
N3 CARRIER TELEPHONE SYSTEM
CARRIER-FREQUENCY SUPPLY
4-KHZ GENERATOR UNIT
MAINTENANCE

This section contains maintenance procedures for determining the operating condition of the J99300BA 4-kHz generator (4 KC GEN) unit and associated alarm circuits.

This section is reissued to revise the procedure for checking the alarm circuit operation and to include reference to the minor alarm indicating lamps. Since this revision is of a general nature, arrows ordinarily used to indicate changes have been omitted. This reissue affects the Equipment Test Lists.

The 4-kHz generator unit is a plug-in equipment unit that includes an amplifier and monitoring facilities to determine if the output voltage is within proper limits. The primary function of the generator unit is to provide a 4-kHz signal to excite the harmonic generator. A second function is to provide information to the switching and alarm circuitry whenever the signal from the amplifier is not adequate to properly excite the harmonic generator. The 4-kHz input signal for the amplifier is provided either by a 61A oscillator, which is an optional component of the 4-kHz generator unit, or a tap from the office primary frequency supply. Units equipped with the 61A oscillator also include an oven alarm circuit which monitors the temperature of the oven housing the frequency controlling crystal unit of the 61A oscillator. On the 4-kHz generator units containing the 61A oscillator, an adjustment is provided for aligning the frequency to the required precision. The procedure is described in Section 362-901-501.

The purposes of the tests in this section are as follows:

- (a) To measure the output voltage of the 4-kHz generator unit
- (b) To measure the dc unbalance of the 4-kHz generator amplifier output stage
- (c) To measure the collector voltage unbalance in the 4-kHz generator differential amplifier stage
- (d) To check operation of the alarm sensing circuitry and minor alarm relay.

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NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

3—Test Alarm Circuit 4

CHART 1
MEASURE GENERATOR OUTPUT VOLTAGE

The purpose of this test is to ensure that adequate voltage is being delivered to the harmonic generator. Using volt-ohm-milliammeter (VOM), measure the dc voltage at ALM IN A and GRD jacks (Fig. 1). The measured dc voltage shall be within the requirements of Table A. This is an in-service test.

APPARATUS:

- 1—KS-14510, List 1, Volt-Ohm-Milliammeter (VOM) or equivalent
- 1—Set—KS-14510, List 8, Test Leads

STEP	PROCEDURE
1	Set VOM range selector switch to DC VOLTS 3 scale. <i>On 4 KC GEN unit:</i>
2	Connect black test lead to GRD test jack (Fig. 1).
3	Connect red test lead to ALM IN A test jack.
4	Measure the dc voltage. Requirement: See Table A.
5	If the requirement of Step 4 is not met and 4 KC GEN unit is J99300BA, List 1 or 3, refer to Section 362-901-501 and measure level of the 4-kHz signal from the office external primary frequency supply. If the level of the external 4-kHz signal is correct, replace the 4 KC GEN unit under test and repeat Steps 2 through 4. If the 4 KC GEN unit is List 2 or 4, replace unit under test and repeat Steps 2 through 4. Caution: <i>The 4 KC GEN switching key white index line must be turned to the ALT position when removing or inserting a generator unit in the regular position. Conversely, the switching key must be turned to the REG position when removing or inserting a unit in the alternate position. If the replacement unit is J99300BA, List 2 or 4, it will be necessary to adjust the frequency of the new unit in accordance with Section 362-901-501.</i>
6	Disconnect the VOM from the 4 KC GEN unit under test.

CHART 1 (Contd)

STEP	PROCEDURE
7	Repeat Steps 2 through 7 for each 4 KC GEN unit to be tested.

CHART 2
MEASURE GENERATOR OUTPUT UNBALANCE

The purpose of this test is to measure the dc unbalance of the amplifier output stage. Using volt-ohm-milliammeter (VOM), measure the dc voltage at ALM IN A and ALM IN B jacks (Fig. 2). The measured dc voltage shall be within the requirements of Table B. This is an in-service test.

APPARATUS:

- 1—KS-14510, List 1, Volt-Ohm-Milliammeter (VOM) or equivalent
 - 1—Set — KS-14510, List 8, Test Leads
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STEP	PROCEDURE
1	Set VOM range selector switch to DC VOLTS 3 scale. On 4 KC GEN unit:
2	Connect red test lead to ALM IN A test jack (Fig. 2).
3	Connect black test lead to ALM IN B test jack. See Note. Note: If meter pointer deflects to left, reverse VOM test leads.
4	Measure the dc voltage. Requirement: See Table B.
5	If the requirement of Step 4 is not met, replace the 4 KC GEN unit under test and repeat Steps 2 through 4. Caution: <i>The 4 KC GEN switching key white index line must be turned to the ALT position when removing or inserting a generator unit in the regular position. Conversely, the switching key must be turned to the REG position when removing or inserting a unit in the alternate position.</i>

CHART 2 (Contd)

STEP**PROCEDURE**

If the replacement unit is J99300BA, List 2 or 4, it will be necessary to adjust the frequency of the new unit in accordance with Section 362-901-501.

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|---|---|
| 6 | Disconnect VOM from 4 KC GEN unit under test. |
| 7 | Repeat Steps 2 through 6 for each 4 KC GEN unit to be tested. |
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CHART 3**TEST ALARM CIRCUIT**

The purpose of this test is to measure the collector voltage unbalance in the differential amplifier stage and to check operation of the alarm sensing circuitry and minor alarm relay. Using volt-ohm-milliammeter (VOM), measure the dc voltage at ALM BAL jacks (Fig. 3). The measured dc voltage shall not exceed 0.5 volts. This measurement may be made on an in-service basis. Using 600-ohm resistor, check alarm operation of the regular and alternate 4 KC GEN units. When testing an in-service carrier frequency supply, caution should be taken to avoid hits on systems carrying data channels.

APPARATUS:

- 1—KS-14510, List 1, Volt-Ohm-Milliammeter (VOM) or equivalent
 - 1—Set — KS-14510, List 8, Test Leads
 - 1—600-Ohm Resistor Equipped with Pin Plugs
-

STEP**PROCEDURE*****Alarm Sensing Circuit Stability***

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|---|--|
| 1 | Set VOM range selector switch to DC VOLTS 3 scale. |
| | On regular 4 KC GEN unit: |
| 2 | Connect VOM test leads to ALM BAL test jacks (Fig. 3). |

Note: If meter pointer deflects to left, reverse VOM test leads.

CHART 3 (Contd)

STEP	PROCEDURE
3	Measure the dc voltage. Requirement: Between 0.0 and 0.5 volts
4	If the requirement of Step 3 is not met, replace the 4 KC GEN unit under test and repeat Steps 2 and 3. Caution: <i>The 4 KC GEN switching key white index line must be turned to the ALT position when removing or inserting a generator unit in the regular position. Conversely, the switching key must be turned to the REG position when removing or inserting a unit in the alternate position. If the replacement unit is J99300BA, List 2 or 4, it will be necessary to adjust the frequency of the new unit in accordance with Section 362-901-501.</i>
5	Disconnect the VOM from the 4 KC GEN unit under test.
6	Repeat Steps 2 through 5 for the alternate 4 KC GEN unit. Alarm Circuit Test
	Note: If the requirements in Steps 9 through 15 cannot be met, replace the 4 KC GEN unit under test. See Caution, Step 4. If the requirement still cannot be met, the trouble is in the switching and alarm circuit (Fig. 4).
7	See Fig. 5. Equip 600-ohm resistor with pin plugs. Test of regular unit:
8	On switching and alarm (SW & ALM) panel, set 4 KC GEN key switch white index line to REG.
9	On regular 4 KC GEN unit, insert resistor pin plugs in GRD and ALM IN A test jacks (Fig. 6). Requirement 1: 4 KC GEN-REC lamp lights. Requirement 2: MINOR ALM lamp lights.
10	Remove resistor pin plugs from GRD and ALM IN A test jacks on regular 4 KC GEN unit.
11	Set 4 KC GEN switch to ALT and then back to REG. Requirement: 4 KC GEN-REG lamp goes out.
12	On SW & ALM panel, depress and release MINOR ALM-RST pushbutton.

CHART 3 (Contd)

STEP	PROCEDURE
	<p>Requirement: MINOR ALM lamp goes out.</p> <p>Test of alternate unit:</p>
13	<p>Insert resistor pin plugs in GRD and ALM IN A test jacks on alternate 4 KC GEN unit.</p> <p>Requirement 1: 4 KC GEN-ALT lamp lights.</p> <p>Requirement 2: MINOR ALM lamp lights.</p>
14	<p>Remove resistor pin plugs from jacks on alternate 4 KC GEN unit.</p> <p>Requirement: 4 KC GEN-ALT lamp goes out.</p>
15	<p>Depress and release MINOR ALM-RST pushbutton.</p> <p>Requirement: MINOR ALM lamp goes out.</p>

TABLE A

	REQUIREMENT
Initial Installation	1.8 — 2.8 Volts
Maintenance	1.0 — 2.8 Volts

TABLE B

	REQUIREMENT
Initial Installation	0.0 — 0.5 Volts
Maintenance	0.0 — 1.1 Volts

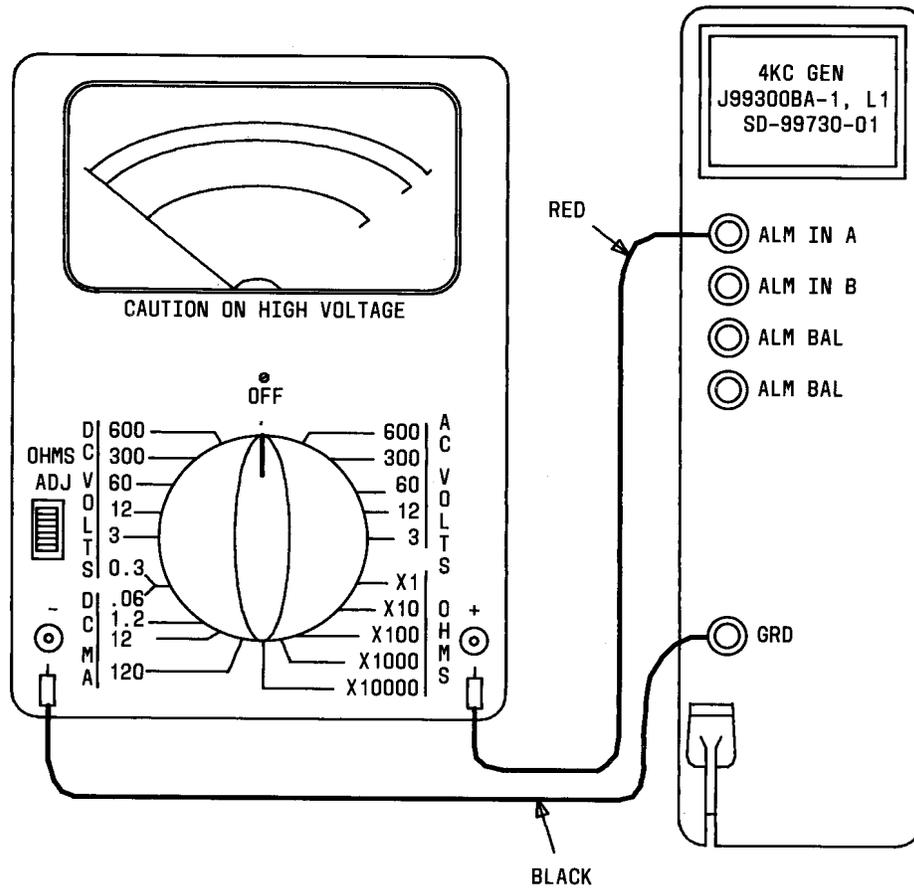


Fig. 1—Test Connections—Measure Amplifier Output Voltage

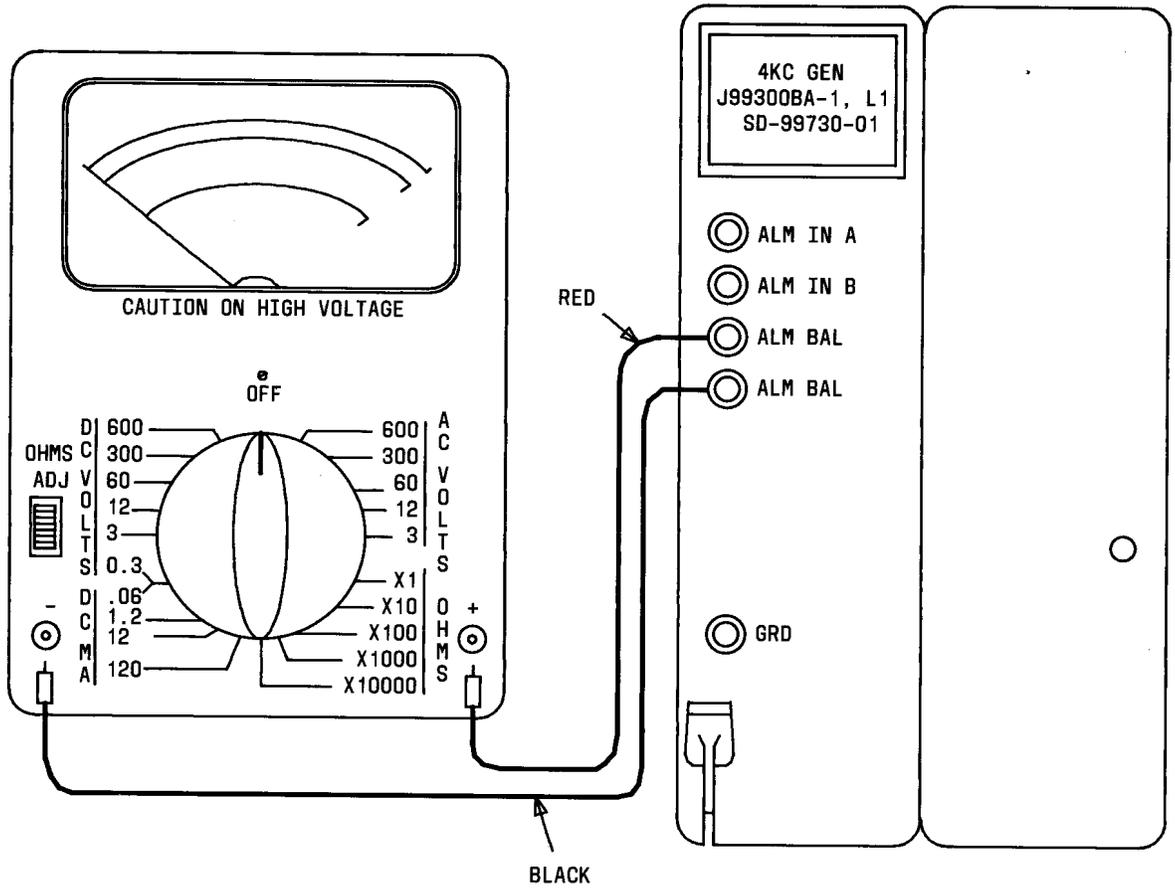


Fig. 3—Test Connections—Measure Alarm Sensing Circuitry Stability

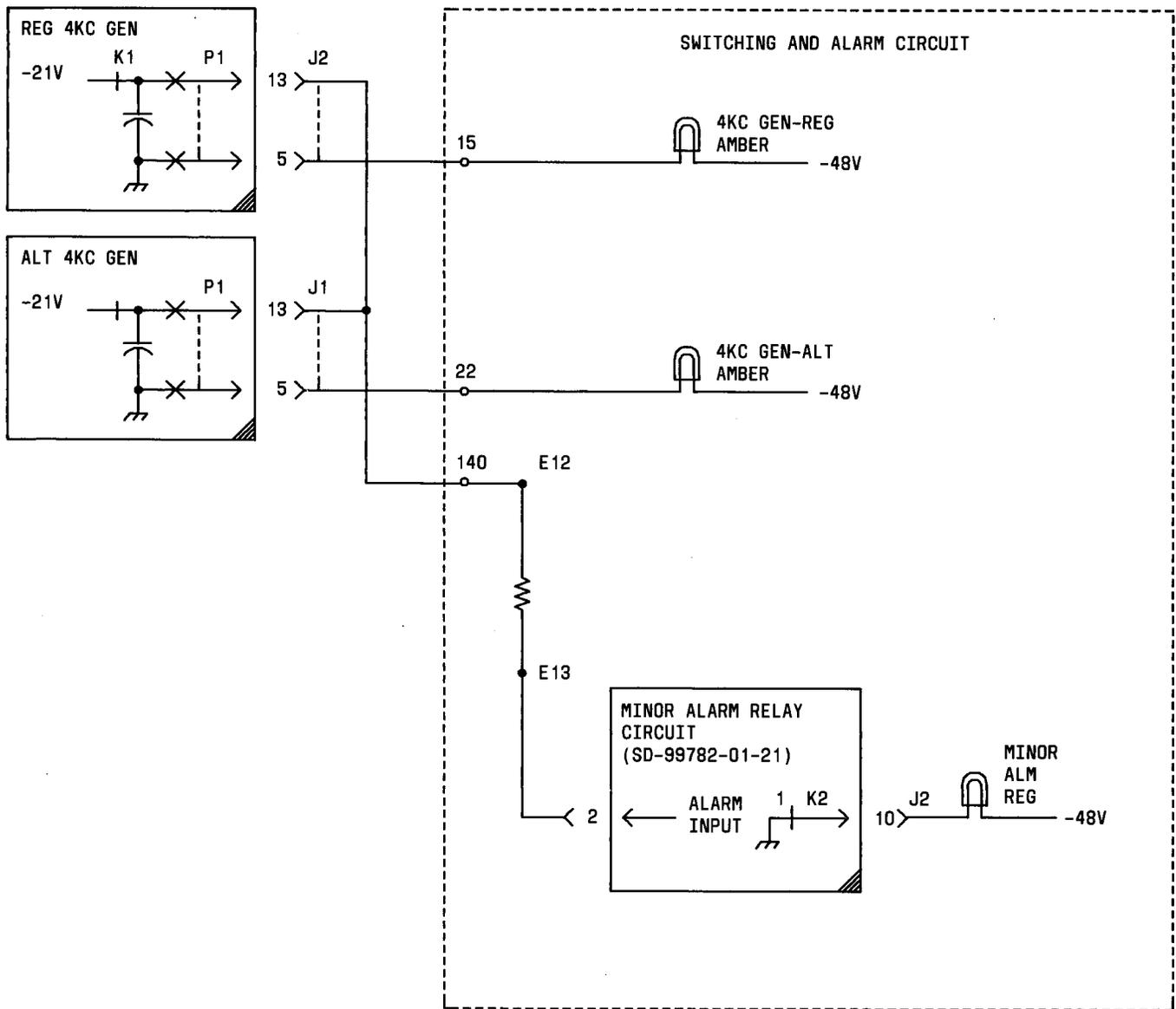


Fig. 4—4 kHz Minor Alarm Circuit

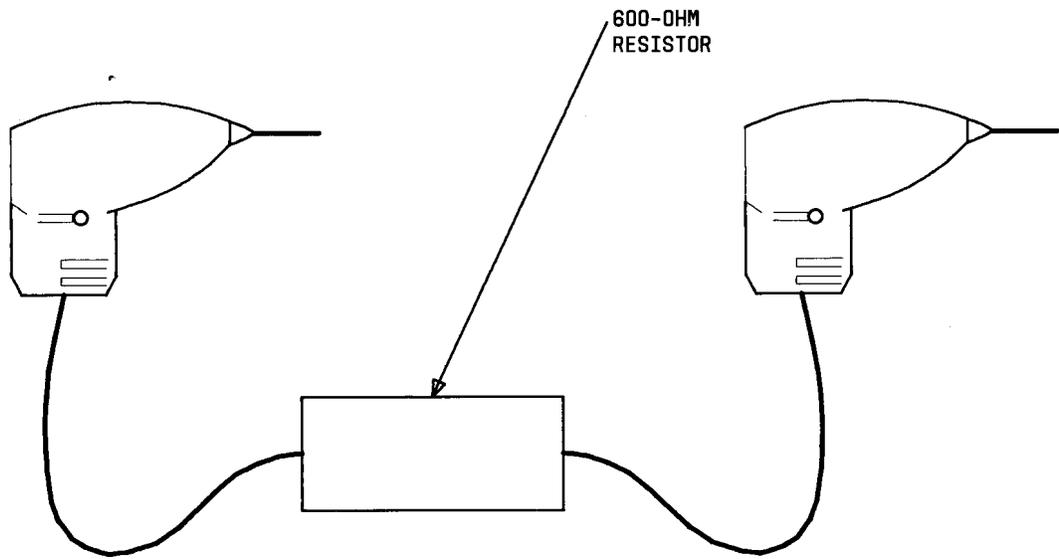


Fig. 5—Test Resistor

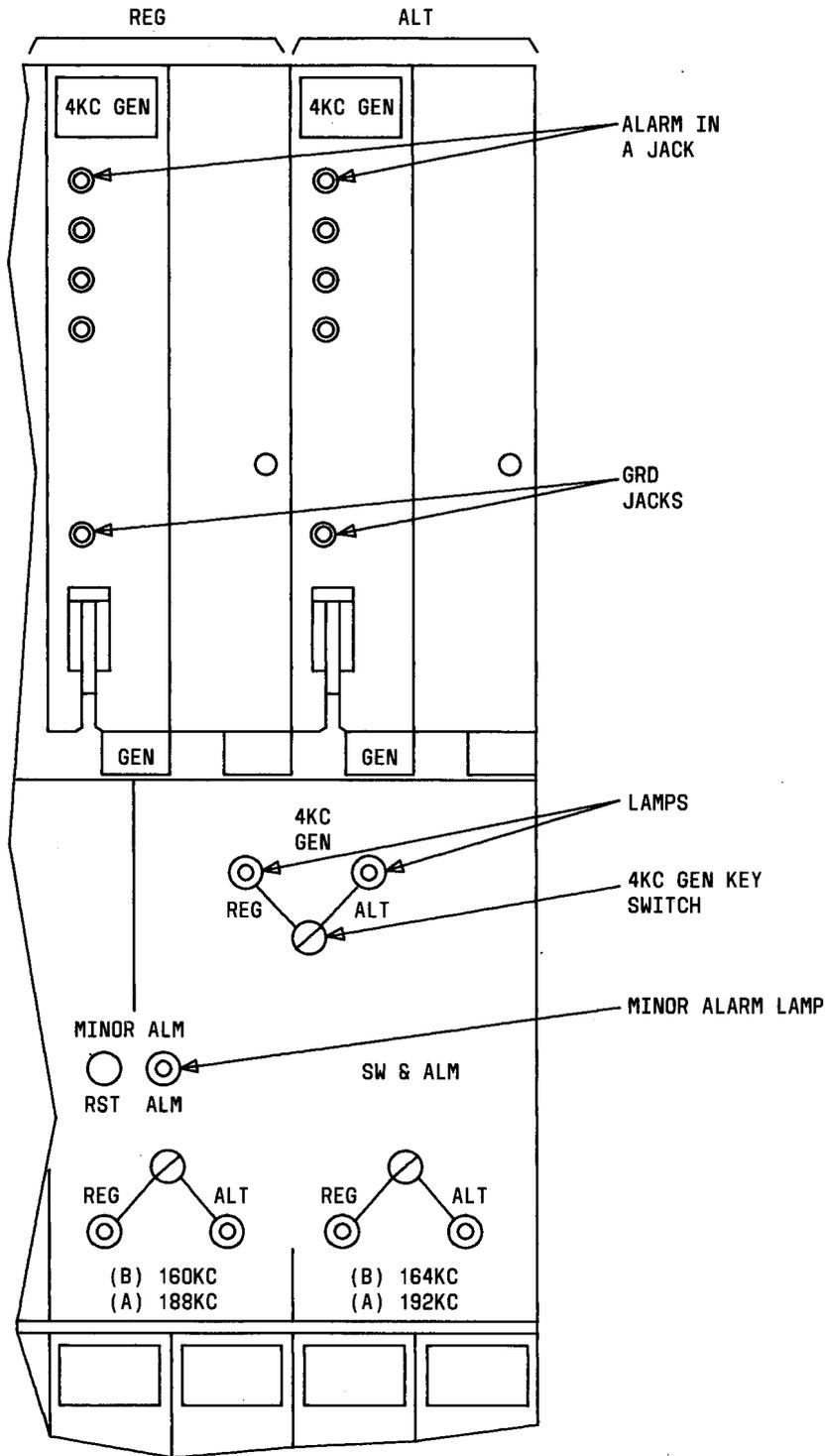


Fig. 6—Switching and Alarm (SW & ALM) Panel