905C DATA TEST SET

FOR USE WITH

1A DATA SELECTIVE CALLING SYSTEM

DESCRIPTION AND OPERATING PROCEDURE

CONTENTS PAGE

1. GENERAL

1.01 This section is issued to provide description of and an operating procedure for the Data Test Set 905C.

2. DESCRIPTION

2.01 The High Speed Data Selective Calling System Data Test Set 905C is used in a remote service test center to generate signals required for testing the 1A High Speed Data Selective Calling System. It is used in conjunction with a test set 905A or test set 905B (905B is the portable version of the rack mounted 905A), and associated test equipment.

2.02 Any call directing code (CDC) or transmitter start code (TSC) used in the selective calling system can be generated. Control code combinations used as end-of-address, end-of-message, or answer-back are available from the data test set 905C.

2.03 Five-level code or ASCII code (8-level) test sequences may be generated. Vertical parity is available for use with 8-level codes.

3. TECHNICAL DATA

3.01 The data test set 905C is mounted on a standard 19-inch relay rack frame (Figure 1). Operating controls are all on the front panel.

3.02 Input and output signal levels are -6 ±1 v dc or 0 ±1 v dc. External dc voltages required from associated equipment are -12 v dc at 110 ma and +17 v dc at 60 ma. The internal test set power supply requires 117 v ac 60-cycle at approximately ten watts.

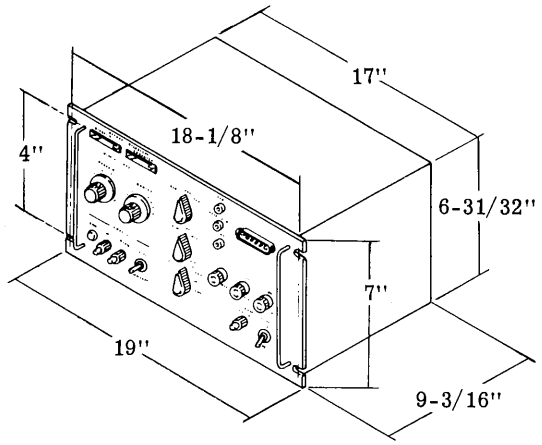

Figure 1 - Data Test Set 905C Dimensions

Prepared for American Telephone and Telegraph Company by Teletype Corporation

4. OPERATING PROCEDURE

CONTROLS (Figure 2)

NO.	NAME	FUNCTION
1	EXTERNAL PROGRAMMING CHARACTER 1 and CHARACTER 2 Jacks	These jacks accept special matrix cards which allow generation of special codes, which are not programmed into the test set.
2	PARITY Switch	Allows either EVEN or ODD parity during 8-level operation. Control is disabled in OFF position and also has no effect during 5-level operation.
3	OUTPUT Test Jack	Output of test set is available for monitoring.
4	RECV'D DATA Test Jack	Received data of any test is available for monitoring.
5	GROUND Test Jack	Provides a chassis ground for monitoring equipment.
6	OUTPUT Connector	Feeds output of test set to associated test equipment. Accepts response signals from equipment being tested.
7	AC Fuse	A 1/2 ampere fuse for the 117 v ac power line.
8	POWER ON-OFF Switch	Power switch for internal 24 v dc power supply.
9	POWER INDICATOR	This amber neon indicator is illuminated when power is applied to the internal power supply.
10	-DC Fuse	A 1/8 ampere fuse to protect the -12 v dc internal power source from overload.
11	+DC Fuse	A 1/8 ampere fuse to protect the external +17 v dc power source from overload.
12	FUNCTION Switch	Determines type of signal sequence to be sent.
	EXT	Characters programmed by matrix cards in EXTERNAL PROGRAMMING CHARACTER 1 and 2 jacks (1) are sent.
	CDC/TSC	Two consecutive call directing code (CDC) or transmitter start code (TSC) alpha characters are sent. The characters are determined by the position of the CDC/TSC switches (18).
	EOM/ETX	A 5-level end-of-message (EOM) sequence (↑H↓, Figures, H, Letters) or an 8-level end-of-text (ETX) code sequence is sent.
	EOA/STX	A 5-level end-of-address (EOA) sequence (<≡↓, Carriage Return, Line Feed, Letters) or an 8-level start-of-text (STX) code sequence is sent.
	V/ACK	A 5-level V acknowledge code or an 8-level ACK character code sequence is sent.
	NACK	An 8-level NACK character code sequence is sent.

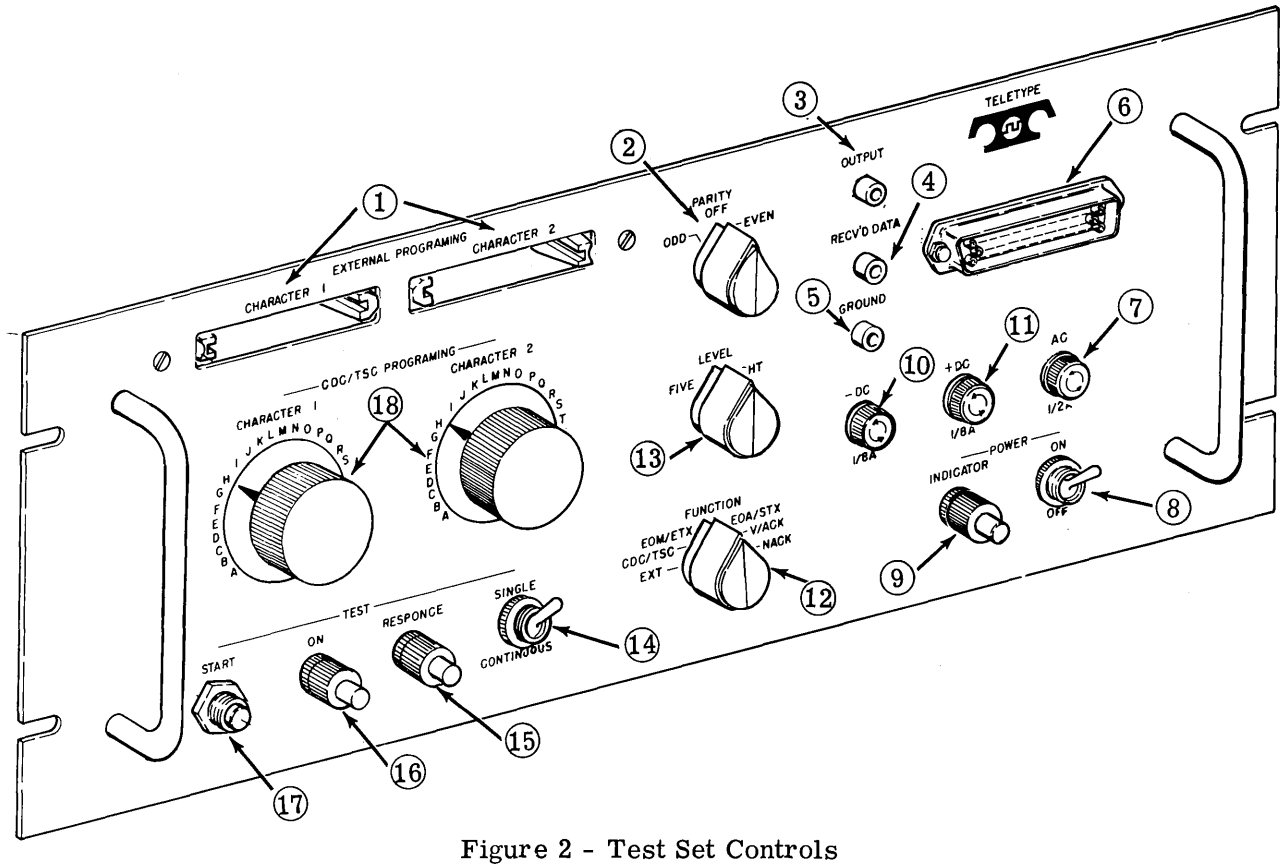

Figure 2 - Test Set Controls

NO.	NAME	FUNCTION
13	LEVEL Switch	Selects either 5-level Baudot or 8-level ASCII for code sequences.
14	TEST SINGLE CONTINUOUS Switch	Single Position — Test sequence is generated once for each depression of TEST START switch (17). Continuous Position — Test sequence is continually generated after one depression of TEST START switch (17).
15	TEST RESPONSE Indicator	This yellow lamp illuminates when a two-second test response line break is generated by the system being tested.
16	TEST ON Indicator	This amber lamp illuminates when a test sequence is being generated.
17	TEST START Switch	Depression of this switch initiates the test sequence selected.
18	CDC/TSC PROGRAMMING CHARACTER 1 and CHARACTER 2 Switches	Each switch selects one of 26 alpha characters to be generated for the CDC/TSC function. Character 1 is sent first followed by character 2. There are six spare positions on each switch. Selecting any of these generates a letters/rubout signal for that switch.

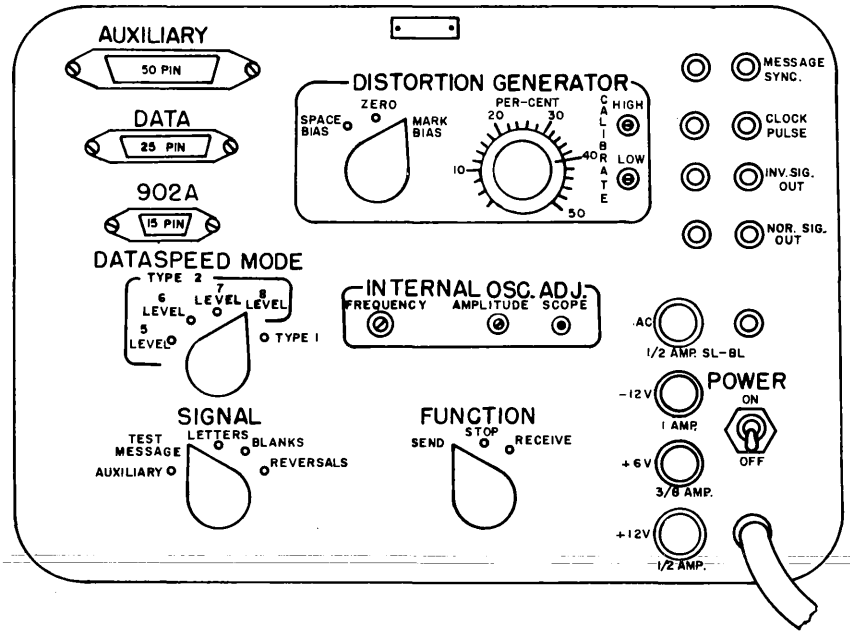

Figure 3 - Data Test Set 905A/B, Front Panel

4.01 The data test set 905A/B (Figure 3) is shown to account for switch positions required during the system testing.

4.02 To use the 905C data test set on a specific High Speed Data Selective Calling System, that station must be contacted and instructed to place the MAINTENANCE TEST CONTROLS on the receiving distributor module of their station controller to the positions required for a given test. Figure 4 shows the controls and instructions as they appear on the receiving distributor module. Refer to the appropriate BSP section for details.

TESTING PROCEDURES

4.03 Connect test equipment as shown in Figure 5. Arrange the control switches of the 905A/B data test set (Figure 3), as follows:

DATASPEED MODE	- TYPE 2, 8-LEVEL
SIGNAL	- AUXILIARY
DISTORTION	- ZERO
DISTORTION PERCENT	- Any Position
FUNCTION	- SEND
POWER	- ON

Arrange the control switches of the 905C data test set (Figure 2), as follows:

(5-Level, 1A System)

PARITY	- OFF
LEVEL	- FIVE
TEST SINGLE/ CONTINUOUS	- SINGLE
POWER	- ON

(8-Level Systems)

PARITY	- ODD, OFF, EVEN (as system demands)
LEVEL	- EIGHT
TEST SINGLE/ CONTINUOUS	- SINGLE
POWER	- ON

4.04 The TEST SINGLE/CONTINUOUS switch on the 905C data test set should be in SINGLE position during all tests. The FUNCTION switch should not be moved to a new position until the TEST ON indicator extinguishes, indicating completion of the test sequence. When the TEST SINGLE/CONTINUOUS switch is moved from CONTINUOUS to SINGLE the TEST ON indicator should be allowed to extinguish before moving the FUNCTION switch.

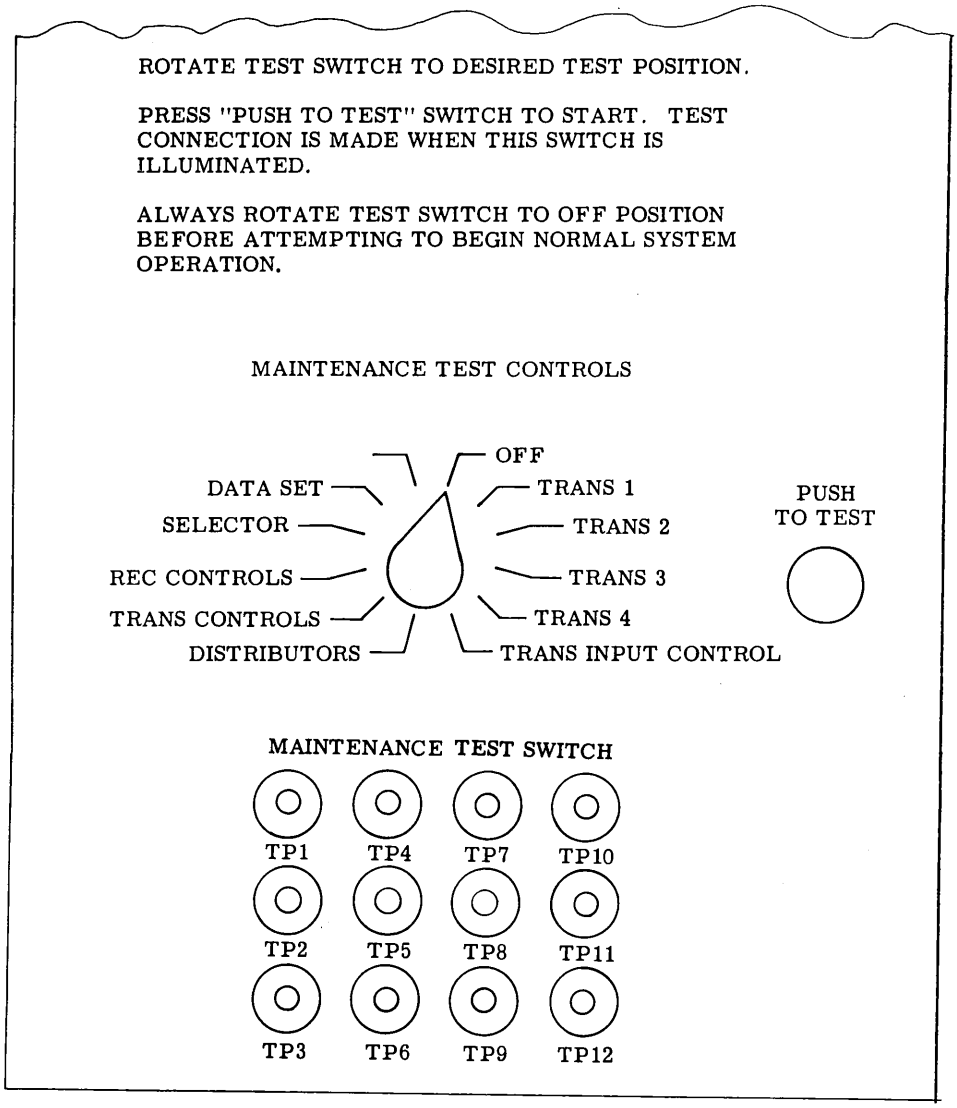

Figure 4 - Operating Instructions

TRANSMITTER CONTROL TEST

4.05 The ability of the transmitting distributor module in the Data Selective Calling System to respond to control sequences needed to operate the high speed reader is checked in this test.

4.06 An operator at the system location should be instructed to place the MAINTENANCE TEST SWITCH (Figure 4) to TRANS CONTROLS position and depress PUSH TO TEST switch. When verification is received that the PUSH TO TEST switch is illuminated, proceed with test.

4.07 Perform the EOM/ETX test first to accomplish two functions. First, the TD module logic will be placed in the select mode for further tests requiring recognition of TSC sequences. Second, the ability of the TD module to recognize the sequence is tested.

4.08 With the data test set 905C programmed for an EOM/ETX sequence, press the TEST START switch. The TEST RESPONSE indicator illuminates for approximately two seconds if the TD module and all the other equipment in the test loop is operating properly.

4.09 Program the 905C data test set for a CDC/TSC sequence with the alpha characters required by the system being tested (any CDC sequence except V, M, and X may be used). Press the TEST START switch and observe the TEST RESPONSE lamp to illuminate for two seconds, indicating proper system operation.

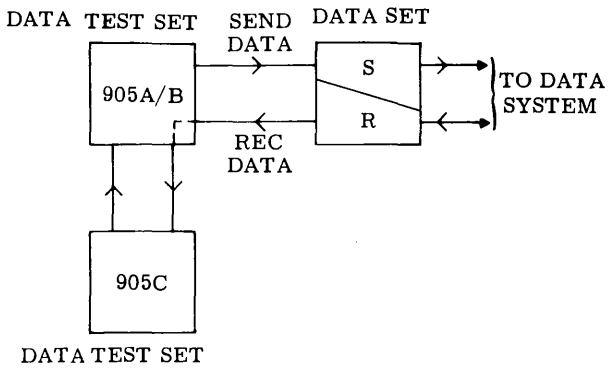

Figure 5 - Test Equipment Setup for Transmitter and Receiver Control Tests

RECEIVER CONTROL TEST

4.10 The ability of the receiving distributor to recognize NACK (8-level only), V/ACK, EOA/STX and EOM/ETX sequences is checked in this test.

4.11 An operator at the system location should be instructed to place the MAINTENANCE TEST SWITCH to REC CONTROLS position and depress the PUSH TO TEST switch. Upon verification of PUSH TO TEST switch illuminating for two seconds, proceed with the test.

4.12 The EOM/ETX, EOA/STX, V/ACK and NACK positions of the FUNCTION switch on the 905C data test set are used for this test. Place the FUNCTION switch to each of the above positions, pressing the TEST START switch while in each position. Observe the TEST RESPONCE indicator to illuminate for two seconds, indicating a properly operating system.

SELECTOR TEST

4.13 The programming and operation of the selector module in the Data Selective Calling System are checked during this test.

4.14 Instruct an operator at the system location to place the MAINTENANCE TEST SWITCH to SELECTOR position and press the PUSH TO TEST switch. When it is verified that the PUSH TO TEST switch is illuminated, proceed with the test.

4.15 Place the FUNCTION switch on the 905C data test set to CDC/TSC position. Rotate the CHARACTER 1 and CHARACTER 2 switches to the desired combination alpha characters depressing the TEST START switch for each combination. Observe the TEST RESPONSE indicator each time the TEST START switch is depressed. The indicator should illuminate only when the proper alpha characters for that station are sent.

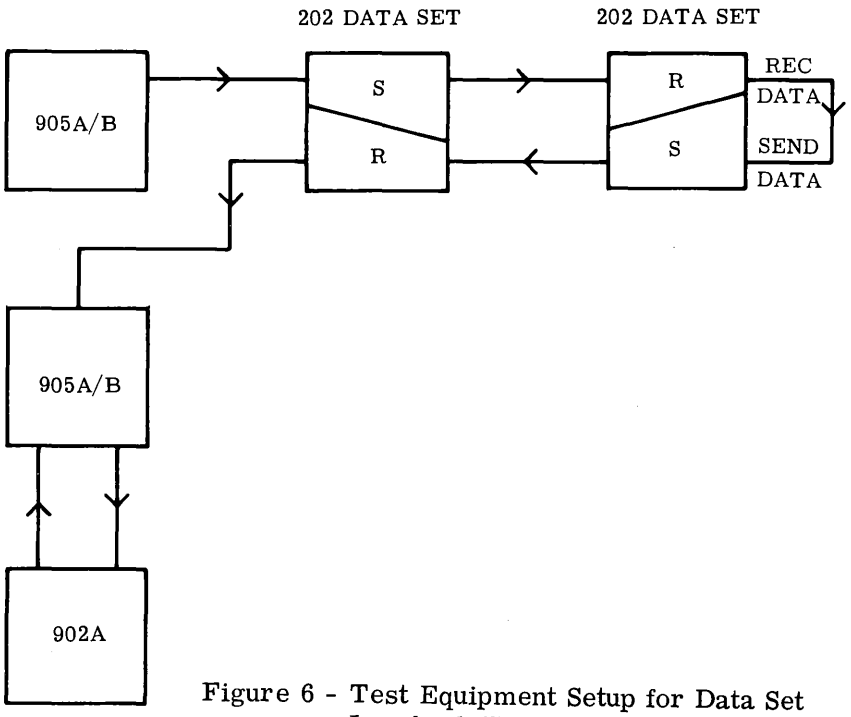

Figure 6 - Test Equipment Setup for Data Set Loopback Test

DATA SET TEST

4.16 Evaluation of data set performance and interconnecting lines is made with this test (Figure 6). An operator at the system location should be instructed to place the MAINTENANCE TEST SWITCH in the DATA SET position. Press the TEST ON switch. The receive data line of the data set is connected to its transmit circuit, routing back on the transmit circuit whatever is received on the receive data lines. See appropriate BSP section for distortion tests.

4.17 Instructing an operator at the system location, to place the MAINTENANCE TEST SWITCH in the TRANS INPUT CONTROL position, enables additional circuitry to be added to the test loop, to evaluate the performance of receiving and transmitting distributor modules.

4.18 The DISTRIBUTORS position of the MAINTENANCE TEST SWITCH enables other portions of the receiving and transmitting distributor modules to be tested.

H/L CONVERTER TEST

4.19 With the test equipment set up as shown in Figure 5, and the MAINTENANCE TEST SWITCH in the OFF position, the H/L Converter may be tested as follows:

4.20 Place the 905A/B data test set SIGNAL switch to AUXILIARY, and the FUNCTION switch to SEND. On the data test set 905C, place the FUNCTION switch to EOM/ETX, and generate a single sequence, placing the H/L Converter in the CDC select condition.

4.21 Place the data test set 905C FUNCTION switch to CDC/TSC and select the 2-character code known to be programmed for the H/L Converter under test. Generation of a single sequence now places the H/L Converter in the receive mode.

4.22 Place the 905A/B data test set SIGNAL switch to TEST MESSAGE, LETTERS, BLANKS, or REVERSALS; the 905C data test set TEST SINGLE/CONTINUOUS switch to CONTINUOUS, and depress the TEST START button. The H/L Converter now receives the selected message.

4.23 The H/L Converter may be removed from the test by placing the 905A/B data test set SIGNAL switch to AUXILIARY, and generating an EOM/ETX sequence. Other H/L Converters may now be selected for test by following the above test procedure, and substituting the appropriate CDC sequence.

L/H CONVERTER OR TAPE SENDER TEST

4.24 This test describes the procedure for testing a L/H Converter or Tape Sender.

4.25 Instruct an operator at the system location to place a 5-level or 8-level test tape in the high speed reader, and to place the MAINTENANCE TEST SWITCH to the TRANS position (1, 2, 3, or 4) corresponding to the unit to be tested. Do not depress the PUSH TO TEST button at this time.

4.26 From the 905C data test set, generate an EOA/STX sequence, and place the FUNCTION switch on the 905A/B data test set to RECEIVE. The operator at the system location can now depress the PUSH TO TEST button, and the test tape shall be transmitted.

4.27 Using the test setup shown in Figure 7, a bit by bit error check can be made. Refer to the appropriate 905A/B data test set BSP section.

4.28 If desired, the high speed reader can now be tested for its ability to respond to a TSC sequence by placing the MAINTENANCE TEST SWITCH to OFF, and generating a TSC sequence known to be programmed for the reader to be tested. Now, generation of a single EOA/

STX sequence places the reader in the nonselect condition and prevents it from stopping for a CDC answer-back on alpha-letters combinations that may be in the test tape.

4.29 Instruct the operator at the system location to manually enter a count into the L/H Converter's message counter, place the 905A/B data test set FUNCTION switch to RECEIVE, and the high speed reader now sends whatever tape is placed in its gate.

4.30 To test a L/H Converter for its ability to generate a no response, instruct the operator that there should be no count in the unit's message counter. Upon verification of this, generate the appropriate TSC sequence, and place the 905A/B data test set FUNCTION switch to RECEIVE. If the L/H Converter is functioning properly, it will generate a V answer-back, which will be recognized by illumination of the TEST RESPONSE lamp for approximately 70 milliseconds.

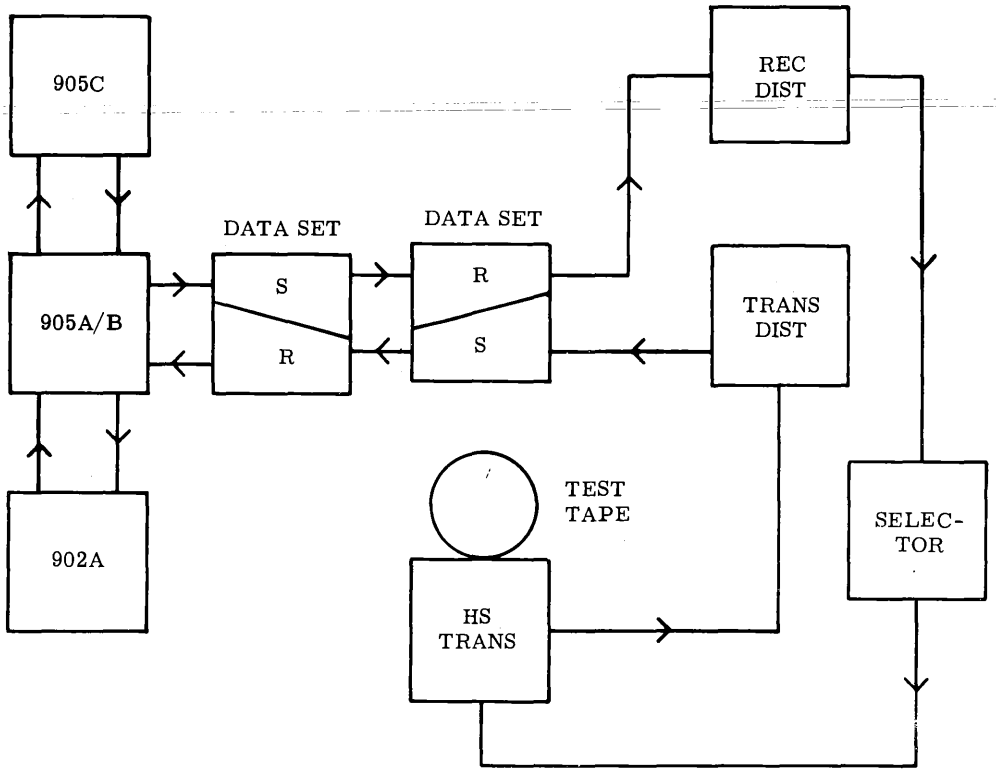

Figure 7 - Test Equipment Setup for Checking Errors in Sending Test Tape from High Speed Transmitter