"TOUCH-TONE®"
STATION TEST CIRCUIT (SD-1A199)
TESTS AND ADJUSTMENTS
NO. 2 ELECTRONIC SWITCHING SYSTEM

1. GENERAL

1.01 This section describes a method of testing and adjusting the SD-1A199 TOUCH-TONE station test circuit used in a No. 2 Electronic Switching System (ESS).

1.02 This section is reissued to include revisions and changes made since last issue. Since this reissue covers a general revision arrows ordinarily used to indicate changes have been omitted.

1.03 The tests and adjustments covered are:

*A. **Channel Detector Passband Test and Adjustment:*** This test checks the upper and lower band edge frequencies.

*B. **Sensitivity Test and Adjustment:*** This test checks the sensitivity of the station test circuit.

1.04 The tests in this section are to be performed on a periodic basis as prescribed by the No. 2 ESS equipment test list procedures or when a malfunction of one of the circuits is suspected.

1.05 In this section, the transmission measuring set is referred to as TMS and the volt-ohm-milliammeter is referred to as VOM.

1.06 When using the trunk test panel (TTP) for these tests, the keys on the TTP may be either a locking or a nonlocking type. In order to differentiate between the two types of keys, the use of the locking type key shall be identified by the words "operate" and "release" and the use of a nonlocking type key shall be identified by the word "depress" in the ACTION column. For more detailed information about the TTP and its operation, refer to Section 232-130-301.

1.07 ***Lettered Steps:*** A letter a, b, c, etc, added to a step number in Part 3 and 4 of this section indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION 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.

2. APPARATUS

2.01 J94023D (23D) transmission measuring set (TMS).

2.02 J64072A (72A) frequency meter.

2.03 Hewlett-Packard 5233L, 5216A, 522B, or equivalent (Input range: 0-3 kHz; Accuracy: ±one count) electronic counter (frequency meter). Model 522B is manufacture discontinued.

2.04 Hewlett-Packard 11001A cable assembly.

2.05 Testing cord, P2AM cord, 8 feet long, equipped with two 327A plugs (2P21A cord).

2.06 Testing cord, W2C cord, 10 feet long, equipped with one 310 plug and two 59 cord tips (2W6A cord).

2.07 Resistor, 11,000 ohms, one-half watt.

2.08 5A attenuator.

Note: The keys on the 5A attenuator are normal when the key is in the horizontal position and are operated when in the vertical position.

2.09 Four testing cords, 893 cord, 3 feet or greater in length, equipped with two 360A tools (1W13A cord) and two KS-6278 connecting clips. Insulate KS-6278 connecting clips with 108 cord tip (insulation tubing).

2.10 KS-14510 L1, volt-ohm-milliammeter (VOM).

2.11 KS-14510 L3 test leads (one red and one black), each test lead equipped with an alligator clip at one end and a connector at the other end. Insulate alligator clip with 108 cord tip insulated tubing.

2.12 Screwdrivers KS-6854, 0.140 inch, for adjusting potentiometers and 1653-type inductors.

2.13 No. 32, 1/4-inch socket wrench for adjusting 1653-type inductors.

2.14 158A adapter extender board used to bring out circuit packs containing controls that require adjustment.

Caution: When making connections to terminals on test circuit terminal strip B, care should be taken that one terminal is not shorted to another. One method to prevent shorting is to connect a 30 Mueller Minigator clip (insulated by a 32 Mueller insulator) to the selected terminal and to make the regular connection to the other end of the 30 Mueller Minigator clip.

3. PREPARATION

3.01 The TOUCH-TONE station test circuit has no network terminals, no group and member number. A specific circuit must be accessed through its associated Station Ringer and TOUCH-TONE test circuit (SRTT). The SRTT group number and member number can be found in local records. Refer to office records to obtain the trunk group number (TGN), member number (MEMN), and directed scan point number (DSP) of the SRTT.

3.02 Verify DSP obtained from office records as follows:

AT MC TTY type in:

A VY:SVC: aaa bbb!

TGN 045
MEMN 000
DSP 02-3901

aaa = TGN

bbb = MEMN

Refer to input message manual (IM-2H200) and output message manual (OM-2H200) for interpertations of machine language.

3.03 For all tests, use the following procedure for gaining access to the circuit under test.

STEP	ACTION	VERIFICATION
1	At telephone set on TTP— Operate access trunk 1 key.	
2	Lift handset off-hook, or operate TRFR key at TEL CKT on TTP if using headset.	At telephone set— Access trunk 1 lamp lighted. At ACCESS TRUNK 1 CONTROL— SUPV lamp lighted. At TEL CKT— TRFR lamp lighted if TRFR key is operated.
3	At TOUCH-TONE dial— Dial 1 + TGN + MEMN + ST to gain access to the SRTT.	At ACCESS TRUNK 1 CONTROL— EQPT ST lamp lighted steadily or flashing at a rate of 120 interruptions per minute. At MISC TEST CONTROL— P & E lamp lighted if connection was successful.

STEP	ACTION	VERIFICATION
		Note: If the EQPT ST lamp is flashing and the P & E lamp is not lighted steadily, the TTP is not connected to the circuit to be tested.
4a	If the P & E lamp is not lighted steadily; At ACCESS TRUNK 1 CONTROL— Depress RLS key.	
5a	Repeat Step 3 until connection is successful.	
6	Place handset on-hook or release TRFR key.	At telephone set— Access trunk 1 lamp extinguished At TEL CKT— TRFR lamp extinguished.
7	At MISC TEST CONTROl— Operate MK BSY key.	At MISC TEST CONTROl— MK BSY lamp lighted.
8	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— EQPT ST lamp extinguished SUPV lamp extinguished.
9	At MISC TEST CONTROL— Release MK BSY key.	At MISC TEST CONTROL— MK BSY lamp extinguished.
10	At portable TMS— Set ADD DBM switch to 0.	
11	Set DIAL-MEAS-EXT switch to MEAS.	
12	Set INPUT switch to 600.	
13	At frequency counter— Connect power cord of frequency counter to ac power supply; set POWER switch to ON and allow at least 5 minutes for equipment to warm up.	At frequency counter— POWER ON lamp lighted.
14b	If using a 5233L frequency counter— Set channel input switch to CHECK. ***Note:*** For 5216A frequency counter, proceed to Step 19c.	
15b	Set TIME BASE switch to 1.	
16b	Set SAMPLE RATE control to obtain a display long enough to be read.	At frequency counter— Counter displays 100,000 Hz.
17b	Set CHANNEL INPUT switch to SEP.	

STEP	ACTION	VERIFICATION
18b	Set FUNCTION switch to FREQUENCY A.	
19c	If using a 5216A frequency counter— Set SENSITIVITY switch to CHECK.	
20c	Set GATE TIME switch to 1.	At MISC TEST CONTROL— P & E lamp extinguished. At maintenance teletypewriter (TTY)— If circuit was not previously busy, message received will be: My SV OS If circuit was previously busy, message received will be: MR SV BSY A camp-on condition will go into effect, and this message will be reported periodically until the request is completed or is canceled. ***Note:*** For detailed breakdown of TTY output messages, consult the No. 2 ESS output message manual (OM-2H200).
21c	Set SAMPLE RATE control to obtain a display long enough to be read.	Counter displays 1,000,000 Hz.
22	At test circuit— Establish connections as shown in Fig. 1	

4. METHOD

4.01 If the verification procedure fails or if a malfunctioning circuit is indicated during any part of these tests, proceed as follows.

(1) Discontinue the test.

(2) Troubleshoot the circuit which failed.

(3) Replace faulty circuit components using standard repair procedures.

(4) Repeat all tests pertaining to replaced component. If verification is successful, continue the test.

STEP	ACTION	VERIFICATION
	A. Channel Detector Passband Test and Adjustment	
	Low-Group Channel Check	
23	At frequency meter— Adjust HORIZ GAIN AND OSC OUT control to obtain TMS meter indication between −4.75 and −5.25 dBm.	
24	At frequency counter— Adjust sensitivity slightly higher than minimum required to give repeatable displays.	

STEP	ACTION	VERIFICATION
25	At frequency meter— Adjust frequency by means of FREQUENCY CPS dials to obtain frequency counter indication between 696.5 Hz and 697.5 Hz.	At VOM— Meter indicates between 21.1 and 25.9 volts.
26	At frequency meter— Slowly adjust FREQUENCY CPS dials to vary frequency to lower side of 697-Hz channel midband frequency (toward 686 Hz); adjust to point where VOM indication drops to indicate between 14.8 and 18.2 volts, and then slowly adjust toward midband frequency just to point where VOM indication increases to between 21.1 and 25.9 volts. ***Note:*** This frequency should be determined as accurately as possible to the nearest tenth of a Hz. If necessary, repeat Step 26.	At frequency counter— Lower band edge frequency for 697-Hz channel is within limits given in Table A.
27d	If requirements of Step 26 are not within	

STEP **ACTION** **VERIFICATION**

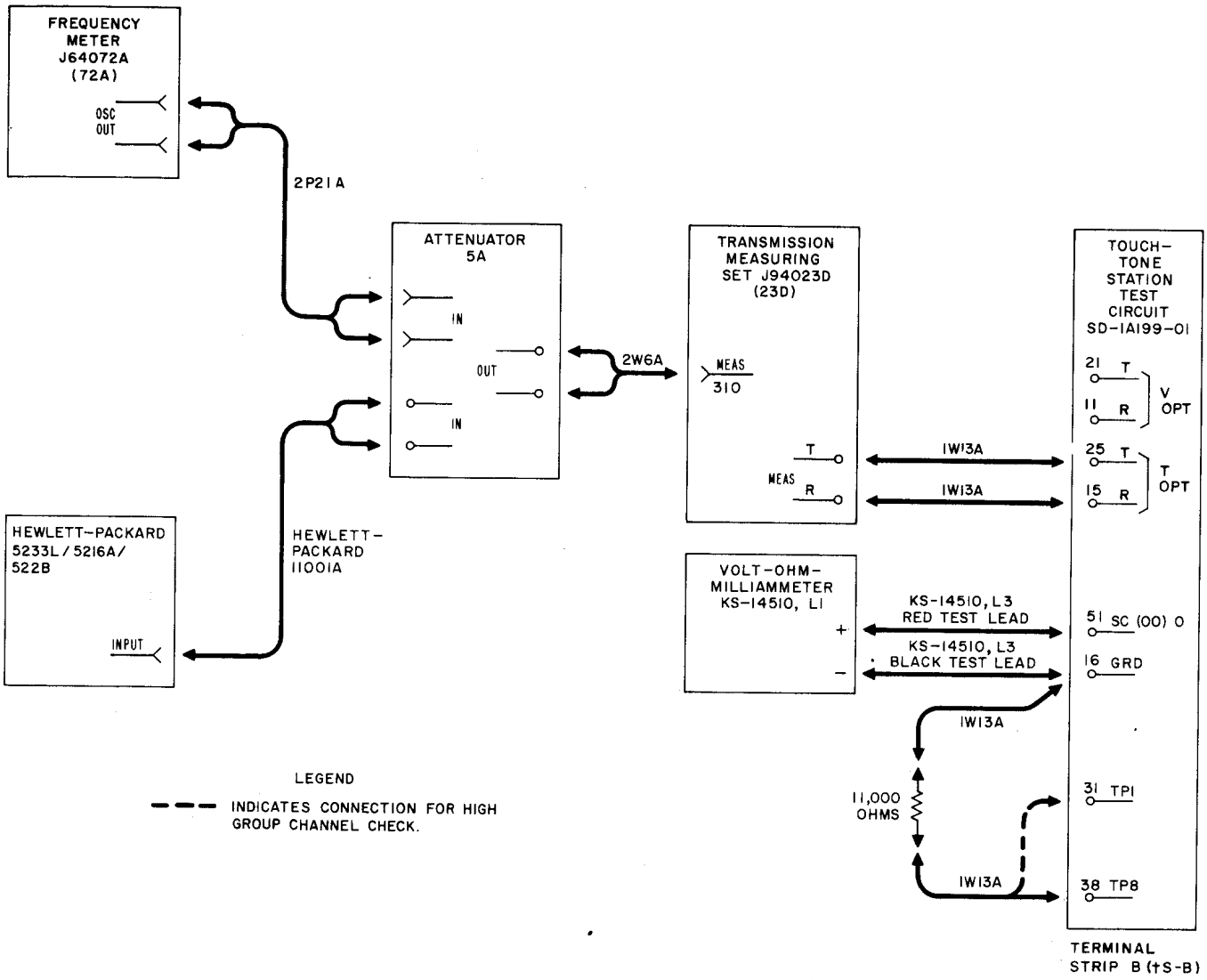


Fig. 1—Tests A and B Connections

limits given in Table A—

STEP	ACTION	VERIFICATION

TABLE A

LOW GROUP BAND EDGE FREQUENCY TEST LIMITS

CHANNEL	NOMINAL MIDBAND FREQUENCY Hz	LOWER BAND EDGE FREQUENCY Hz		UPPER BAND EDGE FREQUENCY Hz	
		MIN	MAX	MIN	MAX
697 Hz	697.0	685.1	687.9	706.1	708.9
770 Hz	770.0	756.9	760.0	780.0	783.1
852 Hz	852.0	837.5	840.9	863.1	866.5
941 Hz	941.0	925.0	928.8	953.2	957.0

The 697-Hz channel must be adjusted (Steps 32 through 48).

28 At frequency meter—
Slowly adjust FREQUENCY CPS dials to vary frequency to higher side of 697 Hz channel midband frequency (toward 707 Hz); adjust to point where VOM indication drops to between 14.8 and 18.2 volts. Record the frequency at this point to the nearest tenth of a Hz then slowly adjust toward midband frequency to point where VOM indication increases to between 21.1 and 25.9 volts. Record the frequency at this point to the nearest tenth of a Hz.

Higher band edge frequency for 697 Hz channel is within limits given in Table A.

29e If requirements of Step 28 are not within limits given in Table A—
The 697-Hz channel must be adjusted (Steps 32 through 48).

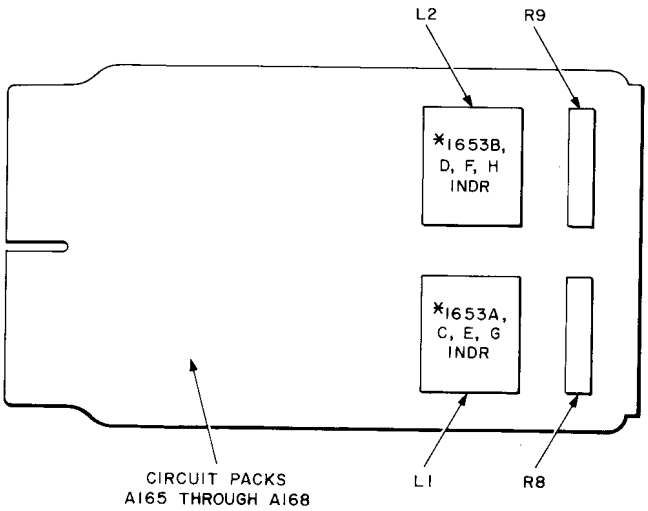
30 Repeat Steps 25 through 29e for each channel in low group (770-Hz, 862-Hz, and 941-Hz, respectively). Refer to Table A for nominal midband frequencies and for band edge frequency limits.

Band edge frequencies are within limits given in Table A.

31f If no channels in the low group require adjustment—
proceed to Step 49.

STEP	ACTION	VERIFICATION
	Low Group Channel Adjustment	
32	At frequency meter— Adjust frequency by means of FREQUENCY CPS dials to nominal midband frequency for first channel in low group to be adjusted. (Refer to Table B.) *Note:* Adjustment of band edge frequencies is done by means of bandwidth adjustment potentiometer R8 or R9 and adjustable 1653-type inductor L1 or L2. To gain access to R8 or R9 and L1 or L2, the selected channel circuit pack is extended out on the 158A adapter. Use Table B to determine selected channel circuit board and associated potentiometer and inductor controls. Use Fig. 2 to locate R8, R9, L1, and L2 on the circuit board. Turning R8 or R9 counterclockwise increases the channel bandwidth; that is, it increases upper edge frequency and decreases lower edge frequency by approximately the same amount. Turning adjustment screw on inductor L1 or L2 clockwise raises the midband frequency and increases both the upper and lower edge frequencies by approximately the same amount.	At frequency counter— Counter indicates nominal midband frequency of selected channel. At VOM— Meter indicates between 21.1 and 25.9 volts.
33	At test circuit Extend circuit pack by means of 158A adapter for first channel in low group to be adjusted.	
34	Determine from Table B and Fig. 2 circuit pack for selected channel in low group, location of inductor (L1 or L2), and potentiometer (R8 or R9) associated with selected channel to be adjusted.	
35	At frequency meter— Adjust frequency by means of FREQUENCY CPS dials to nominal value given in Table B for lower band edge frequency of first channel.	At frequency counter— Meter indicates nominal value for lower edge frequency. At VOM— Meter indicates low voltage or high voltage.
36g	If VOM in Step 35 indicates between 14.8 and 18.2 volts, At test circuit— Slowly adjust potentiometer R8 or R9 counterclockwise just to point where VOM indicates between 21.1 and 25.9 volts.	

STEP **ACTION** **VERIFICATION**



*1653 INDUCTOR LOCATIONS	
INDUCTOR	CIRCUIT PACK
A AND B	A165
C AND D	A166
E AND F	A167
G AND H	A168

Fig. 2—Location of L1, L2, R8, and R9 on Circuit Packs

TABLE B

LOW GROUP BAND EDGE FREQUENCY ADJUSTMENT LIMITS

CHANNEL	CIRCUIT PACK	CONTROLS	NOMINAL MIDBAND FREQUENCY Hz	LOWER BAND EDGE FREQUENCY Hz			UPPER BAND EDGE FREQUENCY Hz		
				MIN	NOM	MAX	MIN	NOM	MAX
697 Hz	A165	R8, L1	697.0	686.3	686.5	686.7	707.3	707.5	707.7
770 Hz	A165	R9, L2	770.0	758.3	758.5	758.7	781.3	781.5	781.7
852 Hz	A166	R8, L1	852.0	838.9	839.2	839.5	864.5	864.8	865.1
941 Hz	A166	R9, L2	941.0	926.6	926.9	927.2	954.8	955.1	955.4

37h If VOM in Step 35 indicates between 21.1 and 25.9 volts,
At test circuit—
Slowly adjust potentiometer R8 or R9 clockwise just to point where VOM indication drops to indicate between 14.8 to 18.2 volts then slowly

STEP	ACTION	VERIFICATION
	adjust potentiometer R8 or R9 counterclockwise just to point where VOM indicates between 21.1. and 25.9 volts.	
38	At frequency meter— Slowly adjust frequency by means of FREQUENCY CPS dials toward upper band edge frequency just to point where VOM indicates between 14.8 and 18.2 volts.	At frequency counter— Counter indication is within limits for upper band edge frequency given in Table B.
39i	If frequency counter indication in Step 38 is within tolerance limits for upper band edge frequency given in Table B— Adjustment of channel passband completed.	
40j	If frequency counter indication in Step 38 is not within limits for upper band edge frequency given in Table B— Performs Steps 41j through 46j.	
41j	At frequency meter— Slowly adjust frequency by means of FREQUENCY CPS 1-cycle (if needed) and 0.1-cycle dials until frequency counter indicates half way between the actual upper band edge frequency determined in Step 38 and in its nominal value given in Table B.	
42j	At test circuit— Using No. 32 socket wrench, slowly adjust L1 or L2 just to point where VOM indicates between 21.1 and 25.9 volts. (See Note after Step 29.)	
43j	Slowly adjust frequency by means of FREQUENCY CPS 0.1-cycle dial until frequency counter indicates nominal value for upper band edge frequency given in Table B.	
44j	At test circuit— Slowly adjust potentiometer R8 or R9 just to point where VOM indicates between 21.1 and 25.9 volts.	
45j	Repeat Steps 38 and 39i except check lower band edge frequency. If necessary, repeat Steps 40j through 44j to adjust lower band edge frequency.	
46j	Repeat Steps 38 through 44j as many times as necessary to have both upper and lower	

STEP	ACTION	VERIFICATION
	band edge frequencies within tolerance limits given in Table B.	
47	Repeat Steps 32 through 40j for each remaining channel to be adjusted in low group using appropriate designations from Table B.	
48k	If no additional tests are required remove all connections shown in Fig. 1.	
	High-Group Channel Check	
49l	If this is the first check being performed, establish all the connections shown in Fig. 1 for the high group channel check.	
50	Using two 1W13A cords, connect 11,000 ohm resistor between terminals 16 and 31 on terminal strip B (Fig. 1).	
51	At frequency meter— Adjust HORIZ GAIN AND OSC OUT control to obtain TMS meter indication between −4.75 and −5.25 dBm.	
52	Adjust frequency by means of FREQUENCY CPS dials to obtain frequency counter indication between 1208.5 and 1209.5 Hz.	At VOM— Meter indicates between 21.1 and 25.9 volts.
53	At frequency meter— Slowly adjust FREQUENCY CPS dials to vary frequency to lower side of 1209-Hz channel midband frequency (toward 1190 Hz); adjust to point where VOM indication drops to between 14.8 and 18.2 volts. Record frequency at this point to nearest tenth of a Hz. Then slowly adjust toward midband frequency just to point where VOM indication increases to between 21.1 and 25.9 volts. Record frequency at this point to nearest tenth of a Hz. ***Note:*** This frequency should be determined as accurately as possible to the nearest tenth of a Hz. If necessary repeat Step 53.	At frequency counter— Lower band edge frequency for 1209-Hz channel is within limits given in Table C.
54m	If requirements of Step 53 are not within limits given in Table C— Record that 1209-Hz channel requires adjustment.	
55	At frequency meter— Slowly adjust FREQUENCY CPS dials to vary frequency to higher side of 1209 Hz channel	

STEP	ACTION	VERIFICATION

TABLE C

HIGH GROUP BAND EDGE FREQUENCY TEST LIMITS

CHANNEL	NOMINAL MIDBAND FREQUENCY Hz	LOWER BAND EDGE FREQUENCY Hz		UPPER BAND EDGE FREQUENCY Hz	
		MIN	MAX	MIN	MAX
1209 Hz	1209.0	1188.4	1193.3	1224.7	1229.6
1336 Hz	1336.0	1313.3	1318.6	1353.4	1358.7
1477 Hz	1477.0	1451.9	1457.8	1496.2	1502.1
1633 Hz	1633.0	1605.2	1611.8	1654.2	1660.8

midband frequency (toward 1226 Hz) adjust to point where VOM indication drops to between 14.8 and 18.2 volts. Record the frequency at this point to the nearest tenth of a Hz then slowly adjust toward midband frequency to point where VOM indication increases to between 21.1 and 25.9 volts. Record the frequency at this point to the nearest tenth of a Hz.

56n If requirements of Step 55 are not within limits given in Table C—
The 1209-Hz channel must be adjusted (Steps 58 through 74).

57 Repeat Steps 51 through 56n replacing 1209-Hz designation with 1336-Hz, 1477-Hz, and 1633-Hz channels in high group. (Refer to Table C for nominal midband frequencies and for band edge frequency limits.)

Band edge frequencies are within limits given in Table C.

High-Group Channel Adjustment

58 At frequency meter—
Adjust frequency by means of FREQUENCY CPS dials to nominal midband frequency for first channel in high group to be adjusted. (Refer to Table D.)

At frequency counter—
Counter indicates nominal midband frequency of selected channel.
At VOM—
Meter indicates between 21.1 and 25.9 volts.

Note: Adjustment of band edge frequencies is done by means of bandwidth adjustment potentiometer R8 or R9 and adjustable 1653-type inductor L1 or L2. To gain access to R8 or R9 and L1 or L2, the selected channel circuit

STEP	ACTION	VERIFICATION
	pack is extended out on the 158A adapter. Use Table D to determine selected channel circuit board and associated potentiometer and inductor controls. Use Fig. 2 to locate R8, R9, L1, and L2 on the circuit board. Turning R8 or R9 counterclockwise increases the channel bandwidth; that is, it increases upper edge frequency and decreases lower edge frequency by approximately the same amount. Turning adjustment screw on inductor L1 or L2 clockwise raises the midband frequency and increases both the upper and lower edge frequencies by approximately the same amount.	
59	At test circuit— Extend circuit pack by means of 158A adapter for first channel in high group to be adjusted.	
60	Determine the following for the channel to be adjusted from Table D and Fig. 2: (a) circuit pack for selected channel in high group, (b) location of induction (L1 and L2) and, (c) location of potentiometer (R8 and R9).	
61	At frequency meter— Adjust frequency by means of FREQUENCY CPS dials to nominal value given in Table D for lower band edge frequency of first channel in high group to be adjusted.	At frequency counter— Meter indicates nominal value for lower edge frequency. At VOM— Meter indicates either low voltage or high voltage.
62o	If VOM in Step 61 indicates between 14.8 and 18.2 volts— At test circuit— Slowly adjust potentiometer R8 or R9	

TABLE D

HIGH GROUP BAND EDGE FREQUENCY ADJUSTMENT LIMITS

CHANNEL	CIRCUIT PACK	CONTROLS	NOMINAL MIDBAND FREQUENCY Hz	LOWER BAND EDGE FREQUENCY Hz			UPPER BAND EDGE FREQUENCY Hz		
				MIN	NOM	MAX	MIN	NOM	MAX
1209 Hz	A167	R8, L1	1209.0	1190.5	1190.9	1191.3	1226.7	1227.1	1227.5
1336 Hz	A167	R9, L2	1336.0	1315.6	1316.0	1316.4	1355.6	1356.0	1356.4
1477 Hz	A168	R8, L1	1477.0	1454.4	1454.8	1455.2	1498.8	1499.2	1499.6
1633 Hz	A168	R9, L2	1633.0	1608.0	1608.5	1609.0	1657.0	1657.5	1658.0

STEP	ACTION	VERIFICATION
	counterclockwise just to point where VOM indicates between 21.1 and 25.9 volts.	
63p	If VOM in Step 61 indicates between 21.1. and 25.9 volts, At test circuit— Slowly adjust potentiometer R8 or R9 clockwise just to point where VOM indication drops to between 14.8 and 18.2 volts. Then slowly adjust potentiometer R8 or R9 counterclockwise just to point where VOM indicates between 21.1 and 25.9 volts.	
64	At frequency meter— Slowly adjust frequency by means of FREQUENCY CPS dials toward upper band edge frequency just to point where VOM indicates between 14.8 and 18.2 volts.	At frequency counter— Counter indication is within limits for upper band edge frequency given in Table D.
65q	If frequency counter indication in Step 64 is within tolerance limits for upper band edge frequency— Adjustment of channel passband completed.	
66r	If frequency counter indication in Step 64 is not within limits for upper band edge frequency given in Table D— Perform Steps 67r through 72r.	
67r	At frequency meter— Slowly adjust frequency by means of FREQUENCY CPS 1-cycle (if needed) and 0.1-cycle dials until frequency counter indicates half way between the actual upper band edge frequency determined in Step 64 and in its nominal value given in Table D.	
68r	At test circuit— Using No. 32 socket wrench, slowly adjust L1 or L2 just to point where VOM indicates between 21.1 and 25.9 volts. (See Note after Step 58.)	
69r	At frequency meter— Slowly adjust frequency by means of FREQUENCY CPS 0.1-cycle dial until frequency counter indicates nominal value for upper band edge frequency given in Table D.	
70r	At test circuit— Slowly adjust potentiometer R8 or R9 just to	

STEP	ACTION	VERIFICATION
	point where VOM indicates between 21.1 and 25.9 volts.	
71r	Repeat Steps 63p and 65g except check lower band edge frequency. If necessary, repeat Steps 66r through 71r to adjust lower band edge frequency.	
72r	Repeat Steps 64 through 71r as many times as necessary to have both upper and lower band edge frequencies within tolerance limits given in Table D.	
73	Remove 158A adapter and restore circuit pack to service.	
74	Repeat Steps 58 through 73 for each remaining channel to be adjusted in high group using appropriate limits from Table D.	
75	Remove all connections shown in Fig. 1.	
76	At telephone set on TTP— Operate access trunk 1 key.	
77	Lift handset off-hook or operate TRFR key at TEL CKT on TTP if using headset.	Access trunk 1 lamp lighted. At ACCESS TRUNK 1 CONTROL— SUPV lamp lighted. At TEL CKT— TRFR lamp lighted if TRFR key is operated.
78	At telephone TOUCH-TONE set— Dial 1 + TGN + MEMN + ST for appropriate SRTT to the TTP.	At ACCESS TRUNK 1 CONTROl— EQPT ST flashing—120 ipm.
79	At telephone set— Place handset on-hook or release TRFR key at TEL CKT on TTP.	At telephone set— Access trunk 1 lamp extinguished. At TEL CKT— TRFR lamp extinguished.
80	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— SUPV lamp extinguished. EQPT ST lamp extinguished. At maintenance TTY— Receive M SV RST output message.
81	At telephone set on TTP— Operate green release key.	

STEP	ACTION	VERIFICATION
B. Sensitivity Test and Adjustment		
	Note: The following test should be performed only if all the requirements of Test A have been met.	
20	At test circuit Establish connections as shown in Fig. 1.	
21	At frequency meter— Adjust HORIZ GAIN AND OSC OUT control to obtain TMS meter indication between −4.75 and −5.25 dBm.	
22	Adjust frequency by means of FREQUENCY CPS dials to obtain frequency counter indication between 940.5 and 941.5.	At VOM— Meter indicates between 21.1 and 25.9 volts.
23d	If requirement in Step 22 is met— Proceed to Step 30.	
24e	If requirement in Step 22 is not met— At frequency meter— Adjust HORIZ GAIN AND OSC OUT control to obtain TMS meter indication between −0.875 and −0.925 dBm.	
25e	At test circuit— A1009 Extend input amplifier circuit pack ~~A163~~ by means of 158A adapter.	
26e	Slowly adjust potentiometer R15 counterclockwise to point where VOM indication drops to between 14.8 and 18.2 volts. Then slowly adjust R15 clockwise just to point where VOM indicates between 21.1 and 25.9 volts.	
27e	At TMS— Set ADD DBM switch to −20.	
28e	At frequency meter— Slowly turn HORIZ GAIN AND OSC OUT control counterclockwise to the point where VOM indication just drops to between 14.8 and 18.2 volts.	At TMS— Meter indicates between −0.4 and −1.4 dBm.
29e	At test circuit— Restore input amplifier circuit pack A163 to service.	
30	Remove all connections established as shown in Fig. 1.	

STEP	ACTION	VERIFICATION
31	At telephone set on TTP— Operate access trunk 1 key.	
32	Lift handset off-hook or operate TRFR key at TEL CKT on TTP if using headset.	Access trunk 1 lamp lighted. At ACCESS TRUNK 1 CONTROL— SUPV lamp lighted. At TEL CKT— TRFR lamp lighted if TRFR key is operated.
33	At telephone TOUCH-TONE set— Dial 1 + TGN + MEMN + ST for appropriate SRTT to the TTP.	At ACCESS TRUNK 1 CONTROL— EQPT ST lamp flashing at 120 ipm.
34	At telephone set— Place handset on-hook or release TRFR key at TEL CKT on TTP.	At telephone set— Access trunk 1 lamp extinguished. At TEL CKT— TRFR lamp extinguished.
35	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— SUPV lamp extinguished. EQPT ST lamp extinguished. At maintenance TTY— Receive M SV RST output message.