# DATA SERVICE UP TO 1200 BPS ON THE SWITCHED NETWORK PROVIDED BY DATA SET 202C-TYPE—REFERENCE GUIDE


Data Set 202C-Type

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## 1. GENERAL

1.01 Data service at up to 1200 bps on the switched network is provided by data set (DS) 202C-type. DS 202C [Manufacture Discontinued (MD)] is a medium-speed, nonsynchronous, frequency-shift-keyed (FSK), serial, voiceband transmitter-receiver. DS 202C-type operates on 2-wire [half-duplex (HDX)] facilities.

**1.02** This section is reissued to:

- Correct USOC DRA
- Revise option tables.

Since this reissue constitutes a general revision, arrows ordinarily used to indicate changes have been omitted.

**1.03** Customer interface signals have the electrical characteristics of Electronic Industries Association (EIA) Standard RS-232-B, with optional contact interface on some earlier model data sets.

**1.04** Automatic operation on the switched network is defined as unattended operation. This includes both manual and/or automatic call origination and answering, and manual and/or automatic termination because some sets can be arranged for key control of these features.

**1.05** For switched network operation, data set 202C can provide automatic operation. For automatic call origination, an automatic calling unit (ACU) is required and must be ordered separately.

**1.06** For switched network applications, the line control function, auto answer, and voice capability are provided by an integrated telephone set.

**1.07** All data sets 202-type are line compatible and different types of data sets may be used to provide a particular service. Consideration must be given to the specific features and limitations of each data set type.

## 2. PHYSICAL AND ELECTRICAL CHARACTERISTICS

**2.01** DS 202C-type is an integrated unit combining a data transmitter-receiver, a line control unit, and a 6-button telephone set in a 2-tone gray plastic case. The data set measures 10-3/4 inches wide, 14-3/4 inches deep, 5-1/2 inches high, and weighs approximately 16 pounds.

**2.02** The data set requires 117-volt ±10 percent, 60 ±3 Hz power supplied by the customer through a grounded 3-wire receptacle.

**2.03** DS 202C-type is designed to operate in an environment with a temperature range of +40 to +120°F and a relative humidity range of 20 to 95 percent.

## 3. SERVICE ORDER INFORMATION

**3.01** Service orders for data services should describe the desired service by uniform service order code (USOC). 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 set apparatus, the oldest apparatus that will perform the service described by USOC should be used first. When the desired data set model is not available from telephone company (telco) stock (field or class C), the use of an available substitute is preferred over the purchase of a new current model. Customer option decisions which must be made to determine the USOC suffixes are listed in 3.04. The USOC suffix ***encoding*** and ***decoding*** procedures are described in Section 590-000-100. 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.

**3.02** Service order information is provided in the following tables:

- Table A—Service Offerings
- Table B—DATAPHONE® 1200 Customer Options for Data Set 202C-Type
- Table C—Telco-Engineered Timing Options for DATAPHONE 1200 Using Data Set 202C-Type
- Table D—Customer-Engineered Timing Options for DATAPHONE 1200 Using Data Set 202C-Type
- Table E—Telco Options for DATAPHONE 1200 on the Switched Network Using Data Set 202C

**3.03** Because of the variety of configurations available for providing the services described

TABLE A

SERVICE OFFERINGS

| USOC (NOTE 1) | FEATURE | APPARATUS REQUIRED | NOTES |
|---|---|---|---|
| DRA++ | Send and receive up to 1200 bps on the switched network. Rotary dial telephone without reverse channel. Individually housed data set with integrated telephone. | DS 202C9<br>DS 202C5<br>DS 202C1 | —<br>2<br>2 and 3 |
| DRF++ | Same as DRA with reverse channel. | DS 202C10<br>DS 202C6<br>DS 202C2 | 4<br>2 and 4<br>2, 3, and 4 |
| DRC++ | Same as DRA with TOUCH-TONE dial. | DS 202C11<br>DS 202C7 | —<br>2 |
| DRL++ | Same as DRF with TOUCH-TONE dial. | DS 202C12<br>DS 202C8 | 4<br>2 and 4 |

*Note 1:* Determine USOC suffix from customer option table and Section 590-000-100.

*Note 2:* When connected to an ESS office, this data set requires the same applique as presently used with key telephone sets connected to an ESS office to provide open-circuit switching interval protection (OSIP). A special line applique circuit (SD-1A297-01) should be assigned to each line associated with this data set and the line classed as OSIP. This data set is *not* compatible with Unigauge lines.

*Note 3:* Soft carrier turnoff is permanently installed.

*Note 4:* Sets with reverse channel installed can be used to provide service where reverse channel is not required, if desired.

in this section, the required service cannot always be uniquely identified by the USOC and a 2-digit suffix. Additional information in these cases must be provided in the REMARKS section of the service order. Information in this part will aid the user in determining what additional information must be specified on the service order and what apparatus is required to provide the service.

## CUSTOMER OPTIONS

**3.04** The following paragraphs provide detailed information on customer options listed in Table B for services provided by DS 202C-type. To provide the type of service desired by the customer, one of the two options under each decision must be selected.

### *Decision A—EIA Voltage (RS-232-B) or Contact Interface*

1. The EIA voltage interface should be selected when the customer data terminal requires an EIA voltage on the ring indicator and data terminal ready interface leads.

2. The contact interface provides a contact closure on the ring indicator and data terminal ready is replaced by a contact closure to give ready and remote release operations. This option is

TABLE B

DATAPHONE 1200 CUSTOMER OPTIONS FOR DATA SET 202C

| DECISION | OPTION | |
|---|---|---|
| | DESCRIPTION | DESIGNATION |
| A | 1. EIA voltage interface (RS-232-B)<br>2. Contact interface | M<br>M |
| B | 3. Not associated with ACU<br>4. Associated with an ACU | —<br>Z |
| C | 5. Telco engineered timing options<br>6. Customer engineered timing options | (Table C)<br>(Table D) |
| D<br>(Note 1) | 7. With automatic answer<br>8. Without automatic answer | —<br>— |
| E<br>(Note 2) | 9. Automatic answer permanently wired<br>10. Automatic answer key controlled | Q or ZD<br>ZE or ZC |

*Note 1:* If decision D-7 is selected, decision E is required. If decision D-8 is selected, decision E is not required.

*Note 2:* Options Q and ZE are used when the EIA interface option is chosen (decision A-1). Options ZD and ZC are used when the contact interface option is chosen (decision A-2).

required by some older business machines and Bell System Type 2 DATASPEED service.

### *Decision B—With or Without 801-Type Automatic Calling Unit (ACU)*

3. When an 801-type ACU is used, the wiring strap (ZJ) in the data set which is associated with this application is stored.

4. When an 801-type ACU is used, this option (ZJ) wires a spare key in the data set to place ground on the ring side of the line when depressed. This allows a means to originate calls manually on a ground start line in case of ACU failure.

### *Decision C—Telco- or Customer-Engineered Timing Options*

5. Telco-engineered timing options are listed in Table C. These options are engineered to maximize the protection against interfering phenomena.

6. Customer-engineered timing options are to be selected from Table D. The options selected must be specified on the service order with descriptive remarks. The customer is responsible for the operation and interface trouble analysis for systems with customer-engineered timing options during the system startup period. The telco is responsible for the steady state performance of these systems after the startup period. Option B5 is recommended.

### *Decision D—With or Without Automatic Answer*

7. With automatic answer, decision E must be made.

8. Without automatic answer, no automatic answer is posible. Decision E is not required.

TABLE C

TELCO-ENGINEERED TIMING OPTIONS FOR DATAPHONE 1200 USING DATA SET 202C

| OPTION | |
|---|---|
| DESCRIPTION | DESIGNATION |
| a. Squelch IN (156 ms) | R |
| b. Clear-to-Send (Note 1) IN (200 ±20 ms) | (Standard) |
| c. Carrier Soft Turnoff (Note 2) IN (24 ms) | ZY |
| d. Carrier Detector Acquisition Timing Normal | (Standard) |
| e. Received Data Clamp IN | V |

*Note 1:* The clear-to-send timing interval is fixed at 200 ±20 ms.

*Note 2:* Soft carrier turnoff option is available in DS 202C5-12, all series.

***Decision E—Automatic Answer Permanently Wired or Key-Controlled***

9. With automatic answer permanently wired, voltage interface requires that the business machine place +5 to +25 volts on data terminal ready (CD) lead (used with decision A1). Contact interface requires only that the business machine connect the CD lead to the remote control common lead (used with decision A2).

10. With automatic key-controlled, voltage interface requires that the AUTO ANS button be depressed and that the business machine place +5 to +25 volts on the data terminal ready lead. The customer may answer calls either manually or automatically under control of the key (used with decision A1). Contact interface requires that the AUTO ANS button be depressed and that the business machine connect the CD lead to the remote control common lead. The customer may answer calls either manually or automatically under control of the key (used with decision A2).

***Telco Option Information***

**3.05** Table E shows the telco option designations applicable to DATAPHONE 1200 on switched network facilities.

## 4. SERIES INFORMATION

**4.01** Table F shows the series changes to DS 202C-type. These series changes resulted from significant modifications to the data sets.

## 5. CONVERSION AND DISPOSITION INFORMATION

**5.01** For information on conversion and disposition of DS 202C-type, refer to Table G.

## 6. MAINTENANCE SPARE GUIDELINES

**6.01** To reduce the types of data sets in field stock, a universal spare may be used for a group of in-service data sets containing various features. For recommended substitute data sets which should be stocked for maintenance spares, refer to Table H.

## TABLE D

### CUSTOMER-ENGINEERED TIMING OPTIONS FOR DATAPHONE 1200 USING DATA SET 202C

| OPTION | |
|---|---|
| **DESCRIPTION** | **DESIGNATION** |
| a. Squelch | |
| OUT | ZM |
| IN (156 ms) | R |
| b. Clear-to-Send (Note 1) | |
| IN (200 ±20 ms) | (Standard) |
| c. Carrier Soft Turnoff (Note 2) | |
| OUT | ZZ |
| IN (24 ms) | ZY |
| d. Carrier Detector Acquisition Timing | |
| Normal | (Standard) |
| e. Received Data Clamp | |
| IN | V |
| OUT | U |

*Note 1:* The clear-to-send timing interval is fixed at 200 ±20 ms.

*Note 2:* Soft carrier turnoff option is available in DS 202C5-12, all series.

TABLE E

TELCO OPTIONS FOR DATAPHONE 1200 ON THE SWITCHED NETWORK USING DATA SET 202C

| OPTION | |
|---|---|
| DESCRIPTION | DESIGNATION |
| Bit Rate (Note 1) | |
| 900 bps or less | ZA |
| Over 900 bps | ZB |
| Reverse Channel (Note 2) | |
| IN | T |
| OUT | S |
| Amplitude Equalizer | |
| IN | F |
| OUT | E |
| Delay Equalizer | |
| IN | B |
| OUT | A |
| Transmit Line Signal Level (dBm) (Note 3) | |
| 0 | K |
| −3 | J |
| −6 | H |
| −9 | G |
| Reverse Channel Transmit Signal Level (dBm) | |
| −3 | ZF |
| −6 | ZG |
| −9 | ZH |
| 2-Wire Service (Notes 4 and 5) | Z |
| 4-Wire Service | Y |
| Termination | |
| 600-ohm (Note 4) | X |
| 900-ohm | W |
| Use With 801-Type ACU | ZJ |
| Use With 6017AP Key | ZV |

*Note 1:* Always install option ZB.

*Note 2:* Reverse channel is provided by wiring option.

*Note 3:* Zero to 13 dBm continuously adjustable in 1-dB steps on DS 202C5-8, series 4 and later; DS 202C9-12, series 3 and later; and DS 202C1 and 2, series 10 and later.

*Note 4:* This option is in DS 202C to allow use on either private line or switched network.

*Note 5:* In addition to strapping arrangements on TB2, the following arrangements must be made on the 11C apparatus unit:

(a) 2-Wire Service (Option Z) — white conductor of handset cord to GN of 4010B network; other white conductor of handset cord to R of 4010B network.

(b) 4-Wire Service (Option Y) — white conductor of handset cord to terminal 1 of TB6; other white conductor of handset cord to terminal 2 of TB6.

TABLE F

SERIES INFORMATION FOR DATA SETS 202C

| DATA SET | DATA SET SERIES NO.* | PURPOSE OF MODIFICATION |
|---|---|---|
| 202C1,2 | 1 | Initial manufacture |
| 202C1,2 | 2 | To guard against the reception of false space transition upon transmitter turnoff. |
| | 3 | To protect the data set against excessive ambient electrical noise. |
| | 4 | To modify data set wiring. |
| | 5 | To reduce distortion in the receiver. |
| | 6 | To allow use of 6017AP key. |
| | 7 | To replace the J87235A1 power supply with a 17A power unit. |
| 202C5-8 | 1 | Initial manufacture to provide soft carrier turnoff as an option. |
| 202C1,2 | 8 | To guard against dropping the line during the remote test. |
| 202C5-8 | 2 | |
| 202C9-12 | 1 | Initial manufacture to provide new line control for ESS and Unigauge compatibility. |
| 202C1,2 | 9 | To replace 17A power unit with 48A power unit for additional power line noise protection and to lengthen holdover timing. |
| 202C5-8 | 3 | |
| 202C9-12 | 2 | |
| 202C1,2 | 10 | To comply with the signal level restraints in F.C.C. Tariff 263. |
| 202C5-8 | 4 | |
| 202C9-12 | 3 | |
| 202C1,2 | 11 | To suppress transient spike across tip and ring. |
| 202C5-8 | 5 | |
| 202C9-12 | 4 | |

TABLE F (Cont)

SERIES INFORMATION FOR DATA SETS 202C

| DATA SET | DATA SET SERIES NO.* | PURPOSE OF MODIFICATION |
|---|---|---|
| 202C1,2 | 12 | To prevent improper operation of the carrier detector circuit under certain combinations of acceptable telephone line characteristics and customer signaling patterns. |
| 202C5-8 | 6 | |
| 202C9-12 | 5 | |
| 202C1,2 | 13 | To provide new circuit packs but with no new features. |
| 202C5-8 | 7 | |
| 202C9-12 | 6 | |
| 202C9-12 | 7 | To change formed cable to woven cable. |
| 202C1,2 | 14 | To modify operational characteristics during remote testing. |
| 202C5-8 | 8 | |
| 202C9-12 | 8 | |
| 202C9-12 | 9 | To change woven cable back to formed cable. |

* Data set series number is stamped on base pan.

TABLE G

CONVERSION AND DISPOSITION INFORMATION

| DATA SET | LATEST SERIES | MFG. STATUS | REPLACED BY | CONVERTIBLE TO | UPDATE & REPAIR RECOMMENDATION |
|---|---|---|---|---|---|
| J1D202AL1 | — | MD | 202C1 | — | Scrap |
| 202C1 | 14 | MD | 202C5 | 202C2 | Series 1-6, 8 and 11 |
| 202C2 | 14 | MD | 202C6 | 202C1 | Series 1-6, 8 and 11 |
| 202C3 | — | Never Mfg. | — | — | — |
| 202C4 | — | Never Mfg. | — | — | — |
| 202C5 | 8 | MD | 202C9 | 202C6 | Series 2 and 5 |
| 202C6 | 8 | MD | 202C10 | 202C5 | Series 2 and 5 |
| 202C7 | 8 | MD | 202C11 | 202C8 | Series 2 and 5 |
| 202C8 | 8 | MD | 202C12 | 202C7 | Series 2 and 5 |
| 202C9 | 9 | MD | — | 202C10 | Series 4 and 5 |
| 202C10 | 9 | MD | — | 202C9 | Series 4 and 5 |
| 202C11 | 9 | MD | — | 202C12 | Series 4 and 5 |
| 202C12 | 9 | MD | — | 202C11 | Series 4 and 5 |

TABLE H

MAINTENANCE SPARE GUIDELINES

| SETS IN SERVICE | MAINTENANCE SPARE | NOTES |
|---|---|---|
| J1D202AL1<br>202C1 | 202C1 | — |
| J1D202AL1<br>202C1<br>202C2 | 202C2 | 1 |
| J1D202AL1<br>202C1<br>202C2<br>202C5<br>202C6 | 202C6 | 1 |
| J1D202AL1<br>202C1<br>202C2<br>202C5<br>202C6<br>202C9<br>202C10 | 202C10 | 1 |
| 202C7 | 202C7 | 2 |
| 202C7<br>202C8 | 202C8 | 1, 3 |
| 202C7<br>202C8<br>202C11<br>202C12 | 202C12 | 1, 4 |

*Note 1:* Disable reverse channel when appropriate to provide proper service.

*Note 2:* DS 202C7 can be temporarily replaced by DS 202C5. Replace with TOUCH-TONE unit when available.

*Note 3:* DS 202C8 can be temporarily replaced by DS 202C6. Replace with TOUCH-TONE unit when available.

*Note 4:* DS 202C12 can be temporarily replaced by DS 202C10. Replace with TOUCH-TONE unit when available.

## 7. REFERENCES

**7.01** The following BSPs provide additional information on DS 202C-type and associated equipment.

| SECTION | TITLE |
|---|---|
| 590-000-100 | Implementation of Data Services— Interdepartmental Coordination |
| 590-000-101 | Description of Data Set Features and Options |
| 590-000-102 | Reference Guides—Cross Reference Information |
| 592-015-100 | Data Set 202C-Type Transmitter-Receiver—Description and Operation |
| 592-015-200 | Data Set 202C-Type Transmitter-Receiver—Installation and Connections |
| 592-015-300 | Data Set 202C-Type Transmitter-Receiver—Maintenance |
| 592-015-500 | Data Set 202C-Type Transmitter-Receiver—Test Procedures |
| 598-012-101 | Data Auxiliary Sets 801C3 and 801C4—Description and Operation |

**7.02** The following schematic drawings (SDs) and circuit descriptions (CDs) contain pertinent information on DS 202C-type:

| NUMBER | TITLE |
|---|---|
| SD-&CD-1A297-01 | Electronic Switching System No. 1 Arranged With 2-Wire Features—Special Line Applique Circuit |
| SD-&CD-10048-01 | Data Set 202C-Type Transmitter-Receiver Circuit |