

## GENERAL

This model ST-120, ST-200A and ST-200B TONE DECODERS are all constructed on a common small PCB. Minor component loading differences on the PCB characterizes the DECODER for any one of the three products.

The ST-120 decodes audible "Burst Tone" or "Single Tone" formats used in tone controlled repeater systems and other selective calling applications.

The ST-200A and ST-200B decode Two-Tone Sequential Tone signals. The ST-200A is intended for compatibility fast Two-Tone formats similar to Reach. The ST-200B provides compatibility with slower formats similar to G.E. Type 99, and Motorola Quick Call II.

Upon receipt of a tone signaling sequence, the decoder will provide a latched, a momentary, and a call lamp output to a unmute a receiver, key a transmitter, momentarily sound a horn or alarm, or perform other remote control functions.

Each decoder is continuously tunable to any tone frequency within the specified frequency range. Special formats and applications can be accommodated by changes in the component values listed on the PCB Optional Component Chart.

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.

Many of our application notes are available for instant access on our web site <http://www.selectone.com>. If you would like application details for a specific radio, please call us at (800) 227-0376 or request assistance via Fax at (510) 781-5454 or E-Mail at [techsupport@selectone.com](mailto:techsupport@selectone.com).

## INSTALLATION:

**Positive (+) 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.

**Negative (-)Supply (BLK):** Connect to system - ground.

**Tone Input (Green):** Connect to audio source, e.g., discriminator output, SPK, etc. (*Note: this point must not mute while awaiting paging tones.*)

**Monitor/Hookswitch (BRN):** Connect to hookswitch, hang up box, or microphone hang up button. Selectable ground to monitor or release from ground to monitor by position of JU-1. Resets latched output on hang up and call lamp when off hook.

JU-1 jumpered from common to "A" allows for "ground to mute" and reset operation.

JU-1 placed from common to "B" provides ground to monitor release form ground to reset and mute operation.

**Set (WHT) or (YEL):** Connect to a point in transmitter which provides keyed + supply upon transmit. Causes decoder to unmute radio (latched output changes status.) on application of + supply. Lead may be removed if not required.

**Decode Latched Output (WHT/ORG):** Open collector output 100 mA at 40Vdc.. Resetable after momentary output time. Disabled by hookswitch or SET connection (see above).

JU-3 IN provides for output normally saturated to ground until decode or monitor.

JU-3 OUT provides for output normally off until decode or monitor.

**Decode Momentary Output (WHT/VIO) or (WHT/BLU):** Open collector output 250mA at 24Vdc. Active approximately 3 sec. following decode.

**Call Lamp Latched Output (BLK/ORG) or (BLK/YEL):** Open collector (Darlington) output 250mA at 24Vdc. Saturated to ground on decode only. Latched until "off hook" Hookswitch condition.

## OPERATING SPECIFICATIONS

Specification:	Detail
<b>Operating Voltage:</b>	+10.5Vdc to 30Vdc (7Vdc min. w/regulator removed & jumpered)
<b>Operating Current:</b>	Typically less than 20mA (less than 18mA with regulator removed)
<b>Decode Bandwidth:</b>	+ - 1.5%
<b>Operating Temp:</b>	Exceeds E1A spec. (-30 C to +60 C )
<b>Frequency Stability:</b>	Less than + .5% Typically + .2%
<b>Input Level:</b>	20mVrms to 2Vrms
<b>Input Impedance:</b>	Greater than 50K
<b>Outputs:</b>	1. Latched open collector 100mA at 40Vdc with hookswitch monitor and reset. 2. Momentary open collector 250mA at 24Vdc approx. 3 Sec. Duration . 3. Call lamp latch open collector 250mA at 24Vdc with hookswitch disable and reset.
<b>Notes:</b>	Latched output independently field selectable decode or decode.
<b>Size:</b>	1.2" W x 1.9" L x .38"H (3.05cm x 4.83cm x .95cm)
<b>Interface:</b>	18" Flying Leads
<b>Mounting:</b>	Double-sided adhesive foam tape

Specification:	ST-120	ST-200A	ST-200B
<b>Freq. Range</b>	800Hz- 3000Hz	800Hz - 3000Hz	300Hz - 1200Hz
<b>Tone Format:</b>			
<b>Tone #1:</b>	300mS, 500mS, or 1S	>60mS	>250mS
<b>InterTone:</b>	N/A	<5mS	200mS Max.
<b>Tone #2:</b>	N/A	>60mS	>250mS following 200mS InterTone Time or >450mS with no InterTone Time
<b>Group Call</b>	N/A	N/A	>5 Sec. of Tone #1

## SETUP / FREQUENCY ADJUSTMENT

The decoder is Continuously tunable over the specified frequency range.

The **ST-120** is shipped with a test jumper installed at TP-1. This causes the circuit to oscillate and provide a sine wave output on the tone input lead (GREEN). Adjust R4 to the required frequency using a frequency counter or an oscilloscope and frequency standard for observing lissajous patterns. Remove the jumper at TP-1. The ST-120 is now ready to operate.

The **ST-200A** and **ST-200B** are both shipped with test jumpers installed at TP-1 & TP-2. This causes the circuit to oscillate on Tone #2 and provide a sine wave output on the tone input lead (GREEN).

1. Adjust R4 to the required frequency using a frequency counter, or an oscilloscope and frequency standard for observing lissajous patterns.
2. Remove the jumper at TP-2. Oscillation continues on Tone #1. Adjust R5 to the required frequency using a frequency counter or an oscilloscope and frequency standard for observing lissajous patterns. Remove the jumper at TP-1. The ST-200A or ST-200B is now ready to operate.

The test jumpers are intended to use wire leads of approx. 26 gage or wire leads from 1/4 or 1/8 watt resistors. This should provide a reasonable source for test jumpers for future frequency changes. The tone test jumper (TP1) may be used as the tone test connection when the tone input lead has been installed and is not available.

### ST-120 DECODE ATTACK TIME:

Field Selectable 300mS, 500mS, or 1 Sec. By R29 and R34.

1. R29 and R34 in: 300mS (FACTORY DEFAULT)
2. R29 out R34 in: 500mS.
3. R29 in R34 out: 1 Sec.

### MOUNTING:

Use of a double-sided adhesive pad eliminates hardware requirements. Mount the decoder on a clean, dry surface oriented to allow future adjustment should they be necessary. Do not touch the adhesive or attempt to reposition the unit after mounting.

## 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, or if any other assistance is required, contact Selectone Customer Service Department at (800) 227-0376, FAX (510) 781-5454, E-Mail [techsupport@selectone.com](mailto:techsupport@selectone.com), or on the WEB at [www.selectone.com](http://www.selectone.com).

**All repairs and returns are to be sent to:**

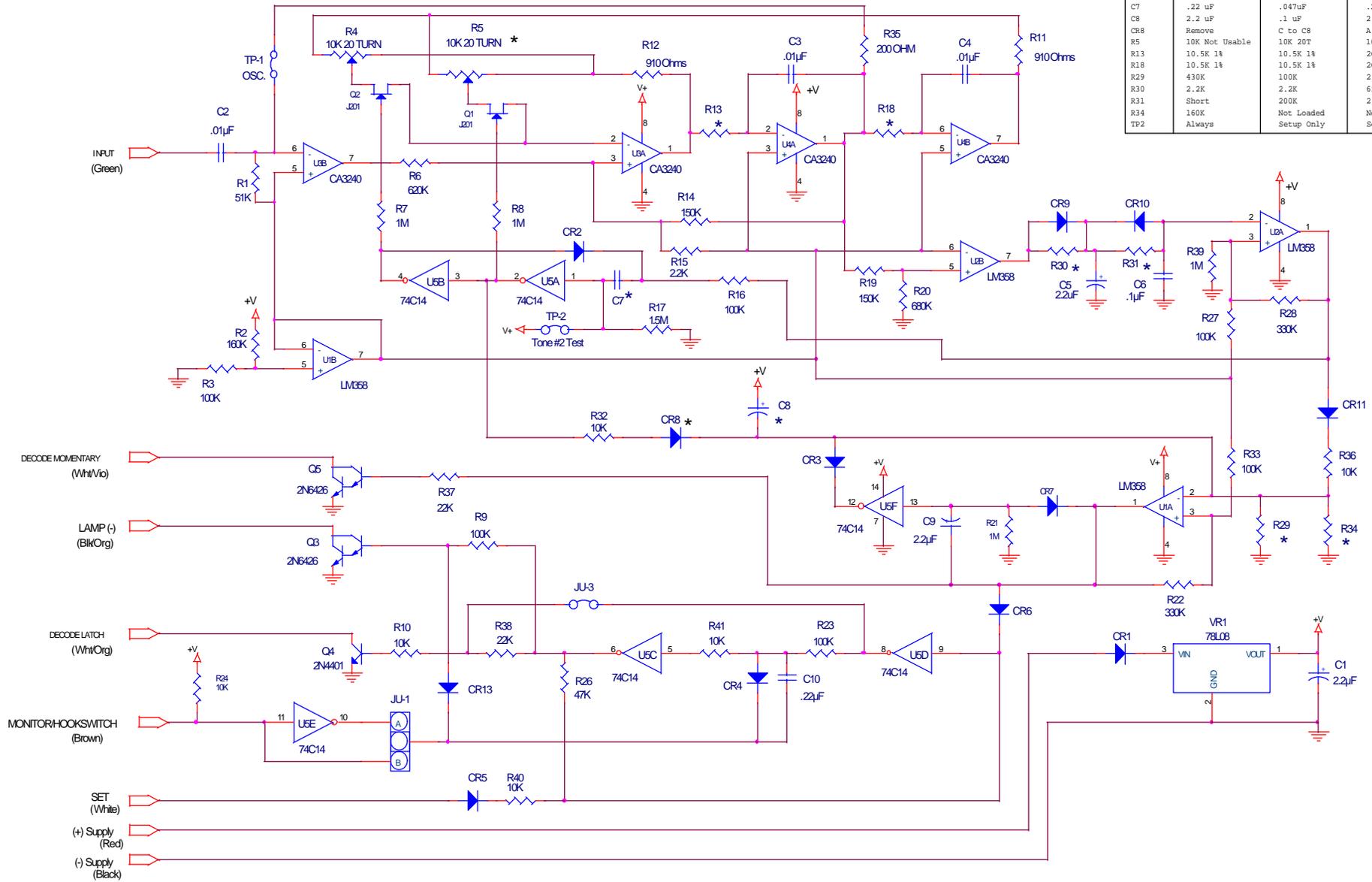
**Selectone**

23210 Bernhardt St.

Hayward, CA 94545

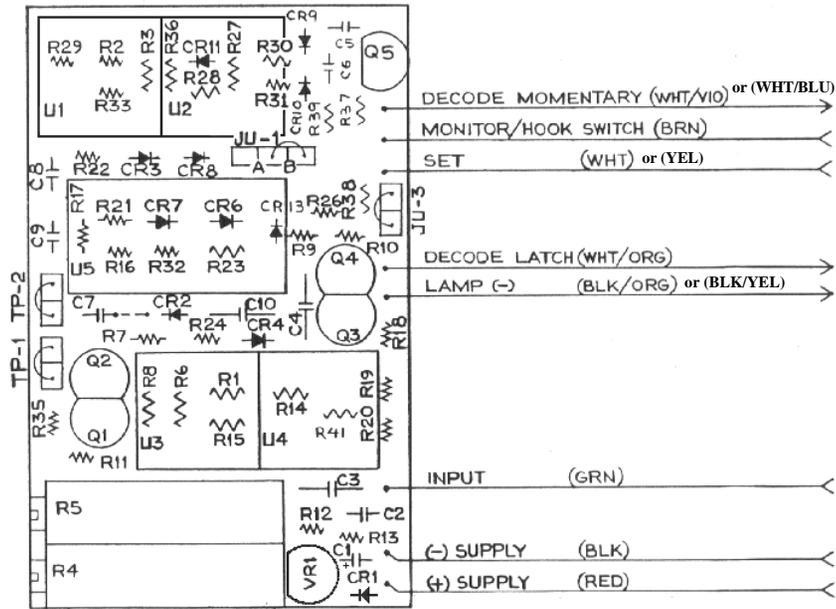
Attn: Customer Service

PCB Optional Component Values			
Item	ST-120	ST-200A	ST-200B
C7	.22 uF	.047uF	.22 uF
C8	2.2 uF	.1 uF	2.2 uF
CR8	Remove	C to C8	A to C8
R5	10K Not Usable	10K 20T	10K 20T
R13	10.5K 1%	10.5K 1%	26.1K 1%
R18	10.5K 1%	10.5K 1%	26.1K 1%
R29	430K	100K	2.0M
R30	2.2K	2.2K	62K
R31	Short	200K	2.0M
R34	160K	Not Loaded	Not Loaded
TP2	Always	Setup Only	Setup Only

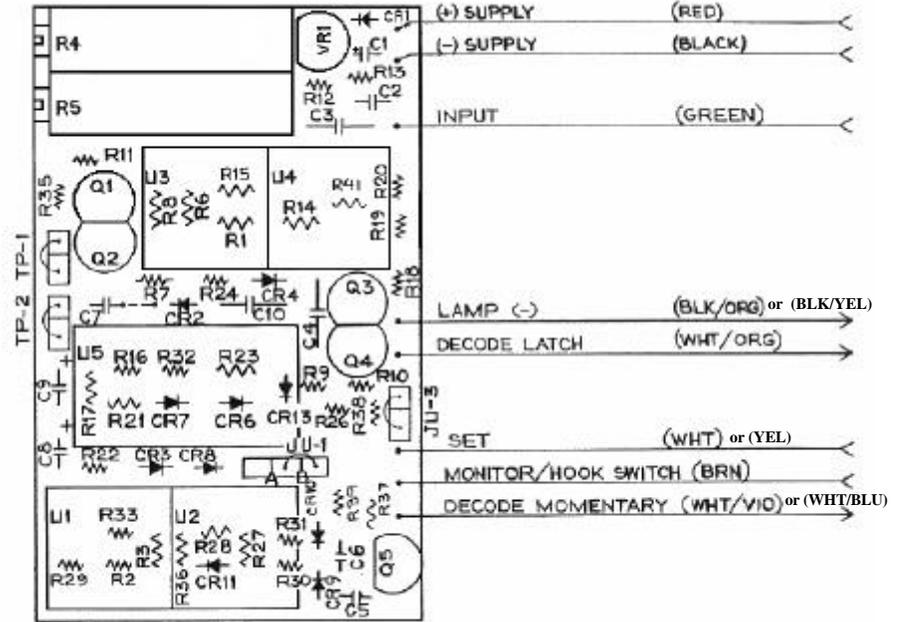


# SCHEMATIC

# COMPONENT DIAGRAM



TOP SIDE VIEW



BOTTOM SIDE VIEW