

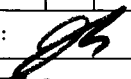
TMC SPECIFICATION

NO. S 10211

REV:

COMPILED: K. BANGIA

CHECKED:



APPD: S. LACROIX

SHEET

1

OF 14

TITLE:

VMC-8 TEST SPECIFICATIONS

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- a. General. The VHF multicoupler, model VMC-8 is a broadband antenna to coupling device which permits the use of common antenna by eight communication receivers.

The following are the overall production test procedures for the unit. Paragraph b. lists the test equipment required. It is advised that only the make and model of the test equipment listed or their exact equivalent should be used. The results of these tests should be recorded on the appropriate test data sheet.

- b. Test Equipment Required

Equipment	Make	Qty. Required
VHF Signal Generator	HP 608C	3
VHF Receiver	ACL SR-201A	1
RMS Voltmeter	HP 3400A	1
VHF Noise Generator	Mega-Node 403A	1
VHF Sweep Generator 50 ohm	Texscan VS-40	1
Oscilloscope	Tektronix 545A	1
VTUM	HP 410B	1
Multimeter	Simpson 260	1
Detector	Texscan CD-50	1

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Equipment	Make	Qty. Required
Rho-tector	TRB-1	1
Variable Attenuator 0 - 50 ohm	Telonic	1
Fixed Attenuator 10 DB	HP model FP-50	1

c. Special Test Equipment

Equipment	Type
Jig for Inter Mod Test	TMC make see figure 7
Jig for Cross Mod Test	TMC make see figure 8

d. Power Supply required

Volts	Tolerance
+ 24 VDC	± 5 %
115 VAC 60 Hz	± 5 %

e. Preliminary Checks

1. Check that the unit is properly wired, switches are properly functioning, fuses are of correct value and ground connections are properly tight.
2. Check the resistance between the pins of AC INPUT connector and +22 V line. These should be as given in table below:

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Multimeter Connected between		Resistance Ohms	Remarks
AC1	GND	INF	
AC2	GND	INF	
AC1	AC2	INF	
AC1	AC2	13	Power Switch ON
+22 V line	GND	8.5 K	No modules connected

f. Power Supply Checks

1. Connect a voltmeter between pin 6 and ground of voltage regulator board.
2. Adjust the potentiometer on the regulator board for a reading of +22 VDC.
3. Apply a short across the +22V line. There should be a voltage drop on the meter.
4. Remove the short, the voltmeter should again read +22 volts.
5. Remove the voltmeter and check that +22 line is supplied to all required points.

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g. Input and Output Impedance Check

1. Connect the test set-up as shown in figure 1A. Observe the output on the scope. There should be no deviation from a straight line.
2. Connect the test set-up as shown in figure 1B. Mark the new reading on the scope which represents 1.5:1 VSWR.
3. Connect the test set-up as shown in figure 1C. The reading on the scope should not exceed the reading marked in 2. above.
4. Connect the RHO-TECTOR through a UHF adapter in turn to all the output jacks of the unit under test.
5. Record the results on the test data sheet.

h. Voltage Gain Check

1. Connect the test equipment as shown in figure 2A.
2. Set the sweep generator attenuation to 0 and adjust the scope to give a readable deflection. Note this deflection.
3. Connect the test set-up as shown in figure 2B. All other outputs of the unit under test are open.
4. Increase the attenuation of the sweep generator until the deflection on the scope is same as noted in 2. above.

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5. Repeat step 3. and 4. above for all the outputs of the unit under test and record the result on the test data sheet.

i. Noise Measurements

1. Connect the test equipment as shown in figure 3.
2. Set SW1 to position 1. Measure the noise figure of the receiver at 136 MHz. It should be between 9 and 10 db. Record this reading in milliamperes as indicated on the noise generator meter and mark this as Fr.
3. Set SW1 to position 2. Mark the reading on the voltmeter.
4. Increase the output of the noise generator until the reading on the voltmeter is 3 db more than noted in 3. above.

Note the reading on the noise generator meter and mark this as Fo (in milliamperes).

5. The noise figure of the unit under test can now be calculated as follows:

$$NF = 10 \log_{10} \left(\frac{FO - Fr - 1}{GM} \right) \text{ db where}$$

FO = noise factor measured with the unit under test and the receiver in cascade

Fr = noise factor of the receiver

GM = multicoupler VMC-8 gain (ratio)

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$$\begin{aligned}\text{Gain in db} &= 10 \log_{10} \frac{P_{\text{out}}}{P_{\text{in}}} \\ &= 10 \log_{10} GM\end{aligned}$$

j. Intermodulation Distortion Check

1. Connect the test equipment as shown in figure 4.
2. Set coaxial switch SW1 to position 1.
3. Tune signal generator No. 1 to 138 MHz and adjust its output level to 250 millivolts open.
4. Tune signal generator No. 2 to 130 MHz and adjust its output level to 250 millivolts open.
5. Tune VHF receiver to 122 MHz (third order intermodulation difference frequency).
6. Adjust variable attenuator to reduce input to the VHF receiver to that level which ensures that there will not be any undesirable cross modulation developed in the receiver.
7. Note this level on the output meter.
8. Set signal generator No. 3 to 122 MHz and adjust its level until the output meter reading corresponds to the reading obtained in 7. above. Note the signal generator output level which is the voltage equivalent of third order intermodulation difference (Eeq).

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9. Intermodulation distortion in db then can be calculated as follows:

$$\text{Intermodulation distortion} = 20 \log_{10} \frac{250,000 \text{ U volts}}{E_{eq} \text{ U volts}}$$

k. Cross Modulation check

1. Connect the test equipment as shown in figure 5.
2. Modulate signal generator No. 1 30% at 400 Hz.
3. Tune signal generator No. 1 output frequency to the desired carrier test frequency and set its output level for a 100 U volts input level in the unit under test.
4. Tune the VHF receiver to the desired carrier test frequency and adjust its audio gain control to give a deflection of 0 db on the output meter.
5. Remove modulation from signal generator No. 1.
6. Modulate signal generator No. 2 30% at 400 Hz.
7. Tune signal generator No. 2 output frequency to 5% above and 5% below the desired carrier frequency.
8. Adjust the output level of the signal generator No. 2 until the output meter reads 0 db. Note the output level of the signal generator No. 2 in terms of the open circuited voltage at the composite output (input level to unit under test).

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1. Coupling Between Output Sockets

1. Connect the test equipment as shown in figure 6.
2. Tune signal generator frequency within the bandpass of the multicoupler.
3. Set coaxial switch SW1 to position 1.
4. Tune receiver to the generator frequency and adjust its output to get a reference on the output meter (7.7 mv). Note the signal generator output level.
5. Set coaxial switch SW1 to position 2.
6. Adjust signal generator output level until the same reference is obtained on the output meter as noted in 3. above
7. The difference between these two levels is the coupling between output sockets and can be interpreted in decibels.

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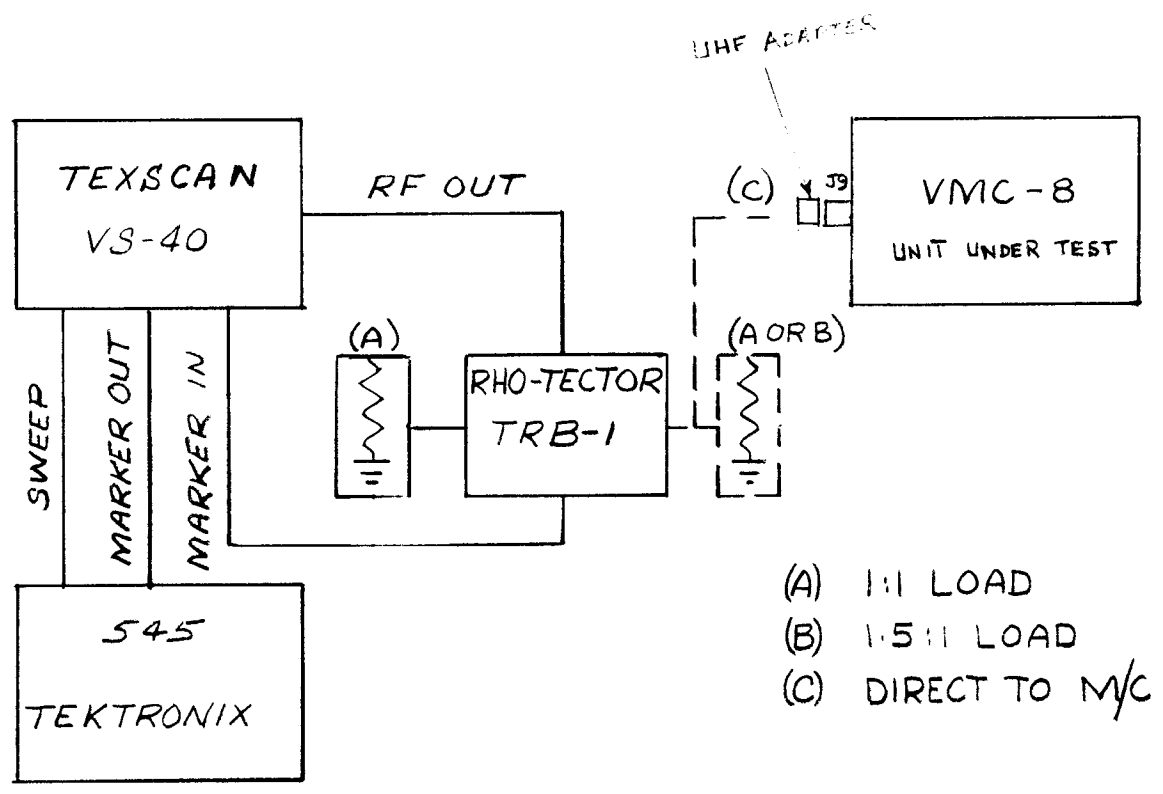


FIGURE 1

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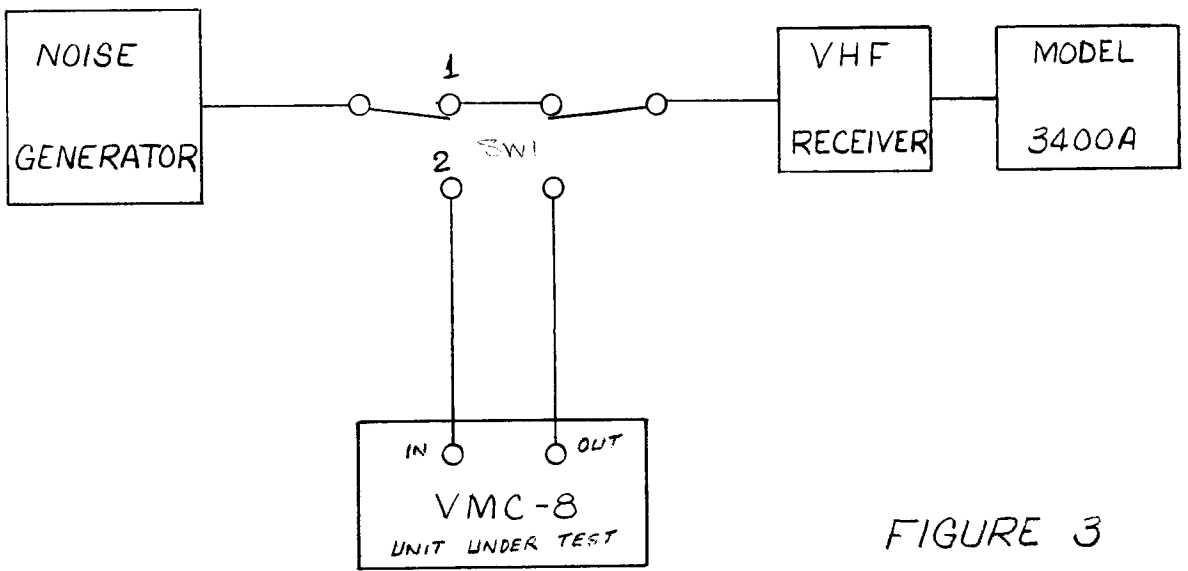


FIGURE 3

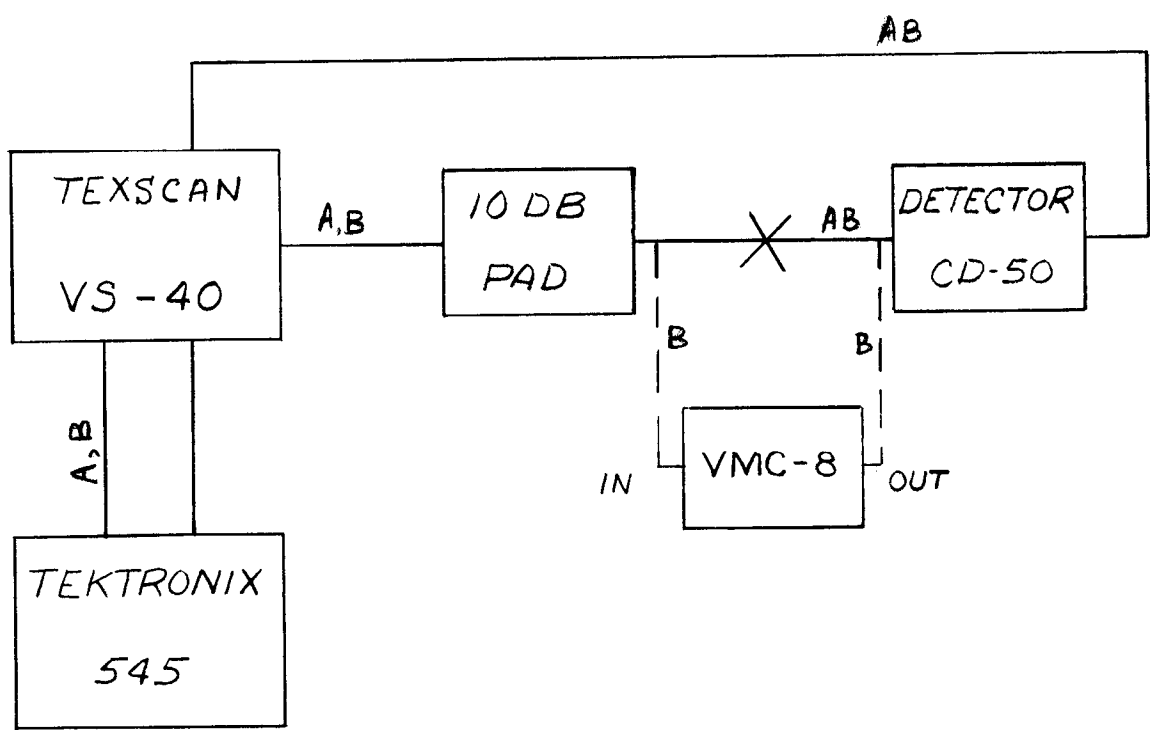


FIGURE 2

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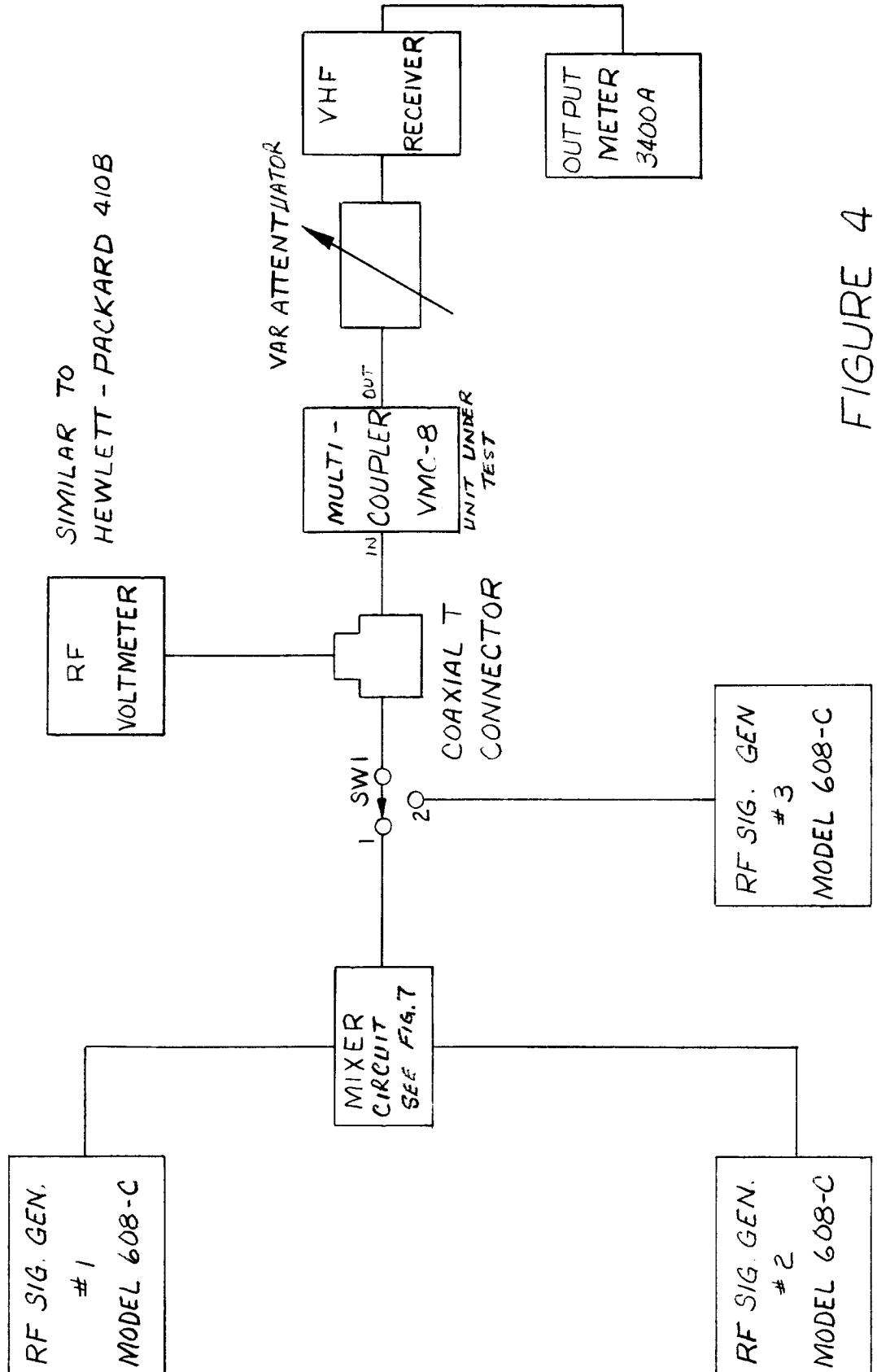


FIGURE 4

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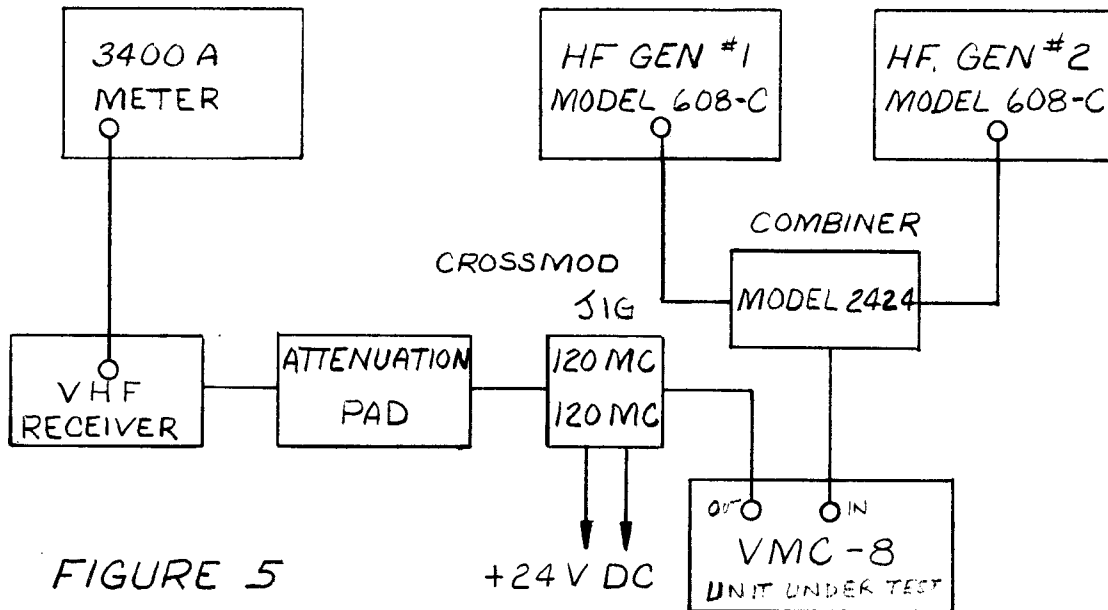


FIGURE 5

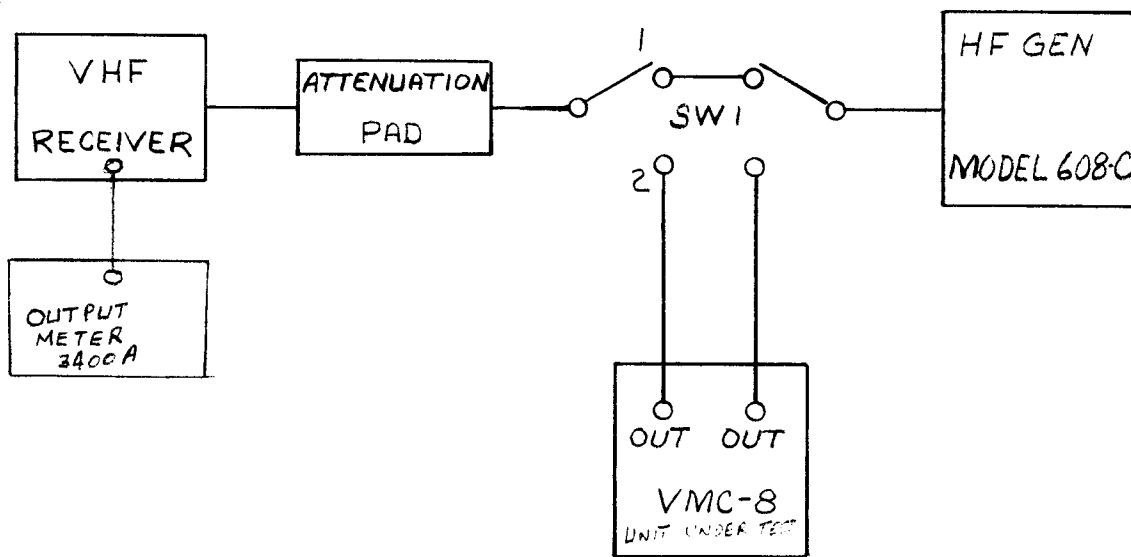


FIGURE 6

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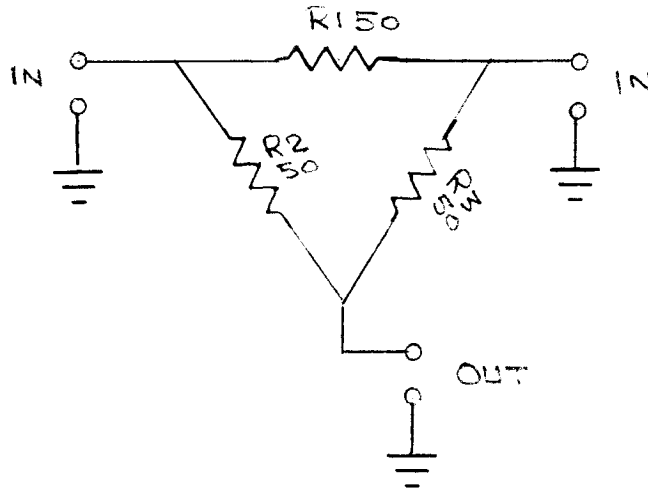


FIGURE 7 INTERMODULATION TEST JIG SCHEMATIC

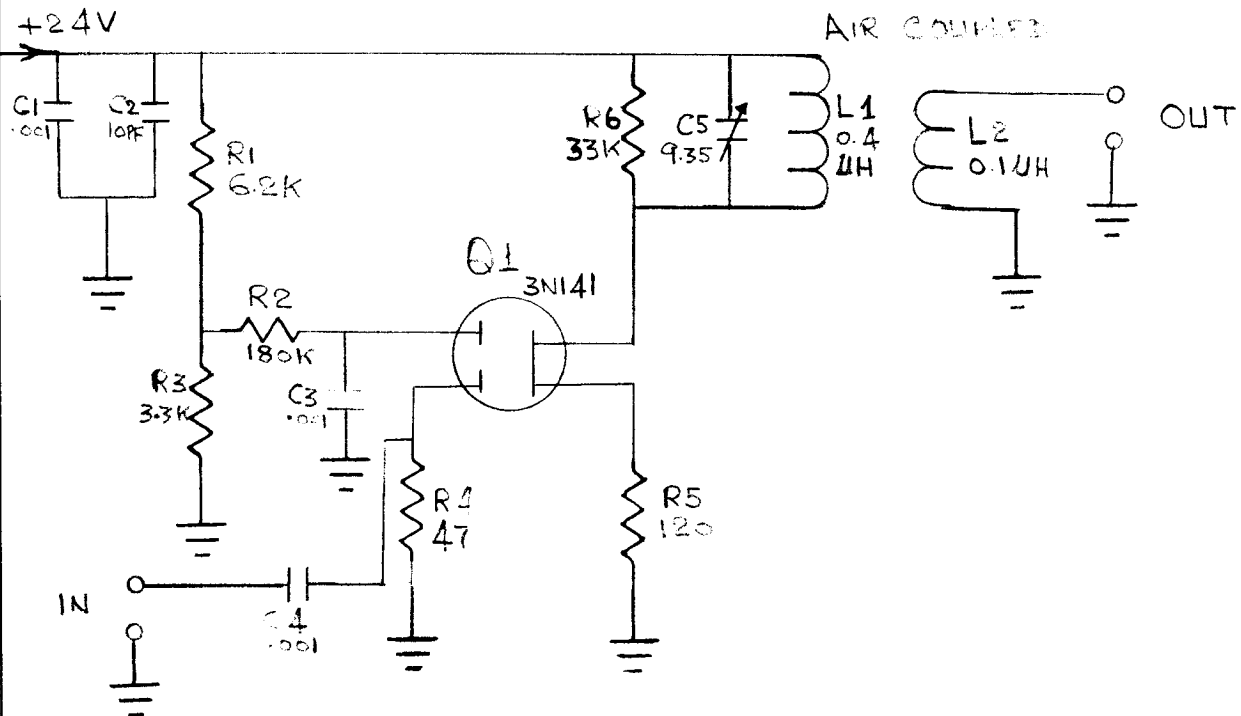


FIGURE 8 CROSS MOD TEST JIG SCHEMATIC