Selectone
P R O D U C T   G R O U P

OPERATING INSTRUCTIONS
Model ST-133
Micro-Miniature CTCSS Encoder

Manual # 600-0801
Rev. B - 99071

December 23, 1999

GENERAL

The ST-133 is a digitally programmable CTCSS Encoder. It is small enough to be mounted in most mobile or portable radios where space is a factor.

Like all Selectone CTCSS products, the ST-133 is fully compatible with major CTCSS systems, including Motorola "Private Line", Ericsson/GE "Channel Guard", and E.F. Johnson "Call Guard".

Because of surface mount construction and our comprehensive warranty policy, field repair is usually not cost effective. Complete technical documentation is available through our applications department for customers with special requirements.

Application information is available or can be developed for most radio models. Documentation on ALL current products and many of our application notes are available for instant access on our website **www.selectone.com**. If you would like application details for a specific radio, please call us at 510-887-1950 or request assistance via E-mail at technicalsupport@smartrunk.com.

OPERATING SPECIFICATIONS

SPECIFICATION	DETAIL
Operating Voltage	5.5 to 16Vdc
Operating Current	Less than 3mAdc
Frequency Range	All EIA RS-220A tones (67.0 to250.3Hz)
Temperature Range	-30° C to +60° C
Encode Output level	Adjustable 0 to 1Vrms
Encode Distortion	Less than 5% THD
Interface	9" Flying leads
Size	.75L x .45W x .18H (19.1mm x 11.4mm x 4.6mm)

INSTALLATION

We have configured the ST-133 to require minimum installation effort for most radios. We recommend that you take advantage of the radio manufacturer's CTCSS connection points whenever possible. Frequency Programming and Output impedance for the ST-133 is adjusted with solder jumpers across closely spaced solder jumper pads. The required jumpers must be installed to accommodate each specific application.

ELECTRICAL INTERFACE

NEGATIVE (-) SUPPLY (BLACK): Connect to system Negative (-) Supply. If PTT switches to Negative (-) Supply to key the transmitter, this lead may be connected to PTT to minimize standby current.

POSITIVE (+) SUPPLY (RED): Connect to system positive (+) Supply.

TONE OUTPUT (WHT/GRN): Most FM two-way radios make provisions for CTCSS modulation. This point is near the voice deviation control. The impedance at this point varies from radio to radio. The ST-133 has provisions for three parallel resistors (1K, 51K, &150K) in series with its output circuit; the 1K or the 51K resistor is paralleled with the 150K resistor to lower the output impedance. Remove JU-7 or JU-8, to provide a correct tone output level without loading the radio modulator circuit and reducing voice modulation. Removal of JU-7 removes the 1K resistor and removal of JU-8 removes the 51K resistor from the circuit. CTCSS deviation is adjusted with R2. A CTCSS deviation level of ± 0.15 % of system deviation is recommended (±.75 KHz for systems with ±5KHz max. deviation).

MOUNTING

Use of a double-sided adhesive pad eliminates hardware requirements. Mount the ST-133 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.

PROGRAMMING

Frequency programming for the ST-133 is done by installation of one or more of six frequency programming solder jumpers. The frequencies and jumper requirements are listed in the Programming Chart below. A solder jumper applies a Negative (-) Supply (GND) level to the corresponding programming input line. Therefore, **digit 0 in the Programming Chart represents a solder jumper**, and represents a logic low condition. No solder jumper allows the internal pull-up circuitry to pull the corresponding programming input line to +5Vdc,a logic high condition. Therefore, **digit 1 in the Programming Chart represents NO jumper.** Frequency Programming is done by removing solder jumpers according to the following Programming Chart.

FREQUENCY PROGRAMMING CHART JUMPERS
JU1-JU6: (0=IN; 1=OUT)

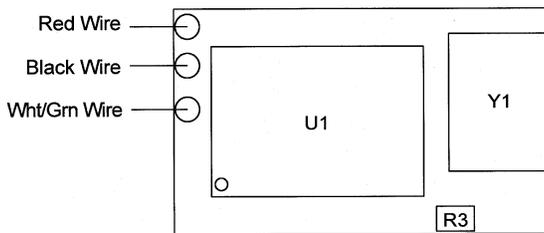| Freq. in Hz	JU1	JU2	JU3	JU4	JU5	JU6	Freq. in Hz	JU1	JU2	JU3	JU4	JU5	JU6
67.0	1	1	1	1	1	1	131.8	1	0	0	1	0	0
69.3	1	0	0	1	1	1	136.5	1	0	0	0	1	0
71.9	1	1	1	1	1	0	141.3	1	0	0	0	0	0
74.4	1	1	1	0	1	1	146.2	0	1	1	1	1	0
77.0	1	1	1	1	0	0	151.4	0	1	1	1	0	0
79.7	1	1	0	1	1	1	156.7	0	1	1	0	1	0
82.5	1	1	1	0	1	0	162.2	0	1	1	0	0	0
85.4	1	1	0	0	1	1	167.9	0	1	0	1	1	0
88.5	1	1	1	0	0	0	173.8	0	1	0	1	0	0
91.5	1	0	1	1	1	1	179.9	0	1	0	0	1	0
94.8	1	1	0	1	1	0	186.2	0	1	0	0	0	0
97.4	1	0	1	0	1	1	192.8	0	0	1	1	1	0
100.0	1	1	0	1	0	0	203.5	0	0	1	1	0	0
103.5	1	1	0	0	1	0	206.5	1	0	0	0	1	1
107.2	1	1	0	0	0	0	210.7	0	0	1	0	1	0
110.9	1	0	1	1	1	0	218.1	0	0	1	0	0	0
114.8	1	0	1	1	0	0	225.7	0	0	0	1	1	0
118.8	1	0	1	0	1	0	233.6	0	0	0	1	0	0
123.0	1	0	1	0	0	0	241.8	0	0	0	0	1	0
127.3	1	0	0	1	1	0	250.3	0	0	0	0	0	0

WARRANTY POLICY

All Selectone products are guaranteed to meet or exceed published performance specifications and are warranted against defects in material and workmanship for a period of two (2) years from date of purchase. Third party equipment such as radios, power supplies, antennas, etc., carry the factory warranty of their respective manufacturers.
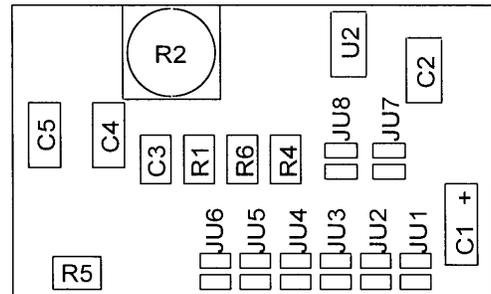
All warranty repairs must be performed at the SmarTrunk factory in Hayward, California, or other factory authorized repair depot. Any unauthorized repair attempted by the customer, alteration or modification of the equipment, damage by external sources, or removal or alteration of the serial number label 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.

Equipment for repair may be returned to the factory without prior written authorization; however, a note must be sent with the packing list briefly describing the nature of the defect. Repairs must be shipped freight prepaid and will be returned freight prepaid. Shipments should be directed to:

SmarTrunk Systems, Inc.
Attn: Repair Department
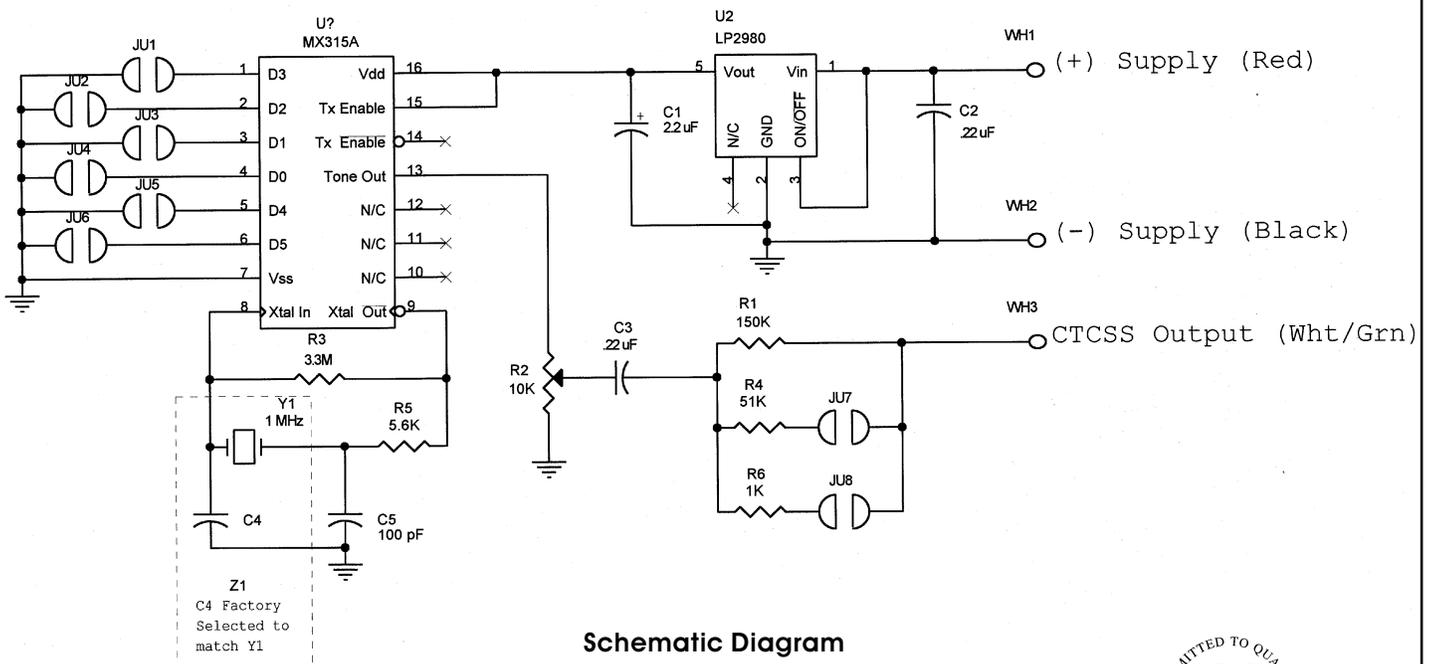23278 Bernhardt Street
Hayward CA 94545, U.S.A.

Red Wire — Black Wire — Wht/Grn Wire — U1 — Y1 — R3

Top View

Component Locator

Bottom View

Schematic Diagram

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