Rockwell International

operator's manual

HF-8096
SELSCAN® Automatic
Communications Processor

NOTICE: This instruction book replaces first edition dated 1 September 1985.

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Frequency selection is automatic and contact with the desired station is accomplished through an automatic exchange of addresses which establish and confirm the link. The operator is signaled when the circuit is ready to use. A positive squelch feature provides transient-free audio muting while scanning.

The two systems accomplish the automatic connectivity by exchanging an frequency shift keying (FSK) data handshake sequence. Frequency selections are made from the stored LQA data based upon propagating conditions between the stations involved. Should contact not be successfully accomplished on the automatically-chosen primary frequency, alternate frequencies are selected automatically and the call is repeated until contact is made, the channel selection sequence is repeated twice, or the call is terminated by the operator.

A listen-before-call feature prevents interrupting existing communications. If an automatically-chosen channel is already in use, an alternate channel will be selected and no call sequence will be initiated on the busy channel. This feature allows the use of shared frequencies on a noninterference basis for improved channel utilization efficiency.

Once a link has been confirmed, the user may talk using his microphone and ptt key or he may operate the system in a data mode. The processor will monitor system key activity and automatically terminate a connection after a time-out period following the last system key action. This eliminates the possibility for user error in failing to return the system to the scanning mode upon completion of his communication.

Using the system for automatic net broadcast connectivity is similar to the station-to-station case except that a Group address or the All Call address is selected instead of an individual station address. No handshake is exchanged due to the large number of stations involved. An automatic Roll Call function is provided should the operator wish to poll the net following a net broadcast to determine which net members received the broadcast.

During normal automatic operation, the processor will cause the HF-80 system receiver to scan up to 30 preset channels selected from the 30 stored preset channels. Audio output from the HF-80 receiver is supplied to the processor where FSK data detection circuits listen for signals.

When FSK address data is received from another net stations, an LQA measurement is automatically made to determine signal-to-noise and delay distortion characteristics. This LQA information is stored in memory referenced to the channel on which the signal was received and the address of the station which transmitted the signal.

To ensure timely LQA updates are provided to other net members, the processor can be programmed to periodically cause the associated HF-80 system to transmit short LQA update bursts on each of the scanned channels.

In addition to the fully automatic mode of operation, manual or channelized operation is possible from the front panel of the processor. A remote control option allows the processor to be remotely controlled and programmed by a higher level station processor or a simple ASCII I/O device.

Some models of the HF-8096 do not have a function keyfield on the front panel A1. These models must enter the commands through the keyboard. Models with function keys may enter specific commands either through the keyboard or through the use of the function keys. Refer to table 3-1 for the equivalent commands entered by each function key. Units that do not have the function keyfield use the RETURN key in place of the ENTER key. Units without a function keyfield also have a RESET and CLEAR key. The RESET key causes the same function as a CTRL SHIFT, refer to table 3-1. The CLEAR key is not functional. The position of the keys may differ between units with and without the function keyfield.

Operator Quick Reference Guide

FUNCTION	PROCEDURE	
ON/OFF	Momentarily depress POWER pushbutton to toggle power on or off. When power is turned on, the front panel display indicates type of equipment being used and an automatic self-test will be performed; refer below for indication meaning. **Note** Power on/off is not controllable from a remote terminal.	
SELF-TEST	To initiate the self-test, enter test command: TE(ENTER) ***SYSTEM TEST INITIATED*****U is displayed until self-test is complete, followed by a slight delay then either TEST PASSED or FAILED (see list below). For display of Replace ROM Processor A8 RAM Memory A7 MODEM Modems A5, A6 AUDIO Audio assemblies A2, A3 USART Interface A4	
AUTOMATIC OPERATION	**Note** Channels, addresses, and system parameters must have been previously programmed. Refer to programming section of manual. To enter automatic operation, enter scan command: SC(ENTER) or press SCAN key in function keyfield and (ENTER)	
Initiate calls	To place a call, enter call command: CA XXX(ENTER) or press CALL key in function keyfield, enter address desired, then (ENTER). XXX is the address to be called. (May be Individual, Group, or All Call address)	
Receive calls	Front panel will display READY and address of calling station. The audible call alert signal will sound. Press push-to-talk (ptt) key and commence voice communications.	
CHANNELIZED OPERATION	**Note** Previous programming is required; refer to programming section of manual. To enter channelized operation, enter channel command: CH ZZ(ENTER) or press CHAN key in function keyfield, enter 2 digit channel number, then (ENTER). ZZ is 2-digit channel number (00 to 29). Key the system to tune the transmitter.	
Initiate calls	To place a SELSCAN* call, enter call command: CA XXX(ENTER) or press CALL key in function keyfield, enter address, then (ENTER). XXX is the address to be called. (May be Individual, Group, or All Call address.) The system will place the SELSCAN* call as if in the automatic mode except only on the operator-selected channel. If no response is received, the call will be aborted and the system will remain on the selected channel.	

FUNCTION	PROCEDURE
Receive messages	To read received messages, enter list messages received command: LI MS RE(ENTER) or Press LIST key in function keyfield then press RB1 or RB2 key in function keyfield. After reading first two lines, press CTRL and Q keys to view next lines. Repeat until all of message has been viewed. **Note** Messages may be viewed multiple times.
ROLL CALL	The Roll Call function can be used following a Group or All Call in any operational mode (ie, automatic, channelized, or manual). **Note** Refer to the programming section for channel, address, and system parameter programming information.
Initiate roll call	To initiate Roll Call following a Group or All Call, enter roll call command: RO(ENTER)
Acknowledge roll call	For Roll Calls, front panel will display ROLL CALL INITIATED. To acknowledge, enter acknowledge command: AC(ENTER) or press ROLL ACK key in function keyfield
MONITORING	To list radio system status, enter list update status command: LI UP(ENTER) or press SYS STAT key in function keyfield To list radio fault status, enter list radio fault or status radio fault command: LI RA FA(ENTER) or ST RA FA(ENTER) or press LIST key in function keyfield, enter RA FA on keyboard then (ENTER) To list radio monitor status, enter status radio monitor command: ST RA MO(ENTER) To list LQA values, enter list LQA command: LI LQ(ENTER) or press LIST key in function keyfield, enter LQ on keyboard, then (ENTER)
OPTIONS	
STANDBY	To place system in standby, enter standby command: SB(ENTER)
SILENT	To operate in the silent mode, enter silent command: SI(ENTER) or press SIL key in function keyfield
SCAN	To cause automatic scanning, enter scan command: SC(ENTER) or press SCAN key in function keyfield **Note** The command SC places system in automatic mode of operation.

2. CONTROLS AND INDICATORS

Controls and indicators of the HF-8096 SELSCAN® Automatic Communications Processor are shown in figure 1 and are listed in table 1 along with their function. All controls and indicators are applicable to all units, unless otherwise indicated.

Note

All units referred to in the controls and indicators table are interfaced through the receiver-exciter, exciter, and/or receiver to the processor.

Table 1. HF-8096 Controls and Indicators.

INDEX NUMBER	CONTROL OR INDICATOR	FUNCTION
1	PHONES volume control A1R2	Provide continuous adjustment of the headphone audio level. Clockwise rotation increases headphone audio level. This function is not remotable.
2	TAKE CMD switch A1S3	A 3-position toggle switch that provides take command and local or remote control of the radio subsystem and the SELSCAN® processor. The function of each switch position is as follows. LCL(up) — The processor takes control of the radio subsystem. Radio subsystem will be controlled for operation as is indicated by display (index number 5). REM(down) — The processor and radio subsystem are controlled by a remote radio set control. Radio subsystem and processor will be controlled from a remote ASCII terminal or higher level processor. Operational status will be indicated on the display and remote terminal. Center position — The processor control situation remains unchanged (LCL or REM above) unless the external take-command line is activated. This causes the processor to relinquish control of the radio subsystem.
3	KEYFILL Jack	Reserved
4	○ AF GAIN control A1R1A	Controls speaker volume, full clockwise equals maximum volume. This function is not remotable.
5	● SQUELCH control A1S2/ A1R1B	Enables/disables speaker squelch and controls speaker squelch sensitivity. Extreme counterclockwise (detented) position speaker squelch is disabled. Rotation of the control increases the squelch threshold, making it harder to break squelch. This function is not remotable. Speaker squelch is broken by the presence of a received audio that exhibits voice characteristics as opposed to positive squelch which is a controlled audio muting function.
6	ESC(escape) Key	Terminates any microprocessor action in progress. Returns display to standard display of last operational status.
7	Front panel display	All front panel indications are displayed on this 2-line 64-character liquid crystal display (LCD). Each character can be any of 96 ASCII characters. Front panel indications include: Mode Frequency Rf gain setting Vbfo offset Filter selection Power amplifier power selection Transmit audio selection Receive audio selection Address selection Built-in test indications Fault indications

Table 1. HF-8096 Controls and Indicators (Cont).

INDEX NUMBER	CONTROL OR INDICATOR	FUNCTION
15	MIC jack A1J1	A push-to-talk key in the MIC jack (when pushed) causes a serial system key to be transmitted to the associated exciter or receiver-exciter. The output of the microphone amplifier is switched onto the selected transmit line audio output channel in voice modes.
16	CW KEY jack A1J2	A key in the CW KEY jack (when engaged) causes a serial system key to be transmitted to the associated exciter or receiver-exciter. The hard-wired external key will cause CW keying of the associated exciter or receiver-exciter.
17	PHONES jack A1J3	Used to monitor sidetone audio in transmit modes and received audio in receive modes, as selected.
18	Fuse F1 A11F1	Primary power fuse should be 2 A for 115-V ac operation or 1 A for 230-V ac operation.
		Caution
		It is very important that the 1-A fuse is used for 230 V ac. Failure to do so could result in additional equipment damage in the event of an equipment failure.
19	J30, EXT STD connector	For future expansion
20	Terminal board (A11)TB1	Interconnects receive/transmit audio inputs/outputs to the associated receiver, exciter, and control.
21	J24, STATION REMOTE CONTROL connector (A11W1)12J24	Connect to a remote terminal/processor for remote control of the processor. Signals supplied to this connector are processed to control of the radio system.
22	J23, RADIO REMOTE CONTROL connector (A11W1) 1J14	Connects to the radio(s) being controlled and operated.
23	J1, 115-230 V AC 50-400 Hz connector (A11)J1	Connects to the ac power source for processor operation.
24	TEST FAIL (red) indicator (A10DS4)	OFF — System functioning properly ON — Failed system self-test Flashing — Processor assembly malfunction
25	+5VDC (green) indicator (A10DS3)	ON — +5 volts dc present OFF — +5 volts dc power supply malfunction
26	+15VDC (green) indicator (A10DS2)	ON — +15 volts dc present OFF — +15 volts dc power supply malfunction
27	-15VDC (green) indicator (A10DS1)	ON — -15 volts dc present OFF — -15 volts dc power supply malfunction

NOTE

Units without keypad utilize a RETURN key for the ENTER function. Units without keypad also have keys labeled RESET (same function as CTRL SHIFT) and CLEAR (not functional). Position of the keys may differ on units without keypad.

3. OPERATION

3.1 GENERAL

All controls and indicators necessary for operation and monitoring of a remotely located radio system are located on the front panel of the HF-8096 SELSCAN® Automatic Communications Processor. Remote control operation must be selected at the associated radio system for the processor commands to be effective.

Microphone audio input to the processor passes through compression amplifiers that level out the short-term audio variations to maintain a more constant rf output. The microphone compression circuit has a relatively short decay time that is desirable for voice signals.

When a compatible radio system is connected to the processor and set for remote control operation, the front panel controls on the radio do not affect the operation of the radio system. Likewise, with the radio system set for local operation, the corresponding functions from the processor do not affect the operation of the radio system. Audio controls, signals, and monitors of the radio system, and the processor remain enabled whether being operated remotely or locally.

This section of the instruction book contains instructions for operating the processor. The operator should be aware of several general characteristics of the radio system and the processor when operating the radio. Channels B1, A2, and B2 audio circuits are active only in ISB (independent sideband) mode. In ISB operation, channel A1 signals are upper sideband signals, channel B1 signals are lower sideband signals, channel A2 signals are upper-upper sideband signals, and channel B2 signals are lower-lower sideband signals. In all other modes, only channel A1 circuits are active.

Processors without a function keyfield must input all commands through the keyboard as shown. Processors with a function keyfield may enter certain specific commands: through use of the function keys and a RETURN; through use of a combination of the function keys, the ASCII keyboard and a RETURN; or through the ASCII keyboard alone using the commands shown.

3.1.1 Definition of Terms

The following terms will be used to describe the operation of the processor. Proper understanding of these terms is essential to proper operation of the processor.

INDIVIDUAL CALL

A call to an individual station in the network.

GROUP CALL

A call to a group of stations in the network. After a group link has been established, a roll call of the stations that have been preprogrammed for that group can be performed.

ALL CALL

A call to all stations in the network. After the link has been established, a roll call of all stations preprogrammed into address locations 1 through 20 can be performed.

ROLL CALL

After a Group or All Call, the operator can command the processor to poll each station in the roll call list to verify if the station received the operator's broadcast.

The activity indicator may be CALLING, SCANNING, SCAN 1, SCAN 2, SCAN 1&2, POLLING, LQA, ANSWER, FROM, ALL CALL, GRP CALL, UNP, or READY. The activity indicator allows call progress to be monitored by the operator.

The current address will display the address of the last station called by the processor or the address of the last station that called the processor.

The silent indicator SIL will be on if the processor is in the silent mode.

The acknowledge indicator ACK will be on if the operator has entered the acknowledge command and it has not been cleared by the polling station.

The monitor indicator MON will be on if the operator has entered the monitor command.

The power amplifier tuned indicator TU will be on if the system is tuned up and ready to transmit.

The channel indicator CH and a 1- or 2-digit channel number will be displayed if the processor has the system tuned to a programmed channel and is not scanning.

The radio frequency will be displayed in kilohertz if the system is not scanning.

The radio mode will be displayed if the system is not scanning.

The exciter indicator EX will be displayed when a duplex channel is selected to alert the operator that the displayed frequency and mode apply only on the transmit frequency.

The voice monitor indicator VM will be displayed when the operator has enabled the voice monitor function.

The address protection off indicator NO-A/P will be displayed.

3.3 SELF-TEST

The self-test of the radio system is performed automatically upon turn on and may be performed at any time deemed necessary by the operator. To perform the automatic self-test, proceed as follows.

Note

When power is turned on or restored to the radio under control, it is normal for its fault indicator to be displayed. This is caused by latching the radio fault circuit when power interruptions are detected. The radio fault is cleared by changing the frequency at the processor when the radio CONT switch is set to REM.

a. Set PWR switch to on.
b. The processor will automatically initiate a self-test.
c. To initiate a self-test during operation, enter the following command:
     TE(ENTER)

   SYSTEM TEST INITIATED*U is displayed until self-test is complete, followed by a slight delay then either TEST PASSED or FAILED (see list below).

ROM	Replace processor A8
RAM	Replace memory A7
MODEM	Replace modems A5, A6
AUDIO	Replace audio assemblies A2, A3

3.4.1.3 Messages

a. After a link has been established to the desired station or group, enter the command TR or XM, a space, and the message buffer code containing message to be sent (RB1, RB2, MS1, MS2), then press ENTER or press XMT key, then MS1, MS2, RB1 or RB2 key in function keyfield. Example: TR MS1(ENTER) causes the message in transmit message buffer MS1 to be transmitted.

Note

RB1 and RB2 are generally used for receiving messages. They generally should not be used for storing a transmit message because they may be overwritten by an incoming message.

b. System will automatically unkey and return to its previous status upon completion of the message transmission.

3.4.1.4 Standby

To disable the power amplifier high voltage, enter the command SB through the keyboard, a space, and press ENTER. The standby function is automatically cancelled by either a transmit (XM or TR) command or a power amplifier power (PA) command. Example: SB (ENTER).

3.4.2 Receiving Calls

3.4.2.1 Individual Station to Station Calls

When a call is received from another station, the front panel display will indicate READY and the address of the calling station, and the audible call alert signal will sound. Communication between stations may now be conducted. If the station called has selected the SILENT mode of operation, the front panel display will indicate that the station is being called, but the link will not be established until the called operator enters the command CA through the keyboard and presses ENTER.

3.4.2.2 Roll Calls

When a Roll Call is initiated by the calling station, the front panel display indicates ROLL CALL INITIATED. To acknowledge the Roll Call, the operator must enter the command AC through the keyboard, a space, and press ENTER or press ROLL ACK key in function keyfield. To not acknowledge the Roll Call, the operator must take no action. Example: AC (ENTER) acknowledges a Roll Call condition.

3.4.2.3 Messages

To read a received message, enter through keyboard the command LI, a space, the command MS, a space, and the command RE, then press ENTER. After viewing the first two lines, press CTRL and Q keys to view next two lines until all of the message has been viewed. Inputting any other command terminates the listing. The message is not erased when it is read out. Messages may be read out multiple times. Example: LI MS RE(ENTER) will allow viewing of received messages.

3.5 MANUAL/CHANNELIZED OPERATION

3.5.1 Initiating Individual Calls

When in the manual or channelized operations, the frequency and mode or the channel to be used must be entered by the operator.

b. To enter a channel, enter the command CH, a space, and the 2-digit number indicating desired programmed channel (0 to 29) then press ENTER or press CHAN key in function keyfield, enter 2 digit number of desired programmed channel, and ENTER. Example: CH 13(ENTER).

c. When a call is received, communications are conducted as on any high frequency radio system.

3.6 OPERATOR ADJUSTMENTS

3.6.1 Audio Adjustments

Line audio output levels of the processor may be adjusted by a qualified operator when his application requires it. The line audio adjustments are shown in figure 2 and listed in table 2. Procedures to be followed are listed below.

3.6.1.1 Channel A Transmit Audio Input Level Adjustment and Channel A Transmit Audio Output Level Adjustment

Note

The variable resistors for these adjustments are accessible to the operator (through access holes in the unit top cover) and may be adjusted to any desired gain levels within the amplifier range. These procedures set up the amplifier to a standardized unity gain (0 dB in — 0 dB out).

Perform the following steps.

a. Enter the command TE PH(ENTER). Enter the command DS A1(ENTER). Enter the command IS(ENTER).

Note

This reconfigures the headphone amplifier as a unity gain amplifier. The headphone volume control on the front panel has been disabled.

b. Connect a voltmeter to the headphone jack.

Note

The headphone output is low impedance, therefore, the output does not require a 600-ohm termination.

c. Set the audio generator for 1000 Hz O dBm and connect to the channel A transmit audio input TB-1 14 and 15.
d. Ground TB-1 24 (EXTERNAL KEY).
e. Adjust the channel A1 XMT input line level adjustment for 0.77 V rms.
f. Enter the commands TE PH OF(ENTER) and DS OF(ENTER).
g. Remove the ground on TB-1 24. Connect TB-1 16 and 14 to a 600-ohm load.
h. Connect the voltmeter to TB-1 16 and 18. Adjust the channel A1 XMT output line level adjustment for 0.77 V rms (0 dBm) or desired level.
i. If a level other than 0 dBm is desired for the channel A1 XMT audio line input, perform step a through g and readjust for the desired level in step e.

Table 2. Line Audio Adjustments.

INDEX NUMBER	ADJUSTMENT	PURPOSE
	Note	
	With transmit input line level adjust and transmit output line level adjust controls set for maximum gain, the total gain of the line amplifier circuits is NLT 33 dB. Line audio output is adjustable from −20 to +10 dBm with a line audio input of −23 to +10 dBm (not less than unity gain).	
1	INPUT LINES — CHAN A1 XMT LVL ADJ A3 R6 (accessible through top cover)	Controls channel A1 transmit line audio input and channel A1 phones amplifier input.
2	INPUT LINES — CHAN B1 XMT LVL ADJ A3 R16 (accessible through top cover)	Controls channel B1 transmit line audio input and channel B1 phones amplifier input.
3	OUTPUT LINES — CHAN A1 XMT LVL ADJ A2 R45 (accessible through top cover)	Controls channel A1 transmit line audio output.
4	OUTPUT LINES — CHAN B1 XMT LVL ADJ A2 R73 (accessible through top cover)	Controls channel B1 transmit line audio output.
	Note	
	With transmit input line level adjust and transmit output line level adjust controls set for maximum gain, the total gain of the line amplifier circuits is NLT 33 dB. Line audio output is adjustable from −20 to +10 dBm with a line audio input of −23 to +10 dBm (not less than unity gain).	
5	MIC GAIN ADJ A2 R8 (accessible through top cover)	Controls microphone line audio ouput.
6	OUTPUT LINES — CHAN B1 RCV LVL ADJ A2 R86 (accessible through top cover)	Controls channel B1 receive line audio output.
7	OUTPUT LINES — CHAN A1 RCV LVL ADJ A2 R60 (accessible through top cover)	Controls channel A1 receive line audio output.
8	INPUT LINES — CHAN B1 RCV LVL ADJ A3 R47 (accessible through top cover)	Controls channel B1 receive line audio input and channel B1 speaker amplifier input.
9	INPUT LINES — CHAN A1 RCV LVL ADJ A3 R37 (accessible through top cover)	Controls channel A1 receive line audio input and channel A1 speaker amplifier input.

3.6.1.2 Channel B Transmit Audio Input Level Adjustment and Channel B Transmit Audio Output Level Adjustment

a. Enter the command TE PH(ENTER). Enter the command DS B1(ENTER). Enter the command IS(ENTER).

Note

This reconfigures the headphone amplifier as a unity gain amplifier. The headphone volume control on the front panel has been disabled.

b.   Connect the voltmeter to the headphone jack.

Note

The headphone output is low impedance, therefore, the output does not require a 600-ohm termination.

c.   Set the audio generator for 1000 Hz O dBm and connect to the channel B receive audio input TB-1 45 and 46.
d.   Ground TB-1 24 (EXTERNAL KEY).
e.   Adjust the channel B1 receive level adjustment for 0.77 V rms on the voltmeter.
f.   Enter the commands TE PH OF(ENTER) and PH OF(ENTER).
g.   Connect TB-1 49 and 47 with a 600-ohm load.
h.   Connect the voltmeter to TB-1 49 and 47. Adjust the channel B1 RCV output line level adjustment for 0.77 V rms (0 dBm) or desired level.
i.   If a level other than 0 dBm is desired for the channel B1 receive audio line input, perform steps a through f and readjust for the desired level in step e.

3.6.2 Microphone Gain Adjust

Perform the following steps.

a.   Perform paragraph 3.6.1.1. Adjust levels for 0.77 V rms.
b.   Set the audio generator for 1000 Hz 0.04 mV. Connect the audio generator to the microphone jack through the microphone attenuator pad. Refer to figure 3.

Note

The pad shall be placed as physically close to the processor as possible to avoid the introduction of noise into the microphone input.

c.   Connect the voltmeter to TB-1 16 and 18.
d.   Enter the command IS(ENTER).
e.   Ground ptt key line at the microphone jack. Adjust the MIC GAIN ADJ for 0.385-V rms reading on the voltmeter.
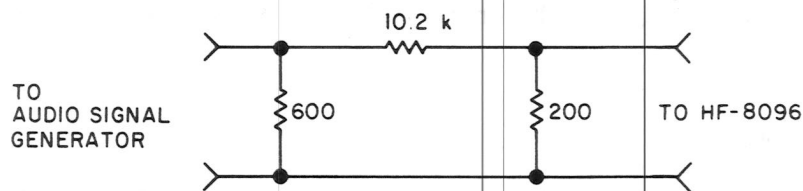

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TO                          10.2 k
AUDIO SIGNAL      ─────/\/\/────
GENERATOR         600          200      TO HF-8096

NOTE:
   ALL RESISTORS ARE IN OHMS,
   1/4 WATT RECOMMENDED.              TPA-9304-012
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Audio Attenuator Circuit
Figure 3

To turn the AGC off or disable this function, enter the command AG, a space, and either OF (off) or DI (disable), then press ENTER. If in independent sideband mode (4-channel ISB systems only), each channel may be controlled separately by entering the channel after either OF or DI. Example: AG OF B1(ENTER) turns the AGC off for channel B1.

To enable the AGC crowbar/net data automatic gain control function, enter the command CR and press ENTER. Example: CR(ENTER).

To disable the AGC crowbar/net data automatic gain control function, enter the command CR, a space, and either OF (off) or DI (disable), then press ENTER. If system is a 4-channel ISB system, a new mode command will have to be entered.

To bus together the automatic gain control lines of the channel in independent sideband mode of operation (4-channel ISB systems only), enter the command BU and press ENTER. This buses all channels together. To bus any combination of two or three channels together, enter the command BU, a space, and the selected channel codes (A1, A2, B1, B2), then press ENTER. Example: BU A2 B1(ENTER) buses the AGC lines of channel A2 and channel B1 together.

To disable the busing of automatic gain control lines in the independent sideband mode, enter the command BU, a space, and DI (disable), then press ENTER.

3.7.4 Squelch

To enable the squelch function, enter the command SQ and press ENTER. If squelch is invoked during scanning, the audio lines to the speaker and all receive line out lines are muted. The positive squelch function mutes the speaker output and keeps it squelched until a call is received and the link is established. Example: SQ(ENTER) invokes the squelch function.

To disable the squelch functions, enter the command SQ, a space, and either OF (off) or DI (disable), then press ENTER. This turns off the muting of the speaker and receive out lines.

3.7.5 Microphone

When operating in the independent sideband mode, the microphone command is used to direct the local microphone audio to the desired sideband A1 or B1. The processor does not have audio connections to sidebands A2 or B2. To select a sideband, enter the command MI, a space, and the desired sideband A1 or B1, then press ENTER. If no selection is made, the default condition is microphone-connected to sideband A1. In 2-channel ISB equipment, A1 is the upper sideband, B1 is lower sideband. Example: MI B1(ENTER) connects the microphone to the B1 independent sideband channel.

3.7.6 Phones

When operating in the independent sideband mode, this command allows selection of which channels (A1 or B1) are connected to the headphones. To enter the command, enter the command PH and press ENTER. This connects both channels to the headphones. To select only one channel or to mix the channels, enter the command PH, a space, and the appropriate channels (A1, B1), then press ENTER. Example: PH A1(ENTER) connects channel A1 to the headphones. In all other radio modes, connection to the phones is performed automatically.

To disconnect the headphones completely, enter the command PH, a space, and OF (off), then press ENTER.

3.7.7 Monitors

In the monitor function, the radio system will stop scanning, drop positive squelch, and stay on any channel on which it receives a FSK data address (other than a Local, Group, or All Call) as long as the return-to-scan delay

3.7.13 Scanning

The processor will scan those channels programmed for scanning or the channels programmed into either or both of the scanning lists. To cause the radio system to scan the channels programmed to scan, enter the command SC, a space, and press ENTER or press SCAN key in function keyfield. Example: SC (ENTER) causes the system to scan those channels programmed with an SC. To select a scanning list, enter the command SC, a space, and either a 1, or a 2, or both 1 and 2, then press ENTER. Example: SC 1 2(ENTER) causes the system to scan those channels placed on the scanning lists 1 and 2.

Note

> Maximum channels scanned system parameter must equal or exceed the total number of channels actively being scanned.

3.7.14 Silent Function

With the silent function enabled, the radio system will not automatically respond to SELSCAN® link requests or Roll Calls until the operator initiates a response. To enable this function, enter the command SI and press ENTER or press SIL key in function keyfield. To disable this function, enter the command SI, a space, and OF, then press ENTER. Example: SI(ENTER).

3.7.15 Automatic Frequency Control (AFC)

To enable the automatic frequency control, enter the command AF and press ENTER. To disable the automatic frequency control, enter the command AF, a space and either OF (off) or DI (disable), then press ENTER. Example: AF(ENTER).

Note

> This command applies only to radio equipment with AFC capability.

3.7.16 Auxiliary Equipment

This command controls the operation of the auxiliary equipment relays in the adaptive processor. To energize the relays enter the command AU, a space, and the 2-digit number for the relay (01, 02, 03), then press ENTER. Relays must be energized separately. To disable an auxiliary equipment relay, enter the command AU, a space, the 2-digit number for the relay, a space, and either OF or DI, then press ENTER. Example: AU 02(ENTER) enables the number two auxiliary equipment relay. Relays may be preprogrammed to operate upon receipt of some function (key out, rf out, squelch open, tuning, or a certain frequency) by modifying the basic command with the appropriate letters. Refer to the command directory.

3.8 PROGRAMMING

3.8.1 General

Before the HF-8096 SELSCAN® Automatic Communications Processor can function in the automatic modes, system parameters, station addresses, channel information, and scan lists must be entered. The communications manager should coordinate the setting of system parameters and assignment of channels and addresses. This information is entered into the processor. The processor will store the information in nonvolatile memory so that the information will be retained when power to the processor is off.

The processor has the capability of storing ten Group addresses. Group addresses are stored in address locations 80 through 89.

When programming a Group address, the address location is selected (80 through 89), the address of group is entered, then the address locations of the individual members of the group are entered.

Group Address Example:

AD 80 = AAA 1 2 4 6(ENTER)
AD 80   Is the address location in the processor memory
AAA   Is the address of the group
01 02 04 06   Are the address locations of the individual station addresses for members of the group

If you try to place an address index number that is not programmed in a group, an error message will be displayed. The Individual addresses must be programmed before programming the Group addresses.

The local Group address is stored in address 97.

If a processor is assigned to Group AAA, you would enter:
AD 97 = AAA(ENTER)

The All Call address is placed in address location 99; entry is in the same format as an Individual address.

3.8.3 Channel Programming

Channel programming inputs new channels into memory, modifies channels presently in memory, and erases channels from memory. Channels being programmed may either be simplex (same frequency for receive and transmit) or duplex (different frequencies for receive and transmit).

Note

The CHAN key in function keyfield may be used in place of the command CH.

To program a simplex channel, enter command CH, a space, and 2-digit channel index number (00 to 29), then press SHIFT and = keys. Next enter the frequency in kilohertz (1600.00 to 2999.99 kHz) and mode of operation (CW, IS, LD, LS, UD, US), then press ENTER. Example: CH 13 = 19933.30 US(ENTER) programs channel 13 for 19933.30 kHz and upper sideband mode of operation.

Note

AM cannot be programmed into a channel. 3- and 10-kilowatt systems will not transmit below 2000.000 kHz.

Options to channel programming include the selection of power amplifier level, scanning, and voice monitoring. Example: CH 13 = 19933.30 US PA LO SC VM(ENTER) programs channel 13 for 19933.30 kHz, upper sideband mode of operation, and low power from power amplifier, channel will be scanned and voice monitoring function is selected for that channel (refer to paragraph 3.7.7, Monitors). The scanning and voice monitoring options can be entered in any order after the power amplifier level. If the power amplifier level is not entered, the channel will be set to the default condition of high.

To program a duplex channel, enter the command CH, a space, and the 2-digit channel index number (00 to 29), then press SHIFT and = keys. Next enter the frequency and mode of the answer-receive frequency, then the frequency and mode of the reply-transmit frequency, then press ENTER. Example: CH 15 = 19300.00 LS 18400.00 US(ENTER) programs channel 15 to use 19300.00 kilohertz in a lower sideband mode as the answer-receive frequency and to transmit on 18400.00 kilohertz in upper sideband mode.

The first frequency and mode entered apply to the answer-receive frequency. This is the frequency that the processor uses when it is scanning. The second frequency is the reply-transmit frequency. This is the frequency on which the processor will transmit in response to a call.

During a Roll Call, the initiating processor informs all other processors that a Roll Call will be performed. The value of this parameter determines how much time will be given to other stations to tune their transmitters before the Roll Call starts.

4   Return-to-Scan delay

The processor monitors the key line for activity. When the processor is in the automatic mode and in a communications link and if no activity has occurred on the key line, the processor will terminate the link and resume scanning. This value determines the length of time that the processor waits after detecting the last key before resuming scanning.

5   Keep alive XMIT period

The processor monitors the key line for activity. If the processor detects key line activity, it will send a short FSK transmission to the other station to reset its RETURN TO SCAN delay counter (system parameter 4). This is to ensure that it doesn't prematurely terminate the communications link and resume scanning.

6   Auto LQA update time

This value determines how often the processor sends the LQA update transmissions. This is normally set to — — — which inhibits the automatic transmissions.

7   Listen-before-call

The value of this parameter determines how long the processor checks the selected channel for activity before it starts calling a station.

8   LQA matrix value degrade period

Stored LQA values are decremented by function of time so that old values are not used in the channel selection algorithm. This system parameter determines how often the values are decremented.

If the decay period is six minutes, a stored LQA value of 15 would be decremented to 14 six minutes later and to 13 six minutes after that and so forth until the LQA value is zero. If the processor measures a new value on a station for a channel, the new value is stored and that value is now decremented every six minutes.

9   Coordination time

If the processor is controlled by a higher level processor, this parameter will be set to the time required by the higher level processor to process data. This value shall be set to zero if a higher level processor is not used.

10   Call alert period

This parameter determines the time the processor call alert signal is active.

11   Home coupler before SCAN — Enter 0 to disable, enter 1 to enable

If the antenna coupler is tuned to a frequency other than what is being used for reception, receiver sensitivity will be reduced. This parameter will home (short out) the coupler while scanning to reduce the attenuation through the coupler. This will increase receiver sensitivity for most channels while scanning. This parameter is not meaningful for systems implemented using an HF-8070 Receiver-Exciter (as any frequency change command to the HF-8070 Receiver-Exciter will cause the coupler to be homed) or any system not using an antenna coupler.

12   Scan using channel mode — Enter 0 to SCAN using ISB mode, enter 1 to SCAN using channel preset mode

The processor can place the associated radio equipment in the independent sideband mode (receive both sidebands) during scanning or it can change the radio mode (ISB, LSB, USB) to the preprogrammed mode for a channel as it scans that channel.

Table 3. System Parameters (Cont).

INDEX NUMBER	PARAMETER/RANGE			DEFAULT VALUE
	Note			
	* Functions with an asterisk in the description may be disabled by entering dashes instead of numeric value.			
	+ Parameters with a plus sign in the description must be the same in all processors that will be operating in a network to assure proper operation.			
	The maximum channels scanned parameter must be equal to or greater than the number of channels programmed for the largest scan list.			

3.8.5 Scan Lists

The processor has the capability of storing information for 30 preset channels. Each channel may be a simplex (same frequency used for both transmitting and receiving) or a duplex channel (separate transmit and receive frequencies). When operating with an HF-8070A Receiver-Exciter, the processor will not accept duplex channels as the HF-8070A Receiver-Exciter does not have duplex capability.

The processor will not scan without preset channel information programmed in its memory. The scanning process used by the processor is a search of radio channels that are listed in the processor. The channels to be scanned may be designated as scanned channels by the addition of the scan attribute in the channel programming or a scan list may be programmed and used. While scanning, the processor searches for data that includes a call to the processor. If the voice monitor attribute is in the programmed channel and the voice monitor function is enabled, the processor will also search the channel for voice signals.

To program channel scan list into memory, enter the commands SC, a space, and LI, a space, followed by a number 1 or 2, then press the SHIFT and = keys. Next enter the 2-digit channel index number for those channels to be scanned, then press ENTER. Example: SC LI 1=10 13 15(ENTER) places channels 10, 13, and 15 in scan list number 1. The scan list numbers are optional. Each scan list is capable of holding 30 channels. Channels programmed with the scan attribute may be scanned with the SC command.

3.8.6 Messages Programming and Editing

The edit command is used to enter message text into the processor memory and to modify message text that is already in memory.

Note

The EDIT key in function keyfield may be used in place of the command ED.

Messages are stored in message buffers. There are four message buffers in the processor. Each message buffer has a name and the buffers are accessed by referring to the buffer name. Each message buffer is made up of 17 lines. Each line can hold 24 characters. This gives each buffer the capability to hold 408 characters.

The command may be used to enter data into a buffer starting at the beginning of the buffer or at the beginning of any line of the buffer. The edit command must include the name of the buffer to be accessed and it may include the line number to be accessed. If no line number is included, the edit function will start at the beginning of the buffer.

The receive buffers (RB) are used by the processor to store messages that have been received over the radio system. When a new message is received, it replaces the contents of the buffer containing the oldest of any earlier

Table 5.

Table 4. Preset Characters.

CHARACTER	HEXADECIMAL CODE VALUE			
	8	4	2	1
1	FILTER E	FILTER D	FILTER C	FILTER B
2	FILTER A	16 KHz	PILOT CARRIER	AFC
3	B2 ON	B1 ON	A1 ON	A2 ON
4	B1 AGC(2)	B1 AGC(1)	A1 AGC(2)	A1 AGC(1)
5	B2 AGC(2)	B2 AGC(1)	A2 AGC(2)	A2 AGC(1)
6	B2 ON BUS	B1 ON BUS	A1 ON BUS	A2 ON BUS
7	NET DATA	AUX 3	AUX 2	AUX 1
8	PEAK CLIPPER	PA LOW POWER	PA MEDIUM POWER	PA HIGH POWER
9	0	0	0	0
10	0	0	0	0

Table 5. Decimal to Hexadecimal Equivalents.

Decimal	Hexadecimal	Decimal	Hexadecimal
0	0	8	8
1	1	9	9
2	2	10	A
3	3	11	B
4	4	12	C
5	5	13	D
6	6	14	E
7	7	15	F

When programming AGC speeds, use the following information:

Fast	Both AGC(2) and AGC(1) should be added on.
Medium	Only AGC(2) is added on, AGC(1) is off (4-channel ISB system only).
Slow	Only AGC(1) is added on, AGC(2) is off.
OFF	Neither is added on, both AGC(1) and AGC(2) must be off.

To formulate the ten characters, select the choices for each character, then add the hexadecimal code value for each choice. This number is converted to hexadecimal equivalent and is placed in the code number in the proper position. Example: If NET DATA and AUX 3 are desired, the values of 8 and 4 are added to result in 12. This number is converted to hexidecimal code C and this would be the seventh character of the 10-digit code. Refer to table 5 for decimal to hexadecimal equivalents.

3.8.8 Link Quality Analysis (LQA)

The link quality command is used to manually enter link quality data into the link quality data matrix. Data may be entered for a channel, an Individual address or any Individual address on a specific channel. To enter link quality data, enter the command LQ, a space, then either CH, a space, and the 2-digit channel number (00 to 29), or the 3-character individual address, or the individual address and CH and channel number. Then press the SHIFT and

35

Table 7. Status Requests.

FORMAT USED	WHAT IS DISPLAYED
ST (RETURN)	
RA FA RA MO [1] RL SY	Radio faults Status of radio monitors Status of three auxilary relays System parameters
1. For additional status information on radio monitors, enter a CTRL-Q as long as CONT is in the display.	

4.   DETAILED COMMAND DICTIONARY

The following is an alphabetical listing of the HF-8096 SELSCAN® Automatic Communications Processor commands. The input format and the processor response to that input are described. Spaces must be entered as shown in the format of the command.

In the descriptions of the commands, an ENTER key operation is designated by the characters (ENTER).

AC

The acknowledge command is used to acknowledge a roll call poll. ROLL ACK key in function keyfield may be used to acknowledge a roll call poll.

This command sets the acknowledgement indicator flag used when the processor is polled after a Group or All Call. The operator should enter the command after receiving the tune command from the polling station.

     Format: AC(ENTER)

When the processor is polled by the calling station, the positive acknowledgement is transmitted only if the acknowledge command has been entered. The acknowledge flag remains set until the processor receives confirmation that the acknowledge transmission has been received or a call from a different caller is received.

     Example: AC(ENTER)
     Response: ACKNOWLEDGED
                       THE STANDARD STATUS MESSAGE IS DISPLAYED

AD

The address command is used to select a current address or program an address. ADDR key in function keyfield may be used in place of AD command.

This command may be used to select a current address by reference to the address index number ##.

     Format: AD ##(ENTER)
     Response: ADDRESS ## YYY SELECTED

     Example: AD 13(ENTER)
     Response: ADDRESS 13 KLM SELECTED
                       THE STANDARD STATUS MESSAGE IS DISPLAYED

AG

The automatic gain control command is used to set the AGC speed on any ISB channel individually for the HF-8054A Receiver or for both channels in the HF-8050A Receiver or HF-8070A Receiver-Exciter.

Format:	AG SL X#(ENTER)	Sets AGC slow on channel X for the HF-8054A Receiver
	AG ME X#(ENTER)	Sets AGC medium on channel X for the HF-8054A Receiver
	AG FA X#(ENTER)	Sets AGC fast on channel X for the HF-8054A Receiver
	AG OF X#(ENTER)	Disables AGC on channel X for the HF-8054A Receiver
	AG DI X#(ENTER)	Disables AGC on channel X for the HF-8054A Receiver
	AG SL(ENTER)	Sets AGC slow for all channels
	AG ME(ENTER)	Sets AGC medium for all channels for the HF-8054A Receiver
	AG FA(ENTER)	Sets AGC fast for all channels

X# is the independent sideband and may be B2, B1, A1, or A2.

Example:	AG FA A1(ENTER)
Response:	AGC ON A1 IS FAST

AM

The amplitude modulation command is used to select the amplitude modulation mode of radio operation. The processor will perform any required internal audio switching.

Format:	AM(ENTER)
Response:	STANDARD STATUS MESSAGE SHOWING AM MODE

AU

The auxiliary command is used to set the status of the auxiliary relays. There are three auxiliary relays in the processor. Form C contacts are brought out to the rear panel on TB1 for each of these relays. The following control commands are available.

This command may be used to activate relay number #. If a power interruption takes place, the relay will be returned to the off state when power is restored.

Format:	AU # ON(ENTER) or AU #(ENTER)

This command causes relay number #, where # is 1, 2, or 3, to be in the relaxed condition. The off condition is the default condition. The off condition is the condition that the relays assume when power to the processor is off or interrupted.

Format:	AU # OF(ENTER)

This command causes relay number # to be activated when the system is not scanning and the key monitor bit from the transmitter or receiver-exciter indicates that the radio is keyed. This conditional command will be

Example:	AU 1 KE(ENTER)
Response:	AUX RELAY 1 ACTIVATED WHEN RADIO IS KEYED

Example:	AU 3 RF(ENTER)
Response:	AUX RELAY 3 ACTIVATED WHEN RADIO INDICATES RF OUT

Example:	AU 3 SQ(ENTER)
Response:	AUX RELAY 3 ACTIVATED WHEN SQUELCH IS OPEN

Example:	AU 1 TU(ENTER)
Response:	AUX RELAY 1 ACTIVATED WHEN TRANSMITTER IS TUNED

Example:	AU 2 LE 23789.00(ENTER)
Response:	AUX RELAY 2 ACTIVATED WHEN FREQ BELOW 23789.00 KHZ

Example:	AU 3 SC 12345.50(ENTER)
Response:	AUX RELAY 3 ACTIVATED WHEN FREQ BELOW 12345.50 KHZ

Example:	AU ST(ENTER)
Response:	AUX RELAY 1 ACTIVATED WHEN TRANSMITTER IS TUNED
	AUX RELAY 2 ACTIVATED WHEN FREQ BELOW 23789.00 KHZ
	AUX RELAY 3 ACTIVATED WHEN RECEIVER FREQ BELOW 12345.50 KHZ

BU

This command provides the capability to bus the automatic gain control functions of the various if channels when controlling an HF-8054A Receiver.

If not in ISB mode, a warning message is displayed. Each command disables AGC busing and then buses indicated lines together.

This command allows the AGC of all four ISB channels to be bused together.

    Format: BU(ENTER)

This command allows the AGC of any three ISB channels to be bused together.

    Format: BU X# X# X#(ENTER)

This command allows the AGC busing function to be disabled.

    Format: BU DI(ENTER)

Example:	BU A1 B1(ENTER)
Response:	AGC BUS ENABLES A1 B1

BW

The bandwidth command is used to select the if filter bandwidth option A, B, C, D, or E for the radio receiver when controlling an HF-8050A Receiver or HF-8054A Receiver. The receiver must be equipped with optional filters for this command to be useful.

The filter options may only be selected when the receiver is in the AM or CW modes.

    Format: BW X(ENTER)

XXXXX.X is frequency in kilohertz and must be in the range of 1600.0 to 29999.9 KHz. The lower frequency limit of 3-kW and 10-kW systems is 2000.0 kHz. Attempting to tune a 3- or 10-kW power amplifier below 2000 kHz will result in a tune fault indication.

YY is the radio mode and may be LS, LD, US, or UD.

PA LO is the low power amplifier power attribute.

SC is the scan attribute.

VM is the voice monitor attribute.

AP is the address protection attribute.

The SC, VM, PA, and AP options can be entered in any order.

The CH command may be used to program a duplex channel into the processor memory. Two frequencies and two radio modes may be entered. The first frequency and mode entered apply to the answer-receive frequency. This is the frequency that the processor uses when it is scanning. The second frequency is the reply-transmit frequency. This is the frequency on which the processor will transmit in response to a call.

Each processor in the network will have its duplex channels programmed in the same way for automatic operation. The processor that initiates a call to another processor will automatically reverse its transmit and receive frequencies. This method of operation makes it possible for any station in the network to call any other station in the network automatically.

The duplex channel capability may be used without using automatic connectivity by selecting a channel. This will allow interoperation with maritime stations. It is possible to program the answer-receive frequency in the range from 10 to 29999.9 kHz. Do not initiate an automatic communications call on a channel with an answer-receive frequency below the lower frequency limit of the transmitter.

The processor will not accept duplex channels if it is operating with an HF-8070A Receiver-Exciter.

> Format: CH ## = XXXXX.X YY AAAAA.A BB [PA LO] [SC] [VM] [AP](ENTER)

XXXXX.X is the answer-receive frequency and may be in the range 10 to 29999.9 kHz.

YY is the answer-receive frequency mode and may be LS, LD, US, or UD.

AAAAA.A is the answer-transmit frequency and may be in the range 1600 to 29999.9 kHz for a 1-kW power amplifier or 2000.0 to 29999.9 in a 3- or 10-kW power amplifier.

BB is answer-transmit mode and may be LS, LD, US, or UD.

Calls are transmitted on the answer-receive frequency. Scanning is done on the answer-receive frequency. Response to a call is transmitted on the reply-transmit frequency. The reception of the response to a call is done on the reply-transmit frequency. The confirmation of the response is transmitted on the answer-receive frequency. Reception of the confirmation is done on the answer-receive frequency.

> Example: CH 11 = 4500.0 US PA LO SC(ENTER)
> Response: CHANNEL 11 PROGRAMMED

This example programs channel 11 for 4500 kHz, upper sideband, low-power output is selected, and the channel will be scanned if the SC command is entered.

When operating with an HF-8070A Receiver-Exciter or HF-8050A Receiver, the CR command may be used to enable the AGC crowbar function.

    Format: CR(ENTER)

    Example: CR(ENTER)
    Response: CROWBAR ON

When operating with an HF-8070A Receiver-Exciter, the CR command may be used to disable the AGC crowbar function.

    Format: CR OF(ENTER) OR CR DI(ENTER)

    Example: CR OF(ENTER)
    Response: CROWBAR OFF

When operating with an HF-8054A Receiver, this command is used as a radio mode command. When this command is executed, the processor performs any internal audio switching required as part of the mode change.

    Format: CR(ENTER)

    Example: CR(ENTER)
    Response: NET DATA MODE SELECTED

CW

The continuous wave command is used to set the radio equipment mode to CW. When this command is executed, the processor performs any internal audio switching required as part of the mode change. If the processor is in the automatic mode when this command is executed, it will enter the manual mode.

    Format: CW(ENTER)

    Example: CW(ENTER)
    Response: STANDARD STATUS MESSAGE IS DISPLAYED

DS

The data sidetone command is used to enable or disable data sidetone function. It may also be used to select the sideband channels to be monitored when operating in the independent sideband mode. This command causes the processor to perform internal audio switching. Data sidetone is normally present at the headphone jack. When the processor receives an external key input, the data sidetone signal is also directed to the front panel speaker.

The data sidetone function may be disabled.

    Format: DS OF(ENTER)

The data sidetone may be enabled for one or both of the sideband channels.

    Format: DS [A1] [B1](ENTER)

    Example: DS A1(ENTER)
    Response: SIDETONE ON A1

    Example: DS(ENTER)
    Response: SIDETONE ON A1 B1

Example:	TESTING NEW MESSAGE(LINE FEED)
Response:	MS1:01 TESTING NEW MESSAGE
	EDIT COMPLETE

Example:

Enter:	ED MS2:05(ENTER)
Response:	MS2:05 EDIT THIS PART ONLY

Example:	EDIT ALL OF THIS (LINE FEED)
Response:	MS2:05 EDIT ALL OF THIS
	EDIT COMPLETE

Example:

Enter:	ED MS1(ENTER)
Response:	MS1:01 TEXT OF OLD MESSAGE

Example:	NEW MESSAGE BEING TYPED INTO THE EDITOR.(LINE FEED)
Response:	MS1:01 NEW MESSAGE BEING TYPED
	MS1:02 INTO THE EDITOR
	EDIT COMPLETE

FR

The frequency command is used to select a radio operating frequency.

Format: FR #####.## [RE] [EX](ENTER)

#####.## is the operating frequency in kilohertz.

RE is an optional attribute of the command that causes the receiver frequency to be changed but leaves the transmitter frequency where it was.

EX is an optional attribute of the command that causes the exciter and transmitter frequency to be changed but leaves the receiver frequency where it was. The optional attributes are not used when operating with an HF-8070A Receiver-Exciter.

After a frequency is selected, this function unkeys the radio. If the system is not in manual mode, this command will cause it to revert to the manual mode.

The decimal point and hundreds of hertz digit are optional.

Example:	FR 20000.0(ENTER)
Response:	STANDARD STATUS MESSAGE SHOWING 20000 KHZ AS THE OPERATING
	FREQUENCY

IS

The independent sideband command is used to select the independent sideband mode of operation for the HF-8010A Exciter, HF-8050A Receiver, and HF-8070A Receiver-Exciter. It is used to select ISB operation and the channels to be enabled when operating with the HF-8014A Exciter and HF-8054A Receiver. The processor performs any required internal audio switching when this command is executed.

This command is used to turn the address protection function off.

Format: KE 0(ENTER)

This command is used to erase one key from memory.

Format: KE ZA #(ENTER)

Example: KE ZA 7(ENTER)
Response: KEY 7 IS ZEROIZED

This command is used to erase all of the keys from memory.

Format: KE ZA(ENTER)

Example: KE ZA(ENTER)
Response: KEYS ZEROIZED

LA

The last command is used to recall the last channel on which the system was keyed, or the last address with which a handshake was exchanged.

Format: LA AD(ENTER)

This command may be used to recall the last channel on which the transmitter was tuned. This command will terminate any call that is in process.

Format: LA CH(ENTER)

Example: LA AD(ENTER)
Response: STANDARD STATUS MESSAGE

Example: LA CH(ENTER)
Response: STANDARD STATUS MESSAGE

LD

The lower sideband data command is used to select the lower sideband radio mode. The processor will perform any required internal audio switching when this command is executed.

If the system is scanning when this mode is selected, the automatic data mode will be used for the next call initiation. This will cause the called station to stay in the data mode when a link is established.

Format: LD(ENTER)

Example: LD(ENTER)
Response: STANDARD STATUS MESSAGE SHOWING LOWER SIDEBAND DATA MODE

LI AC

The list acknowledge command will cause the processor to list member addresses of a Group or All Call address that have acknowledged a roll call operation. The LIST key in function keyfield may be used in place of LI command.

Format: LI AC(ENTER)

LI DD

The list delay distortion command may be used to list the recorded delay distortion values for one address or for all addresses recorded in the LQA matrix. The LIST key in function keyfield may be used in place of LI command.

This command may be used to list delay distortion data for one address.

    Format: LI DD XXX(ENTER)

XXX is the address for which data is required and may be any valid Individual station address.

This command may be used to list delay distortion data for all stations in the matrix.

The list may be stopped by entering CTRL-S (CTRL-S is executed by holding CTRL while typing S). A RETURN will continue list, or another command will terminate it.

    Example: LI DD JKL(ENTER)
    Response: DD JKL 1: 08 13 0 0 0 0
                   0   0   0   0   0 0 0 0 0 CONT

The 1 after the address in the response indicates that the 15 values are for channels 0 to 14. The DD for channels 15 to 29 may be seen by continuing the listing with CTRL-Q (executed by holding CTRL while typing Q).

    Example: CTRL-Q
    Response: DD JKL 2: 0 0 0 0 0 0
                   0   0   0   0 0 0 0 0

Either CTRL-S or the ESCAPE character may be used to terminate the listing. CTRL-Q may be entered to scroll through the list for each address, listing half of each list at a time on the remote entry terminal. A 1 or 2 will be displayed at the beginning of the list to indicate which half is being displayed.

LI KE

Note

Applicable only when address protection option installed.

The list key command is used to list the status of the address protection key registers. It is not possible to list the contents of the key registers. The LIST key in function keyfield may be used in place of LI command.

    Format: LI KE(ENTER)

    Example: LI KE(ENTER)
    Response: KEYS PRESENT: 1.Y 2 . Y 3 .   4.Y
                   5.Y   6.   7.   8.   SEL KEY = 1

In the example, key locations containing valid keys are designated with a Y after the key number.

LI LI

The list lists command causes the processor to list functions that can be listed. The LIST key in function keyfield may be used in place of LI command.

    Format: LI LI(ENTER)

Either CTRL-S or the ESCAPE character may be used to terminate the listing. CTRL-Q may be entered to scroll through the list for each address, listing half of each list at a time on the remote entry terminal. A 1 or 2 will be displayed at the beginning of the list to indicate which half is being displayed.

LI MS

The list message command is used to list messages from the processor message buffers. The LIST key in function keyfield may be used in place of LI command.

     Format: LI XXX(ENTER)

XXX is the message buffer name and may have values of RB1, RB2, MS1, or MS2.

If a message has been received from another processor, this command may be used to list out the received message.

     Format: LI MS RE(ENTER)

The message listing may be stopped by entering a CTRL-S. A RETURN will continue list, another command terminates the list. The message is not erased when it is read out. Messages may be read out multiple times.

     Example: LI MS1(ENTER)
     Response: THIS IS THE MESSAGE

If there is no message in the register, the response will be MESSAGE NOT PROGRAMMED. The standard status message will then be displayed.

LI NA

The list nonacknowledging command is used to list member addresses of a Group or All Call address that negatively acknowledged a roll call operation. The LIST key in function keyfield may be used in place of LI command.

     Format: LI NA(ENTER)

CTRL-S may be entered to stop the listing (hold CTRL while typing the letter S). A RETURN will continue the listing, another command will terminate the list.

     Example: LI NA(ENTER)
     Response: NAK GP2: ABC DEF GHI JKL MMO
                                   A11 A12 A13 A14 A15

A maximum of 5 addresses will be displayed on each line.

The standard status message follows the above response.

LI PR

The list preset command is used to list radio mode presets from the processor memory. The LIST key in function keyfield may be used in place of LI command.

This command may be used to list all radio mode presets.

     Format: LI PR(ENTER)

This command may be used to list one radio preset by referring to its index number.

     Format: LI PR ##(ENTER)

is the index number and must be in the range 01 to 08.

LI SC

The list scan command is used to list the channels that have the scan attribute or channels that are in the two programmable scan lists. The LIST and SCAN keys in function keyfield may be used in place of LI and SC commands.

This command is used to list all the channels that include the scan attribute.

       Format: LI SC(ENTER)

This command is used to list the channels that are included in one of the two scan lists.
       Format: LI SC X(ENTER)

X is the scan list number and may be 1 or 2.

An ESCAPE character or CTRL-S may be used to stop a list in progress (CTRL-S is executed by holding CTRL while typing the letter S). An ENTER will then continue the listing, or another command will terminate the listing.

       Example: LI SC(ENTER)

Channels are listed in exact same format as for the LI CH command.

LI SY

The list system command is used to list out the programmable system parameters as they are stored in the processor memory. Each parameter is displayed every two seconds.

       Format: LI SY(ENTER)

       Example: LI SY(ENTER)
       Response:

#	Parameter	Value
1	MAXIMUM CHANNELS SCANNED RANGE 002 TO 099	= 010
2	CHANNEL DWELL PERIOD RANGE 0.50 TO 9.99 S	= 0.50
3	MAX STATION TUNE TIME RANGE 001 TO 060 S	= 020
4	RETURN TO SCAN DELAY RANGE 010 TO 999 S	= 060
5	KEEP ALIVE XMIT PERIOD RANGE 010 TO 999 S	= 050
6	AUTO LQA UPDATE TIME RANGE 10.0 TO 99.0 MIN	= — — —
7	LISTEN BEFORE CALL RANGE 00.1 TO 05.0 S	= 02.2
8	LQA MATRIX DEGRADE TIME RANGE 01.0 TO 99.0 MIN	= 06.0
9	COORDINATION TIME RANGE 0.00 TO 9.99 S	= 0.00
10	CALL ALERT SIGNAL RANGE 001 TO 099 S	= 005
11	HOME COUPLER BEFORE SCAN ON = 1, OFF = 0 (DEFAULT)	OFF
12	SCAN USING CHANNEL MODE ON = 1, OFF = 0 (DEFAULT)	OFF

When LQA data is programmed, the corresponding positions in the delay distortion matrix are set to 0.

Example: LQ AAA = 10(ENTER)
Response: PROGRAMMED LQA FOR AAA TO 10

Example: LQ CH 7 = 10(ENTER)
Response: PROGRAMMED LQA FOR AAA CH 07 TO 10

Example: LQ AAA CH 07 = 16(ENTER)
Response: PROGRAMMED LQA FOR AAA CH 07 TO 16

LQA XMT

The LQA XMT key in function keyfield initiates LQA data transmissions to the local address in the same manner as the commands AD0(ENTER) CA(ENTER) would. This can be used to update other radios in the system for LQA data.

Example: LQA XMT (ENTER)

LS

The lower sideband command is used to select lower sideband mode of operation. The processor will perform any required internal audio switching.

Format: LS(ENTER)

Example: LS(ENTER)
Response: THE STANDARD STATUS MESSAGE IS DISPLAYED

MI

When operating in the independent sideband mode, the microphone command is used to direct the local microphone audio to the desired sideband. The default condition is sideband A1 (inboard upper sideband).

Format: MI X1(ENTER)

X1 is the selected sideband and may be A1 or B1. The processor does not have audio connections to the outboard sidebands A2 or B2. In 2-channel ISB equipment such as HF-8010 Exciter, HF-8050 Receiver, or HF-8070 Receiver-Exciter, A1 is USB, B1 is LSB.

Example: MI A1(ENTER)
Response: MICROPHONE ON A1

This command is applicable only in the ISB mode. The microphone is automatically connected in all other modes of operation.

MO

The monitor command is used to enable or disable the monitor mode of operation. This command causes the processor to stop and listen to any automatic communication system data transmissions that it detects during scanning. The calling and called addresses are displayed to the operator when a data transmission is detected, as TO and FROM. The CALL MON key in function keyfield may be used to initiate the monitor function.

In this mode, if the system receives a TO address that is not a Local, Group, or All Call, it stops scanning, drops positive squelch. It then stays on that channel until the return-to-scan delay time has expired, or a return-to-scan command is received.

This command may be used to turn on the monitor function.

Format: MO(ENTER)

PR

The preset command is used to select or program mode modifying presets. Mode presets are used to set up the radio for special mode operation such as secure voice, data, fax, or 4-channel ISB. A preset contains a 3-character alphanumeric identifier plus 10 hexadecimal characters. The alphanumeric identifiers can be used interchangeably with the preset number as a human factors aid in calling up the desired preset for use.

The preset command may be used to select a mode preset for use. The preset may be referenced by index number or name.

      Format: PR ##(ENTER)

      Format: PR XXX(ENTER)

is the index number and must be in the range 1 to 8. XXX is the 3-character name and may be any programmed mode.

The preset command may be used to program the presets.

      Format: PR ## = YYY ZZZZZZZZZZ(ENTER)

ZZZZZZZZZZ is 10 hexadecimal characters that define the mode preset.

      Example: PR TTY(ENTER)
      Response: SELECTED PRESET TTY

      Example: PR 1 = TTY 0120004000(ENTER)
      Response: PROGRAMMED PRESET 1 TO TTY

The hexadecimal coding for mode presets is done by adding the code values of the various available functions selected by each character.

Character 1 is used to select an optional filter. Character 2 is used to select an optional filter and to enable the pilot carrier and automatic frequency control functions. Only one optional filter may be enabled by a preset. Character 3 is used to enable the independent sidebands. Characters 4 and 5 are used to set AGC time constants for the sidebands. Character 6 is used to set up the AGC busing functions. Character 7 is used to select net data mode and activate auxiliary relays. Character 8 is used to enable the peak clipper function and set the power amplifier power level. Characters 9 and 10 are not currently used.

SYSTEM PARAMETERS

HEXADECIMAL CODE VALUE

CHARACTER	8	4	2	1
1	FILTER E	FILTER D	FILTER C	FILTER B
2	FILTER A	16 KHz	PILOT CARRIER	AFC
3	B2 ON	B1 ON	A1 ON	A2 ON
4	B1 AGC(2)	B1 AGC(1)	A1 AGC(2)	A1 AGC(1)
5	B2 AGC(2)	B2 AGC(1)	A2 AGC(2)	A2 AGC(1)
6	B2 ON BUS	B1 ON BUS	A1 ON BUS	A2 ON BUS
7	NET DATA	AUX 3	AUX 2	AUX 1
8	PEAK CLIPPER	PA LOW POWER	PA MEDIUM POWER	PA HIGH POWER
9	0	0	0	0
10	0	0	0	0

SB

The standby command is used to place the power amplifier in standby condition. This disables the high-voltage power supply of the power amplifier. The SB command is automatically cancelled by the transmit and power amplifier commands.

    Format: SB(ENTER)

    Example: SB(ENTER)
    Response: IN STANDBY MODE

SC

The scan command is used to place the processor in automatic scanning mode of operation and to program a scan list.

This command is used to start the scanning process using the channels that have the scan attribute programmed. The SCAN key in function keyfield may be used in place of SC command to initiate autoscanning.

    Format: SC(ENTER)

This command is used to start the scanning process using the channels that are included in the scan lists. The SCAN key may not be used for this command.

    Format: SC[1] [2](ENTER)

1 and 2 are optional attributes in the command are the scan list numbers.

The scan command is used to program the scan lists. The SCAN key in function keyfield may not be used.

    Format: SC LI X = A B C D E...(ENTER)

X is the scan list number, 1 or 2. The channel numbers of the channels in the list follow the equal sign. Each list may have up to 15 members. If more than 15 channels are to be scanned, place some of the channels in each list and enter the command SC L1 1 2(RETURN). The processor will scan both lists. Up to 30 channels may be scanned in this way.

    Example: SC(ENTER)
    Response: THE STANDARD STATUS MESSAGE IS DISPLAYED

    Example: SC 1 = 01 09 11 16(ENTER)
    Response: SCAN LIST 1 PROGRAMMED

    Example: SC 1(ENTER)
    Response: THE STANDARD STATUS MESSAGE IS DISPLAYED

SI

The silent command is used to enable and disable the radio silent function. In silent mode, the system will not automatically respond to an incoming call. The operator must momentarily depress the ptt switch or enter the CA command to cause the processor to respond to a call. With the silent mode disabled, the processor will automatically respond to a call.

This command is used to enable the silent mode. The SIL key in function keyfield may be used in place of SI command to initiate silent mode of operation.

    Format: SI(ENTER)

```
Example:     CTRL-Q
Response:    MONITOR:   IF AGC A1        OFF
             CONT       IF AGC B1        OFF

Example:     CTRL-Q
Response:    MONITOR:   AFC LOCK         OFF
             CONT       EXCITER RF       OFF

Example:     CTRL-Q
Response:    MONITOR:   PA READY         OFF
             CONT       PA RF            OFF
```

The example shown is for a processor controlling an HF-8070A Receiver-Exciter. The monitor response will include both receiver and exciter information when operating with other equipment compliments.

CONT indicates that additional status information is available. See the HF-80 instruction books for the meaning and application of the various radio monitors.

The status command may be used to determine the status of the three auxiliary relays.

```
Format:      ST RL(ENTER)

Example:     ST RL(ENTER)
Response:    AUX RELAY STATUS:   1 ON 2 ON 3 OFF
```

SY

The system command is used to program and read out the value of the system parameters.

The system command is used to program the system parameters.

```
Format:      SY ## = XXX(ENTER)
```

is the system parameter number of the parameter to be modified. It must be from 1 to 14. XXX is the new value of the system parameter. When entering XXX, a decimal point may be entered for parameters that can have fractional quantities.

The system command is used to read out the value of one system parameter. If all parameters are to be read out, use the LI SY command.

```
Format:      SY ##(ENTER)
```

The following operator programmable system parameters are used in the processor. They are listed in the order of their index numbers.

1	Maximum channels scanned		
	+ Range: 2 to 99 channels	Default:	10 channels
2	Channel dwell period		
	+ Range: 0.50 to 9.99 seconds	Default:	0.50 seconds
3	Max station tune time		
	+ Range: 1 to 60 seconds	Default:	20 seconds
4	Return-to-scan delay		
	* Range: 10 to 999 seconds	Default:	60 seconds

Example: SY 2 = 50(ENTER)
Response: 2 CHANNELS DWELL PERIOD = 0.50   RANGE 0.50 TO 9.99 SEC

Example: SY 2 = 0.6(ENTER)
Response: 2 CHANNELS DWELL PERIOD = 0.60   RANGE 0.50 TO 9.99 SEC

TE

The test command is used to initiate internal processor tests and to set the gain of the headphone output so that it may be used as an audio test point.

The command is used to initiate ports test, memory tests, interface hardware tests, and FSK modem tests.

    Format: TE(ENTER)

The test command is used to set the gain of the headphones amplifier to a constant gain. The data sidetone and phones commands may then be used to select the audio path to be monitored. 0-dBM audio levels will be measured at the headphone jack when the audio line input gains are adjusted correctly for a standard system input level.

Example: TE(ENTER)
Response: ***SYSTEM TEST INITIATED****U * U
             TEST PASSED
             or
             SYSTEM TEST INITIATED*U * U
             Failed: ROM   RAM   MODEM
                      AUDIO   USART

ROM indicates that the microprocessor assembly has a problem. Have the unit repaired as soon as possible.

RAM indicates that the memory assembly has a problem. Have the unit repaired as soon as possible.

MODEM indicates that one or both of the modem assemblies have a problem.

AUDIO indicates that one or both of the audio assemblies have a problem. Further troubleshooting may be done by observing which inputs and outputs do operate correctly.

If both MODEM and AUDIO are displayed, it is probably a soft failure in the modem. Attempt to establish contact with another station. The system will probably still work. Have it repaired when possible.

USART indicates that the radio interface assembly has a problem. Have the unit repaired as soon as possible.

TI

Note

Applicable only when address protection option installed.

The time command is used to set the internal time-of-day clock that is used for the address protection function.

This command is used to manually set the clock.

    Format: TI = XXYY(ENTER)

UD

The upper sideband data command is used to select the upper sideband radio mode. The processor will perform any required internal audio switching when this command is executed.

If the system is scanning when this mode is selected, the automatic data mode will be used for the next call initiation. This will cause the called station to stay in the data mode when a link is established.

Format: UD(ENTER)

Example: UD(ENTER)
Response: STANDARD STATUS MESSAGE SHOWING UPPER DATA MODE

VB

The vbfo command is used to enable and disable the variable beat frequency oscillator in the receiver and to set the offset frequency of the vbfo. This command is meaningful only if the receiver has the variable bfo option installed.

Format: VB [+][−] ###(ENTER)

Example: VB +120(ENTER)
Response: VBFO FREQUENCY +1200 HZ

+ and − are optional attributes of the command that set the offset above (+) or below (−) carrier frequency.

is the offset frequency in hertz divided by 10. ### is in the range 1 to 999.

The vbfo command may be used to turn the vbfo off.

Format: VB OF(ENTER)

VM

The voice monitor command is used to enable and disable the voice monitor function. When the voice monitor mode is enabled, it is used to stop scanning when voice is detected. If squelch detects voice, scanning is stopped for 5 seconds. While scanning is stopped, the front panel squelch adjustment controls the squelch level. If the squelch closes for five seconds, the processor will return to scanning. The VOICE MON key in function keyfield may be used in place of VM command, to initiate voice monitor operation.

If the processor ptt line is keyed while scanning is stopped, the radio will tune up on frequency and communications may be established. Any time that the system is not keyed for the return-to-scan period and the squelch stays closed for five seconds, the system will return to scan.

Only the channels that are programmed with the voice monitor attribute are tested for voice.

The processor monitors all of the scanned channels for automatic communications system data whether it is testing for voice signals or not.

If the processor stops on a channel, entering an escape character will cause it to resume scanning.

Format: VM(ENTER)

The voice monitor off command is also used to disable the function. The VOICE MON key in function keyfield may not be used.

Format: VM OF(ENTER)

Example: VM OF(ENTER)
Response: THE STANDARD STATUS MESSAGE IS DISPLAYED

SELSCAN® PROGRAMMING WORKSHEET

1. SYSTEM PARAMETERS - CHECK AND PROGRAM IF NECESSARY.

INDEX	CHANNEL	ADDRESS	FUNCTION	VALUE	
90	Blank	Blank	Prompt for depressing LOAD if wish to view/change programmable parameters.		

INDEX	CHANNEL	DISPLAY VALUE	FUNCTION	INITIAL	MODIFIED
90	1	(2 to 99)	MAXIMUM CHANNELS SCANNED ------	10	
90	2	(50 to 999)	CHANNEL DWELL PERIOD --------------	0.5	
90	3	(10 to 600)	MAX STATION TUNE TIME --------------	20	
90	4	(10 to 999)	RETURN TO SCAN DELAY --------------	60	
90	5	(10 to 999)	KEEP ALIVE XMIT PERIOD --------------	50	
90	6	(100 to 990)	AUTO LQA UPDATE TIME --------------	- - -	
90	7	(1 to 50)	LISTEN BEFORE CALL -------------------	2.2	
90	8	(10 to 990)	LQA MATRIX DEGRADE TIME-----------	6	
90	9	(0 to 999)	COORDINATION TIME -----------------------	0	
90	10	(001 to 099)	CALL ALERT SIGNAL ------------------	5	
90	11	(0 to disable)	HOME COUPLER BEFORE SCAN --------	0	
90	12	(0 to scan in ISB, 1 to scan in channel preset)	SCAN USING CHANNEL MODE-----------	0	
90	13	(0 for ON)	DISABLE TTY OUTPUT----------------------	0	
90	14	(0 to ENABLE)	DISABLE PTT FOR CALL-------------------	0	

2. LOCAL, LOCAL GROUP AND ALLCALL ADDRESS - CHECK AND PROGRAM IF NECESSARY.

INDEX		FUNCTION	
0		LOCAL ADDRESS ---	
99		ALL CALL ADDRESS--	
98	UNPROTECTED	ALL CALL ADDRESS--	
97		LOCAL GROUP --	

5. PROGRAM RADIO CHANNELS - CHECK AND PROGRAM IF NECESSARY.

CHANNEL	(R/T)	FREQUENCY	MODE	SCAN	VM	NOTES
00	___	_____	___	___	__	_____
01	___	_____	___	___	__	_____
02	___	_____	___	___	__	_____
03	___	_____	___	___	__	_____
04	___	_____	___	___	__	_____
05	___	_____	___	___	__	_____
06	___	_____	___	___	__	_____
07	___	_____	___	___	__	_____
08	___	_____	___	___	__	_____
09	___	_____	___	___	__	_____
10	___	_____	___	___	__	_____
11	___	_____	___	___	__	_____
12	___	_____	___	___	__	_____
13	___	_____	___	___	__	_____
14	___	_____	___	___	__	_____
15	___	_____	___	___	__	_____
16	___	_____	___	___	__	_____
17	___	_____	___	___	__	_____
18	___	_____	___	___	__	_____
19	___	_____	___	___	__	_____
20	___	_____	___	___	__	_____
21	___	_____	___	___	__	_____
22	___	_____	___	___	__	_____
23	___	_____	___	___	__	_____
24	___	_____	___	___	__	_____
25	___	_____	___	___	__	_____
26	___	_____	___	___	__	_____
27	___	_____	___	___	__	_____
28	___	_____	___	___	__	_____
29	___	_____	___	___	__	_____