

INSTRUCTION MANUAL

MODEL SCG-6/SCD-2A
SUBCARRIER SYSTEM



MOSELEY ASSOCIATES, INC.

SANTA BARBARA RESEARCH PARK
GOLETA, CALIFORNIA 93017

INSTRUCTION MANUAL

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

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INSTRUCTION MANUAL

MODEL SCG-6/SCD-2

SUBCARRIER SYSTEM

1. INTRODUCTION

The Moseley Associates, Inc. Model SCG-6 Subcarrier Generator and the Model SCD-2 Subcarrier Detector collectively form a Subcarrier System designed to provide the broadcaster with a means for adding additional communications-grade channels to an aural STL such as the Moseley Associates, Inc. Model PCL-303. Intended primarily to convey control tones from the studio to the transmitter site for remote control purposes, the SCG-6/SCD-2 Subcarrier System may be used for other purposes such as signaling, communications, or data transmission.

The SCG-6/SCD-2 Subcarrier System features simplicity and stability of operation, small size, all silicon semiconductors, and excellent access for test or adjustment purposes. Both the SCG-6 Subcarrier Generator and the SCD-2 Subcarrier Detector have their major electronic portions on plug-in printed circuit boards. Because of the high performance of the integrated circuit transistor arrays used, the SCG-6/SCD-2 Subcarrier System can, on special order, be placed on any frequency from 26 kHz upwards to 200 kHz.

II. SPECIFICATIONS

Model SCG-6 Subcarrier Generator

Input Impedance	Greater than 1 K ohms
Input Level	6 volts peak-to-peak nominal; remove internal strap for 1 volt peak-to-peak
Frequency Response	100 Hz to 4000 Hz ± 1 dB
Modulation Distortion	Less than 2% at 10% deviation
Noise Level	Better than 50 dB below 10% deviation
Output Level	Adjustable up to 2 volts peak-to-peak into 2000 Ω or more load resistance
Minimum Load Resistance	2000 Ω
Maximum Load Capacitance	1000 picofarads
Center Frequency Stability	Less than 1% drift in 6 months; Less than 1% shift from 0°F to 140°F

Model SCD-2 Subcarrier Detector

Input Impedance	4700 Ω
Input Subcarrier Level	1.5 volts peak-to-peak nominal; 0.5 volts peak-to-peak minimum
Frequency Range	26 kHz to 200 kHz as specified
Frequency Response	± 2 dB, 100 Hz to 4000 Hz
Demodulator Distortion	Less than 2%
Noise Level	Better than 50 dB below 10% deviation
Output Level	2 volts peak-to-peak nominal, no load
Output Load Impedance	600 Ω or greater
Output Impedance	600 Ω unbalanced

Each Unit

Power Requirements	117/240 VAC, 50-60 Hz, 10 watts
Operating Temperature Range	0°F to 140°F
Size	3 $\frac{1}{2}$ " x 19" x 7 $\frac{1}{2}$ "
Weight	7 lbs.
Domestic Shipping Weight	12 lbs.

SCG-6/SCD-2
(Rev. 3/72)

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III. INSTALLATION

The SCG-6 Subcarrier Generator may be placed at any location near the aural STL with which it is used. It is usually placed in the same rack as the STL, but it may be placed closer to the source of the modulation, such as a remote control system. The output cable on the SCG-6 should have less than 1000 picofarads of capacity. For this reason it is recommended that it be placed near the aural STL transmitter. There are no particular requirements as regards ventilation although placement immediately above heat-producing equipment is not recommended. The unit should be securely mounted in the rack and the 3-connector power cable connected to a source of the appropriate voltage. The device is factory wired for 117 VAC but may be field converted to 240 volts if required.

The input, normally from the remote control system, is a DNC connector appropriately labeled on the rear of the unit. The output, also a DNC connector, drives the aural STL multiplex input.

No adjustments should be made at this time on the SCG-6.

The SCD-2 Subcarrier Detector should be placed somewhere near the aural STL receiver from which the subcarrier is derived. The multiplex output of the STL receiver is connected to the input of the SCD-2; the output of the SCD-2, normally the control tones for the remote control system, is connected to the control input on the remote control system.

Placement in the rack, ventilation, and power requirements for the SCD-2 are identical to the SCG-6.

IV. PRINCIPLES OF OPERATION

Discussing first the SCG-6 Subcarrier Generator, refer to the schematic for this unit, drawing number 91B6557.

Transistors Q1 and Q2 form a free-running multivibrator whose frequency is determined by the timing components (CA, CB, R11 and R12), the setting of the Frequency control (R103) and the applied modulation (to the printed-circuit board pin 6 via Modulation control R102). This oscillator is temperature compensated by thermistor R5. Its output is lightly coupled to buffer transistor Q3, which drives the sinusoidalizing low-pass filter. Transistor Q4 is a power amplifier to drive the output load.

The controls are set at the factory for remote control operation and should not be disturbed unless proven necessary. The MODULATION control determines the amount of modulation of the subcarrier by the control tone. The FREQUENCY control determines the center frequency of the generator. The OUTPUT control sets the level of the subcarrier going to the aural STL.

The SCD-2 is shown schematically in drawing 91C-6558 and drawing 20A-2348 depicts the component placement for the plug-in printed circuit module.

The input (from the multiplex output of the aural STL) is applied to the bandpass filter. The output of the filter is the selected subcarrier, its level being a normal 0.3 volt peak-to-peak as seen at the yellow test point.

This filtered subcarrier signal is then applied to a limiter stage using a CA3012. The output of this stage is applied to a buffer, a pulse-counting discriminator and a low-pass filter. This filter removes the subcarrier, leaving only a DC signal proportional to subcarrier frequency and an AC signal proportional to subcarrier deviation. The output of this filter is available for observation at the green test point. Following the filter is a linear amplifier with adjustable gain. The output of this amplifier is available for observation at the blue test point.

Adjustments should not be made on the SCD-2 unless it is felt that a particular problem will be solved by adjustment. To adjust the SCD-2, apply the modulated subcarrier to the input connector. Check that the subcarrier level is 1.5 volts peak-to-peak at that connector or 0.3 volt peak-to-peak at the yellow test point. Then adjust the demodulator tuning control, R9, for an indication of +5 volts DC as measured at the green test point. Next, adjust the output level control, R17, for an output level of 0 dBm (for program-service units) or 1.5 volts peak-to-peak for control service units. The input bandpass filter should not be adjusted unless a component is replaced. The unit has proven quite stable and does not drift enough with temperature changes to affect performance measurably. Should realignment be necessary, tune the inductors for maximum output coincident with minimum modulation or ripple, as observed at the yellow test point.

The power supplies in both units are identical. Each uses a 3-conductor plug and cable for primary power, a split-primary transformer, a plug-in bridge rectifier, and Zener diode regulation.

V. ADJUSTMENT

The SCG-6 and the SCD-2 should not have adjustments made on them unless it is shown that they are definitely at fault. An ordinary oscilloscope may be used for the following adjustments.

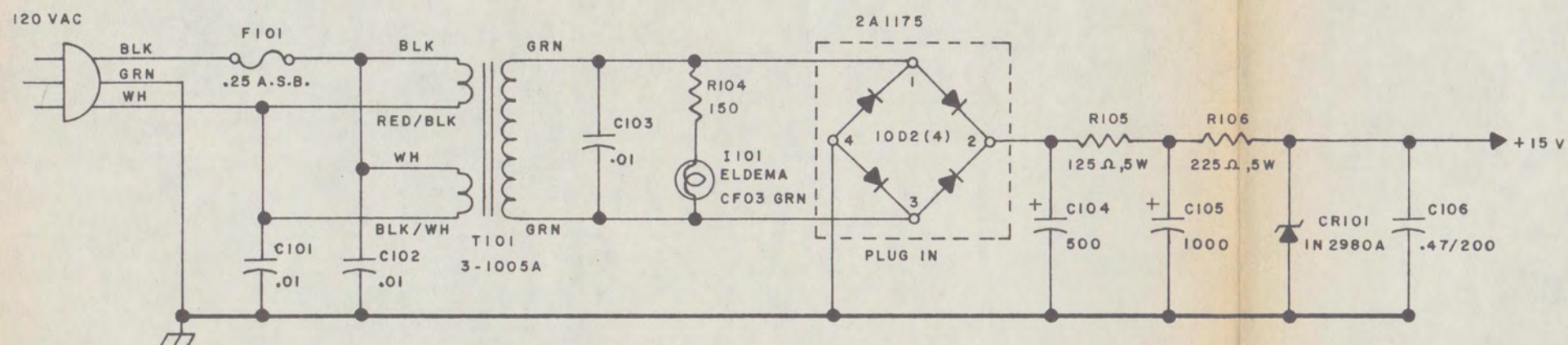
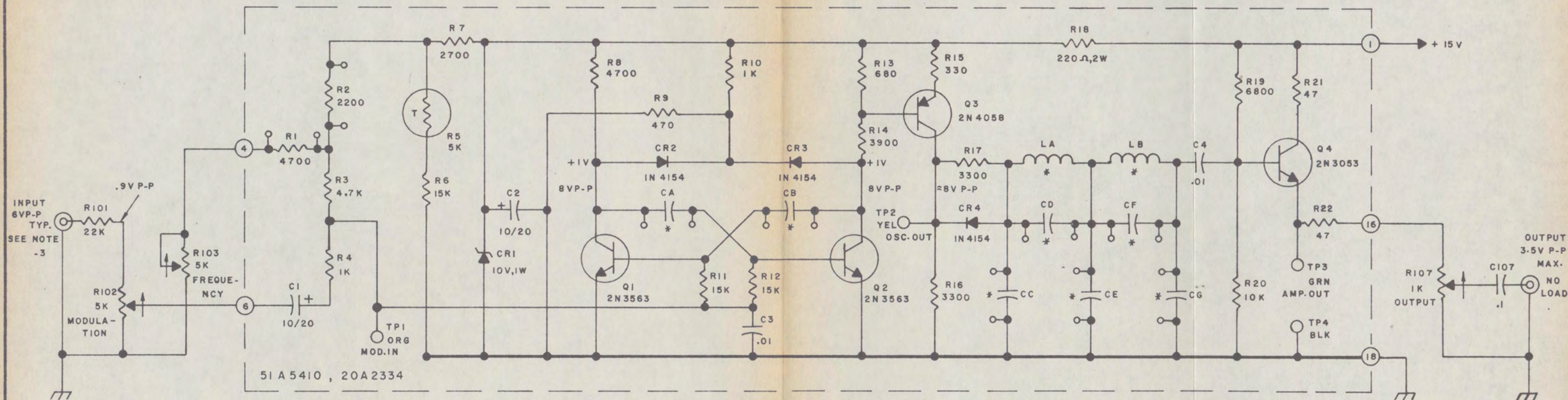
The OUTPUT level adjustment on the SCG-6 should be adjusted for a level of 1.5 volts peak-to-peak of subcarrier out of the Model PCL-303 STL receiver multiplex output.

The FREQUENCY adjustment may be adjusted for maximum subcarrier signal at the detector board yellow test point. This signal may appear to have a small amount of amplitude modulation which is caused by the input bandpass filter selectivity.

The MODULATION control may be adjusted until the above mentioned amplitude modulation is about 10% when the remote control tone is present.

It is assumed that the remote control equipment is connected during these tests. If an audio oscillator is used to supply the modulating signal to the SCG-6, set its output level at 2 volts peak-to-peak at a frequency of 1000 Hz.



This completes any adjustment that is likely to be required in the field.



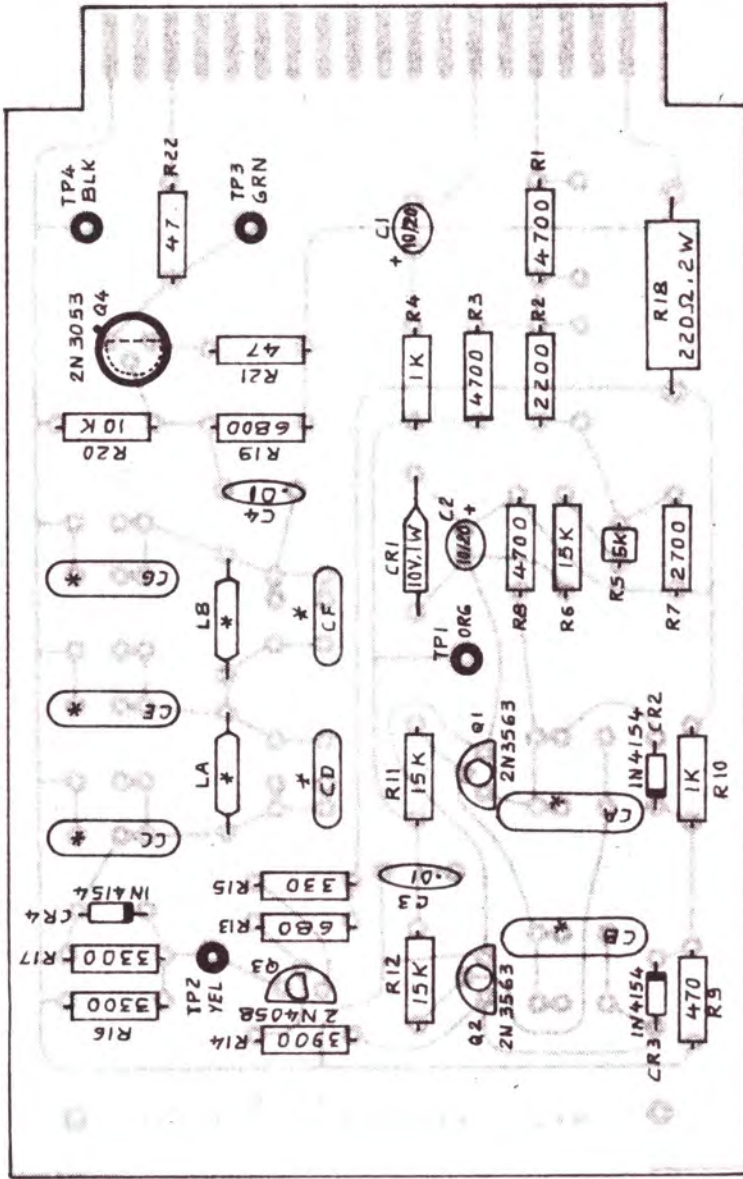
NOTES:

- 1 UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES ARE IN OHMS, 1/2 W, 10%
CAPACITOR VALUES ARE IN MICROFARADS.
- 2 * DENOTES FREQUENCY DEPENDENT COMPONENT.
SEE DRAWING 94 A 4509
- 3 TO INCREASE MODULATION SENSITIVITY
TO 1 V P-P, JUMPER RESISTOR R101.
- 4 P.C. BOARD 51A5410.
- 5 COMPONENT LAYOUT 20A2334.

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DATE			MOSELEY ASSOCIATES, INC.		
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REVISIONS	MGMT. APPR.	SCHEMATIC			
		SUBCARRIER GENERATOR SCG-6			
		TOL: FRACT. $\pm 1/32$, .XX $\pm .030$, .XXX $\pm .010$, $\angle \pm 1/2^\circ$			
		SCALE: NONE			
		DWN		5/26/72	91 B 6557
		CHK	EXY	6/1/72	
		ENG	JCT	3/10/72	

91 B 6557



- NOTES:
- 1 UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES ARE IN OHMS, 1/2W, 10%
CAPACITOR VALUES ARE IN MICROFARADS
 - 2 P.C. BOARD S1A 5410
 - 3 SCHEMATIC 91B 6557
 - 4 * DENOTES FREQUENCY DEPENDENT
COMPONENT, SEE DRAWING 94A 4509

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COMPONENT LAYOUT			
SUBCARRIER GEN		SCG-6	
TOL: FRACT. $\pm 1/32$, .XX $\pm .030$, .XXX $\pm .010$, $\angle \pm 1/2^\circ$	DWN	5-30-72	SCALE: NONE
CHK	FXY	6/1/72	
ENG	JLP	3/MAY/72	
20 A 2334			

