AZDEN

JAPAN PIEZO CO., LTD

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PRINTED IN JAPAN
JAN. '82

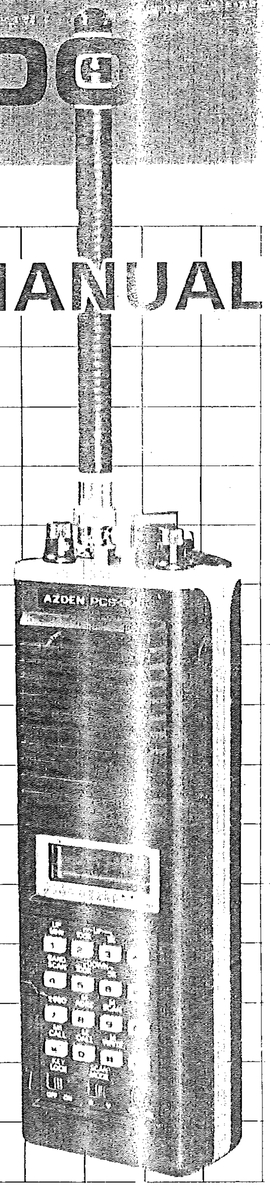
AZDEN

2m FM HANDHELD TRANSCEIVER

PCS-300

10.7

INSTRUCTION MANUAL



JAPAN PIEZO CO., LTD

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This manual was prepared mainly for U.S.A. model.

INTRODUCTION

The AZDEN PCS—300 is new microcomputer-controlled 2-meter FM handheld transceiver. This unit features wide frequency coverage (142.000-149.995 MHz), 8-channel memory with scan, programmable band scan, standard repeater offsets, programmable non-standard offset, and LCD display with S/RF meter.

The PCS—300 has been carefully engineered and manufactured under rigid quality control, so that it will give you, the owner of our newest product, satisfactory and dependable service for many years. Before attempting to operate this transceiver, please read this manual carefully. This will allow you to use all the features to your best advantage.

★UNPACKING

Unpack your PCS—300 carefully and make sure it is supplied with the standard accessories listed below:

Flexible Rubber Antenna With BNC Connector
Nickel-Cadmium Battery Pack (500 mAh, 9.6V)—(BP-500F)
AC Battery Charger —(BC-1)
Charging Stand
Ear phone —(EPH-10)
Belt Hanger
Instruction Manual

Save the carton and packing material. It has been designed for optimum protection of your radio should you need to ship it for any reason.

★ CAUTION

◉DO NOT TRANSMIT WITH THE ANTENNA HELD IN YOUR HAND, TWISTED OR BENT. THIS WILL ENSURE THAT THE ANTENNA IS PROPERLY MATCHED.

◉DO NOT TURN THE POWER ON AND OFF TOO RAPIDLY. Leave the unit on or off for at least 2 seconds.

◉BE SURE TO RECHARGE THE BATTERY PACK WHEN THE FREQUENCY DISPLAY ON THE LCD PANEL BEGINS TO FLASH.

◉DO NOT CONNECT AN EXTERNAL DC POWER SUPPLY OF ANY KIND TO THE CHARGE TERMINAL ON THE PCS—300. Use only the charger unit supplied. Failure to observe this may damage your transceiver.

SPECIFICATIONS

GENERAL

• Semi conductors:	Transistors 36 FETs 6 ICs 10 Diode 49
• Display:	LCD (Liguid Crystal Display)
• Frequency Range:	142.000 to 149.995 MHz
• Frequency Synthesizer:	Digital control of Phase locked VCO
• Mode:	FM
• Channels:	1600
• Memory Channels:	8
• Operating Temperature Range:	−10°C to +50°C
• Power Supply Voltage:	9.6VDC ±15%
• Grounding:	Negative grounding
• Antenna Impedance:	50 ohms
• DC Current Consumption:	Approx. 40 mA in receive with no input signal Approx. 800 mA in transmit(at 3.0W RF output) Approx. 400 mA in transmit(at 1.0W RF output) Approx. 0.01 mA in memory backup(with power switch off)
• Dimensions:	184(H) x 65(W) x 44(D)mm (except projections)
• Weight:	640 grs

TRANSMITTER SECTION

• RF Output Power:	3.0W (High), 1.0W (Low) (144–148MHz)
• Modulation Method:	Variable reactance frequency modulation
• Max, Frequency Deviation:	±5 KHz
• Spurious Radiation:	Better than −60dB
• Offset:	±600 KHz & programmable
• Touch tone:	Built in
• Priority CH:	Memory 1
• Microphone:	Condensor microphone

RECEIVER SECTION

• Receiving System:	Double superheterodyne
• Intermediate Frequency:	1st IF: 10.7 MHz, 2nd IF: 455 KHz
• Sensitivity:	Better than 0.2uV for 12dB SINAD(144–148MHz)
• Squelch Sensitivity:	Less than 0.15uV
• Selectivity:	More than ±6 KHz at 6dB down
• Audio Output:	More than 200mW(8 ohm load and 10% distortion)

NOTICE : Specifications are subject to change without notice for further technical improvement.

MAJOR FEATURES

★ CMOS Microcomputer Control
The built-in microcomputer controls all frequency and scanning operations. Scanning may be carried out in "busy" and "vacant" modes. Once stored in memory, a frequency is retained even if the power is turned off. A NICAD battery is used for power and memory backup.

★ Actual Frequency is Always Displayed
While transmitting, transmitting frequency is shown. While receiving, receiving frequency is shown. This is true regardless of the offset being used.

★ Eight Memory Channels
Any eight frequencies within the transceiver range may be stored. Erasing and rewriting is easily performed.

★ All Digital Display
The digital display prevents reading errors. The S/RF meter is digital, indicating signal strength and relative output power from zero to 8 units. Repeater offset status and memory address information are also shown on the digital display.

★ Programmable Band Scan
The lower and upper limits of the band scan range can be set as desired; this avoids scanning of unwanted frequencies while still allowing optimum coverage of the band.

★ Keyboard Actuation Tone
An electronically synthesized tone indicates data entry into the microcomputer.

★ LCD Display
The built-in liquid-crystal display (LCD) facilitates easy reading in direct sunlight; a switchable lamp allows reading in total darkness. The LCD requires essentially no current to operate, putting minimal drain on the battery.

★ Touch-Tone Pad Built In
The 16-button keyboard functions as a full 16-button autopatch system while transmitting.

PREPARATION FOR USE

Battery

The battery pack, provided as a standard accessory, is fully charged when it leaves the factory. However, it should be recharged for about three hours or more before use, since it may have partly discharged in shipping.

1. Battery Loading (See Figs. 1,2): Push down the grooved tab marked "Open V" with your finger tip to remove the battery case. Be sure the power switch is in the OFF position. Load the battery pack as illustrated. Handle the leads and connector carefully. Be sure to observe the proper polarity. Do not force the battery plug into its socket.

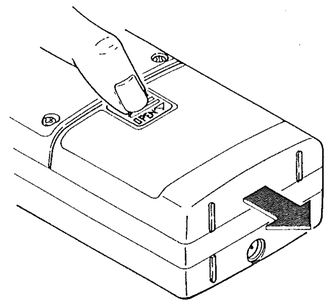


Fig.1 Opening the lid

2. Microcomputer Reset Switch (See Fig. 2): The reset switch is provided inside the battery case. After loading the battery pack, be sure to turn the switch ON as illustrated. When it is placed in the RESET position,the LCD display should show"5.000." When closing the battery case, be sure the battery leads are not pinched.

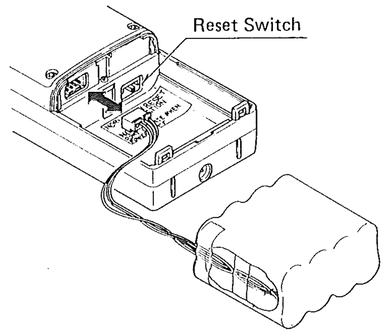
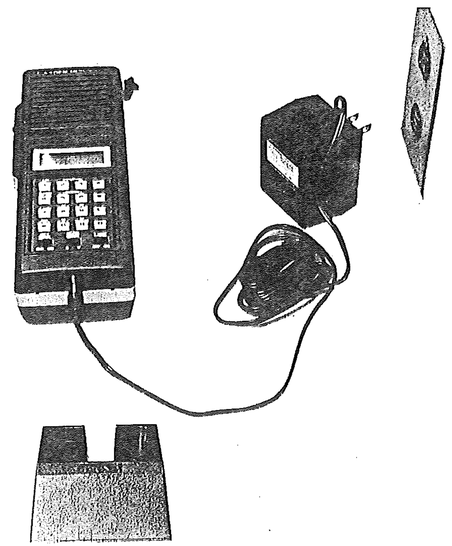


Fig.2 Loading the Battery pack

3. Charging: The LCD frequency display will flash on and off when the battery needs recharging. Do not operate the unit when the display is flashing. Use the AC charger supplied. The battery pack may also be charged using the BC-1 or MC-1 optional accessories. Do not use any charging device except those designed specifically for the PCS-300.



NICAD BATTERY PACK

The general characteristics of the NICAD battery pack supplied with your transceiver and proper handling precautions, are as follows.

1. Charging current: The battery is a 500AF type, which can handle a large charging current of 150 mA. It is not recommended that you use a battery pack other than the one designed for this transceiver. However, if this becomes necessary for emergency reasons, be sure to check the charging current of the battery used. The battery should be 500 mAh capacity, 9.6V.

2. Continuous Charge: The battery can be fully charged in six hours at 150 mA. If another battery must be used, be sure to note its charging time.

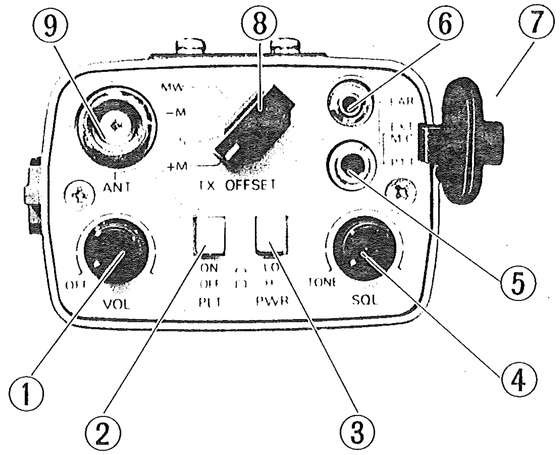
3. Charging Temperature: When charging the NICAD battery, recommended temperature range is +10 to +35 degrees C (+50 to +95 degrees F). Charging will not be possible at temperatures lower than 0 degrees C (+32 degrees F) or higher than +45 degrees C (+113 degrees F).

4. Overdischarge: Running the battery after it is discharged to the point where the display flashes may reduce battery life or cause the fluid to leak. If the battery is not to be used for a long period of time, remove it from the PCS-300 to avoid possible damage to the transceiver from leaking fluid.

5. Life Expectancy: The battery should last for more than 300 charging cycles when properly used. It has a natural life of three to five years.

6. Special Precautions:
   (a) Be sure to use only the charger unit supplied.
   (b) Be certain the polarity is correct while charging.
   (c) Do not solder anything directly to the battery.
   (d) Do not dispose of the battery in fire.

OPERATING CONTROLS AND FUNCTIONS



(1) Power Switch / Volume Control:
When this switch is fully counterclockwise, the power is off. Rotating the switch clockwise will turn the power on; further clockwise rotation will turn up the volume. Avoid switching the power on and off too quickly. Leave the unit in either the on or off condition for at least two seconds.
More rapid switching may cause false readings on the display. If this happens, push any one of the tuning keys to obtain the correct readout.

(2) PL Tone Switch: This switch controls the tone (PT-67 optional accessory) when installed.

(3) HI/LO Power Switch: This switch selects transmitter output of either 3.0 watts or 1 watt.

(4) Squelch Control Switch: This control is used to eliminate receiver hiss when no signal is being received. Turn this knob clockwise until the receiver noise just disappears; then turn it slightly further. Leave the control set at this position for normal use. If the squelch control is turned still further clockwise, stronger and stronger signals will be required to open the squelch and allow reception.
When this switch is set to the "TONE" position (with the knob fully counterclockwise), the squelch will open only for signals accompanied by a certain designated subaudible tone frequency, using an optional tone squelch unit (PT-67).

(5) External Microphone with PTT Jack: Plugging the optional external speaker / microphone into this jack will cause the internal PTT control, microphone and speaker to be disconnected. Only the external speaker / microphone will operate.

(6) Earphone Jack: Inserting a supplied earphone into this jack will disconnect the internal speaker, making reception possible only via the earphone.
Note: You cannot use both the external speaker / microphone and an external earphone at the same time.

(7) Dust Cover: The dust cover cap protects the external speaker / microphone jack and the external earphone jack from dust when they are not in use.

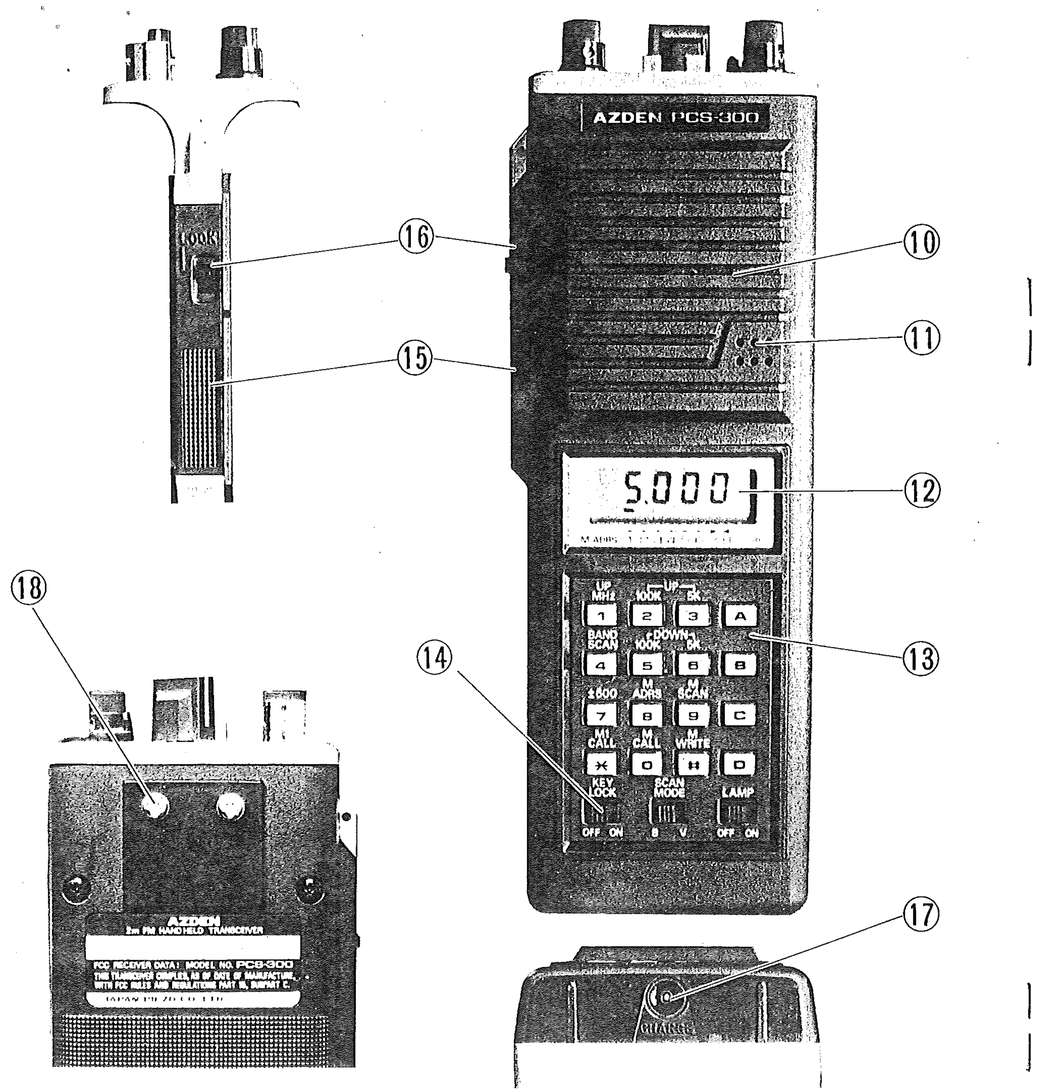
(8) TX-Offset Switch: This switch has four positions: "MW" (memory write), "+M" (plus offset), "–M" (minus offset) and "S" (simplex). The purpose of the TX-Offset switch is to allow programming and use of non-standard offset frequencies, such as may be required for CAP and MARS operation.
The TX-Offset switch incorporates its own memory channel, independent of the eight regular channels. We refer to this as **Memory 0**. It stores an offset value which may be as small as zero or as large as 7.995 MHz. Instructions for programming and using non-standard offsets are detailed in the OPERATION section of this manual. (See page 12)

(9) Antenna Connector: This is a BNC type connector. Use the "rubber duck" antenna (standard accessory) or any other antenna with the proper connector. Do not force the connector into the socket.
A different antenna, if used, should be checked for proper impedance match (50 ohms resistive). Improper imperdance may lead to reduction in effective communication range, reduction in NICAD battery and possible spurious emission.

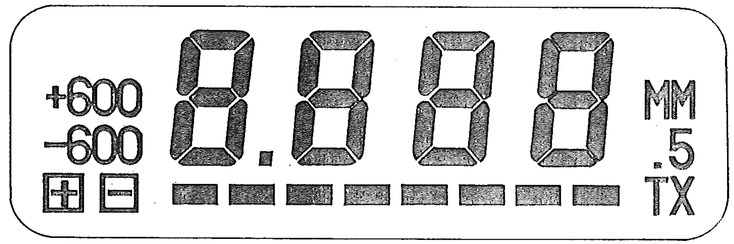
Do not transmit with the antenna twisted or held in your hand, as this will affect its impedance.

(10) Internal Speaker: A miniature, high-performance speaker is built in. The internal speaker is disconnected when an external speaker / microphone or external earphone are used.

(11) Internal Microphone: A miniature, highly sensitive condenser (electret) type microphone is built in. This microphone is disconnected when an external speaker / microphone is used.



(12) **LCD (Liquid-Crystal Display) Panel:** The LCD panel is provided with not only the frequency display, but many other indicators as shown below.



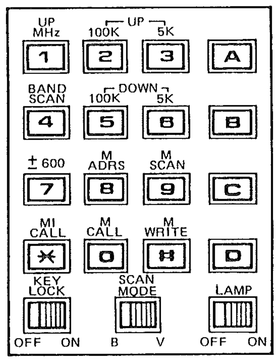
(a) Frequency display indicates the lower four digits of the operating frequency (for example, "6.520" indicates 146.520 MHz). This display follows along with the transmitting frequency when an offset is used. An incandescent lamp facilitates reading the display in darkness.
(b) The "+600" and "–600" indicators show when a standard offset is in use. If an offset would cause out-of-band transmission, the PCS-300 reverts to simplex mode even when the offsets are activated. See the OPERATION section of this manual for details.
(c) "+" and "–" indicators are activated in conjunction with the use of non-standard offsets.
(d) "MM" indicator is activated when the radio is in the memory mode.
(e) "S/RF" indicator shows relative signal strength when receiving and relative output when transmitting. With a properly matched antenna, 3.0 watts output will cause all eight of the bars to appear.
(f) "M ADRS" indicator is provided by the same eight LCD bars as the S/RF indicator. When transmitting, the memory channel being used is indicated by flashing of the corresponding memory address bar. This also occurs when receiving a strong signal.
(g) "5" indicator is activated when the radio is European version.

(13) **Keyboard:** The keyboard is used to select operating frequency, memory mode and scanning functions. It also serves as an autopatch keyboard during transmission periods. Refer to the OPERATION section of this manual for details.
(14) **Key Lock Switch:** Move this lever toward the right to prevent accidental unwanted change to the frequency adjustment. Use this feature when carrying the transceiver.
(15) **Push-To-Talk (PTT) Switch:** Pushing this lever puts the PCS-300 into the transmit mode.
(16) **PTT Lock Switch:** Place this switch to LOCK and the transceiver will not transmit. Use this feature when carrying the transceiver.
(17) **Charging Terminal:** This terminal is used for connecting the battery charger to the PCS-300 for NICAD battery charging.
(18) **Belt Hanger:** This is used for mounting the supplied belt hanger.

OPERATION

I. Details of Keyboard Operation

The PCS-300 employs a 16-button keyboard, which performs all microcomputer control functions. The transceiver produces an electronic sound with each key operation to inform you that the microcomputer has received the command. (This function is disabled in transmit mode, when the keyboard operates as a Touch-Tone pad.)



1. 5K UP and 5K DOWN Keys: Pushing these keys increments the frequency up or down by 5 kHz. These keys do not, however, change the MHz figure. By holding either of these keys down for more than 1/2 second, the frequency will move upward or downward continuously at the rate of eight channels per second. As the desired frequency is approached, release this key. Then, actuate it two or three times as necessary to reach the desired frequency.

2. 100K UP and 100K DOWN Keys: When these keys are pressed, the frequency is moved up or down by 100 kHz. These keys do not affect the MHz digit. For example, if the frequency is 145.800 MHz and the 100K UP key is actuated three times, the new frequency will be 145.100 MHz.

3. MHz UP Key: This key increments the MHz digit upward from 2 to 9. The 100 kHz and 5 kHz digits do not change.

4. ±600 Key: this key chooses the offset of +600 kHz, –600 kHz or simplex, by repeated actuations. The offset in use is shown on the LCD panel.

5. BAND SCAN Key: This key initiates scanning in 5-kHz steps between two preprogrammed limit frequencies. The lower limit frequency is the channel in memory 7, and the upper limit is the channel in memory 8.

6. M ADRS Key: This key steps the memory address from channel 1 to channel 8.

7. M CALL Key: This key calls the contents of the memory channel indicated by the memory address bar display.

8. M1 CALL Key: This key calls the contents of memory channel 1, regardless of the frequency or memory address in use.

9. M WRITE Key: This key writes the frequency shown on the LCD panel into the memory channel indicated by the memory address bar.

10.M SCAN Key: This key actuates scanning of the eight memory channels.

11.Autopatch Operation: When the PTT lever is depressed, the keyboard becomes a 16-key autopatch pad. Note: Do not speak into the microphone when using the autopatch function.

II. Using the Memory.

1. Writing in Memory: The PCS-300 has eight memory channels, M1 through M8. The M WRITE and M ADRS keys are used to store memory. The offset (+600, –600 or simplex) is stored, as well as the frequency shown on the display.To put 145.560 with +600 offset in M4, for example, first press M ADRS repeatedly until the LCD bar lines up with M4. Then dial the desired frequency using the MHz UP, 100K UP/DOWN and 5K UP/DOWN keys. Press the ±600 key to obtain an offset of +600 kHz. Finally, press M WRITE.

2. Scanning memory: In order to scan the memory channels, press M SCAN. The PCS-300 will then scan through channels M1 to M8 over and over. Scanning may be done in either the "busy" or "vacant" modes; see the section **Other Controls** for details.

3. Calling memory: To call the contents of any memory channel, first press M CALL. Then press M ADRS until the memory address bar lines up with the desired memory channel. To call M6, for example, press M CALL and then press M ADRS until you reach M6. Note that as the memory address changes, each memory is recalled in turn.

4. Calling M1: Simply press M1 CALL at any time while receiving .

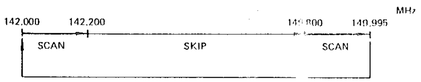
III. Scanning the Band

1. The PCS-300 has a programmable band-scan feature which allows you to scan continuously over any predetermined part of the range 142.000 to 149.995 MHz. Program the lower limit frequency into memory channel 7 and the upper limit frequency into memory channel 8. For example, suppose you wish to scan the range 146.520 to 147.000 MHz. Simply put 146.520 into M7 and 147.000 into M8.

2. Suppose M7 contains the frequency 149.800 and M8 contains 142.200 (thus the frequency in M7 is higher than that in M8). Then scanning will occur as shown below.

Example

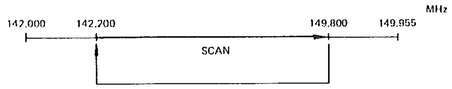
M7>M8



3. Suppose M7 stores 142.200 and M8 stores 149.800. Then band scanning is carried out as shown below.

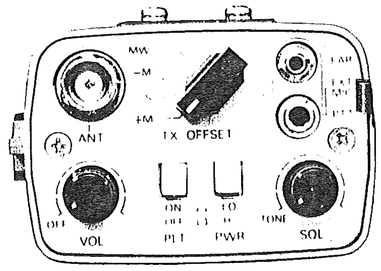
Example

M7<M8



4. If the microcomputer is reset (see page 4), all the stored memories will be erased. In this case, M7 will automatically be programmed with 145.000, and M8 will be programmed with 145.990. For different limits, it will be necessary to reprogram these channels.

IV. Other Controls



1. TX-Offset Switch: This switch provides for the use of non-standard offsets. The offset is stored in a channel which we shall refer to as **Memory 0** (M0). To use this switch:

(a) First, you must know the value of the offset you need. Suppose you wish to operate 143.900 MHz transmit and 148.150 MHz receive. Your split is –4.250 MHz.

(b) Store this offset in M0 by setting the TX-Offset switch to "MW" and using the keyboard to dial up the digits "4.250." M0 now contains the offset information needed to produce a split of either +4.250 MHz or –4.250 MHz.

(c) Set the switch to the "–M" position to provide the desired offset –4.250 MHz. Dial up the appropriate receiving frequency (in this case 148.150 MHz) on the display. You can now operate 143.900 TX, 148.150 RX.

(d) To reverse the split, set the switch to "+M" and dial up 143.900 on the display. You are now on 148.150 TX, 143.900 RX.

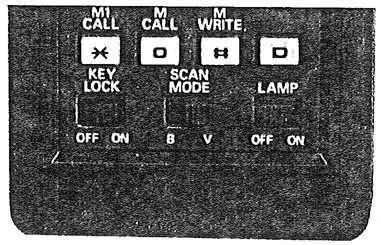
(e) Setting the switch to "S" will result in simplex operation on the frequency indicated by the display.

(f) If the programmed offset would cause out-of-band transmission -- that is, below 142.000 MHz or above 149.995 MHz -- then the PCS-300 will revert to simplex, even if the offset is actuated.

(g) For convenience, indicators on the LCD panel show whether you are in "+M" or "–M" position.

(h) Do not try to use the standard +600 or –600 splits in conjunction with non-standard splits. Use one or the other at a time.

2. Scan Mode Switch: Scanning is carried out at a rate of four channels per second, whether you are scanning the band or the memory channels. Scanning is possible in either of two modes: "busy" or "vacant."



(a) In busy mode, the PCS-300 skips over vacant channels with the squelch closed. When a busy frequency is encountered, it will stop for 5 seconds and then continue. If you do not want it to continue after the five-second delay, press 100K UP, 100K DOWN, 5K UP, or 5K DOWN, and it will stay on frequency.
Note: With the squelch open, the PCS-300 will treat every channel as a busy one, and will not scan at all in busy mode.

(b) In vacant mode the PCS-300 skips over all busy channels and stops at the first empty one. It will remain there until either a signal appears, or scanning is resumed by pressing BAND SCAN or M SCAN.
Note: With the squelch open, the PCS-300 will scan continuously whether there are signals or not.

3. F Lock Switch: With this switch on, the displayed frequency will not change when the keyboard is actuated. This feature is convenient when carrying the unit, to prevent accidental undesired frequency changes.

4. Lamp Switch: This switch controls the lamp on the LCD panel for operation in darkness. If this switch is left on for more than 20 seconds, a timer shuts the lamp off to avoid excessive battery drain. Do not use the lamp unnecessarily, since this will accelerate the discharging process.

SERVICE

Your PCS-300 is built to withstand the severe conditions normally encountered in portable operation. However, if your transceiver should ever require servicing, pack it in its original box and packaging material.
When returning a unit for repair, be sure to include a note stating the nature of the problem in as much detail as possible. When claiming warranty service, please include a photocopy of the bill of sale, or other proof of purchase showing the date of sale.
You need not return accessory items unless they are directly related to the sevice problem.

IMPORTANT

OPTIONAL ACCESSORIES

★ External Speaker/Microphone SDX-316
This is quite handy when you have the PCS-300 fastened to your belt.

★ Mobile Charger MC-1
This battery charger allows you to charge your PCS-300 battery from the 12 V dc supply of your car. Charging can be done safely while driving at any speed. A convenient cigarette-lighter plug is provided.

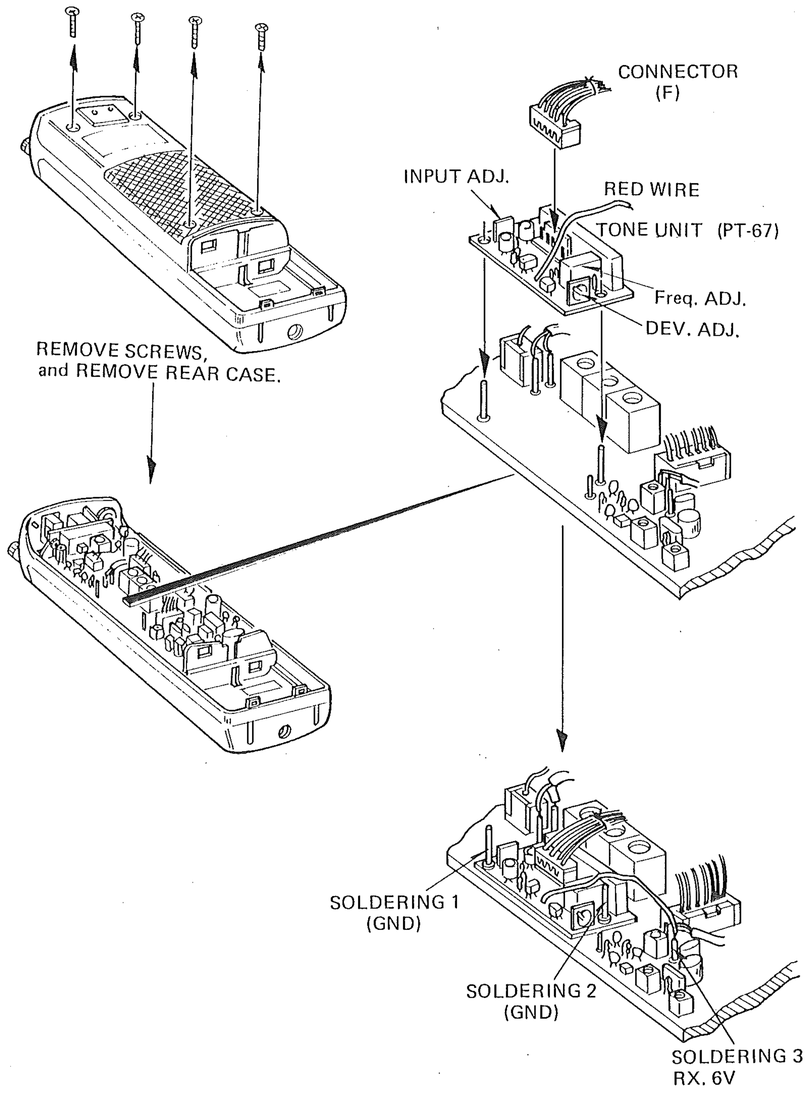
★ Battery Pack BP-500F with CHARGING AID —(JJ-12)
This is a spare battery pack, identical to the one supplied with your transceiver. It eliminates "off-the-air" time while charging the other battery.

★ External Earphone with Plug EPH-10
Use this accessory to hear signals better in noisy places.

★ Tone Squelch / Tone Unit PT-67
This is a PL tone generator to allow you to access PL repeaters; with the PT-67 installed, simply turn on the PL switch to generate subaudible tone. Frequency is fully adjustable.

★ Carrying Case LC-11
This is a rugged, genuine leather case to protect your unit against the rigors of outdoor use.

INSTALLATION OF TONE UNIT PT-67 (OPTION)



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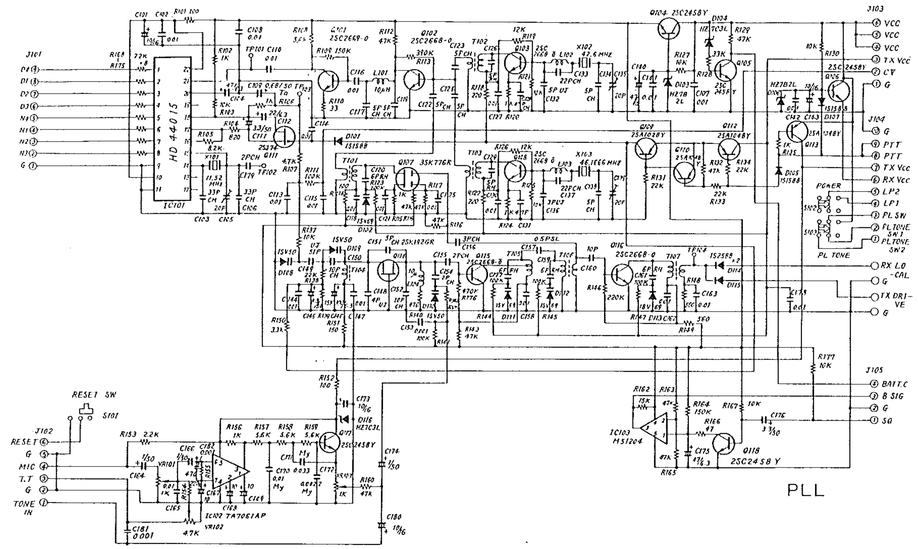
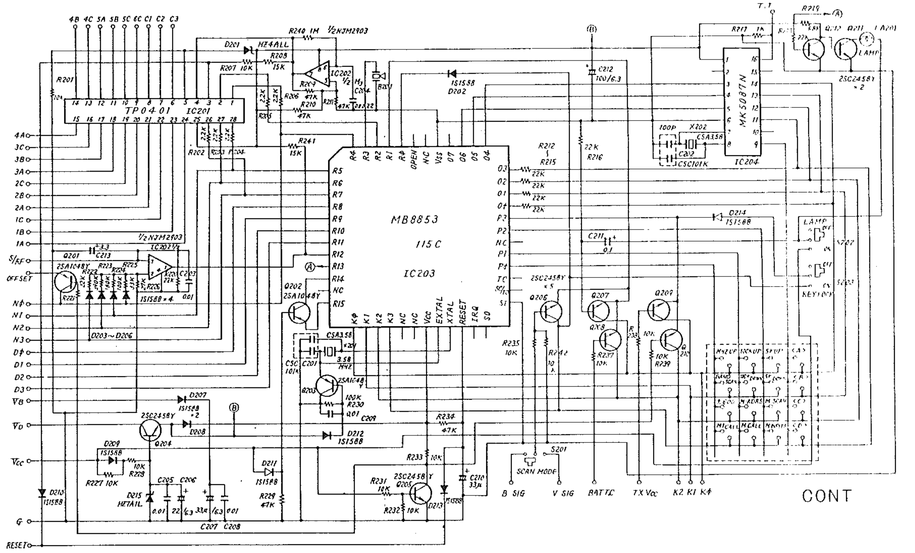
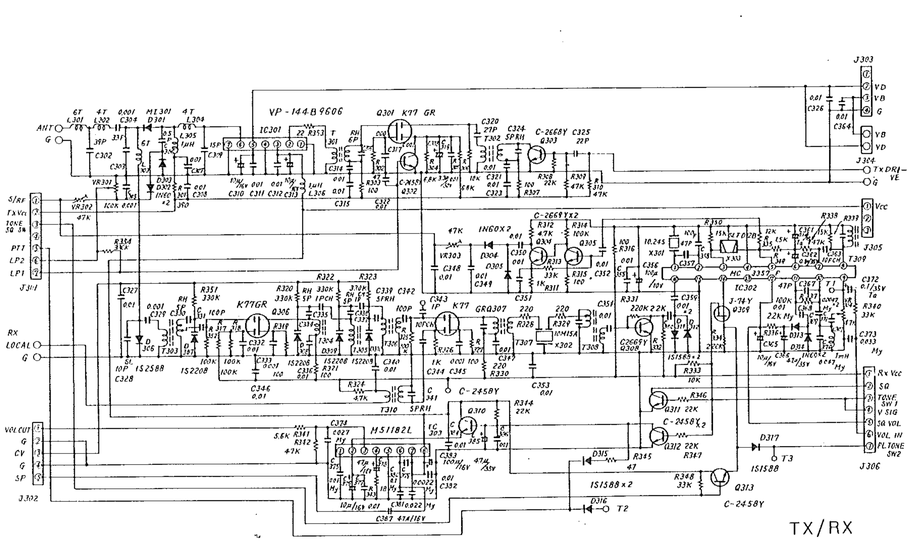
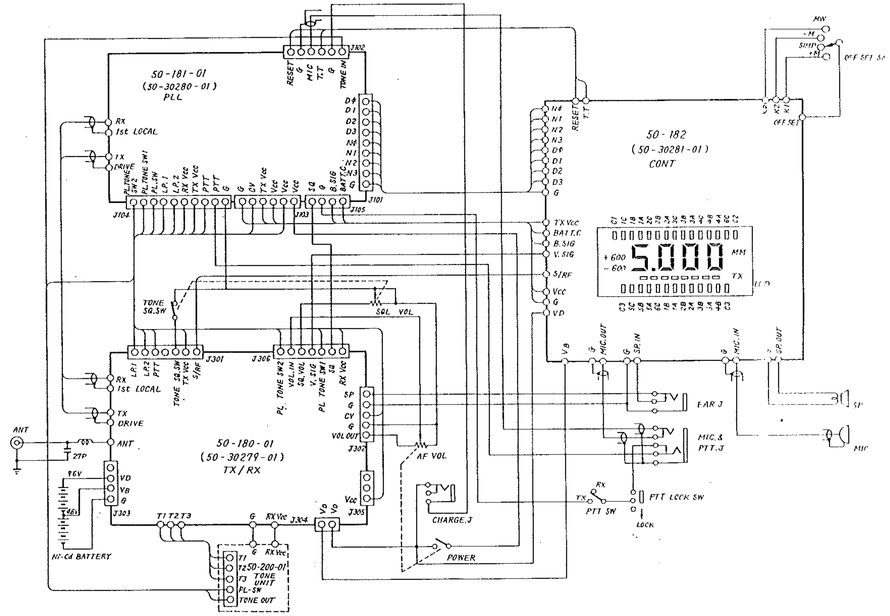




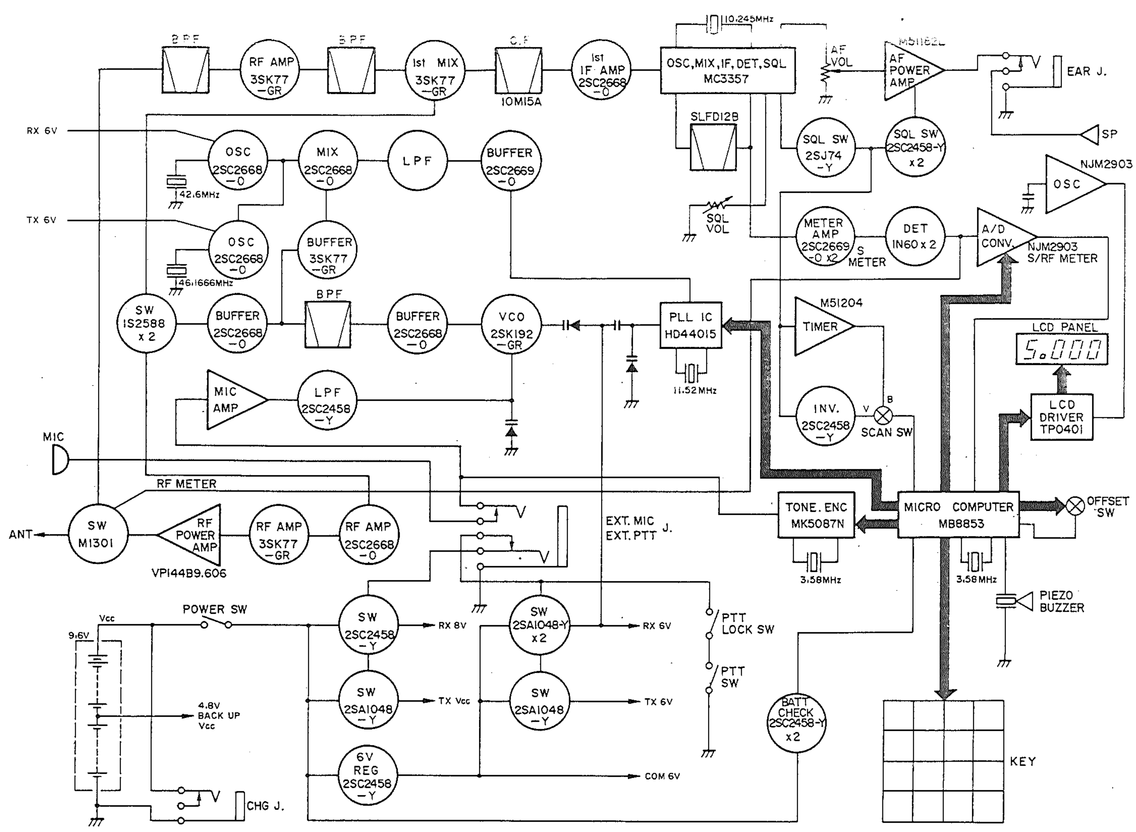




UNIT Ω μF

Some components subject to change for an improvement without notice.

PCS-300 SCHEMATIC DIAGRAM



PCS – 300 BLOCK DIAGRAM

OCT '81