

**DATA AUXILIARY SET 829-TYPE
MULTIPLE CHANNEL ARRANGEMENTS
(SWITCHED DIAL BACKUP)**

DESCRIPTION

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the 48D1 data unit plus an 18- or 30-button key telephone. These arrangements 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 multiple channel arrangements for switched dial backup are furnished by the 48B1, 48C1, and 48D1 data units. The 48B1 and 48C1 data units are provided for by using the 46C1 data mounting.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The 48A1, 48B1, 48C1, and 48D1 data units are used to add a switched dial backup arrangement to full data (FD) and/or full data/alternate voice (FDA) multiple arrangements provided by DAS 829-type. The 48A1 data unit described in Section 598-082-101, when used in conjunction with DAS 829-type, provides for multiple FDA arrangements. The 48C1 data unit provides the switching functions required to add a switching matrix to a backup channel terminated by a 48B1 data unit. The 48D1 data unit is used to concentrate control of the 48A1 and/or the 48B1 and 48C1 data units in a 18- or 30-button Call Director®.

1.04 An example of a switched dial backup arrangement is shown in Fig. 1. This figure shows two 48B1 and two 48C1 data units mounted in a 46C1 data mounting and interconnected by plug connectors to the 48D1 data unit. The 18- or 30-button Call Director is used to control the relay logic of the data units.

1.05 The 48B1, 48C1, and 48D1 data units are compatible with the same modems that work with DAS 829-type. Switchable dial backup service is intended for use with telephone company (telco) modems only. In the case of a customer-provided modem, the customer is required to access the switched network through data access arrangements (DAAs) and must assume responsibility for providing

1. GENERAL

1.01 This section provides the description and operation information on switched dial backup to multiple arrangements of 4-wire private line (PL) voiceband data channels. It also provides information on alternate voice arrangements using

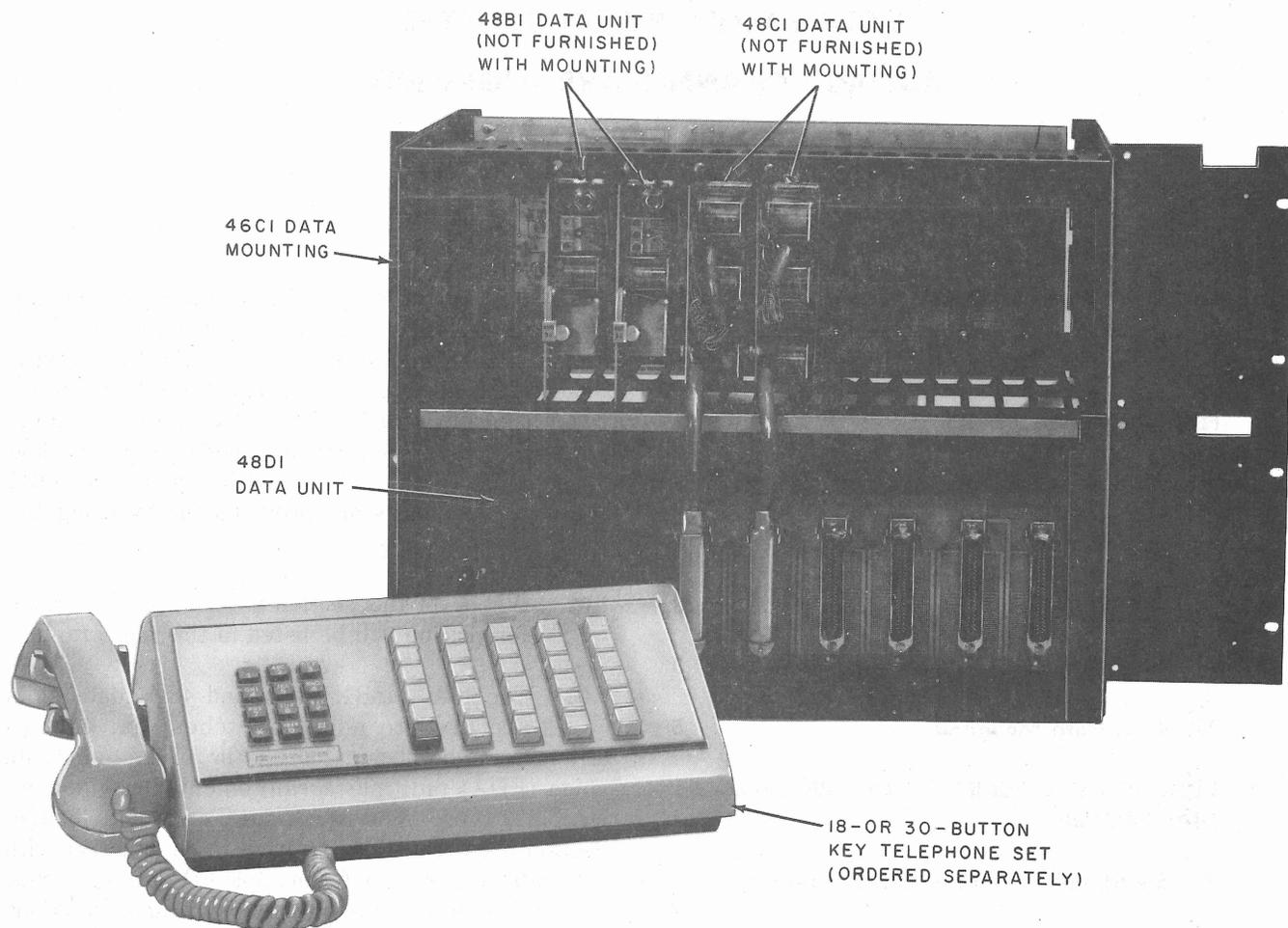


Fig. 1—Overall View of Apparatus Used for Switched Dial Backup

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

1.06 The 48C1 data unit provides the following functions:

- A switchable dial backup service when used in conjunction with the 48B1 data unit mounted in the 46C1 data mounting and the 48D1 data unit connected to the appropriate Call Director.
- A 2-by-4 switching matrix for switching any one of four modems to either one of two dial backup channels.

- Direct interconnection to the 48D1 data unit via the attached cable and connector jack, J1.

1.07 The 48D1 data unit (Call Director adapter) provides the following functions:

- Direct interconnection to three 46B1 data mountings containing a maximum of twenty-three 48A1 data units via connector plugs P1 to P3.
- Direct interconnection to a maximum of six 48C1 data units mounted in a 46C1 data mounting via connector plugs P4 to P9.
- Direct interconnection to the 46C1 data mounting via connector jack J6 when dial backup service is required.

- Concentrated interconnection to a maximum of 23 modems via connectors P11 and P12 in order to provide dial backup status indication to modems, such as data set 209A, that require such an indication.

1.08 Dial backup service is currently provided by either the DAS 828C, by the 48B1 data unit, or by locally engineered arrangements by the telco. These arrangements are adequate when backup service is provided for a single 4-wire PL channel. However, for a multiple arrangement consisting of several 4-wire PLs, the cost of providing a pair of 2-wire dial up lines for each PL channel is uneconomical.

1.09 The multiple channel arrangements for dial backup described in this section have the following advantages over currently available arrangements:

- One or two dial backup channels providing backup for up to twenty-three 4-wire PLs.
- Reduction in the number of key telephones required to provide control of dial backup and/or alternate voice service.
- Flexibility of station arrangements through use of plug-in circuit packs.

2. PHYSICAL DESCRIPTION

2.01 The multiple channel arrangements for dial backup, used in station arrangements, are physically provided by using the 48C1 and 48D1 data units and the 46C1 data mounting.

A. Data Units

2.02 The 48C1 data unit is a plug-in circuit pack while the 48D1 data unit is a rack-mounted collection of the connectors required to connect a Call Director to a 46B1 and/or a 46C1 data mounting.

48C1 Data Unit

2.03 The 48C1 data unit, shown in Fig. 2, comprises component apparatus mounted on a printed wiring board (PWB). The data unit provides a (2 by 4) switching matrix to switch one of two dial backup channels [from direct distance dialing (DDD) loops] to one of four modems. All the required connections for the data unit are

provided through the use of prewired data mountings or through the interconnection, on a plug-in basis, of data mountings. Direct interconnection to the 48D1 data unit is made via the attached cable and connector jack, J1.

2.04 The data unit is used with an appropriate 2-wire key telephone set and mounts in the 46C1 data mounting. The key telephone set is not supplied with the 48C1 data unit and must be ordered separately.

2.05 The dimensions of the 48C1 data unit are 1-1/4 inches high, 5-1/2 inches wide, and 9-11/16 inches deep. The data unit weighs approximately 1-3/4 pounds.

2.06 The 48C1 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.

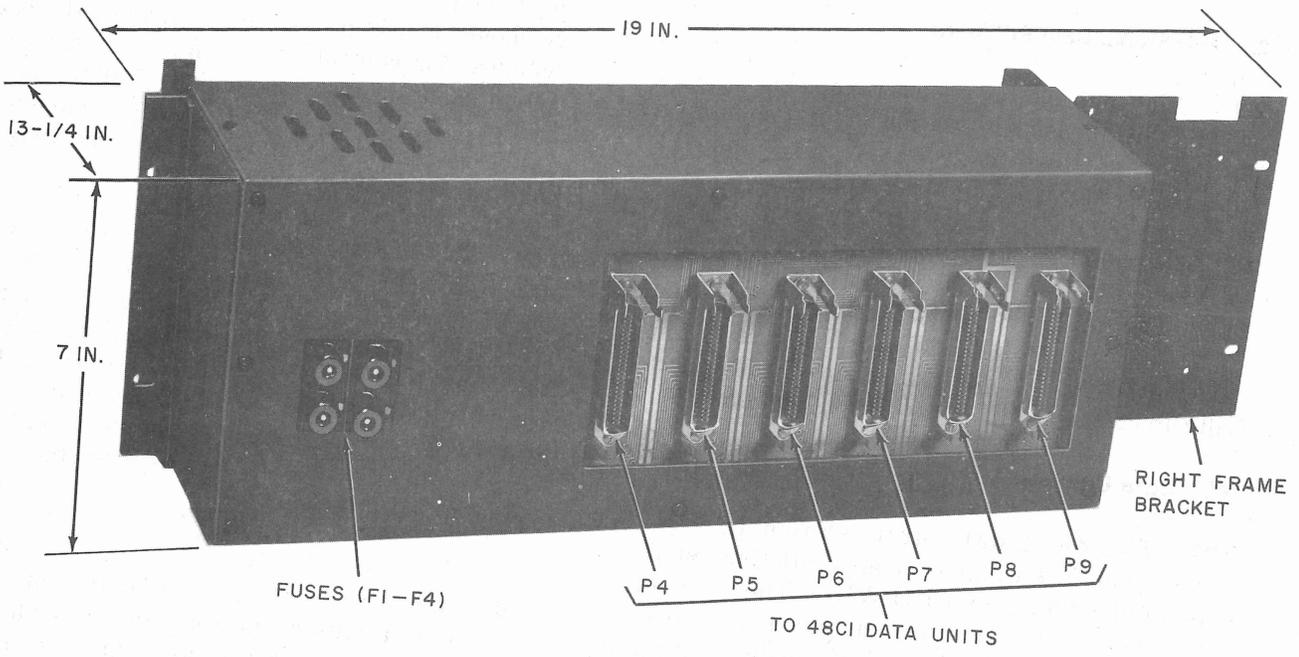
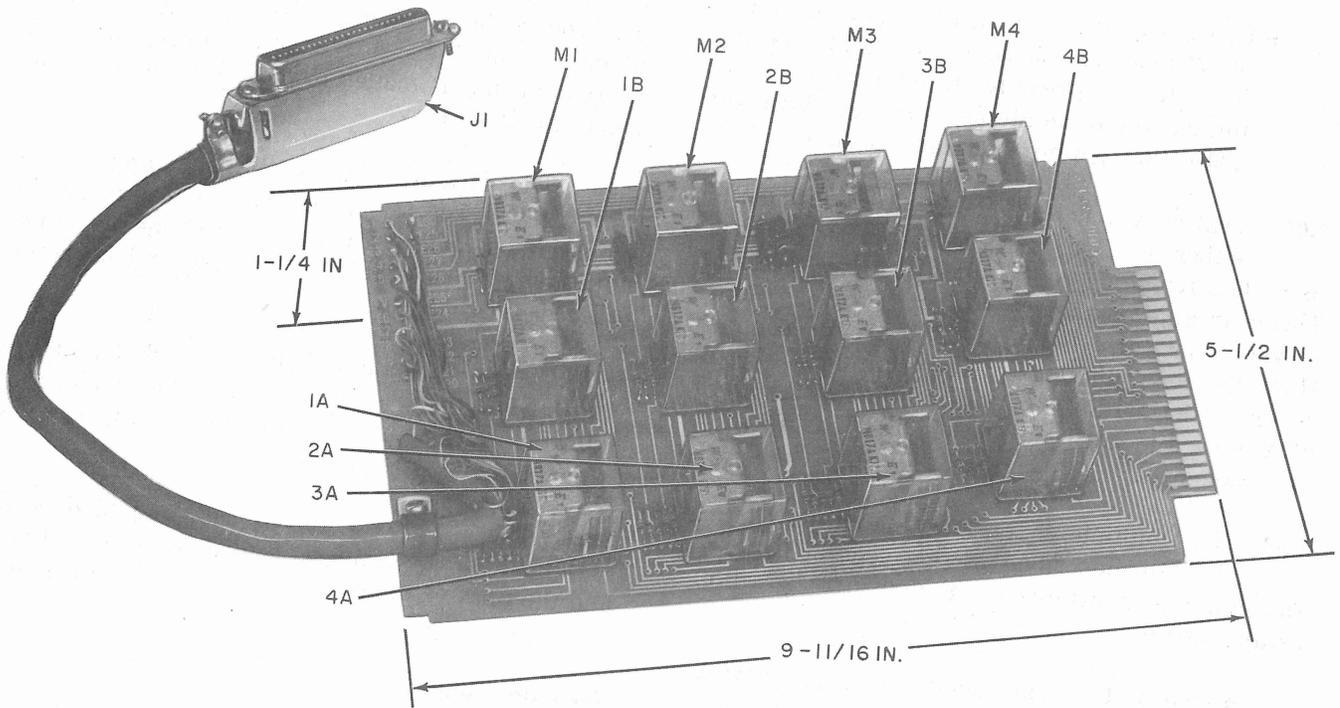
48D1 Data Unit

2.07 The 48D1 data unit, shown in Fig. 3, is used to connect a Call Director to a 46B1 and/or a 46C1 data mounting.

2.08 The 48D1 data unit concentrates control of the 48A1, 48B1, and 48C1 data units in an 18- or 30-button key telephone set (Call Director). Depending on what services are provided, the key telephone set will provide for control of the backup channels, for control of switching the modems to backup channels, and for control of alternate voice circuits. The 18- or 30-button key telephone set (Call Director) is not supplied with the data unit and must be ordered separately.

2.09 The direct interconnection to a maximum of six 48C1 data units mounted in a 46C1 data mounting is made via connector plugs P4 to P9. The 24 Vac transformer, bridge rectifier, regulated power supply, and the required protective fusing are an integral part of the 48D1 data unit. These provide for the operation of the 48B1 data unit, the 48C1 data unit, and the Call Director's buzzer and lamp indications.

2.10 A rear view of the 48D1 data unit showing the various connector jacks and plugs that interconnect to associated apparatus is shown in Fig. 4.



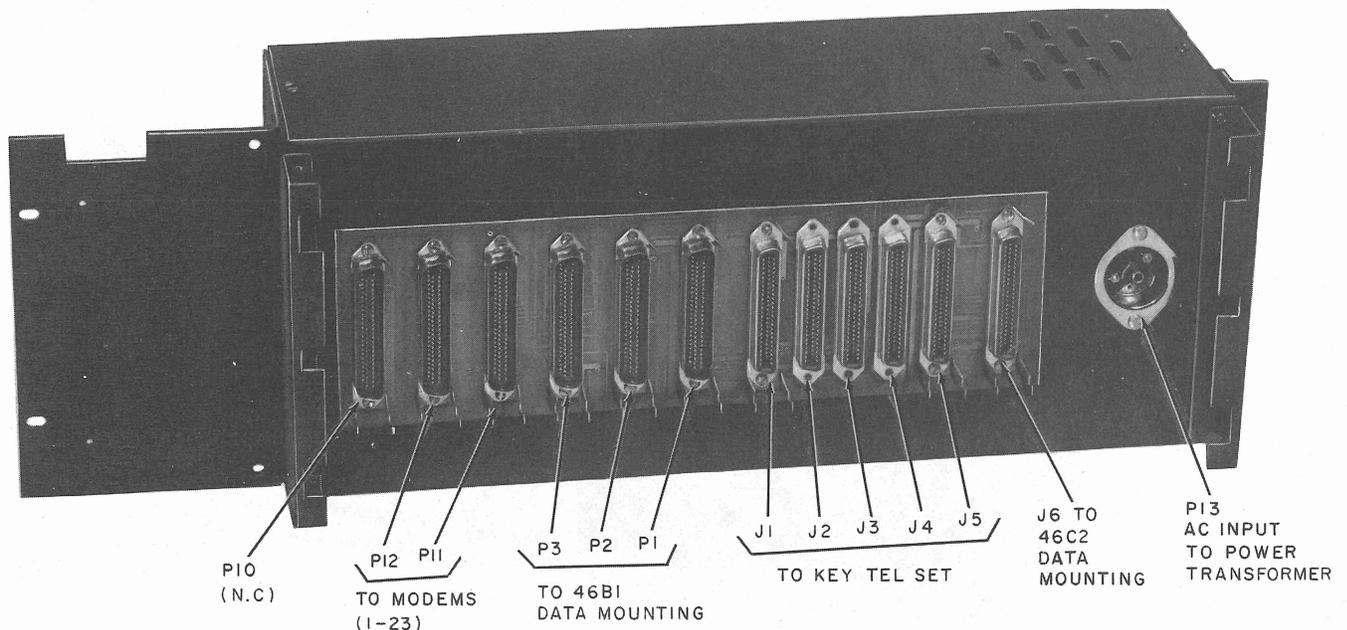


Fig. 4—Rear View of 48D1 Data Unit

2.11 The 48D1 data unit can be mounted in either a 19- or 23-inch relay rack. Mounting in KS-20018-type cabinets is recommended.

2.12 The dimensions of the 48D1 data unit are 7 inches high, 19 inches wide, and 13-1/4 inches deep. The data unit weighs approximately 24 pounds.

2.13 The 48D1 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.

B. 46C1 Data Mounting

2.14 The 46C1 data mounting, shown in Fig. 5, provides a housing for a maximum of two 48B1 data units and a maximum of six 48C1 data units.

2.15 The 46C1 data mounting provides:

- For interconnection only to Bell System provided data sets such as 201C, 202T, 208A, and 209A in any combination not exceeding 23, when the connections are concentrated to connectors P2, P3, and P4.

- For direct connection to up to three 46A1 data mountings containing up to a maximum of twenty-three 829-type data auxiliary sets via connectors J10, J11, and J12, for data-only service.
- For direct interconnections to up to three 46B1 data mountings containing a maximum of twenty-three 48A1 data units via connectors J10, J11, and J12 for alternate voice/data service.
- For direct interconnection to the 48D1 data unit via connector P1.
- For direct interconnection to up to two dial backup channels (four DDD loops) via connector J1 or via screw terminals T2A, R2A, T2B, R2B, T3A, R3A, T3B, and R3B.

These connector jacks and plugs are shown in Fig. 6.

2.16 The 46C1 data mounting must be connected to a 48D1 data unit to provide for control of the switchable dial backup arrangement. The 48B1 and 48C1 data units are installed in the 46C1 data mounting to complete the circuitry required for switched dial backup.

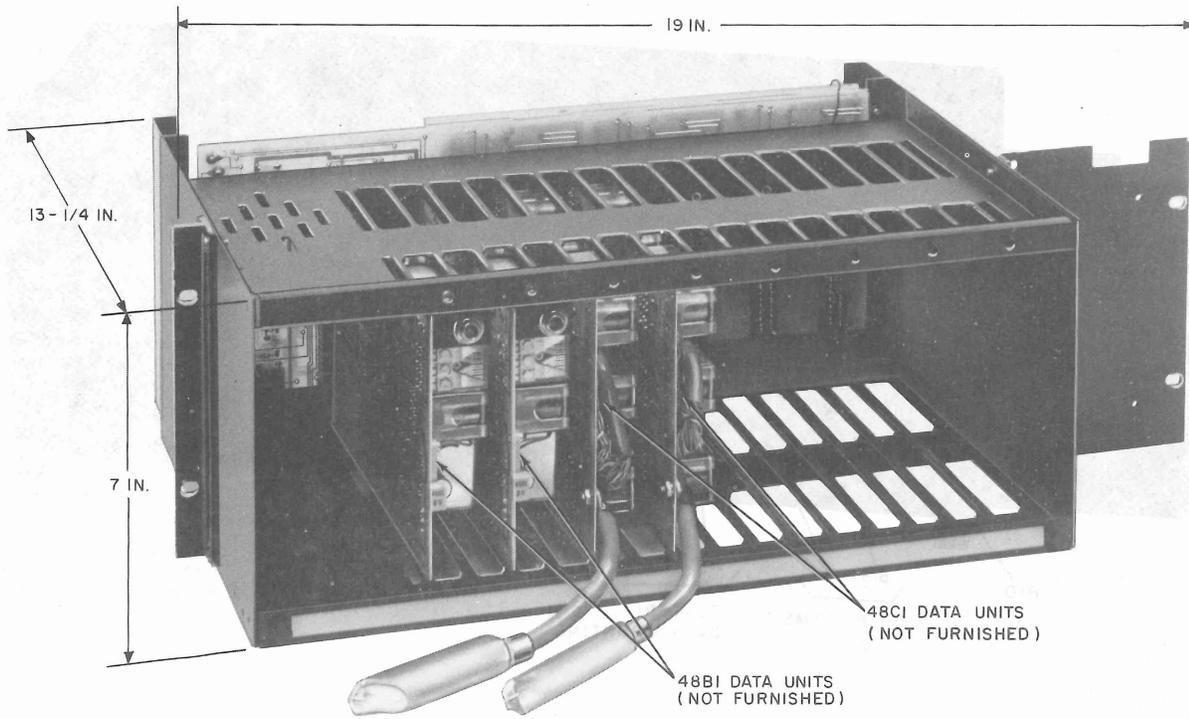


Fig. 5—Front View of 46C1 Data Mounting

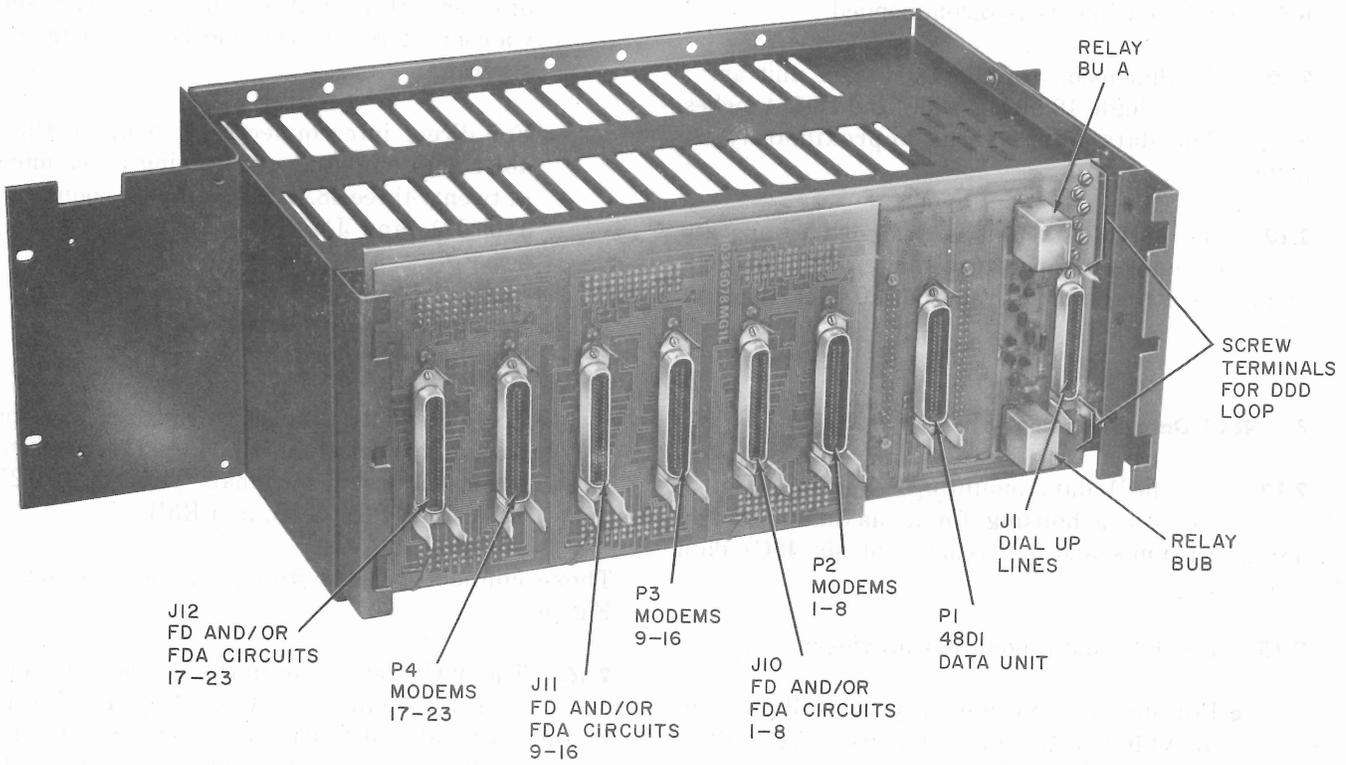


Fig. 6—Rear View of 46C1 Data Mounting

2.17 The dimensions of the 46C1 data mounting are 7 inches high, 19 inches wide, and 13-1/4 inches deep. The data mounting weighs approximately 19 pounds.

2.18 The 46C1 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.

3. FUNCTIONAL DESCRIPTION OF SWITCHED DIAL BACKUP

3.01 This part describes the operation and circuit functions of the switched dial backup circuits using the 48C1 and 48D1 data units and associated apparatus.

3.02 The connections of the standard 6-lead interface from the DAS 829-type to the 48A1 and 48C1 data units is shown in Fig. 7. When the 48A1 data units are not installed in the 46B1 data mounting, the circuit pack connectors on the 46B1 data mounting provide a through connection to the 6-lead interface from DAS 829-type. Figure 7 also illustrates the not-in-data and dial backup indication arrangements which are provided by the 48A1 and 48C1 data units and the DAS 829-type.

Note: The 46C1 circuit pack connectors do not furnish a through connection to the 6-lead interface when the 48C1 data units are not installed.

3.03 The 48A1 data unit uses the 46B1 data mounting for multiple alternate voice service. Descriptive information on this data unit is given in Section 598-082-101.

3.04 For switched dial backup, the 48B1 and 48C1 data units use the 46C1 data mounting. The 48D1 data mounting is a Call Director adapter and connects a Call Director to the 46C1 data mounting.

3.05 When the data station arrangement is in the data mode (using either the 4-wire PL or the 4-wire dial backup channel), continuity exists between the TEK5 and TEK6 leads. When the modem is connected to the 4W PL channel, continuity can be interrupted by either the DAS 829-type being in the loop-back mode (the LBI relay operated) or the 48A1 data unit being in the voice mode (the TK relay operated). Continuity between the TEK5

and TEK6 leads is provided by the 48C1 data unit (the M1 relay is operated) when the modem has been switched to the dial backup channel. While in the dial backup mode, the not-in-data indication is controlled by the 48C1 data unit to allow for either the testing and/or removal of the DAS 829-type or for the use of the 48A1 data unit.

3.06 The standard 6-lead interface is increased to an 8-lead interface when dial backup service is used. The additional interface pair (DBU1—DBU2) provides a dial backup indication to the modem. Continuity between the DBU1 and DBU2 leads is provided by the 48C1 data unit when the modem is switched to a dial backup channel and the M1 relay is operated.

Note: The dial backup status indication provided by the 48B1 data unit is not used to control the interface indication when switchable dial backup is provided.

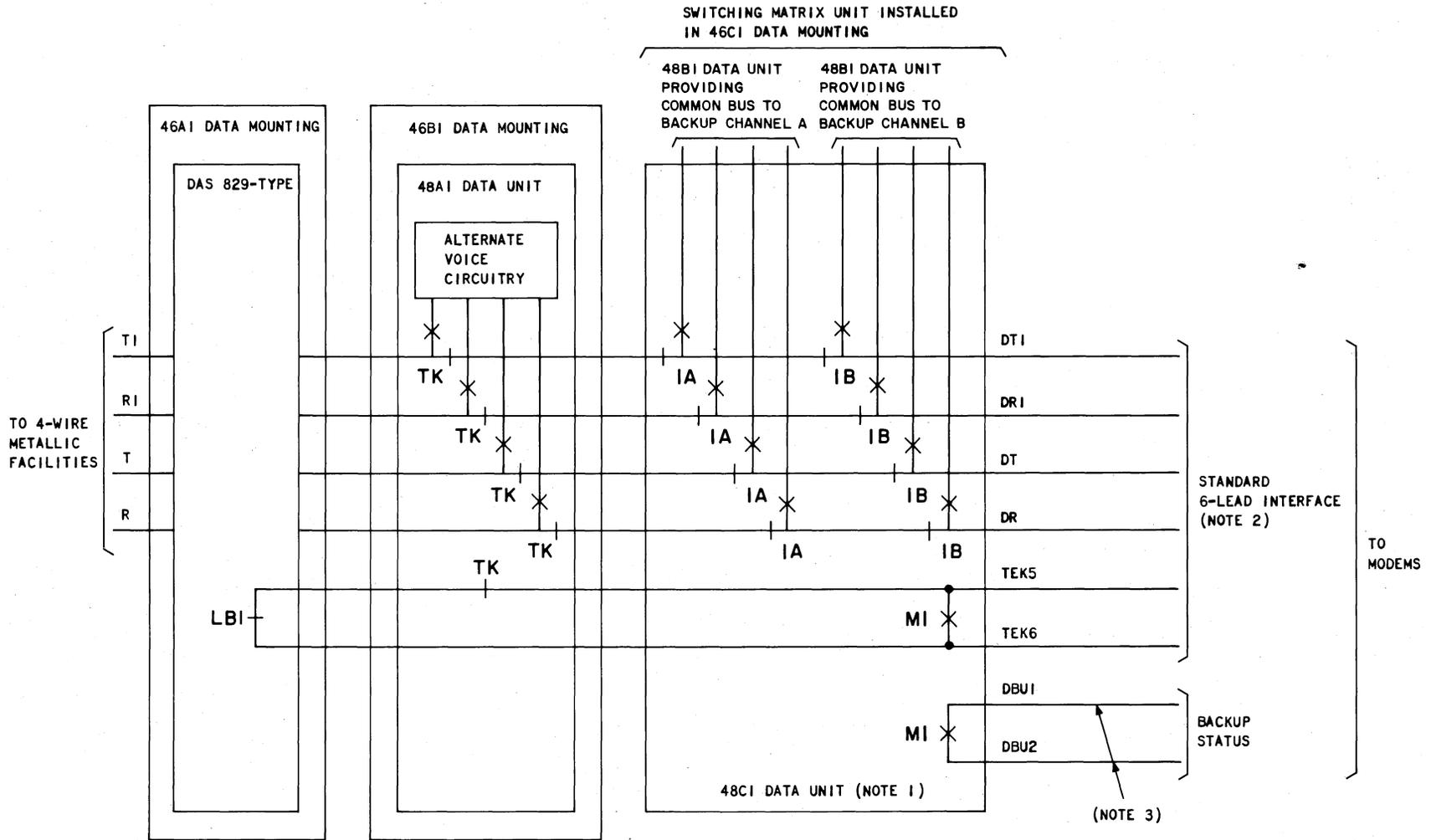
A. Switched Dial Backup Circuit Operation

3.07 A simplified functional diagram of the switched dial backup logic circuitry is shown in Fig. 8. The transmission portion of Fig. 8 is the same as shown in Fig. 7. Fig. 8 shows the switching logic required to control dial backup channel A, to switch modem 1 to backup channel A, and the logic required to provide alternate voice service on the 4W PL provided for modem 1. The operation and circuit functions of the data units, data mounting, and associated key telephone set for switchable dial backup is briefly described below.

3.08 The 48B1 data unit establishes channel A or channel B for use as dial backup. The 48B1 data unit provides a backup channel to a bus arrangement on the 48C1 data unit. This bus arrangement is used for switching to a particular modem whose regular private line is out of service or otherwise unuseable.

3.09 The 48B1 data unit is used to establish the backup channel and is controlled by the key telephone set (Call Director). The 48C1 data unit contains the switching matrix and memory state. These logic functions are controlled by switching circuitry contained in the 46C1 data mounting and 48B1 data unit.

3.10 Two separate calls are made on the dial backup pairs selected on the Call Director.



NOTES:

1. EACH 48CI DATA UNIT PROVIDES SWITCHING FOR ANY OF FOUR MODEMS TO EITHER ONE OF TWO BACKUP CHANNELS. THE SWITCHING ARRAY FOR ONE MODEM IS SHOWN. RELAYS IA AND IB WILL SWITCH THE MODEM TO BACKUP CHANNELS A AND B RESPECTIVELY. THE RELAY MI IS OPERATED WHEN EITHER RELAY IA OR IB IS OPERATED.

2. THE REMAINING THREE SWITCHING ARRAYS PROVIDED BY THE 48CI DATA UNIT HAVE THE NUMERICAL DESIGNATIONS 2, 3, AND 4 (SEE FIG. 2).
3. THE STANDARD 6-LEAD MODEM INTERFACES ARE CONCENTRATED IN CONNECTORS P2, P3, AND P4 OF THE 46CI DATA MOUNTING.
4. THE BACKUP STATUS LEADS FOR THE MODEM INTERFACES ARE CONCENTRATED IN CONNECTORS P11 AND P12 OF THE 48BI DATA UNIT. THESE LEADS ARE NOT SUPPLIED UNLESS REQUIRED.

Fig. 7—Standard 6-Lead Interface Connection to and Modified by the 48A1 and 48C1 Data Unit

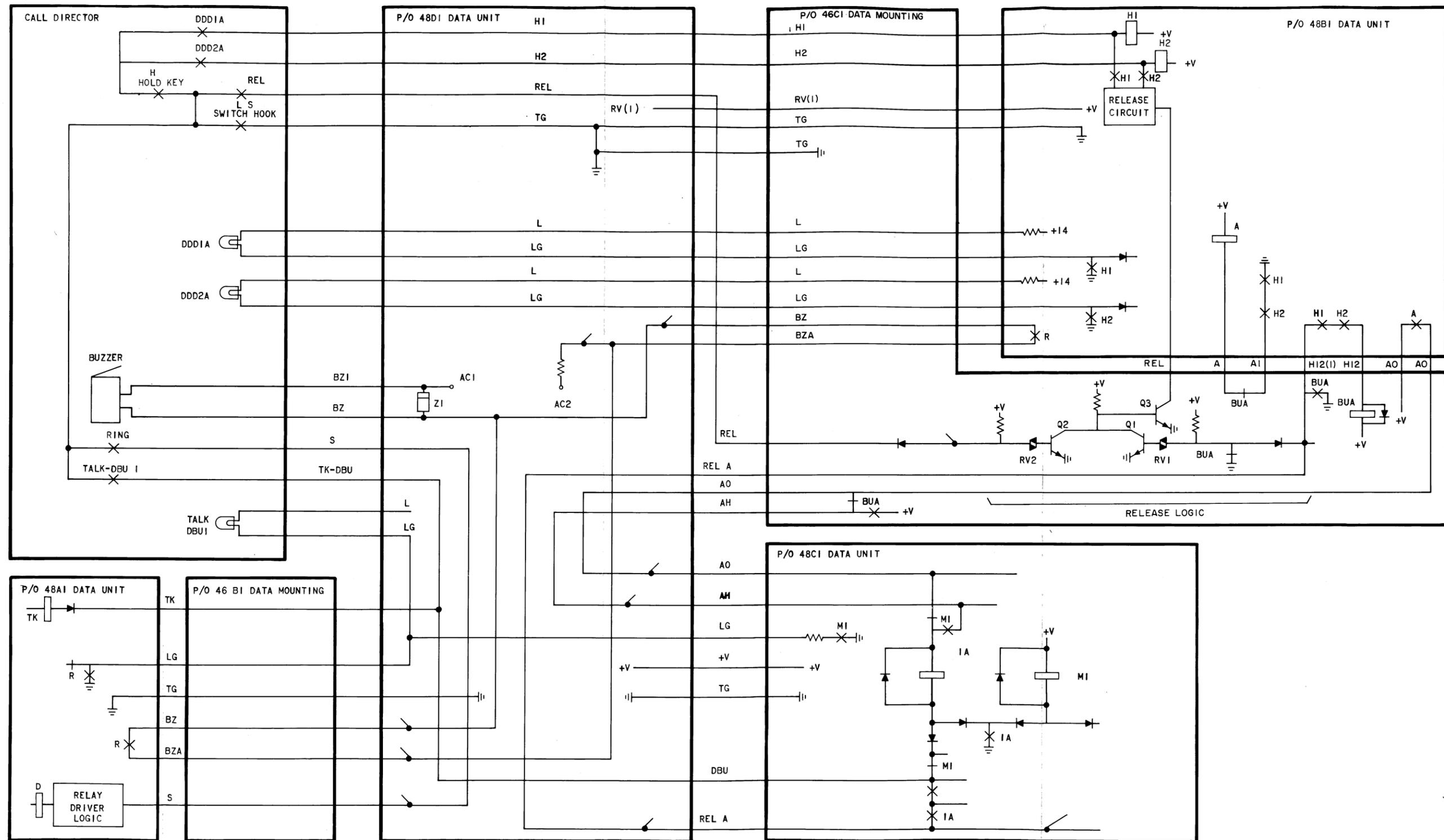


Fig. 8—Simplified Functional Diagram of Switched Dial Backup Circuitry

The pickup keys for an 18-button Call Director providing control for two backup channels, control of the switching matrix for eleven modems, and control of eleven FDA circuits are assigned as shown below.

	REL	RING	TALK — DBU6
*	DDD1A	TALK — DBU1	TALK — DBU7
	DDD2A	TALK — DBU2	TALK — DBU8
†	DDD1B	TALK — DBU3	TALK — DBU9
	DDD2B	TALK — DBU4	TALK — DBU10
	HOLD	TALK — DBU5	TALK — DBU11

* Backup Channel A

† Backup Channel B

The backup pairs of DDD1A and DDD2A for channel A are selected as shown in Fig. 8. After the calls are made, the two line pairs are put on HOLD. The H1 and H2 relays are now operated which in turn supply a ground through their closed contacts to operate the "A" relay. The DDD1A plus DDD2A lamps are lighted when the H1 and H2 relays are operated.

Note: A modem for dial backup cannot be selected until the "A" relay on the 48B1 data unit has operated.

3.11 The "A" backup channel can now be assigned to any one of the modems. At the Call Director, one of the pickup keys designated TALK-DBU1 through TALK-DBU11 is depressed. When the key TALK-DBU1 is depressed, a ground is applied to the switching matrix on the 48C1 data unit controlling the 6-lead interface for modem 1. In this illustration the TALK-DBU1 key causes the A1 relay to operate. Contacts of relay 1A transfer the modem from the private line to the dial backup channel supplied by the 48B1 data unit

as shown in Fig. 7. Another set of contacts of relay 1A also supplies a ground path to the M1 relay. Relay M1 now operates.

3.12 When relay M1 on the 48C1 data unit operates, several events occur simultaneously. These are as follows:

- Provides a lamp ground, through a resistance, for the selected pickup key (TALK-DBU1 in Fig. 8) on the Call Director. This lamp ground provides that the selected pickup key lamp will remain on when the key telephone is on-hook.
- Provides a Not-in-Data indication on the TEK5 and TEK6 leads.
- Provides a memory function and control of the modem that has been transferred to dial backup.
- The backup A (BUA) relay on the 46C1 data mounting operates.
- The operation of the BUA relay releases the A relay on the 48B1 data unit.

The modem has now been transferred and is held in the backup condition.

Release Operation

3.13 To release the modem from the dial backup condition, take the Call Director receiver off-hook and depress the lighted TALK-DBU or DBU pickup key associated with the modem to be released from the dial backup mode. The ground supplied by this pickup key partially enables the logic circuit provided by the 46C1 data mounting. To complete the required release sequence the nonlocking REL key is depressed. With the REL and the TALK-DBU1 key depressed, the REL lead to the 48B1 data unit is grounded releasing the H1 and H2 relays. This in turn releases the BUA relay. The release of the BUA relay removes the DC potential from the DBU matrix on the 48C1 resulting in the release of the A1 and M1 relays. When the key telephone is off-hook and the REL key is depressed, all the DDD lines that are on HOLD and are not being used for dial backup, ie, relays DBUA or DBUB are not operated, will be returned to normal. The modem is then transferred back to the normal private line circuit.

B. Alternate Voice Calling Sequence

3.14 Alternate voice circuits (using 48A1 data units installed in 46B1 data mountings) are concentrated through a 48D1 data unit in an 18- or 30-button key telephone set. To originate a voice call using the 48A1 data unit, perform the following:

- (a) Place the key telephone off-hook.
- (b) Depress the desired TALK or TALK-DBU key.
- (c) The TALK or TALK-DBU key lamp will be on when the 48A1 data unit is in the voice mode.

Note: When the Nth channel is in the dial backup mode, the DBU-N or TALK-DBU-N key lamp will be on. The key lamp indication for the dial backup mode is not as bright as that provided for alternate voice mode. Therefore, when the Nth circuit is in the dial backup mode, the key telephone is off-hook and the TALK-DBU-N key is depressed, the TALK-DBU-N key lamp becomes brighter.

- (d) Depress the RING key until the audible ringback signal is heard in the receiver. The far end will continue to ring approximately 40 seconds after the ringdown signal is received. When the audible ringback signal ceases, the RING key can be depressed again to initiate a new ring cycle.

Note: When the far end is equipped with a DAS 828A there will be no audible ringback signal. In this case depress the RING key until the far end responds.

3.15 To answer a call using the alternate voice circuits, perform the following:

- (a) Depress the TALK or the TALK-DBU key associated with the flashing lamp.

Note: When the Nth channel is in the dial backup mode the TALK-DBU-N key lamp will be on. The lamp indication for alternate voice ringing will cause the TALK-DBU-N key lamp to flash brighter during the interval the key telephone buzzer is on.

- (b) Place the telephone off-hook.

3.16 To terminate a call:

- (a) Depress and release the HOLD key to return the TALK or TALK-DBU key to its normal (unoperated) position. If a TALK key was released, the TALK key lamp will be off indicating the 4W PL channel is in the data mode. If a TALK-DBU key was released, one of two lamp indications can occur. First, if the TALK-DBU lamp is off, it indicates the modem is in the data mode on the 4W PL channel. If the TALK-DBU lamp remains on, and the lamp illumination is not as bright as the illumination when in the TALK mode, it indicates the modem is in the data mode on a dial backup channel.

- (b) Place the telephone on-hook.

C. Switchable Dial Backup Call Sequence

3.17 The calling sequence used in a switchable dial backup arrangement varies in only one respect from the calling sequence required when either the DAS 828C or the 48B1 data unit installed in a 45A1 data mounting is used. The dial backup service previously provided was for use with a single modem. The dial backup mode for a single modem was established, as described in Section 598-082-101. After the 4W backup channel was established and the DDD1 and DDD2 key lamps were on, the modem was automatically switched to the dial backup channel.

3.18 With switchable dial backup, the 4W dial backup channel must first be established; then, using the Call Director, a modem is selected to be switched to the backup channel. The 46C1 data mounting provides for up to two 4W-dial backup channels designated A and B. The 2-wire lines required for Channel A are controlled by the pickup keys designated DDD1A and DDD2A. The 2-wire lines required for Channel B are controlled by the pickup keys designated DDD1B and DDD2B.

Note: Only the indicated channels can be used for dial backup. For example, a dial backup channel **cannot** be established using pickup keys DDD1A and DDD2B.

Originating

3.19 The sequence begins with Station A (at the near end) deciding for some reason, such as the inability to send data via the PL, that a backup connection should be made.

3.20 In the following sequence, a 30-button Call Director controlling up to 23 modems is used for Station A. It is assumed the far end is a single installation provided by the DAS 828C, or by the 48B1 data unit installed in the 45A1 data mounting. To provide a switchable dial backup channel for modem 19, perform the following steps:

- (a) At the Call Director, select an unused dial backup channel. Assume channel A is chosen.
- (b) Complete a call between DDD1A and the far end DDD2.
- (c) When the call is satisfactorily completed, place both ends on HOLD. The DDD1A lamp and the DDD2 lamps are on providing a visual indication of the HOLD mode.
- (d) Complete a call between DDD2A and the far end DDD1.
- (e) When the call is satisfactorily completed, place both ends on HOLD. The DDD2A and the DDD1 lamps are on providing a visual indication of the HOLD mode.
- (f) The far end station is in the dial backup mode when the DDD1 and DDD2 lamps are on. This completes the far end calling procedure and the handset may be placed on-hook.
- (g) The Call Director has established a backup channel when the DDD1A and DDD2A lamps are on. A modem may now be selected for transfer to the backup channel.
- (h) To transfer modem 19 to the dial backup channel requires the following:
 - (1) A backup channel has been established.
 - (2) The key telephone is off-hook.
 - (3) The DBU-19 or TALK-DBU-19 pickup key is depressed.

- (i) When the TALK-DBU-19 key is depressed, the key lamp lights.

Note: The lamp indication has a dual purpose. First, it indicates the 19th 4W PL is in the alternate voice mode. Second, since a dial backup channel was established, the lamp should also indicate that modem 19 is on dial backup.

- (j) The TALK-DBU-19 key is released by depressing and releasing the HOLD key. The TALK-DBU-19 lamp remains on indicating that modem 19 is in the dial backup mode.
- (k) The sequence is completed by placing the handset on-hook. The DDD1A, DDD2A, and TALK-DBU-19 key lamps remain on as an indication of the dial backup mode.

3.21 The above sequence established one dial backup channel. The procedure could now be repeated, using channel B, to establish a second dial backup channel. Having established a second channel, another modem could be switched to dial backup. With two modems switched to dial backup and the key telephone on-hook, key lamp DDD1A, DDD2A, DDD1B, DDD2B, TALK-DBU-N, and TALK-DBU-M would be on. The actual indication of a modem being in the dial backup mode is given by the TALK-DBU-N (or DBU-N) key lamp being on with the pickup key in the normal (released) position.

Releasing

3.22 Once the Nth private line is cleared for data transmission, modem N may be transferred back to the 4W PL by placing the handset off-hook, depressing the TALK-DBU-N (or DBU-N) pickup key, and depressing the REL key. Depress and release the HOLD key to return TALK-DBU-N (or DBU-N) to normal and place the key telephone on-hook. This procedure returns modem N to the 4W PL data mode and returns the dial backup channel to normal. For example, assume as in the preceding example, that modem 19 is connected to dial backup channel A and furthermore that modem 8 is connected to dial backup channel B. For these conditions, the following key lamps are lit when the key telephone is on-hook: DDD1A, DDD2A, DDD1B, DDD2B, TALK-DBU-8, and TALK-DBU-19. If modem 19 is to be returned to

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the 4W PL data mode, perform the following procedure:

- (a) Place key telephone off-hook.
- (b) Depress TALK-DBU-19 pickup key.
- (c) Depress the REL key. The DDD1A and DDD2A key lamps extinguish indicating backup channel A has released. The TALK-DBU-19 lamp is lit as the 19th 4W PL is in the alternate voice mode until the TALK-DBU-19 pickup key is released.
- (d) Depress and release the HOLD key to return the TALK-DBU-19 pickup key to normal. The TALK-DBU-19 key lamp is extinguished and modem 19 is in the 4W PL data mode.
- (e) Place the key telephone on-hook to complete the procedure.

In this example, key lamps DDD1B, DDD2B, and TALK-DBU-8 remain on indicating that modem 8 is still in the dial backup mode.

4. POWER SUPPLIES

4.01 The 48D1 data unit provides the following power supplies:

- A separately fused unregulated dc supply of +33 Vdc for each 48B1 data unit installed in the 46C1 data mounting.
- A separately fused unregulated dc supply of +33 Vdc for both the switched dial backup circuits (furnished by the 46C1 data mounting and associated 48C1 data units) and the regulated +12 Vdc key telephone lamp supply.

- A 24 Vac supply, having a fused primary, providing for the above dc supplies and for the key telephone buzzer supply.

4.02 The transformer used in the 48D1 data unit operates on 105 to 129 volts ac and on a frequency range of from 58 to 62 Hz.

5. REFERENCES

5.01 The following documents provide additional information on facilities and equipment associated with the 48C1 and 48D1 data units and the 46C1 data mounting.

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

SECTION	TITLE
598-082-100	Data Auxiliary Set 829-Type— Channel Interface Units—Voiceband Private Line Channels—Description
598-082-101	Data Auxiliary Set 829-Type— Supplementary Functions for Voiceband Private Line Channels (Alternate Voice and Dial Backup)—Description
598-082-180	Data Auxiliary Set 829-Type— Channel Interface Units—Voiceband Private Line Channels—Summarizing Specification
598-082-202	Data Auxiliary Set 829-Type— Multiple Channel Arrangements (Switched Dial Backup)—Installation and Connections
598-082-502	Data Auxiliary Set 829-Type— Multiple Channel Arrangements (Switched Dial Backup)—Test Procedures