HIGH SEAS AND OVERSEAS RADIO
LINCOMPEX MARK II
TESTS
TRANSMIT UNIT

This section contains test and alignment procedures for the Lincompex Mark II transmit unit. It is assumed that personnel have a general knowledge of the Lincompex system before performing these charts. A general description of the Lincompex transmit and receive units is covered in Section 403-310-101 and Section 403-310-102.

This maintenance section is divided into two categories. The first covers the step-by-step check of the overall alignment in which the signal levels of the control path and the speech path are tested for proper magnitude. The second group of charts tests the individual modules and submodules.

Module location positions 1 through 8 mentioned in this section are referenced from left to right facing the front of the unit.

CHART **PAGE**

CHART 1

STEP-BY-STEP CHECK OF OVERALL ALIGNMENT

APPARATUS:

1—Electronic Frequency Counter with an input impedance high compared with 600 ohms to measure frequencies between 2800 and 3000 Hz to an accuracy of 0.1 Hz

1—Transmission Measuring Set

CHART 1 (Cont)

APPARATUS (Cont):

1—Source of 1000-Hz tone with a 600-ohm attenuator to vary the output level over a range of +5 to −60 dBm

1—DC Millivoltmeter capable of measuring between 10 mV and 1.0 volt

Note: The signal level diagrams (Fig. 1 and 2) will be useful in performing these tests.

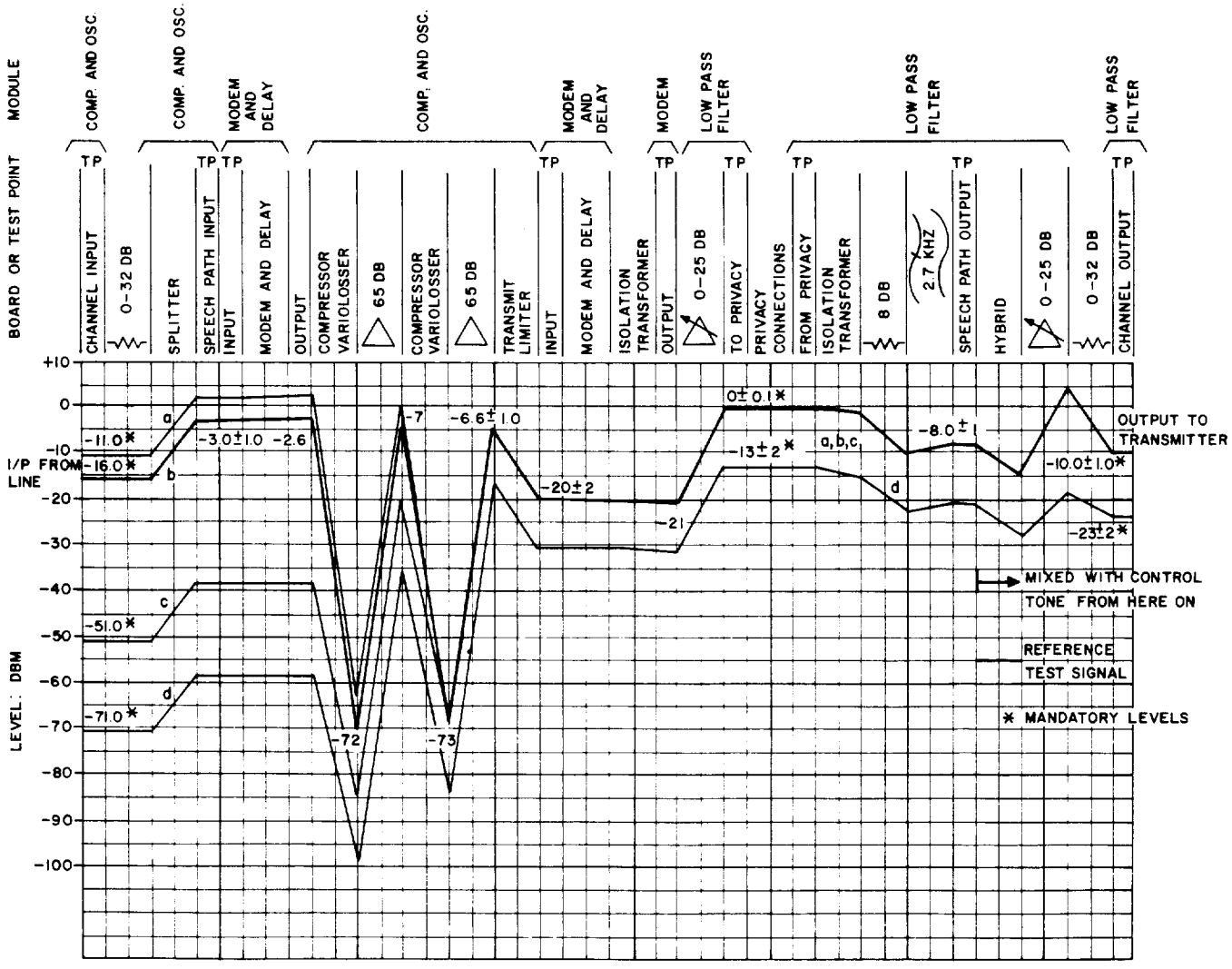


Fig. 1—Speech Path Level Diagram

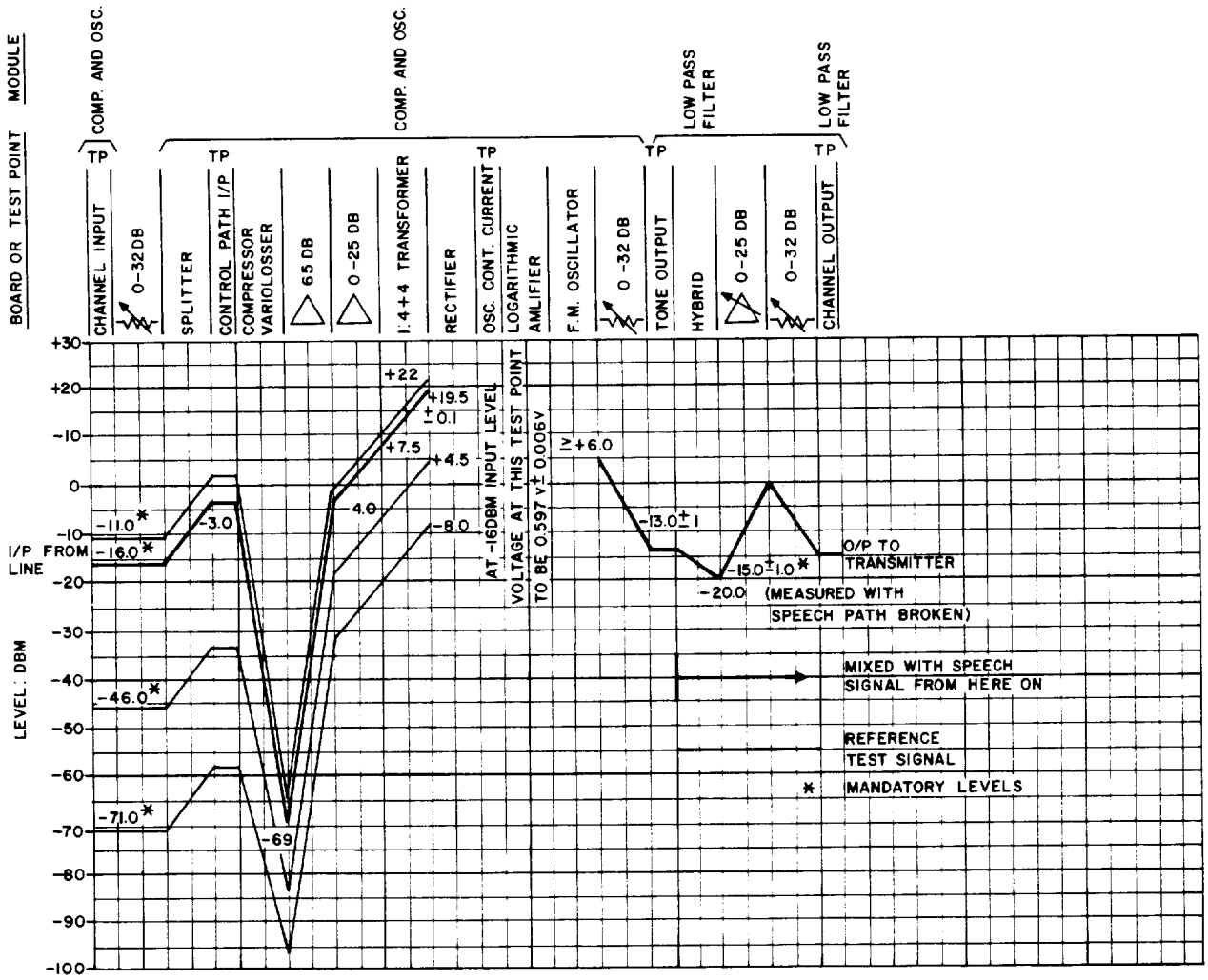


Fig. 2—Control Path Level Diagram

CHART 1 (Cont)	
STEP	**PROCEDURE**
	Control Path Check
1	Ensure that the privacy equipment, if used, is switched out by applying 24 Vdc to TSB10(+) and TSB9(−) from an external source or by strapping TSB7 to TSB10 and TSB8 to TSB9 or by operating privacy cutoff switch. If privacy equipment is not used, strap TSB1 to TSB4 and TSB2 to TSB5.
2	Remove the CHAN I/P and CON PATH I/P bridging plugs.
3	Apply a 1000-Hz tone, −16 dBm to the jack pair ***not*** marked LINE of the CHAN I/P. ***Note:*** If a reference test level other than −16 dBm has been used in the system and attenuator AT1 has been strapped to provide −16 dBm after attenuation, then the alternative reference test level must be applied.
4	Measure the tone level across the unbalanced pair of the CON PATH I/P jacks. ***Requirement:*** −3 dBm ±1 dB (terminated).
5	Restore the CON PATH I/P plug.
6	Plug a test cord into the CONTROL CURRENTS monitoring jacks for COMP 1, 2, and 3 and check the voltage at each point using a millivoltmeter. ***Requirement:*** 597 mV ±30 mV.
7	Plug a test cord into the CONTROL CURRENTS OSC jack and check the voltage. ***Requirement:*** 597 mV ±6 mV.
8	If the requirements of Steps 6 and 7 are not met, extend the compressor and oscillator module on a test frame and set the gain potentiometer RV1 of PCB9 until the correct value for Step 7 is obtained.
9	Remove the TONE O/P bridging plug on the low-pass filter module and measure the tone oscillator output level at the BAL jacks. ***Requirement:*** −13 dBm ±1 dB (unterminated) for a control tone output level −5 dB relative to the speech level. ***Note:*** For control tone levels other than −5 dB relative to the speech signal level, strap AT1 in the compressor and oscillator module to give the required variation on the −13 dBm level measured at this point.
10	Replace the bridging plug.

CHART 1 (Cont)

STEP	PROCEDURE
11	Remove the SP'CH PATH O/P bridging plug on the low-pass filter module. Measure the control tone level at the output by removing the CHAN O/P bridging plug and monitoring across the pair ***not*** marked LINE. ***Requirement:*** −15 dBm ±1 dB (terminated) for a speech-level output of −10 dBm and a tone to speech-level relationship of −5 dB. ***Note:*** Higher or lower speech reference test levels in the range +10 dBm to −30 dBm are obtained by adjusting the channel output attenuator AT2 on the rear panel of the unit or the gain control RV1 of the 25-dB amplifier PCB2 in the low-pass filter module.
12	Vary the level of the input tone at the CHAN I/P jacks in 10-dB steps from −16 dBm to −66 dBm. ***Requirement:*** The output level of the control tone as measured in Step 11 does not vary by more than ±0.5 dB.
13	Using the frequency counter, measure the frequency of the control tone at the CHAN O/P jack with the reference test level signal input at the CHAN I/P jack. ***Requirement:*** 2850 Hz ±1 Hz.
14	If the requirement in Step 13 is not met, vary the input level over the range +5 to −55 dBm0 and record the frequency at each 5-dB step. Compare the results with the figures tabulated in Table A. The logarithmic amplifier and FM oscillator must be readjusted to correct the frequency error. Refer to Chart 2.

TABLE A

INPUT LEVEL (dBm0)	TRANSMIT UNIT 1000 Hz OUTPUT (dBm)	CONTROL TONE FREQUENCY (Hz)
+5	−10 ±1 dB	2840 ±1 Hz
0	−10 ±1 dB	2850 ±0.2 Hz
−5	−10 ±1 dB	2860 ±1 Hz
−10	−10 ±1 dB	2870 ±1 Hz
−15	−10 ±1 dB	2880 ±1 Hz
−20	−10 ±1 dB	2890 ±1 Hz
−25	−10 ±1 dB	2900 ±1 Hz
−30	−10 ±1 dB	2910 ±1 Hz
−35	−10 ±1 dB	2920 ±1 Hz
−40	−10 +1 −2.5 dB	2930 ±1 Hz
−43	−11.5 ±2.5 dB	2936 ±1 Hz
−45	−13 ±2 dB	2940 ±1 Hz
−50	−18 ±2 dB	2950 ±1 Hz
−55	−23 ±2 dB	2960 ±1 Hz
No input	—	2980 ±10 Hz

CHART 1 (Cont)	
STEP	**PROCEDURE**
15	Replace the SP'CH PATH O/P bridging plug.
	Speech Path Check
16	Apply a tone as detailed in Step 3 Control Path Check.
17	Remove the SP'CH PATH I/P bridging plug and measure the tone level across the unbalanced pair of jacks.
	Requirement: -3 dBm ± 1 dB (terminated).
18	Replace the SP'CH PATH I/P bridging plug and remove the O/P bridging plug on the modem in position 2 of the unit. Measure the tone level across the unbalanced pair of jacks.
	Requirement: -3 dBm ± 1 dB (terminated).
19	If the requirement of Step 18 is not met, adjust the modem. A limited range gain control is provided in the modem module, accessible for adjustment through a hole in the inner case of the module.
20	Replace the O/P bridging plug.
21	Remove the I/P bridging plug on the modem module in postion 7 and measure the tone level across the top pair of jacks (unbalanced).
	Requirement: -20 dBm ± 2 dB (terminated).
22	Replace the I/P plug.
23	Remove the O/P bridging plug on the modem module in position 7 and measure the tone level across the top (balanced) pair of jacks.
	Requirement: -20 dBm ± 2 dB (terminated).
24	Replace the O/P bridging plug.
25	Remove the TO PRIV bridging plug on the low-pass filter module and measure the tone level across the top pair of jacks.
	Requirement: 0 dBm ± 1 dB (terminated).
26	If the requirement in Step 25 is not met, use the test frame to extend the module out of the case. Adjust the gain control of 25-dB amplifier PCB1 to give the correct level.
27	Replace the TO PRIV plug.

CHART 1 (Cont)

STEP	PROCEDURE
28	Remove the FROM PRIV bridging plug on the low-pass filter module and measure the tone level across the top pair of jacks. ***Requirement:*** 0 dBm ±1 dB (terminated).
29	Replace the FROM PRIV plug.
30	Remove the SP'CH PATH O/P bridging plug on the low-pass filter module and measure the tone level across the top pair of jacks. ***Requirement:*** −8 dBm ±1 dB (unterminated).
31	Replace the plug.
32	Remove the TONE O/P bridging plug from the low-pass filter module.
33	Remove the CHAN O/P bridging plug and measure the level across the top pair of jacks. ***Requirement:*** −10 dBm ±1 dB (terminated).
34	If the requirement of Step 33 is not met, use the test frame to extend the module out of the case. Adjust the gain control of the 25-dB amplifier PCB2 to give the correct level. ***Note:*** If a reference test output level in the range of −30 dBm to +10 dBm is required for the system, suitable adjustment should be made to gain control RV1 of the 25-dB amplifier PCB2 in the low-pass filter module, or the channel output attenuator AT2 on the rear panel of the unit.
35	Replace all plugs removed during the tests.

CHART 2

COMPRESSOR AND OSCILLATOR MODULE

APPARATUS:

Apparatus listed in Chart 1

1—24-Way Socket, McMurdo Red Range RS24

1*—Power Supply, 25 volts at 0.5 A

1*—Power Supply, 12 volts at 0.5 A

* Lincompex power supply module recommended

CHART 2 (Cont)	
STEP	**PROCEDURE**
	Preparation
1	Remove the module from the transmit case and perform tests on the bench.
2	Connect a 600-ohm resistor between PLA-23 and -24.
3	Connect a 600-ohm resistor between PLA-21 and -22.
4	Strap: PLA-16 to PLA-19 PLA-17 to PLA-18 PLA-8 to PLA-10 PLA-9 to PLA-11
5	Set attenuator AT1 to 20 dB.
6	If the unit serial number is between 001 and 100, remove resistor R5 from across oscillator transformer T2 and replace it with a decade resistance box set at 27 kΩ.
7	Connect an audio signal generator through a 600-ohm balanced attenuator to PLA-5 and -6.
8	Connect an audio level meter of high input impedance across PLA-24 and PLA-23 (ground) to measure the signal output level.
9	Connect a frequency meter between PLA-21 and -22 to measure the control frequency.
10	Connect 12 volts between PLA-3(−) and PLA-2(+).
11	Connect 24 volts between PLA-1(+) and PLA-2(−).
12	Set the voltage of the two power supplies in Steps 10 and 11 to their nominal voltages within 0.05 volt using a voltmeter of proper tolerances.
	Amplitude Assessor Alignment **A. Rectifier Bias Current**
13	Remove the CON PATH I/P bridging link on the front panel.
14	Connect a temporary short between pins 5, 6, and 7 of transformer T1.
15	Connect the digital voltmeter into the CONTROL CURRENTS OSC jack on the front panel.
16	Turn on the power supplies.
17	Adjust RV1 on the rectifier board PCB8 to give a voltage of 10.2 ±0.2 mV on the voltmeter.

CHART 2 (Cont)

STEP	PROCEDURE
	Requirement: The COMP 1, 2, and 3 voltages are between 9.0 and 11.4 mV.
18	Remove the temporary short from T1 and replace the CON PATH I/P link.
	B. Rectifier Drive Level
19	With an input signal level of −16 dBm at 1000 Hz across PLA-5 and -6, monitor the CONTROL CURRENTS OSC jack with the digital voltmeter.
20	Adjust RV1 on the 25-dB amplifier board PCB9 to give an indication of 0.597 ±0.006 volt.
	Requirement: The COMP 1, 2, and 3 voltages are between 0.567 and 0.627 volt.
	Compressor Clamping Level **A. Reference Level**
21	With an input signal of −16 dBm at 1000 Hz across PLA-5 and -6, measure and record the output level across PLA-23 and -24. (It should be between −18 and −22 dBm.)
	B. Clamping Point
22	Apply an input signal of −71 dBm, 1000 Hz.
23	Connect the digital voltmeter between the positive side of the COMP 1 control current jack and the positive side of the COMP 2 control current jack.
24	Adjust RV2 on compressor 1 (PCB1) and RV2 on compressor 2 (PCB3) in equal increments to produce an output level 12 dB below that noted in Step 21. At the same time, the voltage measured on the digital voltmeter must be kept to a minimum (by balancing the two preset controls) and must be less than ±0.05 volt when the adjustment is completed.
	FM Oscillator and Logarithmic Amplifier Alignment
25	Apply an input of −16 dBm at 1000 Hz across PLA-5 and -6.
26	Connect the digital voltmeter across resistor R2 on the logarithmic amplifier board PCB7.
27	Adjust RV1 on board PCB7 to produce a voltage of 6.30 volts ±0.01 volt.
28	With the input signal as in Step 25, connect the digital voltmeter between pins 6(+) and 7(−) on oscillator board PCB6. Set the input level to produce an indication of 1.80 ±0.01 volts.
29	Adjust the core of the Vinkor oscillator transformer T2 to produce an oscillator frequency of 2900 Hz ±0.2 Hz as measured across PLA-21 and -22 with the digital frequency meter.
	Note: Ensure that the rubber plug is replaced in the core after the adjustment.

CHART 2 (Cont)

STEP	PROCEDURE
30	With an input signal of −16 dBm at 1000 Hz, adjust RV1 on the oscillator for a frequency of 2850 ±0.2 Hz.
31	Set the input signal level to −71 dBm at 1000 Hz. On units with serial numbers 001 through 100, adjust the decade resistance box to produce an output frequency of 2960 ±0.2 Hz. On units with serial numbers 101 and above, adjust RV2 on the oscillator to produce the same frequency.
32	Repeat Steps 30 and 31 until both frequencies are correct. On units with serial numbers 001 through 100, select the nearest standard 1-percent resistor to the final setting of the resistance box and solder the resistor in position R5 across T2.
33	Check that the oscillator output level at pins 1 and 2 of AT1 is greater than +6.0 dBm.
34	Adjust the attenuation of AT1 until the level at PLA-21 and -22 is −13.0 dBm ±1.0 dB.
	Input Level vs Oscillator Frequency
35	Check that the oscillator frequency for various signal input levels is in accordance with Table B.

TABLE B

INPUT LEVEL (dBm)	OSC. FREQUENCY (Hz)
−11	2840 ±1
−16	2850 ±0.2
−21	2860 ±1
−26	2870 ±1
−31	2880 ±1
−36	2890 ±1
−41	2900 ±1
−46	2910 ±1
−51	2920 ±1
−56	2930 ±1
−61	2940 ±1
−66	2950 ±1
−71	2960 ±1

36	Remove all loads and short-circuit connections.

CHART 3

MODEM MODULE

APPARATUS:

1—Audio Oscillator with an output impedance of 600 ohms to give a signal level of up to +5 dBm over a frequency range of 250 Hz to 10 kHz

1—Regulated Power Supply to provide a +12 volt and a −12 volt dc output at approximately 60 mA each

1—Oscilloscope to monitor a 6-volt peak-to-peak square wave to 80-kHz repetition frequency

1—High-Impedance Audio Level Meter to measure up to 0 dBm

1—600-ohm Resistor

1—24-way Socket, McMurdo Red Range RS24

1—Harmonic Distortion Meter

STEP	PROCEDURE
	Preparation
1	Fit the 24-way socket to the 24-way plug on the rear of the module.
2	Connect the 600-ohm resistor and the audio level meter across PLA-19 and PLA-18 (ground)).
3	Apply 12 volts to PLA-3(−) and PLA-2(+) and a second 12-volts supply to PLA-4(+) and PLA-2(−).
4	Strap PLA-10 to PLA-11.
	Gain Setting
5	With a 1000-Hz signal applied across PLA-16 and PLA-17 at a level of 0 dBm, monitor the level across PLA-19 and PLA-18. Set the gain potentiometer RV3 to give an output of 0 dBm. Check that the output signal is removed when the INPUT bridging plug on the front panel of the module is withdrawn.
6	Strap: PLA-19 to PLA-20 PLA-18 to PLA-21
7	With the input signal applied as in Step 5, monitor the output across PLA-23 and -24. This should be similar to the signal across PLA-19 and -18. Check that the output signal is removed when the OUTPUT bridging plug on the front panel is withdrawn.

CHART 3 (Cont)	
STEP	**PROCEDURE**
8	**Distortion** With the input signal applied as in Steps 5 and 7, check that the overall harmonic distortion at the output is less than 1 percent.

CHART 4

DELAY MODULE

APPARATUS:

Test Equipment Listed in Chart 3

1—Modem Module

1—24-way Socket, McMurdo Red Range RS24

1—Double-Beam Oscilloscope

1—Audio Oscillator, 600-ohm output impedance, to supply a low frequency (approximately 15 Hz) at a maximum level of 0 dBm

STEP	PROCEDURE
1	**Preparation** Between the delay and modem units, connect: Modem PLA-2 to Delay PLA-2 PLA-4 to PLA-4 PLA-10 to PLA-10 PLA-11 to PLA-23 PLA-12 to PLA-12 PLA-24 to PLA-24
2	On the modem module, connect: PLA-18 to PLA-21 PLA-19 to PLA-20

CHART 4 (Cont)

STEP	PROCEDURE
3	On the modem module, connect a 600-ohm resistor between PLA-23 and PLA-24.
4	On the modem module, connect a signal generator between PLA-16 and PLA-17.
5	On the modem module, connect 12 volts to PLA-3(−) and PLA-2(+), and a second 12-volt supply to PLA-4(+) and PLA-2(−).
6	Insert the delay module bridging plug into the IN position.
	Gain and Frequency Response
7	Apply a 0 dBM input signal at 1000 Hz across PLA-16 and -17.
8	Measure the output level across PLA-23 and -24 and set the modem gain control to produce an output level of 0 dBm.
9	Vary the frequency of the signal generator from 250 Hz to 3000 Hz and note the frequency at which maximum output occurs.
	Note: Keep the input level constant at all frequencies.
	Requirement: Between 250 and 350 Hz, the output does not fall more than 1 dB below the maximum level. Between 350 and 3000 Hz, the output does not fall more than 0.5 dB below the maximum level. At 10 kHz, the output does not fall less than 20 dB.
	Linearity
10	At an input frequency of 1000 Hz, measure the output level with the input levels of +5, −10, −30, and −40 dBm.
	Requirement: The overall gain at each input level must be 0 $\pm$0.5 dB.
	Distortion
11	Apply input levels of +4 and −40 dBm at 300, 1000, and 3000 Hz.
	Requirement: The distortion is no greater than 1.5 percent.
	Noise Level
12	Connect a 600-ohm resistor across PLA-16 and -17.
	Requirement: The noise output across PLA-23 and -24 is less than −70 dBm.
	Delay Measurement
13	With the modem and delay units connected, connect a double beam oscilloscope so that one trace displays the input and the other the output of the modem.

CHART 4 (Cont)

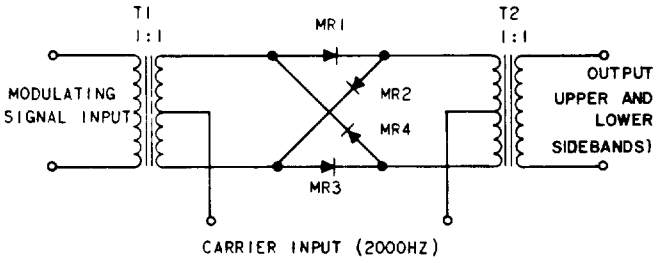
STEP	PROCEDURE
14	Feed into the input of the modem, by means of a double balanced bridge ring modulator (Fig. 3), a 2000-Hz signal at 0 dBm modulated by a signal of as low frequency as possible (approximately 15 Hz).  **Fig. 3—Bridge Ring Modulator** ***Note:*** The oscilloscope should be used with external SYNC fed from the modulating frequency. The peaks of the 2000-Hz signal are 0.5 millisecond apart. ***Requirement:*** The time difference between the input and output waveforms should be 3.6 milliseconds with the U-link in the DELAY IN position, and zero when the U-link is in the DELAY OUT position.

CHART 5

LOW-PASS FILTER MODULE

APPARATUS:

1—Audio Oscillator with an output impedance of 600 ohms capable of providing output levels up to +5 dBm of frequencies between 50 Hz and 10 kHz

1—Distortion Meter

1—Audio Level Measuring Set to measure signal levels from −60 dBm to +10 dBm

2—600-ohm, 1/2-watt Resistors

1—24-way Socket, McMurdo Red Range RS24

1—24-Volt DC Regulated Power Supply capable of providing up to 100 mA with a ripple level of less than 1 mV

CHART 5 (Cont)

STEP	PROCEDURE
	Preparation
1	Fit the 24-way socket to the 24-way plug on the rear of the module.
2	Strap: PLA-7 to PLA-10 PLA-8 to PLA-11 PLA-18 to PLA-20 PLA-19 to PLA-21
3	Connect a 600-ohm resistor between PLA-23 and -24.
4	Connect a 600-ohm resistor between PLA-15 and -16.
5	Apply 24 volts to PLA-1(+) and PLA-2(−).
	Frequency Response
6	Apply an input signal of 1000 Hz at −15 dBm across PLA-5 and PLA-6 (ground).
7	Adjust RV1 on PCB1 to produce a signal level of 0 dBm across PLA-7 and -8.
8	Adjust RV1 on PCB2 to give an output level of +5 dBm across PLA-23 and -24.
9	Maintain a constant signal level into the module. Vary the frequency and check the output level across PLA-23 and PLA-24. ***Requirement:*** The level is +5 dBm within the following limits: 250 to 350 Hz: +0.5 to −1.5 dB 350 to 2300 Hz: +0.5 to −0.5 dB 2300 to 2500 Hz: +0.5 to −1.0 dB 2500 to 2700 Hz: +0.5 to −6.0 dB 2800 Hz and above: Less than −55 dB
10	If the response indicated in Step 9 is obtained, proceed to Step 21. If the response indicated in Step 9 cannot be obtained especially at 2700 Hz and above, either or both of the low-pass filter sections are possibly faulty or out of alignment. Retuning should only be undertaken if there is conclusive evidence that the fault lies in the filters.

CHART 5 (Cont)

STEP	PROCEDURE
	Filter Alignment
11	Remove the filter sections from the module.
12	Remove the rubber discs from the adjustment holes of the four inductors.
13	Connect an audio oscillator to the input of the filter, pins 1 and 2 (ground) on the printed board. Set the oscillator to −10 dBm output.
14	Connect an audio level measuring set to the output of the filter, pins 3 and 4 (ground) on the printed board. Load with 600 ohms.
15	Set the frequency of the audio oscillator to 2813 Hz ±1 Hz.
	Note: Monitor the oscillator with an electronic frequency counter whose accuracy is at least 1 Hz.
16	Adjust inductor L3 to produce minimum output of the filter as indicated on the measuring set.
17	Set the input frequency to 2925 Hz ±1 Hz and adjust inductor L2 for minimum output of the filter.
18	Set the frequency to 3349 Hz ±1 Hz and adjust inductor L4 for minimum output of the filter.
19	Set the frequency to 5271 Hz ±1 Hz and adjust inductor L1 to produce minimum output from the filter.
20	Replace the rubber discs in the four inductors and return the filter section to the module.
	Distortion
21	With an input of 1500 Hz at −15 dBm, check that the total harmonic distortion measured across PLA-23 and -24 is less than 1 percent.

CHART 6

POWER SUPPLY MODULE

APPARATUS:

1—Variable Transformer with a continuously variable output voltage from 100 to 250 volts for an input voltage of 250 volts at 47 to 63 Hz

CHART 6 (Cont)

APPARATUS (Cont):

1—AC Voltmeter to measure voltages between 90 and 260 volts at 50 Hz

1—DC Voltmeter to measure up to 24 volts, accurate to ±5 mV; and 100 mV, accurate to ±0.05 mV

1—Stable 12-volt DC Power Supply for use as a bucking voltage

1—Stable 24-volt DC Supply for use as a bucking voltage

3—50-ohm 15-watt Rheostats

1—1-ampere DC Meter

1—Ohmmeter

1—8-way Socket, McMurdo Red Range RS8

STEP	PROCEDURE
	Preparation
1	Fit the 8-way socket to the plug at the rear of the module.
2	Connect the output terminals of the variable transformer to PLA-6 (HOT) and PLA-7 (NEUTRAL). Set the output to minimum.
3	Connect PLA-8 to office ground (earth).
4	Set the taps on the panel at the rear of the module to 250 volts.
5	Connect the ac voltmeter across the output of the variable transformer to measure the input voltage to the module.
6	Connect the input of the variable transformer to the power line and adjust the input voltage to the module at 250 volts.
	Voltage Checks
7	Check that the lamp on the front panel is lighted.
8	Connect the digital voltmeter between PLA-8(+) and PLA-3(−).
	Requirement: 12 volts ±20 mV.
9	Check the voltage between PLA-8(−) and PLA-2(+).
	Requirement: 12 volts ±20 mV.
10	Check the voltage between PLA-8(−) and PLA-1(+).

CHART 6 (Cont)

STEP	PROCEDURE
	Requirement: 24 volts ±20 mV.
11	If any of the voltages in Steps 8, 9, and 10 are incorrect, it is necessary to adjust the respective potentiometer in the appropriate regulator block. Each regulator block has two potentiometers, one to set the overload trip current and the other to set the output voltage. The voltage setting control is the one mounted on the board ***without*** the finned transistor.
12	Check that the correct voltages appear at the front panel voltage monitoring jacks.
	Regulation
13	Connect the three rheostats set to maximum resistance across PLA-8 and -1, PLA-8 and -2, and PLA-8 and -3.
14	Connect the digital voltmeter and bucking power supply as shown in Fig. 4. This permits the reading of a voltage on the 0.1 volt scale.

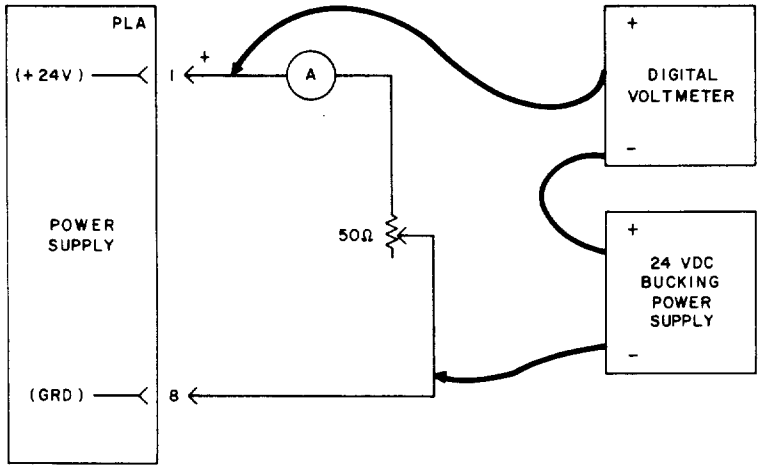


Fig. 4—Power Supply Test Setup

15	Reduce the resistance of each rheostat until the output current in each is 500 mA.
16	Monitor the output of each supply. ***Requirement:*** The change in output voltage from the no-load to 500 mA load condition is no greater than 0.5 mV.
17	With the connections as in Steps 13 through 15, vary the input supply voltage from 225 to 275 volts.

CHART 6 (Cont)	
STEP	**PROCEDURE**
	Requirement: The output voltage does not change by more than $\pm$2.5 mV in any of the three supplies.
18	Adjust the main input voltage in steps corresponding to the voltages marked on the tapping panel, and set the taps in each case to correspond to the voltage. Check that there is no change in the output voltages.
	Alarms
19	Check that a short circuit appears between PLA-4 and -5 if any one of the four fuses on the front panel is removed.
20	With the ohmmeter across PLA-4 and -5, reduce the load resistance across each output in turn until a short circuit appears between PLA-4 and -5.
	Requirement: The load current at which the short circuit appears should be 0.55 A $\pm$0.01 A.
	Note: This is the alarm condition. To reset the circuit after an alarm, increase the load resistance so as not to overload the circuit and temporarily remove the input supply voltage. If the alarm condition does not appear at the correct current, adjust the appropriate potentiometer on the respective regulator block. This is the potentiometer on the board with the finned transistor.