911F DISTORTION MEASURING SET
DESCRIPTION AND OPERATION

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1. GENERAL

1.01 The 911F Distortion Measuring Set (DMS) is essentially a rack-mounted version of the 911C DMS for central office use. It is used with the No. 2 or No. 9B Serviceboard and the Data Observing Test Center (DOTC). The DMS provides a means of measuring distortion of start-stop and synchronous serial data signals over the range of 0 to 49 percent.

1.02 This section is reissued:

- To add information on the locking and nonlocking BSY-CONN switch (options M and N, respectively)
- To reflect the newly added single-character (SCH) distortion measurement capability
- To show the response value of the new transients filter
- To delete all references to the class lead diode matrix
- To make minor changes throughout the text to comply with present format.

1.03 Nixie* tube read-out of distortion and bias is provided on the control panel. A SIGS/M lamp indicates when signals are being received. The SIGS/M lamp will remain on as long as a marking signal is present at the input to the DMS and will turn off when the signal goes spacing. Two optional remotely mounted indicators are available. One unit will repeat both distortion and bias readings and the other unit will repeat the bias reading only.

* Registered trademark of Burroughs Corporation

1.04 The DMS measures distortion of all commonly used serial data signals having either 5, 6, 7, 8, or 9 information bits and speeds up to 200 bits per second.

2. DESCRIPTION

2.01 The 911F DMS consists of a rack-mounted electronic unit and a control panel (Fig. 1). Types of distortion that may be measured by the DMS are marking bias, spacing bias, marking end distortion, and spacing end distortion (Fig. 2).

2.02 A maximum of five control panel positions may be used within a central office area with a single 911F electronic unit by providing a 911K Exclusion Unit that permits use by only one position at a time (Fig. 3). Two types of remotely mounted indicator panels are available on an optional basis (Fig. 4). A power supply type J87272B-L2 or equivalent must be provided to supply operating voltages.

2.03 The 911F DMS provides for distortion measurement of the following types of serial data signals:

(1) Polarized current signals greater than ± 1 mA (normal or reversed)

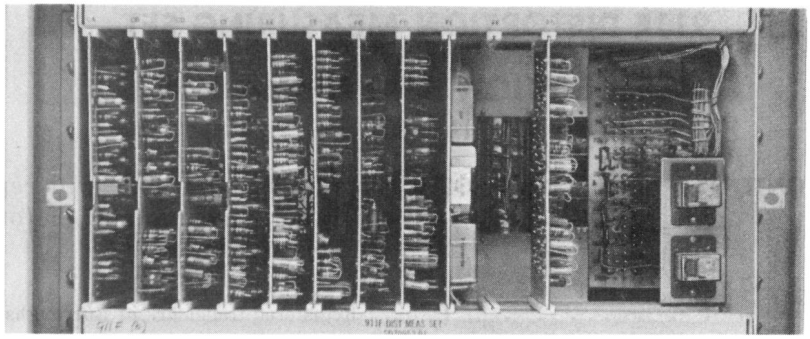
(2) 20-mA neutral signals (normal or reversed)

(3) 60-mA neutral signals (normal or reversed)

(4) +60 −30 volt HUB signals

(5) Electronic Industries Association signals ± 12 volts

(6) Electronic loop signals (SEND −50 −130 volts) or (RECEIVE −50 +130 volts).



ELECTRONIC UNIT

CONTROL AND INDICATOR PANEL

Fig. 1—911F Distortion Measuring Set

2.04 A clock frequency that is 100 times the signaling rate of the signal being measured must be provided. A different clock rate is required for each signaling rate. Clock frequencies may be provided by an internal crystal controlled oscillator or from an external clock source such as the 911M Multiclock Unit, but the two types may not be used in combination. The external clock source must be located such that the length of connecting cable does not exceed 200 feet. Provision is made for installation of 17 internal crystals or connection of 22 external clock frequencies. The BAUDS switch selects the individual operating frequencies, regardless of the options installed.

3. OPERATION

3.01 Because of the variety of options available with the DMS, a detailed knowledge of individual office requirements is desired for optimum utilization of the set.

3.02 Manual control of the 911F DMS is accomplished by adjusting the several switches located on the control panel at any one of the serviceboard positions.

3.03 ***BAUDS Switch:*** The BAUDS switch is used to select the clock frequency required to meet individual test requirements. Table A outlines the function of the BAUDS switch in each of the 23 positions. The basic function of the BAUDS switch is to energize one of 22 relays within the electronic unit, which in turn selects the clock rate assigned to that position. When option Z is provided, only the first five positions of the BAUDS switch will be active for speeds shown in Table A. Position 23 of the BAUDS switch is not used.

3.04 ***CODE Switch:*** The CODE switch enables the DMS to receive all standard code serial data signals of either 5, 6, 7, 8, or 9 information bits. The CODE switch setting controls the character counter to cause the set to synchronize with the code being received.

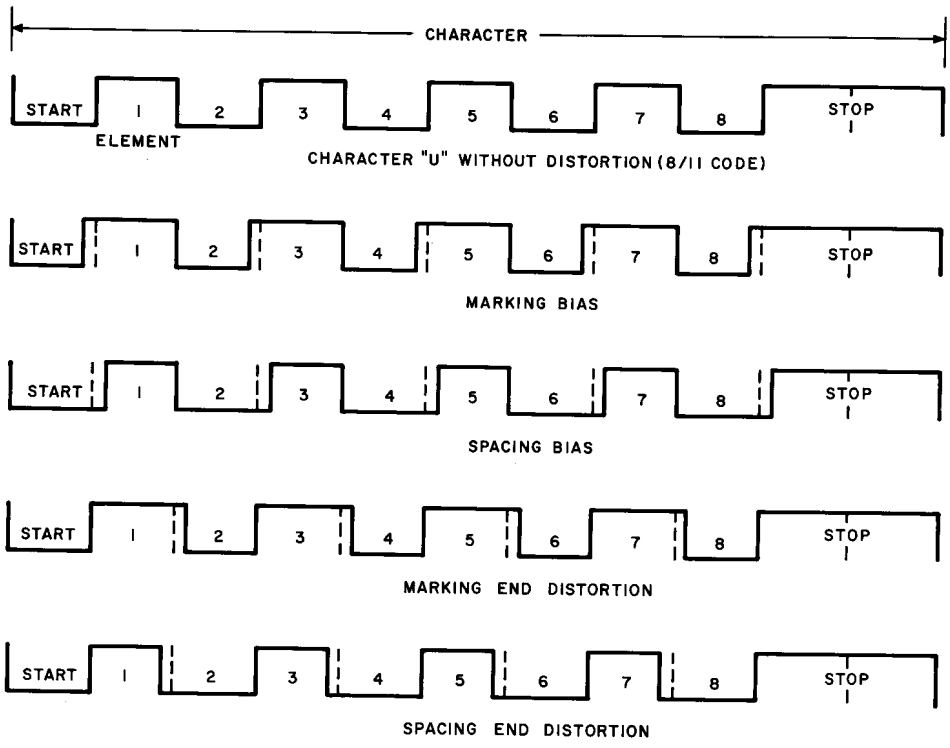


Fig. 2—Types of Distortion Measured by 911F DMS

3.05 ***INPUT Switch:*** The INPUT switch is provided to match the input circuit of the DMS to receive one of ten types of input signals. INPUT switch positions and the input signal characteristics are outlined in Table B. In addition to selecting the proper INPUT switch position, care must be exercised to assure that the proper input jack is selected for the type of signal to be introduced.

3.06 ***DISPLAY and ED (End Distortion) Switches:*** The output display for the DMS consists of five Nixie tubes that are controlled by the DISPLAY and ED switches. In the PIP position the set displays the maximum distortion per character and resets after each character. In the F position, the set displays the peak reading and resets automatically every 2 seconds. In the S position, the set displays the peak reading and resets automatically every 4 seconds. In the PK position, the set displays the highest percent distortion received and must be reset manually. ▶In the SCH position, the set displays the highest distortion of a single character on the DISTORTION Nixies and type of distortion on the M/S Nixie. The display must be reset manually by operating the DISPLAY switch to either F or S position.◀ The BIAS/ED (bias/end distortion) Nixies normally display the average BIAS and reset every 2 seconds. When the DISPLAY switch is in S position, the BIAS/ED Nixies reset every 4 seconds. The type of bias is displayed as S for spacing and M for marking. When the ED switch is operated, the M/S Nixie will display the letter M for marking end distortion and the letter S for spacing end distortion.

3.07 ***PARITY Switch:*** The PARITY switch is provided to check the even or odd parity of a signal. The PARITY lamp will light when the parity of a signal does not check, and will remain lighted until the PARITY switch is turned off.

3.08 ***FILTER Switch:*** The FILTER switch, when operated, prevents transient impulses from being recognized as distortion. When in the IN position, the FILTER causes any transient shorter than approximately ▶1.5 ms at each transition (M to S or S to M), option K, or 100 μs throughout the signal, option J,◀ to be disregarded.

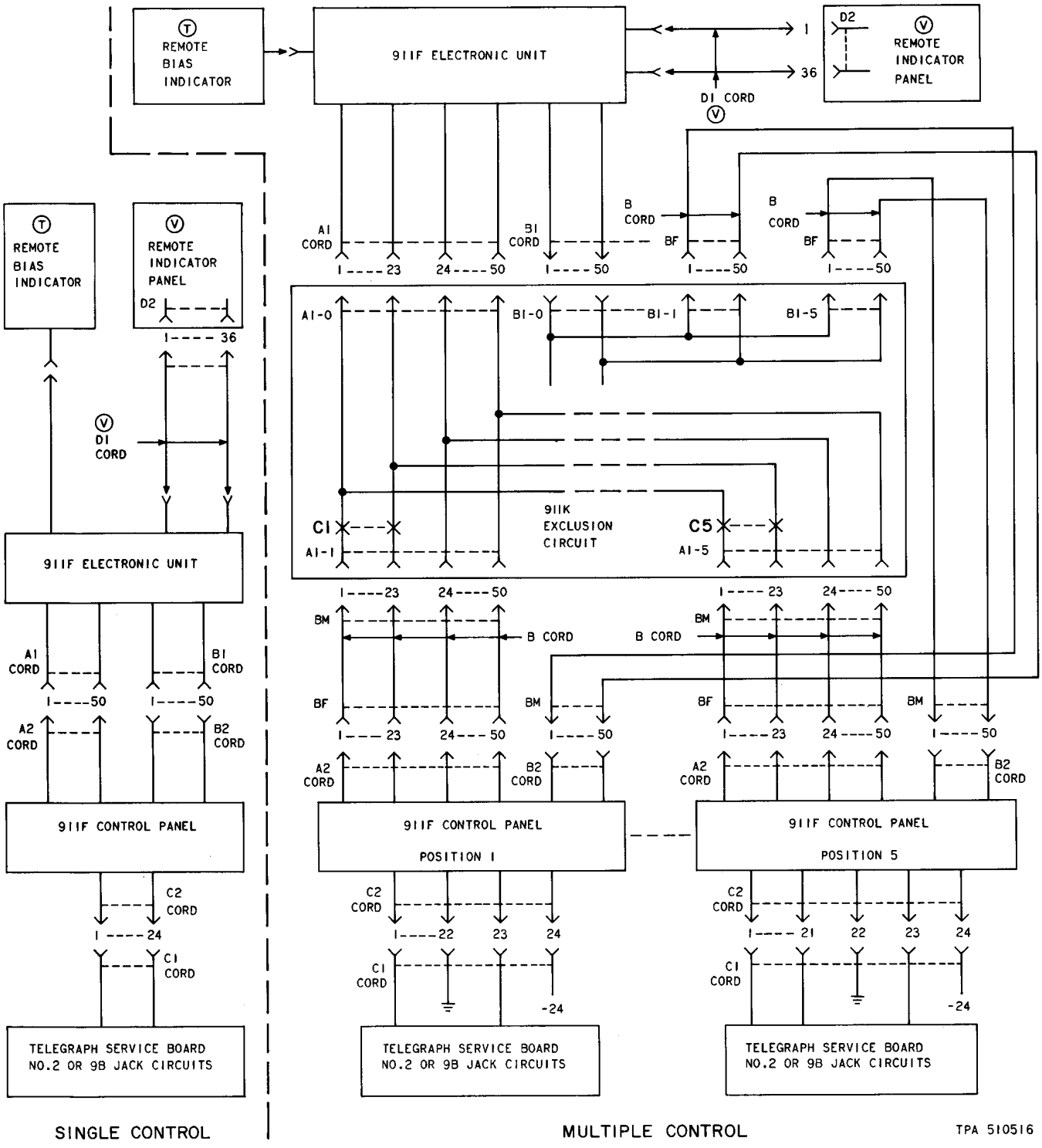
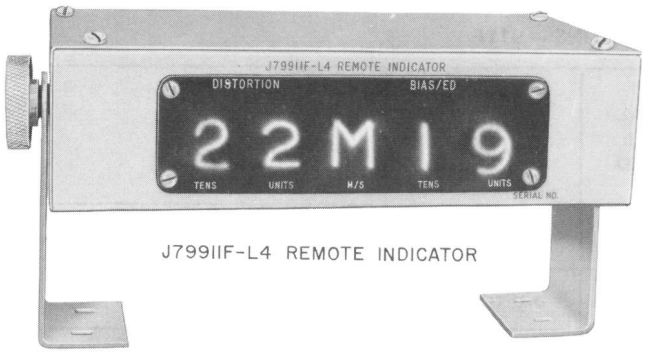
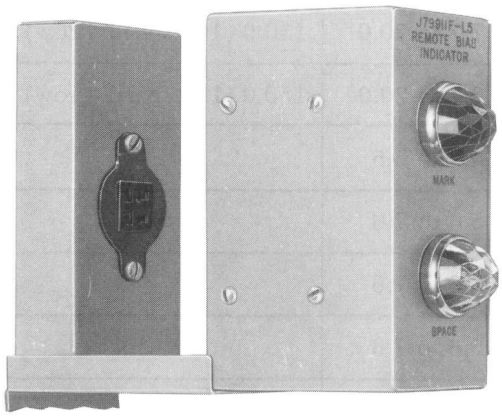


Fig. 3—Arrangement for Single and Multiple Set Control of 911F Distortion Measuring Set



J799IIF-L4 REMOTE INDICATOR



J799IIF-L5 REMOTE BIAS INDICATOR

Fig. 4—911F DMS—Optional Remote Indicators

3.09 ***BSY-CONN:*** The BSY-CONN (busy-connect) switch is used in multiple control position installations to gain access to the 911F electronic unit. The switch is activated to operate relays in the 911K Exclusion Unit to complete the circuit. The BSY lamp will light steadily when any other position is using the circuit. The CONN switch may be operated while the BSY lamp is lighted. The exclusion unit will prohibit connection to the electronic unit, but will cause the BSY lamp at the using control panel to flash once per second. ▶The BSY-CONN switch may be either locking (option M) or nonlocking (option N). The nonlocking BSY-CONN switch should be held depressed while tests are made. The locking BSY-CONN switch should be depressed again after tests are completed to release the switch.◀

4. REFERENCES

4.01 Additional information on the 911F Distortion Measuring Set and associated sets may be found in the following documents:

SD- and CD-70952-01—Distortion Measuring Set 911F

SD- and CD-70957-01—Exclusion Circuit

Section 103-813-107—911M Multiclock Unit—Description and Operation

TABLE A

BAUDS SWITCH FUNCTIONS – 911F

SWITCH POSITION	EXTERNAL CLOCK CIRCUIT SELECTED	RELAY OPERATED		INTERNAL CRYSTAL SELECTED	OPERATING FREQUENCY RANGE KILOHERTZ	OPTION Z BAUDS RATE
1	EC1	CLOCK BOARD CP9	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		K5	CR15	7.7 to 20.0	150.0 (150 speed 4 row)
6	EC6	CLOCK SELECTOR RELAY BOARD CP10	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		K13	—	—	
19	EC19		K14	—	—	
20	EC20		K15	—	—	
21	EC21		K16	—	—	
22	EC22		K17	—	—	
23	Not used					

TABLE B

CONTROL SWITCH FUNCTIONS FOR 911F DISTORTION MEASURING SET

SWITCH	POSITION	MEANING	FUNCTION
CODE	5	5 Info Elements	Receive signals with 5 information elements and stop pulse of 1 or more element lengths
	6	6 Info Elements	Receive signals with 6 information elements and stop pulse of 1 or more element lengths
	7	7 Info Elements	Receive signals with 7 information elements and stop pulse of 1 or more element lengths
	8	8 Info Elements	Receive signals with 8 information elements and stop pulse of 1 or more element lengths
	9	9 Info Elements	Receive signals with 9 information elements and stop pulse of 1 or more element lengths
INPUT	POL N	Polar Normal	Recognize polarized signals greater than +1 mA as mark and —1 mA as space
	POL R	Polar Reverse	Recognize polarized signals greater than —1 mA as mark and +1 mA as space
	20N	20 mA Normal	Recognize 20 mA neutral signals +20 mA as mark and 0 mA as space
	20R	20 mA Reverse	Recognize 20 mA neutral signals +20 mA as space and 0 mA as mark
	60N	60 mA Normal	Recognize 60 mA neutral signals +62.5 mA as mark and 0 mA as space
	60R	60 mA Reverse	Recognize 60 mA neutral signals +62.5 mA as space and 0 mA as mark
	HUB	Hub	Recognize hub signals +60V as mark and —30V as space
	EIA	Electronic Industries Association	Recognize EIA signals —12V as mark and +12V as space
	ELS	Electronic Loop — Send	Recognize ELS signals —50V as mark and —130V as space
	ELR	Electronic Loop — Receive	Recognize ELR signals —50V as mark and +130V as space
	TC	Test Cord	Recognize hub signals +60V as mark and —30V as space

TABLE B (Cont)

SWITCH	POSITION	MEANING	FUNCTION	
			Distortion Nixies	*Bias End Distortion Nixies*
DISPLAY	PIP	Maximum Distortion Per Character	Display max distortion per character & reset each character	Average distortion reset every 2 seconds
	F	Fast	Display peak distortion reading & reset every 2 seconds	Average distortion reset every 2 seconds
	S	Slow	Display peak distortion reading & reset every 4 seconds	Average distortion reset every 4 seconds
	PK	Peak	Display highest percent distortion received (manual reset)	Average distortion reset every 2 seconds
	SC	Single Character*	Display highest percent distortion received (manual reset)	Average distortion reset every 2 seconds
ED	ON	End Distortion		Display average end distortion with "M" for marking end and "S" for spacing end
PARITY	ODD	Odd Number of Info Bits	Check parity of signal with odd number of information bits	
	EVEN	Even Number of Info Bits	Check parity of signal with even number of information bits	
FILTER	IN	Filter Connected in Circuit	Prevent transients shorter than 100 μs from being recognized as distortion	
	OUT	Filter Disconnected	Removes filter	
BUSY CONNECT	ON	Actuated	Used in multiple control installations to gain access to electronic unit	

* Permits measurement of single character.