

I. GENERAL

The SSC Model 510A miniature CTCSS Encoder/Decoder has been designed for use in most CTCSS applications. Continuously tunable frequency adjustments, miniature size and convenient mounting techniques permit quick universal field installations.

II. OPERATING SPECIFICATIONS

Operating Voltage: +10.9Vdc to +25Vdc (6.0Vdc min. with regulator removed)

Operating Current: 10mA (Nominal)

Frequency Range: Continuously tunable 67.0Hz to 250.3Hz

*Operating Temp. Range: Exceeds EIA Spec. (-30°C to +60°C)

*Frequency Stability: Exceeds EIA spec. (±.5%)

Encoder Output Level (Nominal): Adjustable 0 to 1.5 Vrms

Encoder Output Amplitude Stability: Less than ±1dB change over full freq. range.

Encoder Output Distortion (THD): Less than 1%

Decoder Input Level Range: 20mVrms to 2mVrms

Decoder Input Impedance: Greater than 30K

Decoder Output: Decode or ~~Decode~~ open collector (100mA at 40Vdc)

Decoder Activate/Monitor: Normally in monitor, ground to activate decoder.

High Pass Filter (For elimination of CTCSS tone from voice audio): Standard feature.

Size: .5" x 1.25" x 1.75" (1.7cm x 3.2cm x 4.5cm)

Interface: Flying Leads

*EIA Specification used for industry standard reference only. Actual test data available on request.

III. MOUNTING CONSIDERATIONS

The Model 510A is supplied with a pad of double sided pressure sensitive foam tape with can be used to mount the unit to any smooth surface. For best results, be sure that mounting surface is clean and dry. Place the unit on desired location and press firmly to insure good contact of adhesive. Do not touch adhesive or attempt to reposition the unit after mounting.

Frequency and output controls have been located on the same side of the board to allow adjustments with the unit mounted. If possible mounting should allow access to these controls.

Although the Model 510A has been designed for maximum immunity to RF interference, an effort should be made to avoid intense RF fields. Keeping power and output lead lengths to a minimum will also insure maximum immunity to RF.

IV. INSTALLATION & ADJUSTMENTS

Power: Connect the red +12 volt lead to a 10.9 to +25Vdc continuous supply. Connect the black lead to the negative side of the supply (ground).

For applications where supply voltage is less than 10.9Vdc, VR1 may be removed and a jumper placed from pin 1 to pin 2. Minimum supply voltage specification is now +6Vdc. The supply should now be well filtered. Normally only the tone output level specification is effected by this modification. The model 510A is available on request with VR1 removed.

Decoder Input: Connect the signal input (white/orange) directly to the discriminator audio.

Hi Pass Filter Input: (white/violet) This input can usually be connected to the same point as the decode input. Breaking the receiver audio path at this point will allow insertion of the high pass filter and buffer the discriminator audio to the audio out (white/blue) point. This input is separated from the decoder to allow use of the radio manufacturer applique point if desired.

Squelch Gating: Decode (yellow) or ~~Decode~~ (blue) outputs are provided; both are 40Vdc open collector outputs. Decode will remain saturated until a proper signal is detected or hang-up (green) is removed from ground. With J1 cut ~~Decode~~ (blue) will saturate on detection of a proper signal or hang-up is removed from ground.

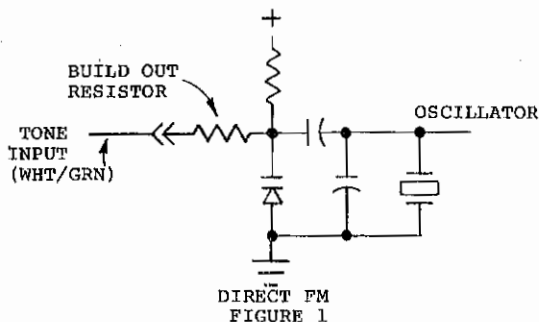
Hookswitch Operation: On a congested radio channel a radio equipped with a model 510A will only hear other associated units. Prior to transmitting we recommend monitoring the channel for other user traffic. A microphone hook switch is usually the most convenient method. The model 510A is usually in the encode/monitor mode. Grounding the hang up (green) lead will mute the receiver awaiting a proper input signal.

For applications where a hook switch is not practical CR4 should be installed and E1 (orange) used for monitor. In this case connect (green) to a transmit keyed positive voltage to produce encode during transmit. Q1 may be changed to an NPN 2N3904 or equivalent for PTT keying. CR 4 installed and Q1 as a 2N3904 is available from the factory by ordering the model 510C~~1~~.

* Second "A" in designation indicates uncased model.

IV. INSTALLATION & ADJUSTMENTS (Cont'd)

Encode: With the hang-up (green) lead removed from ground (grounded in option 1 units) an encode tone is present at the tone out (white/green) lead. Connect the (white/green) lead to the CTCSS input tone applique point normally used by the radio manufacturer for factory supplied CTCSS. When a standard applique point is not available or difficult to locate, tone input should be connected similar to fig. 1 or fig. 2.



DIRECT FM
FIGURE 1

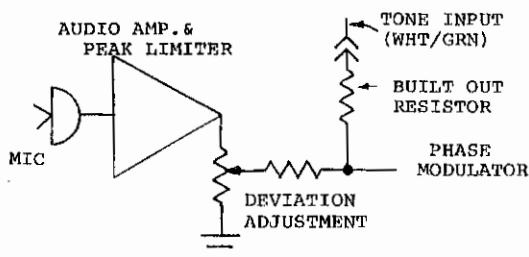


FIGURE 2

Adjust R18 for the required CTCSS frequency and set the CTCSS tone transmit deviation with R29 (approx. 750Hz deviation)

V. PARTS LIST P.C. BOARD 510A-2

Reference	Qty	Description
CAPACITORS		
C1	1	2.2uf, 25V, 20%, Tantalum
C2	1	.1uf, 35V, 20% "
C3	1	.047uf, 50V, 10%, X7R, Monolithic Ceramic
C4	1	.022uf, 50V, 10%, X7R, Monolithic Ceramic
C5	1	3300pf, 50V, 10%, X7R, Monolithic Ceramic
C6, C7, C8	3	2200pf, 50V, 10%, X7R, Monolithic Ceramic
C9, C10, C13, C14	4	.22uf, 100V, 10%, X7R, Monolithic Ceramic
C11, C12	2	.01uf, 50V, 5%, C0G, Monolithic Ceramic
C15	1	220pf, 50V, 20% Monolithic Ceramic, Mica
DIODES		
CR1	1	1N4002
CR2, CR3, CR4	3	1N914
RESISTORS		
	Note:	Unless otherwise indicated, all resistors are 1/8 watt, 5%, Carbon Film
R1, R2, R10	3	100K
R3, R4, R5, R6	4	120K
R7	1	750K
R8	1	51K
R9	2	6.8K
R11, R24, R28	3	10K
R12	1	3M
R13	1	15K
R14	1	13K
R15	1	680K
R16	1	3K
R17, R19	2	26.1K, RN55D, 1%, Metal Film
R18	1	Potentiometer, 100K, 20 Turn, Spectrol 43P104
R20, R22	2	124K, RN55D, 1%, Metal Film
R21, R26	2	200K
R23	1	24K
R25	1	30K
R27	1	3.9K
R29	1	Potentiometer, 10K, Single turn, Mepco 8014 EMU
R30	1	1K
R31, R34	2	7.5K
R32	1	1M
R33	1	130K
R35	1	5.6K
INTEGRATED CIRCUITS		
IC1	1	LM358N National or equiv.
IC2, IC3	2	LM324N " " "
V1	1	MC78L08cp Motorola or equiv.
TRANSISTORS		
Q1	1	2N3906 (2N3904 with OPTION 1)
Q2, Q3	2	2N4401
MISCELLANEOUS		
-	4	7 pin socket strips CA-07STL-TSD
-	1	8 pin socket TI C84-08-02
-	1	1" x 1-3/4" Adhesive Foam Tape 3M#4408
-	10	24 gu. Type BU 19/36 wire, 18" long color coded per schematic

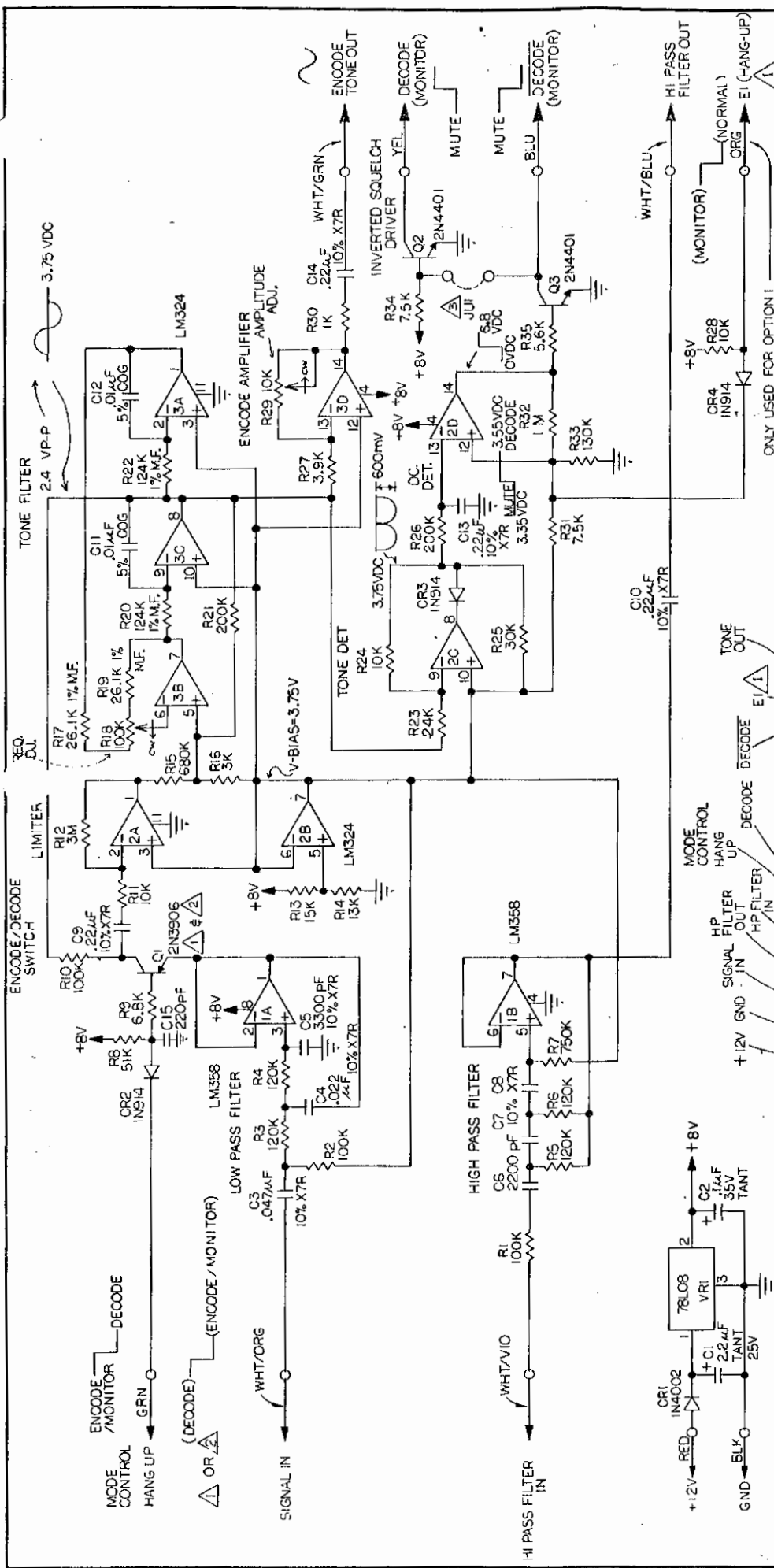
VI. WARRANTY

The SSC Model 510A is warranted for five years for replacement of defective parts and two years for labor. This warranty is specifically limited to correction of the defects by factory repair or replacement of the faulty equipment or parts. For a complete warranty statement, please refer to the "Ordering Information" section of your SSC catalog.

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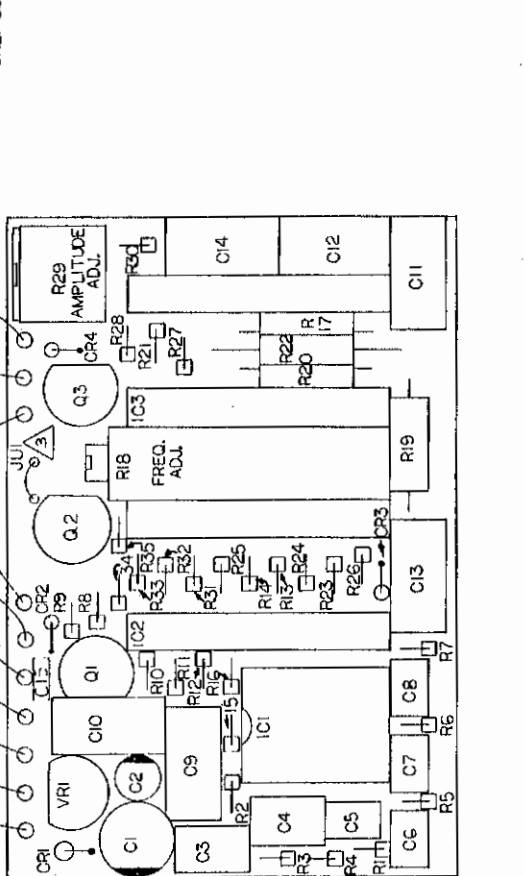


NOTES

- ◻ DIODE, CATHODE (BAND) UP WHEN POSITIONED AS SHOWN
- DRY TANTALUM CAPACITOR
- ◻ SHADED PORTION INDICATES POSITIVE POLARITY
- ◻ FIXED RESISTOR STAND UP
- 1/8 WATT 5% CARBON FILM

REV.	DATE	NAME	DESCRIPTION
1	12-10-79	JRL	ADDED DESCRIPTION
2	0-10-80	W.A.H.	REVISED
3	5-30-79	SGS	TR 210, 213 & 32

SCHEMATIC (-7)
 TITLE 510A CTCSS ENCODER/DECODER
 DRAWING NO. SA-C2-0512-7
 SCALE 4X
 APPROVED BY: [Signature]
 DATE: 8/28/79
 PROJECT NO. 510A



OPTION 1:
 FOR REQUIRED PTT APPLICATIONS
 CHANGE Q1 TO NPN 2N3904 OR
 EQUIV. USE GRN LEAD FOR
 PTT & ORG LEAD FOR HANG-UP.

OPTION 2:
 FOR INVERTED MODE CONTROL;
 CHANGE Q1 TO NPN 2N3904 OR
 EQUIV.

REMOVE JU 1 WHEN DECODE (BLU)
 IS USED.