DATA SET 602C-TYPE

TRANSMITTER-RECEIVER

CONTENTS PAGE

1. GENERAL

1.01 This section contains information necessary for familiarization with the data set 602C-type and procedures to be used for its successful operation.

1.02 This section is reissued to provide the following:

- Fig. 1 and 2 are changed to show the present Bell System logo symbol.
- 1.03 is changed to indicate that private line operation requires battery voltage.

1.03 Data set 602C-type (Fig. 1 and 2) adapts analog signals for transmission over the switched telephone network ▶and can be used on 2-wire private line where battery voltage is provided (wet).◀ The data set is a complete transceiver which can transmit in each direction but not simultaneously. The data set is integrated with a telephone set which may be used to establish data calls and may also be used as a normal telephone. Data sets 602C1, 602C2, 602C3, and 602C4 are now rated manufacture discontinued (MD), but information is retained in this section for those sets still in the field.

1.04 Data set 602C-type provides at the interface a baseband bandwidth up to approximately 1000 Hz, which corresponds to facsimile transmission with resolution of up to 100 lines per inch with a scanning rate of 180 lines per minute. The data set also provides a sync channel for the transmission of a stable 60-Hz signal. This signal may be used to synchronize the drive motor of a distant receiving machine with that of the transmitting machine, or it may be disabled if not required.

1.05 On an optional basis, the data set can be ordered with or without a reverse channel (1A-type data unit), which allows signaling in the reverse direction during analog data transmission.

2. DESCRIPTION

2.01 The data set, which weighs approximately 16 pounds, is enclosed in an integrated housing which is available in 2-tone gray only.

2.02 Data sets 602C1, 602C2, 602C5, and 602C6 have rotary dials; data sets 602C3, 602C4, 602C7, and 602C8 utilize Touch-Tone® dialing. Data sets 602C2, 602C4, 602C6, and 602C8 have reverse-channel capability, whereas data sets 602C1, 602C3, 602C5, and 602C7 do not.

2.03 Data sets 602C5, 602C6, 602C7, and 602C8 are provided with a 3A2 data unit to provide compatibility with ESS central offices and Unigauge lines. Data sets 602C1, 602C2, 602C3, and 602C4, which are now rated MD, have a 3A1-type data unit for line control.

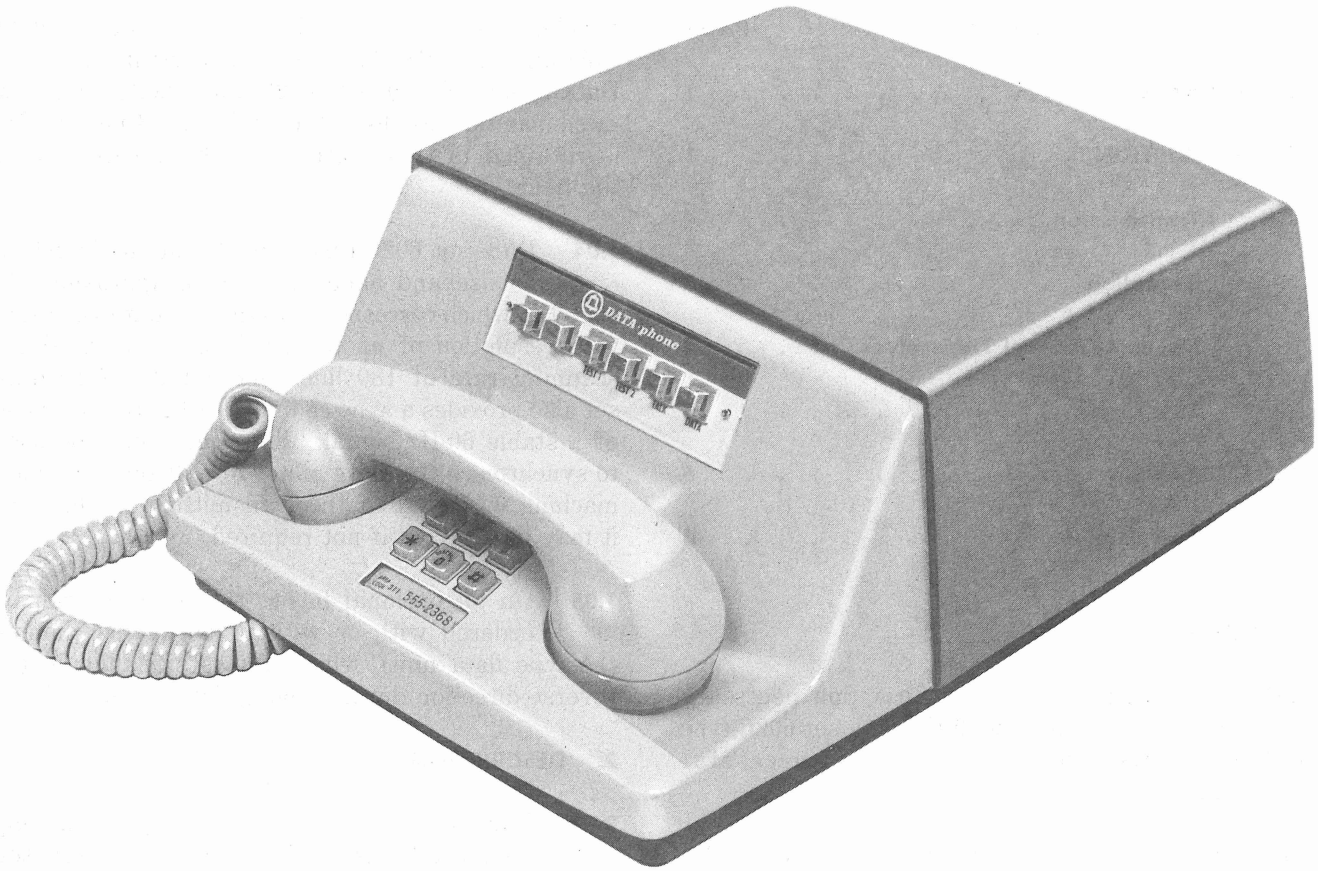

Fig. 1—Data Set 602C-Type (Available Also With Rotary Dial)

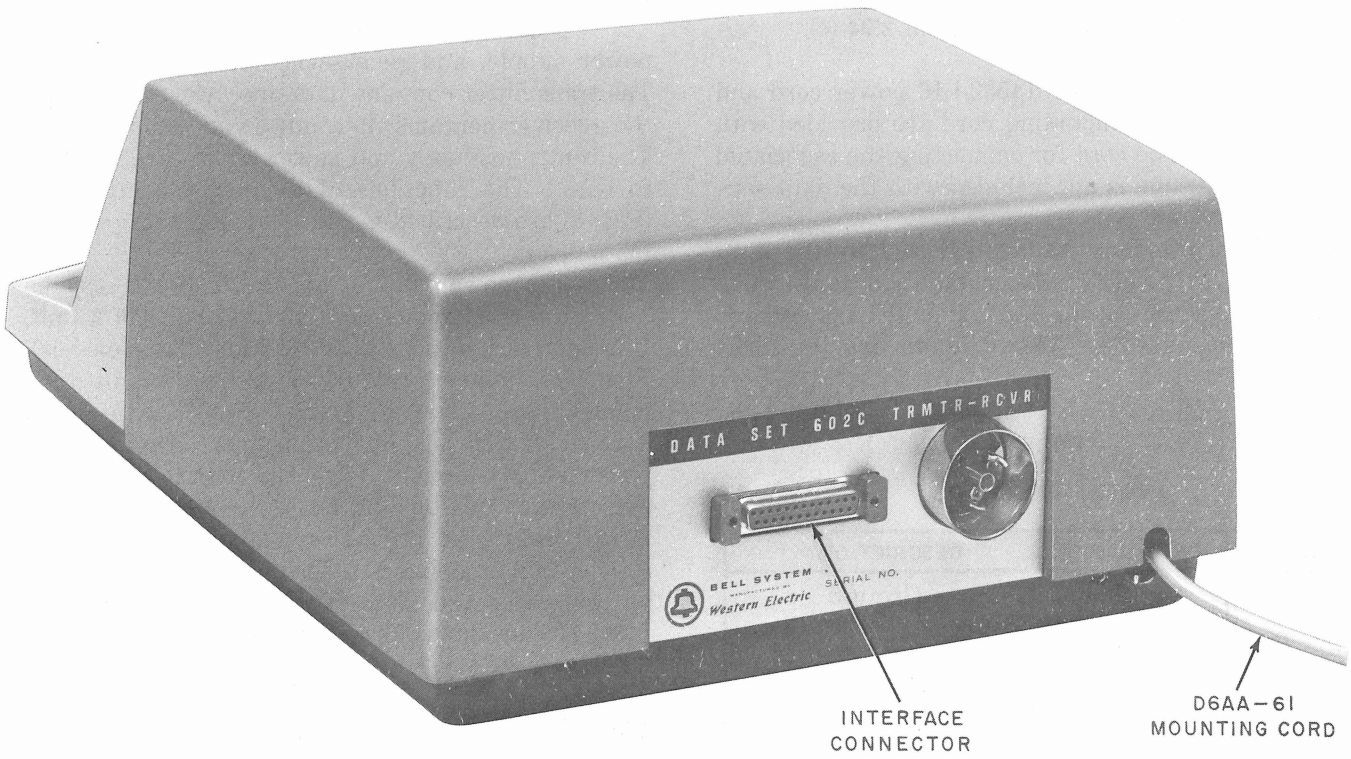

Fig. 2—Data Set 602C-Type, Rear View

2.04 Data set 602C1 or C2 series 1, 2, or 3 is equipped with six pushbuttons as shown below:

			TEST	TALK	DATA

(a) The DATA button transfers the telephone line from the telephone to the data mode.

(b) The TALK button clears all data transmission to allow normal use of the telephone.

(c) The TEST button permits the data set to be systematically tested from a remote data test center.

(d) The remaining three pushbuttons are available for spare lines.

2.05 Data set 602C1 or C2 series 4, data set 602C3 or C4 series 1, and data sets 602C5, C6, C7, and C8 are equipped with six pushbuttons as shown below:

		TEST 1	TEST 2	TALK	DATA

(a) The DATA and TALK buttons operate as explained in 2.04 (a) and (b), respectively.

(b) The TEST 1 button permits the data test center to remotely test the auto answer and reverse-channel features.

(c) The TEST 2 button operates the same as the TEST button described in 2.04 (c).

2.06 A 3-conductor KS-14532-L16 power cord and a D6AA-61 mounting cord are provided with the data set. The cord for connecting the associated business machine is not included with the data set.

2.07 The interface leads presented by the data set to the facsimile installation conform to the Electronic Industries Association (EIA) standards wherever possible. These leads are listed in Table A.

TABLE A

INTERFACE LEADS

PIN NO.	DESIGNATION	DESCRIPTION
1	FG	Frame Ground
2	SD	Send Data
3	RD	Received Data
4	RS	Request to Send
6	IT	Interlock
7	SG	Signal Ground
8	CO	Carrier On-Off
9	+18	Positive Voltage*
10	—18	Negative Voltage *
11	RCS	Reverse-Channel Send
12	RCR	Reverse-Channel Receive
17	SI	Sync In
18	SO	Sync Out
19	RR	Remote Release
20	RC	Remote Common
21	RY	Ready
22	RI1	Ring Indication 1
23	RI2	Ring Indication 2

* Used for test purposes only, not to be wired to the business machine.

2.08 Data set 602C-type consists of a transmitter, receiver, line control unit, telephone set, power supply, and reverse-channel unit (optional). The transmitter contains data and sync modulators; the receiver contains data and sync demodulators. The control circuitry and power supply are common to both. The functions of the major components (Fig. 3) are described in the following paragraphs.

2.09 The power supply for the data set may be a ferroresonant-regulated type J87235A unit, 17A unit (earlier models), or 48A unit (later models). The 17A power unit provides two dc outputs nominally at +18 volts and −18 volts with a load current of 200 mA on both sides. The required power supply input is from 105 to 129 volts ac at a frequency of 60 $\pm$0.1 Hz. The 48A power unit is identical to the 17A power supply in all respects except that it delivers a load current of 250 mA on both sides and its power supply input can vary from 105 to 129 volts ac at a frequency of 57 to 63 Hz.

2.10 Data set 602C-type is designed to operate in an environment with an ambient temperature range of 40 to 120°F and a humidity range of 0 to 95 percent.

Transmission

2.11 The data modulator is a voltage-controlled oscillator. It accepts a voltage in the range of 0 to +7 volts from the business machine on the send data lead and converts it to a square wave which has a frequency range of 1500 to 2450 Hz, respectively. This signal is then sent through the low-pass filter which eliminates the higher harmonic content of the square wave before it is transmitted on the line. The data modulator compensates for both temperature changes and fluctuations in the power supply.

2.12 The sync modulator is an oscillator which is tuned by a control voltage. A positive voltage input in the sync-in lead produces a frequency of 550 Hz; a negative input produces a frequency of 660 Hz. When a sine wave of proper amplitude and symmetrical with respect to ground is applied to the oscillator, it will produce a frequency of 550 and 660 Hz, alternately. These signals are passed through the band elimination filter where they are coupled with the signal from the data modulator and then sent to the line.

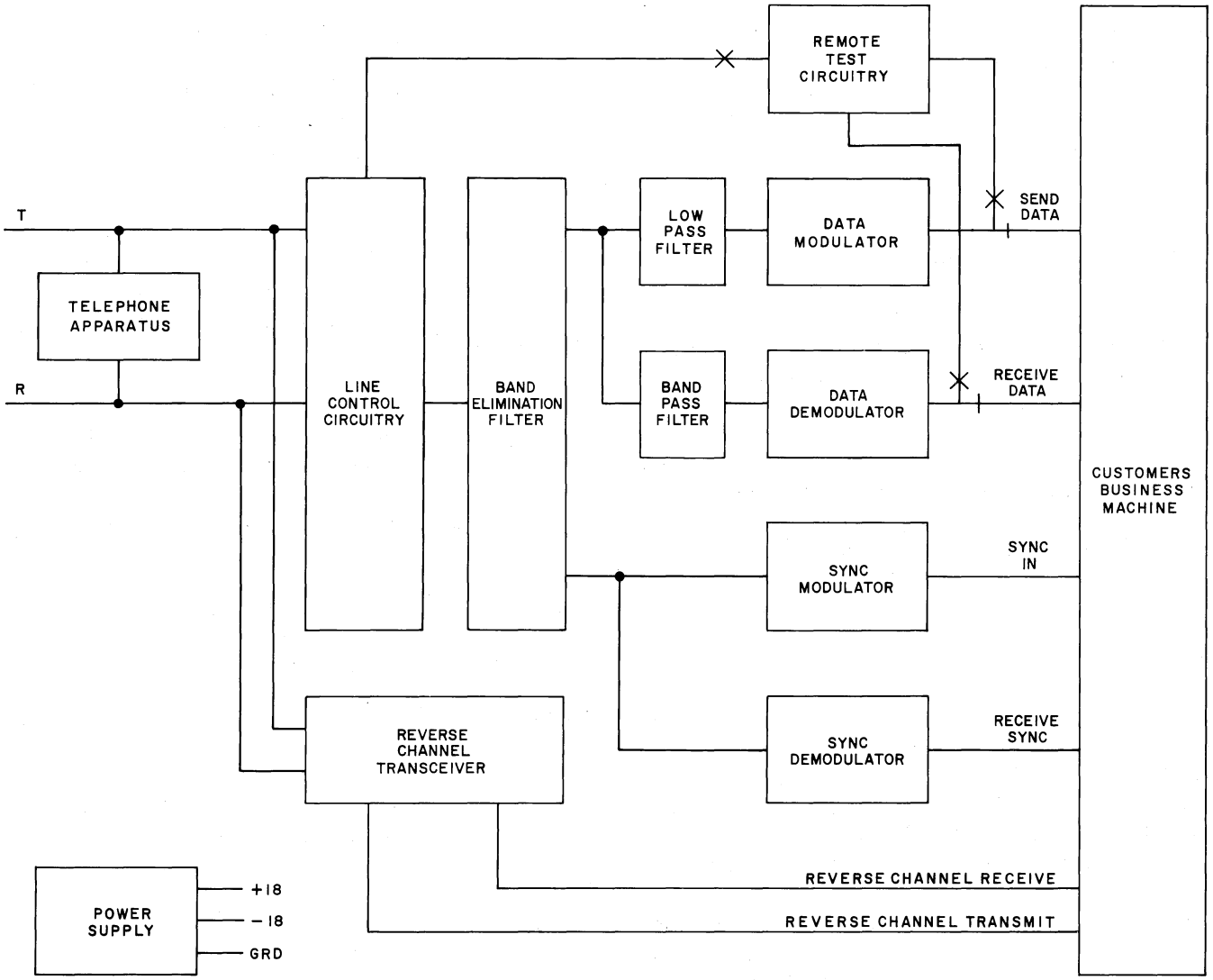

Fig. 3—Data Set 602C-Type, Simplified Block Diagram

Reception

2.13 The data demodulator amplifies and limits the incoming signal, thus converting it to a square wave. A differentiator and a rectifier then convert the square wave into a series of pulses which correspond to the zero crossings of the received line signal. These pulses trigger a one-shot multivibrator. The average output voltage of the multivibrator varies linearly with the frequencies of the incoming signal. This wave is then filtered to produce the received data.

2.14 The sync demodulator operates on its incoming signal in a similar manner to the data demodulator except that the output of the sync demodulator has been passed through a sharply tuned bandpass filter centered at 60 Hz.

Reverse-Channel Transceiver

2.15 The reverse-channel transmitter produces a signal which is sent from the receiving data set to the transmitting data set. When the data set is in the transmitting data mode, the reverse-channel receiver receives a reverse-channel signal from the receiving data set. This signal (387 Hz) keeps the echo suppressors disabled once they have been disabled by the answer-back tone (2025 Hz).

2.16 The line control circuitry performs supervisory functions for the data set as follows:

(a) Connects the data set to the line for transmission

(b) Automatic answer

(c) Gives an indication to the business machine when ringing current is present

(d) Places the data set in the talk, data, or test mode as called for by the pushbuttons and the interface signals

(e) Gives an indication to the attendant when the data set is in any of these modes

(f) Provides data set compatibility with ESS No. 1 central offices and Unigauge lines.

Test Circuit

2.17 The test circuitry provides a means of remotely testing the data set on a call-up basis from the 904-type data test center (DTC). In data sets 602C1 or 602C2 series 4, and data sets 602C3, 602C4, 602C5, 602C6, 602C7, and 602C8, the auto answer and reverse-channel circuitry may also be remotely tested. The test circuitry receives two tones from the DTC and returns the two tones as close in frequency as possible to the tones received. Also, in data sets 602C1 or 602C2 series 4, and data sets 602C3, 602C4, 602C5, 602C6, 602C7, or 602C8 (after the auto answer circuitry has been tested), an additional tone (387 Hz) is received allowing the DTC to test the reverse-channel circuiry.

3. OPERATION

3.01 For detailed operation of data set 602C-type, see CD- and SD-1D081-01.

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

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

(b) After the distant terminal has answered:

(1) ***Manually:*** After verbal agreement is reached to transmit data, depress the DATA key (nonlocking).

(2) ***Automatically:*** There is a 1.1-second quiet interval after connection is established with the distant terminal. At the end of this period, a 2025-Hz tone will be heard for about 3.5 seconds. Depress and release DATA button.

(c) Releasing the DATA button restores the TALK button to normal. The DATA lamp lights 3 to 5 seconds after this button is released. The set is now in the data mode and transmission can begin. The handset may be placed on its cradle.

3.03 To terminate a call, depress the TALK button, lift the handset, then hang up. The business machine may also automatically terminate a call while in the data mode by opening the connection between the remote release and remote common interface leads.

3.04 The data set may be conditioned to answer incoming calls either manually or automatically as follows:

(a) ***Manually:*** Call is answered in normal manner. When verbal agreement is reached or when data transmission is to begin, depress and release the DATA button. Release of the DATA button restores the TALK button. The DATA lamp lights 3 to 5 seconds after the release of the DATA button. The set is now in the data mode and transmission can begin. Handset may be placed on its cradle.

(b) ***Automatically:*** Sets conditioned for automatic answer require no operation by the attendant.

Test Mode

3.05 To put data set 602C1 or C2 series 1, 2, or 3 in the test mode, perform the following steps:

(a) Contact the DTC in a normal telephone manner.

(b) When two tones are heard (660 and 1500 Hz), depress the TEST button and place the handset on-hook. The data set is now in the test mode.

3.06 To put data set 602C1 or 602C2 series 4 and above, or data sets 602C3, 602C4, 602C5, 602C6, 602C7, or 602C8 in the test mode, perform the following steps:

Note: Data set 602C1 or 602C2 series 4 and 602C3 or 602C4 series 1 require that interface leads 19 and 20 (remote release and remote control) be connected either by the business machine or by using a 901- or 914-type data test set to allow remote testing of the automatic answer circuitry. Data sets 602C1, 602C2 series 5 and above, 602C3, 602C4 series 2 and above, and 602C5, 602C6, 602C7, and 602C8 may be tested as indicated.

(a) After contact with the DTC is made, depress TEST on-hook. This action allows the auto answer circuitry to be tested by the DTC.

Note: After auto answer test is completed, data set goes in data mode automatically.

(b) Remove handset off-hook and depress TALK button.

(c) When two tones are heard (660 and 1500 Hz), depress TEST 2 button and place handset on-hook. The data set is in the test mode and the reverse-channel, and data set can be tested.

3.07 At the end of testing operations, the DTC releases the data set from the test mode and terminates the call. The data set is now ready for normal operation.

Proper steps should be taken to ensure that customer is not billed for test calls. See section entitled Crediting Charges on Test Calls (010-250-001).