DATA AUXILIARY SET 829-TYPE
CHANNEL INTERFACE UNITS
VOICEBAND PRIVATE LINE CHANNELS
INSTALLATION AND CONNECTIONS

CONTENTS PAGE

1. GENERAL

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

1.02 This section is reissued to add information on the 48ER1, 48FR1, and 48G1 data units and the 44A2, 46A2, 46C2, 59A1, and 62A1 data mountings. Since this reissue is a general revision, arrows normally used to indicate changes have been omitted.

1.03 The DAS 829-type functions as a channel interface unit (CIU) to provide a prewired

and tested standard termination for 4-wire private line voiceband data channels. Basic station arrangements use the DAS 829-type CIU to provide 4-wire data only service. Other station arrangements use the DAS 829-type CIU and the supplementary apparatus to provide 4-wire data with alternate voice, dial backup, and switched dial backup service. Two-wire data only and data with alternate voice service are also provided.

1.04 A choice of six codes for the DAS 829-type CIU provides proper termination of channels having various loop facilities.

- DAS 829A-L1 or L1A for short loops.
- DAS 829B-L1 or L1A for longer nonloaded loops.
- DAS 829C-L1 or L1A for longer loaded loops.

1.05 A choice of seven data units combined with a DAS 829-type CIU provides the following features:

- 48A1 data unit for 4-wire or 2-wire alternate voice service.
- 48B1 data unit for 4-wire dial backup service with manual dialing.
- 48C1 data unit (switching matrix) for switching any one of four 4-wire modems to either one of two 4-wire dial backup channels.
- 48D1 data unit (interface adapter) for use with a 46C-type and/or 46B1 data mounting to concentrate control leads in an 18- or 30-button CALL DIRECTOR® key telephone set.
- 48ER1 data unit for 4-wire dial backup service with manual or automatic dialing. This data unit complies with all requirements of the FCC Registration Program. The registration number for the 48ER1 data unit is AS593M-67751-PC-E. The ringer equivalence number for each line is 0.5A.
- 48FR1 data unit for 4-wire dial backup service with automatic answering. This data unit complies with all requirements of the FCC Registration Program. The registration number for the 48FR1 data unit is AS593M-67757-PC-E. The ringer equivalence number for each line is 0.5A.
- 48G1 data unit for 2-wire to 4-wire conversion.

1.06 A choice of seven data mountings house single or multiple arrangements of DAS 829-type CIUs and/or 48-type data units without any change in wiring.

- 44A1 or 44A2 data mounting houses one DAS 829-type CIU.
- 45A1 data mounting houses one DAS 829-type CIU or one DAS 829-type CIU with the following data units: one 48A1 or 48B1, or one 48A1 and one 48B1.
- 46A1 or 46A2 data mounting houses up to eight DAS 829-type CIUs.
- 46B1 data mounting houses up to eight 48A1 or 48G1 data units.
- 46C1 data mounting houses one or two 48B1 data units and up to six 48C1 data units.
- 46C2 data mounting houses one or two 48B1 or 48ER1 data units and up to six 48C1 data units.
- 59A1 data mounting houses one DAS 829-type CIU or one DAS 829-type CIU with the following data units: one 48A1, 48B1, 48ER1, 48FR1, or 48G1; or one 48A1 and one 48B1, 48ER1, or 48G1.
- 62A1 data mounting houses one DAS 829-type CIU or one DAS 829-type CIU and one 48G1 data unit.

1.07 The 44A-type, 45A1, 59A1, and 62A1 data mountings can be mounted on a desk, shelf, or wall. The 46A-type, 46B1, and 46C-type data mountings and the 48D1 data unit can be mounted on 19- or 23-inch relay racks. Mounting in KS-20018-type cabinets is recommended. Descriptive information on KS-20018-type cabinets is provided in Section 590-010-201. The DAS 829-type CIUs and the 48A1, 48B1, 48C1, 48ER1, 48FR1, and 48G1 data units consist of plug-in circuit packs that are housed in the appropriate data mountings.

2. INSTALLATION

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

2.02 The data mountings and data units are to be installed in accordance with the general instructions provided in Section 590-010-200.

A. 44A-Type, 45A1, 59A1, and 62A1 Data Mountings

2.03 The 44A-type, 45A1, 59A1, or 62A1 data mounting can be used as a free standing unit on a desk or shelf or it can be wall-mounted as described in paragraph 2.04. If the 44A-type, 45A1, 59A1, or 62A1 data mounting is used as a free standing unit, omit (1) through (3) of paragraph 2.04.

2.04 The 44A-type, 45A1, 59A1, or 62A1 data mounting is wall-mounted by using a 193A backboard (Fig. 1) as follows:

(1) Install four No. 6 binding-head studs (supplied with the backboard) into the threaded holes in the data mounting.

(2) Install the backboard in the desired location by using four wood screws in the outer flanges.

Note: The backboard should be installed with the elevated tab pointing downward.

(3) Install the data mounting on the backboard by placing the binding-head studs in the slotted holes in the backboard and sliding the data mounting into position.

(4) Install the required plug-in option straps on the required circuit pack or packs, as specified on the service order.

(5) Install the wall-mounted transformer that is supplied with the data mounting. This transformer is a KS-21239-L1 or L4 for the 44A-type or 62A1 data mounting and a KS-21362-L1 for the 45A1 or 59A1 data mounting. The customer must provide a standard 3-wire, grounded 105 to 129V at 57 to 63 Hz, power receptacle that is easily accessible to the data mounting. The receptacle must not be under control of a switch.

Caution: If the receptacle has a metal cover, do not remove the center screw to mount the transformer. When this screw is removed, the metal cover can fall across the prongs of the transformer.

(6) Make all connections to the data mounting as shown on the appropriate connection diagrams, including connection of the 6-foot power cord (840807028, supplied with the data mounting) to the wall-mounted transformer. Dress of the cable connections is shown in Fig. 2 for the 44A1 data mounting, Fig. 3 for the 44A2 data mounting, Fig. 4 for the 45A1 data mounting, Fig. 5 for the 59A1 data mounting, and Fig. 6 for the 62A1 data mounting.

(7) Install the circuit pack or packs in the data mounting. Installation of the circuit packs is shown in Fig. 7 for the 45A1 data mounting, Fig. 8 and 9 for the 59A1 data mounting, and Fig. 10 for the 62A1 data mounting.

(8) Apply 117-Vac power to the data mounting and perform the installation tests, as specified in paragraphs 5.01 through 5.03.

B. 46A-Type and 46B1 Data Mountings

2.05 The 46A-type or 46B1 data mounting is rack-mounted as follows:

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

(2) Install the data mounting on the mounting bars.

(3) Make all connections to the data mounting as shown on the appropriate connection diagrams.

(4) Install the required plug-in option straps on the required circuit packs, as specified on the service order.

(5) Install the circuit packs in the data mounting.

(6) Plug the 4-foot power cord (840339907, supplied with the data mounting) into connector P2 on the rear of the data mounting.

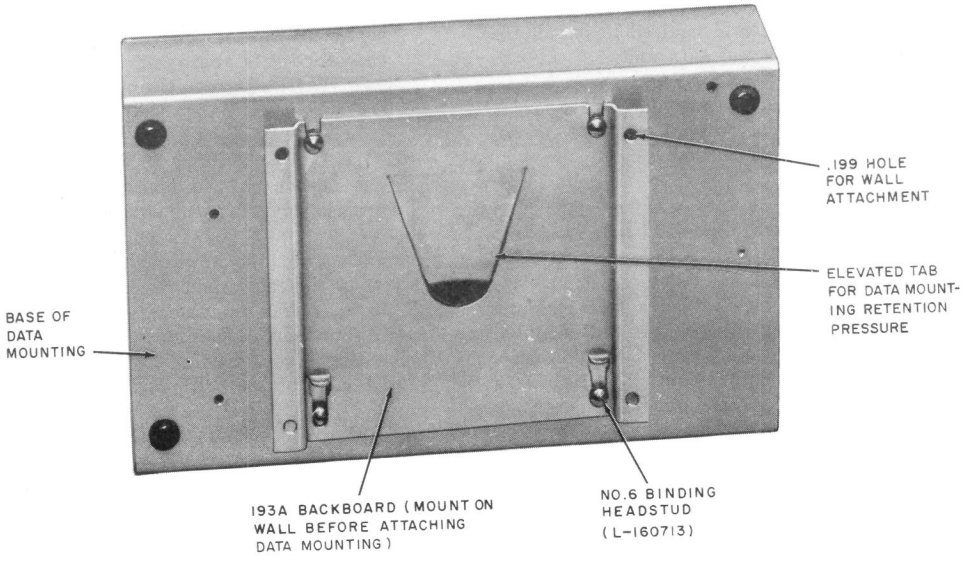


Fig. 1—44A-Type, 45A1, 59A1, or 62A1 Data Mounting Installed on 193A Backboard

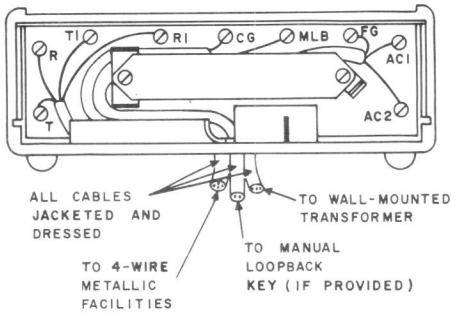


Fig. 2—44A1 Data Mounting Showing Dress of Cable Connections

(7) Apply 117-Vac power to the data mounting and perform the installation tests, as specified in paragraphs 5.01 through 5.03.

C. 46C-Type Data Mounting and 48D1 Data Unit

2.06 The 46C-type data mounting and 48D1 data unit are rack-mounted as follows:

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

(2) Install the 46C-type data mounting and 48D1 data unit on the mounting bars.

Note: The 48D1 data unit mounts directly under the 46C-type data mounting.

(3) Make all connections to the data mounting and data unit as shown on the appropriate connection diagrams.

(4) Install the required plug-in option straps on the required circuit packs, as specified on the service order.

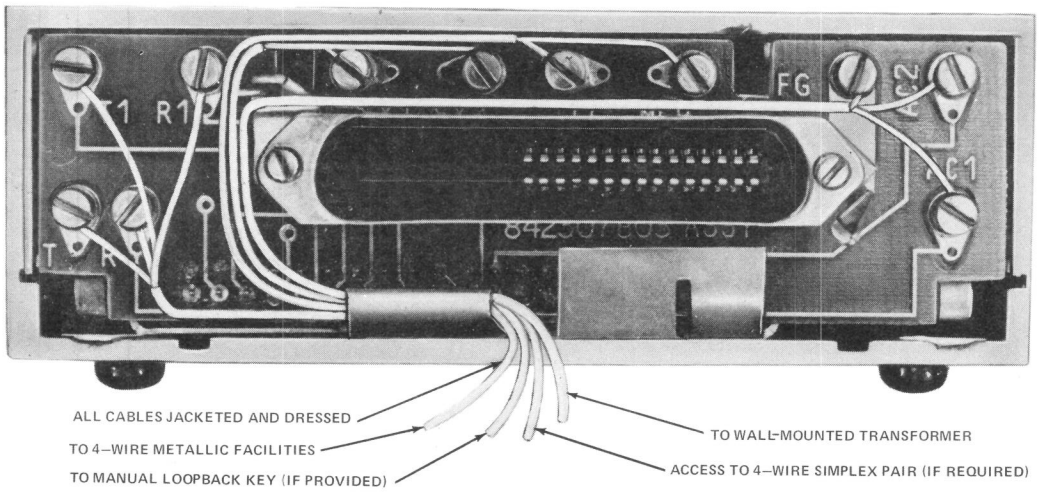


Fig. 3—44A2 Data Mounting Showing Dress of Cable Connections

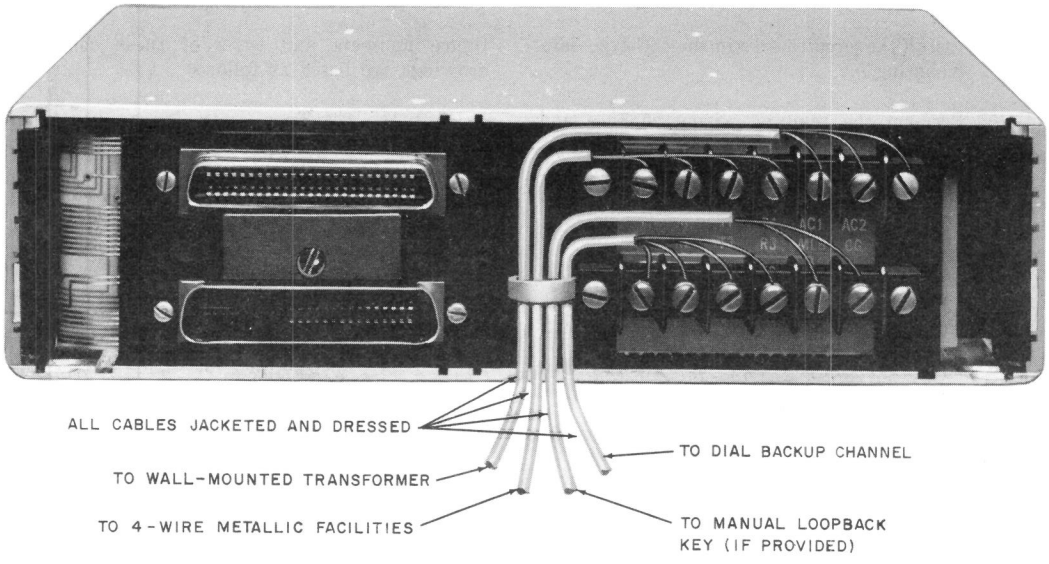


Fig. 4—45A1 Data Mounting Showing Dress of Cable Connections

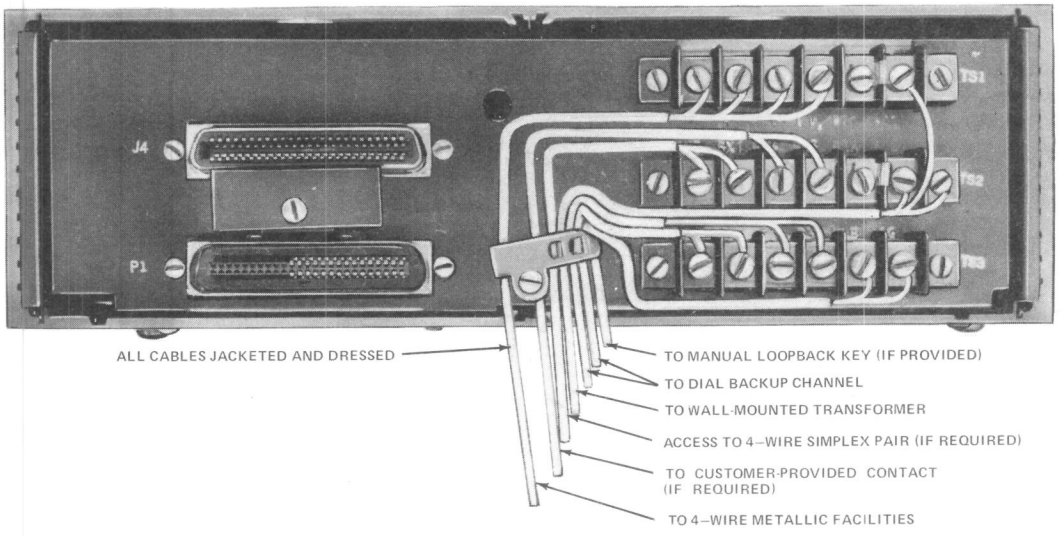


Fig. 5—59A1 Data Mounting Showing Dress of Cable Connections

(5) Install the circuit packs in the 46C-type data mounting.

(6) Perform the required wiring changes and connect the key telephone set to connectors J1 through J3 (for 18-button set) or J1 through J5 (for 30-button set) on the rear of the 48D1 data unit.

(7) Plug the 4-foot power cord (840339907, supplied with the 48D1 data unit) into connector P13 on the rear of the 48D1 data unit.

(8) Apply 117-Vac power to the 48D1 data unit and perform the installation tests, as specified in paragraphs 5.01 through 5.03.

3. CONNECTIONS

A. 44A-Type, 45A1, 59A1, and 62A1 Data Mountings

3.01 Connections for the various types of service using 44A-type, 45A1, 59A1, and 62A1 data mountings are shown in Fig. 11 through 27. The figure numbers and titles of these connection drawings are listed as follows:

Fig. 11—44A-Type Data Mounting—4-Wire Data Only Service

Fig. 12—45A1 Data Mounting—4-Wire Data With Alternate Voice Service

Fig. 13—45A1 Data Mounting—4-Wire Data With 4-Wire Dial Backup Service (Manual Dialing)

Fig. 14—45A1 Data Mounting—4-Wire Data With Alternate Voice and 4-Wire Dial Backup Service (Manual Dialing)

Fig. 15—59A1 Data Mounting—4-Wire Data With Alternate Voice Service

Fig. 16—59A1 Data Mounting—2-Wire Data With Alternate Voice Service

Fig. 17—59A1 Data Mounting—4-Wire Data With 4-Wire Dial Backup Service (Manual Dialing)

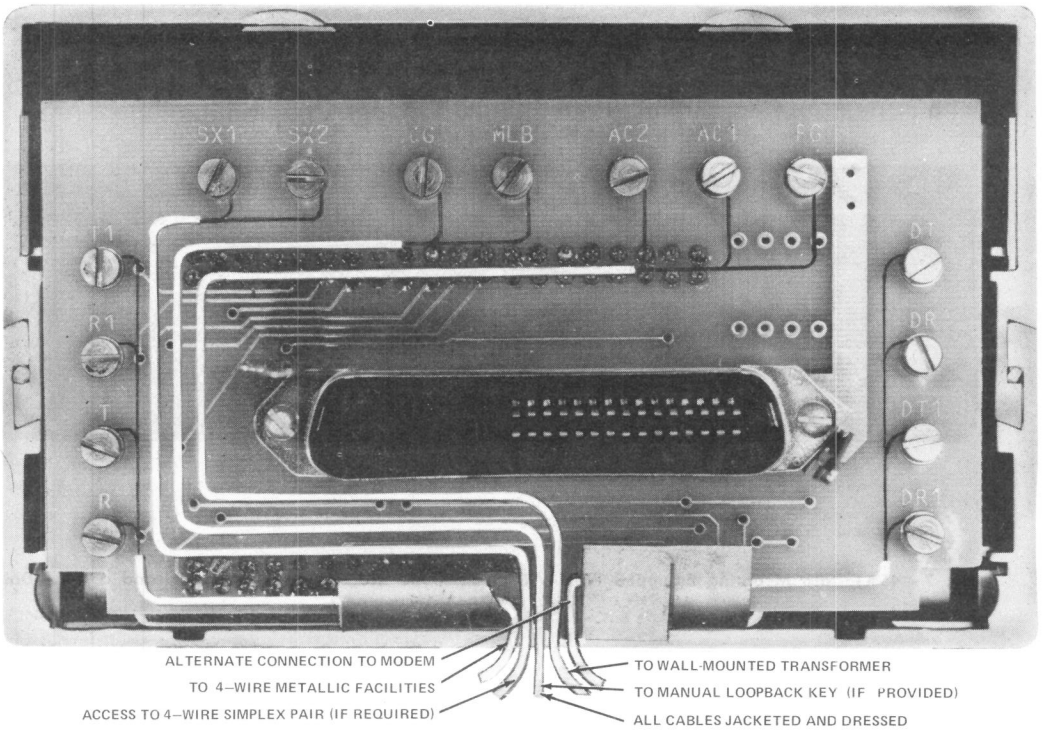


Fig. 6—62A1 Data Mounting Showing Dress of Cable Connections

Fig. 18—59A1 Data Mounting—4-Wire Data With Alternate Voice and 4-Wire Dial Backup Service (Manual Dialing)

Fig. 19—59A1 Data Mounting—4-Wire Data With 4-Wire Dial Backup Service (Automatic Dialing)

Fig. 20—59A1 Data Mounting—4-Wire Data With 4-Wire Dial Backup Service (Automatic Answering)

Fig. 21—59A1 Data Mounting—Connections to 43A or 53A Station Dial

Fig. 22—59A1 Data Mounting—Connections to DAS 801CR-L1/2 ACU

Fig. 23—62A1 Data Mounting—2-Wire Data Only Service

Fig. 24—44A-Type, 45A1, 59A1, or 62A1 Data Mounting—Multiple Arrangement

Fig. 25—Customer-Provided Modem—4-Wire Data Service (With or Without Alternate Voice Service)

Fig. 26—Customer-Provided Modem—2-Wire Data Service (With or Without Alternate Voice Service)

Fig. 27—Customer-Provided Modem—4-Wire Data With 4-Wire Dial Backup Service (With or Without Alternate Voice Service)

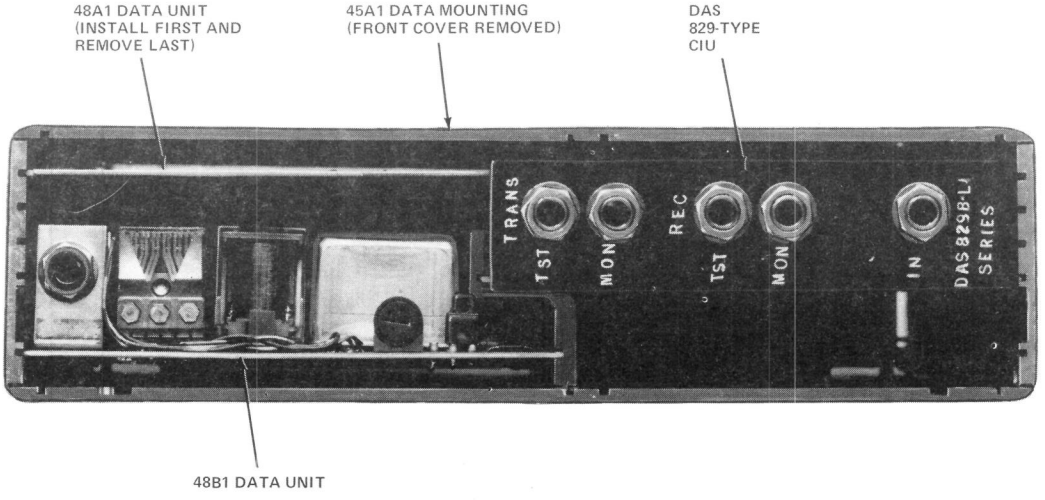


Fig. 7—45A1 Data Mounting Equipped With a DAS 829-Type CIU, a 48A1 Data Unit, and a 48B1 Data Unit

B. 46A-Type and 46B1 Data Mountings

3.02 Connections for the various types of service using 46A-type and 46B1 data mountings are shown in Fig. 28 through 38. The figure numbers and titles of these connection drawings are listed as follows:

Fig. 28—46A-Type Data Mounting—4-Wire Data Only Service

Fig. 29—46A-Type and 46B1 Data Mountings—2-Wire Data Only Service

Fig. 30—46A-Type and 46B1 Data Mountings—4-Wire Data With Alternate Voice Service

Fig. 31—46A-Type and 46B1 Data Mountings—2-Wire Data With Alternate Voice Service

Fig. 32—46A-Type Data Mounting—Connections to 4-Wire Metallic Facilities

Fig. 33—Data Set 202T—4-Wire Multiple Arrangement

Fig. 34—Data Set 202T—2-Wire Multiple Arrangement

Fig. 35—Data Set 201C, 202D, 202T, 208A, or 209A—4-Wire Multiple Arrangement

Fig. 36—Data Set 201C or 202T—2-Wire Multiple Arrangement

Fig. 37—Customer-Provided Modem—Multiple Arrangement Using KS-21253-L1 Adapter

Fig. 38—Customer-Provided Modem—Multiple Arrangement Using 66E-Type Connecting Block

C. 46C-Type Data Mounting and 48D1 Data Unit

3.03 The 46C-type data mounting and the 48D1 data unit provide the interconnection facilities for a variety of multiple arrangements, as described in paragraphs 3.07 through 3.25.

Note: The 48D1 data unit must be used with the 46C-type data mounting.

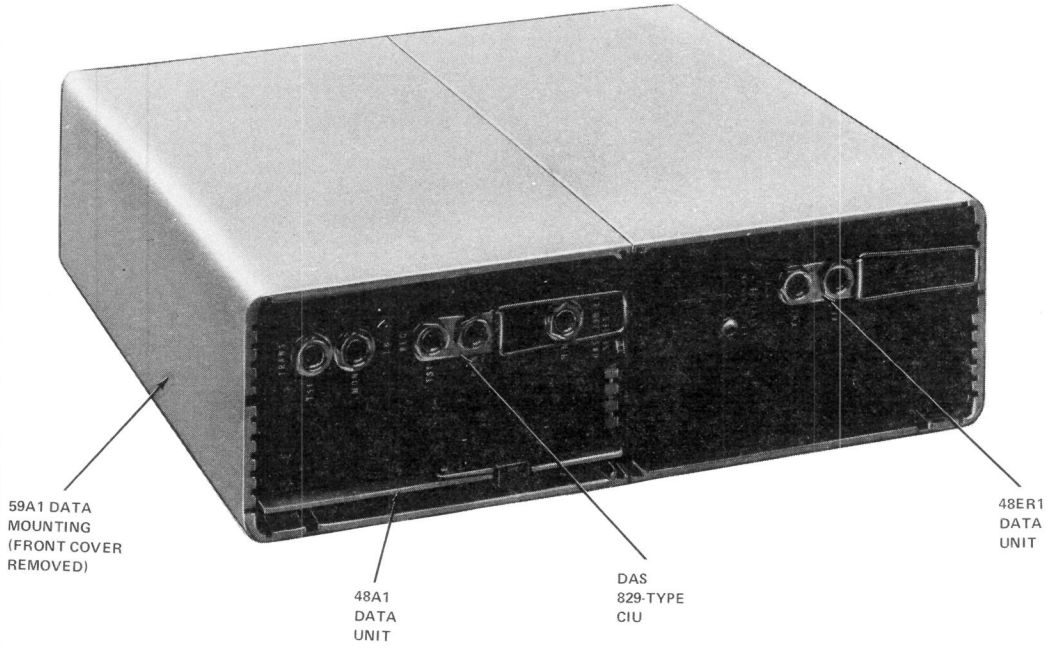


Fig. 8—59A1 Data Mounting Equipped With a DAS 829-Type CIU, a 48A1 Data Unit, and a 48ER1 Data Unit

3.04 The 46C1 data mounting (Fig. 39) houses one or two 48B1 data units and up to six 48C1 data units. The 46C2 data mounting (Fig. 40) houses one or two 48B1 or 48ER1 data units and up to six 48C1 data units. The 46C1 and 46C2 data mountings are the same except a protective cover has been added at the front of the 46C2 data mounting. A cable and connector J1 attached to each 48C1 data unit permits direct connection to connectors P4 through P9 on the 48D1 data unit.

> ***Note:*** The 46C1 data mounting and the 48B1 data unit must not be used in registered arrangements.

3.05 The backplane of the 46C-type data mounting (Fig. 41) contains eight 50-pin connectors and eight screw terminals. Connector P1 permits direct connection to connector J6 on the 48D1 data unit. Connectors P2 through P4 permit connection to a maximum of twenty-three modems. To provide 4-wire data with switched 4-wire dial backup service, connectors J10 through J12 permit connection to up to three 46A-type data mountings containing a maximum of twenty-three DAS 829-type CIUs. To provide 4-wire data with alternate voice and switched 4-wire dial backup service, connectors J10 through J12 permit connection to up to three 46B1 data mountings containing a maximum of twenty-three 48A1 data units. Connector J1 or the eight screw terminals permit connection to one or two dial backup channels consisting of two 2-wire switched network lines per channel.

> ***Note:*** Connector J1 must not be used in registered arrangements.

3.06 The backplane of the 48D1 data unit (Fig. 41) contains twelve 50-pin connectors. Connectors P1 through P3 permit connection to up to three 46B1 data mountings containing a maximum of twenty-three 48A1 data units. Connectors P11 and P12 permit concentrated connection to a

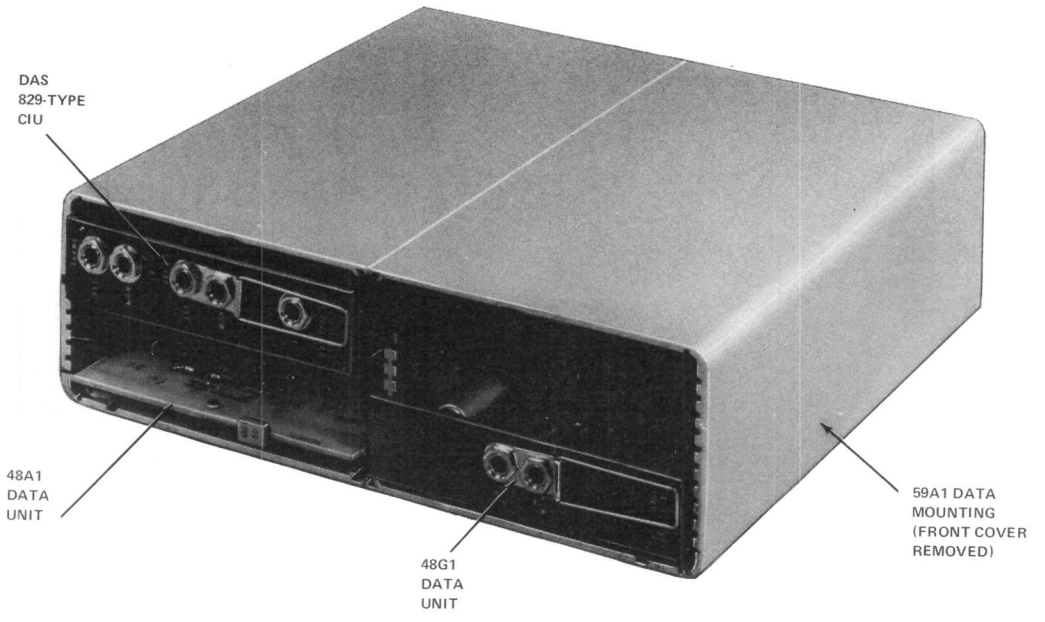


Fig. 9—59A1 Data Mounting Equipped With a DAS 829-Type CIU, a 48A1 Data Unit, and a 48G1 Data Unit

maximum of twenty-three modems to provide dial backup status to modems requiring this information. Connector P10 is provided for future use. Power cord connector P13 is located on the rear of the 48D1 data unit adjacent to the backplane. Connector J6 permits direct connection to connector P1 on the 46C-type data mounting. Connectors J1 through J3 permit connection to an 18-button CALL DIRECTOR key telephone set. Connectors J1 through J5 permit connection to a 30-button CALL DIRECTOR key telephone set. The 18- or 30-button CALL DIRECTOR key strip should be labeled as shown in Table A.

D. Multiple Arrangements

3.07 The DAS 829-type CIU and the 48A1, 48B1, 48C1, and 48ER1 data units are used with the 46C-type data mounting and the 48D1 data unit to provide a variety of multiple 4-wire data only (FD) and/or 4-wire data with alternate voice (FDA) arrangements with or without switched 4-wire dial backup service. Connections for these types of multiple arrangements are shown in Fig. 33, 35, 37, 38, and 42 through 47. The figure numbers and titles of these connection drawings are listed as follows:

Fig. 33—Data Set 202T—4-Wire Multiple Arrangement

Fig. 35—Data Set 201C, 202D, 202T, 208A, or 209A—4-Wire Multiple Arrangement

Fig. 37—Customer-Provided Modem—Multiple Arrangement Using KS-21253-L1 Adapter

Fig. 38—Customer-Provided Modem—Multiple Arrangement Using 66E-Type Connecting Block

Fig. 42—Multiple 4-Wire FD or FDA Arrangement With Switched 4-Wire Dial Backup Service for 11 Modems or Less

Fig. 10—62A1 Data Mounting Equipped With a DAS 829-Type CIU and a 48G1 Data Unit

Fig. 43—Multiple 4-Wire FD or FDA Arrangement With Switched 4-Wire Dial Backup Service for 23 Modems or Less

Fig. 44—Multiple 4-Wire FD and FDA Arrangements With and Without Switched 4-Wire Dial Backup Service

Fig. 45—46C-Type Data Mounting—Connections to DDD Lines

Fig. 46—Multiple Arrangement Showing Cable Length Restrictions

Fig. 47—Multiple Arrangement Using KS-21253-L4 Adapter for Dial Backup Status to Modems

If none of the FD and FDA arrangements require switched dial backup service, the arrangements should be connected as given in paragraph 3.02.

Design Rules

3.08 The following design rules should be used to determine the equipment required to provide a given multiple arrangement.

(1) Determine the number of FD and/or FDA arrangements to be provided with switched dial backup service. When the number of arrangements is 11, or less, an 18-button CALL DIRECTOR key telephone set is used to control the service. When the number of arrangements is 23, or less, a 30-button CALL DIRECTOR key telephone set is used to control the service. When the number of arrangements is greater than 23, more than one CALL DIRECTOR is required; for example, 46 FDA arrangements with switched dial backup service require two separate CALL DIRECTOR arrangements.

(2) Determine the number of FDA arrangements to be provided without switched dial backup

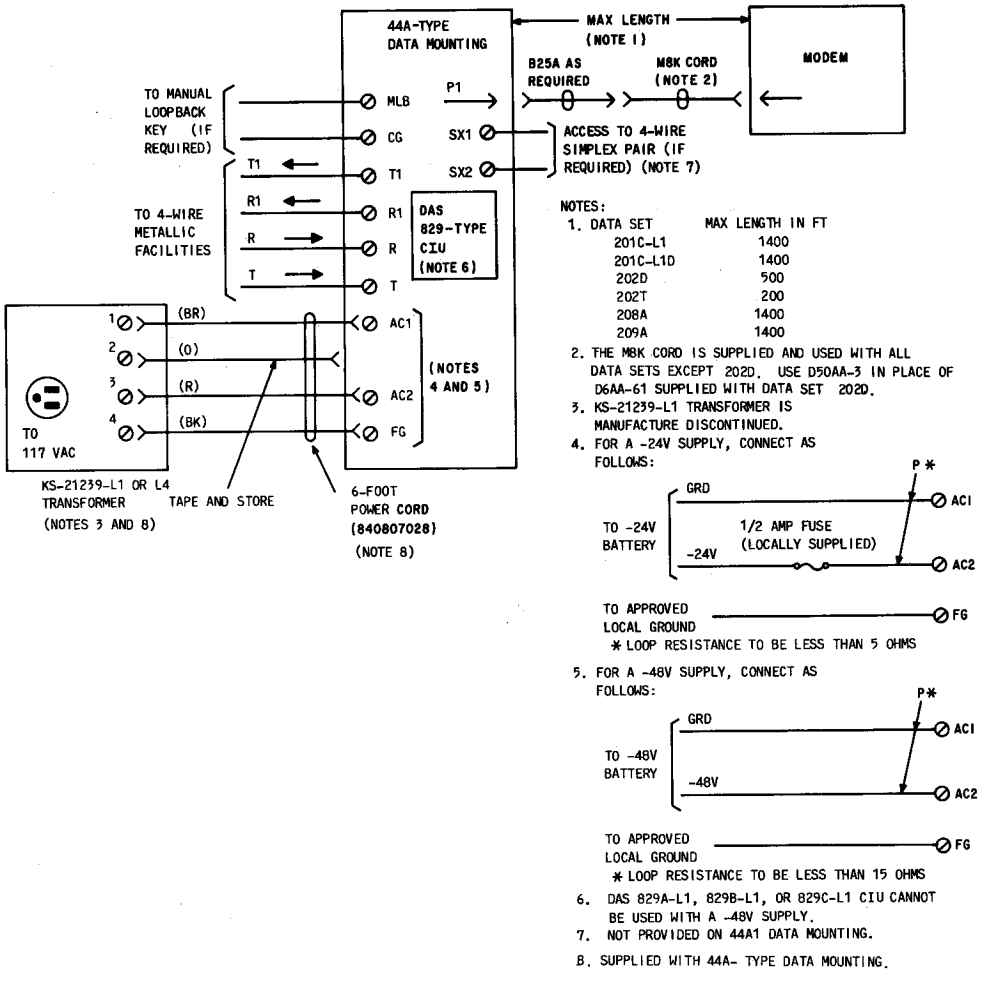
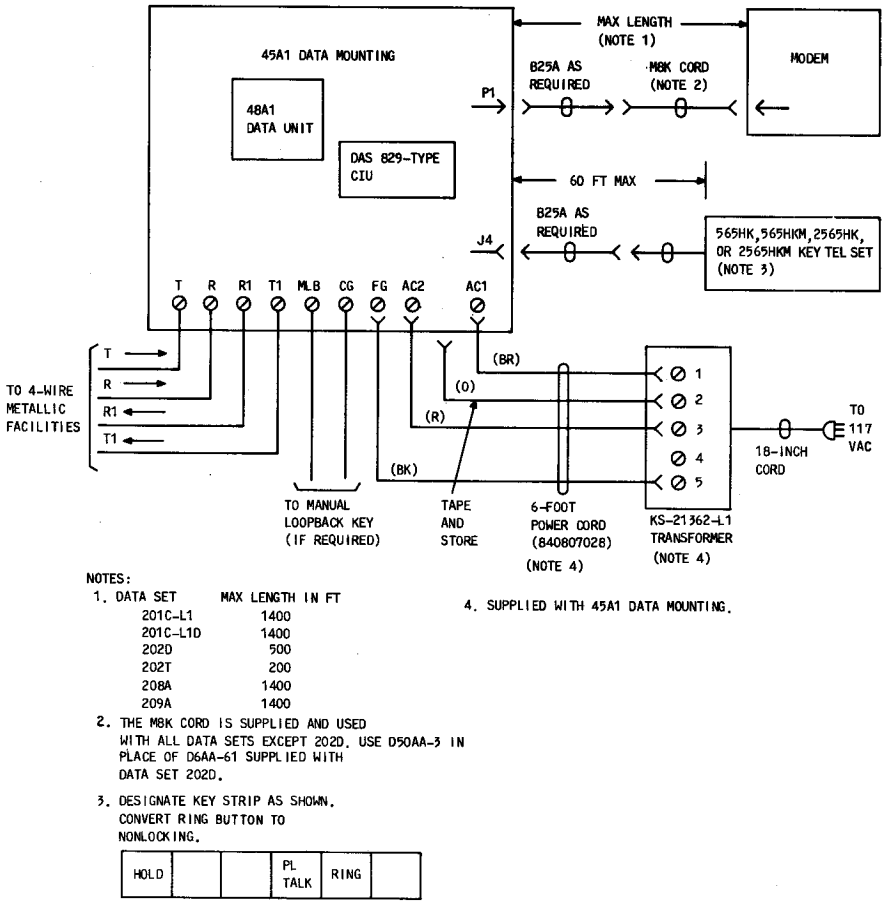


Fig. 11—44A-Type Data Mounting—4-Wire Data Only Service

service. When possible, concentrate the control for the FDA arrangements in the CALL DIRECTOR used to control the switched dial backup service. Table B provides guidelines for using a 30-button CALL DIRECTOR to control FDA arrangements with and without switched dial backup service. When control of the FDA arrangements cannot be concentrated in the CALL DIRECTOR, or when no switched dial backup service is provided, the FDA arrangements should be connected as given in paragraph 3.02.

(3) Determine the number of FD arrangements to be provided without switched dial backup service. These arrangements do not require CALL DIRECTOR control and normally are connected as given in paragraph 3.02. However, when FDA arrangements are provided without switched dial backup service, there may be connections available for FD arrangements. For example, if 12 FDA arrangements are required, the multiple arrangement (two pairs of properly interconnected 46A-type and 46B1 data mountings)



NOTES:

1. DATA SET — MAX LENGTH IN FT

DATA SET	MAX LENGTH IN FT
201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400

2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D.

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

HOLD			PL TALK	RING	

4. SUPPLIED WITH 45A1 DATA MOUNTING.

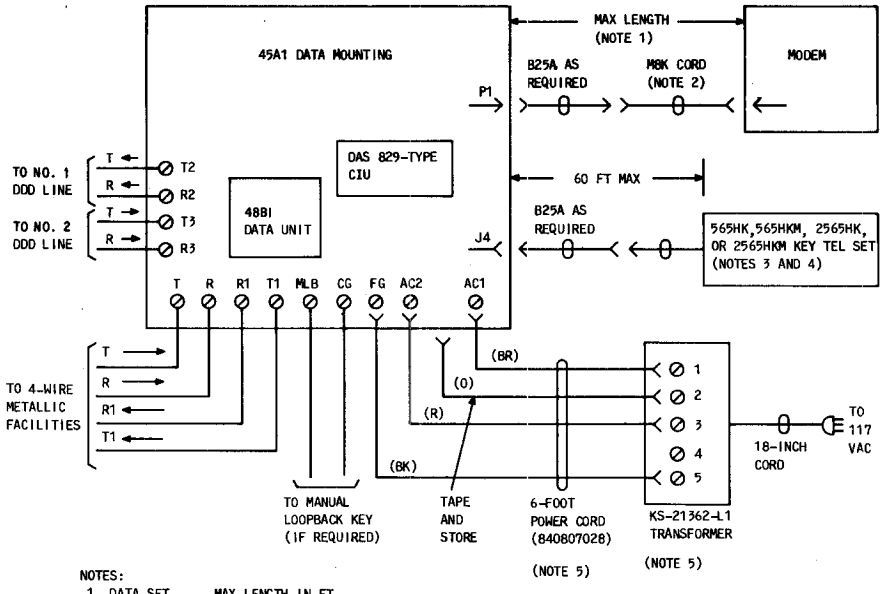
Fig. 12—45A1 Data Mounting—4-Wire Data With Alternate Voice Service

provides for 16 FDA arrangements. The four connections not used for FDA arrangements can be used for FD arrangements.

3.09 Two multiple arrangements are used to explain the above design rules. The examples chosen illustrate the interconnections required between the 48C1 and 48D1 data units and the 46-type data mountings.

First Example—23 FDA Arrangements With Switched Dial Backup Service

3.10 The first example (Fig. 43) is a multiple arrangement consisting of 23 FDA arrangements with switched dial backup service to either one of two dial backup channels. Design rule No. 1 indicates that one 30-button CALL DIRECTOR can be used to control the multiple arrangement. Therefore, for this example, the 631DAM or the



NOTES:

1. DATA SET — MAX LENGTH IN FT

DATA SET	MAX LENGTH IN FT
201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400

2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D.

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

HOLD	DDD1	DDD2			REL

4. MODIFY TEL SET AS FOLLOWS:

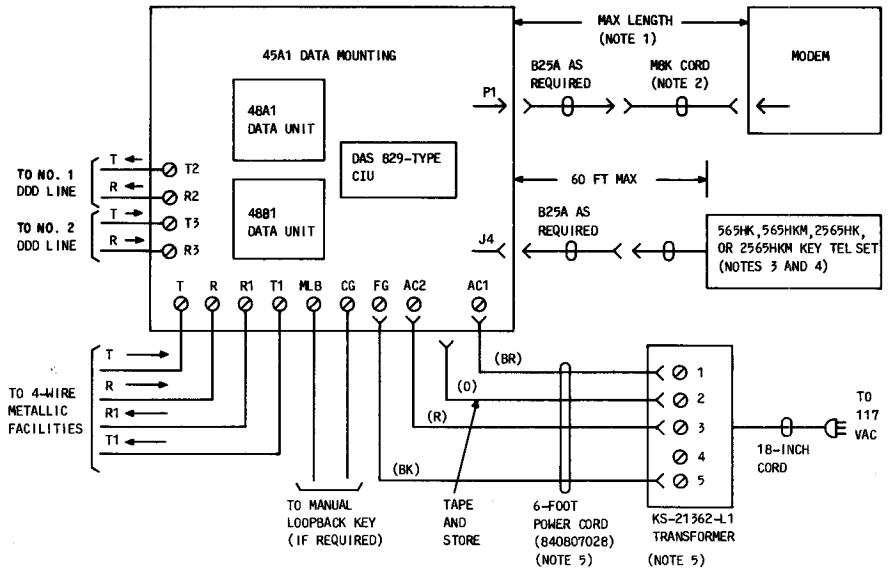
636A KEY LEADS		
COLOR	REMOVE FROM	CONNECT TO
BR	M	X
S-R	M	N
Y	M	TAPE AND STORE
O-BK	N	M

5. SUPPLIED WITH 45A1 DATA MOUNTING.

Fig. 13—45A1 Data Mounting—4-Wire Data With 4-Wire Dial Backup Service (Manual Dialing)

2631DAM 30-button CALL DIRECTOR key telephone set, with the wiring modifications given in Fig. 43, is used to control the multiple arrangement. The CALL DIRECTOR is connected to connectors J1 through J5 of the 48D1 data unit. Design rules No. 2 and 3 do not apply to this example.

3.11 The 23 FDA arrangements are provided by interconnecting 3 pairs of 46A-type and 46B1 data mountings. The three 46A-type data mountings house the twenty-three DAS 829-type CIUs that terminate the 4-wire private lines. The three 46B1 data mountings house the twenty-three 48A1 data



NOTES:

1. DATA SET — MAX LENGTH IN FT

DATA SET	MAX LENGTH IN FT
201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400

2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D5QAA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D.

3. DESIGNATE KEY STRIP AS SHOWN. CONVERT RING AND REL BUTTONS TO NONLOCKING.

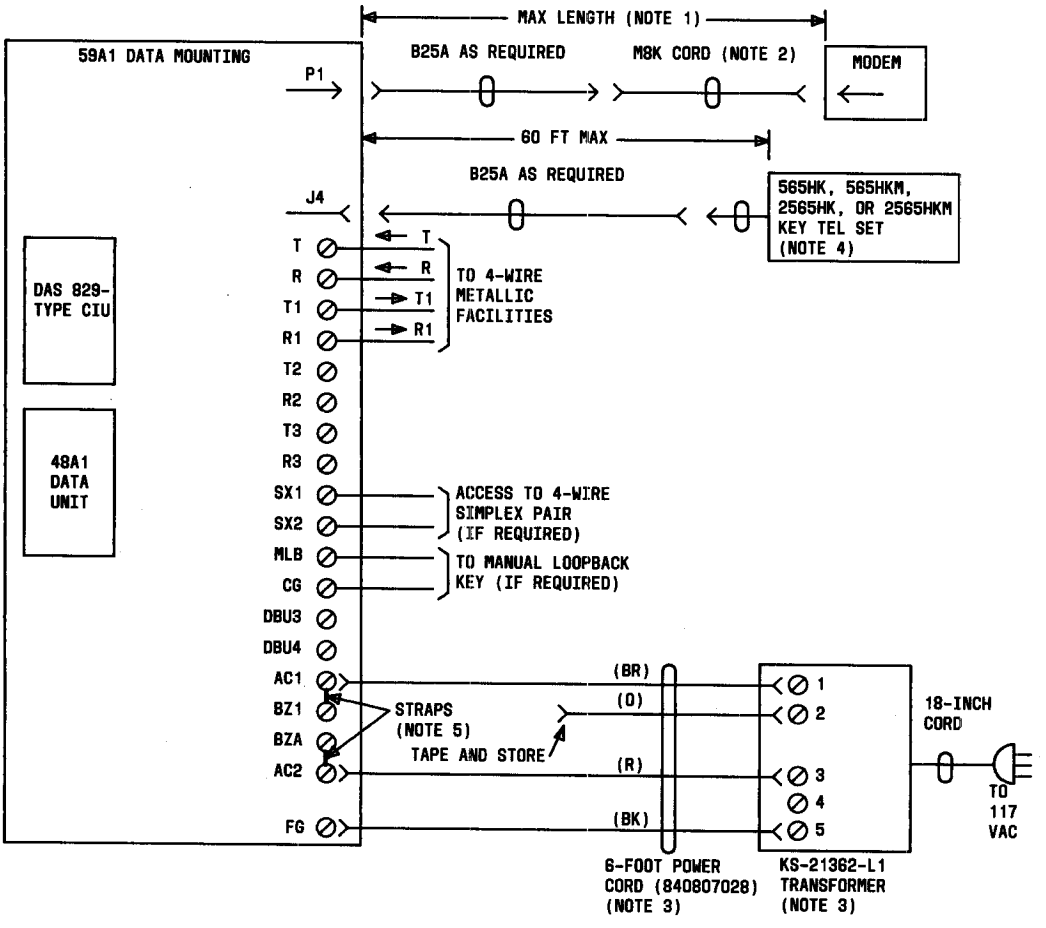
HOLD	DDD1	DDD2	PL TALK	RING	REL

4. 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

5. SUPPLIED WITH 45A1 DATA MOUNTING.

Fig. 14—45A1 Data Mounting—4-Wire Data With Alternate Voice and 4-Wire Dial Backup Service (Manual Dialing)



NOTES:

1. DATA SET MAX LENGTH IN FT

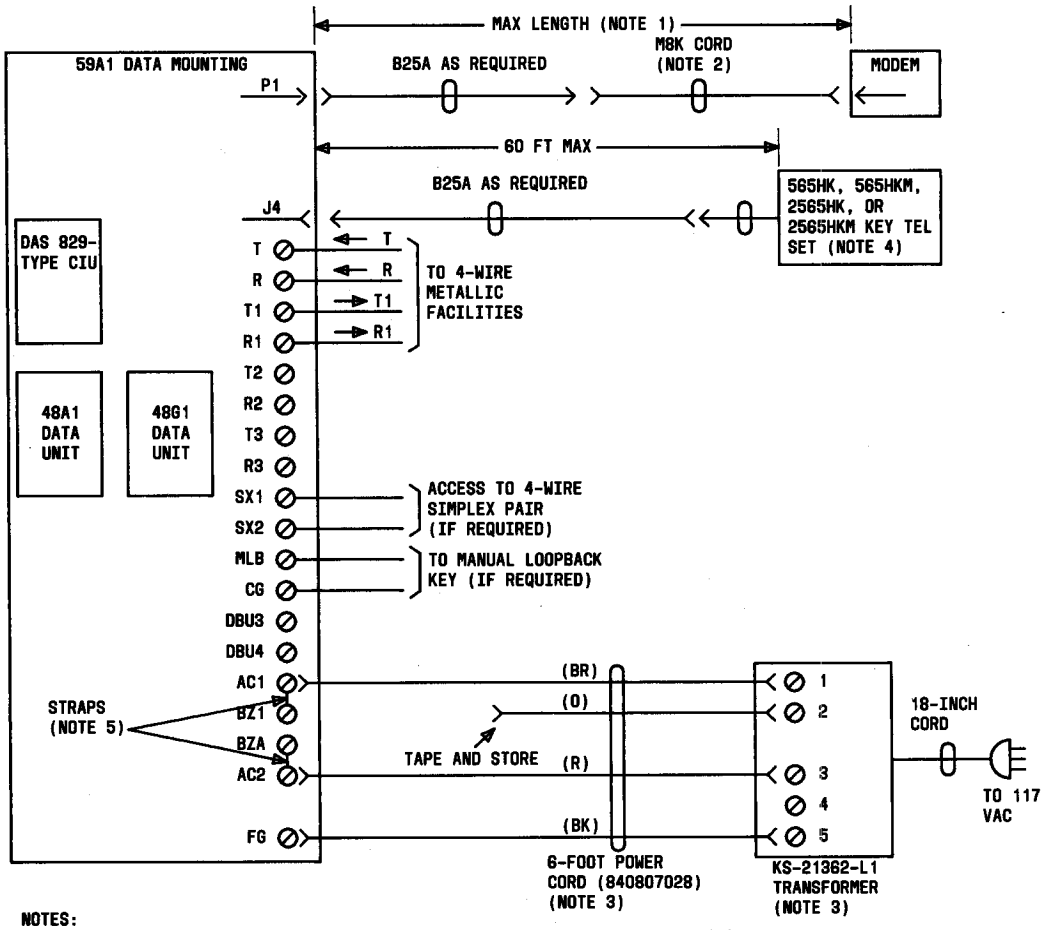
201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400

2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D
3. SUPPLIED WITH 59A1 DATA MOUNTING
4. DESIGNATE KEY STRIP AS SHOWN. CONVERT RING BUTTON TO NONLOCKING

HOLD				PL TALK	RING	

5. STRAPS PROVIDED AS PART OF 59A1 DATA MOUNTING. DO NOT REMOVE STRAPS

Fig. 15—59A1 Data Mounting—4-Wire Data With Alternate Voice Service



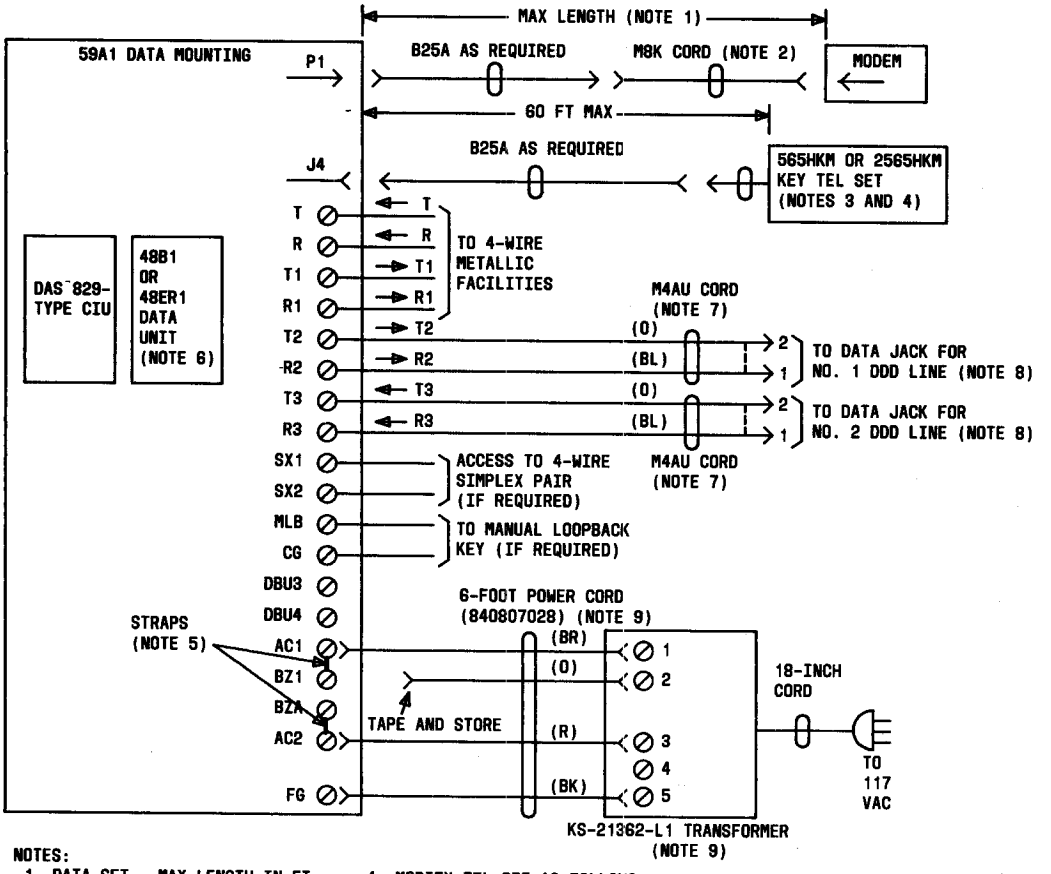
NOTES:

1. DATA SET — MAX LENGTH IN FT
   - 201C-L1 — 1400
   - 201C-L1D — 1400
   - 202T — 200
2. SUPPLIED WITH DATA SET
3. SUPPLIED WITH 59A1 DATA MOUNTING
4. DESIGNATE KEY STRIP AS SHOWN. CONVERT RING BUTTON TO NONLOCKING

HOLD			PL TALK	RING	

5. STRAPS PROVIDED AS PART OF 59A1 DATA MOUNTING. DO NOT REMOVE STRAPS

Fig. 16—59A1 Data Mounting—2-Wire Data With Alternate Voice Service



NOTES:

1. DATA SET — MAX LENGTH IN FT

201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400

2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D
3. DESIGNATE KEY STRIP AS SHOWN. CONVERT REL BUTTON TO NONLOCKING

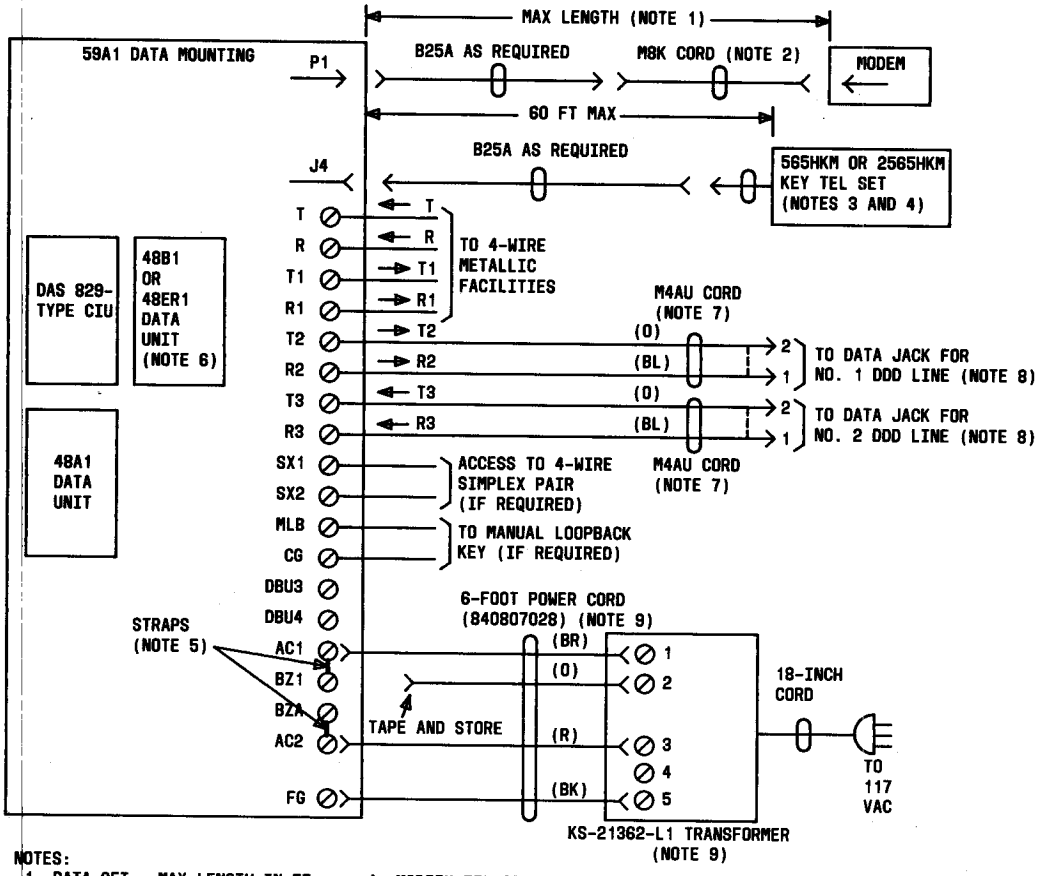
HOLD	DOD1	DOD2			REL

4. 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

5. STRAPS PROVIDED AS PART OF 59A1 DATA MOUNTING. DO NOT REMOVE STRAPS
6. THE 48B1 DATA UNIT CANNOT BE USED IN REGISTERED ARRANGEMENTS OR WHEN THE FAR END OF THE DIAL BACKUP CHANNEL IS EQUIPPED FOR UNATTENDED OPERATION
7. THE TWO M4AU CORDS MUST BE ORDERED SEPARATELY. TAPE AND STORE UNUSED LEADS
8. USE DATA JACK USOC RJ41S WITH SWITCH SET TO FLL. THE TWO DATA JACKS MUST BE ORDERED SEPARATELY
9. SUPPLIED WITH 59A1 DATA MOUNTING

Fig. 17—59A1 Data Mounting—4-Wire Data With 4-Wire Dial Backup Service (Manual Dialing)



NOTES:

1. DATA SET MAX LENGTH IN FT

201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400

2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D
3. DESIGNATE KEY STRIP AS SHOWN. CONVERT RING AND REL BUTTONS TO NONLOCKING

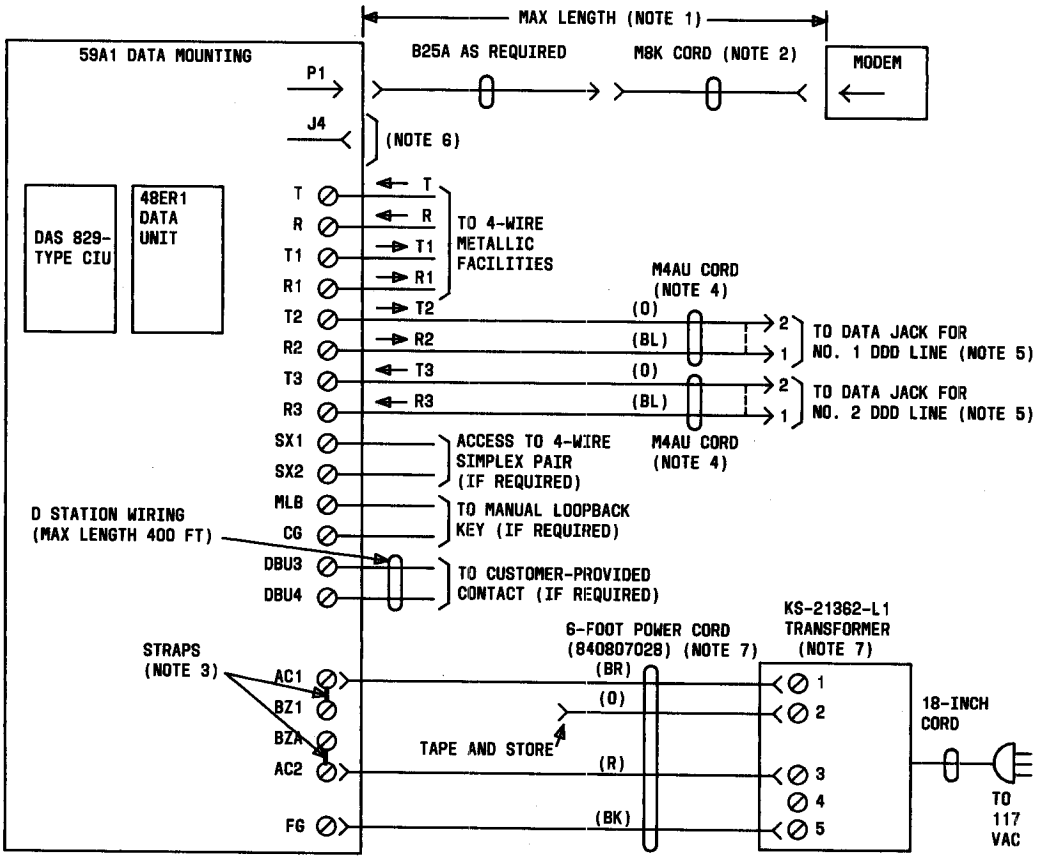
HOLD	DOD1	DOD2	PL TALK	RING	REL	

4. 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

5. STRAPS PROVIDED AS PART OF 59A1 DATA MOUNTING. DO NOT REMOVE STRAPS
6. THE 48B1 DATA UNIT CANNOT BE USED IN REGISTERED ARRANGEMENTS OR WHEN THE FAR END OF THE DIAL BACKUP CHANNEL IS EQUIPPED FOR UNATTENDED OPERATION
7. THE TWO M4AU CORDS MUST BE ORDERED SEPARATELY. TAPE AND STORE UNUSED LEADS
8. USE DATA JACK USOC RJ41S WITH SWITCH SET TO FLL. THE TWO DATA JACKS MUST BE ORDERED SEPARATELY
9. SUPPLIED WITH 59A1 DATA MOUNTING

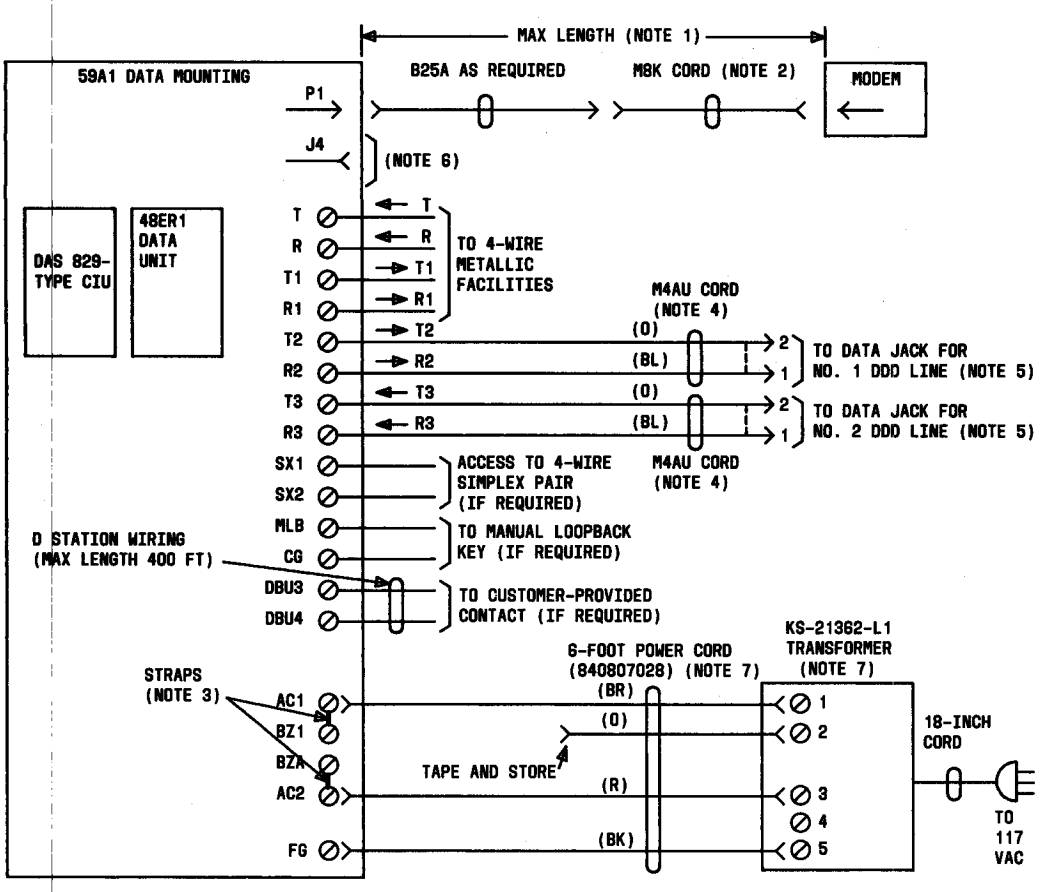
Fig. 18—59A1 Data Mounting—4-Wire Data With Alternate Voice and 4-Wire Dial Backup Service (Manual Dialing)



NOTES:

1. DATA SET MAX LENGTH IN FT
   - 201C-L1 1400
   - 201C-L1D 1400
   - 202D 500
   - 202T 200
   - 208A 1400
   - 209A 1400
2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D
3. STRAPS PROVIDED AS PART OF 59A1 DATA MOUNTING. DO NOT REMOVE STRAPS
4. THE TWO M4AU CORDS MUST BE ORDERED SEPARATELY. TAPE AND STORE UNUSED LEADS
5. USE DATA JACK USOC RJ41S WITH SWITCH SET TO FLL. THE TWO DATA JACKS MUST BE ORDERED SEPARATELY
6. FOR AUTOMATIC DIALING, A SEPARATELY ORDERED 43A OR 53A STATION DIAL OR SEPARATELY ORDERED DAS 801/CR-L1/2 ACU IS CONNECTED TO J4 OF THE 59A1 DATA MOUNTING. IF A 43A OR 53A STATION DIAL IS USED, SEE FIG. 21 FOR CONNECTIONS. IF A DAS 801CR-L1/2 ACU IS USED, SEE FIG. 22 FOR CONNECTIONS
7. SUPPLIED WITH 59A1 DATA MOUNTING

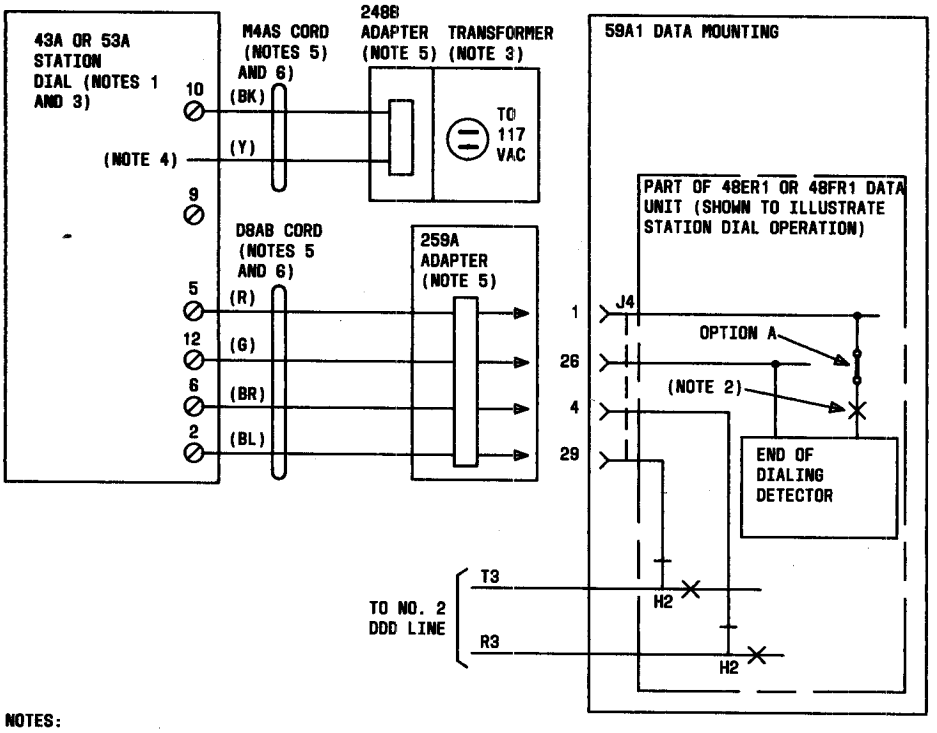
Fig. 19—59A1 Data Mounting—4-Wire Data With 4-Wire Dial Backup Service (Automatic Dialing)



NOTES:

1. DATA SET MAX LENGTH IN FT
   - 201C-L1 1400
   - 201C-L1D 1400
   - 202D 500
   - 202T 200
   - 208A 1400
   - 209A 1400
2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D
3. STRAPS PROVIDED AS PART OF 59A1 DATA MOUNTING. DO NOT REMOVE STRAPS
4. THE TWO M4AU CORDS MUST BE ORDERED SEPARATELY. TAPE AND STORE UNUSED LEADS
5. USE DATA JACK USOC RJ41S WITH SWITCH SET TO FLL. THE TWO DATA JACKS MUST BE ORDERED SEPARATELY
6. FOR AUTOMATIC ANSWERING WITH AUTOMATIC CALLBACK, A SEPARATELY ORDERED 43A OR 53A STATION DIAL IS CONNECTED TO J4 OF THE 59A1 DATA MOUNTING AS SHOWN IN FIG. 21. FOR AUTOMATIC ANSWERING WITH TWO CALLS ANSWERED, THE STATION DIAL IS NOT REQUIRED
7. SUPPLIED WITH 59A1 DATA MOUNTING

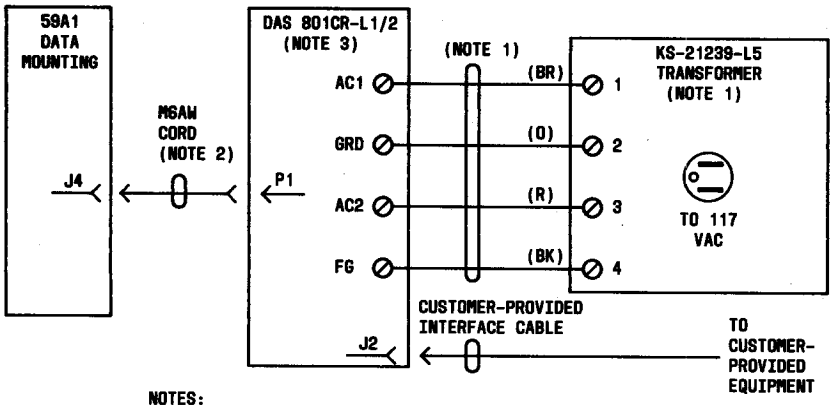
Fig. 20—59A1 Data Mounting—4-Wire Data With 4-Wire Dial Backup Service (Automatic Answering)



NOTES:
1. THE 43A OR 53A STATION DIAL MUST BE OPTIONED FOR RESTRICTED DIALING
2. THE RELAY CONTACT SHOWN IS DESIGNATED R WHEN THE 48ER1 DATA UNIT IS PROVIDED AND IS DESIGNATED OR WHEN THE 48FR1 DATA UNIT IS PROVIDED.
3. A 2012D TRANSFORMER IS REQUIRED WHEN THE 43A OR 53A STATION DIAL IS USED WITHOUT THE 1A350 TONE DETECTOR. A 2075A TRANSFORMER IS REQUIRED WHEN THE 43A OR 53A STATION DIAL IS USED WITH THE 1A350 TONE DETECTOR. THE 2012D TRANSFORMER OR THE 2075A TRANSFORMER AND THE 1A350 TONE DETECTOR MUST BE ORDERED SEPARATELY
4. WHEN A 43A STATION DIAL IS USED, CONNECT YELLOW (Y) LEAD OF M4AS CORD TO TERMINAL 9 OF STATION DIAL. WHEN A 53A STATION DIAL IS USED, CONNECT YELLOW (Y) LEAD OF M4AS CORD TO TERMINAL 6 OF STATION DIAL.
5. THE M4AS CORD, D8AB CORD, 248B ADAPTER, AND 259A ADAPTER MUST BE ORDERED SEPARATELY
6. TAPE AND STORE UNUSED LEADS.

Fig. 21—59A1 Data Mounting—Connections to 43A or 53A Station Dial

units that add alternate voice service to the 4-wire private lines. Each DAS 829-type CIU and 48A1 data unit is identified by a number (N) from 1 to 23. The Nth DAS 829-type CIU terminates the Nth 4-wire private line. The Nth 48A1 data unit adds alternate voice service to the 4-wire private line terminated by the Nth DAS 829-type CIU. The key leads controlling the 23 FDA arrangements are concentrated in connector J10 of each 46B1 data mounting. The key leads controlling FDA arrangements 1 through 8 are connected through connector P1, of the 48D1 data unit, to the keys designated 1 through 8 on the 30-button CALL DIRECTOR. Similarly, the key leads controlling FDA arrangements 9 through 16 and 17 through 23 are connected through connectors P2 and P3, respectively, of the 48D1 data unit, to the keys designated 9 through 16 and 17 through 23,



NOTES:
1. SUPPLIED WITH DAS 801CR-L1/2
2. THE MSAW CORD IS USED INSTEAD OF THE M15H CORD SUPPLIED WITH DAS 801CR-L1/2. THE MSAW CORD MUST BE ORDERED SEPARATELY. THE M15H CORD SHOULD BE RETURNED TO STOCK
3. DAS 801CR-L1/2 OPTIONS REQUIRED ARE SHOWN IN TABLE BELOW.

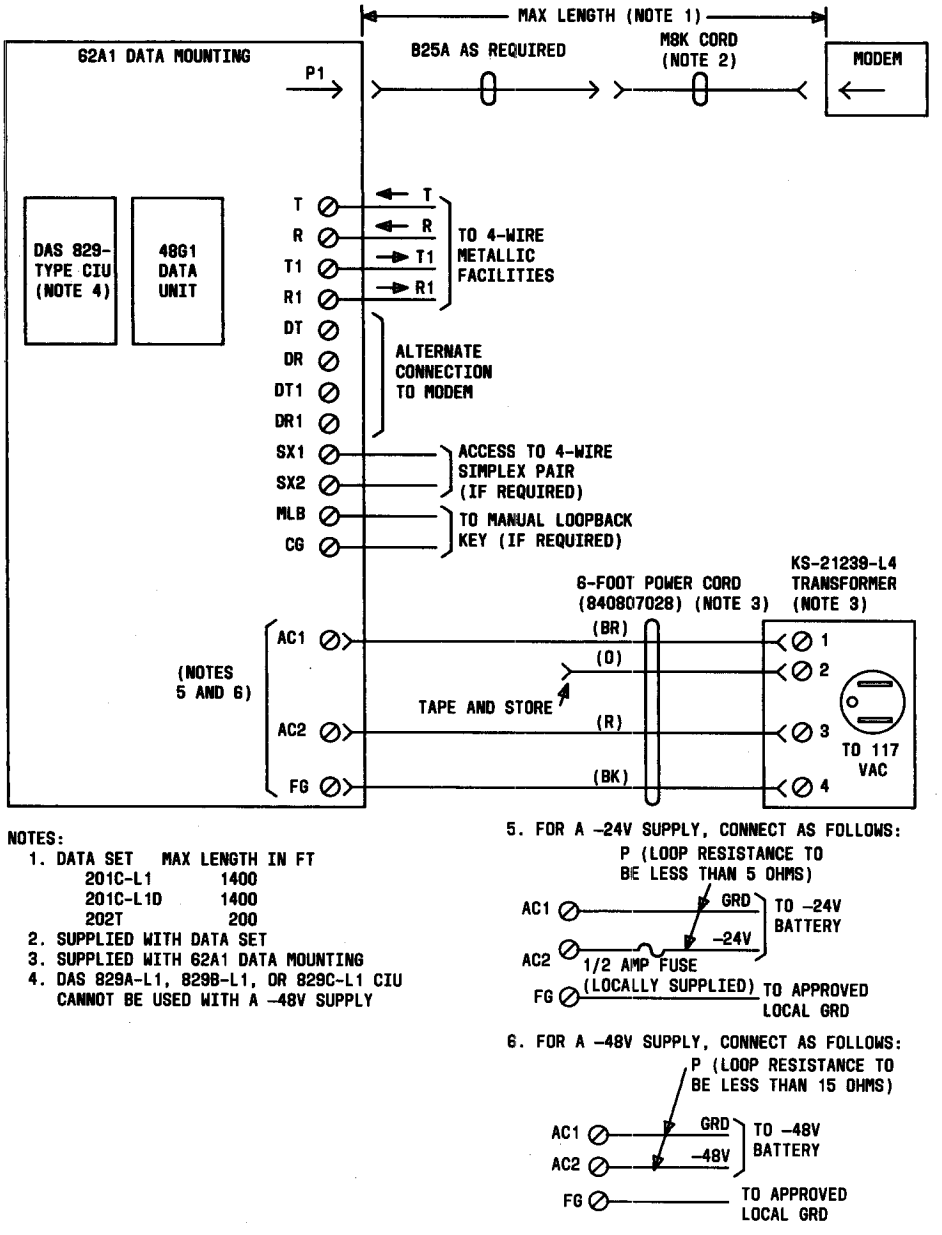
OPTION		SWITCH SETTINGS ON CP1	
DESCRIPTION	DESIG	CLOSED	OPEN
LOOP START	Y	S2-4, S4-1	S1-2, S2-1
DETECT BEGINNING OF ANSWER TONE	X	–	S3-3
DETECT 2225-HZ ANSWER TONE	T	S2-2	S2-3
DATA SET TO DATA MODE BY GROUNDED CONTACT	ZG	S1-1	S1-3
NO CLEAR SIGNAL; NO TK CONTACT	ZN	–	S1-4
TERMINATE CALL VIA DATA SET AFTER DSS ON	G	S4-2	–
STOP ACR TIMER WHEN DSS GOES ON	R	S3-1, S3-2	–
ACR TIMING INTERVAL 56 SEC	ZT	S3-4	S3-5
SIGNAL GRD CONNECTED TO FRAME GRD	ZU	CLOSE SCREW SWITCH ON 52A2 DATA MOUNTING.	

Fig. 22—59A1 Data Mounting—Connections to DAS 801CR-L1/2 ACU

respectively, on the 30-button CALL DIRECTOR. The pickup key controlling the Nth FDA arrangement is designated TALK-DBU N.

3.12 The interface leads for the 23 FDA arrangements and the interface leads for the 23 modems must be connected to the switching matrices controlled by the 30-button CALL DIRECTOR. The interface leads for the 23 FDA arrangements are concentrated in connector P1 of each 46B1 data mounting. The interface leads for FDA arrangements 1 through 8 are connected through connector J10, of the 46C-type data mounting, to the switching matrix provided by the pair of 48C1 data units installed in connectors J4 and J5 of the 46C-type data mounting. The interface leads for modems 1 through 8 are also connected to this matrix through connector P2 of the 46C-type data mounting. The key leads controlling this matrix are connected through connectors P4 and P5, of the 48D1 data unit, to the keys designated 1 through 8 on the 30-button CALL DIRECTOR. The FDA, modem, and key leads for circuits 9 through 16 and 17 through 23 are connected in a similar manner.

3.13 The interface leads for the 23 modems are concentrated in connectors P2, P3, and P4 of the 46C-type data mounting. The modems can



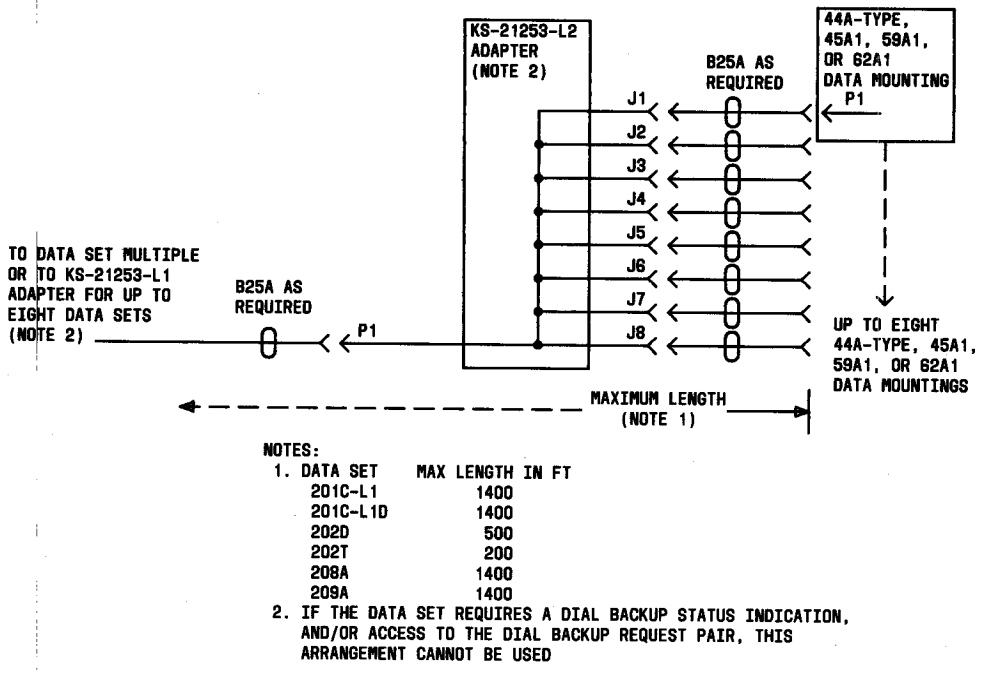
NOTES:

1. DATA SET MAX LENGTH IN FT
   - 201C-L1 1400
   - 201C-L1D 1400
   - 202T 200
2. SUPPLIED WITH DATA SET
3. SUPPLIED WITH 62A1 DATA MOUNTING
4. DAS 829A-L1, 829B-L1, OR 829C-L1 CIU CANNOT BE USED WITH A -48V SUPPLY

5. FOR A -24V SUPPLY, CONNECT AS FOLLOWS:

6. FOR A -48V SUPPLY, CONNECT AS FOLLOWS:

Fig. 23—62A1 Data Mounting—2-Wire Data Only Service



NOTES:

1. DATA SET — MAX LENGTH IN FT

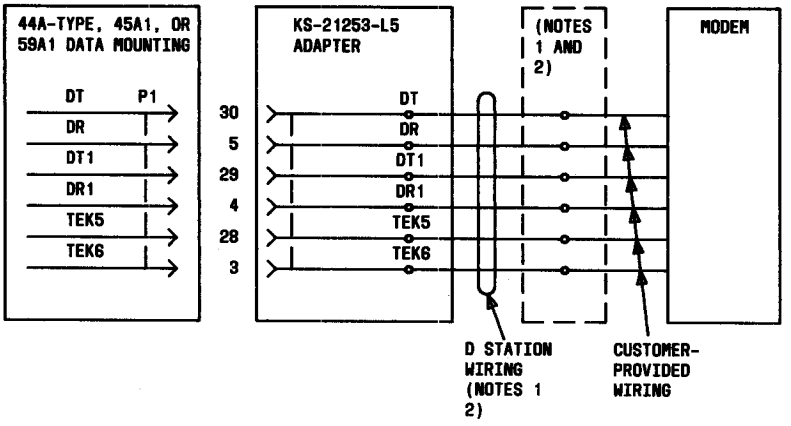
DATA SET	MAX LENGTH IN FT
201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400

2. IF THE DATA SET REQUIRES A DIAL BACKUP STATUS INDICATION, AND/OR ACCESS TO THE DIAL BACKUP REQUEST PAIR, THIS ARRANGEMENT CANNOT BE USED

Fig. 24—44A-Type, 45A1, 59A1, or 62A1 Data Mounting—Multiple Arrangement

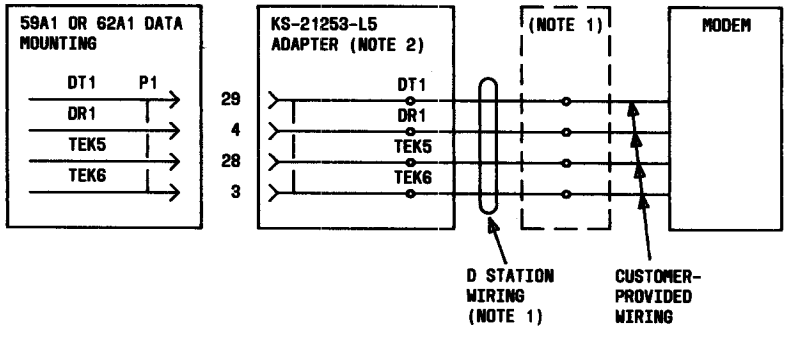
be terminated, as required, using the arrangements given in paragraph 3.02.

3.14 Dial backup channels A and B for the twenty-three FDA arrangements are provided by the two 48B1 or 48ER1 data units installed in connectors J2 and J3 of the 46C-type data mounting. The four direct distance dialing (DDD) lines required for dial backup channels A and B are connected to a terminal strip or connector J1 on the 46C-type data mounting. The key leads controlling the dial backup channels are connected through connector P1, of the 46C-type data mounting, and connector J6, of the 48D1 data unit, to the pickup keys designated DDD1A, DDD2A, DDD1B, DDD2B, and REL.



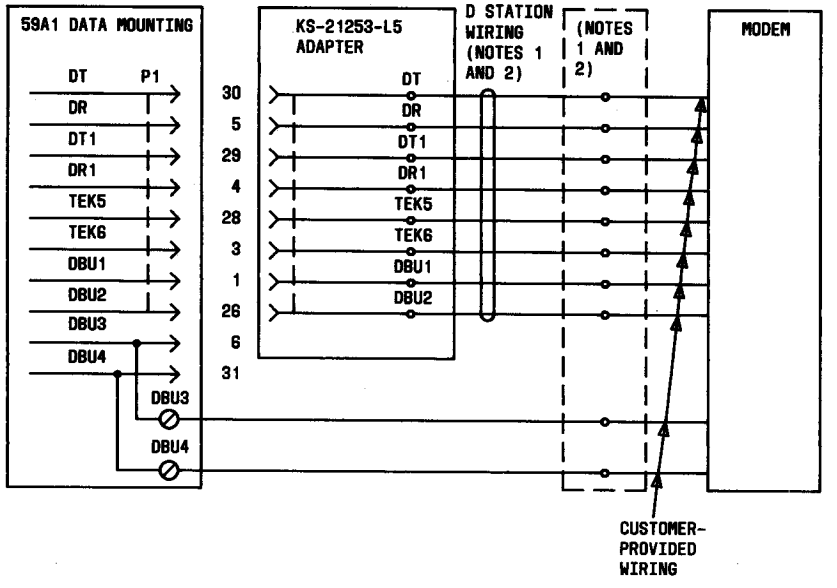
NOTES:
1. IF THE CUSTOMER-PROVIDED WIRING IS TOO SHORT, A 42A CONNECTING BLOCK CAN BE USED WITH D STATION WIRING TO CONNECT THE MODEM TO THE KS-21253-L5 ADAPTER. THE D STATION WIRING SHOULD NOT EXCEED 10 FEET IN LENGTH.
2. IF THE TEK5 AND TEK6 LEADS ARE REQUIRED, A 44A CONNECTING BLOCK MUST BE USED WITH THE D STATION WIRING.

Fig. 25—Customer-Provided Modem—4-Wire Data Service (With or Without Alternate Voice Service)



NOTES:
1. IF THE CUSTOMER-PROVIDED WIRING IS TOO SHORT, A 42A CONNECTING BLOCK CAN BE USED WITH D STATION WIRING TO CONNECT THE MODEM TO THE KS-21253-L5 ADAPTER. THE D STATION WIRING SHOULD NOT EXCEED 10 FEET IN LENGTH.
2. IF THE TEK5 AND TEK6 LEADS ARE NOT REQUIRED FOR 2-WIRE DATA ONLY SERVICE, THE KS-21253-L5 ADAPTER CAN BE OMITTED AND THE DT1 AND DR1 LEADS CONNECTED TO SCREW TERMINALS DT1 AND DR1, RESPECTIVELY, OF THE 62A1 DATA MOUNTING.

Fig. 26—Customer-Provided Modem—2-Wire Data Service (With or Without Alternate Voice Service)



NOTES:
1. IF THE CUSTOMER-PROVIDED WIRING IS TOO SHORT, A 42A CONNECTING BLOCK CAN BE USED WITH D STATION WIRING TO CONNECT THE MODEM TO THE KS-21253-L5 ADAPTER. THE D STATION WIRING SHOULD NOT EXCEED 10 FEET IN LENGTH
2. IF THE TEK5 AND TEK6 LEADS AND/OR DBU1 AND DBU2 LEADS AND/OR DBU3 AND DBU4 LEADS ARE REQUIRED, A 44A CONNECTING BLOCK MUST BE USED WITH THE D STATION WIRING

Fig. 27—Customer-Provided Modem—4-Wire Data With 4-Wire Dial Backup Service (With or Without Alternate Voice Service)

Second Example—Multiple FD and FDA Arrangements With and Without Switched Dial Backup Service

3.15 The second example (Fig. 44) is a multiple arrangement consisting of a variety of services controlled by one CALL DIRECTOR. In this example, 8 FD and 11 FDA arrangements are to be provided. Switched dial backup service using one dial backup channel is to be provided for 5 of the FD and 6 of the FDA arrangements.

3.16 Design rule No. 1 indicates that one 18-button CALL DIRECTOR can be used to control the 11 arrangements (5 FD and 6 FDA) that require switched dial backup service. However, 5 of the FDA arrangements to be provided do not require switched dial backup service. Design rule No. 2 and Table B indicate that when 11 FD and/or FDA arrangements are provided with switched dial backup service, there are up to 8 pickup keys available for control of additional FDA arrangements when a 30-button CALL DIRECTOR is provided. Therefore, for this example, the 631DAM or the 2631DAM 30-button CALL DIRECTOR key telephone set, with the wiring modifications given in Fig. 44, is used to control the entire multiple arrangement. The CALL DIRECTOR is connected to connectors J1 through J5 of the 48D1 data unit. Table B indicates that pickup keys 1 through 8 of the CALL DIRECTOR should be assigned to the FDA arrangements that do not require switched dial backup service. Pickup keys 9 through 23 should be assigned to the FD and/or FDA arrangements that require switched dial backup service.

3.17 The FDA arrangements that do not require switched dial backup service are provided

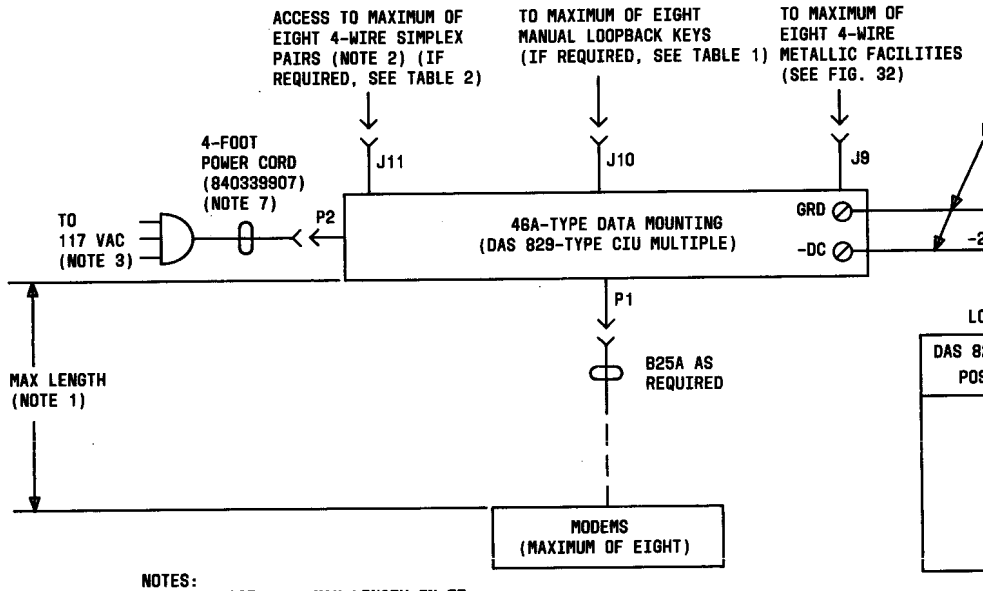


TABLE 1
LOCATION OF LOOPBACK PAIR

DAS 829-TYPE CIU POSITION NO.	J10 TERMINAL NO.	
	CG	MLB
1	3	28
2	6	31
3	9	34
4	12	37
5	15	40
6	18	43
7	21	46
8	24	49

NOTES:
1. DATA SET — MAX LENGTH IN FT
   - 201C-L1 — 1400
   - 201C-L1D — 1400
   - 202D — 500
   - 202T — 200
   - 208A — 1400
   - 209A — 1400
2. NOT PROVIDED ON 46A1 DATA MOUNTING
3. FOR OPERATION FROM A 117 VAC SUPPLY, THE 46A2 DATA MOUNTING MUST BE EQUIPPED WITH THE AC OPTION
4. FOR OPERATION FROM A DC SUPPLY, THE 46A2 DATA MOUNTING MUST BE EQUIPPED WITH THE DC OPTION. THIS OPTION IS NOT PROVIDED ON THE 46A1 DATA MOUNTING
5. DAS 829A-L1, 829B-L1, OR 829C-L1 CIU CANNOT BE USED WITH A -48V SUPPLY
6. LOOP RESISTANCE TO BE LESS THAN 4 OHMS
7. SUPPLIED WITH DATA MOUNTING. NOT REQUIRED FOR OPERATION FROM A DC SUPPLY

TABLE 2
LOCATION OF SIMPLEX PAIR

DAS 829-TYPE CIU POSITION NO.	J11 TERMINAL NO.	
	SX1	SX2
1	1	26
2	2	27
3	3	28
4	4	29
5	5	30
6	6	31
7	7	32
8	8	33

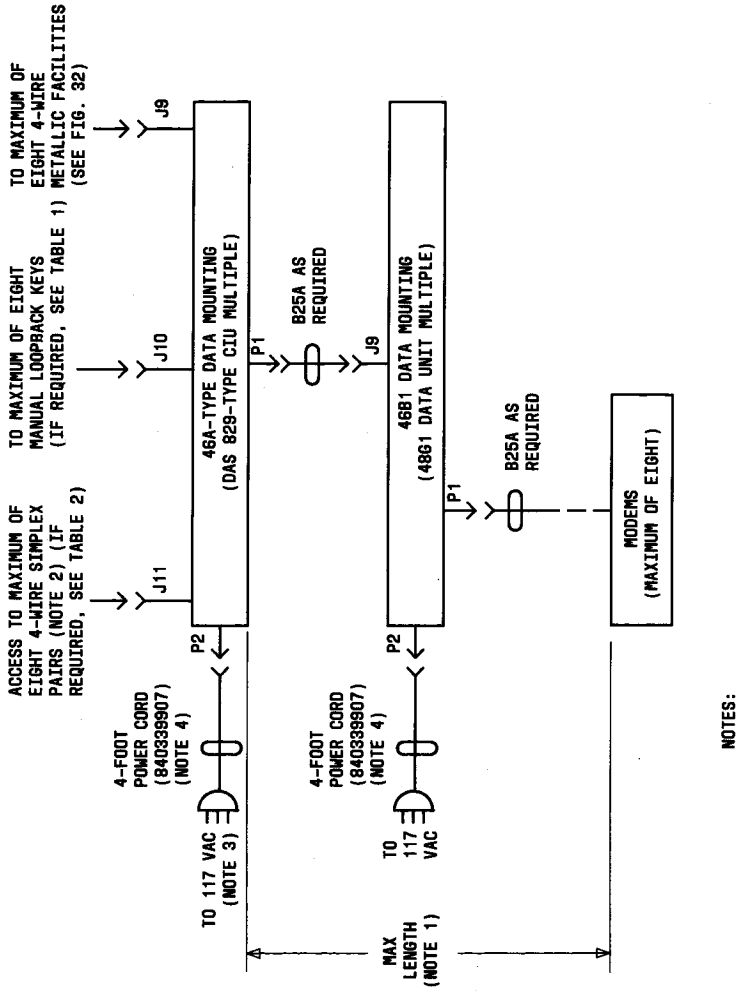
Fig. 28—46A-Type Data Mounting—4-Wire Data Only Service

TABLE 1
LOCATION OF LOOPBACK PAIR

DAS 829-TYPE CIU POSITION NO.	J10 TERMINAL NO.	
	CG	MLB
1	3	28
2	6	31
3	9	34
4	12	37
5	15	40
6	18	43
7	21	46
8	24	49

TABLE 2
LOCATION OF SIMPLEX PAIR

DAS 829-TYPE CIU POSITION NO.	J11 TERMINAL NO.	
	SX1	SX2
1	1	26
2	2	27
3	3	28
4	4	29
5	5	30
6	6	31
7	7	32
8	8	33



NOTES:
1. DATA SET — MAX LENGTH IN FT
   201C-L1 — 1400
   201C-L1D — 1400
   202T — 200
2. NOT PROVIDED ON 46A1 DATA MOUNTING
3. THE 46A2 DATA MOUNTING MUST BE EQUIPPED WITH THE AC OPTION
4. SUPPLIED WITH DATA MOUNTING

Fig. 29—46A-Type and 46B1 Data Mountings—2-Wire Data Only Service

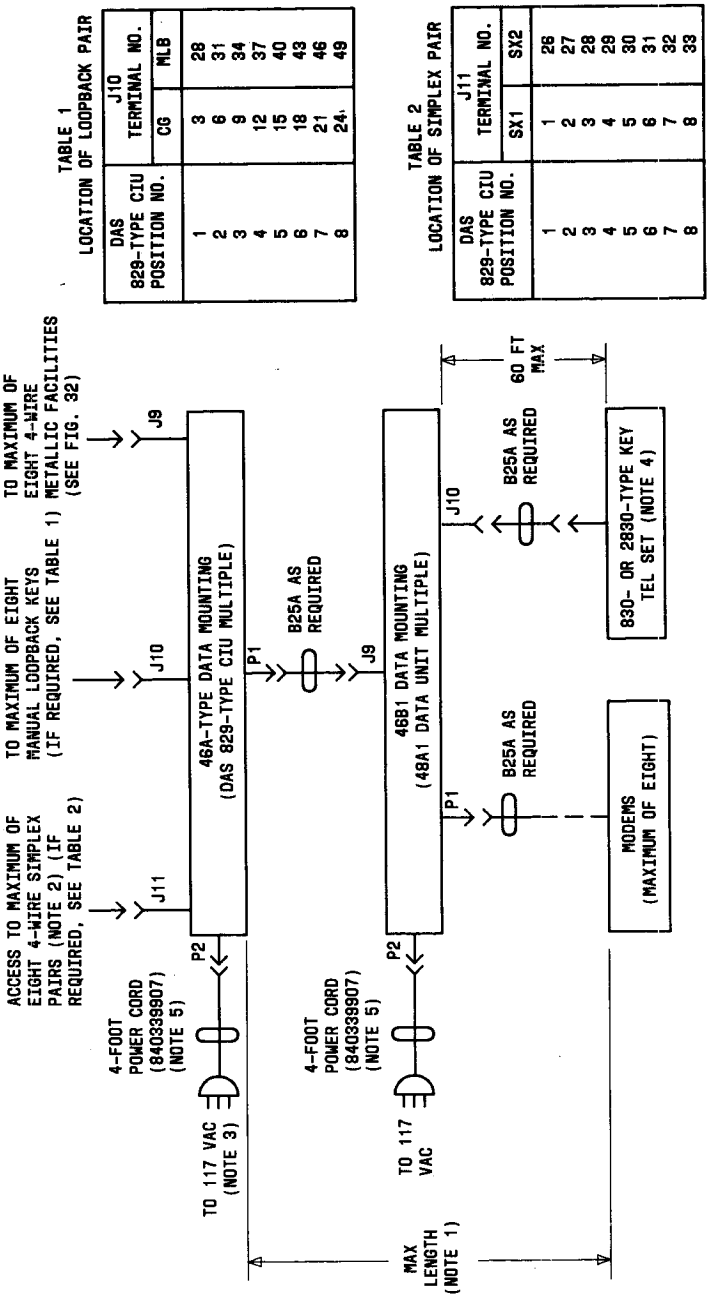


TABLE 1
LOCATION OF LOOPBACK PAIR

DAS 829-TYPE CIU POSITION NO.	J10 TERMINAL NO.	
	CG	MLB
1	3	28
2	6	31
3	9	34
4	12	37
5	15	40
6	18	43
7	21	46
8	24	49

TABLE 2
LOCATION OF SIMPLEX PAIR

DAS 829-TYPE CIU POSITION NO.	J11 TERMINAL NO.	
	SX1	SX2
1	1	26
2	2	27
3	3	28
4	4	29
5	5	30
6	6	31
7	7	32
8	8	33

NOTES:
1. DATA SET MAX LENGTH IN FT

DATA SET	MAX LENGTH IN FT
201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400

2. NOT PROVIDED ON 46A1 DATA MOUNTING
3. THE 46A2 DATA MOUNTING MUST BE EQUIPPED WITH THE AC OPTION
4. DESIGNATE KEY STRIP AS SHOWN. CONVERT RING BUTTON TO NONLOCKING

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

5. SUPPLIED WITH DATA MOUNTING

Fig. 30—46A-Type and 46B1 Data Mountings—4-Wire Data With Alternate Voice Service

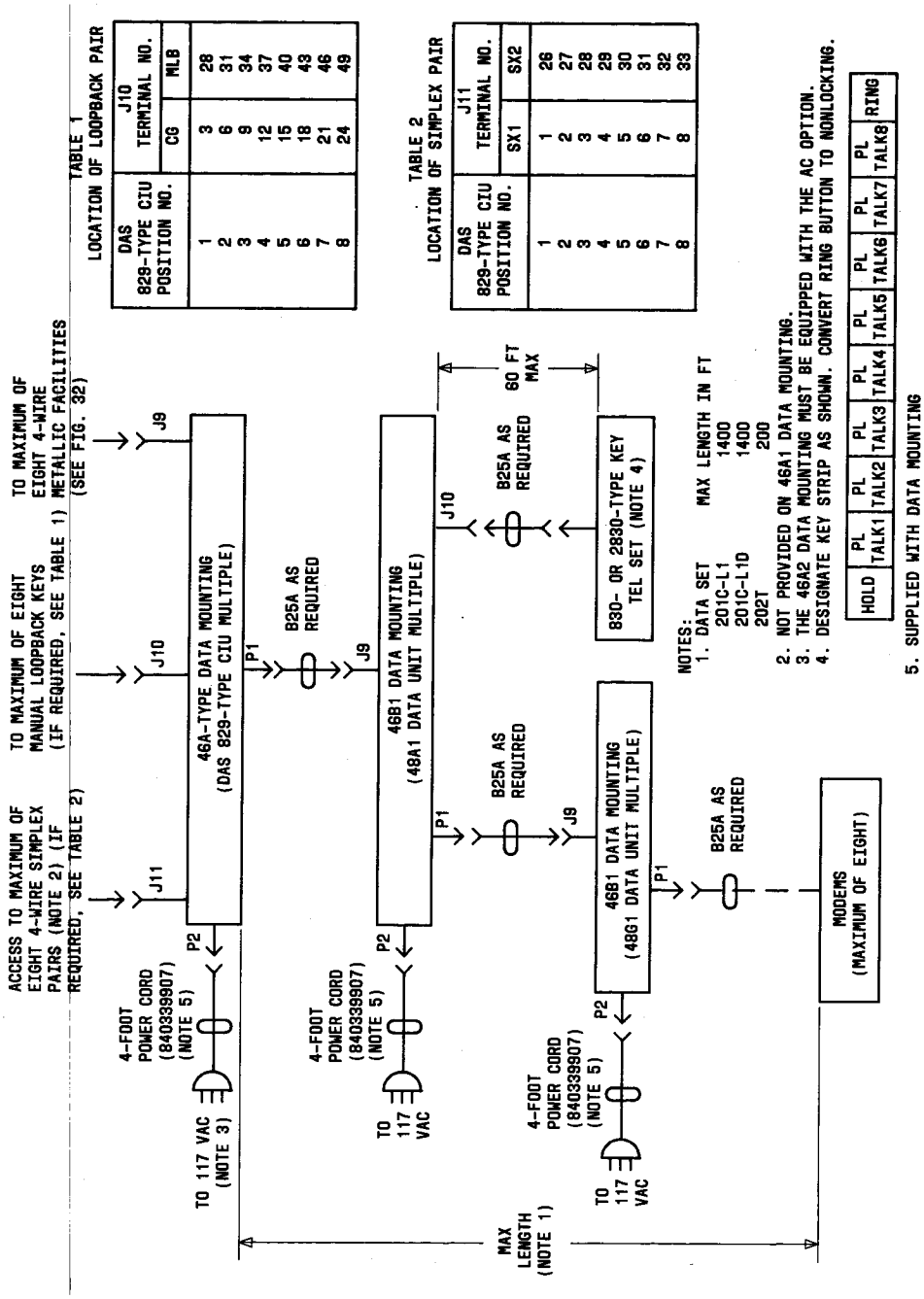


TABLE 1
LOCATION OF LOOPBACK PAIR

DAS 829-TYPE CIU POSITION NO.	J10 TERMINAL NO. CG	J10 TERMINAL NO. MLB
1	3	28
2	6	31
3	9	34
4	12	37
5	15	40
6	18	43
7	21	46
8	24	49

TABLE 2
LOCATION OF SIMPLEX PAIR

DAS 829-TYPE CIU POSITION NO.	J11 TERMINAL NO. SX1	J11 TERMINAL NO. SX2
1	1	26
2	2	27
3	3	28
4	4	29
5	5	30
6	6	31
7	7	32
8	8	33

NOTES:
1. DATA SET — MAX LENGTH IN FT
   201C-L1 — 1400
   201C-L10 — 1400
   202T — 200
2. NOT PROVIDED ON 46A1 DATA MOUNTING.
3. THE 46A2 DATA MOUNTING MUST BE EQUIPPED WITH THE AC OPTION.
4. DESIGNATE KEY STRIP AS SHOWN. CONVERT RING BUTTON TO NONLOCKING.
5. SUPPLIED WITH DATA MOUNTING

Fig. 31—46A-Type and 46B1 Data Mountings—2-Wire Data With Alternate Voice Service

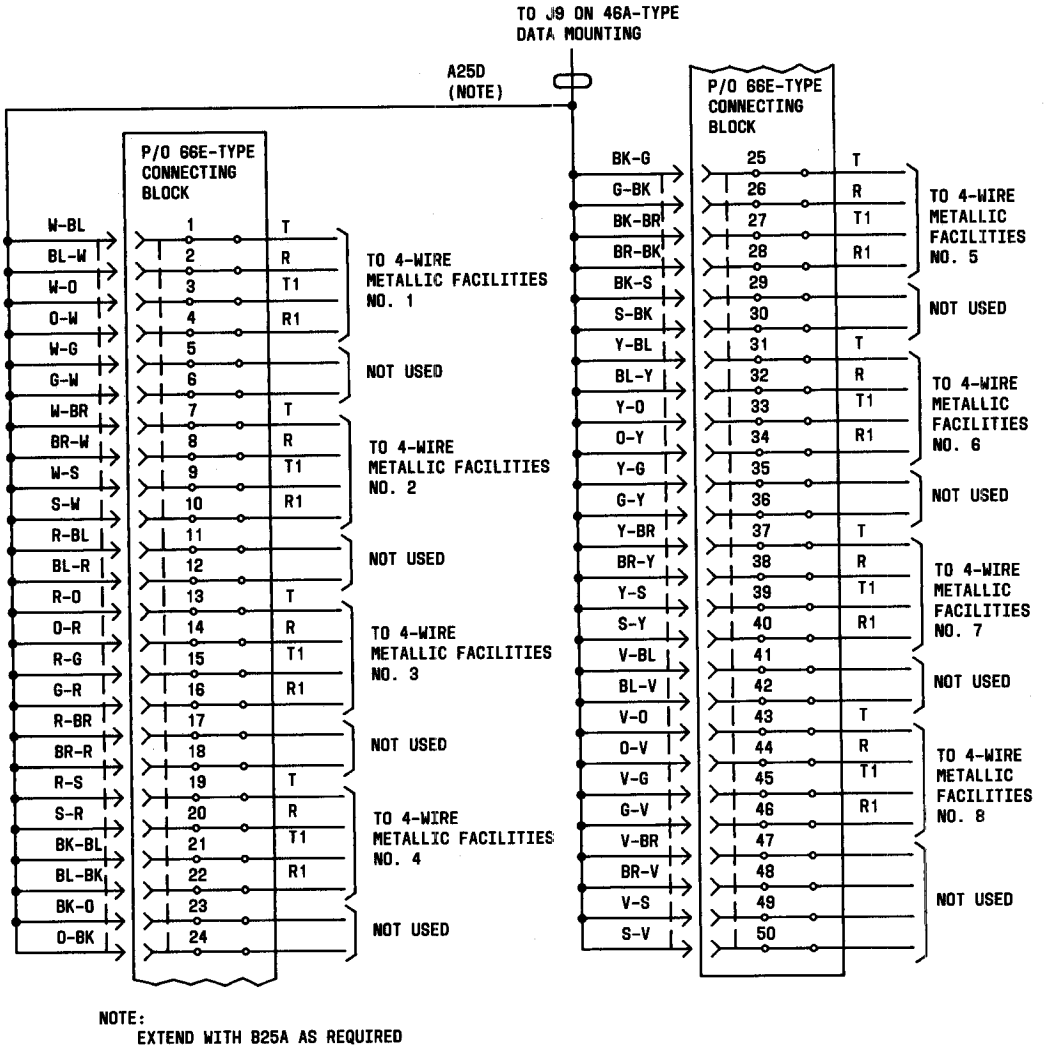
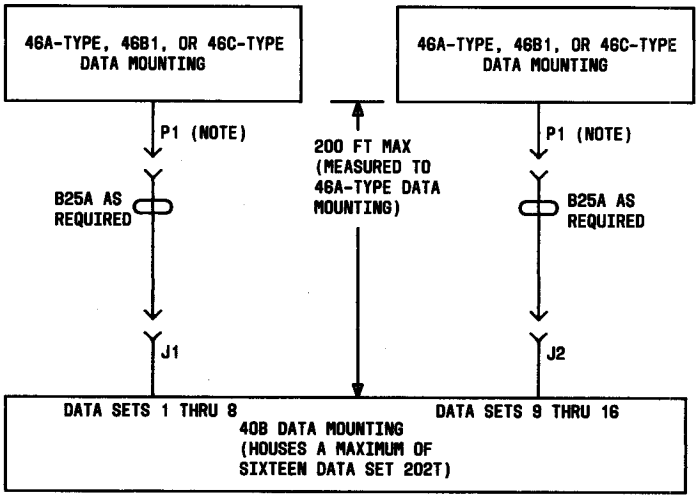


Fig. 32—46A-Type Data Mounting Connections to 4-Wire Metallic Facilities

by the 46A-type and 46B1 data mountings that terminate the 4-wire private lines 1 through 8. Positions 1 through 5 are used for the required 5 FDA arrangements. Positions 6 through 8 are used for the 3 FD arrangements that do not require switched dial backup service (design rule No. 3). The modems for circuits 1 through 8 are connected to connector P1 of the 46B1 data mounting for circuits 1 through 8. The key leads controlling circuits 1 through 8 are connected through connector P1 of the 48D1 data unit.

Note: The 48C1 data units are not installed in connectors J4 and J5 of the 46C-type data



NOTE:
P2, P3, OR P4 ON 46C-TYPE DATA MOUNTING.

Fig. 33—Data Set 202T—4-Wire Multiple Arrangement

mounting. These connectors are left unterminated as switched dial backup service is not required for circuits 1 through 8.

3.18 The pickup keys for positions 1 through 5 control FDA arrangements and are designated TALK 1 through TALK 5, respectively. The pickup keys for positions 6 through 8 are left blank as these positions do not require key lead control.

3.19 The FDA arrangements that require switched dial backup service are provided by the 46A-type and 46B1 data mountings that terminate the 4-wire private lines 9 through 16. Positions 9 through 14 are used for the required 6 FDA arrangements. Positions 15 and 16 are used for 2 of the 5 FD arrangements that require switched dial backup service. The key leads controlling circuits 9 through 16 are connected through connector P2 of the 48D1 data unit.

3.20 The interface leads for FD and/or FDA arrangements 9 through 16 are connected through connector J11, of the 46C-type data mounting, to the switching matrix provided by the pair of 48C1 data units installed in connectors J6 and J7 of the 46C-type data mounting. The interface leads for modems 9 through 16 are also connected to this matrix through connector P3 of the 46C-type data mounting.

3.21 The pickup keys for positions 9 through 14 control FDA arrangements with switched dial backup service and are designated TALK-DBU 9 through TALK-DBU 14, respectively. The pickup keys for positions 15 and 16 control FD arrangements with switched dial backup service and are designated DBU 15 and DBU 16, respectively.

3.22 The remaining FD arrangements that require switched dial backup service are provided by the 46A-type data mounting that terminates 4-wire private lines 17 through 23. Positions 17 through 19 are used for the remaining 3 FD arrangements. Positions 20 through 23 are not used.

3.23 The interface leads for FD arrangements 17 through 23 are connected through connector J12, of the 46C-type data mounting, to switching matrix connectors J8 and J9 of the 46C-type data mounting. The interface leads for modems 17

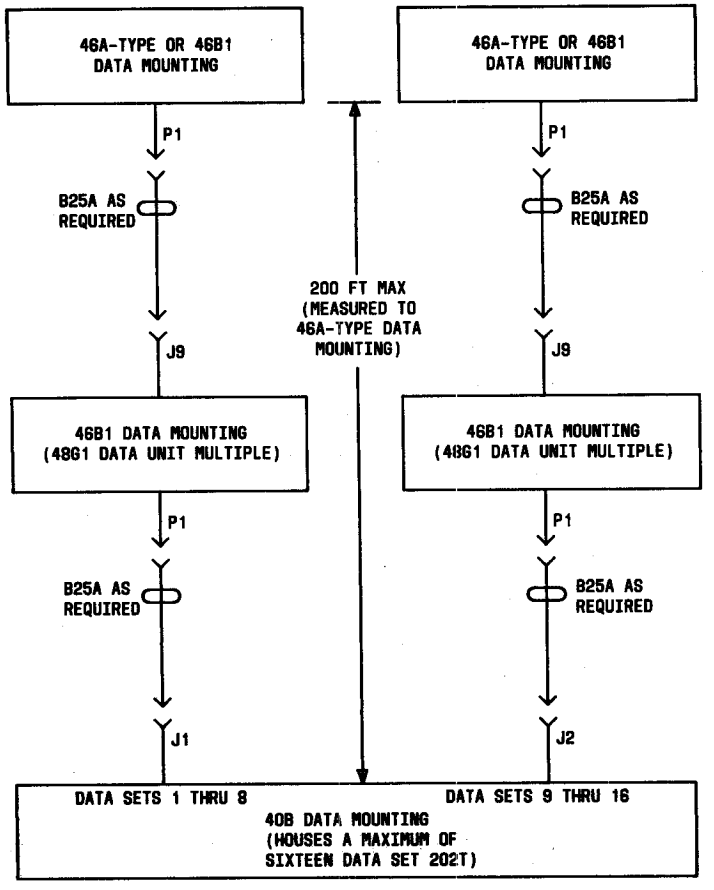


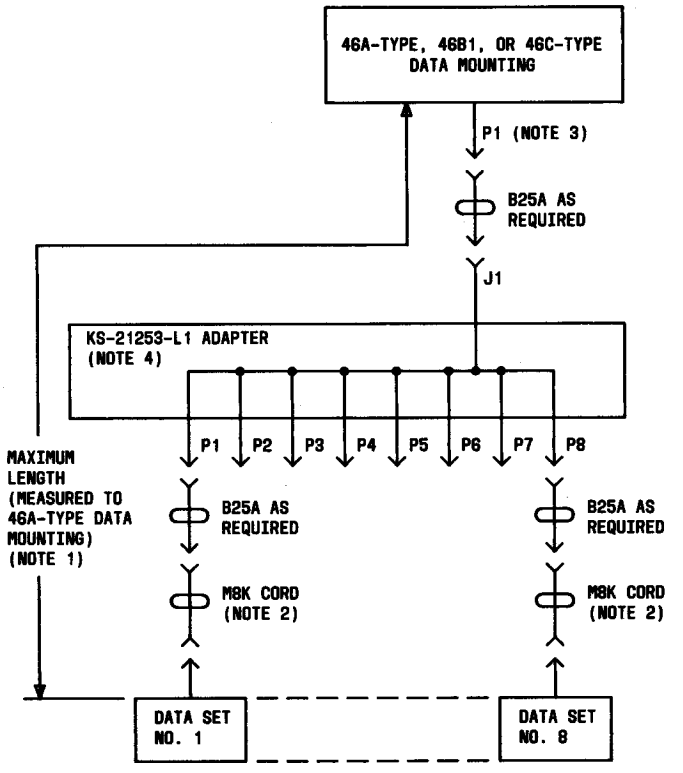
Fig. 34—Data Set 202T—2-Wire Multiple Arrangement

through 23 are also connected to connectors J8 and J9 through connector P4 of the 46C-type data mounting. The 48C1 data unit installed in connector J8 provides the switching matrix for circuits 17 through 20. Since circuits 21 through 23 do not require switched dial backup service, connector J9 is not terminated by a 48C1 data unit.

Note: Connectors J4 through J9 of the 46C-type data mounting, when unterminated, do not provide a through connection for the modem interface leads. Hence, in this example, positions 21 through 23 cannot be used to provide FD arrangements.

3.24 The pickup keys for positions 17 through 19 control FD arrangements with switched dial backup service and are designated DBU 17 through DBU 19, respectively. The pickup keys for positions 20 through 23 are left blank as these positions are not used.

3.25 Dial backup channel A, the only dial backup channel required in this example, is provided by the 48B1 or 48ER1 data unit installed in connector



NOTES:

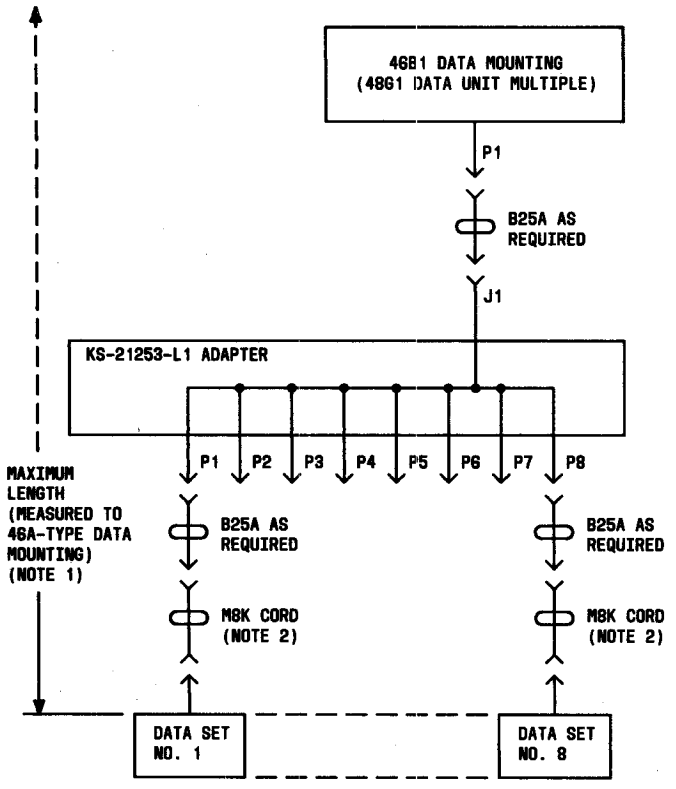
1. DATA SET — MAX LENGTH IN FT

DATA SET	MAX LENGTH IN FT
201C-L1	1400
201C-L1D	1400
202D	500
202T	200
208A	1400
209A	1400

2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D5OAA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D
3. P2, P3, OR P4 ON 46C-TYPE DATA MOUNTING
4. IF THE DATA SET REQUIRES A DIAL BACKUP STATUS INDICATION, THE KS-21253-L4 ADAPTER MUST BE USED AS SHOWN IN FIG. 47

Fig. 35—Data Set 201C, 202D, 202T, 208A, or 209A—4-Wire Multiple Arrangement

J2 of the 46C-type data mounting. The two DDD lines required for dial backup channel A are connected to a terminal strip on the 46C-type data mounting. The two DDD lines and the 48B1 or 48ER1 data unit required for dial backup channel B are not provided. The key leads controlling the dial backup channels are connected through connector P1, of the 46C-type data mounting, and connector J6, of the 48D1 data unit, to the pickup keys designated DDD1A, DDD2A, and REL. The 4th and 5th pickup



NOTES:
1. DATA SET — MAX LENGTH IN FT
   201C-L1 — 1400
   201C-L1D — 1400
   202T — 200
2. SUPPLIED WITH DATA SET

Fig. 36—Data Set 201C or 202T—2-Wire Multiple Arrangement

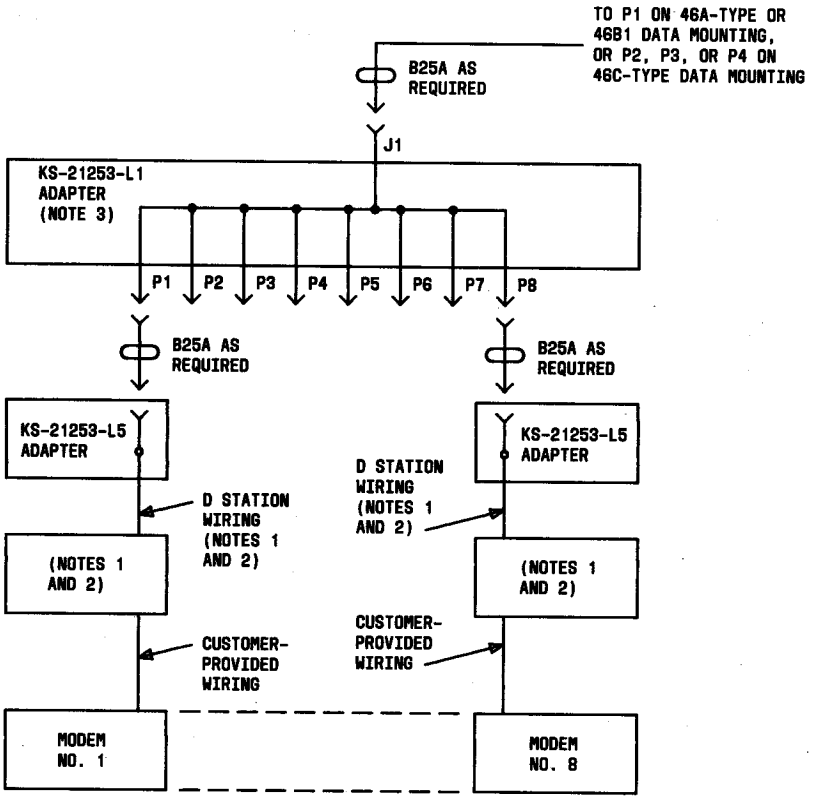
keys of the 1st key module that provide key lead control for the DDD1B and DDD2B lines are not required and are left blank.

4. OPTIONS AND ADJUSTMENTS

A. DAS 829A-L1 CIU

4.01 A sealing current option (Fig. 48) is provided on the DAS 829A-L1 CIU. If this option is specified on the service order, a plug-in strap should be placed in the sealing current option (SC) position. If the option is not specified on the service order, the plug-in strap should be placed in the sealing current storage (ST) position.

4.02 A line impedance option (Fig. 48) on the DAS 829A-L1 CIU provides a 600- or 1200-ohm line termination. The two plug-in straps used for line termination should be placed in the 600-ohm or 1200-ohm option positions as specified on the service order.

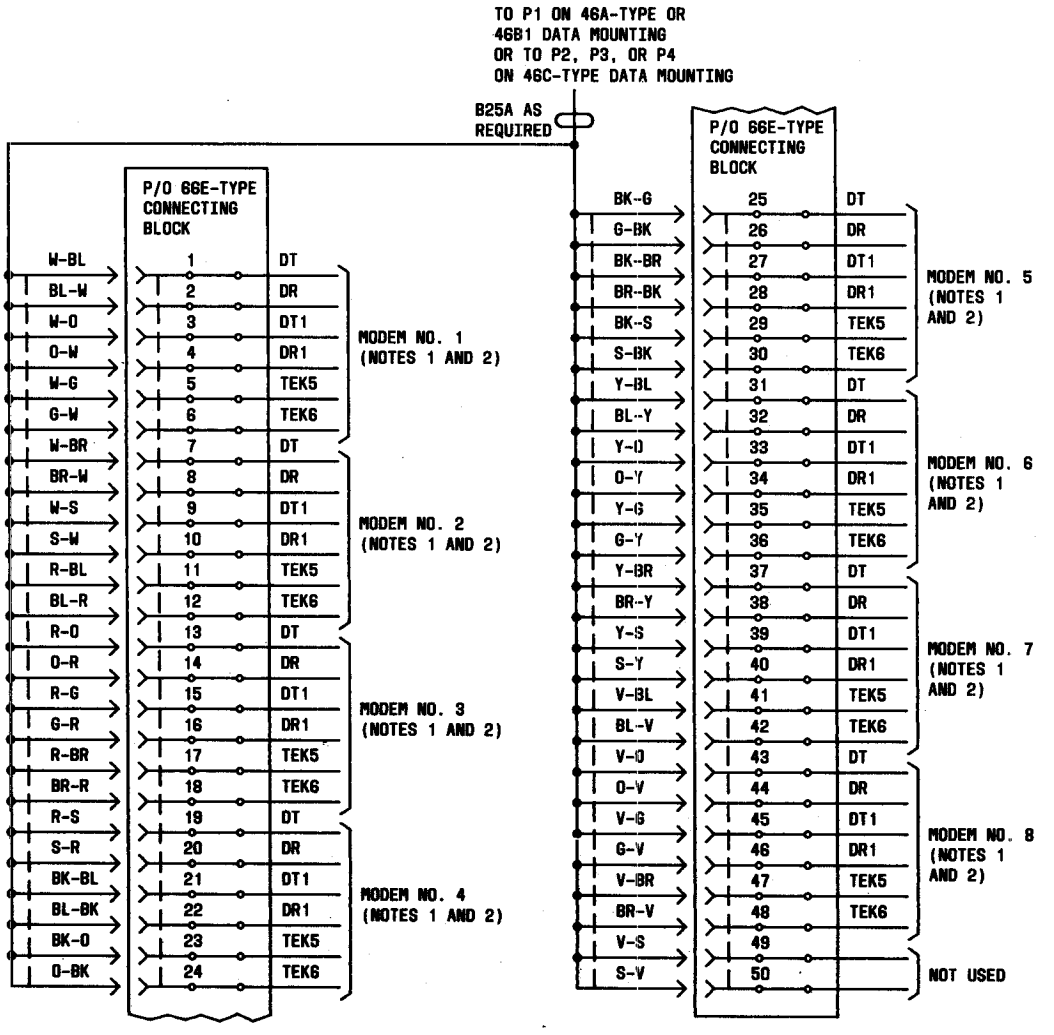


NOTES:
1. IF THE CUSTOMER-PROVIDED WIRING IS TOO SHORT, A 42A CONNECTING BLOCK CAN BE USED WITH D STATION WIRING TO CONNECT THE MODEM TO THE KS-21253-L5 ADAPTER. THE D STATION WIRING SHOULD NOT EXCEED 10 FEET IN LENGTH
2. IF A 4-WIRE MODEM REQUIRES A LINE AND/OR DIAL BACKUP STATUS INDICATION, A 44A CONNECTING BLOCK MUST BE USED WITH THE D STATION WIRING
3. IF A 4-WIRE MODEM REQUIRES A DIAL BACKUP STATUS INDICATION, THE KS-21253-L4 ADAPTER MUST BE USED AS SHOWN IN FIG. 47

Fig. 37—Customer-Provided Modem—Multiple Arrangement Using KS-21253-L1 Adapter

4.03 The transmit (TRANS) attenuator (Fig. 48) and the receive (REC) attenuator on the DAS 829A-L1 CIU should be set to the attenuation values specified on the service order. Four slide switches on each attenuator control 1.0-, 2.0-, 4.0-, and 8.0-dB pads. The attenuation value for each attenuator is variable from 0 to 15 dB in 1-dB steps and is the sum of the exposed numbers. A setting example follows:

- Service order specifies 12-dB attenuation in transmit path—set slide switches on TRANS attenuator so that numbers 4.0 and 8.0 are exposed.



NOTES:
1. THE DT AND DR LEADS ARE NOT REQUIRED FOR 2-WIRE MODEMS.
2. THE TEK5 AND TEK6 LEADS ARE NORMALLY NOT REQUIRED.

Fig. 38—Customer-Provided Modem—Multiple Arrangement Using 66E-Type Connecting Block

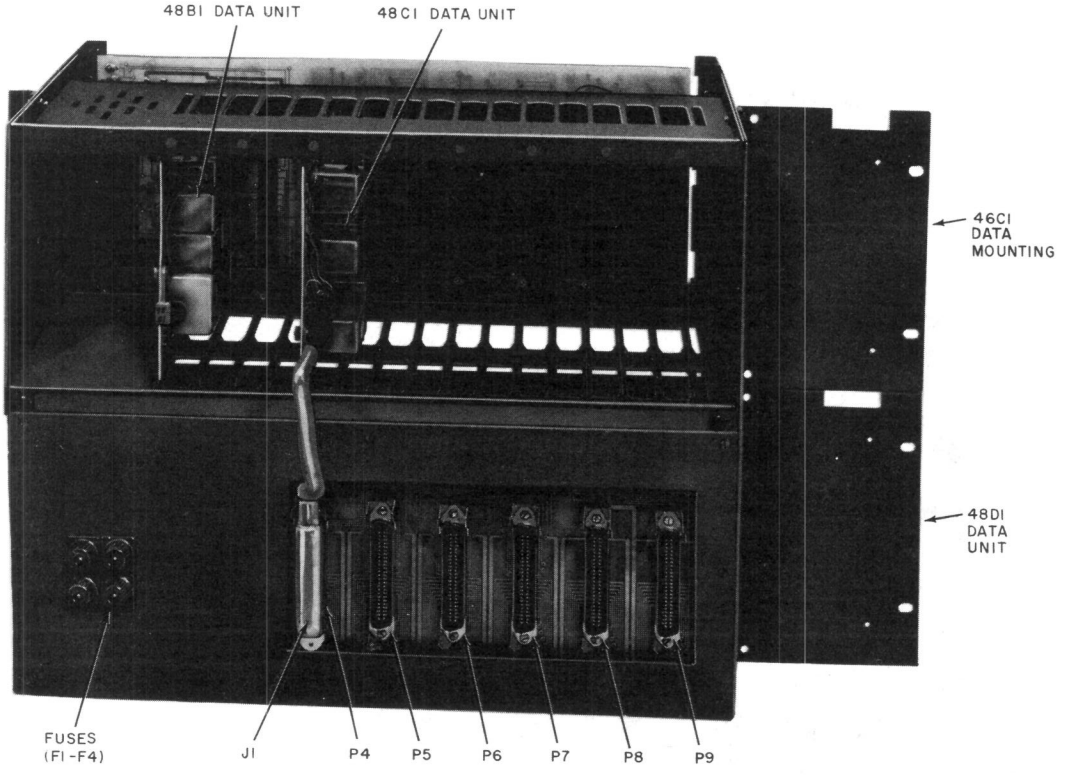


Fig. 39—46C1 Data Mounting and 48D1 Data Unit—Front View

- Service order specifies 11-dB attenuation in receive path—set slide switches on REC attenuator so that numbers 1.0, 2.0, and 8.0 are exposed.

B. DAS 829B-L1 CIU

4.04 A sealing current option (Fig. 49) is provided on the DAS 829B-L1 CIU. If this option is specified on the service order, a plug-in strap should be placed in the sealing current option (SC) position. If the option is not specified on the service order, the plug-in strap should be placed in the sealing current storage (ST) position.

4.05 A line impedance option (Fig. 49) on the DAS 829B-L1 CIU provides a 150-, 600-, or 1200-ohm line termination. The four plug-in straps used for line termination should be placed in the 150-ohm, 600-ohm, or 1200-ohm option positions as specified on the service order.

4.06 The transmit (TRANS) attenuator (Fig. 49) on the DAS 829B-L1 CIU should be set to the attenuation value specified on the service order, as described in paragraph 4.03.

4.07 A coarse gain option (Fig. 49) and a fine gain control on the DAS 829B-L1 CIU provide adjustment for the output level of the CIU receive amplifier. A plug-in strap should be placed in the receive coarse gain option position (GAIN—+10, 0, -10, -20) specified on the service order. The receive fine gain control is variable from 0 to 10

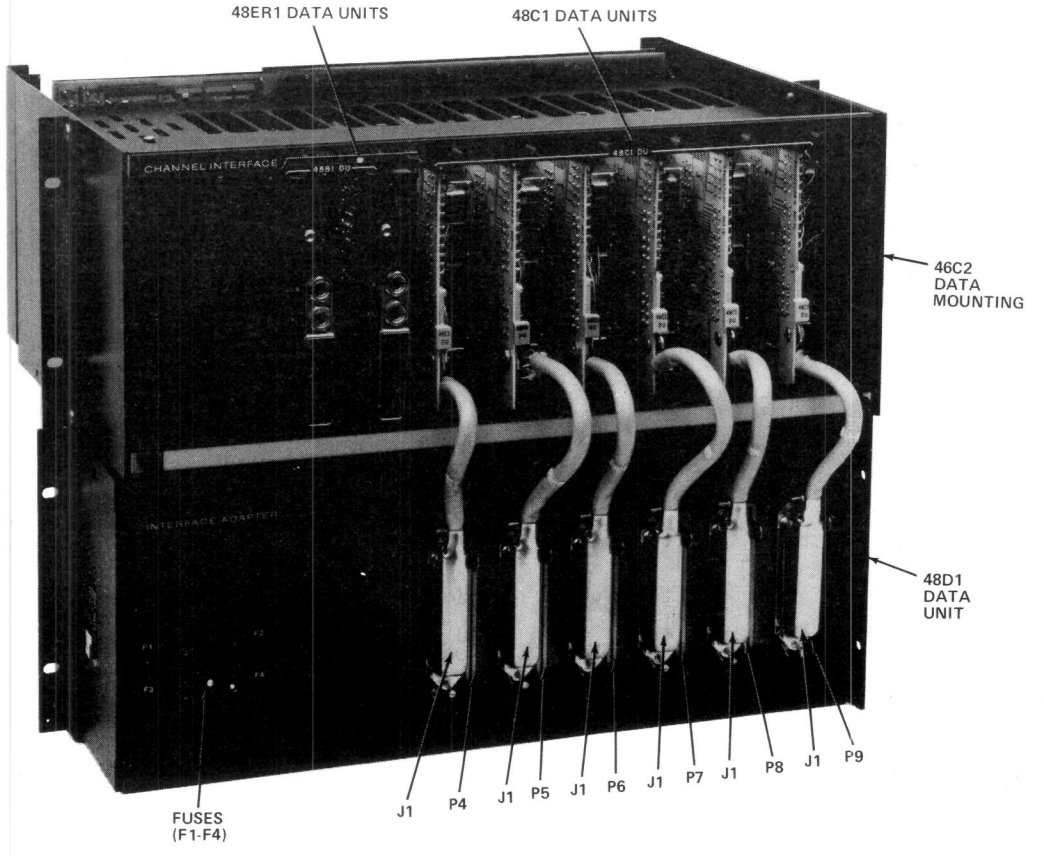


Fig. 40—46C2 Data Mounting and 48D1 Data Unit—Front View

dB and is accessible through a hole in the faceplate of the CIU. Adjustment of the fine gain control is described in Section 598-082-500.

C. DAS 829C-L1 CIU

4.08 A sealing current option (Fig. 50) is provided on the DAS 829C-L1 CIU. If this option is specified on the service order, a plug-in strap should be placed in the sealing current option (SC) position. If the option is not specified on the service order, the plug-in strap should be placed in the sealing current storage (ST) position.

4.09 A 359A or 359K equalizer equivalent option (Fig. 50) is provided on the DAS 829C-L1 CIU. This equalizer equivalent consists of a slope equalizer circuit and a line termination (1200-ohm for 359A and 600-ohm for 359K). Either the 359A or 359K equalizer equivalent should be selected as specified on the service order. The 359A equalizer equivalent is selected by inserting two plug-in straps in column 359 adjacent to the designation A. The 359K equalizer equivalent is selected by inserting two plug-in straps in column 359 adjacent to the designation K. After the equalizer is selected, the required equalizer characteristics are provided by inserting plug-in straps in the positions specified

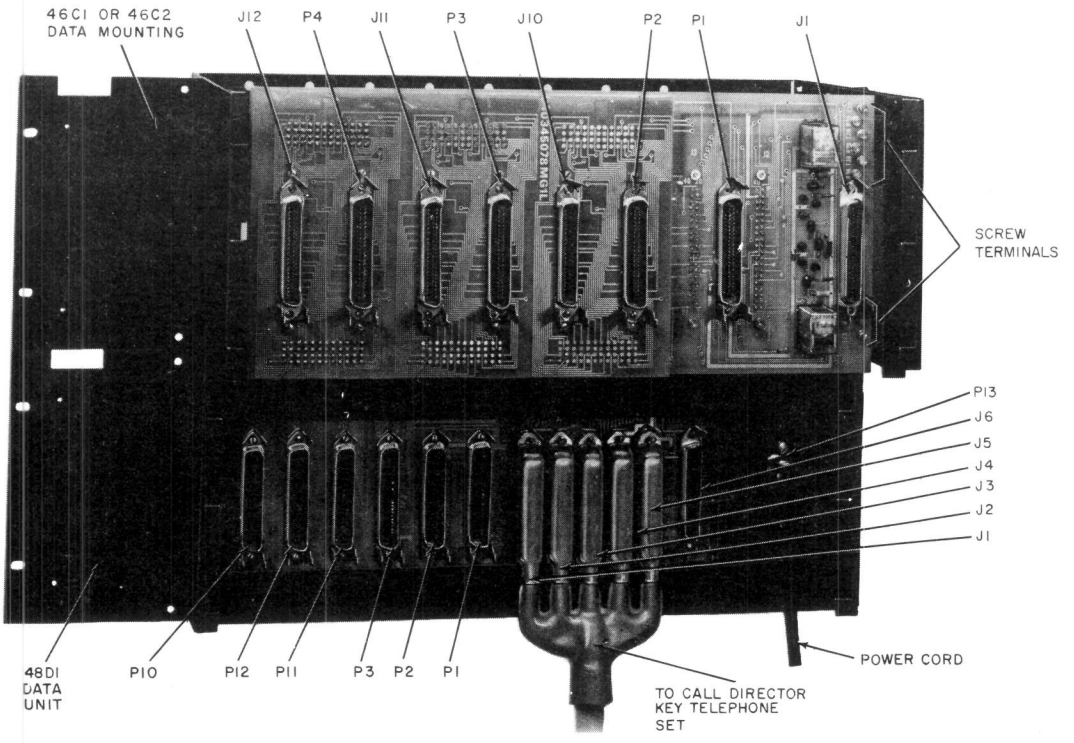


Fig. 41—46C1 or 46C2 Data Mounting and 48D1 Data Unit—Rear View

on the service order or the circuit layout record (CLR). The straps should be inserted in positions identified by columns A, B, C, and D and rows 1, 2, 3, and 4. Strap storage is provided to the left of columns A, B, C, and D in the four ST columns. Additional information is provided in Sections 332-104-500 and 332-116-201.

4.10 The transmit (TRANS) attenuator (Fig. 50) on the DAS 829C-L1 CIU should be set to the attenuation value specified on the service order, as described in paragraph 4.03.

4.11 A coarse gain option (Fig. 50) and a fine gain control on the DAS 829C-L1 CIU provide adjustment for the output level of the CIU receive amplifier. A plug-in strap should be placed in the receive coarse gain option position (GAIN—+20, +10, 0, -10, -20) specified on the service order. The receive fine gain control is variable from 0 to 10 dB and is accessible through a hole in the faceplate of the CIU. Adjustment of the fine gain control is described in Section 598-082-500.

D. DAS 829A-L1A CIU

4.12 A power supply option (Fig. 51) on the DAS 829A-L1A CIU permits operation from a 24 Vac, -24 Vdc, or -48 Vdc power source. A plug-in strap should be placed in the option position specified on the service order (N position for 24 Vac or -24 Vdc, and -48 position for -48 Vdc).

4.13 A loopback amplifier gain option (Fig. 51) on the DAS 829A-L1A CIU permits the CIU to terminate channels with an end-to-end loss of either 8 or 16 dB. A plug-in strap should be placed in the option position specified on the service order (8 position for 8-dB channels and 16 position for 16-dB channels).

TABLE A

CALL DIRECTOR KEY ASSIGNMENT

Key Assignment for 30-button Call Director

Key Assignment for 18-button Call Director

REL (NOTE 1)	RING (NOTE 4)	6	12	18
DDD1A (NOTE 2)	1 (NOTE 5)	7	13	19
DDD2A (NOTE 2)	2	8	14	20
DDD1B (NOTE 3)	3	9	15	21
DDD2B (NOTE 3)	4	10	16	22
HOLD	5	11	17	23

Note 1: When switched dial backup service is provided, the 1st pickup key of the 1st key module will be nonlocking and will be designated REL.

Note 2: When dial backup channel A is provided, designations DDD1A and DDD2A will be provided as shown.

Note 3: When dial backup channel B is provided, designations DDD1B and DDD2B will be provided as shown.

Note 4: When alternate voice service is provided, the 1st pickup key of the 2nd key module will be nonlocking and will be designated RING.

Note 5: Pickup keys numbered 1 to 23 are used to control alternate voice arrangements and/or switched dial backup arrangements provided for 4-wire private lines designated 1 through 23. The numbered pickup keys will be identified in one of the following four ways:

(a) BLANK KEY — Provided when key is not used to control alternate voice or switched dial backup service.

(b) TALK N — Provided when key is used to control the alternate voice arrangement for 4-wire private line designated N.

(c) DBU N — Provided when key is used to control the switched dial backup arrangement for 4-wire private line designated N.

(d) TALK-DBU N — Provided when key is used to control the alternate voice and the switched dial backup arrangement for 4-wire private line designated N.

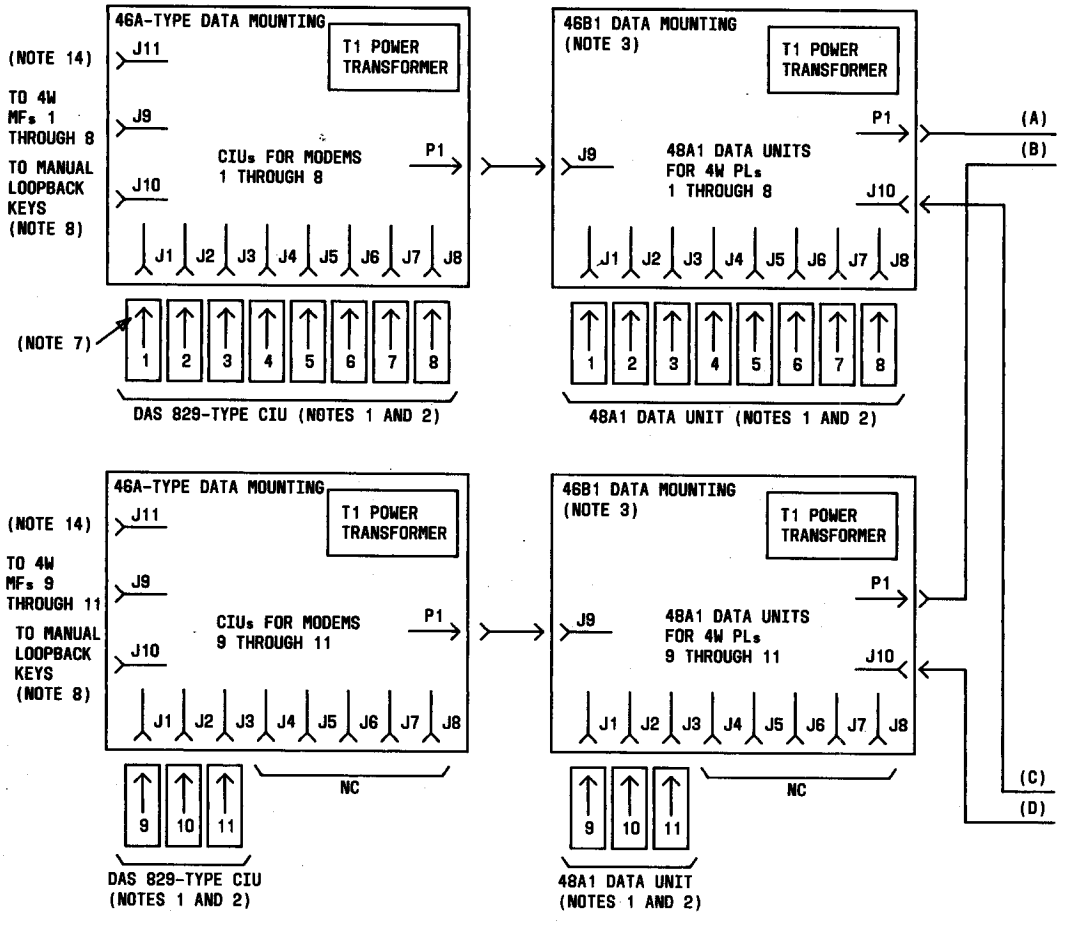


Fig. 42—Multiple 4-Wire FD or FDA Arrangement With Switched 4-Wire Dial Backup Service for 11 Modems or Less (Sheet 1 of 3)

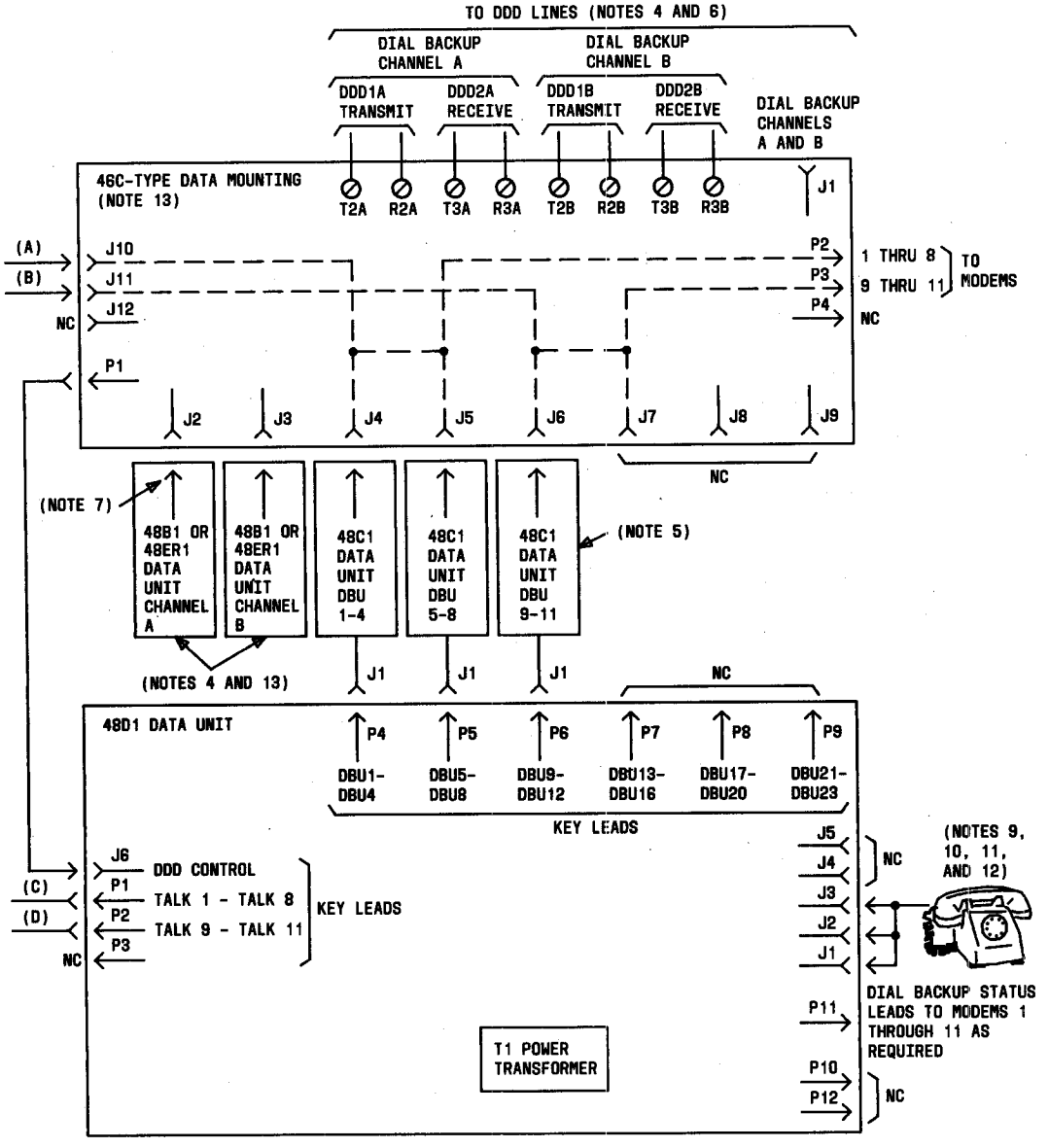


Fig. 42—Multiple 4-Wire FD or FDA Arrangement With Switched 4-Wire Dial Backup Service for 11 Modems or Less (Sheet 2 of 3)

NOTES:

1. A MAXIMUM OF ELEVEN FDA ARRANGEMENTS WITH SWITCHED DIAL BACKUP SERVICE TO EITHER ONE OF TWO DIAL BACKUP CHANNELS CAN BE PROVIDED AS SHOWN. AN FDA ARRANGEMENT IS PROVIDED FOR THE NTH 4W PL WHEN THE NTH DAS 829-TYPE CIU AND 48A1 DATA UNIT ARE PROVIDED. UNUSED POSITIONS IN BOTH THE 46A-TYPE AND THE 46B1 DATA MOUNTINGS ARE LEFT UNTERMINATED.
2. AN FD ARRANGEMENT IS PROVIDED FOR THE NTH 4W PL WHEN THE NTH DAS 829-TYPE CIU IS PROVIDED AND THE NTH 48A1 DATA UNIT IS NOT PROVIDED. UNUSED POSITIONS IN THE 46B1 DATA MOUNTING ARE LEFT UNTERMINATED.
3. WHEN ALTERNATE VOICE SERVICE IS NOT REQUIRED, OR ONLY REQUIRED ON SOME PORTION OF THE 4W PLs PROVIDED, IT MAY BE POSSIBLE TO ELIMINATE ALL, OR PART, OF THE INDICATED 46B1 DATA MOUNTINGS.
4. THE ARRANGEMENT SHOWN PROVIDES TWO DIAL BACKUP CHANNELS. WHEN ONE OF THE BACKUP CHANNELS IS NOT REQUIRED, THE 48B1 OR 48ER1 DATA UNIT ASSOCIATED WITH THAT CHANNEL AND THE DDD LINES REQUIRED FOR THAT CHANNEL ARE NOT PROVIDED.
5. WHEN SWITCHED DIAL BACKUP SERVICE IS NOT REQUIRED ON SOME PORTION OF THE SERVICE, IT MAY BE POSSIBLE TO REDUCE THE NUMBER OF 48C1 DATA UNITS REQUIRED.
6. FOR NONREGISTERED ARRANGEMENTS, THE DDD LINES MAY BE TERMINATED THROUGH USE OF THE SCREW TERMINALS OR CONNECTOR J1. FOR REGISTERED ARRANGEMENTS, THE SCREW TERMINALS MUST BE USED. THE REQUIRED CONNECTIONS ARE SHOWN IN FIG. 45.
7. PLUG SHOWN FOR EITHER THE DAS 829-TYPE CIU OR THE 48-TYPE DATA UNIT IS THE 40-PIN PLUG FORMED BY THE TERMINATIONS ON THE EDGE OF THE PRINTED WIRING BOARD.
8. MANUAL LOOPBACK KEYS ARE NORMALLY NOT PROVIDED.
9. A 630DAM OR 2630DAM 18-BUTTON KEY TELEPHONE SET MUST BE PROVIDED FOR CONTROL OF THE 2 BY 11 SWITCHING MATRIX AND ALTERNATE VOICE CIRCUITS. CONVERT THE TELEPHONE SET AS FOLLOWS:

SCREW TERMINAL LEADS				
COLOR	W-O	V-G	O-W	O-BK
REMOVE FROM	7	5	5	24
CONNECT TO	TAPE AND STORE	7	7	7

10. TO PROVIDE THE SERVICE SHOWN THE TELEPHONE KEY STRIP SHALL BE AS FOLLOWS:

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

WHEN SOME PORTION OF THE SERVICE IS NOT PROVIDED THE KEY STRIPS SHALL BE MODIFIED ACCORDINGLY.

11. CONVERT THE 1ST PICKUP KEY OF THE 1ST KEY MODULE (REL) TO A NONLOCKING KEY.
12. CONVERT THE 1ST PICKUP KEY OF THE 2ND KEY MODULE (RING) TO A NONLOCKING KEY.
13. FOR REGISTERED ARRANGEMENTS, THE 48ER1 DATA UNIT INSTALLED IN A 46C2 DATA MOUNTING IS REQUIRED.
14. CONNECTOR J1 PROVIDES ACCESS TO THE SIMPLEX PAIR SX1 AND SX2 OF THE DAS 829-TYPE CIU. THIS CONNECTOR IS NOT PROVIDED ON THE 46A1 DATA MOUNTING.

Fig. 42—Multiple 4-Wire FD or FDA Arrangement With Switched 4-Wire Dial Backup Service for 11 Modems or Less (Sheet 3 of 3)

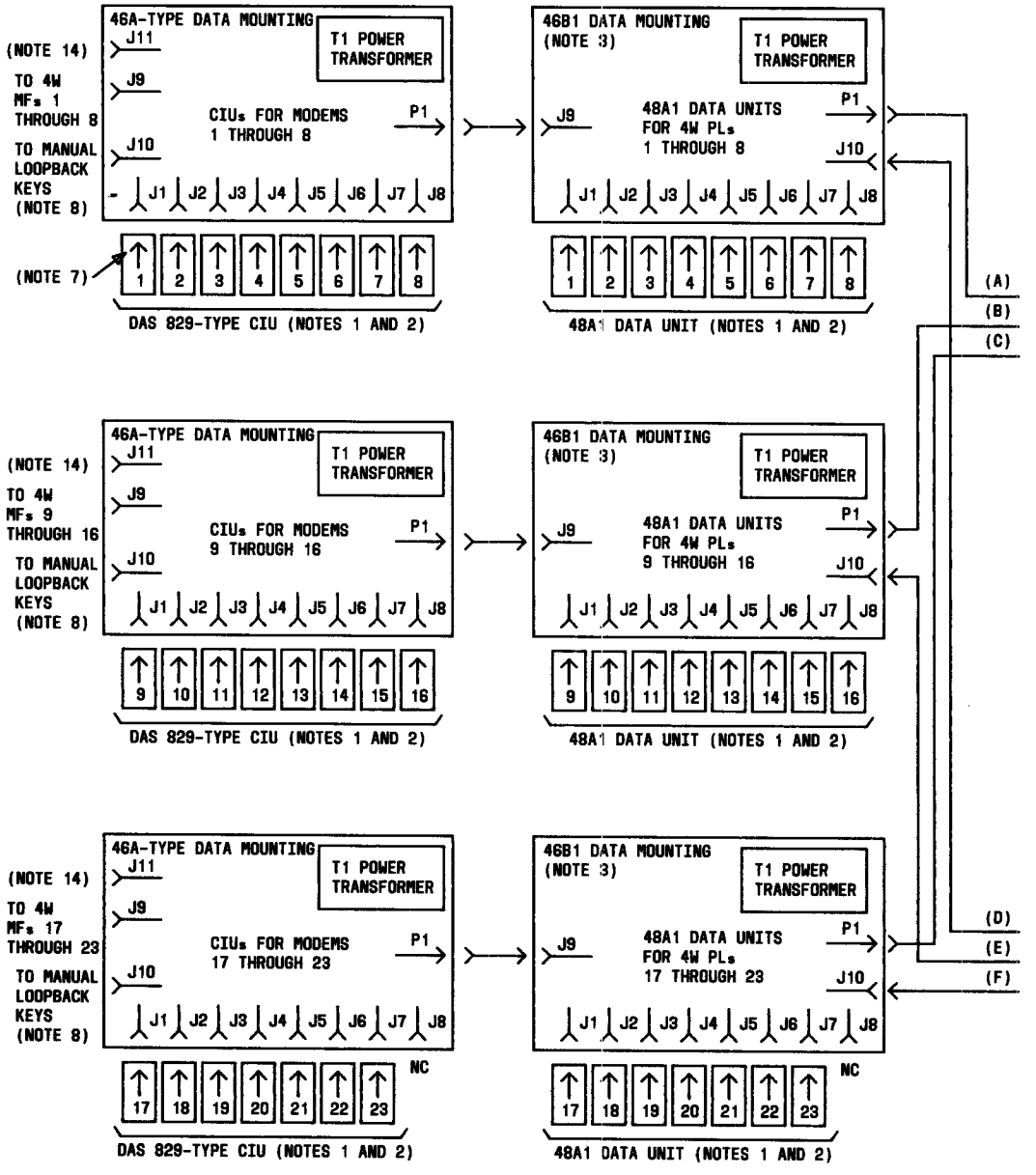


Fig. 43—Multiple 4-Wire FD or FDA Arrangement With Switched 4-Wire Dial Backup Service for 23 Modems or Less (Sheet 1 of 3)

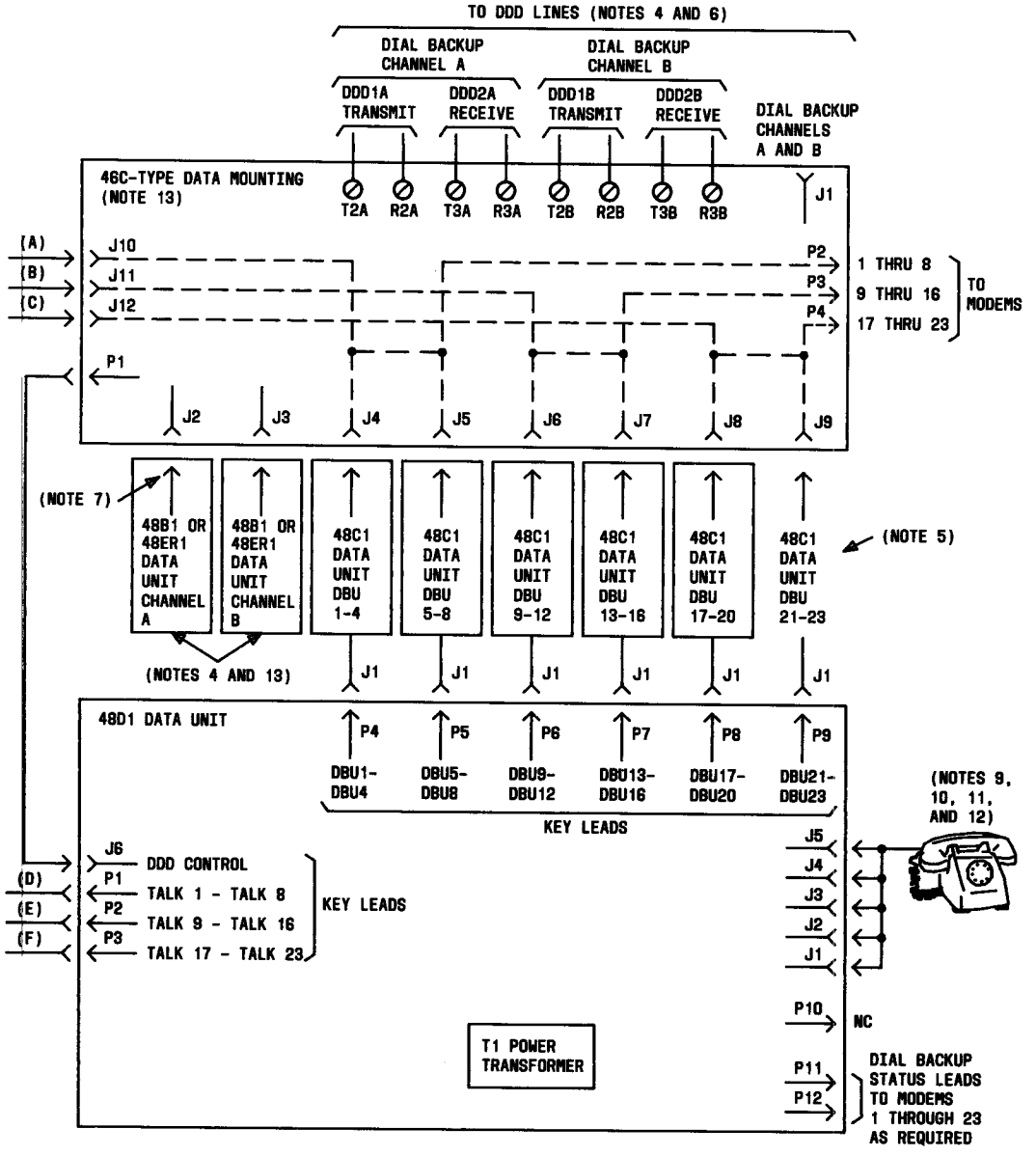


Fig. 43—Multiple 4-Wire FD or FDA Arrangement With Switched 4-Wire Dial Backup Service for 23 Modems or Less (Sheet 2 of 3)

NOTES:

1. A MAXIMUM OF TWENTY-THREE FDA ARRANGEMENTS WITH SWITCHED DIAL BACKUP SERVICE TO EITHER ONE OF TWO DIAL BACKUP CHANNELS CAN BE PROVIDED AS SHOWN. AN FDA ARRANGEMENT IS PROVIDED FOR THE NTH 4W PL WHEN THE NTH DAS 829-TYPE CIU AND 48A1 DATA UNIT ARE PROVIDED. UNUSED POSITIONS IN BOTH THE 46A-TYPE AND THE 46B1 DATA MOUNTINGS ARE LEFT UNTERMINATED.
2. AN FD ARRANGEMENT IS PROVIDED FOR THE NTH 4W PL WHEN THE NTH DAS 829-TYPE CIU IS PROVIDED AND THE NTH 48A1 DATA UNIT IS NOT PROVIDED. UNUSED POSITIONS IN THE 46B1 DATA MOUNTING ARE LEFT UNTERMINATED.
3. WHEN ALTERNATE VOICE SERVICE IS NOT REQUIRED, OR ONLY REQUIRED ON SOME PORTION OF THE 4W PLs PROVIDED, IT MAY BE POSSIBLE TO ELIMINATE ALL, OR PART, OF THE INDICATED 46B1 DATA MOUNTINGS.
4. THE ARRANGEMENT SHOWN PROVIDES TWO DIAL BACKUP CHANNELS. WHEN ONE OF THE BACKUP CHANNELS IS NOT REQUIRED, THE 48B1 OR 48ER1 DATA UNIT ASSOCIATED WITH THAT CHANNEL AND THE DDD LINES REQUIRED FOR THAT CHANNEL ARE NOT PROVIDED.
5. WHEN SWITCHED DIAL BACKUP SERVICE IS NOT REQUIRED ON SOME PORTION OF THE SERVICE, IT MAY BE POSSIBLE TO REDUCE THE NUMBER OF 48C1 DATA UNITS REQUIRED.
6. FOR NONREGISTERED ARRANGEMENTS, THE DDD LINES MAY BE TERMINATED THROUGH USE OF THE SCREW TERMINALS OR CONNECTOR J1. FOR REGISTERED ARRANGEMENTS, THE SCREW TERMINALS MUST BE USED. THE REQUIRED CONNECTIONS ARE SHOWN IN FIG. 45.
7. PLUG SHOWN FOR EITHER THE DAS 829-TYPE CIU OR THE 48-TYPE DATA UNIT IS THE 40-PIN PLUG FORMED BY THE TERMINATIONS ON THE EDGE OF THE PRINTED WIRING BOARD.
8. MANUAL LOOPBACK KEYS ARE NORMALLY NOT PROVIDED.
9. A 631DAM OR 2631DAM 30-BUTTON KEY TELEPHONE SET MUST BE PROVIDED FOR CONTROL OF THE 2 BY 23 SWITCHING MATRIX AND ALTERNATE VOICE CIRCUITS. CONVERT THE TELEPHONE SET AS FOLLOWS:

SCREW TERMINAL LEADS				
COLOR	W-O	V-G	O-W	O-BK
REMOVE FROM	7	5	5	24
CONNECT TO	TAPE AND STORE	7	7	7

10. TO PROVIDE THE SERVICE SHOWN THE TELEPHONE KEY STRIP SHALL BE AS FOLLOWS:

REL	RING	TALK-DBU6	TALK-DBU12	TALK-DBU18
DDD1A	TALK-DBU1	TALK-DBU7	TALK-DBU13	TALK-DBU19
DDD2A	TALK-DBU2	TALK-DBU8	TALK-DBU14	TALK-DBU20
DDD1B	TALK-DBU3	TALK-DBU9	TALK-DBU15	TALK-DBU21
DDD2B	TALK-DBU4	TALK-DBU10	TALK-DBU16	TALK-DBU22
HOLD	TALK-DBU5	TALK-DBU11	TALK-DBU17	TALK-DBU23

WHEN SOME PORTION OF THE SERVICE IS NOT PROVIDED THE KEY STRIPS SHALL BE MODIFIED ACCORDINGLY.

11. CONVERT THE 1ST PICKUP KEY OF THE 1ST KEY MODULE (REL) TO A NONLOCKING KEY.
12. CONVERT THE 1ST PICKUP KEY OF THE 2ND KEY MODULE (RING) TO A NONLOCKING KEY.
13. FOR REGISTERED ARRANGEMENTS, THE 48ER1 DATA UNIT INSTALLED IN A 46C2 DATA MOUNTING IS REQUIRED.
14. CONNECTOR J11 PROVIDES ACCESS TO THE SIMPLEX PAIR SX1 AND SX2 OF THE DAS 829-TYPE CIU. THIS CONNECTOR IS NOT PROVIDED ON THE 46A1 DATA MOUNTING.

Fig. 43—Multiple 4-Wire FD or FDA Arrangement With Switched 4-Wire Dial Backup Service for 23 Modems or Less (Sheet 3 of 3)

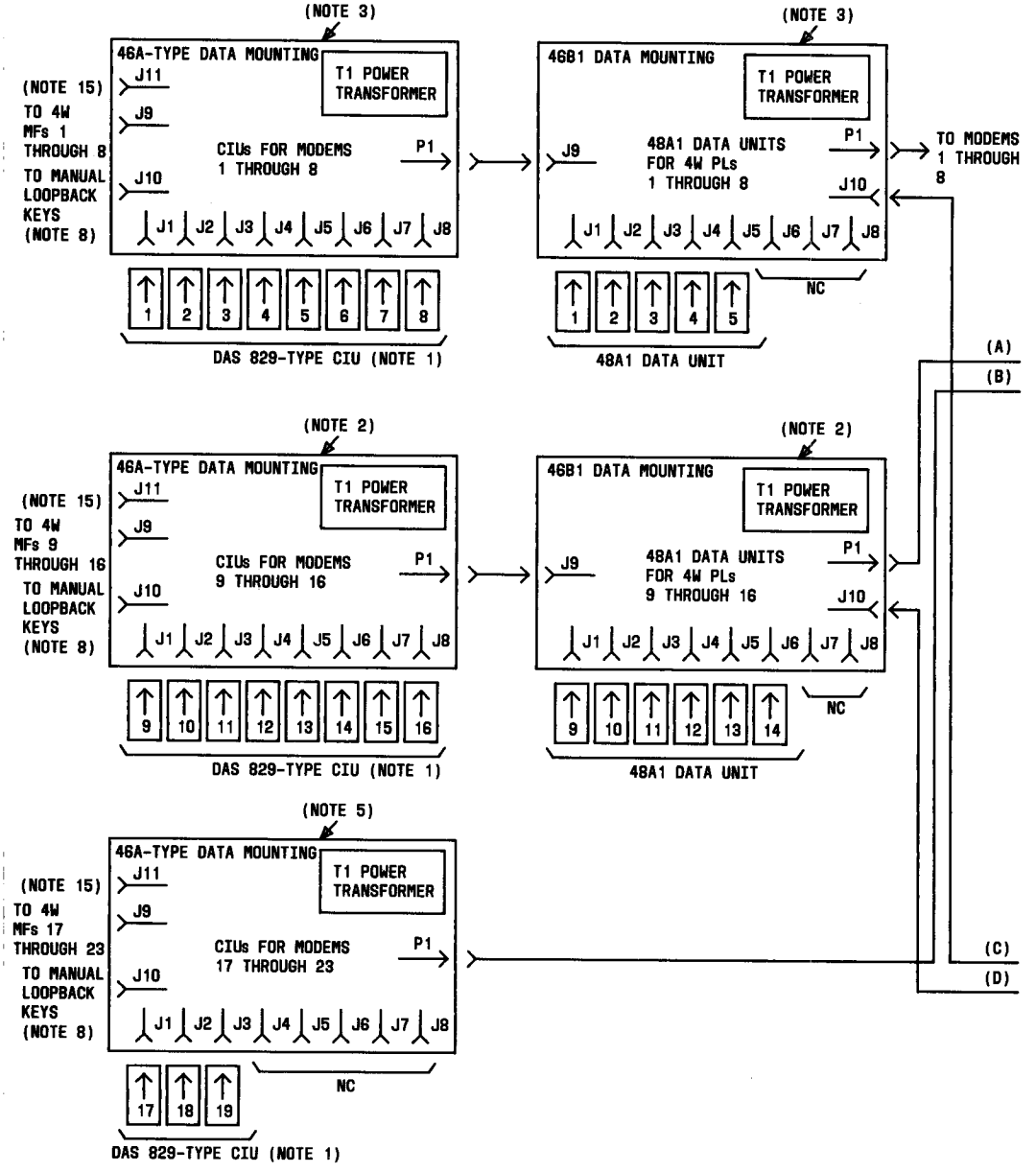


Fig. 44—Multiple 4-Wire FD and FDA Arrangements With and Without Switched 4-Wire Dial Backup Service (Sheet 1 of 3)

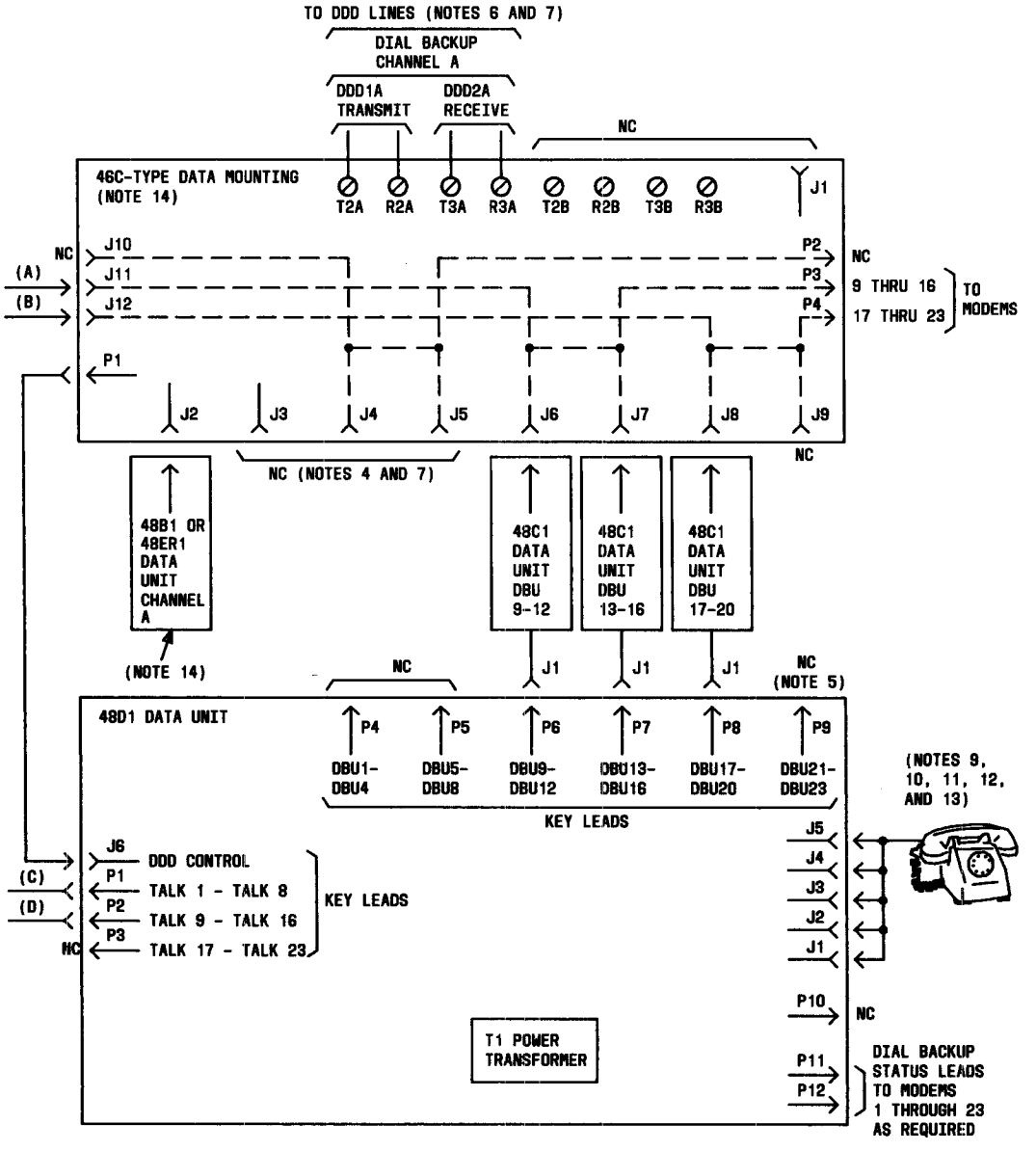


Fig. 44—Multiple 4-Wire FD and FDA Arrangements With and Without Switched 4-Wire Dial Backup Service (Sheet 2 of 3)

NOTES:

1. THE ARRANGEMENT SHOWN ILLUSTRATES THE VARIETY OF SERVICES THAT CAN BE CONTROLLED THROUGH USE OF A 30-BUTTON KEY TELEPHONE SET. THE ARRANGEMENT SHOWN PROVIDES ELEVEN FDA ARRANGEMENTS AND EIGHT FD ARRANGEMENTS. SWITCHED DIAL BACKUP SERVICE, TO ONE DIAL BACKUP CHANNEL, IS PROVIDED FOR SIX OF THE FDA ARRANGEMENTS AND FIVE OF THE FD ARRANGEMENTS.
2. A MAXIMUM OF EIGHT FDA ARRANGEMENTS WITH SWITCHED DIAL BACKUP SERVICE TO ONE DIAL BACKUP CHANNEL CAN BE PROVIDED FOR 4W PLs 9 THROUGH 16 WITH THE INDICATED 46A-TYPE AND 46B1 DATA MOUNTINGS. POSITIONS 15 AND 16 OF THE 46B1 DATA MOUNTING ARE LEFT UNTERMINATED. THESE POSITIONS PROVIDE FD ARRANGEMENTS.
3. A MAXIMUM OF EIGHT FDA ARRANGEMENTS CAN BE PROVIDED FOR 4W PLs 1 THROUGH 8 WITH THE INDICATED 46A-TYPE AND 46B1 DATA MOUNTINGS. POSITIONS 6, 7 AND 8 OF THE 46B1 DATA MOUNTING ARE LEFT UNTERMINATED. THESE POSITIONS PROVIDE FD ARRANGEMENTS. THESE DATA MOUNTINGS ARE NOT CONNECTED TO THE 46C-TYPE DATA MOUNTING AS SWITCHED DIAL BACKUP SERVICE IS NOT REQUIRED. THE 46B1 DATA MOUNTING IS CONNECTED TO THE 48D1 DATA UNIT TO PROVIDE FOR KEY CONTROL OF THE FDA ARRANGEMENTS ON 4W PLs 1 THROUGH 5.
4. THE 48C1 DATA UNITS PROVIDING SWITCHING MATRICES FOR MODEMS 1 THROUGH 4 AND 5 THROUGH 8 ARE NOT PROVIDED AS SWITCHED DIAL BACKUP SERVICE IS NOT REQUIRED FOR THESE 4W PLs.
5. A MAXIMUM OF SEVEN FD ARRANGEMENTS WITH SWITCHED DIAL BACKUP SERVICE TO ONE DIAL BACKUP CHANNEL CAN BE PROVIDED FOR 4W PLs 17 THROUGH 23 WITH THE INDICATED 46A-TYPE DATA MOUNTING. POSITIONS 17, 18 AND 19 OF THE 46A-TYPE DATA MOUNTING PROVIDE FOR THREE FD ARRANGEMENTS. THE SWITCHING MATRIX (48C1 DATA UNIT) REQUIRED TO PROVIDE SWITCHED DIAL BACKUP SERVICE FOR POSITIONS 17 THROUGH 20 IS PROVIDED. THE SWITCHING MATRIX FOR POSITIONS 21 THROUGH 23 IS NOT PROVIDED AS THESE LINES ARE NOT TERMINATED. IF LINES 21 THROUGH 23 ARE TO BE TERMINATED THE SWITCHING MATRIX FOR THESE POSITIONS IS REQUIRED.
6. THE SCREW TERMINALS ARE USED TO TERMINATE THE PAIR OF DDD LINES REQUIRED TO PROVIDE DIAL BACKUP CHANNEL A. THE REQUIRED CONNECTIONS ARE SHOWN IN FIG. 45. THE 48B1 OR 48ER1 DATA UNIT REQUIRED FOR CHANNEL A IS PROVIDED.
7. DIAL BACKUP CHANNEL B IS NOT PROVIDED; HENCE THE 48B1 OR 48ER1 DATA UNIT REQUIRED FOR CHANNEL B IS NOT PROVIDED.
8. MANUAL LOOPBACK KEYS ARE NORMALLY NOT PROVIDED.
9. A 631DAM OR 2631DAM 30-BUTTON KEY TELEPHONE SET MUST BE PROVIDED FOR CONTROL OF THE SWITCHING MATRIX AND ALTERNATE VOICE CIRCUITS. CONVERT THE TELEPHONE SET AS FOLLOWS:

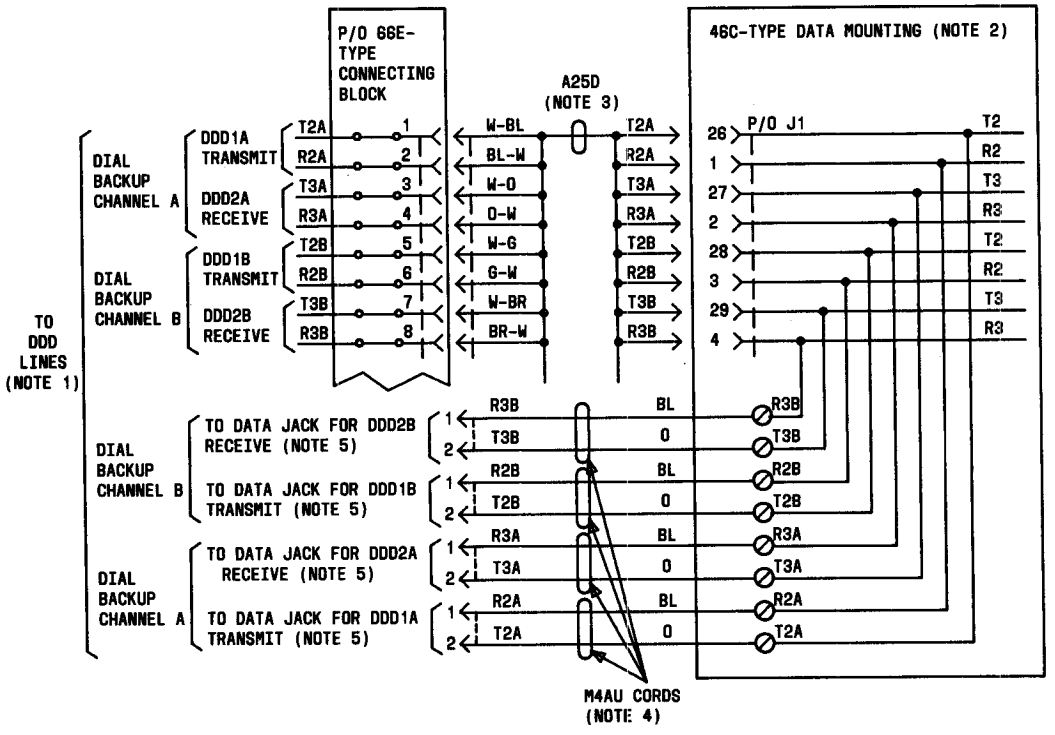
SCREW TERMINAL LEADS				
COLOR	W-O	V-G	O-W	O-BK
REMOVE FROM	7	5	5	24
CONNECT TO	TAPE AND STORE	7	7	7

10. TO PROVIDE THE SERVICE SHOWN THE TELEPHONE KEY STRIP SHALL BE AS FOLLOWS:

REL	RING		TALK-DBU12	DBU18
DDD1A	TALK 1		TALK-DBU13	DBU19
DDD2A	TALK 2		TALK-DBU14	
	TALK 3	TALK-DBU9	DBU15	
	TALK 4	TALK-DBU10	DBU16	
HOLD	TALK 5	TALK-DBU11	DBU17	

11. THE PICKUPS KEYS PROVIDING CONTROL OF 4W PLs ARE IDENTIFIED AS FOLLOWS:
    DBU N - CONTROLS THE SWITCHING MATRIX FOR POSITION N.
    TALK N - CONTROLS THE ALTERNATE VOICE CIRCUIT FOR POSITION N.
    TALK-DBU N - CONTROLS THE ALTERNATE VOICE AND SWITCHING MATRIX FOR POSITION N.
    BLANK - ALTERNATE VOICE CIRCUIT NOT PROVIDED AND SWITCHING MATRIX IS NOT PROVIDED OR IS NOT USED.
12. CONVERT THE 1ST PICKUP KEY OF THE 1ST KEY MODULE (REL) TO A NONLOCKING KEY.
13. CONVERT THE 1ST PICKUP KEY OF THE 2ND KEY MODULE (RING) TO A NONLOCKING KEY.
14. FOR REGISTERED ARRANGEMENTS, THE 48ER1 DATA UNIT INSTALLED IN A 46C2 DATA MOUNTING IS REQUIRED.
15. CONNECTOR J11 PROVIDES ACCESS TO THE SIMPLEX PAIR SX1 AND SX2 OF THE DAS 829-TYPE CIU. THIS CONNECTOR IS NOT PROVIDED ON THE 46A1 DATA MOUNTING.

Fig. 44—Multiple 4-Wire FD and FDA Arrangements With and Without Switched 4-Wire Dial Backup Service (Sheet 3 of 3)



NOTES:
1. FOR NONREGISTERED ARRANGEMENTS, THE DDD LINES MAY BE TERMINATED THROUGH USE OF THE SCREW TERMINALS OR CONNECTOR J1. FOR REGISTERED ARRANGEMENTS, THE SCREW TERMINALS MUST BE USED.
2. FOR NONREGISTERED ARRANGEMENTS, THE 46C1 OR 46C2 DATA MOUNTING MAY BE USED. FOR REGISTERED ARRANGEMENTS, THE 46C2 DATA MOUNTING MUST BE USED.
3. EXTEND WITH B25A AS REQUIRED.
4. TAPE AND STORE UNUSED LEADS.
5. USE DATA JACK USOC RJ41S WITH SWITCH SET TO FLL.

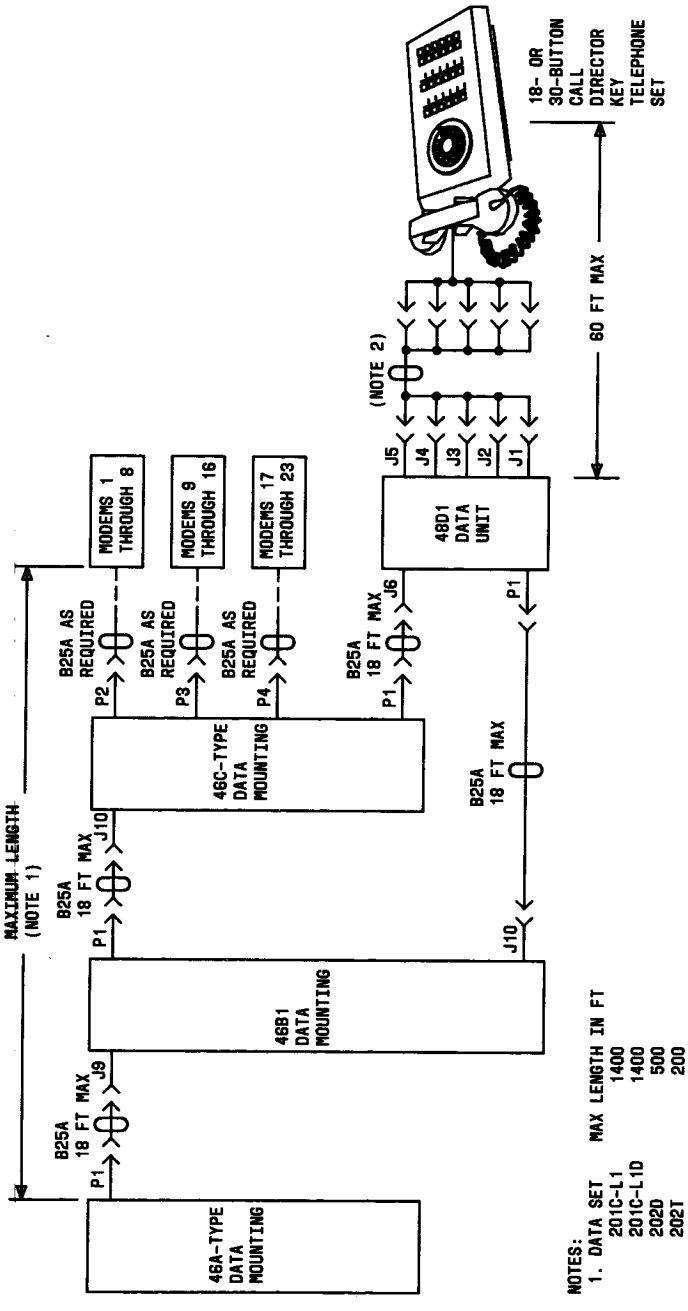
Fig. 45—46C-Type Data Mounting—Connections to DDD Lines

Note: Alternate voice and/or dial backup service cannot be provided for CIUs that terminate 8-dB channels.

4.14 A sealing current option (Fig. 51) is provided on the DAS 829A-L1A CIU. If this option is specified on the service order, a plug-in strap should be placed in the sealing current option (SC) position. If the option is not specified on the service order, the plug-in strap should be placed in the sealing current storage (ST) position.

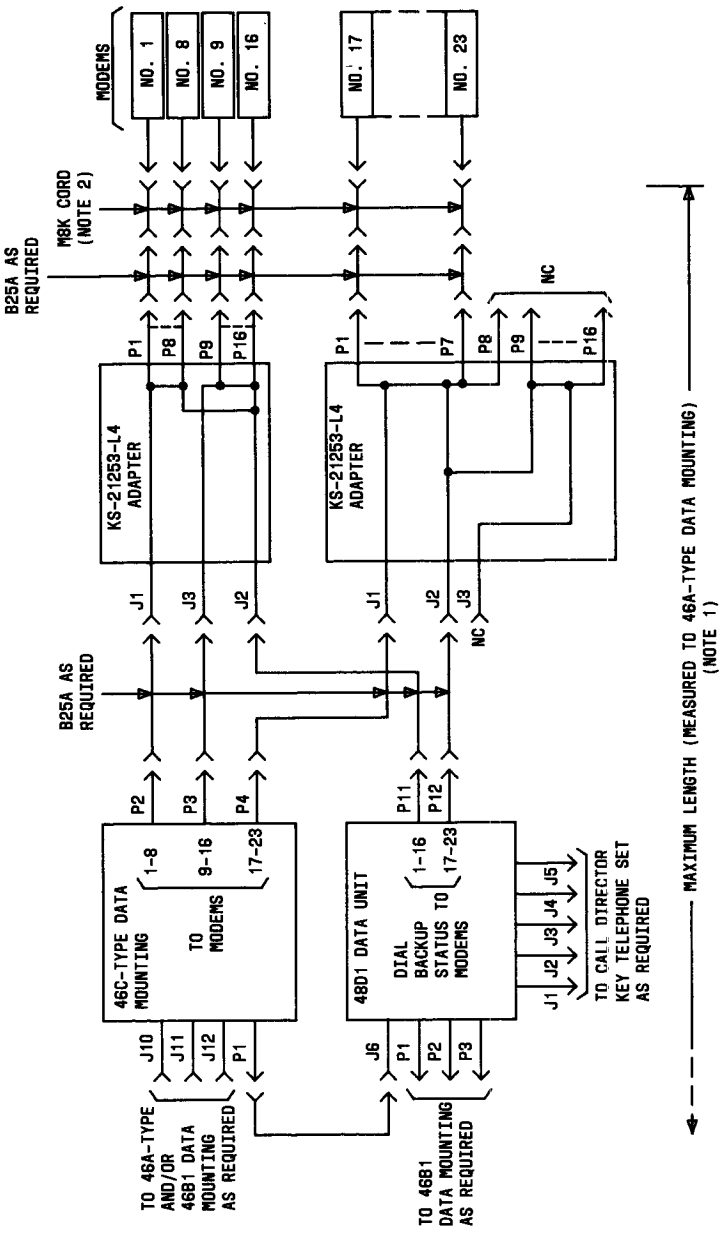
4.15 A line impedance option (Fig. 51) on the DAS 829A-L1A CIU provides a 600- or 1200-ohm line termination. The two plug-in straps used for line termination should be placed in the 600-ohm or 1200-ohm option positions as specified on the service order.

4.16 The transmit (TRANS) attenuator (Fig. 51) and the receive (REC) attenuator on the DAS 829A-L1A CIU should be set to the attenuation values specified on the service order, as described in paragraph 4.03.



NOTES:
1. DATA SET MAX LENGTH IN FT
   201C-L1 1400
   201C-L1D 1400
   202D 500
   202T 200
   208A 1400
   209A 1400
2. FOR THE 18-BUTTON CALL DIRECTOR, USE B75A CABLE AS REQUIRED AND CONNECT TO J1 THROUGH J3 ON THE 48D1 DATA UNIT.
   FOR THE 30-BUTTON CALL DIRECTOR, USE B75A AND B50A CABLES AS REQUIRED AND CONNECT TO J1 THROUGH J5 ON THE 48D1 DATA UNIT.

Fig. 46—Multiple Arrangement Showing Cable Length Restrictions



NOTES:
1. DATA SET MAX LENGTH IN FT
   - 201C-L1 1400
   - 201C-L1D 1400
   - 202D 500
   - 202T 200
   - 208A 1400
   - 209A 1400
2. THE M8K CORD IS SUPPLIED AND USED WITH ALL DATA SETS EXCEPT 202D. USE D50AA-3 IN PLACE OF D6AA-61 SUPPLIED WITH DATA SET 202D.

Fig. 47—Multiple Arrangement Using KS-21253-L4 Adapter for Dial Backup Status to Modems

TABLE B

COMMON CONTROL OF FDA ARRANGEMENTS PROVIDED THROUGH USE OF A 30-BUTTON CALL DIRECTOR, WITH AND WITHOUT SWITCHED DIAL BACKUP SERVICE

NUMBER OF FD AND/OR FDA ARRANGEMENTS PROVIDED WITH SWITCHED DIAL BACKUP SERVICE	NUMBER OF PICKUP KEYS AVAILABLE FOR CONTROL OF FDA ARRANGEMENTS	PICKUP KEY ASSIGNMENT (SEE TABLE A)	
		FOR SWITCHED DIAL BACKUP SERVICE. KEYS DESIGNATED DBU OR TALK-DBU	FOR FDA SERVICE. KEYS DESIGNATED TALK
1 through 7	1 through 16	17 through 23	1 through 16
8 through 15	1 through 8	9 through 23	1 through 8
16	1 through 7	1 through 16	17 through 23
17 through 23	none	1 through 23	none

E. DAS 829B-L1A CIU

4.17 A power supply option (Fig. 52) on the DAS 829B-L1A CIU permits operation from a 24 Vac, -24 Vdc, or -48 Vdc power source. A plug-in strap should be placed in the option position specified on the service order (N position for 24 Vac or -24 Vdc, and -48 position for -48 Vdc).

4.18 A loopback amplifier gain option (Fig. 52) on the DAS 829B-L1A CIU permits the CIU to terminate channels with an end-to-end loss of either 8 or 16 dB. A plug-in strap should be placed in the option position specified on the service order (8 position for 8-dB channels and 16 position for 16-dB channels).

> ***Note:*** Alternate voice and/or dial backup service cannot be provided for CIUs that terminate 8-dB channels.

4.19 A sealing current option (Fig. 52) is provided on the DAS 829B-L1A CIU. If this option is specified on the service order, a plug-in strap should be placed in the sealing current option (SC) position. If the option is not specified on the service order, the plug-in strap should be placed in the sealing current storage (ST) position.

4.20 A line impedance option (Fig. 52) on the DAS 829B-L1A CIU provides a 150-, 600-, or 1200-ohm line termination. The four plug-in straps used for line termination should be placed in the 150-ohm, 600-ohm, or 1200-ohm positions as specified on the service order.

4.21 The transmit (TRANS) attenuator (Fig. 52) on the DAS 829B-L1A CIU should be set to the attenuation value specified on the service order, as described in paragraph 4.03.

4.22 A coarse gain option (Fig. 52) and a fine gain control on the DAS 829B-L1A CIU provide adjustment for the output level of the CIU receive amplifier. A plug-in strap should be placed in the receive coarse gain option position (GAIN—+10, 0, -10, -20) specified on the service order. The receive fine gain control is variable from 0 to 10 dB and is accessible through a hole in the faceplate of the CIU. Adjustment of the fine gain control is described in Section 598-082-500.

F. DAS 829C-L1A CIU

4.23 A power supply option (Fig. 53) on the DAS 829C-L1A CIU permits operation from a 24 Vac, -24 Vdc, or -48 Vdc power source. A plug-in strap should be placed in the option position specified on the service order (N position for 24 Vac or -24 Vdc, and -48 position for -48 Vdc).

4.24 A loopback amplifier gain option (Fig. 53) on the DAS 829C-L1A CIU permits the CIU to terminate channels with an end-to-end loss of either 8 or 16 dB. A plug-in strap should be placed in the option position specified on the service order

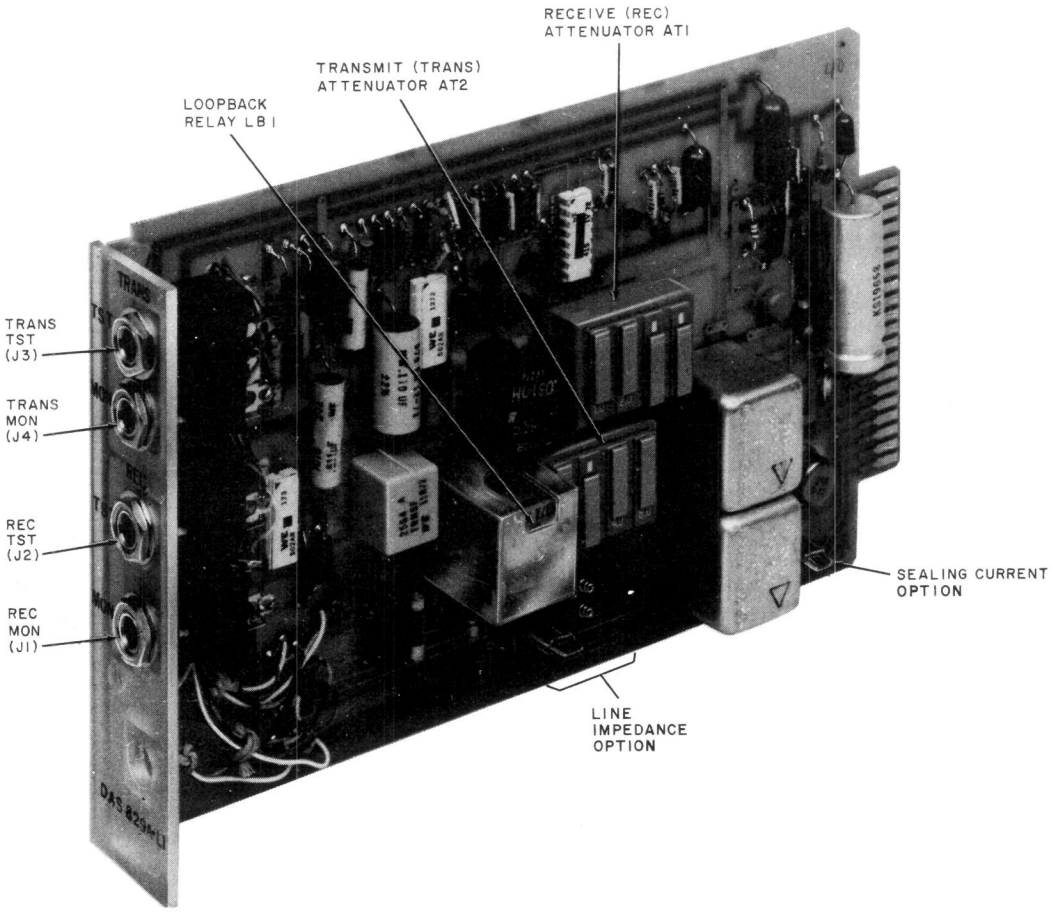


Fig. 48—DAS 829A-L1 CIU

(8 position for 8-dB channels and 16 position for 16-dB channels).

> ***Note:*** Alternate voice and/or dial backup service cannot be provided for CIUs that terminate 8-dB channels.

4.25 A sealing current option (Fig. 53) is provided on the DAS 829C-L1A CIU. If this option is specified on the service order, a plug-in strap should be placed in the sealing current option (SC) position. If the option is not specified on the service order, the plug-in strap should be placed in the sealing current storage (ST) position.

4.26 A 359A or 359K equalizer equivalent option (Fig. 53) is provided on the DAS 829C-L1A CIU. This equalizer equivalent consists of a slope equalizer circuit and a line termination (1200-ohm for 359A and 600-ohm for 359K). Either the 359A or 359K equalizer equivalent should be selected as specified on the service order. The 359A equalizer equivalent is selected by inserting two plug-in straps in column 359 adjacent to the designation A. The 359K equalizer equivalent is selected by inserting

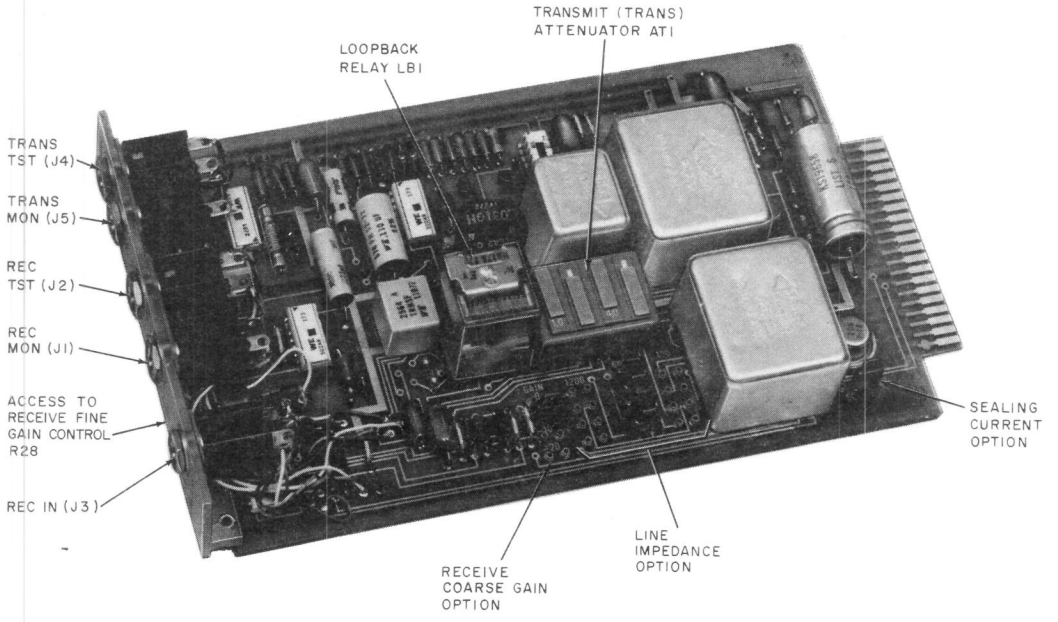


Fig. 49—DAS 829B-L1 CIU

two plug-in straps in column 359 adjacent to the designation K. After the equalizer is selected, the required equalizer characteristics are provided by inserting plug-in straps in the positions specified on the service order or the circuit layout record (CLR). The straps should be inserted in positions identified by columns A, B, C, and D and rows 1, 2, 3, and 4. Strap storage is provided to the left of columns A, B, C, and D in the four ST columns. Additional information is provided in Sections 332-104-500 and 332-116-201.

4.27 The transmit (TRANS) attenuator (Fig. 53) on the DAS 829C-L1A CIU should be set to the attenuation value specified on the service order, as described in paragraph 4.03.

4.28 A coarse gain option (Fig. 53) and a fine gain control on the DAS 829C-L1A CIU provide adjustment for the output level of the CIU receive amplifier. A plug-in strap should be placed in the receive coarse gain option position (GAIN—+20, +10, 0, -10, -20) specified on the service order. The receive fine gain control is variable from 0 to 10 dB and is accessible through a hole in the faceplate of the CIU. Adjustment of the fine gain control is described in Section 598-082-500.

G. 46A2 Data Mounting

4.29 A power supply option (Fig. 54) on the 46A2 data mounting permits operation from a 24 Vac, -24 Vdc, or -48 Vdc power source. Two plug-in straps should be placed in the option position specified on the service order (AC position for 24 Vac and DC position for -24 Vdc or -48Vdc).

H. 46B1 Data Mounting

4.30 A ringing supply option (Fig. 55) on the 46B1 data mounting uses a plug-in strap to select an internal ringing supply (plug-in strap in INT position) or an external ringing supply (plug-in strap in EXT position). When the 46B1 data mounting is used with an 830- or 2830-type key telephone set, the plug-in strap must be in the INT position. When the 46B1 data mounting is used with a 48D1 data unit or a locally engineered

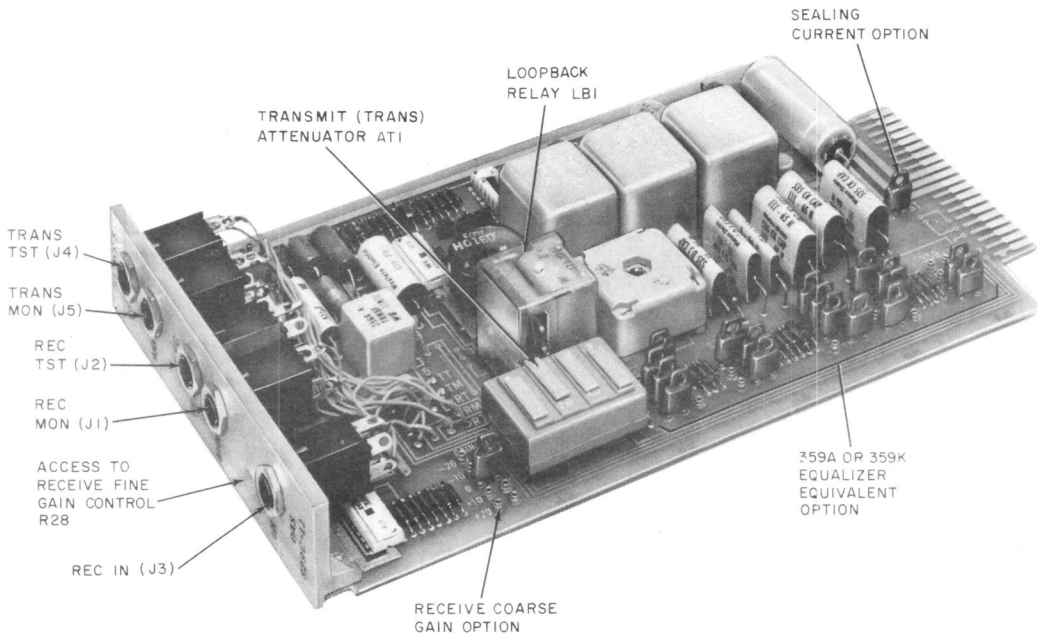


Fig. 50—DAS 829C-L1 CIU

key system, the plug-in strap must be in the EXT position.

I. 48B1 Data Unit

4.31 A slope equalizer option (Fig. 56) that inserts 4 dB of slope equalization into the receive path is provided on the 48B1 data unit. If this option is specified on the service order, a plug-in strap should be placed in the 4 position. If the option is not specified on the service order, the plug-in strap should be placed in the 0 position.

4.32 Receive gain control R9 (Fig. 56) on the 48B1 data unit provides adjustment for the output level of the receive amplifier in the data unit. Adjustment of R9 is described in Section 598-082-500.

4.33 Transmit attenuator AT1 (Fig. 56) on the 48B1 data unit is used to set the transmit signal level at the central office. This level is set as described in Section 598-082-500.

J. 48ER1 Data Unit

4.34 The 48ER1 data unit (Fig. 57) has options that must be installed prior to placing the data unit in operation. The options to be installed should be specified on the service order. Refer to Table C for a summary of the options.

4.35 ***Call Control:*** The calls required to enable the 48ER1 data unit to establish a 4-wire dial backup channel are initiated by either manual or automatic dialing.

(a) With manual dialing (option M) a key telephone set is used. If this option is specified on the service order, nine plug-in straps should be placed in the M1 through M9 positions (Fig. 58).

(b) With automatic dialing (option A), the following items are used: a station dial and a customer- or modem-provided contact; a station dial and the O/R (originate/release) switch on the faceplate of the 48ER1 data unit; or an automatic calling

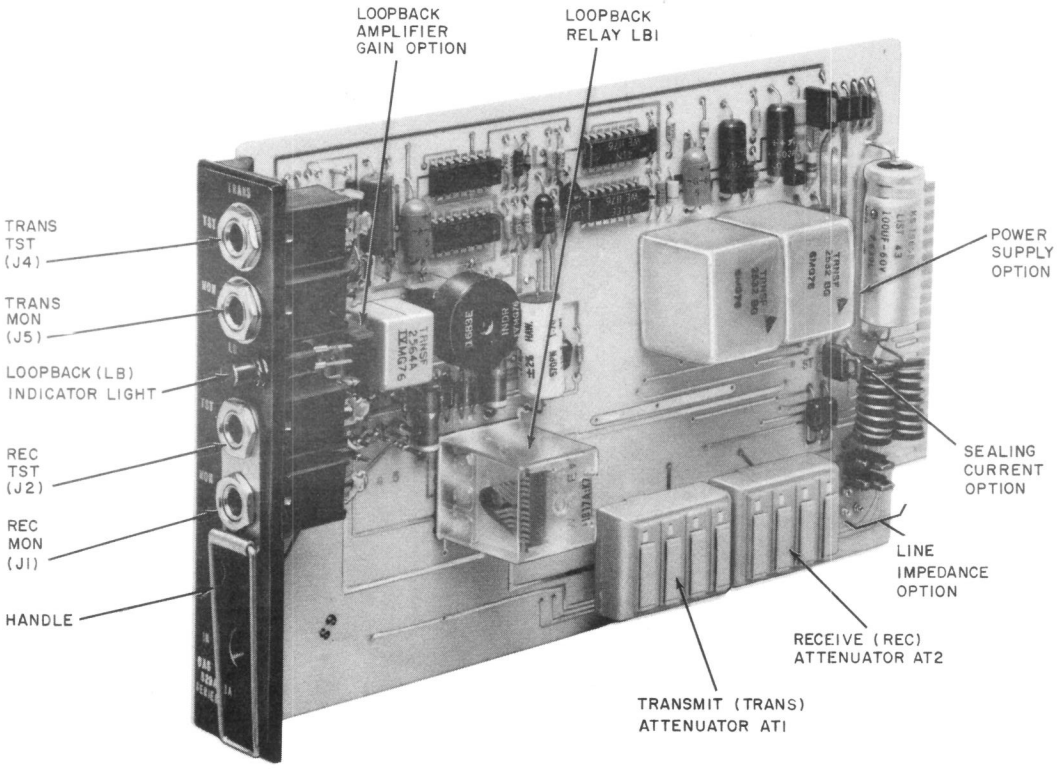


Fig. 51—DAS 829A-L1A CIU

unit (ACU) and a customer- or modem-provided contact. If this option is specified on the service order, nine plug-in straps should be placed in the A1 through A9 positions (Fig. 58).

4.36 ***Unit Control:*** Operating control of the 48ER1 data unit is provided by a key telephone set, a customer- or modem-provided contact, or the O/R (originate/release) switch on the faceplate of the 48ER1 data unit.

(a) With a key telephone set (option T), the 48ER1 data unit will establish a 4-wire dial backup channel and connect the modem to the dial backup channel when directed by control signals from the telephone set. To release the dial backup channel and return the modem to the 4-wire private line, the required control signals are again provided by the key telephone set. If this option is specified on the service order, a plug-in strap should be placed in the T position (Fig. 58).

(b) With a customer- or modem-provided contact (option D), the 48ER1 data unit and an associated station dial or ACU will attempt to establish a 4-wire dial backup channel when the customer or modem provides and maintains a contact closure. When the dial backup channel is established, the 48ER1 data unit will connect the modem to the dial backup channel. If the dial backup channel is not established within 3 minutes, the customer or modem must generate a retry request by interrupting the contact closure for a minimum of 25 ms. To release the dial backup channel and return the modem to the 4-wire private line, the customer or modem removes the contact closure. If this

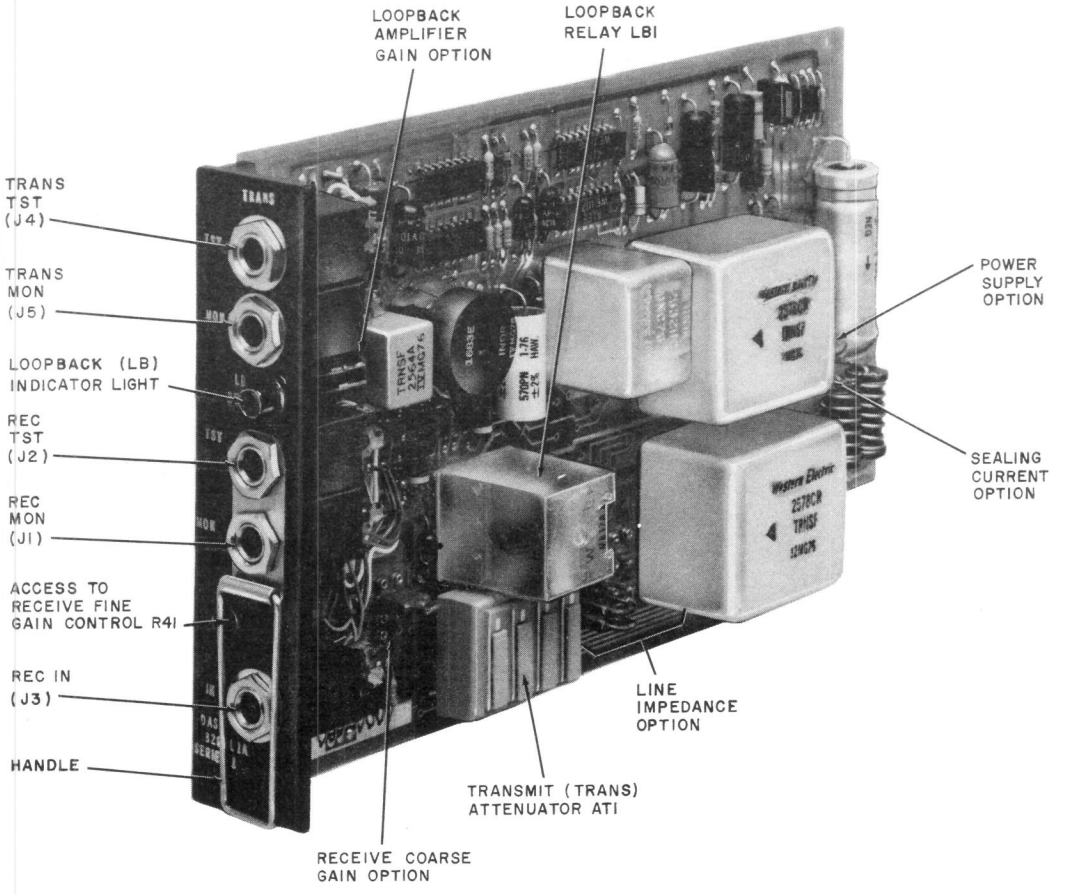


Fig. 52—DAS 829B-L1A CIU

option is specified on the service order, a plug-in strap should be placed in the D position (Fig. 58).

(c) With the O/R switch (option S), the 48ER1 data unit and an associated station dial will attempt to establish a 4-wire dial backup channel when the O/R switch is operated. When the dial backup channel is established, the 48ER1 data unit will connect the modem to the dial backup channel. If the dial backup channel is not established within 3 minutes, a retry request must be generated by releasing and then operating the O/R switch. To release the dial backup channel and return the modem to the 4-wire private line, the O/R switch is released. If this option is specified on the service order, a plug-in strap should be placed in the S position (Fig. 58).

4.37 ***Power Supply:*** Operating power for the 48ER1 data unit can be provided by either a 24 Vac (option N) or a -48 Vdc (option -48) supply. A plug-in strap should be placed in the option position specified on the service order (N position for 24 Vac and -48 position for -48 Vdc (Fig. 58).

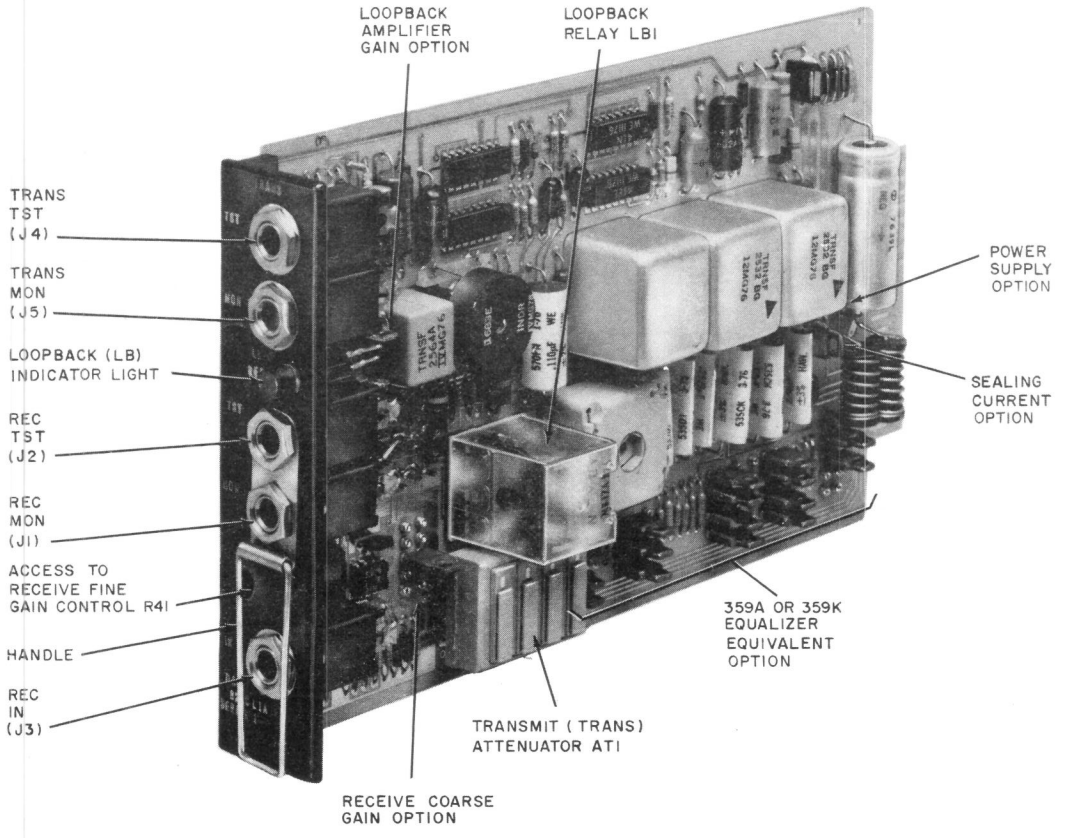


Fig. 53—DAS 829C-L1A CIU

Note: Use of a -48 Vdc supply is not permitted.

4.38 ***Adjustments:*** The transmit (XMT) switch (Fig. 58) and the receive (REC) switch (Fig. 58) on the 48ER1 data unit control the signal gain of the transmit and receive circuits. Adjustment of these switches is described in Section 598-082-500.

K. 48FR1 Data Unit

4.39 The 48FR1 data unit (Fig. 59) has options that must be installed prior to placing the data unit in operation. The options to be installed should be specified on the service order. Refer to Table D for a summary of the options.

4.40 ***Call Control:*** Two methods of automatic answering are provided.

(a) With two calls answered (option T), the 48FR1 data unit automatically answers a call on line 1 and then automatically answers a call on line 2, if the second call is received within 2 minutes of the time line 1 went on hold. If this option is specified on the service order, six plug-in straps should be placed in the T position (Fig. 60).

(b) With automatic call back (option A), the 48FR1 data unit automatically answers a call on line 1 and then automatically initiates a call on line 2. If this option is specified on the

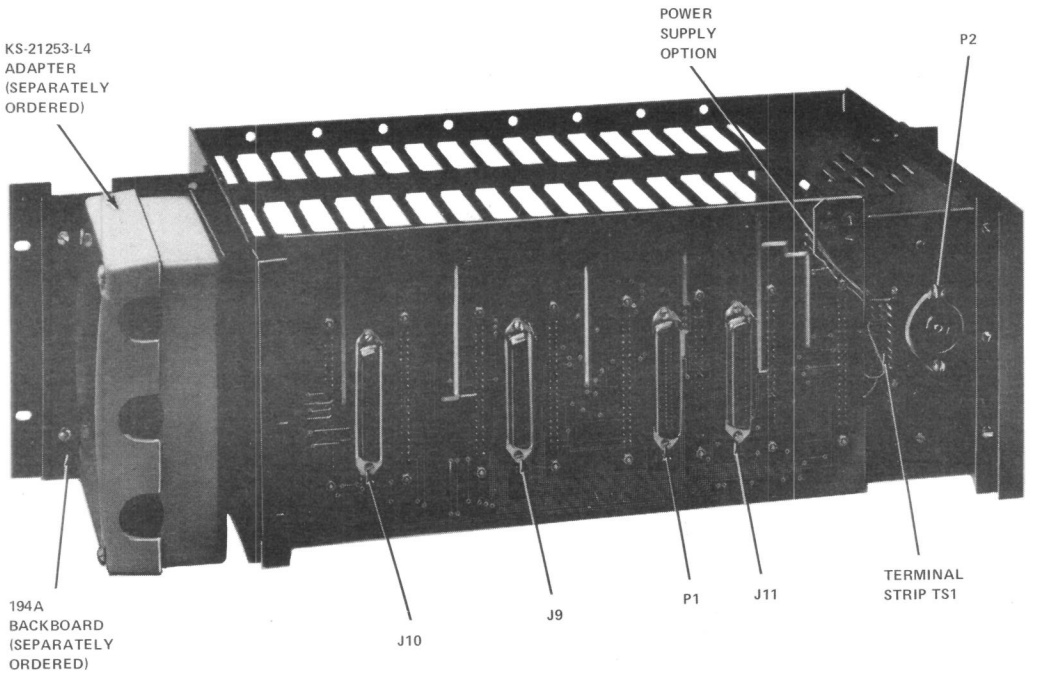


Fig. 54—46A2 Data Mounting—Rear View

service order, six plug-in straps should be placed in the A position (Fig. 60).

4.41 ***Unit Control:*** Two methods of enabling automatic answering are provided.

(a) With unit internal logic (option E), automatic answering is enabled by the internal logic in the 48FR1 data unit. The data unit can automatically answer a call on line 1 and then automatically answer or initiate a call on line 2. If this option is specified on the service order, a plug-in strap should be placed in the E position (Fig. 60).

(b) With a customer- or modem-provided contact (option D), automatic answering is enabled only when the customer or modem provides and maintains a contact closure. The data unit can automatically answer a call on line 1 and then automatically answer or initiate a call on line 2. If this option is specified on the service order, a plug-in strap should be placed in the D position (Fig. 60).

4.42 ***Power Supply:*** Operating power for the 48FR1 data unit can be provided by either a 24 Vac (option N) or a -48 Vdc (option -48) supply. A plug-in strap should be placed in the option position specified on the service order (N position for 24 Vac and -48 position for -48 Vdc (Fig. 60).

> ***Note:*** Use of a -48 Vdc supply is not permitted.

4.43 ***Adjustments:*** The transmit (XMT) switch (Fig. 60) and the receive (REC) switch (Fig. 60) on the 48FR1 data unit control the signal gain of the transmit and receive circuits. Adjustment of these switches is described in Section 598-082-500.

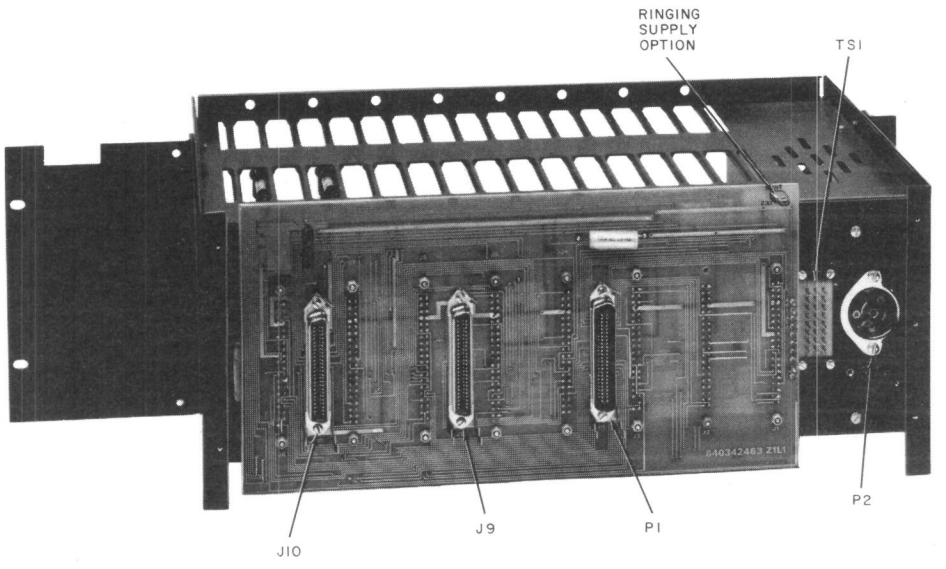


Fig. 55—46B1 Data Mounting—Rear View

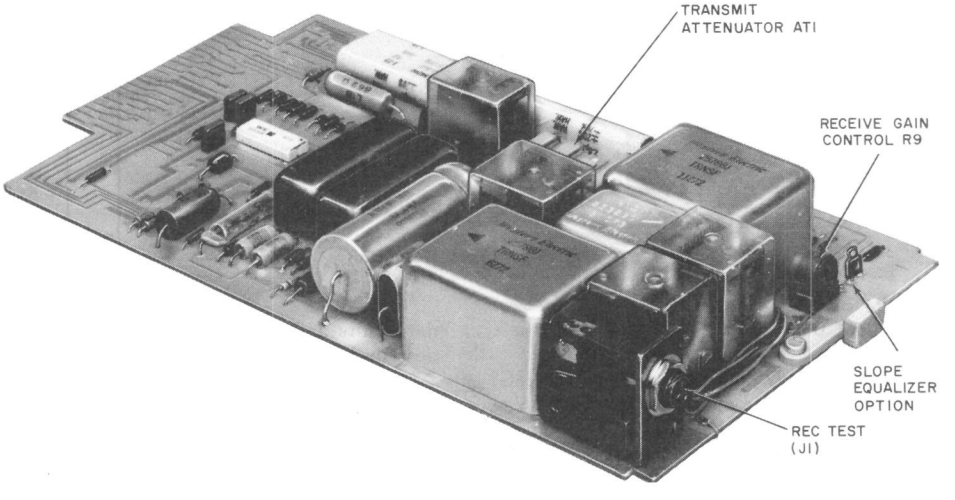


Fig. 56—48B1 Data Unit

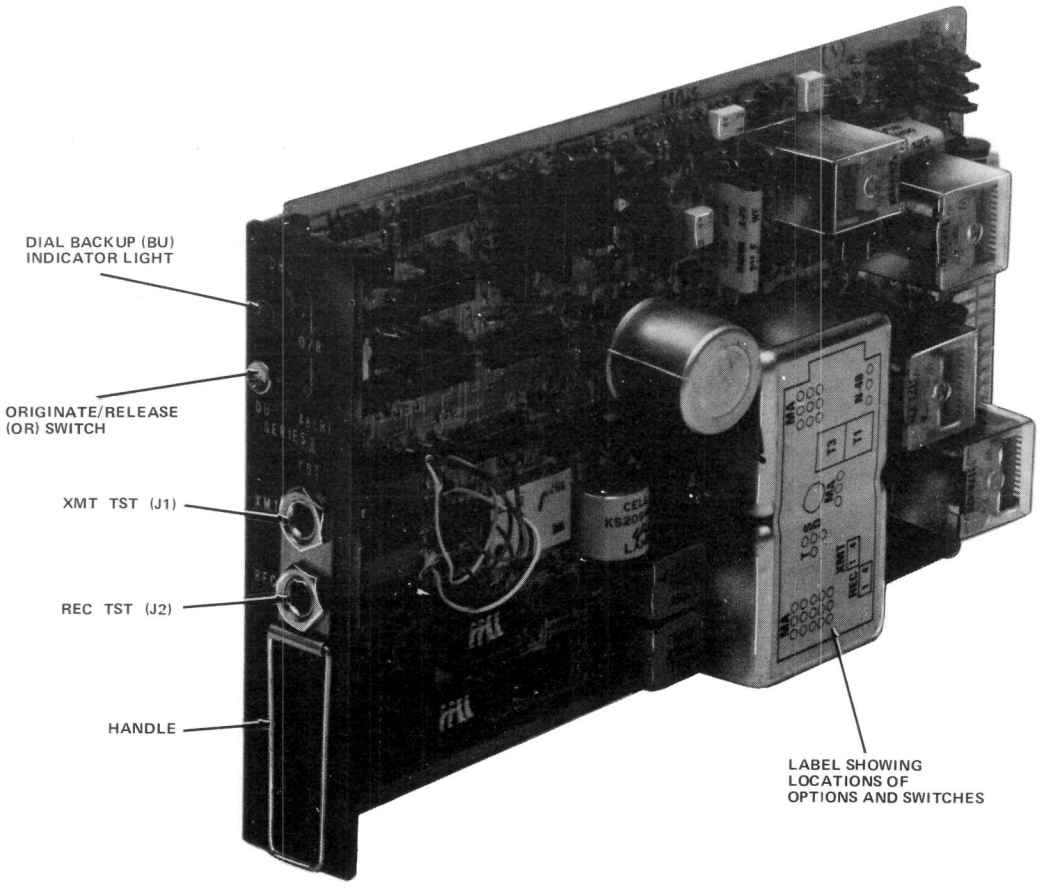


Fig. 57—48ER1 Data Unit

L. 48G1 Data Unit

4.44 A power supply option (Fig 61) on the 48G1 data unit permits operation from a 24 Vac, -24 Vdc, or -48 Vdc power source. A plug-in strap should be placed in the option position specified on the service order (N position for 24 Vac or -24 Vdc and -48 position for -48 Vdc).

5. TESTING

5.01 After the installation procedures are completed, the DAS 829-type CIUs and the supplementary data units and data mountings must be tested as described in Section 598-082-500.

5.02 A tone-activated or manual loopback test should be made by the test center to provide benchmark transmission tests. The test results should be recorded for future maintenance purposes.

5.03 Ensure that the front and rear dust covers are installed on the 44A-type, 45A1, 59A1, or 62A1 data mounting after all installation and testing is completed.

TABLE C

48ER1 DATA UNIT OPTIONS

FEATURE	OPTION	PLUG-IN STRAP(S)		PROVIDE
		QUANTITY	POSITION	
Call Control	Manual Dialing (M)	9	M1-M9	One Per Unit
	Automatic Dialing (A)	9	A1-A9	
Unit Control	Key Telephone Set (T)	1	T	One Per Unit
	Customer- or Modem-Provided Contact (D)	1	D	
	O/R (Originate/Release) Switch (S)	1	S	
Power Supply	24 Vac (N)	1	N	One Per Unit
	-48 Vdc (-48)*	1	-48	

* Use not permitted.

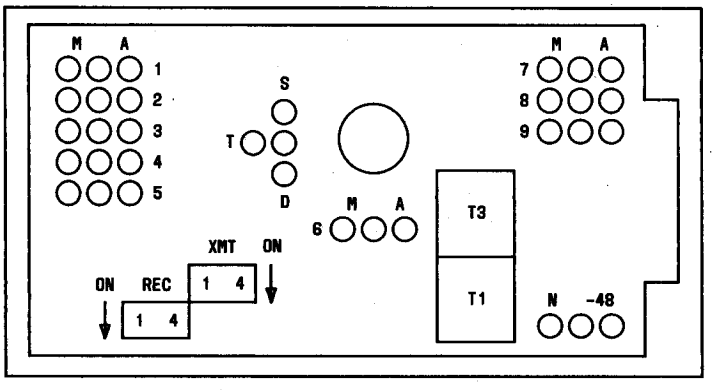


Fig. 58—48ER1 Data Unit—Locations of Options

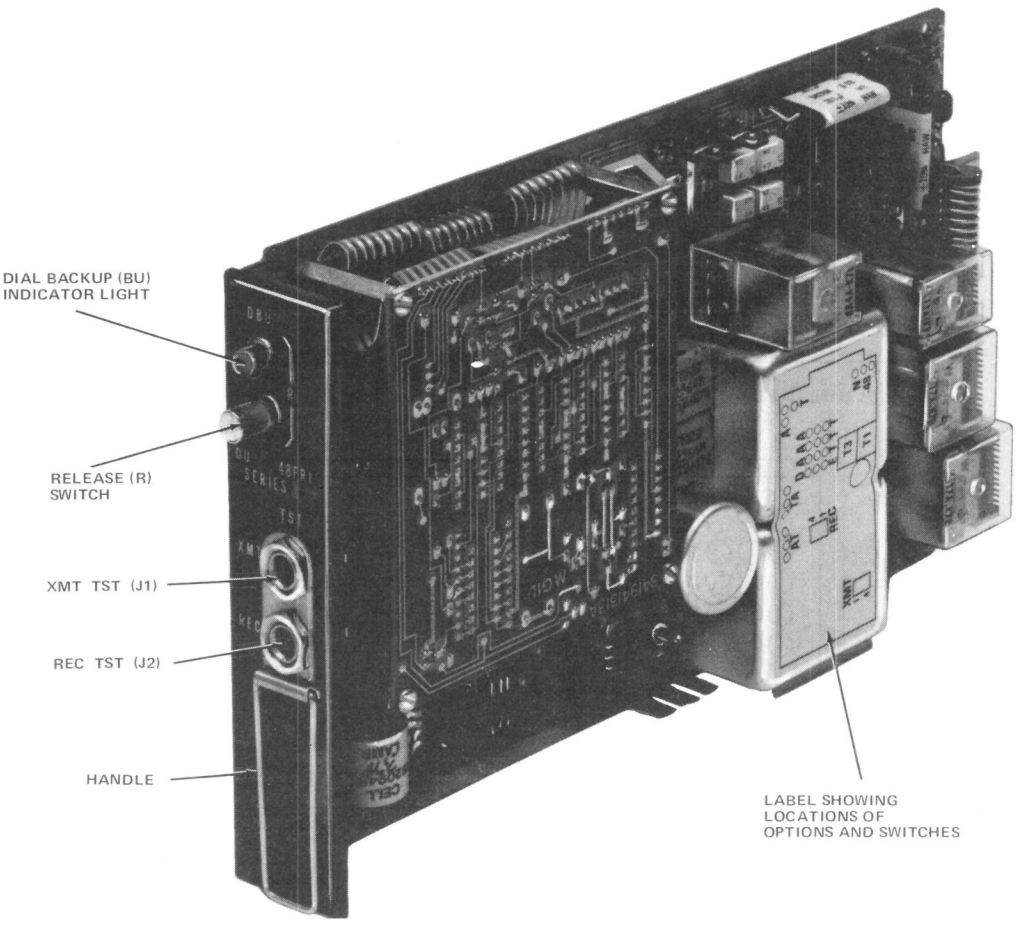


Fig. 59—48FR1 Data Unit

TABLE D

48FR1 DATA UNIT OPTIONS

FEATURE	OPTION	PLUG-IN STRAP(S)		PROVIDE
		QUANTITY	POSITION	
Call Control	Two Calls Answered (T)	6	T	One Per Unit
	Automatic Call Back (A)	6	A	
Unit Control	Unit Internal Logic (E)	1	E	One Per Unit
	Customer- or Modem-Provided Contact (D)	1	D	
Power Supply	24 Vac (N)	1	N	One Per Unit
	-48 Vdc (-48)*	1	-48	

* Use not permitted.

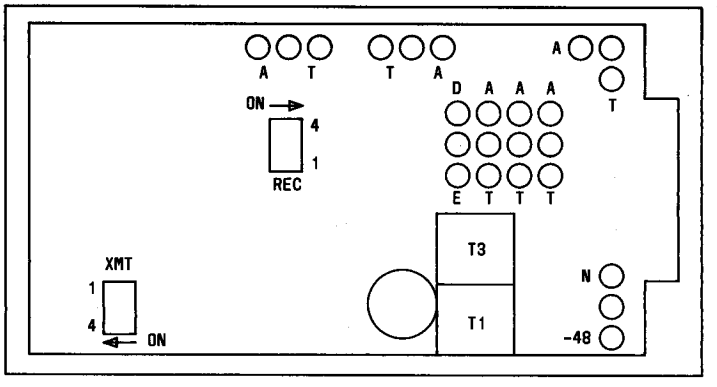


Fig. 60—48FR1 Data Unit—Locations of Options

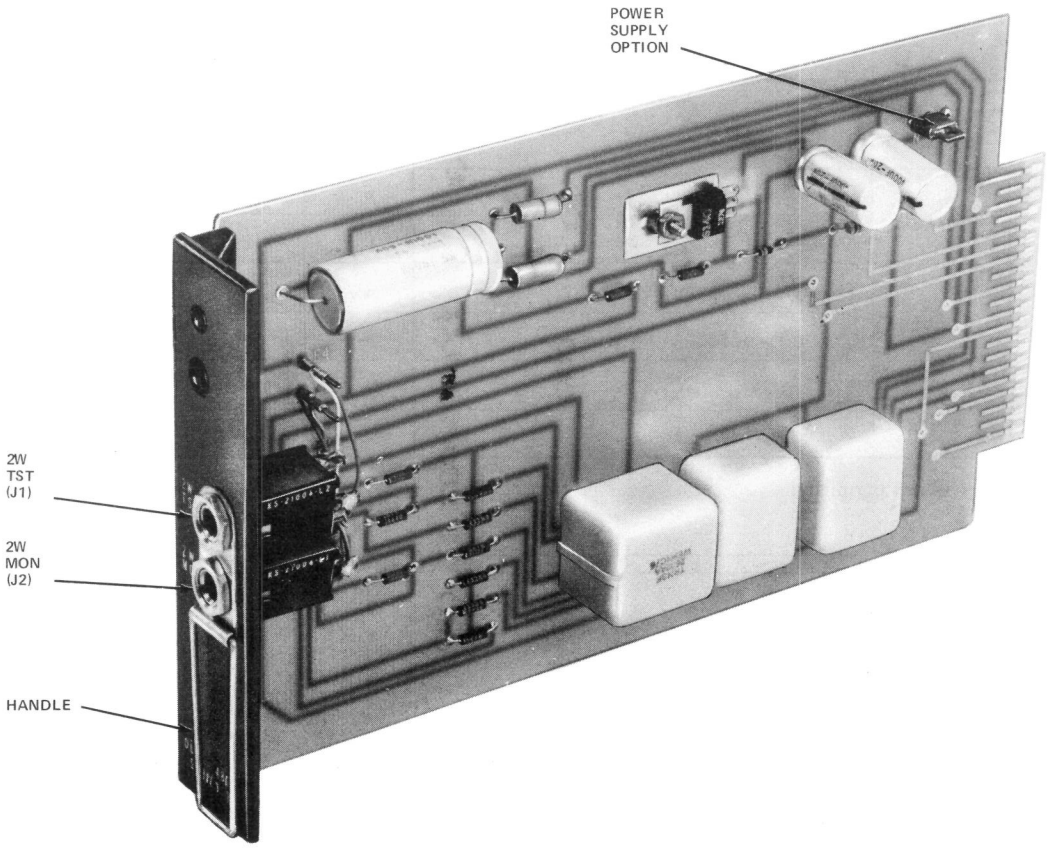


Fig. 61—48G1 Data Unit

6. REFERENCES

6.01 Additional information concerning the DAS 829-type CIU and the supplemental data units and data mountings is contained in the following publications:

SECTION	TITLE
332-104-500	V4-Type Repeaters—Initial Line-Up
332-116-201	Strapping Charts for 359A and 359D Equalizers or 4182C Network
461-200-102	Adapters—148, 149, 153, and 3-Way Bridging Types—Identification
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 and Data Access Arrangements—General Installation and Connection Information
590-010-201	Data Sets—Multiple Installation Information
598-082-100	Data Auxiliary Set 829-Type—Channel Interface Units—Voiceband Private Line Channels—Description
598-082-500	Data Auxiliary Set 829-Type—Channel Interface Units—Voiceband Private Line Channels—Maintenance and Test Procedures

6.02 Detailed information concerning the DAS 829-type CIU and the supplemental data units and data mountings is contained in CD- and SD-1D247-01.