

DATA SET 103A TYPE IDENTIFICATION AND OPERATION

1. GENERAL

1.01 This section includes identification and operation of Data Set 103A type (Fig. 1 and 2). It does not include information related to business machines used with this type data set.

1.02 This section is reissued to include information concerning the D35C-61 cord which replaces the D25C-61 cord which is Manufacture Discontinue (MD). Since there are data sets using the D25C-61 cord, information concerning this cord and its uses will be retained in this section.

1.03 Data Set 103A type was designed to simultaneously transmit and receive low-speed serial data at rates up to 300 bauds in DATA-PHONE* service over the voice message switched

network, or at rates up to 150 bauds in TWX service over teletypewriter exchange type facilities.

* Service Mark of the American Telephone and Telegraph Company

(1) Data Set 103A1 is used —

- with customer-provided business machine or computer-type terminals at TWX-CE stations,
- with customer-provided business machine or computer-type terminals at DATA-PHONE service stations in systems providing communications with 3-row teletypewriter equipment.

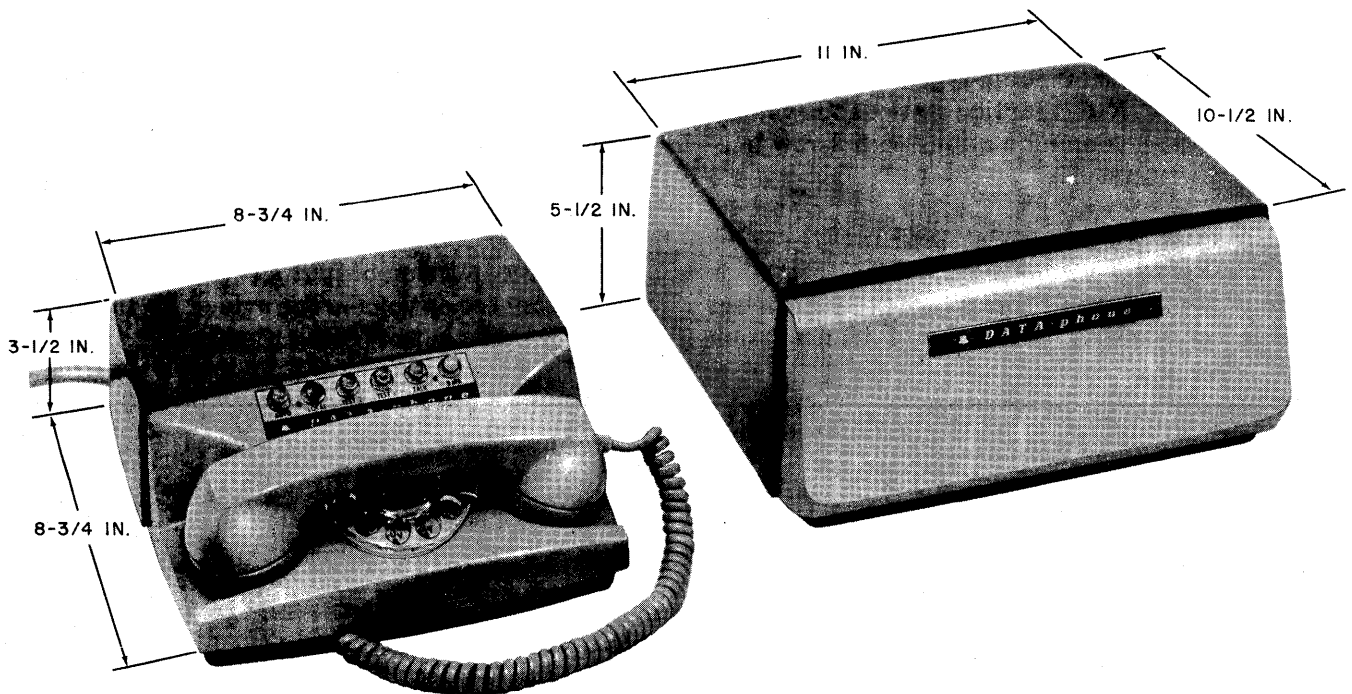


Fig. 1 — Data Set 103A Type and Data Auxiliary Set 804B1

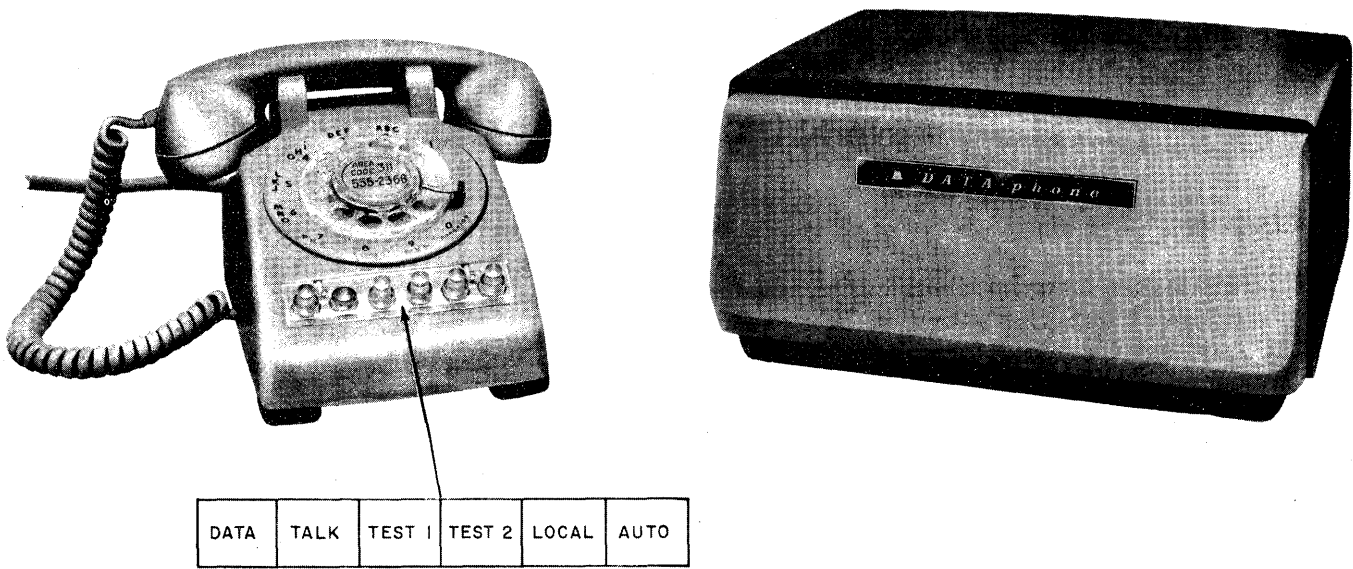


Fig. 2 — Data Set 103A Type and 567PB-61 Telephone Set (Manufacture Discontinue)

(2) Data Set 103A2 is used —

- with customer-provided business machine and computer-type terminals at DATA-PHONE service stations, but
- not with customer-provided business machine or computer-type terminals at DATA-PHONE service stations in systems providing communications with 3-row teletypewriters.

1.04 A Data Auxiliary Set 804B1 (Fig. 1) or 567PB-61 Telephone Set (MD) (Fig. 2) is required for external control of the data set and for establishing the data set transmission

path. The data auxiliary set or telephone set may be arranged either for voice communication on DDD or for call progress tone monitoring only on TWX.

1.05 Data transmission is accomplished over two frequency shift channels. The frequency channel used by each station during a connection is determined by the station that originates the call (Table A).

2. DESCRIPTION

2.01 Transmission output level options and disconnect options are provided by the strapping arrangement of TB1 (Fig. 3).

TABLE A
FREQUENCIES

STATION MODE	SIGNAL TRANSMITTED	FREQUENCY (Hz)	
		DATA SET 103A1	DATA SET 103A2
Originating	f_1 mark (f_{1m})	1070	1270
	f_1 space (f_{1s})	1270	1070
Answering	f_2 mark (f_{2m})	2025	2225
	f_2 space (f_{2s})	2225	2025

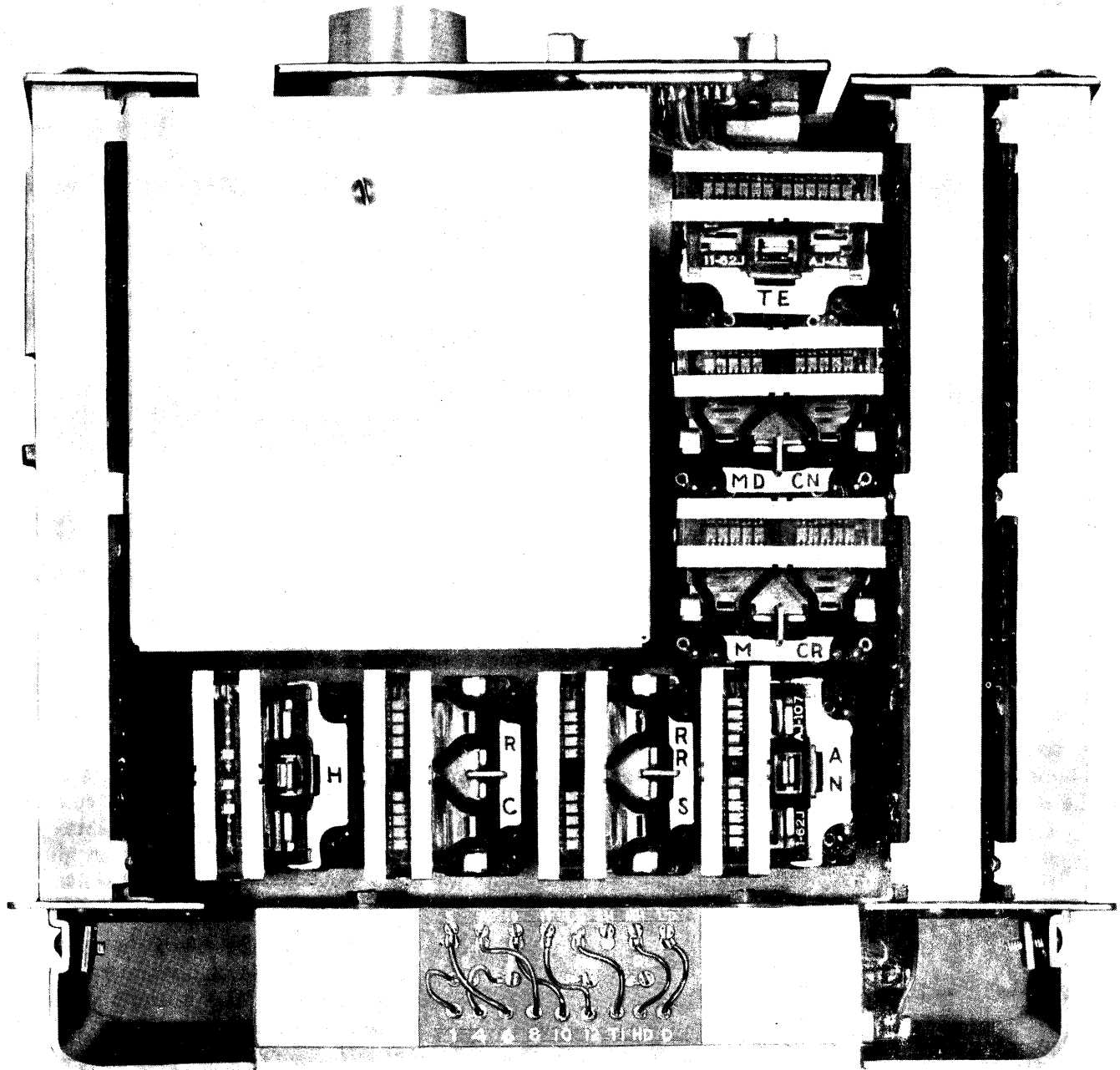


Fig. 3 — Data Set 103A Type, Top View, Cover Removed

2.02 Components of Data Set 103A type are enclosed in a two-tone gray plastic covered case. The cover is held in place by four retaining screws in the base (Fig. 4). See the section entitled Data Set 103A Type, Maintenance (591-014-300) for cover removal and replacement.

2.03 Data signals at the data set interface are EIA Standard RS-232-A (bipolar) type.

2.04 Data Set 103A type with Data Auxiliary Set 804B1 or 567PB-61 Telephone Set (MD) is used for connection to a 2-wire central

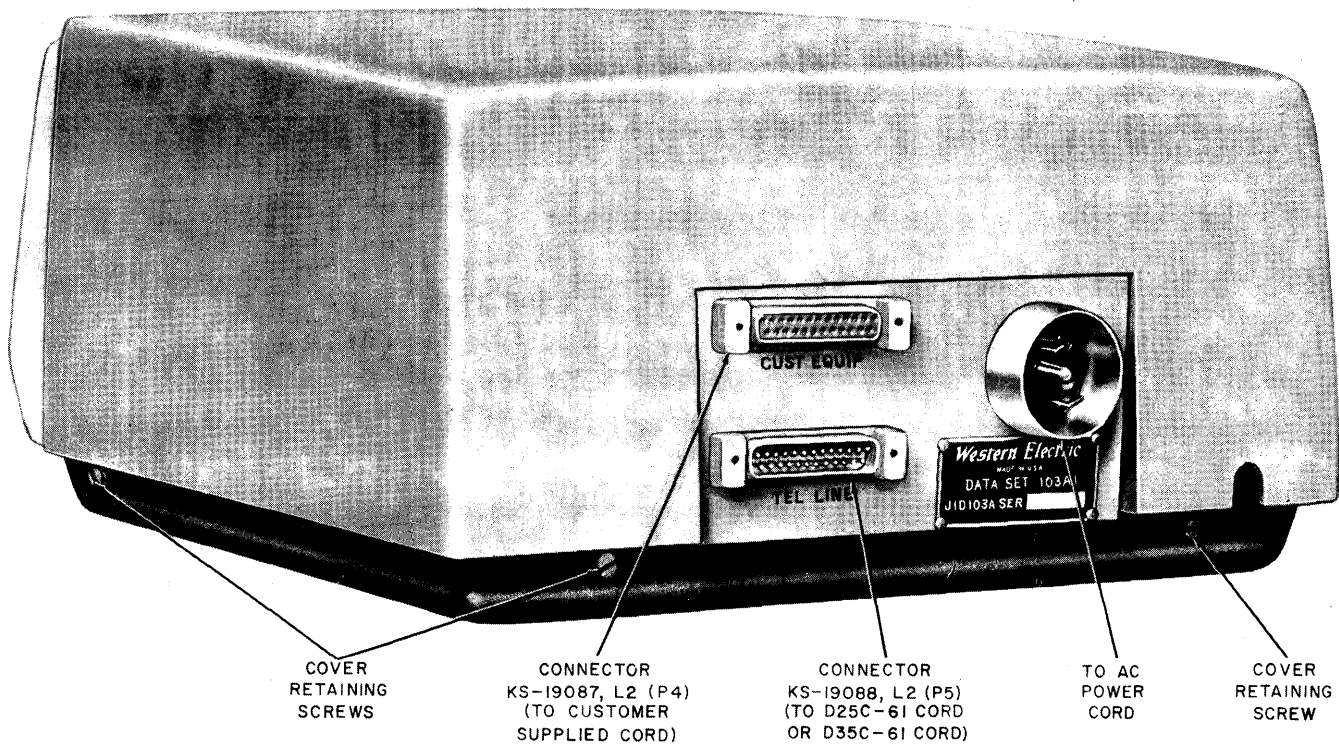


Fig. 4 — Data Set 103A Type, Rear View

office or PBX line. The data auxiliary set or telephone set is used to control the functions of the data set.

2.05 A block diagram of the Data Set 103A type is shown in Fig. 5. It illustrates the five basic component sections of the data set which are:

- Modulator — Data transmitter
- Demodulator — Data receiver
- Control — Logic and timing circuitry
- Line circuit — Impedance-matching transformer and ringing detector
- Power supply — Rectifier

→ **2.06** A 35-conductor 5-1/2 foot D35C-61 cord for connecting telephone circuits to data set, and a 3-conductor 10-foot power cord KS-14532, List 15 are supplied with the Data Set 103A type.

2.07 A 25-pin connector (KS-19087, List 2) is provided at the rear of the data set for connecting the business machine. This connection is made with a customer-furnished cable. Interface leads present at this connector are numbered and designated as shown in Table B.

2.08 The Data Auxiliary Set 804B1 is equipped with a D30C-61 5-1/2 foot cord. The 567PB-61 Telephone Set (MD) is equipped with a D50J-61 5-1/2 foot cord.

2.09 The data auxiliary set is equipped with a 589AG key. The 567PB-61 Telephone Set (MD) is equipped with a 589AC key. Designations and functions of these keys are shown in Table C.

2.10 The transmit levels of both the low-frequency (originate) channel and the high-frequency (answer) channel can be individually adjusted by rearranging spade-tipped straps on terminal strip TB1 in the data set (Fig. 3). Strapping information can be found in Section

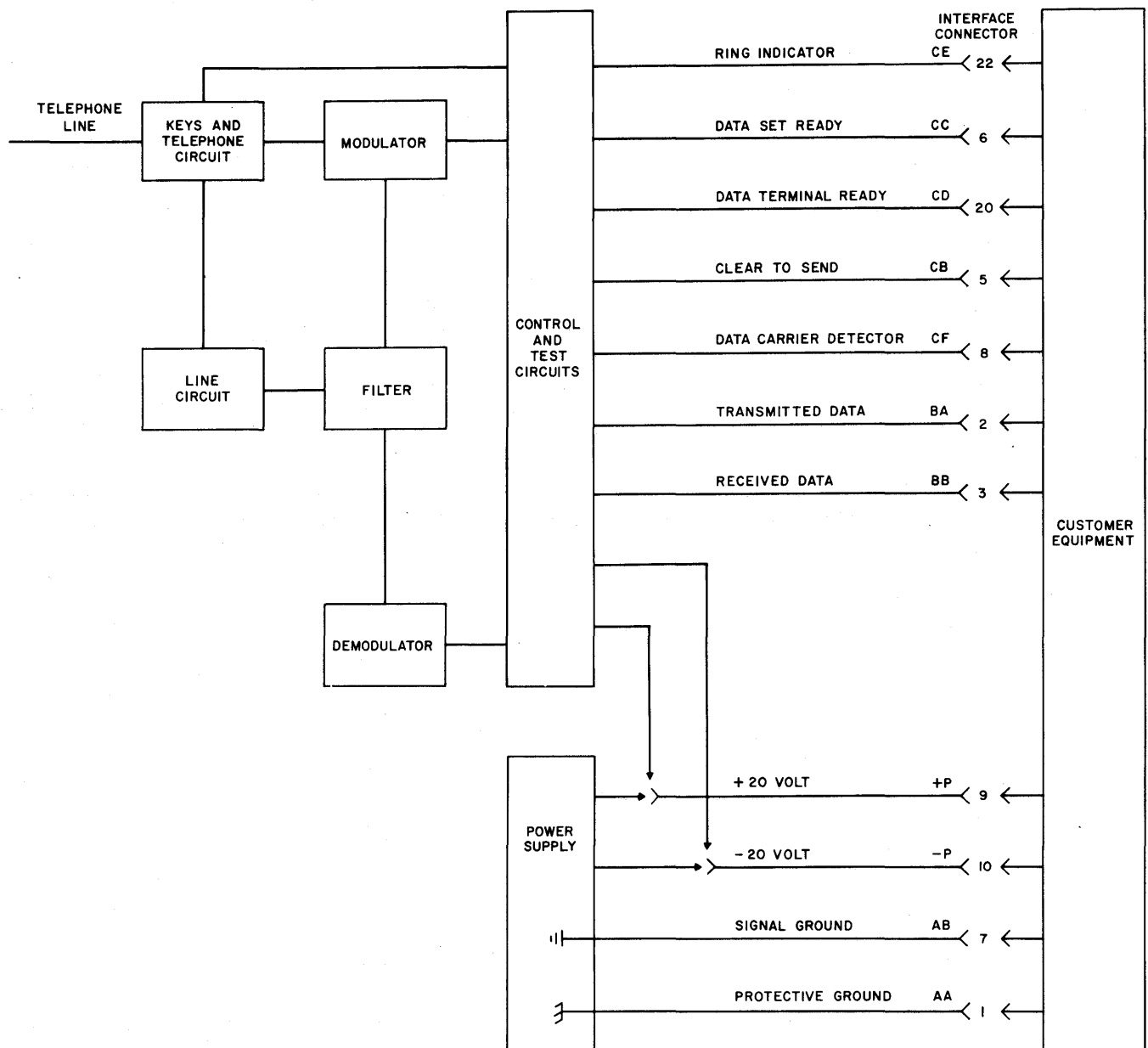


Fig. 5 — Data Set 103A Type, Block Diagram

591-014-200. This feature enables compromise equalization of the transmitted data signals.

3. OPERATION

ATTENDED STATION OPERATION

3.01 The transmission path for the originating station data set is established by first depressing the TALK button on the associated tele-

phone set or data auxiliary set and placing the call in the usual telephone manner.

3.02 At the answering station, ringing current will cause the bell to ring and operate circuitry in the data set to signal the business machine that there is an incoming call. It also prepares the data set for the answering mode. After at least one complete ringing cycle, the attendant at the answering station should de-

TABLE B
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
5	CLEAR TO SEND — Signals business machine that data may be transmitted	CB
6	DATA SET READY — Signals business machine when data set is in the data mode	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
20	DATA TERMINAL READY — Business machine applies on ON condition for auto answer and an OFF condition to disconnect data set from the line	CD
22	RING INDICATOR — Indicates presence of ringing current to business machine on incoming calls	CE

press the TALK button and lift the handset to trip ringing and place the data set in the answer mode. If voice communication option is provided, the attendant may stay in the talk mode to conduct voice communication or go to the data mode by depressing the DATA button.

3.03 When the answering station DATA button is depressed and released, the TALK button is automatically released and a timing interval of 1-1/2 seconds is initiated. This timing interval is the single-frequency (SF) guard interval. The purpose of this guard interval is to insure the receipt of an off-hook signal by the originating (serving) office from the answering station.

3.04 At the end of the 1-1/2 second SF guard interval, the answering station will transmit an f_2 mark tone to disable echo suppressors on toll trunks. Echo suppressors will remain disabled as long as any tones are being transmitted.

3.05 When the originating station attendant hears this f_2 mark tone, the attendant should depress the DATA button until the DATA lamp lights. When the DATA lamp lights, the DATA button should be released. Release of the DATA button causes the following to occur in the sequence listed:

- (1) TALK button releases
- (2) Starts a 1-1/2 second timing interval

TABLE C
KEY ASSIGNMENTS

KEY DESIGNATION	KEY NUMBER		FUNCTION	ILLUMINATED KEY
	DATA AUX SET 804B1	567PB-61 TEL SET		
AUTO	1	6	A locking key used to provide automatic answer of incoming calls	Yes
LOCAL	2	5	A locking key used to connect send and receive leads together and disconnect data set. This permits local operation and test of business machine.	No
TEST 2	3	4	Nonlocking key used to test data set under the direction of data test center	No
TEST 1	4	3	Nonlocking key used to test data set under the direction of data test center	Yes
TALK	5	2	Locking key used to connect telephone set to data line	No
DATA	6	1	Nonlocking key used to shift from talk to data mode (also takes data set out of test mode if connected in error)	Yes

(3) Transmits f_1 mark tone to answering station

(4) Signals business machine at originate end, over the CB interface lead, that data connection is completed

3.06 Upon receipt of f_1 mark tone at the answering station, the station signals its business machine over the CB interface lead that the data connection has been completed. Data transmission can now begin.

3.07 For a more detailed description of data set operation, see CD- and SD-1D034-01.

AUTOMATIC ANSWER

3.08 Calls may be answered automatically when either of the following options are provided:

(1) AUTO button is depressed (alternate auto or manual answering option). ↗

(2) Strapping option is connected to provide permanent automatic answering on all incoming calls (permanent automatic answering option). Use of this option bypasses the AUTO button. ↘

3.09 With the set arranged for automatic answer, ringing current will cause the bell in the telephone set to ring and a relay in the data set to operate. Operation of this relay trips ringing and causes the data set to change to the off-hook condition, providing an ON condition is present on the CD lead. Under these conditions, the line control circuit will initiate the 1-1/2 second SF guard interval. From this point, the call will progress as previously described in 3.05 and 3.06.

SECTION 591-014-100

DISCONNECT

3.10 The connection may be terminated at the end of transmission by one of the following options:

Automatic

(1) With INITIATE DISCONNECT option enabled: The station that is initiating disconnect must momentarily apply an OFF condition to the CD lead. This causes the data set to transmit a 3-second burst of spacing tone. The frequency of the f_1 space tone is 1270 Hz for Data Set 103A1 and 1070 Hz for Data Set 103A2 when acting as an originate station. The frequency of the f_2 space tone is 2225 Hz for the Data Set 103A1 and 2025 Hz for Data Set 103A2 when acting as an answer

station. After transmission of this spacing tone, the station will go to the on-hook condition. Should the distant station be arranged for RESPOND TO DISCONNECT option, it will recognize the space frequency signal for 1-1/2 seconds, disconnect from the line, and go to the on-hook condition.

(2) Without INITIATE DISCONNECT option: An OFF condition on the CD lead will cause station to disconnect and go to the on-hook condition immediately.

Manual

Both attendants must lift handset, depress TALK button (this changes the data set from the data mode to the talk mode), and restore handset to on-hook condition.