

# TECSUN

## PL-450

FM STEREO/LW/MW/SW  
PLL SYNTHESIZED DUAL CONVERSION RECEIVER

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### OWNER'S MANUAL



PLEASE READ THIS MANUAL BEFORE OPERATION

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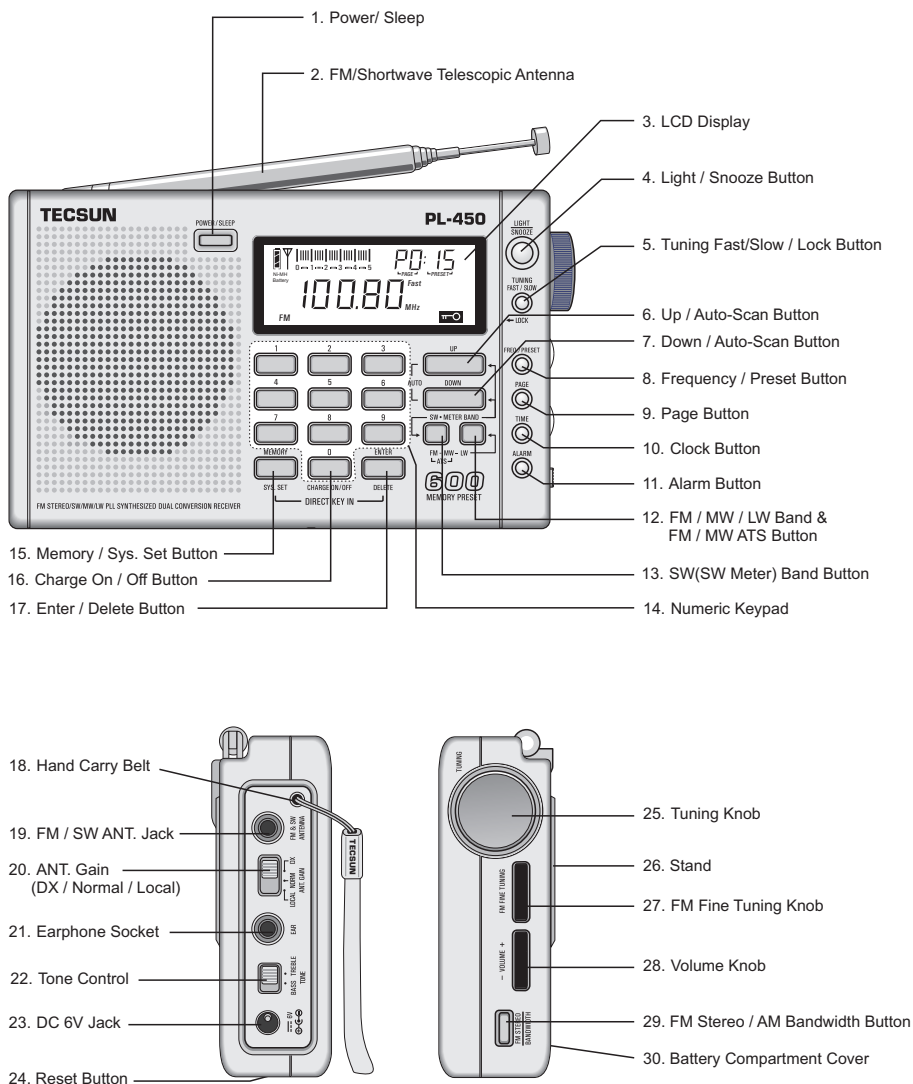
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## 1 MAJOR FEATURES OF THE PL-450

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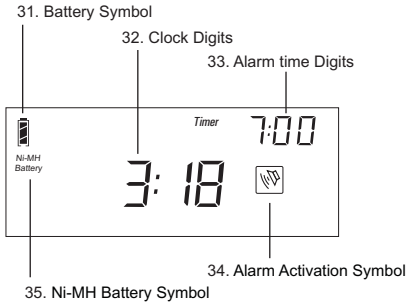
- FM Frequency Range: 87-108 MHz or 76-108 MHz (For Japan)
- Shortwave Frequency Range: 1711- 29999 KHz
- 9/10KHz tuning step selector for Medium Wave (MW) reception
- 1 kHz tuning step for the display of Medium wave and Shortwave
- AM (LW/MW/SW) dual conversion.
- ATS (Auto tuning system) for the memory storage of FM/MW reception
- Manual Tuning
- Auto Scan Tuning
- Direct Keypad Frequency Entry
- Digital Tuning Knob
- 600 Programmable Memories
- Memory Page Customization
- Auto-Scan and manually scan stations stored into memory
- Direct Memory Access
- Fast/Slow tuning rate selection for manual tuning
- Sleep Function
- Two Turn-on Timers with station memory
- Snooze Function: 10 minutes, repeated three times
- FM Stereo/Mono selection
- High/Low Tone Control
- LCD Backlight
- Key Lock
- 12/24 Hr Format selection
- Built-in Ni-MH battery charger
- System set codes

## 2 DIAGRAMS

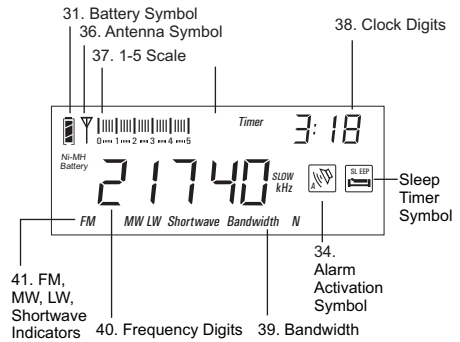


## DIAGRAMS continued

### RADIO OFF DISPLAY

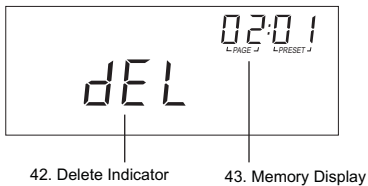


### RADIO ON DISPLAY



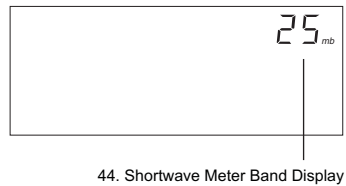
### MEMORY DISPLAY

Refers only to the display's upper right corner.

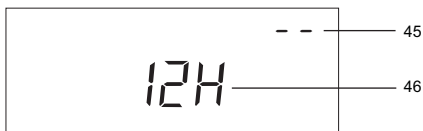


### SHORTWAVE METER BAND DISPLAY

Refers only to the display's upper right corner.



### SYSTEM SET CODE DISPLAY



## 3 GETTING STARTED

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### WHAT THE PL-450 INCLUDES

- Earbud style earphones
- External antenna
- Carrying pouch
- AC adaptor/charger
- 3 - 1000 mAh, Ni-MH rechargeable batteries.
- Owner's manual

**NOTE:** In the instructions below, numbers in parenthesis ( ), refer to the diagrams.

### INSTALLING BATTERIES

The battery compartment is located on the back of the PL-450. Its cover is on the lower right corner of the back. To remove the battery compartment cover, apply thumb pressure and slide it towards the bottom of the radio. Install 3 AA alkaline batteries into the battery compartment, observing the battery polarity diagram on the back of the radio.

**NOTE:** If you don't plan to use rechargeable batteries at all, then it's a good idea to set SYSTEM SET CODE 29. To do this, see the section titled SYSTEM SET CODES. This assures that the battery strength indicator will display correctly for your non-rechargeable batteries. This is not a mandatory procedure and the PL-450 will function if it is not done.

### PREVENTING BATTERY ACID LEAKAGE

To avoid battery acid leakage, only use high quality alkaline, lithium or rechargeable nickel-metal-hydride batteries. Never intermix old with new, or different brands or types of batteries. Damage caused by battery acid leakage is not covered by this product's warranty. If the batteries leak, don't throw them

away and immediately contact the manufacturer of the batteries to inquire about their battery leakage warranty program.

### USING THE INCLUDED AC DAPTOR/CHARGER

To power the PL-450 with the included AC Adaptor/Charger, plug it into a wall outlet first, and then into the socket on the left side of the PL-450, labeled DC 6 V. Batteries can be in the radio while using the AC Adaptor/Charger.

### CHARGING BATTERIES IN THE PL-450

The PL-450 will play using whatever type of AA batteries are in the battery compartment, but only nickel-metal-hydride batteries can be charged within it. If non-rechargeable batteries are installed, the PL-450 as a built-in safeguard system that will prevent them from being charged. This safeguard system works with the PL-450 set to either SYSTEM SET CODE 28 or 29, as described below, and only with the included AC Adaptor/Charger.

**WARNING:** Use only the included AC Adaptor/Charger to recharge Ni-MH batteries. Use of any other device may cause the rechargeable batteries to overheat, become damaged and possibly damage the PL-450. The built-in safeguard system, described above, works only with the included AC Adaptor/Charger. Damage caused to the PL-450 resulting from failure to observe this warning is not covered by the warranty and voids the warranty.

## GETTING STARTED *continued*

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The included AC Adaptor/Charger may be used to charge 3 Ni-MH rechargeable batteries (included) when installed onto the PL-450's battery compartment. Before charging, the PL-450 must be set up for use with Ni-MH batteries and the correct charging rate must be selected for them to be charged. Ni-MH batteries are manufactured with specific capacities rated in milliamp-hours (mAh). These capacities vary from about 1000 mAh up to 2400 mAh at the time of this writing (usually printed on the batteries). For proper charging without damage to the batteries, the correct charging rate must be set. To set the charging rate, plug in the AC adaptor and turn the PL-450 off. Then follow the instructions below.

1. Enter SYSTEM SET CODE 28. See instructions in the section titled SYSTEM SET CODES.
2. While '1000' flashes in the display, use the UP /DOWN buttons to select the mAh rating of your Ni-MH batteries.

### **To charge Ni-MH batteries:**

1. Install 3 Ni-MH AA batteries.
2. Connect the adaptor/charger to the AC wall.
3. Press/release the CHARGE ON/OFF button. 'CHARGE' will flash in the display and the charge indication bars will advance from bottom to top in the upper left corner of the display. The digits in the upper right corner of the display will change to 00:00 and will count up in minutes and hours until charging is finished.

Once charging is finished, 'CHARGE' will stop flashing and the charging indication bars in the upper left corner will stay full.

Charging time varies depending on the milliamp-hour rating of the batteries. The charging circuit automatically senses the milliamp-hour rating of the batteries and will charge them for the correct amount of time. Charging time can take from 5.5 hours for 1000 mAh batteries to 13 hours for 2300 mAh batteries. The charging circuit will sense when the batteries are fully charged and automatically go into trickle-charge mode, thus safeguarding the batteries from being overcharged. Disconnecting the adaptor/charger DC-06 from the PL-450 or pressing the CHARGE ON/OFF button will also stop charging.


## 4 BASIC RADIO OPERATION

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### TURNING THE PL-450 ON AND OFF

The PL-450 can be turned on by the two methods shown below. To turn it off, press the POWER/SLEEP button (1).

#### 1. BATTERY SAVER/TIMER METHOD:

Perform a quick, short press of the POWER/SLEEP button (1). This turns the radio on with 30 in the display and causes the radio to shut off automatically after 30 minutes. The sleep timer symbol , also appears in the display. To change the automatic shut off time from 30 minutes to the number of minutes-to-play of your preference, use the UP or DOWN buttons (6, 7) immediately after turning on the radio. This allows selection of 1-120 minutes of playtime before automatic shut-off occurs. The number of minutes that you last set is also used the next time the radio is turned on.

#### 2. TIMER-DEFEAT METHOD:

This method defeats the automatic minute timer and causes the radio to stay on until deliberately turned off, until the batteries drain or indefinitely if used with an AC adaptor. Hold down the POWER button for about 3 seconds, then release. Note that 'On' appears in the display and that the sleep timer symbol does not appear when this method is used.

### SIGNAL STRENGTH AND BATTERY STRENGTH INDICATOR

When the radio is turned off, the upper left corner of the display (3) shows battery strength. When the radio is turned on, the antenna symbol (37) and the 1-5 scale shows relative signal strength.

### VOLUME AND TONE CONTROLS

The volume control (28), labeled VOLUME, is located on the right side of the radio. To change the volume, rotate the volume control knob. The tone control (22), on the left side of the radio is labeled TREBLE/BASS. Use the position producing the sound that you like best.

### USING EARPHONES

Earphones/headphones with a 1/8 inch stereo plug can be used. Plug them into the earphone socket (21) on the left side of the radio.

### SELECTING FM, MW, LW OR SHORTWAVE


When listening to FM or shortwave, fully extend the telescopic antenna (2). It need not be extended when listening to MW or LW stations. After turning on the PL-450, perform quick, short presses of the 'FM/MW -ATS' button (12) to select FM or MW. To select SW press the 'SW METER BAND' button (13). Each sequential press of the SW METER BAND button or of the UP or DOWN buttons places the radio at the beginning of a specific shortwave meter band. The frequency digits (40) appear toward the center portion of the display. The local stations of the area that you are currently in will be heard on MW and FM, while shortwave stations from around the world can be heard on SW. You can also select LW by press the 'FM/MW/LW' button (12). Before using LW, you should activate the LW function via the SYSTEM SET CODE, see the SYSTEM SET CODE TABLE.

**NOTE:** If you are new to shortwave, see the special shortwave sections later in this manual.



## BASIC RADIO OPERATION continued

### LISTENING IN FM STEREO

FM stereo can be heard when using earphones/headphones. To hear FM in stereo, press the FM STEREO button (29). '  ' will appear in the display.

### SETTING UP MW AND FM INSIDE OF NORTH AMERICA OR JAPAN

You can skip this section if you are neither in North America nor in Japan and just purchased the PL-450. It is already set-up in the factory for use.

Inside of North America, AM stations (MW in the PL-450's display) are spaced in 10 kHz tuning steps, you should change it refer to the instructions CHANGING SYSTEM SET CODES.

The FM frequency range may be different from that used in North America, e.g. like that used in Japan, 76-108MHz. To make these changes, see the SYSTEM SET CODE TABLE and the instructions CHANGING SYSTEM SET CODES.

### TUNING IN STATIONS

There are four ways to tune-in stations, described below. They are Manual Tuning, Auto-scan Tuning, Direct Frequency Entry and Fine Tuning.

#### MANUAL TUNING

Quick, short presses of the UP/DOWN buttons (6, 7) enables tuning up or down frequency.

#### AUTO-SCAN TUNING

Pressing the UP or DOWN buttons (6, 7) for just over 1 second enables automatic scan-tuning. The radio will then automatically stop on the next station encountered and stay for about 5 seconds for your monitoring. Press the UP/DOWN buttons again to keep listening in the station. Use the UP button to auto-scan upward in frequency and the

DOWN button to auto-scan downward in frequency.

#### DIRECT FREQUENCY ENTRY

When the desired frequency is known, it can be entered via the numeric keypad (14). First, make sure that the correct band is selected - FM, WM, LW or SW.

Most WM, LW and Shortwave frequencies are designated in kilohertz (KHz), e.g. 810 KHz or 9475 KHz. All FM frequencies are designated in megahertz (MHz), e.g. 102.9 MHz. To enter such frequencies, just enter the frequency using the numeric keypad (14).

Sometimes Shortwave frequencies are designated in megahertz (MHz). If you encounter such a shortwave frequency and it has less than three digits after the decimal point (e.g. 15.10 MHz or 6.92 MHz), then use the following method to enter it.

However, if there are three digits after the decimal point (e.g. 15.110 MHz or 5.975 MHz), use the method described previously.

1. Enter the frequency using the numeric keypad (14).
2. Press/release the 'Enter' (17) button.

#### TUNING KNOB

The TUNING knob control (25) is located on the right side of the radio. Use it to 'fine-tune' stations or as you would a tuning knob.

## BASIC RADIO OPERATION **continued**

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### **TUNING MODE FAST TUNING SLOW TUNING**

The TUNING-FAST/SLOW button (5) allows selection of fast or slow tuning when using the tuning knob or the UP and DOWN controls. FAST or SLOW appear in the display. When tuning with the tuning knob (25), fast tuning is usually appropriate. When tuning with the UP and DOWN buttons, use slow tuning to tune in stations and fast tuning to move up or down frequency at a rapid rate. Then use slow to actually tune in stations. Experiment with this control to see which tuning mode that you prefer.

### **USING THE BANDWIDTH BUTTON**

The BANDWIDTH button (29) is used when listening to WM and SW stations. Its purpose is to help minimize interference. The preferred setting is WIDE, which provides best audio fidelity. Use NARROW when there is interference. W or N will appear in the display.

## 5 CLOCK AND ALARM FEATURES

### SETTING THE CLOCK

The factory has set the clock to function as a 24-hour format clock. If you prefer a 12 hour, AM/PM clock format, see the section titled CHANGING THE CLOCK FROM 24 TO 12 HOUR FORMAT in the section titled SYSTEM SET CODES.

There are three methods for setting the clock.

#### CLOCK SET METHOD 1 UP AND DOWN BUTTONS:

1. Turn the radio off. The clock digits appear in the center of the display (32).
2. Press/release the button labeled 'Time' (10). The clock's HOUR digits flash in the display, within 5 seconds, set the hour using the UP/DOWN buttons (6, 7).
3. Press/release the 'Time' (10) button again, the MINUTE digits flash in the display, within 5 seconds, set the minute using the UP/DOWN buttons (6, 7).
4. Within 5 seconds of finishing, press/release the 'Time' (10) button or wait until the clock digits stop flashing.

#### CLOCK SET METHOD 2 – NUMERIC KEYPAD:

1. Turn the radio off. The clock digits appear in the center of the display (32).
2. Press/release the button labeled 'Time' (10). The clock's digits flash in the display.
3. Use the numeric keypad to key-in the time in 24 hour format. Within 5 seconds of finishing, press/release the 'TIME' (10) button or wait until the clock digits stop flashing.

### CLOCK SET METHOD 3 TUNING KNOB

1. Turn the radio off. The clock digits appear in the center of the display (32).
2. Press/release the button labeled 'Time' (10). The clock HOUR digits flash in the display.
3. Within 5 seconds, use the tuning knob to set the hour.
4. Within 5 seconds, press/release the 'Time' (10) button, then use the tuning knob to set the minute.
5. Within 5 seconds of finishing, press/release the 'Time' (10) button or wait until the clock digits stop flashing.

You can also set the clock when you turn on the radio. When the radio is on, the clock digits appear in the upper right corner of the display. Set the clock referring to the 3 methods above.

### SETTING THE ALARM (USE AS WAKE-UP ALARM)

The PL-450 has a programmable alarm, enabling the PL-450 to turn on and play the radio for an alterable period of time and then turn off. The playtime can be selected from 1 ~ 90 minutes. The alarm can be used as a wake-up alarm. After setting the alarm time and a playtime, store a radio station into alarm memory and activate the alarm. See the next sections titled STORING A RADIO STATION INTO ALARM MEMORY and ACTIVATING/DEACTIVATING THE ALARM.

NOTE: A radio station must be stored into alarm memory. If this is not done, there will only be static once the timer is activated.

## CLOCK AND ALARM FEATURES continued

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When the alarm activates, it turns on the radio, with the alarm activation symbol and the playtime appear flashing in the display. The radio will play the station stored into alarm memory and shut off automatically when the playtime counts down to 00 or until you turn the radio off with the POWER/SLEEP button. The 'snooze' feature can also be used (see section titled USING THE SNOOZE FEATURE).

There are three methods to set the alarm time. They are almost same as the clock set.

### STORING A RADIO STATION INTO ALARM MEMORY

To hear a radio station when the alarm activates, the station must be stored into alarm memory. Here's the 2 step procedure:

1. Turn on the PL-450 and tune to the desired station.
2. Press the ALARM button (11) for more than 1 second, then release. The alarm symbol flashes in the display twice.

**NOTE:** To monitor the frequencies stored into alarm memory, perform a three second press of the SYSTEM SET button (15) while the radio is turned off. The set code information and the frequency stored into alarm memory flash in the display.

### ACTIVATING/DEACTIVATING THE ALARM

For the alarm to turn on the radio, it must be activated. The alarm can be activated/deactivated with the radio on or off. To activate the alarm, press/release the ALARM button (11). The alarm symbol will appear in the display. To deactivate the alarm, press/release the alarm button (11). The alarm symbol will disappear from the display.

### USING THE SNOOZE FEATURE

When the alarm activates and turns the radio on, the alarm activation symbol (34) appears flashing in the display. While it is flashing, press/release the SNOOZE/LIGHT button (4). The radio will turn off and then turn on again in 10 minutes. This process can be repeated 3 times.

## 6 WORKING WITH MEMORY

At the factory, the PL-450 is set up with 10 pages of memory (from 01~10), each page holding 50 frequencies plus 100 frequency memory in P0. This enables storing of 600 frequencies into memory. Memory setting of 01~10 can be changed and tailored to your personal needs or can be left as is. When first learning to store stations into memory, we suggest using the factory setting. To change the factory setting, see the section CUSTOMIZING MEMORY PAGES. When working with memory, the term PRESET appears in the display under the memory numbers.

### STORING STATIONS INTO MEMORY

1. Turn on the radio.
2. Tune to the desired station.
3. Press/release the MEMORY button (15). Note that the memory number digits, labeled PRESET (43) flash in the upper right corner of the display. The memory page number, labeled PAGE, also appears, but does not flash.
4. Within 5 seconds use the numeric keypad to enter the memory number that you wish to store the station into. For memories 1-9, enter the numbers as 01~09.
5. Within 5 seconds press the MEMORY button (15), or wait 5 seconds. This finalizes storing into memory and after a few seconds, the upper right corner's display returns to show the clock.

### SELECTING/CHANGING MEMORY PAGES

To select/change memory pages:

1. Press/release the PAGE button (9). The page number flashes in the display.
2. Within 3 seconds, use either the UP or DOWN button to change to the page of your choice. Alternately, use the numeric keypad to enter the page or use the tuning knob to change the

page.

3. Press/release the PAGE button to finalize the page change.

### ACCESSING WHAT IS STORED INTO MEMORY

There are three ways to access what has been stored into memory: Direct Memory Access, Manual Memory Search and Memory Auto-scan. These three methods are described below. When the memory page and memory preset numbers appear in the upper right corner of the display, as it will in the descriptions below, the radio is in MEMORY ACCESS MODE. This mode can be exited any time with a press/release of the FREQ/PRESET button (8).

If you first need to change memory pages, see the previous section, SELECTING/CHANGING MEMORY PAGES.

### DIRECT MEMORY ACCESS

Use the numeric keypad to key-in the memory number. For example, if the desired radio station is in memory number 01, just press '0', then '1', and it will go to memory 01.

### MANUAL MEMORY SEARCH

Manual Memory Search enables manual searching through the memories within a memory page, as shown below:

1. Press/release the FREQ/PRESET (8) button.
2. Use quick, short presses on the UP or DOWN buttons or use the tuning knob to search through the memories.
3. Press the FREQ/PRESET button (8) when finished.

## WORKING WITH MEMORY **continued**

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### MEMORY AUTO-SCAN

Memory Auto-scan enables scanning through the memories within the selected memory page. Each filled memory is accessed for about 5 seconds, after which the scan moves on to the next used memory automatically, staying on it for about 5 seconds. This continues indefinitely on the selected page until deliberately stopped. Unused memories are not accessed.

1. Press/release **FREQ/PRESET** (8) button.
2. Press/hold either the **UP** or **DOWN** button for about a second. Then release it. Note that **PRESET** flashes under the memory number, indicating that memory scanning is functioning with each memory being scanned for about 5 seconds. It then moves on to the next memory for another 5 seconds. To stop memory preset auto-scan, press/release either the **UP** or **DOWN** button.

### DELETING A MEMORY'S CONTENTS

1. Press/release the **FREQ/PRESET** button (8).
2. Use the **UP** or **DOWN** button (5,6) to select the memory preset location of the frequency that you wish to delete. Alternately, use the numeric keypad to enter the memory number.
3. Press/hold the **DELETE** button (17) for about 2 seconds and then release it. 'dEL' appears flashing in the display.
4. While 'dEL' is still flashing, press/release the **DELETE** button.

### DELETING ALL MEMORY PAGE CONTENTS

1. Press/release the **FREQ/PRESET** button (8).
2. Press/hold the **DELETE** button (17) for 5 seconds and then release it. 'dEL' and **PAGE** (42, 43) appear flashing in the display.
3. Within 2 seconds, press/release the **DELETE** button.

### MOVING A STORED FREQUENCY

A stored frequency can be moved to a different memory or memory page.

1. Turn on the radio.
2. Press/release the **PAGE** button.
3. Within 3 seconds, use the **UP** or **DOWN** button to select the required memory page.
4. Press/release the **MEMORY** button twice.
5. Within 5 seconds use the numeric keypad to enter the memory number that you wish to store the station into.
6. Within 5 seconds press/release the **MEMORY** button.

### CUSTOMIZING MEMORY PAGES

The PL-450 is configured at the factory with 10 memory pages (from 01~10), each page having 50 memories plus 100 memories in page 00, in total 600 memories. You can change the set up of page 01~10 via the **SYSTEM SET CODES**, shown below.

## 7 SYSTEM SET CODES

System Set Codes allow the radio to be tailored to your needs by changing certain programmable functions. These functions and their descriptions are noted in the table.

**SYSTEM SET CODE TABLE**

CODE NUMBER	FUNCTION	IN DISPLAY
00 (factory default setting)	Divide the memories into 10 pages with 50 locations	10:50
20	Divide the memories into 20 pages with 25 locations	20:25
25	Divide the memories into 25 pages with 20 locations	25:20
50	Divide the memories into 50 pages with 10 locations	50:10
55	Activate LW band	ON
55 (factory default setting)	Deactivate LW band	OFF
09 (factory default setting)	Set the tuning steps for MW to 9KHz	9kHz
10	Set the tuning steps for MW to 10KHz	10kHz
12	Set the clock system to 12 Hr format	12H
24 (factory default setting)	Set the clock system to 24 Hr format	24H
28	Rechargeable battery to be used	Ni-MH
29	Normal AA battery to be used	
76	Set the FM frequency range to 76-108MHz (for Japan)	76 108
87 (factory default setting)	Set the FM frequency range to 87-108MHz	87 108

## SYSTEM SET CODES *continued*

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### CHANGING SYSTEM SET CODES

To enter a system code of your choice, use the procedure below.

1. Turn off the radio.
2. Press/release the SYSTEM SET button (15). Note that '- - ' (45) appears in the upper right corner of the display and the clock digits disappear.
3. Within 5 seconds, enter the desired numeric code with the numeric key pad, then immediately press/release the button labeled SYSTEM SET. The code ICON (46) will briefly appear in the lower right corner of the display.

### DEFAULT FACTORY SYSTEM SET CODES

When shipped from the factory, the radio's System Set Code Table is set up as follows. Changes can be made via the procedure shown in the section titled CHANGING SYSTEM SET CODES.

- Ten pages with 50 memories each. Code 08.
- 9 KHz AM (MW) tuning rate. Code 09.
- 24 hour clock system. Code 24.
- Rechargeable batteries to be used. Code 28.
- 87-108 MHz FM frequency coverage. Code 87.
- LW band Deactivate. Code 55.

### MONITORING THE CURRENT STATUS OF SET CODES AND OTHER SETTINGS

Performing a three second press of the SYSTEM SET button, with the PL-450 turned off, allows monitoring of key set codes and other settings. This information quickly flashes in the display in the following order.

1. 9 or 10 kilohertz setting
2. Rechargeable battery milliamp-hour setting
3. FM tuning range setting
4. Alarm's radio frequency

## 8 ADDITIONAL PL-450 CONTROLS

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### USING THE LIGHT

A quick, short press/release of the LIGHT/SNOOZE button (4), located on the front of the radio's upper right corner, will turn on the display light, shining from the left side of the display, for about 5 seconds. A longer press/release of the button (about 3 seconds) will cause it to stay on indefinitely (note that this will decrease battery life). Turn off the light with a quick short press of the button.

### USING THE ANTENNA GAIN SWITCH

The Antenna Gain switch (20) has three positions, DX, NORMAL and LOCAL. This switch should normally be in the DX position, providing maximum receiving performance. If the AM or Shortwave station that you are listening to is overwhelmingly powerful and causes distortion, try the NORMAL or LOCAL position. This switch is not used for FM stations.



## ADDITIONAL PL-450 CONTROLS **continued**

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### USING THE FM FINE TUNING

**CONTROL** This control knob, labeled FM FINE TUNING and located on the right side of the PL-450, enables optimization of the PL-450's telescopic antenna when listening to FM. While listening to the station, adjust the knob for best reception.

### USING THE LOCK BUTTON

Pressing the LOCK button causes all button-activated controls to be 'locked' and the lock symbol appears in the lower right corner of the display. A long press engages the LOCK feature. Another long press disengages it and the symbol disappears.

This is an excellent feature to use when traveling, as it keeps the radio from being

accidentally turned on. Before placing the radio into a suitcase, purse or briefcase, turn it off and then lock it. This control does not disengage timer functions. While you are listening to a favorite radio station and want not to be shut off accidentally, you can also lock the radio.

### USING THE EXTERNAL ANTENNA SOCKET

The external antenna socket is used to improve shortwave or FM performance. There are many such antennas on the market today. Typing in 'shortwave antennas' or 'FM antennas' on your favorite Internet search site will provide further information if you wish to purchase or make such an antenna.

## 9 LISTENING TO SHORTWAVE STATIONS

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Are you new to shortwave listening? If so, you'll want to read this section.

### WHAT ARE SHORTWAVE STATIONS?

These are radio broadcast stations around the world broadcasting on frequencies that can be heard over vast distances, often many thousands of miles. In the United States, there are also about 30 domestic shortwave broadcasters with religious, politically and ideologically oriented broadcasts.

### WHY LISTEN TO SHORTWAVE STATIONS?

There are many reasons why you may enjoy shortwave stations. Here are just some, as reported to us by our customers. Listening to news and information from

other world sources often exposes you to different and unique perspectives on national and world events.

Exposure to other languages and cultures, including their music and perspectives. Hearing a country's native or 'folk' music can be very enjoyable, even if you don't understand the language.

Learning a language by hearing native speakers.

Keeping in touch with another part of the world, perhaps your original homeland or that of your family's heritage.

Religious, politically and ideologically oriented broadcasts.

## LISTENING TO SHORTWAVE STATIONS continued

### GENERAL SHORTWAVE 'RULES-OF-THUMB'

Night shortwave reception is usually better than daytime shortwave. This can change from time-to-time, so it's worth checking the bands during the day too.

During daytime the most active shortwave bands are 13, 15, 16, 19, and 22 meters, 16 and 19 usually being the best. At night, the most active bands are 25, 31, 41 and 49 meters, with 31 and 49 usually best.

Around sunset and sunrise, both the day and night bands may be good, sometimes exceptionally good. Listening at these times can often be quite rewarding.

The construction materials of some buildings severely block shortwave signals. To counteract this, hold the radio in your hands and get very close to a window.

### SELECTING A SHORTWAVE METER BAND WITH THE PL-450

All 14 of the international broadcast bands can be accessed with the PL-450. The bands are numbered 120, 90, 75, 60, 49, 31, 25, 22, 19, 16, 15, 13 and 11 meters and are commonly called 'Meter Bands'.

The PL-450 offers two ways to access a shortwave band. Each method places the tuner at the beginning of the band's frequency range.

1. Each successive quick, short press of the button labeled SW METER BAND (16) places the radio at the beginning of a band. While pressing the button, the band number shows in the upper right corner of the display (50) and disappears a few seconds after it is released, causing the clock to reappear in the corner. Start tuning only after the

clock reappears. If you don't wait, then method 2 below will automatically be used.

2. Perform one quick, short press of the button labeled SW METER BAND, immediately followed by quick, short presses of either the UP or DOWN tuning buttons. The band number appears in the upper right corner of the display. Once the band of choice is selected, start tuning after the clock reappears in the upper right corner.

### AUTO-SCAN TUNING WHILE IN SHORTWAVE

In shortwave, auto-scan tuning scans in the shortwave frequency ranges noted in the Band Chart below. To tune shortwave frequencies that are in-between these ranges, or outside of these ranges, use one of the other tuning methods, e.g. Regular Tuning (manual tuning) or Direct Frequency Entry as discussed titled TUNING IN STATIONS.

### BAND CHART OF SHORTWAVE AUTO-SCANNING RANGES

BAND (METERS)	FREQUENCY RANGE
120	2250 - 2550
90	3150 - 3450
75	3850 - 4050
60	4700 - 5100
49	5800 - 6300
41	7100 - 7500
31	9400 - 10000
25	11500 - 12150
22	13500 - 13900
19	15000 - 15900
16	17450 - 18000
15	18850 - 19100
13	21450 - 21950
11	25600 - 26100

## 10 TROUBLESHOOTING

### RESET PROCEDURE

The RESET button is on the bottom of the PL-450. When performing a reset, have good batteries in the radio or power it with an AC adaptor and turn it off. Perform a reset if the solutions outlined below don't resolve the issue. To perform a reset, press the reset button with a paper clip or similar object.

### WILL NOT TURN ON

1. Assure that the LOCK feature is not engaged.
2. Assure that the radio has power (batteries installed or AC adaptor plugged in).
3. Assure that batteries are inserted with correct polarity
4. Assure that the batteries are not depleted
5. If using an AC adaptor, assure that it is plugged into the household outlet (mains socket) and into the radio's DC socket. Take care not to plug it into the earphone socket. Also, assure that the AC adaptor is of the correct DC voltage output and polarity and that its plug-tip is of the correct inner and outer diameter.

### SHUTS OFF ABRUPTLY WHILE PLAYING DURING BATTERY USE

This is caused by depleted batteries. Replace them.

### SHUTS OFF ABRUPTLY WHILE BEING MOVED DURING AC ADAPTOR USE

This is usually caused by a broken wire or loose connection in the AC adaptor's cord or if the AC adaptor's plug-tip is of the wrong diameter.

### OPERATES ERRATICALLY

Perform a RESET, as described in the section titled RESET PROCEDURE.

### STATIONS ARE RECEIVED TOO WEAK

- Assure that the ANTENNA GAIN switch is set to the DX position.
- Assure that the telescopic antenna is pulled up all the way for FM and Shortwave reception.
- When listening to AM stations, swivel the radio. The AM internal ferrite bar antenna is highly directional.

### THERE IS NO SOUND FROM THE SPEAKER

Assure that earphones/headphones are not plugged in and that the volume control is turned up.

### A STATION CAUSES SEVERE AUDIO DISTORTION, BUT SEEMS TO BE VERY STRONG IN SIGNAL STRENGTH

This is probably a strong, local station, very close to your location. Because of its close proximity to you, its signal is too strong. To reduce signal strengths, place the ANTENNA GAIN switch into the NORMAL or LOCAL position.

### THE BATTERY COMPARTMENT HAS A STICKY LIQUID OR DRIED WHITE POWDER IN IT

This is the result of battery acid leakage.

To avoid battery acid leakage, only use high quality alkaline or rechargeable nickel-metal-hydride batteries. Never intermix old with new, or different brands or types of batteries. If the batteries leak, immediately contact the manufacturer of the batteries and don't throw them away. Damage caused by battery acid leakage is not covered under warranty.

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