

## J68820AC LEVEL COMPENSATION UNIT (L4)

### TESTS

### COMMON EQUIPMENT

### J68820 AUTOMATIC LINE SWITCH

### L4 CARRIER SYSTEM

This section provides procedures for adjusting the J68820AC switching tone level compensation unit to correct switching signal power inputs to the switching signal amplifier. Presently there are two level compensation units, the J68820AC (mfr disc.) and the J68820AD unit. Systems equipped with the J68820AD level compensation unit are adjusted using procedures in Section 359-100-509.

The J68820AC unit (Fig. 1) is comprised of an amplifier and adjustable attenuator, connected in tandem. This unit, used in earlier and existing L4 systems, is installed between the switching signal filter and the switching signal amplifier at the receive end of a switching section. One unit is required for each 11-foot, 6-inch or 9-foot switch control bay.

This section is reissued to ensure that the LEVEL COMPENSATION UNIT is aligned to compensate for the average deviation of the switching signals and to ensure that the signal power for any one line will not overload the switching signal amplifier. Since changes are extensive, change arrows have not been used. Equipment Test Lists are not affected.

#### CHART

#### PAGE

|                                     |   |
|-------------------------------------|---|
| 1—J68820A or BA Bay . . . . .       | 2 |
| 2—J68820AA, AB, or BB Bay . . . . . | 7 |

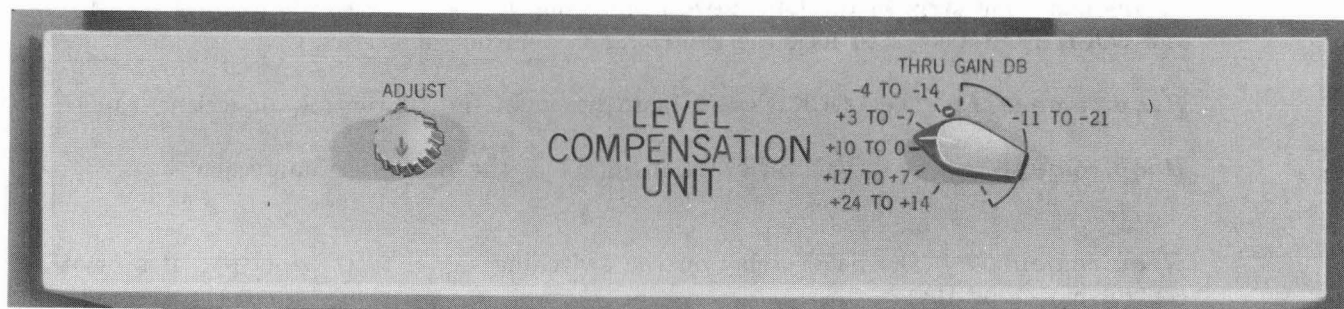


Fig. 1—J68820AC Level Compensation Unit

#### NOTICE

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Bell System except under written agreement

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**APPARATUS:**

The tests in this section require suitable transmission measuring equipment. Refer to Section 356-010-500 and select, from available equipment, sending and receiving units having the following capabilities:

***Sending Test Equipment (STE)*** capable of sending into 75-ohm circuits, signals between 200 and 300 kHz at a power level from -40 to -80 dBm

***Receiving Test Equipment (RTE)*** capable of detecting, from 75-ohm circuits, signals between 200 and 300 kHz at a power level from -40 to -80 dBm

***P2BJ Cord***

***11B Attenuator***

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**CHART 1****J68820A OR BA BAY**

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| STEP | PROCEDURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Ensure that the L4 lines have been equalized (Section 359-200-505) prior to start of this procedure.                                                                                                                                                                                                                                                                                                                                                                                  |
| 2    | Ensure that the switching section under test is released.<br><br><b><i>Requirement:</i></b> No lamps should be lighted in the L4 control connecting bay.                                                                                                                                                                                                                                                                                                                              |
| 3    | Establish a talk circuit between the terminals under test.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4    | On the mounting strip in the L4 control connecting bay, simultaneously depress the MSTR and LOCK NORM keys to lock the switching system out of service.<br><br><b><i>Requirement 1:</i></b> The LOCK NORM lamp lights in the L4 control connecting bay.<br><br><b><i>Requirement 2:</i></b> The OUT SERV lamp lights in the L4 protection receive bay.<br><br><b><i>Requirement 3:</i></b> The STBY relay on the switching signal filter panel operates (switch control bay A or BA). |
|      | <b><i>Note:</i></b> The operation of the STBY relay terminates the switch signal path of the protection line into 75 ohms.                                                                                                                                                                                                                                                                                                                                                            |

## CHART 1 (Contd)

STEP

PROCEDURE

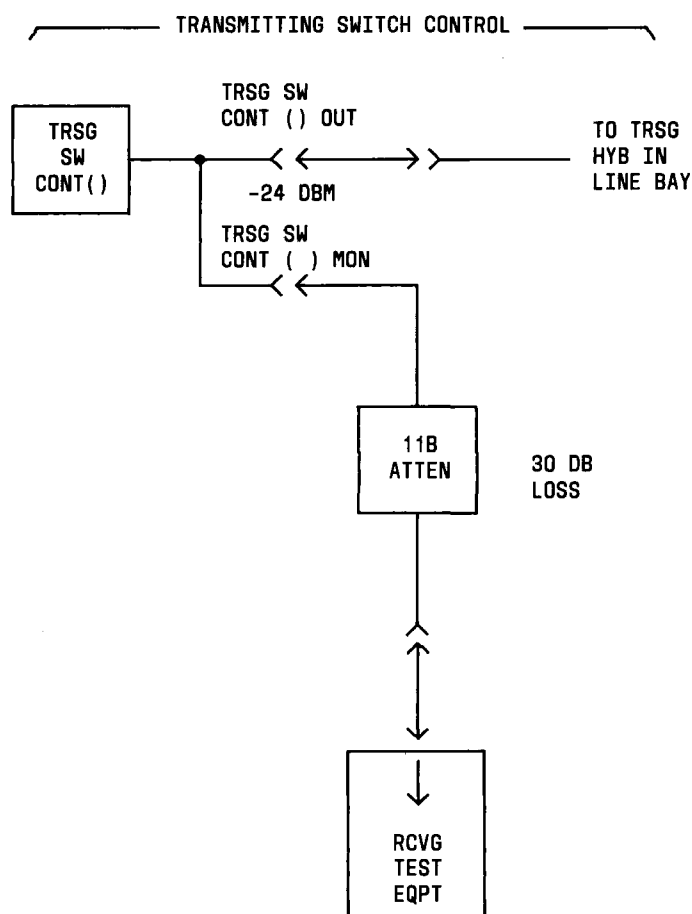


Fig. 2—Transmitting Terminal Release Identification Signal Measurement

*At transmitting terminal:*

- 5 At the associated switch control bay, lock operated the RLS relay.
- 6 Prepare the RTE to make a bridged measurement of the 282-kHz signal at the TRSG SW CONT ( ) MON jack (Fig. 2).
- 7 Measure the power of the 282-kHz signal.

## CHART 1 (Contd)

## STEP

## PROCEDURE

**Requirement:** Meter indication shall be -54.2 to -53.8 dBm.

**Note 1:** If requirement is not met, make adjustments per Section 359-100-511.

**Note 2:** This 282-kHz tone shall remain on the switching system throughout this procedure.

**At receiving terminal:**

- 8 Prepare the RTE for a terminated measurement of 282 kHz at approximately -71 dBm.
- 9 On the switch control bay jack panel, remove the patch plug between the SW FIL OUT and LVL COM IN jacks (Fig. 3).
- 10 Insert a patch cord between the SW FIL OUT jack and RTE [patch (1), Fig. 4].
- 11 On the switching signal filter unit, block operated all regular relays except the relay associated with regular line 1.

**Note:** The relay associated with the protection line is in an operated condition.

- 12 Measure and record the maximum output power of the 282-kHz signal.

**Requirement:** Approximately -71 dBm.

- 13 Remove the block from the relay associated with regular line 2 (if equipped). If this line is not equipped, proceed to Step 22.
- 14 Block operated the relay associated with regular line 1.
- 15 Measure and record the maximum output power of the 282-kHz signal.

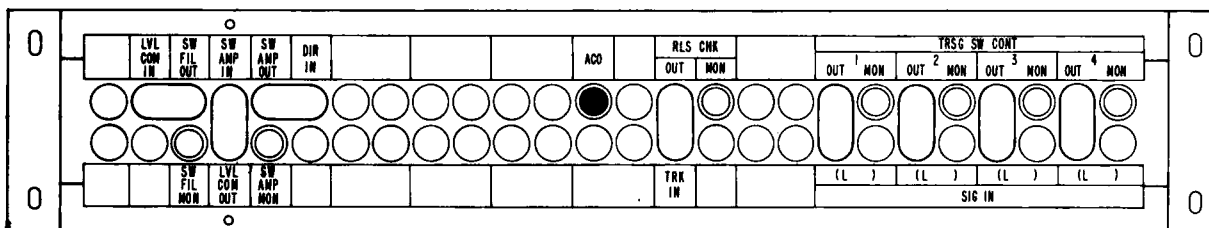


Fig. 3—Jack Field in Switch Control Bay

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**CHART 1 (Contd)**


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| STEP | PROCEDURE                                                                                                                                                                                                               |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16   | Remove the block from the relay associated with regular line 3 (if equipped). If this line is not equipped, proceed to Step 22.                                                                                         |
| 17   | Block operated the relay associated with regular line 2.                                                                                                                                                                |
| 18   | Measure and record the maximum output power of the 282-kHz signal.                                                                                                                                                      |
| 19   | Remove the block from the relay associated with regular line 4 (if equipped). If this line is not equipped, proceed to Step 22.                                                                                         |
| 20   | Block operated the relay associated with regular line 3.                                                                                                                                                                |
| 21   | Measure and record the maximum output power of the 282-kHz signal.                                                                                                                                                      |
| 22   | Add the values recorded in Steps 12, 15, 18, and 21.                                                                                                                                                                    |
| 23   | Divide the total obtained in Step 21 by the number of regular lines measured. (This gives an average value.)                                                                                                            |
| 24   | If the average value is <b>higher</b> than -71 dBm (-69 dBm for example), proceed to Step 25. If the average value is <b>lower</b> than -71 dBm (-75 dBm for example), proceed to Step 27.                              |
| 25   | If the average value is <b>higher</b> than -71 dBm (-69 dBm for example), determine the difference between -71 dBm and the average value determined in Step 23 (2 dB high using -69 dBm as example). Record this value. |
| 26   | Set the THRU GAIN DB control to a position which will compensate for the difference determined in Step 25 (eg, for the difference shown in the example of Step 25, the control would be set to the +3 to -7 position).  |
| 27   | If the average value is <b>lower</b> than -71 dBm (-75 dBm for example), determine the difference between -71 dBm and the average value determined in Step 23 (4 dBm low using -75 dBm as example). Record this value.  |
| 28   | Set the THRU GAIN DB control to a position which will compensate for the difference determined in Step 27 (eg, for the difference shown in the example of Step 27, the control would be set to the +10 to 0 position).  |
| 29   | Disconnect the RTE from the SW FIL OUT jack [patch (1), Fig. 4].                                                                                                                                                        |
| 30   | Prepare the STE to send a 282-kHz signal at the average power level determined in Step 23.                                                                                                                              |
| 31   | Insert a patch cord between the STE and the LVL COM IN jack [patch (2), Fig. 4].                                                                                                                                        |

## CHART 1 (Contd)

| STEP | PROCEDURE                                                                                                                                                                                                                                                         |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32   | On the switch control bay jack panel, remove the patch plug between the LVL COM OUT and SW AMP IN jacks (Fig. 3).                                                                                                                                                 |
| 33   | Prepare the RTE for a terminated measurement of 282 kHz at approximately -71 dBm.                                                                                                                                                                                 |
| 34   | Connect the RTE to the LVL COM OUT jack [patch (3), Fig. 4].                                                                                                                                                                                                      |
| 35   | Adjust the RTE for a maximum meter indication of the 282-kHz signal.<br><br><b>Requirement:</b> -71 dBm $\pm$ 0.2 dB.                                                                                                                                             |
| 36   | If the requirement of Step 35 is met, proceed to Step 37. If requirement is not met, rotate the ADJUST control on the LEVEL COMPENSATION UNIT to meet the requirement.<br><br><b>Note:</b> The ADJUST control should not be set to add greater than 10 dB of loss |
| 37   | Disconnect the STE from the LVL COM IN jack [patch (2), Fig. 4] and replace the patch plug between SW FIL OUT and LVL COM IN jacks.                                                                                                                               |
| 38   | Block operated all regular relays except the relay associated with regular line 1.                                                                                                                                                                                |
| 39   | Measure and record the maximum output power of the 282-kHz signal.<br><br><b>Requirement:</b> Meter indication shall be between -76.0 to -63.0 dBm.                                                                                                               |
| 40   | Remove the block from the relay associated with regular line 2. If this line is not equipped, proceed to Step 49.                                                                                                                                                 |
| 41   | Block operated the relay associated with regular line 1.                                                                                                                                                                                                          |
| 42   | Measure and record the maximum output power of the 282-kHz signal.                                                                                                                                                                                                |
| 43   | Remove the block from the relay associated with regular line 3. If this line is not equipped, proceed to Step 49.                                                                                                                                                 |
| 44   | Block operated the relay associated with regular line 2.                                                                                                                                                                                                          |
| 45   | Measure and record the maximum output power of the 282-kHz signal.                                                                                                                                                                                                |
| 46   | Remove the block from the relay associated with regular line 4 (if equipped). If this line is not equipped, proceed to Step 49.                                                                                                                                   |
| 47   | Block operated the relay associated with regular line 3.                                                                                                                                                                                                          |
| 48   | Measure and record the maximum output power of the 282-kHz signal.                                                                                                                                                                                                |

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**CHART 1 (Contd)**


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| STEP | PROCEDURE                                                                                                                  |
|------|----------------------------------------------------------------------------------------------------------------------------|
| 49   | If the 282-kHz signals do not measure between -76.0 and -63.0 dBm, check switching signal phasing per Section 359-100-511. |
| 50   | Disconnect the RTE from the LVL COM OUT jack [patch (3), Fig. 4].                                                          |
| 51   | Replace the patch plug between the LVL COM OUT and SW AMP IN jacks.                                                        |
| 52   | Release all blocked relays.                                                                                                |
| 53   | Request that the associated transmitting end remove the 282-kHz signal by releasing the RLS relay.                         |
| 54   | If an AA, AB, or BB bay is to be tested, proceed to Chart 2. If no other tests are to be performed, proceed to Step 55.    |
| 55   | Release the switching system by simultaneously operating the MSTR and RLS keys.                                            |
|      | <b>Requirement 1:</b> The LOCK NORM lamp is extinguished.                                                                  |
|      | <b>Requirement 2:</b> The OUT SERV lamp for the protection line is extinguished.                                           |

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**CHART 2****J68820AA, AB, OR BB BAY**


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The 282-kHz signal, used in the A or BA bay, does not appear in the AA, AB, or BB bays. Thus, one of the identification tones must be transmitted from the distant end to adjust the level compensation units in the AA, AB, or BB bay. The closest frequency signal to the 282-kHz signal should be used for the AA, AB, or BB bay.

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| STEP | PROCEDURE                                                                                            |
|------|------------------------------------------------------------------------------------------------------|
| 1    | Ensure that the L4 lines have been equalized (Section 359-200-505) prior to start of this procedure. |
| 2    | Ensure that the switching section under test is out of service.                                      |
|      | <b>Requirement 1:</b> The LOCK NORM lamp in the L4 control connecting bay is lighted.                |
|      | <b>Requirement 2:</b> The OUT SERV lamp in the L4 protection receive bay is lighted.                 |

## CHART 2 (Contd)

| STEP | PROCEDURE                                                                                                                                               |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3    | If the requirements of Step 2 are met, proceed to Step 5. If the requirements are not met, perform Step 4.                                              |
| 4    | On the mounting strip in the L4 control connecting bay, simultaneously depress the MSTR and LOCK NORM keys to lock the switching system out of service. |

**Requirement 1:** The LOCK NORM lamp lights in the L4 control connecting bay.

**Requirement 2:** The OUT SERV lamp lights in the L4 protection receive bay.

**Requirement 3:** The STBY relay on the switching signal filter panel operates (switch control bay A or BA).

**Note:** The operation of the STBY relay terminates the switch signal path of the protection line into 75 ohms.

**At transmitting terminal:**

- |   |                                                                                                                                                |
|---|------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | Send the lowest frequency identification tone provided in the bay under test. Refer to Table A to release the appropriate identification tone. |
| 6 | Make a bridged measurement of the identification tone at the TRSG SW CONT () jack (Fig. 2).                                                    |

**Requirement:** Meter indication shall be -54.2 to -53.8 dBm.

**Note 1:** If requirement is not met, make adjustments per Section 359-100-511.

**Note 2:** The identification tone shall remain on the switching system throughout the entire chart.

TABLE A

|   |     |                             |                                                                                                                                                                         |
|---|-----|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | 290 | 1st REG INIT Identification | Remove LO relay cover on the proper line initiator and operate the REC L SW key to DISC, operate INIT key to TST, block LO relay nonoperated, and operate TST SENS key. |
| 2 | 288 | 2nd REG INIT Identification |                                                                                                                                                                         |
| 3 | 286 | 3rd REG INIT Identification |                                                                                                                                                                         |
| 4 | 284 | 4th REG INIT Identification |                                                                                                                                                                         |

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**CHART 2 (Contd)**

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**STEP****PROCEDURE**

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***At receiving terminal:***

- 7 Prepare the RTE for a terminated measurement at the frequency of the identification tone being used at a level of approximately -71 dBm.
- 8 On the switch control bay jack panel, remove the patch plug between the SW FIL OUT and LVL COM IN jacks (Fig. 3).
- 9 Insert a patch cord between the SW FIL OUT jack and RTE [patch (1), Fig. 4].
- 10 On the switching signal filter unit, block operated all regular relays except the relay associated with regular line 1.
- 11 Measure and record the maximum output power at the frequency of this identification tone being used.
- 12 Remove the block from the relay associated with regular line 2 (if equipped). If this line is not equipped, proceed to Step 21.
- 13 Block operated the relay associated with regular line 1.
- 14 Measure and record the maximum output power at the frequency of the identification tone being used.
- 15 Remove the block from the relay associated with regular line 3. (If this line is not equipped, proceed to Step 21.)
- 16 Block operated the relay associated with regular line 2.
- 17 Measure and record the maximum output power at the frequency of the identification tone being used.
- 18 Remove the block from the relay associated with regular line 4. (If this line is not equipped, proceed to Step 21.)
- 19 Block operated the relay associated with regular line 3.
- 20 Measure and record the maximum output power at the frequency of the identification tone being used.
- 21 Add the values recorded in Steps 11, 14, 17, and 20.
- 22 Divide the total obtained in Step 21 by the number of regular lines measured. (This gives an average value.)

## CHART 2 (Contd)

| STEP                                                                                 | PROCEDURE                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 23                                                                                   | If the average value is <b>higher</b> than -71 dBm (-69 dBm for example), proceed to Steps 24 and 25. If the average value is lower than -71 dBm (-75 dBm for example), proceed to Steps 26 and 27.                     |
| 24                                                                                   | If the average value is <b>higher</b> than -71 dBm (-69 dBm for example), determine the difference between -71 dBm and the average value determined in Step 21 (2 dB high using -69 dBm as example). Record this value. |
| 25                                                                                   | Set the THRU GAIN DB control to a position which will compensate for the difference determined in Step 23 (eg, for the difference shown in the example of Step 24, the control would be set to the +3 to -7 position).  |
| 26                                                                                   | If the average value is <b>lower</b> than -71 dBm (-75 dBm for example), determine the difference between -71 dBm and the average value determined in Step 21 (4 dB low using -75 dBm as example). Record this value.   |
| 27                                                                                   | Set the THRU GAIN DB control to a position which will compensate for the difference determined in Step 26 (eg, for the difference shown in the example of Step 26, the control would be set to the +10 to 0 position).  |
| 28                                                                                   | Disconnect the RTE from the SW FIL OUT jack [patch (1), Fig. 4].                                                                                                                                                        |
| 29                                                                                   | Prepare the STE to send a 282-kHz signal at the average power level determined in Step 22.                                                                                                                              |
| 30                                                                                   | Insert a patch cord between the STE and the LVL COM IN jack [patch (2), Fig. 4].                                                                                                                                        |
| 31                                                                                   | On the switch control bay jack panel, remove the patch plug between the LVL COM OUT and SW AMP IN jacks (Fig. 3).                                                                                                       |
| 32                                                                                   | Prepare the RTE for a terminated measurement of 282 kHz at approximately -71 dBm.                                                                                                                                       |
| 33                                                                                   | Connect the RTE to the LVL COM OUT jack [patch (3), Fig. 4].                                                                                                                                                            |
| 34                                                                                   | Adjust the RTE for a maximum meter indication of the 282-kHz signal.                                                                                                                                                    |
| <b>Requirement:</b> -71 dBm $\pm 0.2$ dB.                                            |                                                                                                                                                                                                                         |
| 35                                                                                   | If the requirement of Step 34 is met, proceed to Step 36. If requirement is not met, rotate the ADJUST control on the LEVEL COMPENSATION UNIT to meet the requirement.                                                  |
| <b>Note:</b> The ADJUST control should not be set to add greater than 10 dB of loss. |                                                                                                                                                                                                                         |
| 36                                                                                   | Disconnect the STE from the LVL COM IN jack [patch (2), Fig. 4] and replace the patch plug between SW FIL OUT and LVL COM IN jacks.                                                                                     |

## CHART 2 (Contd)

| STEP | PROCEDURE                                                                                                                                                                                                                                           |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 37   | Block operated all regular relays except the relay associated with regular line 1.                                                                                                                                                                  |
| 38   | Measure and record the maximum output power of the 282-kHz signal.<br><b>Requirement:</b> Meter indication shall be between -76.0 to -63.0 dBm.                                                                                                     |
| 39   | Remove the block from the relay associated with regular line 2. (If the line is not equipped, proceed to Step 48.)                                                                                                                                  |
| 40   | Block operated the relay associated with regular line 1.                                                                                                                                                                                            |
| 41   | Measure and record the maximum output power of the 282-kHz signal.                                                                                                                                                                                  |
| 42   | Remove the block from the relay associated with regular line 3. (If the line is not equipped, proceed to Step 42.)                                                                                                                                  |
| 43   | Block operated the relay associated with regular line 2.                                                                                                                                                                                            |
| 44   | Measure and record the maximum output power of the 282-kHz signal.                                                                                                                                                                                  |
| 45   | Remove the block from the relay associated with regular line 4 (if equipped). If this line is not equipped, proceed to Step 48.                                                                                                                     |
| 46   | Block operated the relay associated with regular line 3.                                                                                                                                                                                            |
| 47   | Measure and record the maximum output power of the 282-kHz signal.                                                                                                                                                                                  |
| 48   | If the 282-kHz signals do not measure between -76.0 and -63.0 dBm, check switching signal phasing per Section 359-100-511.                                                                                                                          |
| 49   | Disconnect the RTE from the LVL COM OUT jack [patch (3), Fig. 4].                                                                                                                                                                                   |
| 50   | Replace the patch plug between the LVL COM OUT and SW AMP IN jacks.                                                                                                                                                                                 |
| 51   | Release all blocked relays.                                                                                                                                                                                                                         |
| 52   | Request that the associated transmitting end remove the identification tone by returning the REC L SW, INIT, and TST SENS keys to normal and by removing the block from the LO relay. Operate the LO relay momentarily and replace the relay cover. |
| 53   | If no other tests are to be performed, proceed to Step 54. If an AB or BB bay is to be tested, repeat Chart 2.                                                                                                                                      |
| 54   | Release the switching system by simultaneously operating the MSTR and RLS keys.<br><b>Requirement 1:</b> The LOCK NORM lamp is extinguished.<br><b>Requirement 2:</b> The OUT SERV lamp for the protection line is extinguished.                    |

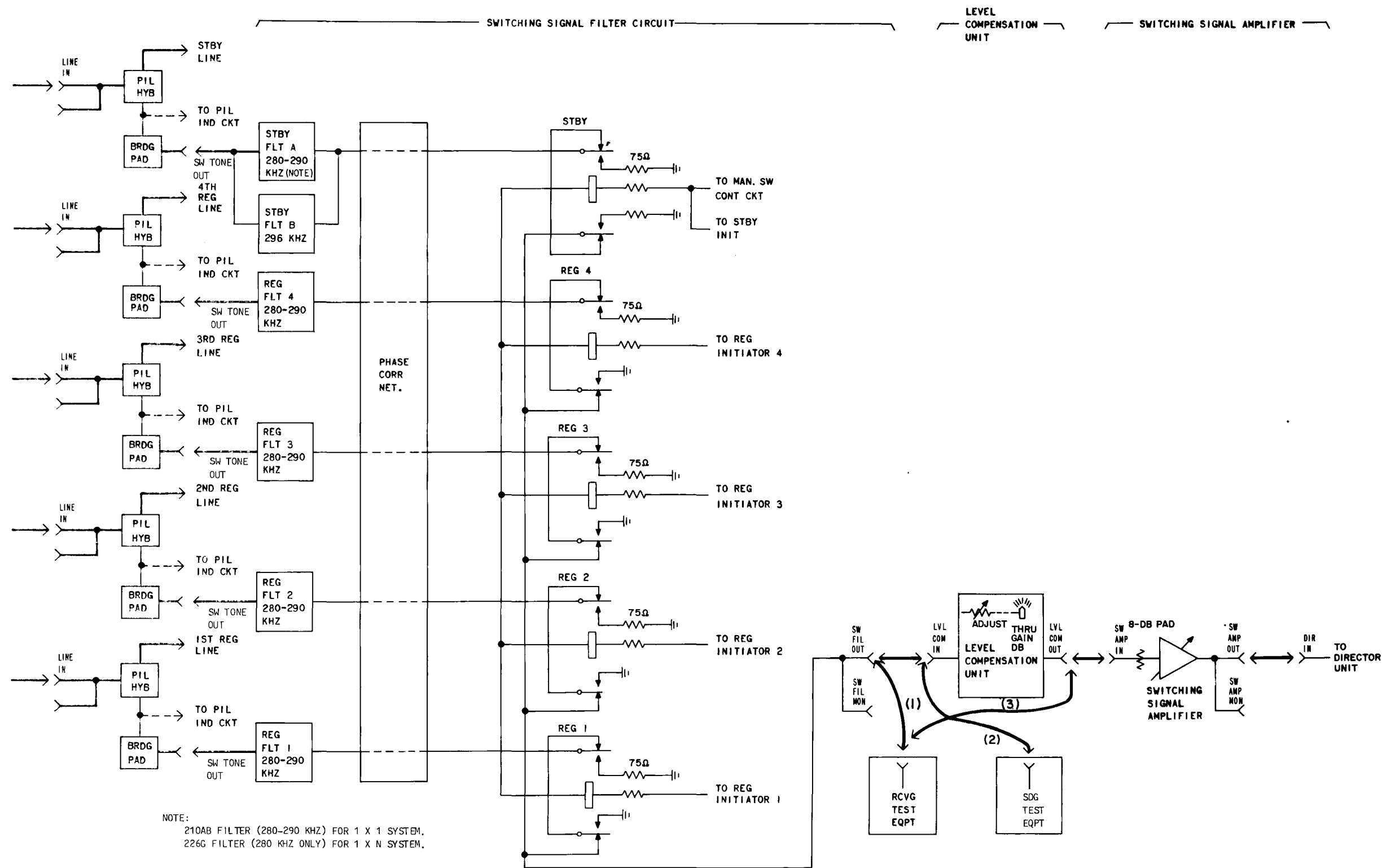


Fig. 4—Input Circuit for Switching Signal Tones