

**MANUAL CONFERENCE CIRCUIT  
FOR 4-WIRE NO. 5 CROSSBAR OFFICES  
WITH 5C OR 5D SWITCHBOARD  
SERVICE MAINTENANCE**

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310-290-100 — Manual Conference Circuit for 4-Wire No. 5 Crossbar Offices with 5C or 5D Switchboard — Description

322-432-100 — VOLCAS for 22-Type Repeaters Used with Toll Conference Grouping Circuits

**TEST EQUIPMENT**

1.04 The 21A transmission measuring set (TMS), or equivalent send-receive device, is used for making measurements on this circuit.

**TESTS PERFORMED**

1.05 Procedures are described for adjustment of the 1C pad in VOLCAS branch testing access circuit relays, testing VOLCAS relays, testing monitoring circuit, and measurement and adjustment of circuit losses.

**PREPARATION FOR TESTS**

1.06 The tests described here assume that the voice-frequency amplifiers and the VOLCAS circuit contained in the conference circuit meet the test requirements for these circuits.

1.07 The transmission measuring set shall be previously calibrated according to instructions pertaining to the instrument.

1.08 If the conference circuit has not previously been put into service, the 1C pad in the VOLCAS "transmit in" leg shall be strapped in accordance with 2.01. (See Fig. 1.)

1.09 A conference circuit previously in service shall be removed from service before preceding with these tests. (See 3.01.)

**1. GENERAL**

1.01 This section describes the methods of testing and adjusting the manual conference circuit at the time of installation and at periodic intervals thereafter.

**REFERENCES**

1.02 The following drawings contain information supplementary to this section.

- SD-64366-01 — VOLCAS Circuit
- SD-95112-01 — V3 Amplifier Circuit
- SD-68053-01 — Switchboard No. 5C or 5D Circuit
- SD-95115-01 — 21A Transmission Measuring Set
- SD-68528-01 — 6-Way Conference Circuit

1.03 The following practices contain information supplementary to this section.

- 310-200-100 — Switched Services Networks Using Central Office Switching Machines — Description

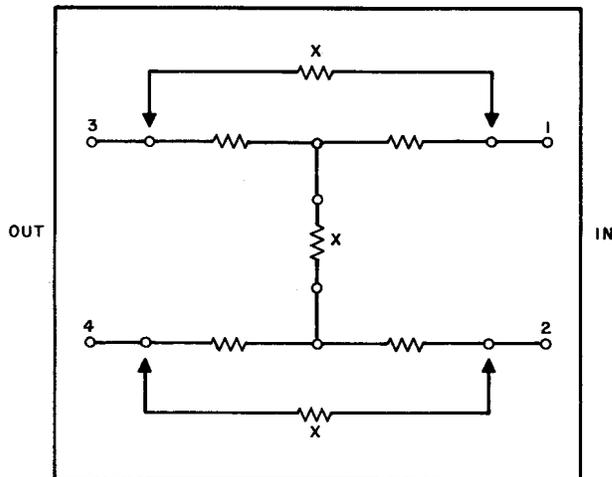


Fig. 1 — IC Pad

## 2. ADJUSTMENT OF IC PAD

**2.01** The IC pad in the “transmit in” leg of branch No. 1 (VOLCAS branch) shall have an 89BJ resistor installed of such value that with a normal transmit level from the switchboard the input level to the associated voice-frequency amplifier shall be  $-16$  dbm as measured across terminals 3 and 4 of the pad. (See Fig. 1.) The normal transmit level from the switchboard is  $-2$  dbm.

## 3. REMOVAL OF THE CIRCUIT FROM SERVICE

**3.01** An operating conference circuit is removed from service for testing by inserting a plug into the upper jack of each jack pair (conference branch) at each switchboard at which the circuit appears. Subsequent removal of the plugs will restore the circuit to service.

## 4. ACCESS CIRCUITS

**4.01** The lighting of the switchboard busy lamp associated with the conference circuit indicates the operation of control relays in the access circuits. When operated, the relays remove the 600-ohm idle circuit termination from the “transmit in” leg of the associated branch.

**4.02** The switchboard busy lamp is lighted when the first connection to the conference circuit is made at the switchboard and remains lighted as long as any branch remains connected.

## 5. VOLCAS RELAY OPERATION

**5.01** Switched losses introduced by the VOLCAS are controlled by relays operated by the presence of voice-frequency signals at the VOLCAS input. The operational test of the relays is made simultaneously with other tests as described in Part 6.

## 6. AMPLIFIER GAIN SETTING

**6.01** Voice-frequency amplifiers are provided in both the “transmit in” leg and the “transmit out” leg of branch No. 1 of the VOLCAS branch. In the remaining branches, an amplifier is provided only in the “transmit in” leg. The amplifiers are adjusted to compensate for the losses introduced by the grouping network and by the VOLCAS circuit.

**6.02** The VOLCAS circuit should be connected and operating during amplifier gain settings.

**6.03** Amplifier gain settings are made simultaneously with other tests as described below.

**6.04** When the monitoring circuit is connected to the VOLCAS and a telephone head set, either or both directions of transmission may be monitored on branch No. 1. The monitor function can be tested while making amplifier gain settings.

STEP	PROCEDURE
1	<p align="center"><b>AMPLIFIER GAIN SETTING, VOLCAS RELAY OPERATION AND MONITORING (FIG. 2)</b></p> <p>Connect telephone headset to TEL jack of monitor circuit.</p>

STEP	PROCEDURE
2	Connect twin jack test cord from DROP MON jack of monitor circuit to VOLCAS HO-DROP jack.
3	Connect twin jack test cord from LINE MON jack of monitor circuit to VOLCAS HO-LINE jack.
4	Insert a single plug into TR jack of VOLCAS.
5	Adjust TMS for output of $-2$ dbm at 1000 cps (600 ohms).
6	Apply output of TMS to AMP IN jack of A0 amplifier. Observe that switchboard OPR lamp is lighted, indicating operation of relays in "transmit in" (West) leg of VOLCAS.
7	Connect receiving side of TMS to AMP OUT jack of A0 amplifier. Adjust amplifier gain potentiometer (GAIN) to obtain an output of $-2$ dbm.
8	Observe that the test signal can be heard in telephone headset via the monitor circuit.
9	Adjust TMS for output of $-21$ dbm at 1000 cps (600 ohms).
10	Apply output of TMS to AMP IN jack of A1 amplifier.
11	Connect receiving side of TMS to AMP OUT jack of A1 amplifier. Adjust gain potentiometer (GAIN) as required to obtain reading of $-2$ dbm.
12	Observe that switchboard OPR lamp is lighted, indicating operation of relays in the "transmit out" (East) leg of VOLCAS.
13	Observe that test signal can be heard in telephone headset via the monitor circuit.
14	Repeat Steps 9, 10, and 11 at AMP IN and AMP OUT jacks of A2, A3, A4, A5, and A6 amplifiers.
15	Remove test equipment connections.

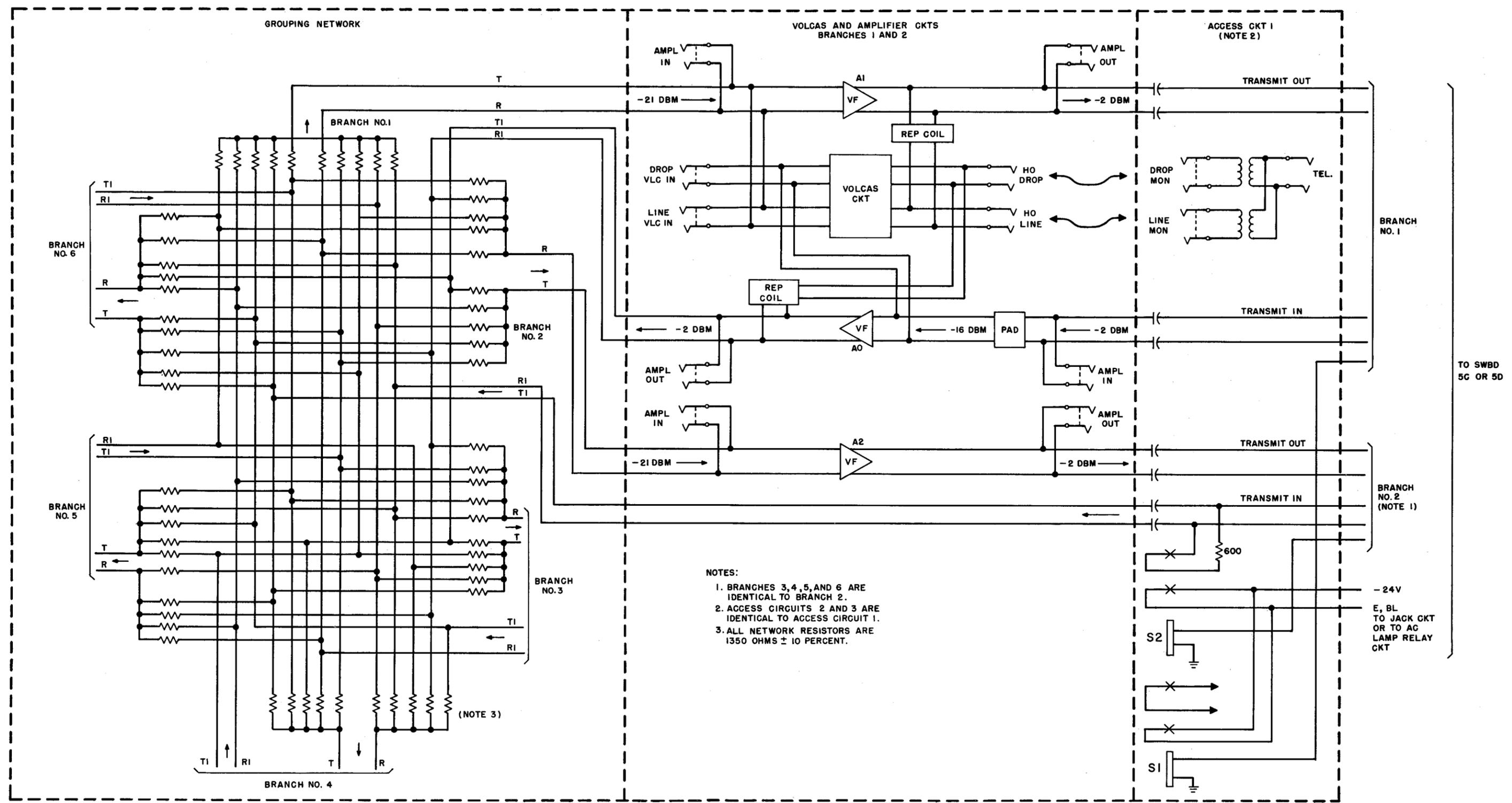
## 7. MEASUREMENT OF CIRCUIT LOSSES

7.01 When the conference circuit has been properly adjusted, a test signal applied at any "transmit in" jack at the switchboard can be re-

ceived at the "transmit out" jack *of any other branch* at approximately the same level as being transmitted.

STEP	PROCEDURE
1	<p align="center"><b>MEASUREMENT OF CIRCUIT LOSSES</b></p> Adjust output of TMS to the normal transmitting level ( $-2$ dbm) of the switchboard at 1000 cps (600 ohms).

STEP	PROCEDURE
2	Connect output of TMS to "transmit in" jack of branch No. 1.
3	Connect receive side of TMS to the "transmit out" jacks of branches 2 through 6, in turn, measuring the received levels. The levels measured shall be the transmitted level $\pm 1.7$ db.
4	Apply the test signal to the "transmit in" jacks of branches 2 through 6, in turn, making received level measurements at the "transmit out" jack of <i>each other</i> branch. The received level measurements shall be the transmitted level $\pm 1.7$ db.
5	Analysis of measurements may show all adjustments to be on the low side due to office wiring losses. When this is the case, minor adjustments may be made in the gain of A0 amplifier. If measurements at an individual jack are lower than all others, and no trouble is found, make minor adjustments in the associated amplifier.
6	Disconnect test equipment.



- NOTES:
1. BRANCHES 3, 4, 5, AND 6 ARE IDENTICAL TO BRANCH 2.
  2. ACCESS CIRCUITS 2 AND 3 ARE IDENTICAL TO ACCESS CIRCUIT 1.
  3. ALL NETWORK RESISTORS ARE 1350 OHMS ± 10 PERCENT.

Fig. 2 - 6-Way Conference Circuit - 4-Wire Talking - Branch 1 (VOLCAS) and Branch 2 (NONVOLCAS)