MOSELEY ASSOCIATES, INC.

INSTRUCTION MANUAL

MODEL SCG-8

SUBCARRIER GENERATOR

MOSELEY ASSOCIATES, INC.
Santa Barbara Research Park
111 Castilian Drive
Goleta, California 93017

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(805) 968-9621

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SUBCARRIER GENERATOR

I. INTRODUCTION

The Model SCG-8 Subcarrier Generator is an all solid-state instrument designed specifically to develop a direct FM subcarrier for multiplexing TV, FM, and STL transmitters with an additional sound channel.

The unit complies with current FCC requirements for SCA service and features compact size, excellent stability, sound quality, and simplicity of operation. Both the environment in which the equipment normally functions and the operator using it have been carefully considered. The various operational controls have been recessed (but remain accessible from the front) behind the front panel. A front-panel meter indicates peak deviation. The modulation circuitry includes pre-emphasis which is easily convertible to any desired curve. Automatic muting of the subcarrier in the absence of program material is switch-selectable. The modern design includes nine linear integrated circuits and seven transistors, all silicon. The SCG-8 is pre-wired to accept telemetry signals in radio remote-control applications.

II. SPECIFICATIONS

Frequency Range	26 to 185 kHz (specify)
Frequency Stability	±0.4% of center frequency
Type of Modulation	Direct FM (VCO)
Harmonic Content of Subcarrier	Less than 2%
FM Noise	Better than 65 dB below 100% modulation (6.7 kHz at 67 kHz) back-to-back with +10 dBm audio input
AM Noise (non-synchronous)	Better than 50 dB below carrier
Incidental AM	Less than 1% peak at 100% modulation
Modulation Response	Better than ±1 dB, 50 Hz to 10 kHz, exclusive of audio low-pass filter
Modulation Distortion	Less than 1% at 100% modulation, using a wideband demodulator
Modulation Capability	±15% of subcarrier frequency
Pre-emphasis	75 μs standard; easily changed to other time-constants
Operational Controls	Subcarrier Modulation Subcarrier Frequency Muting Sensitivity Muting Delay Subcarrier Output Level Muting Control Switch

Subcarrier Status	LED Indicators
Metering	Front-panel meter reads deviation of subcarrier; full-wave peak-sensitive; calibrated in dB referenced to 100% modulation
Program Input Impedance	600Ω, balanced (floating)
Program Input Level	-15 dBm minimum, +10 dBm maximum; adjustable
Subcarrier Output Impedance	Less than 300Ω
Subcarrier Output Connection	BNC
Subcarrier Output Level	Adjustable up to 6 volts peak-to-peak
Muting Delay	Adjustable from less than 1 second to greater than 5 seconds
Subcarrier Envelope	Rise and fall times 50 to 90 milliseconds
Telemetry Input	5 volts peak-to-peak for 20% modulation, BNC Connector
Operating Temperature Range	-20°C to +60°C
Power Requirements	120/240 VAC, 50/60 Hz, 10 watts
Semiconductor Complement	10 integrated circuits, 7 transistors, 16 diodes
Size	1-3/4" H (4.5 cm) x 19" W (48.4 cm) x 10" D (25.4 cm)
Weight	8 pounds (3.6 kg)
Domestic Shipping Weight	11 pounds (5 kg)

III. UNPACKING

The SCG-8 should be carefully unpacked and inspected for any shipping damage. Keep all packing material in case a claim is to be made against the carrier for damages. Should the inspection reveal any damage, immediately file a claim with the carrier.

It is recommended that the top plate be removed for a brief internal inspection. Be sure the printed circuit boards are secure, the integrated circuits and transistors are seated in their sockets, and that the fuse-holder on the rear of the equipment is installed. The top plate may be reinstalled.

IV. INSTALLATION

The SCG-8 will generally be located somewhere in the vicinity of the aural exciter or the Studio-Transmitter Link (STL) transmitter. The power cord will be connected to any source of 120 volts AC, 50/60 Hz. Note that the unit may be connected to 240 volts AC if the fuse is changed and the power transformer is rewired for this voltage. This procedure is discussed under "Field Modifications."

Program material (audio) from a telephone line, limiting amplifier, SCD-8 Demodulator, or other source, is applied to the audio input terminals located on the rear apron. The impedance at this point is a nominal 600Ω, and the level should ideally be 0 to +10 dBm, but the Subcarrier Modulation control will accommodate levels of -15 to +10 dBm.

The subcarrier output is connected to the aural or FM exciter or STL subcarrier input. Note that some equipments may identify this input as a multiplex input. Be sure that the chosen input is intended to handle subcarrier and is not the stereo input terminal. The interconnecting line between the SCG-8 and the affiliated equipment should have not more than 3000 pF of capacity if incidental amplitude modulation is to be minimized. Capacitance above this value will merely cause increased incidental AM.

V. OPERATION

When all connections have been made to the SCG-8, it is ready for operation. There is no power switch. The front-panel lamps (LED's) give an indication of the status of the subcarrier (on or off).

Operating the front-panel control switch will cause the LED's to indicate the subcarrier to be on if the switch is at ON, and off if the switch is at OFF. In the center (automatic) position, the subcarrier should be on when audio is applied, and should be off after audio is removed. The SCG-8 front-panel meter will indicate the presence of audio. Temporarily leave the control switch in the ON position.

The first adjustment which should be made is to set the subcarrier output level. If a TV or FM transmitter is used, the output level is merely adjusted for an injection (modulation of the main carrier) of 8 to 10%. This is best accomplished with the station's modulation monitor. If a Moseley Associates, Inc. STL is used, the output level should be set to 1.5 volts peak-to-peak. This should correspond to an injection of 20% onto the STL carrier.

Next, the subcarrier frequency must be set correctly. For FM, use an FCC type-approved SCA monitor. For aural STL and TV applications, use a frequency counter or trustworthy audio oscillator and oscilloscope for comparison. If a frequency counter is bridged across the output of the SCG-8, it can be used under any conditions, in any service. A word of caution on the use of frequency counters in this application; be sure the "gate" time is of the order of 0.1 second minimum or erroneous readings may result when modulation is applied.

With the correct audio input level applied, set the SUBCARRIER MODULATION control for an indicated 0 dB reading on the SCG-8 panel meter. This meter has been factory calibrated to read 0 dB when the subcarrier is deviated ±10% of its center frequency. A table is included at the end of the text for convenience in determining the deviation for a given subcarrier frequency. Note that in FM

service regulated by the FCC, a monitor is required, whereas none is currently required to monitor the subcarrier on the STL or in TV service. Nevertheless, it is good practice to maintain the subcarrier frequency and amplitude as if it were being actually directly broadcast.

Now operate the control switch to the AUTO position. With audio applied, the subcarrier should stay on. Remove the audio. The subcarrier should go off after a pause. The MUTING DELAY control determines this time. Should the audio only be reduced in level, the subcarrier will stay on until a certain level has been reached. The MUTING SENSITIVITY control determines this level. These two controls may be adjusted during actual programming. It is suggested that they be left midway at this time.

After a good cross-section of program material has been observed, the MUTING DELAY control may then be readjusted so that the SCA receivers handle the program as smoothly as possible. When relaying programs which must not have any "pops" or "thumps" introduced by the receiver squelch circuitry, it is suggested that the subcarrier be left on at all times or else the muting time be set at maximum.

Comments regarding restricted frequency response, and simultaneous operation of stereo and a subcarrier are in the "Standards for Subcarrier Service" section of this manual.

VI. RADIO REMOTE CONTROL

The SCG-8 has been designed with provisions for radio (wireless) remote control. Examination will show that there is an extra input connector on the rear panel labeled METERING INPUT and this provides access to the modulation section. This is intended for use with Moseley Associates, Inc. remote control equipment. In TV and FM, metering or logging data is applied to this connector. In this manner, the data is recoverable back at a control point, such as the studio.

In TV applications, the data will usually be in the audible frequency range. The recommended subcarrier frequency is 39 kHz, and the

peak deviation should be between 3 and 4 kHz. The subcarrier is demodulated at the studio by using a suitable Moseley Associates, Inc. demodulator.

In FM applications, the data may be audible as for TV, but more commonly it will be in the subaudible region, as for example from 20 to 30 Hz. The reason for using this low-frequency spectrum is that background music or other programming may simultaneously be applied to the subcarrier. The metering or data signals "ride piggyback" on the other programming, at a level of about 15 dB below that programming. The programming should deviate the FM subcarrier about 4 kHz peak, and the data should deviate the subcarrier about 400 to 700 Hz peak. In addition, should the programming contain a large amount of low-frequency information, it should be applied to the SCG-8 via an 80 Hz high-pass filter. The Moseley Associates, Inc. Model MIU-1 Metering Insertion Unit is designed for this application.

VII. THEORY OF OPERATION

The following discussion makes reference to the schematic diagram 91C6713, sheets 1 and 2. The block diagram for the SCG-8 is laid out in much the same way. The component layout drawing is 20B2438.

Program audio is applied to the audio input terminals on the rear of the generator. It is routed through RF filters (C9, C10) to the input pad. This pad assures a resistive input, and allows (by modification) accommodation of unusual audio input levels. The recommended level at the input is 0 dBm; an external VU meter connected at this point would read about -10 VU on program material.

After the pad is an input transformer (T2) to go from the floating input to unbalanced circuitry. A portion of the audio at the transformer secondary is selected by the SUBCARRIER MODULATION control, R9. Following this control is an RF filter and overload protection circuitry. IC-1 forms a pre-amplifier with a gain of about 20 dB. Its output drives both the muting circuitry and the pre-emphasis circuitry.

Pre-emphasis is accomplished with precision using IC2. The pre-emphasis can be changed or removed easily by altering or removing C13. This procedure is covered in the "Field Modification" section. Remember that pre-emphasis is basically a high-frequency (treble) boost, used primarily to achieve an increase in the signal-to-noise ratio in the demodulated subcarrier.

Following the pre-emphasis stage is a limiter using IC3. This stage has been designed to overload cleanly slightly above normal deviation levels; it is an efficient gross-overload protective device.

The output of IC3 is processed audio, capable of driving the modulated oscillator. At this point is an audio low-pass filter. Standard cut-off frequencies available for these filters are 3, 5, and 10 kHz.

Following the audio low-pass filter is the modulated oscillator. The maximum possible deviation of the oscillator is determined by the value of resistor R39. When IC3 clips, the resultant deviation ceiling is determined largely by R39. The modulated oscillator has both coarse and fine frequency controls. The front-panel FREQUENCY control is the fine adjustment. Additionally, temperature compensation circuitry is included in this area. The frequency of the oscillator is determined by the sum of the DC and the audio components appearing at the junction of the timing resistors R50 and R51 as well as the value of timing capacitors C25 and C26. Transistor Q3 is a buffer to drive the carrier gate, CR12.

CR12 allows the subcarrier to pass when it is forward-biased. This biasing voltage is derived from the output of IC9, and is shaped by the various components in this area including capacitor C29, resistors R74 and R75, and diode CR15.

The output of the gate is amplified by transistor Q4, and is then applied to the carrier filter. The filter removes harmonics of the subcarrier waveform as well as the small residual audio components appearing at this point in the circuit.

Voltage amplifier Q5 and power amplifier Q6 complete the carrier portion of the generator. Q6 drives the OUTPUT LEVEL control, R73.

The output of the preamplifier IC1 is applied to the MUTE SENSITIVITY control R77. A selected level of audio is then applied to a two-stage amplifier using IC7 and IC8. These stages have a deliberately shaped frequency response in order that audio signals outside of midband will not operate the muting system. Low-frequency telemetry tones or high-frequency noises will be largely ignored. The midband audio appearing at the output of IC8 is rectified by the diodes CR16 and CR17, and applied to timing capacitor C46. The capacitor will discharge at a rate determined by the MUTE DELAY control, R87. The voltage on this capacitor is routed as an input to the threshold detector (Schmitt trigger) IC9. The output of IC9 is positive without audio and is negative with audio. This voltage is used to control the subcarrier gate as well as the front-panel status lamps (via transistor Q7).

The output of the audio low-pass filter is applied not only to the modulated oscillator, but also to a metering system. This uses IC4 as an amplifier and IC5 as a phase-inverter. The outputs of these two stages are full-wave rectified by diodes CR9 and CR10, and are used as the input to DC Amplifier IC6. This IC is used to couple the low-impedance meter to the high-impedance rectifier circuit. Of equal importance, it is used to provide adjustable acceleration to the meter in order that it may accurately follow modulation. Note that the presence of a signal to the METERING INPUT connector will appear on the front-panel modulation indicator.

The power supply is very standard providing +22, +10, and -10 volts.

VIII. INTERNAL ADJUSTMENTS

A. Frequency

Should the front-panel FREQUENCY control be near one end of its range, the internal frequency control (R42) may be used to further adjust the subcarrier frequency. Set the front-panel FREQUENCY control to the middle of its range and then use the internal coarse frequency control, R42, to set the generator on frequency.

B. Metering

Remove all modulation from the inputs to the generator. Then the meter zero adjustment, R37, may be used to zero the front-panel meter. Reapply modulation at a low audio frequency such as 400 Hz. Deviate the subcarrier 10% as per the "Deviation" drawing (15A1009). Adjust the meter calibration control, R21, for a reading of 0 dB on the meter. Turn down the level on the audio oscillator used for these tests. Suddenly increasing the audio oscillator level (do not switch the tone on and off; raise and lower the level manually) will cause the meter to rise and exhibit a small overshoot. Adjust the meter acceleration control, R34, for a 0.5 dB overshoot.

C. Carrier Filter

If excessive incidental amplitude modulation is observed at the output of the SCG-8, the carrier bandpass filter may be slightly tuned to minimize this defect. Note that this problem in itself is harmless if less than 3%. Tune the carrier filter on the SCG-8 for maximum amplitude coincident with minimum incidental amplitude modulation of the subcarrier. This filter tunes very broadly. It should not require readjustment unless a component has been replaced.

IX. STANDARDS FOR SUBCARRIER SERVICE

Certain industry standards have evolved for subcarrier operation. These are the result of both legal and engineering considerations. They will be discussed here as they relate to the operation of the SCG-8 Subcarrier Generator.

The most common use for the SCG-8 will be for program transmission. Two general areas will be mentioned: broadcasting the subcarrier signal directly (SCA); and using it as a means of conveying a secondary program signal to another specific point (via an STL).

Using the SCG-8 as an SCA generator, the most common frequencies involved are 41 kHz and 67 kHz. The SCG-8 modulates the FM transmitter about 9%. This modulation is commonly

termed "injection." Then the subcarrier itself is modulated with program material, such as background music. This modulation of the subcarrier itself is commonly called "deviation." When the SCG-8 is used for SCA service, the usual amount of deviation is 4 to 6 kHz peak. Just as the standard FM transmitter uses pre-emphasis (treble boost) to increase the signal-to-noise ratio, subcarrier systems also commonly use pre- and de-emphasis networks.

Operation of the SCG-8 over an aural STL is similar to FM broadcast service. When the STL is designed for composite stereo transmission, the deviation is generally about 16 kHz peak, at a center frequency of 185 kHz. For monaural STL service, the center frequency is usually 67 kHz.

When the SCG-8 is used in television or broadcast service, telemetry (metering) signals may be applied to the subcarrier along with the program. If these signals are in the 20 to 40 Hz region, they are referred to as "subaudible" telemetry signals. Signals in the 300 to 3000 Hz range are considered "audible" telemetry signals.

When the telemetry signals are in the audible range, programming may not simultaneously be applied to the SCG-8; the telemetry signals would interfere with the program and, by the same token, the program would interfere with the telemetry. However, the entire modulation capability of the subcarrier system may be used for telemetry, increasing both the data rate and the signal-to-noise ratio of the data. It is suggested that deviation of the subcarrier be maintained at 3 kHz peak in this service.

When the telemetry signals are in the subaudible range, programming may simultaneously be applied to the SCG-8. The telemetry signals are held to an upper limit of 40 Hz, and program signals below 80 Hz should be rolled off to prevent interference with the telemetry. At the receiving end, a low-pass filter is used to extract the low-frequency telemetry and reject normal programming. In this system, the telemetry and the programming share the modulation capability of the subcarrier system. It has been found in practice that the telemetry signals are easily separated from the programming if they are not less than 10% of the amplitude of

the programming. It has been found that an upper limit of 20% should be observed. By maintaining the telemetry between these two limits, freedom from interference to the telemetry by the programming, and also freedom from interference to the programming by the telemetry may be achieved. It is suggested that an 80 Hz high-pass filter be used on the program line to clear out any low-frequency components so they do not interfere with the telemetry. Such a filter is contained in an assembly available from Moseley Associates, the Model MIU-1 Metering Insertion Unit.

When a subcarrier is used for programming in FM broadcast service, its sidebands must not interfere with the stereo subchannel region. To accomplish this, both the deviation and the upper audio frequency limit must be restricted. The deviation should be held to about 4 kHz, and the upper audio frequency should be held to about 5 kHz. More deviation may be used if the upper audio frequencies are reduced in amplitude.

In television telemetry service, the subcarrier must be used only for metering. Programming is not allowed in this service.

X. FIELD MODIFICATIONS AND ADJUSTMENTS

A. Typical Applications

Subcarrier Frequency	Audio Response	Typical Applications
26 kHz	3 kHz	Control signal transmission over STL
39 kHz	3 kHz	Data signal return over aural carrier in TV
41 kHz	5 kHz	Program transmission in FM
67 kHz	5 kHz	Program transmission in FM
67 kHz	10 kHz	Program transmission over monaural STL
185 kHz	10 kHz	Program transmission over composite stereo STL.

B. 120/240 Volt Wiring

Voltage	Fuse	Connection
120	0.25 A	Black to white: connect to C5 Red-black to black-white: connect to C6
240	0.1 to 0.2 A	Connect black to C5 Connect black-white to C6 Connect red-black to white

C. Changing Telemetry Sensitivity

Telemetry (metering) tones may be applied to the SCG-8 at the rear-apron Telemetry Input BNC connector. Such tones may be anywhere in the 20 Hz to 3 kHz region. They are routed directly to the modulation circuitry and the setting of the front-panel MODULATION control has no affect on them.

To change the sensitivity of the telemetry input on the SCG-8 Subcarrier Generator, merely alter the value of resistor R16. Decreasing the value of this resistor will increase the telemetry sensitivity and increasing the value will decrease the telemetry sensitivity.

D. Pre-emphasis

Pre-emphasis	C-13
Flat	Remove
50 μs	470 pF
75 μs	750 pF
150 μs	1300 pF

E. Oscillator Timing

Frequency	C-25, C-26
26 kHz	1600 pF
39 kHz	1100 pF
41 kHz	1000 pF
67 kHz	620 pF
185 kHz	220 pF

Note: Carrier filter must also be changed. Please consult the factory.

TFL-280 AUDIO LIMITER
FINAL CHECKOUT SHEET

Date: 27 August, 1982

Tester: Bill

F.O.#: 7-7020

Station: K R Q R (CBS-TV)

Serial #: 36620

Signal-to-Noise Ratio: -71 dB (70 dB minimum)

(re +10 dBm output, de-emphasized)

Harmonic Distortion

(re +10 dBm output, de-emphasized, with 10 dB of indicated limiting)

50 Hz: .34% 5 kHz: .18 % (less than 0.7%, any frequency)

500 Hz: .26% 15 kHz: /// %

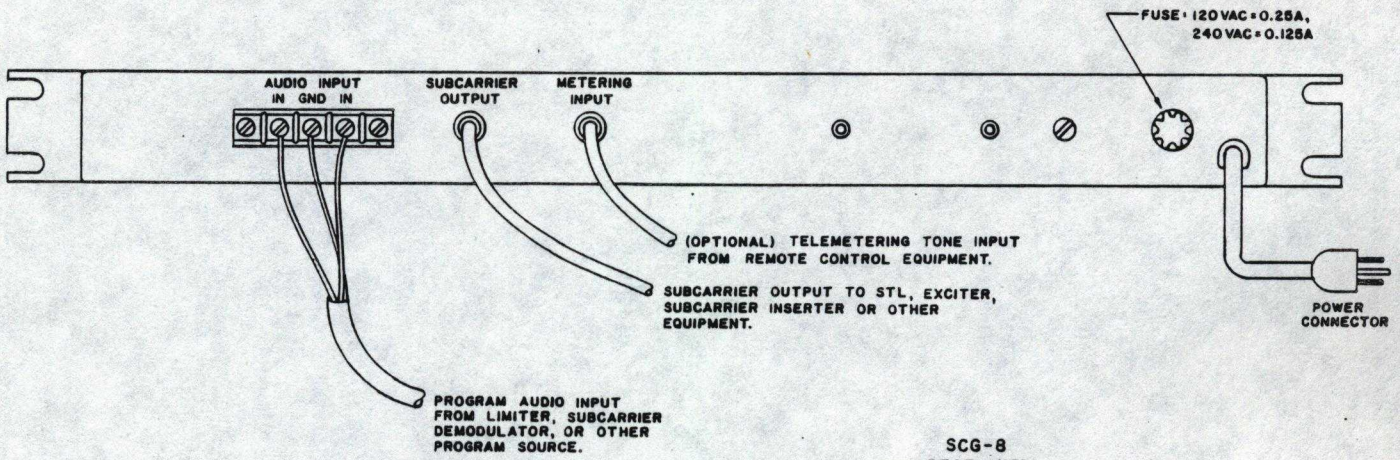
Frequency Response

(re 1000 Hz, below the threshold of limiting, de-emphasized)

-1 dB at 17 Hz and 5.5 kHz (50 Hz or lower, 15 kHz or higher)

(re 200 Hz, below the threshold of limiting, not de-emphasized)

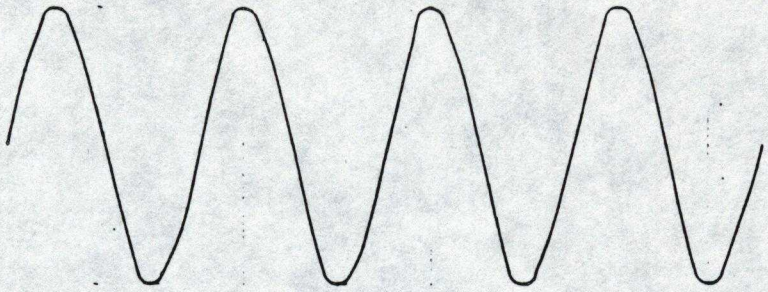
+3 dB at 1061 Hz ~~#####~~ Hz min., 1061 Hz max., for 150microseconds)



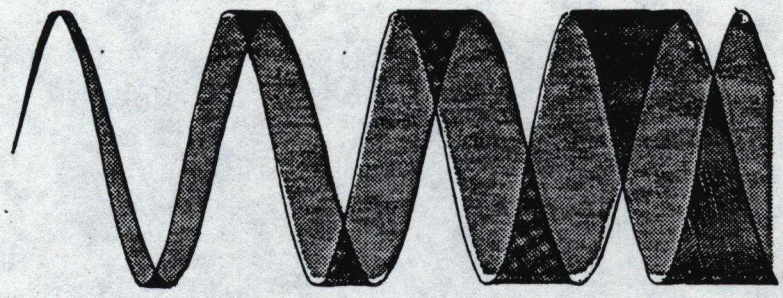
SCG-8
REAR VIEW

REVISIONS	DATE	MOSELEY ASSOCIATES, INC. SANTA BARBARA RESEARCH PARK GOLETA, CALIFORNIA 93017		
MGMT. APPR.		REAR CONNECTIONS SCG-8		
		TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ± 1/2°		
		DWN REB	16/APR/74	SCALE:
		CHK FXY	17 APR 74	
		ENG JCD	17 APR 74	21A 2465

UNMODULATED SUBCARRIER



SUBCARRIER DEVIATED ±9.166% OF CENTER FREQUENCY



SUBCARRIER FREQUENCY	DEVIATION USING STANDARD PATTERN
26 KHz	2.38 KHz
39 KHz	3.575 KHz
41 KHz	3.758 KHz
67 KHz	6.142 KHz
185 KHz	16.96 KHz

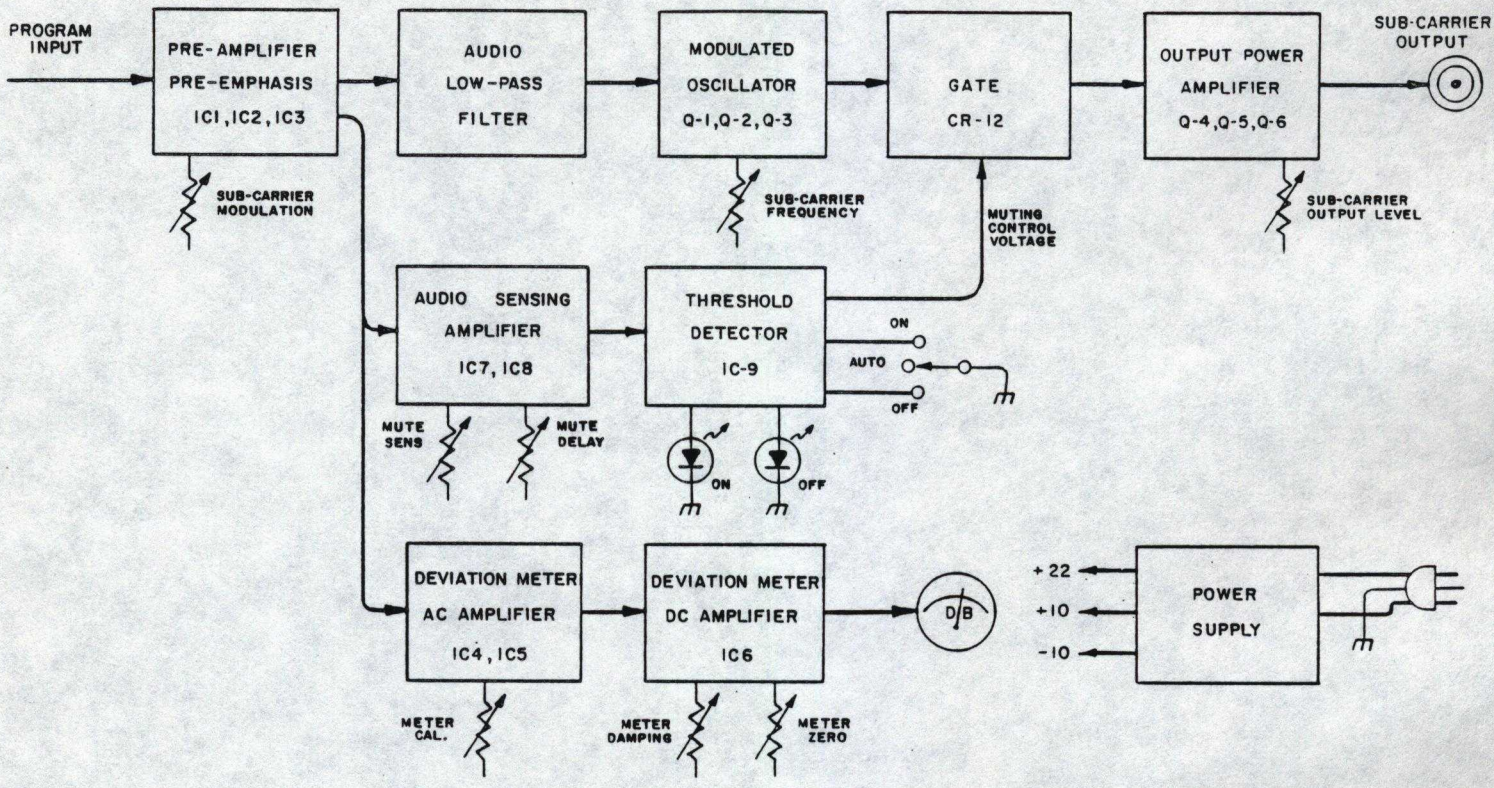
REVISIONS	DATE	MGMT. APPR.
A REDRAWN.	17/APR/74 REB	

MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK
GOLETA, CALIFORNIA 93017

METER CALIBRATION
SUBCARRIER GENERATOR

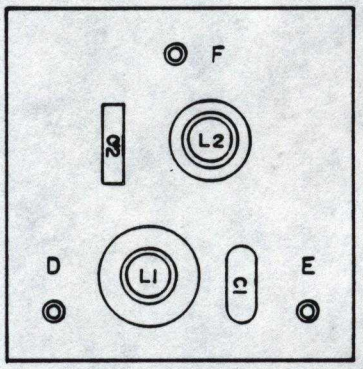
TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ± 1/2°

DWN	REB	17/APR/74	SCALE:
CHK			15A 1009 A
ENG	JCT	17APR 74	



REVISIONS	DATE	MOSELEY ASSOCIATES, INC. SANTA BARBARA RESEARCH PARK GOLETA, CALIFORNIA 93017		
		BLOCK DIAGRAM MODEL SCG-8 SUB-CARRIER GENERATOR		
		TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ± 1/2°		
MGMT. APPR.	DWN	JHM	4-11-74	SCALE:
	CHK	FXY	16 APR 74	92A1135
	ENG	JCT	16 APR 74	

	C1	C2	L1	L2
ITEM 1 (26KHz)	910pf	7500pf	47mH	4.7mH
ITEM 2 (39KHz)	560pf	4700pf	33mH	4.7mH
ITEM 3 (41KHz)	750pf	4700pf	22mH	3.3mH
ITEM 4 (67KHz)	330pf	2700pf	22mH	2.2mH
ITEM 5 (95KHz)	330pf	2200pf	10mH	1.5mH
ITEM 6 (110KHz)	390pf	1500pf	4.7mH	1.5mH
ITEM 7 (185KHz)	160pf	1200pf	4.7mH	680uH
ITEM 8 (20KHz)	1300pf	.0068uf	47mH	10mH
ITEM 9 (78.1KHz)	130pF	1300pF	33mH	3.3mH
ITEM 10 (55 KHz)	360pF	2400pF	22mH	3.3mH
ITEM 11 (171KHz)	200 pf	1300 pf	4.7 mH	.8 mH
ITEM 12 (182KHz)	270 pf	1300pf	4.7 mH	1.1mH



NOTES:

1 UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN PICOFARADS.

2 P.C. BOARD 51A 5544.

3 SCHEMATIC 91A 6717.

4 ALL PARTS ARE FREQUENCY DEPENDENT, SEE CHART.

5 PARTS SHOWN ARE FOR ITEM 1, ITEMS 2-7 DIFFER IN SHAPE AND SIZE.

REVISIONS	DATE	MGMT. APPR.
C1 ADDED ITEM 11 & 12 PCO 3332 21-82 AJB.		
C ADD ITEM 10 ECO 2064 CAM	19MAR81	
B ADDED ITEM 9 ECO 2040 17 MAR 81 AJB.		
A ADD ITEM 8	15APRIL77 J.M.	

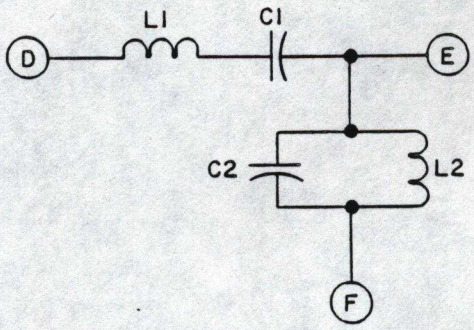
MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK
GOLETA, CALIFORNIA 93017

COMPONENT LAYOUT
SCG-8 CARRIER FILTER

TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ± 1/2°

DWN	REB	27/MAR/74	SCALE:
CHK	FXY	16 APR 74	20A 2443 C1
ENG	JCT	17APR 74	

	C1	C2	L1	L2
ITEM 1 (26KHz)	910pf	7500pf	47mH	4.7mH
ITEM 2 (39KHz)	560pf	4700pf	33mH	4.7mH
ITEM 3 (41KHz)	750pf	4700pf	22mH	3.3mH
ITEM 4 (67KHz)	330pf	2700pf	22mH	2.2mH
ITEM 5 (95KHz)	330pf	2200pf	10mH	1.5mH
ITEM 6 (110KHz)	390pf	1500pf	4.7mH	1.5mH
ITEM 7 (185KHz)	160pf	1200pf	4.7mH	680uH
ITEM 8 (20 KHz)	1300 pf	.0068uf	48 mH	10 mH
ITEM 9 (78.1 KHz)	130 pF	1300pF	33 mH	3.3mH
ITEM 10 (55 KHz)	360pF	2400pF	22mH	3.3mH
ITEM 11 (171 KHz)	200 pf	1300 pf	4.7 mH	.8 mH
ITEM 12 (152 KHz)	270 pf	1300 pf	4.7 mH	1.1 mH



NOTES:

1 UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN PICOFARADS.

2 ALL PARTS ARE FREQUENCY DEPENDENT, SEE CHART.

3 P.C. BOARD 51A 5544.

4 COMPONENT LAYOUT 20A 2443.

REVISIONS	DATE	MGMT. APPR.
C1 ADD ITEMS 11 & 12 TO DWG PCO 3332 Feb. 1 82 AJB.		
C ADD ITEM 10 ECO 2062 18 MAR 81 CAH		
B ADDED ITEM 9 ECO 2040 17 MAR. 81 AJB.		
A ADD ITEM 8 18 APRIL 77 J.M.		

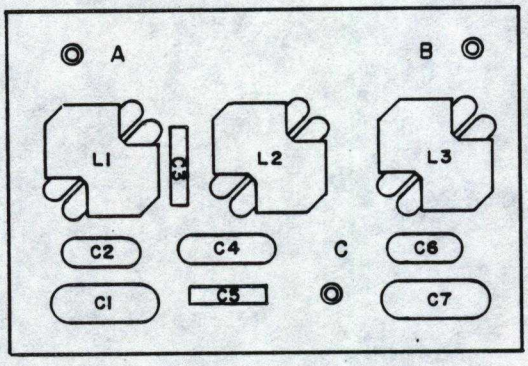
MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK
GOLETA, CALIFORNIA 93017

SCHEMATIC
SCG-8 CARRIER FILTER

TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ± 1/2°

DWN	REB	29/MAR/74	SCALE:
CHK	FXY	16 APR 74	91A 6717 C1
ENG	JCT	17 APR 74	

	C1	C2	C3	C4	C5	C6	C7	L1	L2	L3
ITEM 1 (3KHz)	.0139	820pf	.0206	3600pf	.0193	2700pf	.0124	*-105	*-106	*-107
ITEM 2 (5 KHz)	.008	470pf	.0124	2200pf	.012	1600pf	.0075	*-108	*-109	*-110
ITEM 3 (10 KHz)	4300pf	240pf	.0068	1110pf	.0056	820pf	3600pf	*-111	*-112	*-113
ITEM 4 (3.4 KHz)	.012	620 pf	.0175	.0033	.0162	.0022	.01	* -167	* -168	* -169



NOTES:

1 UNLESS OTHERWISE SPECIFIED
CAPACITOR VALUES ARE IN MICROFARADS.

2 P.C. BOARD 51A 5543.

3 SCHEMATIC 91A 6716.

4 * DENOTES INDUCTOR 2C 1400.

5 CAPACITORS LISTED IN PF ARE DM 15 OR 19.
" " MF " SEI, 3%.

REVISIONS	DATE	MGMT. APPR.
A∅ ADDED ITEM 4 TO DWG.	21 OCT 80 ECO 1942 AJB.	

MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK
GOLETA, CALIFORNIA 93017

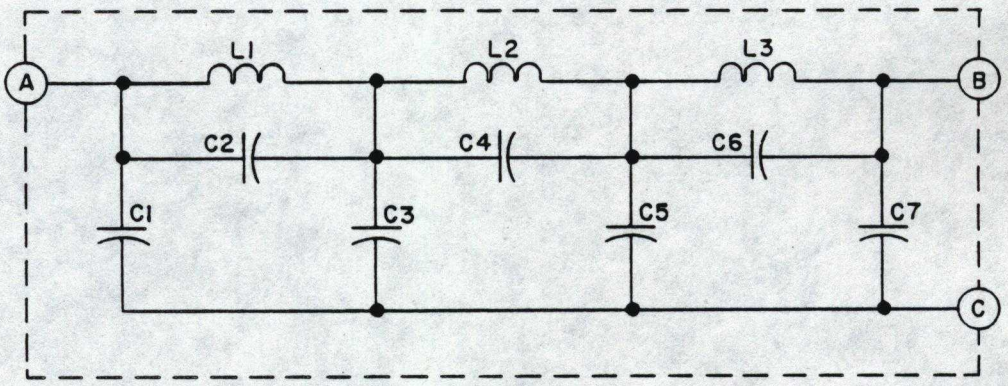
COMPONENT LAYOUT
SCG-8 L.P. FILTER

TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ± 1/2°

DWN	REB	26/MAR/74	SCALE:
CHK	FXV	16 APR 74	
ENG	JCP	17APR74	

20A 2442 A∅

	C1	C2	C3	C4	C5	C6	C7	L1	L2	L3
ITEM 1 (3KHz)	.0139	820pf	.0206	3600pf	.0193	2700pf	.0124	*-105	*-106	*-107
ITEM 2 (5KHz)	.008	470pf	.0124	2200pf	.012	1600pf	.0075	*-108	*-109	*-110
ITEM 3 (10KHz)	4300pf	240pf	.0068	1110pf	.0056	820pf	3600pf	*-111	*-112	*-113
ITEM 4 (3.4 KHz)	.012	620 pf	.0175	.0033	.0162	.0022	.01	*-167	*-168	*-169



NOTES:

1 UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.

2 ALL PARTS FREQUENCY DEPENDENT, SEE CHART.

3 P.C. BOARD 51A 5543.

4 COMPONENT LAYOUT 20A 2442.

5 * DENOTES INDUCTOR 2C1400.

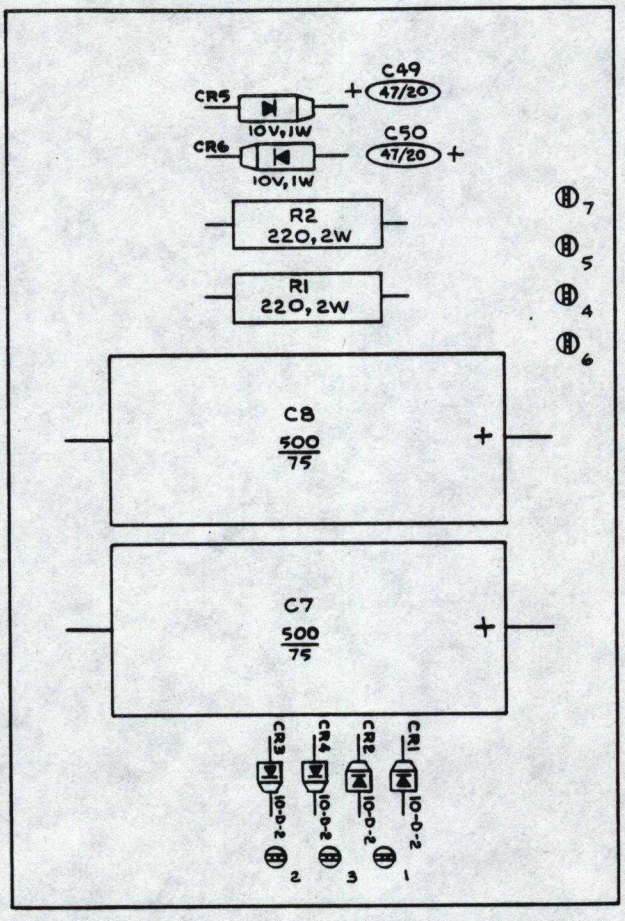
REVISIONS	DATE	MGMT. APPR.
A ADDED ITEM 4 TO DWG.	21 OCT. 80 ECO 1942 AJB	

MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK
GOLETA, CALIFORNIA 93017

SCHEMATIC
SCG-8 L.P. FILTER

TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ± 1/2°

DWN	REB	1/APR./74	SCALE:
CHK	F X Y	16 APR 74	
ENG	JCT	17APR74	91A 6716 A∅



NOTES:

1 UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES ARE IN OHMS, 10%
CAPACITOR VALUES ARE IN MICROFARADS.

2 P.C. BOARD 51A 5546.

3 SCHEMATIC 91C 6713.

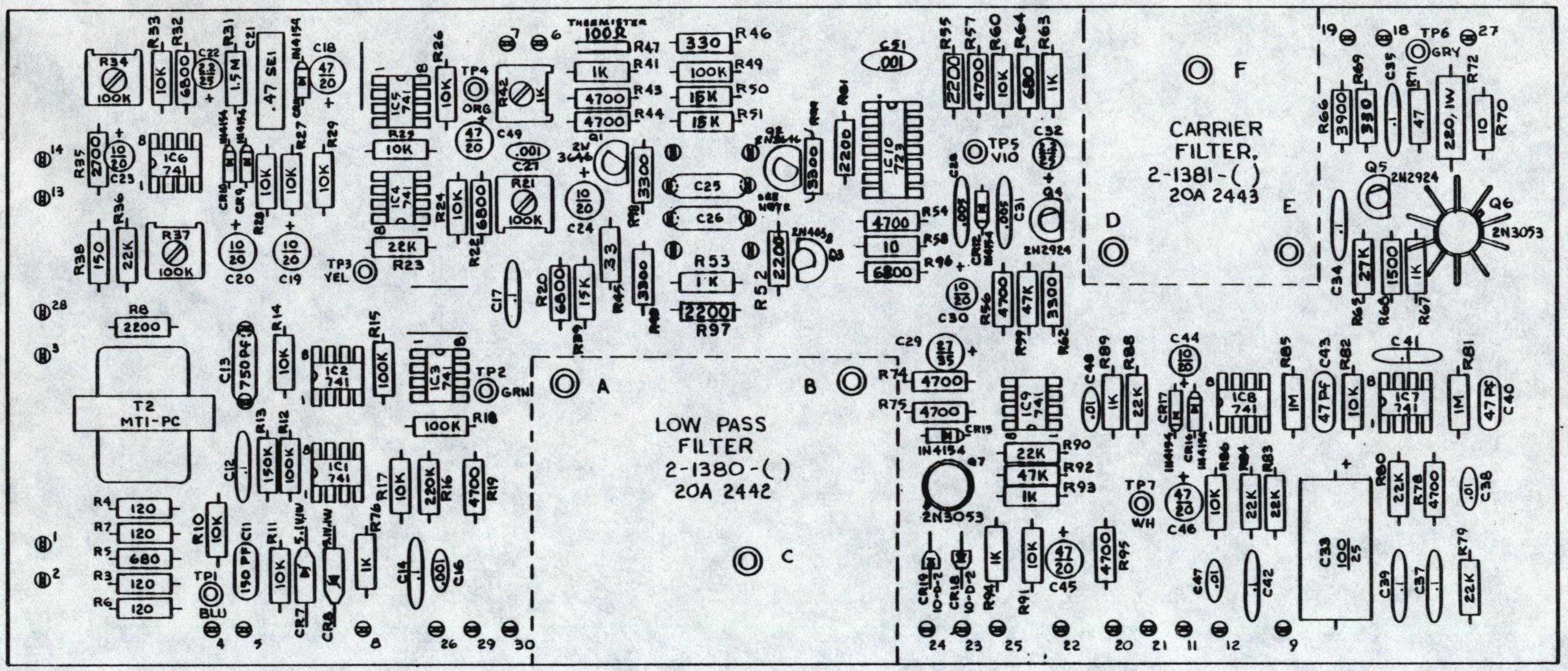
A	ARTWORK REV. A, CHANGE POL. CB. 4/JUNE/74 REB.		
REVISIONS	DATE		
MGMT. APPR.			

MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK
GOLETA, CALIFORNIA 93017

COMPONENT LAYOUT
SCG-8 SUBCARRIER GENERATOR P.S.

TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ± 1/2°

DWN	REB	21/MAR/74	SCALE:
CHK	FXY	16 APR 74	20A 2440 A
ENG	JCT	17 APR 74	



NOTES:

1 UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES ARE IN OHMS, 1/2W, 10%
CAPACITOR VALUES ARE IN MICROFARADS.

2 P.C. BOARD 5IB 5545.

3 SCHEMATIC 9IC 6713.

4 "C13 MAY BE TRIMMED TO ADJ. PRE-EMPHASIS

5 ◎ DENOTES STIMPSON GS 4-6 (INSTALL FROM THIS SIDE, SOLDER FAR SIDE, DO NOT SWAGE)

6 C25 & 26 FREQUENCY DEPENDENT, SEE CHART,
(PARTS INSTALLED INTEST).

	C25, 26
ITEM 1 (26 KHz)	1600 pf
ITEM 2 (39 KHz)	1100 pf
ITEM 3 (41 KHz)	1000pf
ITEM 4 (67 KHz)	820 pf
ITEM 5 (185 KHz)	220 pf
ITEM 6 (171 KHz)	270 pf
ITEM 7 (152 KHz)	330 pf
ITEM 8 (110 KHz)	470 pf

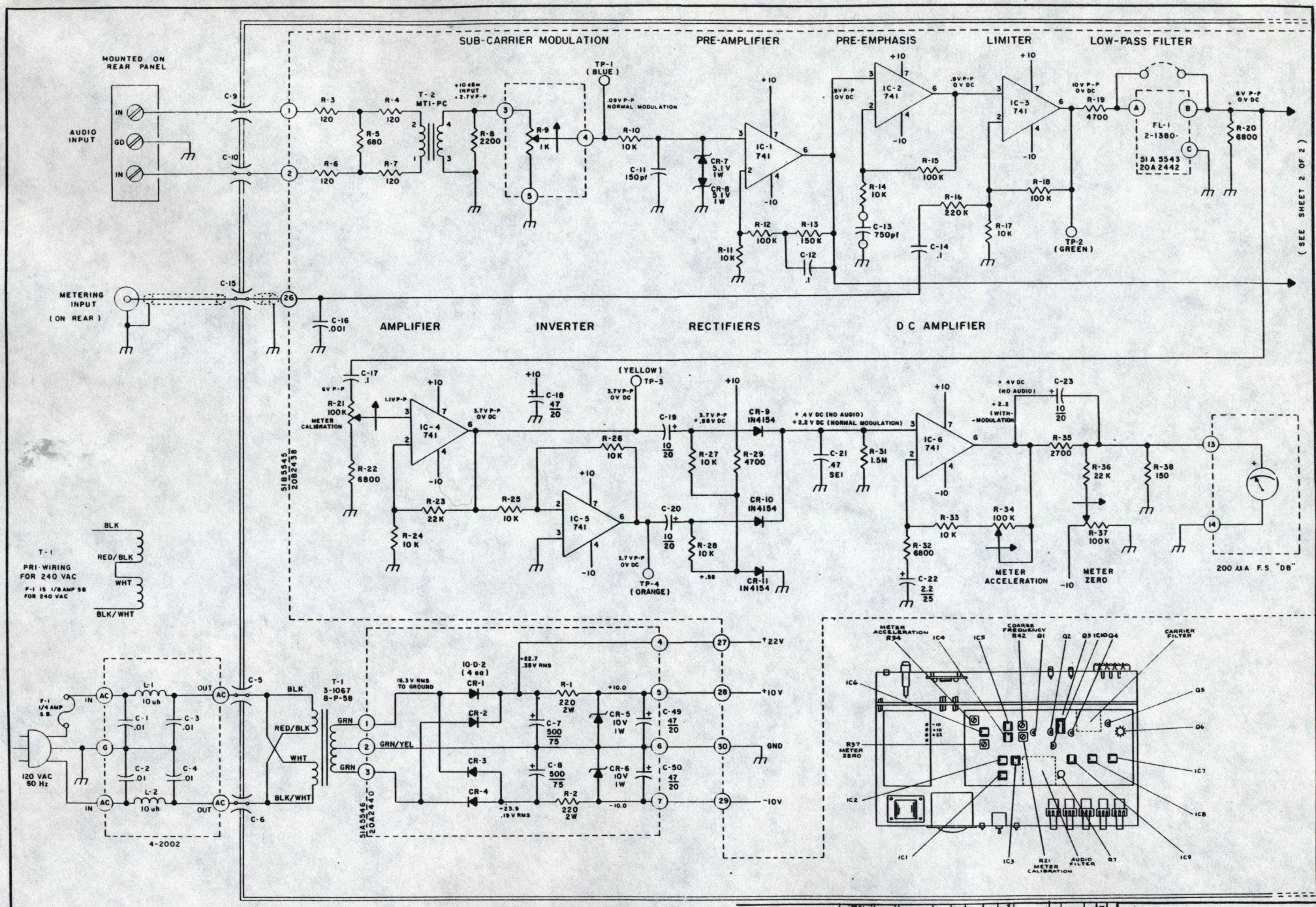
REVISIONS	DATE
A	CHANGE VALUES R60,64,69, 93,&94. 9/MAY/74 REB
B	ARTWORK REV C. MOVE CR13 & CR22 16AUG74 FXY
C	VALUE CHANGES PER PER E.C.O 677 4SEPT74 L.I.
D	CHANGES PER ECO #685 30 OCT 74 JHM
E	9DEC 74 ECO 698 L.I. CHANGED C25 C26 VALUES. THERMISTOR. #20 JUMPER WAS 100 L
F	CHANGE POLARITY OF C44, KF 5 FEB 75
G	REMOVED JUMPPER 8 NO 4 NOTE. 18 MARCH 75 L.I.
H	CHANGES PER ECO 741 18 JULY 75 JHM
I	R39 WAS 4700. PER E.C.O. 757 4-29-75 GM
J	ARTWORK REV E CHG 3 FEB 76 L.I.
K	DIODE SR3669 WAS 2N3569 17FEB76 ECO 780 L.I.
ϕ	ADDED NOTE 4 50 TO BE MORE ACCURATE PRE-EMPHASIS NOV.19 ECO 1446 A.J.B.
M1	ADD R46, R97; R45 WAS 100, R46 WAS 1K R50, R51 WERE 10K ECO 1710 WAS 2 MAY 80
M1	R98, R99 WAS R96, 97 PCO 2022, 3-5-81
N1	CHG. R55 WAS 1K ECO 2055 27MAR81 AJB.
P1	RELOCATE Q1, Q2, R98, 99 48, 61, ECO 1710 16 OCT. 81 CH.
P2	ADD ITEM 6 & 7 8TO DWG. PCO 33B2 2-1-82 AJB.
R2	REVISED NOTE 6 PCO 7:99 3-25-82
	MGMT. APPR.

MOSELEY ASSOCIATES, INC
SANTA BARBARA RESEARCH PA
GOLETA, CALIFORNIA 93

COMPONENT LAYOUT
SCG-8 SUBCARRIER GENERATOR

TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ±		
DWN	REB	16/MAR/74 SCALE:
CHK	FXY	16 APR 74
ENG	JLT	17APR74

20B 2438



NOTES

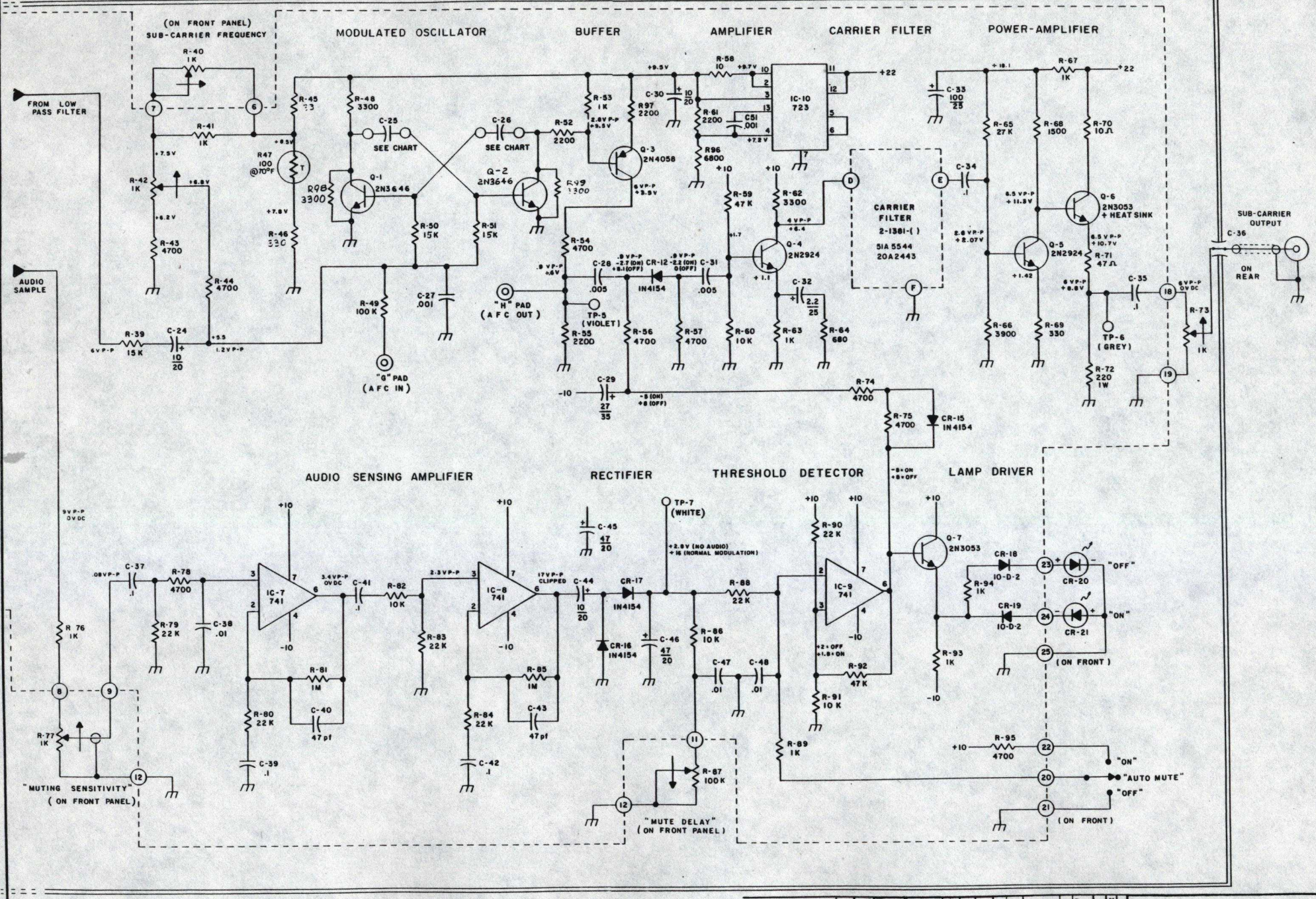
1. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS, 1/2 W, 10%. CAPACITOR VALUES ARE IN MICROFARADS.
2. I.C.'S LISTED AS 741 ARE SN72741P
3. P.C. BOARD 5185545
4. COMPONENT LAYOUT 2082438
5. C-25, C-26 FREQUENCY DEPENDENT PARTS
6. "C-13 MAY BE TRIMMED TO ADJ. PRE-ENPHASIS"

MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK
GOLETA, CALIFORNIA 93017

SCHEMATIC
SCG-8 SUB-CARRIER GENERATOR

TOL: FRACT. ± 1/32. .XX ± .030. .XXX ± .010. ∠ ± 1/2°
DWN JLM 5-7-74 SCALE:
CHK
ENG

91 C 6713 K-2



FREQ.	C-25,C-26
171 KHz	270 pf
152 KHz	330 pf
110 KHz	470 pf

FREQ.	C-25,C-26
26KHz	1600 pf
39KHz	1100 pf
41 KHz	1000 pf
67 KHz	620 pf
185 KHz	220 pf

MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK
GOLETA, CALIFORNIA 93017

SCHEMATIC
SCG-8 SUB CARRIER GENERATOR

TOL: FRACT. ± 1/32, .XX ± .030, .XXX ± .010, ∠ ± 1/2°
DWN JHM 5-7-74
CHK
ENG
SCALE:
91C6713 K2

PARENT ITEM NO 9051301

SPARE PTS KIT SCG-8 SP-34 DATE 4/22/81 PAGE 1

MOSELEY ASSOCIATES INC
111 CASTILIAN DRIVE
GOLETA CA 93117
805 968-9621

COMPONENT ITEM NO.	STOCK LOCA	MANUFACTURER PART NUMBER	COMPONENT DESCRIPTION	QUANTITY PER	UM	UNIT SALES PRICE	TOTAL SALES PRICE
3390135	2715	MV-5022	LED RED	1	EA	1.47	1.47
3600145	2721	1N4154	DIO 1N4154 25V 4NS SI DO35	1	EA	.16	.16
3600178	2744	1N4733A	DIO Z1N4733A 5.1V 1W 5% A1AY	1	EA	1.09	1.09
3600202	2744	1N4740A	DIO Z1N4740A 10V 1W 5% A1AY	1	EA	1.09	1.09
3610003	2721	10D2	DIO 10D2 200V 1A SI DO39	4	EA	.39	1.56
3630027	2721	2N2924LFS	XT NS2N2924LFS.2W160M025V.1A7P	1	EA	.54	.54
3630035	2721	2N3053	XT NP2N3053 05W100M080V.7A	1	EA	1.47	1.47
3630100	2744	2N3646	XT NS2N3646 .2W350M040V.2A5P	1	EA	.63	.63
3630209	2744	2N4058	XT PS2N4058 .4W 030V30M	1	EA	.46	.46
3650116	2743	MC1723CL	RGLTR TYPE 1723 VARV .15A 632	1	EA	2.66	2.66
3660008	2812	SN72741P	IC UA741P OPAMP GEN COMP	2	EA	.83	1.66

TOTAL PRICE 12.79

PARENT ITEM NO 9051319 OPT S/P KIT SCG-8 SP-34 DATE 4/22/81 PAGE 1

MOSELEY ASSOCIATES INC
111 CASTILIAN DRIVE
GOLETA CA 93117
805 968-9621

COMPONENT ITEM NO.	STOCK LOCA	MANUFACTURER PART NUMBER	COMPONENT DESCRIPTION	QUANTITY PER	UM	UNIT SALES PRICE	TOTAL SALES PRICE
3370228	2735	MDL 1/4	FUSE	5	EA	1.53	7.65
4090205	2024	3-1067	XFMR 8-P-58	1	EA	19.78	19.78

TOTAL PRICE 27.43 *