

DATA AUXILIARY SET 829-TYPE
SUPPLEMENTARY FUNCTIONS FOR VOICEBAND PRIVATE LINE CHANNELS
(ALTERNATE VOICE AND DIAL BACKUP)

DESCRIPTION

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B. Voice Transmission	13	1.01 This section provides the description and operation information for the supplementary functions of the data units and mountings that are used in conjunction with data auxiliary set (DAS) 829-type. Descriptive information on the DAS 829-type is given in Section 598-082-100. The supplementary functions are alternate voice and dial backup and are furnished by the 48A1 data unit and 48B1 data unit, respectively. These data units are provided for by using the 45A1 and 46B1 data mountings.	
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1.02 Three types of station arrangements using the supplementary data units can be provided as follows:

- (a) Full data-alternate voice (FDA).
- (b) Full data-dial backup.
- (c) Full data with alternate voice and dial backup.

1.03 The telco-provided FDA arrangement is furnished with 2600-Hz manual ringdown for signaling purposes. A 4-wire backup channel interface unit, the 48B1 data unit provides the transmission functions (level adjustment and optional amplitude slope equalization) required to derive a backup channel over the switched telecommunications network and provides the switching of the modem from the private line (PL) to the backup channel.

Note: As in the case of the present DAS 828C, the new dial backup arrangements are intended for use with telephone company (telco) provided data sets only. In the case of a customer-provided modem, the customer is required to access the switched network through data access arrangements (DAAs) and should assume responsibility for providing the switching arrangements to transfer the modem from the PL to the switched network as well as any level adjustments that may be required.

FUNCTIONS PROVIDED

1.04 The 48A1 data unit provides the following functions:

- (a) A telco-provided alternate voice service over the 4-wire PL through the interface of a DAS 829-type.
- (b) A 4-wire to 2-wire conversion to interface with 2-wire key telephone sets.
- (c) 2600-Hz manual ringdown signaling.
- (d) Control of station equipment through the use of a key telephone set.
- (e) 2600-Hz ring detection and lamp indication.
- (f) Locked-in ring detection.

- (g) Ringback indication.
- (h) Control of a "not-in-data" signal to the modem.

1.05 The 48B1 data unit provides the following functions:

- (a) Dial backup service for telco-provided modems interfacing with data auxiliary set 829-type.
- (b) Termination for a 4-wire backup channel derived over switched telecommunications network.
- (c) Transfer of modem interface to either a 4-wire PL or 4-wire backup transmission channel through use of a key telephone set.
- (d) Gain on receive backup pair to control level of received signal.
- (e) Optional 4-dB slope equalizer on receive backup pair.
- (f) Attenuation on transmit backup pair to control level of transmitted signal.
- (g) Control of "not-in-data" signal to modem.
- (h) Control of "dial backup" signal to modem.
- (i) Lamp indication in backup mode.
- (j) Ring detection and lamp indication on each 2-wire line.
- (k) Line surge protection.
- (l) Impedance matching (600-ohm modem to 900-ohm line).

1.06 When supplementary functions are provided along with DAS 829-type, they are connected on the modem side of the channel interface. A few of the advantages of using these standard station arrangements are as follows:

- Channel interface remains well defined.
- Flexibility is provided for adding other services.

- Easier installation and connection of Bell System data sets which are designed to these standard interface arrangements.

2. PHYSICAL DESCRIPTION

A. Data Mountings

2.01 The supplementary functions of alternate voice and dial backup, used in station arrangements, are physically provided by using the 45A1 and 46B1 data mountings.

45A1 Data Mounting

2.02 The 45A1 data mounting, shown in Fig. 1, provides for housing a single DAS 829-type or one of the following combinations:

- A DAS 829-type and one 48A1 data unit (alternate voice).
- A DAS 829-type and one 48B1 data unit (dial backup).
- A DAS 829-type plus a 48A1 and a 48B1 data unit (alternate voice and dial backup).

A view showing these circuit pack arrangements is shown in Fig. 2, 3, and 4, respectively.

Note: The 48A1 data unit must be inserted first and removed last in the 45A1 data mounting due to the physical arrangement of circuit components on the data unit.

2.03 The 45A1 data mounting comprises a housing, a 24 Vac wall-mounted transformer (KS-21362-L1), and a 6-foot power cord. The data mounting housing may be used as a free standing unit or it may be wall-mounted using a 193A backboard. The 193A backboard is not provided with the 45A1 data mounting and must be ordered separately.

2.04 The backplane of the data mounting is shown in Fig. 5. This backplane contains a screw terminal strip that is used for connecting to the 4-wire metallic facilities, two 2-wire switched network facilities, a 24 Vac transformer, and a manual loop-back key. The modem is connected to the 45A1 data mounting through a 50-pin plug, P1. The 6-button key telephone set (a 565HK or a 2565HK) is connected to the 45A1 data mounting through a 50-pin jack, J4. The 6-button key telephone set is not supplied with the 45A1 data mounting and must be ordered separately.

2.05 The dimensions of the 45A1 data mounting housing are 2-11/16 inches high, 10-1/2 inches wide, and 12-1/4 inches deep. The unit weighs

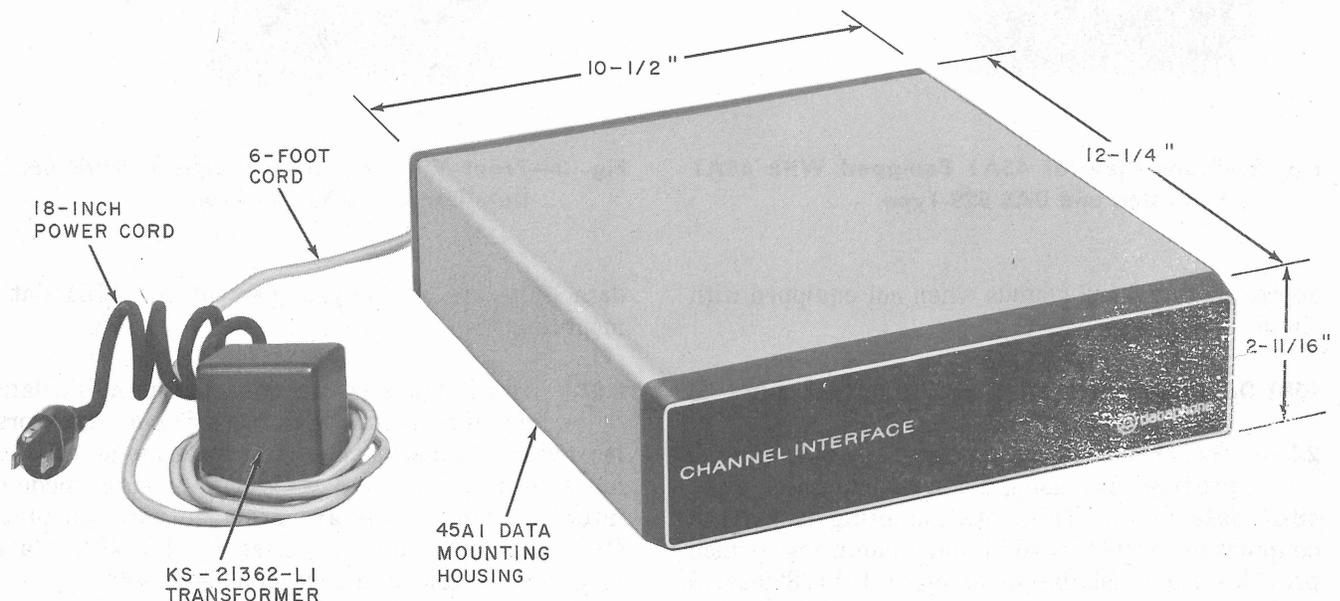


Fig. 1—Front View of 45A1 Data Mounting

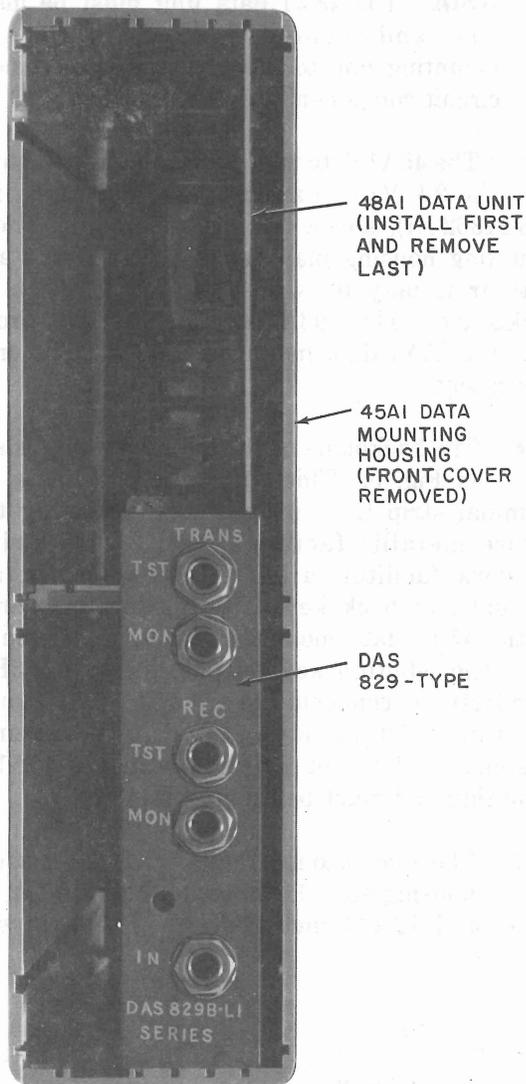


Fig. 2—Front View of 45A1 Equipped With 48A1 Data Unit and DAS 829-Type

approximately 5-1/2 pounds when not equipped with circuit cards.

46B1 Data Mounting

2.06 The 46B1 data mounting, shown in Fig. 6, provides a housing for a maximum of eight 48A1 data units. This data mounting is used in conjunction with the 46A1 data mounting (which provides for a maximum of eight DAS 829-type) and a 10-button key telephone set. The 24 Vac transformer, the bridge rectifier power supply, and the protective fusing required for the 48A1

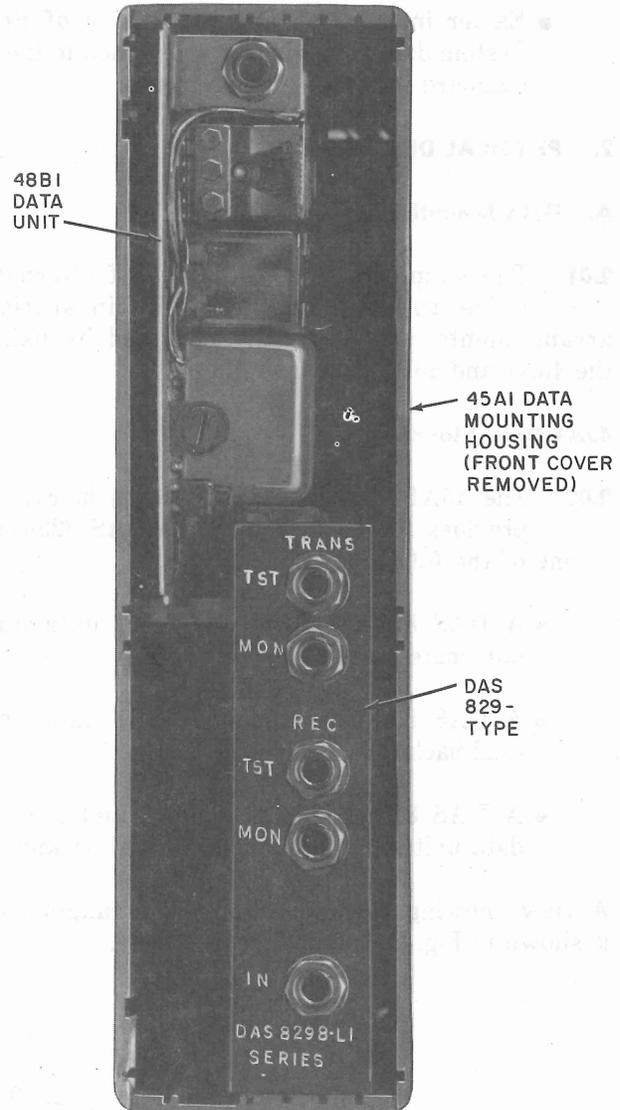


Fig. 3—Front View of 45A1 Equipped With 48B1 Data Unit and DAS 829-Type

data units are an integral part of the 46B1 data mounting.

2.07 All interface connections to the 46B1 data mounting are made through 50-pin connectors located on the backplane of the data mounting and are shown in Fig. 7. A maximum of eight modem interface connections are provided through plug P1 and are the same as those for the 46A1 data mounting described in Section 598-082-100.

2.08 Connection to either an 830-type (Rotary Dial) or 2830-type (Touch-Tone® Dial) 10-button

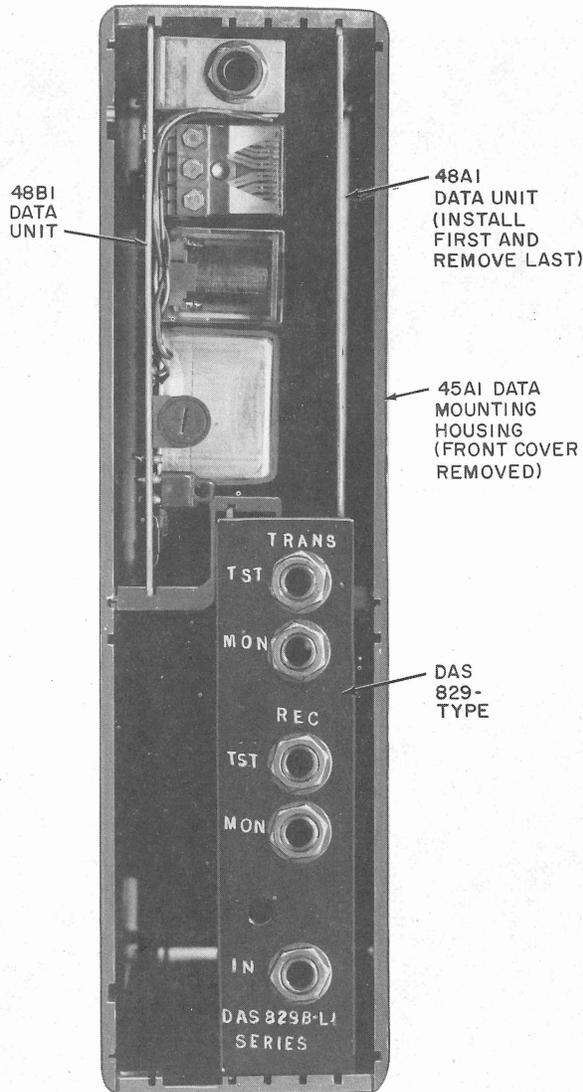


Fig. 4—Front View of 45A1 Equipped With DAS 829-Type, a 48A1 Data Unit, and a 48B1 Data Unit

key telephone set, as shown in Fig. 8, is made at connector jack J10 shown in Fig. 7. The 10-button key telephone set is not supplied with the 46B1 data mounting and must be ordered separately.

2.09 When the customer requires alternate voice service for more than eight 4-wire PLs, the key telephone leads of J10 may be terminated in a locally engineered key control panel as described in Part 3H of this section.

2.10 The 50-pin connector jack (J10) will also connect with the 48D1 data unit. This data unit is now under development and provides a means of interconnecting the telephone control leads for a maximum of three 46B1 data mountings to either an 18- or 30-button key telephone set. The ringing supply for the proposed 48D1 data unit requires that an installer option be provided on the 46B1 data mounting. When used with the proposed 48D1 data unit or when it is used in a locally engineered key system, the installer option on the backplane of the 46B1 must be in the "EXT" position. When the 46B1 data mounting is used with the 830- or 2830-type key telephone set, the installer option must be in the "INT" position.

Note: The designation "EXT" indicates a ring supply external to the 46B1 data mounting while the designation "INT" indicates the ring supply is internal.

2.11 The 46B1 data mounting is approximately 7 inches high, 19 inches wide, and 13-1/4 inches deep. The mounting weighs approximately 20 pounds.

2.12 The 46B1 data mounting can be mounted on 19- or 23-inch relay racks. Mounting in KS-20018-type cabinets is recommended. Descriptive information on the KS-20018-type cabinets is given in Section 590-010-201.

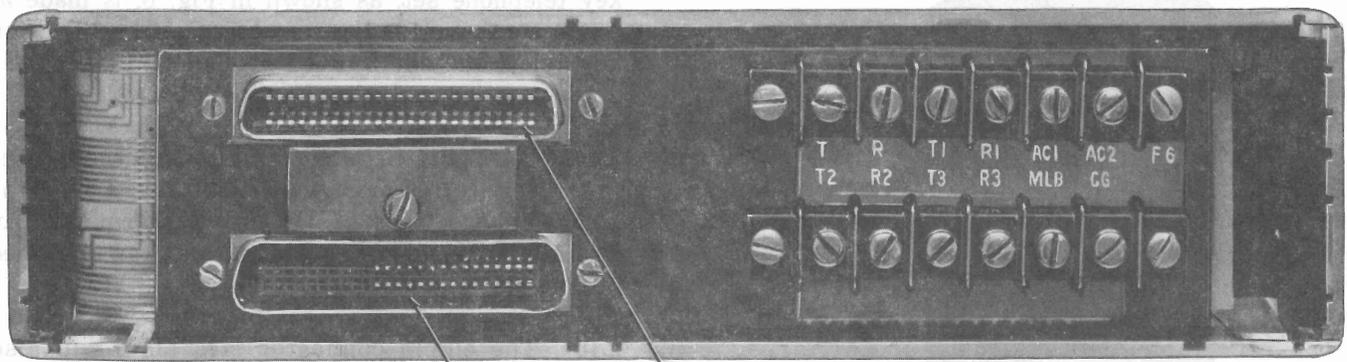


Fig. 5—Rear View of 45A1 Data Mounting

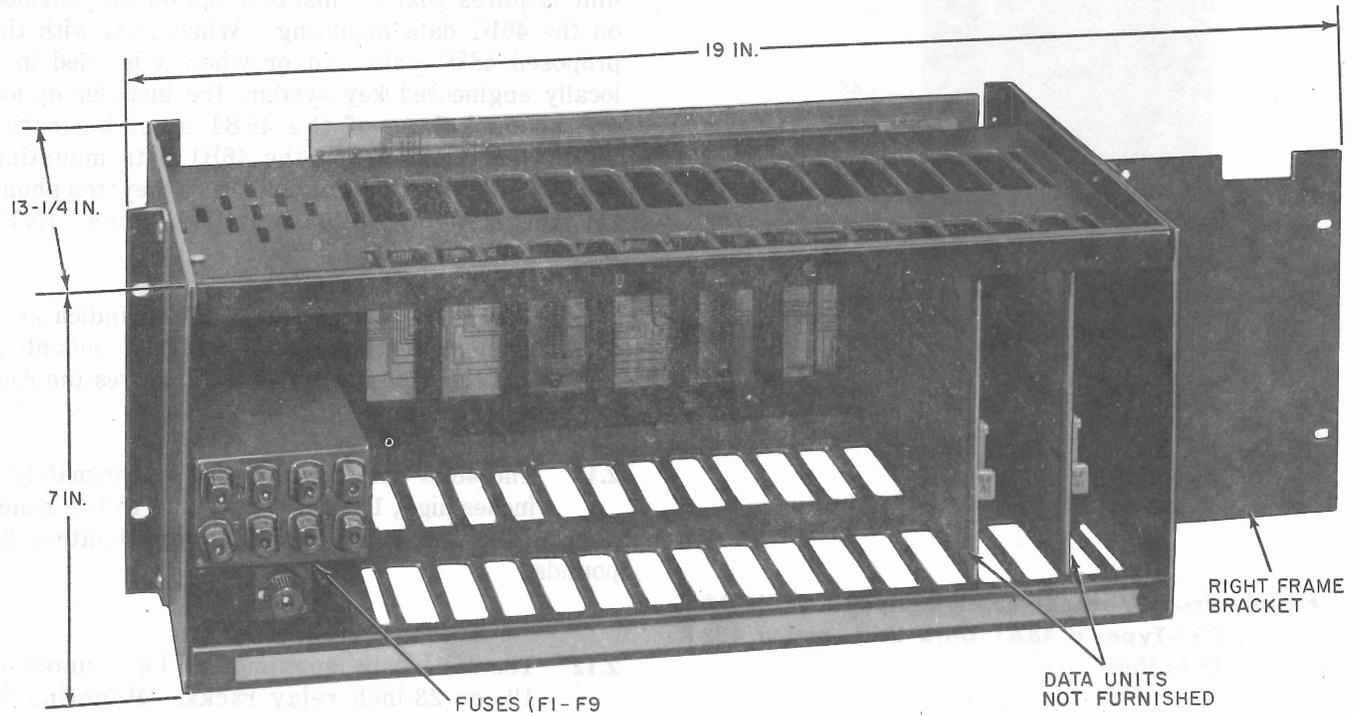


Fig. 6—Front View of 46B1 Data Mounting

B. Data Units

48A1 Data Unit

2.13 The 48A1 and 48B1 data units are plug-in circuit packs. All required connections for the data units are provided using prewired data mountings or through the interconnections, on a plug-in basis, of data mountings.

2.14 The 48A1 data unit, shown in Fig. 9, comprises component apparatus mounted on a printed wiring board (PWB) and provides the circuitry required for alternate voice service on the 4-wire PL channel.

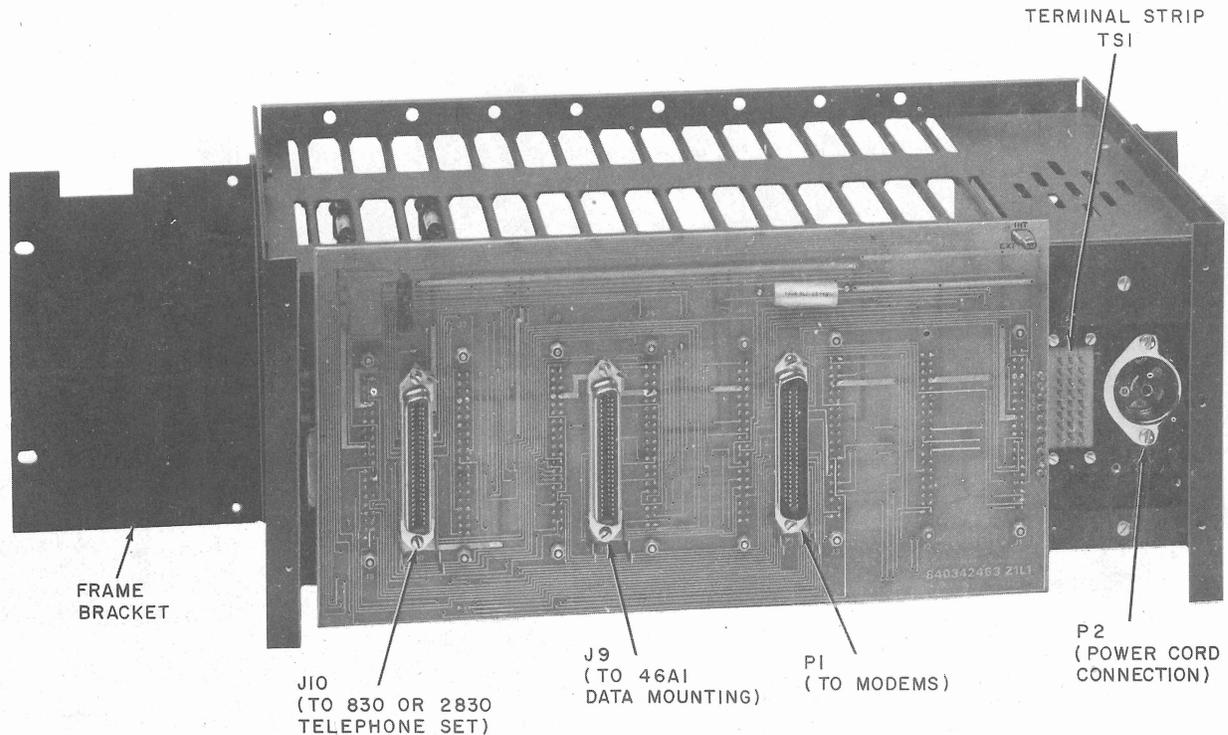


Fig. 7—Rear View of 46B1 Data Mounting

2.15 Alternate voice service is provided when the 48A1 data unit is installed in either the 45A1 or 46B1 data mounting and used in conjunction with their associated telephone set.

Note: The alternate voice arrangement provided by the 48A1 data unit is not compatible with alternate voice arrangements of either the DAS 828A-type or locally engineered systems requiring 20-Hz ringdown signaling unless signal conversion equipment is provided. The 48A1 data unit uses an inband signal of 2600 Hz for ringdown signaling.

2.16 In the data mode, the 48A1 data unit provides a through connection for the standard 6-lead interface connecting the modem to the DAS 829-type.

2.17 If the 48A1 data unit is not installed in either the 45A1 or the 46B1 data mounting, the connectors for the 48A1 data unit in the mountings provide a through connection for the interface leads between the modem and DAS 829-type.

2.18 The 48A1 data unit is approximately 1-1/4 inches high, 5-1/2 inches wide, and 9-11/16

inches deep. The data unit weighs approximately 1-1/4 pounds.

2.19 The 48A1 data unit is designed to operate within the temperature range of 40 to 120° F and the relative humidity range of 20 to 95 percent.

48B1 Data Unit

2.20 The 48B1 data unit, shown in Fig. 10, comprises component apparatus mounted on a PWB and provides the circuitry required for dial backup service to the DAS 829-type over the switched telecommunications network.

2.21 An installer plug option provides for 4 dB of slope equalization on the receive pair when specified on the service order (SO) or circuit layout record (CLR). In addition, a gain circuit adjustable from -6 to +14 dB is provided in the receive pair. Jack J1 (REC TEST) is mounted on the front of the data unit and provides test access for measuring the receive signal level in the receive pair.

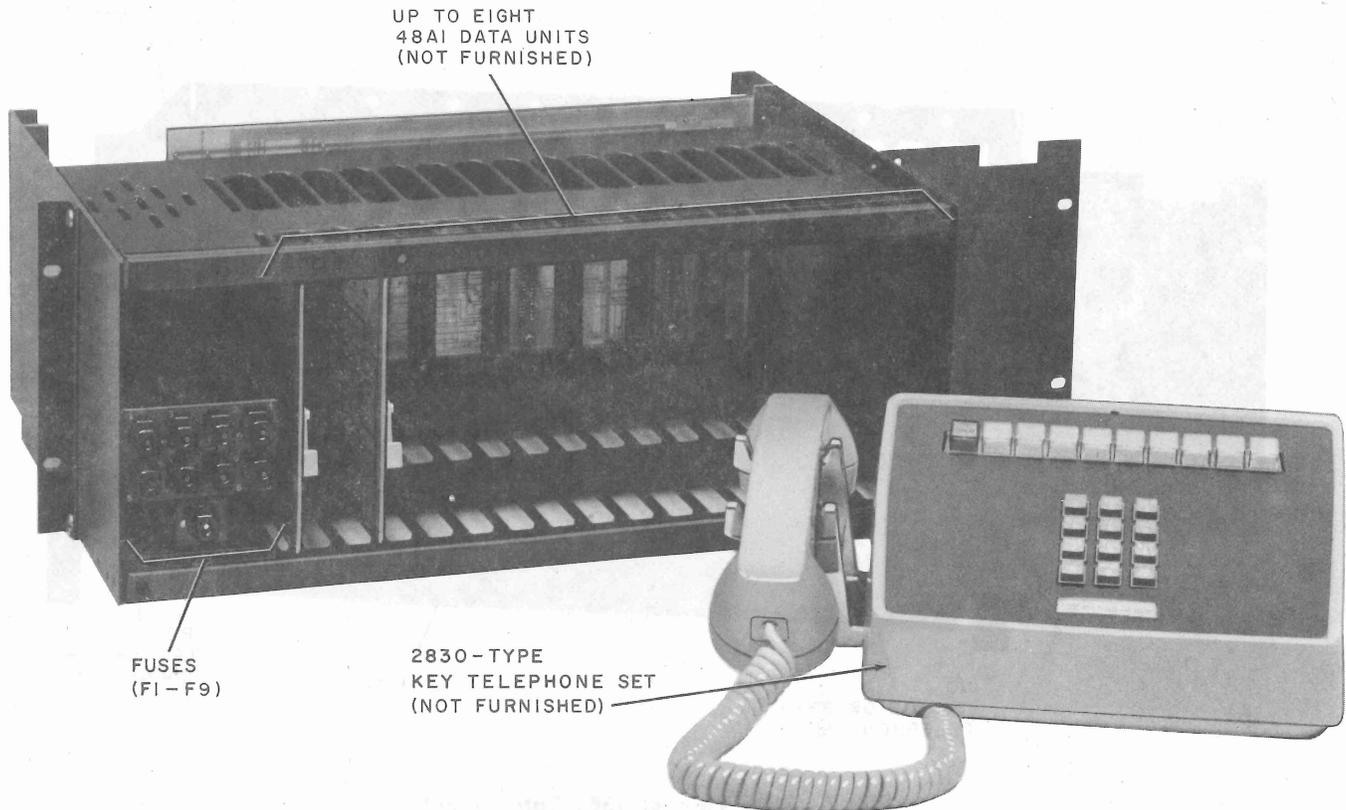


Fig. 8—Front View of 46B1 Data Mounting and 10-Button Key Telephone

2.22 A 0- to 15-dB attenuator, adjustable in 1-dB steps, is provided in the transmit pair.

2.23 The 48B1 data unit is approximately 1-1/4 inches high, 5-1/2 inches wide, and 9-11/16 inches deep. The data unit weighs approximately 2 pounds.

2.24 The dial backup arrangement provided by the 48B1 data unit is compatible with dial backup arrangements provided by either the DAS 828C-type or by locally engineered systems that are equivalent to the DAS 828C-type.

2.25 The 48B1 data unit is designed to operate within the temperature range of 40 to 120° F and the relative humidity range of 20 to 95 percent.

3. FUNCTIONAL DESCRIPTION

3.01 This part describes the operation and circuit functions of the 48A1 and 48B1 data units and associated apparatus.

3.02 The connections of the standard 6-lead interface from the DAS 829-type to the 48A1 and 48B1 data units is shown in Fig. 11. When the data units are not installed in the data mounting, the circuit pack connectors on the 45A1 data mounting provide a through connection to the 6-lead interface from DAS 829-type. Figure 11 also illustrates the not-in-data and dial backup indication arrangements which are provided by the 48A1 and 48B1 data units.

3.03 The 48A1 data unit uses the 45A1 data mounting for single channel alternate voice service or the 46B1 data mounting for multiple alternate voice service. In the following functional

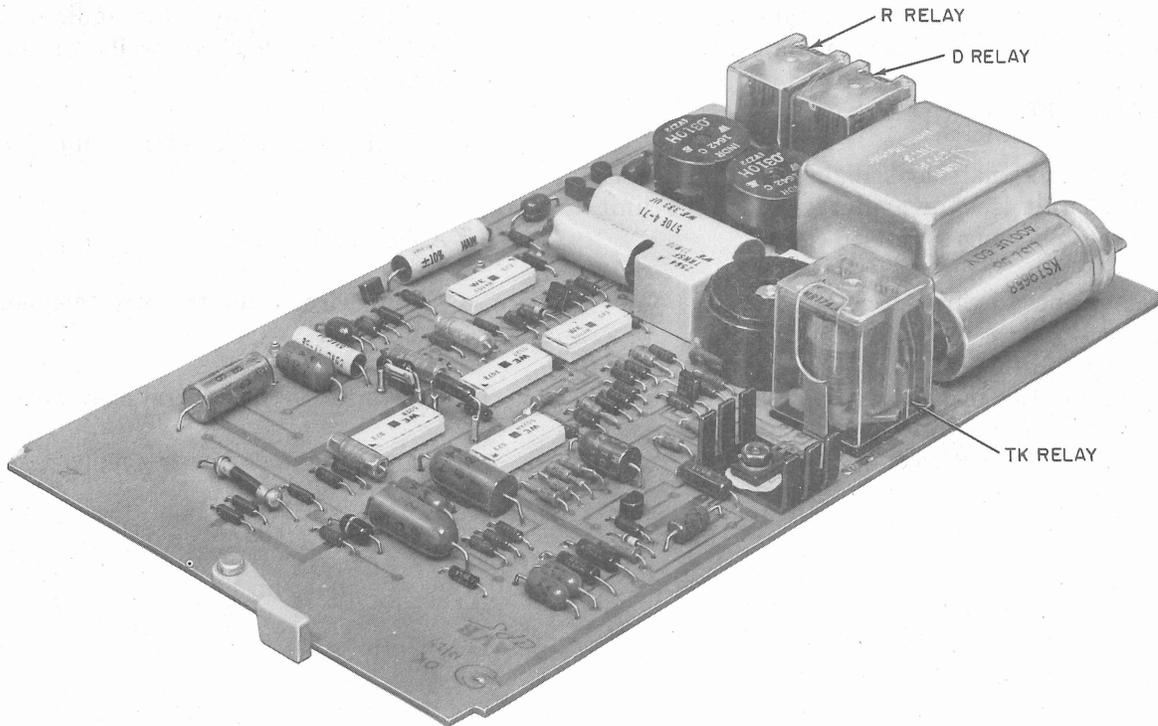


Fig. 9—View of 48A1 Data Unit

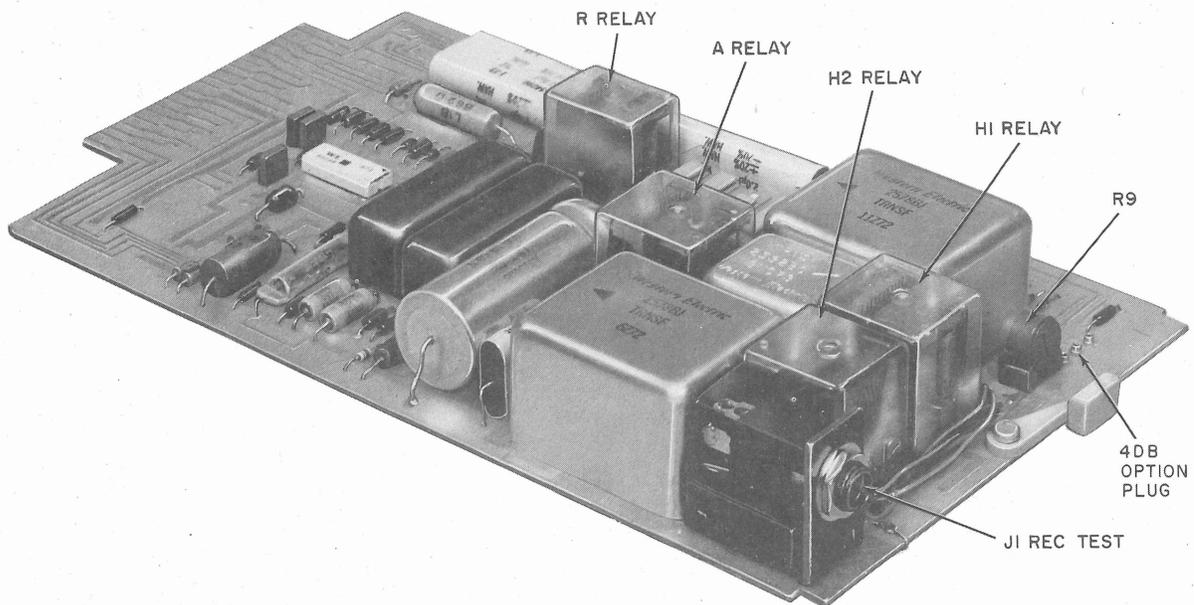


Fig. 10—View of 48B1 Data Unit

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description, the operation of the data units is the same when used in either data mounting.

48A1 DATA UNIT

3.04 The functional block diagram of the 48A1 data unit is shown in Fig. 12. The unit contains the following circuits:

- A balanced hybrid circuit.
- An amplifier in the transmit pair and an attenuator in the receive pair for level control of the voice signals at the interface of the DAS 829-type.
- A 1300-Hz oscillator for audible ringback signal and a 2600-Hz oscillator for inband signaling.
- A 2600-Hz tone detector circuit for inband signaling.
- A 30-second timer.
- A ring circuit for the key telephone lamp and buzzer.
- Relays for circuit control operation.
- A low voltage dc power supply.

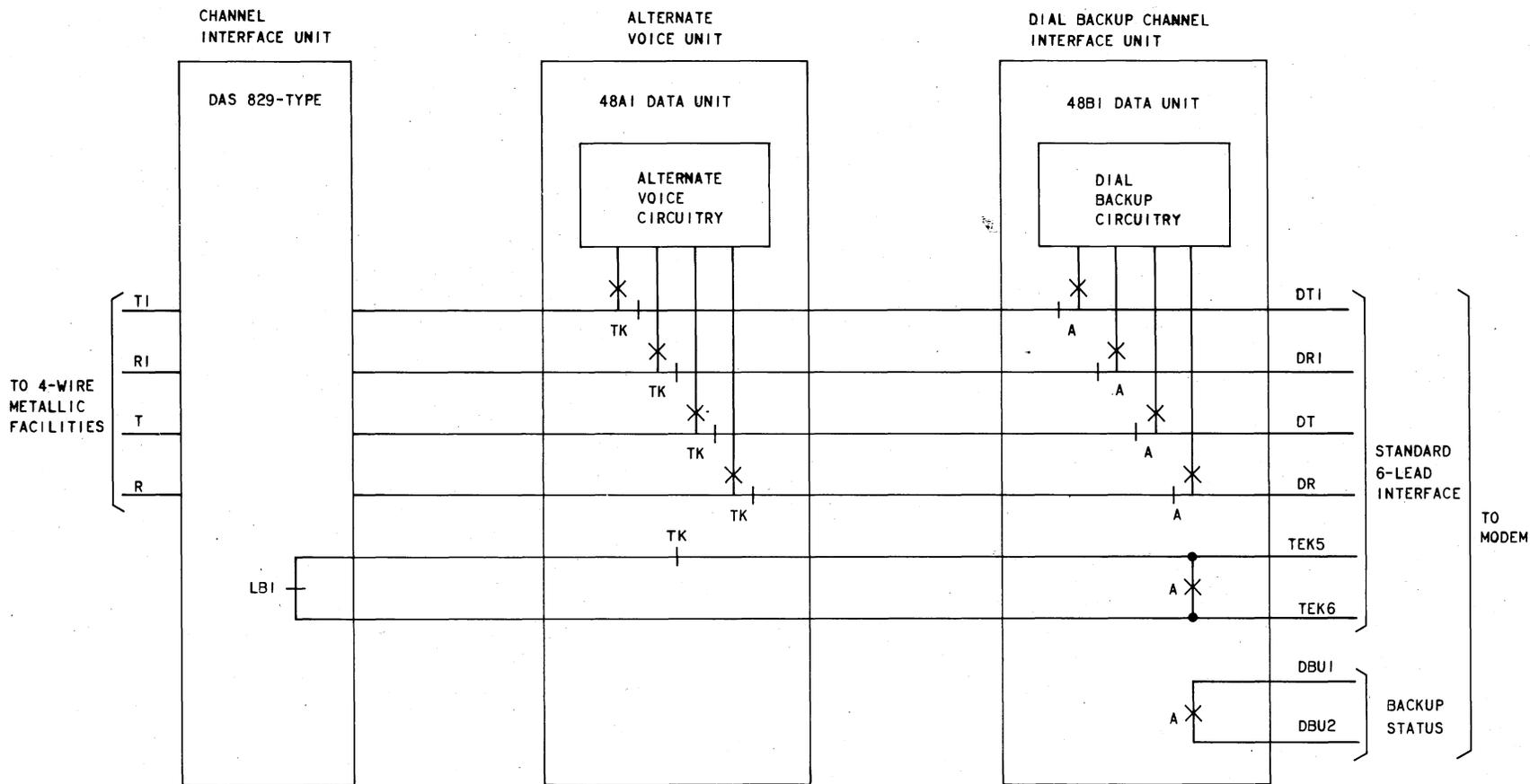


Fig. 11—Standard 6-Lead Interface Connection to and Modified by the 48A1 and 48B1 Data Units

3.05 The following description assumes that the 48A1 data unit has been installed in an appropriate data mounting, the required key telephone set has been provided, and that all required interconnections, as given in Section 598-082-201, have been made. The six pushbuttons on the 565HK or 2565HK key telephone when used for alternate voice service must be marked as follows:

HOLD	—	—	PL TALK	RING	—
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A. Data Transmission

3.06 When in the data mode, the 48A1 data unit provides a through connection for the standard

HOLD	PL TALK1	PL TALK2	PL TALK3	PL TALK4	PL TALK5	PL TALK6	PL TALK7	PL TALK8	RING
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When PL TALK-1 is depressed and the first position of the 46B1 data mounting is equipped with a 48A1 data unit, the 4-wire PL facilities associated with the first position will be in the voice mode.

3.08 When the associated key telephone set is placed off-hook and the PL TALK key is depressed, the TK relay in the 48A1 data unit operates. This causes the following actions to occur:

- (a) The PL TALK lamp on the telephone set lights.
- (b) The receive pair on DT and DR is connected through an attenuator pad, and a balanced hybrid circuit to the associated key telephone set.
- (c) The voice signal from the telephone is connected through a balanced hybrid circuit and an amplifier to the transmit pair on DT1 and DR1 of the standard interface.
- (d) The modem is disconnected from the line facilities and a not-in-data indication is

6-lead interface connecting the modem to the DAS 829-type. The 6-lead interface of DR, DT, DR1, DT1, TEK5, and TEK6 between the modem and the DAS 829-type is complete as long as the data unit remains in the data mode.

B. Voice Transmission

3.07 To place the 48A1 data unit in the voice mode, the telephone set is placed off-hook and the PL TALK key is depressed. If the 830-type or 2830-type key telephone is used, the selection of a PL TALK key is made from the eight keys designated PL TALK-1 through PL TALK-8 as follows:

generated by an open circuit on interface lead TEK5.

- (e) The 2600-Hz inband ring detector is disabled.
- (f) The relay driver logic for ringing is partially enabled.

3.09 The 48A1 data unit is now in the talk mode and conversation may take place provided the other end of the circuit is in the talk mode.

3.10 The amplifier in the transmit pair and the pad in the receive pair of the 48A1 data unit provide the transmission design required to interface with the DAS 829-type. The 48A1 data unit interface to the DAS 829-type is +13 TLP (0 dBm) transmit and -3 TLP (-16 dBm) receive. The 2-wire telephone set interface is 0 TLP transmit and -10 TLP receive.

C. Ringdown Signaling

3.11 With the 48A1 data unit in the talk mode and the nonlocking RING key depressed, the relay logic operates the D relay.

3.12 With the TK and D relays operated, the transmit amplifier is disconnected from the transmit channel and the 2600-Hz oscillator is connected to the transmit channel. Therefore, when the 48A1 data unit is in the talk mode, depressing the RING key causes a signal of 2600 Hz to be transmitted to the distant end. At that end, the 48A1 data unit and the DAS 829-type must be in the data mode in order to receive the 2600-Hz signal. If at the far end the DAS 829-type is in the loop-back mode, or if the 48A1 data unit is in the talk mode, the 2600-Hz detector in the 48A1 data unit cannot be activated.

3.13 The RING key should remain depressed until an audible ringback signal (bursts of 1300 Hz) is heard in the handset. The audible ringback signal should be heard within 10 seconds after the RING key is depressed. When the audible ringback signal is detected, release the RING key. The distant end, if unanswered, will ring for approximately 30 seconds. When the near-end RING key remains depressed for more than 30 seconds, the far end will ring until the RING key is released.

3.14 When the 48A1 data unit is in the data mode and a 2600-Hz signal is detected, it transfers to the ring mode and the following occurs:

- (a) A 30-second timer is activated. The timer provides that the 48A1 data unit will remain in the ring mode for approximately 30 seconds. If 2600 Hz is still being detected when the timed interval elapses, the 48A1 data unit will remain in the ring mode until the 2600-Hz signal is removed.
- (b) The ring multivibrator is activated. The ring multivibrator will periodically light the PL TALK lamp, the key telephone buzzer will sound, and the 1300-Hz oscillator will be activated.
- (c) During each of these periods, the modem will be disconnected from the transmit path and the 1300-Hz oscillator will be connected to the transmit path. The oscillator will transmit a 1300-Hz signal to the near end when the R relay is operated. When the R relay is not operated, no signal is transmitted.

3.15 The RING mode will terminate when the 48A1 is placed in the voice mode (TK relay operated).

D. Alternate Voice Call Sequence

3.16 To originate a voice call using the 48A1 data unit, perform the following:

- (a) Take the telephone off-hook.
- (b) Depress the desired PL TALK key.
- (c) The PL TALK key lamp will be illuminated when the 48A1 data unit is in the voice mode.
- (d) Depress the RING key until the audible ringback signal is heard.

3.17 To answer a call using the 48A1 data unit, perform the following:

- (a) Depress the PL TALK key associated with a flashing lamp.
- (b) Take the telephone off-hook and talk.

3.18 To terminate a call and return to data mode, perform the following:

- (a) Depress and release the HOLD key to return the PL TALK key to its normal (unoperated) position. The PL TALK key lamp will be extinguished.
- (b) Place the telephone on-hook.

48B1 DATA UNIT

3.19 The 48B1 data unit, when installed in an appropriate data mounting, provides the circuitry required for dial backup service. The 45A1 data mounting has been provided for use with the 48B1 data unit. The 48B1 data unit is not presently furnished in a multiple arrangement.

3.20 The key telephone set to be used with the 45A1 data mounting must be ordered separately. The 45A1 data mounting connects to either a 565HK or 2565HK 6-button key telephone set. The six pushbuttons on the 565HK or 2565HK key telephone when used for dial backup service must be marked as follows:

HOLD	DDD1	DDD2	—	—	REL
------	------	------	---	---	-----

When used for dial backup and alternate voice service, the six pushbuttons must be marked as follows:

HOLD	DDD1	DDD2	PL TALK	RING	REL
------	------	------	------------	------	-----

3.21 The 48B1 data unit provides the circuitry required to add dial backup service for only Bell System data sets. The functional block diagram is shown in Fig. 13.

3.22 The 48B1 data unit has one installer option to provide 4-dB of slope equalization on the receive pair. A 0 to 15-dB attenuator, adjustable in 1-dB increments, is provided in the transmit pair. A gain circuit, adjustable from -6 to +14 dB is provided in the receive pair.

3.23 For the following discussion it will be assumed that the 48B1 data unit has been installed in its data mounting, that the required key telephone set has been provided, and all other required interconnections, as given in Section 598-082-201, have been provided.

E. Data Transmission

3.24 When in the 4-wire PL data mode, the 48B1 data unit provides a through connection for the transmission portion of the standard 6-lead interface.

3.25 The following are the transmission pairs from the DAS 829-type (or the 48A1 data unit):

Designation	48B1 Terminal Number
DT	25
DR	2
DT1	24
DR1	23

3.26 The following are the transmission pairs for the modem:

Designation	48B1 Terminal Number
DT	5
DR	22
DT1	4
DR1	3

3.27 The terminals designated DT(M), DR(M), DT1(M), and DR1(M) (shown in Fig. 13) are for use in multiple dial backup arrangements to be provided at a later date.

3.28 The transmission path between the modem and the DAS 829-type is complete with the A relay released. With the A relay released, the 48B1 data unit is in the 4-wire PL data mode.

F. Dial Backup

3.29 The modem is in the dial backup mode when the DDD1 and DDD2 lamps are illuminated.

3.30 The H1 relay is operated when the key telephone is off-hook, the DDD1 key is depressed, and the HOLD key is depressed. The H1 relay latches under the control of a release circuit. The dial-up line terminating on T2 and R2 is transferred from the key telephone to a holding coil when relay H1 is operated. This dial-up line will be used for the transmit direction. The DDD1 lamp is on when the H1 relay is operated.

3.31 The H2 relay is operated when the key telephone is off-hook, the DDD2 key is depressed and the HOLD key is depressed. The H2 relay latches under the control of a release circuit. The dial-up line terminating on T3 and R3 is transferred from the key telephone to a holding coil when relay H2 is operated. This dial-up line will be used for the receive direction. The DDD2 lamp is on when the H2 relay is operated.

3.32 With the H1 and H2 relays operated, the A relay operates placing the 48B1 data unit in the dial backup mode.

48B1 DATA UNIT
DIAL BACKUP

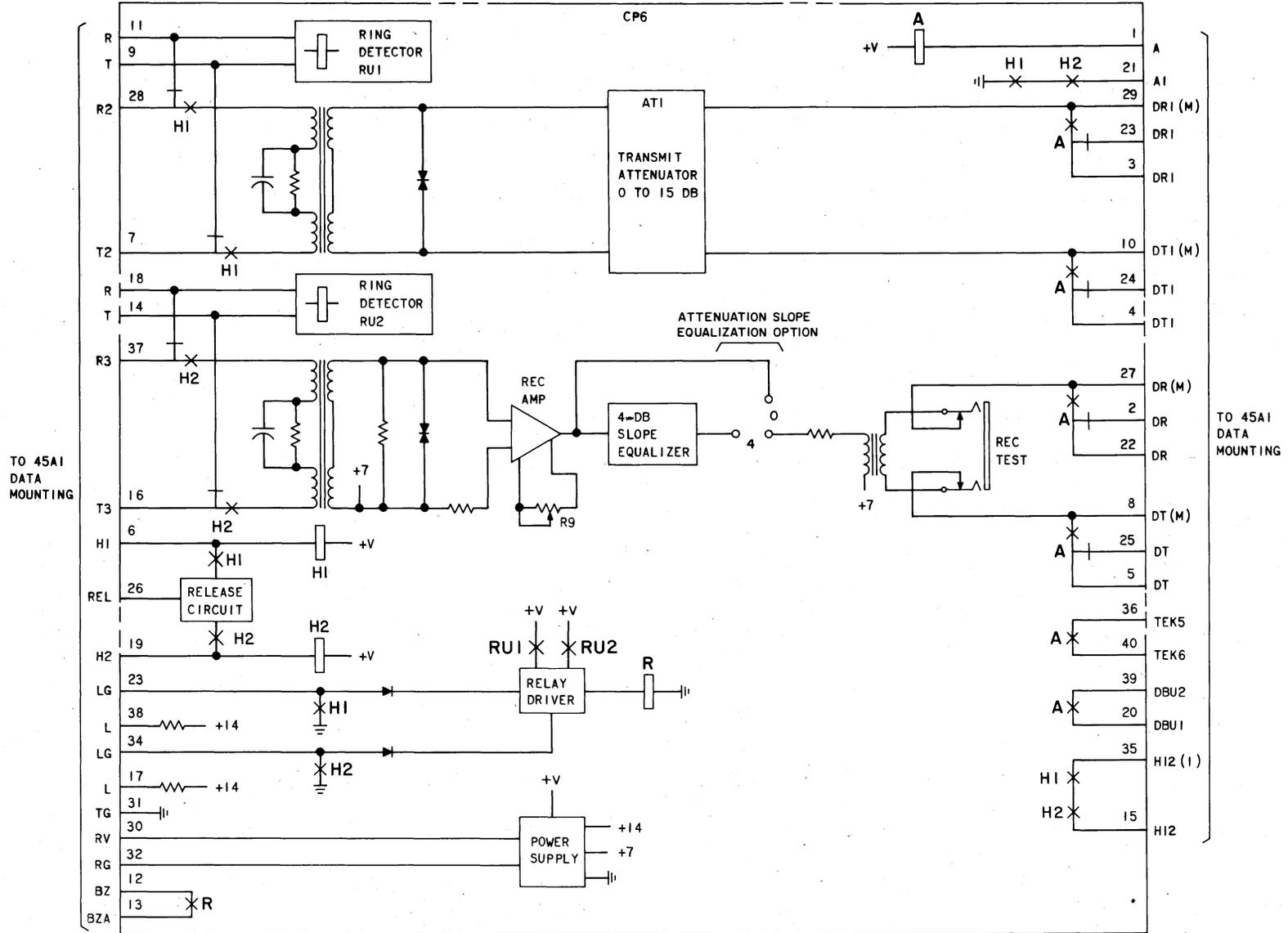


Fig. 13—Functional Diagram of 48B1 Data Unit

Transmit Path

3.33 With A operated, the modem transmit pair (DT1 and DR1) is connected through an attenuator and a line-holding transformer to the 2-wire line. The line-holding transformer provides a 900-ohm termination for the 2-wire line and a 600-ohm termination for the modem.

Receive Path

3.34 When in the dial backup mode the A relay is operated, the modem receive pair (DT and DR) is connected through the REC TEST jack, isolation transformer, optional 4-dB equalizer, receive amplifier, and line-holding transformer to the 2-wire line. The line-holding transformer provides a 900-ohm termination for the 2-wire line. The isolation transformer provides a 600-ohm termination for the modem.

Release of Lines in Hold-Release of Dial Backup Mode

3.35 When either the DDD1 or DDD2 lamps are illuminated, the associated 2-wire line is in the HOLD mode. When both lamps are illuminated, the 48B1 data unit is in the dial backup mode.

3.36 The release of a 2-wire line from the HOLD mode can only be accomplished as follows:

- (1) Take the key telephone off-hook.
- (2) Depress the pickup key of the line on HOLD (DDD1 or DDD2).
- (3) Depress the REL key.
- (4) The DDD1 or DDD2 key lamp will be extinguished indicating the 2-wire line is not in the HOLD mode.
- (5) The line which was in the HOLD mode is now returned to key set control and may be used for conversation.
- (6) To terminate the call, place the key telephone on-hook.

Note: The 2-wire lines cannot be released except as described above. Placing the key telephone on-hook while a 2-wire line is in the HOLD mode will not release the 2-wire line from the HOLD mode.

3.37 The release of the dial backup mode can only be accomplished as follows:

- (1) Take the key telephone off-hook.
- (2) Depress the REL key.
- (3) The DDD1 and DDD2 key lamps will be extinguished indicating the 48B1 data unit is not in the dial backup mode.
- (4) Place the key telephone on-hook.

3.38 The line holding arrangement described was developed to allow:

- (a) The key telephone to be placed on-hook while the 48B1 data unit was in the dial backup mode. This is an improvement over the previous arrangements provided by the data auxiliary set 828C and described in Section 598-080-101. The dial backup mode cannot be accidentally terminated by placing the key telephone on-hook.
- (b) Multiple arrangements requiring more than one dial backup channel to be developed.

Ring Detectors and Key Set Lines

3.39 A ring detector circuit and key set line are connected to each 2-wire pair. Incoming ringing to either idle line operates the corresponding RU relay (RU1 or RU2). The RU1 relay causes the line lamp associated with line 1 to flash, while the RU2 relay causes the line lamp for line 2 to flash.

3.40 The R relay will operate when either the RU1 or RU2 relay is operated. When the R relay is operated, the buzzer associated with the key telephone set will be energized.

3.41 The ring detectors and key set lines are only connected to the 2-wire pairs when the data unit is not in the dial backup or hold modes. If the data unit is in either of these modes the associated ring detector and key set line are disconnected.

G. Dial Backup Call Sequence

3.42 A typical call sequence is shown in Fig. 14. This sequence chart illustrates a typical call

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setup procedure for two stations, A and B. It is assumed that the following exists:

- (a) The modem is used to transmit and receive data over a PL (using a DAS 829-type) and the 48B1 data unit is used for backup.
- (b) Station A initiates the first call on line 1 and answers the second call on line 2.

3.43 The sequence in 3.42 (b) is not the only permissible sequence. Any sequence is allowable, providing that line 1 of one station is connected to line 2 at the other station. Thus, Station A could initiate both calls or B could initiate both calls.

Idle State (Beginning of Sequence)

3.44 At both stations, all dial backup key telephone lamps (DDD1 and DDD2) are out and the telephone handsets are on-hook. The modem is connected through the 48B1 data unit to the PL at the DAS 829-type. Both 2-wire switched network pairs are released and connected to their ring detector circuits. The 48B1 data unit passes an "in-data" or "not-in-data" indication to the modem as determined by DAS 829-type. Assuming that the DAS 829-type is conditioned for data transmission, an "in-data" indication is passed.

First Call

3.45 The sequence begins with Station A deciding for some reason, such as the inability to send data via the PL, that a backup connection should be made. Station A goes off-hook, operating the line switch (LS) in the telephone set. Line 1 is selected by depressing the DDD1 key, and Station B, line 2, is dialed.

3.46 Incoming ringing to Station B causes the line 2 lamp to flash and activate the buzzer. Station B then goes off-hook and depresses the DDD2 key. Ringing is tripped and conversation may now take place.

Note: At this point, both line lamps are extinguished.

3.47 Once the nature of the call is established (backup) and the procedure for the next call determined, both stations may hold their respective lines. At Station A, the HOLD button

is depressed. This causes the H1 relay to hold line 1 by placing a repeat coil across it and to remove the ring detector and the key set line. The line 1 lamp is illuminated at this point to indicate that the line is being held. Once the lamp turns ON, the HOLD button may be released. The DDD1 key releases on the up-stroke of HOLD. At Station B, similar procedures put line 2 on HOLD.

3.48 At this point, one lamp is illuminated at each station. The station need not remain off-hook in order to hold the call. This differs from the procedure required for DAS 828C.

Second Call

3.49 Assuming that Station B is to initiate the second call, the DDD1 key at Station B is depressed and Station A, line 2, is dialed. The Station A, line 2 lamp flashes in response to incoming ringing and the buzzer activates. Station A then depresses DDD2 key and answers the call. Both stations then hold their respective lines by pushing the HOLD button. If for some reason the connection is not satisfactory, the second call can be dropped in the usual manner, by placing the telephone handset on-hook. This releases the second call and it can be reinitiated.

3.50 Once the second call is held, the respective H relays operate. This places the repeat coil across the line and lights the line lamp. Also, the ring detector and key set line are removed.

3.51 With both H1 and H2 operated at the station, the A relay is energized. This transfers the modem from the PL to the backup circuit and signals "in-data" towards the modem. Visual indication of the dial backup mode is provided by the line 1 and line 2 lamps being illuminated. Once the dial backup mode is achieved, the telephone handset should be placed on-hook.

Data Transmission Over Backup Circuit

3.52 The modem now has a complete 4-wire transmission path using a pair of dial-up 2-wire lines. While in this backup mode, it is possible to test the PL from a remote location through use of tone actuated loop-back or to talk over it by using the PL TALK and RING keys as required. These keys will not interfere with the data transmission over the backup circuit.

Return to Idle

3.53 Once the PL is cleared for data transmission, the modem may be transferred back to the PL by taking the handset off-hook and depressing the REL key. This causes the H1, H2, and A relays to release and the lamps to extinguish. When the lamps extinguish, release the REL key and place the handset on-hook. The station is now idle.

H. Locally Engineered Systems

3.54 Locally engineered systems for multiple arrangements using full data and alternate voice service for more than eight 4-wire PLs can be provided as follows:

- (a) Provide a key telephone, coded or locally equipped, with sufficient keys to provide one pickup key for each alternate voice circuit

required, one nonlocking pickup key to supply a common RING key, and a HOLD key. The only function of the HOLD key is to release the PL TALK keys and restore the transmission circuit to the data mode.

- (b) Provide a common buss for each of the following leads on the 46B1 data mounting; TG, S, BZ, and BZ2.

- (c) Provide a ring supply for the buzzer. The 46B1 data mounting must be equipped with the option strap designated EXT installed.

- (d) Provide the appropriate connections from the telephone key modules to the 46B1 data mounting.

3.55 The above rules and guidelines are illustrated and explained in the following example.

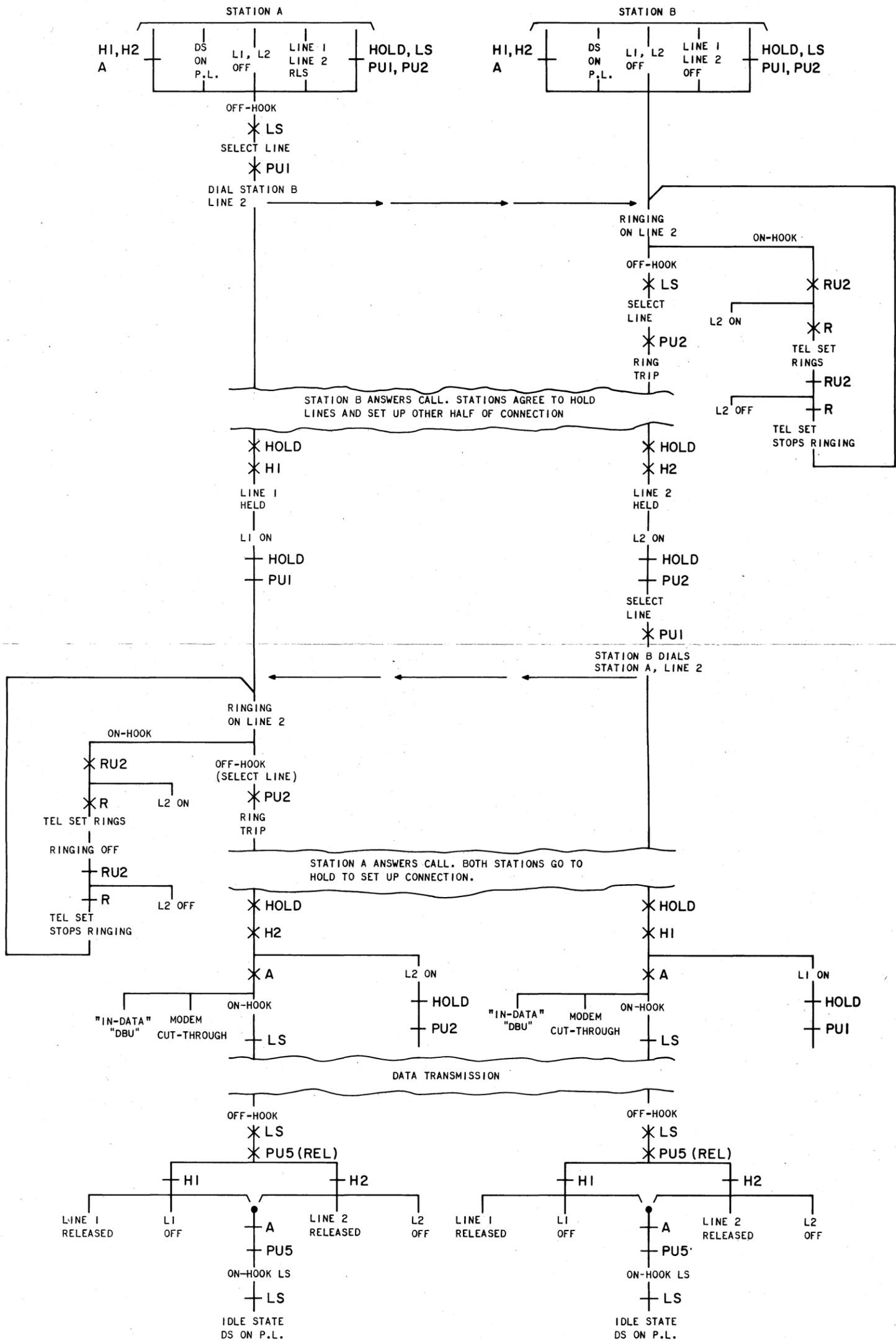


Fig. 14—Call Sequence Diagram

Assume that full data and alternate voice service is to be provided for sixteen 4-wire PLs. It is also assumed that local loop-back keys are not provided. Using the rules in 3.54, the 630DA 18-button key telephone set is selected. The pickup keys are assigned as shown below.

1ST KEY MODULE	2ND KEY MODULE	3RD KEY MODULE
RING*	PL TALK 5	PL TALK 11
PL TALK 1	PL TALK 6	PL TALK 12
PL TALK 2	PL TALK 7	PL TALK 13
PL TALK 3	PL TALK 8	PL TALK 14
PL TALK 4	PL TALK 9	PL TALK 15
HOLD	PL TALK 10	PL TALK 16

* NONLOCKING KEY

The RING key provides a common signaling control for all alternate voice circuits. The PL TALK keys provide means for selecting the 4-wire PL to be switched to the voice mode. Keys designated PL TALK-1 through PL TALK-8 control the selection of circuits associated with the first 46B1 data mounting, while keys designated PL TALK-9 through PL TALK-16 control the selection of circuits associated with the second 46B1 data mounting.

3.56 Fig. 15 and Table A provide the information required for connecting two 46B1 data mountings to a 630DA key telephone. Table A provides the wiring information for a particular key module of the 630DA telephone. The wiring

required for each keyed function to be provided has been grouped; for example, to provide function PL TALK-1, the second pickup key of the first key module must have five leads connected to the 46B1 data mounting providing alternate voice service for the 4-wire PL designated number 1. The leads specified on the same line of Table A are to be connected using a 66-type block. For example, again referring to PL TALK-1 (R LEAD), the BR-W lead of the BL-W binder of the A75A cable is connected, through use of a 66-type block, to the BL-W lead of the A25A cable designated C1.

3.57 In Table A, the column designated LEAD FUNCTION identifies the function associated with all the key telephone control leads. The TG lead provides a ground return for keying voltages. The S lead provides control of ringdown signaling. The T and R pair provide for connection of the key telephone handset to the 2-wire to 4-wire hybrid circuit of the 48A1 data units. The TK lead provides for "A lead" control of the alternate voice service. The L and LG leads provide the required lamp voltages and grounds.

4. POWER SUPPLIES

4.01 The 48A1 and 48B1 data units each contain dc regulators designed to operate from bridge rectified 24 Vac.

4.02 The 45A1 data mounting is comprised of power cords, a bridge rectifier and a 24 Vac transformer that furnishes the input voltage to the 48A1 data unit, the 48B1 data unit, and the DAS 829-type. Overcurrent protection to the 45A1 data mounting is provided by a thermal breaker located in the primary winding of the 24 Vac transformer.

4.03 The 46B1 data mounting contains the 24 Vac transformer and regulated dc power supply that furnishes the dc power required for a maximum of eight 48A1 data units. Overcurrent protection is provided by fuses F1 through F8 in the output of the power supply. Fuse F9 furnishes overcurrent protection to the low voltage transformer.

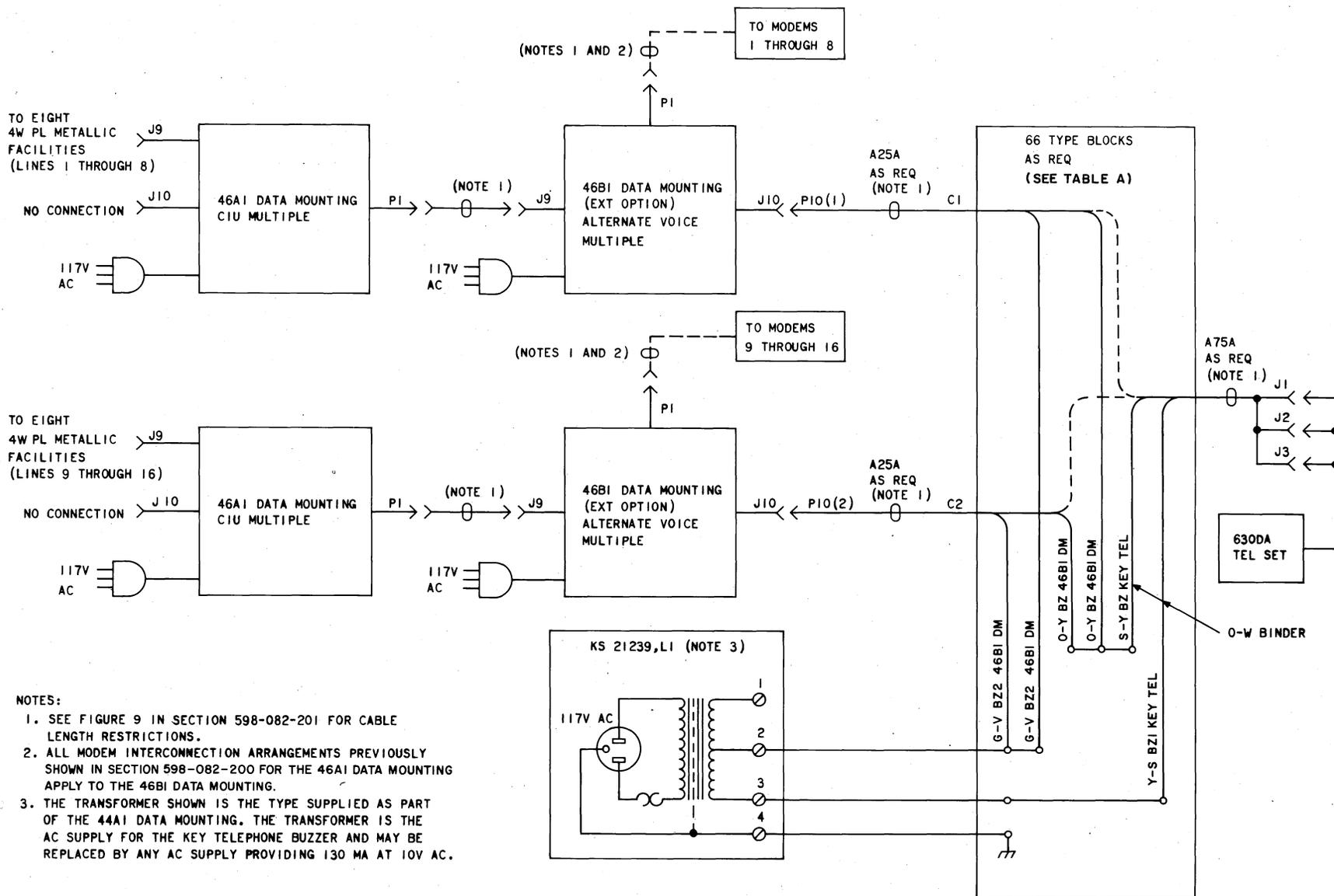
5. REFERENCES

5.01 The following documents provide additional information on facilities and equipment associated with the 48A1 and 48B1 data units and the 45A1 and 46B1 data mountings.

SECTION 598-082-101

CD & SD 1D247-01 Data Auxiliary Set 829-Type

SECTION	TITLE	SECTION	TITLE
598-082-100	Data Auxiliary Set 829-Type— Channel Interface Units— Voiceband Private Line Channels— Description	598-082-201	Data Auxiliary Set 829-Type— Supplementary Functions for Voiceband Private Line Channels (Alternate Voice and Dial Backup)—Installation and Connections
598-082-180	Data Auxiliary Set 829-Type— Channel Interface Units— Voiceband Private Line Channels— Summarizing Specification	598-082-501	Data Auxiliary Set 829-Type— Supplementary Functions for Voiceband Private Line Channels (Alternate Voice and Dial Backup)—Test Procedures



- NOTES:
1. SEE FIGURE 9 IN SECTION 598-082-201 FOR CABLE LENGTH RESTRICTIONS.
 2. ALL MODEM INTERCONNECTION ARRANGEMENTS PREVIOUSLY SHOWN IN SECTION 598-082-200 FOR THE 46AI DATA MOUNTING APPLY TO THE 46BI DATA MOUNTING.
 3. THE TRANSFORMER SHOWN IS THE TYPE SUPPLIED AS PART OF THE 44AI DATA MOUNTING. THE TRANSFORMER IS THE AC SUPPLY FOR THE KEY TELEPHONE BUZZER AND MAY BE REPLACED BY ANY AC SUPPLY PROVIDING 130 MA AT 10V AC.

Fig. 15—Diagram of Locally Engineered Alternate Voice Multiple Arrangement

TABLE A (Cont)

FUNCTIONS PROVIDED BY KEY BUTTONS OF 630DA TELEPHONE SET

TO PROVIDE FUNCTION	A75A CONNECTION (O - W) BINDER		46B1 DATA MOUNTING CABLE CONNECTIONS SEE NOTES 4, 5				LEAD FUNCTION	SEE NOTE
	J2	COLOR	P10(1)	C1 COLOR	P10(2)	C2 COLOR		
PL TALK - 5 PU1, Key	1	BL-W	13	G-BK			R	
	26	W-BL	38	BK-G			T	
	27	W-O	39	BK-BR			TK	
	3	G-W	15	S-BK			L	
	28	W-G	40	BK-S			LG	
PL TALK - 6 PU2, Key	4	BR-W	16	BL-Y			R	
	29	W-BR	41	Y-BL			T	
	30	W-S	14	BR-BK			TK	
	6	BL-R	18	G-Y			L	
	31	R-BL	43	Y-G			LG	
PL TALK - 7 PU3, Key	7	O-R	19	BR-Y			R	
	32	R-O	44	Y-BR			T	
	33	R-G	11	BL-BK			TK	
	9	BR-R	21	BL-V			L	
	34	R-BR	46	V-BL			LG	
PL TALK - 8 PU4, Key	10	S-R	22	O-V			R	
	35	R-S	47	V-O			T	
	36	BK-BL	8	G-R			TK	
	12	O-BK	24	BR-V			L	
	37	BK-O	49	V-BR			LG	
PL TALK - 9 PU5, Key	13	G-BK			1	BL-W	R	
	38	BK-G			26	W-BL	T	
	39	BK-BR			27	W-O	TK	
	15	S-BK			3	G-W	L	
	40	BK-S			28	W-G	LG	
PL TALK - 10 PU6, Key	16	BL-Y			4	BR-W	R	
	41	Y-BL			29	W-BR	T	
	42	Y-O			30	W-S	TK	
	18	G-Y			6	BL-R	L	
	43	Y-G			31	R-BL	LG	

TABLE A (Cont)

FUNCTIONS PROVIDED BY KEY BUTTONS OF 630DA TELEPHONE SET

TO PROVIDE FUNCTION	A75A CONNECTION (G - W) BINDER		46B1 DATA MOUNTING CABLE CONNECTIONS SEE NOTES 4, 5				LEAD FUNCTION	SEE NOTE
	J3	COLOR	P10(1)	C1 COLOR	P10(2)	C2 COLOR		
PL TALK - 11 PU1, Key	1	BL-W			7	O-R	R	
	26	W-BL			32	R-O	T	
	27	W-O			33	R-G	TK	
	3	G-W			9	BR-R	L	
	28	W-G			34	R-BR	LG	
PL TALK - 12 PU2, Key	4	BR-W			10	S-R	R	
	29	W-BR			35	R-S	T	
	30	W-S			36	BK-BL	TK	
	6	BL-R			12	O-BK	L	
	31	R-BL			37	BK-O	LG	
PL TALK - 13 PU3, Key	7	O-R			13	G-BK	R	
	32	R-O			38	BK-G	T	
	33	R-G			39	BK-BR	TK	
	9	BR-R			15	S-BK	L	
	34	R-BR			40	BK-S	LG	
PL TALK - 14 PU4, Key	10	S-R			16	BL-Y	R	
	35	R-S			41	Y-BL	T	
	36	BK-BL			14	BR-BK	TK	
	12	O-BK			18	G-Y	L	
	37	BK-O			43	Y-G	LG	
PL TALK - 15 PU5, Key	13	G-BK			19	BR-Y	R	
	38	BK-G			44	Y-BR	T	
	39	BK-BR			11	BL-BK	TK	
	15	S-BK			21	BL-V	L	
	40	BK-S			46	V-BL	LG	
PL TALK - 16 PU6, Key	16	BL-Y			22	O-V	R	
	41	Y-BL			47	V-O	T	
	42	Y-O			8	G-R	TK	
	18	G-Y			24	BR-V	L	
	42	Y-G			49	V-BR	LG	

Notes:

1. The TG (telephone ground) leads from all 46B1 data mountings must be provided with a common termination.
2. The S (signal) leads from all 46B1 data mountings must be provided with a common termination.
3. Control leads associated with the HOLD key are not used.
4. The ring supply for the buzzer in the 630 key telephone is to be supplied by a circuit equivalent to the one shown in Fig. 15. The BZ and BZ2 leads from all 46B1 data mountings must be provided with a common termination as shown in Fig. 15. Provide all 46B1 data mountings with the option designated "EXT".
5. All leads not shown in Fig. 15 or Table A are to be taped and stored.

TABLE A
FUNCTIONS PROVIDED BY KEY BUTTONS OF 630DA TELEPHONE SET

TO PROVIDE FUNCTION	A75A CONNECTION (BL - W) BINDER		46B1 DATA MOUNTING CABLE CONNECTIONS SEE NOTES 4, 5				LEAD FUNCTION	SEE NOTE
	J1	COLOR	P10(1)	C1 COLOR	P10(2)	C2 COLOR		
RING PU1, NL Key	2 27	O-W W-O	2 5	O-W S-W	2 5	O-W S-W	TG S	1 2
PL TALK - 1 PU2, Key	4 29 30 6 31	BR-W W-BR W-S BL-R R-BL	1 26 27 3 28	BL-W W-BL W-O G-W W-G			R T TK L LG	
PL TALK - 2 PU3, Key	7 32 33 9 34	O-R R-O R-G BR-R R-BR	4 29 30 6 31	BR-W W-BR W-S BL-R R-BL			R T TK L LG	
PL TALK - 3 PU4, Key	10 35 36 12 37	S-R R-S BK-BL O-BK BK-O	7 32 33 9 34	O-R R-O R-G BR-R R-BR			R T TK L LG	
PL TALK - 4 PU5, Key	13 38 39 15 40	G-BK BK-G BK-BR S-BK BK-S	10 35 36 12 37	S-R R-S BK-BL O-BK BK-O			R T TK L LG	
HOLD								3

TABLE A (Cont)
FUNCTIONS PROVIDED BY KEY BUTTONS OF 630DA TELEPHONE SET

TO PROVIDE FUNCTION	A75A CONNECTION (O - W) BINDER		46B1 DATA MOUNTING CABLE CONNECTIONS SEE NOTES 4, 5				LEAD FUNCTION	SEE NOTE
	J2	COLOR	P10(1)	C1 COLOR	P10(2)	C2 COLOR		
PL TALK - 5 PU1, Key	1 26 27 3 28	BL-W W-BL W-O G-W W-G	13 38 39 15 40	G-BK BK-G BK-BR S-BK BK-S			R T TK L LG	
PL TALK - 6 PU2, Key	4 29 30 6 31	BR-W W-BR W-S BL-R R-BL	16 41 14 18 43	BL-Y Y-BL BR-BK G-Y Y-G			R T TK L LG	
PL TALK - 7 PU3, Key	7 32 33 9 34	O-R R-O R-G BR-R R-BR	19 44 11 21 46	BR-Y Y-BR BL-BK BL-V V-BL			R T TK L LG	
PL TALK - 8 PU4, Key	10 35 36 12 37	S-R R-S BK-BL O-BK BK-O	22 47 8 24 49	O-V V-O G-R BR-V V-BR			R T TK L LG	
PL TALK - 9 PU5, Key	13 38 39 15 40	G-BK BK-G BK-BR S-BK BK-S			1 26 27 3 28	BL-W W-BL W-O G-W W-G	R T TK L LG	
PL TALK - 10 PU6, Key	16 41 42 18 43	BL-Y Y-BL Y-O G-Y Y-G			4 29 30 6 31	BR-W W-BR W-S BL-R R-BL	R T TK L LG	