DATA SET 212A

TESTING FROM FIELD LOCATIONS

USING J1P005 AUTOMATIC DATA TEST SYSTEM (ADTS)

CONTENTS PAGE

1. GENERAL

1.01 This section provides self-test and field-test information for data set (DS) 212A. Digital loopback and error run tests are provided using the J1P005 ADTS. These procedures are to be used when testing DS 212A on an initial installation or during a maintenance visit.

1.02 When this section is reissued, the reason for reissue will be presented in this paragraph.

1.03 The self tests require no external test equipment, and are included here for completeness.

1.04 This section contains information for testing DS 212A by means of DIVA (Digital Inquiry Voice Answer). The DIVA requires a TOUCH-TONE* dial telephone, or a rotary dial telephone used with a KS-21799-L1 (or equivalent) portable TOUCH-TONE pad.

1.05 In this section, the term "user" refers to telephone company (telco) personnel at the data set responsible for interfacing the data set with the ADTS.

1.06 Test circuitry built into DS 212A permits the following self tests to be performed: analog loopback, digital loopback, remote digital loopback, and end-to-end. Additional tests require the use of external test equipment such as a 921A data test set (DTS) and/or the ADTS.

1.07 Detailed self-test procedures are presented in paragraphs 4.02 through 4.09.

1.08 General ADTS test information is presented in paragraphs 5.01 through 5.25. Detailed ADTS test procedures are presented in paragraphs 5.26 through 5.45.

2. INSTALLATION TESTS

2.01 This part provides the sequence in which tests are to be performed following installation of

*Trademark.

the data set. This test sequence (Fig. 1) provides a method of verifying that the installation is satisfactory. Before proceeding with the tests, verify that the local loop meets the requirements specified in Section 314-205-501.

3. MAINTENANCE TESTS

3.01 This part provides the sequence in which tests are to be performed when clearing a trouble report and during a maintenance visit to the data station.

3.02 When a trouble report is received, a test center is responsible for isolating the trouble to the data station or the transmission facility. The procedure for doing this is shown in Fig. 2.

3.03 If the trouble seems to be in the data station equipment, a telco employee must be dispatched to conduct more extensive tests at the data station. The following equipment should be taken on a trouble visit:

- 921A DTS
- Spare DS 212A.

3.04 Troubleshooting is performed by the ADTS using the digital loopback test or error run test. If the trouble is isolated to the data set, replace the data set and repeat the test.

3.05 If the trouble persists after the tests have been completed, proceed as follows:

(a) Check that options installed in data set agree with those specified on service order.

(b) Verify that customer-provided equipment (CPE) has been tested and is operating properly.

(c) Check for physical damage to data station equipment.

(d) Verify that all cords and connectors are properly connected.

(e) Check for intermittent trouble in station wiring.

(f) Verify that data set and CPE are connected to a common ground.

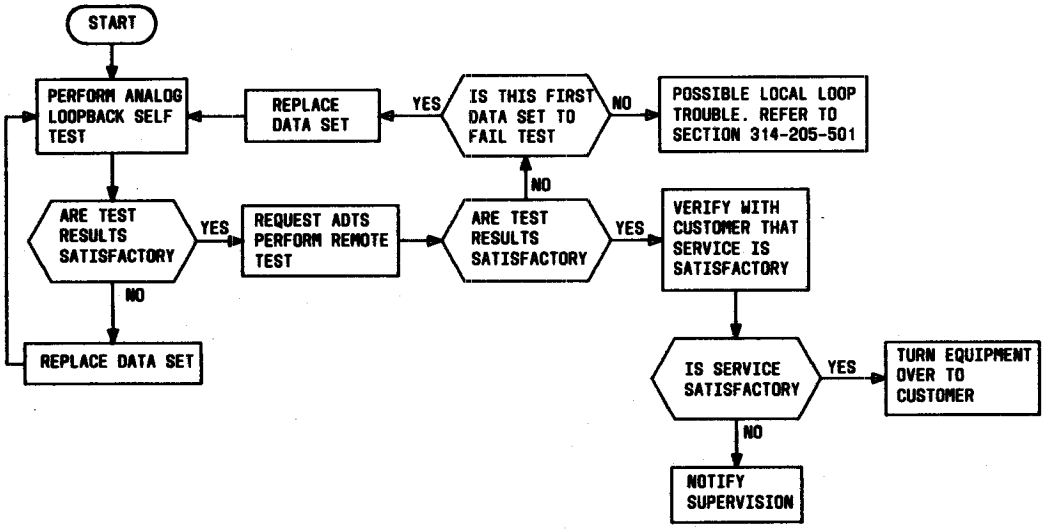

Fig. 1—Installation Test Sequence

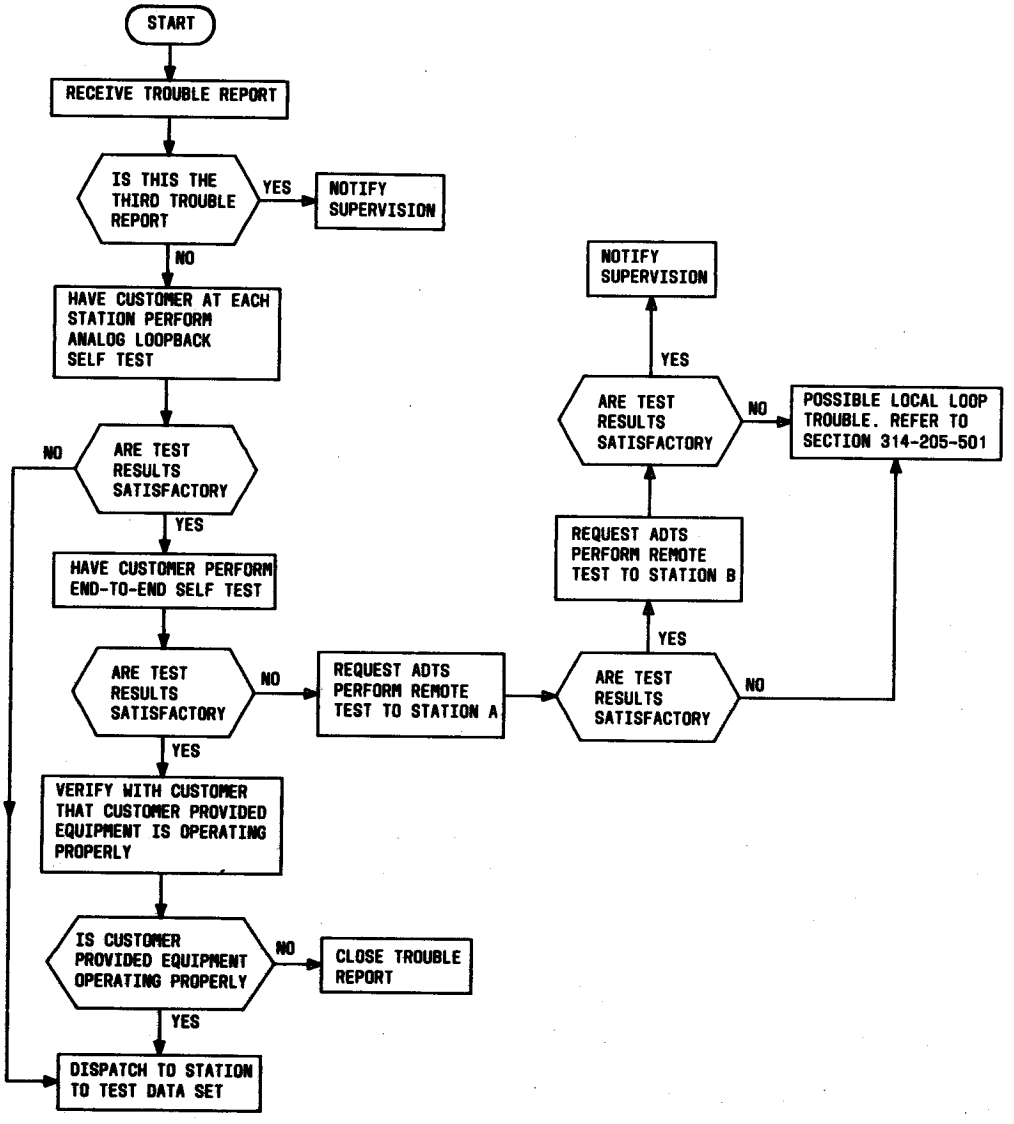

Fig. 2—Clearing Trouble Report

(g) If trouble persists, request help from immediate supervisor, who may then obtain technical support from DATEC (Data Technical Support) per Section 010-521-100.

4. SELF-TEST PROCEDURES

4.01 This part provides procedures for the installation and maintenance self tests.

A. Analog Loopback Self Test

4.02 The analog loopback self test checks the data set transmitter and receiver. The customer interface is not checked. Test data (dotting pattern) generated by the data set is looped internally from the transmitter output to the receiver input. The received data is compared to the transmitted data. This test can be performed in either the high-speed or low-speed mode. If the data set is operating in the low-speed mode, the MC lamp blinks if the distortion threshold (25 percent) is exceeded. If the data set is operating in the high-speed mode, the MC lamp blinks if a bit error is detected in the received data. Perform the test in the speed mode used by the customer provided equipment (CPE). The speed mode is selected by use of the HS switch on the data set (depressed for high-speed mode, released for low-speed mode).

4.03 Perform the test as follows:

(1) Depress AL and ST switches on data set.

Requirements: MB and TM indicators are lighted. MC indicator goes off after SD and RD indicators light. TR indicator is lighted when ST or DL switch is depressed. MR indicator is lighted if option ZF is installed in data set.

(2) Observe MC indicator for 1 minute.

Requirement: MC indicator does not blink.

(3) Release AL and ST switches.

B. Digital Loopback Self Test

4.04 This test uses the digital loopback capability of the data set at one end and the self-test (pattern generating and comparing) capability of the data set at the other end. The test is performed by putting one data set in the DL mode, placing the other data set in the ST mode, placing a call, and then going to the data mode. The MC indicator on the data set that is in the ST mode blinks if the distortion threshold (25 percent) is exceeded in the low-speed mode or if a bit error is detected in the received data in the high-speed mode. Perform the test in the speed mode used by the CPE. The speed mode is selected by use of the HS switch on the data set (depressed for high-speed mode, released for low-speed mode).

Note: In the low-speed mode, the distant data set may be 103J, 103JR, 113C, 113CR, 113D, or 113DR. In the high-speed mode, the distant data set must be a 212A-type.

4.05 Perform the test as follows:

(1) Place a call to distant station. If distant data set is already in DL mode, it will answer automatically.

(2) If distant data set does not answer automatically, instruct attendant at distant station to depress DL switch and go to data mode.

(3) On local data set, depress ST switch and go to data mode.

(4) Observe MC indicator on local data set for 2 minutes.

Requirements

- Low-Speed—If MC indicator stays off, both data sets and the line facilities are operating properly. If MC indicator blinks or remains lighted, the round-trip distortion is exceeding 25 percent. Since the distortion in the two directions may be additive, no conclusion about the proper operability of the data sets and the line facilities may be drawn.
- High-Speed—Maximum of six blinks.

(5) Release ST switch on local data set. Call distant station and have DL switch released.

C. Remote Digital Loopback Self Test

4.06 This test uses the remote digital loopback and self-test capabilities of the local data set and can be used to test both data sets and the line facilities in the high-speed mode only. The local data set

is placed in the self-test mode by depressing the ST switch. The distant data set is placed in the remote digital loopback mode by depressing the RDL switch on the local data set. The local data set pattern generator is used to send a signal to the distant data set, where it is looped back and retransmitted. The error-detecting circuitry causes the MC indicator on the local data set to blink when an error is detected in the received data.

Note: If the distant data set is equipped with option YL (receiver responds to digital loop—OUT) or option ZG (automatic answer—OUT), this test cannot be performed.

4.07 Perform the test as follows:

(1) Depress HS, RDL, and ST switches on local data set and verify that TM indicator lights.

(2) Dial a call to distant data set.

(3) When distant data set has answered, place local data set in data mode.

(4) Observe MC indicator on local data set for 2 minutes.

Requirement: Maximum of six blinks.

Note: If MC indicator is lighted continuously, this may indicate that distant data set is not in DL mode.

(5) Release RDL and ST switches on local data set. Return local data set to speed mode used by CPE.

D. End-to-End Self Test

4.08 This test can be used to check the local data set, the distant data set, and the line facilities. This test is performed by depressing the ST switch at each end, placing a call from one end to the other, and then going to the data mode. Each data set sends the test pattern to the other end. The speed mode of the test is selected at the originating station. The error-detecting circuitry at each end monitors the received data signal and causes the MC indicator to blink if the distortion threshold (25 percent) is exceeded (low-speed) or if a bit error is detected (high-speed). Perform the test in the speed mode used by the CPE.

Note: For low-speed testing, the distant end may be a DS 103J, 103JR, 113C, 113CR, 113D, or 113DR. In the high-speed mode, the distant data set must be a 212A-type.

4.09 Perform the test as follows:

(1) Call distant station and arrange to conduct an end-to-end self test. At originating station, speed mode is selected by use of HS switch on data set (depressed for high-speed mode, released for low-speed mode).

(2) Depress ST switch on each data set. Verify that TM indicator lights.

(3) Go to data mode at each station. Verify that MC indicator goes off after SD and RD indicators light. TR indicator is lighted when ST or DL switch is depressed. HS indicator is lighted or off, depending on speed mode of test.

(4) Observe MC indicator on data set for 2 minutes.

Requirements:

- Low-Speed—If MC indicator stays off, both data sets and the line facilities are operating properly. If MC indicator blinks or remains lighted, the distortion is exceeding 25 percent.

- High-Speed—Maximum of two blinks.

(5) At end of test, go to talk mode and then release ST switch on each data set.

5. ADTS TEST PROCEDURES

A. General

5.01 This part provides instructions necessary for the proper operation of ADTS from field data sets. Included are instructions for entering and leaving the system and for performing installation and maintenance tests.

5.02 Operations involving ADTS require man/machine interaction. With DIVA, the information is entered into ADTS by tones from a TOUCH-TONE dial. The system outputs a message by a voice response unit, and the user receives the message via the telephone handset.

Every entry from a TOUCH-TONE dial must be followed by a TOUCH-TONE star (*) except when calling the DIVA port number. To

avoid repetition, the star entry has not been included in the text but should be understood as included whenever an entry is mentioned.

5.03 The ADTS must be on-line and DIVA must be up to accept DIVA tests.

Functions Available via DIVA (Table B)

5.04 The test functions available via DIVA initiate a static or dynamic test of a data set. When 3 is used as a prefix with a test function, a fast test is performed on the data set without review of the line card information and without receiving test instructions.

5.05 ***Test Function List:*** With an entry of 8, DIVA will respond with a message of all test functions that can be performed on DS 212A.

5.06 ***Digital Loopback Test:*** This function provides a digital loopback test of DS 212A by the ADTS. The digital loopback test is initiated by entering 35; the fast digital loopback test by entering 335.

5.07 ***Results:*** This function provides results of the most recent test of the data set. The results function is initiated by entering 7. In response to the results function entry, the ADTS gives the audible query WHAT IS THE TELEPHONE OR SPECIAL SERVICE CIRCUIT NUMBER? After receiving a number, the ADTS outputs the results in a format similar to the following:

THE TEST RESULTS ARE:

THE DATA SET CODE IS (data set code)

THE RECEIVED SIGNAL LEVEL IS OUT OF LIMITS

WHAT IS THE FUNCTION YOU WISH TO PERFORM?

5.08 ***Stop:*** This function stops the present function and requests a new function. The stop function is initiated by entering #73.

5.09 ***Off:*** This function stops the present function and disconnects the DIVA port. The off function is initiated by entering #63.

Accessing ADTS

5.10 Access to ADTS by DIVA is obtained by placing a call to a DIVA port number. Depending on the mode of ADTS and the mode of DIVA, one of four actions will occur:

(a) Busy signal; all DIVA ports are busy. Try again later.

(b) Call not answered; either ADTS is off-line or DIVA is in the down mode.

(c) Call answered; the user will hear a 1-second burst of answer tone. Following the answer tone will be the audible query: THIS IS THE AUTOMATIC DATA TEST SYSTEM. PLEASE ENTER THE PASSWORD. Once the password has been entered, the system responds with PLEASE ENTER THE FUNCTION YOU WISH TO PERFORM.

(d) Call answered; the user will hear the password query and then the following: THE ADTS IS OFF-LINE. PLEASE ENTER THE FUNCTION YOU WISH TO PERFORM. The ADTS must be put on-line by entering ONLIN to the function query on a terminal at the ADTS.

5.11 The user may shorten the password-function request formalities by inputting both the password and the desired function in one entry (no intervening *). If both the password and function are valid, ADTS begins executing the function immediately. To shorten the time required to set up a test, answers to familiar questions asked by DIVA may be given while the question is being spoken.

5.12 Information is entered into ADTS by letters or numbers on the TOUCH-TONE dial. Numbers are entered into ADTS by depressing the desired digits on the TOUCH-TONE dial. Letters are entered into ADTS by using the following format:

(a) Depress #.

(b) Depress button with desired letter.

(c) Depress a number (1, 2, or 3) corresponding to the letter's position on the button [depressed in (b)].

5.13 In response to a YES or NO question, the following format is used:

(a) YES, enter one (1).

(b) NO, enter zero (0).

5.14 The user can repeat to the last spoken message, by entering #* (Table A).

Performing Tests

5.15 To start a test, the user enters the desired number code from Table B. The ADTS response is WHAT IS THE TELEPHONE OR SPECIAL SERVICE CIRCUIT NUMBER? After the number has been entered, the ADTS response is YOU HAVE ENTERED (telephone or special service circuit number). IS THAT CORRECT? The user enters 1 for YES or 0 for NO. If the response is incorrect, ADTS repeats the original query.

5.16 If the response is correct, ADTS will attempt to find a line card file (LCF). If an LCF is found, ADTS will use the data set code to find the test program. If there is a test program for the data set code and test function entered, ADTS will continue. If no test program is found, ADTS will abort the test with the following message: THE ADTS CANNOT RUN SELECTED TEST ON THIS DATA SET. [Since there is a test program available for DS 212A (35)

TABLE A

TOUCH-TONE CODES FOR DIVA

FUNCTION	DEPRESS BUTTON(S)	DESCRIPTION
1, 2, 3, . . .etc.	Appropriate button(s)	Digits
#	#	Prefix character.
*	*	TOUCH-TONE star. Used at end of all entries as EOL character.
A,B,C, . . .etc.	Depress number sign, button on which character appears, and digit corresponding to the relative position of the letter (1,2, or 3). Example: For the letter A #21	Alphabetic characters.
Yes	1*	Answer yes to a question.
No	0*	Answer no to a question.
Repeat	#*	Repeats last message spoken by the system.
Telephone Number	Example: 3115552368*	Enter telephone number in sequence followed by EOL.
Data Set Code	Example: 202#23* Example: 202#235* Example: 401#515*	202C 202C5 401J5
Data Set Transmit Level	Example: 12*	-12 dBm. Eliminate sign and units designation. Enter numerical value.

TABLE B

FUNCTIONS AVAILABLE VIA DIVA

FUNCTION	DESCRIPTION	NORMAL	FAST
Test List	Lists valid test functions.	8*	
Digital Loopback Test	Tests data set in digital loopback mode.	35*	335*
Error Run Test	Tests a data set with data test set connected.	37*	337*
Results	Outputs results of most recent test of a data set.	7*	
Stop	Stops present function and requests new function.	#73*	
Off	Stops present function and disconnects.	#63*	

this response indicates that the wrong test code was entered.]

5.17 If both an LCF and test program are found, the LCF information is given to the user. The user is then given a chance to make any necessary changes.

5.18 If no LCF is found, the ADTS response is THE DATA SET IS NOT ON FILE. ENTER THE DATA SET CODE. The user must then answer this question and others to create an LCF. In this case the entry would be 212#21*. After entry of the data set code, ADTS checks for the test program.

5.19 After the LCF information has been given or after new line card information has been entered, ADTS instructs the user TO CORRECT ERRORS ENTER ONE. IF NO ERRORS, ENTER ZERO. If a 1 is entered, ADTS repeats the line card information query.

5.20 If no corrections are made to the LCF, ADTS asks ARE YOU CALLING FROM THE DATA SET? If the user is calling from a data set, the user must hang up. The ADTS will then call the data set for testing. After the test has been completed, ADTS calls the data set again to give the user the results of the test. The test instructions direct the user on this procedure.

5.21 The ADTS asks the user DO YOU WANT INSTRUCTIONS? If requested, ADTS will supply test instructions. These instructions are to prompt the user, not to replace the data set BSP instructions.

5.22 After the instructions, ADTS gives the following message: WHEN READY, ENTER ONE. Upon receipt of a 1, ADTS responds THANK YOU. A pause will follow the thank you message as ADTS attempts to seize the hardware needed for the test. If the test hardware is busy performing another test or a self test, ADTS gives the following message: THE ADTS TEST EQUIPMENT IS BUSY, PLEASE WAIT. When the test hardware becomes available, ADTS outputs THE TEST IS READY TO START.

5.23 At completion of the test, the user receives a short message describing the test results. When the data set fails, the system gives the reason(s) for failure. After giving the results of the data set test, the system returns to the function query.

Leaving ADTS

5.24 ***Manual Abort:*** Whenever the system is expecting user input, the user can abort the operation by entering #73 (the letter S) or #63 (the letter O). The letter S, for STOP, causes ADTS to abort the operation and return to the function query. The letter O, for OFF, causes ADTS to abort the operation and the DIVA port to hang up.

5.25 ***Automatic Abort:*** The ADTS automatically performs the equivalent of a user OFF if the user does not respond to a system request. Thirty seconds without a user entry after the original function query, ADTS will repeat the query. Thirty seconds after the second query without a user entry, ADTS will repeat the query for the third time. Thirty seconds after the third query without a user entry, ADTS will abort the task and hang up. If incorrect or illogical entries are made three successive times, ADTS will perform the equivalent of an OFF. After

each invalid entry, an appropriate error message such as THE NUMBER IS INVALID, PLEASE RE-ENTER will be spoken. After a third invalid entry, ADTS will abort the task and hang up.

B. Digital Loopback Test

5.26 Call the DIVA port number of the serving ADTS, using a TOUCH-TONE (TT) dial or pad. A 1-second answer tone will be heard in the handset. After the answer tone will be the following: THIS IS THE AUTOMATIC DATA TEST SYSTEM. PLEASE ENTER THE PASSWORD.

Note 1: If the above message is not heard, refer to paragraph 5.10.

Note 2: TOUCH-TONE stars are shown hereafter as required.

5.27 Enter the 4-character password, followed by a *, on the TT dial. ADTS will respond with PLEASE ENTER THE FUNCTION YOU WISH TO PERFORM.

5.28 Enter 35* on the TT dial. (The fast test, which omits line card review and test instructions, may be requested by entering 335*.) ADTS will respond with DIGITAL LOOPBACK TEST. WHAT IS THE TELEPHONE OR SPECIAL SERVICE CIRCUIT NUMBER?

5.29 Enter the data set telephone number, followed by *, on the TT dial. ADTS will respond with YOU HAVE ENTERED (telephone number). IS THAT CORRECT?

5.30 If the number is correct, enter 1* on the TT dial. If the number is incorrect, enter 0* on the TT dial.

5.31 If 0* was entered, the query in paragraph 5.28 will be repeated. If 1* was entered, ADTS will respond with THE DATA SET CODE IS 212A. THE DATA SET HAS THE HIGH-SPEED OPTION. TO CORRECT ERRORS, ENTER ONE. IF NO ERRORS ENTER ZERO. Enter 0* to change the data set code. The ADTS will respond ENTER THE DATA SET CODE. Follow this with an entry of 212#21* to select DS 212A. The ADTS will respond YOU HAVE ENTERED 212A. IS THAT CORRECT? To respond "yes" enter 1*; to respond "no" enter 0*. The ADTS continues: DOES THE DATA SET HAVE THE HIGH-SPEED OPTION? To respond "yes" enter 1*; to respond "no" enter 0*.

5.32 The ADTS continues: ARE YOU CALLING FROM THE DATA SET? To respond "yes" enter 1*; to respond "no" enter 0*. The ADTS then asks DO YOU WANT TO ORIGINATE THE TEST FROM THE DATA SET? Enter 1* if the data set will call the ADTS; enter 0* if the ADTS will call the data set.

Note: The automatic hardware-controlled handshaking sequence for DS 212A differs slightly for the two cases.

5.33 Next the ADTS asks the following question for all cases except where the user is not calling from the data set and the test is to originate from the ADTS: DO YOU WANT TO RUN THE TEST IN THE LOW-SPEED MODE? In reply to this question, enter 1* for "yes"; enter 0* for "no." If, where the data set is to call the ADTS as specified in paragraph 5.32, the choice of test speed conflicts with the in-service option for that data set, the ADTS will respond THE DATA SET IS NOT OPTIONED FOR THE REQUESTED SPEED and repeat the question in this paragraph.

5.34 This question follows: DO YOU WANT INSTRUCTIONS? To respond "yes" enter 1*; to respond "no" enter 0*. If the reply was 1* (and for an example of a test where the user is calling from the data set, the test is originated by ADTS, and the test is run in low-speed mode) the ADTS will respond as follows: DEPRESS THE DL BUTTON TO PLACE THE DATA SET IN DIGITAL LOOPBACK MODE. ON THE TONE, HANG UP. THE ADTS WILL CALL AND TEST THE DATA SET. WHEN THE TEST IS COMPLETED, THE ADTS WILL CALL THE DATA SET TO REPORT THE TEST RESULTS, OR YOU MAY CALL THE ADTS AND REQUEST THE TEST RESULTS.

5.35 The ADTS then asks DO YOU WANT THESE INSTRUCTIONS REPEATED? To respond "yes" enter 1*; to respond "no" enter 0*. A 1* causes the instructions to be repeated.

Note: The instructions given differ significantly depending on the type of test specified. The instructions for the test described in paragraph 5.34 are continued throughout this practice as a representative example.

5.36 The ADTS next gives the message WHEN READY ENTER ONE. When the user is satis-

fied that the instructions are understood, enter 1*, to which the ADTS responds THANK YOU.

> ***Note:*** When the call is initiated from the data set, the ADTS will send 2 seconds of 1-kHz tone. This is followed by the message HANG UP. The ADTS will then call the data set within 1 minute to perform the test.

5.37 To speed up the test procedure, enter 335* in response to PLEASE ENTER THE FUNCTION YOU WISH TO PERFORM. (This omits test instructions and the opportunity to make corrections.) Enter only the telephone number of the data set and the choice of test type in response to questions asked by DIVA (ARE YOU CALLING FROM THE DATA SET?, DO YOU WANT TO ORIGINATE THE TEST FROM THE DATA SET?, and DO YOU WANT TO RUN THE TEST IN THE LOW-SPEED MODE?) and the test will begin immediately.

5.38 The fast loopback test begins by measuring the level of the answer tone (ADTS originated only) from the remote data set. Then the signal looped back from the remote data set is checked for correct speed and format. This is followed by a 60-second bit error run. If during the test a malfunction is detected, the test will be aborted and appropriate error messages given. For a test where the user is not calling from the data set and the test originates from the ADTS, a high-speed run follows the low-speed run immediately without announcing results if the detected errors for the low-speed run are acceptable. This is the only DIVA test in which both a low-speed and a high-speed run are executed.

5.39 At the completion of the test, the ADTS reports test results to the calling telephone line. Test results announced for a successful or failed test include the measured level(s) of the received signal (ADTS originated only), the number of bit errors detected, and appropriate test status and/or error messages. At the completion of the test in the given example, ADTS will call the data set. The user answers in talk mode. The ADTS continues: TO RECEIVE THE TEST RESULTS ENTER ONE. The user replies by entering 1*. ADTS responds to 1* by reporting the results.

5.40 On satisfactory conclusion of the test, the ADTS gives the results as follows:

THE TEST RESULTS ARE:

THE RECEIVED LEVEL IS (−11 to −38) DBM.

THE DATA SET TESTS OK.

5.41 If the data set failed the test, one or more of the following messages is given:

- RINGING WAS NOT DETECTED.
- DIAL TONE WAS DETECTED.
- THE CARRIER SIGNAL DID NOT GO OFF.
- THE RECEIVED SIGNAL LEVEL IS OUT OF LIMITS.
- THE NUMBER OF BIT ERRORS DETECTED WAS TOO HIGH.
- THE NUMBER OF RECEIVER ERRORS WAS TOO HIGH.
- THE DATA SET IS UNABLE TO ADAPT TO THE ORIGINATOR.
- THERE HAS BEEN AN ADTS TEST EQUIPMENT MALFUNCTION. TRY AGAIN LATER.
- THE TEST COULD NOT BE COMPLETED DUE TO BAD RECEIVED SIGNAL.
- THE DATA SET DID NOT ANSWER.
- THE ADTS RECEIVER LOST SYNCHRONIZATION.
- AN ERROR COUNTER OVERFLOW OCCURRED.
- THE TEST CALL COULD NOT BE COMPLETED.

5.42 The ADTS continues: PLEASE ENTER THE FUNCTION YOU WISH TO PERFORM. If another test is to be run, enter the function code from Table B. If no other test is to be performed at this time, enter #63* to disconnect from the DIVA port.

5.43 For those tests in which the user called from the data set (as in this example), the ADTS calls the data set with the results at the completion of the test. The user should expect to receive this call approximately 2 minutes after entering 1* in response to WHEN READY ENTER ONE (paragraph 5.36).

5.44 When the user did not call from the data set, the ADTS gives test results via the (separate) telephone that made initial contact with ADTS. This telephone must remain off-hook throughout the test, and the user should expect to receive the results within 2 to 4 minutes after entering 1* in response to WHEN READY ENTER ONE (paragraph 5.36).

5.45 After test results are announced they are automatically stored in the ADTS Testlog File, and Recent Results File.

6. REFERENCES

6.01 Additional information concerning the DS 212A and use of the ADTS is contained in the following publications:

SECTION	TITLE
107-402-100	921A Data Test Set—Description and Operation
314-205-501	Data Systems—DATAPHONE® Service and Data Access Arrangements on Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines
590-010-500	J1P005 Automatic Data Test System (ADTS)—Operation From Field Locations
592-034-100	Data Set 212A-L1A/2A Transmitter-Receiver—Description and Operation
592-034-200	Data Set 212A-L1A/2A Transmitter-Receiver—Installation and Connections
592-034-500	Data Set 212A-L1A/2A Transmitter-Receiver—Test Procedures Using 914-Type Data Test Set