

## DATA SET 203-TYPE INSTALLATION AND CONNECTIONS

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23A-Type Data Unit . . . . .	15	1.01 This section contains instructions for installing and connecting the data set 203-type. This section does not include installation methods for the associated business machine or related equipment.	
24A-Type Data Unit . . . . .	15	1.02 This section is reissued to include the following information:	
38A-Type Data Unit . . . . .	15	• New list codes providing automatic retraining auxiliary channel options (L11 and L12)	
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MIL. STD Adapter (840-128-573) . . . . .	16	1.03 Data set 203-type is designed to be operated in ambient temperatures from +40 to +120°F with a relative humidity of up to 95 percent.	
Com-Code 840303200 Bracket Assembly . . . . .	16	1.04 The 41A-type power unit, which supplies operating voltages to the data set 203-type	
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circuits, requires an ac power input of 117 volts ( $\pm 10$  percent) at a frequency between 47.5 and 63 Hz. Each data set is supplied with a P3BG cord to connect the ac source to the 41A-type power unit.

**1.05** A typical data set 203-type installation with a data auxiliary set (DAS) 804A-type is shown in Fig. 1. A typical data set 203A-type with the front cover removed is shown in Fig. 2. A typical data set 203B-type with front cover removed is shown in Fig. 3. Table A lists the optional data units and the DAS used with data set 203-type. Table B lists the functions and associated data units for the main data set codes without regard to the speed or functional options.

**1.06** The data set code identifies the basic, speed, and functional options of the individual data sets as list (L) numbers. The basic data set configuration is covered by a list number made up of a number and a letter. Then the data speed and functional options are provided by additional numbers. A typical example of a coded data set 203-type is 203A-L1C/4/7/8 (see Fig. 4). This is a 203-type transmitter and receiver (203A) mounted in a KS-20018-L3 cabinet (-L1C/) for operation on 2- or 4-wire private lines at a bit rate of 2400, 4800, or 7200 bits per second (bps) (/4/) with a 150-bps secondary channel (/7/) and an EIA Standard interface (/8). Table C contains the basic unit lists, the size, and the weight of the data sets. Table D contains the speed option lists and Table E contains the functional option lists.

**1.07** A set of gummed labels are provided with every data set. If the data set is mounted in a KS-20018-L3 cabinet, the labels are installed on the inside of the front cover. If the data set is rack-mounted, the labels are shipped loose in the bag holding the option shorting clips. It is intended that these labels be used to record pertinent data and provide a record of apparatus change, installer options, and/or circuit options. A complete set of labels, ordering code P-47M666, should be provided according to the configuration when the data set has been repaired or modified.

**1.08** An example of completed data set labels is shown in Fig. 5. Most of the pertinent information is provided at the factory. The remaining information can be filled in at the time of installation.

- Data set 203( ) label: The CKT NO./TEL NO., Installer, Date, Office, 1000 Hz, 2800 Hz, Message Noise, Impulse Count and Return Loss should be entered by the installer. Some installations will have this information available on the service order card and some installations will require the installer to compile the information from other sources. Additional references for performing tests and obtaining requirements can be found in Sections 314-205-300 and 314-205-500. The 1000-Hz and 2800-Hz figures should be actual measured loss (AML). This may be helpful to service personnel at some future maintenance visit.

- Data unit 22A( ) label: Most of the information for this arrangement has been completed at the factory. It would be helpful to list the optional apparatus (AR321 in the illustration) and slot location because this circuit pack and location provide the data unit with capabilities for the data set L2 speed option.

- Data unit 23A( ) label: Most of the information for this arrangement has been completed at the factory. It would be helpful to list the optional apparatus (AR348 in the illustration) and slot locations including the remaining two AR359 circuit packs.

- Data unit 24A( ) label: Most of the information for this arrangement has been completed at the factory. It would be helpful to list the optional apparatus (AR338 and AR502 in the illustration) and slot locations because these circuit packs and locations provide the data unit with capabilities for the data set L8 option. Write in the option straps that have been installed on AR335 in a method similar to the illustration. The illustration also shows the 41A-type power unit was changed out to indicate how notations regarding replacements, series or apparatus changes, etc, which affect the equipment can be entered for future reference.

**1.09** Data set functions appearing on the pins of the CUSTOMER connector (J12) are shown in Fig. 6. Both EIA and data set symbols are shown to identify the functions. The direction of signal flow arrows is provided for reference since

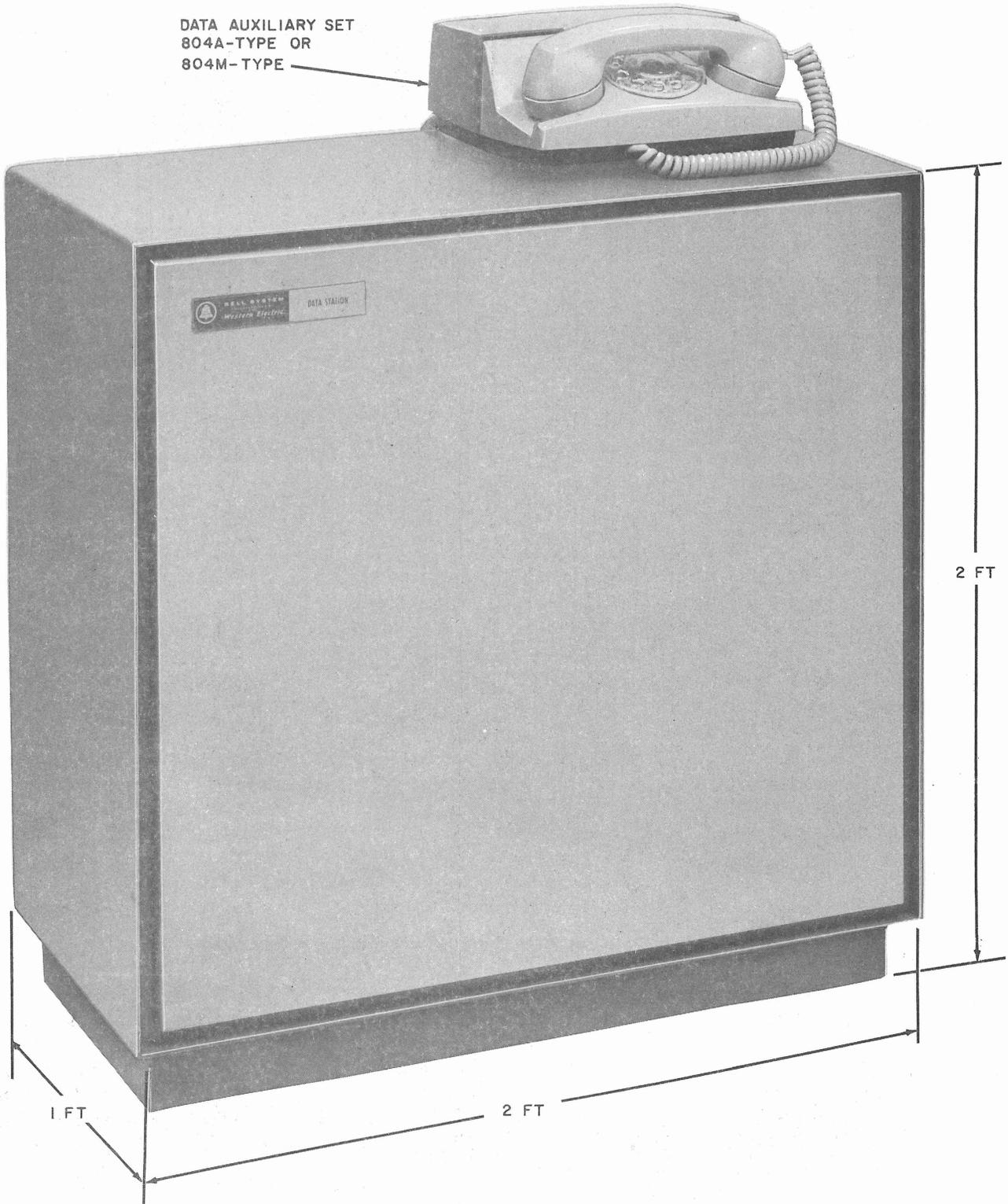
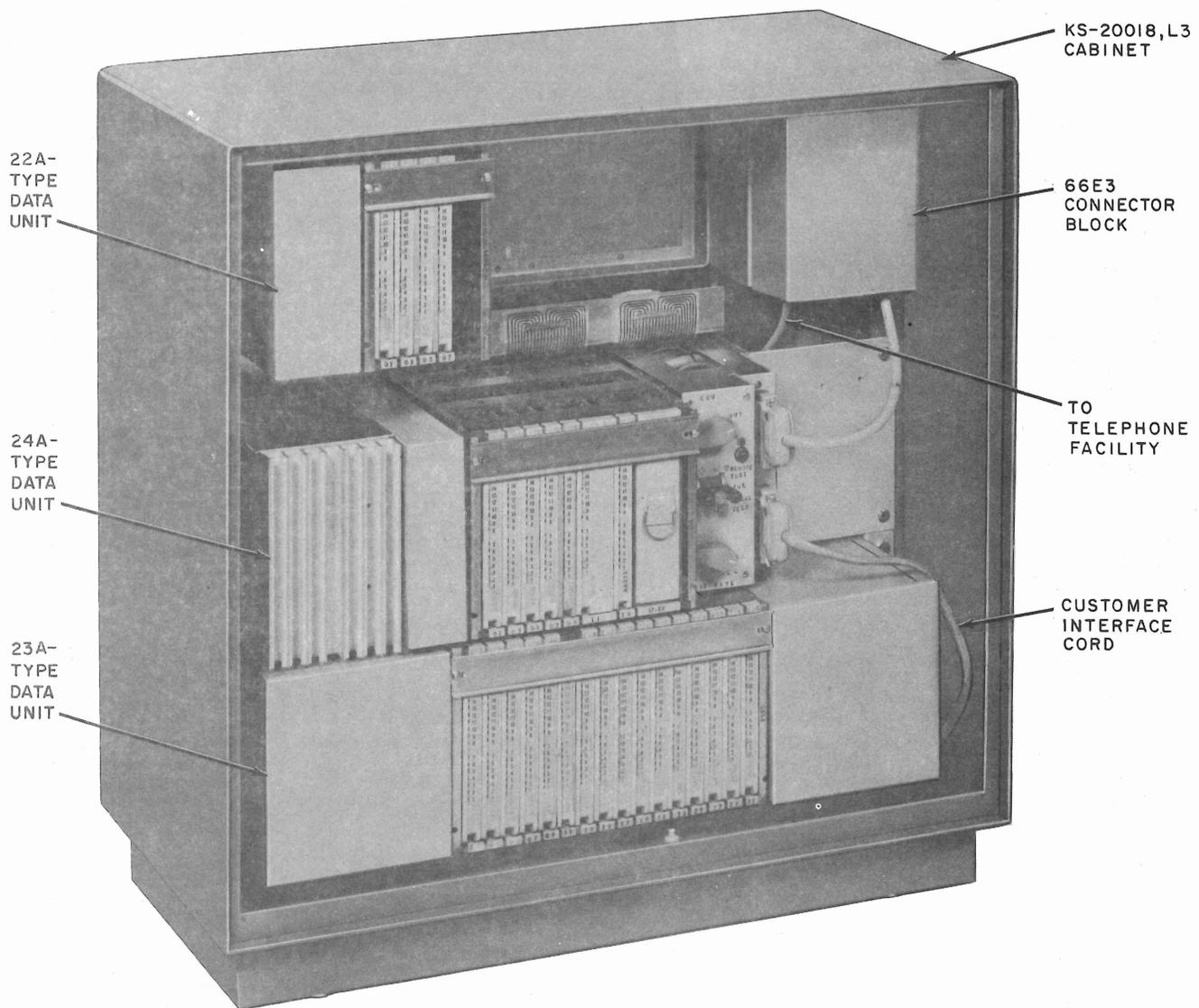


Fig. 1—Typical Data Set 203-Type Installation With DAS 804A-Type



**Fig. 2—Typical Data Set 203A-Type With Front Cover Removed**

different station arrangements may not use all the functions shown.

**1.10** All functions appearing on the pins of the TELEPHONE line connector (P1) are also shown in Fig. 6. The functions and symbols are standard only to the telephone company. Functions are listed for all possible station arrangements, such as the DAS 804A- or M-type, DAS 801A- or C-type, and DAS 828A- or C-type.

**1.11** Do not apply ac power to the data set until instructed to do so. When ac power is

required, the power cord from the data set should be connected to an ac source which provides 117 ( $\pm 10$  percent) volts at a frequency between 47.5 and 63 Hz. The customer must furnish a 3-wire ac outlet to accept a plug with two parallel blades and a U-shaped grounding pin. This source should not be controlled by a switch.

**1.12** For most installations, the customer interface cable and the data set ac power cord must be routed through the front or rear port at the bottom of the cabinet. The customer-provided interface cable should be terminated with a Cinch

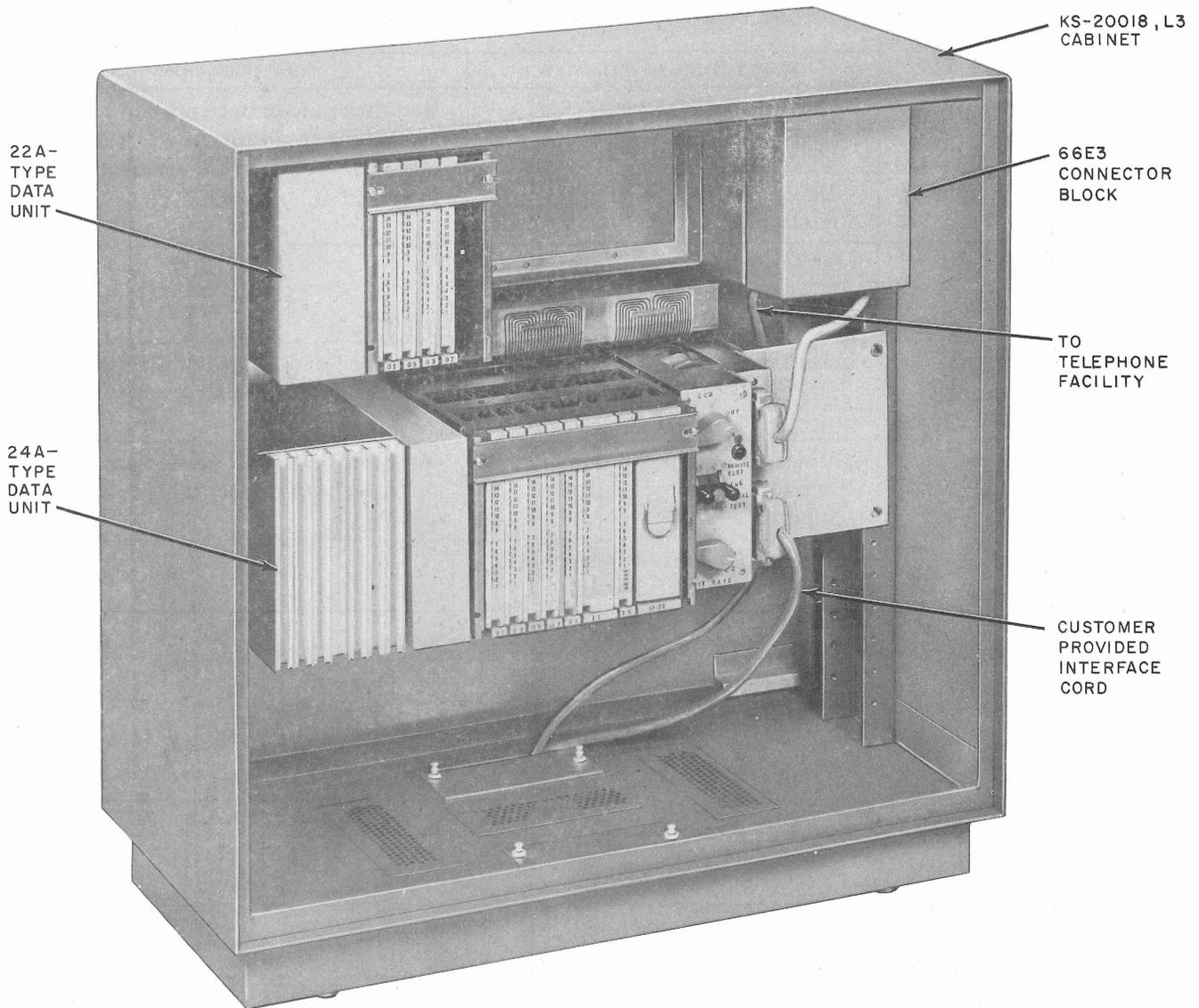


Fig. 3—Typical Data Set 203B-Type With Front Cover Removed

or Cannon DB-19064-432 plug and DB-51226-1 hood (or equivalents).

## 2. INSTALLATION

### A. Initial Installation Procedure for a Data Set at a Customer Location

**2.01** The following procedure describes a typical installation to a 4-wire private line through a DAS 828A-type. The DAS 828A-type will be used to provide alternate voice capability and provide a backup facility using two 2-wire DDD lines. This

will illustrate a straight-through connection and possible deviations will not be described to prevent complications.

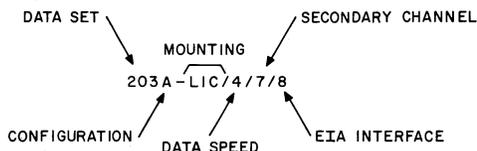
**2.02** Place the data set in the desired location. Set the DAS 828A-type and power supply near the place where they will be mounted. A block diagram illustrating the necessary connections is shown in Fig. 7. Continue the transmit and receive pairs from the main entrance terminal to the intermediate points and the data set location. Take care to maintain the conditioning of the line

**TABLE A**  
**NOMENCLATURE AND DESCRIPTIONS**

APPARATUS	FUNCTIONAL DESCRIPTION	QUALIFICATIONS
22A-type data unit	Data set transmitter	Requires plug-in networks and associated circuit packs according to intended service of the data set to be operational.
23A-type data unit	Data set receiver	
24A-type data unit	Data set common control equipment	
38A-type data unit	Multiple access interface (Customer interface fanout from 2 to 6)	
Data auxiliary sets 801A-type and 801C-type (optional)	Automatic calling features	Requires internal option strapping according to intended service.
Data auxiliary sets 804A-type and 804M-type (optional)	Voice communication and network signaling control functions	Requires internal modification and option strapping according to intended service.
Data auxiliary set 828A	Standard means to terminate private line data channels	

**TABLE B**  
**DATA SET 203-TYPE ARRANGEMENTS**

DATA SET CODE	FUNCTION	INTERNAL APPARATUS
203A-( )	Transmitter and receiver	22A-type, 23A-type, 24A-type, all with Table A qualifications
203B-( )	Transmitter only	22A-type, 24A-type, with Table A qualifications
203C-( )	Receiver only	23A-type, 24A-type, with Table A qualifications



**Fig. 4—Data Set Coding Example**

and to make a neat installation. It is advisable to tag the installation cables for future identification.

**2.03** Mount the DAS 828A-type and power supply at the intermediate point as suggested in Fig. 7. Connect the power supply to the DAS 828A-type and plug the power cord into the ac outlet. When the alternate voice capability is provided by a 568 HAA-3 telephone set, the necessary length of B25A cable should be run between the telephone set and the DAS 828A-type. The cable should now be terminated and secured to the TEL

**TABLE C**  
**BASIC UNIT LISTS**

DATA SET LIST NUMBER (Note 1)	DESCRIPTION	DATA SET SIZE AND WEIGHT		
		203A-( )	203B-( )	203C-( )
L1(MD) L1C(STD)	Mounted in a KS-20018-L3 cabinet with provision for auxiliary data units.	2 ft wide 1 ft deep 2 ft high 110 lbs	2 ft wide 1 ft deep 2 ft high 72.5 lbs	2 ft wide 1 ft deep 2 ft high 89.5 lbs
L1A(MD) L1D(STD)	No cabinet — 23-inch frame. Mounting with provision for auxiliary data units.	23 in. wide 9 in. deep 20 in. high 90 lbs	23 in. wide 9 in. deep 14 in. high 53 lbs	23 in. wide 9 in. deep 20 in. high 70 lbs
L1B(MD) L1E(STD)	No cabinet — 23-inch frame. Mounting without provision for auxiliary data units.	(Not applicable)	(Not applicable)	23 in. wide 9 in. deep 14 in. high 65 lbs

Note 1: MD — Manufacture Discontinued; STD — Standard.

**TABLE D**  
**SPEED OPTION LISTS**

DATA SET LIST NUMBER	LINE SYMBOL RATES (BAUDS)	LINE SIGNAL BANDWIDTH (HZ)	SPEED CAPABILITY BITS/SEC			RECOMMENDED APPLICATION
			NUMBER OF LEVELS			
			2	4	8	
L2	2400	500-2900	2400	4800	7200*	4800 bps on 4-wire C2 private line
L3	1800	700-2700	1800	3600	5400*	3600 bps on switched network or on C2 private line (2- or 4-wire)
L4	2400	700-2700	2400	4800	7200*	4800 on switched network and C2 private line (2- or 4-wire)
L5	3200	400-2900	3200	6400	9600*	6400 on 4-wire C2 private line
L6	3600	401-2900	3600	7200	10,800*	7200 bps on 4-wire C2 private line

\* May have degraded performance.

**TABLE E**  
**FUNCTIONAL OPTION LISTS**

DATA SET LIST NUMBER	FUNCTION
L7*	To provide a low-speed ( $\leq 150$ bps) secondary (auxiliary or reverse) channel
L8†	To provide an EIA Standard interface
L9†	To provide a MIL. Standard interface
L11	To provide the ARAC channel function to data set 203A with speed option L2.
L12	To provide the ARAC channel function to data set 203A with speed option L6.
L13	To provide a multiple access customer interface arrangement (fanout).

\* The secondary channel is optional only for data set 203A-type operating on 4-wire lines. The secondary channel is required for data set 203A-type operating on 2-wire lines. The secondary channel is also required equipment for data sets 203B-type and 203C-type.

† Optional only for 24A2 data unit. The 24A1 data unit, which has been replaced by the 24A2 data unit, contains an EIA Standard interface as common equipment.

connector on the DAS 828A-type. If the cable run between the data set and the DAS 828A-type is made of B25A and M8J-61 sections as shown in Fig. 7, the B25A connector at the DAS should be terminated and secured to the DATA connector on the DAS 828A-type. A connection diagram is also provided in Fig. 7 to show the necessary connections between the data set and the DAS. If the cable run is other than suggested, it is very important that the transmit pair (T1 and R1) and receive pair (T and R) connections be established correctly between the data set and the DAS to provide normal operation. A common signal ground (SG) connection should also be established between the data set and the DAS.

**2.04** Establish voice contact with the central office.

Connect a tone generator to the transmit pair (T1 and R1) of the data cable to permit the central office to verify that their connections are

correct. Other tests may be necessary to be sure the transmission facility meets the requirements consistent with line conditioning. These tests and requirements should be in conformance with Sections 314-205-300 and 314-205-500. Testing should confirm the slope or roll-off characteristics of the facility, especially at 1000 Hz and 2800 Hz and allow necessary adjustment of the DAS 828A-type. The AML at these frequencies is important. Also, test results of the facility envelope and delay distortion characteristics are necessary for future maintenance reference and should be noted on the data set label.

**2.05** An impulse noise test using a 6A or 6H impulse counter should be made, if possible, during the time of day when most telephones and office machines are busiest. The impulse counter should be set for C-message weighting and the plant engineering personnel can advise on the

DATA SET 203A-LIC2/A SERIAL NO.		
SD-1D151-01 SERIES 2		
CKT NO./TEL NO. 1731T 777	INSTL J.M.	DATE 9/28/72
OFF 949	1000 HZ 16 dB	2750 HZ 19 dB
MESS NOISE 35 dB RNCO	IMPULSE 7	RET LOSS 30 dB
AR321 SERIES 4		
AR348 SERIES 4		
AR502 SERIES 1		
AR338 SERIES 3		
4164A		
4165A		
4165K		

DATA UNIT 22A2		
SD-1D152-01 SERIES 2		
CKT NO./TEL NO.	INSTL	DATE
OFF	1000 HZ	2750 HZ
MESS NOISE	IMPULSE	RET LOSS
AR325 SERIES 4		
AR473 SERIES 2		
AR327 SERIES 2		
AR321		
4164A		

DATA UNIT 23A2		
SD-1D153-01 SERIES 2		
CKT NO./TEL NO.	INSTL	DATE
OFF	1000 HZ	2750 HZ
MESS NOISE	IMPULSE	RET LOSS
AR342 SERIES 2		AR354 SERIES 2
AR343 SERIES 4		AR359 (3) SERIES 2
AR344 SERIES 3		AR360 SERIES 2
AR349 SERIES 2		AR328 SERIES 3
AR350 SERIES 5		
AR474 SERIES 1		AR348
AR352 SERIES 3		4165A
AR353 SERIES 3		4165K

DATA UNIT 24A2		
SD-1D154-01 SERIES 3		
CKT NO./TEL NO.	INSTL	DATE
OFF	1000 HZ	2700 HZ
MESS NOISE	IMPULSE	RET LOSS
OPTIONS ON AR335 15, 17, 18, 26, 27/28/ 21, 24/ 1, 2, 3, 4/ 6/ 25, 28/ 31		
AR335 SERIES 1		
AR337 SERIES 1		
AR503 SERIES 3		
AR501 SERIES 1		
19AI DU SERIES 1		
AR338		
AR502		41A PU 10/31/72 JM

Fig. 5—Example of Data Set Labels for a Typical Data Set 203A-Type

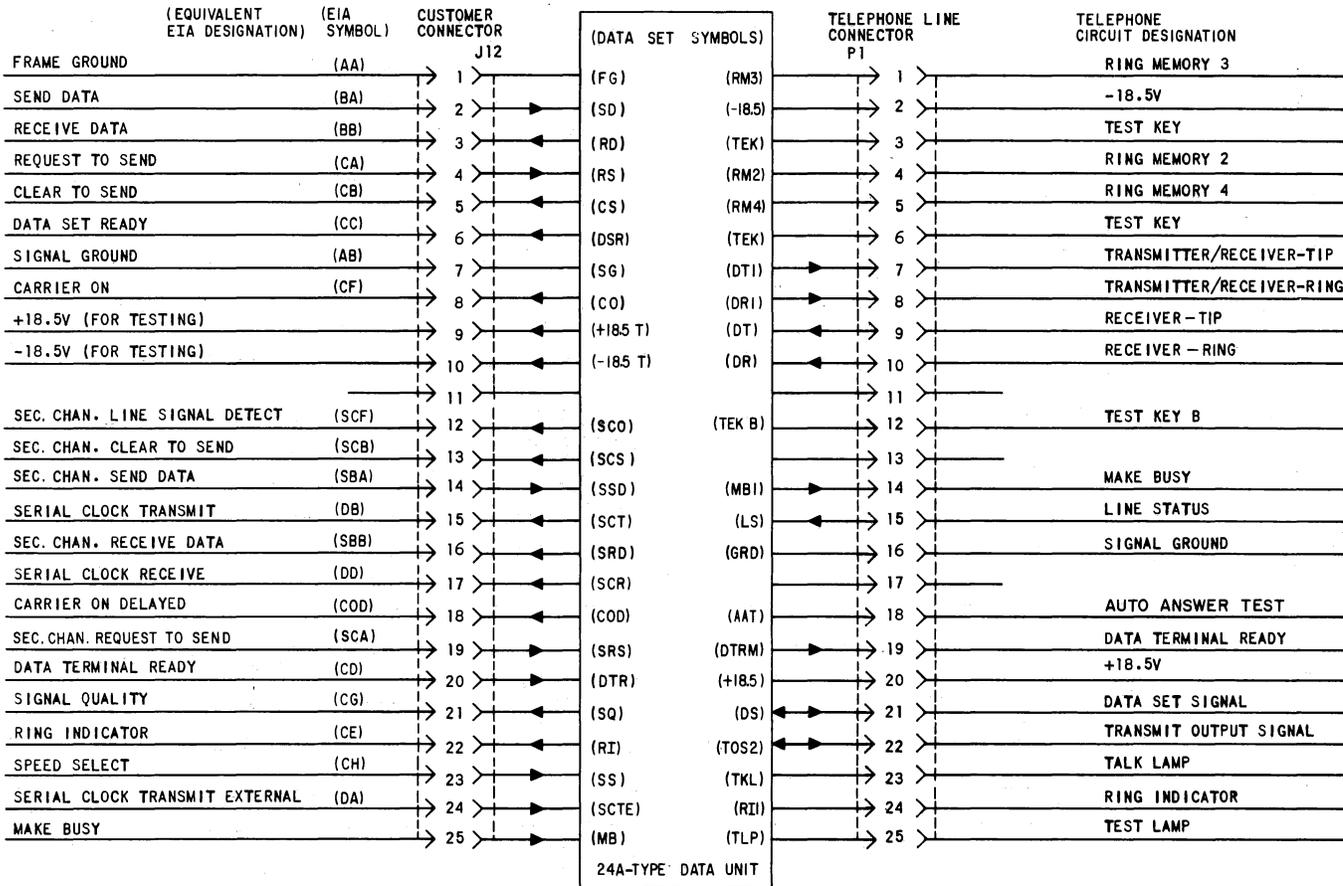


Fig. 6—Customer and Telephone Line Interface Signals

acceptable count total for the one or more impulse tests required for the installation.

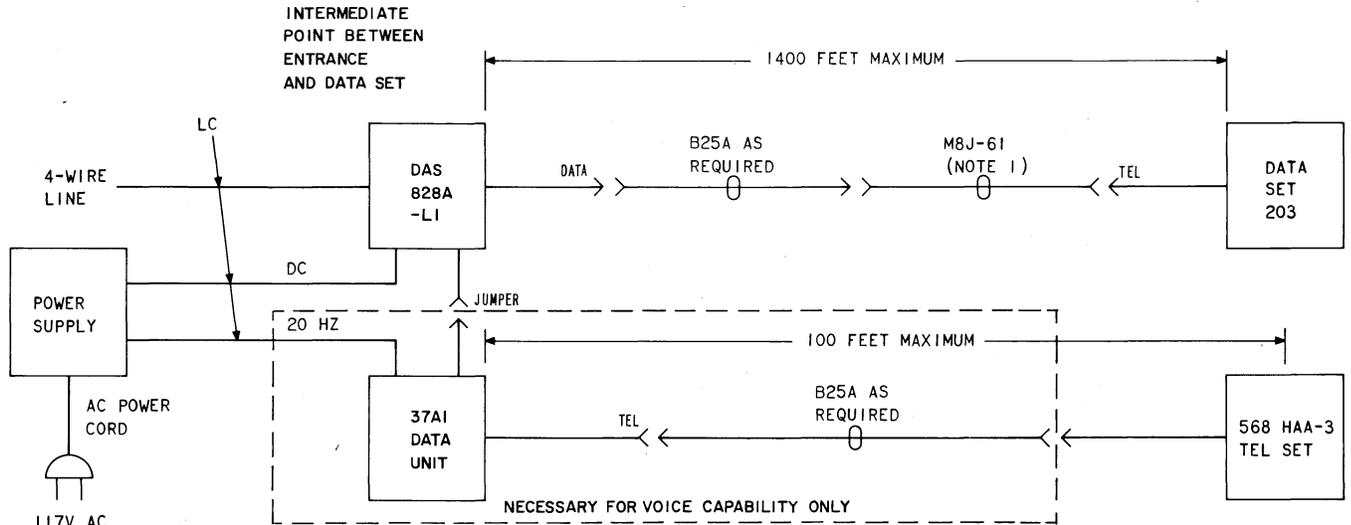
**2.06** After the impulse noise test, loosen the screws and remove the circuit pack retaining bar from the 24A-type data unit. Remove option board AR335 (shown in Fig. 8) from slot location 15 and install (or verify the previous installation of) the required option straps as provided on the service order. Option straps are provided in a bag located behind the 66E3 connector block cover. Option identification and terminal numbers are provided in Table F. Return the AR335 to its original location, replace the retaining bar, and secure the screws.

**2.07** Route the ac cord through the bottom cabinet port. Examine the flat flexible cable ends of the 4.5 Vdc distribution system. If they are loose and/or not secured, it is necessary to terminate the ends onto the 22A-type and/or 23A-type data

units. When this procedure is required, take care to observe the decaled polarity. Also observe that the screws used in terminating the flexible cable are securely seated but not overtightened.

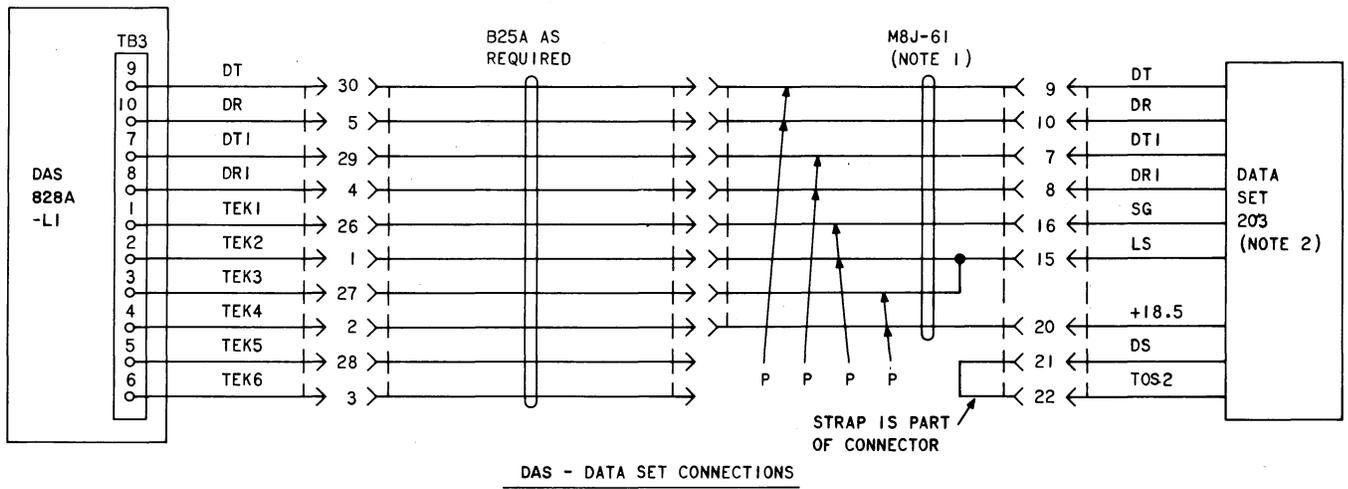
**2.08** After completing the tests of the telephone facility, route the telephone cable through the same port as the ac power cord. Securely terminate the telephone cable at the 66E3 connector block assembly or the data set TELEPHONE connector as required.

**2.09** Connect the data set power cord to the wall receptacle. Operate the REMOTE TEST—LINE—LOCAL TEST switch on the 24A-type data unit to the LOCAL TEST position. The sound of energizing relays indicates that ac power is applied to the data set. Return the switch to LINE position.



BLOCK DIAGRAM - DATA/VOICE

- NOTES:
1. USE M8J-61 CORD IN PLACE OF 66-TYPE CONN. BLOCK AND SPECIAL CORD SUPPLIED WITH 203. PLUG M8J-61 CORD DIRECTLY INTO "TEL" CONNECTOR PI OF DS 203.
  2. DS 203 SHOULD BE OPTIONED FOR "804A-TYPE OPERATION," OPTION YA.



DAS - DATA SET CONNECTIONS

Fig. 7—Block and Connection Diagram Using DAS 828A Data/Voice for Data Set 203-Type

**2.10** Fill in the required information on the data set labels. Cabinet-mounted data sets have the labels secured to the inside of the front cover. Rack-mounted data sets supply the labels loose in the bag with the shorting clips. The labels should be completed as instructed in 1.08 for each respective data unit.

**2.11** Obtain and set up the necessary test equipment to perform the installation tests

as required in Section 592-019-500. When the installation, loop-back, and end-to-end tests are completed, replace and secure all hardware (such as circuit pack retaining bars) before replacing the data set covers. If the data set is rack-mounted, place the data set labels in a convenient location for future maintenance calls.

**2.12** If possible, before turning the facility over, have the customer contact the far-end station

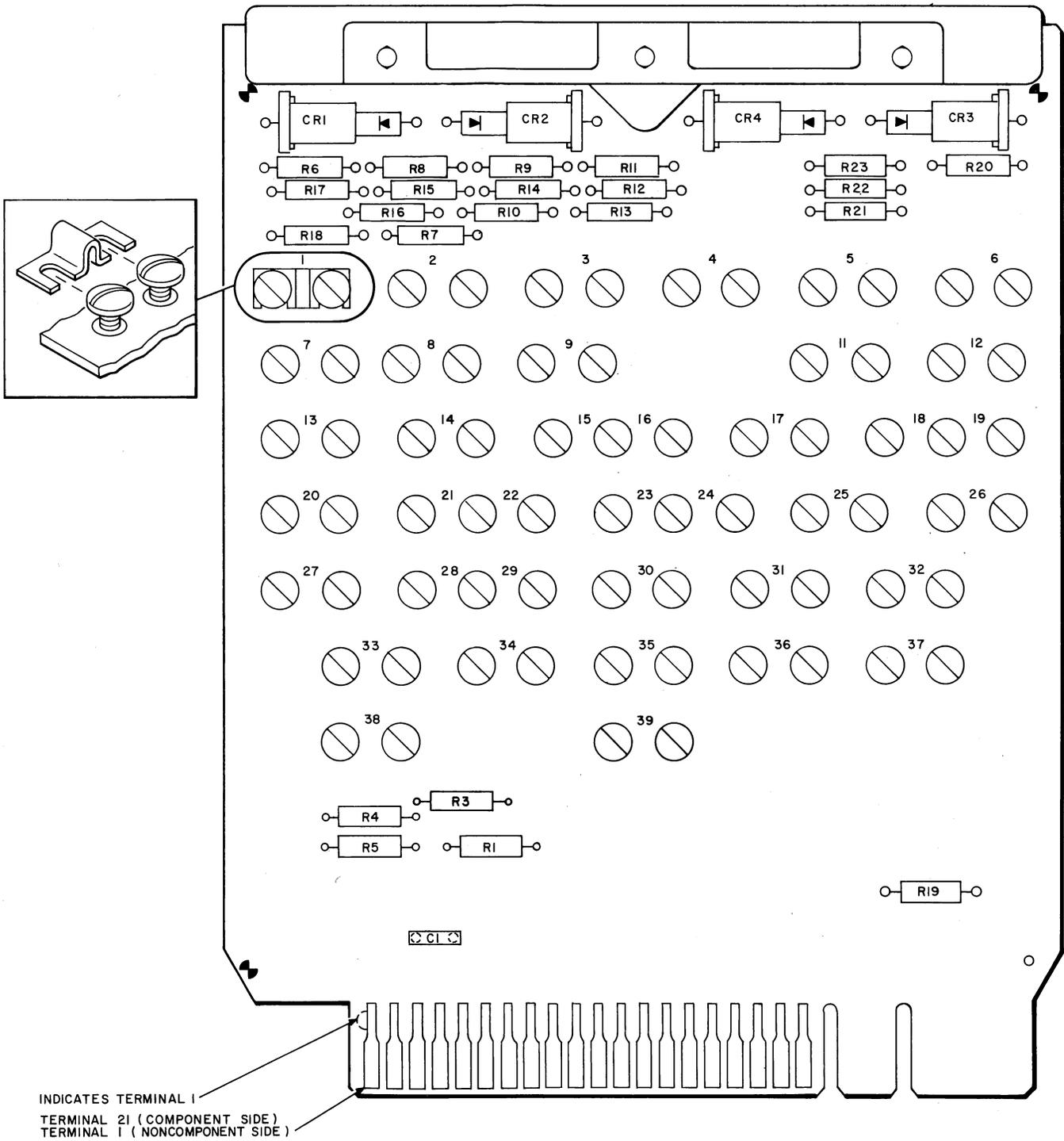


Fig. 8—Option Board AR335

TABLE F  
DATA SET STRAPPING OPTIONS

OPTION		FEATURE	STRAPPING ON AR335	PROVIDE
Z	MODE OF OPERATION	4-wire without secondary channel	Install 7, 12, 15, 17, 27, 34	One per station
Y		4-wire with secondary channel or with ARAC channel	Install 15, 17, 18, 26, 27	
X		2-wire (secondary channel required)	Install 16, 19	
W	CONTROL OF SECONDARY CHANNEL	By request to send only (for switched network or 2-wire private lines)	Install 29, 30	One per station
V		By secondary request to send only (for independent control on 2- or 4-wire private lines)	Install 28	
T		By request to send and secondary request to send (for nonsimultaneous transmission on 2- or 4-wire private lines)	Install 29	
YD		0- to 150- bps secondary channel not provided or ARAC channel is provided	Install 28, 30	
S	LINE IMPEDANCE	600 ohms	Install 21, 24	One per station
R		900 ohms	Install 22, 23	
ZA	TRANSMIT LINE SIGNAL LEVEL AND 2-WIRE RECEIVER PAD	-15 dBm/15 dB	Install 8, 9, 13, 14	One per station
ZB		-14 dBm/15 dB	Install 1, 9, 13, 14	
ZC		-13 dBm/13 dB	Install 2, 8, 9, 13	
ZD		-12 dBm/12 dB	Install 1, 2, 9, 13	
ZE		-11 dBm/11 dB	Install 3, 8, 13, 14	
ZF		-10 dBm/10 dB	Install 1, 3, 13, 14	
ZG		-9 dBm/9 dB	Install 2, 3, 8, 13	
ZH		-8 dBm/8 dB	Install 1, 2, 3, 13	
ZI		-7 dBm/7 dB	Install 4, 8, 9, 14	
ZJ		-6 dBm/6 dB	Install 1, 4, 9, 14	
ZK		-5 dBm/5 dB	Install 2, 4, 8, 9	
ZL		-4 dBm/4 dB	Install 1, 2, 4, 9	
ZM	-3 dBm/3 dB	Install 3, 4, 8, 14		
ZN	-2 dBm/2 dB	Install 1, 3, 4, 14		

OPTION		FEATURE	STRAPPING ON AR335	PROVIDE
ZO	RECEIVER PAD	-1 dBm/1 dB	Install 2, 3, 4, 8	One per station
ZP		0 dBm/0 dB	Install 1, 2, 3, 4	
B		10 dB for 4-wire lines	Install 11	
A		0 dB for 2-wire lines	Install 6	
N	USE OF 804-TYPE DATA AUXILIARY SET	No	Install 5, 20	One per station
YA		Yes	Remove 5, 20	
K	INITIATE START-UP OF HIGH-SPEED CHANNEL	On receipt of secondary channel carrier		Install 33
J		4-Wire Auto Retrain	Clear to send inhibited by carrier on delayed	Install 25, 38
ZR			Clear to send independent of carrier on delayed	Install 38
YB		Under customer control or under ARAC control		Remove 33, 25, 38
Q	Using external serial clock transmitter		Install 35	As required
F	Received data (RD) never clamped		Install 31	As required
E	Serial clock receiver (SCR) never clamped		Install 32	As required
M	Receiver-only data set (203C-type)		Install 37, 39	As required
ZQ	Transmitter-only data set (203B-type)		Install 6, 11	As required
YE	Customer control of carrier		On AR604, loosen screw switch.	One per station when L13 is provided.
YF	Permanent carrier on		On AR604, tighten screw switch.	
YG	Fast startup		On AR582 or AR583: Loosen screw switch S1B and S2C, tighten screw switches S1A and S2D.	One per station when L11 or L12 is provided (See Note 1).
YH	Slow startup		On AR582 or AR583: Loosen screw switches S1A and S2D, tighten screw switches S1B and S2C.	

Note 1: Opposite options must be installed at each end of a data set to data set link. For example, if the local data set has option YG installed, the distant data set must have option YH installed.

and make a short data run for final verification of the installation.

## B. Installation of Data Units

### 22A-Type Data Unit

**2.13** The 22A-type data unit is normally mounted directly above the left end of the 24A-type data unit. The data unit is secured to the mounting bars with four 1/2-inch by 12-24 pan head tapping screws. In this location, the flexible printed wiring for the +4.5 Vdc distribution can easily be secured. When connecting the flexible printed wiring, take care to avoid sharp folds and observe the decaled polarity. The data unit connector plug must be connected to the TRMTR (J13) receptacle on the rear of the 24A-type data unit. The complete 22A-type data unit equipped with the optional circuit pack and network weighs approximately 10.5 pounds.

### 23A-Type Data Unit

**2.14** The 23A-type data unit is normally mounted directly below the 24A-type data unit and is secured to the mounting bars with four 1/2-inch by 12-24 pan head tapping screws. In this location, the flexible printed wiring for the +4.5 Vdc distribution can easily be secured. When connecting the flexible printed wiring, take care to avoid sharp folds and observe the decaled polarity. The data unit connector plug must be connected to the RCVR (J16) receptacle on the rear of the 24A-type data unit. The complete 23A-type data unit equipped with the optional circuit packs and networks weighs approximately 37.5 pounds. When installing this data unit in a KS-20018-L3 cabinet, it is suggested that the cabinet rear panel be snapped in place if necessary, the cabinet laid on the rear panel, and the data unit carefully placed and secured in position. With consideration for the weight and close quarters of the cabinet, two craft personnel should be employed to install the data unit. After the data unit is installed, return the data set cabinet to the upright position.

### 24A-Type Data Unit

**2.15** The 24A-type data unit, when mounted in a KS-20018-L3 cabinet, is located in the center and secured to the mounting bars with four 1/2-inch by 12-24 pan head tapping screws. The complete 24A-type data unit equipped with the optional circuit pack and network weighs approximately 28 pounds.

Prior to installation, it may be necessary to remove the flexible printed wiring from the 41A-type power unit terminal strip. Before removing the connections, be sure to note the sequence of wiring so that reconnection will be identical to the original installation. The P3BG ac power cord must be disconnected from the 41A-type power unit during the installation of a data unit.

### 38A-Type Data Unit

**2.16** The 38A-type data unit is normally mounted close to the right side of the 22A-type data unit when facing the equipment from the front. The 38A-type data unit should be secured to the mounting bars with four 1/2-inch by 12-24 pan head tapping screws. The data unit connector plug labeled P3 must be connected to the J15 receptacle on the rear of the 24A-type data unit. Two shorting clips, like those used on option board AR335, are required to continue the +4.5 Vdc distribution into the 38A-type data unit. When the two data units are mounted close together, it is possible to continue the +4.5 Vdc distribution from the 22A-type data unit bus bar to the 38A-type data unit bus bar by using the two shorting clips, each secured by the screws provided at the bus bar ends.

## C. Installation of Replacement Circuit Packs and Networks

**2.17** Circuit packs can be removed from the data set after the screws securing the data unit retaining bar are loosened and the bar is slid out of position. The end of the retaining bar is notched and it can be used to pry a circuit pack from its slot location safely. ***Do not remove circuit packs from the data set unless ac power has been removed.***

**2.18** Each circuit pack can easily be removed from its slot location once it is released from its mating connector. The new or replacing circuit pack is to be carefully aligned in the guide slots of the original circuit pack, gently slid to the back of the nest, and firmly seated into the mating connector. This procedure should be used when replacing any suspect circuit pack.

**2.19** The networks associated with the various data set options are connected into the circuitry through mating connectors. After the connectors are mated, the network is secured to

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the respective data unit with the four 10-32 nuts and washers supplied with the network.

### D. Special Cords and Connectors

#### P3BG AC Power Cord

**2.20** The P3BG ac power cord is a shielded 3-conductor, 10-foot cord. The shielding is connected to the third wire ground lugs to prevent impulse noises from entering the power supply on the ac line and adversely affecting the data set circuitry. The male connector is a Hubbell No. 5264 (or equivalent) plug cap. The female connector is a Hubbell No. 6600 (or equivalent). This power cord was initially designed for data set 203-type.

#### M23A-51 Cord

**2.21** The M23A-51 cord is to be used when the customer orders the permanent request-to-send feature. The cord is manufactured with a special shorting strap between two pins in the connector which keeps the data set request-to-send (RS/CA) interface function in the ON condition and holds the data set carrier on-line continuously. This feature can be used to prevent data sets 203A-type which are optioned for automatic retraining from retraining each time the customer equipment switches its RS/CA function to ON.

**2.22** The M23A-51 is a 5-foot cord which provides connectors which mate with both the data set interface (CUSTOMER) and the customer equipment interface.

#### M6AL Cord

**2.23** The M6AL cord is required to modify older 24A-type data units for converting the ERROR CONTROL (or ECU) switch to function as a DIGITAL LOOPBACK switch function. The M6AL cord is 5 inches long and connects between J14 and J15 on the rear of the 24A-type data unit. Complete details for this modification are provided in Part 3D of this section.

#### MIL. STD Adapter (840-128-573)

**2.24** The MIL. STD adapter is an applique which is attached to the 24A-type data unit. The adapter expands the normal 25-pin CUSTOMER interface connections to provide both a 15-pin CUSTOMER A and a 25-pin CUSTOMER B connector.

The adapter is supplied along with two special circuit packs which make up option List 9.

#### Com-Code 840303200 Bracket Assembly

**2.25** This bracket assembly is designed to provide a CUSTOMER connector on the outside of the KS-20018-L3 cabinet. One end of the assembly cable is terminated at the CUSTOMER connector on the 24A-type data unit. The opposite end of the cable is terminated at a connector mounted on a bracket that can be snapped into the opening in the bottom of the cabinet. The bracket provides a floor-level interface that will accept either a KS-19088-L2 or an IBM connector.

### 3. CONNECTIONS

#### A. Data Set Installer Options

**3.01** Options which establish the operating characteristics of the data set are made on the option board AR335 circuit pack located in the 24A-type data unit. An option is made by inserting a strapping link under the heads of two screws of the associated terminals and turning the screws to a fully tightened position. The terminals on the option board are shown in Fig. 8. A bag of 25 strapping links for the original installation should be found loose in a bag behind the cover on the 66E3 connector block. A listing of the available options and required strappings is provided in Table F.

**3.02** A visual inspection should be made to ensure that the proper optional circuit packs and networks are installed for the speed option list number specified in the data set code. The following tables provide the necessary information:

- For the 22A-type data unit, see Table G.
- For the 23A-type data unit, see Table H.
- For the 24A-type data unit, see Table I.

#### Data Auxiliary Set Modifications

##### *Data Auxiliary Set 804A-Type*

**3.03** Incorporating options ZL and ZA in the DAS 804A provides compatibility with most data set 203 operations. One exception should be noted. If the DAS is coded 804A1, A2, A3, or A4,

**TABLE G**  
**OPTIONAL APPARATUS FOR 22A-TYPE DATA UNIT**

DATA SET 203 LIST NUMBER	CIRCUIT PACK	CIRCUIT PACK POSITION	NETWORK	NETWORK CONNECTOR
L2	AR321	07	4164A	J1
L3	AR322	07	4164B	J1
L4	AR323	07	4164C	J1
L5	AR324	07	4164D	J1
L6	AR411	07	4164E	J1

**TABLE H**  
**OPTIONAL APPARATUS FOR 23A-TYPE DATA UNIT**

DATA SET 203 LIST NUMBER	CIRCUIT PACK	CIRCUIT PACK POSITION	NETWORK	NETWORK CONNECTOR
L2	AR348	13	4165A	J17
	—	—	4165K	J1
L3	AR347	13	4165B	J17
	—	—	4165F	J1
L4	AR346	13	4165C	J17
	AR359	01	4165G	J1
L5	AR345	13	4165D	J17
	AR359	01	4165H	J1
L6	AR412	13	4165E	J17
	AR359	01	4165J	J1

TABLE I

## OPTIONAL APPARATUS FOR 24A-TYPE DATA UNIT (Note 1)

DATA SET 203 LIST NUMBER	CIRCUIT PACK	CIRCUIT PACK POSITION	NETWORK	NETWORK CONNECTOR
L7 (Note 2) Low-Speed Secondary Channel	AR336	11	4166A	J11
L8 (Notes 3 and 4) EIA Interface	AR338	07	—	—
	AR502(STD) (AR339-MD)	09	—	—
L9 (Notes 3 and 5) MIL. Std 188B Interface	AR496	07	—	—
	AR497	09	—	—
L11 Automatic Retraining Auxiliary Channel (ARAC) (Note 6)	AR582	11	4166B	J11
L12 Automatic Retraining Auxiliary Channel (ARAC) (Note 7)	AR583	11	4166C	J11

**Note 1:** Appropriate labels must be affixed to the 24A-type data unit to indicate the speed selection available for the list chosen. These labels must be ordered separately as indicated below:

- L2 and L4 — P-42W554 Label
- L3 — P-42W555 Label
- L5 — P-42W557 Label
- L6 — P-42W556 Label

**Note 2:** Required for all 2-wire installations and for all installations using data sets 203B and 203C.

**Note 3:** Optional only for 24A2 data unit.

**Note 4:** The EIA interface is provided through a 25-pin KS-19087-L2 connector. The customer cord must be equipped with a Cinch DB-19604-432 connector and Cinch DB-51226-1 hood (or equivalent).

**Note 5:** The MIL. Std 188B interface is provided through a 15-pin KS-19087-L1 connector. (A 25-pin interface is also provided.) This connector is wired with a cable and plug for connection to the 25-pin connector. The customer cable must be equipped with a Cinch DA-19603-403 connector and Cinch DA-51225-1 hood (or equivalent). For conversion purposes, an adapter 840-128-573 must be ordered with the circuit packs for L9.

**Note 6:** The L11 ARAC circuitry is compatible *only* with a data set 203A using speed option list code L2 and operating *only* on a full-duplex 4-wire facility. The L11 ARAC components physically occupy space provided for the L7 low-speed secondary channel components.

**Note 7:** The L12 ARAC circuitry is compatible *only* with a data set 203A using speed option list code L6 and operating *only* on a full-duplex 4-wire facility. The L12 ARAC components physically occupy space provided for the L7 low-speed secondary channel components.

a diode (WECO 456A or equivalent) should be connected on the 3A1 data unit as follows:



A 456A diode is provided as a ship-loose item with the data set 203 for initial installation. It is located in the bag with the option straps taped to the inside of the 66E3 connector block cover.

**3.04** Terminal numbers assigned to the options required for DAS 804A-type are provided in Data Auxiliary Set 804A-Type, Identification and Connections (Section 598-030-100).

#### **Data Auxiliary Set 804M-Type**

**3.05** The following modifications should be provided in the DAS 804M-type to provide compatible operation with data set 203:

- On terminal board TB1, connect a wire from terminal 24 to terminal 43.
- On terminal board TB1, remove the wire at terminal 63 which connects to the TEST key and connect it to terminal 23 on TB1.

**3.06** The following DAS 804M-type options provide the listed control or function for data set 203-type:

- **Option M**—Provides for automatic answer under control of the AUTO key. The AUTO key should be blocked to prevent automatic answering.
- **Option N**—Provides a 600-ohm repeat coil between the receive line and the data set.
- **Option G**—Provides for ringing on the receive line.

- **Option W**—Provides for remote test signals between the data set and DAS 804M-type.
- **Option Z**—Provides positive control signals to the data set interface.
- **Option R**—Removes a test signal path on the receive line.
- **Option T**—Is not required for data set operation. It is usually specified over option V because the DAS 804M-type is factory-wired to provide option T.

**3.07** Terminal numbers assigned to the options required for DAS 804M-type are provided in Data Auxiliary Set 804M-Type, Identification and Connections (Section 598-057-100).

**3.08** In addition to the listing above, the following modifications are required when the DAS 804M-type is used to provide 4-wire service using two DDD lines:

- On terminal board TB1, move the wire from terminal 25 to terminal 1.
- On terminal board TB1, move the wire from terminal 46 to terminal 2.
- On terminal board TB1, move the BL wire from terminal 53 to terminal 19.
- On terminal board TB1, move the BLK wire from terminal 62 to terminal 44.
- On terminal board TB1, move the wire from terminal 26 and connect it to terminal L1 on the dial network.
- On terminal board TB1, move the wire from terminal 47 and connect it to terminal C on the dial network.

#### **Data Auxiliary Set 801-Type**

**3.09** Terminal numbers assigned to the options required in a DAS 801-type will be found in the appropriate section listed:

- Data Auxiliary Sets 801A1, 801A2, 801A3, and 801A4 for Automatic Calling, Installation and Connections (Section 598-010-200)

## SECTION 592-019-200

- Data Auxiliary Sets 801A5 and 801A6 for Automatic Calling, Installation and Connections (Section 598-010-201)
- Data Auxiliary Sets 801C1 and 801C2, Installation (Section 598-012-200)
- Data Auxiliary Sets 801C3 and 801C4, Installation (Section 598-012-201).

### ***Data Auxiliary Set 828A-Type***

**3.10** A DAS 828A-type is the recommended means of terminating a 2- or 4-wire private line voiceband data circuit. Table J lists ordering information and data set 203 installer options required for compatibility with DAS 828A in the data-only application. Table K shows ordering information and options for data set 203 and DAS 828A for data with alternate voice capability. Other information will be found in Data Auxiliary Set 828A Data Service Unit, Installation and Connections (Section 598-080-200).

### ***Data Auxiliary Set 828C-Type***

**3.11** A DAS 828C-type is primarily for use in providing switched network backup capability to a 4-wire private line voiceband data circuit where a DAS 828A-type is used to terminate the private line channel. The DAS 828C-type may also be used to provide backup capability to a 4-wire private line not terminated into a DAS 828A-type or to provide a 4-wire channel over the switched network where a private line is not involved.

**3.12** Table L lists the installer options required for compatibility with data set 203 operation using two switched network lines for 4-wire operation. Other information will be found in Data Auxiliary Set 828C, Description and Operation (Section 598-080-101) and Data Auxiliary Set 828C, Installation and Connections (Section 598-080-201).

### **B. Station Arrangement Connections**

**3.13** Figures 9 through 12 provide installation information and connections for some common station arrangements. No attempt is made to present all possible connections because of the multitude of acceptable station arrangements and equipment codes. Other station arrangements which are acceptable but not used as much, ie, common battery as found in AUTOVON facilities,

or using E and M signaling, are provided in Data Set 203-Type, Theory of Operation and Supplementary Information (Section 592-019-150).

**3.14** Station arrangements presented in this part are as follows:

- Data set 203 and DAS 828A, providing data-only or data/voice capability over 4-wire private lines
- Data set 203 with DAS 828A and DAS 828C, providing data service over 4-wire private lines with two 2-wire DDD backup facilities
- Data set 203 and DAS 828A, providing data service over a 2-wire private line
- Data set 203 with DAS 804A, providing data service over two switched network lines.

**3.15** Providing voice capability to the first arrangement of 3.14 requires adding a 37A1 data unit to the DAS 828A and providing a 568 HAA telephone set. Both may be ordered separately. The telephone set must be modified to make the fifth line key nonlocking.

### **C. Automatic Retraining Auxiliary Channel**

**3.16** The automatic retraining auxiliary channel (ARAC) options L11 and L12 are used only with speed options L2 and L6, respectively, and only with a data set 203A arrangement. Remote testing cannot be done when ARAC circuitry has been installed. ARAC circuitry can be factory-supplied or installed as a field conversion.

**3.17** To install either the L11 or L12 ARAC circuitry, remove the data set from service and disconnect ac power. If installed, remove both circuit pack AR336 from slot location 11 and the 4166A network from connector J11 on the 24A-type data unit.



***Observe the series number marked on the 24A1 data unit, if used. If the number shows modification including both series 3 and 4 have been incorporated (see Fig. 13), proceed to 3.18. If the number is less than 4, install the wire straps as shown in Fig. 13. The ARAC circuitry will not operate properly without them. Change the series***

TABLE J

## ORDERING AND INSTALLATION INFORMATION FOR DAS 828A – DATA ONLY APPLICATION

## A. Items To Be Ordered

ITEM		CODE		QUANTITY PER LINE	NOTES
		4-WIRE	2-WIRE		
Data Service Unit	Rack Mount	DAS 828A-L1		1	1
	Wall Mount	DAS 828A-L1A			2
Connector Cables		B25A		As required	3
Data Set Connecting Cord		M8J-61		1	4
89-Type Resistors	T	89BG	89AN	1	
	LB	89N	89A	1	
24V4B Plug-Ins	EQL	359-type equalizer		1	5
	RAMPL	227D amplifier or 849-type network with 89-type resistor		1	5
	TAMPL	227D amplifier or 849-type network with 89-type resistor		1	5
	TERM SET	—	1B terminating set	1	5, 6
Power Supply				As required	7
LB Key		6017B or equivalent		1	8

**Note 1:** Order mounting bars or brackets as required. Refer to Section 463-140-100.

**Note 2:** Order mounting hardware and mount in accordance with Section 463-130-100.

**Note 3:** Order when required to extend DATA and TEL connectors of DSU.

**Note 4:** To be used in place of any cord supplied with data set.

**Note 5:** Refer to Section AB24.100 for information on selection and use of 24V4B repeater plug-ins.

**Note 6:** Only required for 2-wire data sets. Data set must be 600-ohm impedance. TERM SET must not be installed if a 4-wire data set is used.

**Note 7:** Refer to Table M in Section 598-080-200 for information of power supply selection.

**Note 8:** Only required when locally operated loopback is specified.

**number as directed in Note 3 on Fig. 13.**

**3.18** Remove AR335 circuit pack from slot location 15 on the 24A-type data unit. Make sure that options Y, YD, and YB are installed as directed in Table F. Make sure that options J and ZR are **not** installed. Return the circuit pack to the original location.

**3.19** A set of screw switches are provided on the ARAC circuit pack. The switches are designated S1A-S1B and S2C-S2D (see Fig. 14). These switches are conditioned to provide either a **fast** startup or a **slow** startup for data set retraining. Be aware of what conditioning will be used at the far-end data set because the opposite conditioning will be installed locally. One station will install the **fast** startup by closing (screws turned fully clockwise) switches S1A and S2D with switches

TABLE J (Cont)

B. Data Auxiliary Set Option for 2-Wire or 4-Wire Data Sets

DAS 828A OPTIONS	CONNECT	
	TB2 TO TB3	
4-Wire (factory-shipped) Z	25	9
	26	10
	27	7
	28	8
2-Wire X	29	7
	30	8

C. Repeater Screw Settings Per Section AB24.100

D. Options for Data Set 203-Type

FUNCTION	DATA SET OPTION
600-ohm impedance	S
0-dBm transmit level	ZP
-16 dBm receive level	B
Enable DAS to control data set ready	YA
4-wire operation	Z or Y
2-wire operation	X

S1B and S2C open. The opposite station should install the *slow* startup by closing switches S1B and S2C with switches S1A and S2D open. Close the appropriate screw switches making sure good metal-to-metal contact is provided and observe that the remaining screw switches are open with no possible contact between the screw head and switch contacts.

**3.20** If the speed option of the data set is L2, connect and secure the 4166B network to connector J11 and insert AR582 circuit pack in slot location 11; both are located on the 24A-type data unit.

**3.21** If the speed option of the data set is L6, connect and secure the 4166C network to

connector J11 and insert AR583 circuit pack in slot location 11; both are located on 24A-type data unit.

**3.22** The customer interface connector (J12) requires two straps to provide proper ARAC signal control. A block diagram showing a typical data set 203A using ARAC circuitry and customer interface strapping is shown in Fig. 15. Use an ohmmeter, such as a KS-14510 or equivalent, and test that low resistance continuity is provided between pins 14 and 21 and between pins 4 and 16 on the customer-provided connector. If continuity is not available, have the required straps installed. The ARAC circuitry will not operate without them.

**Note:** While the ARAC function is installed in the data set 203A-type, the RS/CA and

**TABLE K**  
**ORDERING AND INSTALLATION INFORMATION FOR DAS 828A – DATA WITH**  
**ALTERNATE VOICE CAPABILITY**

**A. Items To Be Ordered**

ITEM		CODE		QUANTITY PER LINE	NOTES
		4-WIRE	2-WIRE		
Data Service Unit	Rack Mount	DAS 828A-L1/2		1	1
	Wall Mount	DAS 828A-L1A/2			2
Connector Cables		B25A		As required	3
Data Set Connecting Cord		M8J-61		1	4
89-Type Resistors	T	89BG	89AN	1	
	LB	89N	89A	1	
	R	89BG	89BN	1	
24V4B Plug-Ins	EQL	359-type equalizer		1	5
	RAMPL	227D amplifier or 849-type network with 89-type resistor		1	5
	TAMPL	227D amplifier or 849-type network with 89-type resistor		1	5
	TERM SET	—	1B terminating set	1	5, 6
Power Supply				As required	7

*Note 1:* Order mounting bars or brackets as required. Refer to Section 463-140-100.

*Note 2:* Order mounting hardware and mount in accordance with Section 463-130-100.

*Note 3:* Order when required to extend DATA and TEL connections of DAS.

*Note 4:* To be used in place of any cord supplied with data set.

*Note 5:* Refer to Section AB24.100 for information on selection and use of 24V4B repeater plug-ins.

*Note 6:* Only required for 2-wire data sets. Data set must be 600-ohm impedance. TERM SET must not be installed if a 4-wire data set is used.

*Note 7:* Refer to Table M in Section 598-080-200 for information of power supply selection.

SSD/SBA signals from the customer terminal must be disconnected from pins 4 and 14, respectively, of J12 to enable the ARAC receiver to have control of data set 203A.

**3.23** Restore ac power and use the ARAC test procedures provided in Data Set 203-Type, Test Procedures (Section 592-019-500).

**D. Digital Loop-Back Switch Field Modification**

**3.24** The digital loop-back feature can be added to a data set 203A operating on a 4-wire facility. The loop-back feature will allow testing a data set from the opposite end of the 4-wire facility to which it is connected by transmitting a test pattern and comparing the received pattern to the transmitted pattern. The loop-back switch

TABLE K (Cont)

B. Data Auxiliary Set Option for 2-Wire or 4-Wire Data Sets

DAS 828A OPTIONS	CONNECT	
	TB2 TO TB3	
4-Wire (factory-shipped) Z	25	9
	26	10
	27	7
	28	8
2-Wire X	29	7
	30	8

C. Repeater Screw Setting Per Section AB24.100

D. Options for Data Set 203-Type

FUNCTION	DATA SET OPTION
600-ohm impedance	S
0-dBm transmit level	ZP
-16 dBm receive level	B
Enable DAS to control data set ready	YA
4-wire operation	Z or Y
2-wire operation	X

allows the data set being tested to operate as a regenerator allowing a customer to test both data sets and the transmission facility simultaneously.

**3.25** The loop-back switch in field-modified sets cannot be used in data sets 203A with Lists 7, 11, or 12, or if a 38A1 data unit is installed. If data set 203A contains a 24A2 data unit, series 3 or higher (having a factory-installed loop-back switch), loop-back operation with Lists 7, 11, or 12 is possible if (1) the attendant has control of the RS/CA interface lead during the test, or (2) option J or ZR is installed for the duration of the test. After testing, the option board must be returned to normal.

**3.26** Field modification for 24A1 data units, series 1, 2, 3, and 4, and 24A2 data units, series

1, may be done as shown in Fig. 16. After the modification is completed, test the loop-back function as directed in Data Set 203-Type, Test Procedures (Section 592-019-500).

**E. Permanent Request-to-Send Features**

**3.27** To provide a permanent request-to-send service for data set 203-type operation, the special interface cord (M23A-51) may be ordered separately. This cord internally applies +18.5 volts to the request-to-send interface lead by connecting pin 9 to pin 4 at the data set connector end.

**3.28** The feature provided by the M23A-51 cord is not recommended for use with a data set using the 38A-type data unit. The cord provides

**TABLE L**  
**ORDERING AND INSTALLATION INFORMATION FOR DAS 828C – DATA WITH**  
**ALTERNATE VOICE CAPABILITY**

**A. Items To Be Ordered**

ITEM		CODE 4-WIRE	QUANTITY PER LINE	NOTES
Data Service Unit	Rack Mount	DAS 828C-L1	1	1
	Wall Mount	DAS 828C-L1A		2
Connector Cables		B25A	As required	3
Data Set Connecting Cord		M8J-61	1	4
89-Type Resistor		Determined after installation depending on loop loss.	1	—
Power Supply		—	As required	5

*Note 1:* Order mounting bars or brackets as required. Refer to Section 463-140-100.

*Note 2:* Order mounting hardware and mount in accordance with Section 463-130-100.

*Note 3:* Order when required to extend DATA and TEL connections of DAS.

*Note 4:* To be used in place of any cord supplied with data set.

*Note 5:* Refer to Table M in Section 598-080-200 for information of power supply selection.

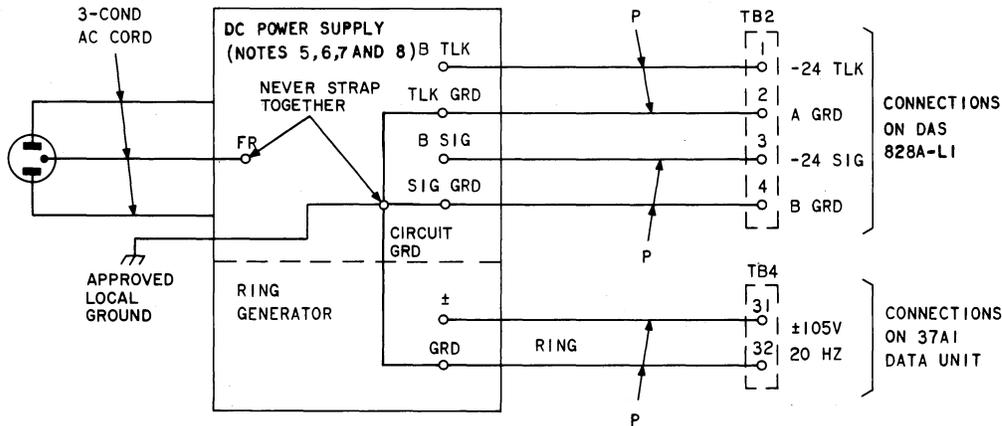
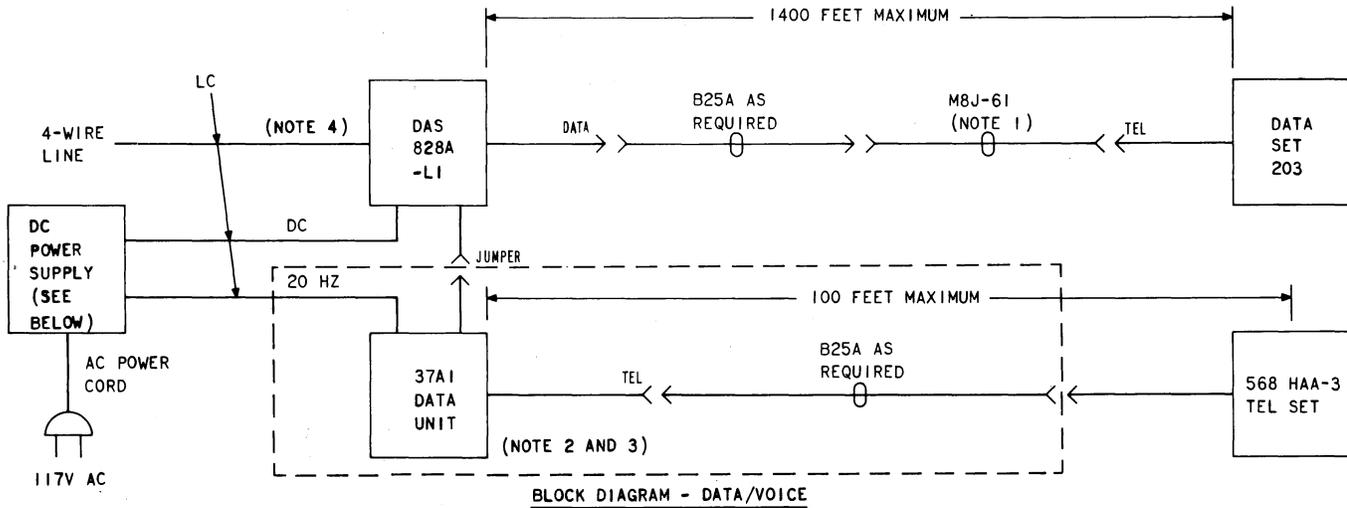
**B. Data Auxiliary Set Option for Data Set 203**

Not-in-Data Indication During Setup of Call	Y	On TB1, strap terminal 43 to terminal 44
--	---	---

**C. Options for Data Set 203-Type**

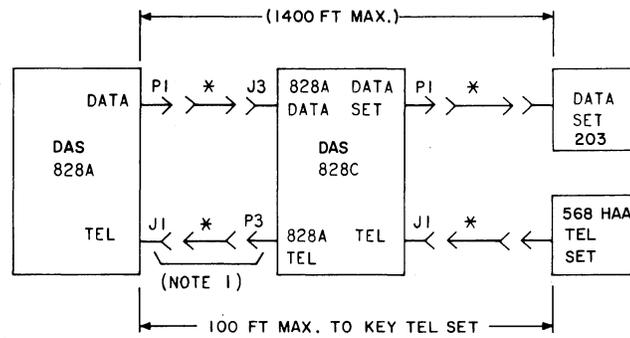
FUNCTION	DATA SET OPTION
600-ohm impedance	S
0-dBm transmit level	ZP
−16 dBm receive level	B
Enable DSU to control data set ready	YA
4-Wire operation	Z or Y
2-Wire operation	(Not recommended)

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- NOTES:
1. USE M8J-61 CORD IN PLACE OF 66-TYPE CONN. BLOCK AND SPECIAL CORD SUPPLIED WITH 203. PLUG M8J-61 CORD DIRECTLY INTO "TEL" CONNECTOR P1 OF DS 203.
  2. DS 203 SHOULD BE OPTIONED FOR "804A-TYPE OPERATION," OPTION YA.
  3. COMPONENTS WITHIN THE DASHED LINES MUST BE ADDED TO DAS 828A WHEN VOICE CAPABILITY IS REQUIRED.
  4. TERMINATE THE 4-WIRE LINE AT THE DAS 828A TERMINAL BLOCK AS FOLLOWS:  
 T - TB2-13  
 R - TB2-14  
 T1 - TB2-15  
 R1 - TB2-16
  5. RUN RING GENERATOR LEADS SEPARATE FROM ALL OTHER LEADS.
  6. CONNECT ALL GROUNDS TO LOCAL GROUND AS SHOWN TO MINIMIZE 20-HZ PICKUP.
  7. STRAP POWER SUPPLY FOR 117 VOLTS AC INPUT (FACTORY SHIPPED).
  8. NOT ALL DAS'S REQUIRE TALK-SIGNALING AND RING VOLTAGES. CONNECT ONLY THOSE REQUIRED.

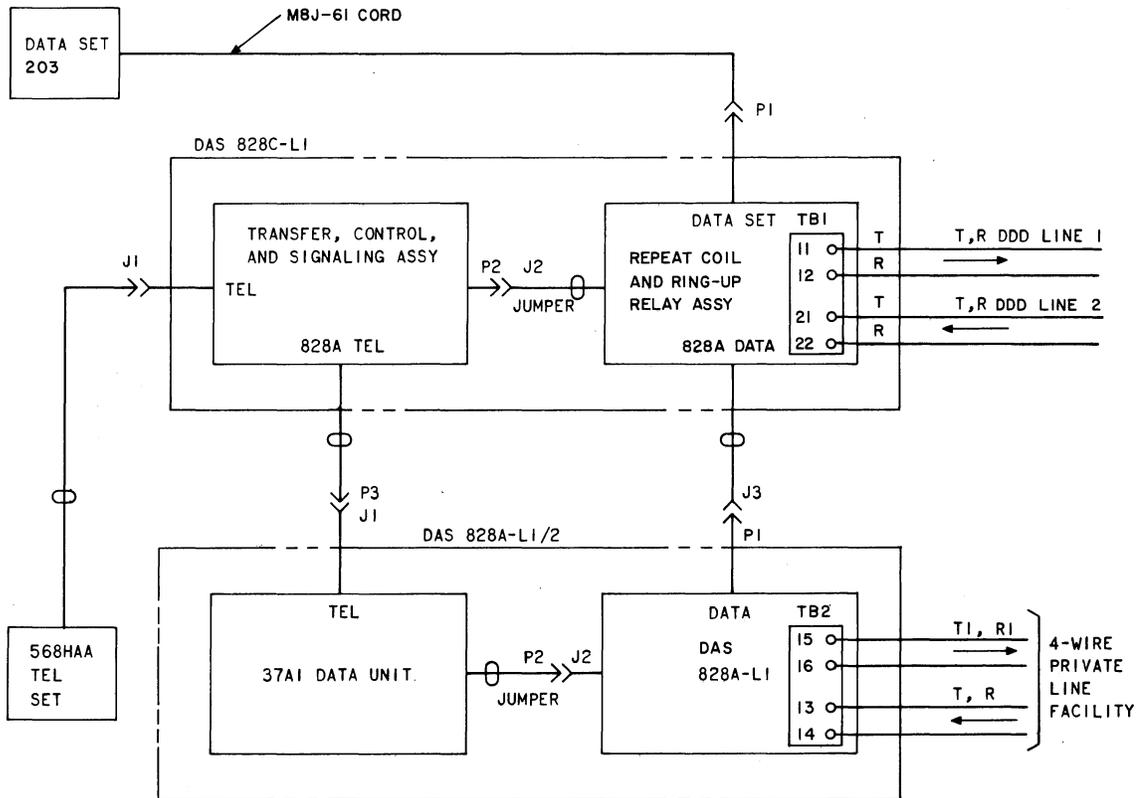
Fig. 9—Connection Block Diagram for DAS 828A and Data Set 203-Type Providing Data Only or Data/Voice Capability Over Four-Wire Private Line



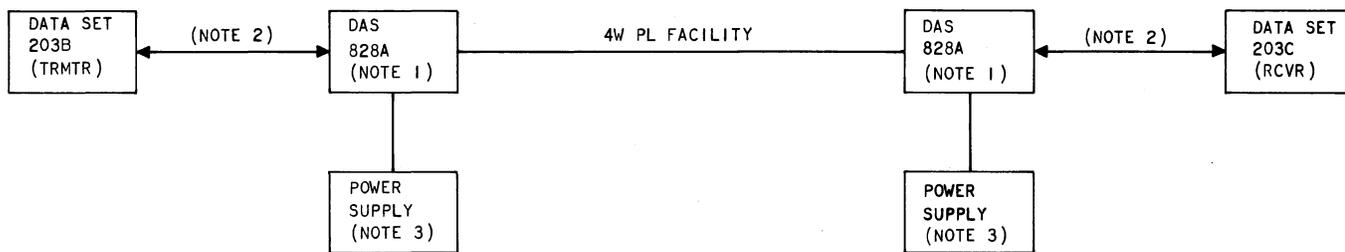
\* B-TYPE CONNECTING CABLES (OR EQUIVALENT) AS REQUIRED

NOTES:

1. THIS CONNECTION MADE ONLY WHERE PRIVATE LINE VOICE TRANSMISSION IS REQUIRED.



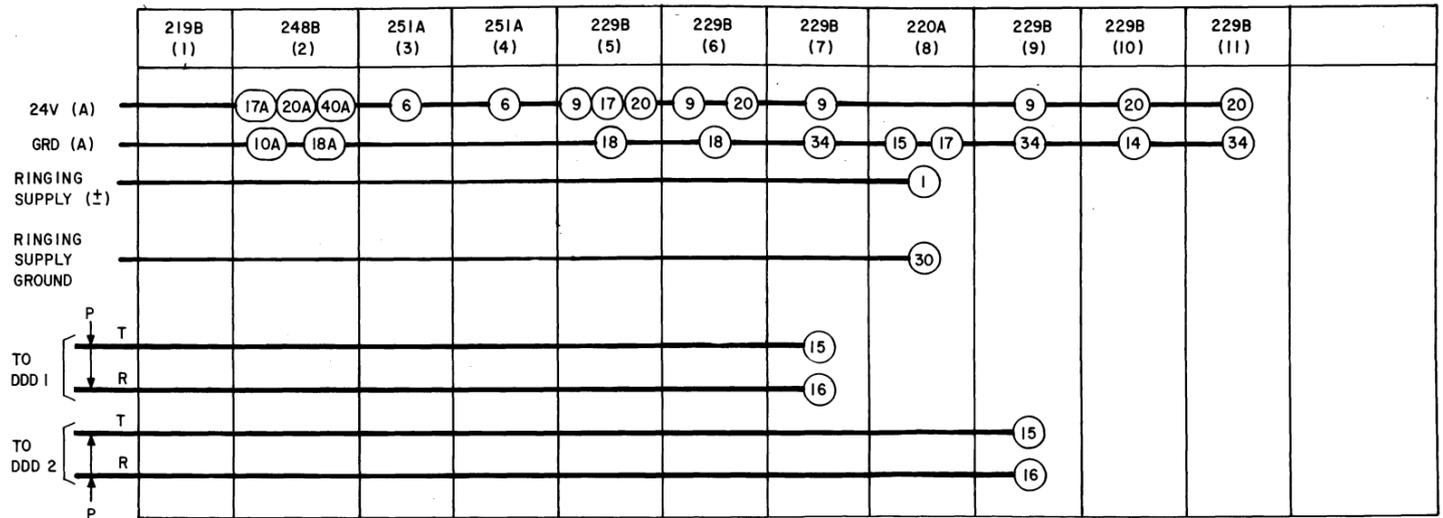
**Fig. 10—Connection Diagram Using DAS 828A and DAS 828C With Data Set 203-Type Over Four-Wire Private Line With Two DDD Backup**



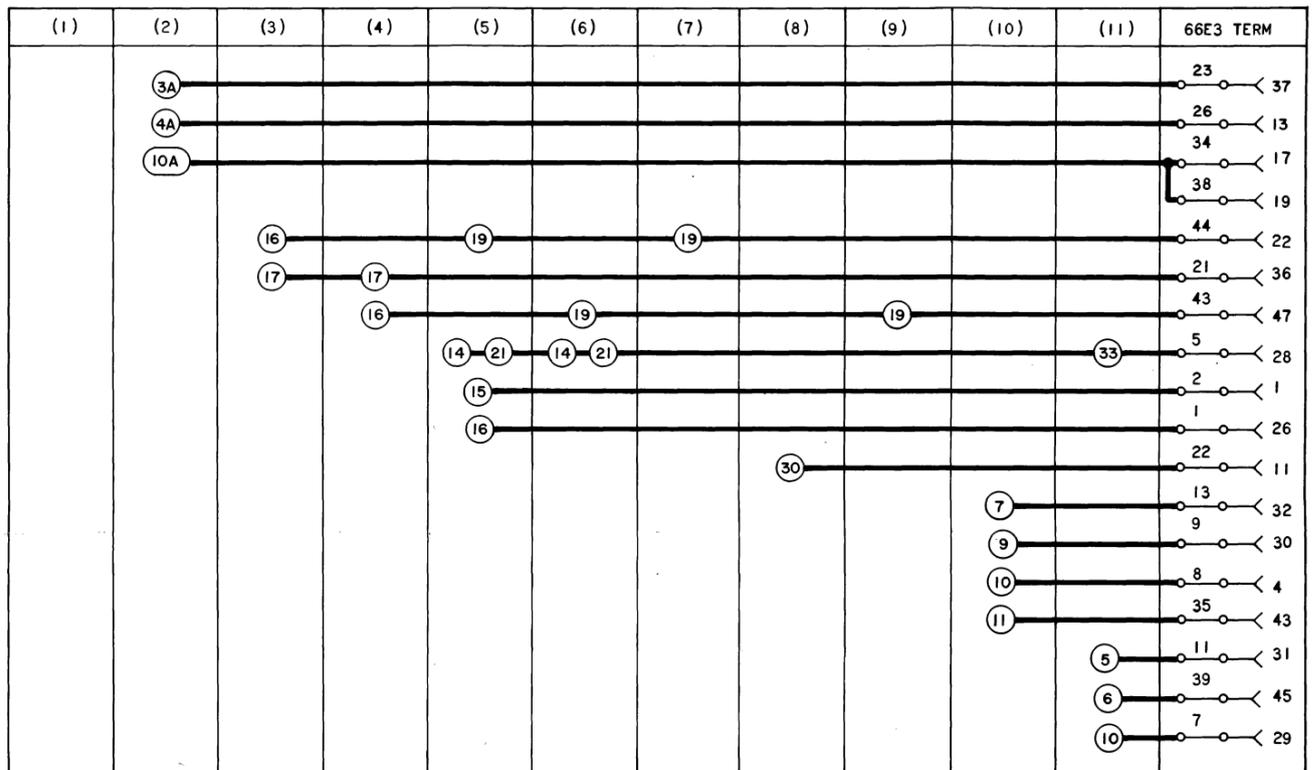
NOTES:

1. PROVIDE 1B TERMINATING SET, 2-WIRE CONDITIONING AND OPTION X LISTED IN TABLE J.
2. CABLE REQUIREMENTS SAME AS SHOWN IN FIG. 9.
3. CONNECT POWER SUPPLY SOURCES AS NECESSARY AS SHOWN IN FIG. 9.

**Fig. 11—Two-Wire Data Set 203-Type Using DAS 828A, Block Diagram**



CONNECTIONS REQUIRED TO DAS CONNECTING BLOCK (66E3)



REQUIRED KEY TELEPHONE UNIT INTERCONNECTIONS AND STRAPPINGS

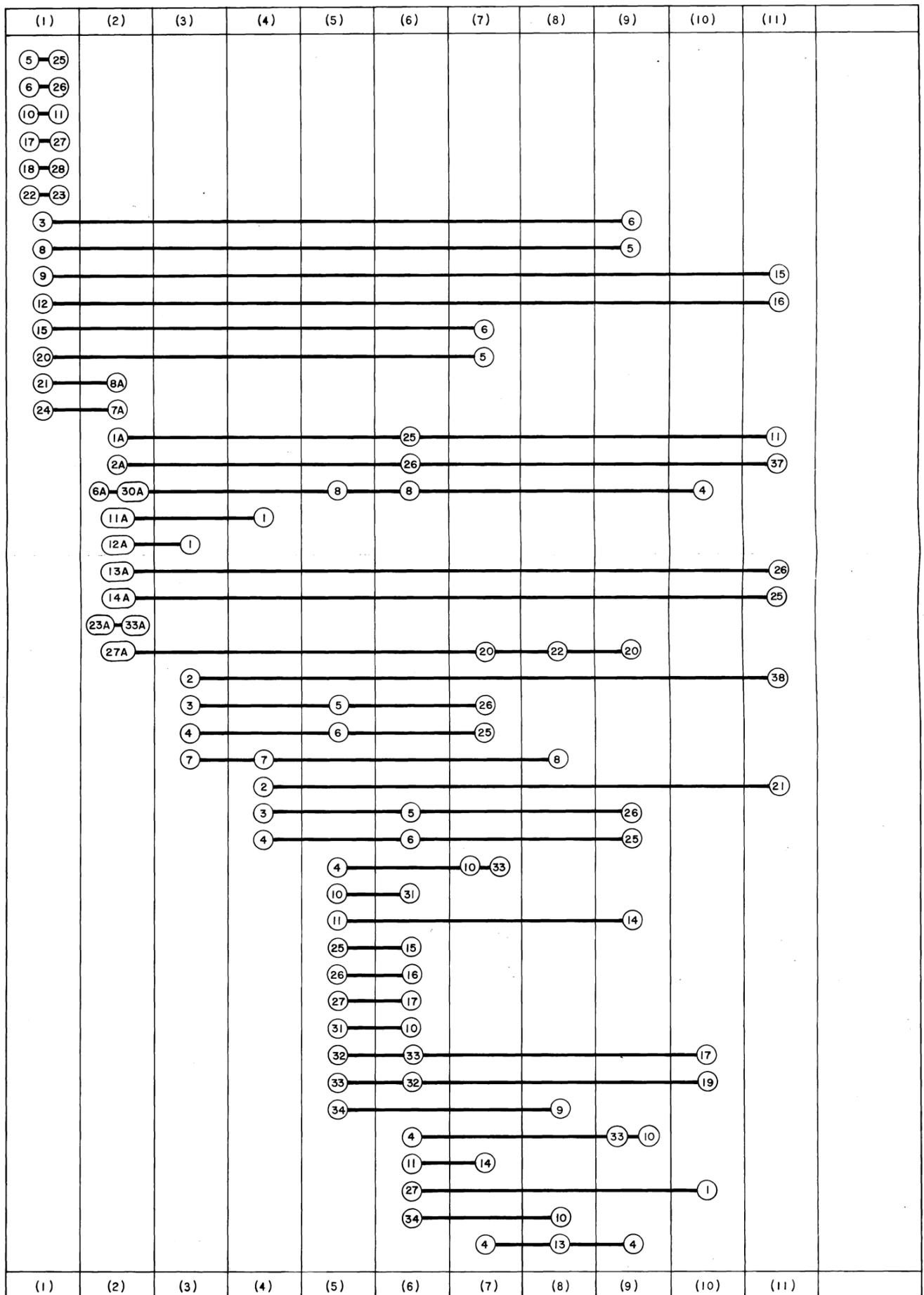
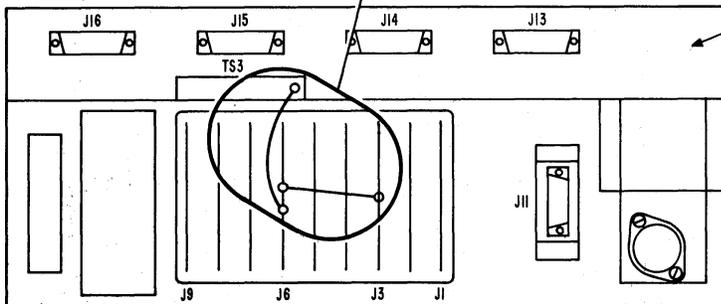
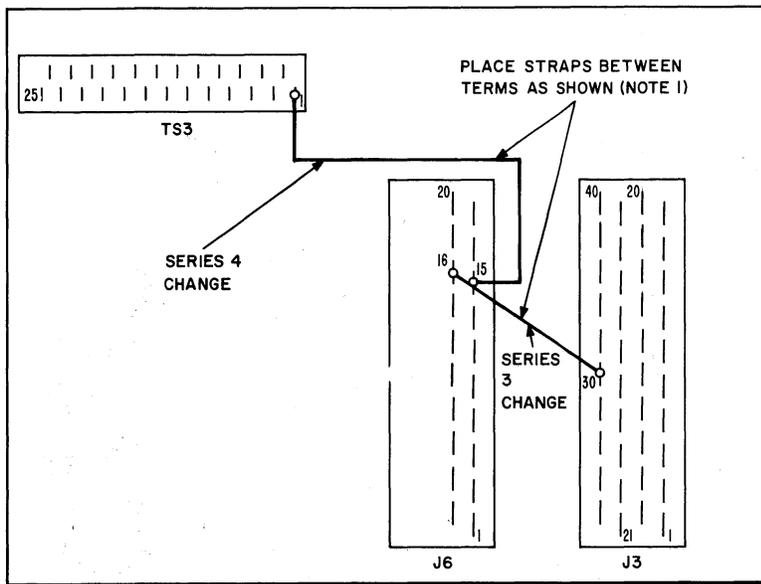


Fig. 12—Connections for Four-Wire Operation Using Two Switched Network Lines With DAS 804A



REAR VIEW OF 24A1 DATA UNIT

NOTES:

1. USE 26 GA BW WIRE, GREEN PREFERRED. ALL CONNECTIONS ON TERMINALS MUST BE SOLDERED. WIRE TO BE AS SHORT AS POSSIBLE. IF 26 GA IS NOT AVAILABLE, USE 24 GA BW WIRE.
2. IF THE DATA SET 203A IS MOUNTED IN A KS-20018-L3 CABINET, CHANGE THE SERIES NO. ON THE 24A LABEL. LABEL IS LOCATED ON INSIDE OF FRONT COVER.

3.

IDENTIFICATION OF 24A1 DATA UNIT		
ORIGINAL SERIES NUMBER	CHANGES TO BE INCLUDED	MARK 24A1 DATA UNIT
SERIES 1	SERIES 3 AND 4 CHANGES AS SHOWN	SERIES 1/3-4 (NOTE 4)
SERIES 2	SERIES 3 AND 4 CHANGES AS SHOWN	SERIES 4
SERIES 3	SERIES 4 CHANGES AS SHOWN	SERIES 4

4. THE SLASH (/) INDICATES INTERVENING CHANGE IS NOT INCLUDED. THIS IS IMPORTANT SINCE THE METHOD OF MAKING SUBSEQUENT CHANGES MAY DEPEND ON THE CHANGES IN THE PRODUCT.

Fig. 13—Changes Required for the 24A1 Data Unit to Enable Operation With the Automatic Retraining Auxiliary Channel (L11 or L12)

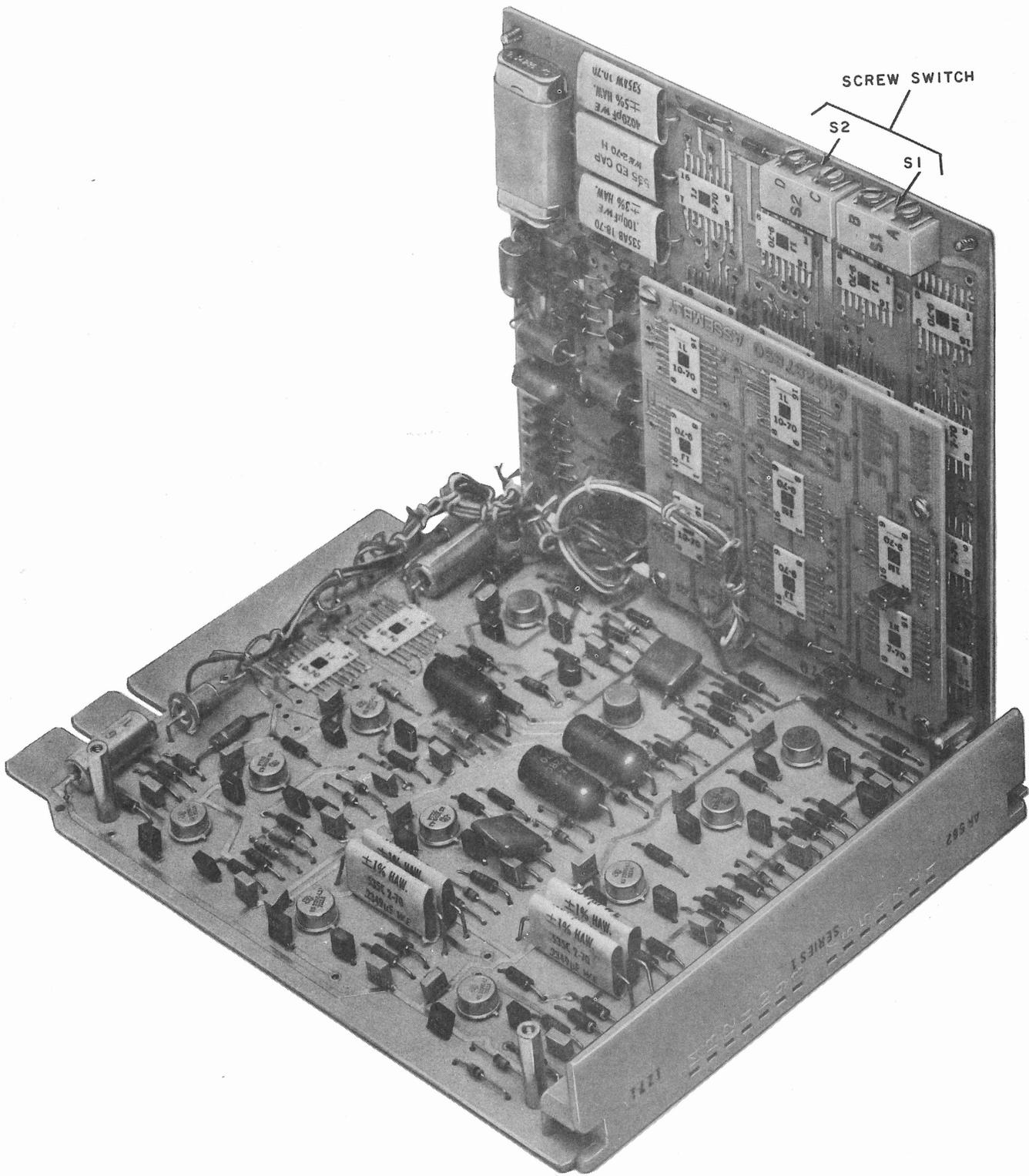


Fig. 14—Typical ARAC Circuit Pack (Associated Network Not Shown)

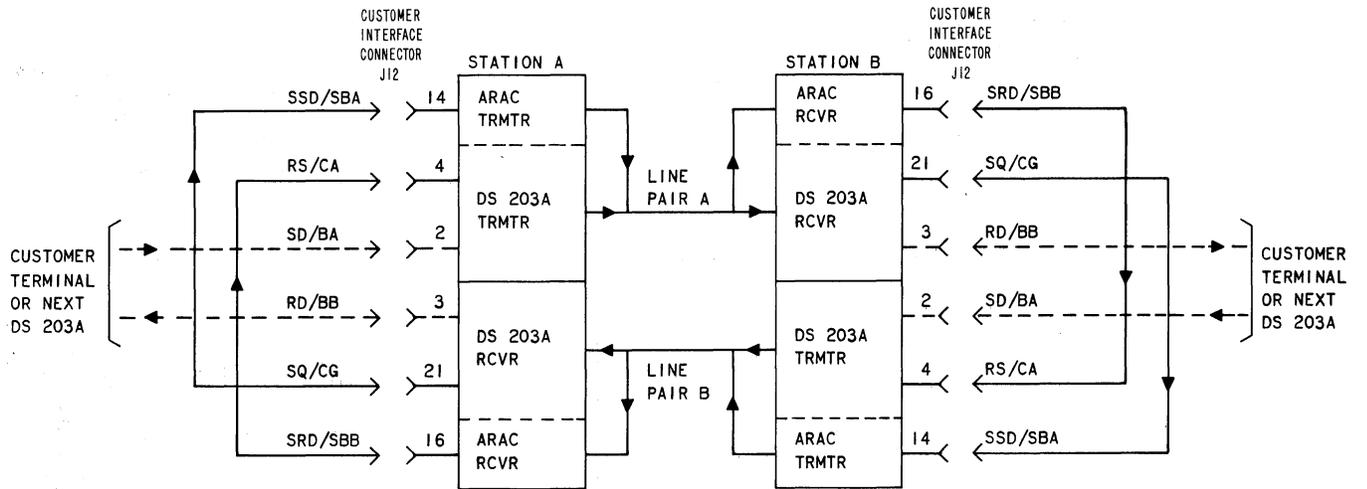
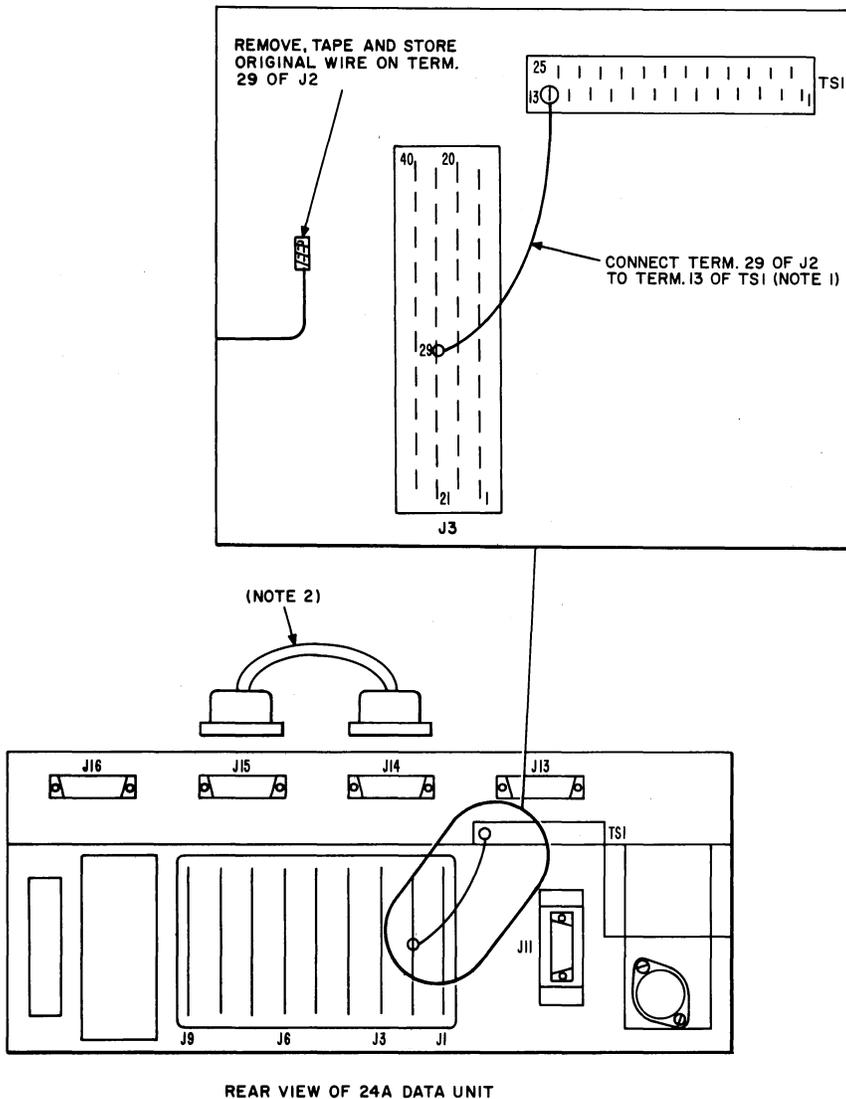


Fig. 15—Block Diagram of Data Set 203A Using ARAC Circuitry



NOTES:

1. USE 26 GA BW WIRE, GREEN PREFERRED. CONNECTIONS SHOULD BE SOLDERED. WIRE TO BE SHORT AS PRACTICAL. IF 26 GA IS NOT AVAILABLE USE 24 GA.
2. CONNECT AN M6-AL CORD BETWEEN J14 AND J15 AS SHOWN.
3. CHANGE THE SERIES NUMBER OF THE 24A-TYPE DATA UNIT AS DIRECTED IN THE CHART BELOW.

ORIGINAL		CHANGE TO SERIES
CODE	SERIES	
24A1	1	1/5
24A1	2	2/5
24A1	3	3/5
24A1	4	5
24A2	1	2

4. PROVIDE A LABEL WITH THE WORDS "DIGITAL LOOP-BACK" ON IT. ATTACH THIS LABEL OVER THE WORDS "ERROR CONTROL" LOCATED ON THE SWITCH PANEL ON THE FRONT OF THE 24A DATA UNIT.

Fig. 16—Changes Required on the 24A-Type Data Unit to Provide Digital Loop-Back Feature

for continuous carrier over the facility without customer control. When the permanent carrier on feature (option YF) is installed in the 38A-type data unit, the request-to-send function is electronically controlled to prevent data set retraining while serving six interface connectors. Using option YF in the 38A-type data unit is preferred over the M23A-51 cord.

F. Connections for the 38A-Type Data Unit Cables

**3.29** Connector P2 of the 38A-type data unit, which is part of the longer cord from the data unit, must be mated with the CUSTOMER connector (J12) on the 24A-type data unit control panel for all installations. The customer interface cord is connected to any of the six connectors (J1

to J6) on the 38A-type data unit, but only connector J1 includes all data set 203 interface functions.

**3.30** Connector P3, which is part of the shorter cord from the data unit, must be mated with connector J15 on the rear panel of the 24A-type data unit.

#### 4. REFERENCES

**4.01** The following references provide additional information on data units and data sets used in a typical data set 203-type installation:

- Data Set 203-Type, Reference Guide (Section 590-002-107)
- 22A-Type Data Unit (Transmitter), Identification (Section 590-100-115)
- 23A-Type Data Unit (Receiver), Identification (Section 590-100-116)
- 24A-Type Data Unit (Common Control Equipment), Identification (Section 590-100-117)
- 38A-Type Data Unit, Identification (Section 590-100-129)
- Data Set 203-Type, Transmitter/Receiver, Summarizing Specification, Data Systems Station (Section 592-019-180)
- CD- and SD-1D151-01 (Data Set 203 Station Arrangements)
- CD- and SD-1D152-01 [22A-Type Data Unit (Transmitter)]
- CD- and SD-1D153-01 [23A-Type Data Unit (Receiver)]
- CD- and SD-1D154-01 [24A-Type Data Unit (Control)]
- CD- and SD-1D230-01 (38A-Type Data Unit)
- EL 286 and Supplement EM 2709
- Bell System Data Communications Technical Reference—Data Set 203-Type—June, 1970
- EL 522
- EL 897
- EL 1092
- EL 1367.