

DATA SET 401F

RECEIVER

IDENTIFICATION AND OPERATION

1. INTRODUCTION

1.01 This section covers identification and operation of data set 401F. It does not include information for the business machine associated with the data set.

2. GENERAL

2.01 Data set 401F is primarily designed for use in DATA-PHONE service. It can also be arranged for use on local battery 2-wire private lines.

2.02 Data received from the telephone line consists of three tones. Each tone may be one of several frequencies. The data set converts these tones into contact closures. These closures are delivered to the associated business machine as received data.

2.03 The data set is used with a 513B-61 telephone set equipped with a D10N-61 cord (Fig. 1). The DATA key is located on the switchhook assembly in the same position as an exclusion key and operates in the same manner. A TEST key permits a general test of the data set from a data test center. TEST lamp lights when data set is in test mode.

3. DESCRIPTION

3.01 Data set 401F is composed of several major components enclosed in a two-tone gray cabinet. These components are:

- Control Circuit
- Channel Circuits
- Power Supply
- Cut-Apart Filter

● Automatic-Answer Circuit

● Data Output Relays

● Test Circuit.

3.02 Electronic circuits are arranged on plug-in printed board assemblies. Fig. 2 shows a typical assembly.

3.03 Dry reed relays are used for data output to the business machine. Wire spring relays are used for automatic-answer and control circuits. The control circuit also uses one dry reed relay mounted in combination with the data output relays and several individual dry reed relays mounted on a printed board assembly. Fig. 3 shows arrangement of components in the cabinet.

3.04 Fig. 4 shows a simplified block diagram of the data set.

3.05 Frequencies accepted by data set 401F are shown in Table A. Minimum receiving level for each tone should be no lower than -39 dbm for frequencies below 1950 cps and -49 dbm for frequencies of 1950 cps and above.

3.06 The answer-back oscillator responds to signals from the business machine and transmits tones back to the distant station. Frequencies of the tones are 1017 and 1785 cps.

3.07 A D3BT-61 cord, 5-1/2 feet long, equipped with a Cannon MC-14E-8-3SN plug on one end is furnished for connections between the TEL LINE jack on the data set and the telephone line.

3.08 A KS-14532, List 15 gray cord assembly, 10 feet long, is provided for connection to a 117-volt ac power receptacle (two parallel blades and a U-shaped grounding pin).

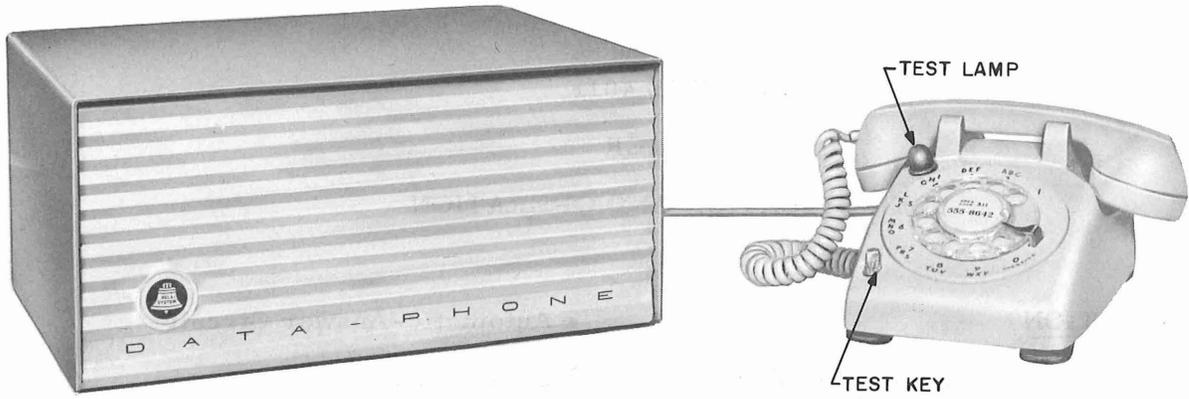


Fig. 1 - Data Set and Telephone Set

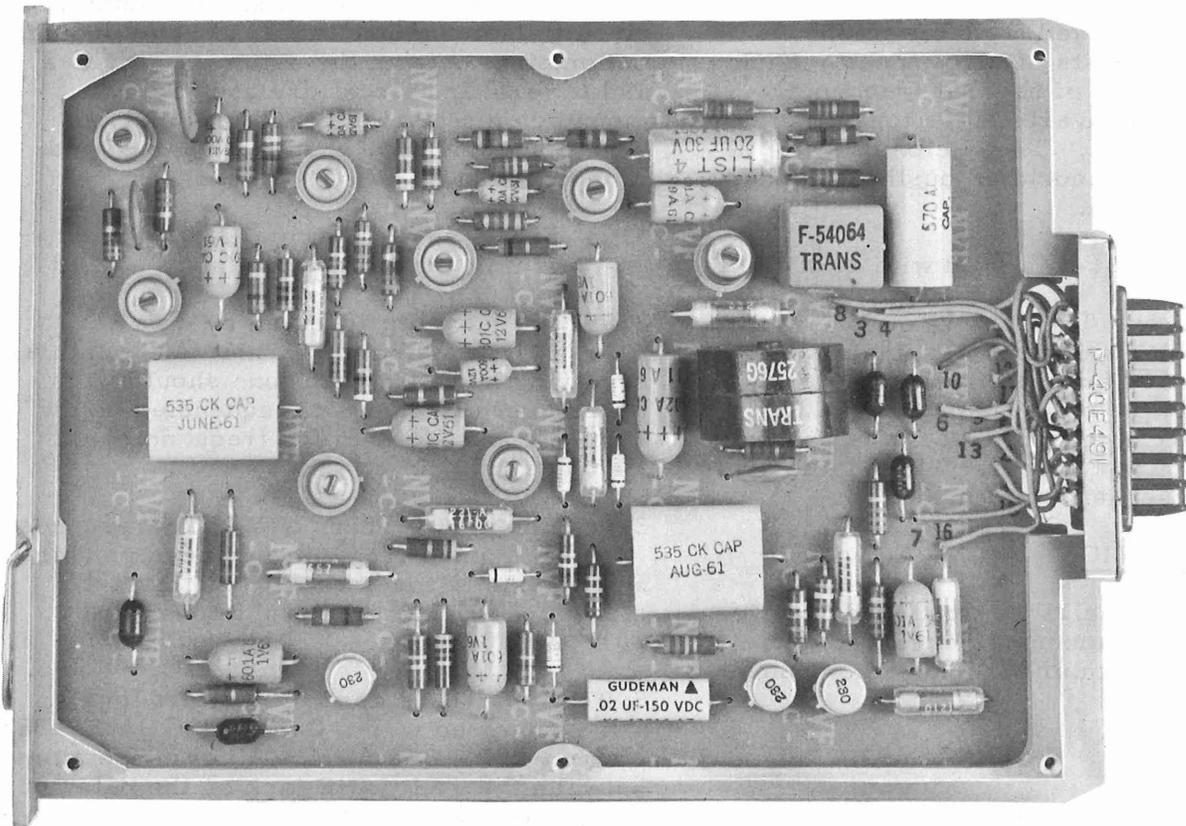


Fig. 2 - Printed Board Assembly

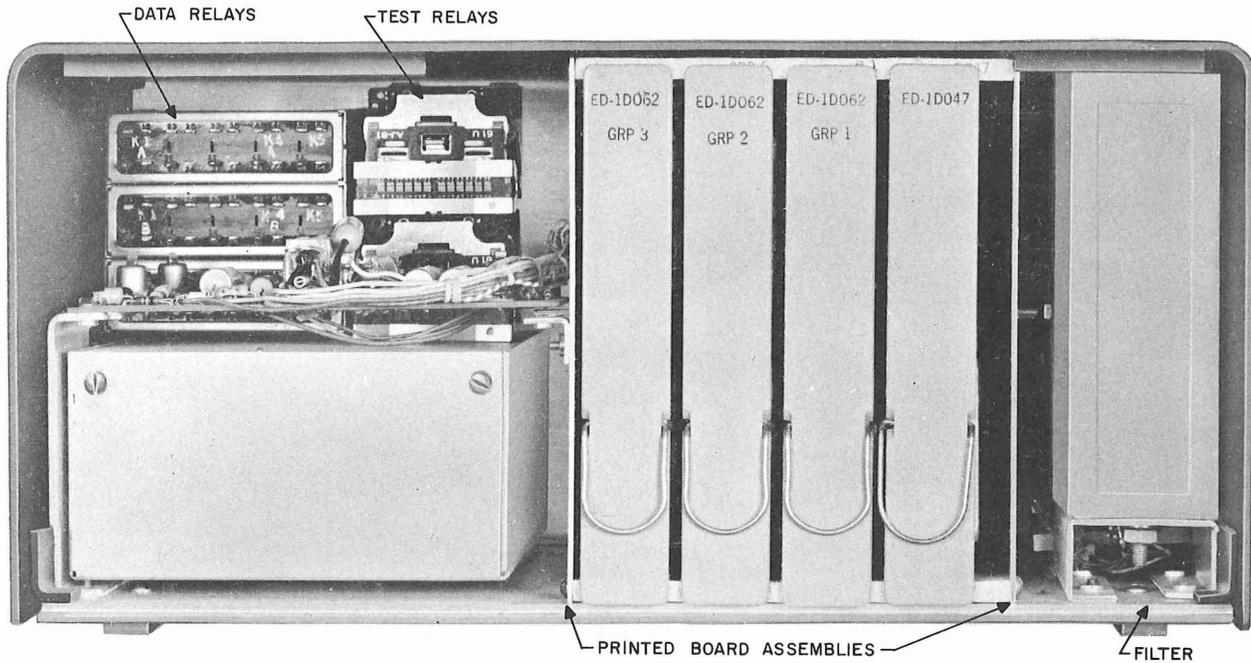


Fig. 3 - Data Set, Front View, Cover Removed

TABLE A
DATA FREQUENCIES

Frequency cps	Relay Operated
600	K5A
697	K1A
770	K2A
852	K3A
941	K4A
1098	K5B
1209	K1B
1336	K2B
1477	K3B
1633	K4B
1950	K4C
2050	K1C
2150	K2C
2250	K3C

3.09 A KS-19087, List 2 receptacle, designated CUST EQUIP, is provided for interface connections to associated business machine. The business machine cord, equipped with a Cinch DB-19604-432 plug, must be furnished by the customer.

3.10 The telephone set cord connects to a KS-19087, List 1 connector designated TEL SET.

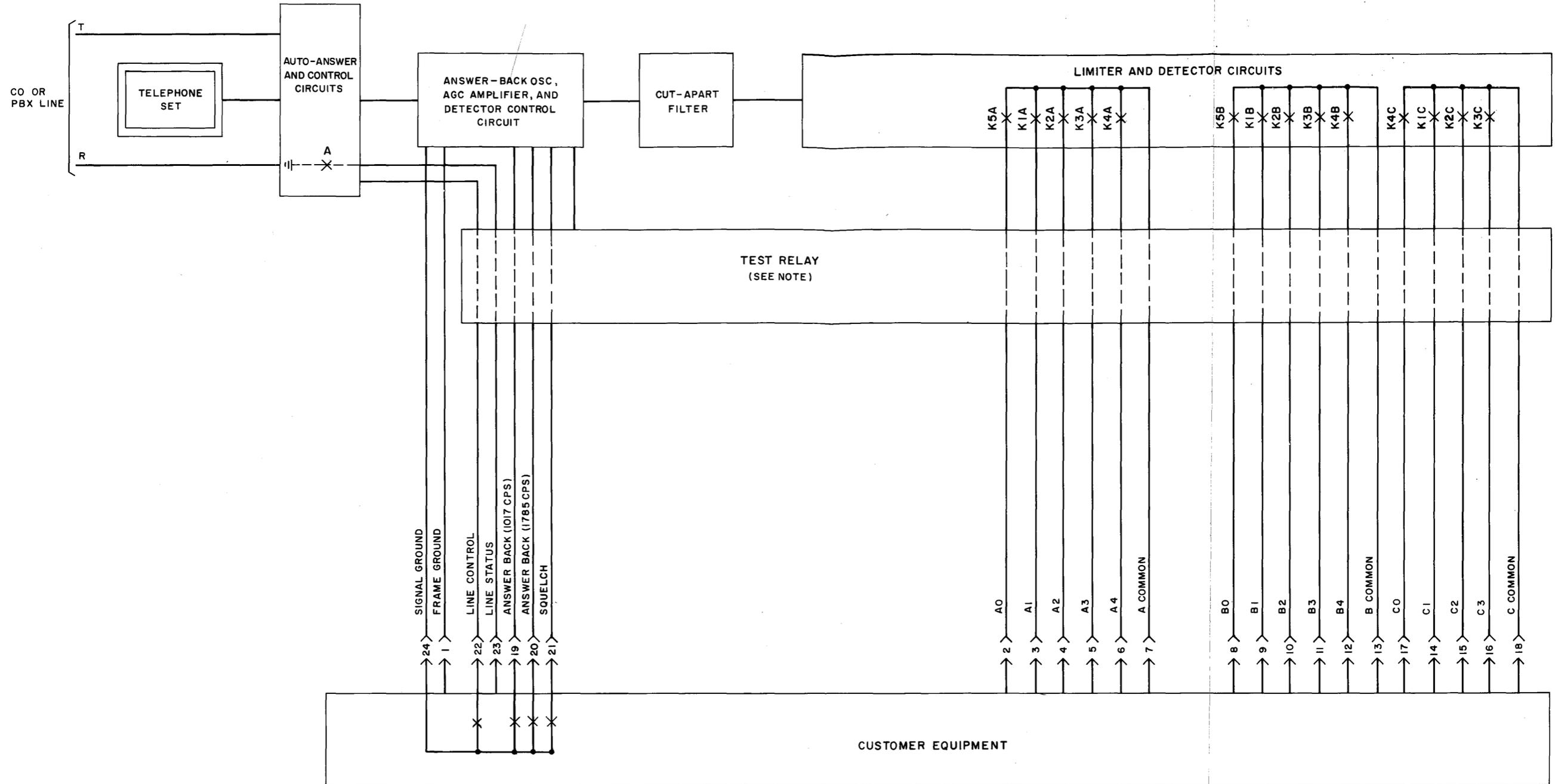
3.11 Fig. 5 shows the rear of the set and location of the various connectors.

3.12 The complete data set is coded J1D401F. This code does not include the 513B-61 telephone set.

4. OPERATION

4.01 For detailed operation, refer to CD- and SD-1D018-01.

4.02 To use the telephone set for voice communication, lift the handset and proceed in a normal telephone manner.



NOTE: WHEN TEST RELAYS ARE NONOPERATED, DATA OUTPUT IS CONNECTED TO INTERFACE. WHEN TEST RELAYS ARE OPERATED, DATA OUTPUT OPERATES B RELAY, TURNING ON ANSWER-BACK OSCILLATOR.

Fig. 4 - Block Diagram

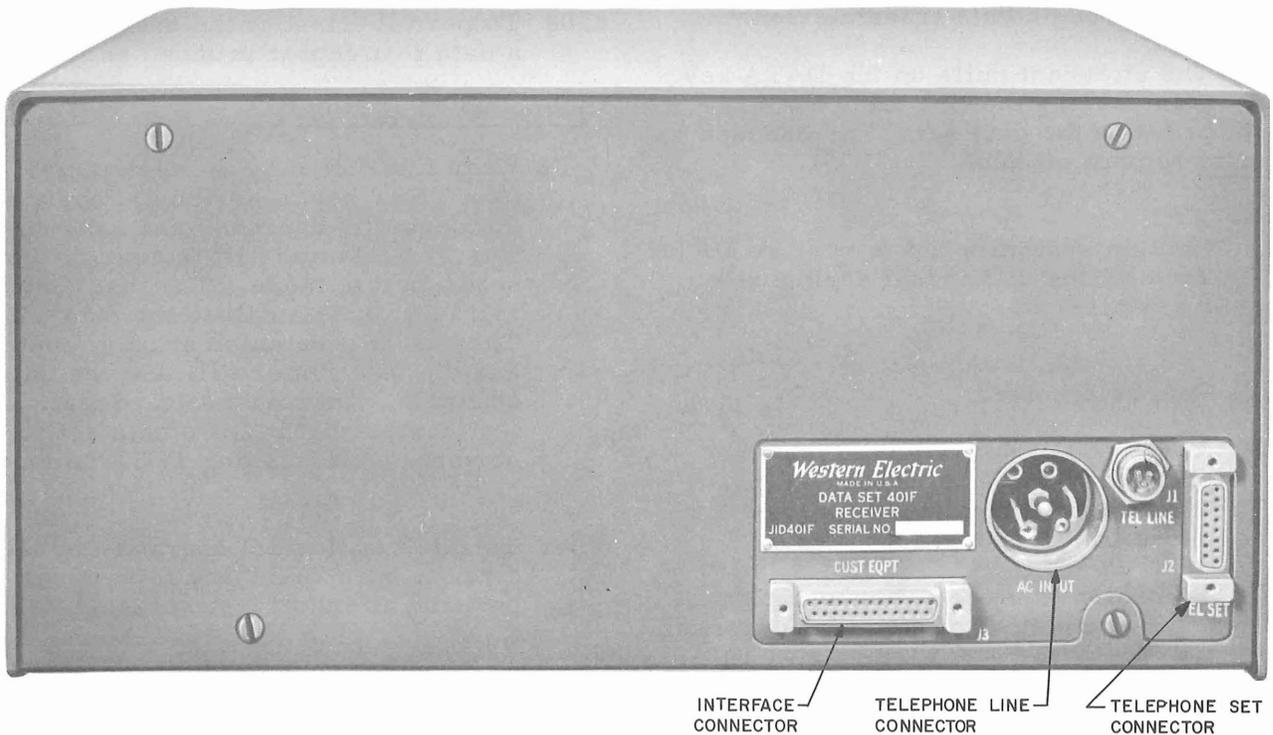


Fig. 5 - Data Set, Rear View

4.03 To receive data, the data set may be operated either attended or unattended. In either mode of operation, the Line Control lead must be grounded in the customer's business machine to receive data.

- The wiring arrangement of the telephone set determines the method of operation. However, in some cases, the customer can remove ground from the Line Control lead to switch from unattended to attended operation even though the telephone set is wired for unattended operation.

4.04 Unattended Operation

(1) When ringing current is applied to the line, the receiving data set automatically trips the ringing and connects a holding bridge across the line. In most installations, the data set, under control of the business machine, will return a 2- to 5-second answer-back tone (1785 cycles) to the calling party. This tone indicates that the receive equipment is ready to accept data.

- The telephone ringer will not operate when in the unattended mode.

(2) At end of data transmission the business machine at the sending end normally sends an end-of-message signal, opening Line Control lead, releasing the line. In some central offices, disconnection by the calling party also releases the holding bridge.

(3) It is possible, in cooperation with the distant station, to establish voice communication after completion of data transmission by lifting the handset. The line will be transferred to the telephone set and the data set will release.

(4) To return to data mode, pull up the DATA key. This transfers the line back to the data set and the handset may be replaced on its mounting.

4.05 Attended Operation

(1) Calls are received in the normal telephone manner. The parties agree

verbally to begin data transmission.

- (2) The attendant pulls up the DATA key, transferring the line from the telephone set to the data set. The handset must remain off hook.



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

- (3) Data is received.
- (4) At the end of data transmission replace the handset on its mounting. The data set restores to normal and the telephone line is released.
- (5) To return to voice communication after completion of data transmission, restore the DATA key to normal. The data set is released and the line is under control of the telephone set.

4.06 Data received from the telephone line consists of three tones. These tones are amplified, separated by the cut-apart filter, then limited and detected. Tuned circuits are set to respond to a particular data frequency. Each received frequency excites a corresponding tuned circuit. The output of each tuned circuit is coupled to a detector which controls a relay.

4.07 When a data relay is operated by the output of its tuned circuit, it provides a contact closure between its data lead and a common lead as long as the tone producing such closure remains on the line. Contact closures of the various relays are accepted by the business machine as received data.

- 4.08 To permit a test of the data set from a data test center proceed as follows:

Unattended Operation

- When instructed by the test center, turn TEST key to horizontal position, momentarily depress, and hang up. The TEST lamp is lit indicating that set is in test mode. The test center will now place a call to the data set. The call will be automatically answered and the test center will test the data channels. On completion of test, test center will restore data set to normal, extinguishing TEST lamp.



To avoid accidental operation of test circuit, turn TEST key to vertical position at end of test.

Attended Operation

- When instructed by the test center, turn TEST key to horizontal position, momentarily depress, then pull up DATA key. Do not hang up. The TEST lamp lights indicating that the set is in test mode. Test center will now test the data channels. After a prearranged time interval return to talk mode. Test circuit will release and handset may be restored to its mounting. Data set attendant also can release test circuit by operating TEST key to vertical position.



To avoid accidental operation of test circuit, turn TEST key to vertical position at end of test.