

### GENERAL

The ST-202 is a sub-miniature circuit board which encodes two-tone sequential tone formats commonly used in radio paging and RCC systems. The ST-202 is compatible with signaling formats such as G.E.'s "Type 99", Motorola's "Quick Call II" and Plectron. Other signaling timing may be easily realized by using the timing formulas on the schematic.

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 labelled on our diagram and should generally be available through component distributors.

Interface diagrams are available or can be developed for most popular radios. Please call us if you would like applications details for a specific radio. Together we may be able to save you some time and money.

### OPERATING SPECIFICATIONS

Supply Voltage:	10.5Vdc to 30Vdc (7Vdc min. with regulator removed and jumpered)
Supply Current:	Standby: Less than 20mA
Operating Temp:	-30°C to +60°C
Frequency Stability:	Better than $\pm 0.5\%$ ; Typically $\pm 0.2\%$
ENCODE OUTPUT Level:	Adjustable 0 to 0.5Vrms nominal
Sinewave Purity:	Less than 5% THD
Impedance:	Selectable 3K or 50K
Keying:	Open collector saturates to [-] supply during Encode; Maximum current =250mAdc 30Vdc maximum open-circuit voltage
Code Programming:	Continuously tunable
Code Capability:	F1 and F2, OR F2 and F1
Interface:	18" flying leads
Size:	1.05"W x 1.9"L x 0.38"H (2.67cm x 4.83cm x 9.97cm)
Mounting:	Double-sided pressure sensitive tape

### TONE FORMAT SPECIFICATIONS

Frequency Range:	300Hz to 3000Hz
Tone Timing:	Tone #1: Typically 1 sec Intertone: Less than 5ms Tone #2: Typically 3 sec

### OPERATION

When the "A" or "B" paging input is momentarily grounded, the ST-202 generates a pre-set paging code (F1 and F2, or F2 and F1) and provides an open collector Darlington output for transmitter PTT keying. Contact our Applications Engineering Department for details of Group-Call operation (Tone 1 or Tone 2 as a long tone).

### INSTALLATION

We have configured the ST-202 to require minimum installation time. Our experience has found that most 1+1 encoder users are familiar with the 1+1 systems and have quite diverse requirements. Therefore, only general connection information is provided. Call us if you would like applications details and suggestions.

#### [+] Supply (RED):

Connect to system [+] supply (10.5Vdc to 30Vdc). +7Vdc operation is possible by removing VR1 and CR1 and jumpering input to output. This modification removes reverse polarity protection.

#### [-] Supply (BLK):

Connect to system [-](ground).

#### Tone Output (WHT/GRN):

Connect to voice audio input of transmitter. Clip R1 or R2 to increase the ST-202 output impedance for matching and non loading of the microphone input.

#### PTT Output (BLK/YEL):

Connect to PTT (relay or solid-state) keying of the transmitter. If the transmitter requires sourced V+ or other than pull-to-ground PTT voltage to key, use this output to drive a small relay coil and key the transmitter with the relay contacts.

#### "A" Page Code (ORG):

Connection to [-] supply starts page cycle. PTT saturates to [-] supply, F1-F2 code is sent, PTT goes to open.

#### "B" Page Code (VIO):

Connection to [-] supply starts page cycle. PTT saturates to [-] supply, F2-F1 code is sent, PTT goes to open.

## MOUNTING

Use of a double-sided adhesive pad eliminates hardware requirements. Mount the ST-202 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.

While the ST-202 has been designed with high RF field immunity in mind, care should be taken in the location and wiring of the unit. Mount the unit as far from the transmitter power amplifier stage as possible and maintain all lead lengths at minimum.

## FREQUENCY ADJUSTMENTS

The ST-202 has been designed to provide you with maximum flexibility in filling 1+1 paging code requirements. Each tone is independently tunable over the frequency range of 300 to 3000 Hz.

To tune the unit, first both TP1 and TP2 must be installed. This is how the unit is shipped from the factory. The frequency of oscillation will be for tone #2 of the page code and can be measured on the WHITE/GREEN wire. Adjust R8 to the required frequency using a frequency counter or a lissajous figure and tone standard. Remove the test jumper at tone #2 test [TP2]. Oscillation will now be for tone #1 of the page code. Adjust R7 for the required frequency. Remove the jumper at tone #1 test [TP1]. The ST-202 is now ready for operation.

The test jumpers in the ST-202 are intended to use wire leads of approximately 25 gauge wire leads from 1/4 or 1/8 watt resistors.

## 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 the date of purchase. Special configurations and non-standard systems are warranted for a period of one year.

If any standard Selectone product fails to operate within the first 90 days from the date of purchase, Selectone will immediately send out a replacement unit and will issue full credit, including freight, upon the return of the defective unit(s). All prepay/C.O.D. customers must return the defective equipment prior to exchange, otherwise the customer will be required to prepay for the new unit(s) with credit issued only on the return of the defective equipment.

After 90 days, this warranty is specifically limited to correction of the defects by factory or replacement of faulty equipment or parts.

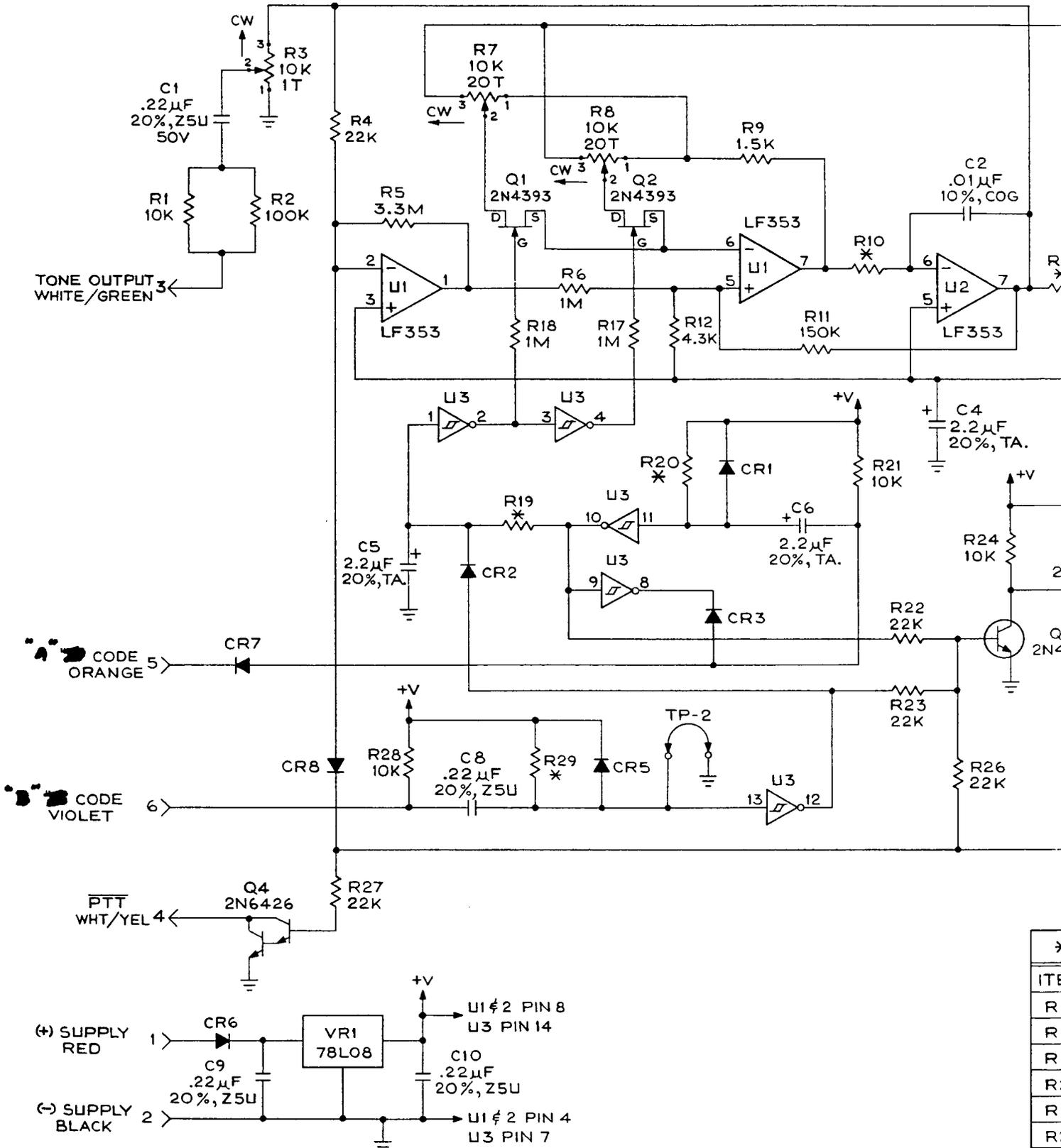
All warranty repairs must be performed at the Selectone factory in Hayward, California. No credit will be given for unauthorized repair work attempted by the customer. Any unauthorized alterations or modification of the equipment, damage caused by external sources, or removal or alteration of the serial number label or date code, will void the warranty. Specifically excluded from this warranty are batteries, fuses, lamps, and damage caused by lightning, power surges, or mechanical abuse.

For equipment to be returned to the factory for repair, you must first call and get an RMA# from Customer Service. The RMA# must be written on the outside of the package, otherwise receiving will reject the shipment. In addition, a note must be sent with the packing list briefly describing the nature of the defect.

For special warranty replacement service, contact Selectone Customer Service Department at (800) 227-0376, fax (510) 781-5454 or E-Mail us at [techsupport@selectone.com](mailto:techsupport@selectone.com).

All repairs and returns are to be sent to:

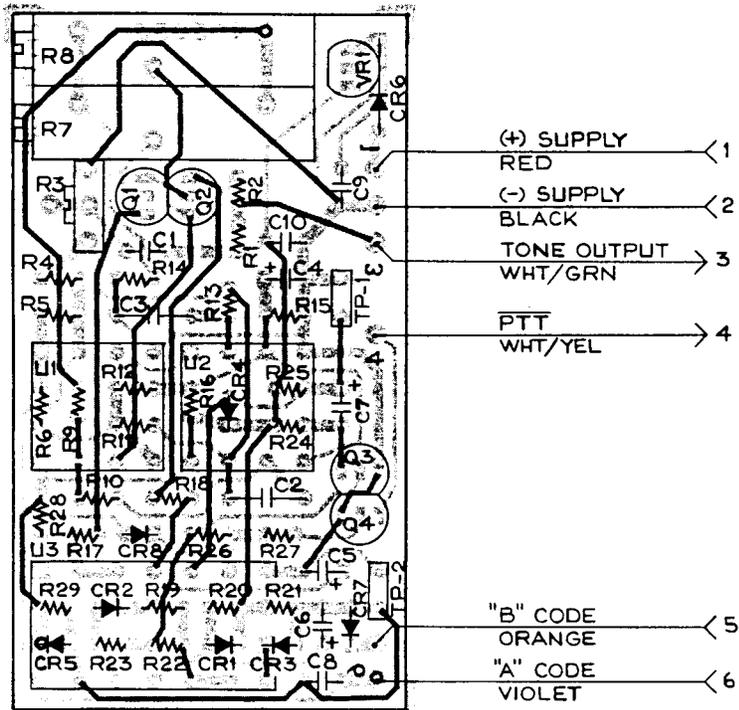
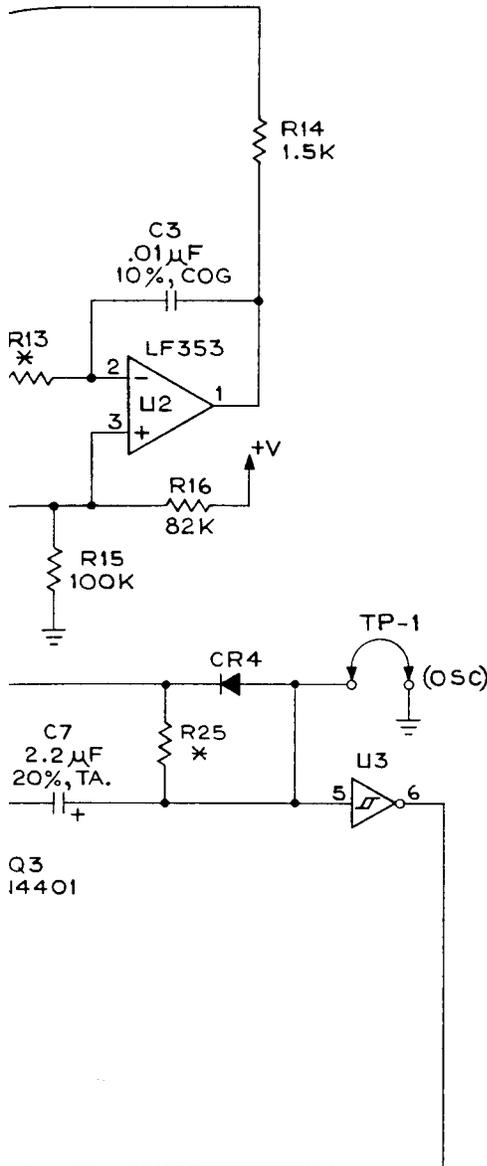
Selectone, Inc.  
3501 Breakwater Ave.  
Hayward, Ca. 94545-3610  
ATTN: Warranty Repair



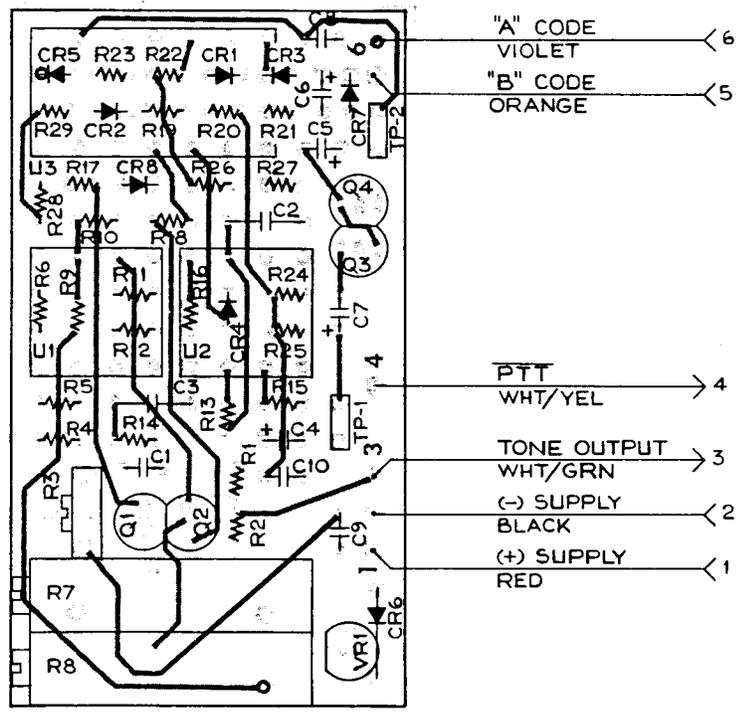
NOTES: UNLESS OTHERWISE INDICATED;

1. ALL RESISTERS ARE 1/8W, ±5%
2. ALL DIODES ARE 1N914
3. ALL IC'S ARE 74C14

R28	10K
C8	.22µF
CR5	1N914
U3	LF353
U2	LF353
U1	LF353
Q2	2N4393
Q1	2N4393
Q4	2N6426
CR6	1N914
CR7	1N914
CR8	1N914
CR1	1N914
CR2	1N914
CR3	1N914
CR4	1N914
CR5	1N914
CR6	1N914
CR7	1N914
CR8	1N914
CR9	1N914
CR10	1N914
CR11	1N914
CR12	1N914
CR13	1N914
CR14	1N914
CR15	1N914
CR16	1N914
CR17	1N914
CR18	1N914
CR19	1N914
CR20	1N914
CR21	1N914
CR22	1N914
CR23	1N914
CR24	1N914
CR25	1N914
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CR27	1N914
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CR79	1N914
CR80	1N914
CR81	1N914
CR82	1N914
CR83	1N914
CR84	1N914
CR85	1N914
CR86	1N914
CR87	1N914
CR88	1N914
CR89	1N914
CR90	1N914
CR91	1N914
CR92	1N914
CR93	1N914
CR94	1N914
CR95	1N914
CR96	1N914
CR97	1N914
CR98	1N914
CR99	1N914
CR100	1N914



SOLDER SIDE



COMPONENT SIDE

\* OPTION CHART

ITEM	ST-202A	ST-202B
R10	10.5K, 1% MF	26.1K, 1% MF
R13	10.5K, 1% MF	26.1K, 1% MF
R19	47K	750K
R20	1.5M	1.5M
R25	75K	1.5M
R29	47K	750K
Q1	OUT	IN
Q2	"	"
Q3	"	"
Q4	"	"
Q5	OUT	IN

DRAWN DAN ALVAREZ	DATE 7-7-81	<b>Selectone</b>
CHECKED J.F.O.	DATE 7/24/81	
ENGR	DATE	ASSEMBLY & SCHEMATIC
MFG	DATE	TWO-TONE
FIRST USED (NEXT ASSY)		SEQUENTIAL ENCODER
MODEL ST-202A & B		
SHEET 1	TOT SMT 1	SIZE D
		DWG NO 402022