DATA SET 203-TYPE

REFERENCE GUIDE

CONTENTS PAGE

1. GENERAL

1.01 This section provides codes, functions, and features of Data Set 203. It is primarily intended to provide information for telephone company personnel to determine the proper apparatus for a particular customer service requirement.

1.02 Data Set 203 uses multilevel amplitude modulation and vestigial sideband spectrum shaping to provide synchronous data service over the DDD network and 2- or 4-wire C2-conditioned private lines. Speed options provide line symbol rates of 1800, 2400, 3200, and 3600 bauds. By changing the number of modulation levels, three bit speeds for each baud rate can be obtained. For example, the 1800-baud option provides bit speeds of 1800 bps, 3600 bps, or 5400 bps.

1.03 There are three basic types of Data Set 203 (Fig. 1). Data Set 203A-type is a transmitter-receiver, Data Set 203B-type is a transmitter only, and Data Set 203C-type is a receiver only. Data Set 203-type can be optionally equipped to provide interface signals which conform to either EIA Standards RS-232-C and RS-334 or to Military Standard 188B, depending upon customer requirements.

1.04 A secondary channel (also known as auxiliary channel and reverse channel) feature is optionally provided with Data Set 203A and is always required for Data Sets 203B and 203C. It is optional when Data Set 203A is used on 4-wire private lines but must always be provided for operation over the DDD network and on 2-wire private lines. When used in 4-wire operation, the secondary channel operates in the same direction as the high-speed channel. In 2-wire operation, the secondary channel is normally used as a reverse channel.

1.05 When the data set is used with Data Auxiliary Sets 804A or 804M, alternate voice transmission, unattended answering, and compatibility with automatic calling units (Data Auxiliary Sets 801-type) are available. When the data set is used in a 4-wire private line arrangement with Data Auxiliary Set (DAS) 828A, alternate voice capability can be provided. The addition of DAS 828C to this arrangement provides a 4-wire backup feature for certain Data Set 203-types. Data Auxiliary Sets 828A and 828C will not provide unattended answering or automatic calling capability.

1.06 The data set code identifies the basic unit and speed options as list (L-) numbers. The list numbers are as shown in Table A. Fig. 2 illustrates the list combinations available for ordering Data Set 203.

2. PHYSICAL AND ELECTRICAL CHARACTERISTICS

2.01 The physical characteristics of the data set are a function of the mounting arrangement specified by the basic list numbers. These characteristics are specified in Table B.

2.02 Data Sets 203-type are intended to operate in environments where the ambient temperature

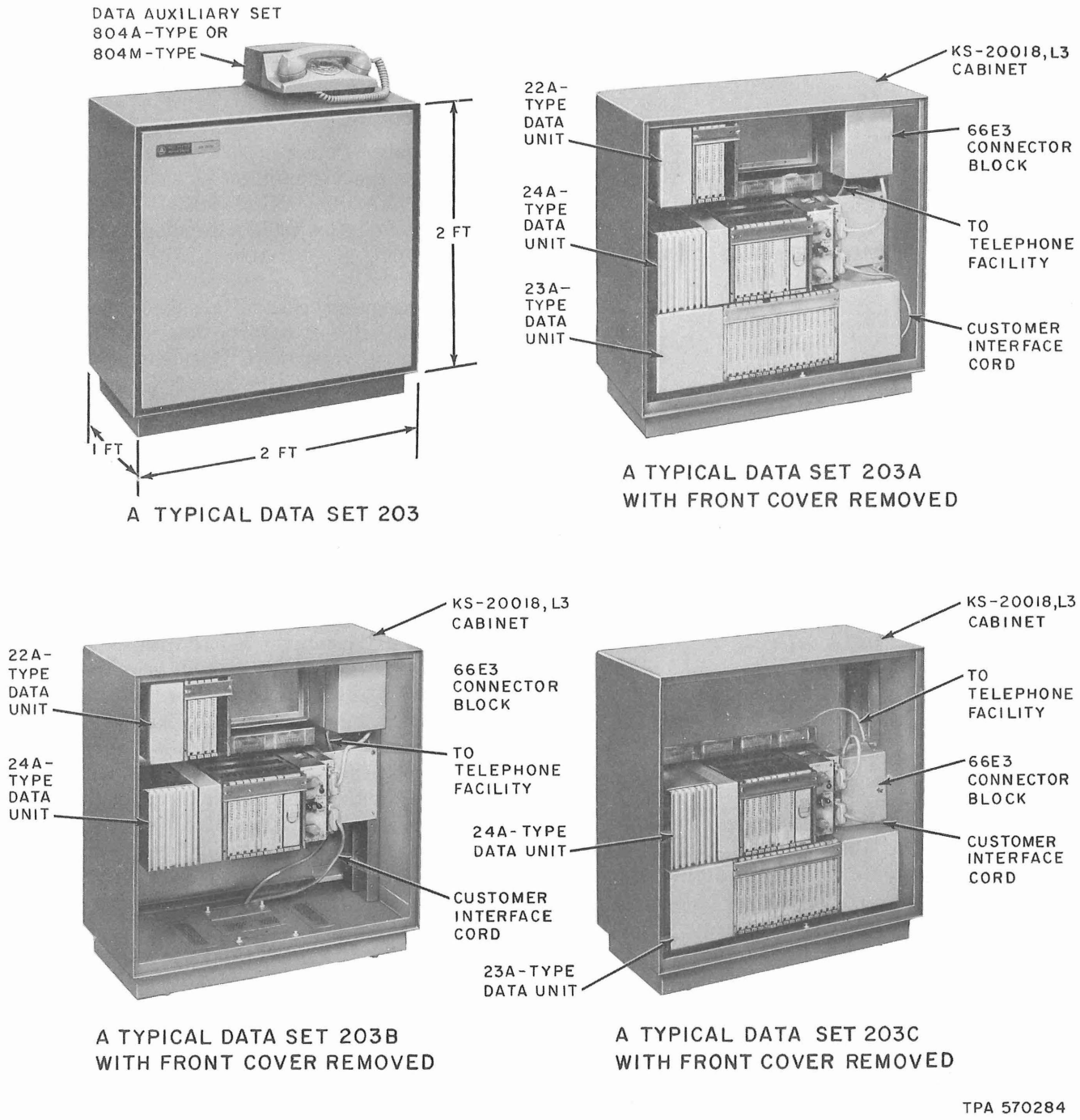


Fig. 1—The Data Set 203 Family

is between +40 and + 120°F and the relative humidity a maximum of 95 percent.

2.03 Data Sets 203-type operate on 117 (±10 percent) volts ac power at a frequency range of 47.5 to 63 Hz. A fuse, in series with the ac input, is provided at the rear of the 41-type power unit. Power consumption varies between 17 and 55 watts, depending on the list options used. The power cord supplied with the data set requires a

TABLE A

BASIC UNIT LISTS	
L1 (MD) L1C (STD)	Common apparatus, assembly, wiring, and hardware for one Data Set 203 with provision for speed and functional option list in a KS-20018-L3 cabinet.
L1A (MD) L1D (STD)	Same as above except for mounting on a 23-inch frame. For Data Set 203C, additional mounting space is included for possible use with auxiliary data units.
L1B (MD) L1E (STD)	Applies to Data Set 203C only. Same as above except without additional mounting space for auxiliary data units.
SPEED OPTION LISTS	
L2	4-Wire private line operation at a bit rate of 2.4, 4.8, or 7.2* kbps. Simultaneous operation of main and secondary channels is possible only on opposite wire pairs.
L3	DDD, 2- or 4-wire private line operation at a bit rate of 1.8, 3.6, or 5.4* kbps (5.4 kbps only for private line operation). Simultaneous operation of main and secondary channels is possible on any wire pair (secondary channel is required on DDD and 2-wire private line).
L4	DDD, 2- or 4-wire private line operation at a bit rate of 2.4, 4.8, or 7.2* kbps (7.2 kbps only for private line operation). Simultaneous operation of main and secondary channels is possible on any wire pair (secondary channel is required on DDD and 2- wire private line).
L5	4-Wire private line operation at a bit rate of 3.2, 6.4, or 9.6* kbps. Simultaneous operation of main and secondary channels is possible only on opposite wire pairs.
L6	4-Wire private line operation at a bit rate of 3.6, 7.2, or 10.8* kbps. Simultaneous operation of main and secondary channels is possible only on opposite wire pairs.
FUNCTIONAL OPTION LISTS	
L7	A 0-150 bps secondary channel. Optional only for Data Set 203A operating on 4-wire facilities. Required on all Data Sets 203B and 203C.
L8†	Provides for an EIA Standard customer interface.
L9	Provides for a Military Standard customer interface.
L11‡	Provides an Automatic Retraining Auxiliary Channel (ARAC) only for Data Set 203A with speed option L2 on 4-wire private line facility. (Not compatible with L7.)
L12‡	Provides an Automatic Retraining Auxiliary Channel (ARAC) only for Data Set 203A with speed option L6 on 4-wire private line facility. (Not compatible with L7.)

TABLE A (CONT.)

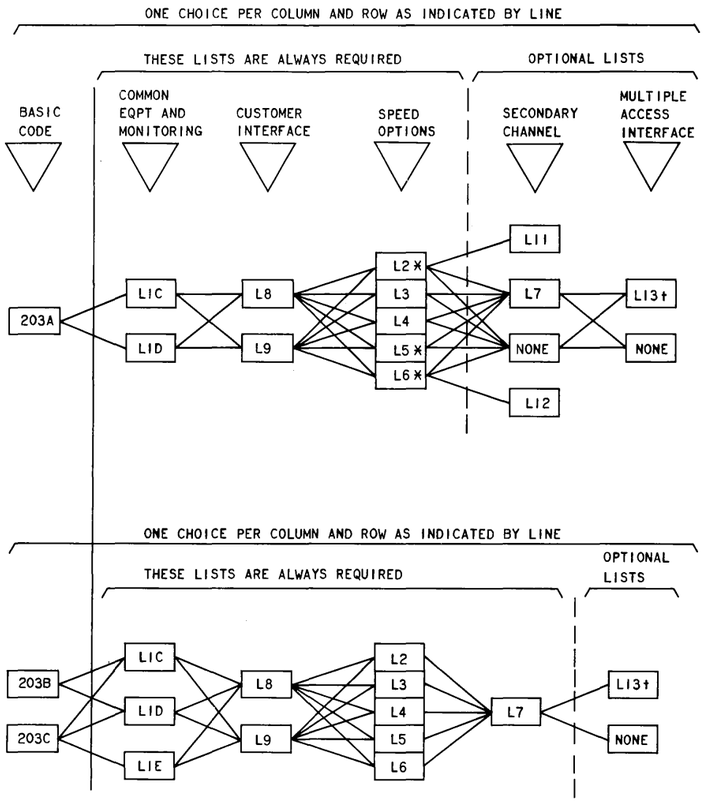
FUNCTIONAL OPTION LISTS	
L13	Provides Data Set 203-type with a multiple-access interface by using a 38A-type Data Unit to supply fan-out functions. (Not compatible with L1E, L9, L11, or L12.)

MD — Manufacture Discontinued; STD — Standard

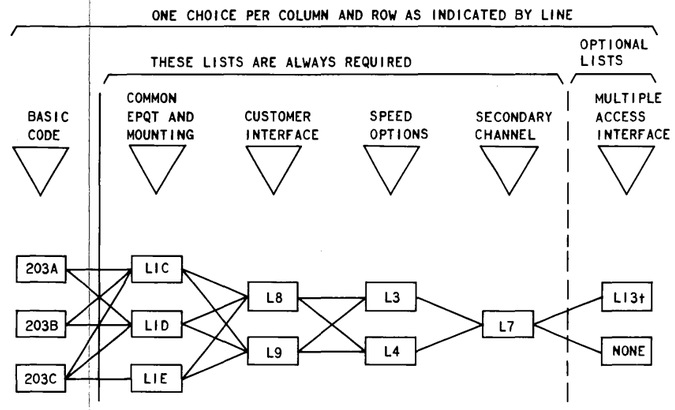
* Operation at these bit speeds is recommended only for exceptionally high quality lines or for applications tolerant of unusually high error rates.

† Either L8 or L9 must be specified for all data sets.

‡ Initially designed for Government applications.



COMBINATIONS FOR 4-WIRE LINE



COMBINATIONS FOR DDD OR 2-WIRE PRIVATE LINE

LEGEND

* THESE COMBINATIONS USING L7 SECONDARY CHANNEL HAVE SPECTRAL LIMITATIONS WHICH PROHIBIT SIMULTANEOUS TRANSMISSION OF HIGH SPEED AND SECONDARY CHANNELS ON THE SAME WIRE PAIR. CLOSE STUDY SHOULD BE MADE OF THE CUSTOMER REQUIREMENTS AND IF OPTION L7 IS NOT NEEDED, IT SHOULD NOT BE PURCHASED.

† OPTION L13 IS NOT ALLOWED WITH EITHER LIE OR L9.

TOTAL CODES

203A - 68
203B - 30
203C - 40
138

TPA 570285

Fig. 2—Data Set 203 List Combinations

TABLE B

PHYSICAL CHARACTERISTICS

DATA SET LIST NUMBER	DESCRIPTION	DATA SET SIZE AND WEIGHT		
		203A-( )	203B-( )	203C-( )
L1 (MD) L1C (STD)	Mounted in a KS-20018-L3 cabinet.	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 additional mounting space 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 additional mounting space for auxiliary data units.	(Not applicable)	(Not applicable)	23 in. wide 9 in. deep 14 in. high 65 lbs

MD — Manufacture Discontinued
STD — Standard

standard 3-wire grounding type ac receptacle which should be on a circuit not under control of a switch.

3. OPERATION

A. Controls

3.01 Three manual controls are provided inside the front cover of the data set on an internal panel.

(a) The BIT RATE switch has four positions. The first three positions allow the selection of any one of the three possible bit speeds. The fourth position, labeled CC, activates the Speed Select (SS) interface lead so that the business machine can choose between the higher two bit speeds by properly controlling the interface lead.

(b) The REMOTE TEST—LINE—LOCAL TEST switch allows selection of the mode of operation designated. When the remote test mode is selected, the data set is conditioned to be tested by a data test center. The LINE position is used for normal data transmission. When the local test mode is selected, the data set is disconnected from the transmission circuit and looped back on itself.

(c) The ERROR CONTROL switch was intended for future use with error control data units. The error control development has been discontinued. Present data set operation requires that the ERROR CONTROL switch, if provided, be set to the OUT position.

(d) The ERROR CONTROL switch has been replaced by a DIGITAL LOOPBACK switch in data sets equipped with 24A2, series 3, Data Units. This switch, when used with the remote test mode, loops the data set at the customer interface to allow testing from a remote data set on a 4-wire facility. On earlier production data sets, the function of the ERROR CONTROL switch may be changed to that of a DIGITAL LOOPBACK switch by adding a field modification to the 24A-type Data Unit.

3.02 When the data set is provided with DAS 804A-type or 804M-type, alternate voice transmission, unattended answering, and compatibility with automatic calling units (Data Auxiliary Sets 801-type) are available. Both Data Auxiliary Sets 804A-type and 804M-type are common battery, illuminated key, 6-button, rotary dial or TOUCH-TONE® telephone and control units. Control features common to all station arrangements are provided by keys labeled TEST, TALK, and DATA. The

remaining keys provide control over such special functions as the station arrangements require.

3.03 Data Auxiliary Set 828A-type provides a standard means to terminate 4-wire private line voiceband data channels. The DAS 828A-type contains the circuitry necessary to provide amplification or attenuation in the transmit and receive pairs and to provide equal level loop-back signals. A DAS 828A-type can also be used to provide alternate voice capability. DAS 828C-type provides a means for two DDD lines to back up a 4-wire voiceband data channel through a DAS 828A-type.

3.04 Error performance, when operating at the minimum or intermediate bit speeds, will be approximately comparable to that achieved with other existing 200-type data sets. When this data set is used on the DDD network, only the minimum and intermediate bit speeds will give satisfactory error performance. Operation at maximum speeds will result in substantially poorer error performance than at the minimum- or intermediate-speed operation. The maximum-speed operation is permissible on private line service ***only*** and may only prove feasible for the transmission of facsimile and graphic display-type information. In all customer negotiations, this difference in expected performance should be clearly pointed out. Customers should also be specifically informed that the telephone company cannot support or back up the maximum-speed operation. If performance at the maximum-speed operation does not meet the requirements of the customer's operating system, the only alternative will be to revert to either the minimum- or intermediate-speed operation.

B. 38A-Type Data Unit

3.05 A 38A-type Data Unit can be included with the standard data units which comprise the basic Data Set 203. The 38A-type Data Unit obtains operating power from the data set and provides the data set with a multiple-access interface feature having the capability of serving up to six data terminals.

3.06 The 38A-type Data Unit contains no active operational controls but does provide the panel containing the six 25-pin interface connectors. The 38A-type Data Unit is required to provide the option list code L13 as listed in Table A.

4. SERVICE ORDER INFORMATION

A. Customer Option Decisions

4.01 Service orders for data services should describe the desired service by USOC (Uniform Service Order Code). Service orders should not specify data set codes. The ***encoding*** procedure to determine the appropriate USOC suffix is described in Section 590-000-100. An explanation of features and options common to most data sets is given in Section 590-000-101. Intercity Service Manual (ISM) Section 87 gives the appropriate words that go with the encoded USOC for ordering and billing purposes, shows tariff listings for data services, and provides general reference to the applicable BSP Reference Guides published in Section 88.

4.02 USOC ***decoding*** procedures are described in Section 590-000-100. Engineering or Plant Department personnel responsible for selecting data sets are not compelled to use any particular data set codes specified or suggested on the service order.

4.03 Service offerings and application codes are listed in Tables C and D, respectively. Customer option decisions are made from the referenced Table E. The ITEM column provides a reference to descriptive information contained in Section 590-000-101. The following paragraphs provide detailed information on customer options for USOC determination.

4.04 The customer option decisions are listed alphabetically (ie, A, B, C, etc), but because of the various service offerings, not every customer option decision A is the same. The customer options are described in more detail in the following order:

- Data Set Mounting (4.05)
- Timing Provision (4.06 and 4.07)
- High-Speed Channel Start-Up (4.08 through 4.10)
- Secondary Channel Control (4.11 through 4.13)
- Data Auxiliary Sets (4.14 through 4.19)
- EIA or Military Standard Interface (4.20 and 4.21)

Note 1: Requires List L7.

Note 2: Requires Add-On Arrangement No. 1.

Note 3: Optional for use with Basic Service Offering No. 3 only. Required addition for Basic Service Offering No. 4 and is included with Basic Service Offerings No. 1, 2, 5, 6, and 7.

Note 4: For use with Basic Service Offering No. 3 with speed options List 2 or List 6 only. Not available with Add-On Arrangement No. 1.

Note 5: Included with Basic Service Offerings No. 5, 6, and 7.

Note 6: Not available with Add-On Arrangements No. 2 or No. 4.

TABLE C

SERVICE OFFERINGS

A – BASIC SERVICE OFFERINGS			
NO.	SERVICE OFFERING	DATA SET TYPE	USOC CODE APPLICATION TABLE
1	Send only with 0-150 bps secondary channel on private line facilities.	203B (Note 1)	D-1
2	Receive only with 0-150 bps secondary channel on private line facilities.	203C (Note 1)	D-2
3	Combined sending and receiving on 4-wire private line facilities.	203A	D-3
4	Combined sending and receiving on 2-wire private line facilities. (Note 2)	203A	D-4
5	Send only with 0-150 bps secondary channel and automatic answer on the switched message network.	203B (Note 1)	D-5
6	Receive only with 0-150 bps secondary channel and automatic answer on the switched message network.	203C (Note 1)	D-6
7	Combined sending and receiving with 0-150 bps secondary channel and automatic answer on the switched message network.	203A (Note 1)	D-7

B – ADD-ON ARRANGEMENTS			
NO.	ARRANGEMENT	DATA AUXILIARY SET TYPE	USOC CODE APPLICATION TABLE
1	Arrangement for a secondary channel at rates up to 150 bps. (Note 3)	—	D-8
2	Arrangement for independent automatic retraining of high-speed transmitter/ receiver pairs. (Note 4)	—	D-8
3	Arrangement for automatic answer, compatibility with automatic calling, and alternate voice capability. (Note 5)	804A or 804M	D-8
4	Arrangement for Military Standard interface in lieu of EIA standard interface.	—	D-8
5	Arrangement for multiple-access interface. (Note 6)	—	D-8

- Automatic Retraining Auxiliary Channel (4.22 and 4.23)
- Permanent Request-to-Send Feature (4.24 and 4.25)
- 38A-Type Data Unit (4.26 and 4.27).

Data Set Mounting

4.05 Data Set 203-type can be provided either mounted in a KS-20018-L3 cabinet or on a 23-inch frame for rack mounting. Refer to Table A for details.

Timing Provision

4.06 ***Data Set Provides Timing:*** Data Set 203-type contains circuitry to provide both bit and symbol clock timing signals. The clock signals are derived from a high-frequency crystal oscillator and a binary countdown chain which includes a pulse adding and deleting circuit. The accuracy of the internal clock signal is ± 0.001 percent.

4.07 ***Customer Provides Timing:*** An externally supplied timing signal may be used (with proper option strapping) to adjust the phase and frequency of the internal clock signal. The external clock signal source must supply a frequency equal to the bit rate (bps) with an accuracy of ± 0.001 percent.

High-Speed Channel Start-Up

4.08 ***Start-Up Secondary Channel Controlled:*** This option is provided to insure that the high-speed receiver is on-line and ready for the startup (or training) sequence. Essentially, the initiation of the training sequence at the transmitter is triggered by turning on the high-speed Request-to-Send (RS or CA) interface lead. However, the completion of the training sequence is delayed until the reception of secondary channel energy from the distant data set. This option is intended for use on 2-wire half-duplex data services, either private line or DDD.

4.09 ***Start-Up Customer Controlled:*** The training sequence can only be initiated and completed by turning on the high-speed Request-to-Send (RS or CA) interface lead at the transmitter. This option can only presume that a data receiver is on-line prior to the initiation of the training sequence.

4.10 ***Start-Up Automatically Controlled:*** This option is only available when using both transmitter and receiver (ie, Data Set 203A) on 4-wire lines. The receiver circuitry uses the Signal Quality (SQ) circuit or senses excessive line drop-out to cause a retrain. The data sets at both stations stop transmitting data and repeat the training sequence until the signal quality is sensed to be adequate. This option does not inhibit the effect of interface lead Request-to-Send (RS). RS can still be used to retrain the data set. The automatic retrain feature is activated only when RS is ON. The Clear-to-Send function can be conditioned to respond to one of the following options:

(1) ***Clear-to-Send Inhibited by Carrier On Delayed (COD):*** Using this option, the Clear-to-Send interface lead is switched OFF if the received line signal is lost for more than 1.0 second (COD switches to OFF). Clear-to-Send will be ON provided the transmitter has completed its training period and a received line signal is detected (COD is ON).

(2) ***Clear-to-Send Independent of Carrier On Delayed (COD):*** Using this option, the Clear-to-Send interface lead is switched ON when the transmitter has completed its training period. A loss of the received line signal will not switch Clear-to-Send to OFF. Clear-to-Send will be switched OFF only when retraining is initiated.

Secondary Channel Control

4.11 ***Secondary Channel Controlled by Request-to-Send:*** This option is intended for 2-wire operation using speed option list codes L3 and L4. The secondary channel is conditioned to operate as a reverse channel under control of Request-to-Send (RS or CA). When RS is ON, the secondary channel is conditioned as a receiver. When RS is OFF, the secondary channel is conditioned as a transmitter. The Secondary Request-to-Send (SRS or SCA) interface lead will have no effect on the data set when this option is used.

4.12 ***Secondary Channel Controlled by Secondary Request-to-Send Only:*** This option allows the customer business machine to control the operation of the secondary channel through the

TABLE D-1

USOC CODE APPLICATION

SEND ONLY WITH 0-150 BPS SECONDARY CHANNEL ON PRIVATE LINE FACILITIES

USOC CODE	SERVICE OFFERING	CUSTOMER DECISION OPTION TABLE
DEH++	1800, 3600, or 5400 bps (Speed Option List 3)	E-1
DEW++	2400, 4800, or 7200 bps (Speed Option List 2) (Note)	Same as DEH++
KF1++	2400, 4800, or 7200 bps (Speed Option List 4)	Same as DEH++
KEH++	3200, 6400, or 9600 bps (Speed Option List 5) (Note)	Same as DEH++
KFA++	3600, 7200, or 10,800 bps (Speed Option List 6) (Note)	Same as DEH++

Note: Not for use on 2-wire private line facilities except for broadcast-type networks (secondary channel not used).

TABLE D-2

RECEIVE ONLY WITH 0-150 BPS SECONDARY CHANNEL ON PRIVATE LINE FACILITIES

USOC CODE	SERVICE OFFERING	CUSTOMER DECISION OPTION TABLE
DEL++	1800, 3600, or 5400 bps (Speed Option List 3)	E-2
DEX++	2400, 4800, or 7200 bps (Speed Option List 2) (Note)	Same as DEL++
KF2++	2400, 4800, or 7200 bps (Speed Option List 4)	Same as DEL++
KEN++	3200, 6400, or 9600 bps (Speed Option List 5) (Note)	Same as DEL++
KFB++	3600, 7200, or 10,800 bps (Speed Option List 6) (Note)	Same as DEL++

Note: Not for use on 2-wire private line facilities except for broadcast-type networks (secondary channel not used).

TABLE D-3

COMBINED SENDING AND RECEIVING ON 4-WIRE PRIVATE LINE FACILITIES

USOC CODE	SERVICE OFFERING	CUSTOMER DECISION OPTION TABLE
DEN++	1800, 3600 or 5400 bps (Speed Option List 3)	E-3
DFE++	2400, 4800, or 7200 bps (Speed Option List 2)	Same as DEN++
KF3++	2400, 4800, or 7200 bps (Speed Option List 4)	Same as DEN++
KE0++	3200, 6400, or 9600 bps (Speed Option List 5)	Same as DEN++
KFC++	3600, 7200, or 10,800 bps (Speed Option List 6)	Same as DEN++

TABLE D-4

COMBINED SENDING AND RECEIVING ON 2-WIRE PRIVATE LINE FACILITIES

USOC CODE	SERVICE OFFERING	CUSTOMER DECISION OPTION TABLE
DEN++	1800, 3600, or 5400 bps (Speed Option List 3) (Note)	E-4
KF3++	2400, 4800, or 7200 bps (Speed Option List 4) (Note)	Same as above

Note: Add-on arrangement for 0-150 bps secondary channel is required. The USOC code for this arrangement which must be added to the basic service USOC code specified in this table is DEQ++ (see Table D - 8).

TABLE D-5

SEND-ONLY WITH 0-150 BPS SECONDARY CHANNEL AND AUTOMATIC ANSWER ON THE SWITCHED MESSAGE NETWORK

USOC CODE	SERVICE OFFERING	CUSTOMER DECISION OPTION TABLE
DEE++	1800 or 3600 bps (Speed Option List 3) with rotary dial	E-5
DFH++	1800 or 3600 bps (Speed Option List 3) with TOUCH-TONE dial	Same as above
KED++	2400 or 4800 bps (Speed Option List 4) with rotary dial	Same as above
KEW++	2400 or 4800 bps (Speed Option List 4) with TOUCH-TONE dial	Same as above

TABLE D-6

RECEIVE-ONLY WITH 0-150 BPS SECONDARY CHANNEL AND AUTOMATIC ANSWER ON THE SWITCHED MESSAGE NETWORK

USOC CODE	SERVICE OFFERING	CUSTOMER DECISION OPTION TABLE
DEF++	1800 or 3600 bps (Speed Option List 3) with rotary dial	E-6
DFK++	1800 or 3600 bps (Speed Option List 3) with TOUCH-TONE dial	Same as above
KEE++	2400 or 4800 bps (Speed Option List 4) with rotary dial	Same as above
KEY++	2400 or 4800 bps (Speed Option List 4) with TOUCH-TONE dial	Same as above

TABLE D-7

COMBINED SENDING AND RECEIVING WITH 0-150 BPS SECONDARY CHANNEL AND AUTOMATIC ANSWER ON THE SWITCHED MESSAGE NETWORK

USOC CODE	SERVICE OFFERING	CUSTOMER DECISION OPTION TABLE
DEG++	1800 or 3600 bps (Speed Option List 3) with rotary dial	E-7
DEL++	1800 or 3600 bps (Speed Option List 3) with TOUCH-TONE dial	Same as above
KEF++	2400 or 4800 bps (Speed Option List 4) with rotary dial	Same as above
KEZ++	2400 or 4800 bps (Speed Option List 4) with TOUCH-TONE dial	Same as above

TABLE D-8

USOC CODE APPLICATION TABLE FOR ADD-ON ARRANGEMENTS

USOC CODE TO BE ADDED TO USOC CODE OF BASIC SERVICE	ARRANGEMENT	CUSTOMER DECISION OPTION TABLE
DEQ++	Arrangement for a 0-150 bps secondary channel (optional with Basic Service No. 3; required addition for Basic Service No. 4) (Note 1)	E-8
3EU++	Arrangement for independent retraining of high-speed transmitter/receiver pairs (Note 2)	E-9
DEV++	Arrangement for automatic answer compatibility with automatic calling and alternate voice capability	E-10
KSJGV	Arrangement for Military Standard interface	—
MJJ++	Arrangement for multiple-access interface	E-11

Note 1: This feature is included with basic Service Offerings No. 1, 2, 5, 6, and 7. For these services, USOC DEQ++ should not be added.

Note 2: Available with speed options L2 and L6 only.

TABLE E-1

CUSTOMER OPTION DECISION TABLE

DECISION	OPTION	DESIGNATION	ITEM
A	1. Data set provides timing	—	A1
	2. Customer provides data set timing	Q	A2
B	3. Cabinet-mounted		
	4. Rack-mounted		
C	5. Start-up secondary channel controlled	K	
	6. Start-up customer controlled	YB	
D	7. Secondary channel controlled by request-to-send only (Decision E is no required.)	W	
	8. Secondary channel controlled by other than request-to-send only (Decision E is required.)		
E	9. Secondary channel controlled by secondary request-to-send only	V	
	10. Secondary channel controlled by both request-to-send and secondary request-to-send	T	

TABLE E-2

CUSTOMER OPTION DECISION TABLE

DECISION	OPTION	DESIGNATION	ITEM
A	1. Cabinet-mounted		
	2. Rack-mounted		
B	3. Receive data clamped (Note)		
	4. Receive data not clamped	F	
C	5. Serial clock receive clamped (Note)		
	6. Serial clock receive not clamped	E	
D	7. Secondary request-to-send wired permanently ON	W	
	8. Secondary channel controlled by secondary request-to-send	V	

Note: Both receive data clamped and serial clock receive clamped are the options which meet EIA Standard RS-232-C. The unclamped options should only be used when the data set is used as part of a regenerator or when specifically requested by the customer.

TABLE E-3

CUSTOMER DECISION OPTION TABLE (NOTE 1)

DECISION	OPTION	DESIGNATION	ITEM
A	1. Data set provides timing	—	A1
	2. Customer provides data set timing	Q	A2
B	3. Request-to-send permanently wired (Decision E9 is required.)		
	4. Request-to-send customer controlled		
C	5. Receive data clamped (Note 2)	—	
	6. Receive data not clamped	F	
D	7. Serial clock receive clamped (Note 2)	—	
	8. Serial clock receive not clamped	E	
E	9. Start-up with automatic retraining (Decision F is required.)		
	10. Start-up customer controlled (Decision F is not required.)	YB	
F	11. Clear-to-send inhibited when carrier-on delayed signal if off	J	
	12. Clear-to-send not inhibited by carrier-on delayed signal	ZR	

Note 1: Indicate whether cabinet-mounted or rack-mounted.

Note 2: Both receive data clamped and serial clock receive clamped are the options which meet EIA Standard RS-232-C. The unclamped options should be used when the data set is used as part of a regenerator or when specifically requested by the customer.

TABLE E-4

CUSTOMER DECISION OPTION TABLE

DECISION	OPTION	DESIGNATION	ITEM
A	1. Data set provides timing		
	2. Customer provides data set timing	Q	
B	3. Cabinet-mounted		
	4. Rack-mounted		
C	5. Start-up secondary channel controlled	K	
	6. Start-up customer controlled	YB	
D	7. Receive data clamped (Note)		
	8. Receive data not clamped	F	
E	9. Serial clock receive clamped (Note)		
	10. Serial clock receive not clamped	E	

Note: Both receive data clamped and serial clock receive clamped are the options which meet EIA Standard RS-232-C. The unclamped options should only be used when the data set is used as part of a regenerator or when specifically requested by the customer.

TABLE E-5

CUSTOMER OPTION DECISION TABLE (NOTE)

DECISION	OPTION	DESIGNATION	ITEM
A	1. Data set provides timing 2. Customer provides data set timing	 Q	A1 A2
B	3. Start-up secondary channel controlled 4. Start-up customer controlled	K YB	
C	5. Secondary channel controlled by request-to-send only (Decision D is not required.) 6. Secondary channel controlled by other than request-to-send (Decision D is required.)	W	
D	7. Secondary channel controlled by secondary request-to-send only. 8. Secondary channel controlled by both secondary request-to-send AND request-to-send	V T	
E	9. Without automatic answer (Decision F is not required.) 10. With automatic answer (Decision F is required.)		
F	11. Automatic answer is permanently wired 12. Automatic answer is pushbutton or key controlled		

Note: Indicate whether cabinet- or rack-mounted.

TABLE E-6

CUSTOMER OPTION DECISION TABLE

DECISION	OPTION	DESIGNATION	ITEM
A	1. Cabinet-mounted 2. Rack-mounted		
B	3. Receive data clamped (Note) 4. Receive data not clamped	 F	
C	5. Serial clock receive clamped (Note) 6. Serial clock receive not clamped	 E	
D	7. Secondary request-to-send wired permanently ON 8. Secondary channel controlled by secondary request-to-send	W V	
E	9. Without automatic answer (Decision F is not required.) 10. With automatic answer (Decision F is required.)		
F	11. Automatic answer is permanently wired. 12. Automatic answer is pushbutton or key controlled.		

Note: Both receive data clamped and serial clock receive clamped are the options which meet EIA Standard RS-232-C. The unclamped options should only be used when the data set is used as part of a regenerator or when specifically requested by the customer.

TABLE E-7

CUSTOMER DECISION OPTION TABLE (NOTE 1)

DECISION	OPTION	DESIGNATION	ITEM
A	1. Data set provides timing 2. Customer provides data set timing	Q	
B	3. Receive data clamped (Note 2) 4. Receive data not clamped	F	
C	5. Serial clock receive clamped (Note 2) 6. Serial clock receive not clamped	E	
D	7. Start-up secondary channel controlled 8. Start-up customer controlled	K YB	
E	9. Secondary channel controlled by request-to-send only (Decision F is not required.) 10. Secondary channel controlled by other than request-to-send (Decision F is required.)	W	
F	11. Secondary channel controlled by secondary request-to-send only. 12. Secondary channel controlled by both secondary request-to-send AND request-to-send	V T	

Note 1: Indicate whether cabinet- or rack-mounted and whether the automatic answer option is to be permanently wired, under pushbutton or key control, or not provided.

Note 2: Both receive data clamped and serial clock receive clamped are the options which meet EIA Standard RS-232-C. The unclamped options should only be used when the data set is used as part of a regenerator or when specifically requested by the customer.

TABLE E-8

CUSTOMER DECISION OPTION TABLE

DECISION	OPTION	DESIGNATION	ITEM
A	1. Secondary channel controlled by request-to-send only (Decision B is not required.) 2. Secondary channel controlled by other than request-to-send only (Decision B is required.)	W	
B	3. Secondary channel controlled by secondary request-to-send only (Note) 4. Secondary channel controlled by both request-to-send and secondary request-to-send	V T	

Note: Applicable to 1800 baud (Speed Option List 3) and 2400 baud (Speed Option List 4) data sets only.

TABLE E-9

CUSTOMER OPTION DECISION TABLE

DECISION	OPTION	DESIGNATION	ITEM
A	1. (L11) Used with DFE++ (Speed Option L2) 2. (L12) Used with KFC++ (Speed Option L6)		
B (Note)	3. Fast start-up sequence delay 4. Slow start-up sequence delay	YG YH	

Note: The opposite B decision is required in the remote data set.

TABLE E-10

CUSTOMER DECISION OPTION TABLE (Note)

DECISION	OPTION	DESIGNATION	ITEM
A	1. Without automatic answer (Decision B is not required.) 2. With automatic answer (note) (Decision B is required)		
B	3. Automatic answer is permanently wired. 4. Automatic answer is pushbutton- or key-controlled.		

Note: Automatic answer is not available when using Data Auxiliary Set 804A- or 804M-types on 2-wire switched message network lines to provide 4-wire service.

TABLE E-11

CUSTOMER DECISION OPTION TABLE

DECISION	OPTION	DESIGNATION	ITEM
OA	Line signal under control of request-to-send interface leads	YE	
OB	Line signal wired permanently ON (Note)	YF	

Note: Applicable to Data Set 203A with automatic retraining (Decision E9 in Table E-3) only.

Secondary Request-to-Send (SRS or SCA) interface lead. The state of the Request-to-Send (RS or CA) interface lead will have no effect on the secondary channel mode of operation when this option is selected. This option is intended for the speed option list codes L3 or L4 operating on 4-wire lines.

4.13 ***Secondary Channel Controlled by Request-to-Send and Secondary Request-to-Send:*** This mode of operation is intended for the speed option list codes L2, L5, and L6 only, because of overlapping primary high-speed and secondary channel frequency spectrums. It should be used on 4-wire private line because this option prevents the simultaneous transmission of primary high-speed channel and secondary channel carriers on the same wire pair. When this option is used, the secondary channel transmitter is switched ON only when the high-speed channel Request-to-Send (RS or CA) interface lead is OFF and Secondary Request-to-Send (SRS or SCA) is ON. Simultaneous transmission of the primary high-speed and secondary channels is possible only in the opposite directions and on separate wire pairs.

Data Auxiliary Sets

4.14 Four data auxiliary sets may be used with a Data Set 203-type. Although DAS 828A- or C-types do not provide automatic answer or compatibility with automatic calling, these features are available by using DAS 804A- or M-types.

4.15 The required service will usually indicate the appropriate data auxiliary set. For example, DAS 804A-type will function for the following station arrangements:

- 2-Wire operation on switched message network (speed option list codes L3 or L4).
- Operation on 2-wire private line with alternate voice (speed option list codes L3 or L4).
- Operation on 2-wire private line with switched message network backup (speed option list codes L3 or L4).
- Operation on 4-wire private line with automatic answer and with compatibility for automatic calling and alternate voice (speed option list codes L2, L3, L4, L5, or L6).
- Operation on 4-wire private line with switched message network backup and alternate voice (speed option list code L3 or L4). Automatic answer capability is not available.
- 4-Wire operation using two switched message network lines (speed option list code L3 or L4). Automatic answer capability is not available.

4.16 The DAS 804M-type will function over 4-wire switched network or 4-wire private lines requiring alternate voice, automatic answer, and compatibility with automatic calling units.

4.17 The DAS 828A-type will provide operation on 4-wire private line with alternate voice capability. The DAS 828C-type, when used with DAS 828A-type, will provide operation on 4-wire private lines with switched message network backup and alternate voice capability.

4.18 ***Automatic Answer Permanently Wired:*** When the customer chooses the permanently wired automatic answer option, the data auxiliary set is arranged by wiring option in which the AUTO key is not used. By using this option, all incoming calls will be automatically answered provided that the station is idle and the Data Terminal Ready (DTR or CD) interface lead is properly conditioned by the business machine.

4.19 ***Automatic Answer Key Controlled:*** This option provides the same function as described above except that, by wiring option, the AUTO key must be pressed to automatically answer incoming calls. Automatic answer will not be provided until the AUTO key is pressed.

EIA or Military Standard Interface

4.20 Provisions for the recommendations of the Electronic Industries Association (EIA) for digital data sets is available to the customer by using option list code L8. Data Set 203-type will interface with a customer through a single commercial standard 25-pin connector providing the electrical signal characteristics detailed in EIA Standards RS-232-C and RS-334.

4.21 Any of the Data Sets 203-type can be ordered with a Military Standard (MIL. STD) interface by selecting option list code L9. This option consists of two replacement circuit packs and a special

applique adapter. The circuit packs provide the electrical signal characteristics detailed in MIL. STD 188B for all interface signals except Request-to-Send, Data Terminal Ready, Speed Select, and Secondary Request-to-Send. These four interface circuits meet EIA Standard RS-232-C. The adapter makes the provision for both a 15-pin CUSTOMER A connector and a 25-pin CUSTOMER B connector.

Automatic Retraining Auxiliary Channel (ARAC)

4.22 The ARAC function was initially designed as a special service for a limited application. The ARAC option list codes L11 and L12 are ***only*** compatible with Data Set 203A-type operating on a 4-wire facility. Further limitations include the ARAC function list code L11 which is applicable ***only*** to a Data Set 203A having the speed option list code L2 and the ARAC function list code L12 which is applicable ***only*** to a Data Set 203A having the speed option list code L6.

4.23 The ARAC function will retrain a Data Set 203A transmitter-receiver pair on half of a full-duplex 4-wire link without disturbing the data stream on the other half of the link. When a local Data Set 203A receiver requires retraining, it initiates a timed sequence in the local ARAC transmitter and the resulting signal is transmitted through the outbound data link to the remote ARAC receiver. The remote ARAC receiver detects the signal and, in turn, initiates a training sequence in the remote Data Set 203A transmitter. The ARAC signals do not interfere with the primary high-speed data stream. Consequently, data transmission on the transmit-receive pair not in need of retraining is not interrupted. The ARAC feature uses the secondary channel for signaling and, therefore, is not compatible with option List 7.

Permanent Request-to-Send Feature

4.24 A permanent request-to-send feature can be provided to the customer by including the use of the M23A-51 cord on the System Service Order (SSO). This feature straps the data set Request-to-Send (RS/CA) interface lead to the ON condition and will keep the data set carrier on-line continuously. This feature may be used to prevent Data Sets 203A-type which are optioned for automatic retraining (see Table E-3, Decision E-9) from retraining each time the customer terminal equipment switches its RS/CA function to ON.

4.25 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.

38A-Type Data Unit

4.26 The 38A-type Data Unit can be connected into Data Set 203 to provide a multiple-access interface. This arrangement provides the data set with the capability of serving up to six data terminals. The 38A-type Data Unit, shown in Fig. 3, consists of a circuit pack nest framework and a panel providing six interface ports. One port provides access to all the data set interface circuits. The remaining five ports provide access only to the primary data set interface circuits: SD/BA, RD/BB, RS/CA, CS/CB, DSR/CC, CO/CF, SCT/DB, and SCR/DD. Operating power is provided by the data set. The following two circuit packs are required to provide option list code L13:

1—AR603 to provide fan-out drivers for the interface ports

1—AR604 to provide fan-in terminators for the interface ports

4.27 Both drivers and terminators at the multiple-access interface provide and require electrical signals which meet the intent of EIA Standard RS-232-C. The data unit includes an installer option to provide a permanent transmitter line signal to eliminate the need for retraining each time control of the interface is changed. This option should only be used with Data Sets 203A-type which have been optioned for automatic retraining (see Table E-3, Decision E-9). The multiple-access interface is not compatible with the MIL. STD interface (L9) or the ARAC arrangements (L11 or L12).

B. Telco Engineering Options

4.28 Telephone company options are listed in Table F. To properly select the Telco engineering options, it is necessary that sufficient information about the arrangements be included in the System Service Order (SSO). For private line use, it should be specified if (1) the data set is to be used for half-duplex or full-duplex service and (2) if alternate voice capability is used, the type telephone set should be designated.

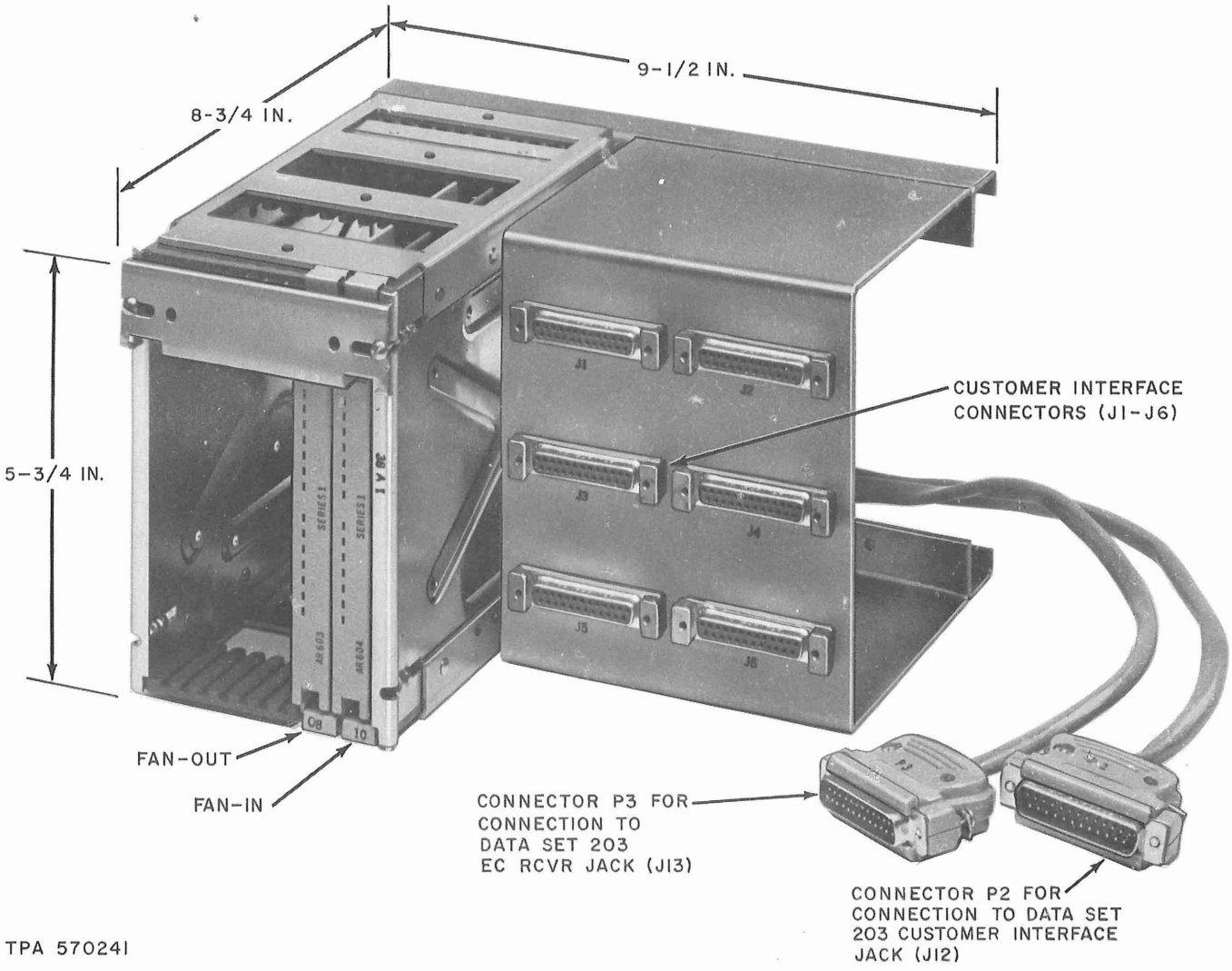


Fig. 3—38A-Type Data Unit

4.29 Telco options in the ITEM column which are more commonly used are described in Reference Guides—Description of Data Set Features and Options (Section 590-000-101). The DEVIATIONS column indicates where some decisions are provided by the answers to the appropriate Customer Decision Option Table.

5. COMPATIBLE DATA SETS

5.01 Presently, the Data Set 203 family is the only multilevel amplitude-modulated vestigial sideband offering available through the Bell Telephone System. A 203-type transmitter can operate only with a 203-type receiver having an identical functional list number and set to operate at the same speed.

5.02 No compatible data sets are available. If compatibility with other data sets is established in the future, this section will be reissued to include the required information.

6. REFERENCES

6.01 The following references provide additional information on Data Set 203-type and associated equipment:

(a) Sections 592-019-100, -150, -180, -200, -300, -500

TABLE F

TELCO ENGINEERING OPTIONS (NOTE 1)

OPTION		DESIG-NATION	ITEM	PROVIDE	DEVIATIONS (NOTE 1)
MODE OF OPERATION	4-wire without secondary channel	Z	B5	One per Station	None
	4-wire with secondary channel or with ARAC channel	Y			
	2-wire (secondary channel required)	X			
CONTROL OF SECONDARY CHANNEL	By request-to-send only (for switched network or 2-wire private lines	W		One per Station	E-1, E-2, E-5, E-6, E-7, E-8
	By secondary request-to-send only (for independent control on 2- or 4-wire private lines)	V			E-1, E-2, E-5, E-6, E-7, E-8
	By request-to-send and secondary request-to-send (for nonsimultaneous transmission on 2- or 4-wire private lines)	T			E-1, E-5, E-7, E-8
	0 to 150 bit secondary channel not provided or ARAC channel is provided	YD			None
LINE IMPEDANCE	600 Ohm	S	C1	One per Station	None
	900 Ohm	R			
TRANSMIT LINE SIGNAL LEVEL AND 2-WIRE RECEIVER PAD	−15 dBm/15 dB	ZA	C2	One per Station	None
	−14 dBm/14 dB	ZB			
	−13 dBm/13 dB	ZC			
	−12 dBm/12 dB	ZD			
	−11 dBm/11 dB	ZE			
	−10 dBm/10 dB	ZF			
	−9 dBm/9 dB	ZG			
	−8 dBm/8 dB	ZH			
	−7 dBm/7 dB	ZI			
	−6 dBm/6 dB	ZJ			
	−5 dBm/5 dB	ZK			
	−4 dBm/4 dB	ZL			
	−3 dBm/3 dB	ZM			
	−2 dBm/2 dB	ZN			
	−1 dBm/1 dB	ZO			
	0 dBm/0 dB	ZP			

TABLE F

TELCO ENGINEERING OPTIONS (NOTE 1) (Cont)

OPTION			DESIG-NATION	ITEM	PROVIDE	DEVIATIONS (NOTE 1)
RECEIVER PAD	10 dB for 4-wire lines		B	C5	One per Station	None
	0 dB for 2-wire lines		A			
USE OF 804-TYPE DATA AUXILIARY SET	No		N	B7	One per Station	None
	Yes		YA			
INITIATE START-UP OF HIGH-SPEED CHANNEL	On receipt of secondary channel carrier		K		One per Station	E-1, E-4, E-5, E-7
	4-wire auto retrain	Clear-to-send inhibited by carrier-on delayed	J			E-3
		Clear-to-send independent of carrier-on delayed	ZR			E-3
	Under customer control or under ARAC control		YB			E-1, E-3, E-4, E-5, E-7
ARAC (Note 2)	Fast start-up sequence delay		YG		One per Station	E-9
	Slow start-up sequence delay		YH			
MULTIPLE ACCESS INTERFACE	Line signal under control of request-to-send interface leads		YE		One per Station	E-11
	Line signal wired permanently ON		YF			
	Using external serial clock transmitter		Q	A2	As required	E-1, E-3, E-4, E-5, E-7
	Received data (RD) never clamped		F		As required	E-2, E-3, E-4, E-6, E-7
	Serial clock receiver (SCR) never clamped		E		As required	E-2, E-3, E-4, E-6, E-7
	Receiver only data set (203C-type)		M		As required	E-2
	Transmitter only data set (203B-type)		ZQ		As required	E-1

Note 1: Deviations are given where the decision is part of the Customer Option Table. Only the applicable tables are listed.

Note 2: Opposite decision required at the remote data set.

(b) Section 598-010-101 (DAS 801A-type)

(c) Section 598-012-101 (DAS 801C-type)

(d) Section 598-030-100 (DAS 804A-type)

(e) Section 598-057-100 (DAS 804M-type)

(f) Section 598-080-100 (DAS 828A-type)

(g) Section 598-080-101 (DAS 828C-type)

(h) CD- and SD-1D151-01 (Data Set 203 Station Arrangements)

(i) CD- and SD-1D152-01 [22A-type Data Unit (Transmitter)]

(j) CD- and SD-1D153-01 [23A-type Data Unit (Receiver)]

(k) CD- and SD-1D154-01 [24A-type Data Unit (Control)]

(l) CD- and SD-1D230-01 (38A-type Data Unit)

(m) E.L. 286 and Supplement E.M. 2709

(n) DL 136 and Supplements #1, #2, #3, and #4

(o) Bell System Data Communications Technical Reference—Data Set 203-Type—June, 1970

(p) E.L. 522

(q) E.L. 897

(r) E.L. 1092

(s) E.L. 1367.