103F-TYPE DATA SET
TRANSMITTER-RECEIVER
DESCRIPTION AND OPERATION

1. GENERAL

1.01 This section is reissued to include information for the data set 103F2 and to treat both the data set 103F1 and data set 103F2 as 103F-type data set rather than as individual data sets.

1.02 The 103F-type data set is designed for low-speed transmission and reception of data over a point-to-point or multistation private line network.

1.03 No provision is made for alternate voice communication.

2. DESCRIPTION

2.01 The 103F-type data set is composed of electronic and relay circuits and is enclosed in a two-tone gray plastic case (see Fig. 1 and 2 for data set 103F1 and Fig. 3 and 4 for data set 103F2). The difference between the data set 103F1 and data set 103F2 is that the data set 103F1 has one test key and data set 103F2 has two test keys.

2.02 Electronic circuits are arranged on plug-in printed wiring boards.

2.03 Data set 103F1 has one and data set 103F2 has two nonlocking lucite keys, which are located on the front of the set and are

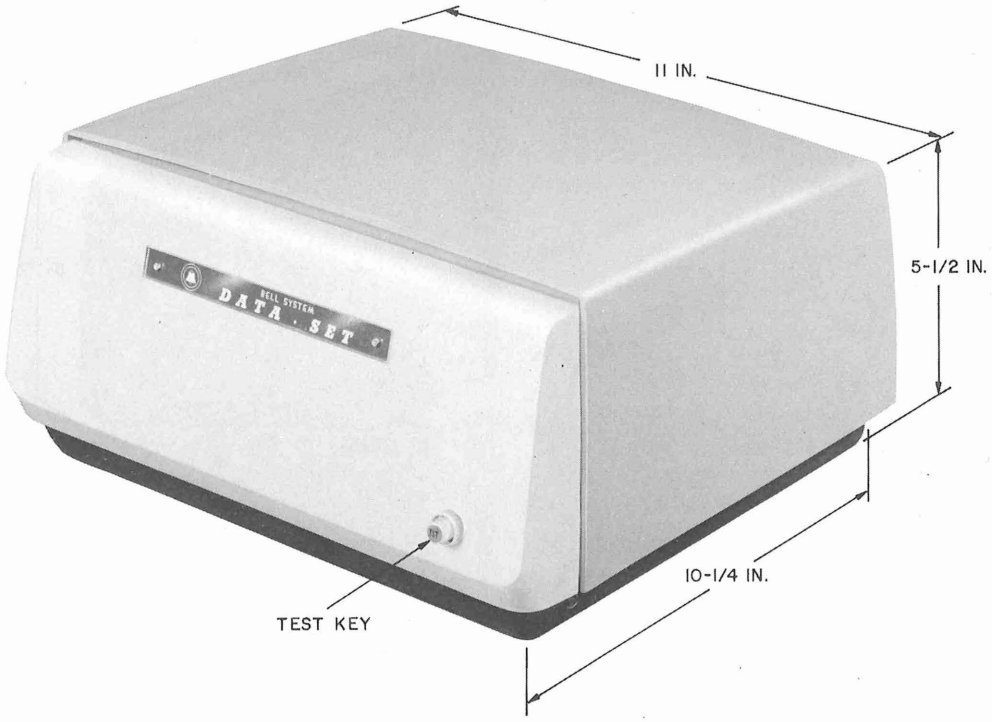

Fig. 1 — Data Set 103F1

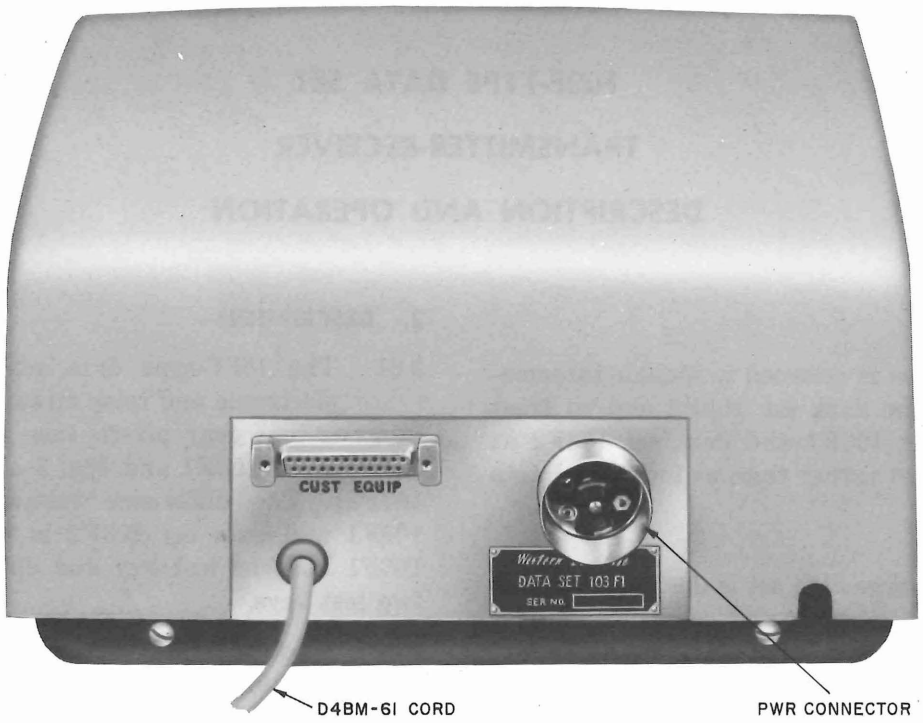

Fig. 2 — Data Set 103F1, Rear View

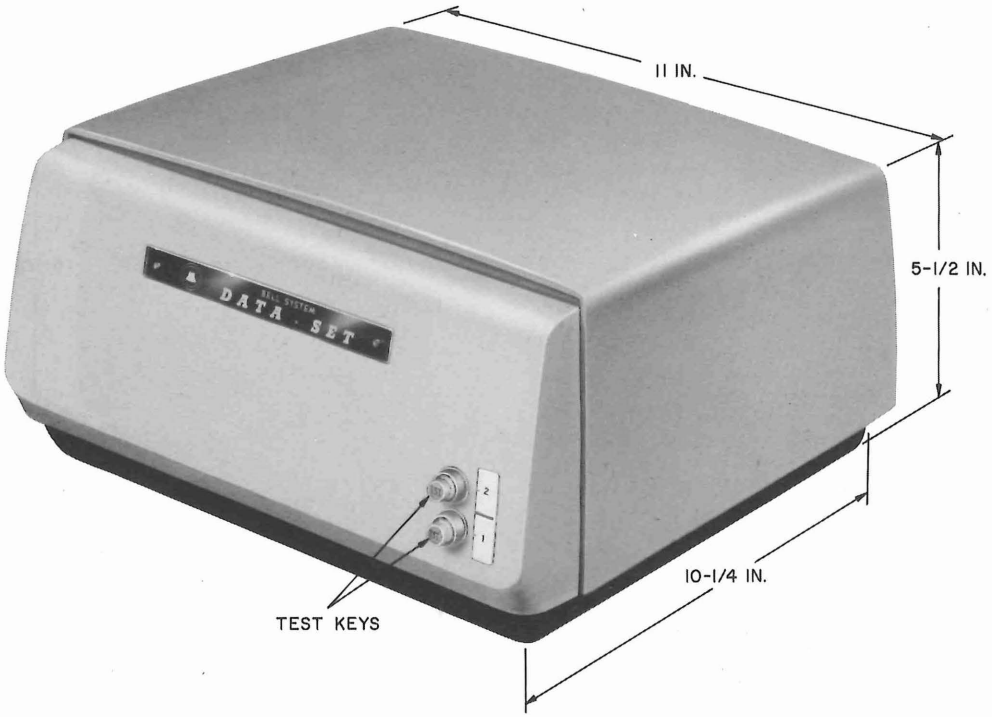

Fig. 3 — Data Set 103F2

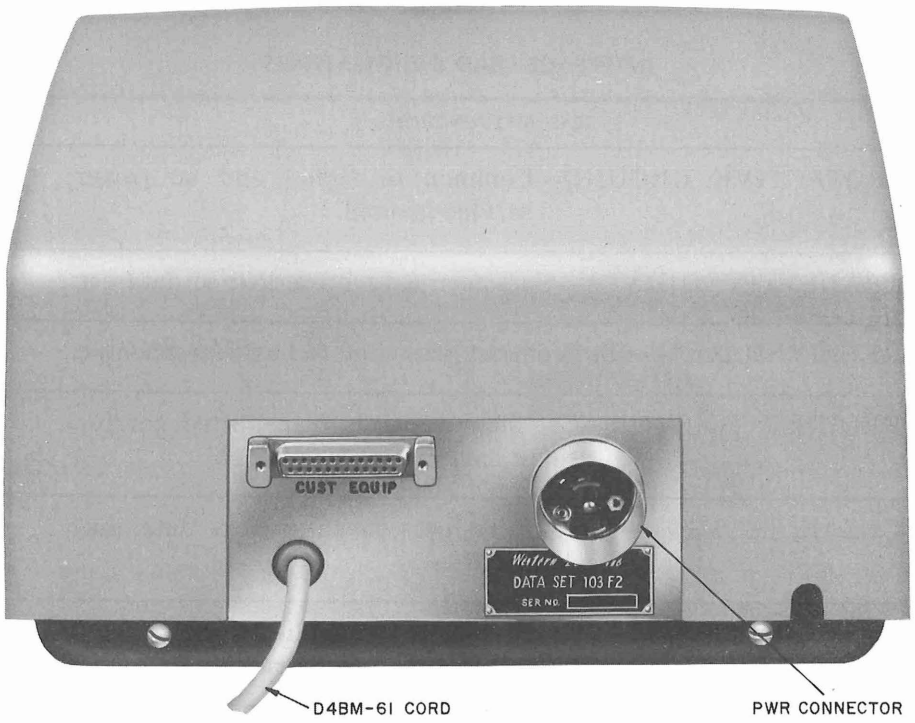

Fig. 4 — Data Set 103F2, Rear View

used to condition the set for remote testing from a data test center. The test key for data set 103F1 is illuminated when in the test mode. Only the test key, TST 1, lights when data set 103F2 is in the test mode. Both the TST1 and TST2 switches are used only when the test center requests their use during the loopback-test.

2.04 Business machine connections are made through a KS-19087, List 2 connector at the rear of the set, designated CUST EQUIP. The connecting cord, equipped with a Cinch or Cannon DB-19604-432 plug, must be furnished by the customer.

2.05 A D4BM-61 cord (5-1/2 feet long) is furnished with data set to connect to telephone line.

2.06 A KS-14532, List 16 gray cord assembly (10 feet long) is used to connect the data set to a 117-volt ac, 3-wire receptacle (two parallel blades and a U-shaped grounding pin).

2.07 A power cord and a D4BM-61 mounting cord are furnished as part of the data set.

2.08 The data set interface is arranged for EIA (bipolar voltage) signals. Interface leads present at interface connector are numbered and designated as shown in Table A.

2.09 The 103F-type data set is intended to provide full-duplex serial data-only service on private line facilities at a bit rate of 0 to 200 bits per second.

2.10 The data set is under direct control from the business machine.

2.11 The 103F-type data set will operate in temperatures from 40 to 120 F.

2.12 Channel transmitting levels are adjustable in 2-db steps from —4 to —14 dbm on the low channel and from 0 to —8 dbm on the high channel. A 0 dbm setting is also provided on the low channel. The settings are such that the difference between the two channels cannot exceed 6 db.

TABLE A

INTERFACE LEAD DESIGNATIONS

PIN NO.	LEAD AND FUNCTION	DESIGNATION
1	PROTECTIVE GROUND—Common to signal and ac power service ground.	AA
2	TRANSMITTED DATA—Customer data presented to data set.	BA
3	RECEIVED DATA—Data output presented to business machine.	BB
4	REQUEST TO SEND—Customer controls transmitted carrier, turns carrier either on or off.	CA
5	CLEAR TO SEND—Signals business machine that data may be transmitted.	CB
6	DATA SET READY—Signals business machine when data set is ready to transmit or receive data.	CC
7	SIGNAL GROUND—Common to frame ground and ac power service ground.	AB
8	DATA CARRIER DETECTOR—Signals business machine that data carrier is being received.	CF
9	+POWER—Power supply (+20 volts)	+P
10	—POWER—Power supply (—20 volts)	—P
11	ORIGINATE MODE—This lead allows the customer to determine whether the data set will operate in the answer mode or the originate mode. An OFF condition on the *CY* lead places data set in answer mode. An ON condition on the *CY* lead places data set in originate mode.	CY
12	LOCAL MODE—Connects customer send and receive data leads together and disconnects data set. This permits local operation and test of business machine.	CX

Level requirements should be specified on the service order.

2.13 The power consumption of the 103F-type data set is approximately 15 to 20 watts, at 60 cps.

2.14 Remove cover as follows:

(1) Loosen, but do not remove the four screws located around the base of set.

(2) Carefully lift cover off.

2.15 Replace cover as follows:

(1) Position retaining wedges of cover screws so that they may easily receive cover lugs.

(2) Place covers on data set, being careful to position cover lugs over cover screws. Carefully press cover into position.

(3) Tighten cover screws.

2.16 Receive level for each frequency may be no lower than —49 dbm.

3. OPERATION

3.01 For detailed operation of the 103F-type data set, refer to CD- or SD-1D045-01.

3.02 All functions of the data set are controlled by the business machine.

3.03 The data set converts signals from the business machine into voice-frequency tones. These frequencies are transmitted over the private line to the distant station. The receive data set converts frequencies received from the line into proper form for business machine use. Fig. 5 shows a simplified block diagram of 103F-type data set.

3.04 To accomplish data transmission between any two stations in the system, one station must be in originating mode and the other in answering mode. Selection of the mode is con-

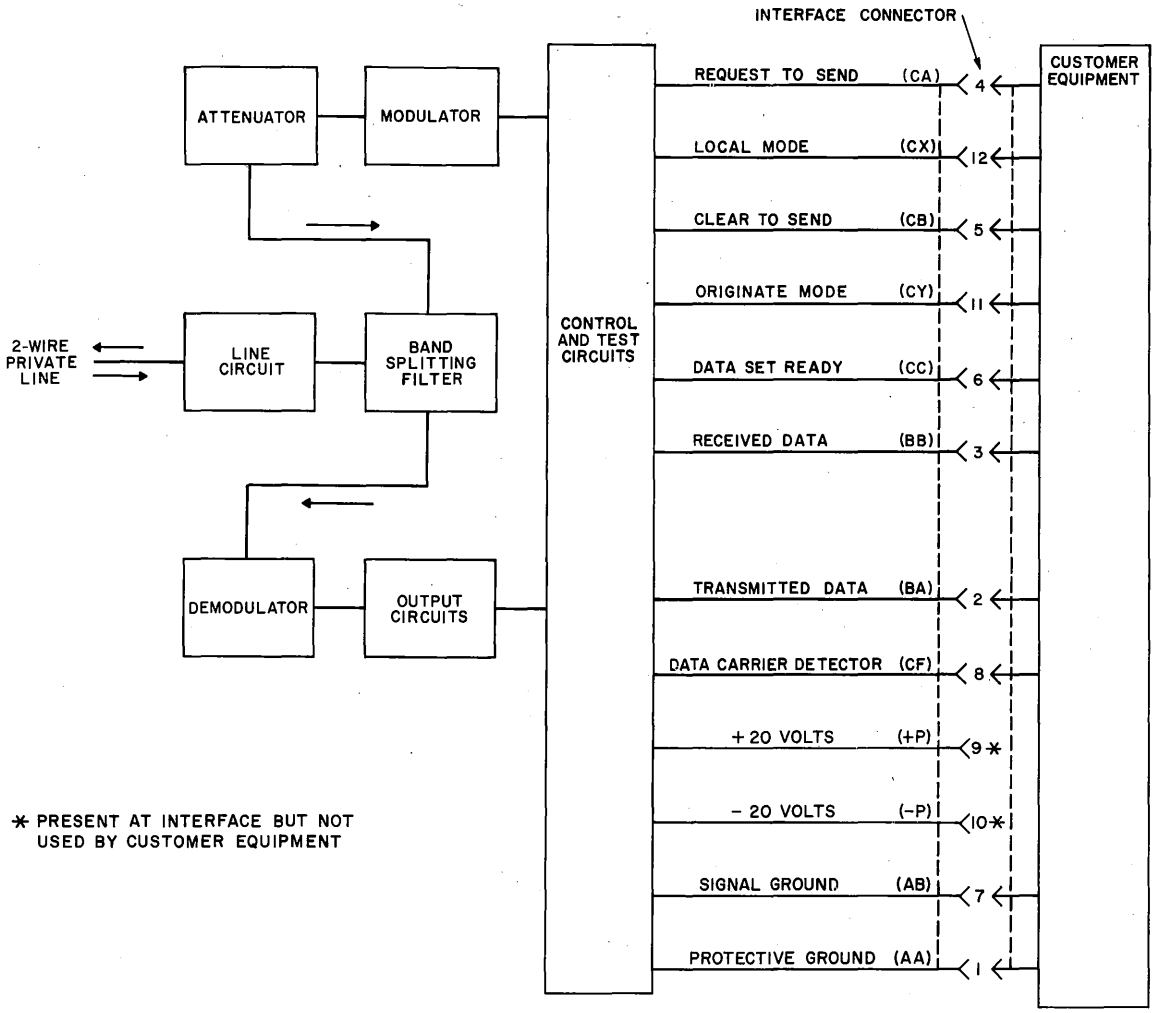

Fig. 5 — Data Set 103F Type, Block Diagram

trolled by the business machine. However, the data set may be modified for answering mode or originating mode only.

THINK ***Take care and do not confuse F_1 and F_2 designations for the transmitting frequencies with the F1 and F2 designations for the two data sets.***

3.05 Data transmission is accomplished over two frequency shift channels. The originating station transmits on the low channel and receives on the high channel. The answering station transmits on the high channel and receives on the low channel. Table B shows the channel frequencies.

TABLE B

CHANNEL FREQUENCIES

STATION MODE	TRANSMITTED SIGNAL	FREQUENCY
		CPS
Originating	mark (F_{1m})	1270
	space (F_{1s})	1070
Answering	mark (F_{2m})	2225
	space (F_{2s})	2025

3.06 The data set output to the business machine is a marking condition during the absence of the received carrier.

3.07 There are two additional modes of operation for the data set, the test mode and local mode.

3.08 A test key is provided to permit remote testing of the data set from a data test center. When in test mode, the data test center can make loop back tests on data set.

3.09 The LO relay, under control of the business machine, connects data set transmit data (BA) lead to the receive data (BB) lead. This permits business machine attendant to test the business machine.

3.10 During the test or local mode, as described in 3.08 and 3.09, the *CC* lead is off. This indicates to the business machine that the data set is not in a position to transmit data.