DATA SET 401A

TRANSMITTER

DESCRIPTION AND OPERATION

1. GENERAL

1.01 This section covers the description and operation of Data Set 401A. It does not include information concerning the business machine used with the data set.

1.02 This section is reissued to update the nomenclature of the various Data Sets 401A-type. Due to extensive changes, marginal arrows have been omitted.

1.03 Data Set 401A is designed primarily for use in DATA-PHONE® service. It is used for low-speed, parallel transmission of data over a voice grade channel, normally the switched network. Information concerning Data Set 401B used at the receiving end of the system is covered in another section.

1.04 Data is received from the transmitting business machine in the form of contact closures. These closures are converted to voice-frequency tones and sent over the telephone line. The data set at the receiving station converts the frequency tones back into contact closures and delivers them to the receiving business machine.

2. DESCRIPTION

2.01 Data Set 401A is an integrated set combining a data transmitter, an answer-back amplifier, and a telephone set in one housing.

2.02 Two models of Data Set 401A are in use. Data Set J1D401A L1 is the early model and has the appearance of the CALL DIRECTOR® (Fig. 1). This set is Manufacture Discontinued. Data Set J1D401A L2 replaced Data Set J1D401A L1. Data Set J1D401A L2 has been replaced by Data Set 401A1 (Fig. 2).

2.03 The data key of the List 2 set is located on the switchhook assembly in the same position as an exclusion key and operates in the same manner. The data key of the List 1 set is located at the upper left corner of the housing. Functions of the key are as follows:

Key in Normal Position (Down)

- Connects telephone circuit to the line
- Connects extension telephone and speakerphone leads to the line
- Removes data transmitter from the line.

Key in Operated Position (Up)

- Connects data transmitter to the line
- Disconnects telephone circuit, extension telephone, and speakerphone leads from the line.

2.04 The data transmitter circuit consists of two transistorized oscillators. Each oscillator is capable of producing five different frequencies. One frequency of each oscillator is a REST frequency.

2.05 A 2-stage transistor amplifier receives incoming supervisory answer-back signals. The amplifier output is usually fed to a loudspeaker in the business machine. Figure 3 shows a simplified block diagram of Data Set 401A.

2.06 Electronic circuits are powered by the central office battery on the local telephone loop. A polarity guard circuit within the data set maintains the correct voltage polarity.

2.07 The List 1 set is equipped with a D1A ringer. The ringer volume control is located as shown in Fig. 4. The List 2 set is equipped with a G1B ringer. Access to the ringer volume control is through a hole in the base of the set.

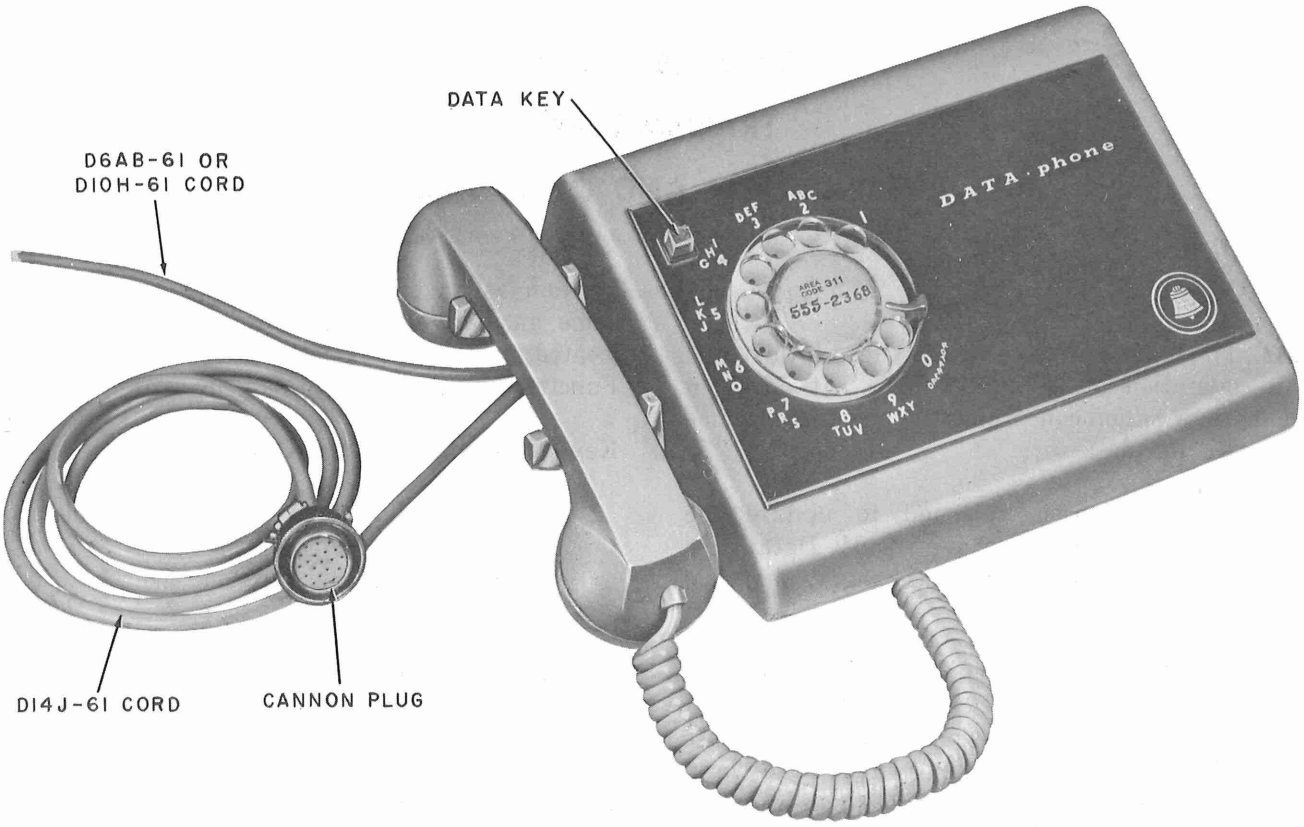

Fig. 1—Data Set J1D401A List 1

2.08 The List 1 set is equipped with a D6AB-61 cord for connection to the telephone line and to extension telephones. When connection to a speakerphone system is required, the D6AB-61 cord must be replaced by a D10H-61 cord. The interface cord may be a D14J-61 cord equipped with a Cinch or Cannon K03-19-20 SN plug (round) or an M14B-61 cord equipped with a KS-19087 List 2 connector (rectangular).

- Adapter cords are available to permit connection of a data set having a round connector to a business machine having a rectangular connector, and connection of a data set having a rectangular connector to a business machine equipped with the round connector. Table A shows the adapter cords to be used.

2.09 On Data Set 401A1 and Data Set J1D401A L2, connections to the telephone line, extension telephone, and speakerphone leads are made through a D10M-61 cord. The interface connections are made through a KS-19087 List 2 connector located at the rear of the data set (Fig. 5). The business machine cord, equipped with a Cinch or Cannon DB-19604-432 plug, must be furnished by the customer.

2.10 The data sets are available in 2-tone gray color only. Ordering information is given below.

(Quantity) DATA SET 401

3. OPERATION

3.01 To transmit data, establish communication with the receiving station, and proceed in the following manner.

3.02 ***Receiving Station Attended:***

(a) Establish connection with the receiving station and verbally agree to begin data transmission.

Fig. 2—Data Set J1D401A List 2 or Data Set 401A1

(b) Operate data key. (Leave handset off-hook.)

(c) Transmit data.

Caution customer not to restore the data key or hang up handset during data transmission.

(d) Upon completion of data transmission, replace the handset on the switchhook. This will restore the data key and release the line.

3.03 ***Receiving Station Unattended:***

(a) When a call is placed to an unattended receiving station, it will be automatically answered and a 2- or 5-second tone will be heard in the telephone receiver at the transmitting station. This tone indicates that the distant station is ready to receive data. Then proceed as in attended operation. (See 3.02.)

3.04 An answer-back amplifier receives and amplifies supervisory signals from the receive station. These signal tones may be heard through a loudspeaker provided as part of the customer's equipment. Typical messages could be the following:

- An error has occurred.
- An error has not occurred.
- Resume voice communication.

The specific manner in which the tones are used is determined by the business machine operating procedure.

3.05 To resume voice communication, stop data transmission, restore the data key to its normal off-hook position, and proceed in a normal manner.

3.06 From each oscillator circuit in the data transmitter, four data leads connect to the business machine. Another lead from each oscillator connects to the business machine as a common lead. Data from the business machine consists of contact closures between the common lead and

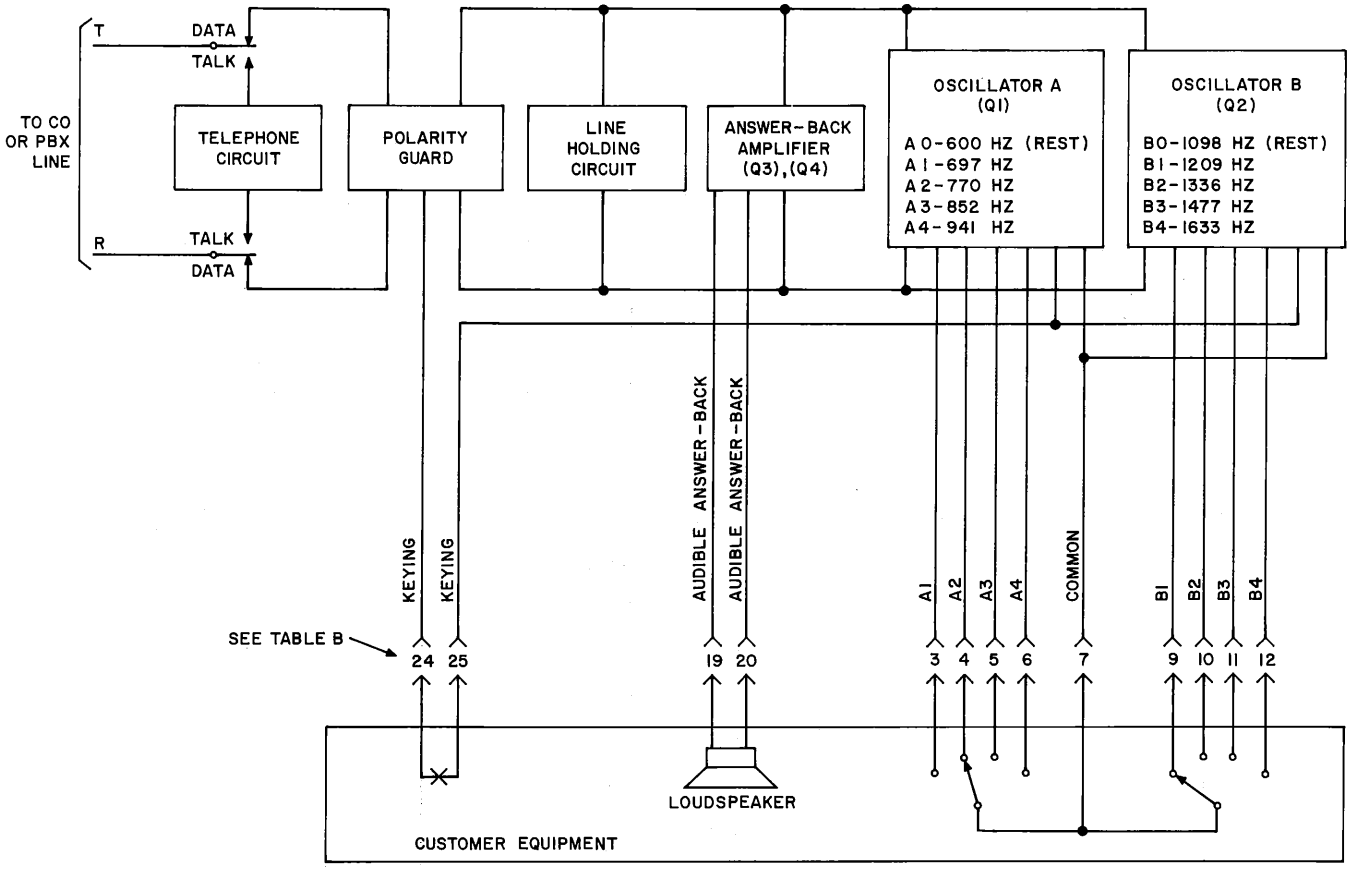

Fig. 3—Data Set 401A, Block Diagram

TABLE A

ADAPTER CORDS

DATA SET AND CONNECTOR		BUSINESS MACHINE CONNECTOR	ADAPTER CORD
J1D401A, List 1	Round	Rectangular	M14B-61*
	Rectangular	Round	M26C-61, 5 feet long
J1D401A, List 2	Rectangular	Round	M26C-61, 5 feet long

* Replacement cord

TABLE B

INTERFACE PIN DESIGNATION

INTERFACE LEAD	DATA SET J1D401A	
	LIST 1	LIST 2/401A1
A1	A	3
A2	B	4
A3	C	5
A4	D	6
B1	E	9
B2	F	10
B3	H	11
B4	J	12
Common	K	7
Keying leads	L	24
	M	25
Audible answer-back	N	20
	P	19

one data lead from each oscillator. These contact closures in the business machine modify the tank circuits in the various oscillators, changing the frequencies generated in them.

3.07 Data Set 401A contains two oscillator circuits designated as "A" or "B" oscillator. Thus, the transmitted data signal consists of two frequencies (one from each oscillator) sent simultaneously over the telephone line.

3.08 If none of the data leads from the oscillators are made with the common lead, the oscillators will generate REST frequencies which are used for echo suppression.

3.09 Table C shows the frequencies produced by Data Set 401A.

3.10 The transmitting level for each tone is fixed at approximately -9 dBm.

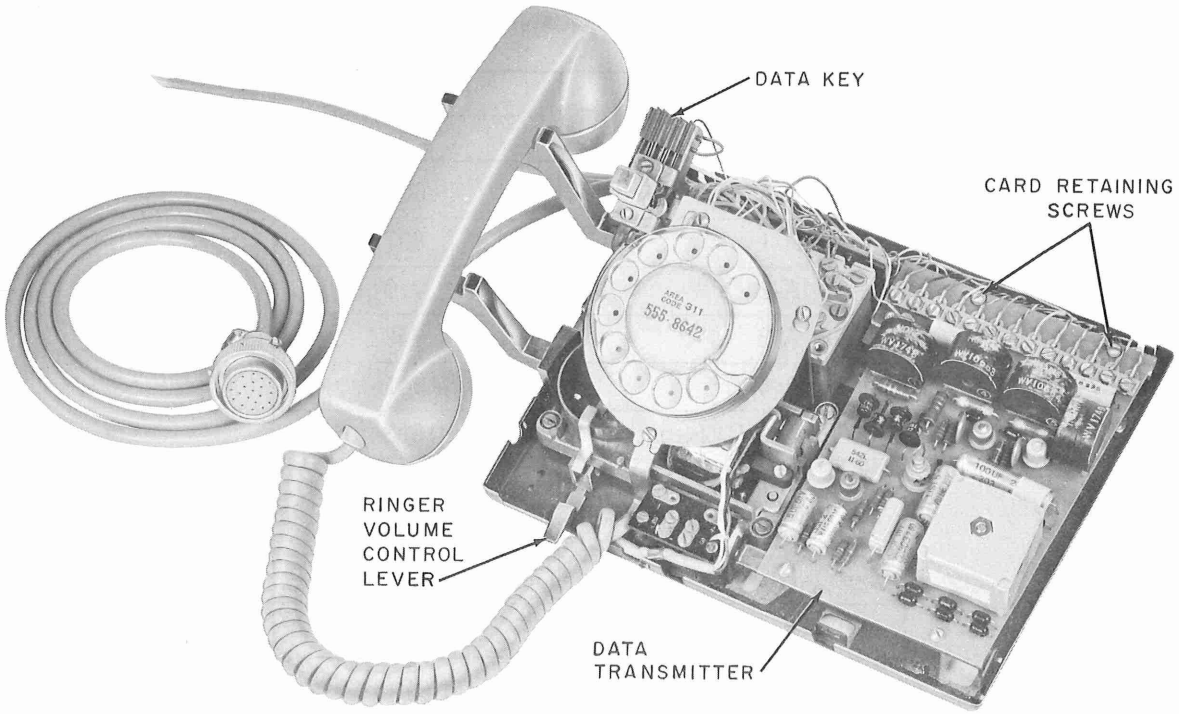

Fig. 4—Data Set J1D401A List 1, Inside View

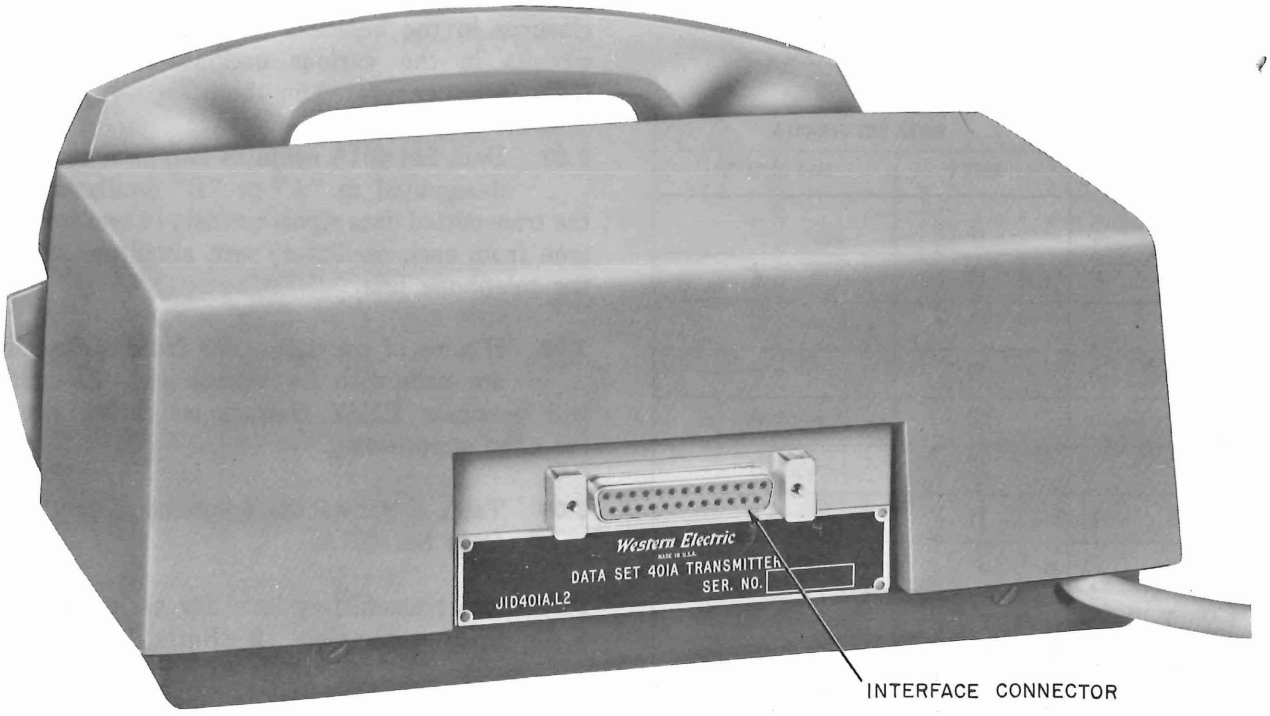

Fig. 5—Data Set J1D401A List 2 or Data Set 401A1, Rear View

TABLE C

DATA FREQUENCIES

DESIGNATION	FREQUENCY Hz
A-0(REST)	600
A-1	697
A-2	770
A-3	852
A-4	941
B-0(REST)	1098
B-1	1209
B-2	1336
B-3	1477
B-4	1633