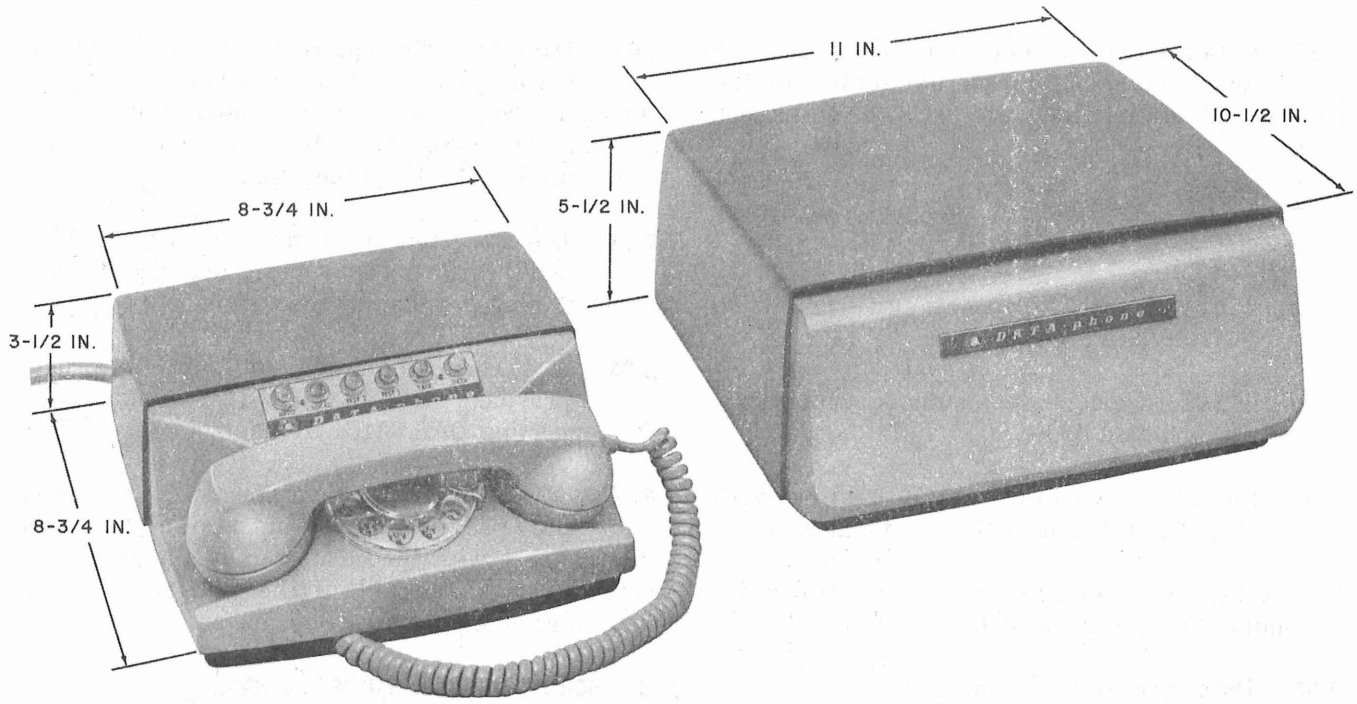
DATA SET 103A-TYPE

REFERENCE GUIDE



Data Auxiliary Set 804B1 and Data Set 103A-Type

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1. GENERAL

1.01 Data set 103A-type is a low-speed asynchronous serial frequency-shift voiceband transmitter-receiver operating at speeds up to 300 baud. Data sets 103A1 (inverted frequencies), 103A2, 103A2A, 103A2B, and 103A3 are used with customer-provided business machines and computer-type terminals in duplex service over the direct distance dialing (DDD) network.

Note: Some data sets 103A2 may be marginal for 300-baud operation. Therefore, data sets 103A2 are being service-center tested for proper operation at 300-bauds and recoded as follows:

103A2—has *not* been tested for proper operation at 300-baud and retains old code.

103A2A—has been tested and found to operate properly at up to 300 baud

103A2B—has been tested and found to operate properly at up to 200 baud but not at 300-baud.

1.02 This section is reissued to include information pertaining to data set 103A3 and to include new service order information. Since this issue is a general revision, change arrows have been omitted.

1.03 Data sets 103A1 and 103A2 require a data auxiliary set (DAS) 804B1 or a 567PB-61 telephone set (MD) for external control of the data set and for establishing the data set transmission path. The DAS or telephone set is arranged for voice communication on the switched network.

1.04 Data set 103A3 requires one of the following telephone sets for external control of the data set and for establishing the data set transmission path.

(a) 565HK telephone set equipped with rotary dial

(b) 2565HK telephone set equipped with TOUCH-TONE® dial

(c) 662A1 telephone set equipped with rotary dial and card dialer

(d) 2662A1 telephone set equipped with TOUCH-TONE dial and a card dialer.

The telephone sets are arranged for voice communications on the switched network.

1.05 Data transmission is accomplished over two frequency-shift channels. The frequency channel used by each station during a connection is determined by the station that originates the call.

2. PHYSICAL AND ELECTRICAL CHARACTERISTICS

2.01 Data sets 103A1 and 103A2 are an electronic package consisting of a data transmitter-receiver, logic and timing circuitry, impedance matching transformer and ringing detector, and a power rectifier combined in a 2-tone gray plastic case.

2.02 Data set 103A3 consists of a data set 103E5 data modem (applications using "inverted frequencies" use a 103E2 with the P47M664 mounting bracket removed or 103E4 data modem) and a 38A1 data mounting which has a 2-tone gray plastic housing similar to that provided with data set 103A1 or 103A2. Data set 103A3 may use a data set 103E6 data modem on a special assembly basis. This should only be done when problems with a standard 103A3 arise, such as in special applications involving long Unigauge loops,behind PBX installations, or any application when a delayed data set ready indication is needed. When a 103E6 data modem is substituted for the standard 103E5 data modem, data set 103A3 should be marked to note the deviation from a standard data set 103A3. For specific information on data set 103E6 data modem used in data set 103A3, refer to Memorandum "B" accompanying EL2163.

2.03 Data set 103A-type requires 117 Vac 60-Hz power supplied by the customer through a common 3-wire receptacle not under control of a switch. The data set is 11 inches wide, 10-1/2 inches deep, and 5-1/2 inches high.

2.04 The connection between the business machine and the data set is by means of a 25-conductor cord and plug provided by the customer.

2.05 A 35-conductor 5-1/2 foot D35C-61 cord is provided with data sets 103A1 and 103A2 for connecting DAS 804B1 to the data set.

2.06 A KS-16672-L1 50-pin female connector is provided on the rear of data set 103A3 to interconnect with the connector on the telephone set cord or B25A cable if the data set is to be located remote from the telephone set.

3. SERVICE ORDER INFORMATION

3.01 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 3.03 and 3.04. 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 590-001-100.

3.02 Service offerings and substitute data sets are given in Table A. Customer options and option designations for USOC DQC are given in Table B. Customer options and option designations for USOC DQL are given in Table C.

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

(a) ***DECISION A—With or Without Automatic Calling Unit:***

1. ***With Automatic Calling Unit:*** With this customer option, calls may be placed automatically using information provided by the business machine.

2. ***Without Automatic Calling Unit:*** With this customer option, all calls must be placed manually by the attendant.

(b) ***DECISION B—Automatic Answering—Permanently Wired or Key Controlled:***

3. ***Automatic Answering—Permanently Wired:*** With this customer option, the data set answers all incoming calls automatically. The AUTO button is rendered inoperative by blocking and cannot be used.

4. ***Automatic Answering—Key Controlled:*** With this customer option installed, the data set answers all incoming calls automatically when the AUTO button on

TABLE A

SERVICE OFFERINGS
CURRENT STANDARD AND SUBSTITUTE MODELS

USOC	FEATURE	MODEL	REMARKS
DQC++	3-row TTYs and COAM terminals (Inverted frequencies)	103A1 103A3 101-type	 Note 1 Note 2
DQL++*	4-row TTYs and COAM business machines; DDD network upright (normal) frequencies	103A3 103A2 101-type	 Note 3 Note 4

* Service orders concerning USOC DQL must specify the maximum baud rate at which the data set will be operating.

Note 1: Data set 103A3 can be substituted if the 103E5 modem is replaced by a 103E2 or 103E4 modem. The data set should be marked to note the deviation from a standard 103A3.

Note 2: Data sets 101-type can be substituted if frequencies are inverted for DATA-PHONE services per AT&T Drawing 38Y3987.

Note 3: Data set 103A2 may be marginal for 300-baud operation. For services requiring 300-baud operation, use data set 103A2A, which has been tested for proper operation at 300 bauds, or data set 103A3.

Note 4: Data sets 101-type can be substituted if modified per AT&T Drawing 38Y3988 for alternate voice for DATA-PHONE.

TABLE B

USOC DQC++ CUSTOMER OPTION DECISION TABLE

DECISION	OPTION	STRAP CONNECTION TB1	ITEM†
A	1. With Automatic Calling Unit 2. Without Automatic Calling Unit		B1
B	3. Automatic Answer—Permanently Wired 4. Automatic Answer—Key Controlled		B3
C	5. Terminal Will Respond to Disconnect 6. Terminal Will Not Respond to Disconnect	TI to LS* TI to NO	
D	7. Terminal Initiates Disconnect 8. Terminal Will Not Initiate Disconnect	D to LD* D to QD	
E	9. MARK Hold 10. SPACE Hold	HD to MH* HD to SH	

* Factory-furnished installer option.

† The ITEM column provides a reference to descriptive information contained in Section 590-000-101.

the attendant set is depressed. If the AUTO button is not depressed, the bell on the telephone set will ring until the attendant answers the call manually, or until the call is abandoned.

(c) ***DECISION C—Terminal Will or Will Not Respond to Disconnect:***

5. Terminal Will Respond to Disconnect: This customer option enables the data set to interpret a long space signal as a disconnect command which causes the data set to disconnect from the line without any action by its associated data terminal. The customer should be cautioned that no period of ***continuous*** space longer than 1.0 second should be transmitted during the message if this option is elected, as this may cause the data set to disconnect prematurely. The distant data set must be arranged for "initiate disconnect" if this option is selected.

6. Terminal Will Not Respond to Disconnect: If the customer does not want the data set to disconnect upon receipt of a long space signal, this option must be specified. The customer must then use an alternate means of disconnecting each station on a connection.

(d) ***DECISION D—Initiates Disconnect or Does Not Initiate Disconnect:***

7. Initiates Disconnect: This customer option enables one of the two stations on a dialed connection to control the disconnect of both stations. When one customer data terminal has completed a transmission and wishes to terminate the call, it turns off the data terminal ready lead on the interface, which causes the data set to send a long space disconnect signal and then disconnect itself from the line. The long space signal causes the distant data set to disconnect also if it is arranged to "respond to disconnect." The "initiate disconnect" option is usually desired and must be specified unless the customer equipment at both ends of the circuit is arranged to turn off the data terminal ready lead at the completion of each call.

TABLE C

USOC DQL++ CUSTOMER OPTION DECISION TABLE

DECISION	OPTION	STRAP TERMINALS ON TB1 OF 103A2	103A3 DESIGNATION	ITEM†
A	1. Rotary Dial 2. TOUCH-TONE Dial	Standard Not Available	Provided by 565HK or 662A1 Provided by 2565HK or 2662A1	
B	3. With Card Dialer 4. Without Card Dialer	Not Available Standard	Provided by 662A1 or 2662A1 Provided by 565HK or 2565HK	
C	5. Loss of Carrier Disconnect 6. No Loss of Carrier Disconnect	Not Available Standard	S w/o S*	
D	7. Send SPACE Disconnect 8. No Send SPACE Disconnect	D to LD* D to QD	T* w/o T	
E	9. Receive SPACE Disconnect 10. No Receive SPACE Disconnect	TI to LS* TI to NO	V* or H w/o V or H	
F	11. Auto Answer—Permanent 12. Auto Answer—Selectable			B3

* Factory-furnished installer option.

† The ITEM column provides a reference to descriptive information contained in Section 590-000-101.

Note 1: Data set 103A2 provides options for MARK or SPACE hold. See 3.05.

Note 2: Data set 103A3 provides options for answer mode indication CE OFF (factory-strapped) or CE ON after tripping of ringing. See 3.05.

Note 3: Data set 103A3 provides options for long (option V) or short (option H) SPACE disconnect. See 3.05.

Note 4: USOC DQL++ does not include telephone set or card dialer. These items must be ordered by a separate USOC.

8. Does Not Initiate Disconnect: If a customer wishes to control the disconnect action by turning the data terminal ready lead off at both ends of the connection, the "does not initiate disconnect" option may be specified. The data terminal must then accomplish the disconnect action at both ends of the circuit. One way this can be done is by sending an end of transmission (EOT) character at the completion of a message, which causes the distant data terminal to turn off the data terminal ready lead. The disconnect action can be completed in a shorter time by this "quick-disconnect" method.

(e) ***DECISION E—MARK or SPACE Hold:***

9. MARK Hold: When the data set is idle, or when carrier is not being received from the distant end of a connection, the received data lead on the interface is held in the mark condition. This is the standard option and should be used unless the customer specifically requests the SPACE hold option.

10. SPACE Hold: When the data set is idle, or when carrier is not being received from the distant end of a connection, the received data lead on the interface is held in the space

condition. This option is sometimes required for COAM teletypewriters which are arranged to "run open" when a permanent spacing condition is present while the machine is on-line. With this option in, a carrier-fail condition would be immediately evident to the operator.

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

(a) ***DECISION A—Rotary Dial or TOUCH-TONE Dial:***

1. ***Rotary Dial:*** Provides a telephone set or DAS with a rotary dial.

2. ***TOUCH-TONE Dial:*** Provides a telephone set with a TOUCH-TONE dial (requires data set 103A3).

(b) ***DECISION B—With or Without Card Dialer:***

3. ***With Card Dialer:*** Provides a telephone set equipped with a card dialer (requires data set 103A3).

4. ***Without Card Dialer:*** Provides a telephone or DAS set not equipped with card dialer.

(c) ***DECISION C—Loss of Carrier Disconnect or No Loss of Carrier Disconnect:***

5. ***Loss of Carrier Disconnect:*** With this customer option installed, the data set automatically disconnects when carrier is removed from the line or whenever the level of the incoming carrier drops below −53 dBm (requires data set 103A3).

6. ***No Loss of Carrier Disconnect:*** With this customer option installed, the data set remains connected when carrier is removed from the line.

(d) ***DECISION D—Send SPACE Disconnct or No Send SPACE Disconnect:***

7. ***Send SPACE Disconnect:*** This option enables one of the two stations on a dialed connection to control the disconnect of both stations. When one of the customer data terminals has completed a transmission and wishes to terminate the call, it turns off the data terminal ready lead at the interface, which causes the data set to send a long space disconnect signal and then disconnect itself from the line. The long space signal causes the distant data set to disconnect also if it is arranged to "receive SPACE disconnect." The "send SPACE disconnect" option is usually desired and must be specified unless the customer equipment at both ends of the circuit is arranged to turn off the data terminal ready lead at the completion of each call.

8. ***No Send SPACE Disconnect:*** If a customer wishes to control the disconnect action by turning the data terminal ready lead off at both ends of the connection, the "no send SPACE disconnect" option may be specified. The data terminal must then accomplish the disconnect action at both ends of the circuit. One way this can be done is by sending an end of transmission (EOT) character at the completion of a message, which causes the distant data terminal to turn off the data terminal ready lead. The disconnect action can be completed in a shorter time by this "quick-disconnect" method.

(e) ***DECISION E—Receive SPACE Disconnect or No Receive SPACE Disconnect:***

9. ***Receive SPACE Disconnect:*** This option enables the data set to interpret a long space signal, (1.5 seconds of continuous spacing) or a short space signal [400 ms of continuous spacing (data set 103A3 only)] as a disconnect command which causes the data set to disconnect from the line without any action by its associated data terminal. The customer should be cautioned that no period of ***continuous*** space longer than 1.0 second (long space) or 300 ms (short space) should be transmitted during the message if this option is elected as this may cause the data set to disconnect prematurely.

This distant data set must be arranged for "send SPACE disconnect" if this option is selected.

10. ***No Receive SPACE Disconnect:*** If the customer does not want the data set to disconnect upon receipt of a long or short space signal, this option must be specified. The customer must then use an alternate means of disconnecting each station on a connecton.

(f) ***DECISION F—Auto Answer—Permanent or Selectable:***

11. ***Auto Answer—Permanent:*** With this customer option, the data set answers all incoming calls automatically. For data sets 103A1 and 103A2, the AUTO button is rendered inoperative by blocking and cannot be used. For data set 103A3, the AUTO button will remain operated until released by the MANUAL ANS button.

12. ***Auto Answer—Selectable:*** With this customer option installed, the data set answers all incoming calls automatically when the AUTO button on the attendant set is depressed. If the AUTO button is not depressed, the bell on the telephone set rings until the attendant answers the call manually, or until the call is abandoned.

3.05 ***Additional Customer Option Information for USOC DQL:*** Data sets 103A2 and/or 103A3 have additional options which must be specified in the remarks column of the service order.

(a) ***With or Without Automatic Calling Unit:*** Data sets 103A2 and 103A3 may be used with a DAS 801-type ACU. See DECISION A in 3.03 for descriptive information in this section and ITEM B1 in Section 590-000-101.

(b) ***MARK or SPACE Hold:*** Data set 103A2 provides options for MARK or SPACE hold. MARK hold is the EIA standard, and the data set is factory-strapped for this option. See DECISION E in 3.03 for descriptive information.

(c) ***Long or Short SPACE Disconnect:*** Data set 103A3 provides options for long or short SPACE disconnect. Long SPACE disconnect (1.5 seconds of continuous spacing) is standard and the data set is strapped for this option.

(d) Data set 103A3 provides options for answer mode indication CE ON or CE OFF after ringing is tripped. Answer mode indication CE OFF is factory-provided.

(e) Data set 103A3 provides options for common or separate CB/CF indications. The common CB/CF indication is factory-furnished.

3.06 ***Telephone Company Engineering Options:*** The only telephone company engineering option is the transmit levels of f_1 and f_2 frequencies, which must be adjusted to arrive at the serving central office with a power level of -12 dBm.

4. CONVERSION AND DISPOSITION INFORMATION

4.01 For conversion and disposition information of data set 103A-type, refer to Table D.

TABLE D

CONVERSION AND DISPOSITION INFORMATION
FOR DATA SETS 103A-TYPE

DATA SET	MFG STATUS	REPLACED BY DATA SET	CONVERTIBLE TO	RECOMMENDATION
J1D103-L1	MD	103A1	103A1 or 103A2	*† Repair and Convert
103A1	MD	—	103A2	†Repair or Convert
103A2‡	MD	—	—	†Repair
103A3	Note 1	—	—	†Repair

* Recode per PEM 9360 (Oct. 11, 1965).

† As needed.

‡ Some data sets 103A2 have been tested for proper operation at 300 baud. Data sets that have been tested will be redesignated as follows;

- Data set 103A2A — passed test for 300-baud operation
- Data set 103A2B — failed test for 300-baud operation.

Data sets that have *not* been tested for proper operation at 300 baud will retain designation of data set 103A2.

Note 1: Data set 103A3 is not a manufactured item. It is made up of "C" stock 103E5 data modem and 38A1 data mounting, which has a housing similar to that provided with data set 103A1 or 103A2.

5. REFERENCES

5.01 The following Bell System Practices (BSPs), schematic drawings (SDs), circuit descriptions (CDs) and Technical References provide additional information on data set 103A-type and associated equipment.

SECTION	TITLE
Bell System Practices Data Set 103A1 and 103A2	
591-014-100	Description and Operation
591-014-200	Installation and Connections
591-014-300	Maintenance
591-014-500	Test Procedures
Data Set 103A3	
591-014-101	Description and Operation
591-014-201	Installation and Connections
591-014-301	Maintenance
591-014-501	Test Procedures
Data Set 103E-Type	
591-025-100	Identification
Data Auxiliary Sets	
598-010-Series	DAS 801A-Type
598-012-Series	DAS 801C-Type
598-031-100	DAS 804B1
Telephone Sets	
502-541-415	565HK
502-543-405	2565HK
502-617-402	662A1
502-619-402	2662A1

NUMBER	TITLE
SDs and CDs	
1D034-01	Data Set 103A-Type
1D147-01	Data Sets 103E5 and 103E6
1D245-01	Data Set 103A3
1D082-01	DAS 801A-Type
1D103-01	DAS 801C3, 4

NUMBER	TITLE
Technical References	
PUB 41101	Data Set 103A Interface Specification
PUB 41102	Data Set 103A3, 103E, 103G, 103H, Interface Specification
PUB 41601	DAS 801A (ACU) Interface Specification
PUB 41602	DAS 801C (ACU) Interface Specification