

WIDEBAND DATA STATION USING DATA SET 303-TYPE  
TWO-WIRE SWITCHED SERVICE  
(DATA-PHONE® 50 SERVICE)  
TEST PROCEDURES

CONTENTS	PAGE
1. GENERAL . . . . .	1
2. WIDEBAND DATA STATION TEST . . . . .	2
A. Wideband Data Station Using DS 303, DAS 806B7, and DAS 804A3 (DAS 801C4, T1WM-4) . . . . .	2
B. Wideband Data Station Using DS 303, DAS 806B7, DAS 804A3, and DS 103F2 (DAS 801C4, T1WM-4) . . . . .	7
C. T1WM-4 Wideband Modem . . . . .	11
D. Test of Remote Test Feature . . . . .	14
E. Attendant Cooperation for Remote Test . . . . .	16
3. TROUBLESHOOTING . . . . .	18
4. REFERENCES . . . . .	28

1. GENERAL

1.01 This section describes local test procedures for testing the wideband data station. A test of the remote test circuit is also described. These are 2-wire switched service tests and are to be made at the time of installation. They can also be used in clearing trouble conditions.

1.02 These tests are arranged in a logical sequence and specify the steps necessary to determine that the data station is operating properly.

1.03 In this procedure, 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.

1.04 The craft employee should become familiar with the options installed in the data station. The indications of certain tests are determined by which options are in the data station.

*Note:* The options wired into DS 303 and the other associated apparatus should be recorded on the label placed in the data station cabinet. If the coding of DS 303 is changed by the addition or removal of circuit packs, this should be noted on the label also. This label indication will prevent the problem of identifying the options and changes in apparatus on a subsequent repair visit.

1.05 Tests are provided for the different configurations of the data station. The test title denotes the system configuration for which the tests are intended.

1.06 There are four basic wideband data station arrangements. A Data Auxiliary Set (DAS) 801C4 may be provided with any one. When DAS 801C4 is provided, it does not affect the basic station test. To aid in determining the particular test to be performed for these station arrangements, refer to Table A.

1.07 Some business machines are capable of performing local tests. It is desirable to use the customer's equipment to determine if the business machine and/or station are operating properly.

1.08 When the indication or action is as specified, proceed to the next step. If the indication is not as specified in the testing procedure, refer to the corresponding step number in the Troubleshooting Chart.

TABLE A

DATA STATION CONSISTING OF	PERFORM TEST				
	2.03	2.10	2.17	2.22	2.27
303, 806, 804	X			X	X
303, 806, 804, T1WM-4	X		X	X	X
303, 806, 804, 103		X		X	X
303, 806, 804, 103, T1WM-4		X	X	X	X

**Note 1:** When testing data stations equipped with a scrambler, the NO DATA lamp indication may not be as indicated in the test. This does not necessarily indicate a trouble condition.

**Note 2:** If a trouble is isolated to a 16A1 Data Unit, check the 0.5 ampere fuse accessible from the rear of the unit.

**1.09** Before proceeding with any test of the data station, verify that:

- Wideband and voiceband loops have been tested and meet requirements as specified in appropriate BSPs.
- Telephone portion of installation meets standard dc talk, signaling, and supervision requirements.
- Strapping options agree with service order.
- Routine trouble condition has been isolated as specified in Section 593-800-310.
- All connections and connectors are properly made.

## 2. WIDEBAND DATA STATION TEST

**2.01** The test of a wideband data station (WDS) is essentially the same, whether the station is operating synchronously or nonsynchronously, dc-coupled balanced line signal or restored polar signal format. The differences are noted in the following procedure. The clock in the 912A Data Test Set (DTS) is used to test synchronous data

stations which require external timing. For synchronous sets with internal timing, the data set clock is used.

**2.02** This section throughout refers to DAS 804A3; however, a DAS 804A7 may be provided. These tests are applicable to both models.

### A. Wideband Data Station Using DS 303, DAS 806B7, and DAS 804A3 (DAS 801C4, T1WM-4)

**2.03 General:** This station arrangement is usually conditioned to operate synchronously; however, it may be provided as an alternate-use station. Alternate-use stations may be operated either synchronously or nonsynchronously. Alternate-use stations should be tested synchronously and nonsynchronously. Test steps followed by the letter "a" (see Step 11a) are required only when testing nonsynchronously.

**2.04** The local test of this station arrangement may be initiated at the DAS 804A3, DAS 806B7, or the 912A DTS. The local test results should be the same in each case.

**2.05** In the local test mode, data is sent from the 912A DTS through the DS 303-type, looped on the line side of DAS 806B7, and returned through DS 303 to the 912A. The local test loop-back relays are provided in DAS 806B7. These relays are controlled by the 912A DTS, business machine, DAS 804A3, or the LT key on DAS 806B7. The DAS 804A3 has control functions that control or condition the WDS for wideband data. This test will verify the following:

- Simultaneous TALK/DATA function.

**Note:** This feature is not provided in a station equipped with a voiceband data set.

- Control functions from DAS 804A3 function properly.
- Proper options are installed.
- DS 303-type can accept and react to business machine interface signals.
- Wideband data station can transmit and receive wideband data on a local loop-back within acceptable limits.
- DAS 806B7 functions properly and controls local test.

**2.06** When DAS 801C4 is provided, it does not affect the local test of the wideband data station. However, if DAS 801C4 is provided, it should be tested per Section 598-012-501.

**2.07 Equipment Required:**

- 1—912A Data Test Set (DTS) equipped with J79912AA interface unit
- 2—310-type plug equipped with 135-ohm termination
- 1—Patch cord at least 4 ft long equipped with a 310-type plug on each end.

**2.08 Preparation:**

- (a) Disconnect the Data Set 303 transmitter and receiver from the line facilities as follows:
  - (1) Insert a 310-type plug equipped with a 135-ohm termination into the WB TRANSMITTING—LINE jack on DAS 806B7.
  - (2) Insert a 310-type plug equipped with a 135-ohm termination into the WB RECEIVING—LINE jack on DAS 806B7.
- (b) If nonsynchronous tests are to be performed, connect the wideband data cable from the 912A WDTS to the NON SYNC connector on DS 303.
- (c) If synchronous tests are to be performed, connect the wideband data cable from the 912A DTS to the SYNC connector on DS 303.
- (d) At DAS 806B7, verify that the LT key is in the horizontal position.
- (e) Set the switches on the 912A DTS as shown in Chart 1.
- (f) Insert one patch cord between DAS 806B7 VB TRANSMITTER—MON jack and the 912A DTS interface, TRMT jack.

CHART 1

SWITCHES	SETTINGS
TRANSMIT — BIT RATE	EXT — (When the internal clock, option Z, is installed in DS 303) or 50 — (When the external clock, option E, is installed in DS 303 or when operating nonsynchronously)
TRANSMIT — TEST SIGNAL	2087
TRANSMIT — TRIGGER	+
TRANSMIT — OUTPUT	NORMAL
RECEIVE — BIT RATE	EXT — (When testing synchronously) or 50 — (When testing nonsynchronously)
RECEIVE — TIMING	0
RECEIVE — TEST SIGNAL	2087
RECEIVE — TRIGGER	+
RECEIVE — INPUT	NORMAL
RECEIVE — WORD SYNC	AUTO
RECEIVE — COUNTER	OFF
INTERFACE UNIT — TEST MODE	UNBAL
INTERFACE UNIT — MODE	NON-SYNC
INTERFACE UNIT — SEND REQ	ON
INTERFACE UNIT — LOCAL TEST	OFF
INTERFACE UNIT — DATA TERM READY	ON
POWER	ON

**2.09 Procedure:** When the T1WM-4 is provided, it should be tested only after satisfactory completion of this test.

STEP	PROCEDURE
1	At the DAS 804A3, lift the handset and depress the TALK button. Observe that the TALK lamp is lighted and all other DAS 804A3 lamps are extinguished.
2	At the DAS 804A3, depress the DATA button and observe that the WB CHAN lamp lights and the TALK lamp extinguishes. Observe that the DATA lamp is extinguished.
3	Return the handset to the cradle and observe that the WB CHAN lamp remains lighted. Verify that all other DAS 804A3 lamps are extinguished.
4	At DAS 804A3, remove handset from the cradle and depress the TALK button. Observe that the TALK and WB CHAN lamps are lighted. All other DAS 804A3 lamps should be extinguished.
5	At DAS 804A3, return the handset to the cradle and observe that all DAS 804A3 lamps are extinguished.
6	At DAS 804A3, remove the handset from the cradle, depress the DATA button, and observe that the WB CHAN lamp lights. Return the handset to the cradle.
7	At the 912A DTS, observe that the CLEAR TO SEND, DATA SET READY, NO DATA, and NO SYNC lamps are lighted. Observe that the AGC lamp is extinguished.
8	At the 912A DTS, operate the LOCAL TEST switch to ON. Observe that the NO DATA, NO SYNC, and DATA SET READY lamps are extinguished. Observe that the AGC and CLEAR TO SEND lamps are lighted. At DAS 806B7, observe that the LT lamp is lighted. At the DAS 804A3, observe that the TST lamp is lighted and the WB CHAN lamp is extinguished.
9	At the 912A DTS, operate the SEND REQ switch to OFF. Observe that the CLEAR TO SEND lamp extinguishes. Observe that the NO DATA and NO SYNC lamps are lighted.
10	At the 912A DTS, operate the SEND REQ switch to ON. Observe that the lamp indications are the same as in Step 8.
11a	At the 912A DTS, operate the MODE switch to SYNC. Observe that the NO DATA and NO SYNC lamps are lighted. Observe that the AGC and CLEAR TO SEND lamps are extinguished.
12a	Operate MODE switch to NON-SYNC.
13a	At the 912A DTS, reset the counter by depressing the RESET button.
14a	Operate the COUNTER switch to ON. The counter should not count.

STEP	PROCEDURE
	 <p><i>A momentary burst of errors is permissible when operating the TIMING switch in Step 15a.</i></p>
15a	<p>If the WDS is the restored polar line signal type and equipped with 100 percent roll-off filter circuit pack (AR126), operate the TIMING switch to +30 then -30. The counter should not register errors. For WDSs equipped with 50 percent roll-off filter circuit pack (AR125), operate the TIMING switch to +20 then -20. The counter should not register errors.</p>
16	<p>At the 912A DTS, reset the counter by depressing the RESET button.</p>
17	<p>Operate the COUNTER switch to ON. The counter should not count.</p>
18	<p>At the RECEIVER portion of the 912A DTS, operate the INPUT switch to INVERTED. Observe that the NO SYNC lamp lights, and the counter counts errors very rapidly.</p>
19	<p>At the RECEIVER portion of the 912A DTS, operate the INPUT switch to NORMAL and observe that the counter does not count.</p>
20	<p>At the 912A DTS, operate the COUNTER switch to OFF.</p>
21	<p>At the 912A DTS, operate the LOCAL TEST switch to OFF. Observe that the LT lamp on DAS 806B7 is extinguished.</p>
22	<p>At DAS 804A3, observe that the WB CHAN lamp is lighted and all other DAS 804A3 lamps are extinguished.</p>
23	<p>At DAS 804A3, depress the TST button and observe that the lamp indications are as in Step 8.</p>
24	<p>At DAS 804A3, remove handset from cradle and depress the TALK button. Observe that the TST lamp is extinguished and the TALK lamp is lighted.</p>
25	<p>Observe that the WB CHAN lamp is lighted. Depress the DATA button and return the handset to the cradle.</p>
26	<p>At DAS 806B7, operate the LT key to the vertical position. Observe that the LT lamp lights and that all other indications are as in Step 8.</p>
27	<p>At DAS 806B7, operate the LT key to the horizontal position and observe that the LT lamp extinguishes.</p>
28	<p>If DAS 801C4 is provided, refer to Section 598-012-501 and perform test as indicated.</p>
29	<p>If T1WM-4 is provided, perform test per 2.17.</p>

**B. Wideband Data Station Using DS 303, DAS 806B7, DAS 804A3, and DS 103F2 (DAS 801C4, T1WM-4)**

**2.10 General:** This station arrangement is usually conditioned to operate nonsynchronously; however, it may be provided as an alternate-use station. Alternate-use stations may be operated either synchronously or nonsynchronously. Alternate-use stations should be tested both synchronously and nonsynchronously. Test steps followed by the letter "b" (see Step 40b) are not required when testing synchronously.

**2.11** The test of this station arrangement is essentially the same as the station arrangement excluding DS 103F2. Data Set 103F2 is not tested on a local loop-back basis but is tested in cooperation with the serving test center (STC). Refer to Attendant Cooperation for Remote Test, Voiceband Test.

**2.12** This test will verify the following:

- Control functions from DAS 804A3 function properly.
- Proper options are installed.
- DS 303-type can accept and react to business machine interface signals.
- Wideband data station can transmit and receive wideband data on a local loop-back basis within acceptable limits.
- DAS 806B7 functions properly and controls local test.

**2.13** When DAS 801C4 is provided, it does not affect the local test of the WDS. However, if DAS 801C4 is provided, it should be tested per Section 598-012-501.

**2.14 Equipment Required:**

- 1—912A Data Test Set (DTS) equipped with J79912AA interface unit
- 2—310-type Plug equipped with 135-ohm termination
- 1—Patch cord at least 4 feet long equipped with a 310-type plug on each end.

**2.15 Preparation:**

- (a) Disconnect the DS 303 transmitter and receiver from the line facilities as follows:
  - (1) Insert a 310-type plug equipped with a 135-ohm termination into the WB TRANSMITTING—LINE jack on DAS 806B7.
  - (2) Insert a 310-type plug equipped with a 135-ohm termination into the WB RECEIVING—LINE jack on DAS 806B7.
- (b) If nonsynchronous tests are to be performed, connect the wideband data cable from the 912A DTS to the NON SYNC connector on DS 303.
- (c) If synchronous tests are to be performed, connect the wideband data cable from the 912A DTS to the SYNC connector on DS 303.
- (d) At DAS 806B7, verify that the LT key is in the horizontal position.
- (e) Insert a patch cord between DAS 806B7 VB TRANSMITTING—MON jack and the 912A DTS interface, TRMT jack.
- (f) Set the switches on the 912A DTS as shown in Chart 2.

**2.16 Procedure:** When the T1WM-4 is provided, it should be tested only after satisfactory completion of this test.

CHART 2

SWITCHES	SETTINGS
TRANSMIT — BIT RATE	EXT — (When the internal clock, option Z, is installed in DS 303) or 50 — (When the external clock, option E, is installed in DS 303 or when operating nonsynchronously)
TRANSMIT — TEST SIGNAL	2087
TRANSMIT — TRIGGER	+
TRANSMIT — OUTPUT	NORMAL
RECEIVE — BIT RATE	EXT — (When testing synchronously) or 50 — (When testing nonsynchronously)
RECEIVE — TIMING	0
RECEIVE — TEST SIGNAL	2087
RECEIVE — TRIGGER	+
RECEIVE — INPUT	NORMAL
RECEIVE — WORD SYNC	AUTO
RECEIVE — COUNTER	OFF
INTERFACE UNIT — TEST MODE	UNBAL
INTERFACE UNIT — MODE	NON-SYNC
INTERFACE UNIT — SEND REQ	ON
INTERFACE UNIT — LOCAL TEST	OFF
INTERFACE UNIT — DATA TERM READY	ON
POWER	ON

STEP	PROCEDURE
30	At DAS 804A3, lift the handset and depress the TALK button. Observe that the TALK lamp is lighted.
31	At DAS 804A3, depress the DATA button and observe that the DATA lamp lights and the TALK lamp extinguishes.
32	At DAS 804A3, observe that in approximately 5 seconds the WB CHAN lamp lights.
33	At DAS 804A3, depress the TALK button. Verify that the TALK lamp is lighted and WB CHAN and DATA lamps are extinguished.
34	Return handset to cradle and verify that all DAS 804A3 lamps are extinguished.
35	At DAS 804A3, remove the handset from the cradle and depress the DATA button until the DATA lamp lights. Verify that in approximately 5 seconds the WB CHAN lamp lights. Return the handset to the cradle.
36	At the 912A DTS, observe that the CLEAR TO SEND, DATA SET READY, NO DATA, and NO SYNC lamps are lighted. Observe that the AGC lamp is extinguished.
37	At the 912A DTS, operate the LOCAL TEST switch to ON. Observe that the NO DATA, NO SYNC, and DATA SET READY lamps are extinguished. Observe that the AGC and CLEAR TO SEND lamps are lighted. Observe that the LT lamp on DAS 806B7 is lighted. At DAS 804A3, observe that the DATA and TST lamps are lighted and the WB CHAN lamp is extinguished.
38	At the 912A DTS, operate the SEND REQ switch to OFF. Observe that the CLEAR TO SEND lamp extinguishes. Observe that the NO DATA and NO SYNC lamps are lighted.
39	At the 912A DTS, operate the SEND REQ switch to ON. Observe that the lamp indications are the same as in Step 37.
40b	At the 912A DTS, operate the MODE switch to SYNC. Observe that the NO DATA and NO SYNC lamps are lighted. Observe that the AGC and CLEAR TO SEND lamps are extinguished.
41b	Operate MODE switch to NON-SYNC.
42	At the 912A DTS, reset the counter by depressing the RESET button.
43	Operate the COUNTER switch to ON. The counter should not count.
	 <p data-bbox="483 1675 1490 1738"><b><i>A momentary burst of errors is permissible when operating the TIMING switch in Step 44b.</i></b></p>

**SECTION 593-800-510**

STEP	PROCEDURE
44b	If the WDS is the restored polar line signal type and equipped with 100 percent roll-off filter circuit pack (AR126), operate the TIMING switch to +30 then -30. The counter should not register errors. For WDSs equipped with 50 percent roll-off filter circuit pack (AR125), operate the TIMING switch to +20 then -20. The counter should not register errors.
45	At the RECEIVER portion of the 912A DTS, operate the INPUT switch to INVERTED. Observe that the NO SYNC lamp lights and the counter counts errors very rapidly.
46	At the RECEIVER portion of the 912A DTS, operate the INPUT switch to NORMAL and observe that the counter does not count.
47	At the 912A DTS, operate the COUNTER switch to OFF.
48	At the 912A DTS, operate the LOCAL TEST switch to OFF. Observe that the LT lamp on DAS 806B7 is extinguished.
49	At DAS 804A3, remove the handset from the cradle, depress the TST button, and observe that lamp indications are as in Step 37.
50	At DAS 804A3, depress the TALK button and observe that the TALK lamp lights and the TST lamp extinguishes. Return handset to cradle.
51	At DAS 806B7, operate the LT key to the vertical position. Observe that the LT lamp lights.
52	At DAS 806B7, operate the LT key to the horizontal position and observe that the LT lamp extinguishes.
53	At DAS 804A3, remove handset from cradle. Depress the DATA button until the DATA lamp lights. In approximately 5 seconds, the WB CHAN lamp will light. Depress the TST key.
54	At the 912A DTS, verify that the DATA SET READY, NO DATA, and NO SYNC lamps are extinguished and the AGC and CLEAR TO SEND lamps are lighted.
55	If DAS 801C4 is provided, refer to Section 598-012-501 and perform test as indicated.
56	If T1WM-4 is provided, perform test per 2.17.

**C. T1WM-4 Wideband Modem**

**Note:** These tests should be performed only after it has been determined that the associated station equipment is functioning properly according to local test.

**2.17** This test will determine if the T1WM-4 is operating properly by allowing the tester to perform an error rate count. To perform an error rate count, the transmitter output of the T1WM-4 must be looped back to the receiver input of the T1WM-4. In this loop-back condition, the 912A DTS transmits a test signal through the data set into the T1WM-4. The transmitted output of the T1WM-4 is looped back to the receiver input of the T1WM-4 by placing the T1WM-4 in the LT mode. The 912A DTS monitors the received test signal. Any variation between transmitted and received signals will be registered as an error count.

**2.18 General:** All stations, whether synchronous or nonsynchronous, must pass this test. The test of T1WM-4 is essentially the same whether operating synchronously or nonsynchronously. The differences are noted in the following procedure.

**2.19 Equipment Required:**

1—912A Data Test Set equipped with a J79912AA interface unit.

1—Patch cord at least 4 feet long equipped with a 310-type plug on each end.

**2.20 Preparation:**

- (a) If the data station consists of DS 303, DAS 806B7, and DAS 804A3, connect the wideband data cable to the SYNC connector on the DS 303.
- (b) If the data station consists of DS 303, DAS 806B7, DAS 804A3, and DS 103F2, connect the wideband data cable to the NON SYNC connector on the DS 303.
- (c) Insert a patch cord between DAS 806B7 VB TRANSMITTING—MON jack and the 912A DTS interface TRMT jack.
- (d) Operate the controls on the 912A DTS as shown in Chart 3.

**2.21 Procedure:** Condition the WDS to transmit and receive data as follows:

- (a) At DAS 806B7, verify that the LT key is in the horizontal position.
- (b) At DAS 804A3, verify that the TST button is not operated.
- (c) At DAS 804A3, verify that the lamp associated with the TST button is not lighted.
- (d) At DAS 804A3, observe the status of the WB CHAN lamp. If WB CHAN lamp is lighted, proceed to Step 57; otherwise go to (e).
- (e) If the data station consists of DS 303, DAS 806B7, DAS 804A3, and DAS 801C4 (optional):
  - (1) At DAS 804A3, remove handset from the cradle.
  - (2) Depress the TALK button and observe that the TALK lamp lights.
  - (3) Depress the DATA button and observe that the WB CHAN lamp lights and the TALK lamp is extinguished.
  - (4) Return the handset to the cradle and observe that the WB CHAN lamp remains lighted.
- (f) If the data station consists of DS 303, DAS 806B7, DAS 804A3, DS 103F2, and DAS 801C4 (optional):
  - (1) At DAS 804A3, remove handset from the cradle.
  - (2) Depress the TALK button and observe that the TALK lamp lights.
  - (3) Depress the DATA button and observe that the DATA lamp lights, the TALK lamp is extinguished, and the WB CHAN lamp lights in approximately 5 seconds.
  - (4) Return the handset to the cradle and observe that the WB CHAN lamp remains lighted.

CHART 3

SWITCHES	SETTINGS
TRANSMIT — BIT RATE	EXT — (When the internal clock, option Z, is installed in DS 303) or 50 — (When the external clock, option E, is installed in DS 303 or when operating nonsynchronously)
TRANSMIT — TEST SIGNAL	2087
TRANSMIT — TRIGGER	+
TRANSMIT — OUTPUT	NORMAL
RECEIVE — BIT RATE	EXT — (When testing synchronously) or 50 — (When testing nonsynchronously)
RECEIVE — TIMING	0
RECEIVE — TEST SIGNAL	2087
RECEIVE — TRIGGER	+
RECEIVE — INPUT	NORMAL
RECEIVE — WORD SYNC	AUTO
RECEIVE — COUNTER	OFF
INTERFACE UNIT — TEST MODE	UNBAL
INTERFACE UNIT — MODE	NON-SYNC
INTERFACE UNIT — SEND REQ	ON
INTERFACE UNIT — LOCAL TEST	OFF
INTERFACE UNIT — DATA TERM READY	ON
POWER	ON

STEP	PROCEDURE
57	At the T1WM-4 modem, remove the REC CONV SIG plug-in unit and observe that the MODEM ALM lamp lights. At the T1WM-4 ALM CONT board, observe that the AR lamp is lighted.
58	At the T1WM-4 ALM CONT board, turn the LT key to the vertical position.
59	Press and release the ACO button and observe that the ACO and LT lamps light.
60	Replace the REC CONV SIG plug-in unit.
61	On the T1WM-4, observe that the AR and MODEM ALM lamps are extinguished.
62	Observe that the ACO and LT lamps remain lighted.
63	At this point, the T1 lines should be terminated and the T1WM-4 wideband data output should be looped back through the data set to the 912A DTS. At the 912A DTS, observe that the NO DATA and NO SYNC lamps are extinguished.
64	At the 912A DTS, reset COUNTER by operating and releasing the RESET button. Operate the COUNTER switch to ON. Observe that the counter does not count.
65	At the RECEIVER portion of the 912A DTS, operate the INPUT switch to INVERTED and observe that the counter counts errors very rapidly.
66	At the RECEIVER portion of the 912A DTS, operate the INPUT switch to NORMAL and observe that the counter stops counting errors.
67	Operate COUNTER switch to OFF.
68	At the T1WM-4 ALM CONT board, return the LT key to the horizontal position and observe that all T1WM-4 lights are extinguished.

**D. Test of Remote Test Feature**

**2.22** There are two remote tests: RT1 and RT2.

The combination of the two tests provides the serving central office with a means of testing the transmission facilities as well as the data station. The RT1 provides a turn-around connection at the line interface. The RT2 provides a turn-around connection at the business machine interface.

**2.23** This test provides a means of performing a local test of the remote test feature and also of determining that the station's RT1, RT2, and back-to-normal operating sequence is proper. However, the complete remote test should be performed from a wideband test bay.

**2.24 Equipment Required:**

1—912A Data Test Set equipped with J79912AA interface unit.

**2.25 Preparation:** Prepare the data station for test as follows:

(a) If the data station is to be tested in the nonsynchronous mode, connect the wideband data cable to the NON SYNC connector on the DS 303.

(b) If the data station is to be tested in the synchronous mode, connect the wideband data cable to the SYNC connector on the DS 303.

(c) At DAS 806B7, insert 310-type plugs equipped with 135-ohm terminations into the following jacks:

WB TRANSMITTING—LINE

WB RECEIVING—LINE

VB TRANSMITTING—LINE.

(d) Insert one patch cord between DAS 806B7 VB TRANSMITTER—MON jack and the 912A DTS interface, TRMT jack.

(e) At DAS 804A3, remove handset from the cradle and depress the TALK button. Observe that the TALK lamp is lighted.

(f) If the data station includes DS 103F2, perform the following:

(1) Depress the DATA button.

(2) Observe that the DATA lamp is lighted.

(3) Observe that in approximately 5 seconds the WB CHAN lamp lights. Return the handset to the cradle.

(g) If the data station does not include a DS 103F2, perform the following:

(1) Remove the handset from the cradle.

(2) Depress the DATA button and observe that the WB CHAN lamp lights.

(3) Return handset to the cradle.

(h) Operate switches on the 912A DTS as indicated in Chart 4.

CHART 4

SWITCHES	SETTINGS
TRANSMIT — BIT RATE	EXT — (When the internal clock, option Z, is installed in DS 303) or 50 — (When the external clock, option E, is installed in DS 303 or when operating nonsynchronously)
TRANSMIT — TEST SIGNAL	2087
TRANSMIT — TRIGGER	+
TRANSMIT — OUTPUT	NORMAL
RECEIVE — BIT RATE	EXT — (When testing synchronously) or 50 — (When testing nonsynchronously)
RECEIVE — TIMING	0
RECEIVE — TEST SIGNAL	2087
RECEIVE — TRIGGER	+
RECEIVE — INPUT	NORMAL
RECEIVE — WORD SYNC	AUTO
RECEIVE — COUNTER	OFF
INTERFACE UNIT — TEST MODE	UNBAL
INTERFACE UNIT — MODE	NON-SYNC
INTERFACE UNIT — SEND REQ	ON
INTERFACE UNIT — LOCAL TEST	OFF
INTERFACE UNIT — DATA TERM READY	ON
POWER	ON

2.26 Procedure:

STEP	PROCEDURE
69	At the 912A DTS, observe that the CLEAR TO SEND, NO DATA, NO SYNC, and DATA SET READY lamps are lighted. Observe that the AGC lamp is extinguished.
70	At the DAS 806B7, depress and hold the LRT key until the RT1 relay is heard to operate (approximately 6 seconds). If the RT1 relay has operated, the RT1 lamp will light when the LRT key is released. Verify that the DAS 804A3 TST lamp is lighted.
71	The wideband data station is now in the RT1 mode. The facility would normally be looped to the serving test center; however, for this test the lines have been terminated at DAS 806B7. Observe that the DATA SET READY, CLEAR TO SEND, and AGC lamps on the 912A DTS are extinguished. Observe that the NO SYNC and NO DATA lamps are lighted.
72	At the DAS 806B7, depress the LRT key again and hold (approximately 6 seconds) until both the LT and RT1 lamps are lighted. The data station is now looped on the customer's side of DS 303. Observe that the CLEAR TO SEND, DATA SET READY, and AGC lamps are extinguished. Observe that the NO DATA and NO SYNC lamps are lighted.
73	At the wideband data station, depress LRT key and hold (approximately 6 seconds) until RT1 lamp extinguishes. Release key and observe that the LT lamp extinguishes. Observe that the NO DATA and NO SYNC lamps are lighted and all other lamps are extinguished.
74	After completing this test, the data station will no longer be in the data mode. All lamps on DAS 804A3 should be extinguished.

E. Attendant Cooperation for Remote Test

**2.27 General:** This test is written to alert the attendant of action that may be required at the wideband data station (WDS). The remote tests are to be performed at, and under control of, the serving test center (STC). See Section 314-602-501.

**2.28** This is a test of the wideband and voiceband data channels from an STC to the WDS. If the STC has direct voiceband loop access to the wideband data station, then no attendant action is required at the WDS for wideband tests. However, if switching occurs between the STC and the WDS, attendant action is required at the station.

**2.29 Equipment Required:** No test equipment is required at the WDS. However, if the 912A DTS is being used, it may remain connected for this test. At the STC, the 915 wideband data

test bay (WDTB) provides the necessary rack-mounted equipment for performing the wideband test.

**2.30 Preparation:** Prepare the WDS for test as follows:

- (a) Establish voice contact between the WDS and the STC over a separate telephone if available. If not available, use coordination phone and, after establishing procedure, return handset to cradle.
- (b) Disable the automatic answer feature at the WDS.
- (c) If voiceband tests are to be performed and if the 912A DTS is connected to the WDS, operate the DATA TERM READY switch to ON.
- (d) If voiceband tests are to be performed and if the 912A DTS is not provided, condition the business machine to provide a data terminal ready ON signal.

**2.31 Procedure:**

(a) **Wideband Test:**

STEP	PROCEDURE
75	At the STC, 915 DTB, make preparations to perform remote test 1.
76	At the STC, when access to the WDS is to be gained through switching equipment, place a call to the WDS that is to be tested. If the automatic answer feature is provided, it should not be activated for this test.
77	At the WDS, depress the TALK button and answer the call.  <i>Next step requires the WDS attendant to listen for an indication.</i>
78	At the STC, send 2800-Hz tone to the WDS for 10 seconds.
79	At the wideband data station, listen for tone. When the tone ceases (when handset receiver goes dead), return the handset to the cradle.

**Analysis:** The wideband portion of the station is now in the RT1 mode. The appropriate test may now be performed from the STC. Following the release of RT1 mode, RT2 can be established. At the end of the remote test sequence, the station is automatically released from the test mode.

(b) **Voiceband Test:** When performing test of DS 103F2, it is not necessary to put the WDS in the RT1 or RT2 mode. However, when performing voiceband test, certain procedures must be followed.

STEP	PROCEDURE
80	At the STC, when access to the WDS is gained through switching equipment, place a call to the WDS that is to be tested. If the automatic answer feature is provided, it should not be activated for this test.
81	At the WDS, depress the TALK button and answer the call.
82	When voice contact has been made with the STC, the attendant should depress the DAS 804A3 DATA button. Observe that the DATA lamp is lighted and then hang up the handset.
83	At the DAS 804A3, depress the TST key and observe that the TST lamp lights. This removes the DATA SET READY ON signal from the wideband portion while performing the voiceband test. Procedures for testing the DS 103F2 are covered in Section 591-019-500.
84	When voiceband tests are completed, the WDS may be returned to the normal mode by depressing the DAS 804A3 TALK button.

### 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 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 charts. Some of the steps in the test charts specify procedure and do not require an indication.

#### 3.02 *Equipment Required:*

1—748A extractor tool (WECO)

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

- Loose cords, connectors, connections, etc
- Incorrect interconnections or options
- Broken wires
- Physical damage
- Verify correct power
- RT or LT.

**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 "Data Set", "Circuit Pack", and "Remarks" columns. If the unit under the "Data Set" column is verified to be operating properly and the trouble still exists, a point-to-point check of the interconnecting wiring is necessary.

#### 3.05 *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.

In RT2, a signal can be sent from a distant station to the station under test. The signal is received, looped at the customer's interface, and transmitted back to the distant station. If the signals received at 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 at the distant station are not the same as those transmitted, then the station under test or the facility is operating improperly.

- (b) Make sure that the station is conditioned for the test being performed. If the RT1 lamp is lighted but should not be, the station may have been accidentally put in a remote test condition or baseband local test condition. To return the station to the normal operating condition, disconnect the power cord from the power receptacle. Reconnect the power cord and condition the system as specified in the test being performed.

#### 3.06 *Replacing Circuit Packs:*

- (a) When performing steps of a certain test and the data station fails, this may indicate a specific circuit pack, in which case the circuit pack most likely to be bad will be indicated. When 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) Replace circuit packs one at a time until the trouble is corrected.
  - (2) Reinstall all original circuit packs one at the time, except for the new one which corrected the trouble. It will, of course, remain in the data set.
  - (3) 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.

## TROUBLESHOOTING CHART

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET OR DATA AUXILIARY SET	REPLACE CIRCUIT PACK	REMARKS
1	DAS 804A3: TALK DATA WB CHAN TST AUTO	Lighted Extinguished Extinguished Extinguished Extinguished	DAS 804A3 DAS 806B7		Verify that DAS 804A3 has been modified per Section 593-800-210.
2	DAS 804A3: WB CHAN  DATA TALK	Lighted  Extinguished Extinguished	DAS 804A3 DAS 806B7 DAS 804A3 DAS 804A3	3A Data Unit 10A Data Unit AR122 3A Data Unit	Verify that DAS 804A3 has been modified per Section 593-800-210. DATA lamp should have been removed in modification.
3	DAS 804A3: TALK WB CHAN	Extinguished Lighted	DAS 804A3 DAS 804A3 DAS 806B7	3A Data Unit 3A Data Unit 10A Data Unit AR122	Verify that DAS 804A3 has been modified per Section 593-800-210.
4	DAS 804A3: TALK WB CHAN	Lighted Lighted	DAS 804A3 DAS 804A3 DAS 806B7	3A Data Unit 3A Data Unit 10A Data Unit AR122	Verify that DAS 804A3 has been modified per Section 593-800-210.
5	DAS 804A3: DATA TALK WB CHAN AUTO TST	Extinguished	See Step 1.		Verify that DAS 804A3 has been modified per Section 593-800-210.
6	DAS 804A3: WB CHAN	Lighted	DAS 804A3 DAS 806B7	10A Data Unit AR122	Verify that DAS 804A3 has been modified per Section 593-800-210.
7	912A DTS: CLEAR TO SEND DATA SET READY NO DATA NO SYNC AGC	Lighted Lighted Lighted Lighted Extinguished	DS 303 DS 303 DAS 804A3 DS 303 DS 303 DS 303	AR135 AR135 3A Data Unit AR135 AR135 AR135	

## TROUBLESHOOTING CHART (Cont)

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET OR DATA AUXILIARY SET	REPLACE CIRCUIT PACK	REMARKS
8	912A DTS: NO DATA	Extinguished	DAS 806B7 DS 303	10A Data Unit AR129 } * AR307 } AR135 AR130	*Only one of these circuit packs will be provided.
	NO SYNC	Extinguished	DS 303	AR133 AR143	
	DATA SET READY	Extinguished	DS 303	AR135	
	AGC	Lighted	DS 303	AR307 } * AR129 }	
	CLEAR TO SEND	Lighted	DS 303	AR135	
	DAS 806B7: LT	Lighted	DAS 806B7 DS 303	10A Data Unit AR135	
	DAS 804A3: TST	Lighted	DAS 806B7 DS 303	10A Data Unit AR135	
	WB CHAN	Extinguished	DAS 806B7  DAS 804A3	10A Data Unit AR122  3A Data Unit	
9	912A DTS: CLEAR TO SEND	Extinguished	DS 303	AR135	
	NO DATA	Lighted	DAS 806B7		
	NO SYNC	Lighted	DAS 806B7		
10	Same as Step 8.				
11a	912A DTS: NO DATA NO SYNC AGC CLEAR TO SEND	Lighted Lighted Extinguished Extinguished	} DS 303	AR135	

## TROUBLESHOOTING CHART (Cont)

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET OR DATA AUXILIARY SET	REPLACE CIRCUIT PACK	REMARKS
14a	912A DTS: COUNTER	Does not count	DS 303	AR125 } * AR126 } * AR130 AR131 AR129 } * AR307 } * AR361	*Only one of these circuit packs provided.
15a	912A DTS: COUNTER	Does not count	See Step 14a.		
17	912A DTS: COUNTER	Does not count	DS 303	AR125 } * AR126 } * AR130 AR131 AR133 AR143 AR361	*Only one of these circuit packs provided.
18	912A DTS: NO SYNC COUNTER	Lighted Counts errors very rapidly.	DS 303 DS 303	AR135 AR135	
19	912A DTS: COUNTER	Does not count	See Step 17.		
21	DAS 806B7: LT	Extinguished	DAS 806B7	10A Data Unit	
22	DAS 804A3: WB CHAN	Lighted	DAS 804A3 DAS 806B7	3A Data Unit 10A Data Unit AR122	
23	Same as Step 8.				

## TROUBLESHOOTING CHART (Cont)

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET OR DATA AUXILIARY SET	REPLACE CIRCUIT PACK	REMARKS
24	DAS 804A3: TST TALK	Extinguished Lighted	DAS 806B7 DAS 804A3 DAS 804A3	10A Data Unit 3A Data Unit 3A Data Unit	
25	DAS 804A3: WB CHAN	Lighted	DAS 806B7 DAS 804A3	10A Data Unit AR122 3A Data Unit	
26	DAS 806B7: LT	Lighted	DAS 806B7	10A Data Unit	
27	DAS 806B7: LT	Extinguished	DAS 806B7	10A Data Unit	
30	DAS 806B7: TALK	Lighted	DAS 804A3	3A Data Unit	
31	DAS 804A3: DATA TALK	Lighted Extinguished	DAS 804A3 DAS 804A3	3A Data Unit 3A Data Unit	
32	DAS 804A3: WB CHAN	Lighted	DAS 804A3 DAS 806B7	3A Data Unit 10A Data Unit AR122	
33	DAS 804A3: TALK DATA WB CHAN	Lighted Extinguished Extinguished	} DAS 804A3 DAS 804A3 DAS 806B7	3A Data Unit 3A Data Unit 10A Data Unit AR122	
34	DAS 804A3: All Lamps	Extinguished	DAS 804A3 DAS 806B7	3A Data Unit 10A Data Unit AR122	
35	DAS 804A3: DATA WB CHAN	Lighted Lighted	DAS 804A3 DAS 804A3 DAS 806B7	3A Data Unit 3A Data Unit 10A Data Unit AR122	

TROUBLESHOOTING CHART (Cont)

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET OR DATA AUXILIARY SET	REPLACE CIRCUIT PACK	REMARKS
36	912A DTS: CLEAR TO SEND DATA SET READY NO DATA NO SYNC AGC	Lighted Extinguished	DS 303 DS 303 DAS 804A3 DS 303 DS 303 DS 303	AR135 AR135 3A Data Unit AR135 AR135 AR135	
37	912A DTS: NO DATA NO SYNC DATA SET READY AGC CLEAR TO SEND DAS 806B7: LT DAS 804A3: DATA TST WB CHAN	Extinguished Extinguished Extinguished Lighted Lighted Lighted Lighted Lighted Extinguished	DAS 806B7 DS 303 DAS 806B7 DS 303 DAS 804A3 DAS 806B7 DAS 804A3 DAS 806B7	10A Data Unit AR129 AR307 } * 10A Data Unit AR135 3A Data Unit 10A Data Unit 3A Data Unit 10A Data Unit AR122	*Only one of these circuit packs provided.
38	912A DTS: CLEAR TO SEND NO DATA NO SYNC	Extinguished Lighted Lighted	DS 303 DAS 806B7 DAS 806B7	AR135 10A Data Unit	

## TROUBLESHOOTING CHART (Cont)

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET OR DATA AUXILIARY SET	REPLACE CIRCUIT PACK	REMARKS
39	Same as Step 37.				
40b	912A DTS: NO DATA NO SYNC AGC CLEAR TO SEND	Lighted Lighted Extinguished Extinguished	DS 303	AR135	
43	COUNTER	Should not count	DS 303		If counter does count, trouble is probably in DS 303 or the 912A DTS. Verify that the TIMING switch on the 912A DTS is set to zero.
44b	COUNTER	Should not count	DS 303	AR130 AR131 AR129 } * AR307 } * AR361 } * AR125 } * AR126 }	*Only one of these circuit packs will be provided in the data set. (See remarks for Step 43.)
45	912A DTS: NO SYNC COUNTER	Lighted Counts errors very rapidly	DS 303 DS 303	AR135 AR135	
46	912A DTS: COUNTER	Should not count	Same as Step 37.		
48	DAS 806B7: LT	Extinguished	DAS 806B7 DS 303	10A Data Unit AR135	

## TROUBLESHOOTING CHART (Cont)

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET OR DATA AUXILIARY SET	REPLACE CIRCUIT PACK	REMARKS
49	Same as Step 37.				CP AR135 does not apply in this step.
50	DAS 804A3: TALK TST	Lighted Extinguished	DAS 804A3 DAS 804A3 DAS 806B7	3A Data Unit 3A Data Unit 10A Data Unit	TST key should be a locking-type key and should release when the TALK key is depressed.
51	DAS 806B7: LT	Lighted	DAS 806B7	10A Data Unit	
52	DAS 806B7: LT	Extinguished	DAS 806B7	10A Data Unit	
53	DAS 804A3: DATA WB CHAN	Lighted Lighted	DAS 804A3 DAS 804A3 DAS 806B7	3A Data Unit 3A Data Unit 10A Data Unit AR122	
54	912A DTS: DATA SET READY NO DATA NO SYNC AGC CLEAR TO SEND	} Extinguished } Lighted	Same as Step 37.  Same as Step 37.		
57 through 68					If Steps 57 through 68 are not as specified in the test, the trouble is probably in the T1WM-4 modem. Refer to Section 365-121-500.

## TROUBLESHOOTING CHART (Cont)

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET OR DATA AUXILIARY SET	REPLACE CIRCUIT PACK	REMARKS
69	912A DTS: CLEAR TO SEND NO DATA NO SYNC DATA SET READY AGC	Lighted Lighted Extinguished	DS 303 DAS 804A3 DS 303	AR135 3A Data Unit AR135	Verify that local test is not activated and that para. 2.25 (c) was correctly performed.
70	DAS 806B7: RT1 DAS 804A3: TST	Lighted Lighted	DAS 806B7 DAS 806B7	AR122 10A Data Unit 10A Data Unit	Depressing the LRT key simulates the 2800-Hz central office tone.
71	912A DTS: DATA SET READY CLEAR TO SEND AGC NO DATA NO SYNC	Extinguished Lighted	DS 303 DAS 806B7 DS 303 DAS 806B7	AR135 10A Data Unit AR135 10A Data Unit	
72	DAS 806B7: LT RT1 912A DTS: CLEAR TO SEND DATA SET READY AGC NO DATA NO SYNC	Lighted Extinguished Lighted As indicated in test	DAS 806B7 DS 303 DS 303 DS 303	AR122 10A Data Unit AR135 AR135 AR135	

## TROUBLESHOOTING CHART (Cont)

STEP	CONTROL OR INDICATOR	NORMAL CONDITION	DEFECTIVE DATA SET OR DATA AUXILIARY SET	REPLACE CIRCUIT PACK	REMARKS
73	DAS 806B7: LT RT1	} Extinguished	DAS 806B7  DS 303	AR122 10A Data Unit AR135	
79	DAS 804A3:  2800-Hz tone	Heard for 10 seconds	DAS 806B7 DAS 804A3	10A Data Unit Telephone Network	
	2800-Hz tone	Tone ceases and receiver goes dead.	DAS 804A3 DAS 806B7	3A Data Unit  AR122 10A Data Unit	
82	DAS 804A3: DATA	Lighted	DAS 804A3	3A Data Unit	
83	DAS 804A3: TST	Lighted	DAS 806B7	10A Data Unit	

**SECTION 593-800-510****4. REFERENCES**

**4.01** The circuit descriptions (CDs) and schematic drawings (SDs) for the apparatus included in the 2-wire switched wideband-type data station are as follows:

- SD-1D100-01 and CD-1D100-01 Data Set 303-Type
- SD-1D097-01 and CD-1D097-01 Data Auxiliary Set 806B7
- SD-1D098-01 and CD-1D098-01 10A-Type Data Unit
- SD-1D041-01 and CD-1D041-01 Data Auxiliary Set 804A3
- SD-1D045-01 and CD-1D045-01 Data Set 103F-Type
- SD-1D103-01 and CD-1D103-01 Data Auxiliary Set 801C4
- SD-1D050-01 and CD-1D050-01 3A-Type Data Unit.

**4.02** Bell System Practices covering the various equipment in the station are as follows:

<b>SECTION</b>	<b>TITLE</b>
593-012-100	Data Set 303-Type, Description
598-042-100	Data Auxiliary Set 806B-Type, Description and Operation
598-030-100	Data Auxiliary Set 804A-Type, Identification and Connections
591-019-100	Data Set 103F-Type, Transmitter-Receiver, Description and Operation
590-100-106	10A-Type Data Unit, Identification
590-100-113	16A1 Data Unit, Identification
365-122-100	T1 Carrier System Terminal, J8713F Line Terminating Unit, Description
365-121-100	T1 Carrier System Terminal, T1WM-4 Wideband Modem, Description
598-012-101	Data Auxiliary Sets 801C3 and 801C4, Description and Operation