DIGITAL DATA SYSTEM
510A-TYPE DATA SERVICE UNIT
TEST PROCEDURES

CONTENTS PAGE

1. GENERAL

1.01 This section contains procedures to be used when testing the 510A-type data service unit (DSU) at the station location. Procedures to be used when isolating troubles in a 510A-type DSU are given in Section 595-201-103, Digital Data System—510A-Type Data Service Unit—Maintenance.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The tests covered in this section are described as follows.

A. End-to-End Self-Test: This test checks the DDS channel between two stations by remotely looping back the DSU at the distant station and checking for errors at the port circuit pack (CP) ER indicator during a 1-minute error run.

B. Local Test: This test allows a particular port of the DSU to be tested through the customer interface connector by creating a data path from the BA lead through the multiplexing portion of the common circuits and back through the port logic to the BB lead. A test message is transmitted over the SD lead and the returned test word on the RD lead is compared with the transmitted test word for errors.

C. DSU Functional Test: This test verifies proper operation of the customer interface circuits in a particular DSU port. This test also checks the ability of a DSU port to transmit and receive data and control codes in conjunction with the associated office channel unit (OCU). In addition, the port is monitored for response to control codes, generated by the serving test center (STC), which determine loopback modes. Voice coordination with the STC via a DDD circuit is required to perform this test.

D. Straightaway Test: This test evaluates the performance of the DDS channel between the hub office and the DSU through a 15-minute error performance run coordinated with the STC. Voice coordination with the STC via a DDD circuit is required to perform this test.

E. Remote Line Loopback Test: This test checks the DDS channel between two stations by remotely looping back the DSU at the distant station and performing a 5-minute error run test.

F. 112A Power Unit Test: This test checks the 112A power unit for the presence of correct output voltages at the terminal strip (TS1) on the rear of the power unit.

1.04 Tests B, C and D should be performed in the order given for installation testing. When performing maintenance tests, any of the tests may be performed individually or in any combination.

1.05 The tests given in this section are to be used to test each DSU port individually, thus allowing any ports not experiencing trouble to continue operation without being affected.

1.06 If the DSU nest or entire DSU must be replaced and the replacement DSU fails any one of the installation tests, the local loop cable pairs may be the trouble source and should be checked as specified in Section 314-410-310, Digital Data System—Local Loop—Maintenance Procedures.

Customer permission should be obtained prior to conducting any test given in this section to ensure that the data channel is idle.

2. APPARATUS

2.01 This part lists the test equipment that is required at the customer location to perform the installation and maintenance tests in this section.

2.02 A list of the test equipment and the tests in which they are used is given below:

TEST EQUIPMENT	TEST
• 914C data test set (DTS)	
(J79914C-L1) or equivalent	
or	B, C, D and E
• 921A DTS (J79921A-L1)	
• KS-16979-L1 volt-ohm-milliammeter (VOM) or equivalent	
or	F
• 921A DTS (J79921A-L1)	

3. TEST PROCEDURES

3.01 This part contains the procedures necessary to perform the tests described in Part 1. Since any of the tests B through F can be performed using one of the two items of test equipment mentioned in 2.02, procedures using both of these items of test equipment will be included separately under each test heading.

In the following tests, when the STC is requested to transmit and/or receive a test signal, the signal should be transmitted and/or received on the subrate (nonmultiplexed) channel under test unless otherwise specified.

A. End-to-End Self-Test

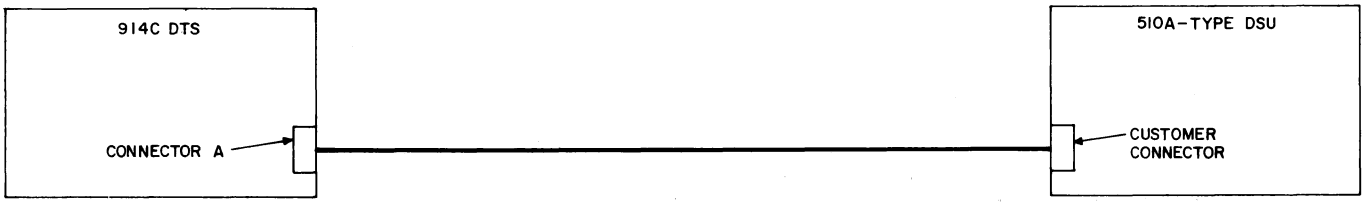
STEP	ACTION	VERIFICATION
	Note: The DSU at the distant station must be installed and operating before this test can be performed.	
1	Apply power to the DSU if power has been removed.	POWER ON indicator on KD21 CP lighted.
2	Press ST key on port CP faceplate.	ER indicator extinguished.
3	Perform a 1-minute error run.	ER indicator is extinguished and does not blink more than one time.
4	Restore the DSU to normal by pressing (releasing) the ST key on the port CP.	

Initial Test Setup

3.02 The procedures for initial setup of the 914C and 921A DTS, when used to perform any of the remaining tests in this section, are given below. These procedures should be performed before referring to the desired test.

STEP	ACTION	VERIFICATION
	914C DTS	
1	Connect the interface connector cable, provided with the 914C DTS, from connector A on the DTS to the interface connector on the port to be tested.	
2	Insert the DTS power plug into a 117-volt 60-Hz ac outlet.	
3	Program the DTS with ten matrix pins and position the switches in accordance with Fig. 1.	
4	Press the DTS POWER switch.	POWER indicator lighted.
	921A DTS	
	Note: Interface indicator DTR on the 921A DTS should be disregarded when performing any test in this section.	
1	Connect the DTS to the customer interface connector on the desired port using the interface cords provided with the DTS.	
	Note: The interface cord is equipped with a 37-pin connector on each end. A 6-inch adapter cord matches the interface cord to the 25-pin interface connector on the DSU port CP.	
2	Verify that all 37 interface selector switches (white bow-tie) on the front of the DTS are in the NORM position.	
3	Insert the 921A DTS power cord plug into a 117-volt 60-Hz ac outlet.	
4	Remove the EIA RS-232-C interface card from the storage area in the DTS and ensure that all 25 interface lead switches are in the MON position.	
5	Insert the interface card into the slot on the right side of the DTS and close the latch.	

STEP	ACTION	VERIFICATION



914C DTS MATRIX PROGRAM

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	STG	
GRD	o	o	o	o	o	o	●	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	GRD
SD	o	●	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	SD
RD	o	o	●	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	RD
SI	o	o	o	●	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	SI
DSI	o	o	o	o	●	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	DSI
DS2	o	o	o	o	o	●	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	DS2
S2	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	S2
DS3	o	o	o	o	o	o	o	●	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	DS3
TPI	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	TPI
TP2	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	TP2
S3	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	S3
DS4	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	DS4
DS5	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	DS5
S4	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	S4
SCT	o	o	o	o	o	o	o	o	o	o	o	o	o	o	●	o	o	o	o	o	o	o	o	o	o	o	SCT
S5	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	S5
SCR	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	●	o	o	o	o	o	o	o	o	o	SCR
DS6	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	DS6
S6	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	S6
DS7	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	DS7
DS8	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	DS8
S7	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	S7
TP3	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	TP3
S8	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	S8
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	STG	

914C DTS SWITCH SETTINGS
(ALL OTHER SWITCHES NOT USED)

SWITCH	SETTING
INTERFACE MODE	VOLTAGE
SI	OFF
TEST SET MODE	SER
COUNTER	BIT ERRORS
FUNCTION	OFF
RCV BIT RATE	EXT +
RCV WORD LENGTH	5I1
WORD SYNC	AUTO
ALL INTERFACE	
SELECTOR SWITCHES	DEPRESSED
TRANSMIT BIT RATE	EXT +
TRANSMIT WORD LENGTH	5I1
TRANSMIT SIG LEV	±4V

INDICATOR LIGHT DESIGNATIONS

DSI	CLEAR TO SEND
DS2	DATA SET READY
DS3	RECEIVED LINE SIGNAL DETECTOR

Fig. 1—914C DTS Switch Positions

6	Operate the POWER switch on the 921A DTS to ON.	POWER ON indicator lighted.
7	Apply power to the DSU if power has been removed.	POWER ON indicator on KD21 CP lighted.
8	Press RST key on the DTS.	Display indicates— 921A VERS #01, briefly, then indicates DATA SET: if the DTS is not defective.

STEP	ACTION	VERIFICATION
		If the DTS is defective, TEST FAILED appears on the display.
9	Select the 510A DSU by entering 99 on the DTS input keyboard. ***Note:*** To delete a wrong entry on the input keyboard, press the backspace arrow.	Display indicates— DATA SET: 99.
10	Press GO key.	Display indicates— BIT RATE:
11	Select the port service rate by entering one of the following on the DTS input keyboard— • 24 for 2.4-kb/s port • 48 for 4.8-kb/s port • 96 for 9.6-kb/s port	Display indicates— BIT RATE: followed by either 24, 48, or 96.
12	Press GO key. ***Note:*** If GO or TST key is pressed at an unauthorized point in a test, the test is terminated and the DTS recycles to this step.	Display indicates— TEST SEQ:

B. Local Test

914C DTS

1	If this is the first test, perform initial setup described in the beginning of 3.02.	
2	Apply power to the DSU if power has been removed.	POWER ON indicator on KD21 CP lighted.
3	Press the LL switch on the faceplate of the port CP under test.	At the KD26 port CP— If the DSU port is equipped with option ZE (DSR ***on*** during RL or LL test)— LL and DM indicators lighted. If the DSU port is equipped with option YE (DSR ***off*** during RL or LL test)— LL indicator lighted; all others extinguished.
4	Position the 914C DTS switch S1 to ON.	At the 914C DTS— DS1 and DS3 indicators lighted; DS2 indicator remains extinguished. NO CLOCK and NO DATA indicators extinguished.
5	Press the DTS counter RESET button.	Counter displays zero errors.

STEP	ACTION	VERIFICATION
6	Position DTS switch S1 to OFF.	If the DSU port is equipped with option ZF (permanent request-to-send)— DS1 and DS3 indicators remain lighted and DS2 indicator remains extinguished. If the DSU port is equipped with option YF (switched request-to-send)— DS1 and DS3 indicators extinguished and NO DATA indicator lighted.
7	If no further tests are to be performed, disconnect the DTS and press (release) the LL switch on the port CP faceplates.	
921A DTS		
1	If this is the first test, perform the initial setup described in the beginning of 3.02.	
2	Operate interface lead switch 19, on the interface card, to the TERM position.	
3	Press the LL switch on the faceplate of the port CP under test.	If the port CP is equipped with options YE or YF— At the KD26 port CP— LL indicator lighted; all others extinguished. At the DTS— All interface indicators (RLSD, DSR, RS and CS) extinguished. If the port CP is equipped with option ZE— At the KD26 port CP— LL and DM indicators lighted. At the DTS— DSR indicator lighted. If the port CP is equipped with option ZF— At the KD26 port CP— LL, RS, CS and RR indicators lighted. At the DTS— RLSD and CS indicators lighted.
4	Select the control for the request-to-send (RS) lead by entering 36 on the DTS.	Display indicates— TEST SEQ: 36 RS = ? (0 or 1).
5	Press key number 1.	Display indicates— TEST SEQ: 36 RS = 1 (0 or 1).

STEP	ACTION	VERIFICATION
6	Press GO key.	At the DTS— Display indicates— TEST COMPLETE, briefly, then displays TEST SEQ: Interface indicators RLSD, RS and CS on DTS lighted; DSR extinguished.
7	Select error test (DOT, SPACE, MARK, and PSEUDORANDOM WORD) by entering 55 on the DTS.	Display indicates— TEST SEQ: 55.
8	Press GO key.	Display indicates— SELECT ERROR TEST, briefly, then D=DT 0=SP 1=MK 2=2047 5=511 6=63 is displayed.
9	Press key number 2.	Display indicates— 2047 BIT ERROR TEST, briefly, then 1=BIT ERRORS 2=BLOCK ERRORS is displayed.
10	Press key number 1.	Display indicates— ???? SECONDS.
11	Select 10 seconds by entering 0010 on the DTS. ***Note:*** To perform the following functions, press associated key.	

KEY	FUNCTION
A	Restart test
B	Display time remaining in test
C	Clear display
D	End test
E	Insert errors into the data stream
F	Force out-of-sync

Display indicates—
0010 SECONDS, briefly, then 0000 BITS IN ERROR is displayed.
From this point, the DTS counts the number of errors received. At the end of the test, the display indicates TEST COMPLETE, then total SYNC LOSSES, then the total BITS IN ERROR, repeatedly.

STEP	ACTION	VERIFICATION
		Requirement: Zero BITS IN ERROR.
12	Press TST key on DTS input keyboard to stop repetition of display in Step 11.	Display indicates— TEST SEQ:
13	Select the control for the RS lead by entering 36 on the DTS.	Display indicates— TEST SEQ: 36 RS=? (0 OR 1).
14	Press key number 0.	Display indicates— TEST SEQ: 36 RS=0 (0 OR 1).
15	Press GO key.	If the port is equipped with option ZF (permanent request-to-send)— Display indicates— TEST COMPLETE, briefly, then TEST SEQ: is displayed. Interface indicators CS and RLSD on DTS lighted. If the port is equipped with option YF (switched request-to-send)— Display indicates— TEST COMPLETE, briefly, then TEST SEQ: is displayed. Interface indicators RS, CS and RLSD on DTS extinguished.
16	If no further tests are to be performed, disconnect the DTS and press (release) the LL switch on the port CP faceplate.	

C. DSU Functional Test

914C DTS

1	If this is the first test, perform the initial setup described in the beginning of 3.02.	
2	Apply power to the DSU if power has been removed.	POWER ON indicator on KD21 CP lighted.
3	Request the STC to transmit repeated idle control code.	
4	Position the 914C DTS switch S1 to ON.	If the DSU port is equipped with option ZH (circuit assurance active)— DS2 indicator on DTS lighted; DS1 and DS3 indicators extinguished. RS and DM indicators on port CP lighted. If the DSU port is equipped with option YH (circuit assurance inactive)—

STEP	ACTION	VERIFICATION
		DS1 and DS2 indicators on DTS lighted; DS3 indicator extinguished. RS, DM and CS indicators on port CP lighted.
5	Request the STC to transmit a repeated MUX-OUT-OF-SYNC control code.	If the DSU port is equipped with option ZG (system status active)— DS2 indicator on 914C DTS and DM indicator on port CP extinguished.
6	Request the STC to transmit repeated bytes with a "1" inserted in position 8.	DS1, DS2 and DS3 indicators on 914C DTS lighted.
7	Request the STC to transmit a repeated 511-bit test word.	
8	Reset the DTS counter by momentarily pressing the RESET switch.	914C DTS counter reads zero errors during a 10-second interval.
9	Press the RT switch on the faceplate of the port CP under test.	DS1, DS2 and DS3 indicators on DTS extinguished. DM, CS and RR indicators on port CP extinguished and RT indicator lighted.
10	Request the STC to make a 10-second error check.	
11	Press (release) the RT switch on the faceplate of the port CP under test.	RT indicator on port CP extinguished.
12	Request the STC to transmit the DSU loopback control code.	RT and RS indicators on port CP lighted; all others extinguished.
13	If no further tests are to be performed, disconnect the DTS and restore all switches on the port CP to their nonoperated position.	
921A DTS		
1	If this is the first test, perform the initial setup described in the beginning of 3.02.	
2	Operate interface lead switch 19, on the interface card, to the TERM position.	
3	Request the STC to transmit repeated idle control code.	
4	Select the control for the RS lead by entering 36 on the DTS.	Display indicates— TEST SEQ: 36 RS=? (0 OR 1).
5	Press key number 1 on DTS.	Display indicates— TEST SEQ: 36 RS=1 (0 OR 1).

STEP	ACTION	VERIFICATION
6	Press GO key.	If the DSU port is equipped with option ZH (circuit assurance active)— Display indicates— TEST COMPLETE, briefly, then TEST SEQ: is displayed. DTS interface indicators DSR and RS lighted; RLSD and CS extinguished. If the DSU port is equipped with option YH (circuit assurance inactive)— Display indicates— TEST COMPLETE, briefly, then TEST SEQ: is displayed. DTS interface indicators DSR, RS and CS lighted; RLSD extinguished.
7	Request the STC to transmit repeated MUX-OUT-OF-SYNC control code.	If the DSU port is equipped with option ZG (system status active)— DSR interface indicator on DTS and DM indicator on port CP extinguished.
8	Request the STC to transmit repeated bytes with a "1" inserted in position 8.	DTS interface indicators RLSD, DSR, CS and RS lighted.
9	Request the STC to transmit a repeated 2047-bit test word.	
10	Select error test (DOT, SPACE, MARK and PSEUDORANDOM WORD) by entering 55 on DTS.	Display indicates— TEST SEQ: 55.
11	Press GO key.	Display indicates— SELECT ERROR TEST, briefly, then D=DT 0=SP 1=MK 2=2047 5=511 6=63 is displayed.
12	Press key number 2 on DTS.	Display indicates— 2047 BIT ERROR TEST, briefly, then 1=BIT ERRORS 2=BLOCK ERRORS.
13	Press key number 1 on DTS.	Display indicates— ???? SECONDS.
14	Select 10 seconds by entering 0010 on DTS. ***Note:*** To perform the following functions, press associated key. **KEY** — **FUNCTION** A — Restart test B — Display time remaining in test	

STEP	ACTION	VERIFICATION
	C Clear display	
	D End test	
	E Insert errors into the data stream	
	F Force out-of-sync	Display indicates— 0010 SECONDS, briefly, then 0000 BITS IN ERROR is displayed. From this point, the DTS counts the number of errors received. At the end of the test, the display indicates TEST COMPLETE, then total SYNC LOSSES, then the total BITS IN ERROR, repeatedly. ***Requirement:*** Zero BITS IN ERROR.
15	Press TST key on DTS input keyboard to stop repetition of display in Step 14.	Display indicates— TEST SEQ:
16	Press the RT switch on the faceplate of the port CP under test.	RT and RS indicators on port CP lighted.
17	Request the STC to make a 10-second error run.	DTS interface indicators RLSD, DSR and CS extinguished.
18	Press (release) the RT switch on the faceplate of the port CP under test.	RT indicator on port CP extinguished; DM, RS, CS and RR indicators lighted. DTS interface indicators RLSD, DSR, CS and RS lighted.
19	Request the STC to transmit the DSU loopback control code.	RT and RS indicators on port CP lighted; all others extinguished. DTS interface indicators RLSD, DSR and CS extinguished.
20	If no further tests are to be performed, disconnect the DTS and restore all switches on the port CP to their nonoperated position.	

D. Straightaway Test

914C DTS

1	If this is the first test, perform the initial setup described in the beginning of 3.02.	
2	Apply power to the DSU if power has been removed.	POWER ON indicator on KD21 CP lighted.

STEP	ACTION	VERIFICATION
3	Request the STC to transmit a repeated 511-bit test word and to check the received 511-bit test word for errors.	
4	Position the 914C DTS switch S1 to ON.	DS1, DS2 and DS3 indicators on 914C DTS lighted. DM, CS, RS and RR indicators on the faceplate of the port CP lighted.
5	Reset the DTS counter by momentarily pressing the RESET switch.	DTS counter registers zero errors and OVERFLOW indicator extinguished.
6	Start timing a 15-minute interval.	Maximum number of errors is three counted by the 914C DTS and three counted by the STC KS-20908 DTS.
7	If three or less errors are counted on either DTS counter, proceed to Step 10. If more than the three errors are counted— Reset both counters and start timing another 15-minute interval.	Same as Step 6.
8	If three or less errors are counted on either counter within the first 5 minutes of the second attempt, proceed to Step 10. If more than three errors are counted— Wait 5 minutes, reset the counters, and start another 15-minute interval. ***Note:*** An extraordinary condition, such as a severe electrical storm or an intermittent failure of customer-supplied ac power, may affect the performance of the DDS channel. The straightaway test cannot properly be performed until these conditions have cleared.	Same as Step 6.
9	If the three attempts fail to achieve the 15-minute requirement, the STC must commence trouble isolation on the channel in accordance with Section 314-901-300.	

The CHAN loopback test should not be performed by the STC in the following step unless all ports of the DSU are experiencing trouble and/or all the ports have been released for testing. If the CHAN loopback test is performed by the STC, the test should be performed on the 56-kb/s (multiplexed) channel.

STEP	ACTION	VERIFICATION
10	Request the STC to perform a 15-minute DSU loopback and a 15-minute CHAN loopback error run and, during initial installation, to record the number of errors on the circuit layout record card (CLRC) as a benchmark for future use.	
11	If no other tests are to be performed, disconnect the 914C DTS and restore the DSU to the pretest state.	
921A DTS		
1	If this is the first test, perform the initial setup described in the beginning of 3.02.	
2	Operate interface lead switch 19, on the interface card, to the TERM position.	
3	Request the STC to transmit a repeated 2047-bit test word and to check the received 2047-bit test word for errors.	
4	Select the control for the RS lead by entering 36 on the DTS.	Display indicates— TEST SEQ: 36 RS=? (0 OR 1).
5	Press key number 1 on DTS.	Display indicates— TEST SEQ: 36 RS=1 (0 OR 1).
6	Press GO key.	Display indicates— TEST COMPLETE, briefly, then TEST SEQ: is displayed. DTS interface indicator lamps RLSD, RS, CS and DSR lighted. DM, CS, RS and RR indicators on port CP faceplate lighted.
7	Select error test (DOT, SPACE, MARK and PSEUDORANDOM WORD) by entering 55 on the DTS.	Display indicates— TEST SEQ: 55.
8	Press GO key.	Display indicates— SELECT ERROR TEST, briefly, then D=DT 0=SP 1=MK 2=2047 5=511 6=63 is displayed.
9	Press key number 2.	Display indicates— 2047 BIT ERROR TEST, briefly, then 1=BIT ERRORS 2=BLOCK ERRORS.
10	Press key number 1.	Display indicates— ???? SECONDS.

STEP	ACTION	VERIFICATION
11	Select 900 seconds by entering 0900 on DTS. ***Note:*** To perform the following functions, press associated key. **KEY** — **FUNCTION** A — Restart test B — Display time remaining in test C — Clear display D — End test E — Insert errors into the data stream F — Force out-of-sync	Display indicates— 0900 SECONDS, briefly, then 0000 BITS IN ERROR is displayed. From this point, the DTS counts the number of errors received. At the end of the test, the display indicates TEST COMPLETE, then total SYNC LOSSES, then the total BITS IN ERROR, repeatedly. ***Requirement:*** Maximum number of errors is three counted by the 921A DTS and three counted by the STC KS-20908 DTS.
12	If three or less errors are counted on either counter, proceed to Step 15. If more than three errors are counted, repeat the test by pressing the A key on the DTS and request the STC to reset error counter and time another 900-second interval.	Same as Step 11.
13	If three or less errors are counted on either counter within the first 5 minutes of the second attempt, proceed to Step 15. If more than three errors are counted wait 5 minutes, then repeat the test by pressing the ***A*** key on the DTS and request the STC to reset error counter and time another 900-second interval. ***Note:*** An extraordinary condition, such as a severe electrical storm or an intermittent failure of customer-supplied ac power, may affect the performance of the DDS channel. The straightaway test cannot properly be performed until these conditions have cleared.	Same as Step 11.

STEP	ACTION	VERIFICATION
14	If three attempts fail to achieve the 900-second requirement, the STC must commence troubleshooting the channel in accordance with 314-901-300.	
	 ***The CHAN loopback test should not be performed by the STC in the following step unless all ports of the DSU are experiencing trouble and/or all the ports have been released for testing. If the CHAN loopback test is performed by the STC, the test should be performed on the 56-kb/s (multiplexed) channel.***	
15	Request the STC to perform a 15-minute DSU loopback and a 15-minute CHAN loopback error run and, during initial installation, to record the number of errors on the circuit layout record card (CLRC) as a benchmark for future use.	
16	If no other tests are to be performed, disconnect the DTS and restore the DSU to the pretest state.	

E. Remote Line Loopback Test

914C DTS

Note: The DSU at the distant station must be installed and operating before this test can be performed.

1	If this is the first test, perform the initial setup described in the beginning of 3.02.	
2	Apply power to the DSU if power has been removed.	POWER ON indicator on KD21 CP lighted.
3	If the DSU port being tested is equipped with option ZB, insert a 914C DTS matrix pin in row S2, column 19 and position switches S1 and S2 to ON. If the DSU port is not equipped with option ZB, press RL button on port CP faceplate and position DTS switch S1 to ON.	If the DSU port is equipped with option ZE (DSR ***on*** during RL or LL test)— DS1 and DS2 indicators on 914C DTS lighted. DM, CS, RS and RL indicators on the faceplate of the port CP lighted. If the DSU port is not equipped with option ZE— DS1 indicator on 914C DTS lighted. CS, RS and RL indicators on the faceplate of the port CP lighted.

STEP	ACTION	VERIFICATION
4	Reset the DTS counter by momentarily pressing the RESET switch.	DTS counter registers zero errors and OVERFLOW indicator extinguished.
5	Start timing a 5-minute interval.	Maximum number of errors is three.
6	If no other tests are to be performed, disconnect the 914C DTS and restore all switches on the faceplate of the port CP to the nonoperated position.	

921A DTS

Note: The DSU at the distant station must be installed and operating before this test can be performed.

1	If this is the first test, perform initial setup described in the beginning of 3.02.	
2	Verify that all 25 interface lead switches on the interface card are in the MON position.	
3	Select the control for the RS lead by entering 36 on the DTS.	Display indicates— TEST SEQ: 36=? (0 OR 1).
4	Press key number 1.	Display indicates— Test SEQ: 36 RS=1 (0 OR 1).
5	Press GO key.	Display indicates— TEST COMPLETE, briefly, then TEST SEQ: is displayed. If the DSU port is equipped with option YB (RL test at interface inactive)— RS, CS and DSR indicators on DTS lighted. CS, DM and RS indicators on port CP faceplate lighted. If the DSU port is equipped with option ZB (RL test at interface active)— RS and CS indicators on DTS lighted. RL, RS and CS indicators on port CP faceplate lighted. If the DSU port is equipped with options ZB and ZE (DSR ***on*** during RL and LL test)— RS, CS and DSR indicators on DTS lighted. RL, RS, CS and DM indicators on port CP faceplate lighted.
6	If the DSU port being tested is not equipped with option ZB, press the RL button on port	Display indicates— Test SEQ: 55.

STEP	ACTION	VERIFICATION
	CP faceplate, enter 55 on DTS and proceed to Step 12.	
7	If the DSU port being tested is equipped with option ZB, enter 48, 38, 55 and 47 on DTS.	Display indicates— TEST SEQ: 48 38 55 47.
8	Press GO key.	Display indicates— SW CONN: X=?? Y=??
9	Assign interface lead 19 to switch S4 by entering 1512 on DTS.	Display indicates— SW CONN: X=15 Y=12, briefly, then SW CONN: X=?? Y=?? is displayed.
10	Press GO key.	***Note:*** The following switch states (ON or OFF) for switches S2 through S4 are used as an example only and may not appear as shown on the actual display. Display indicates— TEST INTERRUPTED, briefly, then S1=ON S2=OFF S3=OFF S4=OFF.
11	Press key numbers 2, 3 and/or 4 as necessary, to place all switches (S2 through S4) in the ***on*** state.	Display indicates— S1=ON S2=ON S3=ON S4=ON.
12	Press GO key.	TEST INTERRUPTED is displayed briefly, if the DSU port is equipped with option ZB; then the following will be displayed or only the following will be displayed if the DSU port is not equipped with option ZB: SELECT ERROR TEST, briefly, then D=DT 0=SP 1=MK 2=2047 5=511 6=63 is displayed.
13	Press key number 2.	Display indicates— 2047 BIT ERROR TEST, briefly, then 1=BIT ERRORS 2=BLOCK ERRORS.
14	Press key number 1.	Display indicates— ???? SECONDS.
15	Select 300 seconds by entering 0300 on DTS.	Display indicates— 0300 SECONDS, briefly, then 0000 BITS IN ERROR is displayed. From this point, the DTS counts the number of errors received. At the end of the test, the display indicates TEST COMPLETE, then total SYNC LOSSES, then total BITS IN ERROR, repeatedly.

STEP	ACTION	VERIFICATION
		Requirement: Three or less BITS IN ERROR.
16	Press GO key. ***Note:*** To perform the following functions, press associated key. **KEY** — **FUNCTION** A — Restart test B — Display time remaining in test C — Clear display D — End test E — Insert errors into the data stream F — Force out-of-sync	Display indicates— TEST INTERRUPTED, briefly, then TEST COMPLETE, briefly, then TEST SEQ: is displayed.
17	If no other tests are to be performed, disconnect the DTS and restore the DSU to the pretest state.	

F. 112A Power Unit Test

KS-16979-L1 VOM

Note: If voltage is not present at any of the terminals checked below, verify that the circuit breaker is not in the OFF position.

1	Condition the KS-16979-L1 VOM as follows: (a) Set the range selector switch to DCV-30. (b) Insert the black and red test leads into the - (negative) and + (positive) VOM jacks, respectively. (c) Set the polarity-reversing switch to - (negative).	
2	Connect the black test lead probe to terminal 4 on TS1 (located on the rear of the power unit) and connect the red test lead probe to terminal 1 on TS1.	Meter indicates between -11.5 and -12.5 volts dc.

STEP	ACTION	VERIFICATION
3	Set the polarity-reversing switch to + (positive).	
4	Connect the red lead probe to terminal 2 on TS1.	Meter indicates between +11.5 and +12.5 volts dc.
5	Connect the red lead probe to terminal 3 on TS1.	Meter indicates between +4.5 and +5.5 volts dc.

921A DTS

Note: If voltage is not present at any of the terminals checked below, verify that the circuit breaker is not in the OFF position.

1	If this is the first test, perform initial setup described in the beginning of 3.02.	
2	Enter 12 on DTS.	Display indicates— TEST SEQ: 12.
3	Connect a meter lead from the GRD terminal to the - METER jack on DTS.	
4	Connect the remaining meter lead from the + METER jack to terminal 1 on TS1 (located on the rear of the power unit).	Display indicates— Between -11.5 and -12.5 VDC.
5	Press GO key.	
6	Move the meter lead from terminal 1 on TS1 to terminal 2 on TS1.	Display indicates— Between +11.5 and +12.5 VDC.
7	Move the meter lead from terminal 2 on TS1 to terminal 3 on TS1.	Display indicates— Between +4.5 and +5.5 VDC.
8	Remove the meter leads from TS1 and the DTS meter jacks.	