SUMMARY OF CONTROLS AND ADJUSTMENTS

ADJUSTMENTS

R4 = Input audio level adjustment
R7 = Squelch adjustment
R20 = Repeat audio deviation adjustment
R55 = Transmitter hold on time adjustment
R61 = CTCSS Encode deviation adjustment

SWITCHES

S1 = Memory write switch
S2 = 1
2
3
4
5
6
} Encode tone frequency data programming switches
7 ON = Program mode
8 ON = CTCSS Encode audio loopback to decoders
9
10
} Transmitter - On Time Limit

TEST POINTS

TP-1 = Input audio level test point

JUMPERS

JU1-JU8 = Decode tone frequency data
JU9 A = Phase modulation
B = Direct FM

8. Press S1 once. This will place the ST-180 in the carrier squelch mode. (The transmitter should again key.)

9. Add a 1KHz tone modulated at ± 3.0KHz to the carrier provided by the service monitor.

10. Adjust R20 for ± 3.0KHz modulation at the output of the transmitter under test.

> **NOTE**
>
> If necessary, clip R58 to reduce maximum repeat audio and make R20 adjustment near center of range.

11. Turn off the 1KHz tone modulation from the service monitor but retain the RF carrier.

12. Press S1 once. This will return the ST-180 to tone squelch operation. (The transmitter should un-key.)

13. Add CTCSS modulation (on a previously programmed frequency) at ± 0.75KHz deviation to the carrier being provided by the service monitor. (The transmitter should key.) Turn off the carrier from the service monitor and note the duration of transmit time from loss of signal until the transmitter un-keys. Adjust R55 and repeat the above test until an acceptable duration of hang time after loss of signal is achieved.

14. Set S2 positions 9 and 10 for the desired maximum transmit time according to TABLE 2.

TIME-OUT TIMER SETTINGS

MAXIMUM TRANSMIT TIME	S2 SECTIONS	
	9	9
1.5 Minutes	ON	ON
2.0 Minutes	ON	ON
2.5 Minutes	OFF	OFF
5.0 Minutes	OFF	OFF

TABLE #2

> **NOTE**
>
> Because decode control is derived as a memory address, it is possible to have CARRIER SQUELCH as a valid user. This may occur as a programming problem if the jumpered decode tone frequency does not match the S2 tone frequency code setting when S1 is pressed. You will have to push S1 while receiving a carrier with no tone to get out of this condition.

LEVEL ADJUSTMENTS DESCRIPTION

The ST-180 has several level adjustment pots. Each of these pots set levels that are critical to proper operation of the finished repeater. A properly calibrated Communications Service Monitor or the equivalent number of separate instruments will be required to properly set these adjustments. The first adjustment is R4, the input level adjustment pot. The operational performance specifications of the repeater panel are based on the proper setting of this pot. R7 is the squelch adjust pot. The setting of this pot is also critical since misadjustment can cause unintentional key-up problems and/or poor sensitivity. R20 is the repeat audio level adjustment and is used to set the proper repeat audio modulation level. Misadjustment can cause either low repeat audio level or possible adjacent channel interference. Repeated sub-audible tone modulation is set with R61. Misadjustment can cause poor CTCSS decode performance of the units using the repeater. Finally, R55 is used to set the transmitter hold on time. This pot is set according to user preference for how long the repeater should stay keyed after loss of input signal and is not critical to performance.

PROGRAMMING SETUP

1. Disconnect the antenna from the receiver.
2. Set R61 to its midrange (or above) position.
3. If you are adding tone channels install all the IC's now.

> **NOTE**
>
> The Programming Chart is used for both decode and encode frequencies. Reference to S2 sections in the Chart applies also to the decode jumpers (i.e., S2 section 1 = JU1-1 through S2 section 6 = JU1-6).

PROGRAMMING (or adding) A SINGLE CTCSS TONE USER

> **NOTE**
>
> A single tone position may be programmed at any time. If multiple tone channels are already in use it is not necessary to reprogram all the installed positions to add or change a tone channel.

1. Perform the steps shown in PROGRAMMING SETUP.
2. Set the tone decode jumpers to the desired tone frequency according to TABLE 1. (Refer to the component locator to find the location of position one in the jumper field.)
3. Turn on power to the ST-180.
4. Set S2 positions 7 and 8 to ON.
5. Set S2 positions 1 through 6 to the same tone frequency as was set by the decode tone jumpers in step 2.

   IMPORTANT! Verify that both the decode jumpers and the encode programming switch are set to identical tone frequencies.
6. Press S1.
7. Set S2 positions 1 through 8 OFF.
8. Reset R61 (if necessary) as outlined in LEVEL ADJUSTMENTS.

FREQUENCY PROGRAMMING

Frequency Programming is done by setting DIP switch positions according to the following Programming Chart.

S2: (0 = SWITCH **ON**; 1 = SWITCH **OFF**)
JUMPERS: (0 = **IN**; 1 = **OUT**)

PROGRAMMING CHART

FREQ	JUMPER SECTION						FREQ	JUMPER SECTION					
IN Hz	1	2	3	4	5	6	IN Hz	1	2	3	4	5	6
67.0	1	1	1	1	1	1	131.8	0	0	1	0	0	1
71.9	0	1	1	1	1	1	136.5	0	1	1	0	0	0
74.4	1	1	1	1	1	0	141.3	0	0	1	0	0	0
77.0	0	0	1	1	1	1	146.2	0	1	0	1	1	1
79.7	1	1	1	1	0	1	151.4	0	0	0	1	1	1
82.5	0	1	1	1	1	0	156.7	0	1	0	1	1	0
85.4	1	1	1	1	0	0	162.2	0	0	0	1	1	0
88.5	0	0	1	1	1	0	167.9	0	1	0	1	0	1
91.5	1	1	1	0	1	1	173.8	0	0	0	1	0	1
94.8	0	1	1	1	0	1	179.9	0	1	0	1	0	0
97.4	1	1	1	0	1	0	186.2	0	0	0	1	0	0
100.0	0	0	1	1	0	1	192.8	0	1	0	0	1	1
103.5	0	1	1	1	0	0	203.5	0	0	0	0	1	1
107.2	0	0	1	1	0	0	210.7	0	1	0	0	1	0
110.9	0	1	1	0	1	1	218.1	0	0	0	0	1	0
114.8	0	0	1	0	1	1	225.7	0	1	0	0	0	1
118.8	0	1	1	0	1	0	233.6	0	0	0	0	0	1
123.0	0	0	1	0	1	0	241.8	0	1	0	0	0	0
127.3	0	1	1	0	0	1	250.3	0	0	0	0	0	0
							OFF	1	1	0	0	0	0

TABLE #1