DATA SET 602D-TYPE
TRANSMITTER-RECEIVER
DESCRIPTION AND OPERATION

CONTENTS PAGE

1. GENERAL

1.01 This section provides a physical and functional description as well as operating procedures for Data Set 602D-type (Fig. 1).

1.02 The Data Set 602D-type houses circuitry to permit voiceband transmission of analog signals generated by customer-provided facsimile machines, slow-scan television systems, etc. The signals are transmitted over the switched telephone network or 2-wire private line.

1.03 Data Set 602D-type is a complete transceiver operating in the half-duplex mode. Since it is integrated with a telephone set, the data set may be used to aid in establishing data calls and may also be used to complete normal telephone connections.

1.04 The data set provides a baseband bandwidth from 0 to approximately 1000 Hz. This frequency capability corresponds to facsimile transmission with resolution of up to 100 lines per inch at 180 lines per minute for a format of 8-1/2 inches wide and 11 inches high.

1.05 Two test keys are provided to permit the customer to enable test circuits within the data set, thereby allowing remote testing of the set from a data test center.

1.06 This section covers Data Sets 602D-L1 and 602D-L1A. Data Set 602D-L1 is provided with a rotary dial while the 602D-L1A utilizes TOUCH-TONE® dialing.

The transmission and reception capabilities of Data Set 602D-type are very similar to those of the 602C-type. However, the 602D-type does not include a sync channel, the automatic answering option, nor a reverse-channel feature. The data channel in the new set includes a forward signaling capability.

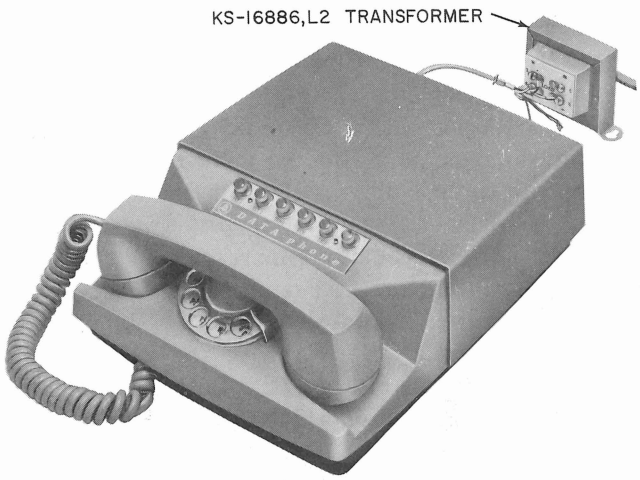

Fig. 1—Data Set 602D-L1, Front View (Available Also With TOUCH-TONE Dial)

2. PHYSICAL DESCRIPTION

2.01 Data Set 602D-type consists of a data transceiver and a telephone set in a 2-tone gray molded plastic integrated housing. The unit measures 11-1/2 inches long, 9 inches wide, and 4-1/2 inches high (with handset in place). It weighs approximately 7-1/2 pounds and must be mounted horizontally.

2.02 The Data Set 602D-type is factory equipped with a D4BJ-61 (5-1/2 foot, 4-conductor) mounting cord (Fig. 2).

2.03 An audible ringing signal is provided on the data line by a M1A ringer. The ringer volume control is located at the lower left front of the data set (Fig. 3).

2.04 Customer control of the data set is provided by six pushbuttons. Shown below are the designations of these buttons and their associated meanings.

TST1	TST2	TRMT	RCV	TALK	

(a) TST1 (Nonlocking)—Depression of the TST1 (test 1) button after depression of the TRMT button causes the transmitter to generate a 1500-Hz signal. Depression of the TST1 button after depression of the RCV button causes the receiver to recognize a 1500-Hz signal.

(b) TST2 (Nonlocking)—Depression of the TST2 (test 2) button after depression of the TRMT button causes the transmitter to generate a 2450-Hz signal. Depression of the TST2 button after depression of the RCV button causes the receiver to recognize a 2450-Hz signal.

(c) TRMT (Locking)—Depression of the TRMT (transmit) button enables the set to transmit data.

(d) RCV (Locking)—Depression of the RCV (receive) button enables the set to receive data.

(e) TALK (Locking)—Depression of the TALK button places the data set in the talk mode.

(f) The remaining pushbutton is blocked and unavailable for other use.

2.05 Four lamps are provided with the data set. Their designations and indications when lit are as follows:

- TST1—Test lamp 1. This lamp is lighted when the data set is receiving a 1500-Hz signal under test conditions.
- TST2—Test lamp 2. This lamp is lighted when the data set is receiving a 2450-Hz signal under test conditions.
- TRMT—Transmit lamp. This lamp is lighted during transmission of data.
- RCV—Receive lamp. This lamp is lighted during data reception.

2.06 A KS-16886, L2 transformer is supplied with each data set. It must be surface wired to the connecting block to which the D4BJ-61 mounting cord is attached.

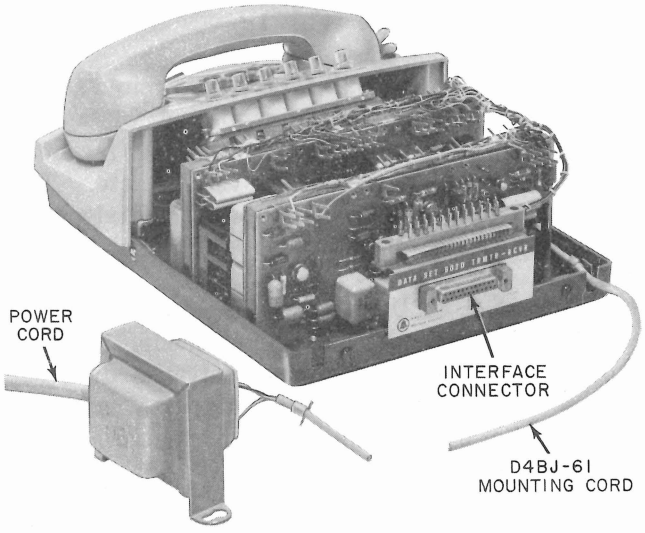

Fig. 2—Data Set 602D-Type, Inside Rear View

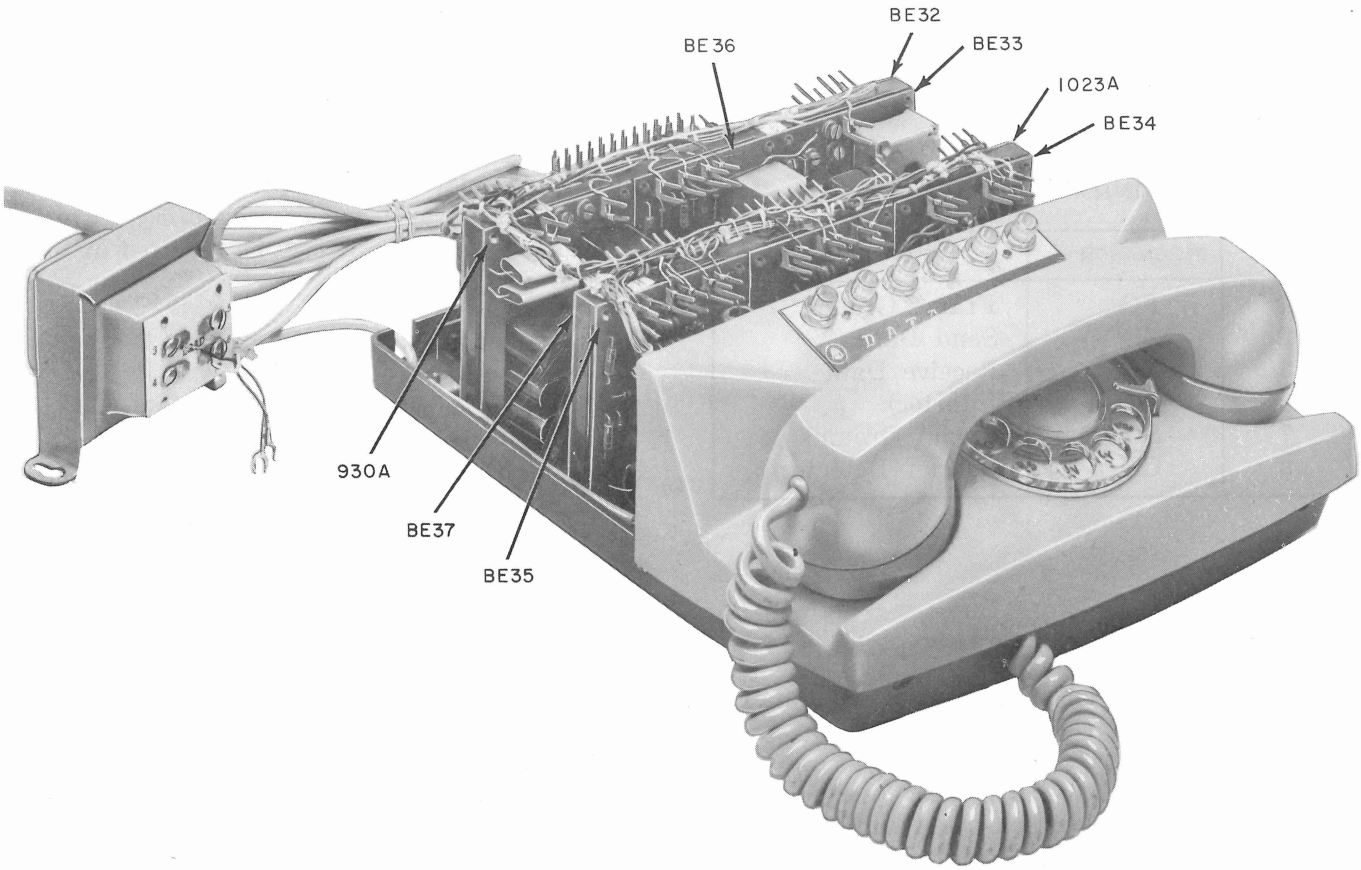

Fig. 3—Data Set 602D-Type, Inside Front View

2.07 All Data Sets 602D-type contain an apparatus unit, a bandpass filter, and an equalizer. In addition, each set contains six modular-type circuit packs. Refer to Fig. 3 for the physical location of each of these modules. Their designations and a brief description of their functions are listed in (a) through (e).

(a) BE32—This circuit, an FM demodulator, converts sine wave input signals of between 1500 and 2450 Hz to analog output signals of between 0 and +7 volts, respectively.

(b) BE33—This is an FM modulator which converts analog input signals of between 0 and +7 volts to linear output frequencies of between 1500 and 2450 Hz, respectively.

(c) BE34—This circuit provides the coupling between the data set and telephone line.

(d) BE35 and BE36—These circuits provide filtered dc power of +12 vdc and -12 vdc from a 26 vac source.

(e) BE37—This circuit enables testing by responding only to the correct voltage levels.

2.08 Data Set 602D-type operates efficiently in an environment with an ambient temperature range from 40° to 120°F and a relative humidity range from 20 to 95 percent. Power for the data set is obtained from a commercial source of from 105 to 129 volts rms with a frequency of 60 ±0.1 Hz.

2.09 The business machine connector cord and plug must be supplied by the customer. Business machine connection will be made at the data set interface connector, which is a 25-pin KS-19087, L6 type (Fig. 2). Table A shows the lead assignments. Pins not identified in Table A

are not assigned. The interface leads presented by the data set to the customer's business machine conform to the latest Electronic Industries Association (EIA) standards.

TABLE A

INTERFACE LEADS

PIN NO.	DESIGNATION	DESCRIPTION
1	FG	Frame Ground
2	SD	Send Data
3	RD	Receive Data
6	IT	Interlock
7	SG	Signal Ground
8	CD	Carrier Detector

3. FUNCTIONAL DESCRIPTION

3.01 A functional block diagram of the Data Set 602D-type is shown in Fig. 4.

3.02 The function of the 602D-type data set depends on whether the transceiver is in the talk, send-data, or receive-data mode of operation. The mode of operation is determined by depression of either the TALK, RCV, or TRMT pushbutton shown in Fig. 1.

3.03 When the data set is in the talk mode, it functions as any normal telephone.

A. Transmitter

3.04 The transmitter is a voltage-to-frequency converter. It accepts a facsimile voltage in the range of 0 to +7 volts from the SD lead at the interface and converts it linearly to a signal whose frequency is between 1500 and 2450 Hz. For forward signaling purposes, a voltage of -1.5 volts at the interface causes a signal of 1300 Hz to be generated.

B. Receiver

3.05 The receiver converts the incoming signal of between 1500 and 2450 Hz to an output voltage of between 0 and +7 volts respectively. A forward signaling input of 1300 Hz will be converted to -1.5 volts.

3.06 The carrier detector produces a positive output of at least 5 volts in the presence of an input signal in the frequency range of 1300 Hz or higher, and a negative output more negative than -5 volts for any other input.

3.07 The delay equalizer provides compensation for the delay distortion present in the average telephone connection. It may be removed by using installer option Z.

C. Remote Test and Interlock Circuitry

3.08 The remote test circuitry provides a means of testing the data set from a remote or central location when the customer suspects trouble. This circuitry tests most of the component circuits of the data set. The interlock circuit provides an indication to the customer's equipment when the data set is in the data mode. In the remote test procedure, the data set sends out one of two signals as a transmitter and recognizes one of two signals as a receiver.

3.09 If the TRMT button is depressed, with the handset off hook, the power supply is connected to the transmitter and not to the receiver; therefore, the data set functions as a transmitter. The operator must then press the TST1 button. This disconnects the business machine output from the SD lead and grounds the SD lead. This causes the transmitter to generate a 1500-Hz signal, which a data test center can measure and count. When the TST1 button is released and the TST2 button is pressed, the business machine is disconnected from the SD lead and +7 volts is applied to the SD lead through a voltage divider. The transmitter now generates a 2450-Hz signal which can be measured by the data test center.

3.10 If the RCV button is depressed with the handset off-hook, power is applied to the receiver and not to the transmitter. If the TST1 is now depressed, the business machine is disconnected from the RD lead and a test circuit is connected to the lead. This circuit recognizes an input 0 $\pm$0.5 volt. If an input voltage is in this range, lamp TST1 will light. If the TST1 button is released and the TST2 button is depressed, the business machine is disconnected from the RD lead and the output of the receiver is connected to the second test circuit. This circuit recognizes an output from the receiver (or an input to the circuit) of a voltage between +6.5 and +7.5 volts. If a voltage within

this range appears, lamp TST2 lights. Thus, if the receiver has a 1500-Hz signal at its input, and the TST1 button is depressed, TST1 lamp will light. Similarly, if a 2450-Hz signal is being received and the TST2 button is depressed, the TST2 lamp will light.

3.11 The interlock circuit provides an output of −5 volts or less, when loaded with a 3 kΩ load, when the data set is not in the transmit or receive data mode. If the data set is in either the transmit or receive data mode, the output is at least +5 volts, when loaded with a 3 kΩ load.

4. OPERATION

4.01 To originate a data call, perform the following steps:

(a) Depress the TALK button and establish connection with the distant terminal in the normal telephone manner.

(b) After the distant terminal has answered and verbal agreement is reached to transmit data, depress the TRMT button.

4.02 To answer a data call, perform the following steps:

(a) When ringing is heard, depress TALK button and answer in the normal manner.

(b) After verbal agreement is reached to transmit data, depress the RCV button.

Note: In the Talk, Data, or Test modes, the handset must be off-hook.

5. REFERENCES

5.01 For detailed information concerning Data Set 602D, refer to CD- and SD-1D158-01.

5.02 Refer to the section entitled Crediting Charges on Test Calls (010-250-001) when testing the 602D.

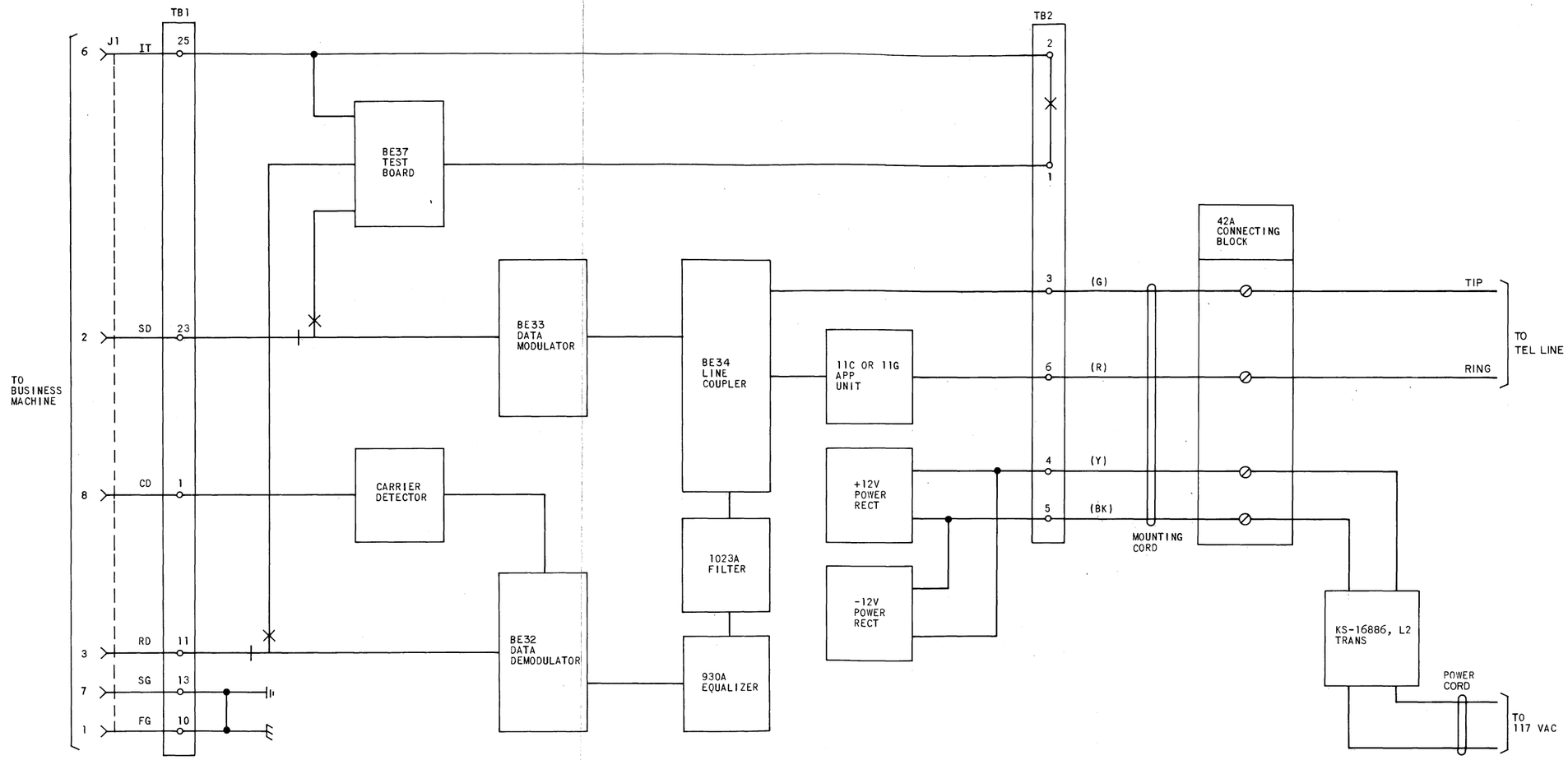

Fig. 4—Data Set 602D-Type, Block Diagram