ERICSSON

Mobile Communications

PCS™
403-512 MHz, SYNTHESIZED PERSONAL RADIO

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Maintenance Manual

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PACKAGE NOMENCLATURE

Digits 1 & 2	Digit 3	Digit 4	Digit 5
Product Code	Frequency Range	Number of Channels	Package
PC	**03** 403 - 440 MHz	**02** 2 Channels	**S** Standard
	04 440 - 470 MHz	**08** 8 Channels	**D** DTMF
	05 470 - 512 MHz		

SPECIFICATIONS*

FCC FILING DATA

Frequency Range	403-512 MHz
RF Power Range	1-4 Watt
Transmitter/Receiver FCC Identifier	
403-440 MHz	AXA9MZ-PCSU1
440-470 MHz	AXA9MZ-PCSU2
470-512 MHz	AXA9MZ-PCSU3
FCC Part Numbers	22, 74, 80, 90, 95

GENERAL

Input Voltage	6.0 to 9.0 Volts
Channel Capacity	2, 8 Channels
Frequency Spread (Full Performance)	
Transmitter	Full Split
Receiver	20 MHz of Split
Frequency Stability	±5 PPM
Channel Spacing	25 kHz
Dimensions (less antenna) H X W X D	
With 1200 mAh* Battery	7.4 X 2.8 X 1.57 inches (18.8 x 7.11 x 4.0 cm)
With 1700 mAh Battery	8.8 X 2.8 X 1.57 inches (22.35 X 7.11 X 4.0 cm)
Weight	
Radio (less battery)	11 ounces
1200 mAh Battery	9 ounces
1700 mAh Battery	13.5 ounces
Ambient Temperature Range	-30° to +60° C (-22° to +140° F)
Battery Drain (7.5 Vdc)	
Receiver Standby	70 milliamperes
Receiver Full Audio	250 milliamperes
Transmit (@5 Watts)	1.7 amperes
Transmit (@2 Watts)	1.2 amperes

Battery Life (Between Charges)	1200 mAh	1700 mAh
Hi Pwr (5-5-90% duty cycle)	8.0 hours	11.0 hours
Lo Pwr (5-5-90% duty cycle)	9.5 hours	13.0 hours

COMBINATION

TRANSMITTER

Power Output	
Hi Power	4 Watts
Lo Power	2 Watts (Adjustable to 1 Watt)
Conducted Spurious	-66 dB (-30 dBm)
Modulation Deviation	±5.0 kHz (maximum)
FM Noise (companion receiver method)	-43 dB
Power Adjust Range	1 to 4 Watts
Distortion	5% (maximum)
Deviation Symmetry	0.1 kHz
RF Output Impedance	50 Ohms
Carrier Attack Time	35 milliseconds
Audio Attach Time	35 milliseconds

RECEIVER

Audio Output (EIA)	0.5 Watts (less than 5% distortion)
Sensitivity	
12 dB SINAD (EIA)	-119 dBm (0.25μ Volts)
Selectivity	
(EIA 2-signal method)	-65 dB ±25 kHz
Spurious Response	-70 dB (Half IF Spurious - 60 dB In Top MHz Of Frequency Range)
Intermodulation	-65 dB
Hum and Noise	
Squelched	-80 dB
Unsquelched	-48 dB
Modulation Acceptance	±7 kHz
Frequency Response	Within +2 dB and -8 dB of a standard 6dB/octave de-emphasis curve from 300 to 3000 Hz (EIA).
RF Input Impedance	50 ohms

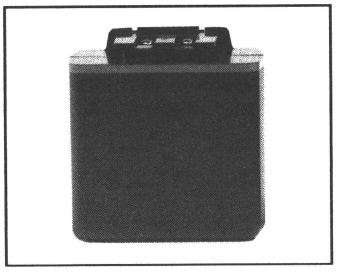
NOTE

* These specifications are intended primarily for use during servicing. Refer to the appropriate Specification Sheet for the complete specifications.

OPTIONS AND ACCESSORIES

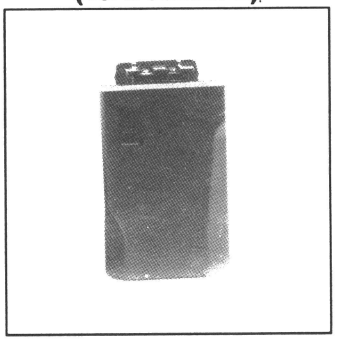
BATTERY PACKS

1200 mAh
(19A705293P1)

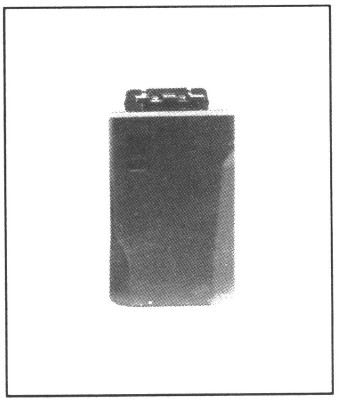


(19A705293P2)

1700 mAh

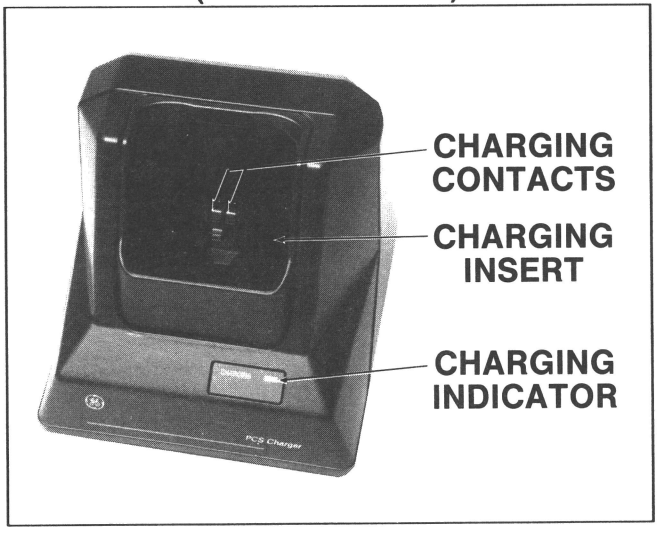


(19A705293P3)
Factory Mutual

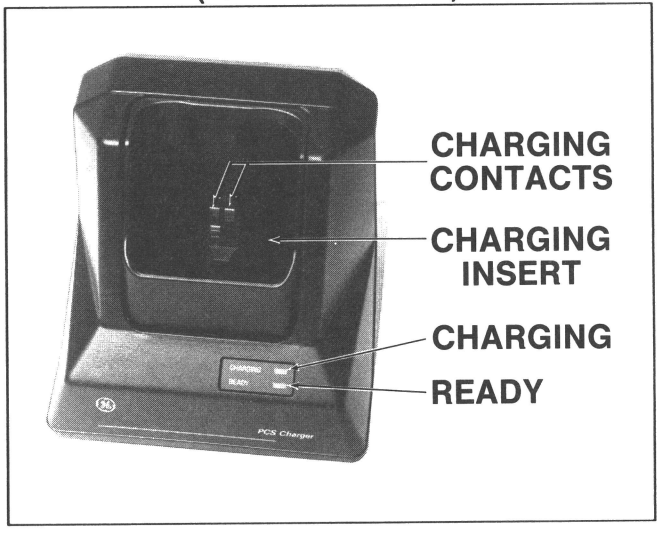


DESK CHARGERS

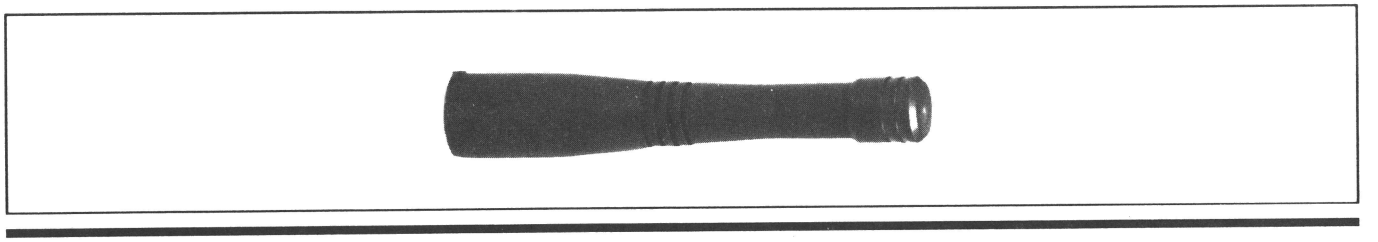
Standard
(19A705493P1 60 Hz)
(19A705493P3 50 Hz)



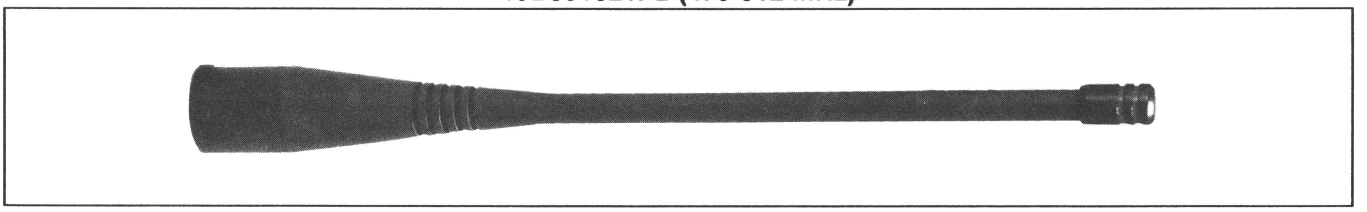
Rapid
(19A705493P2 60 Hz)
(19A705493P4 50 Hz)



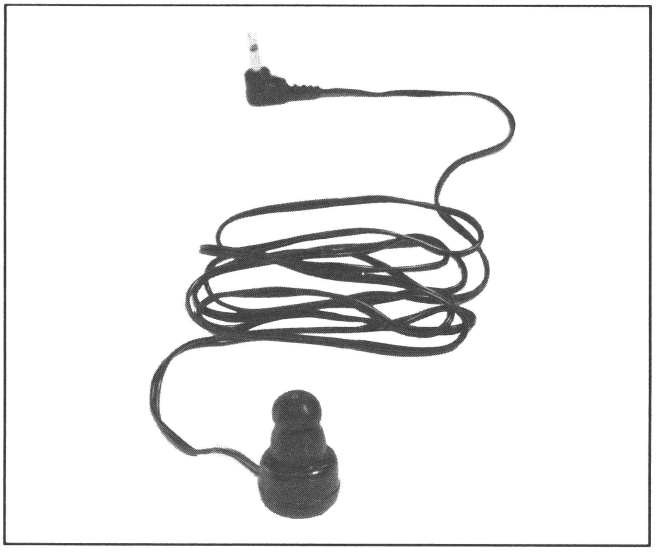
ANTENNA (Helical)
19B801620P1 (403-440 MHz)
19B801620P2 (440-470 MHz)
19B801620P3 (470-512 MHz)



ANTENNA (Flexible Whip)
19B801621P1 (403-470 MHz)
19B801621P2 (470-512 MHz)

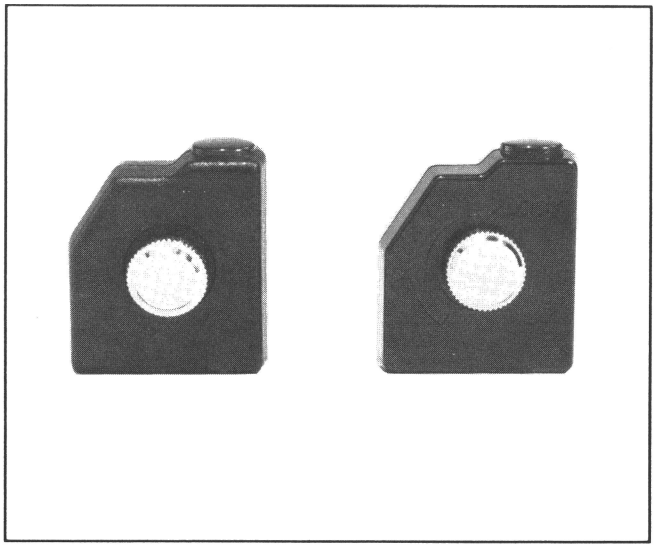


EARPHONE
(4033570G6)



SPEAKER MICROPHONE
(19A705581P1)

ACCESSORIES CONNECTOR
(19C851752P7)

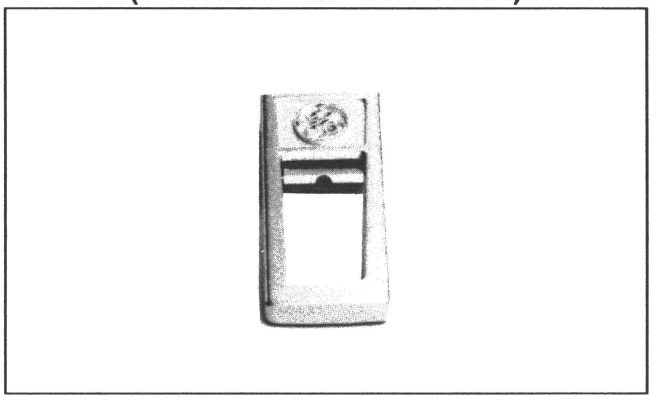


COMBINATION

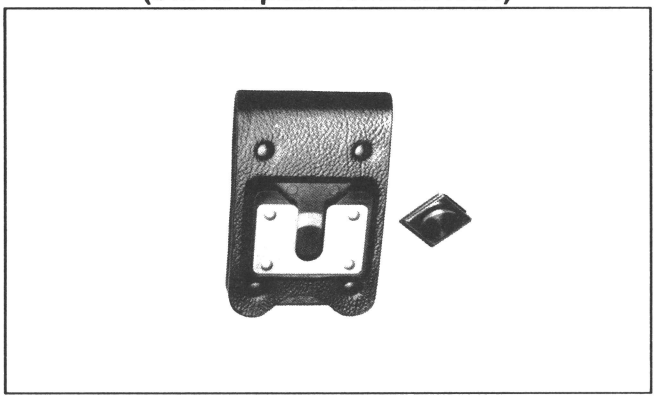
OPTIONS AND ACCESSORIES
(Continued)

CARRYING ACCESSORIES

Belt Clip
(Option Package 19B233241G1)
(Modification Kit 19A144704G1)



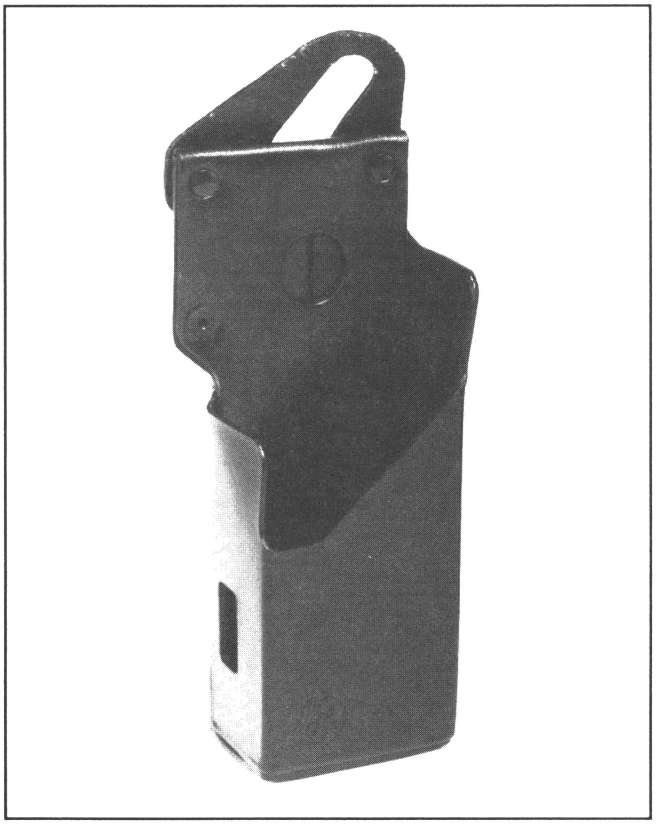
Swivel Plate
(Belt Loop 19B226627G1)
(Swivel Option 19B233243G1)



CARRYING CASES

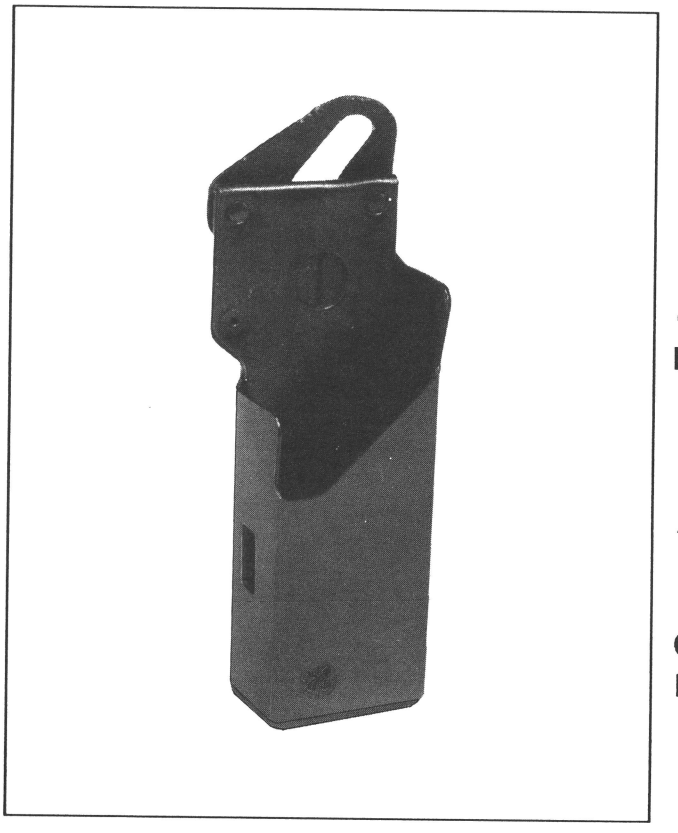
1200 mAh Battery Pack
Full Cover 19D902456P1

1200 mAh Battery Pack
Retaining Strap 19D902456P2



1700 mAh Battery Pack
Full Cover 19D902456P3

1700 mAh Battery Pack
Retaining Strap 19D902456P4



COMBINATION

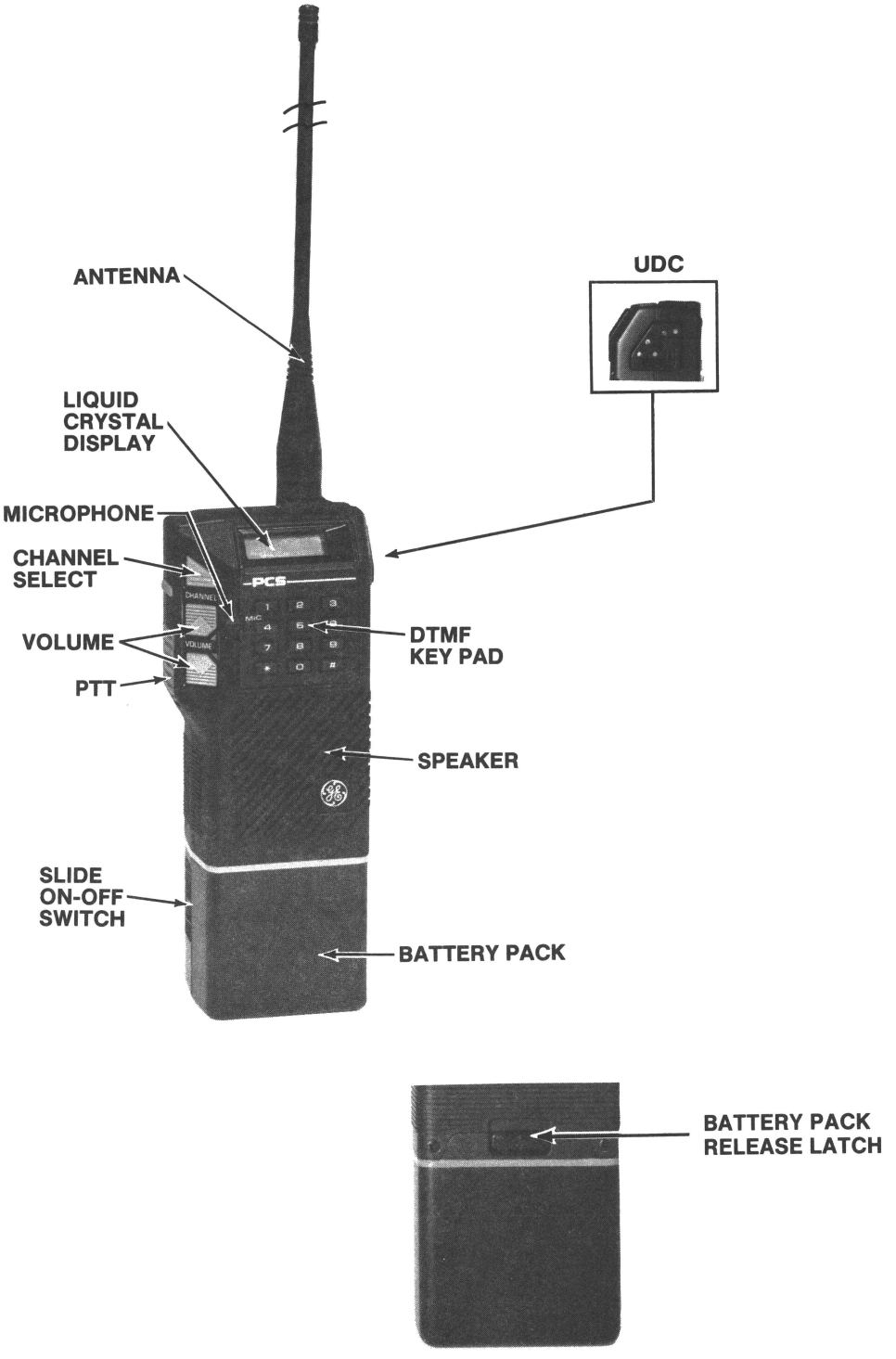


Figure 1 - PCS Personal Radio Operating Controls

DESCRIPTION

The Ericsson GE PCS™ DTMF Personal Radio is a small, ruggedly constructed two-way FM radio, housed in an aluminum and Lexan case. The synthesized radio operates in the 403-512 MHz range, and is available in either a two- or eight-channel version.

Operating controls for the radio are provided through a rubber keypad on the side of the radio, and a Dual Tone, Multi-Frequency (DTMF) keypad on the front of the radio. All keypad switches have a good tactile feel, and are sealed to provide weather protection. When turned ON, the radio powers up on the last channel used, and at the last volume setting. The operating controls, UDC connector and battery pack are shown in Figure 1.

All of the PCS radios are equipped with a User Device Connector (UDC) for connecting external options, and for programming the radios. The radios are programmed using a personal computer and programming interface box that connects to the UDC. The UDC is covered with a rubber boot for weather protection.

The antenna has a BNC base for rapid installation onto the radio BNC antenna connector. The antenna base is extended to fit flush against the housing for added weather protection.

The radio battery pack securely latches in place at the bottom of the radio. The radio **ON/OFF** switch is located on the battery pack.

A Liquid Crystal Display (LCD) on the front of the radio shows the channel status and volume level, along with a **TX** (transmit) indicator, a low battery voltage indicator **(BAT)** and a Type 99 paging indicator **(PG)**. There are eight (8) levels of volume and each bar displayed in the LCD represents one level. The LCD module is backlighted for night viewing, and is mounted in a rubber seal for weather protection.

NOTE

When the battery is low, a flag is displayed on the LCD. When the battery is sufficiently low to cause improper operation, the radio microprocessor terminates all operation.

The radio is shipped from the factory with the high power level set to 5 watts, and the low power level set to 2 watts.

RADIO PROGRAMMING

Each of the radio channels may be programmed for DTMF dialing, tone or digital Channel Guard, Squelch Tail Elimination (STE), Type 99 tone decoding, and HI/LOW transmit power level. These options may be programmed on a channel to channel basis.

Other programmable features include Carrier Control Timer (CCT), display backlighting, and alert beep options. These features can be programmed as desired to meet system requirements.

Refer to the appropriate Programming Manual for complete programming instructions.

ASSEMBLY

The PCS personal radio consists of an RF board mounted in the rear assembly, an audio logic board mounted in the front assembly and a control frame assembly.

The RF board contains all transmit, receive and synthesizer circuits. The audio logic board contains all transmit audio and receive audio circuits along with all logic and control circuits. A microprocessor on the audio logic board generates and decodes all tones used in Channel Guard or Type 99 tone signaling.

The control frame assembly mounts in the radio front cover and provides the following functions:

- Audio logic board interface
- Microphone and speaker connections
- Houses the channel up, volume up, volume down, monitor and PTT switches.
- UDC interface to the outside of the radio for external options and customer programming.
- Houses the LCD module for status display.

The front cover also contains the DTMF circuit board and the DTMF keypad.

Refer to the Interconnection Diagram as listed in the Table of Contents for all circuit board and control frame connections.

STANDARD FEATURES

In addition to tone and digital Channel Guard, DTMF dialing, STE, Type 99 decode and transmitter power level settings, the standard PCS personal radio includes the following standard features:

Monitor

Allows the operator to monitor channel activity before transmitting.

Carrier Control Timer

Programmable from 15 to 225 seconds in 15 second increments, or can be disabled.

Radio Memory

Remembers the radio status such as the last volume level and channel selected. These settings are stored in memory.

Surveillance Feature

Earphone and Accessory Connector

Talk Around

Standard radio can be programmed for talk around channel.

Global Alert Beep

No alert beep will be sounded when this feature is disabled.

LCD Backlight

Backlight will not be turned on when this feature is disabled.

Control Function

The PCS radio can be programmed in one of two operating modes. In Mode 1 the channel and volume level are selected by pressing the **CHANNEL** or **VOLUME** Up or Down buttons. In Mode 2, the CHANNEL Up button is pressed, and the channel selected by pressing the VOLUME Up or Down buttons.

The **MON**itor and PTT switches operate identically in both modes.

Radio Functions

The PCS radio is equipped with a self-check function which is performed when powering up the unit. A good self-check function is indicated by a series of three beeps, if enabled, followed by the last radio status on the LCD. All of the display segments are turned on during the three beeps. A bad self-check function will cause all display segments to remain on, and no beeps will be heard.

The **BAT** display is turned on any time the battery voltage level drops below the low level (6.3 Volts). **BAT** is displayed and continues to be displayed on the LCD until the battery is charged or a fresh battery pack is connected.

When the battery voltage level goes low while transmitting, **BAT** will be displayed and will continue to be displayed after returning to the receive mode. **BAT** will be turned off after 5 seconds unless the battery voltage level is also low in the receive mode.

Below 6.3 volts, **BAT** will continue to be displayed. End of battery is considered to be 5.8 volts. This level will allow at least one hour of operation. The radio will continue to operate at reduced power levels below 5.8 volts. Below 5 volts, radio operation is completely disabled to prevent corruption of the radio personality.

If programmed, the simultaneous flashing of the **BAT** indicator and the sounding of alert beeps indicates the radio has failed to lock on frequency. Transmission will be terminated at this time if the radio is in the transmit mode whenever the synthesizer fails to lock on frequency.

LCD backlighting is turned on every time a control button is pushed (channel select, volume up, volume down and monitor) and remains on for another 5 seconds after the control button is released. Backlighting is turned off while transmitting, and turned on for 5 seconds after PTT is released.

CONTROLS AND INDICATORS

CONTROLS

The radio controls consist of an OFF-ON switch, monitor and PTT switch, VOL and CHAN select controls, and a DTMF keypad.

ON/OFF — The **ON/OFF** slide switch on the battery pack controls power from the battery pack to the radio. When turned **ON,** an audible click is heard and a light yellow square is shown beneath the switch. The radio assumes the last operating state; i.e., channel, volume. This status will be displayed in the **LCD** window, indicating power is applied. **BE SURE** the power switch is fully **ON** (or fully **OFF**).

MON — Quickly pressing and releasing the **MON** button disables Channel Guard. Pressing and holding the **MON** button unsquelches the receiver. This permits the user to monitor channel activity. Pressing the **MON** button also resets the radio for the next call after a Type 99 Tone call has been received.

PTT Keys the radio (transmits) on the communication channel displayed.

DTMF KEYPAD Pressing a key on the DTMF keypad causes DTMF tone frequencies to be transmitted that correspond to the digits dialed on the keypad. A sidetone output to the speaker is also generated each time a key is pressed so that the tones can be monitored as they are transmitted.

The following operating modes of the radio are programmed with a personal computer using the appropriate programming software.

MODE 1 (This is the normal control function)

CHANNEL UP Selects the transmit/receive channel. Communications Channels are selected one at a time or progressively by pressing and holding the **CHANNEL UP** button. The next higher channel is always selected (Channel 1 follows Channel 8). A short beep, if programmed, is sounded at every channel change. The channel number is shown in the LCD display.

VOLUME Δ ∇ Sets receive audio to the desired level while pressing the **VOLUME** Up Δ or **VOLUME** Down ∇ button. Changing the volume level while the radio is squelched causes the radio to beep, if programmed, at the new selected level. No beep is sounded when the radio is already unsquelched. The relative volume level is indicated by the number of bars indicated in the LCD. There are eight levels of volume. Pressing and holding the **VOL** buttons continues to increment the volume in the direction indicated on the button.

MODE 2 This mode is programmed when extreme care in channel selection is desired.

CHANNEL UP When Mode 2 is programmed, pressing the **CHANNEL UP** button enables the channel change mode. This is indicated by the flashing channel indicator in the LCD display.

VOLUME Δ ∇ While the channel indicator is flashing, press the **VOLUME** Up Δ button to increment the channel or press the **VOLUME** Down ∇ button to decrement the channel. When the desired channel has been selected, press the **CHANNEL UP** button again to disable the channel change mode. The channel indicator will stop flashing and **VOLUME** Up Δ and **VOLUME** Down ∇ buttons resume their normal functions.

The channel change mode automatically times out at the end of 30 seconds. The radio then reverts to normal operation for the volume buttons.

INDICATORS

The LCD displays the channel, volume level, battery condition, Type 99 tone status and transmit indicator (see Figure 2). The LCD is backlit anytime the channel select, volume up/down or monitor buttons are pressed and remains on for another 5 seconds after releasing. Backlighting is turned off during transmit and turned on for 5 seconds after PTT is released.

TX Indicates transmit mode when the PTT button is pressed.

VOL Indicates level settings of volume (eight levels).

PG Indicates selected channel programmed to receive Type 99 calls. Upon receipt of a Type 99 call, the **PG** flag flashes until the Type 99 decoder is reset.

BAT Indicates battery voltage is low and battery pack requires charging. When the battery pack voltage reaches the low level while in the transmit mode, **BAT** is displayed and stays on for another five (5) seconds after the radio is returned to the receive mode. **BAT** is turned off after five seconds unless the battery pack level is also low in the receive mode.

CHANNEL The transmit/receive channel is indicated by a number in the LCD.

ALERT TONES

SELF CHECK — A self-check function is performed each time the radio is turned ON. A good self-check function will be indicated by three beeps, if programmed, followed by the last radio status, channel number and volume level displayed in the LCD. All of the displays are shown during the three beeps. If the self-check fails, no beeps will be heard.

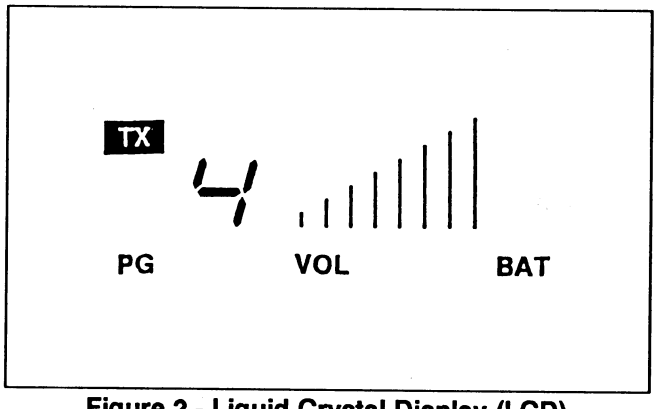


Figure 2 - Liquid Crystal Display (LCD)

BAT ALERT — Simultaneous flashing of **BAT** in the LCD display and sounding of alert beeps, if programmed, indicates failure of the synthesizer to lock on frequency. If this happens during the transmit mode, the transmitter is inhibited and no transmission is made. The operator should select another channel, recharge the battery pack, or have the unit checked.

OPERATION

The PCS radio can be programmed to operate in one of two operating modes.

In Mode 1, the channel and volume level are selected by pressing the **CHANNEL** or **VOLUME** Up or Down buttons. Mode 1 is the normal operating mode, and is the mode used in the procedures discussed in the following paragraphs.

In Mode 2, the **CHANNEL** Up button is pressed, and the channel selected by pressing the VOLUME Up or Down buttons. The **MON**itor and PTT switches operate identically in both modes. Mode 2 is used when careful channel selection is required.

Refer to the OPERATOR'S MANUAL (LBI-38595) for complete operating instructions.

TO RECEIVE A MESSAGE:

1. To turn the radio on, slide the ON/OFF switch on the battery pack to the ON position. A YELLOW area will be visible.

2. After the radio has passed the SELF-CHECK test, press and hold the VOLUME Up Δ or VOLUME Down ∇ button while listening to the beeps (if this feature is programmed). Watch the LCD display for the volume level indicators (eight bar lines) to select the desired listening level.

3. Press the CHANNEL Up Δ or Down ∇ button to select the operating channel.

4. The radio is now ready to receive messages.

With Type 99 Tone:

1. Select the appropriate channel to receive Type 99 tone signaling. The **PG** flag will be displayed on this channel.

2. When receiving a Type 99 call, answer in one of the following two ways:

   a. **To reply to a message** - After hearing the Type 99 paging tone, press the PTT switch and answer the call. After completing the communication, press the MONitor button to reset the radio for the next call.

   b. **To avoid listening to nuisance call** - After hearing the Type 99 paging tone, press the MONitor button to reset the radio for the next call.

3. Type 99 operation may be disabled by pressing the PTT switch when the radio is in the reset mode. While the switch is pressed, the radio beeps to indicate that no transmission is occurring.

   After releasing the PTT switch, the PG flag flashes in the LCD to indicate that the radio is now in a normal receive mode (CG or squelch operation only). A second press of the PTT switch results in a normal transmission.

TO SEND A MESSAGE:

1. Turn the radio ON and select the operating channel as instructed in TO RECEIVE A MESSAGE. The current status of the radio is displayed in the LCD.

2. Press the MONitor button to determine if the channel is in use. NEVER interrupt another conversation.

3. While holding the radio so that the antenna is vertical, press the PTT switch and speak directly into the grill or across the face of the radio or external microphone. Speak in a normal voice. Release the PTT switch as soon as the message is finished. Messages cannot be received when the PTT switch is pressed.

4. When transmission is desired on a paging channel, the PTT switch must be pressed twice. Press the PTT switch the first time to take the radio out of the paging mode. Press the PTT switch the second time for normal PTT operation. Remember that a PG flag flashes in the LCD and the radio beeps on the first press of the PTT switch.

   The radio may be placed back in the Type 99 paging mode by pressing the MONitor button.

TO PLACE A DTMF CALL

Specific procedures for placing a telephone call from a PCS DTMF personal radio are determined by the operating system where the radio is used. Consult a system representative for the exact operating procedures for the system.

The keyboard on the PCS DTMF radio is **not** active until the PTT switch is operated. Therefore, the PTT switch must be operated at all times when operating any switch on the DTMF keypad.

In most systems, a " * " is sent at the beginning of a transmission to get a dial tone. After this, the telephone number is normally sent. With the PCS DTMF personal radio, this means operating the PTT switch, then dialing the telephone number.

In some systems, an additional " * " is sent at the end of the telephone number. The PTT is then released while the telephone number is being sent by the system. The telephone connection is made and the party called answers.

After the call is completed, press the pound "#" button to disconnect from the telephone system. Service Note: These are general instructions and may be different in individual systems. Refer to a systems operation representative for more detailed system information.

Example:

1. Press the PTT switch.

2. While holding the PTT switch pressed, press either the " * " or the "#" keys as required by the operating system.

3. Release the PTT and listen for a dial tone.

4. When the dial tone is heard, press the PTT switch.

5. While pressing the PTT switch, dial the desired telephone number followed by " * " or a "#" as required.

   A sidetone will be heard as each number is dialed. If a sidetone is not heard, two keys may have been pressed by mistake. Care must be taken to press only one key at a time.

6. Release the PTT switch. The radio will send the telephone number. Clicks will be heard as each number is sent. The telephone ring at the other end can be heard.

7. When the party called answers, press the PTT switch and continue the communication as presented in TO RECEIVE A MESSAGE and TO SEND A MESSAGE.

8. At the end of the communication, press and hold the PTT switch. While holding the PTT, press the " * " or the "#" key to disconnect from the system, as required.

9. Release the PTT switch.

TONE PROGRAMMING

Any IBM compatible Personal Computer using **MS DOS** and a General Electric Programmer Interface Box plus the proper programming software is used to program the PCS Type 99 tones, Channel Guard tones and digital codes. The Programmer Interface Box connects between the User Device Connector (UDC) on the side of the PCS radio and the back of the Personal Computer. Refer to the applicable **Programming Guide (TQ-3329)** for details.

TYPE 99 DECODE

Two sets of Type 99 tones may be programmed to the **PCS** radio. Any channel can be programmed to decode any call or calls based on any one of the two tone sets. Individual, group and super group paging can all be used. MOTOROLA formats are also acceptable.

PG is displayed on any channel that has been programmed to receive Type 99 calls. Both receive and transmit Channel Guards may also be programmed to any channel with Type 99 Tone.

The trailing end of the second Type 99 tone of the call is sounded to alert the operator of an incoming call.

Upon receiving a call, the radio will open the audio and flash the **PG** indicator until it is reset by momentarily pressing the **MONITOR** button.

The Type 99 decoder will be disabled as long as the **MONITOR** button is pressed.

The Type 99 decode function can be disabled by the first push of the PTT switch and is indicated by the flashing **PG** indicator. The PTT switch resumes its normal function at the second push of the PTT switch.

Operation and Programming

The optional Type 99 programming provides individual, group and super group call decode. The Motorola formatted two-tone sequential signaling schemes can also be decoded.

In Type 99 tone systems, calls will not be heard from the receiver until the proper two tones are detected. When the second tone is decoded and recognized as correct, an alert tone sounds during the remaining portion of the second tone. The receiver audio path opens and remains open to receive messages until the decoder is reset. The **PG** indicator will also flash to show a call has been received.

The **PCS** radio can be **PC** programmed with up to two separate tables of tones. Either the GE Type 99 format or the Motorola format can be assigned to each tone table. The tone decoder (Individual, Group and Super Group for the GE format or Individual, Group and Quick Call for the Motorola format) can be enabled individually for each channel. Once enabled, one of the two tone tables can be selected for each channel.

The Group Call format allows communication with all radios within a subgroup. The Super Group Call (in GE tone systems) or Quick-Call (in Motorola tone systems) allows communications between all radios in a system.

GE Type 99 Format

Tone frequencies in the GE tone system fall within the range of 517.5 to 997.5 Hz.

In the GE tone format, the first tone may be from tone group **A** (for Individual or Group calls) or from tone group **C** (for Super Group calls). The second tone may be from tone group **B** (for Individual calls) or from tone group **D** (for Group and Super Group calls). The GE tone format is illustrated as follows:

INDIVIDUAL CALL FORMAT

< ...1.0 SEC... >	< ...200 MS... >	< ...1.0 SEC... >
±20%	±25%	+300%, -0%
TONE A	GAP	TONE B

GROUP CALL FORMAT

< ...1.0 SEC... >	< ...200 MS... >	< ...1.0 SEC... >
±20%	±25%	+300%, -0%
TONE A	GAP	TONE D

SUPER GROUP CALL FORMAT

< ...1.0 SEC... >	< ...200 MS... >	< ...1.0 SEC... >
±20%	±25%	+300%, -0%
TONE C	GAP	TONE D

For example, assume the paging number to be 123. The first digit of the paging number is a 1. Look in Table 1 and read down the column labeled "**100's Digit**" to a 1. Read horizontally across the column labeled "**10's Digit**". The tone group is **B**. The second digit of the paging number is a 2. The tone number is **B2**. Look in Table 2 and down the column labeled "**Tone Designator**" to find **B2**. Read horizontally across the column labeled "**Tone Frequency**". The first tone frequency is 787.5 Hz.

To determine the second tone frequency look in Table 1 and as before, find the first digit of the paging number (1).

The second tone group is **A**. The third digit of the paging number is a 3 and the tone Designator is **A3**. In Table 2 read down the column labeled "**Tone Designator**" and find **A3**. Read horizontally across the column labeled "**Tone Frequency**". The second tone frequency is 802.5 Hz.

For different paging numbers, locate the first digit in the "**100's Digit**" column and determine the tone frequencies as described in the example. For a complete description of tone applications refer to **DATAFILE BULLETIN DF-5000-3A**.

Tone D is the diagonal tone used (in GE tone systems only) when the first and second tone frequencies are the same. The standard frequency for **Tone D** is 742.5 Hz, but may be programmed with any tone frequency.

Table 1 - GE Tone Groups

100's Digit	10's Digit	1's Digit
	For First Tone	For Second Tone
0	A	A
1	B	A
2	B	B
3	A	B
4	C	C
5	C	A
6	C	B
7	A	C
8	B	C
9	NOT USED	

Table 2 - GE Tone Generator Frequencies

TONE GROUP	TONE DESIGNATOR	TONE FREQUENCY
A	A0	682.5 Hz
	A1	592.5 Hz
	A2	757.5 Hz
	A3	802.5 Hz
	A4	847.5 Hz
	A5	892.5 Hz
	A6	937.5 Hz
	A7	547.5 Hz
	A8	727.5 Hz
	A9	637.5 Hz
B	B0	652.5 Hz
	B1	607.5 Hz
	B2	787.5 Hz
	B3	832.5 Hz
	B4	877.5 Hz
	B5	922.5 Hz
	B6	967.5 Hz
	B7	517.5 Hz
	B8	562.5 Hz
	B9	697.5 Hz
C	C0	667.5 Hz
	C1	712.5 Hz
	C2	772.5 Hz
	C3	817.5 Hz
	C4	862.5 Hz
	C5	907.5 Hz
	C6	952.5 Hz
	C7	532.5 Hz
	C8	577.5 Hz
	C9	622.5 Hz
DIAGONAL TONE		742.5 Hz

Motorola Format

Tone frequencies in the Motorola tone system is within the range of 288.5 to 1433.4 Hz. In the Motorola tone format, the first tone may be one of three tones: **A** for Individual Call, **B** for Quick Call and **C** for Group Call. The second or final tone is **B** in all cases.

NOTE

The **PCS** radio is able to recognize the **A**, **B** and **C** tones. Individual, Group and Quick Call formats may be used simultaneously.

The Motorola tone format is illustrated as follows:

INDIVIDUAL CALL FORMAT

< ...1.0 SEC... > (Minimum) TONE A	< ...NONE... > GAP	< ...3.0 SEC... > (Minimum) TONE B

GROUP CALL FORMAT

< ...1.0 SEC... > (Minimum) TONE C	< ...NONE... > GAP	< ...3.0 SEC... > (Minimum) TONE B

SUPER GROUP CALL FORMAT

< .....8 SEC..... > TONE B

A. Individual Call

Tables 3 and 5 may also be used to determine the tone frequencies. The first digit of the code determines the tone group used in the code (see Table 3). Then Table 4 is used to determine the actual tone frequencies. For a code of 124, the tone groups used are shown in Table 3. **Tone A** and **Tone B** are both located in tone group 1 and **Tone B** is tone number 4. Refer to the following examples for additional information.

Example 1 - Code 098:

The digit "0" in Table 3 (First Digit of Code) shows that **Tone A** is in Tone Group 4 and **Tone B** is in Tone Group 2 (see Table 4).

Tone number 9 in Tone Group 4 is 524.6 Hz.

Tone number 8 in Tone Group 2 is 879.0 Hz.

Example 2 - Code 265:

The digit "2" in Table 3 shows that both **Tone A** and **Tone B** are both in Tone Group 2.

Tone number 6 is 788.5 Hz.

Tone number 5 is 746.8 Hz.

Table 3 - Motorola Type Coder Numbers

First Digit Of Code	Group From Which Tone A Is Selected	Group From Which Tone B Is Selected
1	1	1
2	2	2
3	1	2
4	4	4
5	5	5
6	2	1
7	4	5
8	5	4
9	2	4
0	4	2
A	3	3

B. Group Call (Quick-Call Format)

In Group Call applications, the Tone Group is determined by Table 5, while the frequency is determined by Table 4. Refer to the following examples.

NOTE

Group Call code numbers range from 00 to 99. However, there are several Group Calls with the same Tone B frequency. This limits the total number of Group Calls to 40.

Example 1 - Group Call Code 07 (also code 27 and 37):

The digit "**0**" in Table 5 shows that **Tone B** is in Tone Group 2 along with 20 to 29 and 30 to 39. Tone number 7 in Tone Group 2 is 832.5 Hz (see Table 4).

Example 2 - Group Call 98 (also code 48 and 88):

The digit "**9**" in Table 5 shows that **Tone B** is in Tone Group 4 along with 40 to 49 and 80 to 89. Tone number 8 in Tone Group 4 is 496.8 Hz.

Table 4 - Motorola Group Call Tone Groups (TG)

Tone No.	Tone Group 1	Tone Group 2	Tone Group 3	Tone Group 4	Tone Group 5	Tone Group 6
1	349.0 Hz	600.9 Hz	288.5 Hz	339.6 Hz	584.8 Hz	1153.4 Hz
2	368.5 Hz	634.5 Hz	296.5 Hz	358.6 Hz	617.4 Hz	1185.2 Hz
3	389.0 Hz	669.9 Hz	304.7 Hz	378.6 Hz	651.9 Hz	1217.8 Hz
4	410.8 Hz	707.3 Hz	313.0 Hz	399.8 Hz	688.3 Hz	1251.4 Hz
5	433.7 Hz	746.8 Hz	953.7 Hz	422.1 Hz	726.8 Hz	1285.8 Hz
6	457.9 Hz	788.5 Hz	979.9 Hz	445.7 Hz	767.4 Hz	1321.2 Hz
7	483.5 Hz	832.5 Hz	1006.9 Hz	470.5 Hz	810.2 Hz	1357.6 Hz
8	510.5 Hz	879.0 Hz	1034.7 Hz	496.8 Hz	855.5 Hz	1395.0 Hz
9	539.0 Hz	928.1 Hz	1063.2 Hz	524.6 Hz	903.2 Hz	1433.4 Hz
0	330.5 Hz	569.1 Hz	1092.4 Hz	321.7 Hz	553.9 Hz	1122.5 Hz

Table 5 - Motorola Group Call Tone Groups (TG)

GROUP CALL CODE NUMBER	TONE GROUP (TONE B)
00 - 09	TG2
10 - 19	TG1
20 - 29	TG2
30 - 39	TG2
40 - 49	TG4
50 - 59	TG5
60 - 69	TG1
70 - 79	TG5
80 - 89	TG4
90 - 99	TG4

CHANNEL GUARD ENCODE/DECODE

The radio can be programmed for Channel Guard (CTCSS) encode/decode tone frequencies of 67 Hz to 210.7 Hz, including all of the standard EIA frequencies. Each channel may be programmed for encode/decode, encode only, decode only, or for no Channel Guard frequency.

A list of the standard tone frequencies is shown in Table 6. A list of digital Channel Guard codes and their equivalents are shown in Table 7.

Table 6 - CG Tone Frequencies

Standard Tone Frequencies Hz			
67.0	97.4	136.5	192.8
71.9	100.0	141.3	203.5
74.4	103.5	146.2	210.7
77.0	107.2	151.4	
79.7	110.9	156.7	
82.5	114.8	162.2	
85.4	118.8	167.9	
88.5	123.0	173.8	
91.5	127.3	179.9	
94.8	131.8	186.2	

Table 7 - Primary & Equivalent Digital Codes (OCTAL)

PRIMARY CODE	EQUIVALENT CODE	PRIMARY CODE	EQUIVALENT CODE	PRIMARY CODE	EQUIVALENT CODE
023	340, 766	132	605, 634, 714	237	464, 642, 772
025		133	413, 620	243	267, 342
026	566	134	273	245	370, 554
031	374, 643	135	205, 610	246	542, 653
032		136	502, 712	252	661
036	137	142	174, 270	254	314, 612, 706
037	560, 627	143	333	255	425
043	355	144	466, 666	262	316, 431, 730
047	375, 707	145	525	266	655
051	520, 771	147	303, 306, 761	271	427, 510, 762
053		150	256, 703	274	652
054	405, 675	152	366, 415	276	326, 432
056	465, 656	153	606, 630	307	362, 565
057	172	155	233, 660	311	330, 456, 561
060	116, 737	156	517, 741	312	515, 663, 743
065	301	157	322, 503	315	321, 673
066	734	161	345, 532	317	546, 614, 751
067	516, 720	162	416	324	343, 570
071	603, 717, 746	163	460, 607, 654	325	550, 626
072	470, 701	164	207, 732	331	372, 507
073	640	165	354	332	433, 552
074	360, 721	171	265, 426	344	471, 664, 715
075	501, 624	176	244, 417	346	616, 635, 724
076	203, 754	212	253	351	353, 435
104	226, 557	213	263, 736	356	521
107	365	217	371, 453, 530	363	436, 443, 444, 662
114	327, 615	222	445, 457, 575	446	467, 511, 672
115	534, 674	223	350, 475, 750	447	473, 474, 731, 744
117	411, 756	224	313, 506, 574	452	524, 765
122	535	225	536	454	513, 545, 564
123	632, 657	227	261, 567	455	533, 551
125	173	231	504, 631, 636, 745	462	472, 623, 725
127	412, 441, 711	234	423, 563, 621, 713	523	647, 726
130	364, 641	235	611, 671, 723	526	562, 645
131	572, 702	236	251, 704, 742		

ERICSSON

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REPLACEMENT OF BATTERY PACK

CAUTION

The battery pack used with the PCS Personal Radio must be as supplied by General Electric and shown under **OPTIONS AND ACCESSORIES** listed in the **TABLE OF CONTENTS** of this manual.

To Remove The Battery Pack From The Radio (refer to Figure 3):

1. Turn the radio **OFF** by sliding the **ON/OFF** slide switch on the battery pack to the **OFF** position.
2. Press down on the battery release latch and slide the battery pack out in the direction of the release latch.

To Re-Connect The Battery Pack to The Radio (see Figure 4):

1. Be sure the **ON/OFF** slide switch on the battery pack is in the **OFF** position.
2. Align the battery pack with the grooves in the back of the radio and slide the battery pack toward the front of the radio.
3. Insert the battery pack into the grooves until the battery release latch clicks into place.

RECHARGING BATTERY PACKS

The radio is equipped with a battery voltage level indicator which is displayed in the LCD when the battery pack voltage reaches a low level and the battery pack requires charging.

There are several chargers and charge rates available of charging the **PCS** battery packs. The battery pack may be charged while connected to the radio or removed for charging. For specific instructions, refer to the applicable charger Operator's Manual.

Figure 3 - Removing Battery Pack

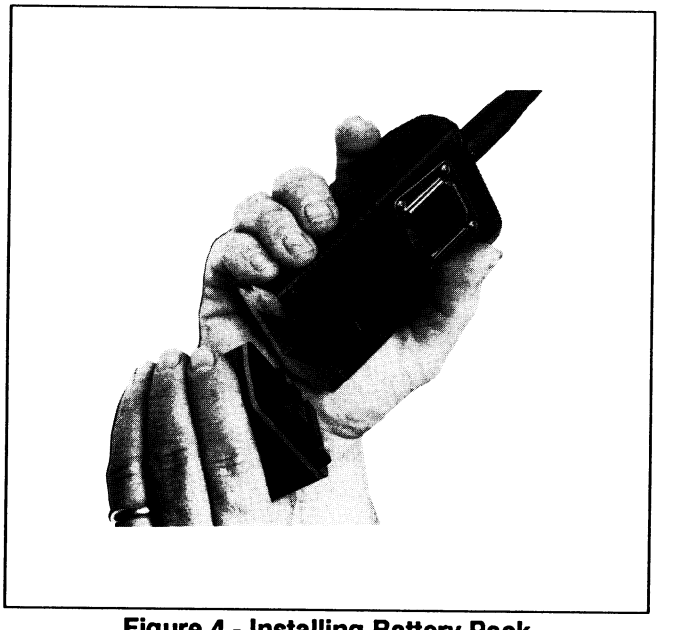


Figure 4 - Installing Battery Pack

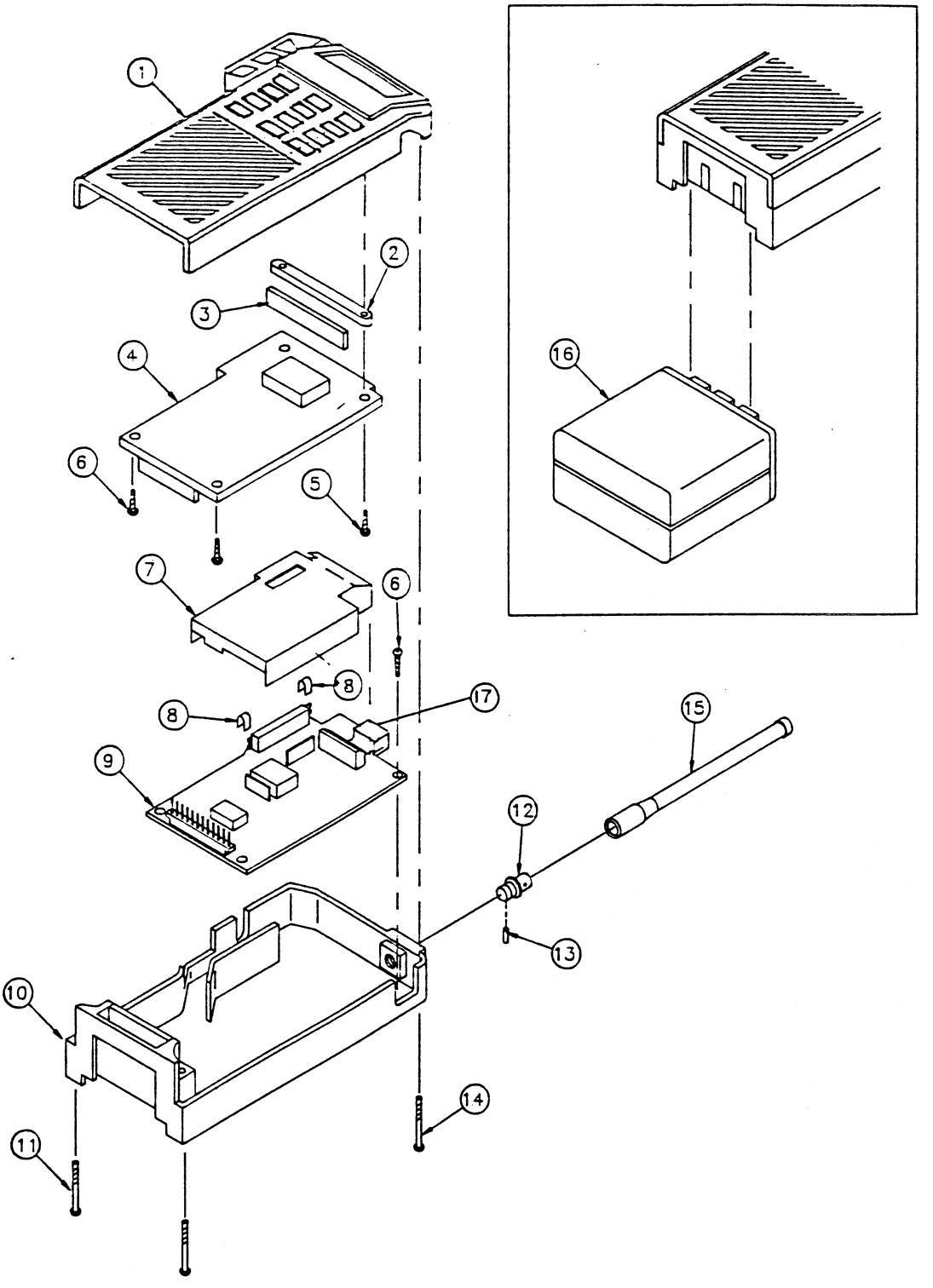
PARTS LIST

PCS MECHANICAL PARTS
(Refer to RC-8312)

LBI-31975

SYMBOL	GE PART NO.	DESCRIPTION
1	19D902180P2	Front Cap Assembly (A3).
2	19B801570P2	P901 Connector Holder.
3	19A705662P1	P901 Connector "MOE".
4	19D902142G3 19D902142G4	Audio/Logic Board, 2 Freq., (A2). Audio/Logic Board, 8 Freq., (A2).
5	19A702364P310	Machine screw: M3 - 0.5 x 10. (Quantity 2).
6	19A702364P304	Machine screw: M3 - 0.5 x 4. (Quantity 7).
7	19B801572G1	RF Shield.
8	19B801492P2	Power Module mounting clip. (Quantity 2).
9	19D438222G2	Transmit/Receive Board (A1).
10	19D902174G1	Rear Cover Assembly. (Includes items 12, 13, 14, 15.)
11	19A705732P333	Machine screw: M3 - 0.5 x 33. (Quantity 2).
12	12A702270P2	BNC Antenna Connector.
13	19A143453P1	Setscrew: #3 - 48 x .125 inch.
14	19A705732P329	Machine screw: M3 - 0.5 x 29. (Quantity 2).
15	19B801621P1,2	Antenna, Flex (UHF).
	19B801620P1-P3	Antenna, Helical (UHF).
16	19A705293P1-P3	Battery: 7.5V.
17	19B801671P1	Connector shield.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES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