DATA SET 402A

TRANSMITTER

DESCRIPTION AND OPERATION

1.00 INTRODUCTION

1.01 This section covers data set 402A. It does not include any operating information concerning the business machine equipment used with the data set.

2.00 GENERAL

2.01 Data set 402A may be used in DATA-PHONE service or on private lines.

2.02 Information concerning data set 402B (receiver) is covered in Sections 594-017-100 through 594-017-500.

2.03 The data set 402A is the transmitter component of a medium-speed parallel data transmission system capable of transmitting 8 data levels at any speed up to 75 characters per second, which is the equivalent of 600 bits per second if all 8 channels are used. The system is designed for one-way transmission of data over a voice channel on a half-duplex basis, with provision for answer-back transmission.

3.00 DESCRIPTION

3.01 The data set 402A consists of a 9-channel transmitter, an answer-back receiver, and a telephone set, all enclosed in one housing (Fig. 1).

3.02 The set will be provided in gray only.

3.03 A data key, located in the upper left corner of the housing, is used to select voice communication or data transmission and answer-back reception. The functions of the data key are outlined below:

Key in voice position (down)

- Connects handset to telephone line.
- Disconnects data transmitter and answer-back receiver from line.

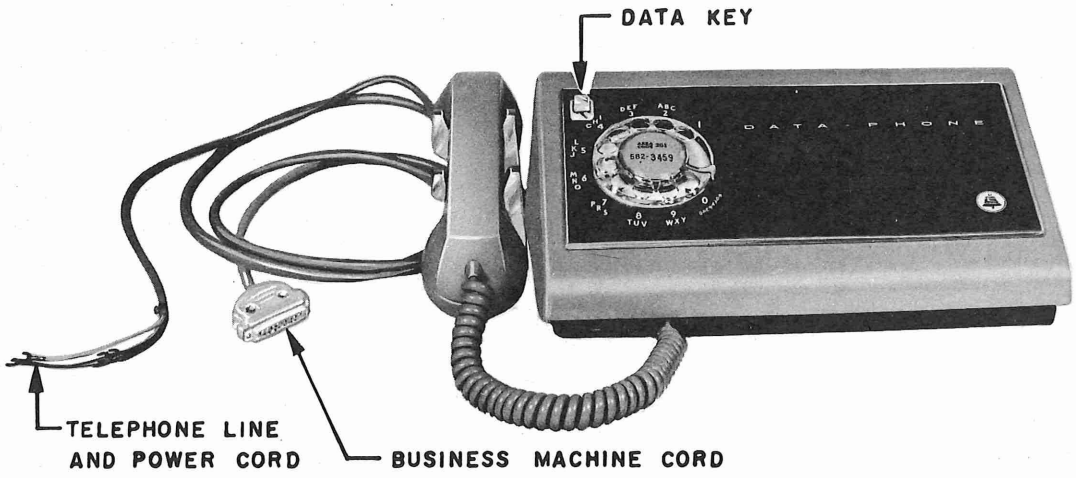


Fig. 1 — Data Set 402A, Transmitter

TABLE A

FREQUENCY RANGE

Channel		1	2	3	4	Timing	5	6	7	8
Freq, cps	MARK	730	900	1070	1240	1410	1580	1750	1920	2090
	SPACE	800	970	1140	1310	1480	1650	1820	1990	2160

- Places a short across the data transmitter and answer-back receiver.
- Opens *INTERLOCK* lead.

Key in data position (up)

- Connects data transmitter or answer-back receiver to telephone line.
- Opens handset receiver.
- Places a short on handset transmitter.
- Connects ground on *INTERLOCK* lead.

3.04 The data transmitter consists of a timing channel and 8 data channels. Each channel is composed of an oscillator circuit which generates both the MARK and SPACE frequencies of the channel, dependent on the condition of the data lead with respect to the data common lead (open or closed). A fixed capacitor in each channel is connected in parallel with the oscillator capacitance over interface leads under control of the customer equipment. Business machine action closes the data lead to the data common lead which shifts the frequency from SPACE to MARK. Therefore, on each channel, a closure from the business machine indicates MARK and an open indicates SPACE. These frequencies are 70 cycles apart. There is a 100-cycle guard band between channels. The range of frequencies is shown in Table A.

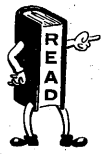
3.05 The timing channel input is also under the control of a set of contacts in the business machine, which will alternately open and close. The condition of the timing contacts will change at the beginning of a character and remain constant for the duration of the character. Therefore, if the timing channel is in the MARK condition for one character, then it will be in the SPACE condition for the next one, and will so alternate during transmission.

3.06 During data transmission, there are always nine frequencies on the line simultaneously.

4.00 OPERATION

4.01 For detailed operation, see CD- and SD-1D005-01.

4.02 To prepare the circuit for data transmission, it is first necessary to establish voice communication with the receiving station in the normal manner. When the attendant at the receiving station signifies he is ready to receive data, the data key of the 402A must be pulled up. The telephone handset must remain off-hook.



The data key at the receiving station must also be pulled up. Caution customer not to restore data key or the handset during data transmission.

4.03 Upon completion of data transmission, voice communication can be re-established by depressing the data key to its normal position. If voice communication is not desired, the circuit is restored to normal by placing the handset on the switchhook. Mechanical linkage between the switchhook and the data key will restore the data key to normal.

4.04 The answer-back receiver, when used, will detect any one of three answer-back frequencies originating from the distant station. The information derived from these signals is presented to the business machine through the operation of two relays located in the answer-back receiver. A fourth or rest frequency is provided for protection against noise and will not operate either relay.

- Three different answer-back signals are available: *A* relay closed, *B* relay closed, or both relays closed.
- Mode control contacts in the business machine disconnect the data transmitter and connect the answer-back receiver.

4.05 Some installations will specify a 402A transmitter and a 402B receiver in the same location bridged on the same line. Operation of the data set 402A is the same as previously described. Receiver operation is covered in Section 594-017-100.

4.06 Fig. 2 is a block diagram of the data set 402A.

4.07 Fig. 3 shows a block diagram of both the data sets 402A and 402B bridged on one line.

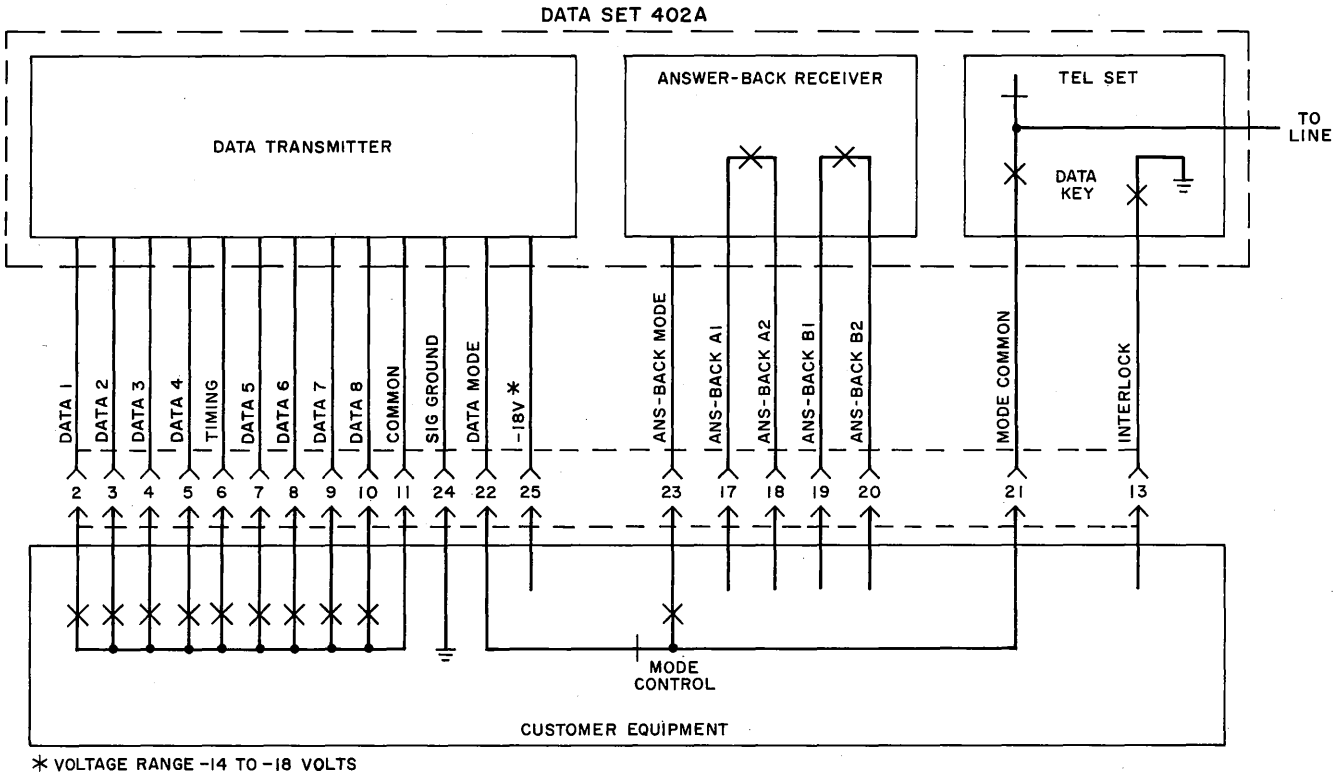


Fig. 2 — Data Set 402A, Block Diagram

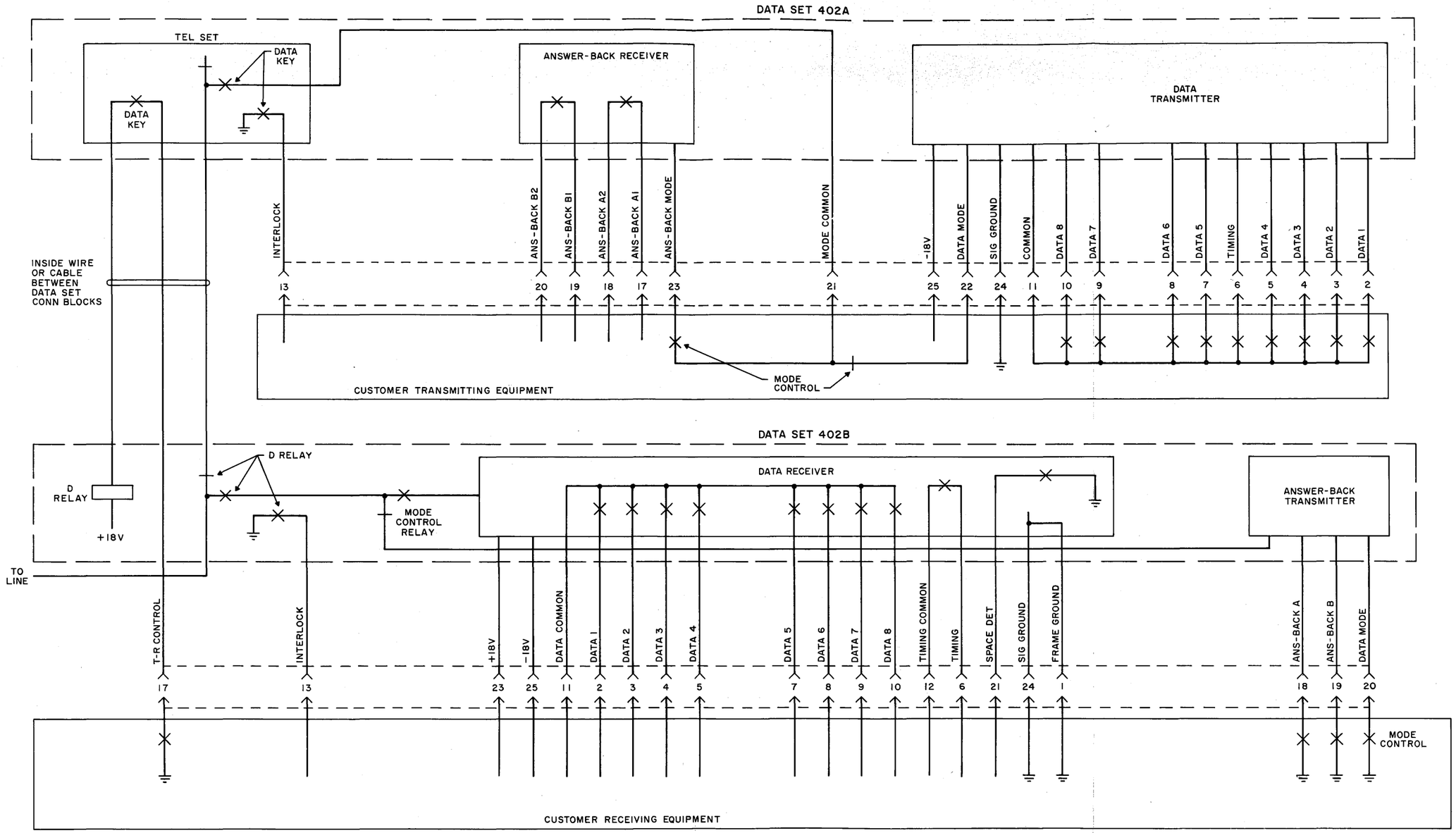


Fig. 3 — Data Sets 402A and 402B Bridge on One Line, Block Diagram