DATA SETS 403A-, D-, AND E-TYPES
REFERENCE GUIDE

Data Set 403A-Type

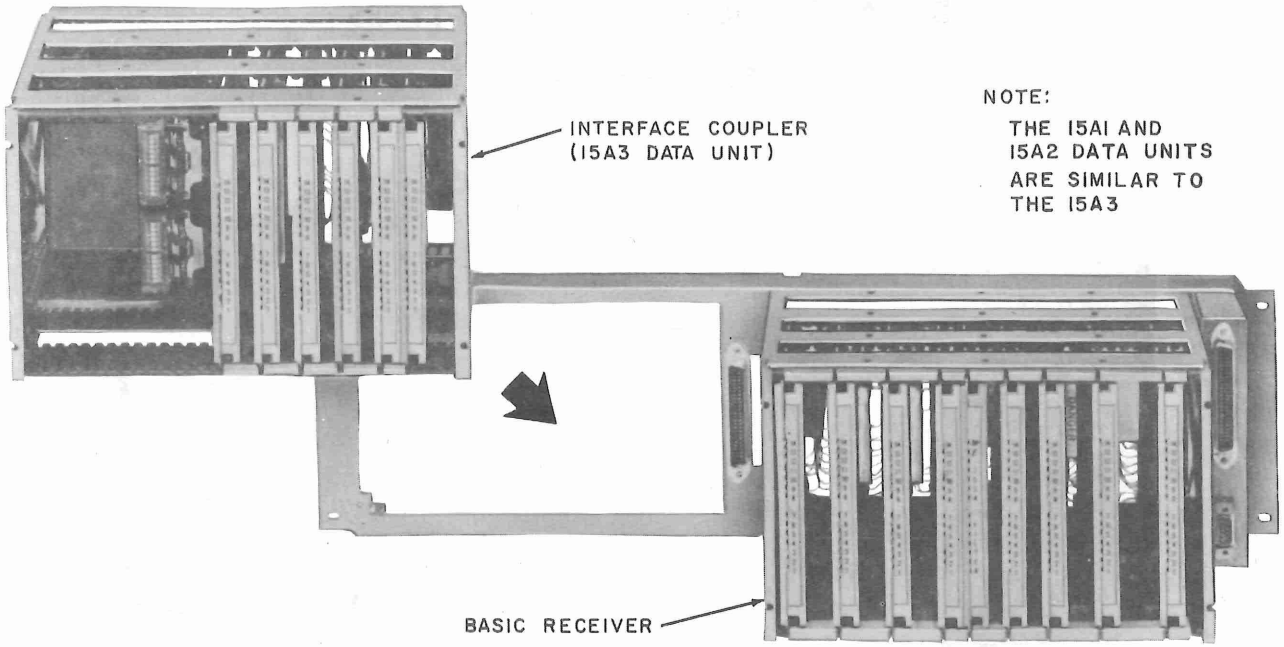
CONTENTS PAGE

1. GENERAL

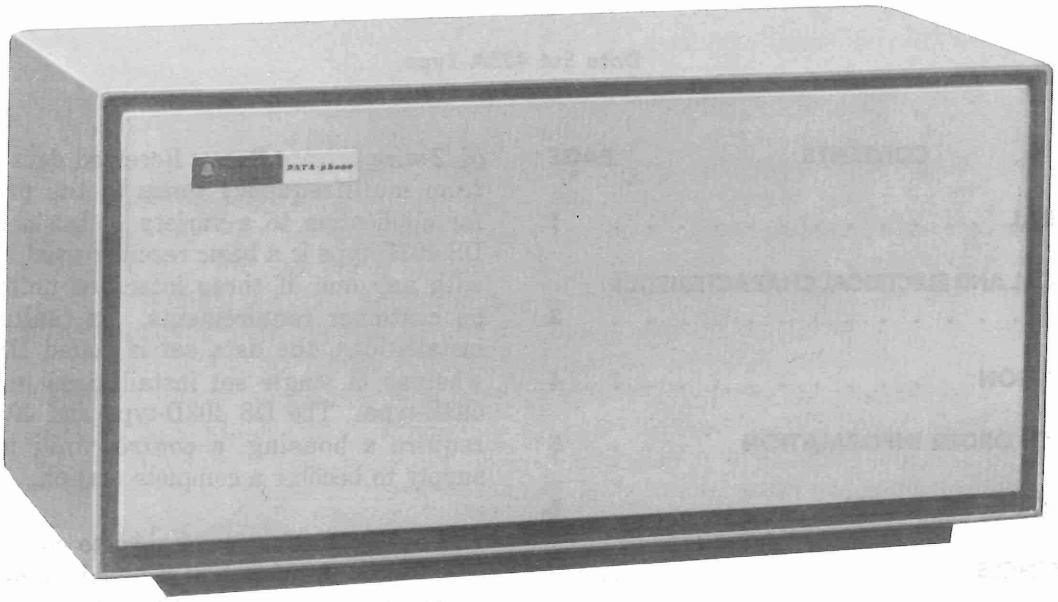
1.01 Data sets (DS) 403A-, D-, and E-types are low-speed, parallel operation 2-out-of-8 (TOUCH-TONE® frequencies) receivers for DATA-PHONE® use on the switched network, or on 2-wire private lines. Received data is translated from multifrequency tones to the proper signals for application to a variety of business machines. DS 403D-type is a basic receiver used in conjunction with any one of three interface units, depending on customer requirements. In multiple data set installations, the data set is coded DS 403D-type, whereas in single set installations it is coded DS 403E-type. The DS 403D-type and 403E-type each require a housing, a control unit, and a power supply to become a complete station.

1.02 This section is reissued to correct the USOC code for DS 403D5 and D11 in Table A, to correct decisions B3 and C6 in Table B, to elaborate on the voice answer-back channel in 4.03 (b)(1), and to move the line intercept options (B and E) from the Telco Options Table (Table C) to the Customer Options Table (Table B).

1.03 Data sets 403A1, 2, and 3, 403D3, 4, 5, 6, 7, and 8, and 403E2, 3, and 4 are rated



Data Set 403D-Type and Interface Coupler



Data Set 403E-Type

Manufacture Discontinued (MD); Data sets 403D9, 10, 11, 12, 13, and 14, and 403E5, 6, and 7 are the current standard data sets. The current standard data sets:

- Provide for operation with ESS and on Unigauge loops
- Reflect the signal level constraints of FCC Tariff No. 263
- Include a call-originating and return-to-data feature
- Include third-wire out-of-service option for single set use
- Include new attendant-alert feature for single set use.

Conversion and disposition information is included, and details are provided to aid in encoding Uniform Service Order Code (USOC) designations. Because many of the data sets 403D3 through 8 (MD) are still in use in the field, information on these units is retained.

1.04 ***DS 403A-type*** (MD) receives signals from a DS 401A-type, a TOUCH-TONE telephone, or any other transmitter using the TOUCH-TONE 2-out-of-8 code. A data auxiliary set (DAS) 804C-type (MD) is required for control functions.

1.05 ***DS 403D-type*** consists of a basic receiver and any one of three interface coupler units, which plug into the frame of the basic receiver. The DS 403D-type is for use in multiple set installations and as the basic receiver in DS 403E-type single set installations. The data set is compatible with DAS 801A- or 801C-type for automatic calling. The plug-in interface coupler units are as follows:

(a) ***15A1 Data Unit:*** This unit provides a contact closure (CC) interface to the business machine. When the basic receiver is equipped with this data unit, the data set is coded DS 403D9 or 403D10. The DS 403D9 is used for multiple set installations and DS 403D10 for single set installations requiring a contact closure interface.

(b) ***15A2 Data Unit:*** This unit provides a binary-coded matrix (BCM) 4-level voltage interface to the business machine. When the basic receiver is equipped with this data unit, the data set is coded DS 403D11 or 403D12. The DS 403D11 is used for multiple set installations and DS 403D12 for single set installations requiring a BCM voltage interface.

(c) ***15A3 Data Unit:*** This unit provides a serial ASCII (American National Standard Code for Information Interchange) voltage interface with the business machine. When the basic receiver is equipped with this data unit, the data set is coded DS 403D13 or 403D14. The DS 403D13 is used for multiple set installations and DS 403D14 for single set installations requiring a serial ASCII voltage interface.

(d) In single or multiple set installations, DS 403D-type requires an associated power supply and telephone control unit to provide a complete receiving data station.

(e) A DAS 804G-type is required to provide control functions for single set installations. A DAS 804K-type and/or a remote console (CALL DIRECTOR® telephone set) is required to provide control for multiple set installations.

1.06 ***DS 403E-type*** contains a DS 403D10, 403D12, or 403D14 and an 8A-type data unit (power supply) in a cabinet. A DAS 804G-type is required to provide conventional telephone service and data, talk, and test mode controls for the data station. The data set is equipped to transmit an answer tone and has an automatic call answering option. The data set is compatible with DAS 801A- or 801C-type automatic calling units.

1.07 Current standard and manufacture discontinued DS 403A-, D-, and E-types are summarized in Table A.

2. PHYSICAL AND ELECTRICAL CHARACTERISTICS

2.01 ▶DS 403A-type (MD) is housed in a KS-20018-L5 2-tone gray aluminum cabinet with removable front and rear panels. The cabinet measures approximately 20 inches wide, 9 inches high, and 12 inches deep. The cabinet will house two 403A-type sets and weighs about 40 pounds when so equipped.◀ Each data set requires 15 watts of 117-volt 60-Hz power provided by the customer through a 3-wire grounded receptacle.

2.02 DS 403D-type is not supplied in a housing. It must be incorporated with other equipment into a housing to be a functionally complete data set. The data set is approximately 23 inches wide, 6 inches high, and 7-3/4 inches deep and weighs about 18 pounds. An external power supply must be provided.

2.03 Multiple data set stations using DS 403D-type are housed in a KS-20093-L1 steel cabinet. The cabinet is 2-tone (off-white doors and the remainder dark gray) and measures approximately 34 inches wide, 74-1/4 inches high, and 30-1/2 inches deep overall. A fully equipped cabinet (16 data sets) weighs about 800 pounds. For additional information on the cabinet and associated hardware, refer to Section 590-010-201.

2.04 The DS 403E-type combines a DS 403D-type with an 8A-type data unit (power supply) in a KS-20018-L1 aluminum cabinet. The cabinet is 2-tone gray and measures approximately 24-1/2 inches wide, 11-3/4 inches high, and 12 inches deep. The complete DS 403E-type weighs about 46 pounds. The 8A-type data unit requires 15 watts of 117-volt 60-Hz power supplied by the customer through a 3-wire grounded receptacle.

3. OPERATION

DS 403A-Type (MD)

3.01 ***For unattended operation,*** connection is established from station A to station B. Ringing current appears on the line at station B. Ringing is automatically tripped and hold is placed on the line at station B. The LINE lamp on the associated console or DATA lamp on DAS 804C-type lights and remains lighted. After appropriate delay, a short 2025-Hz answer tone is transmitted from station B to station A. The business machine at station B is signaled that the data set at station B is conditioned to receive or transmit data. Data may be transmitted from station A to station B at the end of the 2025-Hz answer tone. The data set must be turned off by the business machine upon completion of call. When the data set turns off, the LINE or DATA lamp is extinguished.

3.02 ***For attended operation,*** connection is established from station A to station B. Ringing is heard at B. Attendant at B removes the handset of DAS 804C-type and depresses TALK key. Conversation determines action to be taken. If data is to be transmitted, attendant at station B depresses DATA key and hangs up. The DATA lamp on DAS 804C-type lights and remains lighted. A short 2025-Hz tone is then transmitted. After cessation of the tone, data may be transmitted from station A to station B. The data set must be turned off by the business machine upon completion of call. When the data set turns off, the LINE lamp is extinguished.

DS 403D-Type

3.03 ***For unattended operation,*** connection is established from station A to station B. Ringing current appears on the line at station B. Ringing is automatically tripped and hold is placed on the line at station B. The LINE lamp on DAS 804K-type and/or 630/631-type CALL DIRECTOR telephone lights and remains lighted. After appropriate delay, a 2025-Hz answer tone is transmitted from station B to station A. The business machine at station B is signaled that station B data set is ready to receive or transmit data. Data may be transmitted from station A to station B at the end of the answer tone. The data set must be turned off by the business machine upon completion of call. When the data set turns off, the LINE lamp is extinguished.

403E-Type

3.04 ***For unattended operation,*** connection is established from station A to station B. Ringing is automatically tripped and hold is placed on the line at station B. The DATA lamp on DAS 804G-type lights and remains lighted. After appropriate delay, a short 2025-Hz answer tone is transmitted from station B to station A. After the answer tone, the telephone line is automatically transferred to the data receiver and data may be sent or received from station A. The data set must be turned off by the business machine upon completion of call. When the data set turns off, the DATA lamp is extinguished.

3.05 ***For attended operation,*** connection is established from station A to station B. Ringing is heard at B. Attendant at B removes the handset of DAS 804G-type and depresses TALK key. Conversation determines if data is to be transmitted. Attendant at B depresses and releases the DATA key and hangs up. The DATA lamp on DAS 804G-type lights and remains lighted. A short 2025-Hz tone is then transmitted. After

cessation of the tone, data may be transitted from station A to station B. The data set must be turned off by the business machine upon completion of call. When the data set turns off, the DATA lamp is extinguished.

4. SERVICE ORDER INFORMATION

4.01 Service orders for data services should describe the desired service by USOC and should not specify particular data set codes. The ***encoding procedure*** to determine the appropriate USOC is described in Section 590-000-100. Customer option decisions which must be made to determine the USOC suffix are listed in 4.03. An explanation of features and options common to most data sets is given in Section 590-000-101. A rapid cross-reference between USOC, data sets, and reference guides is presented in Section 590-000-102. Intercity Service Manual (ISM) Section 87 gives customer billing nomenclature, shows tariff listings for data services, and provides general reference information.

Service orders should not specify data set codes. 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. To achieve maximum reuse of data station apparatus, the first choice in selecting apparatus should be the oldest available model that will satisfy the service requirements as identified by USOC. When the desired data set model is not available from telephone company stocks (field or class C), the use of an available substitute is preferred over the purchase of a new current model. USOC decoding procedures are described in Section 590-000-100.

4.02 Service offerings and substitute data sets are given in Table A. Customer options and option designations are given in Table B.

4.03 The following paragraphs provide detailed information on customer options for ***USOC suffix determination.***

(a) ***DECISION A—Attended or Unattended Answering:***

(1) ***1. Attended:*** All incoming calls must be answered by attendant.

(2) ***2. Unattended:*** Data set answers all incoming calls automatically when requested by the business machine. No attendant is required.

(b) ***DECISION B—Internal or External Answer-back:***

(1) ***3. Internal:*** Data set generates ▶tone◀ answer-back signals under control of the business machine. ▶Voice answer-back is also provided with this arrangement. Use of the internally generated tone answer-back signals preempt the voice answer-back channel.◀

(2) ***4. External:*** Answer-back signals are externally generated by an additional Bell System data set—for example, a DS 202D or DS 402C-type. A customer-provided answer-back generator can only be used if a data access arrangement is provided. Remote test feature is disabled when this option is used; therefore, use of this option should be reviewed with the responsible engineer.

(c) ***DECISION C—With or Without Out-of-Service (Make-Busy) Feature:***

(1) ***5. With Out-of-Service (OOS) Feature:*** Provides a means for the business machine to make the station appear busy to incoming calls. Thus, when maintenance is performed on the business machine the distant end receives a "station busy" signal instead of no signal at all.

Caution: On "receive only" service telephone lines, tip and ring may be shorted together to provide OOS feature. This will unnecessarily tie up Central Office equipment unless the CO is equipped for this arrangement. Another method of providing the OOS feature is by means of third-wire (sleeve) ground. These two methods are supplied by installer option. Refer to Section 594-025-201 and 594-026-200 for details on options.

TABLE A

DATA STATIONS 403A-, D-, AND E-TYPES
SERVICE OFFERINGS – LATEST DATA SETS AND SUITABLE SUBSTITUTES

USOC	DATA STATION DESIGNATION	APPLICATION RECEIVE ONLY	INTERFACE	DATA SET	DATA UNIT	CONTROL FUNCTION	POWER SUPPLY	HOUSING
DDA	403A1 (MD) 403A3 (MD)	2 Rcvrs	CC	403A1 (MD) 403A3 (MD)	5A1	630-31 Tel Set 804C[1]		
DDS	403A3 (MD) 403A1 (MD)	2 Rcvrs	CC	403A3 (MD) 403A1 (MD)	5A1	804C 630-31 Tel Set[2]		
DAX	403A2 (MD) 403A1 (MD)	Single Station	CC	403A2 (MD) 403A1 (MD)	5A1	804C 630-31 Tel Set[2]		
DFA	403D9 403D3 (MD)	Multi- Station	2/8- CC	403D9 403D3 (MD)	15A1	804K	31A	KS-20093
DCB	403E5 403E2 (MD)	Single Station	2/8- CC	403D10 403D4 (MD)	15A1	804G	8A	KS-20018
DBA	403D11 403D5 (MD)	Multi- Station	BCM	403D11 403D5 (MD)	15A2	804K	31A	KS-20093
DCC	403E6 403E3 (MD)	Single Station	BCM	403D12 403D6 (MD)	15A2	804G	8A	KS-20018
DAV	403D13 403D7 (MD)	Multi- Station	ASCII- EIA	403D13 403D7 (MD)	15A3	804K	31A	KS-20093
DCS	403E7 403E4 (MD)	Single Station	ASCII- EIA	403D14 403D8 (MD)	15A3	804G	8A	KS-20018

Note 1: Must add 5A1 Data Unit

Note 2: Must remove 5A1 Data Unit

(2) ***6. Without Out-of-Service Feature:*** This option is used when customer does not require out-of-service feature.

(d) ***DECISION D—Answer Tone Duration (DS 403D- and E-types Only):***

(1) ***7. Answer Tone Duration of 0.57 Sec (ACU not used):*** Recommended as normal option.

(2) ***8. Answer Tone Duration of 1.25 Sec (ACU used):*** Recommended when a DAS 801A- or 801C-type ACU is used at calling station.

(e) ***DECISION E—Line Intercept Under Attendant or Business Machine Control:***

(1) ***9. Attendant Control:*** This option is used when customer does not use business machine control.

(2) ***10. Business Machine Control:*** This option is used when line intercept is controlled by the business machine.

4.04 Additional information on customer options for Data Sets 403D13, 403D14, and 403E7 (serial ASCII interface) follows:

(a) ***Eleventh and Twelfth Pushbutton Reception:*** DS 403D13, 403D14, and 403E7, which have a 15A3 data unit (ASCII translator),

◗ TABLE B ◖

CUSTOMER OPTION DECISIONS WITH ASSOCIATED WIRING OPTION DESIGNATIONS

DECISION	CUSTOMER OPTION	ITEM IN SECTION 590-000-101	WIRING OPTION DESIGNATIONS		
			403A	403D	403E
A	1. Attended answer	B6	Z	Z	Z
	2. Unattended answer (Note 1)	B6	Y	Y	Y
B	3. Answer-back tones generated internally, or voice answer-back	A4	K	A	A
	4. External answer-back	—	J	F	F
C (Notes 2, 3)	5. Out-of-service (OOS) feature desired	—	—	(Note 5)	(Note 5)
	6. Out-of-service feature disabled	—	—	ZC	ZC
D (Notes 2, 4)	7. Answer tone duration 0.57 second	—	—	N	N
	8. Answer tone duration 1.25 seconds	—	—	M	M
E (Note 2)	9. Line intercept under attendant control (Note 6)	—	—	E	E
	10. Line intercept under business machine control (Note 7)	—	—	B	B

Note 1: For USOCs DDA, DDS, and DAX (403A), the choice of unattended answer will provide an answer tone duration of 1.25 seconds. No other answer tone duration is available.

Note 2: For USOCs DDA, DDS, and DAX (403A), no customer options should be selected for decisions C, D, or E.

Note 3: Sales personnel should discuss OOS feature with Engineering before decision is made. OOS feature requires the following decisions:

(1) Will the customer use OOS feature?
(2) How can Telco provide OOS feature?
  (a) Terminating-only service?
  (b) Third-wire control scheme?
(3) Which way is best for customer if Telco can provide either one?
(4) If extra charge is required for feature in 2(a) or 2(b), will customer still want OOS feature?
(5) If customer wants OOS feature, does the business machine provide ON or OFF signals to data set?

Note 4: Most uses of data sets 403D- and 403E-types will be with TOUCH-TONE telephone sets utilizing standard answer-back tone of 0.57 second. However, should the 403D- and E-types have reception from other data sets such as the 401A and 401E or from a business machine equipped with an automatic calling unit, a longer answer tone of 1.25 seconds may be required and Engineering advice should be obtained.

Note 5: Wiring designation depends upon choice of method for providing OOS feature, a Telco option. (See Table C).

Note 6: Applies to data sets 403D3, 5, 7, 9, 11, and 13.

Note 7: Applies to data sets 403D3, 5, 9, and 11 only.

are capable of receiving signals from TOUCH-TONE transmitters having star (*) and number sign (#) pushbuttons. Data set outputs corresponding to these two inputs must be selected from any of the group of ASCII characters having bit B7 as "0". Also, the data set recognizes the second of two consecutive number signs (##) as a distinct character; an ASCII character for this data set output must also be selected. These options must be specified on the service order and provided by the Telco installer. See Section 594-025-201 for further details.

Note: If the ASCII translator has been programmed, for example, to respond to a # signal as the character "$" and the second consecutive # signal as the character "?", then # would print out as $; a second # (with no intervening character) would print out as a ?. A series of consecutive number signs would print out as $????, etc. Another $ will not print out in response to # until some other character (either printing or nonprinting) intervenes, after which the sequence will be repeated in response to consecutive number sign inputs.

(b) ***Automatic Answer-back:*** DS 403D13, 403D14, and 403E7 may be arranged to send a 200-ms burst of 2025-Hz answer-back tone which starts 100 ms after the ***end of an incoming*** *, #, or ## signal. There is no customer-controlled answer-back channel. If an answer-back tone is selected for the ## input, the data set will automatically terminate the call after the tone has been transmitted. Call termination is not available for * and # signals. Automatic answer-back and call termination options must be specified on the service order and provided by the Telco installer.

(c) ***Automatic Character Generation:*** DS 403E7 is factory-optioned to transmit automatically to the terminal equipment the ASCII character selected for the ## signal at the beginning of each data call and each time a talk-to-data mode transfer is made. If this option is not specified on the service order, it may be disabled by the Telco installer.

(d) ***Time-out Interval:*** DS 403D13, 403D14, and 403E7, after going to data mode either automatically or manually, wait for a specified period of time for an incoming character. If no character is received during this period, the data set transmits a ## signal to the business machine, an answer-back tone to the calling party, then terminates the call. This time-out interval may be either 15 or 45 seconds, or disabled. The option must be specified on the service order and provided by the Telco installer.

4.05 In multiple receiver installations using DS 403D9, 403D11, and 403D13, a 630D2, 1630D2, or 2630D2 CALL DIRECTOR telephone may be used to provide a remote control console in parallel with or instead of DAS 804K-type. Refer to Sections 594-025-101 and 594-025-201 for further details. The option must be specified on the service order and provided by the Telco installer.

4.06 Telephone company engineering options are listed in Table C.

4.07 The power resistor option is provided to supply a dummy load to the power supply when only one receiver is used (DS 403A2 only).

5. SUBSTITUTE, CONVERSION, AND DISPOSITION INFORMATION

5.01 Data sets that may be substituted to supply the services previously described in this section are listed in Table A.

5.02 For conversion and disposition of DS 403A-, D-, and E-types, refer to Table D.

◗TABLE C◖

TELCO ENGINEERING OPTIONS

OPTION	DESIGNATION	ITEM IN SECTION 590-000-001
Termination		
600 Ohms	X	C1
900 Ohms	W	
Answer-back Level (Note 1)		
−3 dBm	V	
−7 dBm	T	C4
−12 dBm	S	
6-dB Pad		
IN	R	C10
OUT	Q	
Power Resistors (Note 2)		
IN	N	—
OUT	M	
Out-of-Service Feature (Note 3)		
Tip-to-Ring Short		
Control Circuit ON	G	
Control Circuit OFF	H	
Third-Wire Control		—
Control Circuit ON	J	
Control Circuit OFF	K	
Disabled	ZC	
Private Line Service w/o Ringing		
With Talk Battery	ZB	—
Without Talk Battery	ZA	

Note 1: External padding may be required on earlier models to meet FCC tariff regulation.

Note 2: Used on DS 403A2 only.

Note 3: Applies to DS 403D- and E-types only, except that options G and J do not apply to ASCII sets (DS 403D7, 8, 13, and 14, and DS 403E4 and 7).

TABLE D

CONVERSION AND DISPOSITION INFORMATION
FOR DATA SETS 403A-, D-, AND E-TYPES

DATA SET	MFG STATUS	REPLACED BY DS	CONVERTIBLE TO	RECOMMENDATION
X403A	MD	403A types		Junk
403A1	MD	403D/E-type	—	Repair[1]
403A2	MD	403D/E-type	—	Repair[1]
403A3	MD	403D/E-type	—	Repair[1]
403D1[2]	—	—	—	—
403D2[2]	—	—	—	—
403D3[3]	MD	403D9	403D9	Convert & Repair
403D4[3]	MD	403D10	403D10	Convert & Repair
403D5[3]	MD	403D11	403D11	Convert & Repair
403D6[3]	MD	403D12	403D12	Convert & Repair
403D7[3]	MD	403D13	403D13	Convert & Repair
403D8[3]	MD	403D14	403D14	Convert & Repair
403D9[4]	STD	—	—	Repair
403D10[4]	STD	—	—	Repair
403D11[4]	STD	—	—	Repair
403D12[4]	STD	—	—	Repair
403D13[4]	STD	—	—	Repair
403D14[4]	STD	—	—	Repair
403E1[2]	—	—	—	—
403E2[3]	MD	403E5	403E5	Convert & Repair
403E3[3]	MD	403E6	403E6	Convert & Repair
403E4[3]	MD	403E7	403E7	Convert & Repair
403E5[4]	STD	—	—	Repair
403E6[4]	STD	—	—	Repair
403E7[4]	STD	—	—	Repair

Note 1: Retain only enough for maintenance spares. Return for salvage when existing installations of DS 403As are removed from service.

Note 2: None of these sets were ever manufactured.

Note 3: Preliminary information indicates that conversion will cost about $200.00 per data set; see EL 851 for details.

Note 4: EL 851 announces latest codes (DS 403D9 through 14 and DS 403E5 through 7).

6. REFERENCES

6.01 The following Bell System Practices provide additional information on data sets 403A-, D-, and E-types and associated equipment.

SECTION	TITLE
Data Set 403A-Type	
594-023-100	Identification and Operation
594-023-200	Installation and Connections
594-023-300	Maintenance
594-023-500	Test Procedures
Data Set 403D-Type	
594-025-100	Description
594-025-101	Multiple Data Set Station—Description and Operation
594-025-201	Multiple Data Set Station—Installation and Connections
594-025-301	Multiple Data Set Station—Maintenance
594-025-501	Multiple Data Set Station—Test Procedures
594-025-151	Data Sets 403D- and 403E-Types—Theory of Operation and Supplementary Information
590-010-201	Data Sets—Multiple Installation Information
Data Set 403E-Type	
594-026-100	Single Receiver Station—Description and Operation
594-026-200	Installation and Connections
594-026-300	Single Receiver Station—Maintenance
594-026-500	Single Receiver Station—Test Procedures
Data Auxiliary Set 804G-Type	
598-048-100	Description and Operation
Data Auxiliary Set 804K-Type	
598-055-100	Identification
Miscellaneous	
590-100-110	8A-Type Data Unit—Identification
590-100-111	15A1, 15A2, and 15A3 Data Units—Identification
590-102-101	1B-Type Data Mounting—Identification
590-000-100	Implementation of Data Services—Interdepartmental Coordination
590-000-101	Description of Data Set Features and Options—Reference Guide
590-000-102	Data Service—Reference Guides—Cross-Reference Information

6.02 The following schematic drawings (SDs) and circuit descriptions (CDs) provide additional information on data sets 403A-, D-, and E-type and associated equipment.

NUMBER	TITLE
SD-&CD-1D072-01	Data Set 403A-Type
SD-&CD-1D074-01	Data Auxiliary Set 804C
SD-&CD-1D092-01	8A-Type Data Unit
SD-&CD-1D093-01	Data Set 403E-Type
SD-&CD-1D102-01	Data Auxiliary Set 804G-Type
SD-&CD-1D109-01	Data Auxiliary Set 804K-Type
SD-&CD-1D130-01	Data Set 403D-Type
SD-&CD-1D135-01	1B2 Data Mounting
SD-&CD-81878-01	31A-Type Power Unit

6.03 The following Engineering Letters (ELs) and Plant Engineering Letters (PELs) contain pertinent information on data sets 403A-, D-, and E-types and associated equipment.

NUMBER	TITLE
EL 51	Data Sets 403D- and 403E-Types; Data Auxiliary Sets 804G- and 804K-Types
EL 194	Data Sets 403D7, 403D8, and 403E4; 15A3 Data Unit
◗EL 851	Data Set 403D-Type, Data Set 403E-Type, and Data Auxiliary Set 804G◖
PEL 7497	Data Set 403A-Type; Data Auxiliary Set 804C

6.04 Interface information is given in the following:

Data Set 403A Interface Specification

Data Sets 403D and 403E Interface Specification