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

CONTENTS PAGE

1. GENERAL

1.01 This section contains information and instructions for the installation and connection of supplementary data units and data mountings. These units are used in conjunction with data auxiliary set (DAS) 829-type. This section does not cover the installation of modems used in conjunction with the data units and associated data mountings.

1.02 The supplementary functions furnished are those of alternate voice and/or dial backup. These functions are provided by the 48A1 data unit and 48B1 data unit, respectively, in conjunction with DAS 829-type.

1.03 The DAS 829-types are referred to as channel interface units (CIUs). The CIUs provide standard, prewired, tested station arrangements for terminating 4-wire private line voiceband data channels. The standard data transmission arrangement is referred to as a full data (FD) arrangement. Descriptive information on the DAS 829-type is given in Section 598-082-100.

1.04 Three types of station arrangements can be provided by using the supplementary data units along with a CIU mounted in the 45A1 data mounting. These arrangements are:

(a) Full data with alternate voice (FDA)

(b) Full data with dial backup

(c) Full data with alternate voice and dial backup

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 telecommunication network through data access arrangements (DAAs) and should assume responsibility to transfer the modem from the private line to the switched network.

Descriptive information on the supplementary data units is given in Section 598-082-101. A multiple FDA arrangement can be provided using 46A1 and 46B1 data mountings.

1.05 Two types of data mountings are used to house the supplementary data units. These are as follows:

- ***45A1 Data Mounting***—This data mounting houses a single 829-type, and either a 48A1 data unit or a 48B1 data unit, or both the 48A1 and 48B1 data units. The data mounting may be either wall-, desk-, or shelf-mounted.

- ***46B1 Data Mounting***—This data mounting houses up to eight 48A1 data units. It is intended for rack mounting on 19- or 23-inch relay racks or KS-20018-type cabinets.

2. CONNECTIONS

A. 45A1 Data Mounting

2.01 For single channel installations, the 45A1 data mounting is used and is shown in Fig. 1. The functional diagram is shown in Fig. 2.

2.02 The 45A1 data mounting should be located close to the modem. The mounting can be wall-, desk-, or shelf-mounted. The overall size of the 45A1 data mounting permits installation of two 45A1 data mountings (side by side) on a 23-inch shelf.

2.03 The 45A1 data mounting may be wall-mounted using a 193A backboard. The 193A backboard is not furnished as part of the 45A1 data mounting and must be ordered separately.

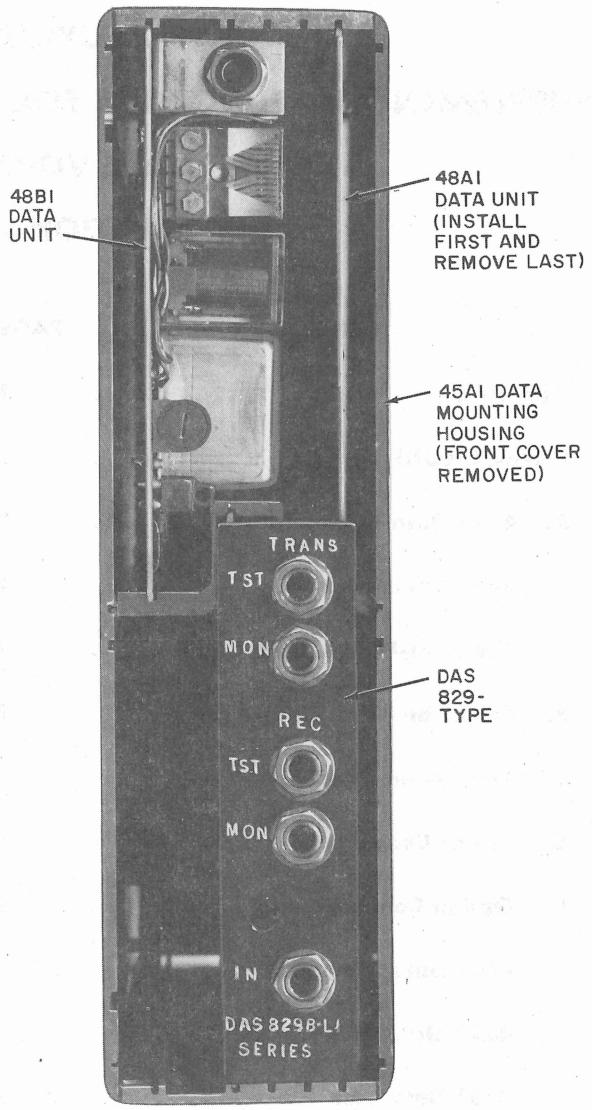

Fig. 1—Front View of 45A1 Equipped With DAS 829-Type, a 48A1 Data Unit, and a 48B1 Data Unit

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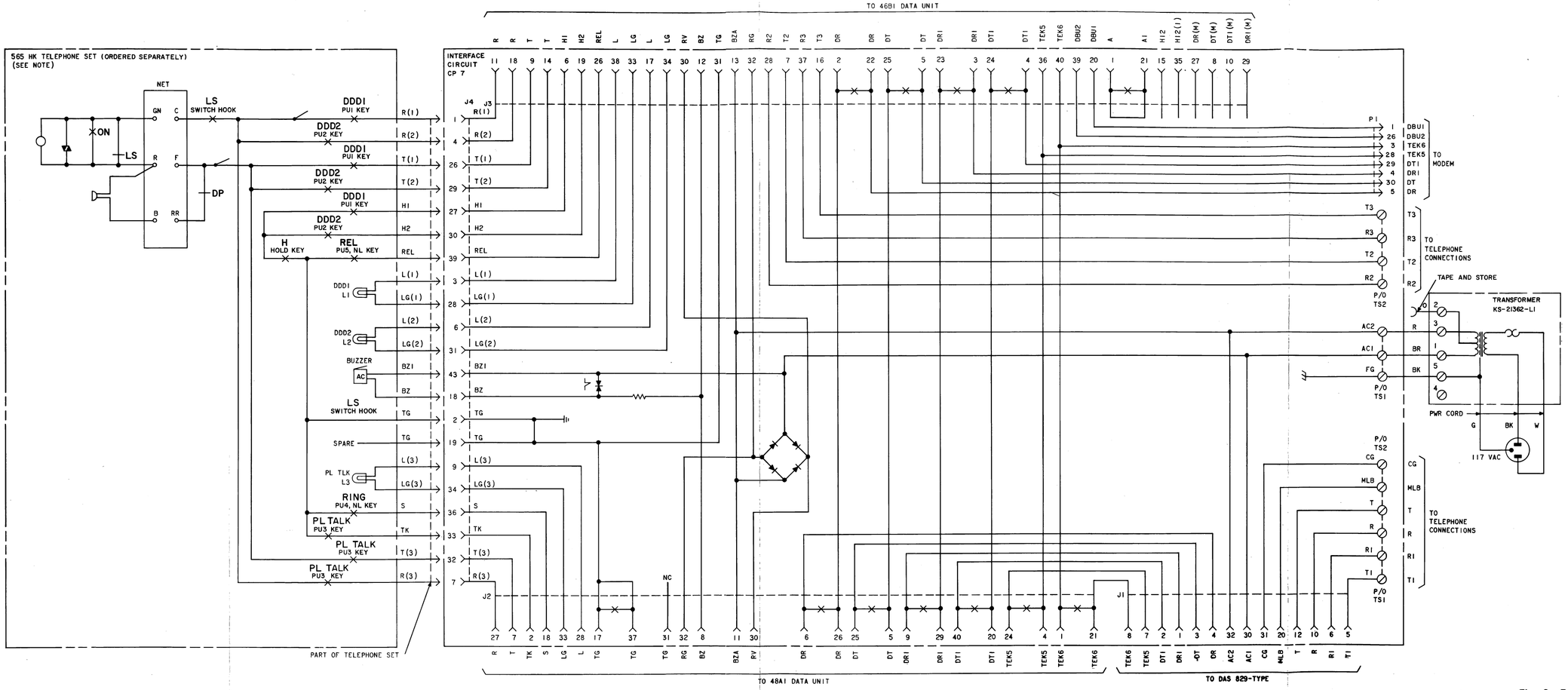
2.04 The new private line data sets 201C, 202T, 208A, 209A, and all new private line data sets connect directly to the 50-pin interface (P1) of the 45A1 data mounting using the M8K-61 cord. If the length of the cable connecting the CIU to the data set is greater than 6 feet, an extension using B25A cable may be used. The length of cable permitted between the CIU and the data set is shown in Fig. 3.

2.05 Data set 202D connects to the 50-pin interface (P1) of the 45A1 data mounting using the D50AA-3 cord in place of the D6AA-61 cord supplied with the data set. The length of cable permitted between the CIU and data set 202D is shown in Fig. 3.

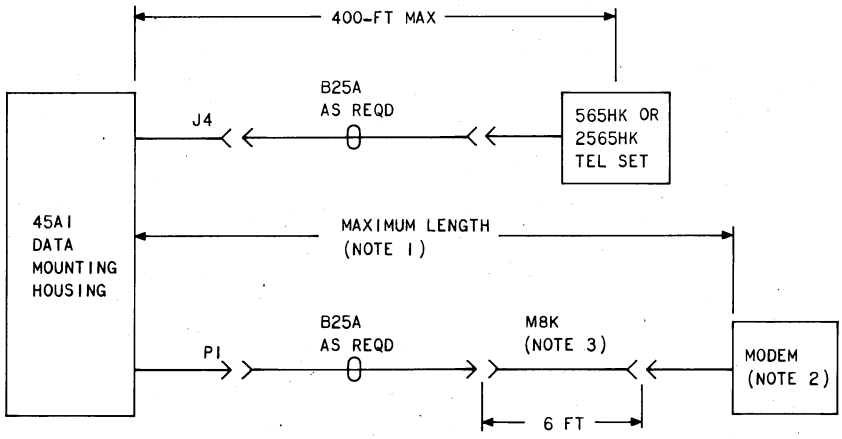
2.06 The 6-button key telephone set (a 565 HK or a 2565 HK) is connected to the 45A1 data mounting through a 50-pin jack, J4. The 6-button key telephone set is not supplied as part of the 45A1 data mounting and must be ordered separately. The length of the cable connecting the CIU to the telephone set may be extended



NOTE:
THIS DIAGRAM SHOWS THE TELEPHONE SET EQUIPPED FOR FDA AND DIAL BACKUP SERVICE. THE FOLLOWING CHANGES HAVE BEEN MADE:

636A KEY LEADS				
COLOR	BR	S-R	Y	O-BK
REMOVE FROM	M	M	M	N
CONNECT TO	X	N	TAPE AND STORE	M

Fig. 2—Functional Diagram of 45A1 Data Mounting



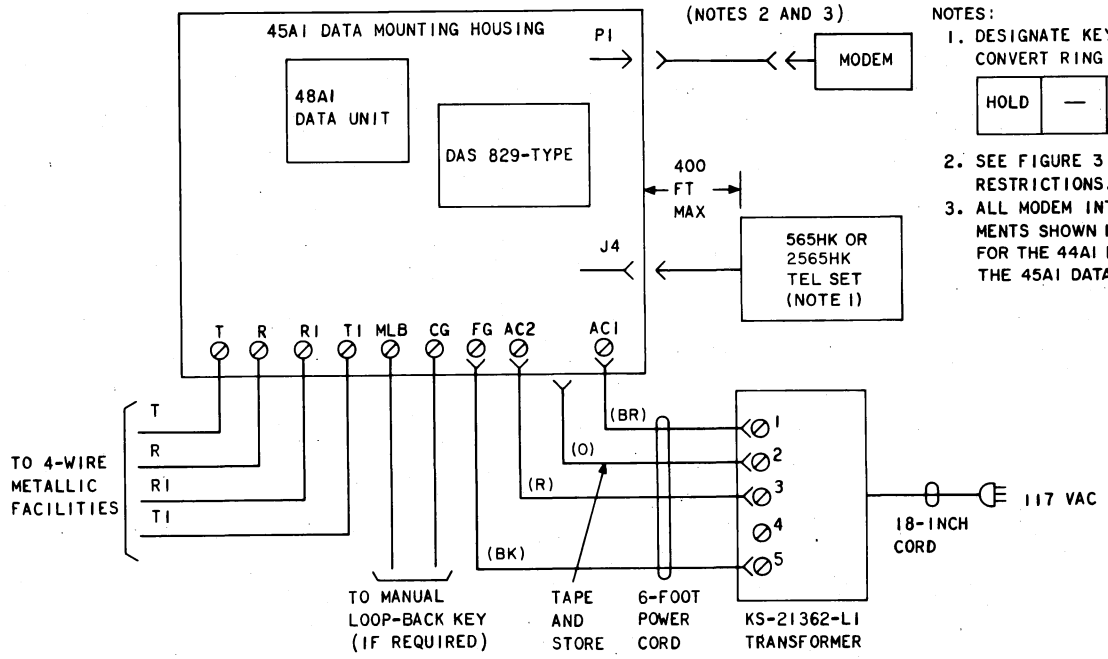
NOTES:

1. DATA SET — MAX LENGTH IN FT.
   - 201C — 1400
   - 202D — 500
   - 202T — 200
   - 208A — 1400
   - 209A — 1400
2. ALL MODEM INTERCONNECTION ARRANGEMENTS SHOWN IN SECTION 598-082-200 FOR THE 44A1 DATA MOUNTING APPLY TO THE 45A1 DATA MOUNTING (WITH THE EXCEPTION THAT MODEMS REQUIRING THE ADDITIONAL INTERFACE PAIR INDICATING DIAL BACKUP CANNOT USE THE KS-21253 ADAPTERS).
3. THE M8K CORD IS NOT USED WITH DATA SET 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D.

Fig. 3—Connection Diagram Showing Cable Length Restrictions

using B25A cable. However, the maximum length should not exceed 400 feet.

2.07 External connections that are required to the 45A1 data mounting for the three types of station arrangements as given in 1.04 are shown in Fig. 4, 5, and 6.



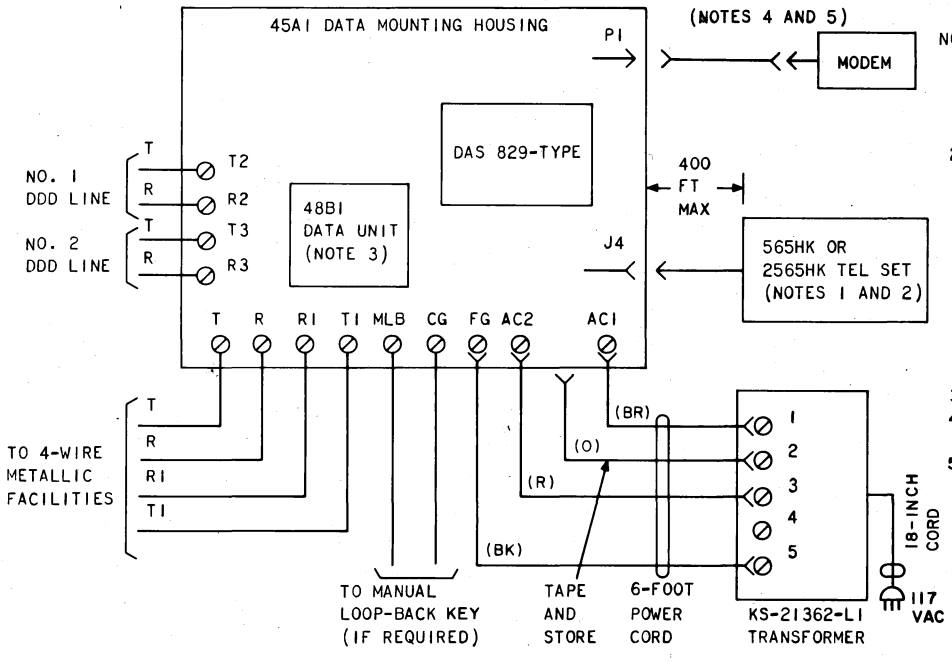
NOTES:

1. DESIGNATE KEY STRIP AS SHOWN. CONVERT RING BUTTON TO NONLOCKING.

HOLD	—	—	PL TALK	RING	—

2. SEE FIGURE 3 FOR B25A CABLE LENGTH RESTRICTIONS.
3. ALL MODEM INTERCONNECTION ARRANGEMENTS SHOWN IN SECTION 598-082-200 FOR THE 44AI DATA MOUNTING APPLY TO THE 45AI DATA MOUNTING.

Fig. 4—Connection Diagram for Full Data—Alternate Voice at Station



NOTES:

1. DESIGNATE KEY STRIP AS SHOWN. CONVERT REL BUTTON TO NONLOCKING.

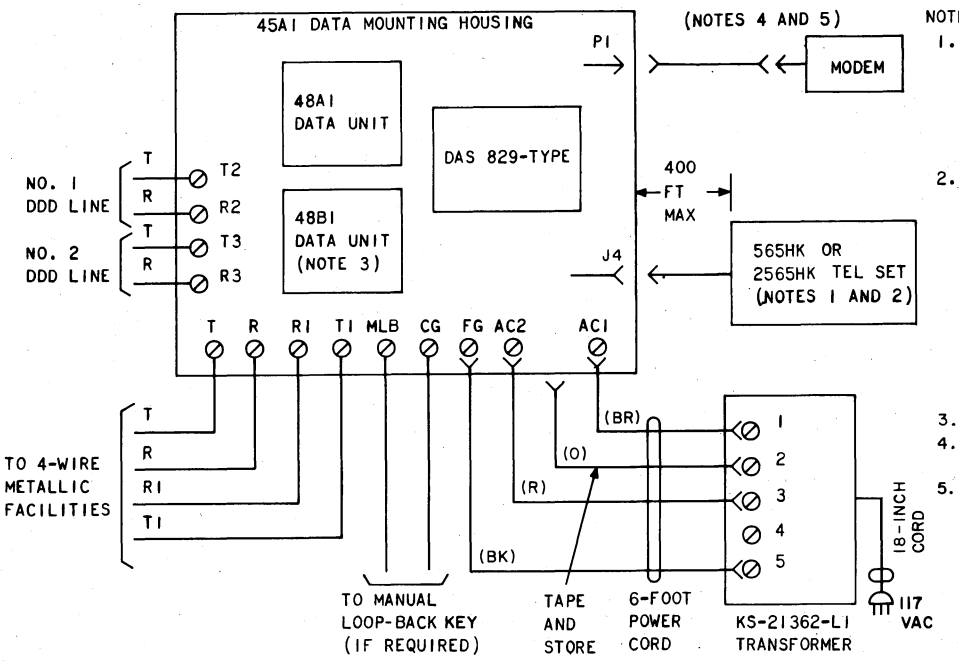
HOLD	DDD1	DDD2	—	—	REL

2. MODIFY TEL SET AS FOLLOWS:

636A KEY LEADS		
COLOR	REMOVE FROM	CONNECT TO
BR	M	X
S-R	M	N
Y	M	TAPE AND STORE
O-BK	N	M

3. INSTALL REQUIRED "SLOPE EQUAL" OPTION.
4. SEE FIGURE 3 FOR B25A CABLE LENGTH RESTRICTIONS.
5. ALL MODEM INTERCONNECTION ARRANGMENTS SHOWN IN SECTION 598-082-200 FOR THE 44AI DATA MOUNTING APPLY TO THE 45AI DATA MOUNTING (WITH THE EXCEPTION THAT MODEMS REQUIRING THE ADDITIONAL INTERFACE PAIR INDICATING DIAL BACKUP CANNOT USE THE KS-21253 ADAPTERS).

Fig. 5—Connection Diagram for Full Data—Dial Backup at Station



NOTES:

1. DESIGNATE KEY STRIP AS SHOWN. CONVERT RING AND REL BUTTON TO NONLOCKING.

HOLD	DDD1	DDD2	PL TALK	RING	REL

2. MODIFY TEL SET AS FOLLOWS:

636A KEY LEADS		
COLOR	REMOVE FROM	CONNECT TO
BR	M	X
S-R	M	N
Y	M	TAPE AND STORE
O-BK	N	M

3. INSTALL REQUIRED "SLOPE EQUAL" OPTION.
4. SEE FIGURE 3 FOR B25A CABLE LENGTH RESTRICTIONS.
5. ALL MODEM INTERCONNECTION ARRANGMENTS SHOWN IN SECTION 598-082-200 FOR THE 44A1 DATA MOUNTING APPLY TO THE 45A1 DATA MOUNTING (WITH THE EXCEPTION THAT MODEMS REQUIRING THE ADDITIONAL INTERFACE PAIR INDICATING DIAL BACKUP CANNOT USE THE KS-21253 ADAPTERS).

Fig. 6—Connection Diagram for Full Data With Alternate Voice and Dial Backup at Station

2.08 Connections to be made when the full data with alternate voice service is to be provided on a single channel are shown in Fig. 4. In this arrangement, the 45A1 data mounting is equipped with a DAS 829-type and a 48A1 data unit. The telephone set requires no wiring changes. The fourth pickup key, designated RING, must be converted to nonlocking operation. The telephone key strip should be labeled as follows:

HOLD	—	—	PL TALK	RING	—

2.09 Connections to be made when the full data with dial backup service is to be provided on a single channel are shown in Fig. 5. In this arrangement, the 45A1 data mounting is equipped with a DAS 829-type and a 48B1 data unit. The telephone changes required are shown in the note of Fig. 2. The fifth pickup key, designated REL, must be converted to nonlocking operations. The telephone key strip should be labeled as follows:

HOLD	DDD1	DDD2	—	—	REL

2.10 Connections to be made when the full data with alternate voice and dial backup service is to be provided on a single channel are shown in Fig. 6. In this arrangement, the 45A1 data mounting is equipped with a DAS 829-type, a 48A1 data unit, and a 48B1 data unit. The telephone set wiring should be converted as shown in the note of Fig. 2. The fourth and fifth pickup keys must be converted to nonlocking operations. The telephone key strip should be labeled as follows:

HOLD	DDD1	DDD2	PL TALK	RING	REL

Customer-Provided Modems

2.11 Customer-provided (CP) modems may be plugged into P1 of the 45A1 data mounting

using a 153D adapter. This adapter is described in Section 461-200-102. The line status pair TEK 5 and TEK 6 (normally not required by the customer) does not terminate in the 153D adapter. The line status pair using a locally wired arrangement can be provided if requested by the customer. The 45A1 data mounting would be used only for FDA service since dial backup is not provided for CP modems.

B. 46B1 Data Mounting

2.12 For multiple FDA installations, the 46B1 data mounting is used to house up to a maximum of eight 48A1 data units. The functional diagram of the 46B1 data mounting is shown in Fig. 7. The 24 Vac transformer, diode bridge, and protective fusing are integral parts of the 46B1 data mounting.

2.13 The 46B1 data mounting, described in Section 598-082-101, can be used to provide alternate voice service for some or all or part of the 4-wire private lines terminated by the DAS 829-type.

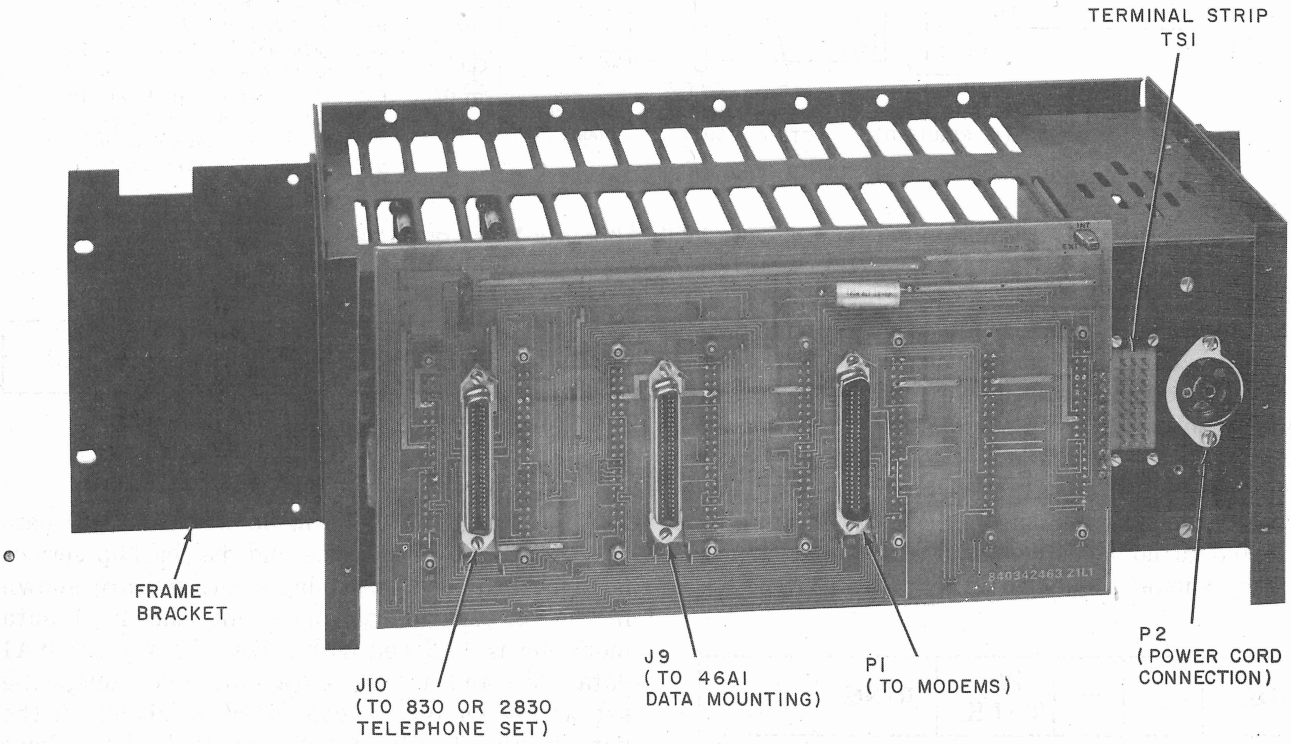


Fig. 7—Rear View of 46B1 Data Mounting

2.14 All interface connections to the 46B1 data mounting are made through 50-pin connectors. Jack J9, shown in Fig. 8, provides connection to the 46A1 data mounting which in turn provides for up to eight DAS 829-type. Up to eight modems may interface at plug P1. Connection to either a 830- or 2830-type 10-button key telephone set is made at connector J10. No telephone wiring changes are required. The ninth pickup key, designated RING, should be converted to nonlocking operation. The telephone key strip should be labeled as follows:

HOLD	PL TALK1	PL TALK2	PL TALK3	PL TALK4	PL TALK5	PL TALK6	PL TALK7	PL TALK8	RING

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2.15 A multiple arrangement showing the connections used in providing full data and alternate voice service is shown in Fig. 9. The B25A cable is used to interconnect the 46A1 and 46B1 data mountings and the 830- or 2830-type key telephone set.

2.16 The cable length restriction on the distance between the 46B1 data mounting and key telephone set is also shown in Fig. 9. The distance between the key telephone set and the 46B1 data mounting is limited to 400 feet (or a maximum loop resistance of 20 ohms). This will ensure that the pickup keys and lamps function properly.

C. Power Connections

2.17 The power supply for the 45A1 data mounting should be connected as shown in Fig. 2. The KS-21362-L1 transformer, the bridge rectifier, and the 6-foot power cord are furnished as part of the 45A1 data mounting.

2.18 The power supply used for multiple installation of the 48A1 data unit is an integral part of the 46B1 data mounting. Each 46B1 data mounting provides a separate 24 Vac supply for a maximum of eight 48A1 data units. The 46B1 data mounting is connected to 117 Vac source using a 4-foot power cord supplied as part of the data mounting. This power cord will connect to a power strip that can be equipped in the KS-20018-type cabinet. Information on the KS-20018-type cabinets is given in Section 590-010-201.

D. Option Connections

46B1 Data Mounting

2.19 The ringing supply for the planned 48D1 data unit requires that an installer option be provided on the 46B1 data mounting. When used with the planned 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.

48A1 Data Unit

2.20 There are no option straps or connections to be made on the 48A1 data unit.

48B1 Data Unit

2.21 The 48B1 data unit has one installer option to provide 4-dB of slope equalization on the receive pair. The 4-dB slope equalizer is provided when the option designated "4" is provided. The slope equalizer is bypassed when the option designated "0" is provided. It is expected that most data sets will perform better with the 4-dB slope equalizer option provided; however, if the data set has provision for dial backup slope equalization, the 48B1 data unit should be provided with the 4-dB slope equalizer bypassed ("0" option). The service order should specify whether the strap is to be in the 0- or 4-dB position on the board.

2.22 The gain of the receive amplifier determines the receive signal level arriving at the modem and is a function of the total losses of the switched telecommunications network. By controlling the losses of the metallic facilities connecting the near and distant end 48B1 data units to their serving central offices (COs), it is possible to provide a receive level to the data set which should be satisfactory. The loss due to the transmit leg of the metallic facilities is controlled by requiring the signal reaching the local serving CO to be less than, or equal to, −12 dBm. The loss due to the receive leg of the metallic facilities is controlled by establishing a requirement on the level of the signal received from the milliwatt source of the local serving CO at the REC TEST jack on the 48B1 data unit. A functional diagram showing these receive levels is given in Fig. 10. Determination

of receive levels is shown in Table A. The receive amplifier will be adjusted to provide a gain of 3.7 dB from the local serving CO. The received signal from the near end will then be approximately −16 dBm.

2.23 Adjust the output level of the receive amplifier using the following procedure. A front view of the 45A1 data mounting equipped with DAS 829-type, a 48A1 data unit, and a 48B1 data unit is shown in Fig. 1.

Note: The DAS 829-type and 48A1 data unit are not required in this procedure and need not be installed at this time.

(1) Insert the 48B1 data unit, with the required slope equalizer option installed, into the 45A1 data mounting. Connect the 24 Vac supply as shown in Fig. 2.

(2) Connect the switched network facilities to the backplane of the 45A1 data mounting by connecting the DDD1 line to terminals R2 and T2 and the DDD2 line to terminals R3 and T3.

(3) Connect the telephone set to the 45A1 data mounting by connecting the telephone set cord to jack J4.

(4) Using the TTS-4B test set or its equivalent, prepare to measure and adjust the receive amplifier gain as follows:

(a) Place the TTS-4B close to the 45A1 data mounting and apply power to the TTS-4B. Allow time to warm up and stabilize, then calibrate using the instructions printed on the test set case.

(b) Set the controls on the TTS-4B to the following positions:

FUNCTION to REC + TALK

REC IMP to 600Ω

REC LEVEL to +7

(5) Take the telephone handset off-hook and depress the DDD2 line key.

Requirement: Dial tone should be heard in the handsets receiver.

(6) Dial the directory number of the milliwatt supply in the local serving CO using Line 2 on the telephone set.

(7) When connection to the milliwatt supply is completed, depress the HOLD key and then release it.

Requirement: The DDD2 line lamp illuminates and the DDD2 key releases on the up-stroke of the HOLD key.

(8) Place the telephone handset on-hook and connect a 2P4B cord between the REC 310 jack on the TTS-4B to the REC TEST jack on the 48B1 data unit.

(9) Measure the receive level of the milliwatt supply and adjust R9 on the 48B1 data unit for a reading of +3.7 dBm on the TTS-4B meter.

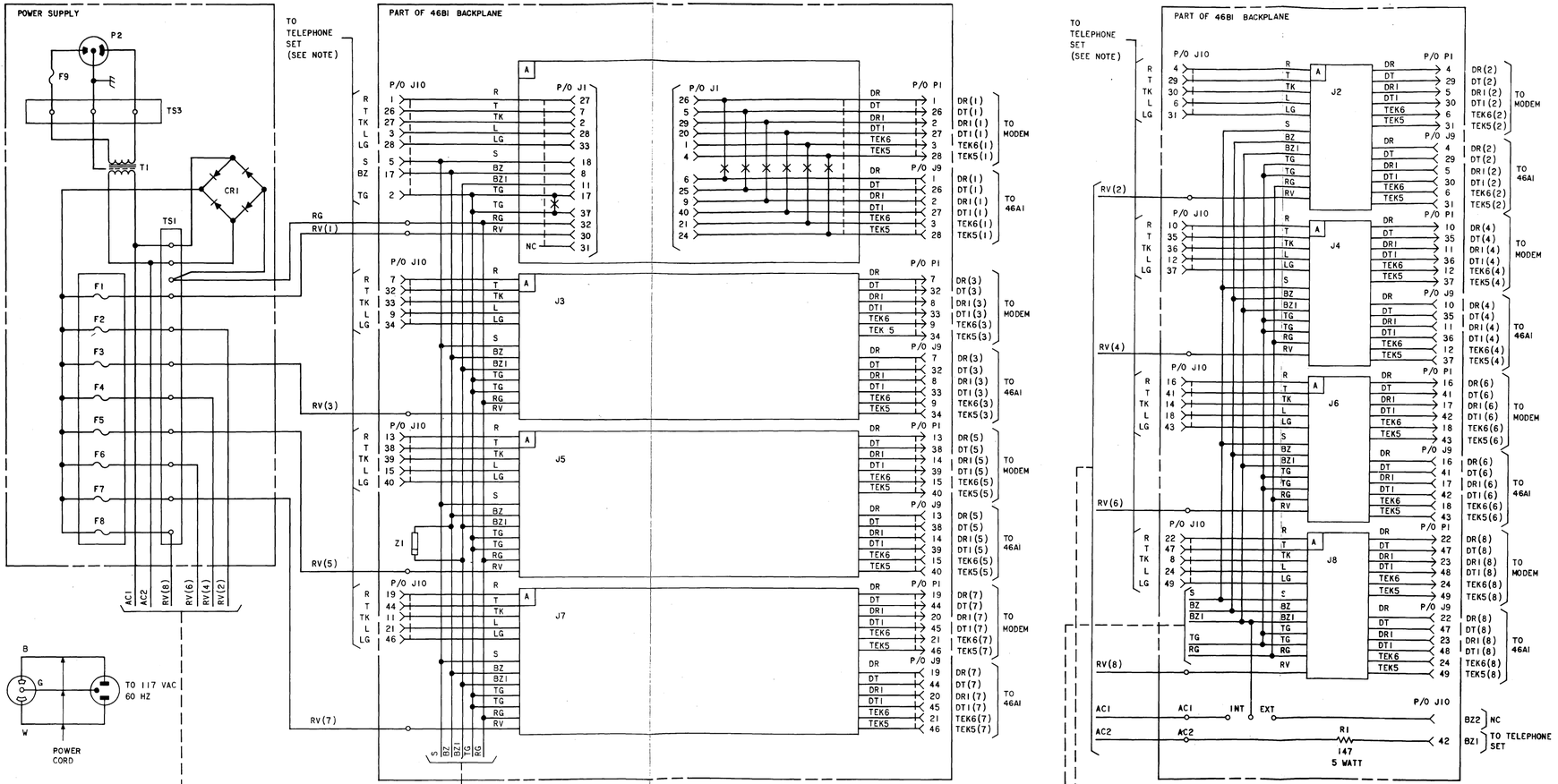
(10) Take the telephone receiver off-hook and depress the REL key and release.

Requirement: The DDD2 line lamp extinguishes indicating call has been disconnected.

(11) Disconnect and remove the TTS-4B and cord connection from the 48B1 data unit.

2.24 The attenuator AT1 is used to set the transmit signal level arriving at the CO. The attenuation to be provided by AT1 is established by determining the loss from the CO to the line side of the transmit transformer (T2 and R2). Once the loss is known, the attenuator setting can be found by knowing (1) what the modem transmit level is and (2) what level is required at the CO.

2.25 The following is an example of transmit level adjustment. It is expected that modems using the DAS 829-type will transmit at 0 dBm. The level required at the serving CO is less than, or equal to, −12 dBm. Assume the installer measures a 4-dB loss on line 1; this measurement should be made using the milliwatt source and measuring the loss by placing a meter across R2



NOTE:
THE 830 OR 2830-TYPE TELEPHONE SHOULD BE USED WITH A FULL DATA-ALTERNATE VOICE MULTIPLE HAVING A MAXIMUM OF EIGHT MODEMS.

Fig. 8—Functional Diagram of 46B1 Data Mounting

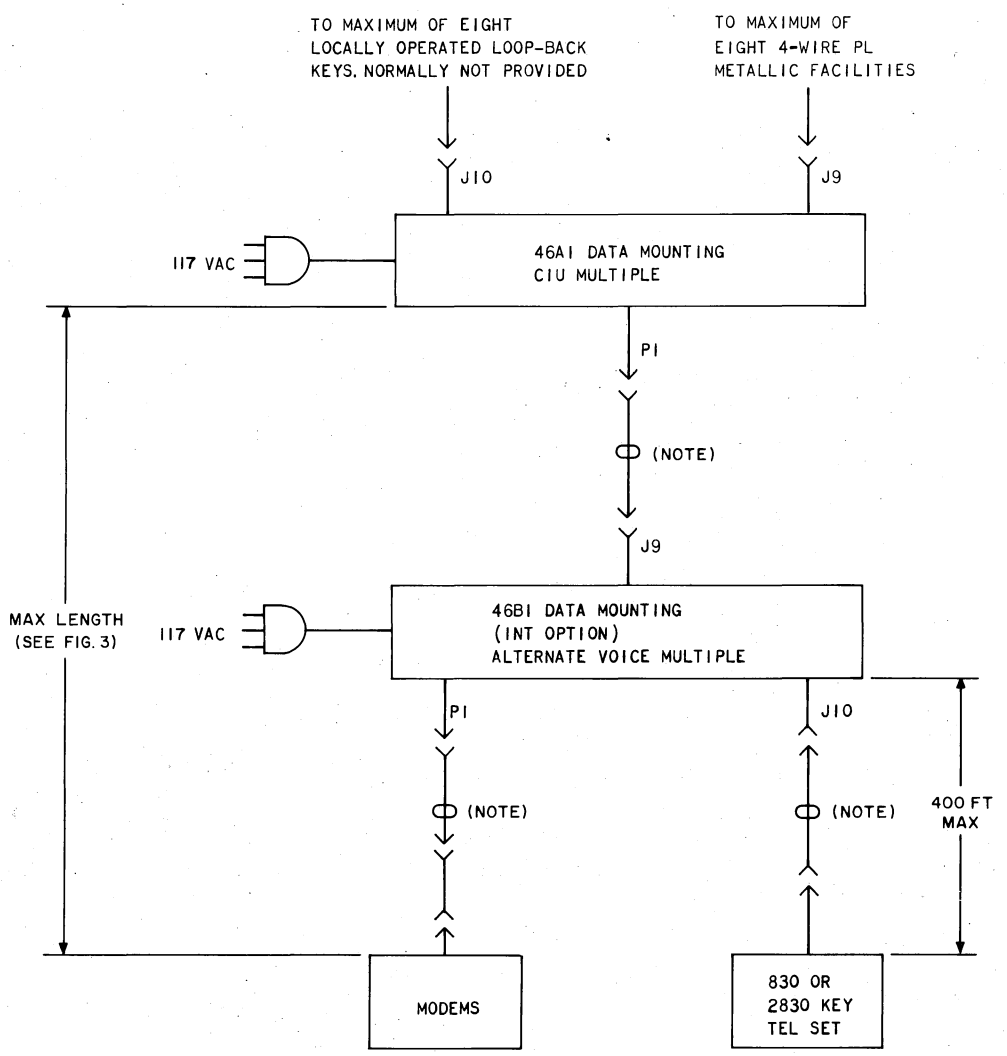


Fig. 9—Multiple Arrangement for Full Data and Alternate Voice at Station Showing Cable Length Restriction

and T2. The attenuator setting required is calculated as follows:

attenuator setting = (modem transmit level) − (required CO level) − (line 1 loss) − (transformer loss).

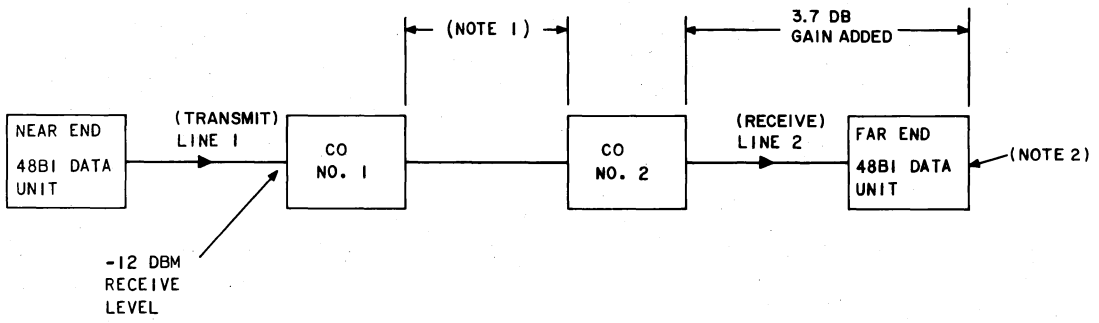
If a nominal transformer loss of 0.5 dB is assumed, the attenuator setting would be 0− (−12) − 4− 0.5 = 7.5 dB. The attenuator, in this example, is set to provide 8.0 dB of loss.

Note: The attenuator setting is adjustable in 1-dB steps.

2.26 After the receive amplifier gain and AT1 adjustments are completed, the 48B1 data unit is removed from the 45A1 data mounting, cable connections removed, and the installation is started.

3. INSTALLATION

3.01 No special tools are required to install the supplementary data units and data mountings.



NOTES:
1. REFER TO TABLE A FOR 1000-HZ LOSS BETWEEN END OFFICES.
2. REFER TO TABLE A FOR ESTIMATED RECEIVE LEVEL AT FAR END (THE LEVEL MEASURED AT THE REC TEST JACK OF THE 48B1 DATA UNIT TERMINATED IN 600 OHMS).

Fig. 10—Example of Receive Level at End Offices

TABLE A

DETERMINATION OF STATION

RECEIVE LEVELS

1000-HZ LOSS BETWEEN END OFFICES			ESTIMATED RECEIVE LEVEL (DBM)	
CIRCUIT LENGTH (IN MILES)	AVERAGE LOSS (dB)	STANDARD DEVIATION (dB)	AVERAGE LEVEL (dBm)	STANDARD DEVIATION (dB) *
Short (Up to 180)	6.5	±2.0	—14.8	±2.0
Medium (180 to 725)	7.3	±2.3	—15.6	±2.3
Long (Over 725)	7.7	±2.5	—16.0	±2.5

*The variation in the adjustment of the transmitted signal to provide a —12 dBm receive level at the serving central office and the 3.7 dB gain adjustment are not included.

3.02 The supplementary data units and mountings are to be installed in accordance with general instructions given in sections covering installation of station sets. Refer to Section 590-010-200 entitled Data Sets, General Installation Information.

A. Shelf-, Desk- or Wall-Mounted (45A1 Data Mounting)

3.03 The 45A1 data mounting may be either shelf-, desk- or wall-mounted. When shelf or desk mounting is selected, the data mounting is a free standing unit. When this method of intallation is used, perform only the procedures given in Steps 5, 6, and 7 of 3.04.

3.04 The installation procedure for a wall-mounted installation is as follows:

Note: The incoming 4-wire metallic facilities, the pair for local loop-back key to J10, and the data set cord to plug P1 are not connected until after the installation tests are completed.

(1) Remove the four rubber feet from the 45A1 data mounting.

(2) Install the four No. 6 binding-head screws (supplied with 193A backboard) into the threaded holes.

(3) Install the 193A backboard in the desired location by using four wood screws on the outer flanges.

Note: The 193A backboard should be installed with the center flap pointed downward.

(4) Install the 45A1 data mounting on the 193A backboard by placing the binding-head screws in the slotted holes and sliding into position.

(5) Connect the leads from the wall-mounted transformer to terminals AC1, AC2, and FG on the back plane of the 45A1 data mounting as shown in Fig. 11.

Note: The additional cable connections shown are not made at this time.

(6) Install the circuit packs in the 45A1 data mounting.

(7) Apply power and perform tests as required in 4.01.

B. Rack-Mounted (46B1 Data Mounting)

3.05 The multiple installation of data/alternate voice (FDA) service uses both the 46A1 and 46B1 data mountings. In the case of a new FDA installation, both assemblies are installed at the same time using the procedures given in 3.06. In the case of an exisiting multiple full data (FD) service converting to an FDA service, only the 46B1 data mounting would be installed. In that case, reference to the 46A1 data mounting in 3.06 should be disregarded.

3.06 The installation procedure for a rack-mounted (multiple) installation is as follows:

Note: The incoming 4-wire metallic facilities, the pair for local loop-back key to J10, and the data set cord to plug P1 on the 46A1 data mounting are not connected until after the installation tests are completed.

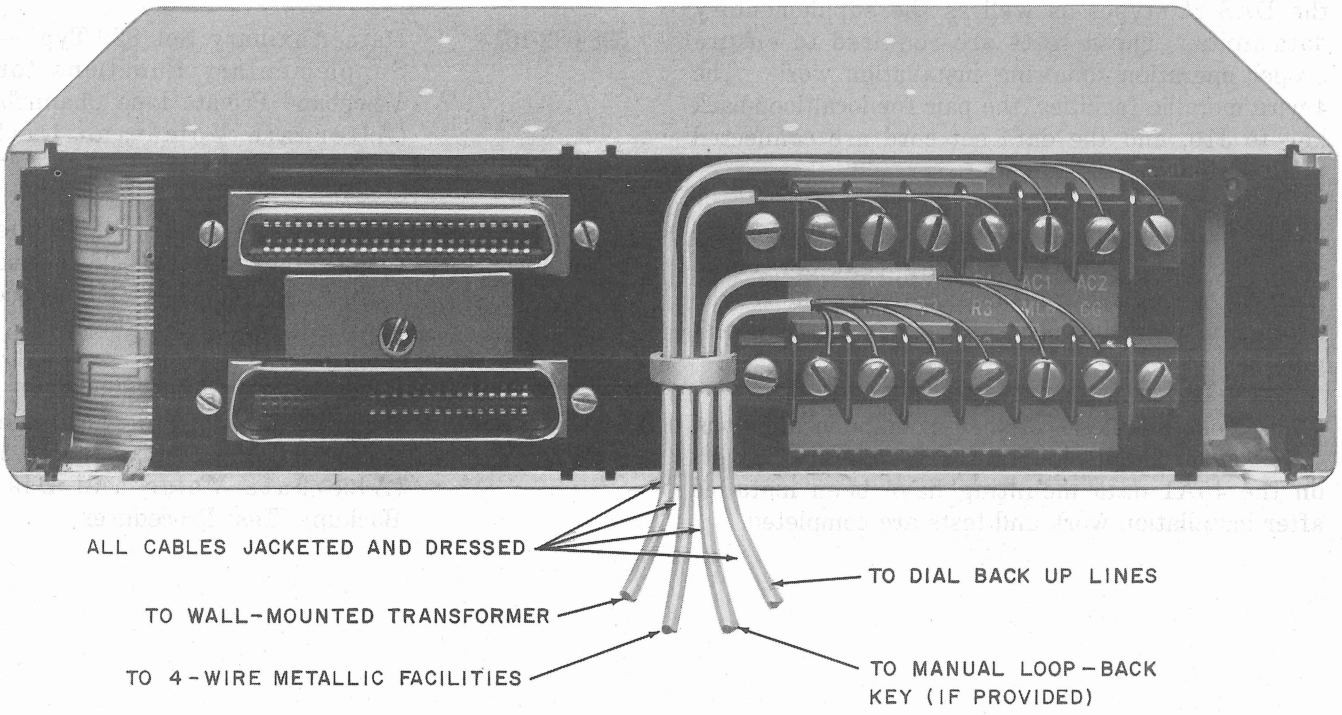


Fig. 11—Rear View of 45A1 Data Mounting Showing Dress of Cable Connections

(1) Assemble and set up relay rack or mounting bars.

(2) Mount the 46A1 data mounting and the 46B1 data mounting units to the relay rack mounting bars.

(3) Connect the necessary interconnect data cables as shown in Fig. 9.

(4) Install the straps that are required on the DAS 829-types. These should be specified on the service order.

(5) Install the DAS 829-types in the 46A1 data mounting and the 48A1 data units in the 46B1 data mounting.

(6) Connect the power cable to both the 46A1 and the 46B1 data mountings and perform tests as required in 4.01.

4. INSTALLATION TESTING

4.01 After completing the installation procedure for the CIU, it must be tested as outlined in Section 598-082-501. This section tests both the DAS 829-types as well as the supplementary data units. These tests are required to ensure proper operation following installation work. The 4-wire metallic facilities, the pair for local loop-back key to J10, and the data set cord are connected after completing these tests.

4.02 A tone-activated or local loop-back test should be made by the serving test center to perform benchmark transmission tests. The results should be recorded for future maintenance test purposes.

4.03 For wall-, desk-, or shelf-mounted installations, ensure that the front and rear dust covers on the 45A1 data mounting have been installed after installation work and tests are completed.

Note: The connector plugs to J4 and P1 are connected after the rear cover has been installed.

5. REFERENCES

5.01 For additional information on installing the supplementary units, refer to the following sections:

SECTION	TITLE
461-604-100	Connecting Blocks 66-Type—Tools, Terminating, Adapters, and Maintenance
463-140-100	Equipment Cabinets and Apparatus Mountings—Installation
590-010-200	Data Sets—General Installation and Connection Information
590-010-201	Data Sets—Multiple Installation Information
598-082-100	Data Auxiliary Set 829-Type Channel Interface Unit—Voiceband Private Line Channel—Description
598-082-101	Data Auxiliary Set 829-Type—Supplementary Functions for Voiceband Private Line Channels (Alternate Voice and Dial Backup)—Description
598-082-500	Data Auxiliary Set 829-Type Channel Interface Unit—Voiceband Private Line Channel—Maintenance and Test Procedure
598-082-501	Data Auxiliary Set 829-Type—Supplementary Functions for Voiceband Private Line Channels (Alternate Voice and Dial Backup)—Test Procedures