911G TEST SENTENCE GENERATOR

DESCRIPTION AND OPERATION

1. GENERAL

1.01 The 911G Test Sentence Generator (TSG) is a rack-mounted test set for central office use as a source of digital signals for testing teletypewriter equipment and transmission facilities. This section contains a physical and functional description of the TSG.

1.02 This section is reissued to include a third "FOX" test sentence for use in testing 37-type teletypewriters and to make minor editorial changes throughout to comply with present format. Since this change constitutes a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The 911G TSG uses three different plug-in printed circuit translator matrix cards to generate three "FOX" test sentences.

(a) The 5-element Baudot (or Murray) code test sentence, using the J79911GG-1, List 1 card, is as follows:

THE QUICK BROWN FOX JUMPED OVER A LAZY DOGS BACK 1234567890 A1A TESTING

(b) The 8-element ASCII (American National Standard Code for Information Interchange) test sentence, using the J79911GF-1, List 1 (MD) card, is as follows:

THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 TESTING

(c) The 8-element ASCII test sentence, using the J79911GF-1, List 2 card, is as follows:

The Quick Brown Fox Jumped Over A Lazy Dog's Back 1234567890 Testing yzyz

1.04 The J79911GF-1, List 2 card is used for testing 37-type teletypewriters, which have upper and lower case characters. A space plus four additional characters have been added after the word "Testing" for determining the length of the TTY line. (The last "z" in the test sentence is the 73rd character in the sentence.) This translator matrix card is also used in testing 33- and 35-type TTYs. The printout is the same as for the 37-type *except* that all characters are printed in upper case.

1.05 The test sentence may be advanced automatically or manually on a single character basis by operating the AUTO.-STOP-STEP switch on the control panel. The REPEAT switch allows the TSG to generate a repeated character. A SIGS lamp indicates when signals are being generated; it will remain on as long as a marking signal is present at the output and will turn off when the signal goes spacing.

1.06 An RY OR U* control switch allows the TSG to generate a repeating alternating sequence of "R" and "Y" characters for the 5-element code and a sequence of "U" and "*" characters for the 8-element code.

1.07 Using the BIAS, DIST 5%, and DIST 1% control switches, the TSG may be conditioned to generate a signal of the desired code and speed containing a predetermined amount of distortion. The types of distortion generated, in relation to an undistorted signal, are illustrated in Fig. 1. In instances where the mark-to-space transition of the start pulse has been delayed, the entire waveform must be shifted in order to see the distortion as it will appear to the receiving device.
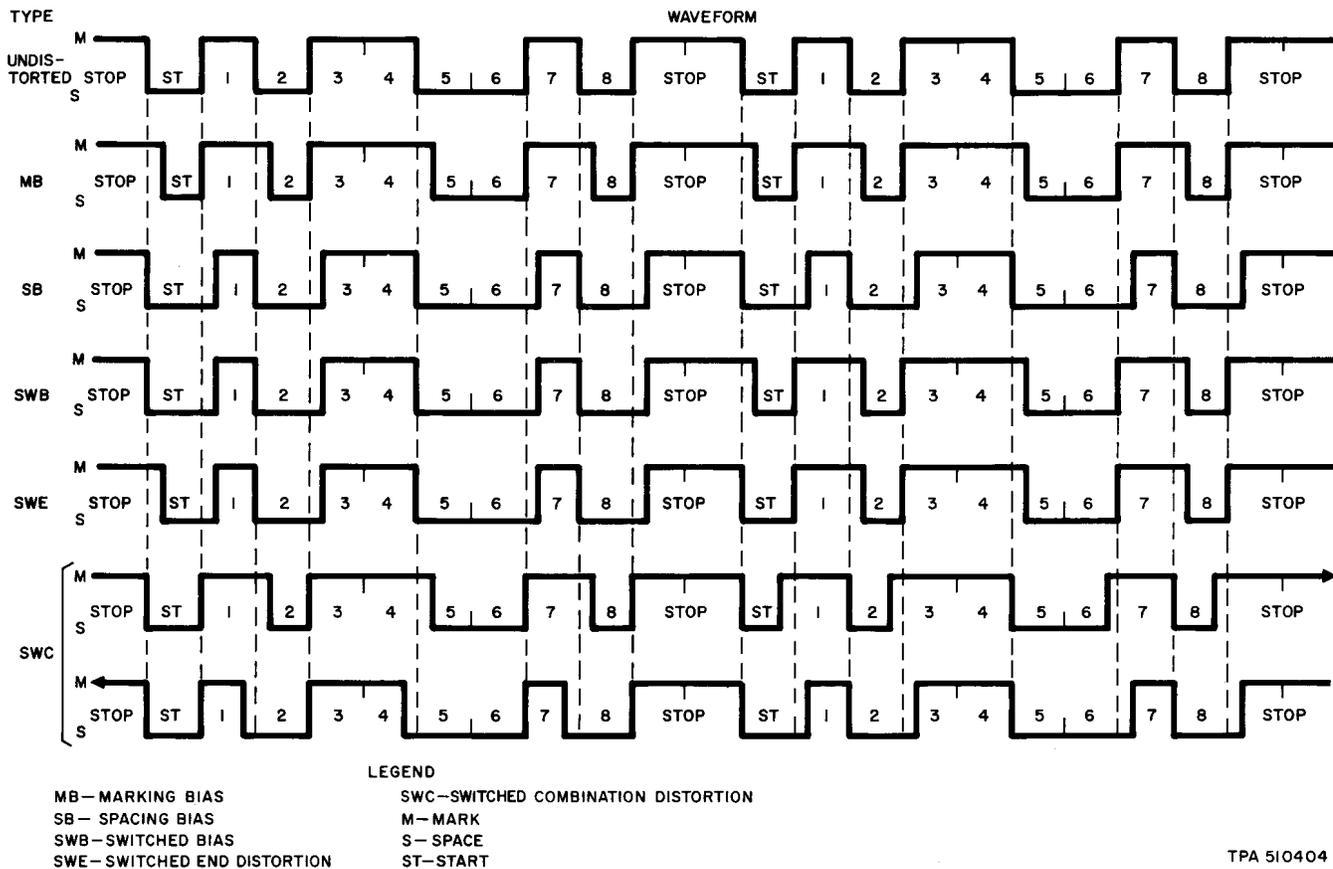
LEGEND

MB— MARKING BIAS	SWC—SWITCHED COMBINATION DISTORTION
SB— SPACING BIAS	M— MARK
SWB— SWITCHED BIAS	S— SPACE
SWE— SWITCHED END DISTORTION	ST— START

TPA 510404

Fig. 1—911G Test Sentence Generator—Types of Distortion

2. DESCRIPTION

2.01 The 911G Test Sentence Generator consists of an electronic unit, a control panel, and a power supply (Fig. 2). The control panel is normally located on the No. 2, No. 9B, or DOTC Serviceboard and is connected to the input/output appearances with a maximum cable length of 200 feet. The electronic unit may be located at any point, provided that the cable length to the control panel is not more than 300 feet, and provided that the power supply is mounted in the same bay as the electronic unit.

2.02 The control panel for the 911G TSG used in the No. 2 Serviceboard is 7-11/16 inches square. The control panel used in the Data Observing Test Center (DOTC) Serviceboard is 3/4 inch high by 12-3/4 inches wide. The control panel used in the No. 9B Serviceboard is equipped with a 19-inch mounting adapter and requires 5-1/4 inches of vertical mounting space.

2.03 In order to assure a ± 1 percent accuracy in the generation of test signals, an accurate clock signal that is 100 times the baud rate of the test signal must be provided. The clock signals may be generated by an internal crystal controlled oscillator or connected from an external clock source, but the two sources may not be intermixed. The BAUDS switch selects the clock frequency of the source that is used.

2.04 By using a 911K Exclusion Circuit (Fig. 3), a maximum of five control panel positions may utilize a single TSG electronic unit. The exclusion circuit prohibits use of the TSG electronic unit by more than one control position at a time. A CONN switch on the control panel is depressed to obtain access to the electronic unit in multiple installations.
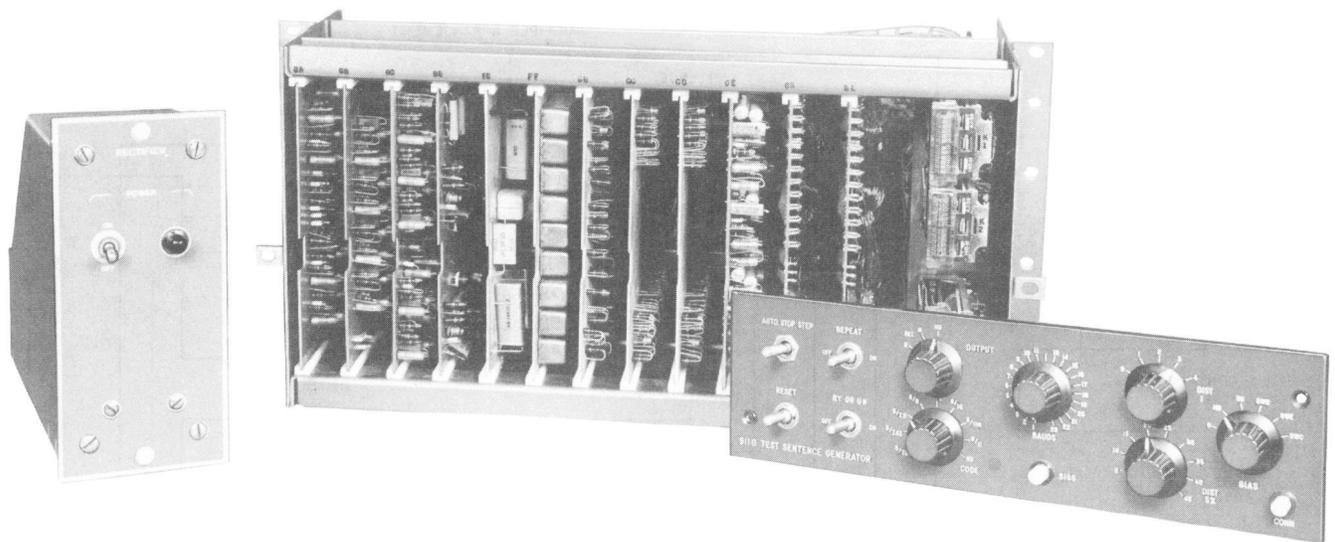
Fig. 2—911G Test Sentence Generator

3. OPERATION

3.01 The controls required for operation of the 911G Test Sentence Generator are located on the front of the control panel. The set may be conditioned by use of the controls to generate the 5-element or 8-element "FOX" test sentence automatically or manually; ie, one character at a time on demand of the operator. The TSG may be conditioned to generate a repeated character either automatically or manually; it may also be conditioned to generate repetitive "RY" or "U*" characters.

3.02 The BAUDS switch selects the clock frequency for the desired BAUD rate. A total of five crystal units and a clock printed wiring board having provisions for 17 crystal units are normally required for testing 3-row and 4-row teletypewriters. A clock selector relay printed wiring board is required in addition to the clock printed wiring board, if more than five clock frequencies are desired. The functions of the BAUDS switch are outlined in Table A.

3.03 The CODE switch (Table B) basically controls the character counter to regulate the number of elements and the stop interval length of the several codes generated by the TSG. The character counter is conditioned by setting the CODE switch to divide the output from the element counter to produce characters having 5, 6, 7, or 8 information and parity elements. The element counter divides the input clock frequency by 100. When the CODE switch is set to the RS (reversals) position, the output of the TSG is a square wave with a period of two element lengths for the speed that has been selected by the BAUDS switch. Even parity is generated in the 8/10 and 8/11 codes (see Table B).

3.04 The OUTPUT switch has three positions. In the REL N (relay normal) position, the output is taken across the contacts of a polar relay. The relay contacts are closed for a mark and open for a space. In the REL R (relay reverse) position, the output is taken from the same relay, but the TSG is conditioned to reverse the mark-space conditions; ie, open contacts for a mark and closed contacts for a space. In the HD (hub drive) position, the TSG is used to drive a half-duplex type 2 hub potentiometer and the output is +60 volts for a mark and −30 volts for a space.

3.05 The BIAS switch (Table B) conditions the TSG to introduce the type of distortion that is desired in the test output (Fig. 1). An undistorted output is generated when the BIAS switch is set to the "0" position. Any amount of distortion up to a maximum of 49 percent may be generated in 1-percent increments by adjusting the DIST 1% and DIST 5% switches (Table B).
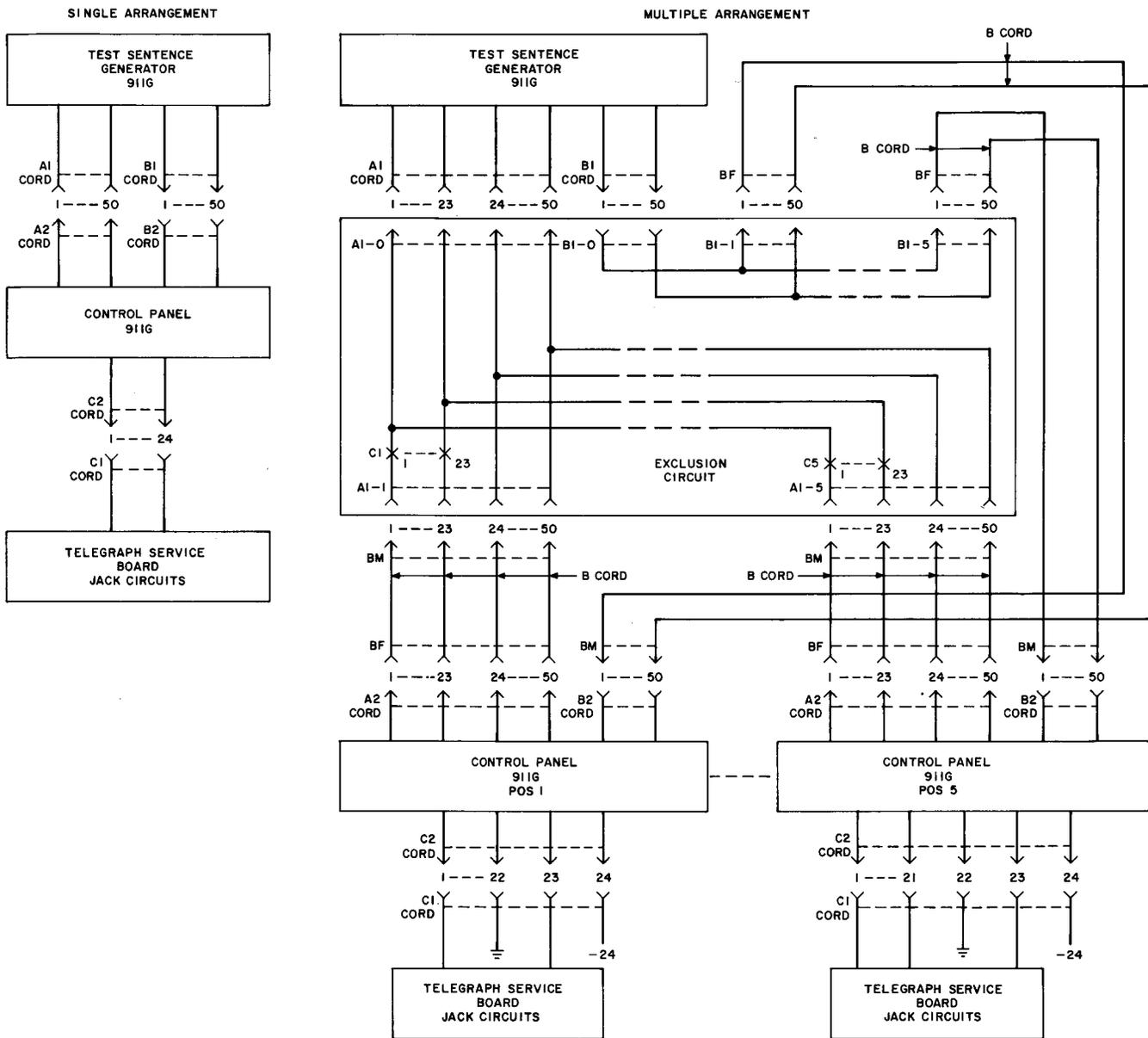
SINGLE ARRANGEMENT

MULTIPLE ARRANGEMENT

Fig. 3—Test Sentence Generator Arrangement for Single and Multiple Installations

3.06 The AUTO.-STOP-STEP switch allows the operator to have complete control of any selected test sentence. In the STOP position, a continuous mark is generated. In the AUTO. position, the test sentence or the RY or U* characters are repeated continuously. The STEP position of the switch provides manual stepping of the test sentence, one character at a time.

3.07 The REPEAT switch conditions the TSG to repeat the last character generated. The

character may be repeated continuously or singly by use of the AUTO.-STOP-STEP switch.

3.08 The RY OR U* switch conditions the TSG to transmit the RY test characters when a 5- or 6-element code has been selected, and to transmit the U* test characters when a 7- or 8-element code has been selected. These characters are transmitted continuously or singly depending upon the position of the AUTO.-STOP-STEP switch.

TABLE A

BAUDS SWITCH FUNCTIONS — 911G

SWITCH POSITION	EXTERNAL CLOCK CIRCUIT SELECTED	RELAY OPERATED		INTERNAL CRYSTAL SELECTED	CRYSTAL FREQUENCY RANGE KILOHERTZ	OPTION Z BAUDS
1	EC1	Clock Board	K1	CR1	4.0 to 5.5	45.5 (60 speed 3 row)
2	EC2		K2	CR3	5.6 to 7.6	56.9 (75 speed 3 row)
3	EC3		K3	CR6	5.6 to 7.6	74.2 (100 speed 3 row)
4	EC4		K4	CR12	7.7 to 20.0	110.0 (100 speed 4 row)
5	EC5	CP9	K5	CR15	7.7 to 20.0	150.0 (150 speed 4 row)
6	EC6	Clock Selector Relay Board	K1	CR2	4.0 to 5.5	—
7	EC7		K2	CR4	5.6 to 7.6	—
8	EC8		K3	CR5	5.6 to 7.6	—
9	EC9		K4	CR7	5.6 to 7.6	—
10	EC14		K5	CR16	7.7 to 20.0	—
11	EC17		K6	CR17	7.7 to 20.0	—
12	EC12		K7	CR10	5.6 to 7.6	—
13	EC13		K8	CR11	7.7 to 20.0	—
14	EC16		K9	CR8	5.6 to 7.6	—
15	EC15		K10	CR14	7.7 to 20.0	—
16	EC10		K11	CR13	7.7 to 20.0	—
17	EC11		K12	CR9	5.6 to 7.6	—
18	EC18	CP10	K13	—	—	—
19	EC19		K14	—	—	—
20	EC20		K15	—	—	—
21	EC21		K16	—	—	—
22	EC22		K17	—	—	—
23	Conditions Set For Switching By Class Of Service Lead to Diode Matrix					

The REPEAT switch will cause the last character generated to be repeated.

3.09 The RESET switch when actuated will clear the TSG and start the test sentence from the beginning.

3.10 The CONN switch is used to request access to the electronic unit in multiple control installations. A maximum of five control panels may be installed with a 911K Exclusion Circuit to limit access to the TSG electronic unit to one control panel at a time. When the electronic unit is busy, the CONN light at the non-using positions will be lighted. If access is desired while the unit is busy, the CONN switch may be actuated to cause the CONN light at the using position to flash at a 60-ipm rate.

TABLE B

911G TEST SENTENCE GENERATOR — CONTROL SWITCH FUNCTIONS

SWITCH	POSITION	MEANING	FUNCTION
CODE	5/7.0	5 Information Elements 1-Element Stop Interval	Generates signal with start element, 5 info elements, and stop interval of 1 element length.
	5/7.42	5 Information Elements 1.42-Element Stop Interval	Generates signal with start element, 5 info elements, and stop interval of 1.42 element lengths.
	5/7.5	5 Information Elements 1.5-Element Stop Interval	Generates signal with start element, 5 info elements, and stop interval of 1.5 element lengths.
	6/8	6 Information Elements 1-Element Stop Interval	Generates signal with start element, 6 info elements, and stop interval of 1 element length.
	7/9	7 Information Elements 1-Element Stop Interval	Generates signal with start element, 7 info elements, and stop interval of 1 element length.
	8/10	8 Information Elements 1-Element Stop Interval	Generates signal with start element, 7 info elements, parity element, and stop interval of 1 element length. Even parity generated in parity element.
	8/11M	8 Information Elements 2-Element Stop Interval	Generates signal with start element, 7 info elements, parity element, and stop interval of 2 element lengths. Parity element always marking.
	8/1	8 Information Elements 2-Element Stop Interval	Generates signal with start element, 7 info elements, parity element, and stop interval of 2 element lengths. Even parity generated in parity element.
	RS	Reversals	Provides square wave output with period of 2 element lengths for speed selected by BAUDS switch.

TABLE B (Cont)

SWITCH	POSITION	MEANING	FUNCTION
BIAS	0	No Distortion	Provides undistorted output
	MB	Marking Bias	Provides marking bias distortion on output signal
	SB	Spacing Bias	Provides spacing bias distortion on output signal.
	SWB	Switched Bias	Provides marking bias and spacing bias distortion on alternate characters.
	SWE	Switched End	Provides marking end and spacing end distortion on alternate characters.
	SWC	Switched Combination	Provides marking end, marking bias, spacing end, and spacing bias distortion in a 4-character cycle.
DIST 5% (Note 1)	0	No Distortion	Produces undistorted output signal.
	5	5% Distortion	Introduces 5% distortion
	10	10% Distortion	Introduces 10% distortion
	15	15% Distortion	Introduces 15% distortion
	20	20% Distortion	Introduces 20% distortion
	25	25% Distortion	Introduces 25% distortion
	30	30% Distortion	Introduces 30% distortion
	35	35% Distortion	Introduces 35% distortion
	40	40% Distortion	Introduces 40% distortion
	45	45% Distortion	Introduces 45% distortion
DIST 1% (Notes 1 & 2)	0	No Distortion	Produces no additional distortion
	1	1% Distortion	Introduces 1% additional distortion
	2	2% Distortion	Introduces 2% additional distortion
	3	3% Distortion	Introduces 3% additional distortion
	4	4% Distortion	Introduces 4% additional distortion
AUTO-STOP-STEP	AUTO	Automatic	Transmits output signal continuously
	STOP	Stop	Stops output transmission
	STEP	Single Character	Transmits single character each time switch is activated to STEP position

TABLE B (Cont)

SWITCH	POSITION	MEANING	FUNCTION
RY or U*	ON	Test Characters	Transmits test characters "RY" for 5 and 6 element code, and "U*" for 7 and 8 element code.
REPEAT	ON	Repeat Last Character	Repeats last character generated, either automatically or stepped.
RESET	ON	Start From Beginning	Starts generation of test sentence from beginning
CONN	ON	Connect	Initiates connection of control panel to electronic unit in multiple control position installations.
OUTPUT	REL N	Relay Normal	Provides relay contact output—closed for mark and open for space.
	REL R	Relay Reverse	Provides relay contact output—open for mark and closed for space.
	HD	Hub Drive	Drives half-duplex hub potentiometer (+60V mark and −30V space).

Note 1: Type of distortion produced is determined by BIAS switch setting.

Note 2: Introduces distortion in addition to that amount set by DIST 5% switch.

4. REFERENCES

4.01 Additional information on the 911G Test Sentence Generator and associated test equipment may be found in the following:

NUMBER	TITLE
103-813-504	911G Test Sentence Generator—Tests
103-813-100	911C Distortion Measuring Set—Description, Operation and Maintenance
103-813-103	911F Distortion Measuring Set—Description and Operation
103-813-105	911J Data Signal Distorting Set—Description and Operation
103-813-106	911K-Type Exclusion Unit—Description and Operation
103-813-107	911M Multiclock Unit—Description and Operation
SD-&CD-70953-01	911G Test Sentence Generator
SD-&CD-70938-01	911C Distortion Measuring Set
SD-&CD-70952-01	911F Distortion Measuring Set
SD-&CD-70954-01	911J Data Signal Distorting Set
SD-&CD-70957-01	911K Exclusion Unit
SD-&CD-70966-01	911M Multiclock