

DATA SET 205A  
TRANSMITTER-RECEIVER  
USED ON PRIVATE SERVICE SYSTEMS  
SWITCHING SYSTEM NO. 307  
IDENTIFICATION AND OPERATION

1. GENERAL

- 1.01 Distribution of Issue 1 of this section was limited. It is being re-issued to make corrections.
- 1.02 The data set 205A is a phase-modulated transmitter-receiver unit. It uses synchronous four-phase modulation for the transmission of serial binary data over voice frequency circuits using 2-wire or 4-wire facilities.
- 1.03 The data set may be operated at 2400 or 1200 bps under control of a speed selection interface control lead

from the telephone station. It may be used at half-speed (1200 bps) to improve the probability of successful transmission over facilities other than those normally used.

- 1.04 For clearness, business machine or telephone set operation will be referred to only where necessary.

2. IDENTIFICATION

- 2.01 More detailed information can be found in Section 592-017-150 and CD-1D054-01.

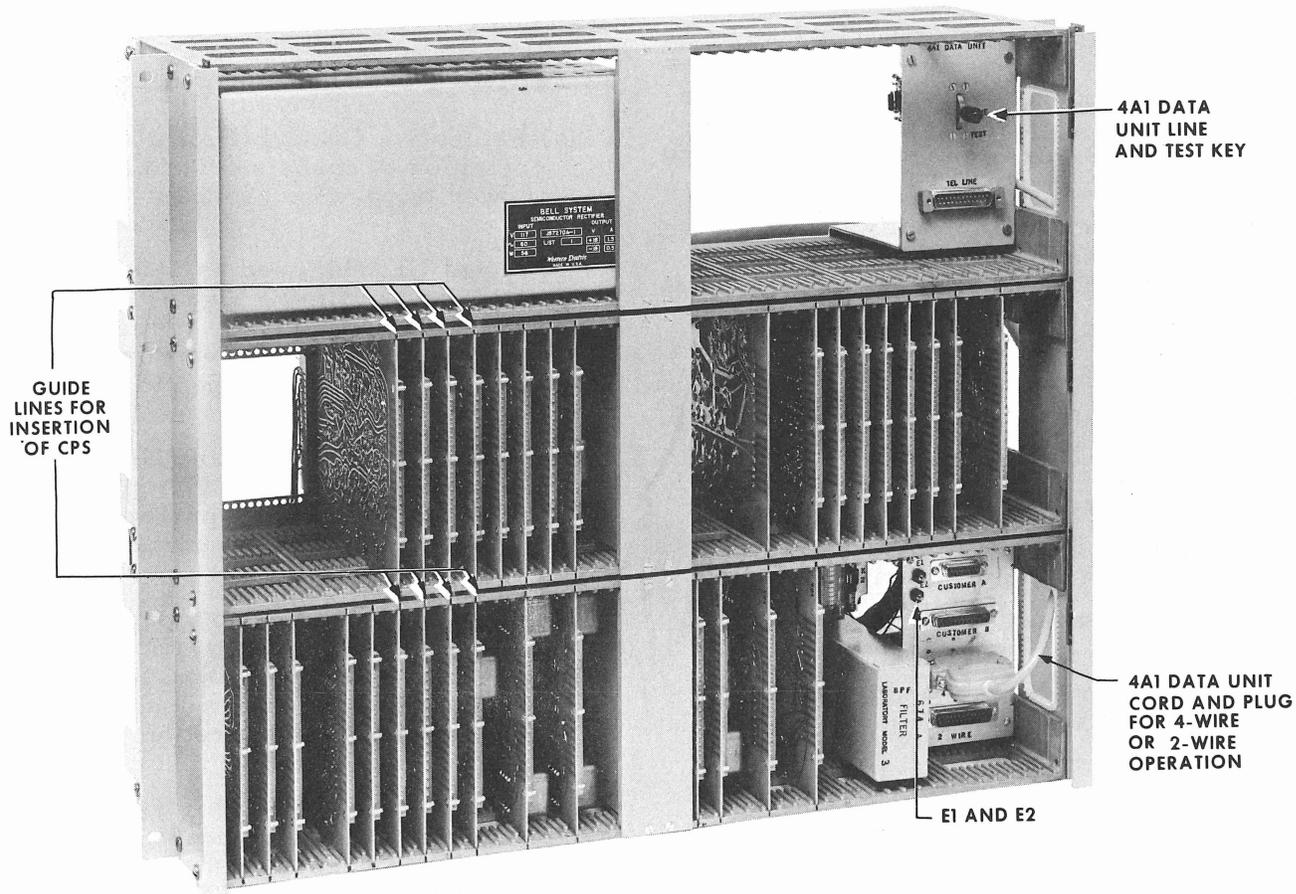


Fig. 1 - Data Set 205A, Front View

SECTION 592-017-100

2.02 Fig. 1 is a front view of the data set 205A with the circuit board retaining covers removed. This is a shop model, production models may vary.

2.03 The data set 205A weighs 56 lbs.

2.04 The data set has ten major circuit categories.

Line Connector, Transmit-Receive Switch (TR SW), and Power Supply

Interface Connectors and Remote Test

Clock Selection and Single Frequency Detector

Control Timing

Oscillator and Common Countdown

Transmitter Timing

Transmitter Data

Receiver Analog

Receiver Digital Data

Receiver Timing

2.05 An auxiliary LINE and TEST key, the data unit 4A1, is also provided. For 4-wire (full duplex) operation the 4A1 data unit cord is plugged into the 4-WIRE connector. For 2-wire operation the 4A1 cord is plugged into the 2-WIRE connector.

2.06 The data unit 4A1 is always in the circuit as it is used to make the connection of DT1, DR1, DT, and DR leads to T1, R1, T, and R leads, respectively, when the key is in the LINE position.

2.07 With the key in the TEST position, the data transmit leads DT1 and DR1 are connected to the receive leads DT and DR through a 12-db attenuator. The line connections are terminated in 600 ohms.

2.08 The TR SW circuit board has two sets of option strapping terminals.

Strap between 1 and 2 - Continuous Carrier

No Strap between 1 and 2 - Carrier Controlled by the Request-to-Send Lead

Strap between 3 and 4 - Internal Transmitter Timing

No Strap between 3 and 4 - Customer Supplied Transmitter Timing

2.09 A J87270A power supply is provided to convert the 105- to 130-volt, 60-cycle ac power into regulated dc outputs of  $+18 \pm 1.0$  and  $-18 \pm 1.0$  volts.

2.10 The path set interface connectors, designated CUSTOMER A and CUSTOMER B, are for the customer business machines. CUSTOMER A connector carries data and clock interface circuits and a clock speed selection circuit. CUSTOMER B connector carries all control, data and clock interface circuits, and a clock selection circuit. Pin designations and connections are given in Section 592-017-200.

2.11 Options for transmitting levels of 0, -3, -6, or -9 dbm are provided.

2.12 Data set will operate properly when receiving a random data signal level as low as -38 dbm.

2.13 Data carrier detector sensitivity will normally range between -38 and -40 dbm.

2.14 Two grounds are provided:

(a) Protective Ground (Frame Ground); common to chassis ground and ac power third-wire ground.

(b) Signal Ground; used as reference for all data and timing signals. Within the data set it is common to the chassis ground and to the ac power third-wire ground when E1 is strapped to E2.

Note: Terminals E1 and E2 must be strapped if CUSTOMER A plug is removed. Remove strap when CUSTOMER A plug is connected.

2.15 The data set has provisions for remote testing by the 904E data test center, with the assistance of the customer. This remote testing can be done only when set is used on 4-wire operation.

2.1 There is a total of thirty-one circuit boards of twelve types. The card number and reference location number on the data set are shown in Table A.

2.17 Fig. 2 is a rear view of the data set showing card reference location numbers and reference points shown on the schematic drawings.

### 3. OPERATION

3.01 Detailed operation of this data set is covered in CD-, SD-1D054-01 and Section 592-017-150. Circuit board information may be found in SD-1D060-01.

3.02 The data set 205A can transmit and receive simultaneously over the 4-wire facility. Calls between stations are made on a full duplex basis, but the use of the set for data transmission will generally be in one direction at a time.

3.03 The customer, through the associated telephone equipment determines at what bit speed and which type of trans-

mission (HSASR, FACSIMILE, etc) is to be used. Regardless of the speed or selection, the data set 205A operates in the same manner.

3.04 A Request-To-Send on signal turns on carrier and initiates the RS-CS period during which the synchronizing code is transmitted. After this period, a Clear-To-Send (CS) on is given. Data may now be transmitted. The RS-CS time period depends on the state of the Confirm circuit. With Confirm (CON) off, a 640-msec timing period is given for a receiver to acquire synchronization. With Confirm on, a sync pattern from a remote data set must be detected before the 640-msec timing period is initiated. This indicates a data set is connected to the line at the far end.

TABLE A  
CARD AND REFERENCE INFORMATION

Type of Circuit Board	Card No.	No. of Cards	Reference No. on Data Set
NOR Gate	A835175	(10)	001, 006, 007, 009, 038, 039, 043, 054, 057, 058
Flip-Flop	A835176	(10)	002, 003, 005, 037, 040, 041, 042, 053, 055, 056
Monopulser	A835177	(1)	008
Automatic Gain Control 1	A835178	(1)	017
Automatic Gain Control 2	A835179	(1)	016
Demodulator	A835180	(2)	012, 014
Transmit-Receive Switch	A835181	(1)	019
Transmitter Output	A835182	(1)	044
Single Frequency Detector	A835183	(1)	010
Remote Test Circuit	A835184	(1)	021
EIA Interface	A835185	(1)	059
MIL STD 188 Interface	A835186	(1)	060

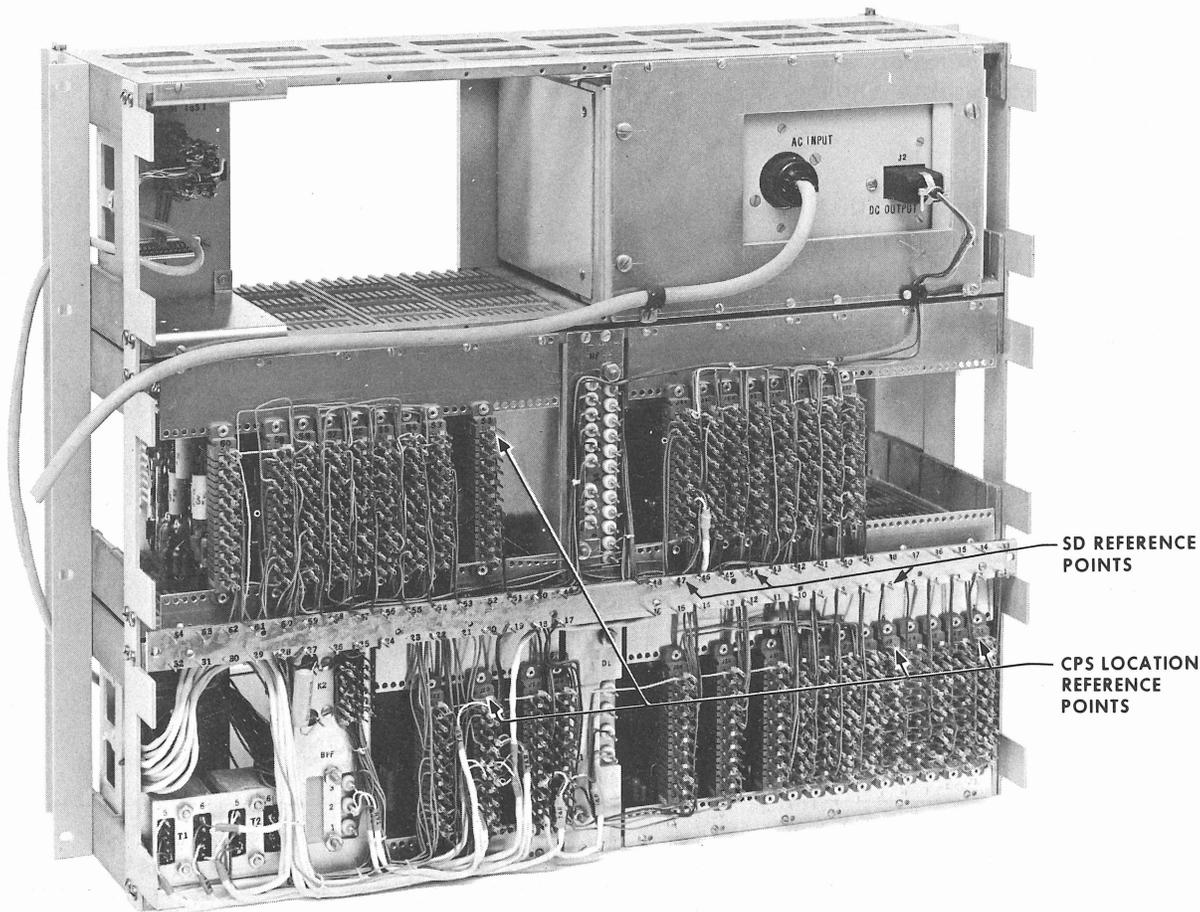


Fig. 2 - Data Set 205A, Rear View

3.05 The Clear-To-Send (CS) in an ON condition is a signal to the control equipment that the data sets are in sync and data transmission may begin.

3.06 Incoming serial data bits are delivered to the transmitter on the Send Data (SD) circuit synchronous with positive-going transitions of the transmitter clock (SCT). The transmit-receive switch controls the application of the transmit signal to the line facility.

3.07 Timing for the transmitter is controlled by either the internal oscillator or by customer's external clock connected to the SCTE lead. A 2400-cycle square wave may also be used.

3.08 The received line signal is presented through the data unit 4A1 to the TR-SW circuit, through the bandpass filter, through the AGC circuit where the signal splits to the time delay circuit, and the demodulator circuits.

3.09 The data set demodulates the signal to deliver serial data (RD) synchronous with positive transitions of SCR.

3.10 The AGC circuit has an input sensitivity of  $-39 \text{ dbm} \pm 1 \text{ db}$ . In the event the received signal is excessive, loss pads may be inserted (by option strapping) to reduce the sensitivity of the receiver to noise of speech interference.

3.11 Complete loss of data transmission may be experienced for a period up to six seconds and then restored without losing the sync of the data sets. This maximum dropout time depends on the transmitter and receiver clock frequency tolerances. Since the receiver clock tolerance is fixed at  $\pm 0.0005$  per cent, the transmitter clock frequency tolerance will determine the maximum dropout time. The maximum of six seconds for a transmitter clock tolerance of  $\pm 0.0005$  per cent decreases linearly to 0.57 seconds for a tolerance of  $\pm 0.01$  per cent.