to the data block, initiate the load function.

---

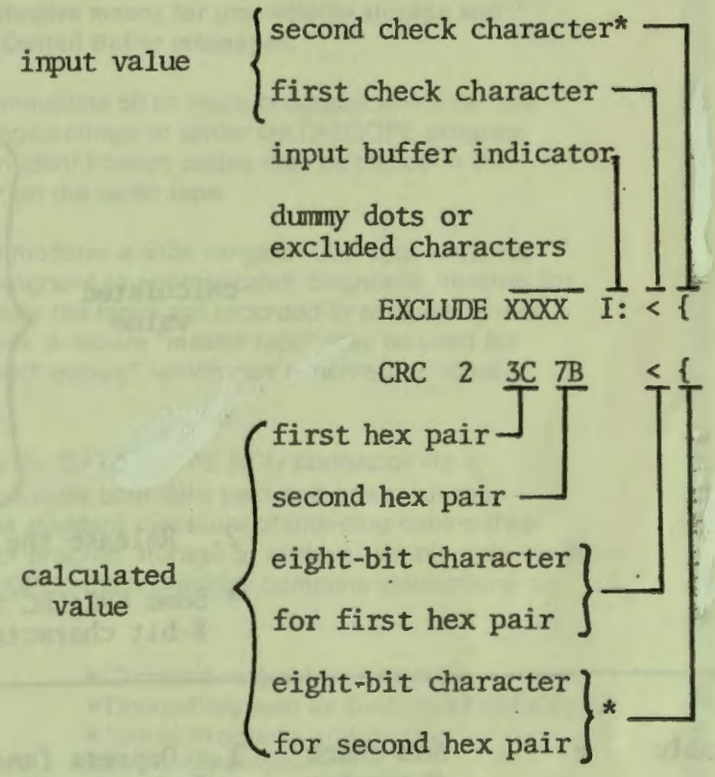
* Parity refers to the parity assigned to the result of the computation.

CRC/LRC OPERATION SEQUENCE

STEP (INPUT BUFFER)	STEP (OUTPUT BUFFER)	OPERATION	PROCEDURE
A	A	Trap or load data	Refer to Section 7.0 for Output Buffer loading instructions.
B	B	Define the data block	1. Use the CURSOR pushbuttons to position the cursor under the last character of the selected data block. 2. Momentarily depress the MRK pushbutton, and observe that a marker appears over the cursor. 3. Use the CURSOR pushbuttons to move the cursor under the first character of the selected data block.
C	C	Select the excluded characters	1. Depress (and hold) the RDCT pushbutton. 2. Momentarily depress the 0 pushbutton (of the hexadecimal keyboard) and observe that the following is displayed on the CRT screen: EXCLUDE _ • • • CRC 0 * * * * 3. Momentarily depress pushbuttons of the hexadecimal keyboard to enter the hex pairs that form the desired excluded characters. Observe that the "dummy dots" of the CRT display are replaced with the excluded characters as they are entered. 4. Release the RDCT pushbutton.
D	D	Select the CRC/LRC type	1. Depress (and hold) the RDCT pushbutton. 2. Referring to the listing of CRC/LRC types in paragraph 13.0, momentarily depress pushbuttons 1, 2, 3, 4, or 5 of the hexadecimal keyboard. Observe that the selected type is displayed on the CRT screen. 3. Release both pushbuttons.

CRC/LRC OPERATION SEQUENCE (cont.)

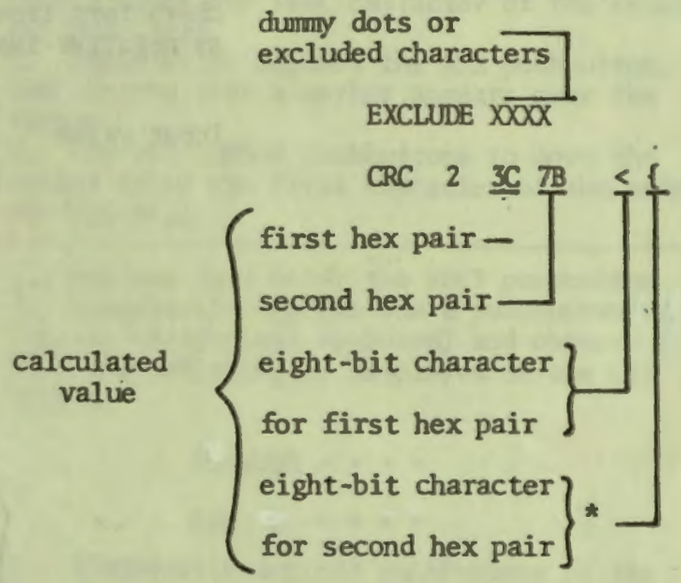
STEP (INPUT BUFFER)	STEP (OUTPUT BUFFER)	OPERATION	PROCEDURE
E	Not Applicable	Calculate (and display the check characters	1. Depress (and hold) the RDCT pushbutton and observe that the calculated CRC/LRC characters are displayed on the CRT screen in two places. Disagreement of calculated value with input value is indicated when the check characters from the input buffer are displayed as negative-image characters.



2. Release the RDCT pushbutton.

* Some CRC/LRC values are expressed as one 8-bit character

CRC/LRC OPERATION SEQUENCE (cont.)

STEP (INPUT BUFFER)	STEP (OUTPUT BUFFER)	OPERATION	PROCEDURE
Not Applicable	E	Calculate (and display the check characters	1. Depress (and hold) the RDCT pushbutton and observe that the calculated CRC/LRC characters are displayed on the CRT screen replacing the four asterisks (* * * *)  2. Release the RDCT pushbutton. * Some CRC/LRC values are expressed as one 8-bit character
Not Applicable	F	Add check character to the data block	1. Depress (and hold) the RDCT pushbutton and observe that the calculated check characters are displayed on the CRT screen (as in E above). 2. Momentarily depress the LOD pushbutton once. 3. Release the RDCT pushbutton. 4. Observe that the calculated CRC/LRC check characters have been added to the end of the selected-data block and that the marker is moved to highlight the last check character.

SPECTROM CORPORATION

PSA-502

Program Storage Adapter

Store and retrieve D-502 DATASCOPE programs easily, inexpensively with audio cassette recorder

The Program Storage Adapter is a low-cost audio cassette recorder interface for the D-502 DATASCOPE. It provides a simple, cost-effective means for non-volatile storage and retrieval of frequently used Programs and Output Buffer messages.

A single 30-minute tape cassette can accommodate 50 or more programs which can be easily located by using the recorder's footage counter or under DATASCOPE program control. Operator instructions and program identification codes may be placed in the Output Buffer or may be recorded verbally on the audio tape.

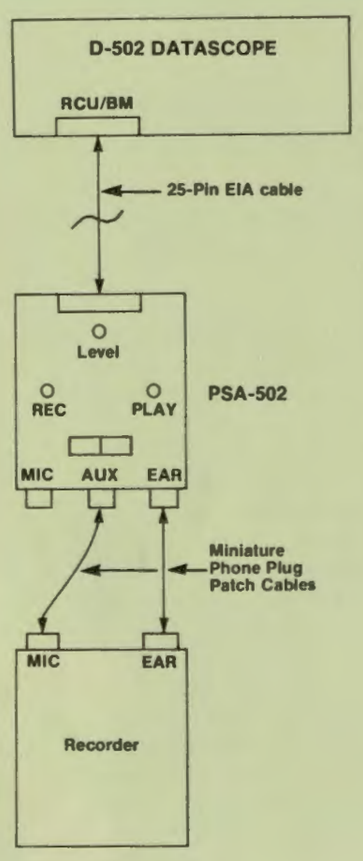
The system is simple and flexible. It accommodates a wide range of user requirements, ranging from bulk storage of single-user programs to sophisticated diagnostic libraries for central site or field service applications. Since the tapes are recorded in an audio format, they can easily be duplicated for distribution. A secure "master tape" may be used for revision level control and production of "work copies", which can be write-protected to avoid accidental erasure.

The PSA-502 is easy to use. It connects to the DATASCOPE RCU connector via a standard 25-pin EIA Data Set Cable (this provides both data path and power for the PSA-502). Connection to the recorder is via standard miniature phone-plug cables (two each supplied as standard accessories). For program storage or retrieval, simply activate the Program Transfer function of the DATASCOPE, which provides complete instructions on the CRT display. That's all there is to it.

Features

- Low-cost bulk program storage on standard audio cassette tapes
- Simple operation
- Compact, rugged construction
- Compatible with all D-502 DATASCOPES
- Stores Programs and Output Buffer Messages

PSA-502 Specifications



DATASCOPE Connection — A standard 25-pin EIA Cable (male to male) is used to interconnect the RCU/Business Machine D-502 connector and the PSA-502. This provides data path and PSA power. (±12 VDC on pins 9 & 10).

Recorder Connections — Two miniature phone plug cables are used to interconnect PSA-502 and audio cassette recorder.

MICrophone — PSA phone jack output is a 50 mV Peak-to-Peak audio signal (for use with high-sensitivity recorder inputs).

AUXiliary — PSA phone jack output is a 500 mV Peak-to-Peak audio signal (for use with normal, low-sensitivity recorder inputs).

EARphone — PSA phone jack input (connected to earphone output).

Mode Switch — A two-position "RECord/PLAYback" switch sets PSA-502 for record to tape or playback from tape. Two LED indicators display operating mode selected.

Level Indicator — A LED indicator is ON whenever recorder output level is insufficient for reliable data transfer.

Data Rate — 300 BPS nominal.

Dimensions — Length — 5.85" (24.86 cm), Width — 4.30" (10.92 cm), Height — 1.20" (3.05 cm)

Weight — 10 oz. (284 grams).

Maximum Power Requirements — +12 VDC @ 110 ma, -12 VDC @ 100 ma (supplied by DATASCOPE RCU connector).

Included Accessories — Operator instructions, two each miniature phone plug 6 ft. patch cables.

Ordering Information —
Program Storage Adapter, Model PSA-502 ..... $150.00

Optional Accessories —
Cassette Recorder — Model RQ-413 AS, complete with AC Cord, one tape cassette, and carrying case $100.00
Tape Cassettes — Model HC-60 (60 minutes) ..... $ 5.00

RQ-413 AS Recorder

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344 New Albany Road • P. O. Box 620 • Moorestown, NJ 08057
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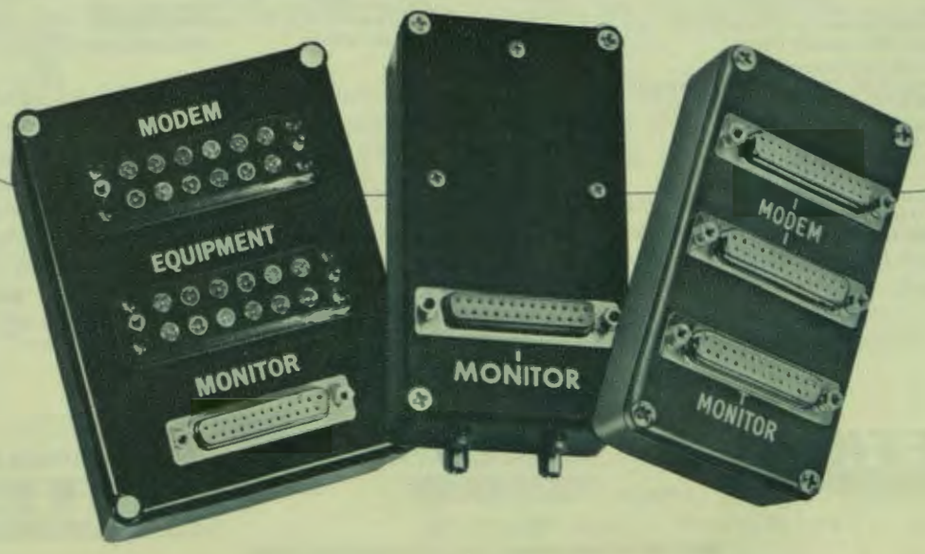
Spectron Remote Connection Units (RCU's)

The versatility of Spectron DATASCOPE Data Communications Monitors and T-511 Tape Recorders is augmented by this series of Remote Connection Units (RCU's). These RCU's provide bridging and electrical isolation as well as signal and connector conversion. In addition, they may be conveniently located close to a modem to avoid rerouting cables through the DATASCOPE or T-511.

The Remote Connection Units provide electrical isolation and line driving capability for monitoring of a communications interface (RS-232, 20/60 ma loop current, Wideband or CCITT v.24 or v.35) beyond the 50-foot limit usually imposed by modem and business machine manufacturers. This feature allows remote connection of monitoring devices at distances up to 300 feet, and avoids interaction between the monitoring device and the channel being monitored.

The RCU provides isolation and amplification for the leads in the interface specified on the reverse side. The remaining leads are forwarded through the RCU by direct metallic connections.

Each RCU requires dc power at ±10 to 15 volts and draws a maximum of 60 milliamperes from each polarity. This power may be obtained at the user's option from the associated modem (if available), from the associated business machine or monitoring device (DATASCOPE), or from a separate power supply. The usual arrangement is to obtain power from an associated monitoring device and all DATASCOPES are equipped to supply it. Each RCU is housed in a cast aluminum case which is electrically connected to Frame Ground but not to Signal Ground. Three interface connectors provide for connection to the modem, the business machine and a monitoring device. The monitoring connector is a DB-25S in every instance.



Spectron Remote Connection Units (RCU's)

RCU-220

INTERFACE: EIA RS-232
CONNECTORS: 3 DB-25S

DB-25S Pin No.	Name	Mnemonic	Isolated or Direct
1	Frame Ground	FG	D
2	Send Data	SD	I
3	Receive Data	RD	I
4	Request to Send	RS	I
5	Clear to Send	CS	I
6	Data Set Ready	DSR	I
7	Signal Ground	SG	D
8	Carrier On	CO	I
11	Supervisory Transmitted Data	SDT	I
12	Supervisory Received Data	SRD	I
14	New Sync	NS	I
15	Serial Clock Transmitter	SCT	I
17	Serial Clock Receiver	SCR	I
20	Data Terminal Ready	DTR	I
22	Ring Indicator	RI	I
24	Serial Clock Transmitter External	SCTE	I
9, 10, 13, 16, 18, 19, 21, 23, 25	Unassigned	—	D

RCU-TTY

INTERFACE: Polar or Neutral Current Loop
CONNECTORS: 2 ADC PJ-838 (Bantam Jack)

ADC Pin Conn.	DB-25S Pin No.	Name	Mnemonic	Isolated or Direct
Send Tip, Send Ring	2	Send Data	SD	I
Receive Tip, Receive Ring	3	Receive Data	RD	I
	9	(+) Voltage	+V	—
	10	(-) Voltage	-V	—
	4, 5, 6, 7, 8, 11, 12, 14, 20, 22	Signal Ground	SG	D
Sleeve	1	Frame Ground	FG	D
	13, 15-19, 21, 23-25		Unterminated	

RCU-235

INTERFACE: CCITT v.35
CONNECTORS: Winchester MRA 34SJ602

Winchester Pin No.	DB-25S Pin No.	Name	Mnemonic	Isolated or Direct
A	1	Frame Ground	FG	D
B	7	Signal Ground	SG	D
C	4	Request to Send	RTS	I
D	5	Clear to Send	CTS	I
E	6	Data Set Ready	DSR	I
F	8	Carrier Detect	CD	I
H	20	Data Terminal Ready	DTR	I
J	22	Ring Indicator	RI	I
R, T	3	Receive Data	RD	I
V, X	17	Serial Clock Receive	SCR	I
P, S	2	Send Data	SD	I
Y, a	15	Serial Clock Transmit	SCT	I
U, W	24	Serial Clock Transmit External	SCTE	I
K, L, M, N, Z, b, c, d, f, g, h, i, j, k, m, n		Unassigned	—	D

RCU-250

INTERFACE: Wideband (Current) WE Type 303 or Equiv.
CONNECTORS: Burndy MD12-MXR-8 (Coaxial)

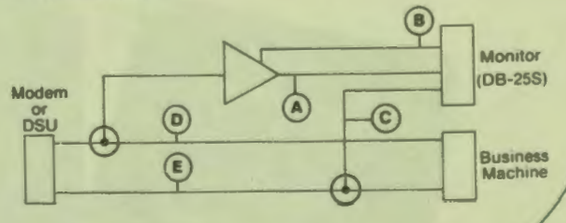
Burndy Pin No.	DB-25S Pin No.	Name	Mnemonic	Isolated or Direct
A	16	Dibit Clock Transmit	DCT	I
B	—	Dibit Clock Transmit, External	DCTE	D
C	5	Clear to Send	CS	I
D	4	Request to Send	RS	I
E	2	Send Data	SD	I
F	6	Data Set Ready	DSR	I
G	18	Dibit Clock Receive	DCR	I
H	24	Serial Clock Transmit, External	SCTE	I
J	15	Serial Clock Transmit	SCT	I
K	3	Receive Data	RD	I
L	17	Serial Clock Receive	SCR	I
M	8	Carrier Detect	CD	I
F (outer)		Ring Indicator	RI	I
M (outer)		Data Terminal Ready	DTR	I
—	1	Frame Ground	FG	D
C,D,E,G,H J,K & L (outer)	7	Signal Ground	SG	D
	9-14, 19-23, 25		Unterminated	

Equipment

Model	Description	Price
RCU-220	Remote Connection Unit (RS-232) with DSC-2502PP Cable	$ 240.00
RCU-220/TTY	Remote Connection Unit with TLPC-(2W)-2 Cable (for use with a 20/60 ma loop current interface)	135.00
RCU-250	Remote Connection Unit with WBC-1203 Cable (converts wideband current interface to EIA RS-232)	650.00
RCU-235	Remote Connection Unit with DDC-23502 Cable (converts CCITT v.35 to RS-232)	650.00

Standard RCU Configuration

A - Leads isolated and amplified
B - dc power
C - Ground wires
D - Leads connected direct
E - Remaining leads connected direct



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TWX: 710-897-1359 TELEX: 83-1488 PHONE: 609-234-5700

Printed in USA

Specifications and prices subject to change without notice.

October 1977

Product Bulletin

MODEL T-511

HIGH SPEED TAPE UNIT

CAPTURE DATA COMMUNICATIONS PROBLEMS – 50 to 56,000 bps

FEATURES

- **Full duplex data stream tape recording**
- **Accepts all codes, line disciplines and speeds up to 56,000 bps**
- **Compatible with EIA Interface RS-232C, CCITT V.24, CCITT V.35 and Wide Band WE Type 303**
- **Lamp display of all significant interface signals**
- **Slow speed playback for display and analysis**
- **Complete electrical isolation from monitored channel**
- **Lightweight portability . . . single compact unit**
- **Simple, straight forward connection and operation**

The Spectron High Speed Tape Unit, Model T-511 is a portable magnetic tape-recording instrument designed for troubleshooting and monitoring data communications channels. A member of the DATASCOPE family of test instruments, the High Speed Tape Unit records all traffic on **both** sides of a data link at speeds from 50 to 56,000 bps. Below 44 Kbps the T-511 produces tapes that may be replayed on any Model 601 DATASCOPE. Alternatively, tapes recorded at **any** speed may be replayed on the Tape Unit itself with a cable connection to any model DATASCOPE for display.

The T-511 is compatible with most forms of data transmission, whether synchronous or asychronous and, like the D-601 DATASCOPE, it uses a magnetic tape cartridge to record both sides of the communication channel simultaneously. It may be connected to the data link directly or through a Remote Connection Unit which bridges the channel interface and provides electrical isolation without adding cable length or increasing electrical loading. A DATASCOPE may be used for real-time display of traffic being recorded, and then switched to replay at slow speed for analysis without recabling; or the T-511 may be used alone to produce tapes for later replay. The Block Diagram shows the High Speed Tape Unit with a typical modem and DATASCOPE connection.

The T-511 may be left on-line indefinitely. An endless loop format is used (even though the tape is not physically arranged as a loop) and thus a perpetual moving history of all events on the line is recorded. The cartridge may be changed at any time to retain a permanent record.

Both Send and Receive data are recorded along with Carrier Detect and Request-to-Send signals from the channel interface. Provision is also made for recording an Event Mark either in response to an external signal or under the control of a front panel push button. During replay these signals are read from tape and delivered to the output interface for display on an associated DATASCOPE just as if they were arriving on-line, but the replay speed may be slowed or stopped for close examination of the data.

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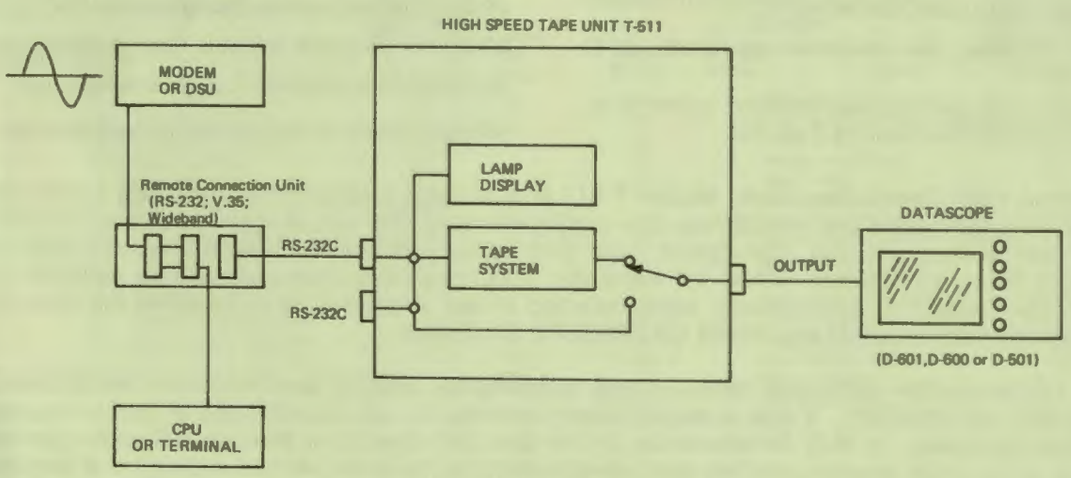
The tape cartridge (3M-DC300A) is the same as used in the DATASCOPE Model D-601. Recording alternates among four (4) tracks at a tape speed of either 25 or 100 inches-per-second. The tape is recorded serially one track at a time, reversing direction each time "end-of-tape" is reached and continuing on the next track without loss of data until all four tracks are full. After that, old data is replaced with new as recording continues. The tape is buffered from the line and data is recorded in a variable length block format. The same buffer is used to read from tape for output to a DATASCOPE.

Because of the wide range of speeds accommodated by the T-511, two different tape velocities and block lengths are used for recording. This results in varying tape storage capacity as follows:

Typical Line Speed	Tape Speed	Maximum Block Length	Tape Operation	Storage Capacity	Replay
1200 bps	25 ips	204 Characters	Start/Stop	40 min.	T-511 or D-601
2400 bps	25 ips	204 Characters	Start/Stop	25 min.	T-511 or D-601
9600 bps	25 ips	204 Characters	Start/Stop	10 min.	T-511 or D-601
11-44 Kbps	100 ips	204 Characters	Continuous	2.4 min.	T-511 or D-601
44-56 Kbps	100 ips	2040 Characters	Continuous	2.4 min.	T-511 only

The T-511 is compatible with and may be connected directly to any EIA RS-232 interface. However, at speeds above 19.2 Kbps various special interfaces exist which require signal conversion and connector adaptation. A series of Remote Connection Units (RCU's) has been developed to augment the versatility of the T-511 by accommodating these special interfaces. These RCU's provide bridging and electrical isolation as well as signal and connector conversion; and in addition, they may be conveniently located close to a modem to avoid rerouting cables through the T-511.

BLOCK DIAGRAM



PRICES:	T-511 High Speed Tape Unit	$5,900.00
	Send/Receive Option	800.00
	RCU-220 Remote Connection Unit	240.00
	RCU-220/TTY Remote Connection Unit (for use with a 20/60 ma teletype interface)	135.00
	RCU-250 Remote Connection Unit (converts wideband current interface to EIA RS-232)	650.00
	RCU-235 Remote Connection Unit (converts CCITT V.35 to RS-232)	650.00
	SS2-501 Slide Rack Mounting	220.00
	TC-501 Shipping Case	225.00
	DC-300A Tape Cartridge	40.00
POWER:	120/240V, 50/60 Hertz 360 Watts Voltage Selected By Internal Straps	
WARRANTY:	One Year	

Spectron MAU-2408 Monitor Alarm Unit

Provides continuous alarm monitoring for SD/RD response plus 3 other EIA RS-232 signals

The MAU-2408 Monitor Alarm Unit is a modular unit that monitors eight EIA RS-232 interface leads and provides alarms on four of these leads. The leads monitored are Send Data (SD), Receive Data (RD), Request to Send (RTS), Clear to Send (CTS), Data Set Ready (DSR), Carrier Detect (CD) and Signal Quality (SQ). Alarm monitoring is provided for the SD/RD response and for any three of the remaining monitored leads.

The time delays are selected individually for each of the four alarm circuits. The available delays range from 10 milliseconds to 2.55 seconds in 10 millisecond intervals, and from one second to 255 seconds in one second intervals.

The alarm indicators for the selected control signals are activated whenever the signal is true or false (as selected by the user) for a period in excess of the programmed delay time. In the case of the SD/RD alarm circuit, the preselected time delay is triggered when the SD signal is in an idle state. If the RD signal does not become active during the period, the alarm indicators on both the MAU and its associated power unit light. The idle state can be selected as either a binary "0" or binary "1".

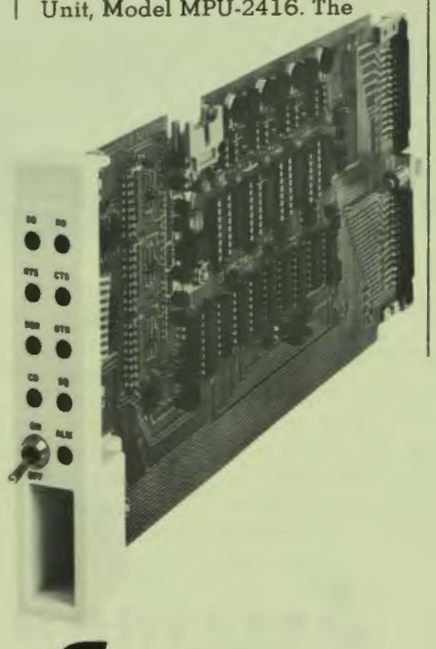
The MAU front panel consists of eight LEDs to monitor the signals, an alarm indicator (LED), alarm ON/OFF switch and an interface monitor patch cavity. A Spectron patch cord with one end connected to a DATASCOPE can be inserted into this patch cavity to access all leads of the interface. The connected DATASCOPE can monitor the traffic without interrupting the data circuit.

The rear of the MAU module is equipped with two DB-25S connectors to accommodate the interfacing devices. The MAU is typically installed between a modem and a front-end port or terminal.

Time delays are programmed individually for each of the four alarm circuits. Each circuit includes an oscillator and a programmable 8-bit counter.

The power required to operate the Monitor Alarm Units is provided by the Monitor Power Unit, Model MPU-2416. The front panel of the power unit consists of a monitor patch cavity connected to a DB-25S connector located on the rear of the unit for interfacing with test equipment; an alarm indicator; an audible alarm; a reset switch; and a three-position switch to enable/disable the audible alarm and to test the audible alarm and all LEDs on the connected MAUs. The reset switch simultaneously resets all connected MAUs.

In addition to the DB-25S connector, the rear panel of the MAU is equipped for connection to the Spectron RAP-8 Remote Alarm Panel. This optional panel, located apart from the MAUs, provides an additional



- Monitors eight EIA RS-232 signals
- Provides alarm monitoring for SD/RD response plus three other control signals
- Independently set timers for each alarm
- Modular, compact and easily expanded
- Provides both audible and visual alarms
- Connects directly to EIA RS-232 interface; no special cables required
- Equipped with monitor port for access to the EIA RS-232 interface
- Five-year warranty

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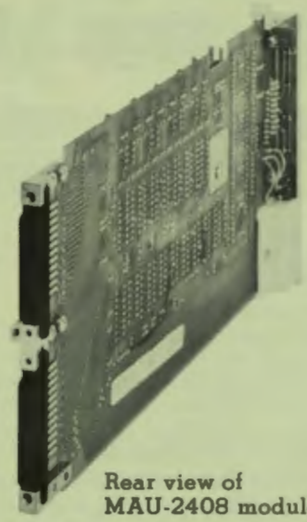
alarm indication. Each RAP-8 accommodates up to eight racks of MAUs. An alarm condition detected by any connected MAU causes an additional alarm to be indicated at the RAP-8. The panel has separate indicators for each connected rack. The advantage is that a user with many racks of Monitor Alarm Units located on different floors or in different rooms has a single alarm panel which indicates an alarm condition and the location.

Up to 16 MAU modules plus the power module can be installed in 19-inch, 23-inch, or 24-inch wide equipment cabinets using the appropriate Rack Adapter. Unused positions can be filled with blank panels.

Each MAU module measures 5.2 inches high (13.21 cm) and 11.6 inches deep (29.46 cm); it weighs one pound (0.45 kg). Power required for the MPU is 120/240 volts at 50/60 hertz. Power consumption of the MPU with 16 MAU modules connected is less than 50 watts.

The Spectron MAU-2408 Monitor Alarm Unit, MPU-2416 Monitor Power Unit and MRA-519 Monitor Rack Adapter are backed by a five-year warranty. The RAP-8 Remote Alarm Panel is backed by a one-year warranty.



Rear view of MAU-2408 module

MAU-2408	Monitor Alarm Unit	$160
MPU-2416	Monitor Power Unit, provides power for up to 16 MAU-2408s	240
MRA-519	Monitor Rack Adapter, for 19-inch-wide cabinet, accommodates MPU-2416 plus up to 16 MAU-2408s	220
MRA-523	Monitor Rack Adapter, for 23-inch-wide cabinet, accommodates MPU-2416 plus up to 16 MAU-2408s	250
MRA-524	Monitor Rack Adapter, for 24-inch-wide cabinet, accommodates MPU-2416 plus up to 16 MAU-2408s	250
DPU/BL	Blank Panel	5
RAP-8	Remote Alarm Panel, for up to eight racks of MAUs	380

The Monitor Alarm Unit is backed by a five-year warranty.

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MAU 79-8

D-901 DATASCOPE

Product Bulletin 79-2
D-901
Initial Documentation
April 1979

OVERVIEW

The Spectron D-901 DATASCOPE, the newest member of the prominent DATASCOPE family of line monitors and data analyzers, is the most comprehensive and versatile diagnostic device available.

The D-901 combines the capability of a powerful programmable interactive data analyzer and emulator with a large-capacity, flexible data storage and retrieval device to provide all the tools necessary to troubleshoot the complex problems of today's sophisticated data networks.

Under manual or program control, the D-901 DATASCOPE is able to:

- Remotely operate or control another D-901 DATASCOPE
- Monitor and analyze data at speeds up to 1,600,000 bps
- Recognize and store complex data patterns
- Perform bit level testing
- Store selected data sequences
- Initiate and terminate recording of data and selected control signals at speeds up to 72,000 bps
- Output a user-selected response to a specific incoming sequence
- Store and edit user programs
- Display or freeze the data stream on a large easy-to-read 9-inch CRT
- Count events and measure the time interval between events
- Perform confidence and diagnostic tests
- Conduct a bit-error rate test (BERT)
- Program comprehensive interactive emulation routines with simple instructions
- Generate and check any 16-bit polynomial BCC
- Perform a dynamic CRC and LRC test
- Load programs into and obtain results from a D-901 via a telephone data circuit

The microprocessor-based D-901 consists of the following major elements: a CRT display, a keyboard with cursor controls, two floppy disk drives, and an LED display of all EIA signals.

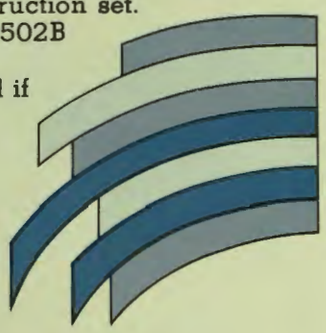
PROGRAMMING LANGUAGE

A compiler-level language designed specifically for data communications purposes allows the user to program a wide variety of diagnostic tests and emulation routines ranging from a simple response time calculation to a complex simulation of a front-end processor. Eight counters, eight timers plus an interrupt timer are available to the programmer. The contents of these counters and timers can be displayed on the CRT even during program execution. All instructions are entered from the keyboard. The D-901 can perform a variety of functions under program control including the monitoring, displaying, storing, and analyzing of all data flowing across the modem interface.

Program efficiency is enhanced and editing simplified by utilizing labelled instruction steps rather than fixed program steps. This procedure frees the programmer from concern with forward and backward referenced step numbers. Assigning labels to user instructions facilitates editing procedures such as instruction deletion and insertion because the compiler compensates for changes in branch addresses.

Program entry is simplified by prompting messages. All instructions are entered from the front panel alphanumeric keyboard in English rather than hexadecimal with the instructions requiring a minimum number of keystrokes to enter. The keyboard is also used to enter configuration parameters, to perform paging and editing functions, and to control the cursor.

The instruction set of the D-502B DATASCOPE is a subset of the D-901 instruction set. Therefore, all existing D-502B programs can easily be converted, and enhanced if desired, to execute on the D-901.



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Spectron D-901 DATASCOPE.

Sync Reset
Pushbutton causes the D-901 to initiate a search for new sync on both send and receive legs.

Hex Display
Pushbutton causes a hexadecimal representation of the displayed line data.

Interface Status
Individual LED indicators display the status of 21 EIA data and control leads. Separate LEDs for positive states and negative states of each lead.

Interface Jacks
Interface jacks allow direct oscilloscope monitoring of all interface signals.

Control Out
Output jack that supplies a high- or low-level signal as determined by the user program.

External Stop
Input jack to which an external signal may be applied to stop the user program and data display.

External Sync Reset
Input jack to which an external signal may be applied to request a search for new sync.

Test In
Four input jacks whose status is stored on the Data Diskette when recording. Interface jacks may be connected to these input jacks via jumper cables for recording the status of the selected leads.

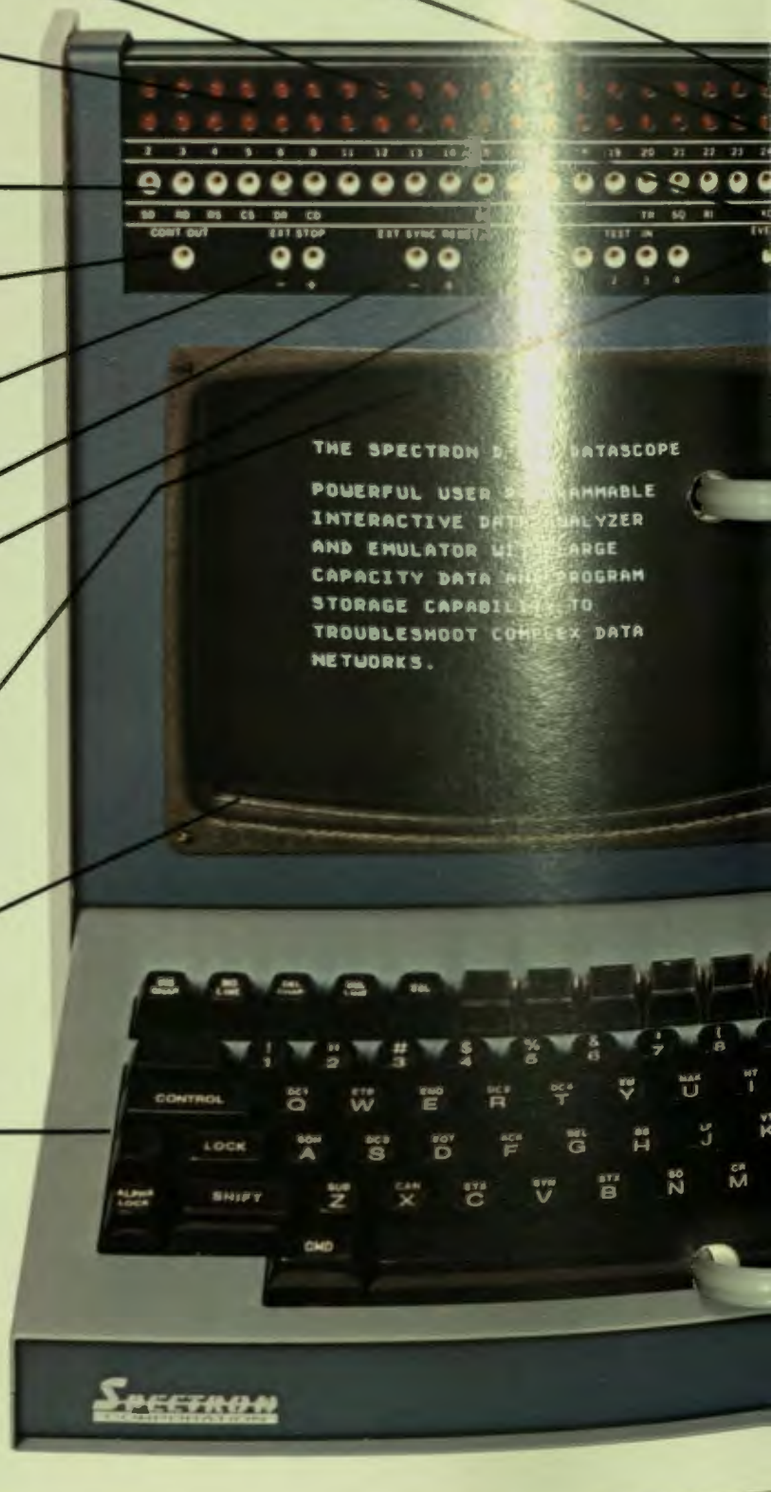
Event Marker
Pushbutton causes a mark to be placed on recorded data. User program can test for this mark in a Replay mode.

CRT Display
Large easy-to-read CRT to display send data and/or receive data, user programs, timer and counter values, and system operating parameters.

Keyboard
Keyboard used to enter output messages, program instructions, and configuration parameters. All program editing is accomplished from the keyboard.

Character Framing
Two-position switch, when in the "off" position, disables all automatic synchronization. When in the "on" position, character framing is determined by an entry made to the configuration table.

Operating Mode
A three-position switch s
Monitor mode is used
from the line. Run Progr
and record data under
terminates all data
program execution.



selects operating m
to monitor and rec
ram mode is used t
program control. St
nonitoring, record

Remote Control Operation

A three-position switch allows operation of D-901 as a local, slave or master station.

Record Control

Pushbutton switch causes the unit to record incoming data on the track specified by the Track Indicator. Data is recorded in a continuous loop. Idle, replay and record operations can also be initiated under program control.

Replay Controls

Four pushbutton switches control replay of stored data beginning at the track specified by the Track Indicator. Replay speed is determined by the selected pushbutton.

Track Indicator

Three-digit indicator displays the track on the Data Diskette that is being read or written.

Idle Control

Pushbutton switch terminates record or replay operations and causes the unit to enter a standby mode.

Track Controls

Manual controls for reverse, forward and fast forward movement of the Data Diskette and reset to track 001.

Data Diskette

Records send and receive data along with the status of eight signal leads. Data Diskette operations are controlled manually or by the user program.

System Diskette

Stores D-901 operating system, user programs, selected line data logged by the user program, counter and timer values, and a variety of system configurations as defined by the user.

Cursor Controls

Pushbutton positions a cursor vertically and horizontally. Additional pushbuttons control paging and tabbing.

DISKETTE UNITS

The D-901 is equipped with two integral floppy disk drives designated the Data Diskette and the System Diskette.

Full-duplex data and the status of up to eight user-selected control signals can be recorded at speeds up to 72,000 bps on the Data Diskette. This data is continually recorded in a closed-loop manner with new data replacing old data. The capacity of this long-term storage device at this speed is over 300,000 bytes of send and receive data. A front-panel display indicates the recording track.

User programs can be stored on the System Diskette along with character sequences, system configuration parameters, and the D-901 operating system. User programs can be called up with simple commands, easily edited, if necessary, and executed on live data or recorded data. Data sequences entered by the operator through the keyboard or received over a telephone line can be stored in a 4K-character output buffer and automatically transmitted upon reception of a user-specified character sequence. The system configuration parameters that can be stored include speed, code, sync pattern, and framing.

OPERATION

Full-duplex data at speeds up to 1.6 megabits per second can be monitored, displayed and analyzed under program control. A large 9-inch CRT displays incoming and/or outgoing traffic. The CRT is also used to display user programs, buffer contents and stored configuration parameters. The contents of the CRT are selected via the keyboard.

Two buffers are provided. A log buffer records the most recently received 4096 characters and an output buffer stores user-entered messages. Any number of messages can be stored in this output buffer up to a total of 4096 characters. These messages are selectively transmitted upon receipt of a particular character sequence under program control.

The D-901 can be operated as a local station, a master station or a slave station. As a local station, the D-901 is controlled from its front panel. In a master-slave environment, a master D-901 can control a remotely located slave D-901 with the slave unit transmitting the results of its program and the data back to the master. The two units are connected by a dial-up line or leased line.

The D-901 is capable of performing dynamic cyclic redundancy checks (CRC) and longitudinal redundancy checks (LRC) including any 16-bit character parity generation and check.

COMPATIBILITY

The D-901 is compatible with most forms of asynchronous and synchronous data transmission and accommodates RS-232, V.35, X.21, TTL and RS-449 interfaces. The unit may be connected directly to the data link or for monitoring only, through a Remote Connection Unit (RCU) which bridges the interface and provides electrical isolation and signal level conversion without increasing the electrical loading. An RCU allows a user to install the D-901 a greater distance from the interface.

SELF DIAGNOSTICS

The D-901 is capable of performing a confidence test and an internal diagnostic test. The confidence test automatically checks the CRT, memory, I/O circuitry, keyboard and the Data and System Diskettes. Successful completion of the test assures the operator that the major systems are operational. The diagnostic test allows the user to check specific operating components of the D-901.

SUMMARY

The D-901 has many capabilities. It can function as a programmable interactive analyzer, as an emulator, as a storage device, and as a data monitor. *It is powerful, comprehensive, and versatile, but most of all — it's a DATASCOPE, from the inventor and leading supplier of data monitors.*

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Printed in USA

The Spectron Series of Modem-Related Devices

Cost-effective alternatives to modems

- **MODEM ELIMINATORS** that enable the direct connection of a computer to a terminal without the need for back-to-back modems.
- **MODEM ELIMINATOR REPEATERS** that perform all the functions of modem eliminators plus enabling a cable length of 50 feet to be installed on each side.
- **MODEM INTERFACE SPLITTERS** that permit multiple connections to a single modem.
- **MODEM INTERFACE REPEATERS** that permits the extension of the EIA cable to over 100 feet.

MODEM ELIMINATORS

Spectron's Modem Eliminators permit direct connection between terminals and computers without the need for modems. They are intended for applications where transmission over short distances would otherwise require two back-to-back modems.

They are available in models designed for the EIA RS-232 interface, the CCITT V.35 interface, and the wideband interface. A modem eliminator in a patch cord form is also available for the RS-232 interface.

ME-81 — Modem Eliminator for the RS-232 Interface

The ME-81, designed for the RS-232 interface, is available in the following models: ME-81, ME-81FS-2, ME-81FS-3 and ME-81HF.

The ME-81 is a low-cost unit operating at a single user-specified transmission speed up to 19,200 bps. It transposes SEND and RECEIVE data; generates CLEAR TO SEND and SIGNAL QUALITY signals after a strappable delay of 0, 10, or 50 milliseconds; and provides an active output for DATA SET READY. If required, an active output for RING INDICATOR can also be provided.

Modem Eliminator
Model ME-81FS-2

The ME-81FS-2 Modem Eliminator is equipped with a frequency selector option. It performs all the functions of the basic ME-81 and has four switch-selectable clock speeds: 2400, 4800, 7200, and 9600 bps.

The ME-81FS-3 is similar to the ME-81FS-2 except it operates at a maximum speed of 19,200 bps. The four switch-selectable clock rates are 2400, 4800, 9600, and 19,200 bps.

The ME-81HF is a high-frequency version of the basic ME-81 with a single customer-specified clock of either 28.8K, 38.4K, 48K, 50K, or 56K bps.

The ME-81 Series Modem Eliminators are available in either 120 volt or 240 volt configurations and are designed to be rack mounted. Nominal dimensions are 2 inches wide by 5¼ inches high by 7 inches deep. All units are equipped with two 25-pin EIA connectors (DB-25S) with screw locks on the rear panel. Power consumption is less than 10 watts.

Up to eight of the ME-81 Series units can be mounted in an equipment cabinet using the RA-8 Rack Adapter.

SPECTRON

MEPC — Modem Eliminator Patch Cord

The MEPC Modem Eliminator is a patch cord designed for asynchronous applications with and without secondary channels and for synchronous applications. In all cases the business machine is supplying clocks. The cable transposes the appropriate leads in the EIA RS-232 interface in order to emulate two back-to-back modems. The synchronous MEPC is equipped with an external lead to be connected to the external clock source.

ME-8V35 — Modem Eliminator for the CCITT V.35 Interface

The ME-8V35 Modem Eliminator is designed for the CCITT V.35 interface. It operates at one of 15 switch-selected transmission speeds — 1200, 2000, 2400, 3600, 4800, 7200, 9600, 19.2K, 34.8K, 40.8K, 50K, 56K, 64K 75K and 150K bps.

The unit transposes SEND and RECEIVE DATA, generates CTS and SQ after activation of RTS, and supplies active Data Set Ready and Ring Indicator signals. The CTS delay is switch selectable for either 0 or 0.4 milliseconds. Also switch-selectable is the isolation of chassis and signal grounds.

The ME-8V35 is intended for applications where the maximum distance between the two connected devices is 2000 feet.

The ME-8V35 measures approximately 4 inches wide by 5¼ inches high by 7 inches deep. Power consumption is approximately 5 watts.

Up to four ME-8V35 units can be mounted in a standard equipment cabinet using the RA-8 Rack Adapter.

ME-8B — Wideband Modem Eliminator

The ME-8B permits direct connection between communications devices located no more than 50 feet apart and conforming to the wideband interface standard. The unit transposes the SEND and RECEIVE DATA signals; generates CLEAR-TO-SEND and AGC after REQUEST-TO-SEND; supplies active DATA SET READY and RING INDICATOR; and generates SEND and RECEIVE clocks. The CTS and AGC delay is nominally set at 40 milliseconds.

The following models operating at the indicated speeds are available in the single speed ME-8B:

ME-8B-1	19.2 K
ME-8B-2	40.8 K
ME-8B-3	50.0 K

The ME-8BFS is offered which operates at four internal speeds — 19.2, 40.8, 50.0 and 56.0 Kbps. Speeds are changed by front-panel rotary switch.

The Spectron ME-8B measures approximately 4 inches wide by 5¼ inches high by 7 inches deep. Power consumption is approximately 5 watts.

Up to four ME-8B units can be mounted in a standard equipment cabinet using the RA-8 Rack Adapter.

MODEM ELIMINATOR
MODEL ME-8B

MER-810 — MODEM ELIMINATOR REPEATER

The MER-810 Modem Eliminator Repeater combines the capability of a modem eliminator with a repeater and extends the maximum EIA cable length to 100 feet. The unit operates asychronously or synchronously at any one of the following user-selected speeds: 50, 74.2, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, and 19,200 bps.

The MER-810 can be set up for either internal or external clocks and either constant clocks or CTS-gated clocks. Carrier Detect can be placed in a constant ON (+12V) condition via strapping. Additional switches are provided to select a 0, 10 or 50 millisecond RTS to CTS delay. Front panel LED indicators provide status of SEND DATA, RECEIVE DATA, CLEAR TO SEND, REQUEST TO SEND and CLOCK.

The MER-810 measures 2½ inches high by 5½ inches wide by 9 inches deep. Power required is 110 volts at 50/60 hertz; power consumption is approximately 10 watts.

MODEM INTERFACE SPLITTER

Two versions of a modem interface splitter are offered: the MIS-3400 and MIS-3404.

The MIS-3400 permits multiple connections to a single RS-232 interface. It is equipped with a controlled access feature which enables it to grant access to only the terminal (or port) that raises the RTS signal first. The front panel of the unit is equipped with four LEDs to indicate the active port.

The MIS-3404 performs all the functions of the MIS-3400 plus it is equipped with Streamguard and Tail Circuit features.

The Streamguard feature limits the duration of the RTS signal from a terminal in a multipoint data communications system. Use of this protective feature prevents capture of the system by that terminal in the event of a continuous "high" of the RTS signal. When the RTS signal is "high" for more than 24 seconds, the unit automatically rejects the signal from that port and permits other ports to gain control of the line. The defective port will continue to be blocked out until it drops RTS; at that time the MIS-3404 will automatically reset.

The tail circuit feature automatically modifies the signals on one of its ports to emulate a computer output. This port can be cabled to a modem that is connected by telephone lines to a remote modem and terminal.

The MIS-3404 front panel is equipped with four LEDs to indicate the active port plus four LEDs to indicate the port which has had its RTS signal active for more than 24 seconds. An On-Off switch activates the streamguard feature.

The MIS-3400/3404 measures 2½ inches high by 15 inches wide by 12¼ inches deep. Power required is 120 volts at 50/60 hertz; power consumption is 43 watts.

The MIS-3400/3404 can be mounted in a standard equipment cabinet using the MIS-319RA Rack Adapter.

MIR-4/MIR-6 MODEM INTERFACE REPEATER

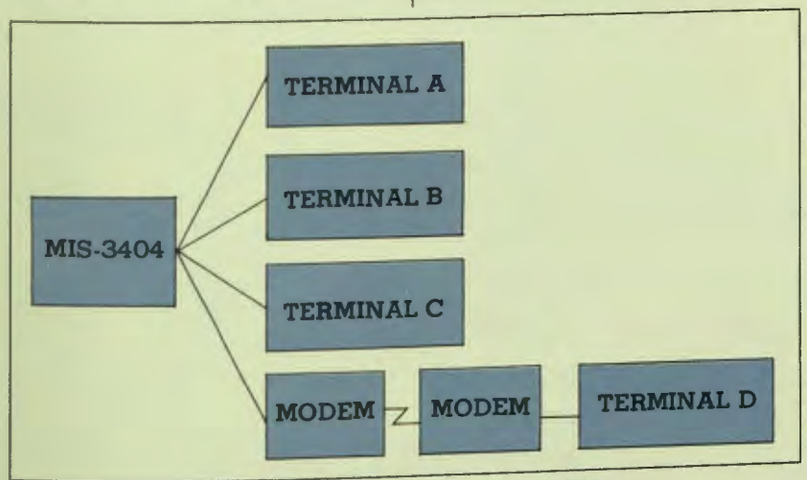
The Modem Interface Repeaters are offered in two models: MIR-4 and MIR-6. These units permit extending the 50-foot limit of the EIA interface. They are intended for applications where modems are centrally located in an equipment cabinet remote from terminals or communications controllers.

The MIR-4 is equipped with four line drivers for the Send and Receive data leads and the Send and Receive clock leads. The MIR-6 is equipped with six line drivers to regenerate the same leads as the MIR-4 plus two additional leads as specified by the customer.

The line drivers have differential inputs, ±3 volt thresholds and full hysteresis, thus eliminating both common mode and differential noise.

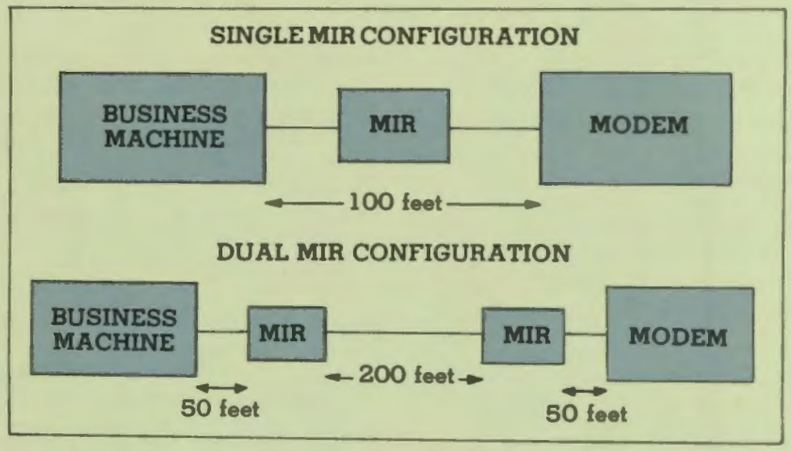
A single modem interface repeater permits a modem and business machine to be up to 100 feet apart. Two modem interface repeaters extend this distance to 300 feet.

The MIR-4 and MIR-6 are packaged in a compact case which measures approximately 2 inches wide by 7 inches deep by 5¼ inches high. They are designed for mounting in a standard equipment cabinet.



MIS-3404 WITH TAIL CIRCUIT

The RA-8 Rack Adapter accommodates up to eight units; the CSU-MB accommodates a single unit. Alternately, up to eight units can be mounted in the F-525 desktop miniconsole. The modular construction permits easy expansion to meet increasing system requirements. Power required is 120 or 240 volts at 50/60 hertz; power consumption is less than 10 watts.



Spectron Modem-Related Devices

Modem Eliminators	
ME-81, operates at one customer-specified clock	$240
Additional clocks	25
ME-81FS-2, operates at 2400, 4800, 7200 and 9600 bps	330
ME-81FS-3, operates at 2400, 4800, 9600 and 19,200 bps	350
ME-81HF, operates at one customer-specified clock (28.8K, 38.4K, 48K, 50K or 56K bps)	300
ME-8B1, operates at 19,200 bps	480
ME-8B2, operates at 40,800 bps	480
ME-8B3, operates at 50,000 bps	480
ME-8V35, operates at one of 15 user-selected speeds	650
from 1200 bps to 150K bps	450
MEPC, Modem Eliminator in Patch Cord Form	50
Modem Eliminator Repeater	
MER-810	330
Modem Interface Splitters	
MIS-3400, with Controlled Access	495
MIS-3404, with Streamguard, Tail Circuit and Controlled Access	580
Modem Interface Repeaters	
MIR-4, amplifies four signals	250
MIR-6, amplifies six signals	290
RA-8 Rack Adapter	90
MIS-319RA Rack Adapter	40
CSU-MB Rack Adapter	18
F-525 Miniconsole	240

All Spectron modem-related devices are covered by a five-year warranty; the MEPC is covered by a 90-day cable warranty.

SPECTRON

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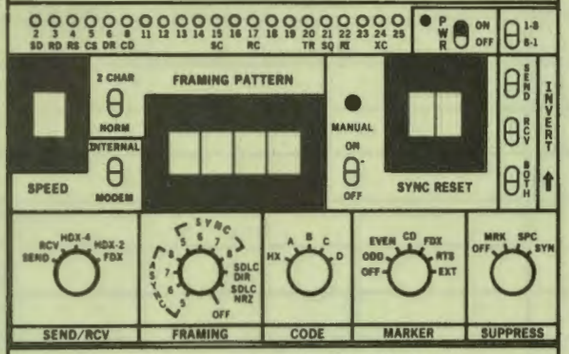
SPECTRON

D-500 PROGRAM
(SHORT FORM)

REV

MONITOR SETUP



CODE: PARITY BIT =
CRC/ ( ) EXCLUDE:
Patch ( ) MARKER IN to Pin ( )
Place LIST Cursor at Program Step
☐ Press RSCT Before Running Pgm.

Title:	
By:	Date / /
Protocol:	☐ Pt-Pt ☐ Multi-Drop
Run Program at (Site):	☐ HOST ☐ REMOTE
D-502 is Connected to:	☐ MODEM ☐ TERM
CNTR 1	
CNTR 2	
CNTR 3	
CNTR 4	
TIMR 1	
TIMR 2	
TIMR 3	
TIMR 4	
ITMR	

STEP	OPERATION		GO TO	IF: (COUNT= / TIME» / CHARS≠)	COMMENTS
01					
02					
03					
04					
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06					
07					
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11					
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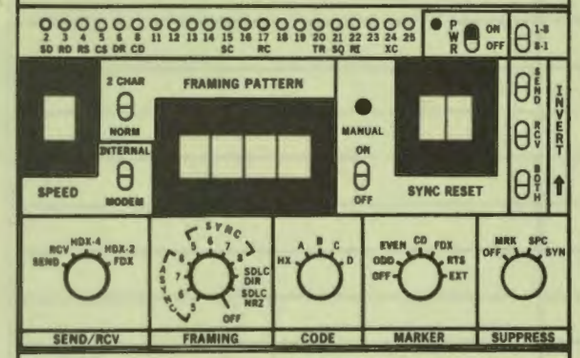
38					
69	STIM				
	OUTBUF				

SPECTRON

D-500 PROGRAM
(SHORT FORM)

REV

MONITOR SETUP



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Title:	
By:	Date / /
Protocol:	☐ Pt-Pt ☐ Multi-Drop
Run Program at (Site):	☐ HOST ☐ REMOTE
D-502 is Connected to:	☐ MODEM ☐ TERM
CNTR 1	
CNTR 2	
CNTR 3	
CNTR 4	
TIMR 1	
TIMR 2	
TIMR 3	
TIMR 4	
ITMR	

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