WIDEBAND DATA STATION USING DATA SET 306
POINT-TO-POINT, LIMITED DISTANCE
TEST PROCEDURES

CONTENTS PAGE

1. GENERAL

1.01 This section describes local, remote, and end-to-end test procedures. The tests may be performed at the time of installation or in clearing trouble conditions. Data trouble conditions may generally be classified as either ***error*** or ***control.*** ***Error*** troubles (invalid data information) are caused by impairments in or associated with the data signal path which includes the data transceiver. ***Control*** troubles (invalid operation) are caused by equipment, such as the business machine, interface, data auxiliary set, data set, or by incorrect programming of business machines.

1.02 These tests are arranged in a logical sequence and specify the steps necessary to determine that the data station is operating properly. Tests for the line terminating unit and telephone set should be performed according to the appropriate BSP.

1.03 For tests provided for the wideband data station arrangements, refer to Table A. The test title denotes the station arrangement for which the tests are intended. A station arrangement is determined mainly by the type of service associated with the voice line. Another station variation is the location of the J98713F T1 line terminating unit (LTU).

1.04 A simple arrangement is the Data Set (DS) 306A-L1 which consists of a 33A1 Data Unit, 41A power unit, and P3BG and 840129985 cords. The intended use of DS 306A-L1 is in a wideband data test bay (refer to engineering letter 1232).

1.05 In the test procedures, the indication resulting from switch operation occurs simultaneously with the operation of that switch unless otherwise specified. Controls or indicators not mentioned in the text have no bearing on the test being performed and should be ignored.

1.06 When the craft employee tests a DS 306A-type station arrangement, a 912A Wideband Data Test Set (WDTS) equipped with a J79912AC interface

TABLE A

STATION TEST — CROSS REFERENCE

STATION ARRANGEMENT		TEST		
		LT	END-TO-END	REMOTE TEST FEATURE
Data Set 306A-L1/2		2.12	2.18	2.22
Data Set 306A-L1/2 With DAS 804A-Type	DAS 804A-Type Functioning as Typical TEL SET	2.29	2.33	2.37
	DAS 804A-Type Providing Limited Control	2.42	2.43	2.47
	DAS 804A-Type Control Providing DATA-PHONE Features	2.49	2.53	2.57

unit is required. This unit provides interface for balanced high-speed synchronous transmission. Pin jacks provide access to the high-frequency signaling of the clocks and data and to the EIA control signals.

The ZK wiring should be added to the interface unit of the 912A WDTS. Otherwise, errors detected during the tests may be due to noise pickup producing errors in the 912A WDTS itself but not in the data station. This condition is most likely when the data station is located near relays, motors, or other electromechanical devices.

2. WIDEBAND DATA STATION TEST

2.01 Tests are performed to assure proper data station operation. These tests include a local test (LT), an end-to-end test, and a test of the remote test feature. The tests may vary depending on the station arrangements, option(s), and the associated auxiliary equipment.

2.02 A local test allows the business machine or 912A Wideband Data Test Set (WDTS) to send to itself by looping the wideband transmit line to the wideband receive line in the line terminating unit.

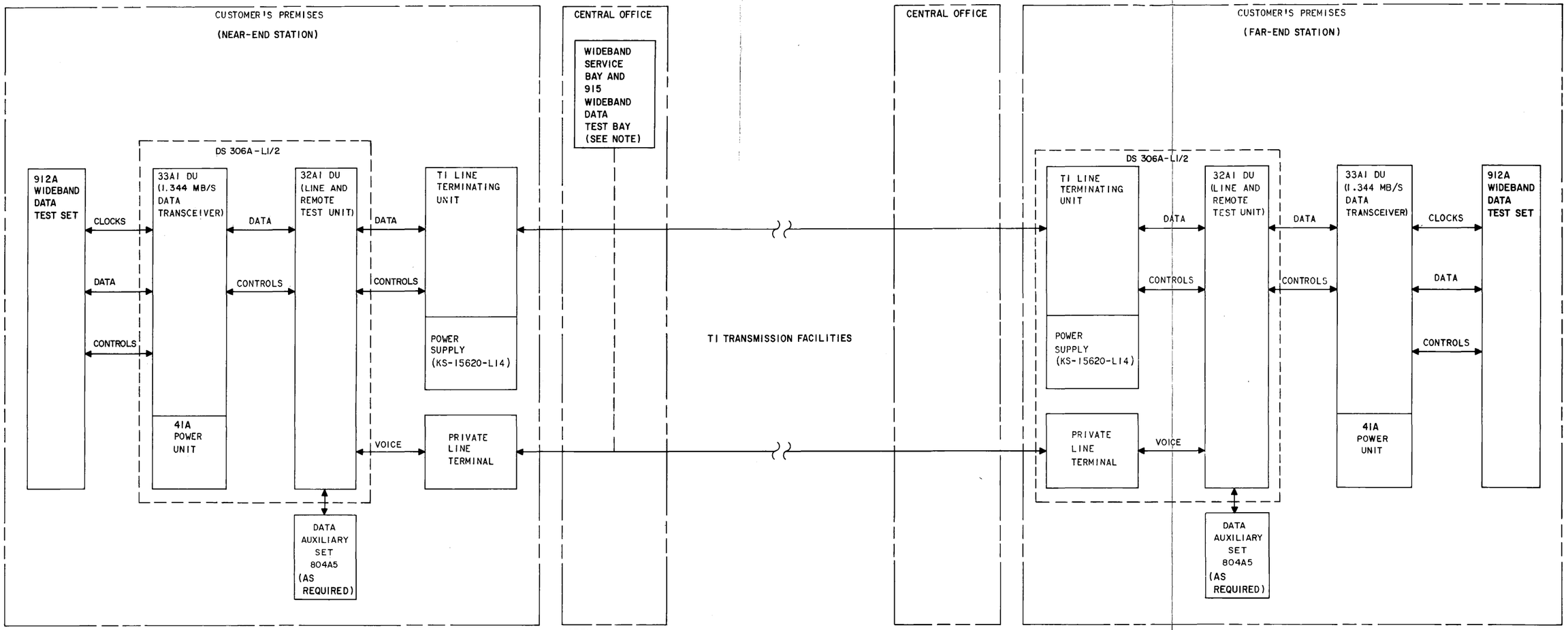
2.03 An end-to-end test consists of test signals being sent and received between the two data stations, thus the test conditions are very similar to the actual data operation. This test may be conducted between another station or a 915 Wideband Data Test Bay as shown in Fig. 1. When performing an end-to-end test, one station should be designated the near end and the other station the far end which will aid the craftsman in following the test procedure. If test fails, ring or notify the other end.

2.04 Remote testing consists of two tests: remote test 1 and remote test 2. Remote test 1 (RT1) allows testing of the T1 facility by looping the wideband lines at the LTU. The actual testing of the facilities is performed at the wideband data test bay. Remote test 2 (RT2) loops the data station at the customer interface to allow testing of the lines and data set.

2.05 The remote tests are controlled from the 915 Wideband Data Test Bay by sending a 2800-Hz signal over the voice lines. The received test signal (at data station) is required to be between −8 and −25 dBm in power and must be present for a period of at least 7 seconds for proper activation of the test circuitry.

2.06 The RT1 and RT2 loopback may be established at the data station by the remote test feature (using LRT key). This section provides a procedure using the LRT key of locally checking the operational relay sequence of normal, RT1, RT2, and back-to-normal.

A numbered step followed by the letter a, ie, 8a, is used throughout this section to indicate that option R (permanent request to send [PRS]) is installed in the 33A1 Data Unit, ie,



NOTE:
THE 915 WDTB MAY BE A SUBSTITUTE AND MAY BE REFERRED TO AS THE FAR END WHEN PERFORMING AN END-TO-END TEST.

TPA 569951

Fig. 1—Block Diagram of a Typical Wideband Data System Using Data Set 306A-L1/2

use Step 8a rather than 8. Certain lamp indications will change because of the installed option.

A numbered step followed by the letter b, ie, 20b, is used throughout this section to indicate that option Q (permanent data terminal ready [PDTR]) is installed in the 33A1 Data Unit, ie, use Step 20b rather than 20. Certain lamp indications will change because of the installed option.

2.07 When the indication or action is as specified, proceed to the next step. If the indication is not as specified in the test procedure, refer to the corresponding step number in the Troubleshooting Chart. The corrective action may be a reference to another test or a specific action.

2.08 The tests described in this practice (LT, RT, and End-to-End) should be performed at the time of installation. After satisfactory completion of the tests, the business machine should be connected in place of the 912A WDTS at both stations. Actual data should be sent and received over the facilities (dynamic test) to verify station to business machine compatibility.

2.09 Before proceeding with any test of the data set, verify that:

(a) The 912A WDTS is operating properly or perform a self-check which may be accomplished by setting (1) POWER switch to ON, (2) TEST MODE switch on AC interface in LOOPED mode, (3) both TEST SIGNAL switches to 131111, (4) COUNTER switch to ON, (5) TRANSMIT and RECEIVE BIT RATE switches set to 250, and (6) the remaining switches as shown in Table B. No errors should be registered. Now, switch RECEIVE—TEST SIGNAL to 2087 and notice that many errors are counted.

(b) Wideband and voiceband loops have been tested and meet requirements as specified in appropriate BSPs.

(c) Telephone portion (if applicable) of installation meets standard dc talk, signaling, and supervision requirements.

(d) Strapping option(s) agree(s) with service order.

(e) All connections and connectors are properly made.

(f) The J98713F line terminating unit meets the requirements as specified in Section 365-200-503.

2.10 There are presently four station arrangements and each one must have a voice coordination channel. This voiceband line provides a means of remote testing the data station and carrier facilities from the 915 Wideband Data Test Bay (WDTB).

DATA SET 306A-L1/2

2.11 Data Set 306A-L1/2 consists of a 33A1 Data Unit, 32A1 Data Unit, 41A power unit, cords P3BG and 840129985, and cable assembly 840129977. The voice line is required only for remote test control but may be provided with a 500-type or other 2-wire telephone set. This arrangement allows the wideband channel to be independent of the voiceband channel (voice line). This is accomplished by installing options S (permanent line status), Y (permanent off-hook), and W (simulated answer) in the 33A1 Data Unit. The T1 line terminating unit, which is required as part of the T1 line installation, may be located in the data station cabinet or externally up to 750 cable feet from the data set. In this arrangement, the data set is on-line continuously and is capable of transmitting and receiving data as long as the connecting wideband facility is satisfactory.

Local Test

2.12 The customer business machine or the 912A WDTS may be used in local testing. When the 912A WDTS is used, it is connected to CUST on the 33A Data Unit (DU). The 912A WDTS applies a test signal to the transmitter portion of the 33A DU. The signal is looped back to the receiver input by the LTU which also simultaneously loops the T1 line toward the serving central office. The receiver output is applied to the 912A WDTS and compared with the original transmitted test signal. Any variation between the signals will be registered as an error rate count.

Do not local test both ends simultaneously. This may cause a trouble condition affecting the T1 system and causing trouble in other circuits.

2.13 Local test may be initiated in several ways, but regardless of the method used, the circuitry controlled in the 32A1 DU will be the same. The test mode may be initiated from either the business machine or 912A WDTS by applying an ON signal to the LT lead in the customer controls interface circuit pack. Local test may also be initiated by operating the LT turnkey on the 10A3 DU or LT turnkey on the LTU. However, the LT key on the LTU is intended only for use when the line is being installed and lined up.

2.14 When either the LT or RT1 loopback is established, the wideband line is looped in both directions, ie, toward the data set and toward the serving central office by means of a looping relay in the T1 LTU. Although the wideband line is looped in both directions for either local test or remote test, the proper test mode must be established for the looping condition desired in order to provide the proper supervisory logic in the data set.

2.15 ***Equipment Required:***

1—912A Wideband Data Test Set equipped with J79912AC interface unit and an ED-73361 cable (see READ under 1.06).

2.16 ***Preparation:***

(a) Operate the controls on the 912A WDTS as specified in Table B.

(b) At 912A WDTS, operate the POWER, DATA TERM READY, and REQ TO SEND switches to ON.

(c) On 10A3 DU, operate LT turnkey to ON (vertical position).

TABLE B

912A WDTS SETTINGS

SWITCHES	SETTINGS
TRANSMIT — BIT RATE	EXT —
TRANSMIT — TEST SIGNAL	131111
TRANSMIT — TRIGGER	+
TRANSMIT — OUTPUT	NORMAL
RECEIVE — BIT RATE	EXT
RECEIVE — TIMING	0
RECEIVE — TEST SIGNAL	131111
RECEIVE — TRIGGER	+
RECEIVE — INPUT	NORMAL
RECEIVE — WORD SYNC	AUTO
RECEIVE — COUNTER	OFF
INTERFACE UNIT — TEST MODE	OPERATE
INTERFACE UNIT — REQ TO SEND	OFF
INTERFACE UNIT — LOCAL TEST	OFF
INTERFACE UNIT — DATA TERM READY	OFF
POWER	OFF

2.17 ***Procedure:***

STEP	PROCEDURE
1	At 10A3 DU, verify that the LT lamp is lighted and the RT1 lamp is extinguished.
2	At 912A WDTS, verify that the RCVD LINE SIG DETR and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
3	Verify that the bipolar violation detector (BVD) lamp on circuit pack AR505 is extinguished.
4	At 912A WDTS, reset error counter.
5	Operate COUNTER switch to ON. The counter should not count.
6	Operate COUNTER switch to OFF.
7	Operate the REQ TO SEND switch to OFF.
8	Verify the LT, RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
8a	When option R (permanent request to send) is installed, verify the CLEAR TO SEND, LT, and RCVD LINE SIG DETR lamps are lighted and the remaining lamps are extinguished.
9	Operate DATA TERM READY switch to OFF.
10	Verify the LT, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
10b	When option Q (permanent data terminal ready) is installed, verify that the LT, RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
11	At 10A3 DU, operate LT turnkey to OFF (horizontal position).
12	At 912A WDTS, operate LT switch to ON.
13	Verify LT lamp on 10A3 DU is lighted and the remaining lamp is extinguished.
14	Operate LT switch to OFF.

End-to-End Test

2.18 This is a test of the wideband data channel in both directions. The procedure must be performed from each station in order to verify proper operation of the data set (transceiver) at both ends. Test equipment is required at both stations. The 912A WDTS applies a test signal to the transmitter portion of the near-end DS 306A-L1/2. The transmitter output is sent to the far-end DS 306A-L1/2 receiver via the T1 transmission facility. The 912A WDTS monitors the receive signal at the far end and performs an error count. This determines whether or not the near-end transmitter and far-end receiver are functioning properly. When error counts are registered, a local test should be performed to determine which station is faulty.

2.19 ***Equipment Required:***

2—912A Wideband Data Test Sets equipped with J79912AC interface units and ED-73361 cables. (One complete test set is required at each end of the facility. See READ under 1.06.)

2.20 ***Preparation:***

(a) It is necessary to establish voice contact with the far-end data station. The wideband channel is independent of the voiceband channel.

(b) Operate the controls on the 912A WDTS as indicated in Table B.

(c) The data signal path should be completed in both directions for full-duplex operation.

(d) At both 912A WDTSs, operate POWER, DATA TERM READY, and REQ TO SEND switches to ON.

2.21 ***Procedure:***

STEP	PROCEDURE
15	At both ends, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
16	At near end, operate REQ TO SEND switch to OFF.
17	At near end, verify that the DATA SET READY and RCVD LINE SIG DETR lamps are lighted and the remaining lamps are extinguished.
17a	When option R (PRS) is installed at the near end, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
18	At far end, verify that the DATA SET READY, RCVD LINE SIG DETR, CLEAR TO SEND, NO DATA, and NO SYNC lamps are lighted and the remaining lamp is extinguished.
18a	When option R is installed at the near end, verify at the far end that the DATA SET READY, RCVD LINE SIG DETR, and the CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
19	At far end, operate DATA TERM READY switch to OFF.
20	At far end, verify that the NO DATA and NO SYNC lamps are lighted and the remaining lamps are extinguished.
20b	When option Q (PDTR) is installed at the far end, the lamp indications are the same as in Step 18. In addition, if option R is installed at near end, the lamp indications are the same as in Step 18a.
21	At near end, verify that the DATA SET READY, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
21b	When option Q is installed at far end, the lamp indications at the near end are the same as in Step 17. In addition, if option R is installed at near end, the lamp indications are the same as in Step 17a.
22	At near end, operate REQ TO SEND switch to ON.

STEP	PROCEDURE
23	At far end, operate DATA TERM READY switch to ON.
24	At both ends, verify that the lamp indications are the same as in Step 15.
25	At far end, operate REQ TO SEND switch to OFF.
26	At far end, verify that the DATA SET READY and RCVD LINE SIG DETR lamps are lighted and the remaining lamps are extinguished.
26a	When option R is installed at far end, the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished at the far end.
27	At near end, verify that the DATA SET READY, RCVD LINE SIG DETR, CLEAR TO SEND, NO DATA, and NO SYNC lamps are lighted and the remaining lamp is extinguished.
27a	When option R is installed at far end, verify at the near end that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
28	At near end, operate DATA TERM READY switch to OFF.
29	At near end, verify that the NO DATA and NO SYNC lamps are lighted and the remaining lamps are extinguished.
29b	When option Q is installed at near end, the lamp indications are the same as in Step 27. In addition, if option R is installed at far end, the lamp indications at the near end are the same as in Step 27a.
30	At far end, verify that the DATA SET READY, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
30b	When option Q is installed at near end, the lamp indications at the far end are the same as in Step 26. In addition, if option R is installed at far end, the lamp indications are the same as in Step 26a.
31	At near end, operate DATA TERM READY switch to ON.
32	At far end, operate REQ TO SEND switch to ON.
33	At both ends, verify the same lamp indications as in Step 15.
34	At both ends, reset counter on 912A WDTS.
35	At both ends, operate COUNTER switch to ON. The counter should not count errors.
36	At both ends, operate COUNTER switch to OFF.
37	At both ends, verify that the bipolar violation detector (BVD) lamp on circuit pack AR505 is extinguished.

Remote Test Feature

2.22 By using the remote test feature, RT1 and RT2 loopbacks may be established locally at the data station by activating the sequential relay circuitry. The sequential relay circuitry may be activated locally by the LRT key or remotely by detecting 2800-Hz tone on the voice line. This test, using the LRT key, checks the proper operation of the local sequencing (normal, RT1, RT2, and back-to-normal) and indicating circuits but does not check operation of 2800-Hz detector circuit or the looping of the transmission paths. Either RT1 or RT2 loop-back mode or the normal mode will be indicated by the LT and/or RT1 lamps on the 10A3 Data Unit as shown in Table C.

TABLE C

LAMPS INDICATING MODE OF DATA SET

MODE	LAMPS ON 10A3 DATA UNIT	
	LT	RT1
Normal	Extinguished	Extinguished
LT	Lighted	Extinguished
RT1	Extinguished	Lighted
RT2	Lighted	Lighted
Normal	Extinguished	Extinguished

2.23 After completion of these tests, a check should be performed from the wideband data test bay to validate the overall remote testing procedure. The actual testing while in either RT1 or RT2 loop-back mode is performed from the wideband data test bay at the serving central office. The combination of RT1 and RT2 provides the central office with a means of validating the transmission facilities (RT1) and of the data station (RT2).

2.24 ***Equipment Required:***

1—912A WDTS equipped with J79912AC interface unit and an ED-73361 cable. (See READ under 1.06.)

2.25 ***Preparation:***

(a) Operate the controls on the 912A WDTS as specified in Table B.

(b) Refer to Table C for lamp and mode indications.

(c) At 912A WDTS, operate POWER, DATA TERM READY, and REQ TO SEND switches to ON.

2.26 ***Procedure:***

STEP	PROCEDURE
38	At 10A3 Data Unit, depress and hold (approximately 7 seconds) the LRT key until relay RT1 is heard to operate.
39	If the RT1 relay has operated, the RT1 lamp will light when the LRT key is released. ***Note:*** The data station is now in RT1 mode, the carrier facility is looped back to the wideband data test bay, and the DS 306 is looped back as in local test. The LT lamp is extinguished.
40	At 912A WDTS, verify that the RCVD LINE SIG DETR lamp is lighted and the remaining lamps are extinguished.
41	At 10A3 Data Unit, again depress the LRT key and hold (approximately 7 seconds) until both the LT and RT1 lamps are lighted.

STEP	PROCEDURE
	Note: The data station is now looped on the customer's side of DS 306A-type in the RT2 mode.
42	Again depress and hold (approximately 7 seconds) the LRT key until the RT1 lamp extinguishes.
43	Release the LRT key.
44	Verify that the LT and RT1 lamps are extinguished which indicates a normal condition.

DATA SET 306A-L1/2 WITH DATA AUXILIARY SET 804A-TYPE

2.27 Data Auxiliary Set 804A1, A3, A5, or A7 may be used with DS 306A-L1/2. For this section, these data auxiliary sets will be referenced as DAS 804A-type except in the Procedure, Troubleshooting Chart, and Flow Chart where they will be referenced only as DAS 804.

A. Data Auxiliary Set 804A-Type Functioning as Typical Telephone Set

2.28 This station arrangement is essentially the same as DS 306A-L1/2 with the exception that a Data Auxiliary Set (DAS) 804A-type is used in lieu of a telephone set. The DAS 804A-type is bridged across the voice coordination channel and provides a WB CHAN lamp indication whenever the wideband channel is capable of receiving data. Other features provided by DAS 804A-type are ring indicator, test lamp, and key control of local test. The remaining DAS 804A-type controls have no effect on the data set operation.

Local Test

2.29 Local testing may be initiated (1) at the business machine (normally not performed by the craft employee), (2) at the DAS 804A-type, (3) at the 10A3 Data Unit, and (4) at the 912A WDTS. The local test results should be the same in each case.

2.30 ***Equipment Required:***

1—912A Wideband Data Test Set equipped with a J79912AC interface unit and an ED-73361 cable. (See READ under 1.06.)

2.31 ***Preparation:***

(a) Operate the controls of the 912A WDTS as specified in Table B.

(b) At 912A WDTS, operate POWER, DATA TERM READY, and REQ TO SEND switches to ON.

2.32 ***Procedure:***

STEP	PROCEDURE
45	At DAS 804, depress the TALK key and leave or place handset in cradle (on-hook).
46	At 10A3 DU, operate LT turnkey to ON (vertical position).
47	At 10A3 DU, verify that the LT lamp is lighted and the RT1 lamp is extinguished.
48	At DAS 804, verify that the TEST lamp is lighted and the remaining lamps are extinguished.

STEP	PROCEDURE
49	At 912A WDTS, verify that the RCVD LINE SIG DETR and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
50	Verify that the bipolar violation detector (BVD) lamp on circuit pack AR505 is extinguished.
51	Reset counter by depressing the reset button.
52	Operate COUNTER switch to ON. The counter should not count errors.
53	Operate COUNTER switch to OFF.
54	At 912A WDTS, operate REQ TO SEND switch to OFF.
55	Verify the RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished on the 912A WDTS.
55a	When option R (PRS) is installed, verify that the RCVD LINE SIG DETR and CLEAR TO SEND lamps are lighted and the remaining lamps on the 912A WDTS are extinguished.
56	At 10A3 DU, verify that the LT lamp is lighted and the RT1 lamp is extinguished.
57	At 912A WDTS, operate DATA TERM READY switch to OFF.
58	Verify the LT, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
58b	When option Q (PDTR) is installed, verify that the lamp indications are the same as in Step 55. In addition, if option R is installed, verify that lamp indications are the same as in Step 55a.
59	At 10A3 DU, operate LT turnkey to OFF (horizontal position).  ***This completes the local test procedure. However, the remaining test procedure should be performed to assure that a local test condition may be initiated from other sources.***  ***Ignore the lamps on the 912A WDTS for the remainder of the test procedure.***
60	At 912A WDTS, operate LOCAL TEST switch to ON.
61	At 10A3 DU, verify that the LT lamp is lighted and the RT1 lamp is extinguished as indicated in Table C.
62	At DAS 804, verify that the TEST lamp is lighted and the remaining lamps are extinguished.

STEP	PROCEDURE
63	Operate the LOCAL TEST switch to OFF.
64	Verify that the LT and RT1 lamps are extinguished.
65	At DAS 804, depress the TEST key.
66	At 10A3 DU, verify that the LT lamp is lighted and the RT1 lamp is extinguished.
67	At DAS 804, depress the TALK key.
68	Lift the handset from the cradle (off-hook).
69	Verify that the TALK lamp is lighted and the remaining lamps are extinguished.
70	Replace handset in cradle (on-hook).
71	Verify that all lamps are extinguished on 10A3 DU and DAS 804.

End-to-End Test

2.33 The test purpose is to determine if the complete data system is operating properly (data set and lines). The near-end data station will transmit to the far-end data station. The far end will determine if half of the wideband channel is operating properly. Simultaneously, the far end transmits to the near end which also performs an error count to determine if the other half of the wideband channel is operating properly, thus indicating proper system operation for the wideband section.

2.34 ***Equipment Required:***

2—912A Wideband Data Test Sets equipped with J79912AC interface units and ED-73361 cables. (One complete set is required at each end of the facility. See READ under 1.06.)

2.35 ***Preparation:***

(a) At the near end and far end, connect the 912A WDTSs to CUST connector on the 33A DUs.

(b) Operate controls of the 912A WDTSs as specified in Table B.

(c) It is necessary to establish voice contact with the far-end data station over the voice coordination channel.

(d) At both 912A WDTSs, operate POWER, DATA TERM READY, and REQ TO SEND switches to ON.

2.36 ***Procedure:***

STEP	PROCEDURE
72	At near end on DAS 804, depress the TALK key.
73	Remove the handset (off-hook) and depress the RING key.
74	At far end on DAS 804, ringing should be heard and the RING lamp should flash; also, RING IND lamp on 912A WDTS should flash.

STEP	PROCEDURE
75	Remove the handset (off-hook) and depress the TALK key. Now, verify that voice communication is possible.
76	At both ends, place handsets in cradle (on-hook) and repeat Steps 73 through 75 in the other direction.
77	Using voice communication between the ends, perform Steps 15 through 37 and verify that the WB CHAN lamp is lighted whenever the RCVD LINE SIG DETR lamp is lighted.

Remote Test Feature

2.37 The purpose and function of the remote test feature are the same as in 2.22. This procedure differs in that a TEST lamp indication on the DAS 804A-type is provided.

2.38 ***Equipment Required:***

1—912A Wideband Data Test Set equipped with J79912AC interface unit and an ED-73361 cable. (See READ under 1.06.)

2.39 ***Preparation:***

(a) Operate the controls on the 912A WDTS as specified in Table B.

(b) Refer to Table C for lamp and mode indications.

(c) At 912A WDTS, operate POWER, DATA TERM READY, and REQ TO SEND switches to ON.

2.40 ***Procedure:***

STEP	PROCEDURE
78	Place the handset in the cradle (on-hook) and depress the TALK key.
79	Perform Steps 38 through 44 and, in addition to Steps 40 and 41, verify that the TEST lamp is lighted and the remaining lamps are extinguished.

B. Data Auxiliary Set 804A-Type Providing Limited Control

2.41 The operation of this station arrangement is capable of simultaneous wideband data transmission and voice communication provided the call has been answered (off-hook). The DAS 804A-type, when operated in conjunction with an associated private line terminal, provides: (1) telephone and signaling functions, (2) a ring indicator function which is available to the business machine, (3) lamps for indicating when data can be received and when the station is in local or remote test, and (4) a key for establishing local test. The DAS 804A-type obtains its power from the associated data set. The T1 line terminating unit may be located in the data set cabinet or at the T1 office repeater bay.

Local Test

2.42 This test is the same as when the DAS 804A-type is functioning as a typical telephone set; therefore, refer to paragraphs 2.29 through 2.32.

End-to-End Test

2.43 The test purpose is to determine if the complete data system is operating properly

(data set and lines). The near-end data station will transmit to the far-end data station. The far end will determine if half of the wideband channel is operating properly. Simultaneously, the far end transmits to the near end which also performs an error count to determine if the other half of the wideband channel is operating properly, thus indicating proper system operation for the wideband section.

2.44 ***Equipment Required:***

2—912A Wideband Data Test Sets equipped with J79912AC interface units and ED-73361 cables. (One complete set is required at each end of the facility. See READ under 1.06.)

2.45 ***Preparation:***

(a) At the near end and far end, connect the 912A WDTSs to CUST connector on the 33A DUs.

(b) Operate controls of the 912A WDTSs as specified in Table B.

(c) It is necessary to establish voice contact with the far-end data station over the voice coordination channel.

(d) At both 912A WDTSs, operate POWER, DATA TERM READY, and REQ TO SEND switches to ON.

2.46 ***Procedure:***

STEP	PROCEDURE
80	At both DASs 804, verify that the handset is in the cradle (on-hook) and the TALK key is depressed.
81	At both 912A WDTSs, verify at both ends that the NO DATA and NO SYNC lamps are lighted and the remaining lamps are extinguished; on both DASs 804, verify that the lamps are extinguished.
82	At near end, remove handset (off-hook) and verify that the TALK lamp is lighted and the remaining lamps are extinguished.
83	At near end, press RING key and release.
84	At far end, verify that bell rings.
85	At far end, verify that RING lamp on DAS 804 and RING IND lamp on 912A WDTS flash.
86	At far end, remove handset (off-hook) and voice communication is now possible.
87	When option T is installed, the lamp indications of Steps 88 and 89 are delayed 2 seconds.
88	At far end on 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
89	At far end on DAS 804, verify that the WB CHAN and TALK lamps are lighted and the remaining lamps are extinguished.
90	After call is answered at far end and the WB CHAN lamp is lighted (2-second delay when option T is installed at far end), verify that Steps 91 and 92 occur at near end.
91	At near end on 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.

STEP	PROCEDURE
92	At near end on DAS 804, verify that the WB CHAN and TALK lamps are lighted and the remaining lamps are extinguished.
93	At both ends, reset counter on 912A WDTS.
94	Operate COUNTER switch to ON. The counter should not count errors.
95	Operate COUNTER switch to OFF.
96	At both ends, verify that the bipolar violation detector (BVD) lamp on circuit pack AR505 is extinguished.
97	At far end on DAS 804, depress the DATA key and replace handset in cradle (on-hook).
98	At near end on DAS 804, a 2025-Hz answer-back tone should be heard.
99	At the far end on DAS 804, verify that the WB CHAN lamp is lighted and the remaining lamps are extinguished.
100	At far end on the 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
101	At near end on DAS 804, verify that the WB CHAN and TALK lamps are lighted and the remaining lamps are extinguished.
102	At near end of 912A WDTS, the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
103	At near end on 912A WDTS, operate REQ TO SEND switch to OFF.
104	At near end on DAS 804, verify that the TALK and WB CHAN lamps are lighted and the remaining lamps are extinguished.
105	At near end on 912A WDTS, verify that the DATA SET READY and RCVD LINE SIG DETR lamps are lighted and the remaining lamps are extinguished.
105a	When option R (PRS) is installed at near end, verify that the CLEAR TO SEND, RCVD LINE SIG DETR, and DATA SET READY lamps are lighted and the remaining lamps are extinguished.
106	At far end on DAS 804, verify that the WB CHAN lamp is lighted and the remaining lamps are extinguished.
107	At far end on 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, CLEAR TO SEND, NO DATA, and NO SYNC lamps are lighted and the remaining lamp is extinguished.
107a	When option R is installed at near end, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps at the far end are lighted and the remaining lamps are extinguished.

STEP	PROCEDURE
108	At near end on 912A WDTS, operate DATA TERM READY switch to OFF.
109	At near end on DAS 804, verify that the TALK lamp is lighted and the remaining lamps are extinguished.
109b	When option Q (PDTR) is installed at the near end, verify that the lamp indications on DAS 804 at near end are the same as specified in Step 104.
110	At the near end 912A WDTS, verify that the NO DATA and NO SYNC lamps are lighted and the remaining lamps are extinguished.
110b	When option Q is installed at the near end, the lamp indications on 912A WDTS at near end are the same as in either Step 105 or 105a at the far end.
111	At the far end on the DAS 804, verify that all lamps are extinguished.
111b	When option Q is installed at near end, verify at the far end on DAS 804 that the WB CHAN lamp is lighted and the remaining lamps are extinguished.
112	At far end on the 912A WDTS, verify that the DATA SET READY, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
112b	When option Q is installed at near end, verify that the lamp indications on the 912A WDTS at the far end are the same as specified in Step 107 or 107a.
113	At the far end on the 912A WDTS, operate the DATA TERM READY switch to OFF.
114	At the far end on 912A WDTS, verify that the NO DATA and NO SYNC lamps are lighted and the remaining lamps are extinguished.
114b	When option Q is installed at far end, the lamp indications on the 912A WDTS at the far end are the same as Step 112 or 112b.
115	At the far end on DAS 804, verify that all lamps are extinguished.
115b	When option Q is installed at the far end, verify that the lamp indications on the DAS 804 are the same as specified in Step 111 or 111b.  ***Proceed to Step 126 if option Q (PDTR) is strapped at both ends or if automatic answer feature is not installed in DAS 804. If not, proceed to next step.***
116	Re-establish voice communication by depressing the TALK key on DAS 804 at the far end.
117	At far end on DAS 804, depress the AUTO key and place handset in cradle (on-hook).
118	At far end on DAS 804, verify that the AUTO lamp is lighted and the remaining lamps are extinguished.

STEP	PROCEDURE
119	At both ends on the 912A WDTS, operate the DATA TERM READY and REQ TO SEND switches to ON.
120	At the near end on DAS 804, depress the RING key and listen for a 2025-Hz answer-back tone which lasts from 2 to 5 seconds.
121	At near end on DAS 804, verify that the WB CHAN and TALK lamps are lighted and the remaining lamps are extinguished.
122	At near end on 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
123	At far end on DAS 804, a short ring should be heard. ***Note:*** Some lamp indications in Steps 124 and 125 will be delayed 2 seconds when option T is strapped in 33A DU.
124	At far end on DAS 804, verify that the AUTO and WB CHAN lamps are lighted and the remaining lamps are extinguished.
125	At far end on 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
126	This completes the test procedure in one direction but should be repeated in the other direction (interchange far end and near end) with the exception of the error check (Steps 93 through 95).

Remote Test Feature

2.47 This test is the same as when the DAS 804A-type is functioning as a typical telephone set; therefore, refer to paragraphs 2.37 through 2.40.

C. Data Auxiliary Set 804A-Type Control Providing DATA-PHONE Features

2.48 This arrangement does not permit the wideband channel and the voiceband channel to be utilized simultaneously, thus they are mutually exclusive. The wideband channel is under control of the DAS 804A-type in that the data mode must be established before data transmission is possible. The standard DATA-PHONE operational procedures require a waiting period before processing wideband data. This waiting period is a function of timing circuits in DAS 804A-type.

Local Test

2.49 This procedure is the same as described under DAS 804A-type providing limited control except a DATA lamp will be lighted every time the TEST lamp is lighted.

2.50 ***Equipment Required:***

1—912A Wideband Data Test Set equipped with a J79912AC interface unit and an ED-73361 cable. (See READ under 1.06.)

2.51 ***Preparation:***

(a) Operate controls of the 912A WDTS as specified in Table B.

(b) At 912A WDTS, operate POWER, DATA TERM READY, and REQ TO SEND switches to ON.

2.52 ***Procedure:***

STEP	PROCEDURE
127	Follow the local test procedure described in Steps 45 through 71.

End-to-End Test

2.53 The purpose of this test is the same as described in 2.18. Certain lamp indications may be delayed for 2.1 seconds if option T is installed in the 33A1 DU. Part of the test procedure should be performed from the far end and will be stated as such.

2.54 ***Equipment Required:***

2—912A Wideband Data Test Sets equipped with J79912AC interface units and ED-73361 cables. (One WDTS and cable are required at each end. See READ under 1.06.)

2.55 ***Preparation:***

(a) Operate controls of the 912A WDTS as specified in Table B.

(b) It is necessay to establish voice contact with the far end over a separate telephone circuit.

(c) At both 912A WDTSs, operate POWER, DATA TERM READY, and REQ TO SEND switches to ON.

2.56 ***Procedure:***

STEP	PROCEDURE
128	At both DASs 804, verify that the handset is in the cradle (on-hook) and the TALK key is depressed.
129	At both 912A WDTSs, verify that the NO DATA and NO SYNC lamps are lighted and the remaining lamps are extinguished.
130	At the near end, remove handset from cradle (off-hook).
131	At the near end on DAS 804, verify that the TALK lamp is lighted and the remaining lamps are extinguished.
132	At the near end on DAS 804, depress and release the RING key.
133	At far end on DAS 804, the RING lamp flashes and ringing can be heard.
134	At 912A WDTS, verify that the RING IND lamp flashes.
135	At far end, remove the handset from the cradle (off-hook).
	Note: Some lamp indications in Steps 136 and 137 will be delayed 2 seconds when option T is installed in 33A DU at far end.
136	At both 912A WDTSs, verify that the RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.

STEP	PROCEDURE
137	At both DASs 804, verify that the WB CHAN and TALK lamps are lighted and the remaining lamps are extinguished.
138	At the far end on DAS 804, depress the DATA key and place handset in cradle (on-hook).
139	At the far end on DAS 804, verify that the WB CHAN lamp is lighted and that the DATA lamp lights after a 2- to 5-second delay and the remaining lamps are extinguished.
140	At the far end on the 912A WDTS, verify that the RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and that the DATA SET READY and CLEAR TO SEND lamps light after a 2- to 5-second delay.
141	At the near end, a 2025-Hz answer-back tone is heard from 2 to 5 seconds.
142	At the near end on DAS 804, verify that the WB CHAN and TALK lamps are lighted and the remaining lamps are extinguished.
143	At the near end on 912A WDTS, verify that the RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished before the answer-back tone ceases.
144	At the near end, the 2025-Hz answer-back tone ceases.
145	At the near end on 912A WDTS, verify that the RCVD LINE SIG DETR lamp is lighted and the remaining lamps are extinguished.
146	At the near end on DAS 804, depress the DATA key and place the handset in the cradle (on-hook).
147	At the near end on DAS 804, verify that the WB CHAN and DATA lamps light after 2 to 5 seconds and the remaining lamps are extinguished.
148	At near end on the 912A WDTS, verify that the RCVD LINE SIG DETR is lighted and that the DATA SET READY and CLEAR TO SEND lamps light after 2 to 5 seconds and the remaining lamps are extinguished.
149	At the far end on the 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
150	At both ends, reset counter on 912A WDTSs.
151	At both ends, verify that the bipolar violation detector (BVD) lamp on CP AR505 is extinguished.
152	Operate COUNTER switch to ON. The counter should not count errors.
153	Operate the COUNTER switch to OFF.
154	At the near end on 912A WDTS, operate the REQ TO SEND switch to OFF.

STEP	PROCEDURE
155	At the near end on DAS 804, verify that the WB CHAN and DATA lamps are lighted and the remaining lamps are extinguished.
156	At the near end on 912A WDTS, verify that the DATA SET READY and RCVD LINE SIG DETR lamps are lighted and the remaining lamps are extinguished.
156a	When option R (PRS) is installed at the near end, verify that the CLEAR TO SEND, DATA SET READY, and RCVD LINE SIG DETR lamps are lighted and the remaining lamps are extinguished.
157	At the far end on DAS 804, verify that the WB CHAN and DATA lamps are lighted and the remaining lamps are extinguished.
158	At the far end on 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, CLEAR TO SEND, NO DATA, and NO SYNC lamps are lighted and the remaining lamp is extinguished.
158a	When option R is installed at the near end, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished.
159	At the near end, operate the DATA TERM READY switch to OFF.  ***When option Q (PDTR) is installed in the near end, skip to Step 168.***
160	At the near end on 912A WDTS, verify that the NO DATA and NO SYNC lamps are lighted and the remaining lamps on both the 912A WDTS and DAS 804 are extinguished.
161	At the far end on DAS 804, verify that the DATA lamp is lighted and the remaining lamps are extinguished.
162	At the far end on 912A WDTS, verify that the DATA SET READY, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
163	At the far end, remove the handset from the cradle (off-hook) and depress the TALK key.
164	At the far end on DAS 804, verify that the TALK lamp is lighted and the remaining lamps are extinguished.
165	At the far end on 912A WDTS, verify that the NO DATA and NO SYNC lamps are lighted and the remaining lamps are extinguished.
166	At the near end, remove the handset from the cradle (off-hook) and depress the TALK key. It is possible to talk between the two stations at this time.
167	At the near end on DAS 804, verify that the TALK lamp is lighted and the remaining lamps are extinguished.

STEP	PROCEDURE
	 ***When option Q (PDTR) is installed at far end, skip to 188.***
168	At the near end on DAS 804, verify that the WB CHAN and DATA lamps are lighted and the remaining lamps are extinguished.
169	At the near end on 912A WDTS, verify that the DATA SET READY and RCVD LINE SIG DETR lamps are lighted and the remaining lamps are extinguished.
169a	When option R (PRS) is installed at the near end, verify that the CLEAR TO SEND, DATA SET READY, and RCVD LINE SIG DETR lamps are lighted and the remaining lamps are extinguished.
170	At the far end on DAS 804, verify that the WB CHAN and DATA lamps are lighted and the remaining lamps are extinguished.
171	At the far end on 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, CLEAR TO SEND, NO DATA, and NO SYNC lamps are lighted and the remaining lamp is extinguished.
171a	When option R is installed at the near end, verify that the DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted and the remaining lamps are extinguished at the far end on the 912A WDTS.
172	At the far end, remove the handset from the cradle (off-hook) and depress the TALK key.
173	At the far end on DAS 804, verify that the WB CHAN and TALK lamps are lighted and the remaining lamps are extinguished.
174	At the far end on 912A WDTS, verify that the RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
174a	When option R is installed at the near end, verify that the RCVD LINE SIG DETR lamp is lighted and the remaining lamps are extinguished at the far end on the 912A WDTS.
175	At the near end on 912A WDTS, verify that the DATA SET READY, RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.
175a	When option R is installed at the near end, verify that the CLEAR TO SEND, DATA SET READY, RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and the remaining lamp is extinguished.
176	At the near end, remove the handset from the cradle (off-hook) and depress the TALK key.
177	At the near end on DASs 804, verify that the WB CHAN and TALK lamps are lighted and the remaining lamps are extinguished.

STEP	PROCEDURE
178	At the near end on 912A WDTS, verify that the RCVD LINE SIG DETR, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished.  ***When option Q (PDTR) is installed at the far end, skip to Step 188.***
179	At the far end on DAS 804, depress the AUTO key and place handset in the cradle (on-hook).
180	At the far end on DAS 804, verify that the AUTO lamp is lighted and the remaining lamps are extinguished.
181	At the near end on DAS 804, depress the RING key and a 2025-Hz answer-back tone will be heard.
182	At the far end, a short ring should be heard.
183	At the far end on DAS 804, verify that the AUTO lamp is lighted and the DATA lamp lights after 2 to 5 seconds. The remaining lamps are extinguished.
184	At the far end on 912A WDTS, verify that the DATA SET READY, NO DATA, and NO SYNC lamps are lighted and the remaining lamps are extinguished. DATA SET READY lights at the same time as DATA lamp.
185	At the far end, remove handset from cradle (off-hook) and depress TALK key.
186	At the far end on 912A WDTSs, verify that the lamp indications are the same as in Step 165.
187	At the far end on DASs 804, verify that the lamp indications are the same as in Step 167.
188	At the near end, place the handset in the cradle (on-hook).
189	At the far end, place handset in the cradle (on-hook).
190	This completes the test from the near end. Repeat the test procedure from the far end by interchanging far end and near end.

Remote Test Feature

2.57 This test is the same as that described under DAS 804A-type providing limited control except that the DATA lamp will be lighted every time the TEST lamp is lighted. Refer to paragraphs 2.37 through 2.40.

3. TROUBLESHOOTING

3.01 ***General:***

(a) The preceding tests are designed to determine if the data station is operating properly. If the data station does not meet the conditions

specified in the tests, refer to the Troubleshooting Chart to determine the most probable cause of the trouble.

(b) The step numbers in the Troubleshooting Chart correspond to the test procedure step numbers. When performing a test and indications are not as specified, refer to the same step number in the Troubleshooting Chart.

(c) There will not be a step in the Troubleshooting Chart for each step in the test procedures. Some of the steps in the test procedures specify action and do not require an indication.

(d) This section contains two troubleshooting procedure charts: Troubleshooting Chart and Flow Chart. The Troubleshooting Chart provides a step-by-step procedure and is intended for the new craftsman. The Flow Chart (Fig. 2 and 3) for troubleshooting is for the more experienced craftsman which is divided into two parts due to its length.

(e) The symbol ⊛ is used in the Troubleshooting Chart and Flow Chart to reference a starting point after a local test has been attempted but failed.

(f) The interface signals are described in 593-801-100. They are divided into EIA control signals and balanced signals. Scope patterns are presented for the balanced signals using Tektronics 422 oscilloscope or equivalent.

3.02 ***Equipment Required:***

1—912A Wideband Data Test Set equipped with J79912AC interface unit and an ED-73361 cable (See READ under 1.06.)

1—Valid spare circuit pack for each type used

1—Multimeter, KS-14510 or equivalent.

3.03 ***Troubleshooting Procedure:*** Before performing any troubleshooting procedure, check the following for obvious causes of trouble:

(a) Loose cords, connectors, connections, etc.

(b) Incorrect interconnections or options in all equipment.

(c) Broken wires.

(d) Physical damage.

(e) Verify correct power. (See Table G.)

(f) LT or RT condition.

(g) Interface connections.

3.04 If the control or indicator does not pass the test as specified, refer to the Troubleshooting Chart for the correct condition of the control or indicator and the most probable cause of trouble as indicated in the Defective Data Set, Data Auxiliary Set, or Data Unit; Replace Circuit Pack or Data Unit; and Remarks columns. If the unit under the Defective Data Set, Data Auxiliary Set, or Data Unit column is verified to be operating properly and the trouble still exists, a continuity check of the interconnecting wiring is necessary. Refer to Table D.

3.05 Data trouble conditions may generally be classified as either ***error*** or ***control. Error*** troubles are caused by impairments associated with the data signal path. The bipolar violation detector lamp on CP AR505 will be lighted when the quality of the bit stream is unacceptable in the receive data signal path. ***Control*** troubles may be caused by the transmission facilities. For example, if the wideband receive line (T1, R1) is open, the near-end indications are RDF (BVD lamp lights) and CS signals are off and framing pulses are not transmitted. At the far end, the CS signal is off. If the wideband transmit line (T, R) is open, the far-end indications are RDF and CS signals are off and framing pulses are not transmitted. At the near end, the CS signal is off. A momentary loss of RDF (BVD lamp lights) will not turn DSR off once it has been on. ***Control*** troubles may also be caused by equipment, such as the business machine, interface, data auxiliary set, or data set. ***Control*** problems may readily be isolated by removing circuit pack AR504. The system should now be operational, that is, error-free data transmission is possible. All lamps on the 912A WDTS will be extinguished while the AR504 is removed. If the condition clears by extinguishing the NO DATA and NO SYNC lamps, thus indicating good data transmission, replace CP AR504 and/or verify that correct options are installed.

3.06 Voltages on the EIA control leads may be checked and should approximate the values in Table E and Table F, depending on the test

condition. The measurements may be obtained from TB2 on the 33A1 Data Unit or from the J79912AC interface unit of the 912A WDTS.

3.07 ***Use of Remote Test Feature:***

(a) Remote tests can be used to make certain checks of the station as an aid in isolating trouble. Although the remote tests do not check the control functions, they do provide a means of checking the station and transmission facilities. A test signal may be sent from a distant station to the station under test. RT1 checks the transmission facilities from the test bay to the data station. The wideband loopback is made in the LTU. In RT2, the test signal is received, looped at the customer interface, and transmitted back to the distant station. If the signals received back from the distant station are the same as those transmitted, then the station under test can be assumed to be operating properly. If the signals received back from the distant station are not the same as those transmitted, then the station under test or the facility is faulty. Also, if the station cannot be put into remote test from the test bay, CP AR122 (remote test tone detector) in 32A DU may be faulty.

(b) Whenever making tests other than remote tests, make sure that the station is conditioned for the test being performed. If the RT1 lamp on 10A3 Data Unit is lighted but should not be, the station may have been accidentally put in a remote test condition. To return the station to the normal operating condition from a remote test condition, observe the lamp indication(s) on the 10A3 DU and compare to Table C. The lamps indicate which mode of operation the data set is in. For example, if the RT1 lamp is lighted, depress and hold (approximately 7 seconds) the LRT pushbutton and then release. The data station is now in RT2. Again push and hold (approximately 7 seconds) the LRT pushbutton and release. The data set is now in a normal operating condition.

3.08 ***Replacing Circuit Packs:***

(a) When performing steps of a certain test and the data station fails, this may indicate trouble in a specific circuit pack, in which case the circuit pack most likely to be bad will be indicated in the table. When the data station trouble has been isolated to a particular data set or data auxiliary set, the trouble may be corrected by replacing a circuit pack.

(b) When replacing a circuit pack, verify that the correct options, and no others, are installed on the new circuit pack for that particular data station arrangement.

(c) If the trouble cannot be isolated to a particular circuit pack within a data set or data auxiliary set, replace all circuit packs within the defective data set or data auxiliary set as follows:

(1) Verify power supply voltages (see Table G).

(2) Replace circuit packs one at a time in the order listed until the trouble is corrected.

(3) Reinstall all original circuit packs one at a time, except for the new one which corrected the trouble. It will, of course, remain in the data set.

(4) If, after replacing an original circuit pack, the data set does not function properly, that circuit pack is obviously defective and should also be replaced.

3.09 If, after checking the conditions mentioned in 3.03, the data set remains completely inoperative, a voltage check should be performed with results similar to those as indicated in Table G.

3.10 If incorrect information or data is contained in this BSP, corrective action should be initiated by completing BSP Comment Form E-3973.

4. REFERENCES

4.01 The circuit descriptions (CDs) and schematic drawings (SDs) for the apparatus included in Wideband Data Set 306A-type are as follows:

- CD- and SD-1D237-01—Wideband Data Station Using Data Set 306-Type—Application Schematic
- CD- and SD-1D187-01—Data Systems Station—Data Set 306-Type
- CD- and SD-1D196-01—Data Unit 33-Type
- CD- and SD-1D218-01—Data Unit 32A-Type, Line and Test Circuit

- CD- and SD-1D041-01—Data Auxiliary Set 804A-Type.

4.02 Bell System Practices covering the various equipment in the DS 306A-type are as follows:

SECTION	TITLE
107-400-100	912A Wideband Data Test Set, Description and Operation
365-200-503	Digital Transmission Systems T1 Carrier, J98713F Line Terminating Unit, Tests
590-100-106	10A-Type Data Unit, Identification
590-100-122	32A-Type Data Unit, Description and Operation
590-100-123	33-Type Data Unit, Description
593-801-100	Wideband Data Station Using Data Set 306—Point-to-Point, Limited Distance, Description and Operation
593-801-200	Wideband Data Station Using Data Set 306—Point-to-Point, Limited Distance, Installation and Connections
598-030-100	Data Auxiliary Set 804A-Type, Description and Operation.

TABLE D

CONTINUITY TEST WITH ALL CIRCUIT PACKS AND 10A3 DATA UNIT REMOVED

33A1 DATA UNIT TB1 TERMINAL	TO	32A1 DATA UNIT TB1 TERMINAL
1		17
2		15
3		6
4		9
5		45
6		8
7		40
8		39
9		18
10		44
11		43
12		11
13		7
14		26
15		25
19		42
21		41
22		16

TABLE E

LOCAL TEST CONDITION

TEST POINTS ON TB2 OF 33A DATA UNIT BETWEEN GND (B) AND	CONTROL SIGNALS	VOLTS DC	TEST STATE
H	DTR	−7	OFF
C	RS	+7	OFF
K	LT	+6.4	ON
E	DSR	−6.4	OFF
F	RLSD	+6.4	ON
D	CS	+6.4	ON
J	RI	−6.4	OFF

Note: If the 912A WDTS is utilized, the voltage checks may be obtained from the pin jacks on the J79912AC interface unit. Conditions and indications on 912A WDTS are as follows:

(a) LOCAL TEST switch is ON.
(b) RCVD LINE SIG DETR and CLEAR TO SEND lamps are lighted.
(c) DATA SET READY lamp is extinguished.

TABLE F

END-TO-END TEST CONDITION

TEST POINTS ON TB2 OF 33A1 DATA UNIT BETWEEN GND (B) AND	CONTROL SIGNALS	VOLTS DC	TEST STATE
H	DTR	+7	OFF
C	RS	+7	OFF
K	LT	−7	OFF
E	DSR	+6.4	ON
F	RLSD	+6.4	ON
D	CS	+6.4	ON
J	RI	−6.4	OFF

Note: If the 912A WDTS is utilized, the voltage checks may be obtained from the pin jacks on the J79912AC interface unit. Conditions and indications on 912A WDTS are as follows:

(a) LOCAL TEST switch is OFF.
(b) DATA SET READY, RCVD LINE SIG DETR, and CLEAR TO SEND lamps are lighted.

TABLE G

POWER TEST ON 33A1 DATA UNIT

TEST POINTS	CORRECT VOLTAGE	REPLACE
5 to 1* on AR511 or 50 to 46* on TB1	+17.5 to +20.0	41A2 Power Unit
2 to 6* on AR505 or 46 to 47* on TB1	−17.5 to −20.0	
6 to 1* on AR511 or 53 to 46* on TB1	+4.41 to +4.59	
14 to 1* on AR511	+11.7 to +12.3	AR511

* Ground lead of meter is connected to this test point.

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
1	LT RT1	Lighted Extinguished	32A DU	10A3 DU	
2	RCVD LINE SIG DETR	Lighted	32A DU or Line Terminating Unit (LTU) or 33A DU	10A3 DU	Check loop test feature of LTU. Check circuit packs as in Fig. 3 after LT (start at ★).
	CLEAR TO SEND	Lighted	33A DU	AR504	
	NO DATA NO SYNC	Extinguished Extinguished	33A DU		Remove AR504. If NO DATA lamp extinguishes, replace AR504. Check circuit packs as in Fig. 3 after LT (start at ★).
	DATA SET READY RING INDICATOR	Extinguished Extinguished	33A DU	AR504	
3	Bipolar Violation Detector Lamp	Extinguished	33A DU	AR504 or AR511	Check errors in Step 5. If no errors, replace AR505.
5	COUNTER	No Errors	33A DU or 32A DU or LTU		Check 33A1 DU circuit packs as in Fig. 3 after LT (start at ★).

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
8	LT	Lighted	33A DU	AR504	Verify that option R is ***not*** installed.
	RCVD LINE SIG DETR	Lighted			
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			
8a	CLEAR TO SEND	Lighted	33A DU	AR504	Verify that option R is properly installed.
	LT	Lighted			
	RCVD LINE SIG DETR	Lighted			
	Remaining Lamps	Extinguished			
10	LT	Lighted	33A DU	AR504	Verify that option Q is ***not*** installed.
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			
10b	LT	Lighted	33A DU	AR504	Verify that option Q is properly installed.
	RCVD LINE SIG DETR	Lighted			
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
11	LT	Extinguished	33A DU or 32A DU	AR511 10A3 DU	
13	LT	Lighted	33A DU or 32A DU	AR511 10A3 DU	
15	DATA SET READY	Lighted	33A DU at end in trouble	AR504	
	RCVD LINE SIG DETR	Lighted	33A DU at either end or T1 line		Check DATA SET READY at other end first. Check both ends in local test (see READ under 2.12). If tests check OK, T1 line is bad.
	CLEAR TO SEND	Lighted	33A DU at end in trouble	AR504	Check RCVD LINE SIG DETR first.
	NO DATA NO SYNC	Extinguished Extinguished	33A DU at either end or T1 line		Check CLEAR TO SEND first. Check both ends in local test (see READ under 2.12). If tests check OK, T1 line is bad.
	Remaining Lamps	Extinguished	33A DU at end in trouble	AR504	
17	DATA SET READY RCVD LINE SIG DETR Remaining Lamps	Lighted Lighted Extinguished	33A DU at near end	AR504	At near end, check EIA customer interface with aid of Table F.

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
17a	DATA SET READY	Lighted	33A DU at near end	AR504	At near end, verify that option R is properly installed.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	Remaining Lamps	Extinguished			
18	DATA SET READY	Lighted	33A DU at near end	AR504	Check near-end EIA customer interface.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamp	Extinguished			
18a	DATA SET READY	Lighted	33A DU at near end	AR504	At near end, verify that option R is properly installed.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	Remaining Lamps	Extinguished			
20	NO DATA	Lighted	33A DU at near end	AR504	At far end, check EIA control interface with aid of Table F.
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
20b	DATA SET READY	Lighted	33A DU at near end	AR504	At far end, verify that option Q (PDTR) is properly installed.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamp	Extinguished			
21	DATA SET READY	Lighted	33A DU at far end	AR504	
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			
21b	DATA SET READY	Lighted	33A DU at far end	AR504	At far end, verify option Q (PDTR) is properly installed on TB1 of 33A DU.
	RCVD LINE SIG DETR	Lighted			
	Remaining Lamps	Extinguished			
26	DATA SET READY	Lighted	33A DU at far end	AR504	At far end, check EIA control interface with aid of Table F.
	RCVD LINE SIG DETR	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
26a	DATA SET READY	Lighted	33A DU at far end	AR504	At far end, verify that option R is properly installed.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	Remaining Lamps	Extinguished			
27	DATA SET READY	Lighted	33A DU at far end	AR504	
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamp	Extinguished			
27a	DATA SET READY	Lighted	33A DU at far end	AR504	At far end, verify that option R is properly installed.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	Remaining Lamps	Extinguished			
29	NO DATA	Lighted	33A DU at near end	AR504	
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
29b	Same as in Step 27 or 27a.		33A DU at near end	AR504	At near end, verify that option Q (PDTR) is properly installed.
30	DATA SET READY NO DATA NO SYNC Remaining Lamps	Lighted Lighted Lighted Extinguished	33A DU at near end	AR504	
30b	DATA SET READY RCVD LINE SIG DETR Remaining Lamps	Lighted Lighted Extinguished	33A DU at near end	AR504	Verify that option Q (PDTR) is properly installed at near end on TB1 of 33A DU.
33	All columns are the same as in Step 15.				
35	COUNTER	No Errors			Check local test at both ends (see READ under 2.12). If tests are OK, then T1 line is bad.
37	Bipolar Violation Detector Lamp	Extinguished	33A DU	AR505	If no errors, T1 line must be OK. Only possible trouble is bipolar violation detector.
39	RT1 LT	Lighted Extinguished	32A DU	10A3 DU AR122	

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
40	DATA SET READY	Extinguished	33A DU	AR504	
	RCVD LINE SIG DETR	Lighted			Check loop test feature of LTU. If OK, make local test.
	NO DATA	Extinguished			
	NO SYNC	Extinguished			
	CLEAR TO SEND	Extinguished	33A DU	AR504	
41	LT	Lighted	32A DU	10A3 DU or AR122	
	RT1	Lighted			
42 thru 44	LT	Extinguished	32A DU	10A3 DU or AR122	
	RT1	Extinguished			
47	LT	Lighted	32A DU	10A3 DU	
	RT1	Extinguished			
48	TEST	Lighted	32A DU or DAS 804	10A3 DU	
	TALK	Extinguished	DAS 804		
	DATA	Extinguished			
	RING	Extinguished			
	AUTO	Extinguished			
	WB CHAN	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
49	RCVD LINE SIG DETR	Lighted	32A DU or LTU or 33A DU	10A3 DU	Check loop test feature of LTU. If OK, check circuit packs as in Fig. 3 after LT (start at ⊛).
	CLEAR TO SEND	Lighted	33A DU	AR504	
	NO DATA	Extinguished	33A DU		Remove AR504. If NO DATA extinguishes, replace AR504. Check circuit packs as in Fig. 3 after LT (start at ⊛).
	NO SYNC	Extinguished			
	DATA SET READY	Extinguished	33A DU	AR504	
	RING INDICATOR	Extinguished			
50	Bipolar Violation Detector Lamp	Extinguished	33A DU	AR505 or AR511	Check errors in Step 52. If ***no*** errors, replace AR505.
52	COUNTER	No Errors	33A DU or possibly 32A DU or LTU		Check 33A DU circuit packs as in Fig. 3 after LT (start at ⊛).
55	RCVD LINE SIG DETR	Lighted	33A DU	AR504	Verify that option R is ***not*** installed.
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
55a	RCVD LINE SIG DETR CLEAR TO SEND Remaining Lamps	Lighted Lighted Extinguished	33A DU	Possibly AR504	Verify that option R is properly installed.
58	LOCAL TEST NO DATA NO SYNC Remaining Lamps	Lighted Lighted Lighted Extinguished	33A DU	AR504	Verify that option Q is ***not*** installed.
58b	See Step 55 or 55a depending on option R.				Verify that option Q is properly installed.
61	LT	Lighted	33A DU or 32A DU	AR511 or 10A3 DU	
64	LT	Extinguished	33A DU or 32A DU	AR511 or 10A3 DU	
66	LT	Lighted	DAS 804		
69 thru 71	TALK Remaining Lamps	Lighted Extinguished	DAS 804		
72	TALK	Depressed	DAS 804 or Private Line Terminal or 32A DU at same end		Check DAS 804 connector at both ends.
73	RING	Depressed	Same as in Step 72.		

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
74	804: RING Ringing 912A: RING IND	 Flashes Heard Flashes	Same as in Step 72.		
75	TALK	Depressed	DAS 804 or Private Line Terminal or 32A DU at same end		Verify that voice communication is possible. Check DAS 804 connector at both ends.
77	WB CHAN	Lighted whenever RCVD LINE SIG DETR is lighted during Steps 15 through 37.			If WB CHAN lamp is always lighted, AR504 is bad. If WB CHAN lamp does not light, AR504 or lamp in DAS 804 or RCVD LINE SIG DETR feature is bad.
79	TEST Remaining Lamps	Lighted Extinguished	DAS 804		Also, see Steps 38 through 44.

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
81	912A: NO DATA	Lighted	33A DU at either end	AR504 or AR509	At both ends.
	NO SYNC	Lighted			
	RCVD LINE SIG DETR	Extinguished	33A DU at either end	AR504, AR506 or AR510	AR506 at same end and AR510 at other end.
	CLEAR TO SEND	Extinguished	33A DU at either end	AR504	May be lighted if RCVD LINE SIG DETR lamp is lighted at same end.
	DATA SET READY	Extinguished			
	804: WB CHAN	Extinguished	33A DU at same end	AR504	May be lighted if RCVD LINE SIG DETR lamp is lighted at same end.
	TALK	Extinguished	DAS 804		At same end.
	DATA	Extinguished	DAS 804		
	RING	Extinguished	Private Line Terminal (PLT) or DAS 804		
	TEST	Extinguished	DAS 804 or 32A DU	10A3 DU	
	AUTO	Extinguished	DAS 804		
82	TALK	Lighted	DAS 804 at near end		
	Remaining Lamps	Extinguished			
84	Ringer	Rings	DAS 804 or PLT at either end		

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
85	RING Lamp	Flashes	DAS 804 or PLT at far end		
	RING IND	Flashes	DAS 804 or 32A DU or 33A DU at far end	CS4 AR504	
88	DATA SET READY	Lighted	DAS 804 or 33A DU at far end	AR504	
	RCVD LINE SIG DETR	Lighted			Check near-end RCVD LINE SIG DETR, DATA SET READY. If OK, then check each end in local test (see READ under 2.12). If tests fail, the trouble is in transmit side of near-end 33A DU or receive side of far-end 33A DU.
	CLEAR TO SEND	Lighted	33A DU at far end	AR504	
	NO DATA	Extinguished			Check each end in local test (see READ under 2.12). If tests fail, trouble is in transmit side of near-end 33A DU or receive side of far-end 33A DU.
	NO SYNC	Extinguished			
89	WB CHAN	Lighted	33A DU or DAS 804 at far end	AR504	
	TALK	Lighted	DAS 804 at far end		

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
91	RCVD LINE SIG DETR	Lighted			Check each end in local test (see READ under 2.12). If tests fail, trouble is in transmit side of far-end 33A DU or receive side of near-end 33A DU. If tests are OK, trouble is in T1 line.
	CLEAR TO SEND	Lighted	33A DU at near end	AR504	Check RCVD LINE SIG DETR first.
	DATA SET READY	Lighted			
	NO DATA	Extinguished			Check each end in local test (see READ under 2.12). If test fails, trouble is in transmit side of far-end 33A DU or receive side of near-end 33A DU. If tests are OK, trouble is in T1 line.
	NO SYNC	Extinguished			
92	WB CHAN	Lighted	33A DU or DAS 804 at near end	AR504	
	TALK	Lighted	DAS 804 at near end		
93 thru 95	COUNTER	No Errors	33A DU at either end or Transmission Facility		Sectionalize by LT at both ends (see READ under 2.12). If tests are OK, T1 line is bad.
96	Bipolar Violation Detector Lamp	Extinguished	33A DU at faulty end	AR505	
98	2025-Hz Tone	Heard	DAS 804 at far end		

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
99	WB CHAN Remaining Lamps	Lighted Extinguished	DAS 804 or 33A DU at far end	AR504	
100	All columns have the same indication as in Step 88.				
101	All columns have the same indication as in Step 89.				
102	All columns have the same indication as in Step 88.				
104	TALK WB CHAN	Lighted Lighted	33A DU at near end	AR504	
105	DATA SET READY RCVD LINE SIG DETR Remaining Lamps	Lighted Lighted Extinguished	33A DU at near end	AR504	Verify that option R is ***not*** installed at near end.
105a	CLEAR TO SEND RCVD LINE SIG DETR DATA SET READY Remaining Lamps	Lighted Lighted Lighted Extinguished	33A DU at near end	AR504	Verify that option R is properly installed at near end.
106	WB CHAN Remaining Lamps	Lighted Extinguished	33A DU at near end	AR504	

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
107	DATA SET READY	Lighted	33A DU at near end	AR504	
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	NO DATA	Lighted	33A DU at near end	AR504 AR509	At near end verify that option R is properly installed.
	NO SYNC	Lighted			
	Remaining Lamp	Extinguished	32A DU or DAS 804 at near end	CS4	
107a	DATA SET READY	Lighted	33A DU at near end	AR504	At near end, verify that option R is properly installed.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	Remaining Lamps	Extinguished			
109	WB CHAN	Extinguished	33A DU at near end	AR504	Verify that option Q is ***not*** installed at near end.
	TALK	Lighted	DAS 804		
	Remaining Lamps	Extinguished			
109b	See Step 104.		33A DU at near end	AR504	Verify that option Q is properly installed at near end.
110	NO DATA	Lighted	33A DU at near end	AR504	Verify that option Q is ***not*** installed at near end of 33A DU.
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
110b	See Steps 105 or 105a.		33A DU at near end	AR504	Verify that option Q is properly installed at near end.
111	WB CHAN	Extinguished	33A DU at far end	AR504	Check RCVD LINE SIG DETR first.
	Remaining Lamps	Extinguished	DAS 804 at far end		
111b	WB CHAN	Lighted	33A DU at near end	AR504	Verify that option Q is properly installed at near end.
	Remaining Lamps	Extinguished			
112	DATA SET READY	Lighted	33A DU at far end	AR504	
	RCVD LINE SIG DETR	Extinguished	33A DU at near end	AR504 AR510	
	CLEAR TO SEND	Extinguished	33A DU at far end	AR504	Check RCVD LINE SIG DETR first.
	NO DATA	Lighted	33A DU at near end	AR504	
	NO SYNC	Lighted			
112b	All columns have the same indications as in Steps 107 or 107a.				
114	NO DATA	Lighted	33A DU at far end	AR504	Verify that option Q is ***not*** installed at far end.
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			
114b	See Steps 112 or 112b.		33A DU at far end	AR504	Verify that option Q is installed at far end.
115	All lamps on DAS 804	Extinguished	33A DU at far end	AR504	Verify that option Q is ***not*** installed at far end.
115b	See Step 111 or 111b.		33A DU at far end	AR504	Verify that option Q is properly installed at far end.

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
118	AUTO Remaining Lamps	Lighted Extinguished	DAS 804 at far end		
120	2025-Hz Tone	Heard from 2-5 seconds	DAS 804 at far end		
121	WB CHAN TALK Remaining Lamps	Lighted Lighted Extinguished	DAS 804 at far end		
122	All columns have the same indication as in Step 91.				
123	Ringer	Short Ring	DAS 804 at far end		
124	AUTO WB CHAN Remaining Lamps	Lighted Lighted Extinguished	DAS 804		At far end.
125	All columns have the same indication as in Step 88.				
129	NO DATA NO SYNC Remaining Lamps	Lighted Lighted Extinguished	33A DU or DAS 804 at either end	AR504	Trouble may be caused by either end and affecting either end.
131	TALK Remaining Lamps	Lighted Extinguished	DAS 804 at near end		
133	RING Ringing Tone	Flashes Heard	DAS 804		Either DAS 804 or private line terminal. If DAS 804 rings, trouble is at far end.

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
134	RING IND	Flashes	DAS 804 or 32A DU or 33A DU	CS4 AR504	At far end.
136	RCVD LINE SIG DETR	Lighted	33A DU at either end		Check both ends in local test (see READ under 2.12). If tests are OK, T1 line is bad.
	NO DATA	Lighted	DAS 804 or 33A DU at far end	AR504	Check options on 33A DU at other end.
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished	32A DU at near end	CS4	
137	WB CHAN	Lighted	33A DU or DAS 804 at near end	AR504	
	TALK	Lighted			
	Remaining Lamps	Extinguished			
139	WB CHAN	Lighted	33A DU or DAS 804 at near end	AR504	
	DATA	Lighted	DAS 804 at far end		
	Remaining Lamps	Extinguished			
140	DATA SET READY	Lighted	33A DU or DAS 804 or 32A DU	AR504	Delay is in DAS 804. If only one of these lights, trouble is in AR504.
	CLEAR TO SEND	Lighted		CS4	
	RCVD LINE SIG DETR	Lighted	Same as Step 136.		
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamp	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
141	Answer-Back Tone	Heard	DAS 804 or Private Line Terminal (PLT)		At both ends.
142	All columns have the same indication as in Step 137.				
143	All columns have the same indication as in Step 136.				
145	RCVD LINE SIG DETR	Lighted	33A DU or DAS 804 at near end	AR504	
	NO DATA	Extinguished	33A DU at far end	AR504	
	NO SYNC	Extinguished			If bipolar violations occur, trouble is far-end AR511, near-end AR505, or T1 line. Check both ends in local test (see READ under 2.12). If tests are OK, T1 line is bad.
	Remaining Lamps	Extinguished	32A DU at near end	CS4	
147	WB CHAN	Lighted	DAS 804 at near end		
	DATA	Lighted			
	Remaining Lamps	Extinguished			
148	DATA SET READY	Lighted	DAS 804 or 33A DU at near end	AR504	
	CLEAR TO SEND	Lighted	33A DU at near end	AR504	
	RCVD LINE SIG DETR	Lighted	Same as Step 145.		
	NO DATA	Extinguished			
	NO SYNC	Extinguished			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
149	RCVD LINE SIG DETR	Lighted			
	DATA SET READY	Lighted			
	CLEAR TO SEND	Lighted			
	NO DATA	Extinguished	33A DU at near end	AR504	
	NO SYNC	Extinguished			Check local test at both ends (see READ under 2.12). If tests are OK, T1 line is bad. If bipolar violation occurs, trouble is AR511 at near end or AR505 at far end or T1 line.
150	COUNTER	No Errors	33A DU at either end or T1 line	AR504	Local test both ends (see READ under 2.12). If tests are OK, T1 line is bad.
151	Bipolar Violation Detector Lamp	Extinguished	33A DU at either end or T1 line	AR504	If bipolar violations occur, check CP AR505 at same end and CP AR511 at other end.
155	All columns have the same indication as in Step 147.				
156	CLEAR TO SEND	Extinguished	33A DU at near end	AR504	Verify that option R is ***not*** installed.
	DATA SET READY	Lighted	Same as Step 148.		
	RCVD LINE SIG DETR	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
156a	DATA SET READY	Lighted	Same as Step 148.		
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted	33A DU at near end	AR504	At near end, verify that option R is properly installed.
	Remaining Lamps	Extinguished	Same as Step 148.		
158	DATA SET READY	Lighted			
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	NO DATA	Lighted	33A DU at near end	AR504	Verify that option R is ***not*** installed at near end.
	NO SYNC	Lighted			
	Remaining Lamp	Extinguished			
158a	DATA SET READY	Lighted			
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted	33A DU at near end	AR504	At near end, verify that option R is correctly installed.
	Remaining Lamps	Extinguished			
160	NO DATA	Lighted	33A DU at near end	AR504	At near end, verify that option Q is ***not*** installed.
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
161	DATA Remaining Lamps	Lighted Extinguished	33A DU at near end	AR504	At far end, verify that option Q is ***not*** installed.
162	DATA SET READY NO DATA NO SYNC Remaining Lamps	Lighted Lighted Lighted Extinguished	33A DU at near end	AR504	At near end, verify that option Q is ***not*** installed.
164	TALK Remaining Lamps	Lighted Extinguished	DAS 804 at far end		
165	NO DATA NO SYNC Remaining Lamps	Lighted Lighted Extinguished	33A DU at far end DAS 804 or 33A DU at far end	AR504 AR509 AR504	
167	TALK Remaining Lamps	Lighted Extinguished	DAS 804		At near end.
168	WB CHAN DATA Remaining Lamps	Lighted Lighted Extinguished	33A DU at near end	AR504	At near end, verify that option Q is installed.
169	DATA SET READY RCVD LINE SIG DETR Remaining Lamps	Lighted Lighted Extinguished	33A DU at near end	AR504	At near end, verify that option Q is installed.

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
169a	CLEAR TO SEND	Lighted	33A DU at near end	AR504	At near end, verify that option R and option Q are properly installed.
	DATA SET READY	Lighted			
	RCVD LINE SIG DETR	Lighted			
	Remaining Lamps	Extinguished			
170	WB CHAN	Lighted	33A DU at near end	AR504	At near end, check option Q.
	DATA	Lighted			
	Remaining Lamps	Extinguished			
171	DATA SET READY	Lighted	33A DU at near end	AR504	Verify that option Q is installed at near end.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamp	Extinguished			
171a	DATA SET READY	Lighted	33A DU at near end	AR504	Verify that option Q and option R are installed.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
173	WB CHAN	Lighted	DAS 804 at far end		
	TALK	Lighted			
	Remaining Lamps	Extinguished			
174	RCVD LINE SIG DETR	Lighted	33A DU at far end	AR504	
	NO DATA	Lighted			
	NO SYNC	Lighted			
	DATA SET READY	Extinguished	DAS 804 at far end		
	CLEAR TO SEND	Extinguished	33A DU at far end	AR504	
174a	RCVD LINE SIG DETR	Lighted	33A DU at far end	AR504	
	Remaining Lamps	Extinguished	Same as in Step 174.		
175	DATA SET READY	Lighted	33A DU	AR504 AR509	At far end.
	RCVD LINE SIG DETR	Lighted			
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
175a	DATA SET READY	Lighted	33A DU at far end	AR504 AR509	At near end, verify that option R is properly installed.
	RCVD LINE SIG DETR	Lighted			
	CLEAR TO SEND	Lighted			
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamp	Extinguished			
176	WB CHAN	Lighted	DAS 804 at near end		
	TALK	Lighted			
	Remaining Lamps	Extinguished			
178	RCVD LINE SIG DETR	Lighted	33A DU or DAS 804 at near end	AR504 AR509	
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			
180	AUTO	Lighted	DAS 804		At far end.
	Remaining Lamps	Extinguished			
181	2025-Hz Tone	Heard at near end	DAS 804 at far end		
182	Ringer	Short Ring	DAS 804 at far end		

TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET, DATA AUXILIARY SET OR DATA UNIT	REPLACE CIRCUIT PACK OR DATA UNIT	REMARKS
183	AUTO	Lighted	DAS 804 or Private Line Terminal (PLT)		At far end.
	DATA	Lighted			
	Remaining Lamps	Extinguished			
184	DATA SET READY	Lighted	33A DU at far end	AR504	
	NO DATA	Lighted			
	NO SYNC	Lighted			
	Remaining Lamps	Extinguished			

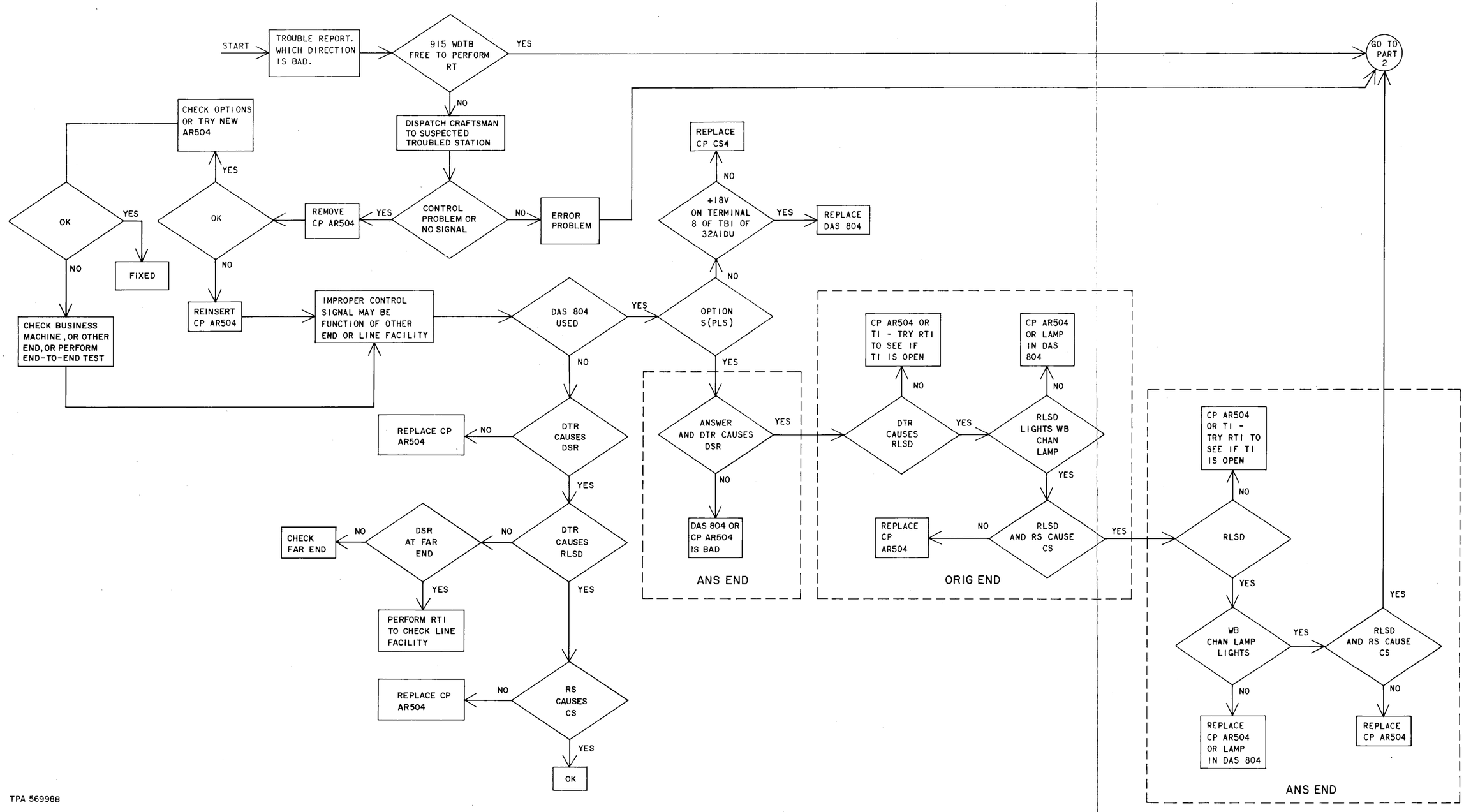


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Fig. 2—Flow Chart for Troubleshooting (Part 1)

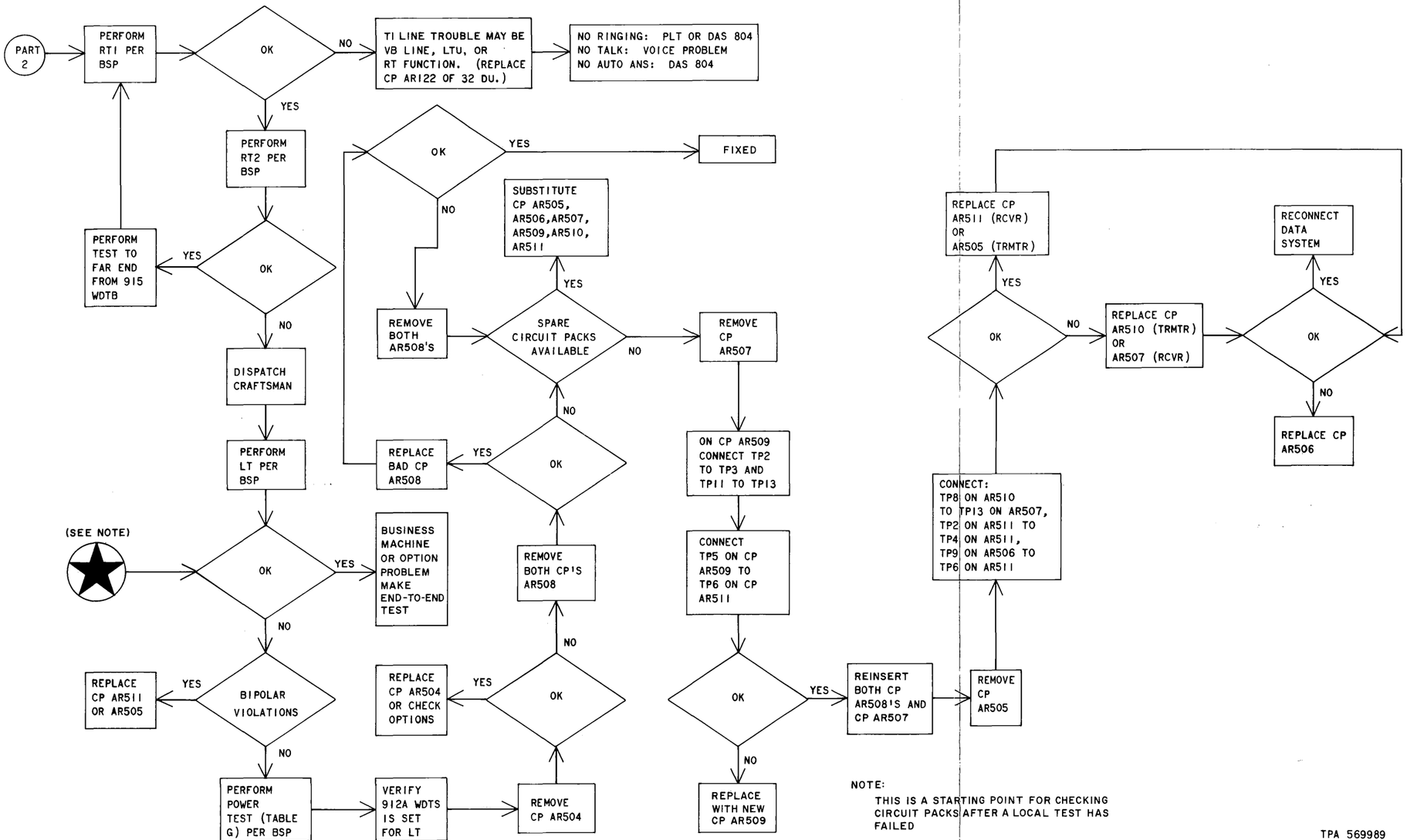

Fig. 3—Flow Chart for Troubleshooting (Part 2)