

DATA SET 202S

TRANSMITTER-RECEIVER

INSTALLATION AND CONNECTIONS

| | CONTENTS | PAGE |
|----|--------------------------------|------|
| 1. | GENERAL | 1 |
| 2. | OPTIONS | 3 |
| 3. | INTERFACE DATA | 12 |
| 4. | CONNECTIONS | 16 |
| | SINGLE DATA SET | 16 |
| | MULTIPLE ARRANGEMENT | 16 |
| 5. | INSTALLATION TEST | 23 |
| 6. | REFERENCES | 24 |

1. GENERAL

1.01 This section contains the information needed to install and connect data set (DS) 202S. The data set should be installed in conformance with the general instructions given in Section 590-010-200. The information in this section covers installation of single data sets and multiple installations in individual housings, ie, DS 202S-L1/2, -L1/2/3, -L1A/2, -L1A/2/3A, -L1C/2, and -L1C/2/3B. Refer to Section 590-010-201 for a description of multiple data sets in a data mounting(s) and cabinet.

1.02 This section is reissued to show DS 202S-L1/2, -L1/2/3, -L1A/2, and -L1A/2/3A rated manufacture discontinued (MD). The replacing data sets are DS 202S-L1C/2 and -L1C/2/3B. The replacing data sets provide the following new options and features not provided on earlier DS 202S-type:

- Echo suppressor enable installer option—This option eliminates echo problems that may be encountered during startup over satellite

transmission circuits. *This option cannot be used with reverse channel installed.*

- Carrier controlled turnaround installer option—This option delays turnon of the clear-to-send circuit until the remote data set has entered the receive mode.
- Early data set ready indication installer option—With this option installed, the data-set-ready circuit turns on at the beginning of the answer tone sequence in the called data set.
- An adjustable output level of -4 to -12 dBm is provided. This can be altered to a fixed output level of -4 dBm whenever FCC registration requires this value to be met.
- A filter is provided to prevent “glitches” from causing a call disconnect during talk to data transfer.
- A filter is provided on the request-to-send circuit to eliminate contact bounce problems sometimes encountered when using the 914-type data test set.
- The transmit shaping filter is modified to improve performance when used with DS 202C-type.
- The filter on the D1 lead of the telephone interface is improved to prevent noise from causing the data set to enter the data mode.

The replacement transmitter-receiver is coded DS 202S-L1C and the reverse channel circuit pack (CP) (specified by list 3B) is coded JY3. The 47A-type data mounting (single set housing) remains the same.

NOTICE

Not for use or disclosure outside the
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Since this reissue constitutes a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 DS 202S operates on a type II DATAPHONE® line described in Section 314-205-501, over an ambient temperature range of 4 to 49° Celsius (40 to 120°F) with a relative humidity range of 20 to 95 percent at 21°C (70°F) or 20 to 40 percent at 49°C (120°F).

Note: These environmental conditions are valid only if no condensation occurs.

1.04 DS 202S should be located near the customer-provided equipment (CPE), since the customer-provided interface cord should not exceed 50 feet in length [to reduce stray capacitance and to conform to Electronic Industries Association (EIA) standards]. In order to minimize inductive interference with data signals, the telephone line should not be carried in the same cable run as cable between the data set and CPE or lines connected to teletypewriter services. If this condition cannot be met, it will be necessary to run the telephone line in type-SK (shielded) station wire from the building entrance. The shield should be grounded at one end only, preferably the distribution terminal end.

1.05 Low voltage alternating current is supplied to the data set by wall transformer KS-21239-L5 (-L1 and -L4 are MD) which is shipped loose. The customer must provide a standard 3-wire, grounded 105 to 129V at 57 to 63 Hz power receptacle that is accessible to the data set. The receptacle should not be under control of a switch. The power required per set is approximately 9 watts. Approximately 1.7 watts of this is dissipated in the wall transformer.

Caution: Remove and discard the protective covering from the data set housing. If not removed before operation, excessive heating of the data set will result.

1.06 A 25-pin KS-19087-L6 connector is provided at the rear of the data set for connection to the CPE. This connector is designed to connect to a customer-provided Cinch or Cannon DB-19604-432 plug equipped with a DB-51226-1 hood, or equivalent. The connection between DS 202S and the key telephone set is made with an M13F cord. A key

telephone set is required if manual calling and/or answer is needed.

1.07 The CPs comprising the basic DS 202S and reverse channel must be removed from the housing to be accessible.

Caution: Handle the CPs by the nonconductive surfaces only, otherwise certain circuit components may be damaged by static charges.

The CPs should be removed from the housing as follows:

- (1) Remove the front cover by gently squeezing it at the top, then push down and out of the housing.
- (2) If provided, remove the retaining screw under the left front side of the housing. This screw has been omitted from late production of -L1 sets and all -L1A and -L1C sets.
- (3) Remove the CPs from the housing by gently prying behind the faceplate with a screwdriver or similar tool. On later sets, a wire handle is provided which should be rotated outward and pulled to remove the set.

1.08 If the data set is equipped with the reverse channel CP, it must be removed to gain access to the option switches on -L1 and -L1A sets. Remove the four retaining screws and then exert steady upward pressure at the front and rear of the CP. To replace the CP, align the female connector on the bottom of the card with the contact posts on the data set, then press down on the CP until it makes good contact with the posts, and the front edge is resting on top of the faceplate. Insert and tighten the retaining screws.

1.09 To reassemble, proceed as follows:

- (1) Slide the data set into the housing, ensuring that the contacts at the rear of the CP are firmly seated in the connector at the rear of the housing.
- (2) If provided, align and tighten the retaining screw.

- (3) Hook the tabs on the bottom of the front cover into the detents in the bottom of the housing.
- (4) Gently press the top of the front cover into the housing until it snaps into place.

2. OPTIONS

2.01 *Disassemble the data set as required to verify that the options specified on the service order are installed in the data set prior to placing the set in service.*

2.02 An option label (orderable by specifying E-6573) is shipped affixed to the bottom of the housing.

2.03 The data set output level is controlled by the switch settings on switch S3 (DS 202S-L1 and -L1A) or S4 (DS 202S-L1C) (Fig. 1 through 4). The output level (transmit line signal level) must be set so that the level of the signal reaching the central office does not exceed -12 dBm. The output level is determined by the following formula: the data set output should be equal to the sum of the desired power level at the central office (-12 dBm) and the loop loss. For example, if the loop loss is 5 dB:

$$\begin{aligned} \text{Data set output} &= -12 \text{ dBm} + 5 \text{ dB} \\ &= -7 \text{ dBm.} \end{aligned}$$

Therefore, contacts 2, 5, 8, and 9 on option switch S3 of the -L1 or -L1A sets or contacts 1, 2, 4, 5, and 6 on option switch S4 of the -L1C sets should be closed if the data set *is* equipped with reverse

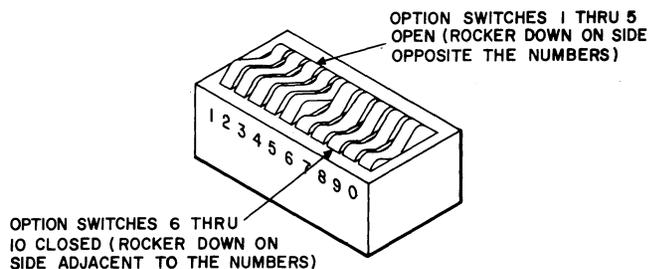


Fig. 1—Option Switch

channel, S3 contacts 5, 6, 7, and 9 of the -L1 or -L1A sets or S4 contacts 3, 4, 5, and 6 of the -L1C sets should be closed if it *is not* equipped with reverse channel. (See Tables A and B.)

2.04 In the event the actual loop loss is not known, it may be determined as follows:

- (1) Dial the central office milliwatt supply or request the local testboard to send a 1000-Hz tone at 0 dBm on the loop.
- (2) Use a transmission test set, such as the TTS-4, with a 900-ohm termination to measure the level of the incoming signal. The numerical reading is equal to the loop loss in dB (for example, -6 dBm on the meter is equal to 6 dB loop loss).

2.05 The other data set options are determined by the switch settings on S2 and S3. A description of the other options shown in Tables A and B follows. The recommended options for switched network service are given in Table C.

- **Reverse Channel:** This feature may be used to keep echo suppressors disabled, to provide a break feature, to provide circuit assurance, or as a feedback signal for error detection and retransmission systems. JY2 (MD) and JY3 provide this feature (specified by lists 3A and 3B, respectively), eg, DS 202S-L1C/2/3A or DS 202S-L1C/2/3B. The JY1 CP (MD) (specified by list 3) can be used in DS 202S-L1/2/3 *only*. JY2 shall be used on DS 202S-L1A and may be used on DS 202S-L1. JY3 shall be used only on DS 202S-L1C.

Note: The reverse channel CP must not be installed if option ZD is installed (reverse channel OUT).

- **Transmit Only** (202S-L1A and -L1C only): This option makes it possible to operate the data set as a transmit-only set. When this option is IN, the local copy on primary channel option may be installed in the OUT position to disable the receiver. With the transmitter enabled and the receiver disabled, the data set provides the same service as DS 202E-type [except 202E1 and -E10 (MD)].

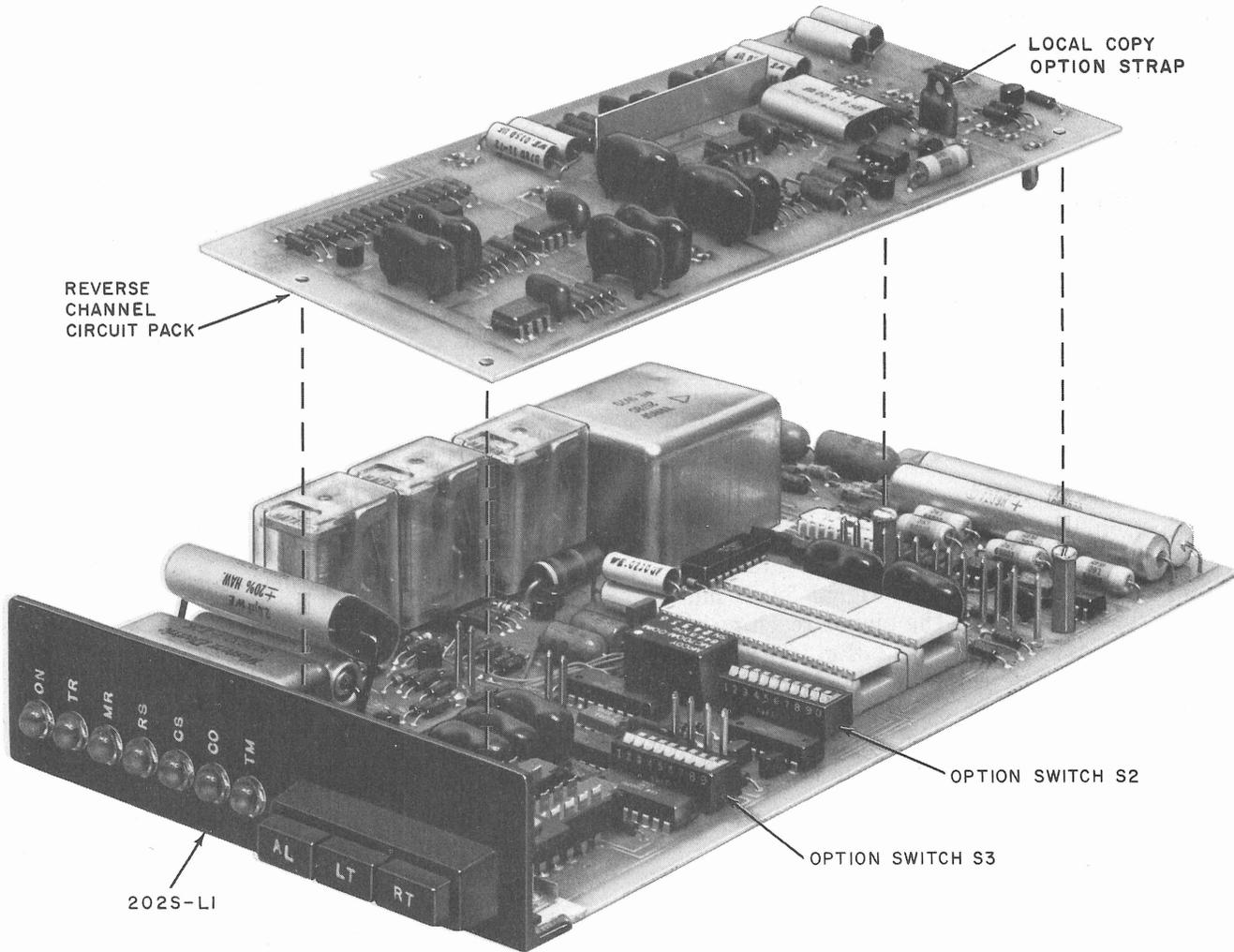


Fig. 2—Data Set 202S-L1/3 (-L1A/3A Is Similar)

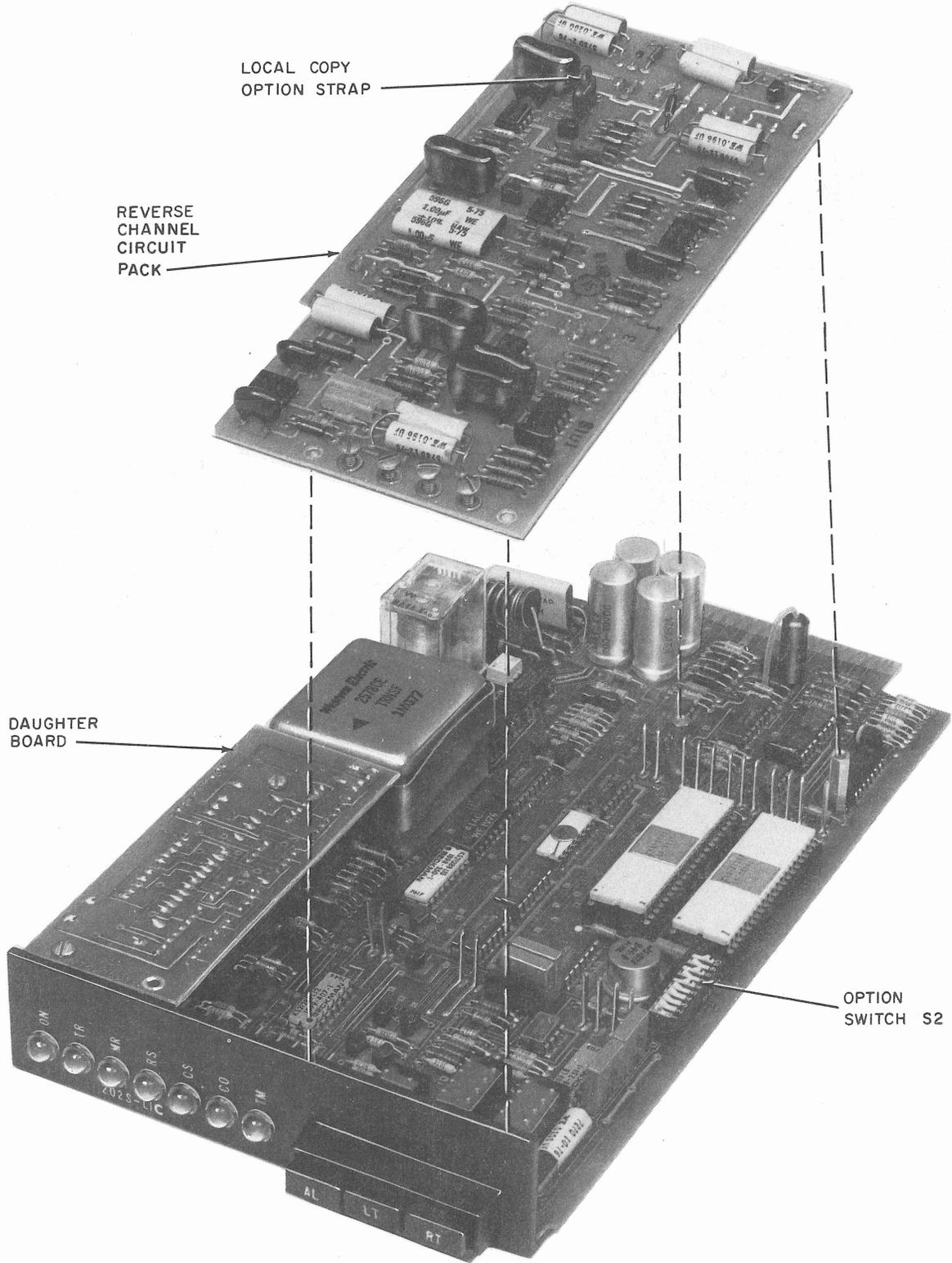


Fig. 3—Data Set 202S-L1C/3B

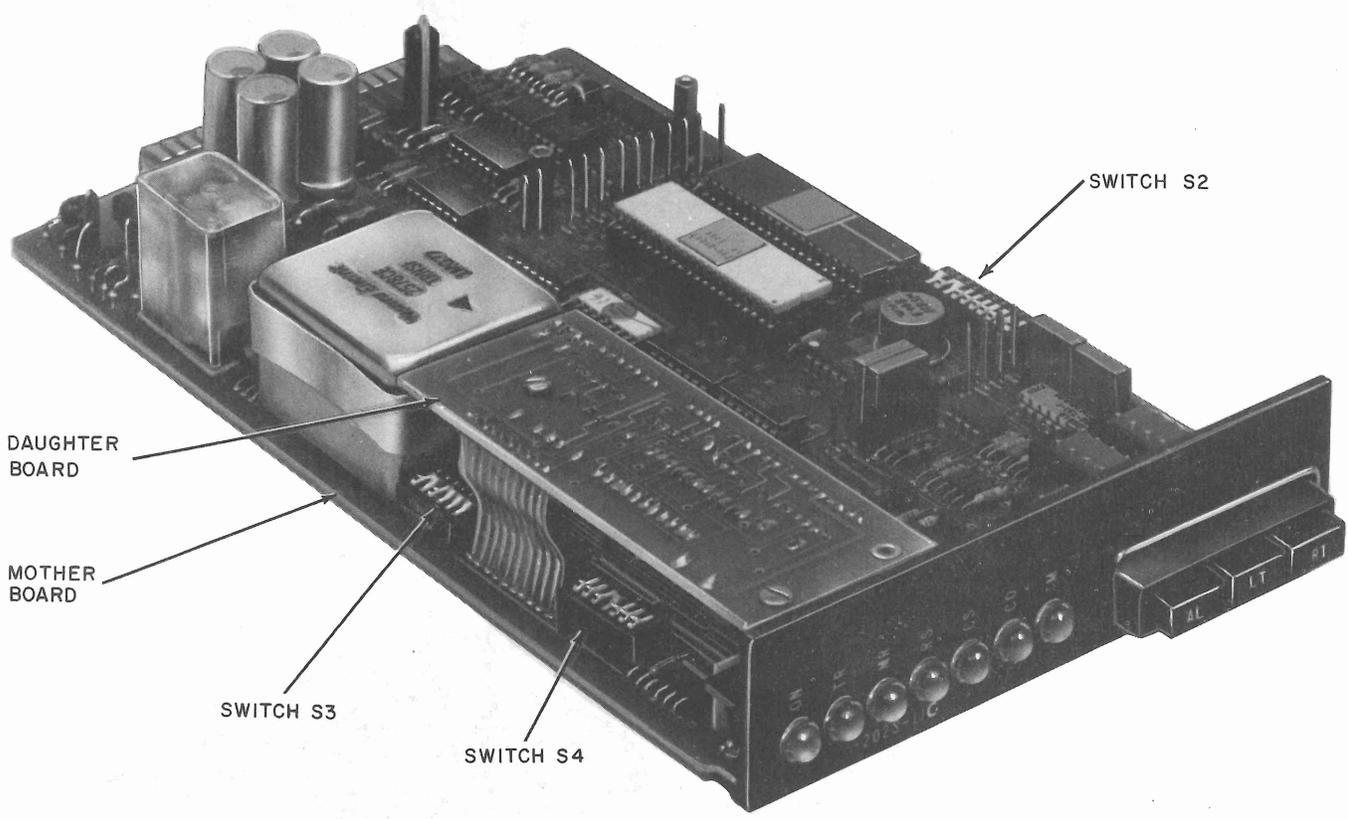


Fig. 4—Data Set 202S-L1C

TABLE A
INSTALLER OPTIONS FOR DS 2025-L1 AND -L1A

| OPTION | DESIG | WITHOUT REVERSE CHANNEL | WITH REVERSE CHANNEL | SWITCH SETTING | | | | | | | | | | PROVIDE |
|-------------------------------------|-----------------|-------------------------|----------------------|---|---|---|---|---|---|---|---|---|--------------------------|-------------|
| | | | | S3 SWITCH CONTACT SETTING ON TRANSMITTER-RECEIVER | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | |
| Transmit Line Signal Level | ZK | 0 | -1 | — | X | — | X | X | X | X | X | X | — | One Per Set |
| | ZL | -1 | -2 | — | X | — | 0 | X | X | X | X | X | — | |
| | ZM | -2 | -3 | — | X | — | X | 0 | X | X | X | X | — | |
| | ZN | -3 | -4 | — | X | — | X | X | 0 | X | X | X | — | |
| | ZO | -4 | -5 | — | X | — | X | X | X | 0 | X | X | — | |
| | ZP | -5 | -6 | — | X | — | X | 0 | X | 0 | X | X | — | |
| | ZQ | -6 | -7 | — | X | — | 0 | X | 0 | 0 | X | X | — | |
| | ZR | -7 | -8 | — | 0 | — | 0 | X | X | X | 0 | X | — | |
| | ZS | -8 | -9 | — | 0 | — | 0 | X | 0 | X | 0 | X | — | |
| | ZT ¹ | -9 | -10 | — | 0 | — | X | X | X | X | X | 0 | — | |
| | ZU | -10 | -11 | — | 0 | — | 0 | X | X | 0 | X | 0 | — | |
| | ZV | -11 | -12 | — | 0 | — | X | 0 | X | X | 0 | 0 | — | |
| ZW | -12 | -13 | — | 0 | — | 0 | 0 | 0 | 0 | 0 | 0 | — | | |
| Reverse Channel ³ | ZC ² | In | | 0 | — | 0 | — | — | — | — | — | — | — | One Per Set |
| | ZD ¹ | Out (Remove CP) | | X | — | X | — | — | — | — | — | — | — | |
| Transmit Only (-L1A Only) | YG | In | | — | — | — | — | — | — | — | — | X | One Per Set ⁴ | |
| | YH ¹ | Out | | — | — | — | — | — | — | — | — | — | | 0 |
| Soft Turnoff and Squelch Intervals | | SOFT TURNOFF | SQUELCH | S2 SWITCH CONTACT SETTING ON TRANSMITTER-RECEIVER | | | | | | | | | | One Per Set |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | |
| | Z | 0 | 0 | — | — | 0 | X | — | — | — | — | 0 | X | |
| | Y | 8 ms | 0 | — | — | 0 | X | — | — | — | — | 0 | 0 | |
| | X | 24 ms | 0 | — | — | 0 | X | — | — | — | — | X | 0 | |
| | W | 0 | 9 ms | — | — | 0 | 0 | — | — | — | — | 0 | X | |
| | V | 0 | 156 ms | — | — | X | 0 | — | — | — | — | 0 | X | |
| | T | 8 ms | 9 ms | — | — | 0 | 0 | — | — | — | — | 0 | 0 | |
| S | 8 ms | 156 ms | — | — | X | 0 | — | — | — | — | 0 | 0 | | |
| R ¹ | 24 ms | 156 ms | — | — | X | 0 | — | — | — | — | X | 0 | | |
| Fast Carrier Detection ⁵ | Q | In (7 ms) | | — | — | — | — | 0 | — | — | — | — | — | One Per Set |
| | N ¹ | Out (23 ms) | | — | — | — | — | X | — | — | — | — | — | |
| Clear-to-Send Interval | M | 8 ms | | — | — | — | — | — | 0 | 0 | — | — | — | One Per Set |
| | K | 30 ms | | — | — | — | — | — | 0 | X | — | — | — | |
| | J | 60 ms | | — | — | — | — | — | X | 0 | — | — | — | |
| | G ¹ | 180 ms | | — | — | — | — | — | X | X | — | — | — | |

TABLE A (Contd)

INSTALLER OPTIONS FOR DS 202S-L1 AND -L1A

| OPTION | | DESIG | | SWITCH SETTING | | | | | | | | | | PROVIDE |
|---|-----------------|---|-----|---|---|---|---|---|---|---|---|---|---|------------------------------------|
| | | | | S2 SWITCH CONTACT SETTING ON TRANSMITTER-RECEIVER | | | | | | | | | | |
| DESCRIPTION | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | |
| Automatic Answer | B ¹ | In | | — | — | — | — | — | — | — | X | — | — | One Per Set |
| | A | Out | | — | — | — | — | — | — | — | O | — | — | |
| Local Copy on Primary Channel ⁶ | 202S-L1 | ZA | In | X | — | — | — | — | — | — | — | — | — | One Per Set |
| | | ZB ¹ | Out | O | — | — | — | — | — | — | — | — | — | |
| | 202S-L1A | ZA | In | O | — | — | — | — | — | — | — | — | — | |
| | | ZB ¹ | Out | X | — | — | — | — | — | — | — | — | — | |
| Clamp (202S-L1 Only) | F ¹ | In | | — | O | — | — | — | — | — | — | — | — | Must be Provided |
| Condition of CC (DSR) During Analog Loop-back (202S-L1A Only) | YI | On | | — | X | — | — | — | — | — | — | — | — | One Per Set |
| | YJ ¹ | Off | | — | O | — | — | — | — | — | — | — | — | |
| Local Copy on Reverse Channel | | | | STRAPPING ON REVERSE CHANNEL | | | | | | | | | | One Per JY1 or JY3 CP ³ |
| | ZE | In | | Install E21-E22 | | | | | | | | | | |
| | ZF ¹ | Out | | Install E21-E23 | | | | | | | | | | |
| Grounding Option | | | | SCREW SWITCH SETTING ON INTERFACE CIRCUIT | | | | | | | | | | One Per 47A-Type Data Mounting |
| | ZG ¹ | Signal Ground Connected to Frame Ground | | Screw Switch S1 Closed | | | | | | | | | | |
| | ZH | Signal Ground Not Connected to Frame Ground | | Screw Switch S1 Open | | | | | | | | | | |

X Contact closed

— Contact not applicable

O Contact open

Note 1: Factory furnished.**Note 2:** Factory furnished instead of option ZD when reverse channel board is installed.**Note 3:** DS 202S-L1A operates with JY3 only.**Note 4:** The transmit-only out option (YH) must be selected.**Note 5:** Same as carrier acquisition timing in earlier model DS 202-type.**Note 6:** Note that IN or OUT status of option requires the opposite position for contact 1 of switch S2 between models L1 and L1A.

TABLE B
INSTALLER OPTIONS FOR DS 2025-L1C

| OPTION | | OUTPUT LEVEL | SWITCH SETTING | | | | | | | | | | | | | | PROVIDE |
|--|-----------------|--------------|---|---|---|---|---|---|-------------|----------------------|---|---|---|---|---|-------------|---------|
| | | | 54 SWITCH CONTACT SETTING ON TRANSMITTER-RECEIVER | | | | | | | | | | | | | | |
| | | | WITHOUT REVERSE CHANNEL | | | | | | | WITH REVERSE CHANNEL | | | | | | | |
| DESCRIPTION | DESIG | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Transmit Line Signal Level | ZO | -4 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | ZP | -5 | O | X | X | X | X | X | X | O | X | X | X | X | X | X | X |
| | ZQ | -6 | X | O | X | X | X | X | X | O | O | X | X | X | X | X | X |
| | ZR | -7 | O | O | X | X | X | X | O | X | X | O | X | X | X | O | O |
| | ZS | -8 | X | X | O | X | X | X | O | X | O | O | X | X | X | O | O |
| | ZT ¹ | -9 | X | O | O | X | X | X | O | X | O | X | O | X | X | O | O |
| | ZU | -10 | X | X | X | O | X | X | O | O | O | O | O | X | X | O | O |
| | ZV | -11 | O | O | X | O | X | X | O | O | O | O | O | O | X | O | O |
| | ZW | -12 | O | O | O | O | X | X | O | O | O | O | O | O | O | O | O |
| Soft Turnoff and Squelch Intervals | | SOFT TURNOFF | SQUELCH | 52 SWITCH CONTACT SETTING ON TRANSMITTER-RECEIVER | | | | | | | | | | | | One Per Set | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | | | | |
| | Z | 0 | 0 | — | O | O | — | — | — | — | X | — | X | | | | |
| | Y | 8 ms | 0 | — | O | O | — | — | — | — | O | — | X | | | | |
| | X | 24 ms | 0 | — | X | O | — | — | — | — | O | — | X | | | | |
| | W | 0 | 9 ms | — | O | O | — | — | — | — | X | — | O | | | | |
| | V | 0 | 156 ms | — | O | X | — | — | — | — | X | — | O | | | | |
| | T | 8 ms | 9 ms | — | O | O | — | — | — | — | O | — | O | | | | |
| S | 8 ms | 156 ms | — | O | X | — | — | — | — | O | — | O | | | | | |
| R ¹ | 24 ms | 156 ms | — | X | X | — | — | — | — | O | — | O | | | | | |
| Fast Carrier Detection | Q | In (7 ms) | — | — | — | — | — | — | — | O | — | — | — | — | — | — | — |
| | N ¹ | Out (23 ms) | — | — | — | — | — | — | — | X | — | — | — | — | — | — | — |
| Clear to Send Interval | M | 8 ms | — | — | — | O | O | — | — | — | — | — | — | — | — | — | — |
| | K | 30 ms | — | — | — | O | X | — | — | — | — | — | — | — | — | — | — |
| | J | 60 ms | — | — | — | X | O | — | — | — | — | — | — | — | — | — | — |
| | G ¹ | 180 ms | — | — | — | X | X | — | — | — | — | — | — | — | — | — | — |
| Automatic Answer | B ¹ | In | X | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | A | Out | O | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Local Copy on Primary Channel | ZA | In | — | — | — | — | — | — | — | O | — | — | — | — | — | — | — |
| | ZB ¹ | Out | — | — | — | — | — | — | — | X | — | — | — | — | — | — | — |
| Condition of CC (DSR) During Analog Loopback | YI | On | — | — | — | — | — | — | — | — | — | — | — | X | — | — | — |
| | YJ ¹ | Off | — | — | — | — | — | — | — | — | — | — | — | O | — | — | — |
| Reverse Channel | | | 53 SWITCH CONTACT SETTING ON TRANSMITTER-RECEIVER | | | | | | One Per Set | | | | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | | | | | | | | | |
| Reverse Channel | ZC ² | In | O | O | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | ZD ¹ | Out | X | X | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Transmit Only | YG | In | — | — | X | — | — | — | — | — | — | — | — | — | — | — | — |
| | YH ¹ | Out | — | — | O | — | — | — | — | — | — | — | — | — | — | — | — |
| Echo Suppressor Enable | YQ | In | — | — | — | O | — | — | — | — | — | — | — | — | — | — | — |
| | YR ¹ | Out | — | — | — | X | — | — | — | — | — | — | — | — | — | — | — |
| Carrier Controlled Turnaround | YS ¹ | In | — | — | — | — | — | — | — | O | — | — | — | — | — | — | — |
| | YT | Out | — | — | — | — | — | — | — | X | — | — | — | — | — | — | — |
| Early CC (DSR) Indication | YU | In | — | — | — | — | — | O | — | — | — | — | — | — | — | — | — |
| | YV ¹ | Out | — | — | — | — | — | X | — | — | — | — | — | — | — | — | — |

TABLE B (Contd)

INSTALLER OPTIONS FOR DS 202S-L1C

| OPTION | | | STRAPPING ON REVERSE CHANNEL | PROVIDE |
|-------------------------------|-----------------|---|---|------------------------------------|
| DESCRIPTION | DESIG | | | |
| Local Copy on Reverse Channel | ZE | In | Install E21-E22 | One Per JY1 or JY2 CP ³ |
| | ZF ¹ | Out | Install E21-E23 | |
| Grounding Option | | | SCREW SWITCH SETTING ON INTERFACE CIRCUIT | One Per 47A-Type Data Mounting |
| | ZG ¹ | Signal Ground Connected to Frame Ground | Screw Switch S1 Closed | |
| | ZH | Signal Ground Not Connected to Frame Ground | Screw Switch S1 Open | |

X Contact closed

— Contact not applicable

O Contact open

Note 1: Factory furnished.

Note 2: Factory furnished instead of option ZD when reverse channel board is installed.

Note 3: DS 202S-L1C operates with JY2 only.

TABLE C

RECOMMENDED CUSTOMER OPTIONS

| OPTION | 202S | 202C(MD), 202D*(MD), OR 202R(MD) |
|------------------------|--------------|----------------------------------|
| Squelch Interval | 156 ms | In |
| Clear-to-Send Interval | 180 ms | 200 ms |
| Fast Carrier Detection | Out (normal) | 40 ms |
| Soft Turnoff Interval | 24 ms | In |
| Clamp | In | In |
| Reverse Channel | Optional | Optional† |
| Automatic Calling Unit | Optional | Optional† |
| Automatic Answer | Optional | Optional† |
| Local Copy | Optional | Always Provided |

* 202D used with 804A

† Not available with DS 202R

Note: The contact closed position (option YG) will cause the data set to become transmit only. The data set will still pass the local and remote tests specified in Section 592-028-500.

• **Soft Turnoff and Squelch Intervals:**

These two options are implemented in pair via S2 switch contact settings.

(1) The soft turnoff signal is a 900-Hz tone which is transmitted after the request-to-send lead is turned **off** (at the end of a message). This signal prevents transients from causing spurious spacing signals at the distant station. The interval during which this signal is transmitted is optional for either 0, 8, or 24 ms. Use the 24-ms option for all standard switched network installations. The 0- and 8-ms options are provided for some customer-engineered systems where spurious spacing signals will not cause a problem.

(2) The squelch feature clamps the received line signal detection circuit, which also clamps the received data circuit, to prevent reception of spurious spacing signals due to echoes after the request-to-send lead is turned **off**. The data set may be optioned for a squelch interval of 0, 9, or 156 ms. Use the 156-ms interval for all standard switched network installations. The 0- and 9-ms options are provided for use under the same conditions as the 0- and 8-ms soft turnoff intervals.

• **Fast Carrier Detection:** With this option OUT, the received line signal detection

circuit turns **on** in approximately 23 ms and turns **off** in approximately 11 ms. With this option IN, the turnon and turnoff times are approximately 7 and 6 ms, respectively. Set this option for the OUT position for all standard switched network installations. The IN position is provided for use under the same conditions as the shorter soft turnoff and squelch intervals previously explained. This feature is the same as carrier acquisition timing and/or receive line signal detector timing in earlier model DS 202-types.

• **Clear-to-Send Interval:** This feature is provided to delay the turnaround time from reception to transmission of data until echo suppressors are turned around or until echoes have decayed to sufficiently low levels. The data set may be optioned for 8-, 30-, 60-, or 180-ms clear-to-send intervals. Use the 180-ms interval for all standard switched network installations. The shorter intervals are provided for use under the same conditions as the soft turnoff and squelch intervals.

• **Automatic Answer:** This feature permits the data set to detect and answer incoming calls automatically.

• **Local Copy on Primary Channel:** With this option IN, the receiver continuously monitors the transmitted line signal while in the data mode and provides a local copy on the received data circuit.

Note: The IN or OUT status of this option requires opposite switch setting for contact 1

between models -L1 and -L1A, and for contact 1 of -L1 and contact 6 of -L1C.

- **Clamp:** This feature clamps the received data circuit when the received line signal detector is *off*. It is intended to prevent noise from causing spurious signals on the received data circuit when the received line signal detector is *off*.

Note: The clamp function must always be IN for DS 202S-L1 (not to be considered an option). DS 202S-L1A and -L1C have this function permanently wired in.

- **Condition of CC (DSR) During Analog Loopback:** This option is available on DS 202S-L1A and -L1C only. With the ON setting, the data set ready circuit turns *on* during the analog loopback test mode when the data terminal ready circuit is turned *on*. This permits testing with the customer terminal. With the OFF setting, the data set ready circuit is clamped *off* during the analog loopback mode as it is with DS 202S-L1.
- **Local Copy on Reverse Channel:** With option IN, the local reverse channel receiver monitors the reverse channel transmitted signal. The option is installed (IN or OUT) via a strapping plug (Fig. 2 and 3) on the reverse channel CP.
- **Grounding Option:** Signal ground (AB) is normally connected to frame ground (AA) (factory-furnished) to minimize the introduction of longitudinal power line noise into the data circuits. Local procedures or conditions may require that signal ground *not* be connected to frame or protective ground. The grounding option is accomplished via a screw switch setting on the interface circuit located at the inside rear of the housing.



A long screwdriver (8-inch blade) is needed to operate the screw switch that controls the grounding option. If the appropriate screwdriver is not available, the backplane may be taken out of the housing by removing the two screws on the bottom of the housing.

- **Echo Suppressor Enable Option:** This option eliminates echo problems that may be encountered during startup over satellite transmission circuits. Available on DS 202S-L1C only. ***This option cannot be used with reverse channel installed.***
- **Carrier Controlled Turnaround:** This option delays turnon of the clear-to-send circuit until the remote data set has entered the receive mode. Available on DS 202S-L1C only, this option installed should benefit most systems.
- **Early Data Set Ready Indication:** With this option installed, the data-set-ready (DSR) circuit turns on at the beginning of the answer tone sequence in the called data set. Available on DS 202S-L1C only, this option installed causes DSR to operate as it does on DS 202C.

3. INTERFACE DATA

- 3.01 DS 202S provides the customer with the interface leads listed in Table D. These leads conform to EIA Standard RS-232-C.
- 3.02 The telephone interface leads are listed in Table E and described as they are used in DS 202S installations.
- 3.03 Figure 5 shows a simplified block diagram of the interface between the telephone set and the data set line control. This diagram provides information needed for modification/troubleshooting of single or multiple housing data set arrangements.
- 3.04 With DS 202S-L1, both calling and called data sets transmit answer tone except when a call is originated by an automatic calling unit (ACU). DS 202C *may* detect answer tone as a spacing signal when called by DS 202A-L1, which causes problems in some systems. The modification shown in Fig. 5 (move O-BK lead of HOLD key from terminal N or storage to screw terminal SG) disables answer tone when DS 202S-L1 is manually placed in the data mode. This modification should be made when DS 202S-L1 is used to originate calls manually and/or answer calls automatically. This modification should not be made if DS 202S-L1 is used to answer calls manually. DS 202S-L1A and -L1C provide answer tone when either is the

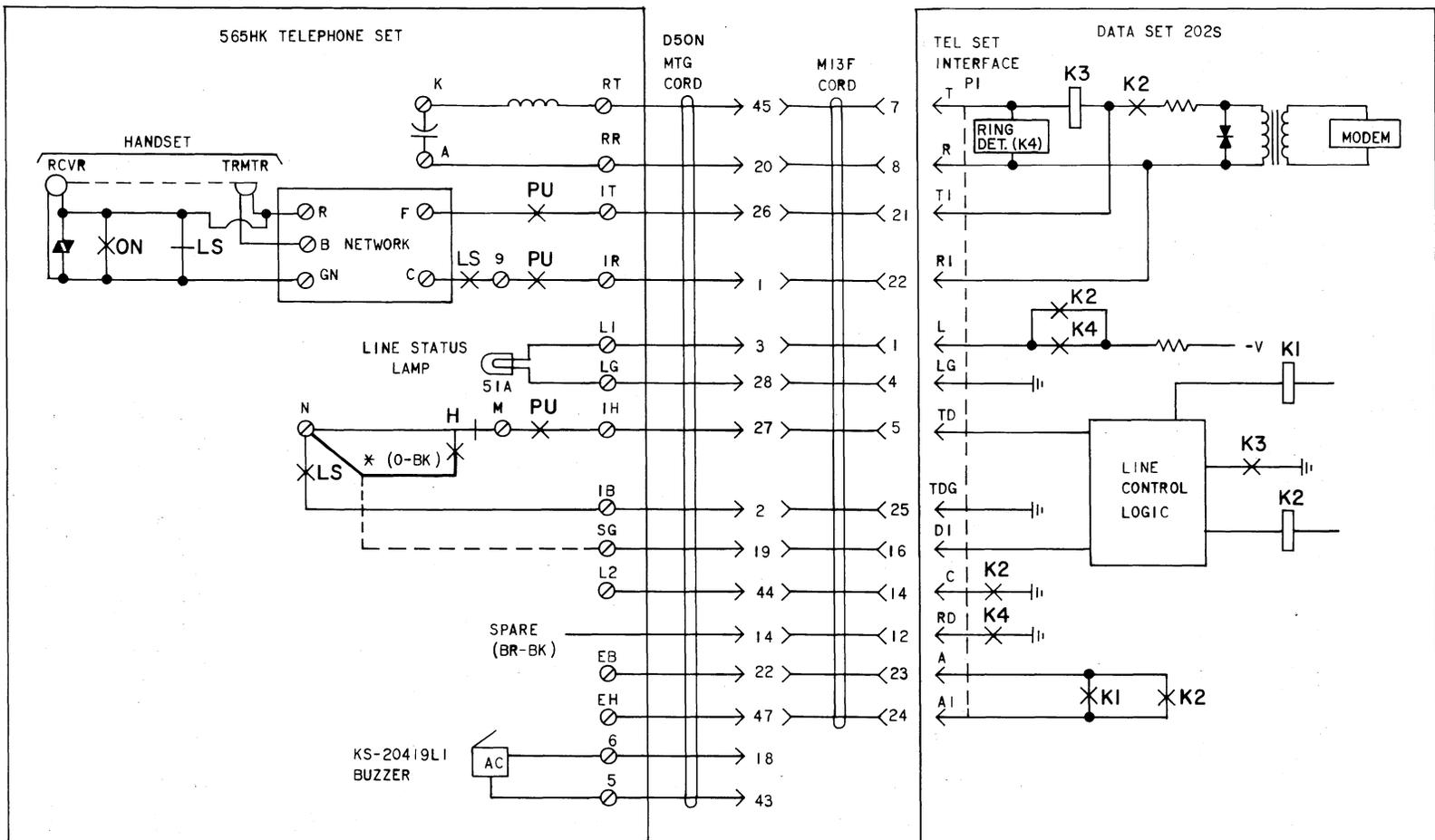
TABLE D

CUSTOMER INTERFACE

| LEAD NO. | FUNCTION | EIA DESIGNATION (RS-232-C) |
|----------|---|----------------------------|
| 1 | Protective Ground | AA |
| 2 | Transmitted Data | BA |
| 3 | Received Data | BB |
| 4 | Request-to-Send | CA |
| 5 | Clear-to-Send | CB |
| 6 | Data Set Ready | CC |
| 7 | Signal Ground | AB |
| 8 | Received Line Signal Detector | CF |
| 9 | Positive 14 Volts | — |
| 10 | Negative 14 Volts | — |
| 11 & 19 | Secondary Request-to-Send | SCA |
| 12 | Secondary Received Line Signal Detector | SCF |
| 20 | Data Terminal Ready | CD |
| 22 | Ring Indicator | CE |

TABLE E
TELEPHONE INTERFACE

| LEAD NO. | DESIGNATION | DESCRIPTION |
|----------|-------------|---|
| 1 | L | Telephone set line lamp control from data set |
| 4 | LG | Telephone set line lamp ground from data set |
| 5 | TD | Talk/data control from telephone set |
| 7 | T | Telephone line tip lead |
| 8 | R | Telephone line ring lead |
| 12 | RD | Common ringer control contact to ground |
| 14 | C | Data mode contact closure to ground from set to ACU |
| 16 | D1 | Data mode contact closure to ground from ACU to data set |
| 21 | T1 | Telephone set tip lead |
| 22 | R1 | Telephone set ring lead |
| 23 | A | A lead control: Used to provide an indication to ACU or KTU when the line is in use |
| 24 | A1 | |
| 25 | TDG | Talk/data control ground lead |



* IF 202S-L1 WILL BE CALLING A 202C AND WILL NEVER BE USED TO ANSWER CALLS MANUALLY, IT IS RECOMMENDED THAT THE O-BK LEAD OF THE HOLD KEY (EITHER TAPED & STORED OR CONNECTED TO TERMINAL N) BE CONNECTED TO EITHER OF THE TWO SG SCREW TERMINALS. THIS MODIFICATION PREVENTS THE 202S-L1 FROM SENDING ANSWER TONE WHEN IT IS MANUALLY PLACED IN THE DATA MODE.

Fig. 5—Interface Between Telephone Set and Data Set Line Control

called data set only, in the same manner as DS 202C.

MULTIPLE ARRANGEMENT

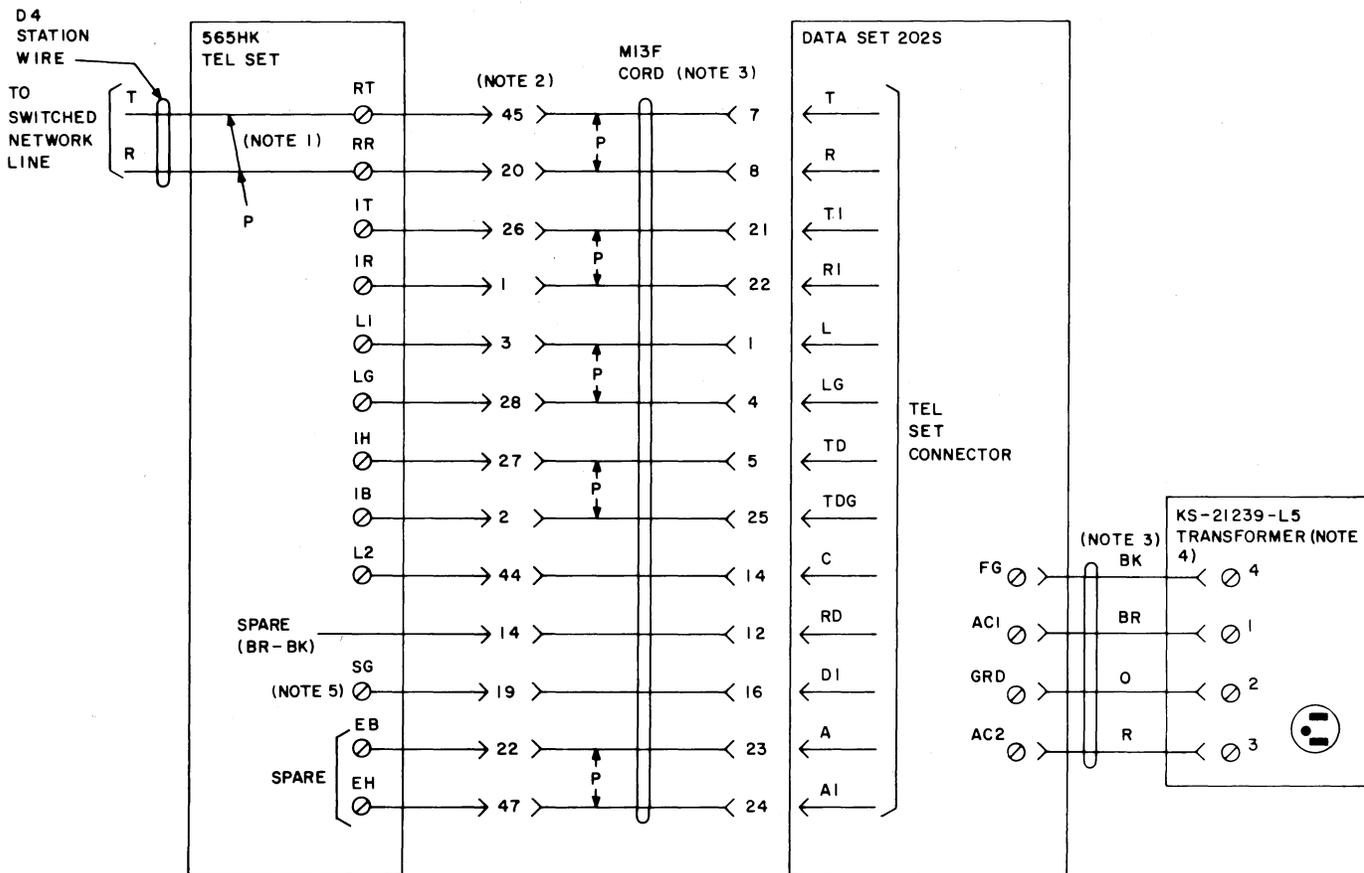
4. CONNECTIONS

SINGLE DATA SET

4.01 The information given in this part describes the single DS 202S, with and without an ACU.

4.02 The data set should be connected in accordance with Fig. 6 or 7, and 8.

4.03 The purpose of a multiple arrangement of individually housed DS 202S is to provide up to five data sets that may be controlled by a single 565HK telephone set. Since these sets are individually housed, this arrangement can utilize available space more efficiently than the same number of sets in a common cabinet. For information pertaining to multiple installations using a data mounting, refer to Section 590-010-201.



NOTES:

1. RT and RR ARE LOCATED ON THE TELEPHONE TERMINAL STRIP NEAR THE LAMP STRIP.
2. A B25A CORD MAY BE USED IF ADDITIONAL LENGTH IS REQUIRED (MAXIMUM OF 100 FEET).
3. THIS CORD IS SHIPPED WITH THE DATA SET HOUSING ASSEMBLY.
4. KS-21239-L1 AND -L4 TRANSFORMERS ARE MANUFACTURE DISCONTINUED.
5. SEE FIG. 5 FOR POSSIBLE MODIFICATION.

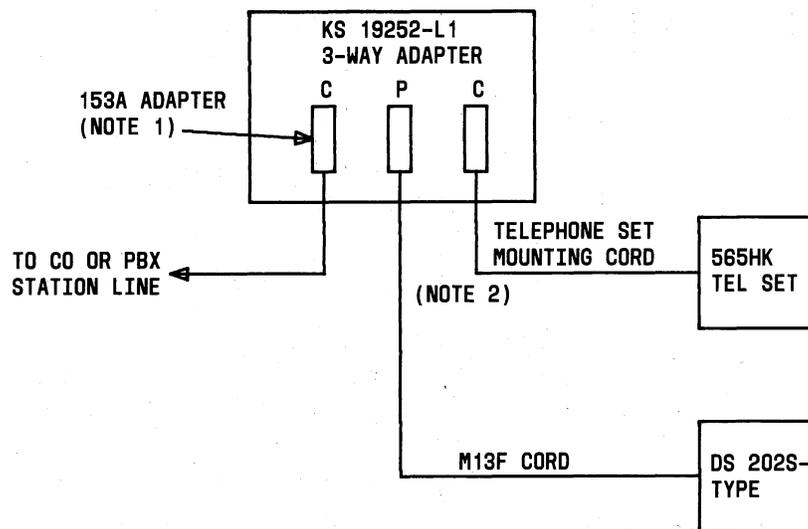
Fig. 6—Typical Data Set 202S Installation With 565HK Telephone Set

4.04 The KS-21253-L3 adapter makes it possible to assemble a multiple installation with a minimum of effort on the part of the installer, since most of the connections are made via 50-pin connectors.

4.05 Figure 9 shows a typical arrangement of five (maximum) data sets plugged into a KS-21253-L3 adapter, which interfaces them with the controlling 565HK telephone set and the

telephone lines. In addition, the adapter is equipped with a relay (Fig. 10) and the necessary wiring to provide a common ringing indication (a buzzer in the 565HK telephone set). The buzzer and relay are powered by low voltage alternating current supplied by the 2012C transformer shown connected to adapter terminals AC1 and AC2 in Fig. 9.

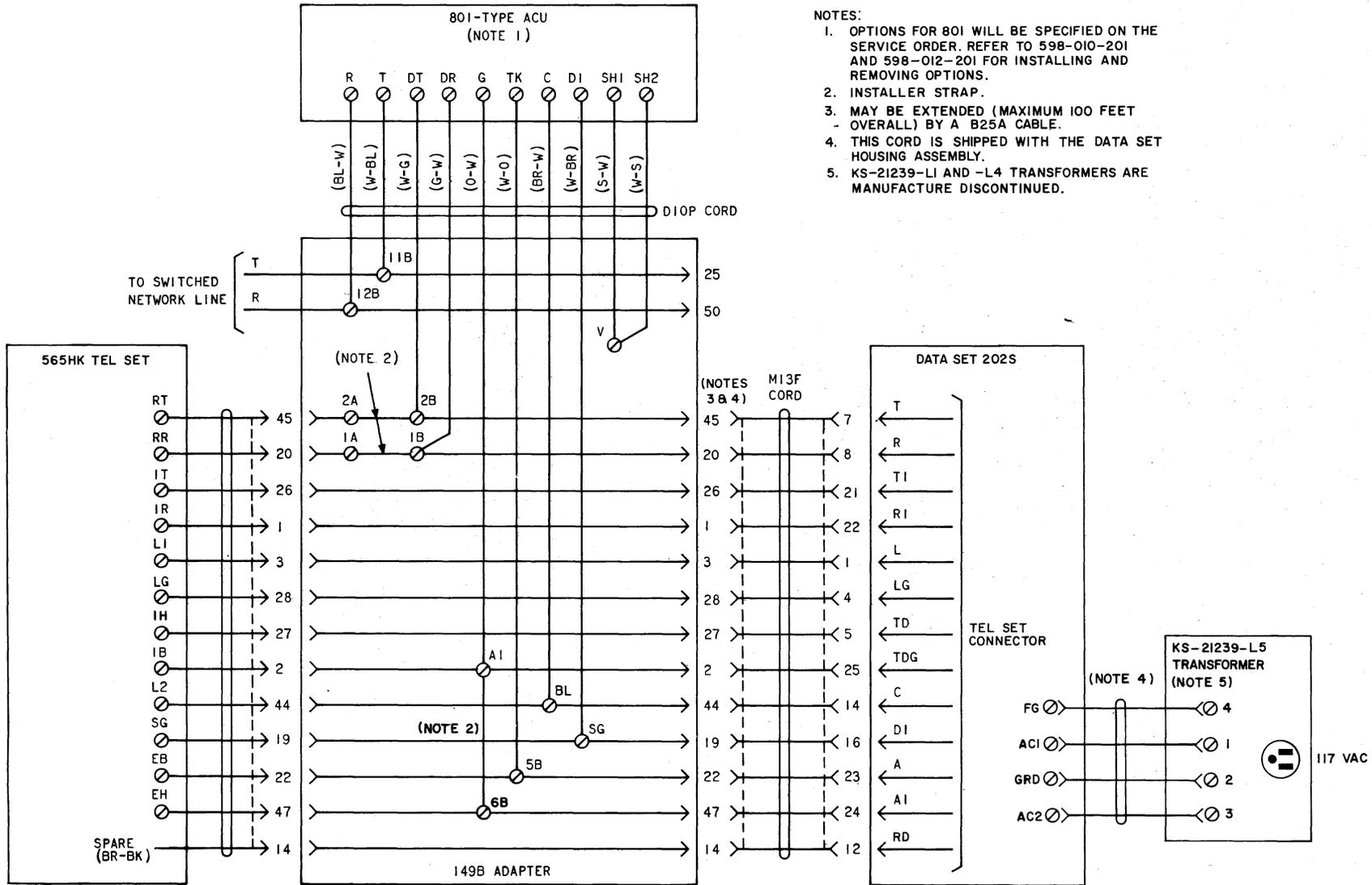
Note: The buzzer is shipped with the 565HK telephone set and the adapter is factory-wired to provide the common ringing indication.



NOTES:

1. CONNECT T AND R OF DDD LINE TO TERMINALS B AND R OF 153A ADAPTER.
2. DATA SET OR TELEPHONE SET CAN BE EXTENDED WITH B25A CABLE IF REQUIRED.

Fig. 7—Single Data Set 202S-Type With 565HK Telephone Set and Without ACU—Alternate Arrangement



- NOTES:
1. OPTIONS FOR 801 WILL BE SPECIFIED ON THE SERVICE ORDER. REFER TO 598-010-201 AND 598-012-201 FOR INSTALLING AND REMOVING OPTIONS.
 2. INSTALLER STRAP.
 3. MAY BE EXTENDED (MAXIMUM 100 FEET - OVERALL) BY A B25A CABLE.
 4. THIS CORD IS SHIPPED WITH THE DATA SET HOUSING ASSEMBLY.
 5. KS-21239-L1 AND -L4 TRANSFORMERS ARE MANUFACTURE DISCONTINUED.

Fig. 8—Typical Data Set 202S Installation With 801-Type ACU

4.06 To eliminate the need for several 117-Vac outlets, a multiple power outlet strip should be used into which the individual KS-21239-L1 (MD), -L4 (MD) or -L5 transformers can be plugged (Fig. 9). A 602-15 Waber Electric power outlet strip will accommodate three transformers. A 1A2 power panel will accommodate six transformers. A KS-14532-L20 or equivalent cord is required with the 1A2 power panel.

Caution: The KS-21239-type transformer mounts directly on the 117-volt 60-Hz outlet, using the primary connection blades. A possible safety hazard exists when securing the transformer to ac receptacles which are equipped with metal covers. If care is not exercised when securing the transformer, there is a possibility that the metal cover can slip and short the transformer blades if they are only partially inserted into the ac outlet. As soon as pending changes

in the present UL Standard covering specialty transformers are approved, the requirement to secure the transformer with the cover retaining screw will be omitted and the tab on the transformer removed. Until such time as the standard is changed, it is recommended that metal covers be taped in place while the retaining screw is removed or that the metal cover be replaced with a plastic cover.

4.07 The buzzer is used for the indication in order to avoid the need for a local ringing generator. If ringing is desired, the telephone set can be rewired to place the ringer across pins 18 and 43 (Fig. 11) of the telephone set connector, and the ringing current supply brought in to screw terminals BS1 and BS2 or through the telephone line connector on pins 25 and 50. In this case, the connections between terminals AC1 and BS1 and AC2 and BS2 must be removed.

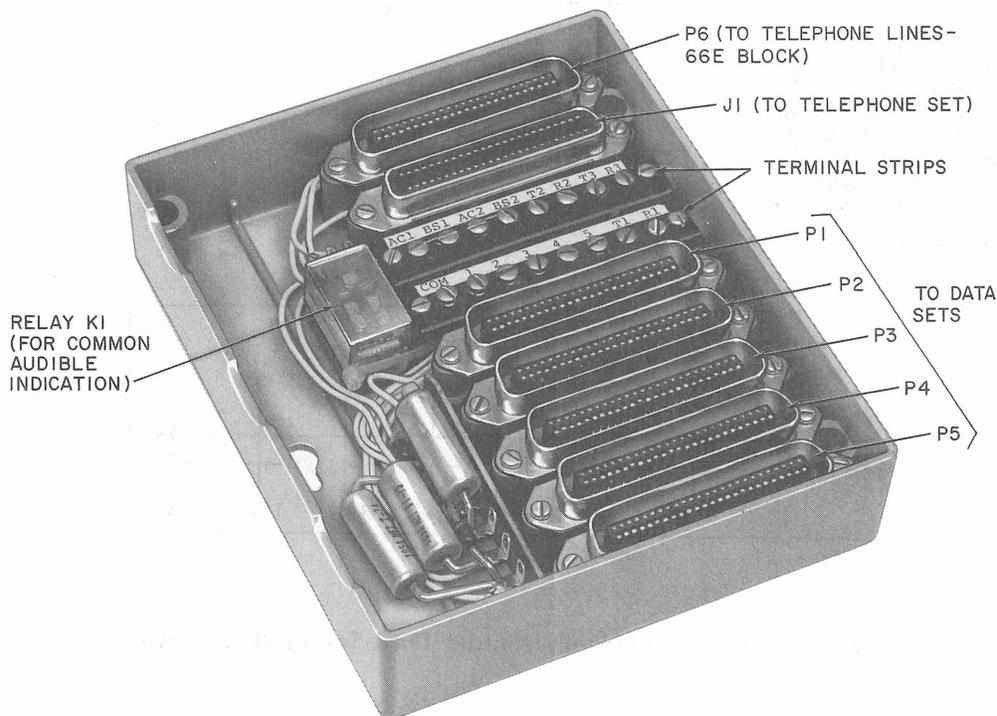


Fig. 10—KS-21253-L3 Adapter With Cover Removed

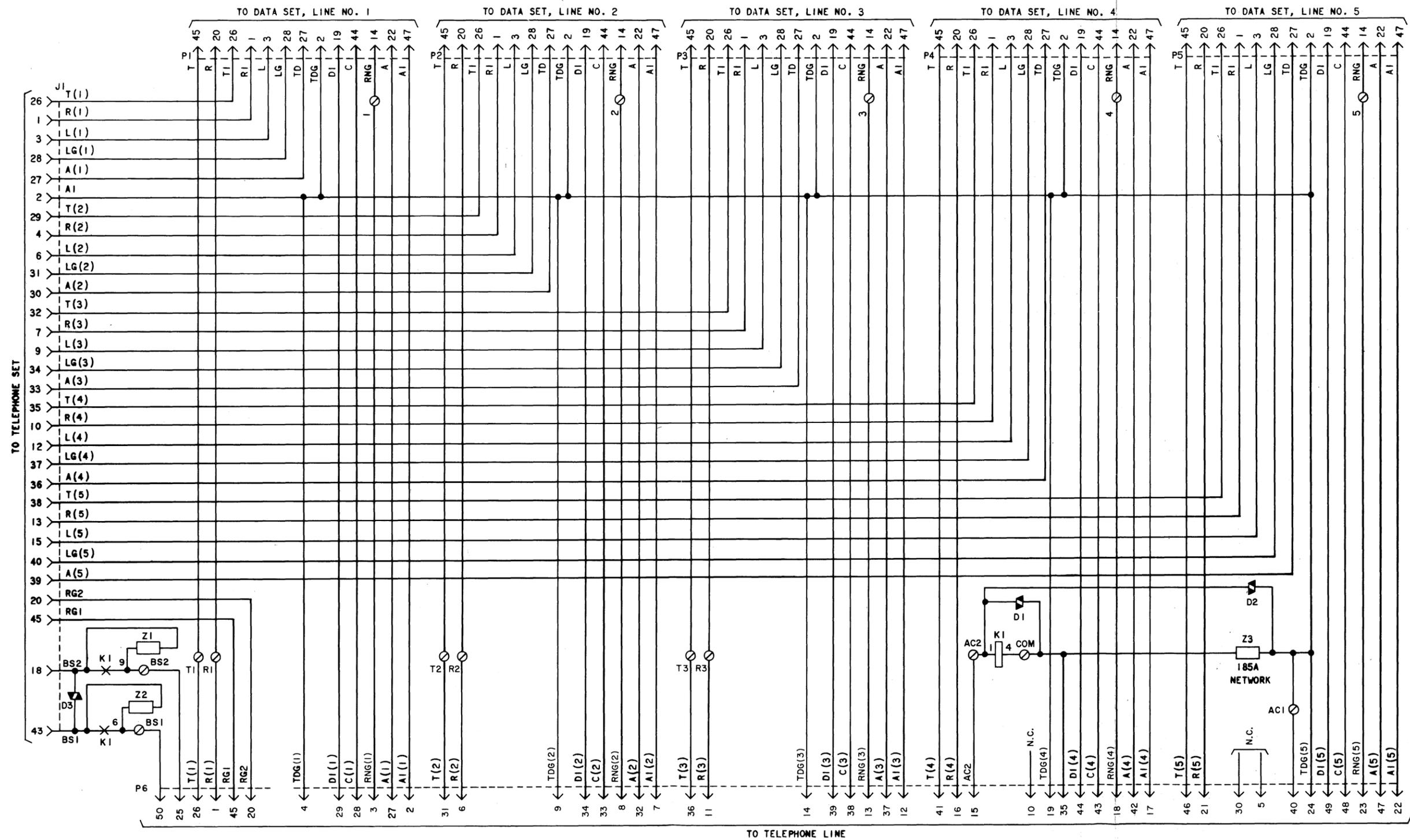


Fig. 11—Adapter for up to Five Data Sets Connected to One Key Telephone Set

Note: Low voltage alternating current is still required.

4.08 At installation of three or fewer data sets, tip and ring pairs may be connected directly to adapter screw terminals T1 and R1, T2 and R2, and T3 and R3, respectively, for the first three data sets. This arrangement eliminates the need for the B25A cable and the 66E-type connecting block.

Note: Low voltage alternating current must be connected to adapter terminals AC1 and AC2.

4.09 Multiple Installations Using 801-Type Automatic Calling Unit (ACU):

Connections for an ACU can be made on the line side of the KS-21253-L3 adapter by using an A25B cable (or equivalent) and a 44A-type connecting block (Fig. 12).

4.10 The ACU can be connected on the data set side of the KS-21253-L3 adapter by using a 149B adapter to make the connections for the ACU and data set (Fig. 8) and a B25A cable to connect the KS-21253-L3 adapter to the 149B adapter.



The B25A cable is connected between the data set plug on the KS-21253-L3 adapter and the telephone set connector on the 149B adapter.

5. INSTALLATION TEST

5.01 After installation is completed, the data set should be tested to determine if it is operating properly in accordance with Section 592-028-500.

5.02 Ensure that a copy of Data Set 202S—How to Operate Manual is readily available to the customer.

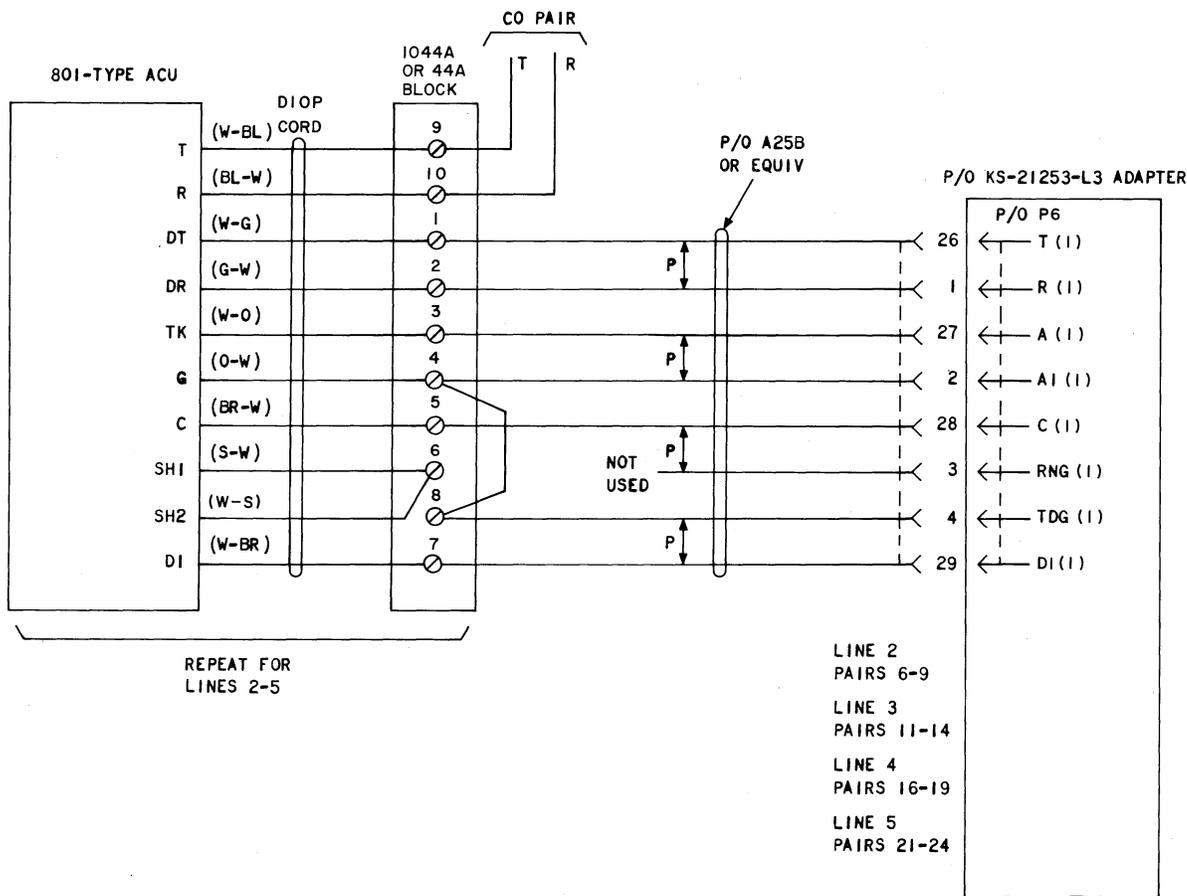


Fig. 12—ACU Wiring Using P6 for ACU Access

SECTION 592-028-200

6. REFERENCES

6.01 The following BSPs provide additional information:

| SECTION | TITLE | SECTION | TITLE |
|----------------|---|----------------|--|
| | | 590-010-200 | Data Sets and Data Access Arrangements—General Installation and Connection Information |
| 314-205-501 | Data Systems—DATAPHONE® Service—Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines | 590-010-201 | Data Sets—Multiple Installation Information |
| | | 999-100-141 | Data Station 202S—How to Operate Manual |