

SSC

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MODEL 224BA/BY

OPERATING INSTRUCTIONS

TWO-TONE SEQUENTIAL DECODER
MODEL 224BY (MOBILE)
MODEL 224BA (P.C. BOARD)

REV.: June 1986
(Replaces 224A Series)

I. GENERAL

The SSC Model 224B is a true universal two-tone sequential or burst tone decoder capable of being easily field programmed via dip switch and tuned to any existing two-tone sequential or single tone format operating between 250Hz and 3050Hz.

Tone acceptance is guaranteed by the ability to independently select tone decode times, independently adjust the frequencies anywhere in the range and to separately select the desired intertone delay limit. The group call function may be used on either the first or second tone or inhibited. Burst tone decoding is provided by removal of one diode. Hook sw. Control is reversible.

Falsing is eliminated by interlocking the outputs of two independent tone filters and detectors while suppressing the decode function in the presence of voice or other extraneous tones.

The Model 224BY is designed as a self-contained under-dash add-on to existing mobile radios where the only connections are to power source, speaker leads and a normally closed mic hanger switch. Additional momentary and latched contacts are available for operating external options such as blowing a horn and lighting a beacon. Internal provisions have been made for adding a transponder.

The Model 234AA is an uncased version of the 224BY and is intended for mounting within host equipment.

II. OPERATIONAL SCENARIO

The radio receiver power and volume controls are turned on for the SSC decoder to receive selective calls. Set noise squelch for normal operation.

With the "MONITOR RESET" switch in the extended "MUTE" position and the radio microphone on the hook, the radio speaker will remain muted until either the operator removes the mic from the hanger, or depresses the "MONITOR" switch, or another station selectively calls the local station with a proper encoded signal.

If selectively called, the decoder will respond by momentarily sounding the buzzer (if provided) and by blowing the vehicle horn (if connected and if the operator had depressed the "HORN BLOW" switch).

In addition, the red "CALL" lamp will illuminate and together with the unmuted speaker will remain operational until reset either by removing and replacing the mic on the hook switch or by twice pushing the "MONITOR RESET" switch so that it winds up in the extended "MUTE" position.

If the SSC Decoder happens to be in the "MONITOR" mode when a selective call is received, the optional buzzer and horn will sound momentarily and the "CALL" lamp will illuminate and remain on until reset by one of the above-mentioned means.

III. SPECIFICATIONS

Signal Format: Two-Tone Sequential with optional single tone group call or optional single burst tone.

Input Level: 18mV to 10VRMS

Frequency Range: Each tone independently continuously tunable from 250Hz to 3050Hz in two independent dip switched bands.

Decode Bandwidth: $\pm 1.5\%$ Nominal, $\pm 0.5\%$ Stability

Input Impedance: Balanced, D.C. isolated 16ohms
2W dummy speaker load in muted condition,
2.5K in decoded condition. Unbalanced and greater than 0.5Megohm with coupling transformer and load resistor deleted.

Tone Acceptance Format:

Tone #1: Greater than 70ms. or 300ms., independently dip switch selectable.

Intertone delay limit: 100ms. or 400ms. dip switch selectable window before start of second tone.

Tone #2: Greater than 70ms or 300ms independently switch selectable.

Group Call Operation: Selectable; disable or greater than 4.9 seconds of either tone 1 or tone 2 but not both.

Single burst tone operation afforded by synchronously tuning both tone filters and removing interlock diode.

Other timing values obtained by changing appropriate resistors.

Supply Voltage: 10.8V to 20VDC

Current, Stand-by: 21Ma nominal

Current, Latched: 68Ma nominal

Current, Max.: 140Ma nominal during three second alarm

Decode Indication: Bright red LED on front panel and unmuting of speaker. Momentary call annunciator optional.

Controls: "Monitor-Reset/Mute" push button, "Horn" enable push button

External Control: Hook switch; open ckt for MUTE, closed ckt for Monitor/Reset or reverse by jumper.

Outputs: Momentary: 1 Form "C" 2Amp contacts enabled by front panel switch for horn blow or other signalling purpose. Latched: 1 Form "C" 1 Amp contacts for aux. purposes: 1 Form "C" contact reserved for connecting speaker.

Operating Temperature Range: -40°C to $+85^{\circ}\text{C}$

Enclosure Size: 3-1/8"W x 4-1/16"D x 1-5/16"H plus mounting bracket and rear connector with mating cable.

P.C. Board Size: 2-5/8"W x 3-3/8"L x 3/4"H with coupling transformer, excluding switch and connector overhangs.

IV. MOUNTING CONSIDERATIONS

Locate a convenient surface under the dashboard of the vehicle or attach to the host radio where the mounting bracket may be secured leaving room for passenger knees and still within easy reach of the operator. Refer to the mobile installation drawing on the back page for all necessary connections.

V. INSTALLATION AND ADJUSTMENTS

Before installing, open the cover of the 224BY and program the decoder according to required Two-Tone Sequential System format. This will be determined by the associated encoder format.

Determine the following parameters:

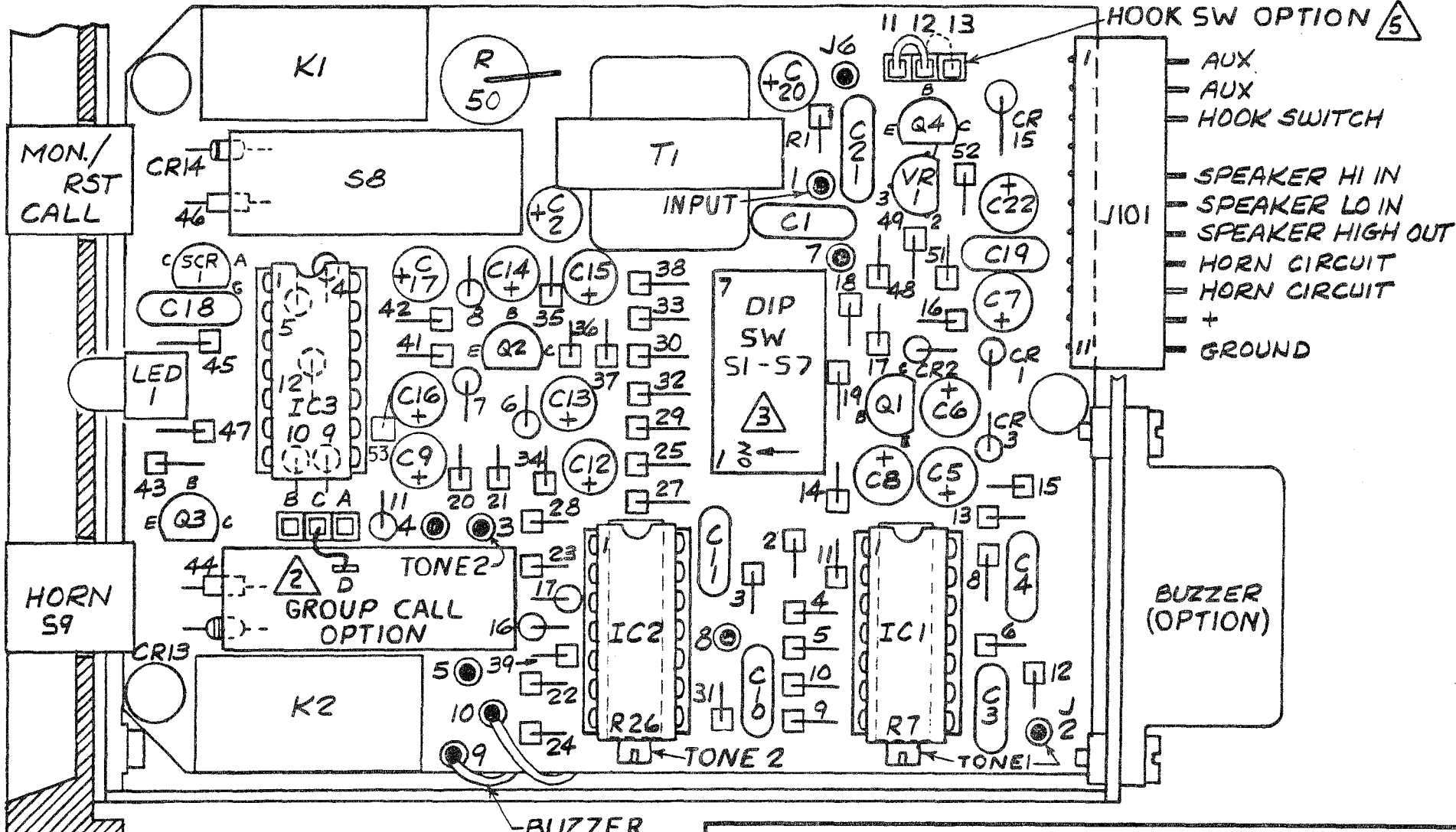
- 1) frequency of Tone 1
- 2) frequency of Tone 2
- 3) length of Tone 1
- 4) space between Tone 1 & Tone 2
- 5) length of Tone 2
- 6) If group call is used, which tone.
- 7) If single burst tone, see Note 1
- 8) Hook sw. Control logic, see Note 5.

Locate the seven section dip switch on the 224B board. Program the required format as required according to the Dip Switch Programming Chart. \triangle

The group call option is factory strapped for "None." If group call is desired on either the first or second tone, consult the schematic, option note 2, for instructions and consult the assembly drawing for location of the group call strapping.

Following the decoder programming and strapping procedure in the above, prepare to tune the decoder to the exact required frequencies.

To set tone #1, use factory supplied jumper between J1 and J2, this will cause tone filter #1 to oscillate at the decode frequency. Connect a counter or scope with frequency standard reference to the jumper for observation of frequency. Adjust R7 (20 turn pot) for desired tone 1 frequency. Remove the jumper and reconnect between J1 and J3 to cause tone filter #2 to oscillate. Repeat the tuning procedure while adjusting R26 for desired tone #2 frequency. Tune both filters to the same frequency for single burst tone decoding. (Cont. on page 4)



- DIODE CATHODE (BAND) UP
- RESISTORS STANDING UP
- ELECTROLYTIC CAPACITORS SHOWING POSITIVE LEAD
- BEAD PIN SHOWING (J) NUMBER

SSC

SOLID-STATE COMMUNICATIONS, INC.

REVISIONS	
-1 9-25-84	-2 4-4-85
-3 4-29-85 ECR 312	

TITLE
**MODEL 224 BY
 ASSEMBLY DRAWING**

DRAWN 4/20/84 *Nc*
 CHECKED *ck*
 APPROVED *Adel 10/2/84*

SCALE
2:1

DRAWING NO.
A-A2-1284-4

Connect and physically install the Model 224BA or 224BY as shown in the cable assembly drawing and the Model 224BY mobile installation drawing on rear page.

If the decoder does not respond to calling commands from the associated station encoder, recheck all of the above procedure steps and make sure the encoder is actually sending the required tone frequencies with timing over the communications medium. If the decoder fails to reset and a constant "Momentary" output is indicated, recheck to be sure that one of the group call strapping options is installed per Note 2 of schematic. Check hook sw. control logic jumper per Note 5. If still having problems, consult the SSC factory at (415) 785-4610.

VI. LIMITED FIVE YEAR WARRANTY

All cataloged SSC products are 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. Any unauthorized alteration or modification of the equipment or damage caused by external sources will void the warranty.

All warranty repairs must be performed at the SSC factory in Hayward, California. No credit will be given for unauthorized repair work attempted by the customer. In-warranty merchandise must be shipped to the factory freight prepaid and will be returned freight prepaid.

Equipment for repair may be returned to the factory without prior written authorization; however, it is required that a note be sent with the packing list briefly describing the nature of the defect. Customer authorization must be included for out-of-warranty equipment before repairs can be made.

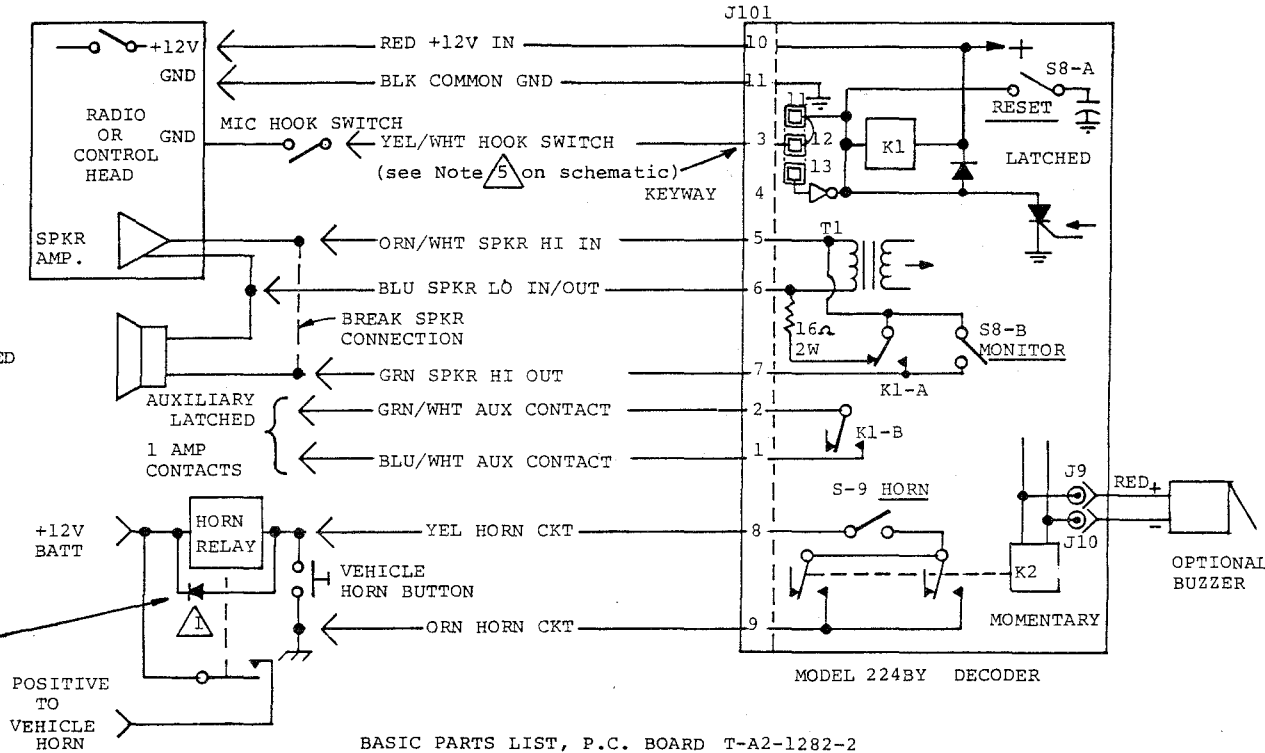
Non-warranty repairs will be billed at prevailing labor rates plus parts if not covered.

224AY MOBILE INSTALLATION

CAUTION

DO NOT RUN RADIO UNSQUELCHED AT FULL VOLUME WITH DECODER IN MUTE CONDITION.

ADD IN4002 OR EQUIVALENT AS INDICATED. INSTALL HIGH CURRENT HORN RELAY IF NOT AVAILABLE IN VEHICLE.



BASIC PARTS LIST, P.C. BOARD T-A2-1282-2

Reference	Qty.	Description
R52	1	2.2K 5% 1/8 or 1/4W CF
R41	1	220 ohm, 5% 1/8 or 1/4W CF
R15, R34	2	1.8K, " " " "
R4, R23, R43	3	2.4K, " " " "
R16, R35	2	5.6K, " " " "
R1, R51, R21	3	10K, " " " "
R48, R49	2	3.9K, " " " "
R18, R37	2	39K, " " " "
R20	1	43K, " " " "
R17, R36, R6, R25	4	100K, " " " "
R5, R24	2	180K, " " " "
R42	1	560K, " " " "
R22, R3	2	680K, " " " "
R2	1	3.3M, " " " "
R12, R31	2	10M, " " " "
R19, R38	2	12K, " " " "
R39	1	910K, " " " "
R44, R46	2	3K, " 1/8W CF
R47	1	1K, " 1/4W CF
R10, R13, R29, R32, R8, R9, R27, R28	4	10.2K 1% RN55 D or C
	4	11.5K 1% RN55 D or C
R11, R14, R30, R33	4	22.6K, " " " "
R50	1	16 ohm, 5% 2W CC
R7, R26	2	Pot, 100K, 20 T. Dale 8417
R45	1	22K 5% 1/4W C.F.
CAPACITORS		
C19	1	.001uf, 20% 100V, C Disc
C18, C21	2	.1uf, 20% 16V, C Disc
C6, C13	2	.1uf, 20% 16V, Tant
C7, C14, C5, C12, C22, C20	6	2.2uf, 20% 16V, Tant
C1	1	.1uf 20% 50V X7R
C2, 8, 15, 17, 16, 9	6	10uf, 10% 16V, Tant
C4, C11, C3, C10	4	.01uf, 5% 16V, CCG

Reference	Qty.	Description
J1 thru J10	10	MISCELLANEOUS
J101	1	Bead Pins, Male .062 DIA Connector, Male Rectangle Amp. Amp #1-640657-1
	6	Socket, single in line 7 pin (for IC sockets) CA-07, STL-TSD (or equiv.)
	1	Socket strip, 3 Pin CA-03STL-TSD
PI01		Connector, Female Amp #160441-1 Cable, Milspec Supply Custom 6T/PBU1936-24
K1, K2	2	Relay, 2 Form C ITT#RZ-12
C1 thru 14, 16, 17	16	DIODES
CR15	1	IN914
LED-1	1	IN4002
	1	LED, RED, "DIODE-LITE" #550-2406 DIALIGHT CORP.
Q1, Q2, Q3, Q4	4	TRANSISTORS
SCR-1	1	2N4401 TO-92 Pkg SCR TIC-44 / 2N5060 / C103Y
IC-1, IC-2	2	INTEGRATED CIRCUITS
		Quad, JFET-Input Oper. Amplifier #TL-084CN
IC3	1	Operational Ampl #LM324CN
VR1	1	Voltage Reg. #LM78L08 (TO-92 Pkg)
T1	1	TRANSFORMER
		Centinal, 42TM016
S1-7	1	SWITCHES
S8, S9	2	Digital #CTS-206-7 2PDT Latching, Push-On, Push-Off Type, "F" Series, F-2UEE, Schadow or Equiv.
S8, S9 Ref.	2	Button, Black (For S8, S9) #FSC