

DATA SET 404A
TRANSMITTER-RECEIVER
TEST PROCEDURES

1. GENERAL

1.01 This section contains test procedures for Data Set 404A. These test procedures include:

- (a) Test with a Data Test Center (DTC)
- (b) Test of +6 volt supply
- (c) Installation tests
 - (1) Table A—local and remote test modes
 - (2) Table B—static remote test mode
- (d) Trouble tests
 - (1) Table A—local and remote test modes
 - (2) Table C—receiver interface test

1.02 This section is being reissued to make changes and corrections. Due to extensive revision, change arrows have been omitted.

1.03 For detailed testing information, refer to the section entitled Data Set 404A Transmitter-Receiver, Theory of Operation and Supplementary Information (594-021-150).

1.04 The following test equipment is required to perform these tests:

- 2—901-type Data Test Sets (DTS's)
- 1—Test meter KS-14510 L10 volt-ohm-milliammeter (VOM) or equivalent.
- 1—1011-type handset



All continuity checks of the data set should be made with the power disconnected.

2. TEST WITH DATA TEST CENTER

2.01 Upon request of the DTC, the data set attendant must depress the Remote Test key on the telephone set associated with the Data Set 404A. The DTC will then send valid signals to the set and check the signals which are being transmitted by the set in order to verify that their frequencies are the same.

2.02 The DTC can check the data set in the static remote test mode by sending a 2050-Hz tone with the valid signals. Data Set 404A will, in turn, transmit signal tones as long as it is receiving the 2050-Hz tone.

3. TEST OF +6 VOLT SUPPLY

3.01 The procedure for checking the +6 volt supply is as follows:

- (a) Disconnect the ac power.
- (b) Connect plug P1 to connector J1.
- (c) Connect the 901B DTS cover to connector J2.
- (d) Set the KS-14510 VOM to +12 volt dc scale. Place the positive (+) probe to terminal 7 and the negative (-) probe to terminal 24 on the test set cover.
- (e) Connect the ac power. Measure the voltage.

Requirement: +6.2 (± 0.6) volts dc

- (f) If the result is unsatisfactory, replace CP AS61. If the result is still unsatisfactory, check the wiring to the relays.
- (g) Disconnect the ac power and restore the set to normal.

4. INSTALLATION TESTS

4.01 If additional testing is required at the time of installation, refer to the tests in Table A and Table B. Figure 1 shows the cord arrangement for testing per Table A. The same cord arrangement is used for Table B except for the removal of the patch cord between J2 and J3.



A chassis ground strap is factory-installed between E1 on the chassis and the R power supply ground. Verify that this strap is connected before installation testing. After testing has been completed, remove this strap. If the data set requires further testing at a later date, disconnect the ac power and connect P1 to J1. An electrical shock may be experienced if the data set is touched in any manner while power is ON and P1 is not connected to J1.

4.02 For clarity, the two 901B DTS's and covers shown in Fig. 1 are labeled No. 1 and No. 2. For further information pertaining to the 901-type DTS's, refer to the section entitled 901A and 901B Data Test Sets, Identification and Operation (107-100-100).

4.03 The controls are set as follows:

- 901B DTS No. 1

SELECTOR—6

A TEST—OFF

B TEST—OFF

ATT-UNATT—ATT

- 901B DTS No. 2

SELECTOR—7

A TEST—OFF

B TEST—OFF

ATT-UNATT—ATT

- (a) Set the KS-14510 VOM to OHMS \times 10,000.

- (b) Remove the connectors from J1, J2, and J3 on Data Set 404A.

- (c) Remove the patch cord between J4 and J5, and place it between J2 and J3.

- (d) Connect plug P1 to J1.

- (e) Connect 901B DTS No. 1 to the test set cover, and connect the cover to J5.

- (f) Connect 901B DTS No. 2 to the test set cover, and connect the cover to J4.

Note: All captive shorting clips on the test set covers must be closed and tightened securely.

- (g) Connect the test probes of the VOM to terminals 20 and 23 on test set cover No. 2.

- (h) Connect a 1011-type handset to TP1 and TP2 on Data Set 404A. Set MON-TALK switch on handset to MON.

- (i) Connect both power supply cords.

- (j) Refer to Table A for testing Data Set 404A in the local and remote test modes.

- (k) Refer to Table B for testing Data Set 404A in the static remote test mode. Use the same arrangement and preparation as used in Table A, except when removing the patch cord between J2 and J3.



Disconnect power while removing this patch cord.

- (l) Restore the circuit to normal. Refer to the section entitled Data Set 404A Transmitter-Receiver, Used On Private Line Service Systems, Switching System No. 307, Installation and Connection (594-021-200).

TABLE A
LOCAL AND REMOTE TEST

STEP	ACTION	901B NO. 1 A TEST	901B NO. 2 A TEST	FREQUENCY CHECKED	CIRCUIT BOARD	NORMAL INDICATION	ABNORMAL INDICATION	CORRECTIVE ACTION
1	Place strap between terminals 7 and 9 on cover No. 1, and set switch S1 of 404A to LOCAL. Remove strap between ground R and terminal E1 on chassis.			See <i>Note 1.</i>		A deflection of the VOM needle towards a short condition and a momentary burst of tone in the handset should be noted when the A TEST switch of the 901B No. 1 test set is advanced in each step. The deflection will be only for the duration of the tone and the tone should be the next higher frequency for each step. See <i>Note 2.</i>	No deflection of needle on VOM No burst of tone in 1011-type handset No relay operation	Change: CP AS59 (CPS10) CP AS60 (CPS11)
2		2	3	(1209) 697*	CP AS51 (CPS2)		No deflection No burst of tone Relays operate	Change: CP AS61 (CPS12) CP AS62 (CPS13) CP AS63 (CPS14)
3		3	4	(1209) 770	CP AS55 (CPS6)			
4		4	5	(1209) 852	CP AS51 (CPS2)		No deflection Burst of tone but no rise in frequency Relays operate	Change: CP AS58 (CPS9)
5		5	6	(1209) 941	CP AS55 (CPS6)			
6		OFF	OFF					
7	Remove strap between terminals 7 and 9, and place between terminals 7 and 4.	7	8	(770) 1209	CP AS52 (CPS3)		No deflection Burst of tone and rise in frequency Relays operate	Change: CP AS50 (CPS1)
8		8	9	(770) 1336	CP AS56 (CPS7)			
9		9	10	(770) 1477	CP AS53 (CPS4)			
10		10	11	(770) 1633	CP AS56 (CPS7)			
11		OFF	OFF				No deflection Burst of tone and rise in frequency Relays operate	Change: CP AS50 (CPS1)
12	Remove strap between terminals 7 and 4, and place between terminals 7 and 9.							
13	Remove patch cord between J2 and J3.							
14	Set switch S1 to REMOTE.						Deflection on some steps Burst of tone and rise in frequency Relays operate	Change: CP AS63 (CPS14)
15	Repeat Steps 2 through 11.							
<p>Note 1: With the strap between terminals 7 and 9, the F relay will operate with the A, B, C, or D relay when the A TEST switch of the 901B No. 1 test set is set to position 2, 3, 4, or 5, respectively. With the strap between terminals 7 and 4, the B relay will operate with the F, H, J, or K relay when the A TEST switch is set to position 7, 8, 9, or 10, respectively.</p> <p>Note 2: Any indication in the handset or on the VOM should be ignored if either 901B Data Test Set switch is on a setting not given in the above table.</p> <p>* If deflection is not noted on the VOM, do not replace the detector circuit board for this frequency until Step 3 is checked as trouble could be in CP AS50.</p>						Deflection on some steps Burst of tone and rise in frequency Relays operate	Change: Circuit board associated with the frequency for which no deflection was noted	
						Deflection on some steps Burst of tone and rise of frequency on some steps Relays operate	Change: CP AS63 (CPS14)	
						Deflection on some steps Burst of tone and rise in frequency on some steps Some relays operate	Interchange relays	

TABLE B
STATIC REMOTE TEST

STEP	ACTION	901B NO. 1 A TEST	901B NO. 2 A TEST	NORMAL INDICATION
1	Place strap between terminals 14 and 18 on cover No. 1, and set S1 switch to the REMOTE position.	2	3	With the strap in place and the S1 switch in the REMOTE position, relays TE1, TE2, TE3, and Z are operated and a continuous tone (rest frequency) is generated. As the 901B No. 1 is set to each position shown in the steps, a frequency tone change should be heard in the 1011-type handset when the relay associated with that frequency operates. A continuous deflection of the VOM towards a short condition should be noted when the 901B switches are set correctly for each set.
2		3	4	
3		4	5	
4		5	6	
5		7	8	
6		8	9	
7		9	10	
8		10	11	
9		OFF	OFF	
10		2	*	Same as in Steps 1 through 8 except that there should be very little, if any, deflection as the A TEST switch of the 901B No. 2 is rotated. See <i>Note</i> .
11		3	*	
12		4	*	
13		5	*	
14		7	*	
15		8	*	
16		9	*	
17		10	*	
18		OFF	OFF	
19	Disconnect ac power; restore set to normal.			

Note: Any indication in the handset or on the VOM should be ignored if the A TEST switch of either 901B test set is on a setting not given in Table B.

* With the A TEST switch of 901B No. 1 on the setting shown in this step, rotate the A TEST switch of 901B No. 2 to positions 3, 4, 5, 6, 8, 9, 10, and 11, excluding the combinations which were checked in Steps 1 through 8.

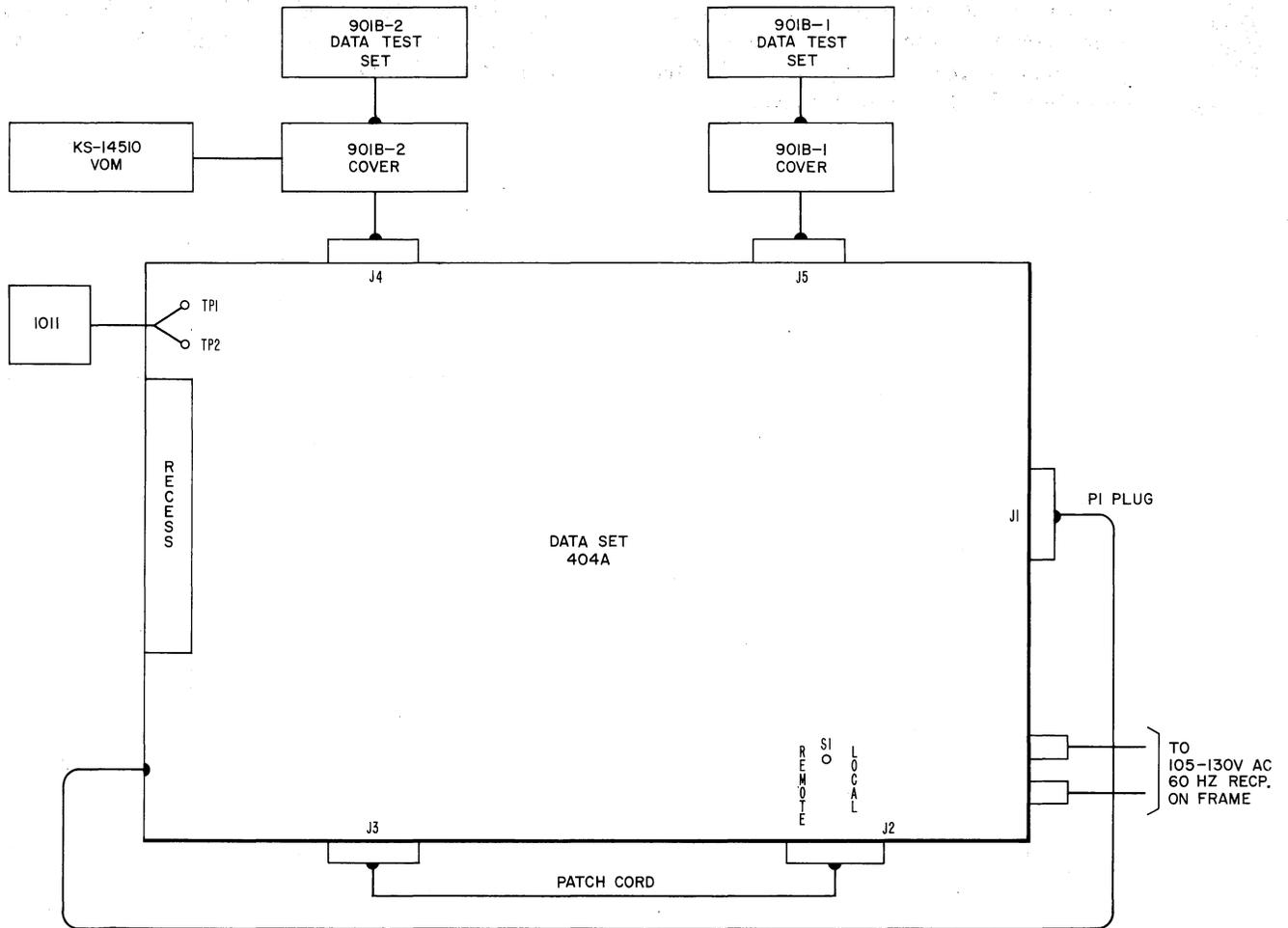


Fig. 1—Cord Arrangement For Installation Test

5. TROUBLE TESTS

5.01 If a DTC is not available, use Table A and Table C to help isolate the trouble. Preparation for testing in accordance with Table C is as follows:

- (a) Remove all connector plugs including the patch cord from interface connectors.
- (b) Set SELECTOR switch of the 901B DTS to position 6.
- (c) Connect the 901B DTS to cover No. 1 and connect the cover to J5.
- (d) Connect cover No. 2 to J3.
- (e) Set switch S1 on Data Set 404A to LOCAL.
- (f) Strap terminal 7 to terminal 9 on cover No. 1.
- (g) Set the VOM to the +3 volt dc scale.
- (h) Place the negative (-) probe of the VOM to terminal 14 on cover No. 2.
- (i) Connect the positive (+) probe of the VOM to cover No. 2 as shown in Table C.
- (j) Connect plug P1 to J1 and apply ac power.

Note: For testing in accordance with Table C, use one 901B DTS and two 901B DTS covers designated No. 1 and No. 2.



Disconnect ac power on Data Set 404A before preparing for the test. Disconnect ac power after testing and before removing the test equipment.

(k) Conduct test as shown in Table A and Table C. Preparation for Table A is given in Part 4 of this section.

TABLE C
RECEIVER INTERFACE TEST

STEP	PROCEDURE	VOM (+) PROBE POSITION ON COVER NO. 2	901B A TEST SWITCH	NORMAL INDICATION	ABNORMAL INDICATION	CORRECTIVE ACTION
1		3	OFF	Meter reading should be 0 volts	Voltage indication on meter	Check relay wiring
2		3	2	Momentary operation of A and F relays The needle on the VOM should deflect upward to 0.75 (± 0.25) volt during the relay operation.	No meter indication or Indication is out of limits Wrong relays operate. or No upscale meter deflection and no relay operation	Replace CP AS58 or Replace CP AS59 or Check relay wiring and power.
3		4	3	Momentary operation of B and F relays Meter deflection same as Step 2		
4		5	4	Momentary operation of C and F relays Meter deflection same as Step 2		
5		6	5	Momentary operation of D and F relays Meter deflection same as Step 2		
6		19	2, 3, 4, 5	Momentary operation of A and F, B and F, C and F, D and F relays with the respective setting of the A TEST switch Meter deflection same as Step 2		
7	Remove the strap between terminals 7 and 9, and place it between terminals 7 and 4.	9	7	Momentary operation of F and B relays Meter deflection same as Step 2		
8		10	8	Momentary operation of H and B relays Meter deflection same as Step 2		
9		11	9	Momentary operation of J and B relays Meter deflection same as step 2.		
10		12	10	Momentary operation of K and B relays Meter deflection same as Step 2		
11		19	7, 8, 9, 10	Momentary operation of F and B, H and B, J and B, K and B relays with the respective setting of the A TEST switch Meter deflection same as Step 2		
12	Disconnect ac power; restore the set to normal.					