

Selectone

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GENERAL

The ST-100 is a unique miniature CTCSS Encoder designed for land mobile tone squelch applications. Compact size, continuously tunable frequency adjustment, and convenient mounting techniques permit easy field installation in almost any portable, mobile, or base station radio. The ST-100 is fully compatible with all major CTCSS systems, including Motorola "Private Line", General Electric "Channel Guard", and RCA "Quiet Channel".

Because of our comprehensive warranty policy, you should probably not have to consider any field repair; however, if repair is unavoidable, all parts are clearly labeled on our diagram and should be generally available through component distributors.

Application notes are available or can be developed for most popular radios. If you would like application details for a specific radio, please call us TOLL FREE at (800) 227-0376, or in California call (415) 887-1950. Together we may be able to save you some time and money.

OPERATING SPECIFICATIONS

OPERATING VOLTAGE:	5.5 Vdc to 30Vdc (reverse polarity protected)
OPERATING CURRENT:	Less than 6mA (12 Vdc supply); less than 2mA with regulator removed
FREQUENCY RANGE:	67.0 Hz to 250.3Hz
OPERATING TEMPERATURE RANGE:	Exceeds EIA spec. (-30°C to +60°C)
FREQUENCY STABILITY:	Exceeds EIA spec (less than $\pm .5\%$); Typically less than $\pm .2\%$
ENCODE OUTPUT LEVEL:	Adjustable 0 to nominally 1 Vrms
ENCODE OUTPUT LEVEL: STABILITY:	Less than ± 1 dB change 67.0Hz to 250.3Hz
ENCODE RISE TIME:	Less than 150ms
-tone PURITY:	Less than 1% distortion (THD)
INTERFACE:	Flying Leads
SIZE:	1.0" L X .80" W X .38" H (2.54cm X 2.03cm X .95cm)
MOUNTING:	Double-sided pressure sensitive tape

INSTALLATION

We have attempted to configure the ST-100 to require minimum installation effort for most radios. We recommend that you take advantage of the radio manufacturers CTCSS connection points whenever possible.

Tone Output (white/green): Connections should be similar to Figure A or B. RA may be required to avoid circuit loading by the low output impedance of the ST-100. For your convenience, three common values for RA have been supplied with a section of heat shrinkable tube.

(-) Supply (black): Connect to system (-) supply (ground).

(+) Supply (red): Connect to system (+) supply +5.5Vdc to +30Vdc. The ST-100 voltage regulator is effective above 10.5Vdc. For low current applications like portables, or when the supply voltage is less than 10.5Vdc, the voltage regulator may be removed. Cut the three leads of VR1 as near the case as possible. Bend over the lead nearest the anode of CR1 so as to touch the anode lead of CR1 and solder. Cut off the remaining two VR1 leads near the board. The ST-100 will now operate 5.5Vdc to 30Vdc at low current (less than 2mA). A regulated supply voltage is recommended for operation at less than 10.5Vdc and all low current applications.

ADJUSTMENTS

The ST-100 is continuously tunable over the standard CTCSS frequency range from 67HZ to 250.3HZ. To set frequency, apply power & connect the white/green (tone output) lead to a frequency counter. Adjust R3 for the desired CTCSS frequency. You may find the use of a lissajous figure with a known on frequency reference the quickest frequency set up procedure, or as an alternate if a counter is not available. The output level of the ST-100 is set with R11. Adjust R11 for approximately .75 khz deviation.

OPERATING INSTRUCTIONS

CTCSS Encoder

Model ST-100

MOUNTING

Use of a double-sided adhesive pad eliminates hardware requirements. Mount the ST-100 on a clean, dry surface oriented to allow future adjustments should they be necessary. Press firmly after mounting to insure good contact of adhesive. Do not touch the adhesive or attempt to reposition the unit after mounting.

The ST-100 has been designed to maximum immunity to RF interference; however, an effort should be made to locate the unit as far as possible from the radio's RF power stages. To further minimize RF problems, twist the power leads together and maintain all leads at a minimum length.

PARTS LIST

Schematic Reference	Description	Selectone Part No.
CAPACITORS		
C1, C2	.01uf, 50V, 10%, COG, Ceramic	5-11-310
C3	.22uf, 50V, 10%, X7R, Ceramic	5-14-422
C4	.01uf, 50V, 10%, X7R, Ceramic	5-14-310
C5	2.2uf, 16V, 20%, Tantalum	5-47-522
DIODES		
CR1	IN914	6-51-914
INTEGRATED CIRCUITS		
U1	LM324N Op Amp, RCA	6-31-324
VR1	MC78L08cp Regulator, Motorola	6-32-808
RESISTORS		
Note: Unless otherwise indicated, all resistors are 1/8 watt, 5% carbon film.		
R1, R5	124K, RN55D, 1%, Metal Film	7-33-124
R2, R4	26.1K, RN50D, 1%, Metal Film	7-22-261
R3	100K, 20 turn pot, Spectrol 43P104	7-65-410
R6	560K	7-11-456
R7	430K	7-11-443
R8	4.3K	7-11-243
R9	470K	7-11-447
R10	150K	7-11-415
R11	10K, Single turn pot, VRN 182-10K	7-61-310
WIRE		
Note: All wire type BU, 24gu, 19/36, 18" long, stripped 3/8"x3/16".		
- Supply	Black	8-11-100
+ Supply	Red	8-11-122
Tone Out	White/Green	8-11-195
MISCELLANEOUS		
-	IC Socket Strip, Augat 510-AG910-7	8-21-107
-	Vinyl Foam Pad, Scotch #4408	8-18-100
-	P.C. Board #401002	4-01-002

WARRANTY POLICY

All standard Selectone products are guaranteed to meet or exceed published performance specifications and are warranted against defects in material and workmanship for a period of five years from date of purchase. Special configurations and nonstandard systems are warranted for a period of one year.

If any standard Selectone products fails to operate within the first 90 days from the date of purchase, Selectone will immediately send a replacement unit postpaid, via airmail or UPS Blue label (air), and will issue full credit, including freight, upon the return of defective unit(s). For this special warranty replacement service, call the Selectone customer service department TOLL FREE at (800) 227-0376 (In California call (415) 887-1950).

After 90 days, 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.

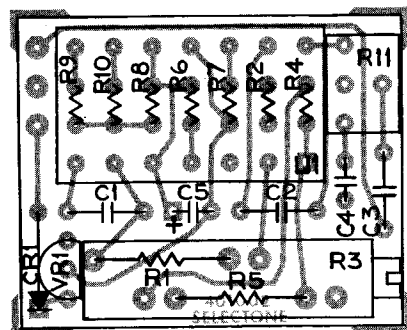
All warranty repairs must be performed at the Selectone factory in Hayward, California. No credit will be given for unauthorized repair work attempted by the customer.

Equipment for repair may be returned to the factory without prior written authorization; however, it is requested that a note be sent with the packing list briefly describing the nature of the defect.

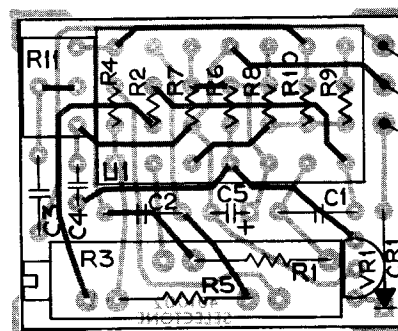
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Toll Free outside California [800] 227-0376

REV. 2/80

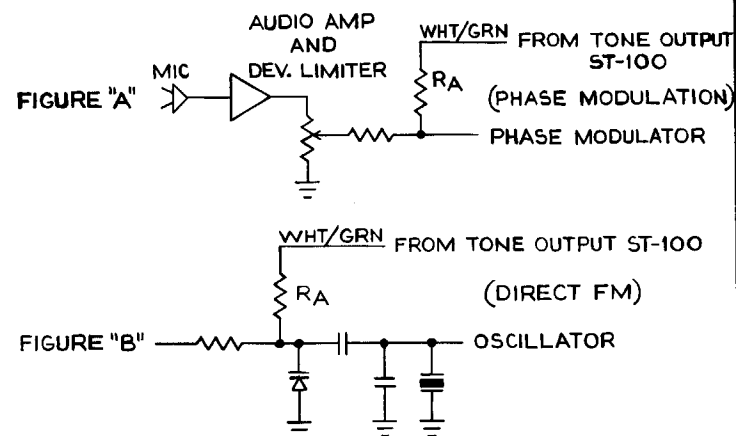
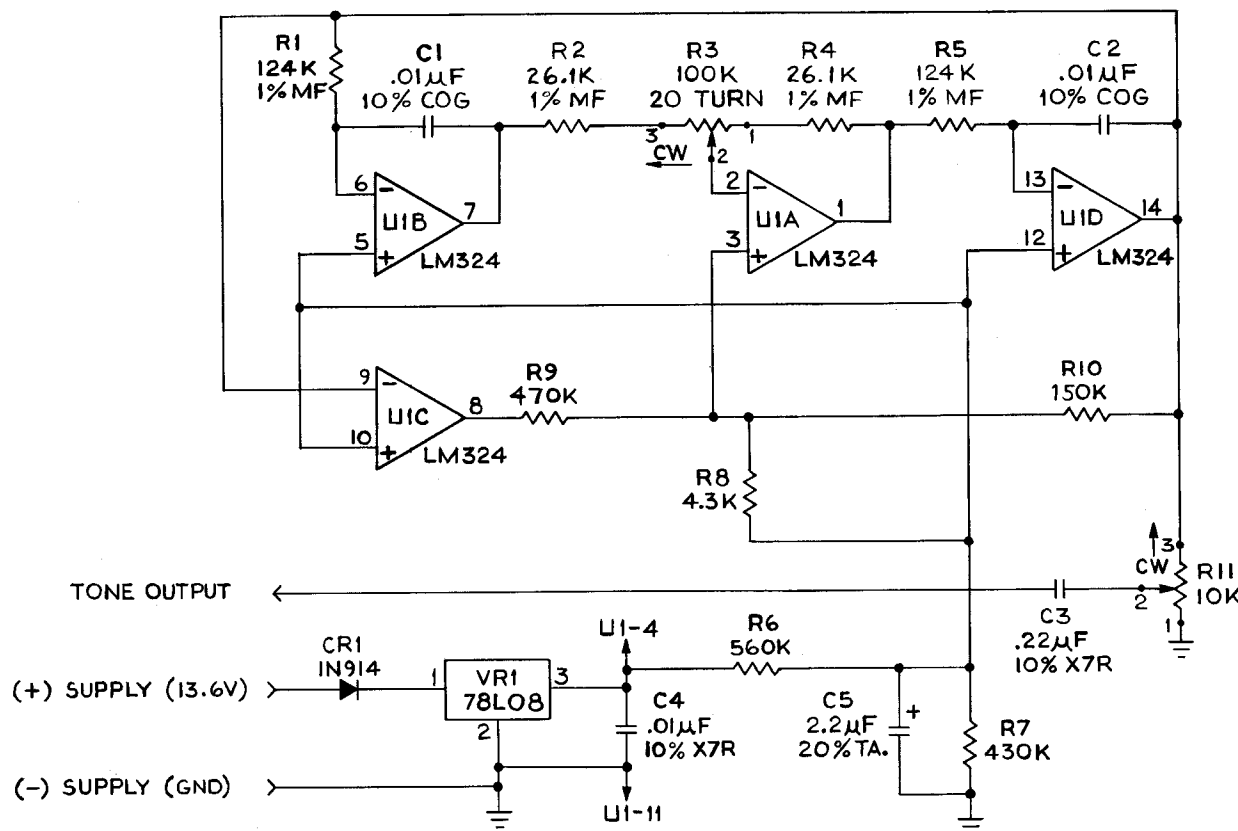


SOLDER SIDE



COMPONENT SIDE

TONE OUTPUT (WHT/GRN)
(-) SUPPLY (BLK)
(+) SUPPLY (RED)



NOTE : UNLESS OTHERWISE INDICATED
ALL RESISTORS ARE 1/8W, ±5%

DRAWN DAN ALVAREZ	DATE 1-9-80	Selectone	
CHECKED J.F.O.	DATE 1-9-80		
ENGR	DATE	ASSEMBLY & SCHEMATIC	
MFG	DATE	ST-100 CTCSS ENCODER	
FIRST USED (NEXT ASSY)		MODEL ST-100	
SHEET 1	TOT SHT 1	SIZE C	DWG NO 401002