Selectone

Note: The ST-210 has been discontinued.

OPERATING INSTRUCTIONS
Mobilecall™ Decoder
Model ST-210

GENERAL

The ST-210 Mobilecall Decoder is designed for mobile radio paging applications for RCC's and other fleet dispatching systems. Compatible with all popular two-tone sequential signalling formats, the ST-210 features full tunability for easy field adjustment of both tone frequencies without the use of reeds, special resistors, or frequency elements.

Two configurations of the ST-210 are available: the ST-210A which is compatible with high speed, high frequency (800 to 2800Hz) signalling formats similar to Reach; and the ST-210B which is compatible with slow speed, low frequency (300 to 1600Hz) signalling formats similar to Motorola's "Quick Call II", G.E.'s "Type 99" and RCA's "1+1". The ST-210B has an additional "group call" feature which allows paging of multiple unit simultaneously.

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.

Interface diagrams 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 SPECIFICATIONS

General Specifications - Both Models

SUPPLY VOLTAGE:	13.8Vdc ±20%
SUPPLY CURRENT:	
Standby:	Less than 20mA
Operating:	Less than 225mA (during momentary output); Less than 150mA (latched output only)
OPERATING TEMPERATURE:	Exceeds EIA spec. (−30°C to +60°C)
FREQUENCY STABILITY:	Less than ±.5%; typically ±.2%
INPUT LEVEL:	20mVrms to 10Vrms
INPUT IMPEDANCE:	20ohm spk. load resistor or greater than 50K bridging
DECODE BANDWIDTH:	±1.5%
OUTPUTS:	
Latched:	1 form C relay for speaker control, switched with 20ohm load
Momentary:	1 form A relay, 3 sec. nominal, for horn control
RELAY CONTACT RATING:	1 amp at 125Vac; 2 amps at 30Vdc
RESET/MONITOR:	Manually with front panel switches or remotely with microphone hook switch
SIZE:	3.0" W x 2.0" H x 3.25" D (7.62cm x 5.08cm x 8.26cm)
INTERFACE:	36" cable assembly w/connector

OPERATING SPECIFICATIONS, cont.

Tone Format Specifications	**ST-210A**	**ST-210B**
FREQUENCY RANGE:	Continuously tunable 800 to 2800Hz	Continuously tunable 300 to 1200Hz (300 to 1600Hz on request)
TONE FORMAT:		
Tone #1:	Greater than 60ms	Greater than 250ms
Intertone time:	50ms window for Tone #2	200ms maximum
Tone #2:	Greater than 60ms	Greater than 250ms following 200ms Intertone Time or greater than 450ms with no Intertone Time.
GROUP CALL FEATURE:	n/a	5 sec. of tone #1

OPERATION

When the proper tone code is received, the ST-210 Mobilecall will: 1) momentarily sound an internal buzzer to alert the driver of the call; 2) light a red "call" indicator on the front panel; and, 3) provide a latched relay closure to unmute the radio by transferring the radio's audio output from a 20 ohm load in the ST-210 to the radio speaker. If the "horn" button is depressed, the unit will also provide a momentary relay closure (3 sec. nominal) to control a vehicle horn or other external function. Monitor and reset functions can be accomplished manually by depressing the corresponding switches on the front panel or by the use of an external microphone hook switch.

INSTALLATION

We have attempted to configure the ST-210 to require minimum installation time. Our experience has found that most 1+1 decoder users are familiar with 1+1 systems and have quite diverse requirements. Therefore, only general connection information is provided. If you would like application details and suggestions call us TOLL FREE at (800) 227-0376, or (415) 887-1950 in California.

(+) Supply (Red): Connect to receiver +13.6V supply.

(−) Supply (Black): Connect to system (−) (ground).

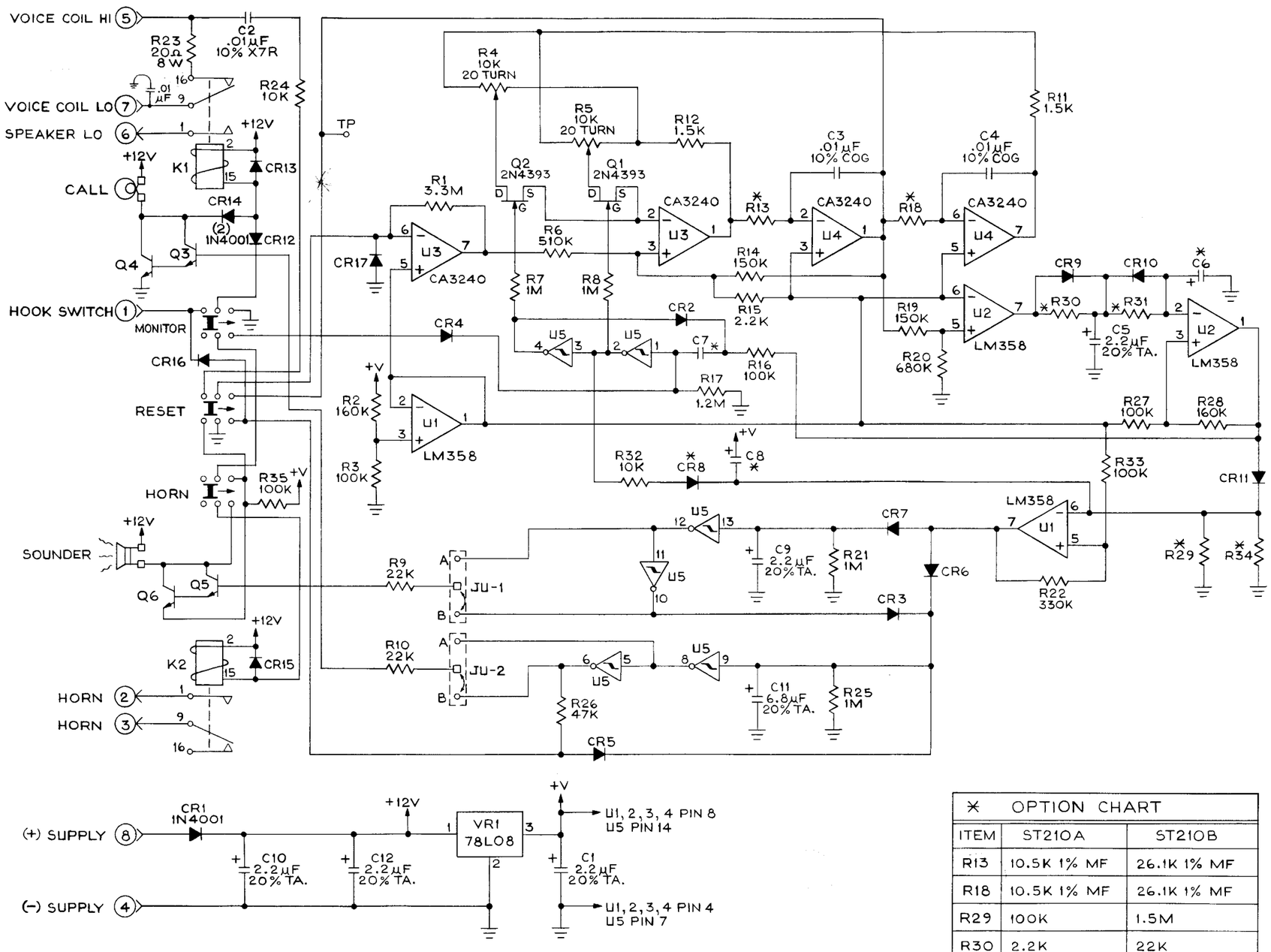
Audio Output Hi (Green): Connect to audio output hi.

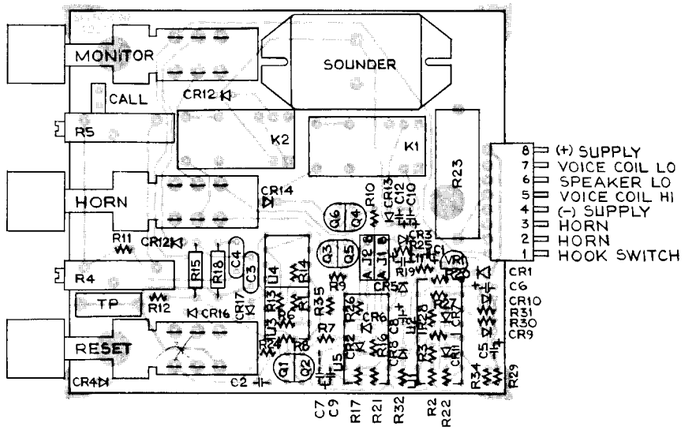
Audio Output Low (Gray): Connect to audio output low (ground). Break the connection from audio output low to spkr. low.

Spkr. Low (Wht/Yel): Connect to spkr. low (this is the speaker side of the lead broken for audio output).

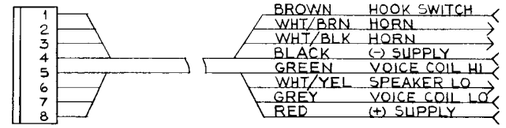
Monitor/Hook Switch (Brown): Connect to a mic. hook switch closed to ground with mic. "off" hook. (Automatic reset occurs on hangup).

Horn Relay (Wht/Bk and Wht/Brn): Provides a momentary relay closure for horn activation.

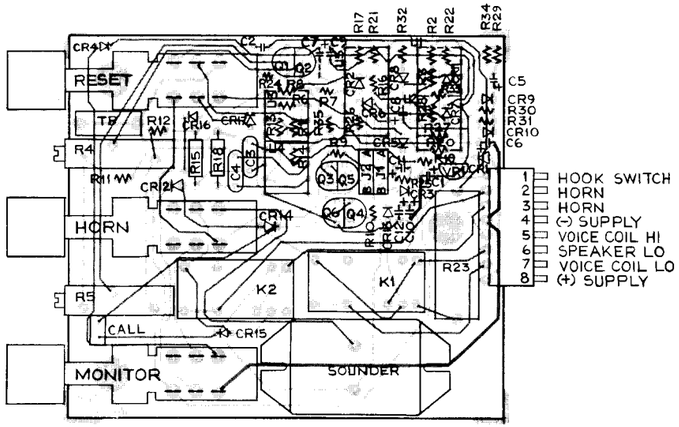




SOLDER SIDE



CABLE ASSEMBLY



COMPONENT SIDE

✳ OPTION CHART		
ITEM	ST210A	ST210B
R13	10.5K 1% MF	26.1K 1% MF
R18	10.5K 1% MF	26.1K 1% MF
R29	100K	1.5M
R30	2.2K	22K
R31	100K	56K
R34	NOT USED	NOT USED
C6	.1µF 20% TA	2.2µF 20% TA.
C7	.047µF 10% X7R	.22µF 10% X7R
C8	NOT USED	2.2µF 20% TA.
CR8	NORMAL	REVERSE

NOTES: UNLESS OTHERWISE INDICATED;

1. ALL RESISTORS ARE 1/8W, ±5%
2. ALL DIODES ARE 1N914
3. ALL IC'S ARE 74C14
4. ALL TRANSISTORS ARE 2N4401

DRAWN DAN ALVAREZ	DATE 11-14-79	Selectone	
CHECKED J.F.O	DATE 11-28-79	ASSEMBLY & SCHEMATIC TWO-TONE SEQUENTIAL DECODER	
ENGR	DATE		
MFG	DATE		
FIRST USED (NEXT ASSY)		MODEL ST-210A & B	
SHEET 1	TOT SHT 1	SIZE D	DWG NO 402102

FREQUENCY ADJUSTMENT

The ST-210 has been designed to provide you with maximum flexibility in filling 1+1 paging requirements. Each tone is independently tunable over the specified frequency range:

ST-210A: 800Hz to 2800Hz
ST-210B: 300Hz to 1200Hz (300Hz to 1600Hz on request)

1. Remove the two small screws holding the plastic front escutcheon.
2. Remove the plastic escutcheon and face plate.
3. Deactivate the horn and monitor switches ("out" position).
4. Connect a frequency counter or scope set up for a lissajous figure to the test point (TP) located between the reset and horn switches.
5. Press the reset button and the ST-210 will oscillate on Tone #1 frequency. Adjust the multi-turn pot located between the horn and monitor switches for the required Tone #1 frequency.
6. Release the reset button and depress the horn and monitor buttons (both "in").
7. Press the reset button. The ST-210 will now oscillate on Tone #2 frequency. Adjust the multi turn pot located next to the test point for the required Tone #2 frequency.
8. Release the reset button. The ST-210 will self test its output circuitry. The buzzer will "buzz", the horn will "honk" and the call lamp will "light".
9. Release the horn and monitor switches (both "out") and momentarily depress the reset button. The ST-210 is now ready for operation.

Technician Test Note:
The ST-210 sees Step 8 as a complete test of its active filter and decode circuitry. If this test is OK and the decoder fails to decode, the input connections and tone format should be verified. ST-210B "all call" feature may be tested by pressing the reset button for 5 seconds with the monitor button deactivated ("out").

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 configuations 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.

PARTS LIST

Schematic Reference	Description	Selectone Part No.
	CAPACITORS	
C1, C5, C6B, C8B, C9, C10, C12	2.2uf, 16V, 20%, Tantalum	5-47-522
C2	.01uf, 50V, 10%, X7R, Ceramic	5-14-310
C3, C4	.01uf, 50V, 10%, COG, Ceramic	5-11-310
C6A	.1uf, 35V, 20%, Tantalum	5-49-410
C7A	.047uf, 50V, 10%, X7R, Ceramic	5-14-347
C7B	.22uf, 50V, 10%, X7R, Ceramic	5-14-422
C11	6.8uf, 16V, 20% Tantalum (normally not loaded—used for two momentary outputs)	5-47-568
	DIODES	
CR1, CR12, CR14	IN4001	6-51-001
All Others	IN914	6-51-914
	INTEGRATED CIRCUITS	
U1, U2	LM358N (National) Dual Op Amp	6-31-358
U3, U4	CA3240E (RCA) Dual Op Amp	6-31-240
U5	LM74C14 (National) Hex Schmitt Trigger	6-11-414
VR1	MC78L08CP (Motorola) Voltage Regulator	6-32-808
	RESISTORS **Note:** Unless otherwise indicated, all resistors are 1/8 watt, 5% carbon film	
R1	3.3 Meg	7-11-533
R2, R28	160K	7-11-416
R3, R16, R27, R29A, R31A, R33, R35	100K	7-11-410
R4, R5	10K, 20 turn pot, Spectrol 43P103	7-65-310
R6	510K	7-11-451
R7, R8, R21, R25	1 Meg	7-11-510
R9, R10, R30B	22K	7-11-322
R11, R12	1.5K	7-11-215
R13A, R18A	10.5K, RN55D, 1%, metal film	7-32-105
R13B, R18B	26.1K, RN55D, 1%, metal film	7-32-261
R14, R19	150K	7-11-415
R15, R30A	2.2K	7-11-222
R17	1.2 Meg	7-11-512
R20	680K	7-11-468
R22	330K	7-11-433
R23	20ohm, 8 watt, Ohmite #1509	7-55-020
R24, R32	10K	7-11-310
R26	47K	7-11-347
R29B	1.5 Meg	7-11-515
R31B	56K	7-11-356
R34	Not loaded	—
	TRANSISTORS	
Q1, Q2	2N4393	6-55-393
Q3-Q6	2N4401	6-54-401
	MISCELLANEOUS	
K1, K2	SPDT Relay, Aromat #HB1-DC12V	8-31-100
S1	Sounder, Projects Unlimited #AI-128	8-41-128
Switches	Latched (2 ea.) Schadow #F2UEE	8-32-012
"	Momentary (1 ea.) Schadow #F2UOA	8-32-022
"	Buttons (3 ea.) Schadow #FSC Black	8-32-901
TP	Test Point, Smith #430-101	8-29-430
—	Socket Strips, Aries #7-0513-10	8-21-107
—	P.C. Board	4-02-102
—	Swedge Standoff (3 ea.) Amatom #9537B-B-0440	8-59-501
Connector	Connector, Male, right angle, Amp #640457-8	8-23-108
"	Connector Plug, Female, Amp #640441-8	8-26-108
"	Strain Relief Cover, Amp #640550-8	8-26-908
—	Connector Cable, 8 conductor, 24gu.	8-12-108

CALL SELECTONE TOLL FREE!
(800) 227-0376

END OF DOCUMENT