DATA AUXILIARY SETS 801A5 AND 801A6 FOR AUTOMATIC CALLING TEST PROCEDURES

CONTENTS PAGE

1. GENERAL

1.01 This section provides installation and maintenance test procedures on Data Auxiliary Sets 801A5 and 801A6. Information concerning the data set and business machine associated with the data auxiliary set is not included.

1.02 This section is reissued to provide additional maintenance test procedures on Data Auxiliary Sets 801A5 and 801A6 using the 914B DTS. Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 Data Auxiliary Sets 801A5 and 801A6 will be referred to in this section as the ACU (Automatic Calling Unit) unless special application makes it necessary to refer to the data auxiliary set by complete nomenclature.

1.04 The information shown in Fig. 1 and 2 and Table A is provided as a means of identifying printed wiring board assemblies.

Note: Refer to the section entitled Data Auxiliary Set 801A5 and 801A6 for Automatic Calling—Maintenance (598-010-301) for circuit board replacement procedures.

1.05 A letter ***a, b, c,*** or ***d*** added to a step number in this section indicates an action which may or may not be required depending on the type of data set or options installed with data auxiliary set. The condition under which a lettered step or a series of lettered steps should be made is given in the Procedure column and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

1.06 DAS 801A5 and 801A6 series 5 and later have an additional ACR timer switch position at extreme clockwise to allow use of the speaker for monitoring call progress when ACU is not in the test mode.

2. INSTALLATION TEST PROCEDURES

2.01 These tests should be made at time of installation and when clearing trouble conditions. No test equipment is required for these tests.

A. Dialing Test

2.02 The purpose of this test is to verify proper operation of the dialing circuitry by using the numbered buttons on the ACU.

Note: The following test procedure may be accomplished with the aid of the local test desk, or locally with an attendant on an adjacent telephone. This test procedure

requires the aid of the local test desk only, because it is a distant location with a known telephone number. The test desk does not have a practice for testing the ACU and consequently will rely upon the person testing the ACU for information as to what to do. The test is written using the local test desk, and to accomplish the test locally, the attendant assumes the test desk responsibility.

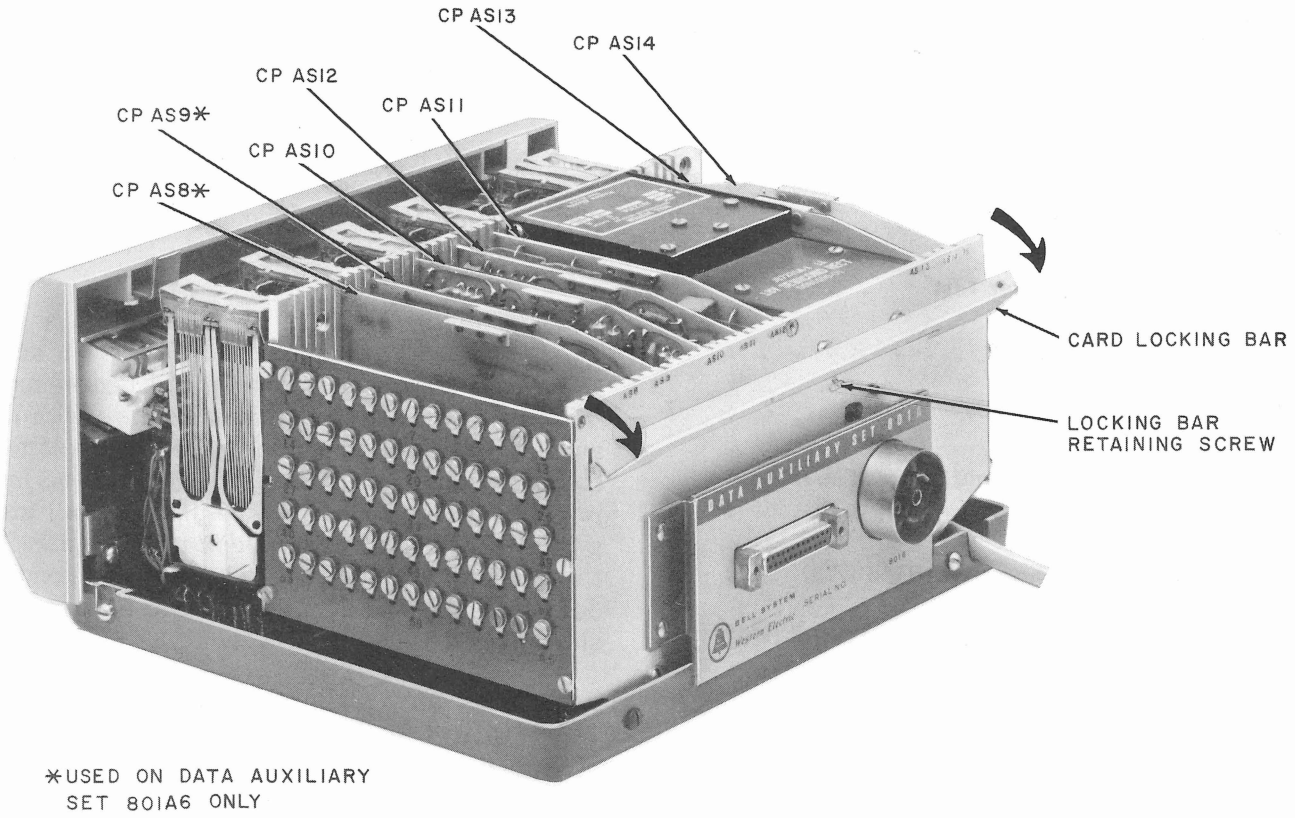


Fig. 1—Data Auxiliary Set 801A-Type—Covers Removed for Printed Circuit Board Identification

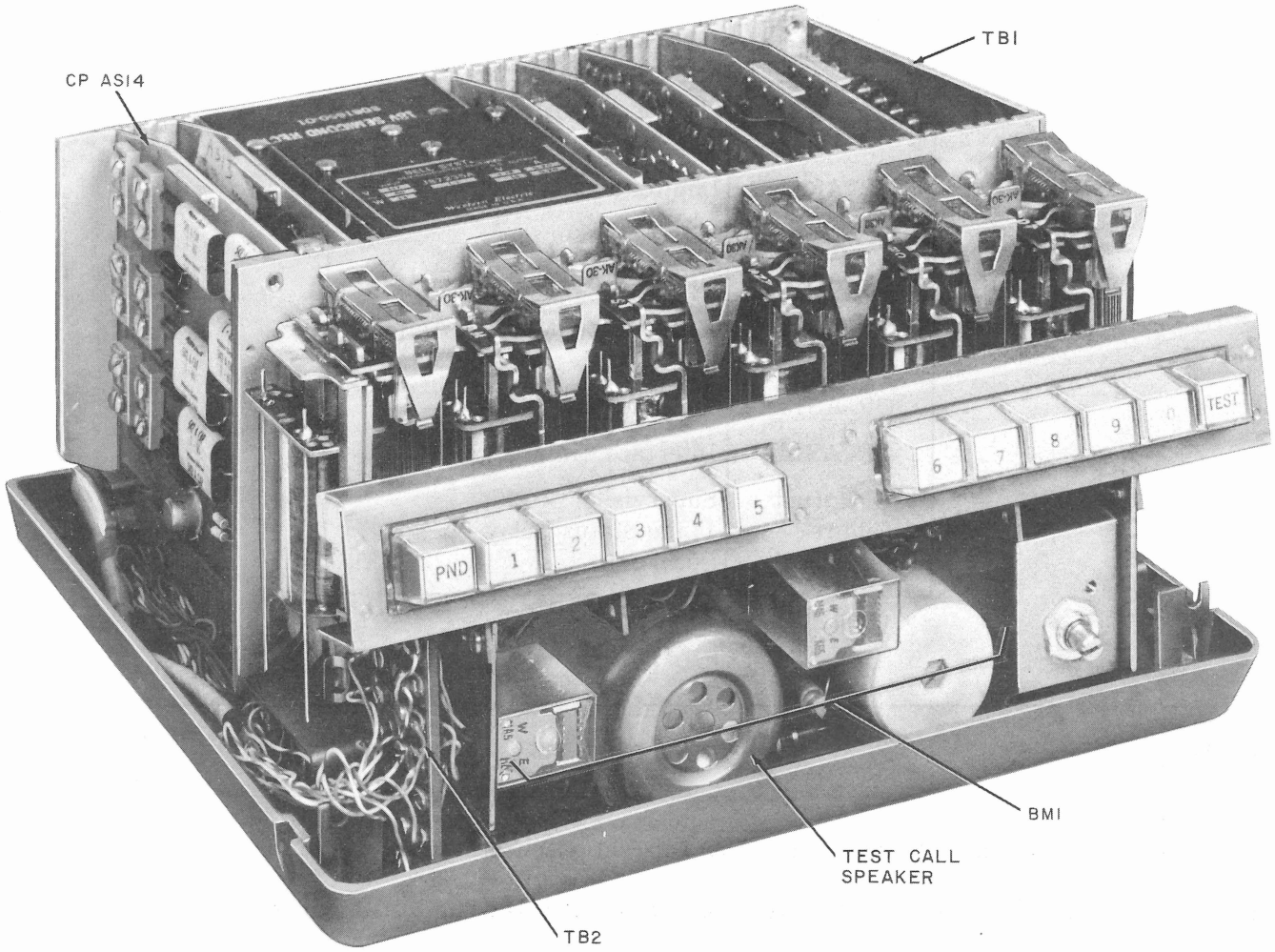


Fig. 2—Data Auxiliary Set 801A-Type—Inside View Showing Printed Circuit Board BM1

TABLE A

PRINTED WIRING BOARD IDENTIFICATION

PRINTED BOARD DESIGNATION AND ASSEMBLY NUMBER	PRINTED BOARD FEATURES
CP AS8*	2025 or 2225 Answer-Tone Detector
CP AS9*	Limiter and Detector
CP AS10	Pulse Counter
CP AS11	Dial Pulse Generator
CP AS12	ACR Timer, Monitor Amplifier
CP AS13	Interface Gates
CP AS14	Interface Circuits
BM1 (not field replaceable)	Supervision Circuit (Line Status Relay — Speaker)

* Used on Data Set 801A6 only.

STEP	PROCEDURE
1	Call the local test desk by using an adjacent telephone.
2	Inform the local test desk attendant that an ACU is being tested and assistance is needed.
3	Inform the local test desk, that upon hanging up, a call using the ACU will be made and that the call be recognized by the answer "ready to test." ***Note:*** Take proper steps to ensure that the customer is not billed for test calls. Refer to the section entitled Crediting Changes on Test Calls (010-250-001).
4	Depress TEST button on the ACU. ***Requirement:*** TEST lamp and PND lamp should light and dial tone should be heard in the test speaker.
5	Release the TEST button.
6	Depress the numbered button corresponding to the first digit of the number to be dialed and hold it depressed until the PND lamp goes out. ***Note:*** Failure to wait for the PND lamp to go out may result in a wrong number being sent by the ACU.

STEP	PROCEDURE
7	When the PND lamp relights, the next digit can be dialed. Follow the same procedure for the remaining digits of the local test desk telephone number.
8	After the last digit has been dialed, the local test desk should answer through the test speaker.
9	Depress PND button. ***Requirement:*** PND and TEST lamps will extinguish. ***Note:*** If the PND and TEST lamps extinguish before the test is completed, the ACR timer circuitry has timed out and the test must be repeated.
10	If a wrong number, busy tone, or other overflow is reached, disconnect by momentarily depressing the PND button. The test will have to be repeated.
11	Set the ACR timer to the service order specifications (see Table B).
12	If the ACU meets preceding test requirements, the unit may be considered dialing properly.

TABLE B

ACR TIMER ADJUSTMENT PROCEDURE

INTERVAL SELECTED SECONDS	ACR TIMER ADJUSTMENT	MEASURED INTERVAL SECONDS
7	Rotate adjustment screw to extreme counterclockwise position.	7 to 9
10	Rotate adjustment screw one position clockwise from extreme counterclockwise position.	10 to 12
15	Rotate adjustment screw two positions clockwise from extreme counterclockwise position.	15 to 18
25	Rotate adjustment screw three positions clockwise from extreme counterclockwise position.	25 to 30
40	Rotate adjustment screw four positions clockwise from extreme counterclockwise position.	40 to 48
*40 Monitor	Rotate adjustment screw to extreme clockwise position for 40-second monitor	40 to 48

* Data Auxiliary Sets 801A5 and 801A6 series 5 and later have an additional switch position at the extreme clockwise to allow use of the speaker for monitoring normal call progress. In this case the 40-second position is one position counterclockwise from the extreme clockwise position.

B. Data Test Center Test

2.03 This test is conducted under the direction of the data test center (DTC) and verifies that the ACU will correctly dial the number of the DTC and transfer the line to the data set when properly conditioned. To successfully complete this test (to cause the data set to go into the data mode), the data terminal ready (DTR) lead at the data set business machine interface must be in the on (positive) state.

STEP	PROCEDURE
1	Call the DTC by using an adjacent telephone.
2	Request a remote test for the ACU and follow the DTC instructions. ***Note:*** The DTC will request the type of associated data set to determine which tone to send in response to test calls (ACU options T or S). Take proper steps to ensure that the customer is not billed for test calls. See the section entitled Crediting Charges on Test Calls (010-250-001).
3	Depress TEST button. ***Requirement:*** Dial tone is heard in the test speaker and lamps PND and TEST will light.
4	Depress numbered button corresponding to the first number of the DTC telephone number and hold it depressed until PND lamp is extinguished. ***Note:*** Failure to hold numbered button depressed until PND lamp is extinguished may result in a wrong digit being sent by the ACU.
5	When PND lamp goes out, release the numbered button and wait for PND to light again.
6	Follow the procedure in Steps 4 and 5 and dial the remaining digits of the DTC telephone number; depress button, wait for PND lamp to go out, release button, wait for PND lamp to light, depress the next button, etc.
7	When a tone is heard through the test speaker which signifies that the DTC has answered the call, depress digit 9 button. This will send a pulse train to the DTC as a means of identification.
8a	When end of number (EON) mode of operation is to be tested— Simultaneously depress both the number 4 and 8 buttons. Hold the buttons depressed until PND lamp extinguishes. ***Note:*** When PND lamp extinguishes, the ACU has transferred the line to the data set. The data set can now detect answer tone (2025 or 2225 Hz from DTC) and go into data mode. When the ACR timer times out, the TEST lamp extinguishes and the ACU returns to an idle state.
9b	When ACU answer-tone detection is to be tested (801A6)—

STEP	PROCEDURE
	The DTC sends an answer tone that should be momentarily heard in the test speaker. When the ACU detects answer tone, PND lamp extinguishes indicating the telephone (data) line is transferred to the data set which enters data mode if DTR is on. The TEST lamp extinguishes at the end of the ACR timer interval. ***Note:*** If the PND lamp does not go out, the ACU is defective. If wrong number, busy tone, or other overflow tone is reached, disconnect by momentarily depressing PND button. The complete test sequence will then have to be repeated.
10	If the ACU meets all preceding test requirements, the unit may be considered to be operating properly.

3. MAINTENANCE TESTS

3.01 These tests should be made when investigating a trouble condition and maintenance is required. The type of tests to be run will depend upon the test equipment available. Data auxiliary sets not meeting the requirements of the following tests should be replaced. Defective ACUs should be tagged to identify the nature of the trouble and returned to the distributing house for repair.

A. Interface Test

3.02 The purpose of this test is to verify that the ACU will, in response to a call request, access the data (telephone) line and will properly respond to dialing information from the business machine (901B).

3.03 The following test equipment is required:

- Interface test adapter (901B Data Test Set cover)
- KS-14510-L5 volt-ohm-milliammeter, or equivalent
- 1011 handset

3.04 Disconnect power to the ACU.

3.05 Connect the interface test adapter (901B Data Test Set cover) to the ACU (under test) per Fig. 3 and make the resistance measurements as shown in Table C.

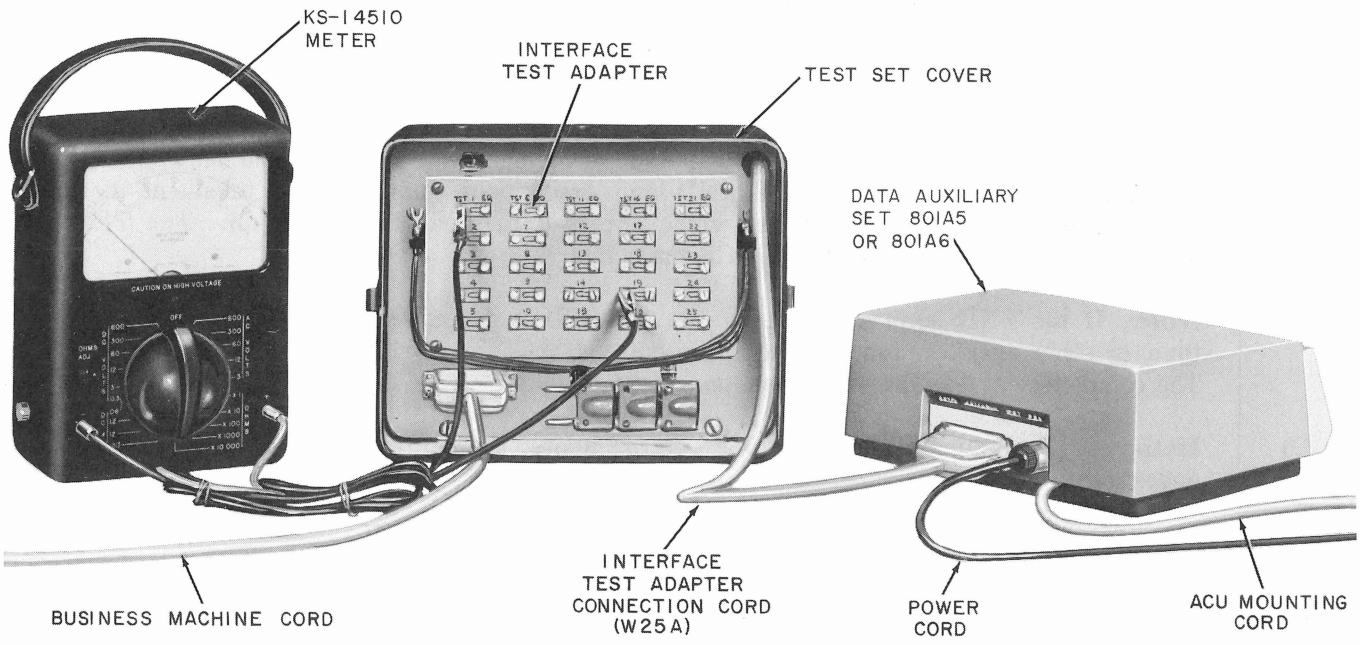


Fig. 3—Typical Connection Diagram for Testing 801A-Type ACUs

TABLE C

RESISTANCE MEASURED		RESISTANCE VALUE	
FROM TERM.	TO TERM.	IF ZE IS INSTALLED	IF ZF IS INSTALLED
EQ1 (FGD)	EQ7 (SGD)	0 Ω	0 Ω
EQ1 (FGD)	EQ6 (PWI)	00 Ω (Open ckt)	510

3.06 Apply power to the ACU.

Note: Option ZE provides contact interface, and option ZF provides voltage interface.

3.07 Use the KS-14510-L5 meter to make voltage or resistance measurements per Table D and E.

TABLE D

VOLTAGE MEASUREMENTS

VOLTAGE OR RESISTANCE MEASURED FROM		FOR SETS WITH ZF INSTALLED VOLTAGE VALUE	FOR SETS WITH ZE RESISTANCE
FROM TERM.	TO TERM.		
EQ1	EQ3 (ACR)	−18V (ACR OFF)	Open Ckt
EQ1	EQ5 (PND)	−18V (PND OFF)	Open Ckt
EQ1	EQ6 (PWI)	+18V (PWI ON)	0 ohms to Gnd
EQ1	EQ13 (DSS)	−18V (DSS OFF)	Open Ckt
EQ1	EQ22 (DLO)	−18V (DLO OFF)	Open Ckt

TABLE E

INTERFACE TEST PROCEDURE

STEP	HANDSET — 1011- OR 1013-TYPE	METER CONNECTION — KS-14510 OR KS-16979-L1 W/L6		CONNECT STRAP FROM		TO	OBSERVATION	
		FROM	TO	IF ZF IS INSTALLED	IF ZE IS INSTALLED		IF ZF IS INSTALLED	IF ZE IS INSTALLED
1	Connect on tip and ring			EQ9 (+P)	EQ7 (SGD)	EQ4 (CRQ)		
2	TALK-MON Switch to MON						Dial tone should be heard.	
3		EQ7 (SGD)	EQ5 (PND)				Meter should read from +6 to +10 Vdc	Meter should read 0Ω
4		EQ7 (SGD)	EQ22 (DLO)				Meter should read from +6 to +10 Vdc	Meter should read 0Ω
5				Disconnect strap from EQ4				
6	TALK-MON Switch to MON			EQ7 (SGD)		EQ14 (NBI)		
				EQ9 (+P)	EQ7 (SGD)	EQ4 (CRQ)	Dial tone should be heard.	
7	TALK-MON Switch to MON			EQ7 (SGD)		EQ2 (DRP)	A single dial pulse should be heard.	
8				Disconnect straps from EQ14, EQ4, and EQ2				
9	TALK-MON Switch to MON			EQ7 (SGD)		EQ15 (NB2)		
				EQ9 (+P)	EQ7 (SGD)	EQ4 (CRQ)	Dial tone should be heard.	
10				EQ7 (SGD)		EQ2 (DPR)	Two dial pulses should be heard.	
11				Disconnect straps from EQ15, EQ4, and EQ2				
12	TALK-MON Switch to MON			EQ7 (SGD)		EQ16 (NB4)		
				EQ9 (+P)	EQ7 (SGD)	EQ4 (CRQ)	Dial tone should be heard.	
13	TALK-MON Switch to MON			EQ7 (SGD)		EQ2 (DPR)	Four dial pulses should be heard.	

TABLE E (Cont)

STEP	*HANDSET — 1011- OR 1013-TYPE	METER CONNECTION — KS-14510 OR KS-16979-L1 W/L6		CONNECT STRAP FROM		TO	OBSERVATION	
		FROM	TO	IF ZF IS INSTALLED	IF ZE IS INSTALLED		IF ZF IS INSTALLED	IF ZE IS INSTALLED
14				Disconnect straps from EQ4, EQ2, and EQ16				
15				EQ7 (SGD)		EQ17 (NB8)		
				EQ7 (SGD)		EQ14 (NB1)		
16	TALK-MON Switch to MON			EQ9 (+P)	EQ7 (SGD)	EQ4 (DPR)	Dial tone should be heard.	
17	TALK-MON Switch to MON			EQ7 (SGD)		EQ2 (DPR)	Nine dial pulses should be heard.	
	Note: Nine actual pulses will not be discerned but a burst of pulses should be heard as opposed to a single pulse.							
18				Disconnect all straps from 901B DTS cover				

*If ACU tested is series 5 or higher, the handset need not be connected. Instead, the ACR timer select switch can be positioned to extreme clockwise position and the ACU test monitor speaker will monitor tip and ring.

B. Abandon Call and Retry Timer Test (901B)

3.08 The purpose of this test is to verify that the ACR timer circuitry will signal the business machine to abandon a call after a preset time interval.

3.09 The following test equipment is required.

- 1011 handset
- KS-14510 volt-ohm-milliammeter
- Interface test adapter (901B Data Test Set cover).

3.10 Connect the interface test adapter (901B Data Test Set lid), the 1011 handset, and the ACU under test per Fig. 3 and perform the test per Table F. A 1011 handset may be connected from the tip and ring of the connecting block for monitoring signals.

TABLE F

ACR TIMER TEST

STEP	ACR ADJUSTMENT POSITION	*HANDSET — POSITION 1011- OR 1013-TYPE	METER CONNECTION — KS-14510 OR KS-16979-L1 W/L6		CONNECT STRAP FROM		TO	OBSERVATION	
			FROM	TO	IF ZF IS INSTALLED	IF ZE IS INSTALLED		IF ZF IS INSTALLED	IF ZE IS INSTALLED
1		Connect on tip and ring							
2	Extreme counter-clockwise	TALK-MON to MON	EQ3 (ACR)	EQ7 (SGD)					
3					EQ9 (+P)	EQ7 (SGD)	EQ4 (CQR)	Dial tone should be heard and from 7 to 10 seconds after this tone is heard, Meter should read +6 to +10 Vdc	Meter should read 0 ohms
4						Disconnect the EQ4 end of the strap			
5	One position from extreme counter-clockwise	TALK-MON Switch to MON	EQ3 (ACR)	EQ7 (SGD)		Reconnect the EQ4 end of the strap		Dial tone should be heard and from 10 to 13 seconds after this tone is heard, Meter should read +6 to +10 Vdc	Meter should read 0 ohms
6						Disconnect the EQ4 end of the strap			
7	Two positions from extreme counter-clockwise	TALK-MON Switch to MON	EQ3 (ACR)	EQ7 (SGD)		Reconnect the EQ4 end of the strap		Dial tone should be heard and from 15 to 20 seconds after this tone is heard, Meter should read +6 to +10 Vdc	Meter should read 0 ohms
8						Disconnect the EQ4 end of the strap			
9	Three positions from extreme counter-clockwise	TALK-MON Switch to MON	EQ3 (ACR)	EQ7 (SGD)		Reconnect the EQ4 end of the strap		Dial tone should be heard and from 25 to 33 seconds after this tone is heard, Meter should read +6 to +10 Vdc	Meter should read 0 ohms
10						Disconnect the EQ4 end of the strap			

TABLE F (Cont)

STEP	ACR ADJUST-MENT POSITION	*HANDSET — POSITION 1011- OR 1013-TYPE	METER CONNECTION — KS-14510 OR KS-16979-L1 W/L6		CONNECT STRAP FROM		TO	OBSERVATION	
			FROM	TO	IF ZF IS INSTALLED	IF ZE IS INSTALLED		IF ZF IS INSTALLED	IF ZE IS INSTALLED
11	Rotate to 5 positions from counter clockwise	TALK-MON Switch to MON	EQ3 (ACR)	EQ7 (SGD)		Reconnect the EQ4 end of the strap		Dial tone should be heard and from 40 to 53 seconds after this tone is heard,	
								Meter should read +6 to +10 Vdc	Meter should read 0 ohms
12	Remove the straps from the interface test adapter.								
13	Remove the handset and the meter.								

*If ACU tested is series 5 or higher, the handset need not be connected. Instead, the ACR timer select switch can be positioned to extreme clockwise position and the ACU test monitor speaker will monitor tip and ring.

3.11 Adjust the ACR timer to the value specified on the service order. If no interval is specified, set the timer to the 40-second position (extreme clockwise position for series 1 through 4 and one setting from full clockwise position for series 5).

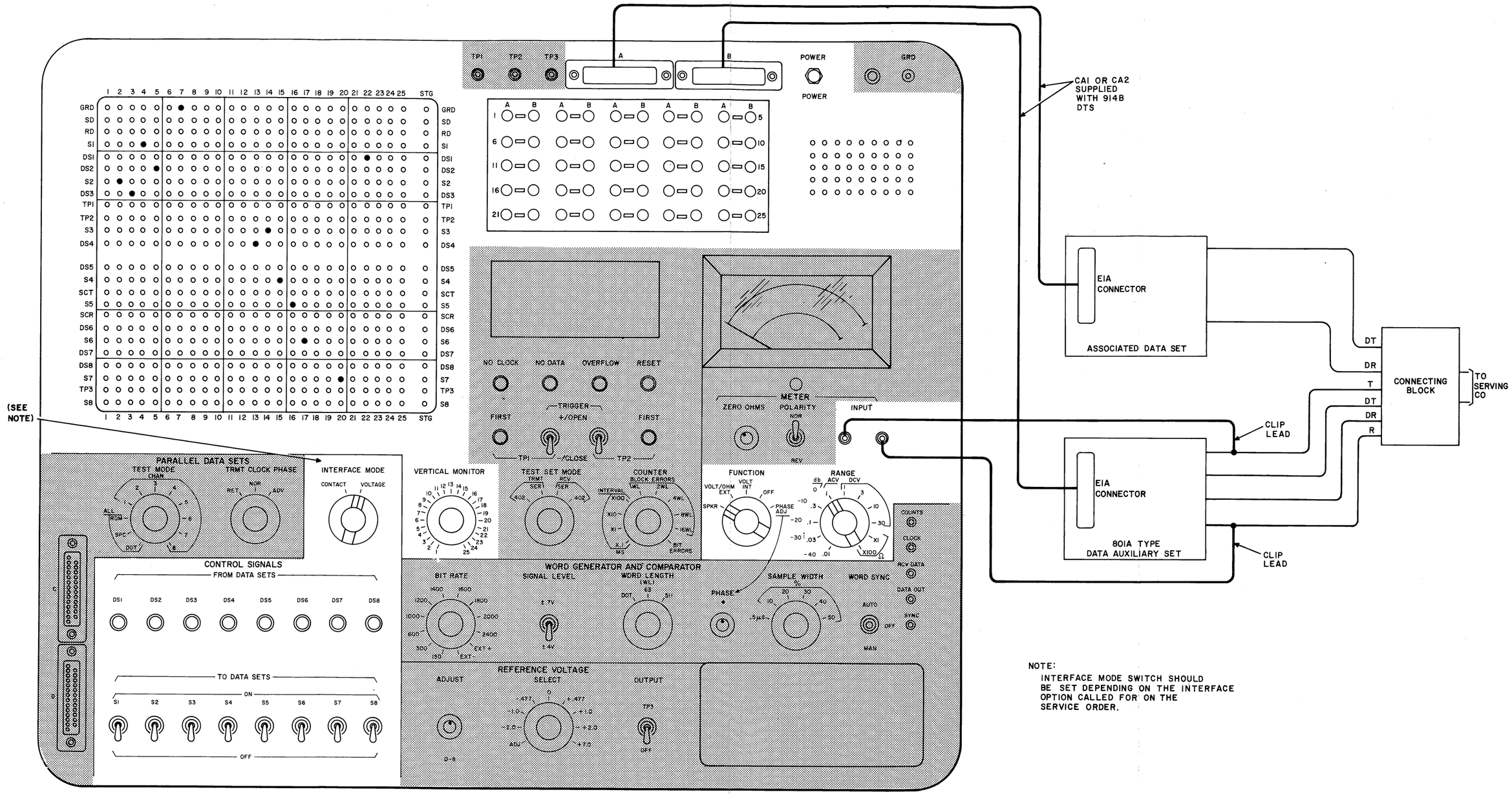
C. Call Origination Test (914B DTS)

3.12 This test provides a means to dial the DTC using the 914B Data Test Set (DTS), as a business machine simulator, to initiate a call and dial the digits manually. The DTC to be called must be instructed that a test of an ACU is to be performed, and upon answering the incoming call, answer tone (2025 or 2225 Hz as required by the ACU option) should be sent to the ACU for 3 to 5 seconds. This test verifies that the ACU correctly dials the digits presented by the 914B DTS and monitors interface functions.

Note: The ACU and data set must be connected to the data line using connection information in the Installation and Connection Practice for the particular data set.

3.13 A 914B Data Test Set and a suitable timing device are required for this test.

STEP	PROCEDURE
	Note: This procedure should be read carefully and understood before proceeding. Manual dialing using the 914B DTS requires the digit to be dialed be set up in binary form on the 914B DTS control switches. The time interval between the dialing of each digit should be minimized to prevent central office time out.
1	Disconnect the power cord of the ACU from the 120 Vac receptacle.
2	Remove customer cord from the ACU and data set EIA connector. Interconnect the 914B DTS with the ACU and data set as illustrated in Fig. 4.



NOTE:
INTERFACE MODE SWITCH SHOULD BE SET DEPENDING ON THE INTERFACE OPTION CALLED FOR ON THE SERVICE ORDER.

TPA 553451

Fig. 4—Test Conditions for 914B DTS—Call Origination Test

STEP	PROCEDURE
3	Condition the 914B DTS as shown in Fig. 4. ***Note:*** INTERFACE MODE switch should be set to VOLTAGE or CONTACT depending on the interface option called for on the 801A-type service order. Test set switches neither shown on the test connection diagram (Fig. 4) nor mentioned in the text are not required for the test. Lamp indications not called for in the test are not pertinent and may be disregarded. Before making any test connections, ensure that all programming pins are removed from the 914B matrix. Insert only those pins shown in the test connection diagram.
4	Pull out all A interface selector switches except 20A.
5	Depress all B interface selector switches except 20B.
6	Program the matrix as shown in Fig. 4.
7	Operate POWER switch on the 914B DTS to the ON position. ***Requirement:*** POWER lamp should light.
8	Insert the ACU power cord into a 120 Vac receptacle.
9	Set the ACR timer to the 40-second position (extreme clockwise position for series 1 through 4 and one setting from full clockwise position for series 5).
10	Condition the data set to go into the data mode. ***Note:*** For voltage interface, operate switch S7 on the 914B DTS to the ON position. This is the data terminal ready (DTR) function normally supplied to the data set by the business machine. For contact interface, consult the proper BSP for the data set being used to determine which interface leads must be conditioned. In some sets, these leads are 19, 20, and 21 and must be shorted together. In this case shorting pins would be placed at crosspoints 19, 20, and 21 on row GRD on the 914B DTS matrix.
11	Operate switch S1 (CRQ) to the ON position. ***Requirement:*** Dial tone should be heard through the 914B DTS speaker and lamps DS1 (DLO) and DS2 (PND) should light. [Level of tone may be controlled by the RANGE (ACV) switch.] ***Note:*** The ACU power indicator (PWI) may be monitored at any time with the VERTICAL MONITOR switch to position 6 and FUNCTION switch to VOLT/INT.
12	Using Table G and switches S3 through S6, set up the first digit of the DTC telephone number.

TABLE G

914B SWITCH SETTINGS REQUIRED TO REPRESENT DECIMAL DIGITS TO BE DIALED

		VOLTAGE INTERFACE					CONTACT INTERFACE			
DIGIT	S-3 NB1	S-4 NB2	S-5 NB4	S-6 NB8	DIGIT	S-3 NB1	S-4 NB2	S-5 NB4	S-6 NB8
0	ON	ON	ON	ON	0	OFF	OFF	OFF	OFF
1	OFF	ON	ON	ON	1	ON	OFF	OFF	OFF
2	ON	OFF	ON	ON	2	OFF	ON	OFF	OFF
3	OFF	OFF	ON	ON	3	ON	ON	OFF	OFF
4	ON	ON	OFF	ON	4	OFF	OFF	ON	OFF
5	OFF	ON	OFF	ON	5	ON	OFF	ON	OFF
6	ON	OFF	OFF	ON	6	OFF	ON	ON	OFF
7	OFF	OFF	OFF	ON	7	ON	ON	ON	OFF
8	ON	ON	ON	OFF	8	OFF	OFF	OFF	ON
9	OFF	ON	ON	OFF	9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF	10	OFF	ON	OFF	ON
11	OFF	OFF	ON	OFF	11	ON	ON	OFF	ON
12	ON	ON	OFF	OFF	12	OFF	OFF	ON	ON
13	OFF	ON	OFF	OFF	13	ON	OFF	ON	ON
14	ON	OFF	OFF	OFF	14	OFF	ON	ON	ON
15	OFF	OFF	OFF	OFF	15	ON	ON	ON	ON

STEP	PROCEDURE
13	Operate switch S2 to the ON position. ***Requirement:*** Lamp DS2 will extinguish (the digit present on the NB interface leads is now being dialed by the ACU).
14	Operate switch S2 to the OFF position. ***Requirement:*** Lamp DS2 will light. ***Note:*** After dialing the last digit of the DTC telephone number, switch S2 should be in the OFF position.
15	Repeat Steps 13 through 15 for the remaining digits of the DTC telephone number. ***Note:*** If the ACR timer interval is exceeded, lamp DS3 will light and the test must be repeated.
16	Verify the correct digits of the DTC telephone number have been dialed. ***Requirement:*** Telephone should ring upon completion of the call from the ACU.
17a	When ACU answer-tone detection is to be tested (801A6)— Answer tone should be heard coming from the DTC. DS2 (PND) extinguishes, and DS4 (DSS) lights when the line is transferred to the data set.
18b	When EON operation is to be tested— Using Table G and switches S3 through S6, set up to send digit 12 to the ACU.
19b	Operate switch S2 to the ON position. ***Requirement:*** Lamp DS2 will extinguish and DS4 lights when the line is transferred to the data set.
	Call Termination Test
20c	If option Z (call termination by CRQ) is used— Operate S1 to OFF. ***Requirement:*** DS1 extinguishes.
21d	If option G (call termination through data set) is used— Operate S1 to OFF. ***Requirement:*** DS1 remains on.

STEP	PROCEDURE
22d	Operate S7 to OFF. ***Requirement:*** DS1 extinguishes.
	ACR Timer Test
23	Set the abandon call and retry (ACR) timer to the 7-second position (extreme counterclockwise position).
24	Set S1 to ON. ***Requirement:*** DS1 and DS2 light. DS3 lights at end of ACR timer interval. ***Note:*** Time the interval from the moment switch S1 is operated to the ON position and lamp DS3 lights. Limits are given in Table B.
25	Turn off S1 for reset.
26	Repeat Steps 23 through 25 for remaining timer intervals given in Table B.
27	Terminate the call by operating switch S1 to the OFF position. ***Requirement:*** Lamps DS1 and DS2 should extinguish indicating an idle state.
28	Remove all data test connections and return the ACU to its normal operating condition.

D. Answer-Tone Detection Test (901B DTS) (801A6 Only)

3.14 The purpose of this test is to verify that the answer-tone detection circuitry will transfer the data (telephone) line to the associated data set.

> ***Note:*** The ACU and a data set must be connected to the data line using connection information provided in the Installation and Connection Bell System Practice for the particular data set.

3.15 The following test equipment is required:

- Interface test adapter (901B DTS cover)
- KS-14510-L5 meter, or equivalent
- 1011 handset

STEP	PROCEDURE
1	Connect the interface test adapter connection cord (W25A) to the ACU EIA interface connector. (See Fig. 3.)
2	Connect the business machine cord to the interface connector on the interface test adapter. (See Fig. 3.)
3	Call the DTC by using an adjacent telephone and request that a 2025-Hz (S Option) or a 2225-Hz (T Option) tone be sent for 3 to 5 seconds upon receiving a call from the ACU.
4	Using a KS-14510-L5 meter, connect test leads to terminals EQ13 and EQ7. Set the appropriate scale to read +18v for voltage interface or to X1 ohms for contact interface.
5	Call the DTC using the numbered buttons on the ACU. Dialing procedure is as follows: (1) Depress the TEST pushbutton on the ACU. ***Requirement:*** TEST and PND lamps light. (2) Depress the numbered button corresponding to the first digit of the DTC and hold it depressed until the PND lamp goes out. ***Note:*** Failure to wait for the PND lamp to go out may result in a wrong number being sent by the ACU. (3) Follow the same procedure for each of the remaining digits of the DTC telephone number.
6	Upon receipt of the call, the DTC will answer the call and send the answer tone required for the option installed. ***Requirement:*** Answer tone should be heard in the test speaker.
7	When the ACU detects answer tone and transfers the line to the data set, the meter will indicate as follows: ***Requirement:*** For voltage interface (option ZF) +8 to +10 Vdc. For contact interface (option ZE) 0 ohms (short). Transfer should occur at beginning (option X) for end (option W) of the answer-tone signal.
8	If the ACU passes the previous test, the answer-tone detection circuitry can be said to be working correctly.

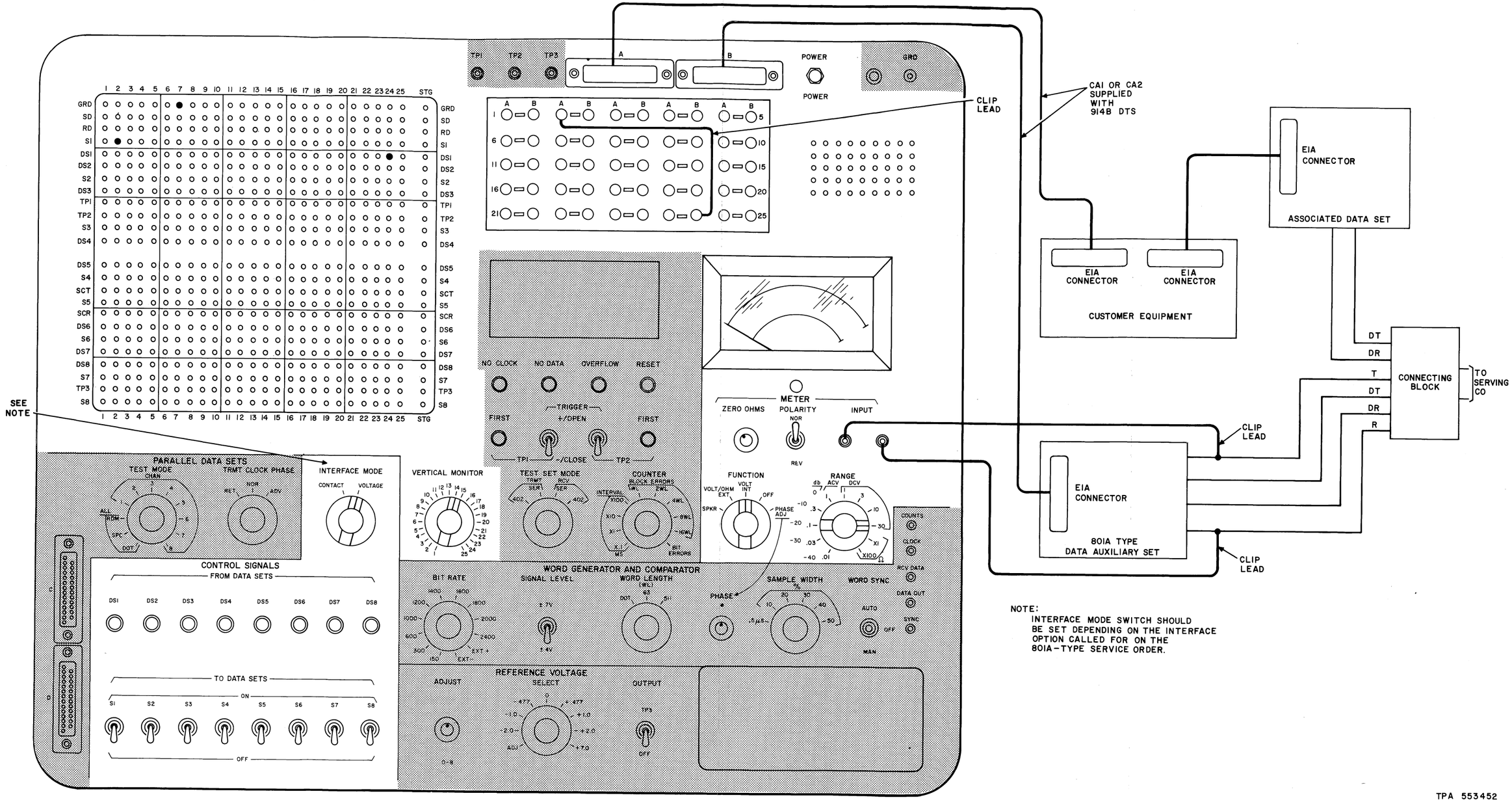
E. Monitoring of Interface Leads (914B DTS)

3.16 This test should be made when a trouble condition exists that cannot be detected by routine testing, for example, when the ACU is operating under the control of the customer equipment. This test requires coordination with the customer and allows monitoring of the interface leads to evaluate the interaction between the business machine and the ACU during a normal data call by the customer.

3.17 The following test equipment is required:

- One clip lead
- 914B Data Test Set

STEP	PROCEDURE
	Note: This procedure must be read carefully and understood before proceeding so the time required between the dialing of digits is minimized. The tester controls DPR and consequently controls the dialing rate.
1	Remove the ACU power cord from the 120 Vac receptacle.
2	Set the ACR timer to the 40-second position (extreme clockwise positon for series 1 through 4 and one setting from full clockwise position for series 5).
3	Connect the customer cord and data auxiliary set to the 914B DTS as shown in Fig. 5.
4a	If voltage interface is used (option ZF)— Condition the 914B DTS as shown in Fig. 5.
5b	If contact interface is used (option ZE)— Condition the 914B DTS as follows: INTERFACE MODE to CONTACT METER FUNCTION switch to VOLT/OHM EXT RANGE switch to X1 ohms.
6	Program the matrix as shown in Fig. 5.
7	Depress all interface selector switches except switches 2A and 24A.
8	Insert the ACU power cord into a 120 Vac receptacle.
9	Depress POWER switch on the 914B DTS to the ON position. ***Requirement:*** POWER lamp should light.
10	Request the customer to turn on the call request (CRQ) lead at the business machine.
11	Inform the customer to condition the NB interface leads with digit to be dialed and DPR lead must be conditioned. ***Requirement:*** Lamp DS1 will light.



NOTE:
INTERFACE MODE SWITCH SHOULD BE SET DEPENDING ON THE INTERFACE OPTION CALLED FOR ON THE 80IA-TYPE SERVICE ORDER.

TPA 553452

Fig. 5—Test Conditions for 914B DTS—Monitoring of Interface Leads

STEP	PROCEDURE
12a	If voltage interface is used— When lamp DS1 (DPR) lights, move VERTICAL MONITOR switch to positions 14, 15, 16, and 17 in that order and record the polarity of each reading. Table H is used to convert these potentials (binary code) to be compared with the known digit stored in the business machine.

TABLE H

METER READINGS FOR BINARY TO DECIMAL CONVERSION

VOLTAGE INTERFACE					CONTACT INTERFACE				
FUNCTION	NB1	NB2	NB4	NB8	NB1	NB2	NB4	NB8	FUNCTION
LEAD / DIGIT	14	15	16	17	14 (OHMS)	15 (OHMS)	16 (OHMS)	17 (OHMS)	LEAD / DIGIT
0	+	+	+	+	∞	∞	∞	∞	0
1	−	+	+	+	0	∞	∞	∞	1
2	+	−	+	+	∞	0	∞	∞	2
3	−	−	+	+	0	0	∞	∞	3
4	+	+	−	+	∞	∞	0	∞	4
5	−	+	−	+	0	∞	0	∞	5
6	+	−	−	+	∞	0	0	∞	6
7	−	−	−	+	0	0	0	∞	7
8	+	+	+	−	∞	∞	∞	0	8
9	−	+	+	−	0	∞	∞	0	9
10	+	−	+	−	∞	0	∞	0	10
11	−	−	+	−	0	0	∞	0	11
12	+	+	−	−	∞	∞	0	0	12
13	−	+	−	−	0	∞	0	0	13
14	+	−	−	−	∞	0	0	0	14
15	−	−	−	−	0	0	0	0	15

STEP	PROCEDURE
	Note: Since the meter polarity switch is in the NORMAL position, a meter deflection to the left (off scale) indicates a negative voltage, and a deflection to the right indicates a positive voltage.
13b	If contact interface is used— When lamp DS1 lights, connect the RED METER INPUT lead to the center of interface switches 14, 15, 16, and 17 in that order. Record the resistance readings at those points. Table H is used to convert these readings (binary code) to a decimal digit. This digit can be compared to the known digit stored in the business machine.
14	Operate switch S1 to the ON position. ***Requirement:*** Lamp DS2 will extinguish (the digit present on the NB interface leads is now being dialed by the ACU). ***Note:*** Before operating switch S1 to the ON position to dial the last digit presented to the ACU from the business machine, connect the leads supplied with the 914B DTS from the METER INPUT jacks to tip and ring at the connecting block, set the RANGE switch to ACV 1 and FUNCTION switch to SPKR.
15	Operate switch S1 to the OFF position. ***Requirement:*** Lamp DS1 will light. ***Note:*** After the last digit has been dialed, ensure that switch S1 is in the OFF position.
16	Repeat Steps 12 through 15 until all the digits of the called station have been dialed (DS1 lights, position VERTICAL MONITOR to verify digit, operate switch S1, etc).
17	Position FUNCTION switch to SPKR and RANGE switch to ACV 1 after the last digit has been dialed. ***Requirement:*** Shortly after the called station answers the call, answer tone of either 2025 Hz or 2225 Hz should be heard through the 914B DTS speaker. Data lamp on the associated data set should light. ***Note:*** It is important that this step be accomplished immediately after the last digit has been dialed, otherwise the answer tone may not be heard through the 914B DTS speaker. The speaker may be used to monitor the remainder of the data call.
18	Reset the ACR timer interval to the position called for on the service order.
19	Remove all test connections made to the 914B DTS and the ACU.
20	If the ACU has correctly dialed the digits supplied by the customer and is working properly, return the ACU to its normal operating conditions. If any of the digits were incorrectly dialed, tag the defective ACU and label the cause of trouble. Return the defective ACU to the distributing house for repairs.