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## VOICE-FREQUENCY CARRIER TELEGRAPH

### A1 LEVEL-VARIATION DETECTOR

### TESTS AND ADJUSTMENTS

#### 1. GENERAL

1.01 This section describes the methods required in testing and making adjustments on the A1 level-variation detector.

1.02 This section is reissued to:

- (a) Insert Caution to avoid possible stripping of threads in the plastic block of the loss pad screwswitch.
- (b) Insert Caution to call attention to limits of the LEVEL ADJ and ZERO SET potentiometers.

1.03 The following tests and adjustments are covered:

- (a) **Zero Set:** The ZERO SET control provides positive biasing, with respect to the -18 volt dc reference point, by adjusting the detector circuit to a reference level without the presence of an input signal to the A1 level-variation detector (0-dB, 10-dB, and 20-dB switches nonoperated).
- (b) **Sensitivity Adjust:** Loss pads of 0-dB, 10-dB, and 20-dB, controlled by screwswitches, provide a choice of three ranges of sensitivity.
- (c) **Level Adjust:** The LEVEL ADJ control provides a fine adjustment of the detector sensitivity within a chosen range and adjusts the gain of the common amplifier circuit.

1.04 The A1 level-variation detector sensitivity range is such that proper operation can be obtained when the normal aggregate level of the monitored tones on the voice-frequency (VF) facilities

lies within the -23 to 0 dBm range at the monitored bridging point.

1.05 The data control release (DCR) screwswitch allows the data control feature to be disabled, and the alarm disabling (ALM DSBL) key allows the office alarm indications to be disabled. These operations are performed during periods of tests and adjustments to the A1 level-variation detector. The DCR feature is provided to avoid service interruptions to customers that are using the telegraph channels carried by the monitored VF circuits. The alarm disable feature is provided to avoid false alarm indications in the office.

1.06 This practice describes tests to be made at initial line-up when there is a change in the number of channels associated with the monitored system or when periodic maintenance is performed on the carrier system. The tests as described may be performed at any time without disturbing the customer service.

#### 2. APPARATUS

2.01 One KS-14510 volt-ohm-milliammeter, or equivalent (20,000 ohms/volt), will be required for the following tests and adjustments.

#### 3. TESTS AND ADJUSTMENTS

3.01 No tests or adjustments should be made until it is assured that the proper voice-frequency signal level is present at the input to the level-variation detector. Such assurance may be had by observing that the proper signal levels exist on each of the channels assigned to the VF facility being monitored. A KS-19935 telegraph carrier test set is convenient for this purpose, but other means of measurement may be used if so desired.

**SECTION 312-709-500**

**A. Zero Set**

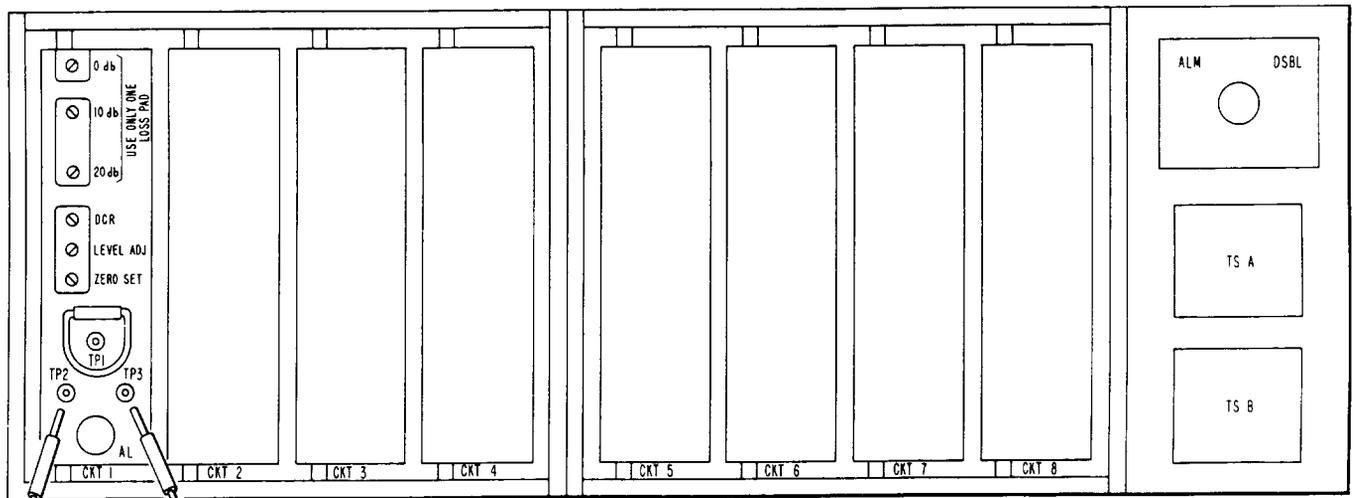
STEP	PROCEDURE
1	<p>The detector cards should be mounted in the detector unit chassis and powered for 15 minutes before any adjustments are made.</p> <p><b>Caution:</b> <i>In order to avoid damaging the voltmeter, a voltage scale having a full-scale reading of 50 volts or more should be used when the voltmeter is initially connected to the test points.</i></p>
2	<p>Using a screwdriver, open (by turning counterclockwise) the DCR screwswitch.</p>
3	<p>Open (by turning counterclockwise) the 0-dB, 10-dB, or 20-dB attenuator screwswitch.</p>
4	<p>Connect the voltmeter between pin jacks TP1 and TP2.</p> <p><b>Note:</b> Pin jack TP1 is the -18 volts dc reference point.</p>
5	<p>Adjust the ZERO SET control to obtain a voltmeter indication of 0.</p> <p><b>Note:</b> The selector range on the voltmeter should be decreased as the adjusted voltage approaches 0.</p> <p><b>◆Caution:</b> <i>The total effective range of the ZERO SET potentiometer is completed with approximately ten turns when a "stop" indication can be detected. Attempted rotation beyond this stop will, thereafter, make it difficult to detect the end point of the potentiometer.◆</i></p>
6	<p>Disconnect the voltmeter from pin jacks TP1 and TP2.</p>
7	<p>Continue to the level adjust operation.</p>

**B. Level Adjust**

STEP	PROCEDURE
1	<p><b>Note:</b> The LEVEL ADJ control provides a fine adjustment of the A1 level-variation detector sensitivity, and the test is made when normal signal levels are being monitored. A coarse adjustment is made by operating <b>only one</b> of the attenuator screwswitches (0-dB, 10-dB, or 20-dB).</p> <p>The detector cards should be mounted in the detector unit chassis and powered for 15 minutes before any adjustments are made.</p>

STEP	PROCEDURE
2	<p>With the DCR screwswitch open, momentarily operate the ALM DSBL key by fully depressing the key. This action will cause an internal locking mechanism to change the electrical condition of the key. The object of this step is to disable the alarm circuit and when this has been accomplished, the signal light integral with the key will be lighted.</p>
3	<p>Adjust the LEVEL ADJ control to approximately midrange.</p> <p><b>◆Caution:</b> <i>The total effective range of the LEVEL ADJ potentiometer is completed with approximately ten turns when a "stop" indication can be detected. Attempted rotation beyond this stop will, thereafter, make it difficult to detect the end point of the potentiometer.</i></p>
4	<p>Using a screwdriver, operate <b>only one</b> of the attenuator screwswitches at a time, and observe the ALM lamp on the card under adjustment.</p> <p><b>Requirement:</b> The attenuator switch that causes the ALM lamp to be extinguished is the correct coarse adjustment.</p> <p><b>◆Caution:</b> <i>The screws of the screwswitches should be firmly bottomed on the contact wires and then tightened no further in order to avoid possible stripping of threads in the plastic block.◆</i></p>
5	<p>If none of the attenuator switches cause the ALM lamp to be extinguished, the 10-dB switch should be operated.</p> <p><b>◆Note:</b> Observe <b>Caution</b> in Step 4.◆</p>
6	<p>Connect the voltmeter positive terminal to pin jack TP2 and the negative terminal to pin jack TP3 (see Fig. 1).</p> <p><b>Caution:</b> <i>In order to avoid damaging the voltmeter, a voltage scale having a full-scale reading of 50 volts or more should be used when the voltmeter is initially connected to the test points.</i></p>
7	<p>Adjust the LEVEL ADJ control to obtain a voltmeter indication of <math>0 \pm 0.1</math> volt.</p> <p><b>◆Note 1:</b> Observe <b>Caution</b> in Step 3.◆</p> <p><b>Note 2:</b> If the voltmeter indication is positive, the detector sensitivity should be reduced by turning the LEVEL ADJ control in a counterclockwise direction. If the voltmeter indication is negative, the meter leads should be reversed. The detector sensitivity should then be increased by turning the LEVEL ADJ control in a clockwise direction.</p>
8	<p>If a voltmeter indication of <math>0 \pm 0.1</math> volt cannot be obtained, the coarse adjustment should be changed by opening the 10-dB switch and proceeding to Step 9.</p>
9	<p>Operate the 0-dB switch to increase the sensitivity or the 20-dB switch to decrease the sensitivity.</p> <p><b>◆Note:</b> Observe <b>Caution</b> in Step 4.◆</p>

STEP	PROCEDURE
10	Repeat Step 6 for a voltmeter indication of $0 \pm 0.1$ volt.  <i>Note:</i> If the requirement cannot be met, the A1 level-variation detector card should be replaced.
11	Disconnect the voltmeter from pin jacks TP2 and TP3.
12	Using a screwdriver, operate the DCR screwswitch.
13	Release the ALM DSBL key by momentarily, fully depressing the key.
14	The above procedure is required for initial line-up or whenever there is a major change in the level to be monitored due to the addition or subtraction of channel units. For periodic testing, the procedure may be simplified to insure that the detector is operating within its normal range (ZERO SET— $0 \pm 0.1$ volt; LEVEL ADJ— $0 \pm 0.1$ volt).



KS-14510

Fig. 1—Typical Method for Making Level Adjust Measurements