SG-2000 PowerTalk™ Head w/ADSP™ & SNS™

(Catalog Number 04-22)

For the SG-2000 HF SSB

Installation and Operations Manual
Revised: Sept. 6, 1995

SGC Inc. SGC Building, 13737 S.E. 26th St. P.O.Box 3526, Bellevue, WA. 98009 USA
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June 28, 2004; 15:46

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Disclaimer

The "ADJ" knob has a mechanical detent. You can feel the detents when the ADJ knob is rotated. The ADSP™ portion of the PowerTalk™ head can hang up if the ADJ knob stops between detents. Rotating the ADJ knob and stopping on the detent will allow the head to adjust properly.

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1.0 General Description

Since the PowerTalk™ head is only one of the several optional heads for the SG-2000 HF SSB radio, this manual is designed as a companion to the manual for the SG-2000. There is much vital information on such things as antenna and grounding setups, licenses needed, computer control of the radio, software and hardware accessories and troubleshooting in the SG-2000 manual that is beyond the scope of this manual.

This manual will tell you how to operate the PowerTalk™ Head. If you have just bought the SG-2000 radio with the PowerTalk™ head, please read the SG-2000 manual to make sure you have properly set up the radio before you start reading this manual. If you have bought this head separately to install on an existing SG-2000 setup and are happy with the performance of the system, this manual will tell you how to get the most from the PowerTalk™ head. If you think the performance of your radio could be better, you might want to look at the SG-2000 manual again and follow some of its suggestions for optimal performance.

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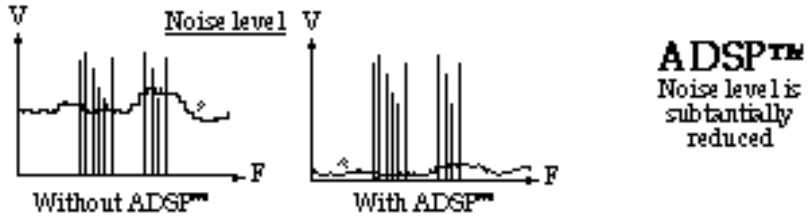
2.0 Noise Reduction

The PowerTalk™ head incorporates several technologically advanced processes to filter out unwanted received noise, resulting in dramatically enhanced signal clarity. Adaptive Digital Signal Processing (ADSP™), Spectral Noise Subtraction (SNS™) and the Notch filter (tone suppressor) are three methods used by the PowerTalk™ head to filter out signal noise. In addition, the user can adjust the quality of the audio signal by setting the Low, High and Center frequency. These processes can be used separately or in combination by the user to configure the audio to get the best possible reception.

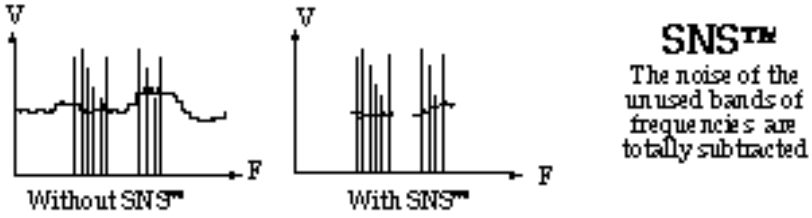
2.1 Adaptive Digital Signal Processing (ADSP™)

The benefit of ADSP™ is illustrated in the following graph:



2.2 Spectral Noise Subtraction (SNS™)

The benefit of SNS™ is illustrated by the following graph:



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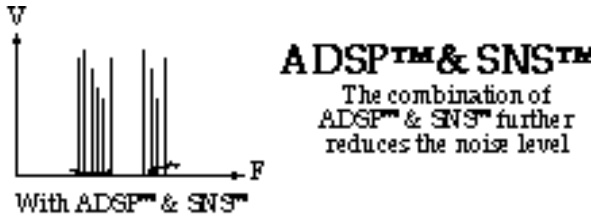
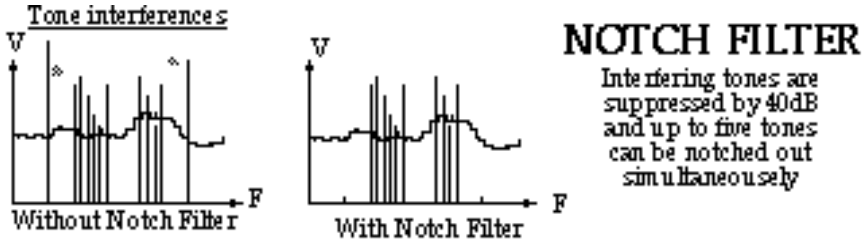
2.3 ADSP™ and SNS™

The benefit of ADSP™ and SNS™ working in tandem is even more dramatic as illustrated in the following graph:



2.4 Notch Filter

If the PowerTalk™ head detects the presence of any constant tones, enabling the Notch filter will suppress this tone by 40 dB. The Notch filter will automatically suppress up to 5 tones at once.



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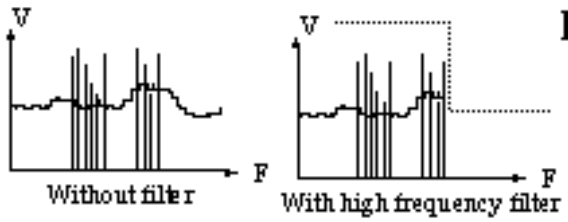
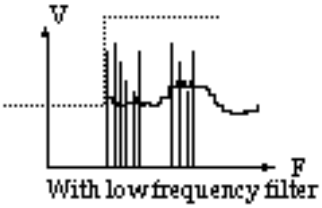
2.5 High, Low and Center Frequency Filters

In addition to the above noise reduction features, which are mainly on or off, the PowerTalk™ head lets the user adjust the audio quality to their own liking by means of the High, Low and Center Frequency filters as illustrated below:



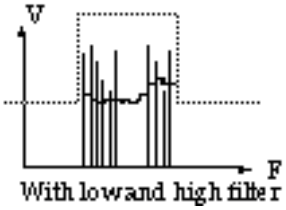
HIGH FREQUENCY FILTER

High frequency corner can be adjusted in 100Hz steps



LOW FREQUENCY FILTER

Low frequency corner can be adjusted in 100Hz steps



CENTER FREQUENCY FILTER

Band pass frequency center can be adjusted in 100Hz steps

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3.0 Front Panel Layout

The front panel of the PowerTalk™ head is shown in Figure 1 below. While the basic display and many of the button functions are similar to the Standard SG-2000 head, there are enough differences and new capabilities to warrant giving the PowerTalk™ its own manual.

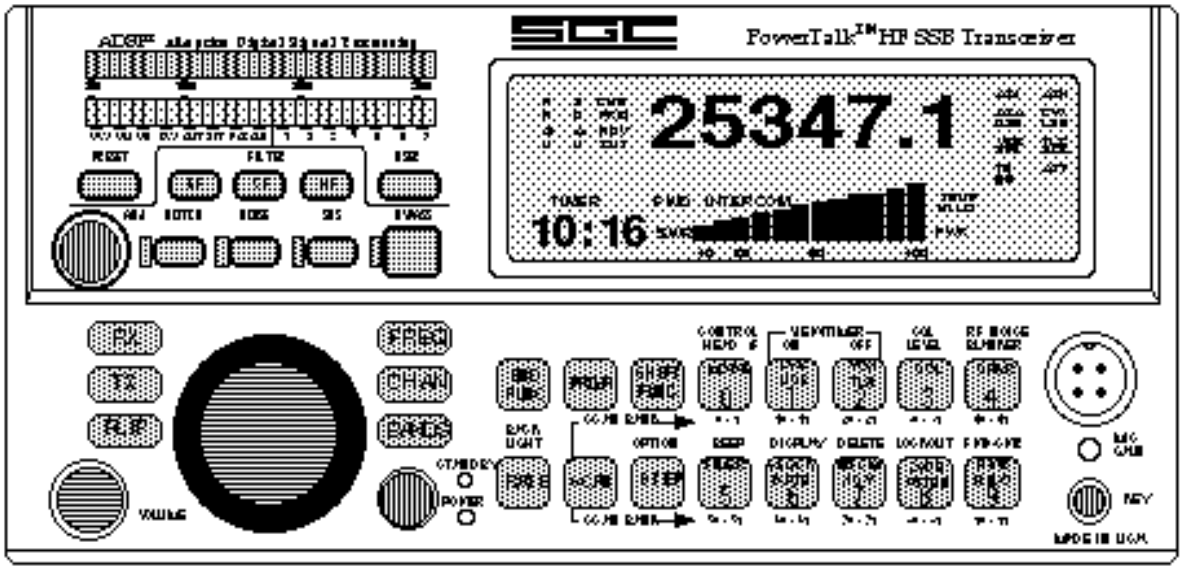

Figure 1

The main visible differences in the new PowerTalk™ head are the ADSP™ control section in the upper left corner, the tuning knob in the lower left corner that replace the up and down arrows of the standard head, and associated buttons. The following sections of this manual, detailing the operations of the PowerTalk™ head, will refer to this drawing.

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4.0 ADSP™ Control Panel Layout

Let's start with the section that gives the PowerTalk™ its reason for being: the ADSP™ (Adaptive Digital Signal Processing) control panel in the upper left corner of the PowerTalk™ face. The overall panel layout is shown below in Figure Two:

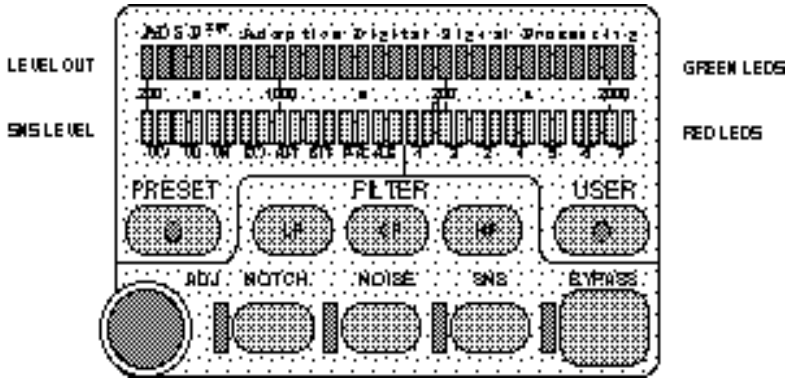

Figure Two

Disclaimer:
The "**ADJ**" knob has a mechanical detent. You can feel the detents when the **ADJ** knob is rotated. The ADSP™ portion of the PowerTalk™ head can hang up if the **ADJ** knob stops between detents. Rotating the **ADJ** knob and stopping on the detent will allow the head to adjust properly

Now lets go over the operation and control of the ADSP™ control panel step by step.

4.1 Notch Filter (NOTCH)

The PowerTalk™ head has the ablility to sense and suppress up to five (5) tones simultaneously. When the NOTCH push-button is selected, the green LED next to it will illuminate. Tones will be rejected in the 0-4,000 Hz. frequency band. (See Figure Three).

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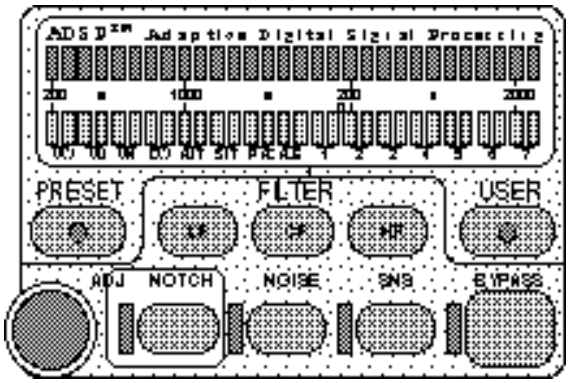
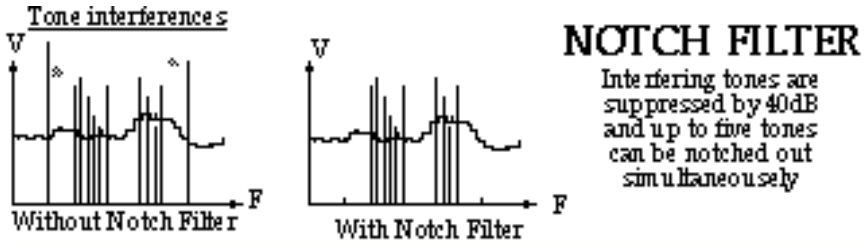


Figure Three

The noise reduction benefit of the Notch Filter is shown in the graph below, reproduced from Section 2.4:



4.2 Bandpass Filter

Band Pass functionality is achieved by separately adjusting the lower and higher bandpass corner frequencies in 100 Hz increments and moving the filter's center frequency across the available bandwidth. Displayed frequencies are between 200 and 3100 Hz. The lower frequency limit, however, can be as small as 100 Hz. Adjustments are made through the digital rotary control—labeled "ADJ"—on the ADSP™ panel.

4.2.1 Low Frequency Corner (LF)

The low corner frequency is selected by the LF push-button. The default setting is 200 Hz. with the first red LED and the last 29 green LEDs illuminated. Positioning of the lower corner frequency is set by the rotary control. (See Figure Four).

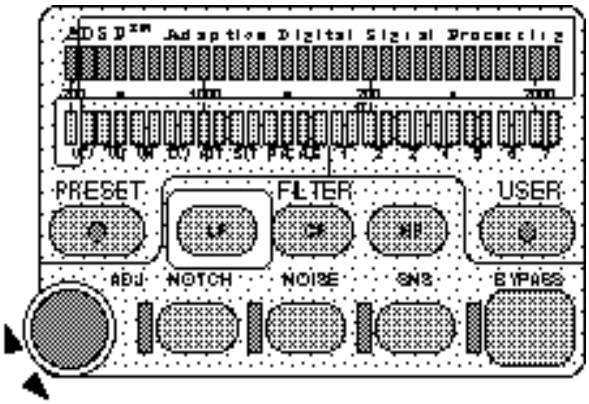
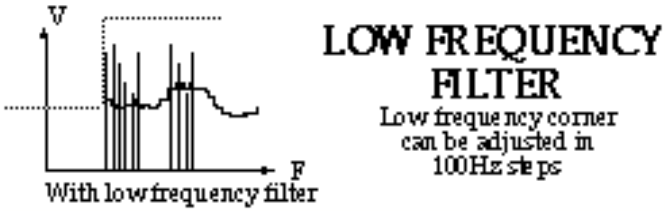


Figure Four

A graphic representation of setting the Low Corner Frequency is shown below, reproduced from Section 2.5:



4.2.2 High Frequency Corner (HF)

This filter is selected by the HF push-button. Default setting for this filter is 3100 Hz. with the first 29 green LEDs and the last, or 30th, red LED illuminated. Positioning of the Higher Corner Frequency is controlled by the digital rotary control. (See Figure Five).

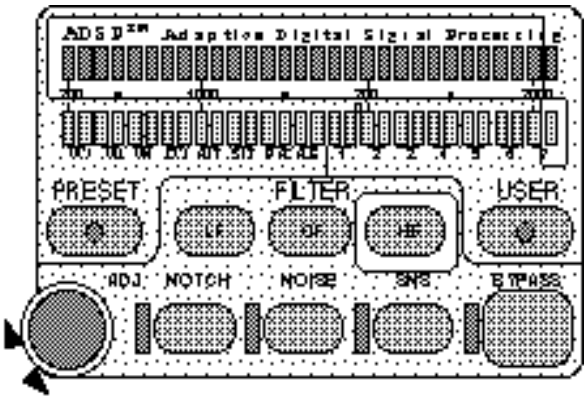
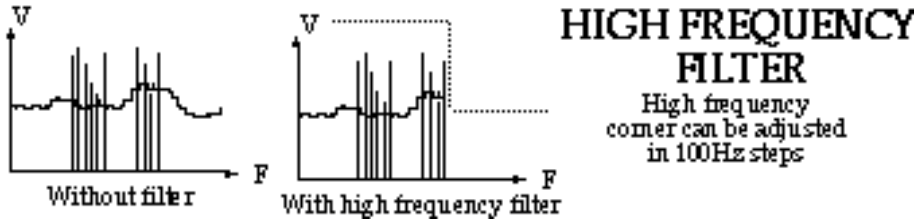


Figure Five

A graphic representation of setting the High Corner Frequency is shown below, reproduced from section 2.5:



4.2.3 Center Frequency (CF)

Once the operator has chosen the Bandpass Filter's range by means of the Upper and Lower Corner Frequencies, the Center Frequency can be selected by pressing the CF push-button. When selected, all green LEDs within the passband range will be illuminated. In addition, within five seconds of pressing the CF push-button, the operator may begin adjusting the Center Frequency up or down via the digital rotary control. (See Figure Six).

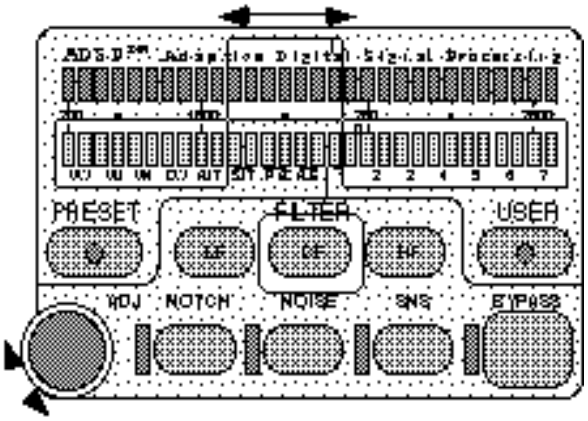


Figure Six

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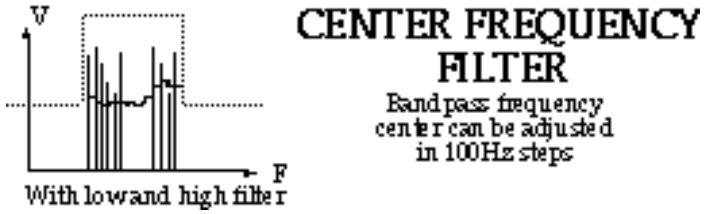
A graphic representation of the Center Frequency Filter is shown below, reproduced from section 2.5:



4.3 Noise Reduction (NOISE)

Noise reduction (shown below in the ADSP™ graph) is obtained via a digital process which is initiated by pressing the NOISE push-button. When selected, the green LED next to the NOISE push-button illuminates. (See Figure Seven).

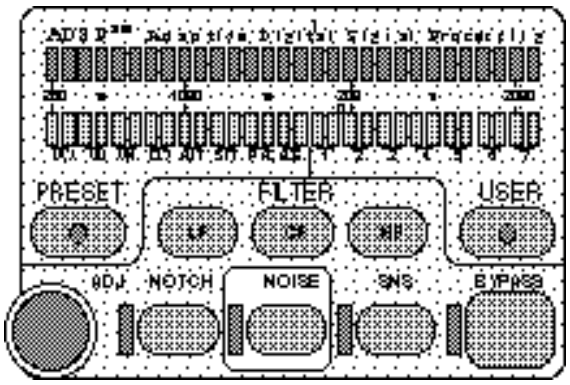


Figure Seven

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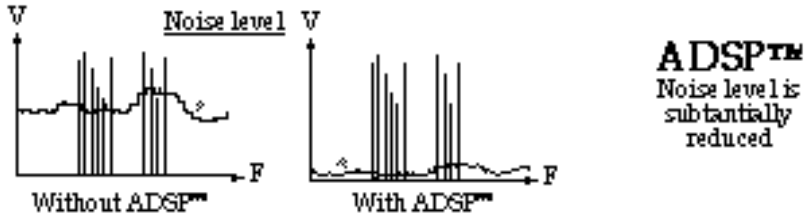
The noise reduction benefit of the Noise button is illustrated in the graph below, reproduced from section 2.1:



4.4 Spectral Noise Subtraction (SNS™)

Spectral Noise Subtraction is the special process of subtracting noise and that portion of the spectrum where voice modulation is not used. It is selected by pushing the SNS™ push-button. When selected, the LED next to the SNS™ push-button illuminates. (See Figure Eight).

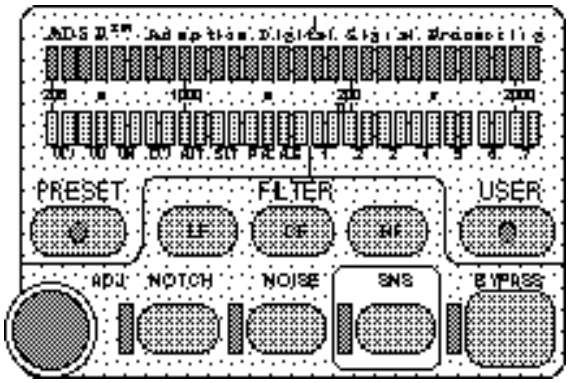


Figure Eight

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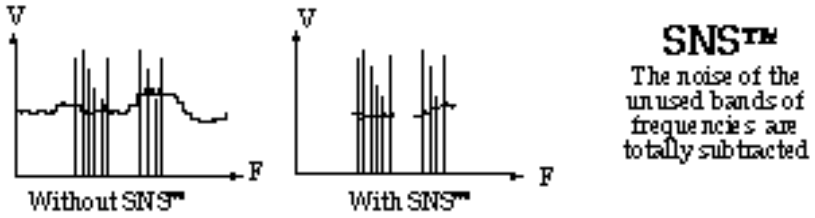
The benefit of Spectral Noise Subtraction is illustrated in the graph below, reproduced from Section 2.2:



4.5 Preset Memory (PRESET)

Eight options are preset into the unit's memory. These are:

	VOICE BANDWIDTH	NOTCH	NOISE	SNS™
VW	Wide (300 to 3100 Hz.)	Yes	Yes	Yes
VM	Medium (300 to 2000 Hz.)	Yes	Yes	No
VN	Narrow (300 to 1700 Hz.)	Yes	Yes	No
CW	Filter on 1000 Hz. ± 200 Hz.	No	Yes	No

	DATA BANDWIDTH
AMTOR	Filter on 2175 Hz. ± 150 Hz.
SITOR	Filter on 1700 Hz. ± 150 Hz.
PACTOR	Filter on 2175 Hz. ± 200 Hz.
ALE	Filter on 1725 Hz. ± 1125 Hz.

Two digital filters are used in the eight PRESET functions. For voice and CW functions, a filter with a shape factor of 1:1 (130 ms delay) is used. The low , center and high frequency points of this filter can be adjusted to reduce adjacent channel interference.

For data modes, the 130 ms delay of the voice/CW filter prevents a proper handshake in ARQ modes and other data protocols due to increased switching time between transmit and receive. Therefore, in the case of AMTOR, SITOR, PACKET, PACTOR, G-TOR , and ALE, a second, very short, delay filter

(approximately 2 ms) is selected. This filter's shape factor is 1.15:1, and its extremely steep skirts reject interference from adjacent frequencies.

Of necessity, the low, center and high frequency settings of data filter memories are fixed. However, by transferring data memory parameters in PRESET mode to USER mode, the short delay filter can be accessed and used in conjunction with new parameters defined by the user and stored in a USER memory.

For information on transferring data memory parameters, see Section 4.6.

Selecting the PRESET function activates the last-used preset memory and causes the two red LEDs above the selected function to become illuminated. The digital rotary control can then be used to change to any of the eight preset locations. (See Figure Nine).

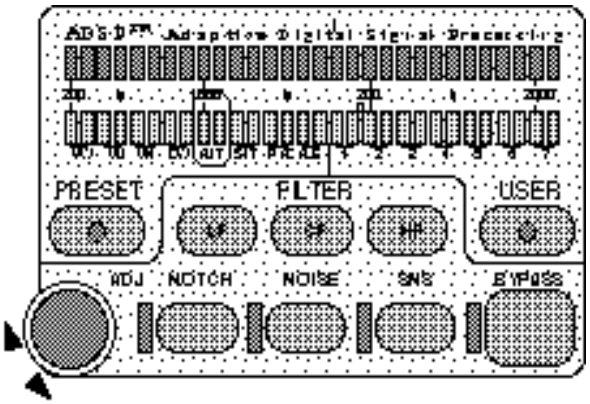


Figure Nine

4.6 User Memory (USER)

Seven locations are provided for user-programmed memories. Pressing the USER push-button activates the last-used User Memory selection and displays it by illuminating the two LEDs above that position. If no memory has been programmed into a particular User Memory location, the two LEDs above it will be blinking. If a User Memory location has already been programmed, the LEDs are on continuously. Use the rotary control to move between USER locations.

To program a user-defined memory, configure the ADSP™ section as desired (frequency, mode, etc.) and choose an empty memory location. Then press and hold the USER switch for six seconds. The LED pair above the location chosen changes from blinking (empty) to being on steadily (programmed). To clear a user-defined memory, depress the USER push-button and select the memory location in question with the digital rotary control. Then press and hold the USER button for six seconds. When the associated LED pair changes from being on continuously to blinking, release the USER switch. The memory and its old program have now been successfully cleared.

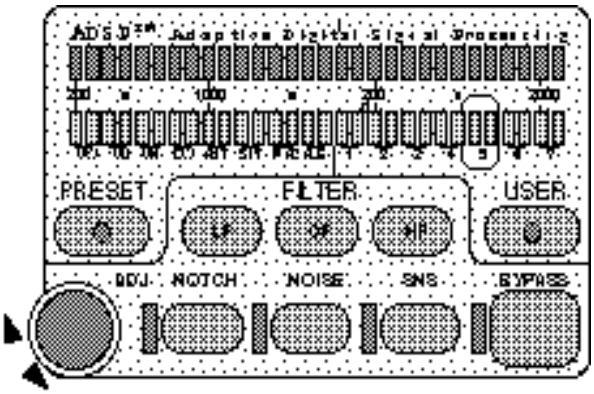


Figure Ten

By the same process, a Preset Memory location can be selected, modified and then entered into a User Memory location.

4.7 Bypass (BYPASS)

The BYPASS push-button is a toggle that determines whether or not the ADSP™ system is active. When BYPASS is pressed, its associated LED is illuminated and all functions of the ADSP™ are disabled, or bypassed. If BYPASS is pushed again or any ADSP™ function is selected (PRESET, USER, NOTCH, NOISE, SNS™, LF, CF or HF), ADSP™ becomes active again and the green LED associated with the BYPASS button goes off, confirming that the ADSP™ system is engaged and operating. Pushing the BYPASS button to re-engage the ADSP™

system will return the unit to the previous ADSP™ function while pushing any other button will engage that particular function (See Figure Eleven).

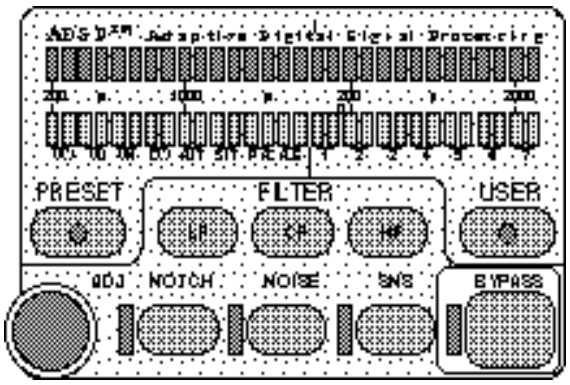


Figure Eleven

4.8 Digital Rotary Control (ADJ)

The digital rotary control affects ADSP™ functions as follows:

Preset Memory (PRESET)	Set Location
User Memory (USER)	Set Location
Spectral Noise Subtraction (SNS™)	Set Level
Low Frequency Corner Filter (LF)	Set Frequency
High Frequency Corner Filter (HF)	Set Frequency
Center Frequency Filter (CF)	Adjusts Frequency Center

4.9 LED Display

4.9.1 "Off" Condition

When the unit is in bypass mode, all LED indicators, except **BYPASS**, including dedicated LEDs, i.e., **NOTCH**, **NOISE** and **SNS**™ are off.

4.9.2 "On" Condition

Appropriate dedicated LEDs are on. **NOTCH**, **NOISE** , **SNS**™ and **BYPASS** have dedicated LEDs.

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When selected, the **PRESET** Memory or **USER** Memory functions will cause the LED pair associated with the last-used memory location to illuminate and blink if empty or stay on continuously if already programmed.

If **NOISE** is selected, the adjacent LED is illuminated.

If **SNS**™ is selected, the adjacent LED is illuminated and the row of red LEDs - labeled "SNS™ LEVEL" on Figure One - is used as a spectral noise subtraction, peak-reading meter.

If **LF**, **CF**, or **HF** buttons are depressed, the lower corner frequency, the upper corner frequency and/or the bandwidth frequencies outside the passband are indicated by red LEDs. The selected corner or center frequency can be set by the **ADJ** (for ADJUST) knob. When bandpass is activated, both green and red LED displays change to VU-type metering within five seconds. When either the **PRESET** or **USER** memory function buttons are depressed, the LED memory pair of the specific memory selected will be displayed. If **NOISE** , **SNS**™ , **NOTCH**, **LF**, **CF** or **HF** is selected, the display will change to VU metering.

4.10 Mnemonics

4.10.1 Memory Selection

Preset Memory	PRESET	Section 4.5
User Memory	USER	Section 4.6

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4.10.2 Preset Memory Function

Voice Wide	VW	Section 4.5
Voice Medium	VM	Section 4.5
Voice Narrow	VN	Section 4.5
Morse, 1000 Hz.	CW	Section 4.5
AMTOR	AMT	Section 4.5
SITOR	SIT	Section 4.5
PACTOR / PACKET	PAC	Section 4.5
Automatic Link Establishment	ALE	Section 4.5

4.10.3 Operating Functions

Notch Filter	NOTCH	Section 4.1
Noise Reduction	NOISE	Section 4.3
Spectral Noise Subtraction	SNS™	Section 4.4
ADSP™ Bypass	BYPASS	Section 4.7
Low Frequency Corner	LF	Section 4.2.1
High Frequency Corner	HF	Section 4.2.2
Center Frequency	CF	Section 4.2.3

4.11 Toggling Between Bandpass and User or Preset

This unit includes the ability of allowing the user to toggle between the currently selected bandpass and any Preset or User Programmed conditions. This provides the user the ability to listen and compare before selecting one set of parameters over another.

Select a Bandpass Filter width as described in Section 4.2. To toggle to a PRESET or USER defined filter, push the PRESET or USER button and turn the rotary knob to find the desired setting, i.e. VN, ALE, 1, 2, etc. To toggle back to the originally selected Bandpass mode, push LF, CF or HF. Pushing the PRESET or

USER button again will toggle back to the previous PRESET or USER setting. This toggling can continue indefinitely, allowing the user to listen to and compare the two sets of conditions.

If the user wants the Bandpass changed to the parameters of the PRESET or USER setting, pushing the PRESET or USER button twice in succession will update the Bandpass settings to those of the PRESET or USER.

4.12 Conclusion

The foregoing technical/operational description has been generated by SGC to provide a highly intuitive and friendly interface between an operator and the ADSP™/SNS™ operating modes unique to this unit. This design is exclusive and proprietary to SGC and must not be emulated, simulated or copied by other parties for any purpose. This manual was produced solely to provide the operator an understanding of the outstanding capabilities of the **PowerTalk™** head.

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5.0 Key Pad Changes

The other major difference between the PowerTalk™ head and the standard SG-2000 head is the presence of the tuning knob instead of the up/down arrows to control tuning.

The tuning knob and its six associated push-buttons control adjustments to Receive or Transmit frequencies or channels. In addition, several other keys have been added, deleted or had their functions altered.

For our customers who have just switched over from the standard SG-2000 head to the PowerTalk™ head, the following is a detailed list of changes.
For the next sections, refer to the drawing of the PowerTalk™ head in Figure 1, of this manual.

5.1 Keys Deleted

VOL - The VOL select button is deleted. The volume adjustment is now a potentiometer. See Also section 5.3 VOLUME POTENTIOMETER. A secondary function of the VOL button was to escape in the middle of a SHIFT or PRGR key code sequence. The escape function is now implemented with the SHIFT button.

CLAR - The CLAR select button is deleted. The fine tuning is now done by the STEP selecting .1 increments and turning the TUNING KNOB.

EMER - The EMER key is deleted. The Emergency function is removed from the head.

UP ARROW AND DOWN ARROWS - The UP and DOWN arrows are being replaced with the TUNING KNOB. Rotating the knob clockwise increments. Rotating the knob counter-clockwise decrements.

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5.2 Keys Modified

RATE - The RATE function is the same as the current head. The difference is that it was a shift function. Now it is a separate button. Previous SHIFT, FREQ button sequences are replaced with a single RATE button push.

STEP - The STEP button selects the step value. Steps of .1, .5, 1, 5, and 10 KHz may be selected. The step value is used by both the frequency being adjusted by the TUNING KNOB and the scanning by frequency.

5.3. Keys Added

TUNING KNOB - The TUNING KNOB replaces the UP and DOWN arrows.

BANDS - The BANDS button selects one of 64 pre-programmed channels. These are ITU channels 101 to 153 and 155 to 165. Channel 154 is not used. The key sequence is BANDS, then adjust the TUNING KNOB to select one of 64 ham channels, then push BANDS (or wait for time out) to set the receive and transmit frequencies.

RX - The RX button sets the displayed frequency into the RX frequency memory. To set the RX frequency, first adjust the displayed frequency to the desired RX frequency then push the RX button.

TX - The TX button sets the displayed frequency into the TX frequency memory. To set the TX frequency, first adjust the displayed frequency to the desired TX frequency then push the TX button.

FLIP - The FLIP button exchanges the receive and transmit frequencies memory values.

VOLUME POTENTIOMETER - The volume control is a 10K ohm audio taper potentiometer. This is a totally analog approach and as in the Standard head is not controlled by the microprocessor.

PWR - The PWR button is physically different but functionally the same. The physical size is smaller. The PWR button is recessed into the front panel. This improves the likelihood of not accidentally turning the radio off.

END FUNC - The end function button terminates any function

5.4 Modes of Operation

The receive and transmit frequencies operate in two modes. When both frequencies are different this is the FLIP Mode (Duplex). When both frequencies are the same this is the NON-FLIP Mode (Simplex).

In memory are stored the two frequencies. These two memories and the mode along with the RX, TX, FLIP buttons determines the receive and transmit frequencies.

Setting FLIP Mode - To set the FLIP mode, display frequency on the LCD then adjust the TUNING KNOB to the desired transmit frequency, then press the TX button. Then adjust the TUNING KNOB to the desired receive frequency and press the RX button. RX and TX will contain different frequencies in the FLIP mode.

Setting NON-FLIP Mode - To set the NON-FLIP mode, display the frequency on the LCD then adjust the TUNING KNOB to the desired frequency and individually press the RX and TX buttons. RX and TX will contain the same frequency.

Displaying the TX Frequency - The display always shows the receiving frequency regardless of the mode. To display the TX frequency push the FLIP buttons once. Push the FLIP button a second time to revert back to the correct RX and TX frequencies.

5.5 Operational Changes with Tuning Knob

INCREMENT/DECREMENT FREQUENCY - The incrementing and decrementing of a frequency uses the TUNING KNOB in conjunction with the STEP button. The STEP button selects the resolution of the increment. See section 5.2 for a complete explanation of the STEP button.

CHANGE FREQUENCY STEP - The frequency step can be changed by rotating the TUNING KNOB which replaces the up and down arrows. The key sequence is STEP, then rotate the TUNING KNOB to select the step, then push STEP again (or wait for time-out) to set the step value into memory. Steps of .1, .5, 1, 5, and 10 KHz may be selected. If you wish the displayed (i.e. receive) frequency to be rounded off to the step boundary push the OPTION button instead of pushing the STEP button the second time. This will set the step value into memory and round off the display to the step boundary .

SQUELCH LEVEL - The squelch level is adjusted by the TUNING KNOB which replaces the up and down arrows.

SCAN BY FREQUENCY - The scan by frequency no longer is initiated by the SCAN, then up and down arrows. The key sequence is SCAN, FREQ. The initial direction is up from the displayed frequency.

CHANGE FREQUENCY SCAN DIRECTION - While scanning by frequency, the scan direction can be changed by rotating the TUNING KNOB which replaces the up and down arrows. Counterclockwise scans down. Clockwise scans up.

CHANGE FREQUENCY STEP WHILE SCANNING - Same as section **CHANGE FREQUENCY STEP** above. The scanning of the frequency is interrupted by pushing the STEP button. Following the adjustment of the step scanning is resumed.

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SCAN BY CHANNEL - The scan by channel is no longer initiated by the SCAN, CHAN, then up and down arrows. The key sequence is SCAN, CHAN. The initial direction is up from the displayed channel.

CHANGE CHANNEL SCAN DIRECTION - While scanning by frequency, the scan direction can be changed by rotating the TUNING KNOB which replaces the up and down arrows. Counterclockwise scans down. Clockwise scans up.

SCAN RATE - While scanning by channel the scan rate is adjusted by the TUNING KNOB which replaces the up and down arrows. The key sequence is RATE, then rotate the TUNING KNOB, then push RATE again (or wait for time-out) to set rate value. Scanning by channel will resume with the new rate value.

DEFINE SCAN BANK - In the define scan banks function the next scan bank memory is optionally selected by the TUNING KNOB which replaces the up and down arrows. The key sequence is PRGR, SCAN, enter bank #, enter channel # or (optionally rotate the TUNING KNOB to select the next scan bank memory), PRGR.

DELETE SCAN BANK - In the delete scan bank function the next scan bank is optionally selected by the TUNING KNOB which replaces the up and down arrows. The key sequence is PRGR, SCAN, enter bank #, (optionally rotate the TUNING KNOB to select the next scan bank), SHIFT, 7.

SET TIME ON - In the set time on key sequence the DOWN ARROW button is replaced by the TUNING KNOB button.

BACKLIGHT LEVEL - The backlight level adjustment will use the TUNING KNOB to select the level. The key sequence is SHIFT/FUNC, RATE. This turns off the backlight. If backlighting is desired, then rotate the TUNING KNOB for the desired level. There are four levels of brightness to select.

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6.0 Operating the PowerTalk™

Now that you understand some of the differences and new capabilities of the PowerTalk™, lets explain the key functions as they actually work on the new PowerTalk™.

Key functions are loosely grouped into two categories, basic and advanced. Basic key functions do not require the use of the SHIFT/FUNC keys. Advanced operations do require the use of the SHIFT/FUNC keys and may involve several key strokes.

6.1 Key Functions

BASIC FUNCTIONS

Power ON/OFF Press [POWER]

NOTE:	When you first turn on the SG-2000, it will automatically switch to the last frequency used.

Increase Volume To increase or decrease volume rotate Volume knob.

Display Frequency Press [FREQ] or [RX]

Display Channel Press [CHAN]

Change Channel Press [CHAN] *until 4 dashes appear, enter channel number,* [CHAN]

EXAMPLE: To call KMI on channel 401 press: [CHAN] , 401, [CHAN]

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FREQUENCY FUNCTIONS

Enter a SIMPLEX Frequency Press [PRGR] , [FREQ] *enter frequency*, [PRGR]

NOTE:	When a programming sequence begins with PRGR, you must press PRGR at the end of the key sequence to execute the sequence.

EXAMPLE: To enter the simplex frequency 3920.5 KHz, you would

Press [PRGR] , [FREQ] 39205 [PRGR]

Enter a DUPLEX Frequency Press [PRGR] , [FREQ] *enter receive frequency* , [FREQ] *enter mode,* [FREQ] ,enter transmit frequency, [PRGR]

EXAMPLE: To enter the duplex frequency 3920.5 KHz receive, 3815.3 KHz transmit and Lower Sideband, you would press:

[PRGR] , [FREQ]

39205 [FREQ] [1] [FREQ] 38153 [PRGR]

NOTE:	The 1 key toggles selection of LSB or USB in this example.

Increment Frequency (NonFLIP) Press [FREQ] then turn Tuning Knob clockwise. Press [SHIFT/FUNC] or [FREQ] to complete

Decrement Frequency (NonFLIP) Press [FREQ] then turn Tuning Knob counterclockwise. Press [SHIFT/FUNC] or [FREQ] to complete

Increment RX Frequency (FLIP) Press [RX] then turn Tuning Knob clockwise to increment receive frequency only. Press [SHIFT/FUNC] or [RX] to complete

Decrement TX Frequency (FLIP) Press [RX] then turn Tuning Knob counterclockwise. to decrement receive frequency only. Press [SHIFT/FUNC] or [RX] to complete

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Flip RX & TX Frequencies Press [FLIP], to exchange the receive and transmit frequencies.

Change Frequency Step Press [STEP], then turn Tuning Knob counterclockwise or clockwise. Press [SHIFT/FUNC] or [STEP] to complete

Select Frequency Bands Press [BANDS], then turn Tuning Knob counterclockwise or clockwise. Press [SHIFT/FUNC] or [BANDS] to complete

CHANNEL FUNCTIONS

Display Channel Press [CHAN]

Change Channel Press [CHAN] *until 4 dashes appear, enter channel number,* [CHAN]

EXAMPLE: To call KMI on channel 401 press [CHAN], 401, [CHAN]

MODE FUNCTIONS

USB/LSB Toggle Press [1] Observe front panel display changes

Voice - Telex Filter Switch Press [2] Observe front panel display changes

Squelch On / Off Press [3] Observe front panel display changes and receiver is silenced if no signal is present.

Speaker On - Off Press [4] Observe front panel display changes and speaker is silenced when SPK light is extinguished on LCD.

Timer On - Off Press [5] Observe "TIMER" indication over clock portion on LCD.

Time - Date Display Press [6] Displays clock time or date on front panel.

Intercom On - Off Press [7] *enter # of remote head desired* ***or*** [7], [0] *for*

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all heads

20 dB Attenuator On - Off	Press	8	Observe front panel display changes
Power High - Low	Press	9	Observe HI PWR or LO PWR flag on LCD.

SHIFT FUNCTIONS

Back light Set	Press	SHIFT/FUNC , RATE	then turn Tuning Knob left or right.
Display control head ID	Press	SHIFT/FUNC , 0	
View Timer Frequency On	Press	SHIFT/FUNC , 1	
Alarm Time - Frequency Off	Press	SHIFT/FUNC , 2	
Squelch Level Set	Press	SHIFT/FUNC , 3	then turn Tuning Knob left or right
Noise Blanker On - Off	Press	SHIFT/FUNC , 4	
Beep each key stroke	Press	SHIFT/FUNC , 5	
Alternate Time - Date	Press	SHIFT/FUNC , 6	
SWR Forward - Reverse	Press	SHIFT/FUNC , 9	

SCAN FUNCTIONS

Scan by FREQUENCY RADIO MUST BE IN **FREQUENCY** DISPLAY MODE. PRESS FREQ BEFORE ACCESSING THIS FUNCTION. THEN:

Press SCAN then turn Tuning Knob left or right.

Change Scan Direction While Scanning, press Tuning Knob right or left

Change Frequency Step While scanning by frequency, Press SHIFT/FUNC , FREQ

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then turn Tuning Knob left or right. Steps of .1, .5, 1, 5, 10 KHz may be selected.

CHANNEL SCAN

Scan by CHANNEL Press [SCAN], [CHAN] *(if dashes displayed, press* [CHAN] *again),* then turn Tuning Knob left or right.

Scan Rate *While Scanning* Press [SHIFT/FUNC], [SCAN], turn Tuning Knob left or right. *(8 bars =Fastest, 1 bar = Slowest)*

Scan by Scan Bank(s) Press [SCAN] (*if freq. displayed, press* [CHAN] *again*), *enter bank #(s),* then [SCAN]

Define Scan Bank Press [PRGR], [SCAN] *enter bank # (0-9), enter channel # in bank,* OPTIONAL - *press* Up *or* Down *for next scan bank memory],* [PRGR]

Delete Scan Bank Press [PRGR], [SCAN] *enter bank #* ,turn tuning knob clockwise, [SHIFT/FUNC] [7]

DEFINE MEMORY

Define User Channel Simplex Press [PRGR], [CHAN] *enter channel #,* [FREQ] e*nter RCV frequency*, [FREQ] *set parameters,* [PRGR]. (RCV means "Receive")

Define User Channel Duplex Press [PRGR], [CHAN] *enter channel #,* [FREQ] *enter RCV frequency*, [FREQ] *set parameters,* [FREQ] *enter TX frequency,* [PRGR]

Delete User Channel Press [PRGR], [CHAN] *enter channel # to delete,* [CHAN]
(Begin with Channel Display) [SHIFT/FUNC], [7], [PRGR]

TIMER FUNCTIONS

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Set Time ON Press [PRGR] , [5] *on time* turn Tuning Knob counterclockwise, *off time* [PRGR]

Set Timer On Frequency Press [PRGR] , [5] , [FREQ] *receive frequency* [*FREQ*] *mode* [*PRGR*]

Set Timer on CHAN Press [PRGR] , [5] , [CHAN] *enter CHAN number* [*PRGR*]

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6.2 Sample Entries

Marine Use:

It's easy to call the Marine Operator!

Here's all you need to do to call the AT&T Marine Operator on ITU Channel 401:

[POWER]	To turn on the radio
[CHAN]	Until 4 *dashes* appear.
[4] [0] [3]	Channel number desired
[CHAN]	To execute channel change.

Ham Radio Use:

Here's all you need to do to get on to 14,290.0 in the 20 Meter Ham Band and tune down the band from this frequency:

[POWER]	To turn on the radio
[PRGR] , [FREQ]	*Six dashes will appear*
[1] [4] [2] [9] [0] [0]	*Frequency desired*
[PRGR]	*To execute frequency change.*

Then, to QSY down the band (move frequency down) simply touch:

Move to any Frequency in 100 Hz steps!

[FREQ] , turn Tuning Knob counterclockwise.

You can move up or down the band by turning the Tuning Knob clockwise (to move up) or counterclockwise (to move down). You can change the size of the frequency step easily. See **Frequency Functions**.

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7.0 Display LCD

The front panel of the SG-2000 is dominated by a large liquid crystal display (LCD) . The large display was selected because in many applications, the operating conditions of the radio need to be quickly determined. The large backlit display is easily read under all conditions. The backlight may be turned on and off or adjusted as conditions indicate. Now, lets explore the display and what the various LCD indicators mean.

REFER TO DRAWING - Figure 1 (Left to Right - Top half of display)

PRGR Upper left corner of display. This indicates when the radio is in the Program mode. This mode is used to make permanent or temporary changes to the memories of the SG-2000. Think of this button as the "*Enter*" key.

SCAN Upper left corner of display. This is activated when the radio is Scanning. Note that the SG-2000 has several ways to scan: by Channel, by Frequency, and by Band. These functions are fully explained in the section Advanced Operations, later in this manual.

CHAN
FREQ
RCV
XMT

Upper left corner of display. These are status indicator lights which tell you what the SG-2000 is doing at any particular moment. Most times, you will have two of the four status indicators on. If you are listening to KMI on Channel 403, you would have the CHAN indicator on and the RCV indicator on. This tells you that the number on the display, to the right of the indicator is showing a channel number, in this case, 403. It also says that the radio is in the receive mode, as indicated by the RCV indicator.

LCD Numerals Upper center of display. This shows the frequency or the channel which is being used by the SG-2000. Just left of the numerals is a flag which indicated "CHN" if channel information is displayed or "FRQ" if frequency is being displayed.

A3J A3H
A3A CW
USB LSB
VOC TLX
SPK SQL
TND ATT
NB

Upper right corner of radio. These indicators show the current mode of transmitting/receiving (A3J, A3H, A3A, CW), whether upper or lower sideband is selected (USB LSB), status of the voice/telex filter (VOC, TLX), whether speaker and squelch are activated (SPK, SQL), whether the antenna coupler is reporting tuned system (TND), if the 20 dB receive attenuator is active (ATT) and if the optional noise blanker (NB) is active.

REFER TO DRAWING - figure 1 **(Left to Right - Bottom Half of Display)**

Timer Lower left corner of display. Indicates on or off status of radio timer.

Small Numerals Lower left corner of display. Displays either the date or the time from the SG-2000 system clock.

FWD

S *or* **SWR** Lower left center of display. In receive, the letter S is dis-played and the bar graph to the right of the S will indicate relative signal strength. In transmit, either FWD or SWR will be displayed. Forward power is transmitter power going to the antenna. Alternatively, in transmit, SWR may be dis-played. SWR is an abbreviation for "standing wave ratio", the ratio of power going to the antenna compared with power coming back from the antenna which creates standing waves on the antenna feed line. SWR should always be as low as possible. A good

automatic antenna coupler, such as the SG-230 or SG-235 Smartuner™, will virtually eliminate SWR on antenna feed lines and increase transmitter efficiency.

INTCM Lower center of display over bar graph. It indicates if the intercom feature to another control head is active. You can activate this feature on an SG-2000 with no additional heads attached, but no one will hear you!

Bar Graph Lower center of display. Small numbers show under graph (10, 20, 50, 100). The bar graph displays relative strength of received signals and relative strength of transmitted signals.

TEMP Lower right corner of display. This light indicates a temperature condition which is abnormal for the transmitter and means that transmitter power output is being reduced to correct the condition.

HI LO

PWR Lower left corner of display. This indicates whether the transmitter is in the high or low power mode. High power output is 150 watts PEP on SSB and 150 watts CW while low power is 50 watts PEP and CW output.

Red LED's There are two red lights which are located in the lower left corner of the SG-2000 control panel just above the power switch.

The right hand light of this pair indicates that 12 VDC power is being applied to the radio and that the crystal oven, used for the onboard frequency standard, is available and is being supplied.

The left hand light above the power switch indicates that the radio's electronics are on and ready for operation. Please always allow for 10 minutes of warm-up for the crystal oven to insure the frequency standard has stabilized. This is especially important when the SG-2000 is being operated in extremely cold environments. The radio will, of course, work when first turned on with no warm up, but may be

slightly off frequency in violation of regulations which govern operations.

8.0 Front Panel Controls

Control of the SG-2000 is accomplished through push buttons located on the front panel of the radio. We will cover the functions of each button, then we will do some actual "on-the-air" operations in the *Operating Session* section.

The primary functions of each button are imprinted on the button itself. The gray 1 button is the number 1 when you are entering a frequency. When you are listening to the radio, it will toggle between LSB and USB. SHIFT functions are printed on the front panel above and below the button. These advanced functions are accessed by use of the SHIFT/FUNC key.

The key pad of the SG-2000 may be operated with or without a confirming beep when each key is pressed.

8.1 Primary Keyboard Functions

In this section, we will discuss the various primary keyboard functions. Let's start our exploration left to right, beginning with the top row of buttons and working left to right.

RX This function displays the frequency being received or transmitted. If the Channel is currently displayed, pressing the RX key will switch the display to the receive frequency of the channel. If the frequency is being displayed, pressing this key, then rotating the Spinner Knob clockwise or counterclockwise will change the operating receive frequency of the radio. When the RX button is pushed the receive frequency is changed. The transmit is not. Thus the radio is entering the FLIP mode (duplex) of operation.

TX This function stores the receive frequency in the transmit frequency memory.

FLIP The FLIP function is to exchange the receive and transmit frequencies.

FREQ This function displays the frequency being received or

transmitted. If the Channel is currently displayed, pressing the Frequency key will switch the display to the receive frequency of the channel. If the frequency is being displayed, pressing this key, then rotating the Spinner Knob clockwise or counterclockwise will change the operating frequency of the radio.

CHAN

If the frequency desired is currently displayed, the CHAN button will change the display to the corresponding channel number if the frequency has been assigned to one of the channel memories. If the desired frequency is displayed, but does not have a corresponding channel, the CHAN button enables the user to input a preprogrammed channel of their choosing .

This is slightly different from the memory architecture of typical amateur radios which have memories numbered 1 to 99. The SG-2000 has memories numbered from 1 to 2520, 644 of which are preprogrammed and 100 of which are user definable. Channel E0 is the international distress frequency, 2182 KHz.

The SG-2000 comes preprogrammed with all standard marine ITU and most SITOR channels (see ITU programmed frequency chart). The SG-2000 has the capability to hold up to 100 operator chosen channels in permanent memory.

BANDS

The BANDS select one of 65 pre-defined frequencies located in the ham bands. These frequencies correspond to channels 101 to 165.

Selecting BANDS displays the frequency 14150 Khz. The Spinner Knob is then used to select the desired frequency within the desired band.

END FUNC

The END FUNC button is used to treminate an active key sequence.

PRGR

Pressing this key activates the programming mode which tells the SG-2000 what to do. The best way to think of the Program function is to remember that commands must be "sandwiched between Program commands". For example, to program a simplex frequency directly into use, the keyboard sequence is PRGR, FREQ, enter the digits of the desired

frequency and press PRGR to finish the programming operation. You will note that FREQ and the actual digits of the frequency desired were sandwiched between the PRGR key strokes.

It is best to think of the Program button as meaning both "*Program*" and "*Enter*".

SHIFT/ FUNC Pressing this key accesses the alternate key functions which are screened on the front panel of the SG-2000.

MODE Display of the current mode is in the upper right corner of the LCD display. The mode operation button allows the user to sequence through 4 modes of operations. The modes of operations are:

1) A3H: AM / AM compatible. On receive, this is the AM mode and utilizes the SG-2000's true AM detector. In transmit, the SG-2000 transmits compatible AM (sometimes called AME, meaning AM equivalent) which is single sideband with 50% re-inserted carrier.

2) A3J: Single Sideband. This is the most commonly used method of voice transmission and is very efficient because all the transmitter power is devoted to carrying voice information. No power is wasted by transmitting a carrier.

3) A3A: Single Sideband with pilot carrier. This mode has a 4% pilot carrier reinsertion. This is commonly used among public shore stations and ITU stations where the carrier can be locked on and used by automated services.

4) CW mode: This mode is used for key coded transmissions. While in this mode the user can only transmit a 1 KHz tone by either keying the microphone or Morse code key.

These modes are sequenced counter clock-wise on the LCD display and are stored with the current configuration when the unit is turned off. Mode information may be stored as desired in the channel memory which also stores transmit and receive frequencies.

LSB - USB

The use of this button directs the transceiver to operate either upper sideband (USB) or lower sideband (LSB). U.S. and International Marine and Commercial regulations require that only upper sideband be used in marine frequency operation. Lower sideband may be used for Government or special applications only. In the amateur bands, frequencies on 40 meters (the 7 MHz band) and lower have traditionally employed lower sideband.

VOC - TLX

The standard SG-2000 has two selectable audio filters which allow the user to optimize the reception of incoming voice or data signals. The Voice filter, (VOC) allows a wide band width of 400 Hz to 2400 Hz. The second, the Telex (TLX) filter, is a tight filter centered at 1700 Hz. This filter increases the "signal to noise ratio" of the frequencies used in SITOR, RTTY, and FEC communications by removing unwanted noise.

Technical note for advanced users:

SG-2000's that have been ordered for ALE (Automatic Link Establishment), or adaptive HF controller service employing Digital Signal Processing (DSP) systems are specially modified to use the VOC-TLX switch to turn the automatic (receiver) gain circuits (AGC) on and off. This configuration is selected by moving a jumper on the exciter board of the radio. ALE and other advanced government protocols require that automatic gain control circuits be defeated. This modification allows the AGC speed switch to be called via the serial port. The modification removes the TLX filter function which is not used under wide spectrum digital protocols. The PRC-2250 MIL is supplied standard with the ALE modification selected by the internal jumper.

SQL

The squelch is used to block non-voice reception (e.g. atmospheric background noise) and is incorporated in most SSB transceivers. The SG-2000 converts the signal to a digital form. The signal is then analyzed by the micro-processor to determine if it is a voice signal. If the signal is determined to be voice, it is allowed to pass. If not, the radio remains silent. This feature provides a faster response time to the incoming signal so that no data is lost.

SPK

This button will engage the front panel speaker on or off. This feature is utilized when the privacy of using a telephone style handset is desired. The SG-2000 back panel speaker jack (J-505) is also controlled by this switch. Please note that when the SG-2000 is first turned on, all control heads are normalized at one half volume, regardless of the last setting of the SPK switch.

Note: External Speaker jack J-505 is only usable when the SG-2000 is used in the control head attached to the radio configuration.

20 DB ATTN

This control inserts or removes a special -20 dB receiver gain reduction pad in the front end receiver of the SG-2000. When this pad is in the ON position, the SG-2000 reduces it's sensitivity to overcome unwanted RF noise, interference signals and helps to prevent signal overload when communicating with nearby stations. Signal overload occurs only when your location is extremely close to another transmitting station or the amount of signal arriving at your location is extremely high due to high power transmitters and high gain directional antennas being used.

If your SG-2000 is operated in the area of high power broadcast stations, you may wish to order the optional Broadcast Band filter. This filter will virtually eliminate all AM broadcast signals allowing the SG-2000 to operate in the same room with very high power AM broadcast transmitters.

PWR HI / LO

Power to the transmitter is controlled by this button. When power is reduced, or on LO, the maximum output power is approximately 35% of the full power available. This feature can be used when your normal power output is overloading (saturating) the receiver of the station with whom you are communicating. In the LO power mode, the SG-2000 consumes less DC current and will therefore reduce power consumption from the supply battery. This feature is recommended to save the life of the battery and is useful when using the SG-2000 under sail or when solar and other power sources are low.

INTCM / XCV The SG-2000's intercom system is unique, allowing communication between the user and any or all of up to eight separate control heads. By engaging this button and "0", the user may communicate with all control heads by using the microphone. Engaging this button then pressing the number of another control head (1 - 8) enables the user to privately communicate with a specific control head. The control head ID numbers are programmed at the factory and the control head number, which is permanently etched into the memory of the control head MicroProcessor can be displayed by pressing the "SHIFT /FUNC" and then the number 0 on the keypad. The LCD will display the head number in the frequency window.

CLOCK / DATE The lower left hand corner of the display shows the current time or date. Either option may be selected by engaging this button. The default setting preferred by most users is the clock function. Time is displayed in military (24 hour) format. If you are making position sightings, you may wish to check the clock periodically against the U.S. Bureau of Standards time stations, WWV and WWVH. These may be found 24 hours a day on 2.5, 5, 10, 15, and 20 MHz providing time of day, storm warnings and navigation aid updates including the status of GPS satellites.

TIMER This button engages/disables the alarm time programmed into the unit. (See Function Operation Instructions). When engaged, the unit will automatically shut down at midnight if there is no previous pre-programmed time. The SG-2000 may be programmed to turn on, tune to a pre-assigned frequency and mode of operation to receive daily broadcasts. At the end of these broadcasts, the radio can then be programmed to turn itself off.

This feature is used to schedule receiving weather faxes in unattended operation. It may also turn on the radio for a regularly scheduled net or if you want to use the SG-2000 as a sophisticated clock radio.

STEP The Step function is used in conjunction with the frequency function to allow the operator to select the size of frequency step. The steps are in preprogrammed increments of .1 (100

Hz), 1, 3 and 5 KHz. If you are operating in ham bands (and especially when using CW), the 100 Hz (.1 KHz) mode is best. On the short wave broadcast bands, scanning at 5 KHz is great!

SCAN

The Scan button engages the automatic scanning functions of the SG-2000. The scanning function operates in three different modes; scanning by frequency, scanning by channel, and scanning by scan bank. Scanning may also be controlled by an external device such as a computer or ALE controller. When operated by an ALE controller the SG-2000 will scan at speeds in excess of 5 channels per second. Manual operation is variable from 5 seconds per channel to approximately 5 channels per second.

In the frequency mode, the SG-2000 will scan up or down in discrete steps defined by the Step Function. By rotating the Spinner Knob clockwise or counterclockwise, the direction of the scan can be changed to direct the scan to the desired frequency range. If the squelch is activated in scan, the unit will continue scanning until activity breaks the squelch. The unit will then pause for 5 seconds and if there are no more breaks in the squelch, the unit will continue in the original direction.

The scan channel mode is similar to the frequency mode in that when activated, the unit will begin to scan factory programmed ITU-VOICE and ITU-SITOR channels. The direction of the scan can be changed rotating the Spinner Knob clockwise or counterclockwise. When rotating the Spinner Knob in scan, the unit will step once in that direction and then pause for approximately 2 seconds. This will allow the manual stepping through of the scan routine to find activity. The ITU or SITOR channels can be selected by first setting the radio in VOC or TELEX modes respectively.

The programmed scan mode allows you to program channels into one of six banks or files for scanning. There are six banks with up to 10 files in each, allowing up to 60 channels to be programmed. When scanning, the unit will search through the selected banks at a pre-determined rate.

This scan rate may be changed at any time using the *RATE*.

key. If the squelch is on during the scan routing, scanning will pause on a squelch break. If there is no further activity on that channel, scanning will resume after 5 seconds. The Tuning Knob can be used to change the direction of the scan and to step through the scan banks manually.

RATE The Rate function allows you to select pre-programmed scanning speeds of both frequencies and channels which range from .2 seconds to 40 seconds. See Section 13.11, Changing Frequency or Channel Scan Rates, for specific rates.

8.2 SHIFT Functions

To access the secondary function keys on the upper half on the front panel, the operator will depress the *SHIFT/FUNC* key prior to pressing the desired key. Secondary functions of keys (The functions printed above the buttons on the panel) are described as follows:

Control Head # This key is used to view the Control Head number pre-programmed by the manufacturer (see INTCM-XCV key in preceding section).

View Timer These two keys are used to preview the pre-programmed alarm times and their corresponding channel or frequency.

SQL Level This function allows you to set a squelch level by rotating the Spinner Knob clockwise or counterclockwise. To optimize the squelch level, depress the Up and Down buttons respectively and increase the SQL-Level once or twice. This function allows for optimum detection and minimum background noise. For viewing purposes, the adjustment levels are displayed on the bar coded meter.

RF Noise Blanker This optional feature allows the radio to recover information that would otherwise be drowned out by high powered impulse type noise. In noisy environments, engine spark noise, lightning, radar pulses or other EMI sources can cause the radio's built-in automatic gain control to reduce the sensitivity to the input signal. With the noise blanker, incoming noise is detected and turns off the receiver for the length of the noise pulse, thus preventing the automatic gain

control from causing desensing.

FWD - SWR This function is used to display the output power and returned (lost) power when transmitting via the bar graph portion of the display. Widely fluctuating readings of either the FWD or SWR when in the CW transmit mode usually indicate problems such as an improperly tuned antenna or a faulty connection between the radio and antenna. Situations such as these can harm the radio and should be resolved immediately.

Lockout Function not available in this version of SG-2000. (Not to be confused with scanning lockout).

Delete The SHIFT/FUNC plus DELETE sequence is used to delete obsolete or incorrect information when in the PRGR mode.

Display Engaging this key directs the date and time to flash intermittently on the display in 2 second intervals, thus allowing the operator hands-free access for viewing time and date.

Beep This key is used to engage audible sound (a beep) when any key is depressed. To turn off the beeping sound, press the SHIFT/FUNC plus BEEP keys again.

Back Light This function engages the back lighting of the front panel. To change the back lighting, press "SHIFT/FUNC", "RATE", then rotate the Spinner Knob clockwise or counterclockwise to adjust the back lighting to a comfortable level.

8.3 Program Functions

As was mentioned earlier, remember that the PRGR key means two things: At the beginning of a key sequence it means "OK, do the following". At the end of a key sequence, it means "OK, enter the preceding and execute the command".

The Program Functions allow the operator to program the following:

Channel Up to 100 channels can be entered by the operator. These channels will remain a part of the pre-programming of the

unit until deleted by the operator. All pertinent information such as USB/LSB mode, VOC/TLX, and Attenuator can be programmed via this function and mode.

Clock / Date The current time or date can be entered via this function.

Timer The Timer function allows the unit to power itself on or off at any time to a specific preprogrammed frequency or channel of your choice .

Frequency This function is used to select any frequency between 1.6 MHz and 30 MHz. For transmission purposes, care should be taken not to transmit on restricted frequencies.

Scan This function is used to program the different banks used by the scanning function. The bank number is programmed first, then the desired channels to be contained in that bank. The Spinner Knob is used to step through each bank.

Lock Feature The SG-2000 can be limited to channelized operation. This function is used to prevent transmission on any frequency other than the legal ITU channels. This is useful in areas where there are restricted frequencies in which to operate. See *Transmit Channel Locking* of this manual for the sequence to turn the feature on and off.

8.4 Operating Session

This section will give you practical key entry sequences which will make operating the SG-2000 very efficient.

Power Before turning on the power to the SG-2000, you may notice a red stand-by light glowing on the lower left portion of the control head. This indicates the 12 VDC power is available for the radio. If you do not see the red stand-by light on, please check your 12 VDC power wiring to determine why power is not being supplied to the radio. The Oven LED is only active when rear panel oven switch is on.

The Stand-by light also serves to indicate whether 12 VDC power is being supplied to the onboard crystal oven. As

you'll recall from the introduction to the radio, the onboard frequency standard uses a highly stable crystal oscillator.

Allow 12 VDC power to be applied for 10 minutes or longer. If you do not do this, the frequency standard will not be standard and off frequency operation may be noticed. Failure to allow the oven to come up to temperature may result in operation on an improper frequency.

Once the availability of power has been confirmed, turn power to the on position.

The control head should begin to display radio status information.

The first frequency displayed will be the last frequency used prior to the radio being turned off.

You may also notice when power is turned on that the radio comes up at partial volume. The SG-2000 always comes on at its last volume setting before it was last turned off.

Now, notice the frequency/channel portion of the display. The indicator to the left of the numbers will inform you whether CHN (channel number) or FRQ (frequency) is being displayed. If Channel is displayed, go to the CHANNEL section to continue operating in the channel mode. If you wish to operate in the frequency mode, go to FREQUENCY section.

If you are in CHN and wish to see FRQ, press the FREQ key. If you are in the FRQ mode and wish the display to show channel information, simply press CHAN. If the frequency displayed does not have an assigned channel number, four dashes will appear on the display. This indicates that the radio is not operating on a channel (and mode) which is in memory.

Change Channel - Voice Mode

In order to change the operating channel, press the CHAN key until four dashes appear. You will need to press it 1 or 2 times before the dashes appear.

With the dashes displayed, type in the desired channel

number with the key pad. Then press the CHAN key a second time to enter the command.

(Refer to the Quick Reference Card)

If the channel desired is a four digit channel number, the function will be entered automatically following input of the fourth digit.

Change Channel - Telex Mode If the new operating channel desired involves the use of the Telex mode, you must change the mode to Telex *before* attempting to change to a SITOR channel.

This is incorporated into the SG-2000's software programming to prevent accidental entry and accidental voice use of SITOR channels. Voice on these channels could interfere with data reception.

As you can imagine, if this feature was not incorporated, it would be possible to enter channel 812, a SITOR channel, accidentally when you meant to enter channel 812, a semi-duplex ITU voice channel.

Use the following sequence to change to a Telex SITOR channel:

1) Set mode to TLX by pressing the VOC/TLX key. TLX will be displayed on the right hand side of the LCD display.

2) Depress "CHAN" key until dashes appear. Press CHAN once if CHN flag is on left of numbers, or twice if FRQ flag is on).

3) Enter the desired SITOR channel number.

4) Depress "CHAN" key to enter the channel and make it current.

Frequency Change - General

There are two ways to change the operating frequency of an SG-2000. For large frequency changes, you may use the direct entry method. For small changes of frequency you may use the Tuning Knob. When the knob is used, the frequency will increment or decrement in steps of .1 (100

Hz), .5, 1, 3, and 5 KHz. The size of the step is set by the *Change Frequency Scan Step* procedure.

Frequency Change - Direct Entry

To change to a new operating frequency via the direct entry method, the following steps are used:

1) Press "PRGR" to alert the memory that new information is coming.

2) Press "FREQ" to specify that frequency numbers will follow.

3) Enter the frequency digits including the first number to the right of the decimal point. If you are satisfied with the mode and are not working duplex (e.g. a different receive and transmit frequency), go to Step 4. Otherwise, keep reading.

Optional:	After you have keyed in the digits for the direct entry frequency you may change two other variables. You can specify mode and specify a transmit frequency if you wish it to be different from the receive frequency.

3-A) You may press the "FREQ" button again at this time to enter MODE information and select the desired sideband (USB or LSB).

3-B) You may press the "FREQ" button once more to bring up 6 dashes which are displayed as [- - - - - -]. This is where you enter your desired transmitter frequency.

Note:	While most of the ITU High Seas voice channels use relatively small frequency differences of under 1 MHz, the SG-2000 may be operated with any difference desired. For example, if you wanted to transmit on 2 MHz and listen on 26 MHz, this is easily within the capability of the SG-2000.

4) Press "PRGR" to enter the information into memory and execute the function.

Frequency Change - Incremental

To change frequency a relatively small distance, you may use the following sequence.

1) Press "FREQ" once if FRQ flag is on, twice if CHN flag is on.

2) Rotate the Tuning knob.

You will notice that the frequency displayed is changing by the increment specified by the *Change Frequency Scan Step* function.

Fine Tuning - CW Operation

If you are using the SG-2000 in the CW mode, you should tune in the desired station by pressing the Frequency button and then using the Tuning Knob until the received station is heard at the same pitch as the CW sidetone emitted from the control head speaker.

When this is done, you will be operating on the same frequency as the station you wish to work.

If you then wish to adjust the note or tone of the CW station, this may be done with the clarifier. You will be able to adjust the note between 400 and 1600 Hz.

SPECIAL NOTE: Do NOT use the SG-2000 on CW in the LO PWR mode. If you desire to operate CW and LO PWR, use an external tone source and connect it to the external audio I/O port J-301 located on the rear panel of the SG-2000. Vary the amplitude of the external tone source to control output power of the SG-2000.

Program User Channel into Memory

User defined channels are assigned channel numbers 1-99. You may designate any frequency to be a channel from 1-99. Channel 0 is displayed as E0 - the international distress frequency - and may not be reassigned.

Enter a Simplex Channel into Memory

The following steps are required to assign the *simplex* frequency 14,735.1 KHz to user channel 09:

1) Press the "PRGR" key
2) Press the "CHAN "key
3) Enter the desired channel number (09)
4) Press the "FREQ" key
5) Enter the desired frequency including one digit right of the decimal point. (147351)
6) Press the "FREQ" key to select mode of operation
7) Press the "PRGR" key for simplex operation and to end the programming sequence.

Enter a Duplex Channel into Memory

If the desired channel is a *duplex* channel (e.g. different receive and transmit frequencies), these additional steps are required:

1) Follow steps 1 through 6 as shown above under Entering Simplex Frequency into Memory.
2) After step #6, press the "FREQ" key once more. Six dashes will be displayed on the LCD [- - - - - -].
3) Enter the transmit frequency
4) Press the "PRGR" key to enter the information into memory.

Deleting Errors in Entry

In the event an error is made entering information, press the "SHIFT/FUNC" key and the "7" key to delete any errors. Repeat this sequence as necessary.

Delete a Channel from Memory

You may not delete a frequency from an SG-2000. You may only delete user definable channels. You may or may not be on the channel you wish to delete. To delete a channel, use the following key sequence: "PRGR", "CHAN", "the channel number you wish to delete, if channel 1-9, you must add a preceding 0", "CHAN", "SHIFT", "7" and "PRGR".

8.6 Scanning Functions

The SG-2000 will scan both frequencies and channels. You can scan from 2 to 30 MHz continuously in 100 Hz steps. Or, you may scan just a few of the hundreds of channels.

Program a Channel Bank

The SG-2000 has 6 channel banks number 00 to 05. Each of these banks will hold up to 10 channels, complete with mode and offset (if duplex). The entry sequence is:

1) Press the "PRGR" key.

2) Press the "Scan" key.

Note: The display will show the "PRGR" indicator active with the large digit display showing a "-0" on the far left.

3) Enter the desired bank number to be programmed (0-5). The display will show the bank number on the far left of the display and the previous channel programmed in the first file of that bank. If the file has not been previously programmed, the display will show 4 dashes to indicate it is empty.

4) If the file is empty, as indicated by 4 dashes, enter the desired channel number.

5) Rotate the Tuning Knob clockwise to proceed to next file in that bank and repeat step 4, or press the "PRGR" key to end the function.

6) If a file is not empty, the file can be deleted by first engaging "SHIFT/FUNC" and then "7" or

"INTCM/XCV".

7) Press the "PRGR" key to end the function.

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Scan by Frequency - General

1) Press the "Scan" key.

2) Press the "FREQ" key.

Note:	If there are no keys pressed within 4 seconds, the unit will start scanning automatically from the original channel on display at the start of the function.

3) To change the direction of the scan or to step through the frequencies, rotate the Tuning Knob

4) To allow the pause on detection, press the squelch by pressing "3" or "SQL".

5) To stop the scan, simply press the "Scan" key.

Scan by Frequency - Specific Range

This is an advanced function and should be studied closely. Also called Program or Band scanning, this capability allows the SG-2000 to scan in a particular mode between two frequencies. There are two steps to using band scanning with the SG-2000. First, you will need to load channels into the scan brackets. This tells the radio the range within which to scan. When you are done using the band scanning, you will need to unload the scan brackets to allow the radio to resume normal scanning operation.

Load Frequency Limits

Before following this sequence you will need to have the upper and lower frequencies assigned to memories. This is explained in an earlier section. For the purpose of this discussion, let's suppose that you have put 3900 KHz LSB into Channel 22 and 4000 KHz into Channel 23.

1) Press "PRGR".

2) Press "SCAN".

3) Press "CHAN" Display will flash [LC: - - - -] (lower channel).

4) Enter the channel number of the lower frequency. In this example, 22.

5) Press "CHAN" Display will flash [UC : - - - -] (upper channel).

6) Enter the channel number of the upper frequency. In this example, 23.

7) Press "PRGR" to exit programming and execute commands.

Begin Scanning

This is done by simply displaying frequency and scanning. If you start within the frequency range bracketed, the radio will simply go low to high or high to low, depending on whether you have rotated the Spinner Knob clockwise or counterclockwise.

If you begin scanning frequencies which are outside of the range, the radio will only scan to the range. E.G. If you start scanning down from 28.400 MHz the radio would scan down until it got to 3.9 MHz and would then scan only from 4.00 MHz to 3.900 MHz after it reached that range.

Unload Frequency Limits

In order for the SG-2000 to resume normal frequency scanning (scanning up or down anywhere in its range), it is necessary to unload the scan brackets. To do this, the following sequence is used.

1) Press "PRGR"

2) Press "SCAN"

3) Press "CHAN"

4) Display will show [LC : - - 2 2] (If Channel 22 is lower limit)

5) Press "SHIFT/FUNC"

6) Press "7" (the delete key in the SHIFT/FUNC mode)

7) Press "CHAN"

8) Display will show [L C : - - 2 3] (If Channel 23 is upper limit)

9) Press "SHIFT/FUNC"

10) Press "7" (the delete key in the SHIFT/FUNC mode)

11) Press "PRGR" to execute the function and exit the programming mode.

Scan by Channels

1) Press "SCAN" .

2) Press "CHAN". (If dashes appear, press CHAN again).

Note:	If there are no keys pressed within 4 seconds, the unit will start scanning automatically from the original channel on display at the start of the function.

3) To change the direction of the scan or to step through the channels, rotate the Tuning Knob clockwise or counterclockwise.

4) To allow the pause on detection, press the squelch by pressing "3" or "SQL".

5) To change from scanning the ITU channels to the SITOR channels or visa versa, set the unit in VOC or TLX mode respectively by engaging the "2" or "VOC/TLX" key.

6) To stop the scan, simply press the "SCAN" key.

Scan by Channel Banks

1) Press the "SCAN" key.

2) If the frequency is displayed, press the "CHAN" key to

display 6 dashes.

3) If 6 dashes are already displayed, type in the desired banks to scan. Example: By entering "0134", the radio will scan through banks 0, 1, 3 and 4. If an empty bank is selected, the unit will first try to scan through that bank, however the bank will be eliminated once it is determined the bank is vacant.

Note: If there are no keys pressed within 4 seconds, the unit will begin scanning automatically from the original channel on display at the start of the function.'

4) Press the "SCAN" key again to begin scanning.

5) To change the direction of the scan , or to step through the scan banks, rotate the Tuning Knob clockwise or counterclockwise.

6) To allow the pause on detection, press the squelch by pressing "3" or "SQL".

7) To stop the scan, simply press the "SCAN" key.

8.7 Changing Frequency or Channel Scan Rates

Separate scan rates are available for frequency or channel scanning. You must be in the frequency scan mode to set frequency scan rate and in channel scan to set channel scan rate. If the unit is not scanning, the function will change the rate of the last scan mode performed.

Change Frequency Scan Rate (In Frequency Scan Mode)

1) Press the "SHIFT/FUNC" key.

2) Press the "Scan" key.

3) Rotate the Tuning Knob clockwise or counter-clockwise to change the rate to the following:

   a) 1 step per second |

b) 2 steps per second | |

c) 5 steps per second | | |

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4) This function will automatically time out after 4 seconds.

Change Channel Scan Rate (In Channel Scan Mode)

1) Press the "SHIFT/FUNC" key.

2) Press the "SCAN" key.

3) Rotate the Tuning Knob clockwise or counter-clockwise to change the rate to the following:

   a) 1 channel per 40 seconds |

   b) 1 channel per 20 seconds | |

   c) 1 channel per 10 seconds | | |

   d) 1 channel per 5 seconds | | | |

   e) 1 channel per 2 seconds | | | | |

   f) 1 channel per second | | | | | |

   g) 2 channels per second | | | | | | |

   h) 5 channels per second | | | | | | | |

4) This function will automatically time out after 4 seconds.

Change Frequency Scan Step

1) Press the "SHIFT/" key

2) Press the "FREQ" key

3) Rotate the Tuning Knob clockwise or counter-clockwise to change the rate to the following:

   a) 100 Hz per step

   b) 500 Hz per step

   b) 1000 Hz per step

   c) 3000 Hz per step

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d) 5000 Hz per step

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4) The function will automatically time out after 4 seconds.

8.8 Additional Functions

Timer

To turn timer on and off:

Press "5" or "TIMER"

Display Alarm Time ON and Frequency

1) Press the "SHIFT/FUNC" key
2) Press "1" or "LSB/USB" keys

Display Alarm Time OFF

1) Press the "SHIFT/FUNC" keys
2) Press "2" or "VOC/TLX"

Program Time ON-OFF

1) Press the "PRGR" key
2) Press "5" or "TIMER"
3) Type in 1-4 digits for time on in 24 hour format
4) Rotated the Tuning Knob counterclockwise to program off time or "PRGR" to end

Program Time ON Frequency

1) Press the "PRGR" key
2) Press the "5" or "TIMER" key
3) Press the "FREQ" key
4) Type in frequency desired
5) Press the "FREQ" key for more parameters or "PRGR"

to end

6) Press desired parameters (LSB, ATTN, VOC,...ETC.)

7) Press the "FREQ" key for transmit frequency or "PRGR" to end

8) Type in transmit frequency desired

9) Press the "PRGR" key to end or the "FREQ" key to repeat settings

Program Timer on Channel

1) Press "PRGR"

2) Press "5" or "TIMER"

3) Press "CHAN"

4) Type in desired channel number

5) Press "PRGR"

Clock / Date

To toggle between time of day (24 hour format), and date:

Press "Clock / Date".

Set Clock

1) While clock is displayed, press the "PRGR" key

2) Press "6" or "Clock / Date"

3) Type 6 digits for time desired (ie..131500 FOR 1:15 PM)

4) Press the "PRGR" key to end

Set Date

To program in the date:

1) While date is displayed, press the "PRGR" key

2) Press "6" or "Clock / Date"

3) Type 6 digits for date desired in the format MM DD YY

4) Press the "PRGR" key

Attenuator

To turn 20 dB Attenuator on or off:

Press the "20 dB / ATTN" key.

Power HI-LO

To change output power level:

Press the "PWR / Hi LO" key.

Volume

To change the volume level adjust the Volume knob.

Intercom

To activate the intercom:

1) Press the "7" or "INTCM / XCV" keys

2) Depress a number key 1-8 for any specific control head or 0 for all control heads.

3) Depress the "7" key to disperse.

Control Head Number Display

To display control head number for 2 seconds (will be timed out after 4 seconds):

1) Press the "SHIFT / FUNC" key

2) Press the "0" or "Mode" key

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Back Light

To turn back light on or off or adjust brightness level:

1) Press the "SHIFT/FUNC" key

2) Press the "RATE" key

3) Rotate the Tuning Knob clockwise or counter-clockwise to step through available levels

Noise Blanker

To turn RF Noise Blanker on or off (optional):

1) Press the "SHIFT/FUNC" key

2) Press the "4" or "SPK" key

Beep

To enable a beep for every key stroke:

1) Press the "SHIFT/FUNC" key

2) Press the "5" or "TIMER" key

Display (Date / Time)

To toggle between constant date/time display or to alternate date/time display:

1) Press the "SHIFT/FUNC" key

2) Press the "6" or "Clock/Date" key

Delete

To delete last entry made:

While in programming mode, press the "SHIFT/FUNC" key

1) Press the "7" or "INTCM/XCV" key

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Lockout

To lock out a channel in scan mode:

1) While scanning, wait for a channel to appear and press the "SHIFT/FUNC" key

2) Press the "8" or "20 dB/ATTN" key

FWD / SWR

To toggle forward power and SWR display in transmit:

1) Press the "SHIFT/FUNC" key

2) Press the "9" or "PWR/Hi LO" key

Transmit Channel Locking

The SG-2000 includes a provision in software for locking the radio into channelized operation only. We recommend that this function be invoked whenever you are using an SG-2000 in a maritime mobile situation where only one operator who is knowledgeable about direct entry of frequencies is aboard. In this way, the persons aboard the vessel, who might need to operate the SG-2000 in an emergency, need only be taught how to call for help on the desired emergency channels. Please note that the channels include major ham frequencies on the 75, 40 and 20 meter bands where distress assistance may be available. When the lock is invoked, reception on all frequencies is possible, but transmitting will only occur on programmed channels (including those which are user defined).

Lock for Channelized Operation Only

Use the following key sequence to lock out direct entry of transmit frequencies:

SHIFT/FUNC, 8, 8, CHAN

Unlock Channelized Only Operation

Use the following sequence to enable transmit capability on all direct entry frequencies plus frequencies which are contained in channel memories:

SHIFT/FUNC, 8, 7, CHAN

NOTE:	If you are operating the SG-2000 aboard a vessel or in a mobile installation where channelized operation only is allowed, you may disable the all frequency transmit capability of the SG-2000 . You may not wish to disclose the unlocking sequence to some operators. Simply say that the radio is type approved for ITU channels and it includes reception capabilities for all frequencies. You will be able to demonstrate that it will not transmit on unauthorized frequencies.

Temporary Settings:

The SG-2000 will store current settings on a temporary basis so they may be easily recovered after changing radio parameters. To temporarily store settings, press the "PRGR" then "SHIFT/FUNC" keys. To recover these temporary settings, press "SHIFT/FUNC" then "PRGR".

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9.0 Schematics

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