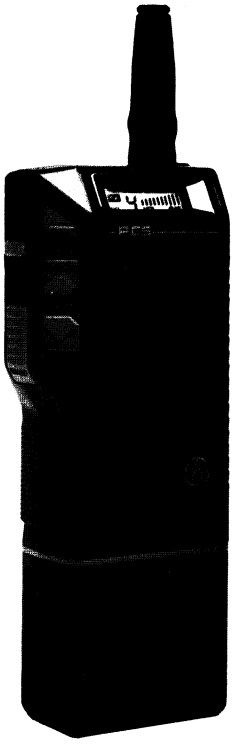
ERICSSON

Mobile Communications

PCS™ 403-470 MHz SYNTHESIZED PERSONAL RADIO



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Maintenance Manual

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SPECIFICATIONS

(Typical)

FCC FILING DATA

Frequency Range	403 - 470 MHz
RF Power Range	1 - 4 Watts
Transmitter/Receiver FCC Identifier	
403-440 MHz	AXA9MZ-PCSU1
440-470 MHz	AXA9MZ-PCSU2
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 Per)	
TX	Full Split
RX	20 MHz of Split
Frequency Stability	± 5 PPM

(continued)

SPECIFICATIONS (Cont.)

(Typical)

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)
Vibration	Meets EIA and U.S. Forest Service Specifications
Shock	1 meter drop test
Relative Humidity	90% @ 50°C
Altitude	15000 Feet
Construction	
Front	LEXAN®
Rear	Die-Cast Aluminum
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)	9.0 hours	13.0 hours

TRANSMIT CIRCUIT

Frequency Range	
Low Split	403 - 440 MHz
Mid Split	440 - 470 MHz
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)

(continued)

SPECIFICATIONS (Cont.)

(Typical)

FM Noise (companion receiver method)	-43 dB
Power Adjust Range	1 to 4 Watts
Distortion	5% (maximum)
Deviation Symmetry	0.1 kHz
RF Load Impedance	50 Ohms
Carrier Attack Time	35 milliseconds
Audio Attact Time	35 milliseconds
RECEIVER	
Frequency Range	
Low Split	20 MHz of 403 - 440 MHz
High Split	20 MHz of 440 - 470 MHz
Audio Output (EIA)	0.5 Watts (less than 5% distortion)
Sensitivity 12 dB SINAD (EIA)	-119 dBm (0.25 µVolts)
Selectivity (EIA 2-signal method)	-65 dB ±25 kHz
Spurious Response	-70 dB (Half IF Spurious -60 dB In Top 10 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 6 dB/octave de-emphasis curve from 300 to 3000 Hz (EIA).
RF Input Impedance	50 ohms
Receiver Attact Time	40 milliseconds (EIA)
Receiver Recovery Time	65 milliseconds (EIA)

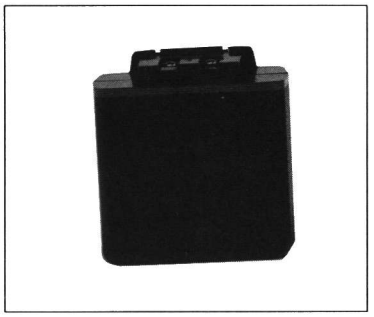
COMBINATION NOMENCLATURE

DIGITS 1&2	DIGIT 3	DIGITS 4&5	DIGIT 6	DIGIT 7&8	DIGIT A
Product Code	**Package**	**Frequency Range**	**Channel Spacing**	**Channels**	**Programming**
PC	**1** Standard	**U1** 403-440 MHz	**A** 25 KHz	**02** 2 Channels	**0** Customer Programmed
		U2 440-470 MHz		**08** 8 Channels	**1** Factory Programmed

OPTIONS AND ACCESSORIES

BATTERY PACKS

1200 mAh
(19A705293P1)PCPA1J

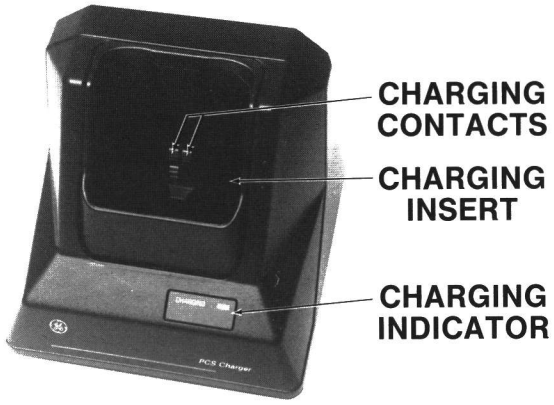


1700 mAh
(19A705293P2)PCPA1K

DESK CHARGERS

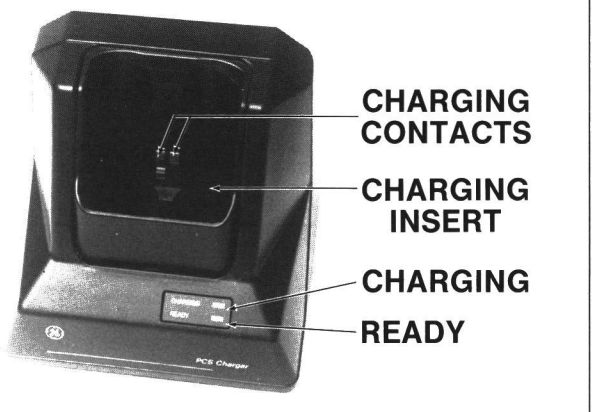
Standard
(19A705493P1 60 Hz)PCPS1E
(19A705493P3 50 Hz)PCPS1F

Sixteen Hour



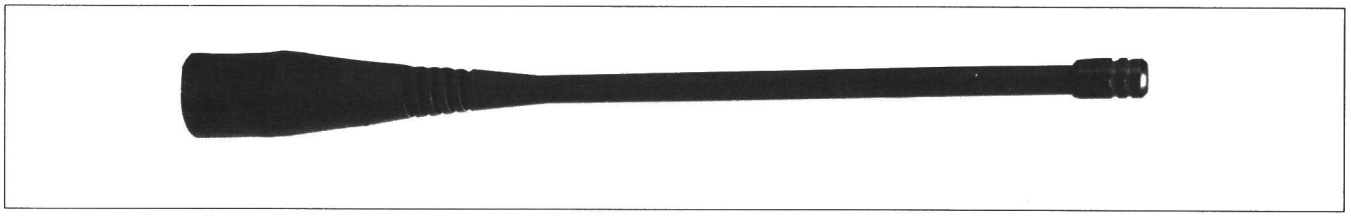
Rapid
(19A705493P2 60 Hz)PCPS1G
(19A705493P4 50 Hz)PCPS1H

One Hour



ANTENNA (Helical)
19B801620P1 (403-440 MHz)PCNC3C
19B801620P2 (440-470 MHz)PCNC3D

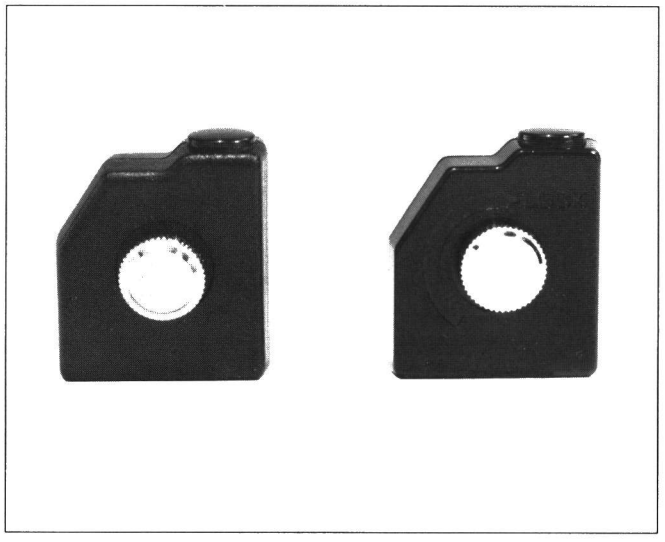
ANTENNA (Flexible Whip)
19B801621P1 (403-470 MHz)PCNC3A



EARPHONE
(4033570G6)PCZM1A, includes PCAC1C

SPEAKER MICROPHONE
(19A705581P1)PCAE1F

ACCESSORIES CONNECTOR
(19C851752P7)PCAC1C



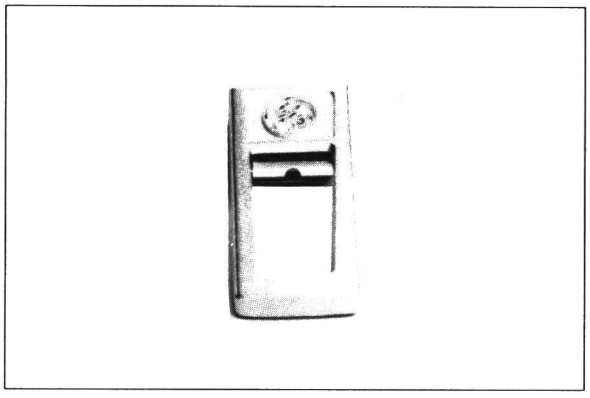
COMBINATION

OPTIONS AND ACCESSORIES

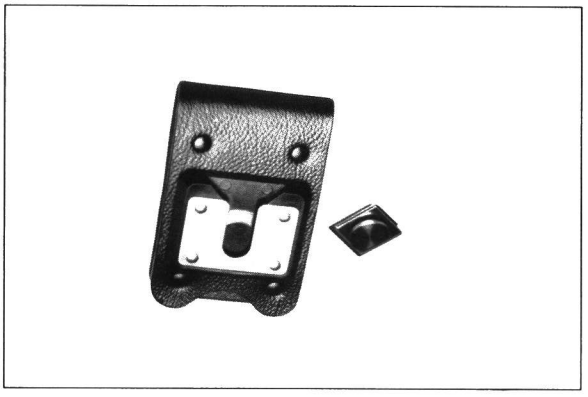
(Continued)

CARRYING ACCESSORIES

Belt Clip (PCHC1C)
(Option Package 19B233241G1)
(Modification Kit 19A144704G1)



Swivel Plate (PCHC1D)
(Belt Loop 19B226627G1)
(Swivel Option 19B233243G1)



CARRYING CASES

1200 mAh Battery Pack
Full Cover 19D902456P1 (PCHC1A)

1200 mAh Battery Pack
Retaining Strap 19D902456P2 (PCHC1B)

1700 mAh Battery Pack
Full Cover 19D902456P3 (PCHC3E)

1700 mAh Battery Pack
Retaining Strap 19D902456P4 (PCHC3F)

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DESCRIPTION

General Electric's **PCS™** Personal Radio, housed in an aluminum and Lexan case, is small, rugged and functional. The radio battery pack slides easily into place at the bottom of the radio and is securely latched in place. The radio antenna has a BNC base for rapid installation onto the radio BNC antenna connector. The antenna base is overmolded to fit flush against the housing and provide weather protection. Operator interface is achieved through a rubber keypad on the side of the radio. Channel status, volume level, along with a TX indicator, a low battery voltage indicator and a paging indicator are all displayed on a Liquid Crystal Display (**LCD**) which is visible from the front of the radio. The LCD is backlit for night viewing. All switches offer tactile feel and are provided with weather sealing. A rubber seal is placed around the LCD module, also for weather protection. The radio **ON/OFF** switch is located on the battery pack.

The **PCS** radio offers full performance over the 403 to 470 MHz UHF band with three frequency splits. The transmit circuit operates over the entire split bandwidth, while the receive circuit operates over 20 MHz of this split bandwidth. The radio is synthesized and is available in either a two channel or an eight channel version. All units are programmed using a personal computer and programming interface box connected to a User Device Connector (**UDC**), located on the side of the radio. The UDC is covered with a rubber boot for weather protection. Both tone and digital Channel Guard may be programmed on a channel to channel basis. Squelch Tail Elimination (**STE**) can be programmed if desired. Type 99 Tone signaling can also be decoded by the **PCS** radio again on a channel to channel basis. The transmit power level may be programmed for HI/LOW power on each channel. The high power level is factory set to 4 watts and the low setting is factory set at 2 watts. When the battery is low, a **BAT** flag is displayed on the LCD. When the battery is sufficiently low to cause improper operation, the radio microprocessor terminates all operation. Radio turn on always returns to the last channel used and volume setting.

The **PCS** personal radio consists of an RF board mounted in the **REAR ASSEMBLY** and a control frame assembly and audio logic board mounted in the **FRONT 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, located on the audio logic board, generates and decodes all tones used in tone signaling. The control frame assembly resides in the radio front cover and performs several system functions. The control frame is in effect a three dimensional printed circuit board which provides the following functions:

- Interfaces with the audio logic board
- Provides connection to the microphone and speaker
- Houses the channel up, volume up, volume down, monitor and PTT switches
- Provides a User Device Connector (**UDC**) to the outside of the radio for external options and customer programming
- Houses the LCD module for status display.

Refer to the Interconnection Diagram (19D438710) in the Service Section (LBI-38279) for all circuit board and control frame connections.

STANDARD FEATURES

The **PCS** UHF personal radio has standard feature as follows:

Frequency Range

403 - 440 MHz
440 - 470 MHz

Frequency Capacity

2 Channel Model	8 Channel Model
1 to 2 receive Channels	1 to 8 Receive Channels
1 to 2 transmit Channels	1 to 8 Transmit Channels

Channel Guard

CTCSS Encode and Decode
DCG Encode and Decode
Each Channel can have its own set of Channel Guard Tones or codes (See Table 1 for Standard Channel Guard Tone Frequencies and Digital Codes)

Squelch Tail Elimination

Programmable on channel to channel basis

Carrier Control Timer

Programmable from 15 to 225 seconds in 15 second increments or CCT disabled.

COMBINATION

Power Level

Programmable on channel to channel basis for **LOW** or **HIGH** transmit power.

Radio Memory

The radio status such as the last volume level and channel selected 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

Control function can be programmed in one of two modes:

Mode 1 - This is the normal control function mode. In this mode, volume level is incremented by pushing the **VOL UP** button and decremented by pushing the **VOL DOWN** button. Changing the volume level while the radio is squelched will cause the radio to beep, if enabled, at the new selected volume level. No beep is sounded when the radio is already unsquelched. There are eight (8) levels of volume and each bar represents one level.

A Channel is selected by pushing the **CHANNEL UP** button. A short beep, if enabled, is sounded at every channel change.

Mode 2 - In this mode, a two (2) key stroke operation is required to change the channel. First, press the **CHANNEL UP** button. This key stroke enables the **CHANNEL CHANGE** mode and is indicated by a flashing channel indicator. Second, while the channel indicator is flashing, press **VOL UP** or **VOL DOWN** to increment channel or decrement the channel respectively. Press the **CHANNEL UP** button again to disable the **CHANNEL CHANGE** mode and stop the channel indicator flashing. Unless the **CHANNEL CHANGE** mode is disabled manually as described above, the **CHANNEL CHANGE** mode is disabled automatically at the end of a 30 second period.

The volume level is changed by pressing **VOL UP** or **VOL DOWN** only when the channel indicator is not flashing.

MONITOR and PTT switches operate identically in both modes.

Display Indicator

Liquid Crystal Display

Mode	Active Pixel
Receive	Channel Digit (1 to 8) **VOL** (8 bars indicate volume level) **PG** (if T99 is enabled) **BAT**
Transmit	**TX** Channel Digit (1 to 8) **BAT**

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 pixels are turned on during the three beeps. A bad self-check function will keep all displays pixels on and no beep is sounded.

The **BAT** pixel 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 voltage goes back above the low level due to charging of the battery pack or connection of a fresh battery pack.

When the battery voltage level goes low while transmitting, **BAT** will be displayed and continue 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 allows

at least one hour of operation. However, the radio will continue to operate at reduced power levels below 5.8 volts. If the voltage becomes too low for locking of the synthesizer, an audio alert will sound, if enabled, flashing **BAT** and transit operation will be disabled. Below 5 volts, radio operation is completely disabled to prevent corruption of the radio personality.

Simultaneous flashing of **BAT** and alert beeps, if enabled, is an indication that the radio has failed to lock on frequency. Transmission is terminated at this time, should failure to lock on frequency happen while in the transmit mode.

LCD backlighting is turned on every time a control button is pushed (channel up, 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.

Two Tone (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.

Detailed Type 99 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 shown 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 tones 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 radio in 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:

GENERAL ELECTRIC FORMAT

INDIVIDUAL CALL FORMAT

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

GROUP CALL FORMAT

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

SUPER GROUP CALL FORMAT

<·····1.0 SEC·····> ± 20%	<·····200 MS·····> ± 25%	<·····1.0 SEC·····> +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 fine **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.

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.

TABLE 1 - 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 - 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
DIGITAL TONE		742.5 Hz

The Motorola tone format is illustrated as follows:

INDIVIDUAL CALL FORMAT

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

GROUP CALL FORMAT

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

QUICK CALL FORMAT

<.....1.0 SEC.....>
TONE B

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

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 TONE FREQUENCIES AND GROUPS

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

Radio Programmer

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** radio. 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**).

CHANNEL GUARD 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	100.9	156.7	
82.5	144.8	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	

CHANNEL GUARD
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, 553	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		

OPERATION

The General Electric **PCS** Personal Radio is designed to provide personal communications in a lightweight, handheld unit. There are two versions available, a two channel and an eight channel. Both version operate identically. Each radio is equipped with a User Device Connector (**UDC**) to allow connection of external audio devices and programming of radio information through a personal computer and PC programming Software (refer to Figure 1).

Each communications channel may be programmed for tone or digital Channel Guard Encode/Decode operation, type 99 Tone Decode operation, high/low power and squelch tail elimination. Carrier Control Timer, display backlighting and alert beep option are programmed on a radio to radio basis to meet each individual radio environment.

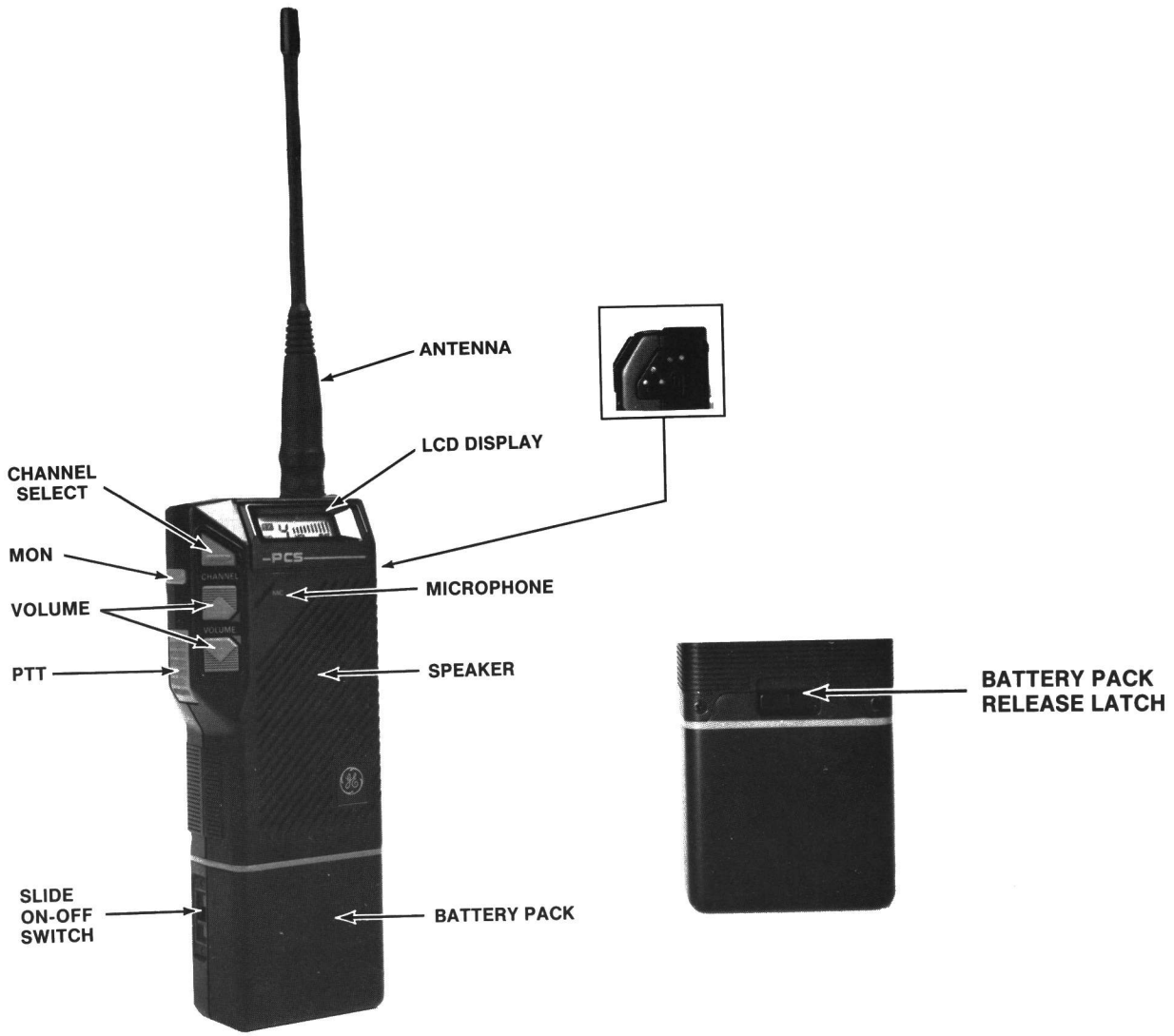


Figure 1 - PCS Personal Radio Operating Controls

CONTROLS AND INDICATORS

ON/OFF — The **ON/OFF** slide switch located 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 Liquid Crystal Display (**LCD**) window, indicating power is applied. **BE SURE** the power switch is fully **ON** or fully **OFF**.

MON — The receiver is unsquelched by pressing and holding the **MON** button. 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 on the communication channel displayed.

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

MODE 1 (This is the normal control function)

CHANNEL UP — Selects the transmit/receive channel. Communication 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 displayed in the LCD display.

VOLUME ▲ ▼ — Sets receive audio to the desired level while pressing the **VOLUME** Up ▲ 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 can be selected when extreme care in channel selection is desired.

CHANNEL UP — When the normal control function is **NOT** programmed, pressing the **CHANNEL UP** button only enables the channel change mode. This is indicated by the flashing channel indicator in the LCD display.

VOLUME ▲ ▼ — While the channel indicator is flashing, press the **VOLUME** Up ▲ button to increment the channel or press the **VOLUME** Down ▼ button to deincrement the channel. When the desired channel has been selected, press the **CHANNEL** button again to disable the channel change mode. The channel indicator will stop flashing and **VOLUME** Up ▲ 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 indicates the channel, volume level, battery condition, Type 99 tone status and transmit indicator (refer to 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.

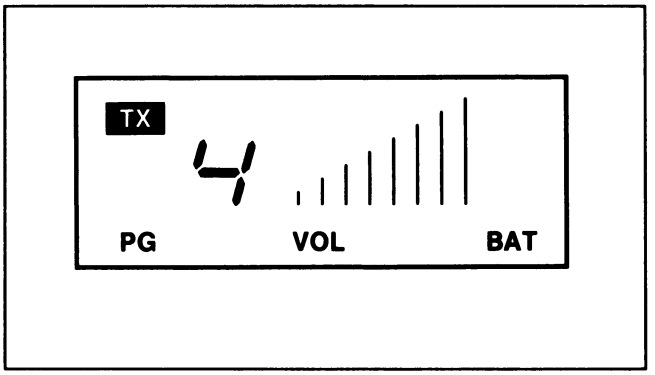


Figure 2 - Liquid Crystal Display

TX Indicates transmit mode when the PTT button is pressed.

VOL Indicates level setting 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

Radio/Channel Failure Simultaneous flashing of **BAT** in LCD 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. You may select another channel, charge the battery pack or have the unit repaired.

SELF-CHECK Each time the radio is powered on, there is a self-check function performed. 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 pixels are on during the three beeps. If the self-check fails there won't be any beeps.

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 ^ or **VOLUME** Down v button while listening to the beeps (if this feature is programmed) or watching the LCD display for the volume level indicators (eight bar lines) to select the desired listening level.

3. Press the **CHANNEL UP** button to select the operating communication channel.

4. The **PCS** radio is now ready to receive messages.

TYPE 99 TONE

NOTE

Only those channels programmed to decode Type 99 tones may be used to receive your personal messages. When receiving a message, you'll first hear a tone and then the radio will unsquelch for the message.

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

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

   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 to 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 indicating 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. The radio may be placed back into the Type 99 paging mode by pressing the **MONitor** button.

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 **MON**itor 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 you stop talking. 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. The first time you press the PTT switch takes the radio out of the paging mode. The second time you press the PTT switch, is for normal PTT operation. Remember - a flashing **PG** flag in the LCD and radio beeps occur on the first press of the PTT switch.

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.

Figure 3 - Removing Battery Pack

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.

Figure 4 - Installing Battery Pack

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.

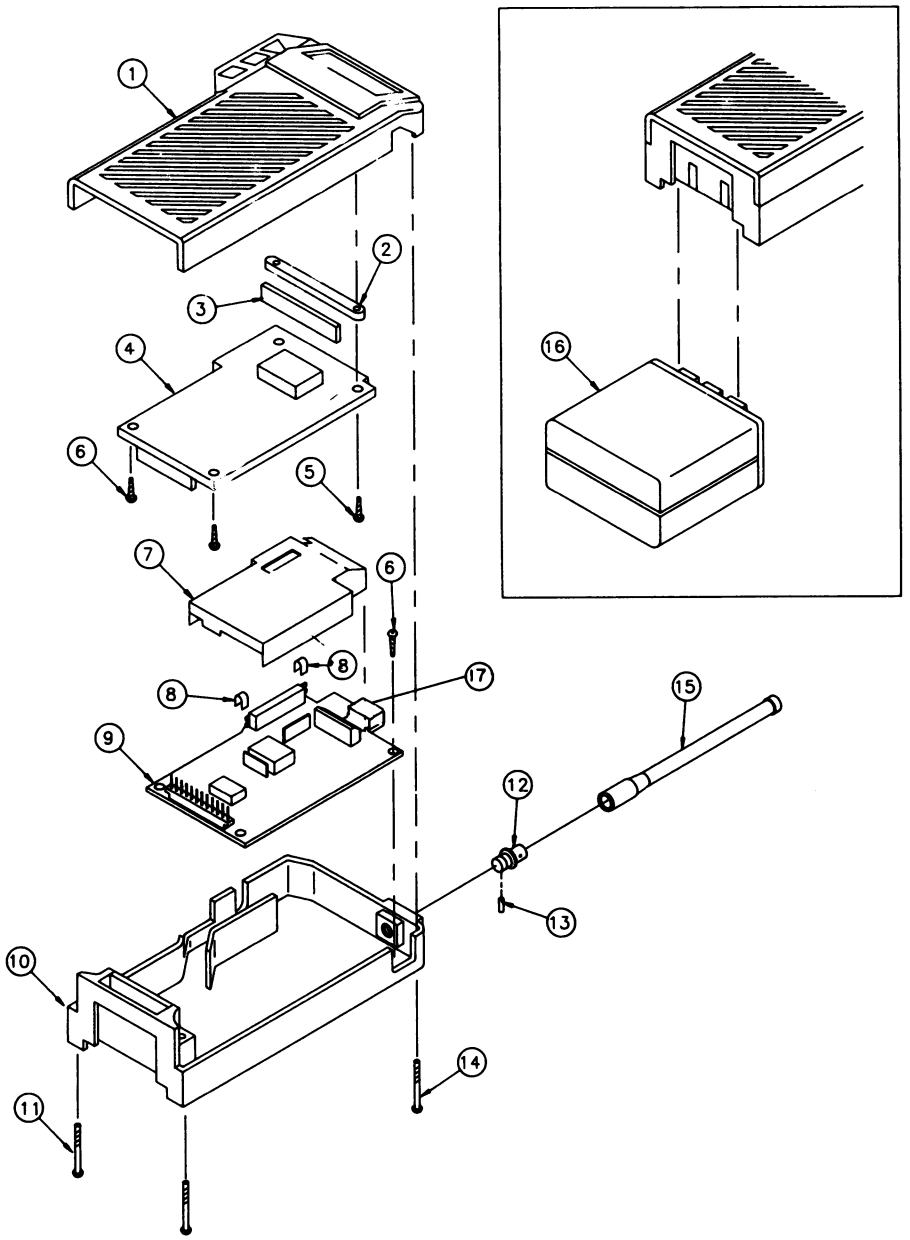
There are several chargers and charge rates available of charging the **PCS** battery packs. The battery pack may be charged while connected to the radio or removed for charging. For specific instructions, refer to the applicable charger Operator's Manual.

PARTS LIST

PCS MECHANICAL PARTS
(Refer to RC-7359)
LBI-38352A

SYMBOL	GE PART NO.	DESCRIPTION
1	19D902180P1	Front Cap Assembly (A3).
2	19B801570P2	P901 Connector Holder.
3	19A705662P1	P901 Connector "MOE".
4	19D902142	Audio/Logic Board (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	19D438262	Transmit/Receive Board (A1).
10	19D902174G1	Rear Cover Assembly. (Includes items 12 & 13).
11	19A705732P333	Machine screw: M3 - 0.5 x 33. (Quantity 2).
12	19A702270P2	BNC Antenna Connector.
13	19A143453P1	Setscrew: #3 - 48 x .125 inch.
14	19A705732P329	Machine screw: M3 - 0.5 x 29. (Quantity 2).
15	19B801620P10	Antenna (VHF).
	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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