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TRANSMISSION AND NOISE MEASURING SYSTEMS
APPEARANCES AT VOICE-FREQUENCY PATCHING BAYS AND PACKAGED N-CARRIER TERMINALS
DATA, AIR-GROUND, AND VOICE-CIRCUIT TESTBOARDS
FOR PRIVATE SERVICE SYSTEMS AND AT SIMILAR LOCATIONS
TESTS AND ADJUSTMENTS

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1. GENERAL

1.01 This section covers the methods for calibration and adjustment of the transmission and noise measuring systems used at voice-frequency patching bays, packaged N-carrier terminals, data, air-ground, and voice-circuit testboards associated with private service systems and at similar locations.

1.02 This section is reissued to include information on the KS-20805 digital transmission measuring system (TMS) used in place of the 1U and 1W amplifier-rectifiers at voice-frequency patching bays, packaged N-carrier terminals, packaged A6 channel banks and other similar locations. Changes or corrections to the format of the procedure for calibration of the analog measuring systems are also included. Since this is a general revision, change arrows have been omitted. This reissue does affect the 103 division equipment test list.

1.03 The analog transmission and noise measuring system used at voice-frequency patching bays and packaged N-carrier terminals is covered by SD-59432-01 and SD-59433-01, respectively. The KS-20805 digital TMS is used in place of SD-59432-01 and SD-59433-01. It interfaces through SD-95900-01, and in some uses, through SD-3C203-01 as well. When a particular transmission and noise measuring system covered by SD-95900-01 is used at voice-frequency patching bays or packaged N-carrier terminals, the system should be tested and adjusted as covered in this section. The analog transmission and noise measuring system (J1G001) used at data, air-ground, and voice-circuit testboards associated with private service systems is covered by SD-1G073-01 and SD-1G074-01, respectively.

1.04 The analog transmission measuring systems consist of a 1U amplifier-rectifier, one or more meters which can be switched to the 1U output, and one or more receiving circuits which can be switched to the 1U input. The meters are switched, one at a time, to the output of the 1U amplifier whenever it is necessary to watch the meter reading while making adjustments at points other than the measuring location. The meters used with the amplifier-rectifier may be panel-mounted, bracket-mounted, or the projection-type. With the latter type, the screen may be located so that the same meter can be read from several positions, each of which has a receiving circuit that can be switched to the input of the associated 1U amplifier-rectifier.

1.05 The analog noise measuring systems employ a 1W amplifier-rectifier but generally share the same meters and receiving circuits with the transmission measuring system. A key or switch at the testing location switches the receiving circuit to the input of the 1W amplifier-rectifier when a noise measurement is desired.

1.06 The KS-20805 digital transmission measuring system consists of the input circuits for level and noise measurements, output digital displays, and a common measuring unit (CMU). The CMU contains filters, scanning lockout switches for selecting level or noise inputs, and the circuitry for measuring level, frequency, and noise. The digital displays may be mounted in the aisle, rack mounted, or horizontal or vertical panel mounted.

1.07 Busy lamps at the various testing locations indicate when the transmission or noise measuring systems or the corresponding meter is in use from another location. A relay interlock prevents more than one location from using the analog system simultaneously. The scanning lockout switches of the CMU prevent more than one location from using the level or noise measuring circuitry simultaneously.

1.08 The amplifier-rectifiers, meters, and transmission and noise measuring systems are described in the following sections:

SECTION	TITLE
103-231-101	1U Amplifier-Rectifier
103-231-102	1W Noise Amplifier-Rectifier With C-Message Weighting
103-231-103	Projection Meter, Projector, and Screen

103-231-104	Transmission and Noise Measuring Systems—KS-20805—Description
103-231-110	Transmission and Noise Measuring Systems—Appearances at Voice-Frequency Patching Bays and Packaged N-Carrier Terminals—Data, Air-Ground, and Voice-Circuit Testboards for Private Service Systems and at Similar Locations

1.09 The 1U amplifier-rectifier used in all the analog transmission measuring circuits is covered by SD-64098-01. Some of the earlier 1U amplifier-rectifiers were equipped with an internal high-pass filter (Option Y). The purpose of this filter was to reduce errors in transmission measurements when low-frequency induction was present on voice-frequency, open-wire circuits. Since this filter is now provided externally to the 1U amplifier-rectifier and is used only at testboard and other positions were required, ***the high-pass filter should be removed from all 1U amplifier-rectifiers.*** The internal high-pass filter is removed by incorporating a wiring option (Option X) of SD-64098-01. ***All 1U amplifier-rectifiers should be inspected to ensure that they are wired in accordance with Option X of SD-64098-01.***

1.10 An improved version of the 1U amplifier-rectifier is now available. The original, or early version, can be calibrated at only two levels of input power, whereas the improved version can be calibrated at three values of input power. These values are −16, 0, and +7 dBm, permitting maximum range required for all measurements.

1.11 The 1W noise amplifier-rectifier, used in all the analog noise measuring circuits, was originally provided with 144 weighting and was covered by SD-95102-01. Later, when F1A weighting was introduced, the 1W noise amplifier-rectifier was modified as shown on SD-95102-02. Arrangements were also made to convert existing 1W noise amplifier-rectifiers to include F1A weighting on SD-95102-01, Issue 9B. Finally, the weighting was changed to C-message weighting to match the weighting provided in the 3-type noise measuring sets. This was accomplished by the addition of a "C-message" panel, as shown on SD-95102-01, Issue 11B or later; and SD-95102-02, Issue 6B or later. All 1W noise amplifier-rectifiers should have been converted to C-message weighting. Detailed description of the 1W noise amplifier-rectifier equipped with C-message weighting is covered in Section 103-231-102.

2. PROJECTION METER AND SCREEN

2.01 The accuracy obtainable from the analog transmission and noise measuring system depends in part upon the care with which the projectors and screens are installed and maintained. All projection meters should be checked to see that the image on the screen is in focus and of adequate brilliance and size to be seen clearly from all locations from which the meters are normally read. Distorted images tend to compress one end of the scale and should be avoided. Shielding from ambient lighting may be necessary in some cases. The screen should be kept clean at all times by washing the enamel or aluminum finish as covered in Section 069-305-301.

2.02 If the adjustments on the projector, as covered in Section 103-231-103, are not successful in producing a suitable image, the distance between the projector and the screen and the angle of incidence should be checked against the applicable ED drawings. If any of these dimensions is not within the appropriate limits shown on the drawings, the matter should be referred through channels for corrective action.

3. TEST POWER OUTLETS

3.01 All test power outlets which may be used by the systems should be checked with the 22A milliwatt reference meter, and adjusted if necessary, to meet the requirements given in Section 103-335-512. The check should include all jack-ended outlets at voice-frequency patching bays, repeater bays, packaged N-carrier terminals, and at voice-circuit testboards associated with private service systems. It also includes the milliwatt supply to the noise calibration panel of the analog system. This check, and adjustment if necessary, should be completed prior to other tests to ensure accuracy of calibration and a minimum out-of-service interval at the measuring appearances of the system. All of the jack-ended outlets should be checked periodically as required in accordance with Section 103-335-300.

4. PREFERENCE OF LOCATION AND METER FOR BASIC CALIBRATION

A. General

4.01 The procedure for calibration and adjustment of the various analog arrangements is basically similar, though differences exist in the transmission levels used for calibration and the method of applying the test power.

4.02 The basic calibration of the 1U amplifier-rectifier is made by selecting a measuring appearance at a centrally located test position and the regular output meter which is normally read at that position. This reference position is intended to enable calibration from a location having average wiring lengths to the input of the amplifier-rectifier.

> ***Note 1:*** The reference testing location and meter selected for the basic calibration should be the only location used for calibration or adjustment of a particular 1U amplifier-rectifier. The adjustment of the 1U amplifier-rectifier, as determined by the basic calibration from the reference location, should never be readjusted to correct for deviations at other testing locations (see Note 2 for exception).

> ***Note 2:*** There is one exception to Note 1. In some cases where some of the equipment is shared by test locations widely distributed over the office, one or more of the extreme positions may not meet requirements during the first calibration as covered in Part 5D. In this event, the meter circuit potentiometer associated with the normally read meter at the reference position is adjusted to give a range on the B scale of the meter which will bring the most extreme position within requirements. The calibration of the 1U amplifier-rectifier is repeated at the reference position, and checks are repeated at the other positions to ensure that the requirements are met.

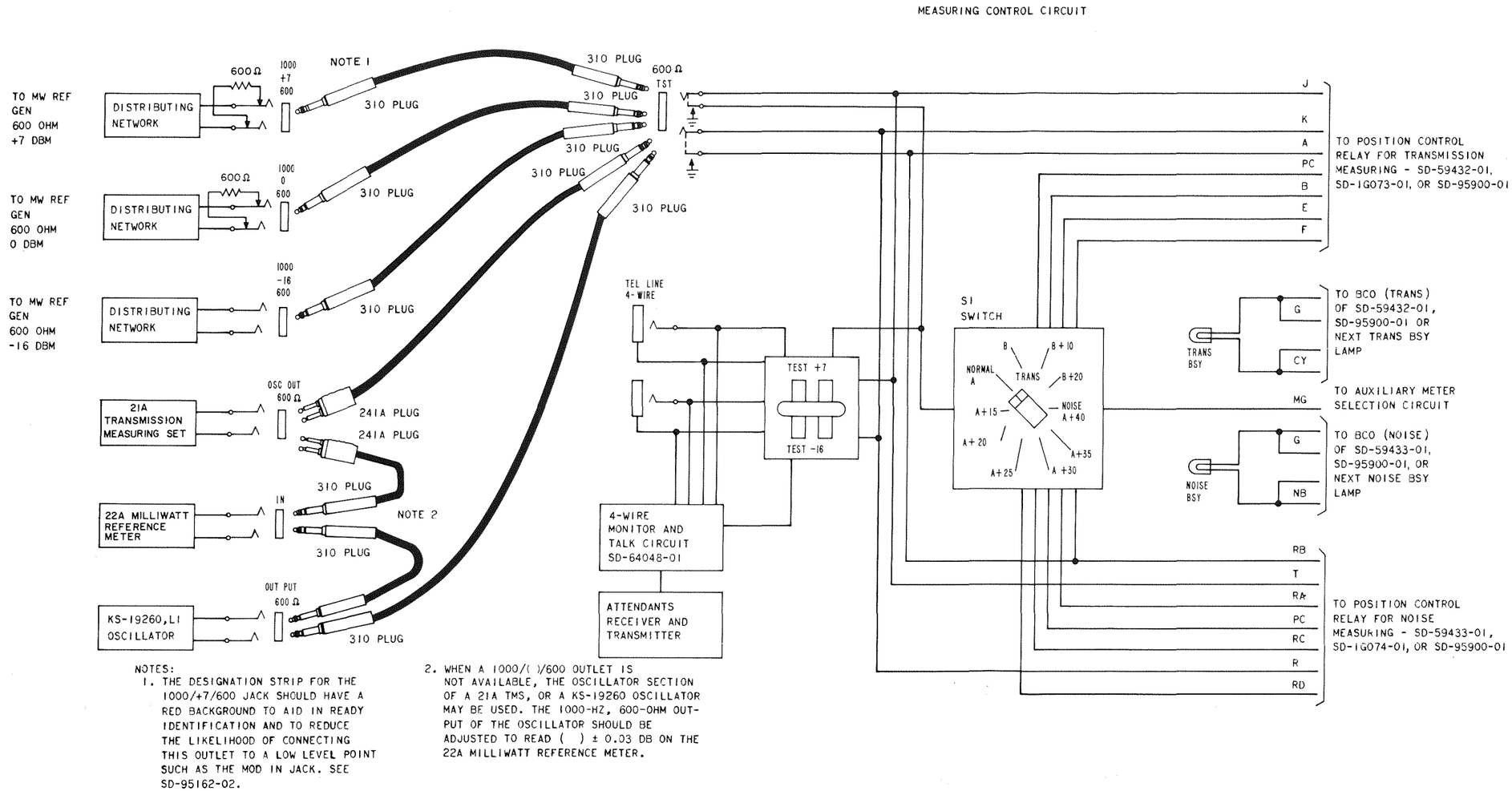
4.03 An analysis of the measuring appearances and meters served by a particular 1U amplifier-rectifier should be made to determine whether a testboard position, or other testing position, is to be used for the reference position. When the combination includes a lineup of testboards, voice-frequency patching bays, and perhaps packaged N-carrier terminals, the preferred location is at a centrally located test position in the largest lineup. When the particular 1U amplifier-rectifier serves only voice-frequency patching bays or packaged N-carrier terminals, the preferred location is a centrally located voice-frequency patching bay. When the measuring inputs are provided by figures (other than connecting circuits) shown on SD-95900-01, Section 103-231-500 should be used for the test and adjustment procedures and for determination of the reference test position.

B. Transmission and Noise Measuring System—SD-59432-01 and SD-59433-01

4.04 Figure 1 shows the measuring control circuit covered by SD-59432-01, SD-97256-01, and SD-97188-01 provided at voice-frequency patch bays and packaged N-carrier terminals. The measuring control circuit allows joint use of an input circuit and a rotary switch (S1) for sensitivity control of the amplifier-rectifiers used in the transmission and noise measuring system covered by SD-59432-01 and SD-59433-01. When the improved version of the 1U amplifier-rectifier is used, basic calibration must be made at −16, 0, and +7 dBm. The 600Ω TST jack shown in Fig. 1 is connected to the 1000/−16/600, 1000/0/600, and 1000/+7/600 jack-ended outlets, or to a source of 1000-Hz power (such as a suitable oscillator) which has been checked and adjusted (if required) to the required output during the basic calibration of the system.

C. Transmission and Noise Measuring System—SD-1G073-01 and SD-1G074-01

4.05 Figure 2 shows the transmission and noise measuring control circuits covered by SD-1G073-01 and SD-1G074-01, respectively. Figure 2A shows the transmission measuring circuits, and Fig. 2B and 2C show the noise measuring control circuits provided at data, air-ground, and voice-circuit testboards associated with private service systems. The basic calibration of the early version of the 1U amplifier-rectifier is made at 0 dBm. Basic calibration of the improved version is made at −16 and 0 dBm. The A scale is calibrated using a source of 0 dBm. The REC B jack shown in Fig. 2A is connected to the required source of power during the basic calibration of the system.

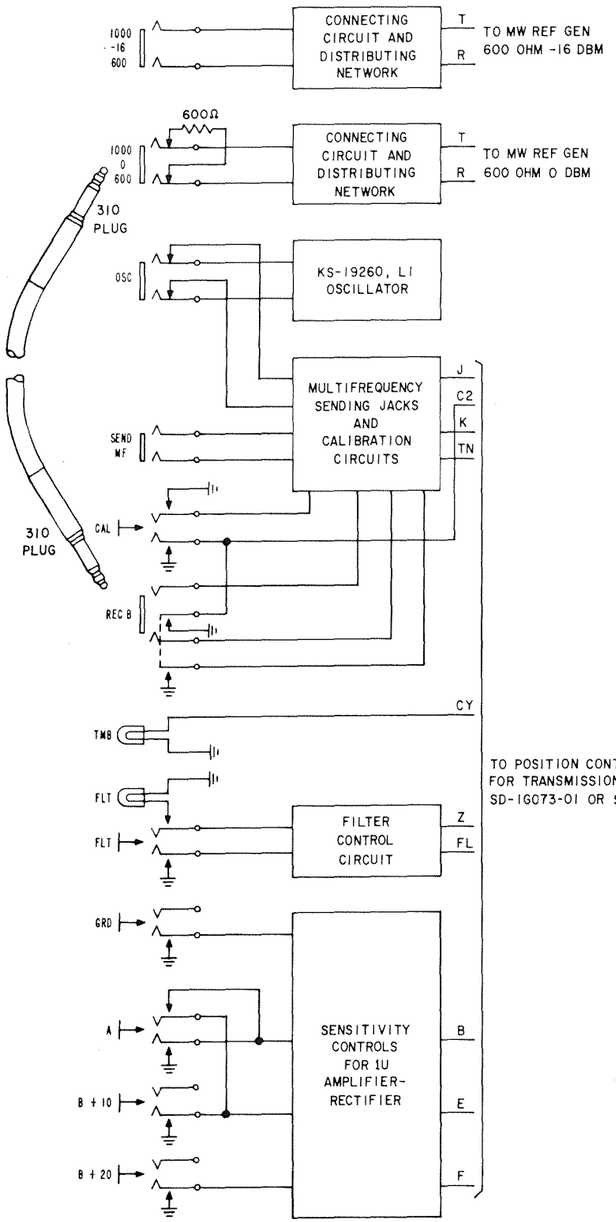


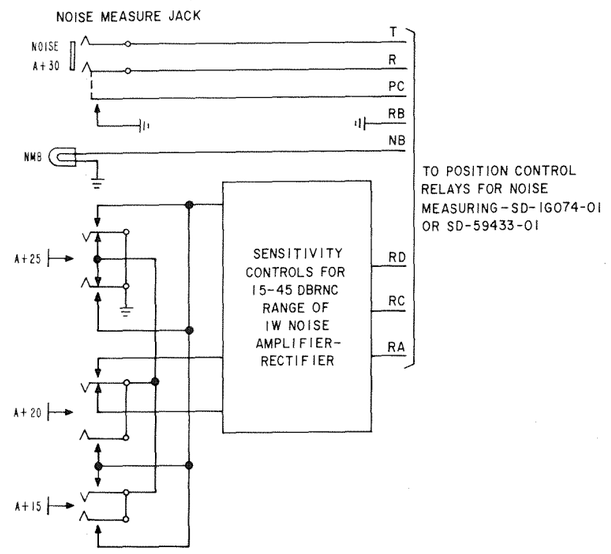
NOTES:

1. THE DESIGNATION STRIP FOR THE 1000/+7/600 JACK SHOULD HAVE A RED BACKGROUND TO AID IN READY IDENTIFICATION AND TO REDUCE THE LIKELIHOOD OF CONNECTING THIS OUTLET TO A LOW LEVEL POINT SUCH AS THE MOD IN JACK. SEE SD-95162-02.

2. WHEN A 1000/( )/600 OUTLET IS NOT AVAILABLE, THE OSCILLATOR SECTION OF A 21A TMS, OR A KS-19260 OSCILLATOR MAY BE USED. THE 1000-HZ, 600-OHM OUTPUT OF THE OSCILLATOR SHOULD BE ADJUSTED TO READ ( ) ± 0.03 DB ON THE 22A MILLIWATT REFERENCE METER.

Fig. 1—Transmission and Noise Measuring Control Circuit — Voice-Frequency Patching Bays and Packaged N-Carrier Terminals





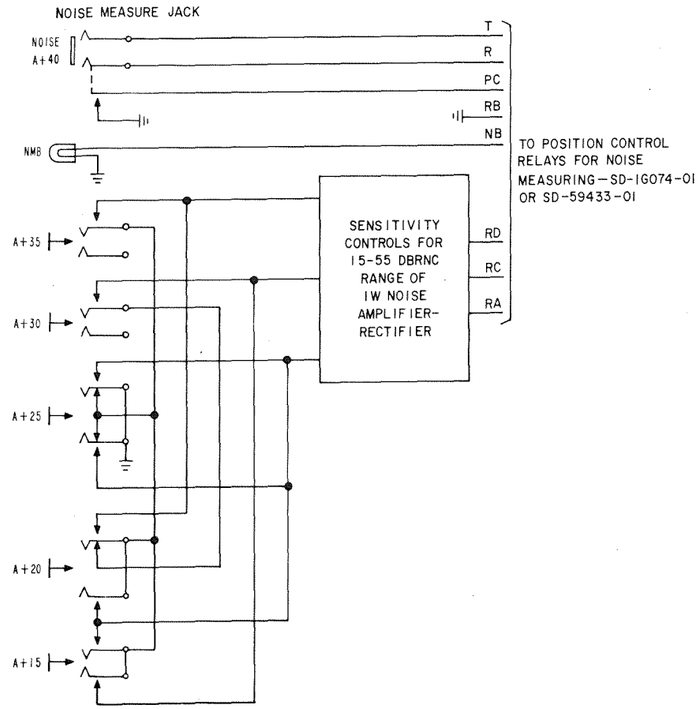


Fig. 2—Transmission and Noise Measuring Control Circuits — Data, Air-Ground, and Voice Testboards Associated with Private Service Systems

5. CALIBRATION OF 1U AMPLIFIER-RECTIFIER FROM REFERENCE TEST POSITION USING REGULAR METER

A. General

5.01 The earlier version of the 1U amplifier-rectifier was calibrated for greatest accuracy at the transmission level(s) most frequently measured at the reference test position. For example, when the reference test position was a centrally located voice-frequency patch bay, the calibration was made at −16 and +7 dBm. When the reference test position was a centrally located testboard position, the calibration was made at 0 dBm.

5.02 The improved version of the 1U amplifier-rectifier is calibrated by adjustments made with the CAL 1, CAL 2, and CAL 3 controls to meet requirements at −16, 0, and +7 dBm. Where the reference position does not require +7 dBm (such as SD-1G073-01), the CAL 3 control is adjusted using a 0 dBm source.

B. Basic Calibration of 1U Amplifier-Rectifier at Locations Having Equipment Similar to SD-59432-01

5.03 When the 1U amplifier-rectifier serves only voice-frequency patch bays, N2 or N3 packaged terminals, or a combination of these, the basic calibration is made at −16 and +7 dBm with the earlier version. The improved version is calibrated at −16, 0, and +7 dBm. The reference test position selected for making the tests should be a centrally located test position in the VF patch bay.

5.04 In the following procedure, lettered steps are applicable only to the improved version (provided with CAL 2 and CAL 3 controls) of the 1U amplifier-rectifier.

STEP	PROCEDURE
1	Check that TMS and meter are idle by observing that TRANS BSY lamp at a VF patch bay or TRMSN BSY lamp at a packaged N-carrier terminal is not lighted.
2	Set adjustable resistor (X), (Y), (MA), or (MC) associated with the meter under test to its midrange position. ***Note:*** It may be found that, in attempting to calibrate other meters in accordance with subsequent procedures, there is insufficient range available in the associated meter resistors. If this should occur, the entire calibration procedure should be repeated. The resistor for the meter under test in Step 2 should be adjusted above or below the midrange position, depending upon whether it was found that the other meter resistors required less or more resistance than was available. Refer to Part 5D for this adjustment.
3	Operate sensitivity switch to B+10 position.
4	Patch 600Ω TST jack to the 1000/-16/600 jack and observe if TRANS BSY or TRMSN BSY lamp lights. Inspect relays in amplifier-rectifier to see if B relay is operated and C and D relays are released. ***Requirement:*** The meter shall read 6 ±0.1 dBm on the B scale. If requirement is not met, adjust CAL resistor on the ***earlier*** version or CAL 1 on the ***improved*** version of the amplifier-rectifier until meter reads exactly 6 dBm on the B scale.
5a	Operate sensitivity switch to B position.
6a	Patch 600Ω TST jack to 1000/0/600 jack and inspect relays in the amplifier-rectifier to see if B, C, and D relays are released.

STEP	PROCEDURE

Note: If a 1000/0/600 jack-ended outlet is not available, the oscillator section of a 21A TMS or a KS-19260 oscillator may be used. The 1000-Hz, 600-ohm output of the oscillator should be adjusted to read 0 $\pm$0.03 dBm on a 22A milliwatt reference meter.

Requirement: The meter shall read 0 $\pm$0.1 dBm on the B scale. If requirement cannot be met, adjust CAL 2 on the amplifier-rectifier until meter reads exactly 0 dBm on the B scale.

7 Operate sensitivity switch to NORMAL A position.

8 Patch 600Ω TST jack to 1000/+7/600 jack and inspect relays in the amplifier-rectifier to see if B and D relays are operated and C relay is released.

Note: If a 1000/+7/600 jack-ended outlet is not available, the oscillator section of a 21A TMS or a KS-19260 oscillator may be used. The 1000-Hz, 600-ohm output of the oscillator should be adjusted to read +7 $\pm$0.03 dBm on a 22A milliwatt reference meter.

Requirement: The meter shall read 7 $\pm$0.1 dBm on the A scale. If the requirement is not met, adjust S resistor on the ***earlier*** version or CAL 3 on the ***improved*** version of the amplifier-rectifier until meter reads exactly 7 dBm on the A scale.

9 Repeat Steps 3, 4, 7, and 8 on the ***earlier*** version or Steps 3 through 8 on the ***improved*** version of the amplifier-rectifier to see that requirements are still met without the need for further adjustment. If requirements cannot be met due to instability or difficulty with the adjustments, a test of the amplifier-gain without feedback can be made to find troubles which might otherwise be masked by the stabilizing action of the feedback circuit. The trouble location test is covered in Section 103-231-101.

Note: Complete recalibration is required after any trouble has been cleared.

10 Repeat Steps 3, 4, 7, and 8 at all other positions which have receiving appearances associated with the same ***earlier*** version of the amplifier-rectifier (or Steps 3 through 8 for the ***improved*** version) and from which the same meter is read.

Note: Do not change adjustment of the amplifier-rectifier or meter.

Requirement: (a) ***Earlier*** version of the 1U amplifier-rectifier—same as specified under Steps 4 and 8. (b) ***Improved*** version—same as specified under Steps 4, 6a, and 8. If requirement is not met at these other positions, look for trouble in wiring and relay contacts in the receiving system associated with the various positions. If no trouble is found or after a trouble is found, corrected, the tests repeated, and the requirements are still not met, record the test position and the deviations from the required meter readings on the B and A scales. If a reading is lower than the required value, record the deviation as a negative value; if higher, record it as a positive value. Retain these readings for later analysis (Part 5D).

STEP	PROCEDURE

Calibration of Meters Read From Other Testing Locations

Note: Whenever a single amplifier-rectifier serves more than one testing location, the calibration of the meters which are normally read from the other locations is done after the initial meter has been calibrated in accordance with Steps 2 through 9 as applicable to the earlier or improved version of the 1U amplifier-rectifier. Use the receiving appearance at a centrally located position in the testing location and the meter that is normally read from that position.

11 Repeat Steps 7 and 8.

Note: Do not change adjustment of the amplifier-rectifier.

Requirement: The meter being calibrated shall read 7 $\pm$0.1 dBm on the A scale. If requirement is not met, adjust the (X), (Y), (MA), or (MC) resistor associated with the meter under test until meter reads exactly 7 dBm on the A scale.

12 Check meter reading at -16 dBm by repeating Steps 3 and 4.

Note: Do not change adjustment of the amplifier-rectifier or meter.

Requirement: The meter shall read 6 $\pm$0.15 dBm on the B scale. If requirement is not met, this meter or the one calibrated in Steps 2 through 9 is defective and should be replaced.

13 Repeat Steps 11 and 12 at all other positions which have receiving appearances associated with the same amplifier-rectifier and from which the same meter is read.

Note: Do not change adjustment of the amplifier-rectifier or meter.

Requirements: Same as in Steps 11 and 12. If requirements are not met, look for trouble in wiring or relay contacts in the receiving system associated with the various positions. If no trouble is found or after a trouble is found, corrected, the tests repeated, and the requirements are still not met, record the test position and the deviations from the required meter readings on the B and A scales. If a reading is lower than the required value, record the deviation as a negative value; if higher, record it as a positive value. Retain these readings for later analysis (Part 5D).

Calibration of Meters Read From Other Than Testing Positions

Note: In some offices, meters are located near equipment bays where adjustments are made even though the measurement may be made at a testing location remote from the equipment bay. Calibration of these meters is done using the receiving appearance at the testing location where the level is measured and the meter which is normally read from the location where the adjustment of this level is made. These are auxiliary meters.

14 Repeat Steps 7 and 8.

Note: Do not change adjustment of the amplifier-rectifier.

STEP	PROCEDURE
	Requirement: The meter being calibrated shall read 7 $\pm$0.1 dBm on the A scale. If requirement is not met, adjust the (X), (Y), (MA), or (MC) resistor associated with the meter under test until meter reads exactly 7 dBm on the A scale.
15	Check meter reading at -16 dBm by repeating Steps 3 and 4.
	Note: Do not change adjustment of the amplifier-rectifier or meter.
	Requirement: The meter shall read 6 $\pm$0.15 dBm on the B scale. If requirement is not met, this meter or the one calibrated in Steps 2 through 9 is defective and should be replaced.

C. Basic Calibration of 1U Amplifier-Rectifier at Locations Having Equipment Similar to SD-1G073-01

5.05 When the 1U amplifier-rectifier is shared by a combination of measuring locations such as testboards, VF patch bays, or packaged N-carrier terminals, the basic calibration should be made using 0 dBm for the earlier version of the amplifier-rectifier and −16 and 0 dBm for the improved version. The reference test position selected for making the tests should be a centrally located testboard position.

5.06 In the following procedure, lettered steps are applicable only to the improved version (provided with CAL 2 and CAL 3 controls) of the amplifier-rectifier.

STEP	PROCEDURE
1	Check that TMS and meter are idle by observing that TMB lamp is not lighted.
2	Set adjustable resistor (X) or (Y) associated with the meter under test to its midrange position. ***Note:*** It may be found that, in attempting to calibrate other meters in accordance with subsequent procedures, there is insufficient range available in the associated meter resistors. If this should occur, the entire calibration procedure should be repeated. The resistor for the meter under test in Step 2 should be adjusted above or below the midrange position depending upon whether it was found that the other meter resistors required less or more resistance than was available. Refer to Part 5D for this adjustment.
3a	Depress B+10 sensitivity key.
4a	Patch REC B jack to 1000/-16/600 jack and verify that TMB lamp lights. Inspect relays in the amplifier-rectifier to see if the B relay is operated and the C and D relays are released. ***Note:*** If a 1000/-16/600 jack-ended outlet is not available, the oscillator section of a 21A TMS or a KS-19260 oscillator may be used. The 1000-Hz, 600-ohm output of the oscillator should be adjusted to read −16 ±0.03 dBm on a 22A milliwatt reference meter. ***Requirement:*** The meter shall read 6 ±0.1 dBm on the B scale. If requirement is not met, adjust CAL 1 on the amplifier-rectifier until meter reads exactly 6 dBm on the B scale.
5	Depress B sensitivity key.
6	Patch REC B jack to 1000/0/600 jack and inspect relays in the amplifier-rectifier to see if the B, C, and D relays are released. ***Requirement:*** The meter shall read 0 ±0.1 dBm on the B scale. If requirement is not met, adjust CAL resistor on the ***earlier*** version or CAL 2 on the ***improved*** version until meter reads exactly 0 dBm on the B scale.
7	Depress A sensitivity key and inspect relays in the amplifier-rectifier to see that the B and D relays are operated and the C relay is released.

STEP	PROCEDURE

Requirement: The meter shall read 0 ±0.1 dBm on the A scale. If requirement is not met, adjust S resistor on the ***earlier*** version or CAL 3 on the ***improved*** version of the amplifier-rectifier until meter reads exactly 0 dBm on the A scale.

8 Repeat Steps 3a through 7 (as applicable) to see that requirements are still met without the need for further adjustment. If requirements cannot be met due to instability or difficulty with the adjustments, a test of the amplifier-gain without feedback can be made to find troubles which might otherwise be masked by the stabilizing action of the feedback circuit. The trouble location test is covered in Section 103-231-101.

Note: Complete recalibration is required after any trouble has been cleared.

9 Depress and release GRD key, if provided.

Requirement: With GRD key depressed, the meter reading shall not change more than 0.1 dB from the reading obtained with GRD key released. If requirement is not met, check for unbalance in the sending, calibration, and input portion of the TMS.

10 Repeat Steps 5 through 9 at all other positions which have receiving appearances associated with the same amplifier-rectifier and from which the same meter is read.

Note: Do not change adjustment of the amplifier-rectifier or meter.

Requirement: Same as specified in Steps 6, 7, and 9. If requirement is not met at these other positions, look for trouble in wiring or relay contacts in the receiving portion of the system associated with the various positions. If no trouble is found or after a trouble is found, corrected, the tests repeated, and the requirements are still not met, record the test position and the deviations from the required meter readings on the B and A scales. If a reading is lower than the required value, record the deviation as a negative value; if higher, record it as a positive value. Retain these readings for later analysis (Part 5D).

Calibration of Meters Read From Other Testing Locations

Note: Whenever a single amplifier-rectifier serves more than one testing location, the calibration of the meters which are normally read from those other locations is done after the initial meter has been calibrated in accordance with Steps 2 through 8. Use the receiving appearance at a centrally located position in the testing location and the meter that is normally read from that position.

11 Repeat Steps 5 and 6.

Note: Do not change adjustment of the amplifier-rectifier.

Requirement: The meter being calibrated shall read 0 ±0.1 dBm on the B scale. If requirement is not met, adjust the (X) or (Y) resistor associated with the meter under test until meter reads exactly 0 dBm on the B scale.

12 Repeat Steps 5 and 6 at all other positions which have receiving appearances associated with the same amplifier-rectifier and from which the same meter is read.

STEP	PROCEDURE

Note: Do not change adjustment of the amplifier-rectifier or meter.

Requirement: The meter shall read 0 $\pm$0.1 dBm on the B scale. If requirement is not met, look for trouble in wiring or relay contacts in the receiving system associated with the various positions. If no trouble is found or after a trouble is found, corrected, the tests repeated, and the requirements are still not met, record the test position and the deviations from the required meter readings on the B and A scales. If a reading is lower than the required value, record the deviation as a negative value; if higher, record it as a positive value. Retain these readings for later analysis (Part 5D).

Calibration of Meters Read From Other Than Testing Positions

Note: In some offices, meters are located near equipment bays where adjustments are made even though the measurement may be made at a testing location remote from the equipment bay. Calibration of these meters is done using the receiving appearance at the testing location where the level is measured and the meter which is normally read from the location where the adjustment of this level is made.

13 Repeat Steps 5 and 6.

Note: Do not change adjustment of the amplifier-rectifier.

Requirement: The meter being calibrated shall read 0 $\pm$0.1 dBm on the B scale. If requirement is not met, adjust the (X) or (Y) resistor associated with the meter under test until meter reads exactly 0 dBm on the B scale.

D. Analysis of Recorded Readings and Changes in Calibration

5.07 Parts 5B and 5C covered calibration of the TMS and checks for transmission accuracy at all meter locations served by the 1U amplifier-rectifier. The adjustments of the 1U amplifier-rectifier resistors and the meter circuit potentiometers were made from selected reference positions and from meters normally read at the testing appearances. If the requirements were met, the calibration of the TMS is complete, and the reference test position and meter should be used for future calibrations. However, if the requirements could not be met, a readjustment of the 1U amplifier-rectifier and the various meter circuit potentiometers will be required.

5.08 The analysis of the readings failing to meet requirements is based primarily on the B scale recorded readings. The CAL adjustment on the early version of the 1U amplifier-rectifier and the CAL 1 and CAL 2 adjustments on the improved version, together with the MC or MA potentiometer adjustments, affect both the B and A scale readings; however, the MC or MA potentiometer adjustments control the B scale readings much more than the A scale readings. The S resistor or CAL 3 adjustment shifts only the A scale readings. Consequently, the A scale reading can only be shifted to meet the best average accuracy at all testing appearances or, if preferred, at a particular lineup where the greatest accuracy is required of measurements on the A scale.

5.09 The procedures for analysis and the changes in calibration are as follows:

STEP	PROCEDURE
1	From the results of the B scale deviations recorded in Parts 5B or 5C, note the test position and meter that showed the largest deviation. ***Note:*** If the results being analyzed indicate both positive and negative deviation which do not meet requirements, trouble is indicated which must be cleared before proceeding further.
2	At the test position and the meter having the largest negative deviation, perform the tests in Part 5B (Steps 1 through 6a) or Part 5C (Steps 1 through 6). Do not change the MC or MA potentiometer setting.
3	Return to the reference test position and meter selected for the tests in Parts 5B or 5C and repeat the tests called for in Step 2 above. However, in this case, readjust the MC potentiometer to give a reading of exactly −16 (or 0) on the B scale and do not readjust any of the controls on the 1U amplifier-rectifier panel.
4	At the reference test position, repeat the procedures given in all of Part 5B or 5C. If the requirements still cannot be met, trouble is indicated and must be cleared. If the B scale requirements were met during the initial calibration or upon recalibration, but some of the A scale readings did not meet requirements, the A scale deviations can be analyzed to determine whether or not the A scale adjustment can be shifted within the tolerance requirement ($\pm$0.1 dB) to improve further the A scale accuracy of the TMS. However, before doing this, check to make sure that the recorded readings from a particular meter are not due to a defect in the meter itself. If the B scale requirements were not met after recalibration, assuming trouble conditions were corrected, the B scale recorded deviations should be analyzed to determine whether

STEP	PROCEDURE
	or not excessive lead lengths between the testing locations or meters and the transmission and noise measuring bay are contributing to the failure to meet requirements. If such is the case, the recorded B scale deviations and the analysis should be used to refer the condition through supervisory channels for appropriate action.

6. MISCELLANEOUS TESTS OF ANALOG TRANSMISSION MEASURING SYSTEM

A. Sensitivity Range and Meter Scale Matching

6.01 The sensitivity range and meter scale matching test checks the ability of the 1U amplifier-rectifier and meter to track accurately at various 1000-Hz levels in the sensitivity ranges of the system most frequently used. The test should be made on each 1U amplifier-rectifier and on each regular and auxiliary meter. For each combination of 1U amplifier-rectifier and meter, it is only necessary to make the test from one test position.

6.02 An oscillator such as the KS-19260, KS-19353, or the oscillator section of a 21A TMS, or equivalent and a 22A milliwatt reference meter are required for this test.

STEP	PROCEDURE
1	Patch the 22A milliwatt reference meter to the oscillator output, set for 1000 Hz. If the test position is equipped with a suitable oscillator (see Fig. 2), patch the 22A meter to the OSC jack.
2	Calibrate 22A milliwatt reference meter and set FUNCTION switch to 600.
3	Set REFERENCE LEVEL DBM switch of 22A meter to 0.
4	Adjust 1000-Hz oscillator output until the light beam scale of the 22A meter reads between red lines.
5	Remove patch from OSC jack and 22A meter. Patch from 600Ω TST jack (see Fig. 1) or REC B jack (see Fig. 2) to OSC jack.
6	Operate sensitivity switch (see Fig. 1) or depress sensitivity key (see Fig. 2) of the transmission measuring system, when necessary, to the appropriate sensitivity.
7	Record meter reading and sensitivity switch or key designation of transmission measuring system.
8	Repeat Steps 1 through 7 at the following oscillator output levels: (a) −5 (b) −10 (c) −13 (d) −16 (e) +4 (f) +7
9	Repeat Steps 1 through 8 as follows: (a) On each 1U amplifier-rectifier.

STEP	PROCEDURE

(b) On each regular and auxiliary meter.

Requirement at 0 dBm—The meter shall read 0 $\pm$0.10 dBm on the B and A scales.

Requirement at Other Levels—The meter reading and the sensitivity switch or key designation in Step 7 shall match, within $\pm$0.15 dB, the setting of the REFERENCE LEVEL DBM switch on the 22A meter.

Note: If requirement is not met, trouble is indicated.

(a) If trouble is confined to a single meter, the meter should be repaired or replaced.

(b) If trouble is common to all meters associated with a particular 1U amplifier-rectifier, the amplifier-rectifier is at fault and should be repaired and recalibrated. Trouble may be caused by faulty electron tubes, the varistor, defective electrolytic capacitors, or incorrect plate, screen, or heater voltages. (See Section 103-231-101.)

B. Frequency Characteristics

6.03 The frequency characteristic test checks the ability of the 1U amplifier-rectifier and meter to track accurately at various frequencies. The test should be made from each receiving appearance of the transmission measuring system. However, it is only necessary to make the test using the regular meter which is normally read from the position at which the test is made. A single test on the B or A scale range, whichever is the normal range for the position when the sensitivity switch or keys are not operated, is adequate.

6.04 A 21A TMS, or equivalent, which has recently been checked for accuracy over the frequency range, should be used for this test. The 22A milliwatt reference meter is not adequate for the lower frequencies which will be used.

STEP	PROCEDURE
1	Patch 600Ω TST jack or REC B jack of transmission measuring system to OSC OUT 600Ω jack of the 21A.
2	Adjust oscillator for 1000 Hz and adjust its output until the meter of the transmission measuring system reads exactly zero.
3	Patch oscillator section of the 21A set to detector, read the meter to the nearest 0.1 dB, and note reading.
4	Repeat Steps 1 through 3 at the following frequencies: (a) 200 (b) 300 (c) 500 (d) 800 (e) 1500 (f) 2000 (g) 2500 (h) 3000 (i) 3500 (j) 4000
5	Compute difference between each of the readings obtained in Step 4 at various frequencies and the reference reading obtained in Step 3 at 1000 Hz. ***Requirement:*** (a) At 200 and 300 Hz—The difference shall not exceed 0.5 dB.

STEP	PROCEDURE
	(b) At (c) through (j) frequencies in Step 4—The difference shall not exceed 0.2 dB.
6	Repeat Steps 1 through 5 at each testing appearance served by each 1U amplifier-rectifier.

C. Routine Calibration Check of 1U Amplifier-Rectifier at Locations Having Equipment Similar to SD-59432-01

6.05 Routine checks of the 1U amplifier-rectifier are made using −16 and +7 dBm. The tests should be made from the reference test position used for the basic calibration of the system.

STEP	PROCEDURE
1	Check that the TMS and meter are idle by observing that the TRANS BSY lamp at a VF patch bay or the TRMSN BSY lamp at an N carrier terminal is not lighted.
2	Operate sensitivity switch to B+10 position.
3	Patch 600Ω TST jack to the 1000/-16/600 jack and verify that TRANS BSY or TRMSN BSY lamp lights. ***Note:*** Do not change adjustment of the amplifier-rectifier or meter. ***Requirement:*** The meter shall read 6 ±0.1 dBm on the B scale.
4	Operate sensitivity switch to NORMAL A position.
5	Patch 600Ω TST jack to the 1000/+7/600 jack. ***Note:*** Do not change adjustment of the amplifier-rectifier. ***Requirement:*** The meter shall read 7 ±0.1 dBm on the A scale.
6	If the requirements of Steps 3 and 5 are not met, a complete recalibration is required. Refer to Part 5B, Steps 1 through 15.

D. Routine Calibration Check of 1U Amplifier-Rectifier at Locations Having Equipment Similar to SD-1G073-01

6.06 Routine checks of the 1U amplifier-rectifier are made using 0 dBm. The tests should be made from the reference test position used for the basic calibration of the system.

STEP	PROCEDURE
1	Check that TMS and meter are idle by observing that the TMB lamp is not lighted.
2	Depress B sensitivity key.
3	Patch REC B jack to the 1000/0/600 jack and verify that TMB lamp lights. ***Note:*** Do not change adjustment of the amplifier-rectifier or meter. ***Requirement:*** The meter shall read 0 $\pm$0.1 dBm on the B scale.
4	Depress A sensitivity key. ***Requirement:*** The meter shall read 0 $\pm$0.1 dBm on the B scale.
5	If the requirements of Steps 3 and 4 are not met, a complete recalibration is required. Refer to Part 5C, Steps 1 through 13.

7. CALIBRATION OF 1W NOISE AMPLIFIER-RECTIFIER

A. General

7.01 The noise measuring circuits covered by SD-59433-01, SD-1G074-01, or SD-95900-01 are equipped with a calibrating arrangement located in the same bay with the 1W noise amplifier-rectifier. This consists of an appearance from the milliwatt supply, calibration pads, a meter, various keys, and relays. Busy lamps indicate whether the system is being used at any of the testing locations. In some cases, a jack may be available for measuring the output from the milliwatt supply. In other cases, this jack is not available, and it is necessary to unsolder the leads from the calibration circuit in order to check the level. When this is done, the operation should be carried out expeditiously so that the milliwatt supply circuit is left unterminated for as short a time as possible.

7.02 Before starting the tests and adjustments on the 1W noise amplifier-rectifier, the milliwatt supply to the calibrating circuit should be checked and adjusted, if necessary, to meet the requirements given in Section 103-335-500 and associated sections. If no jack is available, the leads should be left unterminated for as short a time as possible. In most applications, the milliwatt supply is 600 ohms, but in a few of the earlier SD-95900-01 installations, it is 900 ohms. If the milliwatt supply is not equipped with a jack for checking its output and a 2A sending panel (MFR DISC) is involved, it will be necessary to operate the CAL NOISE key to start the machine if it is not already running.

7.03 The calibration includes the basic calibration of the 1W noise amplifier-rectifier and routine calibration checks at the noise calibration panel. These calibrations are made with the input of the 1W noise amplifier-rectifier terminated in 600 ohms. The basic calibration is made when C-message weighting features are added, when components are replaced, or when repairs are made. The basic calibration also checks the ability of the amplifier-rectifier to track accurately at two 1000-Hz levels (−35 and −45 dBm) equivalent to 55 and 45 dBrnc at 1000 Hz. Two potentiometers are provided in the 1W noise amplifier-rectifier for this calibration which is checked at the 15- and 5-dB markings on the A scale of the meter. A frequency weighting test is also made to check the amplitude-frequency characteristics of the amplifier-rectifier when it is initially modified for C-message weighting and after components are replaced or repairs are made.

7.04 After the basic calibration and initial frequency weighting tests have been completed, subsequent calibrations of the 1W noise amplifier-rectifier can be made at the noise calibration panel without further adjustments at the C-MSG panel. A noise sensitivity range and meter linearity test is made at various 1000-Hz levels to check the tracking of the 1W noise amplifier-rectifier when its gain sensitivity is varied by the operation of the sensitivity switch or noise sensitivity keys at the testing positions.

7.05 Keys A5 and A10 (controlling pads of 10- and 5-dB loss, respectively) are used in the tests at the noise calibration panel to shift the test power level at the input to the 1W noise amplifier-rectifier from −35 to −45 or −40 dBm.

> ***Note:*** Issue 8D of SD-59433-01, Issue 4D of SD-1G073-01, and Issue 16 of SD-95900-01 reversed the designations of the A5 and A10 keys so that the key designations and meter readings coincide. If this change has not already been made, the keys should be redesignated to agree with the latest drawing.

7.06 The tests and adjustments are based on an accurate test power level (0 dBm) at the CAL MW jack or input of the noise calibration panel as discussed in 7.02. Lettered steps are used to identify the inputs used for noise calibration as follows:

(a) At the voice-frequency patch bay (includes packaged N-carrier terminals)

(b) At the voice-circuit testboard.

B. Basic Calibration of 1W Noise Amplifier-Rectifier

7.07 The basic calibration of the 1W noise amplifier-rectifier arranged for C-message weighting is as follows:

STEP	PROCEDURE
1	Check that noise measuring system is idle by observing that NMB, NOISE BSY, or BSY lamp at the noise calibration panel is dark.
2	At the noise calibration panel, operate CAL NOISE key and verify that NMB, NOISE BSY, or BSY lamp lights.
3	At C-message panel, depress C-MSG OUT key to take the C-message circuit out of the measuring system. ***Requirement:*** The noise calibration meter shall read 15 $\pm$0.15 dBm on the A scale. If requirement is not met, adjust SENS ADJ potentiometer (and SCALE ADJ potentiometer, if necessary) on the 1W noise amplifier-rectifier panel until the meter reads exactly 15 dBm on the A scale.
4	Release C-MSG OUT key. ***Requirement:*** The noise calibration meter shall read 15 $\pm$0.15 dBm on the A scale. If requirement is not met, adjust gain of the amplifier on C-message panel until the meter reads exactly 15 dBm on the A scale.
5	At noise calibration panel, depress A5 key to reduce input to $-$45 dBm (45 dBrnc). ***Requirement:*** The noise calibration meter shall read 5 $\pm$0.5 dBm on the A scale. If requirement is not met, adjust SCALE ADJ potentiometer on 1W noise amplifier-rectifier panel until the meter reads exactly 5 dBm on the A scale.
6	Release A5 key to restore input to $-$35 dBm (55 dBrnc). ***Requirement:*** The noise calibration meter shall read 15 $\pm$0.15 dBm on the A scale. If requirement is not met, adjust SENS ADJ potentiometer until meter reads exactly 15 dBm on the A scale.
7	Repeat Steps 5 and 6 until both requirements are met without adjustment of either potentiometer. If the range of either potentiometer is insufficient, the 1W amplifier-rectifier should be investigated for trouble. ***Note:*** The meter circuit potentiometers, adjusted during transmission calibration, should never be changed during noise calibration.
8	Release CAL NOISE key.

C. Frequency Weighting

7.08 After the basic calibration of the 1W noise amplifier-rectifier (7.07), or when components are replaced or repairs are made, the frequency weighting test should be made. This test checks the amplitude-frequency characteristic of the 1W noise amplifier-rectifier for C-message weighting.

7.09 The frequency weighting test requires a variable frequency oscillator with output control and the same nominal impedance (600 ohms) as the noise measuring system appearance which is used. The oscillator of a 21A TMS can be used for this test.

STEP	PROCEDURE
1	Check that noise measuring system and meter are idle by observing that NOISE BSY lamp at a VF patch bay or NMB lamp at a voice-circuit testboard is not lighted.
2a	Perform the following at the voice-frequency patch bay: (a) Set oscillator frequency for 1000 Hz with an output of −45 dBm. (b) Operate sensitivity switch to NOISE A+30. (c) Patch from 600Ω TST jack to OSC jack and verify that NOISE BSY lamp lights.
2b	Perform the following at the voice-circuit testboard: (a) Set oscillator frequency for 1000 Hz with an output of −45 dBm. (b) If NOISE A+40 jack is available, depress A+30 key. (c) Patch from NOISE A+30 or NOISE A+40 jack to OSC jack and verify that NMB lamp lights.
3	Adjust oscillator output controls until regular meter reads 10 on the A scale. Record the oscillator output setting for use in Step 4 as a reference point for measurements.
4	Set oscillator frequency to 200 Hz. Adjust oscillator output until input level to the 1W amplifier-rectifier results in a reading of 10 on the A scale of the meter. Record output setting of the oscillator.
5	Repeat Step 4 for each of the other frequencies listed in Table A. ***Requirements:*** The difference between the oscillator output setting at each frequency and the setting in Step 3 at 1000 Hz should be as indicated in the column headed NORMAL in Table A. If requirements are not met, perform Step 6.
6	Repeat Steps 4 and 5 with C-MSG OUT key at the C-message panel held operated. ***Requirements:*** The difference between the oscillator output setting at each frequency and the setting in Step 3 at 1000 Hz should be as indicated in the column headed OPERATED in Table A.

STEP	PROCEDURE
	If requirements in the OPERATED column are not met, the components in the 1W amplifier-rectifier panel should be investigated for trouble. It is important to check the electron tubes and electrolytic capacitors. If requirements in the OPERATED column are met and those in the NORMAL column are not met, the components in the C-message panel should be investigated for trouble.
7	Release C-MSG OUT key.
8a	At the voice-frequency patch bay: (a) Operate sensitivity switch to NORMAL A position (b) Remove patch established in Step 2a(c).
8b	At the voice-circuit testboard: (a) If NOISE A+40 jack was used, release A+30 sensitivity key. (b) Remove patch established in Step 2b(c).
9	Repeat Steps 1 through 7 on each 1W noise amplifier-rectifier.

TABLE A

OSCILLATOR FREQUENCY (Hz)	C-MSG OUT KEY	
	NORMAL	OPERATED
200	25.4 ± 4.0	22.3 ± 4.0
300	16.7 ± 2.5	14.1 ± 2.5
400	11.6 ± 2.0	9.6 ± 2.0
500	8.0 ± 1.8	6.5 ± 1.8
600	5.5 ± 1.5	4.3 ± 1.5
800	1.8 ± 1.1	1.3 ± 1.1
1000	(Reference)	(Reference)
1500	1.3 ± 1.9	2.6 ± 1.9
2000	1.6 ± 1.6	4.5 ± 1.6
2500	2.0 ± 2.0	5.9 ± 2.0
3000	4.4 ± 2.7	8.0 ± 2.7
4000	14.9 ± 3.4	12.6 ± 3.4
5000	31.7 ± 3.5	19.3 ± 3.5

D. Routine Calibration of 1W Noise Amplifier-Rectifier at the Noise Calibration Panel

7.10 Routine calibration of the 1W noise amplifier-rectifier is made at the noise calibration panel as follows:

STEP	PROCEDURE
1	Check that noise measuring system and meter are idle by observing that NMB, NOISE BSY, or BSY lamp is not lighted.
2	At noise calibration panel, operate CAL NOISE key and verify that NMB, NOISE BSY, or BSY lamp lights.
3	Depress A5 key to reduce input to −45 dBm (45 dBrnc). ***Note:*** Do not change adjustment of the 1W noise amplifier-rectifier or meter. ***Requirement:*** The noise calibration meter shall read 5 ±0.15 dBm on the A scale.
4	Release the A5 key to restore input to −35 dBm (55 dBrnc). ***Requirement:*** The noise calibration meter shall read 15 ±0.15 dBm on the A scale. If requirements are met, release CAL NOISE key. If requirements of Steps 3 and 4 are not met, a complete recalibration is required. Refer to Part 7B, Steps 1 though 8.

E. Noise Sensitivity Range and Meter Linearity Check at the Testing Position

7.11 The basic calibration test covered in Part B varied the input levels to the 1W noise amplifier-rectifier from 45 to 55 dBrnc while the noise sensitivity relays A, C, and D were released. This test checks the tracking of the 1W noise amplifier-rectifier when its gain sensitivity is changed by operation of the sensitivity relays. These relays are controlled by the operation of the noise sensitivity switches or keys at the testing positions.

7.12 This test should be made after the basic calibration test covered in Part B has been completed. The test is made on each 1W noise amplifier-rectifier and is repeated for each regular meter which can be connected to its output. For each combination of 1W noise amplifier-rectifier and regular meter, it is only necessary to make the test from one testing location.

7.13 An oscillator such as the KS-19260, KS-19353, or the oscillator section of a 21A TMS and a 5A attenuator are required for this test. The 19C oscillator is not suitable as an output range of approximately +10 to −30 dBm is required.

STEP	PROCEDURE
1	Perform the following at the testing location: (a) Set 5A attenuator to 35 dB and patch attenuator input to oscillator output. (b) Set oscillator for 1000 Hz.
2a	At the voice-frequency patch bay: (a) Check that NMS is idle by observing that NOISE BSY lamp is not lighted. (b) Patch 600Ω TST jack to 5A attenuator output and verify that NOISE BSY lamp lights. (c) Operate sensitivity switch to NOISE A+40.
2b	At the voice-circuit testboard having NOISE/A+40 jack: (a) Check that NMS is idle by observing that NMB lamp is not lighted. (b) Patch 5A attenuator output to NOISE/A+40 jack and verify that NMB lamp lights.
2c	At the voice-circuit testboard having NOISE/A+30 jack: (a) Check that NMS is idle by observing that NMB lamp is not lighted. (b) Patch 5A attenuator output to NOISE/A+30 jack and verify that NMB lamp lights.
3a	At the voice-frequency patch bay: (a) Adjust oscillator output controls until regular meter reads 15 on the A scale and note the oscillator setting for use in Step 4a as reference. (b) Reduce oscillator output by 5 dB.

STEP	PROCEDURE

Requirement: The meter shall read 10 $\pm$0.2 dBm on the A scale.

3b At the voice-circuit testboard having NOISE/A+40 jack:

(a) Adjust oscillator output controls until regular meter reads 15 on the A scale and note the oscillator output setting for use in Step 4b as reference.

(b) Reduce oscillator output by 5 dB.

Requirement: The meter shall read 10 $\pm$0.2 dBm on the A scale.

3c At the voice-circuit testboard having NOISE/A+30 jack:

(a) Adjust oscillator output controls until regular meter reads 15 on the A scale and note oscillator output setting for use in Step 4c as reference.

(b) Reduce oscillator output by 5 dB.

Requirement: The meter shall read 10 $\pm$0.2 dBm on the A scale.

4a To check noise sensitivity range at the voice-frequency patch bay:

(a) Reduce oscillator output in 5-dB steps from that noted in Step 3a as referenced. The requirements and relay conditions, with a particular sensitivity switch setting, should be as indicated in Table B.

(b) Change sensitivity switch setting, after each reduction in (a), as indicated in Table B.

(c) Operate sensitivity switch to NORMAL A position.

(d) Remove patches established in Steps 1(a) and 2a(b).

4b To check noise sensitivity range at the voice-circuit testboard with NOISE/A+40 jack:

(a) Reduce oscillator output in 5-dB steps from that noted in Step 3b as referenced. The requirements and relay conditions, with a particular sensitivity key depressed, should be as indicated in Table C.

(b) Momentarily depress noise sensitivity keys, after each reduction in (a), as indicated in Table C.

(c) Remove patches established in Steps 1(a) and 2b(b).

4c To check noise sensitivity range at the voice-circuit testboard with NOISE/A+30 jack:

(a) Reduce oscillator output in 5-dB steps from that noted in Step 3c as referenced. The requirements and relay conditions, with a particular sensitivity key depressed, should be as indicated in Table D.

STEP	PROCEDURE
	(b) Momentarily depress noise sensitivity keys, after each reduction in (a), as indicated in Table D.
	(c) Remove patches established in Steps 1(a) and 2c(b).
5	Repeat Steps 1 through 4 on each 1W noise amplifier-rectifier. If requirements are not met in Steps 4a, 4b, or 4c, the 1W noise amplifier-rectifier is at fault and should be repaired and recalibrated. Among the troubles which may cause this failure are faulty electron tubes, defective electrolytic capacitors, or improper relay operation.

TABLE B

OSC SETTING BELOW OUTPUT USED IN 3a	EQUIV IN dBrnc	SENS SWITCH SETTING	REQUIREMENT ON A SCALE IN dB	RELAYS IN J64001W PANEL	
				OPERATED	RELEASED
(Reference)	50	A + 40	10 ± 0.2	None	A, C, & D
5	45	A + 35	10 ± 0.2	D	A & C
10	40	A + 30	10 ± 0.2	C	A & D
15	35	A + 25	10 ± 0.2	A	C & D
20	30	A + 20	10 ± 0.3	A & D	C
25	25	A + 15	10 ± 0.3	A & C	D

TABLE C

OSC SETTING BELOW OUTPUT USED IN 3b	EQUIV IN dBrnc	SENS KEY – DEPRESSED	REQUIREMENT ON A SCALE IN dB	RELAYS IN J64001W PANEL	
				OPERATED	RELEASED
(Reference)	50	None	10 ± 0.2	None	A, C, & D
5	45	A + 35	10 ± 0.2	D	A & C
10	40	A + 30	10 ± 0.2	C	A & D
15	35	A + 25	10 ± 0.2	A	C & D
20	30	A + 20	10 ± 0.3	A & D	C
25	25	A + 15	10 ± 0.3	A & C	D

TABLE D

OSC SETTING BELOW OUTPUT USED IN 3c	EQUIV IN dBrnc	SENS KEY – DEPRESSED	REQUIREMENT ON A SCALE IN dB	RELAYS IN J64001W PANEL	
				OPERATED	RELEASED
(Reference)	40	None	10 ± 0.2	C	A & D
5	35	A + 25	10 ± 0.2	A	C & D
10	30	A + 20	10 ± 0.3	A & D	C
15	25	A + 15	10 ± 0.3	A & C	D

8. CALIBRATION OF KS-20805 DIGITAL TRANSMISSION AND NOISE MEASURING SYSTEM

8.01 The KS-20805 Digital Transmission and Noise Measuring System is used in place of the 1U and 1W amplifier-rectifiers for transmission and noise measurements, respectively. In some cases, the KS-20805 may be used by itself as the measuring system; generally, the KS-20805 is used as a measuring system interfacing through SD-95900-01, and if required, through SD-3C203-01. The calibration interval should be no greater than every 12 months. Because the KS-20805 may be produced by several different manufacturers, the manufacturers technical manual is recommended for calibration procedures for level, noise, and frequency.