

OWNER'S MANUAL

Cat. No. 20-228

DX-398

**All-Band Shortwave Receiver
with Radio Data System**

Please read before using this equipment.



RadioShack®

FEATURES

Your RadioShack DX-398 All-Band Shortwave Receiver with Radio Data System brings you the voices of the world. In the 14 international short-wave (SW) bands, you can hear news broadcasts and other programs from sources around the world, such as the British Broadcasting Corporation, Radio Cairo, and Radio Beijing. You can set your receiver so it displays Radio Data System (RDS) call letters of those stations that transmit an RDS signal.

You can get emergency information firsthand by listening to amateur radio broadcasts, including single sideband (SSB) voice transmissions.

In the longwave (LW) band, you can hear ship-to-shore calls, other marine and aeronautical services, and sometimes even hurricane reports. You can also tune to local broadcasts in the FM and medium-wave (MW) bands. (In the United States, we commonly call the MW band the AM band.)

In addition, you can connect a cassette recorder to the receiver's record line out and standby jacks so you can directly record your favorite programs live or at a preset time.

Your receiver's features include:

Digital Synthesized Radio — ensures accurate, stable tuning.

Large, Fast-Response Display — shows the time, band and frequency, signal strength, and other indicators.

212 Preprogrammed Shortwave Stations — let you rapidly tune to the most popular U.S. and international shortwave stations.

Three Timer Alarms — let you set the buzzer to sound or the radio to turn on daily at up to three specified times.

Record Line Out and Standby Jacks — let you connect a tape recorder so you can record broadcasts live or at a preset time.

Dual Time — includes a primary and a secondary clock, so you can set one to your local time and the other to UTC (Coordinated Universal Time — formerly known as Greenwich Mean Time) or to the local time of a city in another time zone.

World Time Zone — provides the correct time for 42 cities worldwide, once you set your local time.

Search Tuning — scans up or down the band for the next station.

Memory Tuning — stores up to 306 frequencies so you can quickly select your favorite stations.

Priority Button — lets you quickly store and recall your favorite station.

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Auto Tuning System (ATS) — the receiver finds the stations with strong signals and stores them in memory in order by signal strength.

Rotary Tuning Dial — lets you manually tune desired frequencies. You can select a higher tuning increment for faster tuning or a lower one for fine tuning, or lock the dial to prevent accidentally changing the tuned frequency.

Memory Lock — prevents accidental frequency changes.

Control Lock — prevents accidental setting changes.

Sleep Timer — lets you set the receiver so it turns itself off after a length of time you set, so you can fall asleep as you listen to it.

MW Step Setting — lets you easily change the frequency step setting to match the MW (AM) broadcast frequency step used by many other countries.

RF Gain Control — lets you adjust the receiver's sensitivity when you listen to SW/LW/MW broadcasts, to provide the best possible reception.

Narrow/Wide Control — lets you reduce interference from adjacent stations when you listen to SW, MW (AM), and LW broadcasts.

Page Memory Location — lets you store and select frequencies in storage locations called *pages*. You can store

and select up to nine MW/FM frequencies in two pages, nine LW frequencies in one page, and 261 SW frequencies in 29 pages.

Edit — lets you create and edit station names for FM/MW/LW bands, page names for SW bands, and home/world city names for easy identification.

Tone Control — lets you adjust the tone setting for different types of broadcasts such as news, music, and so on.

Battery Power/Signal Strength Indicator — displays the battery's power and the strength of the received signal.

Memo Label — lets you record helpful information such as the memory location numbers of your favorite stations.

Three Power Options — let you power the receiver from internal batteries, standard AC power (with an optional AC adapter), or your vehicle's battery (with an optional DC cigarette lighter adapter).

Your receiver is preset to cover the following bands:

Band (Meters)	Frequency Range (MHz)
120	2.300–2.495
90	3.200–3.400
75	3.900–4.000
60	4.750–5.060
49	5.900–6.200
41	7.100–7.350
31	9.400–9.990
25	11.600–12.100
21	13.500–13.870
19	15.100–15.800
16	17.480–17.900
15	18.900–19.020
13	21.450–21.750
11	25.600–26.100

THE FCC WANTS YOU TO KNOW

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Your receiver might cause TV or radio interference even when it is operating properly. To determine whether your receiver is causing the interference, turn it off. If the interference goes away, your receiver is causing it.

Try to eliminate the interference by:

- moving your receiver away from the TV or radio
- connecting your receiver to an outlet that is on a different electrical circuit from the TV or radio
- contacting your local RadioShack store for help

If you cannot eliminate the interference, the FCC requires that you stop using your receiver. Changes or modifications not expressly approved by RadioShack could void the user's FCC authorization to operate this equipment.

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PREPARATION

CONNECTING TO POWER

You can power the receiver from internal batteries, standard AC power, or your vehicle's battery.

Installing Internal Batteries

You can use four AA batteries (not supplied) to power the receiver. For the best performance and longest life, we recommend alkaline batteries, available at your local RadioShack store.

Cautions:

- Always use fresh batteries of the required size and type.
- Do not mix old and new batteries or different types of batteries (standard or alkaline).

Follow these steps to install the batteries.

1. Remove the battery compartment's cover by sliding the cover in the direction of the arrow on the cover's tab.

2. Slide four AA batteries into the compartment on top of the lift-out ribbon, according to the polarity symbols (+ and –) marked next to the compartment.

3. Replace the cover.

Cautions:

- If you will not be using the receiver with battery power for several months, remove the batteries.
- Dispose of old batteries promptly and properly.

Using Standard AC Power

To power the receiver from standard AC power, you need an optional AC adapter, such as Cat. No. 273-1662.

Note: Connecting an AC adapter disconnects internal batteries.



Caution: You must use a Class 2 power source that supplies 6 volts DC and delivers at least 300 mA. Its center tip must be set to negative and its plug must fit the receiver's **DC IN 6V** jack. The recommended adapter meets these specifications. Using an adapter that does not meet these specifications could damage the receiver or the adapter.

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- When you finish using the AC adapter, unplug it from the AC outlet first, then disconnect it from the receiver.

Follow these steps to use AC power.

1. Set the adapter's voltage switch to 6V.
2. Line up the 5.5 mm outer diameter/2.1 mm inner diameter barrel plug with the adapter's socket so it reads **-TIP**, and insert the plug into the socket.
3. Insert the barrel plug into the receiver's **DC IN 6V** jack.
4. Plug the adapter into a standard AC outlet.

Using Vehicle Battery Power

To power the receiver from your vehicle's battery, you need an optional DC cigarette lighter adapter, such as Cat. No. 273-1802.



Caution: You must use a DC cigarette lighter adapter that supplies 6 volts DC and delivers at least 300 mA. Its center tip must be set to negative and its plug must fit the receiver's **DC IN 6V** jack. The recommended DC cigarette lighter adapter meets these specifications. Using an adapter that does not meet these specifications could damage the receiver or the adapter.

Caution: Always plug the DC cigarette lighter adapter into the receiver before you plug it into your vehicle's cigarette-lighter socket. Always unplug the adapter from the vehicle's cigarette-lighter socket before you unplug it from the receiver.

Follow these steps to power the receiver from your vehicle's battery.

1. Set the DC cigarette lighter adapter's voltage switch to 6V.

-
2. Insert the adapter's barrel plug into the receiver's **DC IN 6V** jack.
 3. Push the adapter's plug into the vehicle's cigarette-lighter socket.

ADJUSTING THE TELESCOPING ANTENNA

For the best reception, adjust the telescoping antenna for the desired band.

FM — Pull up the antenna base about halfway then fully extend the antenna and rotate it for the best reception.

LW and MW (AM) — Rotate the receiver. The receiver uses a built-in antenna for these bands.

SW — Pull up the antenna base then fully extend the antenna and point it straight up.

CONNECTING AN EXTERNAL ANTENNA

To improve SW/MW/LW reception, you can connect an optional external antenna (such as Cat. No. 20-181) directly to the **AM EXT ANT** jack on the left side of the receiver. This automatically disconnects the receiver's built-in antenna.

Follow the antenna's supplied instructions to connect it to the receiver.

CONNECTING HEADPHONES

For private listening and for stereo sound during FM stereo broadcasts, you can plug optional stereo headphones with a $\frac{1}{8}$ -inch (3.5 mm) plug (available at your local RadioShack store) into the  jack on the left side of the receiver. This automatically disconnects the internal speaker.

When you connect stereo headphones and tune to a stereo broadcast,  appears on the display.

Listening Safely

To protect your hearing, follow these guidelines when you use headphones.

- Do not listen at extremely high volume levels. Extended high-volume listening can lead to permanent hearing loss.
 - Set the volume to the lowest setting before you begin listening. After you begin listening, adjust the volume to a comfortable level.
- Once you set the volume, do not increase it. Over time, your ears adapt to the volume level, so a volume level that does not cause discomfort might still damage your hearing.

Traffic Safety

Do not use headphones with your receiver when operating a motor vehicle or riding a bicycle in or near traffic. Doing so can create a traffic hazard and could be illegal in some areas.

If you use headphones with your receiver, be very careful. Do not listen to a continuous broadcast. Even though some headphones let you hear some outside sounds when listening at normal volume levels, they still can present a traffic hazard.

CONNECTING A TAPE RECORDER

You can connect an optional tape recorder to your receiver's **REC LINE OUT** jack to record transmissions.

The recorder must have a line level input jack.

Note: If you use a recorder's MIC IN jack to connect to the receiver, the sound will be distorted.

To connect a tape recorder, you need a mono patch cord (not supplied) with a $\frac{1}{8}$ -inch (3.5 mm) plug on both ends. Your local RadioShack store carries a wide selection of mono patch cords.

Insert the cord's plug into the **REC LINE OUT** jack on the left side of the receiver, then connect the other end of the cord to your tape recorder's LINE IN jack.

Follow the instructions provided with your tape recorder to record transmissions from the receiver.

Note: When you connect a tape recorder, the receiver's built-in speaker continues to work.

The **REC STANDBY** jack on the left side of the receiver lets you record a broadcast at a preset time.

To connect a tape recorder to the receiver's **REC STANDBY** jack, you need a mono patch cord (not supplied) with a $\frac{3}{32}$ -inch (2.3 mm) plug. And, your tape recorder must have a STANDBY IN or REMOTE IN jack rated at no more than 20V, 150mA.

Connect one end of the cord to the **REC STANDBY** jack, then connect the other end to your recorder's STANDBY IN or REMOTE IN jack. Then see "Timer Recording" on Page 33 for more information about using the receiver's timers to record.

USING THE STAND

You can position the receiver more securely and possibly improve the sound by resting the receiver on its stand.

Lift the latch on the back of the receiver to open the stand.

USING THE MEMO LABEL

You can use the memo label under the receiver's stand to record helpful information, such as the memory location numbers of your favorite stations.

If you are in a country where the AM frequency increments are 9 kHz, set **MW-STEP** to **9k**.

SETTING THE MW (AM) TUNING INCREMENT

In the United States, the Federal Communications Commission (FCC) assigns frequencies for stations in the MW band in 10-kHz increments. (In the United States, we commonly call the MW band the AM band.) In Europe and some other parts of the world, MW frequencies are assigned in 9-kHz increments.

MW-STEP on the right side of the receiver is preset to **10k** for use in the United States, Canada, and many South American countries. Depending on the country you are in, you might have to change the frequency step.

UNDERSTANDING YOUR RECEIVER

Once you understand a few simple terms we use in this manual and familiarize yourself with your receiver's features, you can start using your receiver to listen to the world!

POWER — turns the receiver on and off.

 — turns on the display light for about 12 seconds (if you installed batteries) or until you press  again.

 — displays the time in your area using Daylight Saving Time.

 **SET** — lets you set the time.

STEP — sets the tuning range for manual tuning (see “Direct Access Tuning” on Page 19).

ATS/FM — selects the FM band and lets you select FM stations using your receiver's automatic tuning system (ATS).

ATS/LW — selects the LW (longwave) band and lets you select LW stations using your receiver's automatic tuning system.

ATS/MW — selects the MW (medium wave) band and lets you select MW stations using your receiver's automatic tuning system.

METER/SW — selects the SW (shortwave) band, and lets you scan for a shortwave frequency in one of the receiver's 14 meter bands.

Number Keys — each key has a single-digit label and a band range. The single digits are used to enter a channel, frequency, or ID number. The band range (120m, for example) indicates the shortwave band you can tune by pressing that key.

- — enters a decimal point or clears an incorrect entry.

C (cancel) — cancels an entry.

F/FREQ (frequency) — lets you tune a frequency directly.

M/MEM — stores frequencies into memory.

ENTER  — enters a frequency.

TIMER 1, TIMER 2, TIMER 3 — let you select any of the receiver's three timers.

WORLD/HOME — lets you select the time you want to display (world time or your home time).

AM MODE — lets you set up the alarm timer.

 — lets you lock out selected frequencies.

EDIT — lets you assign a name for each FM, MW, or LW station or for each page where you stored an SW station.

PAGE — lets you select either of the receiver's memory pages (see "Memory Functions" on Page 27).

PRIORITY — tunes to the priority station you set.

TUNING  /  — tunes up or down the band you selected.

BASIC OPERATION

TURNING THE RECEIVER ON AND OFF

Press **POWER** to turn on the receiver, then adjust **VOLUME** to a comfortable listening level.

Fresh batteries show a power level of 10. If the indicator shows a power level of 3 or below or **BATT LOW** flashes, replace all of the batteries.

Press **POWER** again to turn off the receiver.

LIGHTING THE DISPLAY

Press  to light the display in low-light situations.

The display shows the band, frequency, time, and signal strength (with 10 as the strongest signal).

When you press **POWER** to turn off the receiver, the battery power indicator appears on the display for several seconds.

Notes:

- If you use battery power, the light automatically turns off after 12 seconds to save battery power.
- If you use AC or DC power, the light stays on while the receiver is on. You must turn off the receiver to turn off the light.

LOCKING THE CONTROLS

The lock feature prevents you from accidentally turning the receiver on or off, changing the band or frequency, or using the front panel buttons.

Press  to lock all the front panel buttons and **ROTARY TUNING**.  appears.

You can still adjust **VOLUME**, **STONE**, and other controls.

To unlock the buttons, press  again.  disappears.

SETTING AND VIEWING THE LOCAL TIME

Your receiver has two clocks. One displays your local time and the other lets you display the time in any of 42 preset world cities or a world city you specify. Once you set your local time, the receiver automatically calculates the correct time in each of the preset world cities or a world city that you specify and lets you select and display that time.

The time zone map on the back of the receiver shows the difference in hours between UTC (Universal Time Coordinate — formerly called Greenwich Mean Time) and each time zone. To determine your local time from UTC, add or subtract the specified number from UTC time. During Daylight Saving Time, add one more hour.

The clock display shows a random time when you install batteries. Follow these steps to set the local time in the 24-hour format (0:00 – 23:59).

1. Repeatedly press **WORLD/HOME** until **HOME** flashes.
2. Rotate **MANUAL TUNING** until the name of your city (or a city in the same time zone) appears, then press **ENTER** . The receiver beeps and the city's name appears for 2 seconds then disappears. **HOME** and the time appear on the display.
3. Press  **SET**. **HOME** flashes.

4. While **HOME** flashes, use the number buttons to enter the correct time.

Notes:

- If **HOME** stops flashing before you press a number button, start again at Step 3.
- Do *not* precede single-digit hours with a 0. For example, enter **930** for 9:30 AM.
- If you make a mistake, press **C** to erase the last digit, then enter the correct digit.

- If you enter an invalid time, the clock beeps twice and **E** (error) appears for about 1 second. Repeat Steps 3–4 to enter the correct time.

5. Press **ENTER** . The time you set appears, and the seconds start counting from 0.

Note: The receiver does not display the seconds.

VIEWING A WORLD TIME

Important: You need to set your local time before following these steps. See “Setting and Viewing the Local Time” on Page 16.

1. Repeatedly press **WORLD/HOME** until **WORLD** flashes.
2. Rotate **MANUAL TUNING** until the name of the world city (or a city in the same time zone) appears. The current time in that city appears on the display.
3. To save the displayed city as your world city, press **ENTER** . **WORLD** stops flashing. Then, the world city's name disappears from the display within 2 seconds.
4. To return to your home time, repeatedly press **WORLD/HOME** until **HOME** flashes. Your home city's name and the time in that city appear.
5. Press **ENTER** . **HOME** stops flashing.

CHANGING A WORLD CITY NAME

You can change the name of any of the preprogrammed world cities to a name you choose, then save the new name in the receiver's memory.

1. Repeatedly press **WORLD/HOME** until **HOME** flashes.
 2. Turn **MANUAL TUNING** to select a city in the same time zone as the city you want to change.
 3. Press **EDIT**. The first character of the city's name flashes.
 4. Turn **MANUAL TUNING** to select the desired character.
 5. When the character you want appears, press **TUNING**  to move to the next position, then turn **MANUAL TUNING** to enter the next character (up to 8 characters).
- Note:** If you want to correct a character you entered, press **TUNING**  to move back to it.
6. Press **ENTER** . The receiver stores the name of the world city you entered.

TUNING STATIONS

Note: “Special Tuning Controls” on Page 24 contains more information about using your receiver’s controls.

Selecting a Band

Press **ATS/FM**, **ATS/LW**, **ATS/MW**, or **METER/SW** to select the band. (Press **ATS/MW** for AM.)

To select a smaller band within the SW band, press **METER/SW** again. When **m** flashes on the right side of the display, enter the desired band by pressing its labeled key on the keypad. For example, to select the 75 meter shortwave band, press **3**.

Manual Tuning

You can select a lower or higher frequency by pressing **TUNING** **^** or **v**. The frequency changes in the following increments.

Band	Tuning Increment
FM	0.1 MHz
LW	9 kHz
MW	9 or 10 kHz
SW	0.005 MHz

You can also select a higher or lower frequency by turning **MANUAL TUNING**.

As you turn **MANUAL TUNING**, you might find that you need the frequencies to change more slowly. To change how quickly the frequencies change as you rotate the knob, repeatedly press **STEP** on the front of the receiver so the arrow on the right side of the display points to **FAST** or **SLOW**.

If you set **STEP** to **FAST**, the tuning increments are the same as when you press **TUNING** **▲** or **▼**. If you select **SLOW**, the tuning increments are smaller so you can fine tune the frequency.

Band	Fast	Slow
FM	0.1 MHz	0.05 MHz
LW	9 kHz	1 kHz
MW	9/10 kHz	1 kHz
SW	5 kHz	1 kHz
AM Mode set to USB or LSB	1 kHz	40 Hz

Note: You can tune standard AM, upper sideband (USB), and lower sideband (LSB) frequencies. For more information, see “Tuning SSB Stations” on Page 25.

If you set **STEP** to **STOP**, turning **MANUAL TUNING** has no effect at all, so you cannot accidentally change the frequency.

Note: Setting **STEP** to **STOP** locks only **MANUAL TUNING**. For information about locking the front panel buttons, see “Locking the Controls” on Page 15.

Direct Access Tuning

Follow these steps if you know a station’s frequency and want to directly tune to that station.

1. Press **F/FREQ**. The frequency display disappears and **FREQ** flashes for about 30 seconds.
2. Use the number keys and **•** to enter the frequency, then press **ENTER** **↵**.

Notes:

- If you wait more than 30 seconds to press a button, the previous frequency returns to the display. Begin again at Step 1.
- If you make a mistake, press **C** (cancel) to erase the last digit, then enter the correct digit.

Scan Tuning

To automatically tune up or down to the next active frequency in the selected band, hold down **TUNING** **▲** or **▼** for about 1 second. The receiver scans up or down the selected band and tunes to the first frequency it finds with a strong signal.

To scan for an SW (shortwave) frequency in one of the 14 meter bands, press **SW**, press the number button with the meter range you want to scan, then press **TUNING** **▲** or **▼** to scan the band.

Notes:

- When scanning, the receiver only searches for frequencies with strong signals. To search for stations with weaker signals, use one of the manual tuning methods.
- When scanning in a lower band, the receiver searches only within the selected band and stops at the upper and lower limits of the band.
- Your receiver shows the shortwave bands you can receive on the bottom of the display.

TUNING PREPROGRAMMED SHORTWAVE STATIONS

Your receiver is preprogrammed with 212 of the most popular worldwide and U.S. shortwave stations. You can quickly tune these popular stations.

Notes:

- You cannot change the preset shortwave stations stored in your receiver's memory.
- You can store shortwave frequencies into the receiver's empty

memory locations. See "Storing SW Frequencies in Memory" on Page 28 for more information.

- International commercial broadcast programs (often in English) usually contain news, commentaries, music, and special features reflecting the culture of the broadcasting country. Reception for this range is best between 6:00 PM and midnight (your time).

Follow these steps to tune preprogrammed shortwave stations.

1. Find the country and frequency for the shortwave station you want to tune in the "DX-398 Shortwave Pages Chart" on Page 21. Then write down the page number and memory location number shown on the chart for that station.
2. Press **SW**, then press **PAGE**.
3. While **PAGE** is flashing, repeatedly press **TUNING**  or **TUNING**  or turn **MANUAL TUNING** until the page number you wrote down in Step 1 appears next to **PAGE**. The name of the broadcaster's country also appears next to **PAGE**.

Then, when you reach the desired page number, press **ENTER** .

4. Press a number key to enter the memory location number you wrote down in Step 1. The receiver tunes the station.

Note: If you press a number key for a memory location number where there is no station stored, **MEMOFREE** flashes for a few seconds. Then the receiver tunes the station you previously tuned.

DX-398 SHORTWAVE PAGES CHART

Note: All frequencies are in MHz.

Page	Country (Stations)	Memory Location								
		1	2	3	4	5	6	7	8	9
1	AUSTRALIA (Radio Australia)	5.995	9.580	9.860	11.800	11.880	13.755	15.365	17.795	17.860
2	AUSTRIA (Radio Austria)	6.015	7.325	9.495	9.655	9.870	13.730			
3	CANADA Radio Canada Intl.)	5.960	6.070	6.155	9.625	9.640	9.755	11.855	13.650	13.670
4	CHINA (China Radio Intl.)	7.405	9.560	9.690	9.710	9.730	11.680	11.695	15.130	
5	CST RICA (Adventist World Radio, Radio for Peace Intl.)	5.030	6.150	6.205 USB	7.385	9.725	13.750	15.050	15.460	
6	CUBA (Radio Habana)	6.000	6.180	9.505	9.820	9.380 USB	13.715	13.725 USB		
7	ECUADOR (HCJB Voice of Andes)	5.860	9.445	9.745	11.960	12.005	15.115	15.540	21.455 USB	
8	ENGLAND (BBC World Service)	5.965	5.975	6.175	6.195	9.515	9.590	9.600	9.740	9.915

Page	Country (Stations)	Memory Location								
		1	2	3	4	5	6	7	8	9
9	ENGLAND (BBC World Service)	11.750	11.835	12.095	15.220	15.400	15.575	17.830	17.840	21.660
10	FRANCE (Radio France Intl.)	11.615	13.625	15.325	15.530	17.620				
11	GERMANY (Deutsche Welle-Voice of Germany)	5.960	6.040	6.085	6.145	6.185	9.515	9.535	9.615	9.640
12	HOLLAND (Radio Netherlands Wereldomroep)	6.020	6.165	9.700	9.720	9.845	9.890	15.315	17.605	
13	ISRAEL (Kol Israel)	7.465	9.435	11.605	12.077	15.615	15.640			
14	JAPAN (Radio Japan/NHK)	5.960	6.110	6.120	9.535	11.705	11.895	12.000	13.630	
15	KOREA N (Radio Pyongyang)	6.575	9.975	11.335	13.670					
16	KOREA S (Radio Korea Intl.)	9.650	11.715	13.650	15.575					
17	N ZEALND (Radio New Zealand)	6.100	9.570	9.700	9.810	9.875	11.735	11.900	11.905	15.115
18	NORWAY (Radio Norway Intl.)	5.905	7.440	7.465	7.520	9.560	11.840	13.800	15.340	
19	RUSSIA (Voice of Russia)	7.125	7.240	7.250	9.665	11.630	11.675	11.750	12.050	15.400

Page	Country (Station)	Memory Location								
		1	2	3	4	5	6	7	8	9
20	S AFRICA (Channel Africa)	3.220	5.955	9.530	9.675	11.900	15.240			
21	SWEDEN (Radio Sweden)	6.065	6.090	7.115	7.290	11.650	13.740	15.240		
22	SWITZLND (Swiss Radio Intl.)	6.135	9.885	9.905	13.635					
23	TAIWAN (Voice of Free China)	5.950	7.130	7.445	9.680	11.740	15.600	17.750		
24	U.S.A. (Voice of America)	5.985	6.035	6.130	7.405	9.455	9.760	11.695	11.715	15.205
25	U.S.A. (Voice of America, WEWN)	15.410	15.580	17.895	5.825	6.890	7.425	9.455	11.875	13.615
26	U.S.A. (WHRI, WRMI, WRNO)	5.745	5.760	6.040	7.315	9.495	13.760	9.955	7.355	7.395
27	U.S.A. (WSHB)	5.850	6.095	7.510	7.535	9.355	9.430	11.550	13.770	15.665
28	U.S.A. (WWCR, WGTG)	3.210	3.215	5.070	7.435	9.475	12.160	15.685	5.085	9.400
29	(Open)									

ADJUSTING THE TONE

Set **TONE** to **NEWS** to enhance broadcast voices while listening to talk shows or news programs on SW, MW, and LW frequencies.

Set **TONE** to **MUSIC** to enhance treble and bass response when listening to a music program (especially FM programs).

Set **TONE** to **NORM** to help reduce interference.

SPECIAL TUNING CONTROLS

STEREO/MONO-FM

jack and setting **STEREO/MONO-FM** on the right side of the receiver to **STEREO**.

To improve reception for weak FM stereo stations, set **STEREO/MONO-FM** to **MONO-FM**. The sound is no longer in stereo, but the reception should improve.

WIDE/NARR.-AM

A strong station that broadcasts close to a frequency you tuned might interfere with that frequency. To reduce interference from adjacent stations in the SW, MW, or LW bands, set **WIDE/NARR.-AM** on the right side of the receiver to **NARR.-AM**. Or, if there is no interference, set it to **WIDE** for better sound.

AM RF GAIN

You can receive FM stereo by connecting stereo headphones to the 

AM RF GAIN on the left side of the receiver lets you tune a received signal for the best SW reception. If the signal is weak, turn **AM RF GAIN** toward +. If the sound is distorted, turn **AM RF GAIN** toward –.

TUNING SSB STATIONS

SSB (single sideband) is very popular among amateur radio and business radio users because of its superior signal quality. Many amateurs who operate SSB and transmit below 10 MHz generally use LSB (lower sideband), while amateur and commercial stations who transmit above 10 MHz generally use USB (upper sideband). Your receiver receives both USB and LSB transmissions.

Follow these steps to receive SSB stations.

1. Select an SW band (see “Selecting a Band” on Page 18).
2. If you know the frequency of an SSB station, enter that frequency.

Or, scan the band for SSB stations by slowly rotating **MANUAL TUNING**, tuning through the selected band until you hear an SSB station. Or, scan the band for USB or LSB stations by holding down **TUNING ▼** or **TUNING ▲** for about 2 seconds until you hear an USB or LSB station

Note: SSB stations sound distorted when you tune to them in the normal SW band. To help you find SSB stations, watch for deflections on the signal strength indicator. Since SSB is transmitted with a suppressed carrier, the signal strength indicator will move more quickly when there is a transmission and more slowly during pauses in the transmission.

3. When you have located an SSB station, press **AM MODE** to receive the transmission. Repeatedly press **AM MODE** to switch between USB or LSB transmissions (try LSB for frequencies below 10 MHz or USB for frequencies above 10 MHz).
4. Set **STEP** to **SLOW** then readjust **MANUAL TUNING** for maximum intelligibility.

USING RDS

The receiver displays information about FM radio stations that transmit a Radio Data System (RDS) signal. When the receiver receives an RDS station, the station’s call letters appear on the display. Also, if the station broadcasts CT (clock time) information, the receiver automatically corrects the displayed time.

Follow these steps to use RDS.

1. Turn on the receiver.
2. Tune the receiver to an FM station that transmits RDS (and CT) information.
3. Set **TIME SET** on the right side of the receiver to **AUTO**.
4. Make sure that your local time (as described in "Setting and Viewing the Local Time" on Page 16) has been set correctly. (The receiver compares the CT information with your local time to display the correct time at the broadcaster's location).
5. If your time zone is using Daylight Saving Time, repeatedly press  until  appears.

MEMORY FUNCTIONS

Besides tuning to the preprogrammed shortwave stations (see “Tuning Preprogrammed Shortwave Stations” on Page 20), you can store and then quickly tune up to 94 frequencies in your receiver’s *memory locations*. The memory locations are grouped into *pages* (nine memory locations per page).

You can store up to 18 FM frequencies (2 pages), 18 MW frequencies (2 pages), and 9 LW frequencies (1 page) into your receiver’s FM/MW/LW memory locations. You can store frequencies automatically (see “Automatic Storage”) or manually (see “Manual Storage”).

Additionally, you can store frequencies into any empty memory location in the receiver’s SW memory pages (see “Storing SW Frequencies in Memory” on Page 28). There are 40 empty locations scattered throughout the pages, and all 9 locations in Page 29 are blank. See “DX-398 Shortwave Pages Chart” on Page 21.

STORING FM, MW, OR LW FREQUENCIES IN MEMORY

Automatic Storage

You can set your receiver’s automatic tuning system (ATS) so it automatically stores all available FM, LW, and MW

stations (from strongest to weakest) in the FM, LW, and MW memory locations until all the memory locations are occupied. This feature helps you find local stations in another city by simply pressing a memory location button.

Note: You cannot use this feature to store SW stations.

To use ATS, hold down **ATS/FM**, **ATS/LW**, or **ATS/MW** for about 3 seconds. The receiver beeps and the selected band and **ATS** flash. Then the receiver automatically scans and stores the strongest frequency into the first available memory location. It continues to scan and store frequencies until it fills the nine memory locations in that page.

The first stored station appears. Once the receiver has stored nine stations in Page 1, press **PAGE** to select the next page. Then hold down **ATS/FM** or **ATS/MW** again to store the other available frequencies. The receiver beeps when it finishes automatically tuning stations.

Manual Storage

1. Press **ATS/FM**, **ATS/MW**, or **ATS/LW** to select the band where you want to store a frequency.
2. Tune to the frequency you want to store.

-
3. Repeatedly press **PAGE** to select the page where you want to store the frequency. **1** or **2** appears under **PAGE**.

Notes:

- **PAGE** flashes only when the receiver is set to SW mode.
 - If you wait more than 10 seconds to press **PAGE**, **PAGE** stops flashing.
 - If you pressed **ATS/LW** in Step 1, **PAGE** does not appear because there is only one LW page.
4. Press **M/MEM**. **MEMO** flashes for about 12 seconds. The number for the first available empty memory location for the selected page flashes next to **MEMO**.

Note: If an empty memory location number does not flash, all memory locations are full in the band you selected. If this happens, clear a memory location (see “Deleting a Station You Stored” on Page 30) then store the frequency. Or, to replace a stored frequency with a new frequency, repeatedly press **TUN-**

ING **▼** or **▲** to select a new frequency, press **M/MEM**, then press the number key for the memory location. After a few seconds, the receiver beeps and stores the new frequency in the memory location.

5. Press **ENTER** **⬅** to store the frequency in the flashing memory location. The receiver beeps and a bracket appears around the memory location number where you stored the frequency, to show that the frequency was stored there.

STORING SW FREQUENCIES IN MEMORY

Follow these steps to store shortwave frequencies into empty memory locations in the shortwave page.

1. Press **METER/SW** to select the shortwave band.
2. Tune to the frequency you want to store. The currently selected page number appears under **PAGE**.
3. Press **M/MEM**. **PAGE** and **MEMO** flash for about 10 seconds.

-
4. While **PAGE** and **MEMO** flash, repeatedly press **TUNING**  or  to select the page where you want to store the frequency.

The page's number appears under **PAGE** and the name of the page's country appears as you press **TUNING**  or . For each page, the number of the first available empty memory location in that page flashes next to **MEMO**.

Note: If you wait more than 10 seconds to press **TUNING**  or , **PAGE** and **MEMO** stop flashing. If this happens, start again at Step 3.

5. Press **ENTER**  to assign the frequency to the flashing memory location. The receiver beeps and a bracket appears around the number where you stored the frequency.

Notes:

- If the receiver's memory is full, **MEMOFULL** appears when you press a number key.
- To replace a frequency you stored with a new frequency, repeatedly press **TUNING**  or **TUNING**  to select a new frequency, press **M/MEM**, then hold down the number key corresponding to that memory

location for about 2 seconds. The receiver beeps and stores the new frequency in the memory location.

ASSIGNING A NAME TO AN FM/MW/LW STATION OR SW PAGE

To help you easily identify stored frequencies, you can assign a name (up to 8 characters) to an FM, MW, or LW memory location, or to an SW page.

1. Select a band (see "Selecting a Band" on Page 18).
2. Repeatedly press **PAGE** to select the page number where you stored the desired frequency.
3. For an FM, MW, or LW station, use the number keys to enter the desired memory location number.
4. Press **EDIT**. A cursor flashes under the displayed frequency for about 30 seconds.
5. While the cursor flashes, turn **MANUAL TUNING** until you see the first character you want to use.

Note: If you wait more than 20 seconds to turn **MANUAL TUNING**, the cursor stops flashing. If this happens, start again at Step 4.

6. When the character you want appears, press **TUNING**  to move to the next position, then rotate **MANUAL TUNING** to select the next character.

Note: If you want to correct a character you entered, press **TUNING**  to move back to it.

7. When you have finished entering the name, press **ENTER** .

DELETING A STATION YOU STORED

1. Select a band (see "Selecting a Band" on Page 18).
2. Press **ENTER** .
3. Repeatedly press **PAGE** until the page with the desired frequency appears.
4. Use the number keys to enter the memory location number.
5. Press **M/MEM**.
6. Press **C** (cancel).

LOCKING/UNLOCKING A STORED STATION

After storing your favorite stations, you can lock any of them in memory. This helps you avoid overwriting the station if you accidentally use the receiver's ATS automatic store feature.

To lock or unlock a station, recall the station, press **M/MEM** then press .  appears (locked) or disappears (unlocked).

MOVING A FREQUENCY TO ANOTHER MEMORY LOCATION

Note: These steps show you how to move a frequency to another memory location on the same page. To move the frequency to another memory location on a different page, follow the steps in "Storing FM, MW, or LW Frequencies in Memory" on Page 27 or "Storing SW Frequencies in Memory" on Page 28.

1. Select a band (see "Selecting a Band" on Page 18).
2. Recall the memory location number of the frequency you want to move.
3. Press **M/MEM**. **MEMO** and the memory location where the station is programmed flash.

-
4. Use the number keys to enter the new memory location number. The receiver beeps.

USING PRIORITY

You can store one MW/LW/FM station as the priority station, then quickly recall it.

1. Tune to your favorite station.
2. Press **M/MEM**.
3. Press **PRIORITY** to store the station in the priority location.

Note: If you previously stored a priority station, pressing **PRIORITY** replaces it.

4. To tune to the priority station, press **PRIORITY**. The receiver tunes to the priority station.

The receiver stores a SW priority station differently than an MW/LW/FM station. It stores a page containing 9 stations (including the SW station you want to store as the priority station) in a memory location.

1. Use the steps under "Tuning Preprogrammed Shortwave Stations" on Page 20 to tune to the page where you stored your favorite shortwave station.
2. Press **M/MEM** to store the page containing the desired station.

3. Press **PRIORITY** to store the page with the desired station in the priority location.

Note: If you previously stored a priority station, pressing **PRIORITY** replaces it.

4. To tune to the priority station, press **PRIORITY**. The receiver tunes to the page you selected then to the strongest frequency among the 9 preset stations.

Note: If there is a stronger station on the page you selected, the receiver might tune to it instead of the station you selected.

5. Press the memory location number you selected in Step 1 under "Tuning Preprogrammed Shortwave Stations" on Page 20 to tune to the priority station.

TIMER FUNCTIONS

USING THE TIMER ALARMS

Your receiver has three timer alarms. You can set these alarms to sound (buzzer or radio) at a time you set.

Setting an Alarm

1. If you want the radio to turn on at the alarm time, tune to the desired station. Then press **M/MEM. MEMO** and the memory location where the station is programmed flash for about 10 seconds.
2. Press **TIMER 1**, **TIMER 2**, or **TIMER 3** twice. **TIMER**, the selected timer number, and  (buzzer) flash for about 10 seconds.
Note: If **MEMO** stops flashing before you press **TIMER 1**, **TIMER 2**, or **TIMER 3**, start again from Step 2.
3. To select the type of alarm (buzzer or radio), repeatedly press **AM MODE** until  for the buzzer or  for the radio flashes next to **TIMER**.
Note: If  or , stops flashing before you press **AM MODE**, start again from Step 2.
4. Use the number keys to enter the time you want the alarm to sound.
5. Press **ENTER** .
6. Turn the receiver off.

Silencing the Alarm

When the display shows the alarm time, the radio turns on or the buzzer sounds and **TIMER**, 1, 2, or 3, and  or  flash on the display.

If you selected the buzzer, its volume increases after several seconds. After a few more seconds, the buzzer's volume increases again. Then, after 60 seconds, the buzzer turns itself off and sounds again the next day at the set time.

If you selected the radio, it automatically turns off after 60 minutes. To silence the radio or the buzzer sooner, press **POWER** to turn off the receiver. **TIMER**, 1, 2, or 3, and  or  disappear and the alarm sounds again the next day at the set time.

Using the Snooze Feature

To silence the buzzer or radio alarm for about 5 minutes, press any button except **POWER**, , or .  flashes above . This temporarily silences the buzzer or radio and then it sounds again. You can repeat this for up to 30 minutes using the buzzer alarm or up to 60 minutes using the radio alarm.

Note: The snooze feature does not work if a plug is connected to the **REC LINE OUT** jack.

Turning a Timer Alarm On or Off

To turn off the alarm so it does not sound again, press **TIMER 1**, **TIMER 2**, or **TIMER 3**. Then press **C** while **TIMER** flashes.

If you want to turn on a timer alarm again, press **TIMER 1**, **TIMER 2**, or **TIMER 3**. Then press **ENTER**  while **TIMER** and **1**, **2**, or **3** flash.

Timer Recording

You can connect a tape recorder to the receiver and have it record starting at a preset time.

Connect your tape recorder as described in "Connecting a Tape Recorder" on Page 10 and set your tape recorder to record. Then follow the steps in "Using the Timer Alarms" on Page 32 to have the radio start to play at the time you want.

When the radio plays at the time you set, the tape recorder starts and records the broadcast.

USING THE SLEEP TIMER

The sleep timer lets you set the receiver to turn off in an amount of time you set.

1. With the receiver off, hold down **POWER** until the receiver beeps and turns on. **90** appears and  flashes.

After a few seconds, **90** disappears and  stops flashing.

2. Tune to the desired station.

After the preset number of minutes, the receiver turns off. To turn off the receiver sooner, press **POWER**.

To change the playing time after you set it, hold down **POWER**. The sleep timer changes from 90 → 80 → 70 → 60 → 50 → 40 → 30 → 20 → 10 → 90 minutes, repeating the sequence as you hold down **POWER**. Release **POWER** when the desired amount of time appears.

LISTENING HINTS

Shortwave listening is a hobby with thousands of participants worldwide. It requires no special knowledge or skills, but your enjoyment increases as you gain experience and develop special listening techniques.

The information in this section can help you make the most of your DX-398.

REFERENCE SOURCES

Many books and magazines about shortwave listening are available through your local library or newsstand. Consult sources such as the *World Radio Handbook*, *Radio Amateur's Handbook*, *Passport to World Band Radio*, *Monitoring Times*, and *Popular Communications*. These publications can help you learn about the conditions that make long-distance reception possible and provide up-to-date listings for shortwave broadcasts in English and in other languages.

FREQUENCY CONVERSION

A band is a group of frequencies. Sometimes, bands are grouped according to their wavelengths, in meters. The tuning location of a station can be expressed as a frequency (kHz or MHz) or a wavelength (meters).

Amateur radio operators generally refer to the frequencies they operate on

using the frequency's wavelength. For example, the 19-meter band refers to the range of frequencies with waves about 19 meters long.

Use the following equations to convert kHz, MHz, and meters.

To convert MHz to kHz, multiply by 1,000. For example:

$$9.62 \text{ MHz} \times 1000 = 9,620 \text{ kHz}$$

To convert kHz to MHz, divide by 1,000. For example:

$$2780 \text{ kHz} \div 1000 = 2.780 \text{ MHz}$$

To convert MHz to meters, divide 300 by the number of MHz. For example:

$$300 \div 7.1 \text{ MHz} = 42.25 \text{ meters}$$

To convert meters to MHz, divide 300 by the number of meters. For example:

$$300 \div 42.25 \text{ meters} = 7.1 \text{ MHz}$$

BAND ALLOCATION

Certain bands are set aside for specific purposes.

Amateur Radio Frequencies

Tuning to the amateur radio frequencies can be interesting and helpful, because amateur radio operators often broadcast emergency information when other means of communication break down.

Amateur radio operators use the following bands. Portions of these bands are set aside for continuous wave (CW) Morse code communication or for single sideband (SSB) voice communication, as shown below.

160 meters:

1,800–2,000 kHz: SSB

80 meters:

3,500–3,800 kHz: CW
3,800–4,000 kHz: SSB

40 meters:

7,000–7,150 kHz: CW
7,150–7,300 kHz: SSB

20 meters:

14,000–14,200 kHz: CW
14,200–14,350 kHz: SSB

15 meters:

21,000–21,250 kHz: CW
21,250–21,450 kHz: SSB

10 meters:

28,000–28,500 kHz: CW
28,500–29,700 kHz: SSB

Note: These ranges are not precisely observed everywhere in the world.

International Frequencies

International commercial broadcasts are found in the following shortwave bands. Programs (often in English) usually contain news, commentaries, music, and special features reflecting the culture of the broadcasting country. Reception for this range is best between 6:00 PM and midnight (your time).

Band (in meters)	Frequency Range (in MHz)
*120	2.300–2.495
*90	3.200–3.400
*75	3.900–4.000
*60	4.750–5.060
49	5.900–6.200
**41	7.100–7.350
31	9.400–9.990
25	11.600–12.100
21	13.500–13.870
19	15.100–15.800
16	17.480–17.900
13	21.450–21.750
11	25.600–26.100

* These bands are reserved for stations in tropical areas.

** Interference is heavy in the 41m band (7.100–7.300 MHz) because amateur radio operators and international stations share this range.

Aircraft Frequencies

Aircraft on international routes sometimes use SW. Most transmissions are in SSB, although you can still hear some MW transmissions. Here are some bands where you might hear aircraft communications.

4,650–4,750 kHz

6,545–6,765 kHz

8,815–9,040 kHz

11,175–11,400 kHz

13,200–13,360 kHz

15,010–15,100 kHz

17,900–18,030 kHz

Ships and Coastal Station Frequencies

Most transmissions from ships and coastal stations are in SSB and CW. You can hear these transmissions in the following bands.

2,000–2,300 kHz*

4,063–4,139 kHz

4,361–4,438 kHz

8,195–8,181 kHz

12,330–12,420 kHz

13,107–13,200 kHz

16,460–16,565 kHz

* The Coast Guard and small boats use this band, with 2,182 kHz set aside as the international distress and emergency channel.

Time Standard Frequencies

The following frequencies announce the exact time of day at specified intervals.

WWV in Fort Collins, Colorado:

2,500 kHz

5,000 kHz

10,000 kHz

15,000 kHz

20,000 kHz

CHU in Canada: 7,335 kHz

VNG in Australia:

4,500 and 12,000 kHz

Longwave Band

The 150–519 kHz range is known as the longwave band. Most stations in this range serve as beacons for aircraft and marine navigation by continuously transmitting their call letters. Reception for this range is best between 6:00 PM and midnight (your time).

Some ships also use this range, with 500 kHz set aside as an international distress and emergency station.

Most stations in this range use CW (Morse code), although some use AM voice transmission for weather broadcasts.

LISTENING GUIDE

The following list contains some of the more frequently heard stations. All stations broadcast in English unless otherwise specified. You can hear these stations throughout North America. However, reception varies based on the season, time of day, and a number of other conditions.

This information can change at any time. For sources of yearly, up-to-date listings, see "Reference Sources" on Page 34.

kHz	Station	Location	Remarks
3,223	Radio SR	Swaziland	
3,265	Radio Mozambique	Maputo, Mozambique	
3,300	Radio Cultural	Guatemala City, Guatemala	Religious Programs
3,380	Radio Iris	Esmeraldas, Ecuador	Programs in Spanish
3,385	FR3	Cayenne, French Guiana	Programs in French
3,396	Radio Kaduna	Kaduna, Nigeria	
4,750	Radio Bertoua	Bertoua, Cameroon	
4,755	Imo Regional Radio	Imo, Nigeria	
4,777	Radio/TV Gabon	Libreville, Gabon	Programs in French
4,795	Radio Nueva America	La Paz, Bolivia	Programs in Spanish
4,820	Radio Paz y Bien	Ambala, Ecuador	Programs in Spanish
4,832	Radio Reloj	San Jose, Costa Rica	Programs in Spanish
4,855	Radio Clube do Para	Belem, Brazil	Programs in Portugese
4,890	National Broadcasting Commission	Papua New Guinea	
4,915	Voice Kenya	Nairobi, Kenya	
4,920	Australian Broadcasting Commission	Brisbane, Australia	
4,945	Radio Colosal	Neiva, Colombia	Programs in Spanish
4,965	Radio Santa Fe	Bogota, Colombia	Programs in Spanish
4,980	Ecos del Torbes	San Cristobal, Venezuela	Programs in Spanish
5,020	Solomon Islands Broadcasting Service	Honiara, Solomon Islands	
5,057	Radio Gjrokaster	Gjrokaster, Albania	Programs in Albanian

kHz	Station	Location	Remarks
5,950	Guyana Broadcasting Service	Georgetown, Guyana	
5,954	Radio Casino	Puerto Limon, Costa Rica	
5,960	Radio Canada International	Montreal, Canada	
5,980	Radio RSA	Johannesburg, South Africa	
6,005	CFCX	Montreal, Canada	
6,025	Radio Malaysia	Kuala Lumpur, Malaysia	Programs in Chinese
6,045	Radio Australia	Lyndhurst, Australia	
6,055	Nihon Shortwave Broadcasting Company	Tokyo, Japan	Programs in Japanese
6,060	Radio Nacional	Buenos Aires, Argentina	Programs in Spanish
6,075	Radio Sutatenza	Bogota, Colombia	Programs in Spanish
6,090	Radio Luxembourg	Ville Louvigny, Luxembourg	
6,095	Polskie Radio	Warsaw, Poland	
6,105	Radio New Zealand	Wellington, New Zealand	
7,140	Trans World Radio	Monte Carlo, Monaco	
7,170	Radio Noumea	Noumea, New Caledonia	Programs in French
7,300	Radio Tirana	Tirana, Albania	
9,475	Radio Cairo	Cairo, Egypt	
9,515	Voice of Greece	Athens, Greece	
9,525	Radio Korea	Seoul, South Korea	
9,530	Spanish Foreign Radio	Madrid, Spain	
9,535	Swiss Radio International	Berne, Switzerland	
9,540	Radio Prague	Prague, Czech Republic	
9,570	Radio Bucharest	Bucharest, Romania	
9,575	Italian Radio and Television Service	Rome, Italy	

kHz	Station	Location	Remarks
9,610	Radio-TV Algeria	Algiers, Algeria	Programs in Arabic
9,620	Radio Berlin International	Berlin, Germany	
9,645	Radio Norway	Oslo, Norway	
9,720	Radio Iran	Tehran, Iran	Programs in Farsi
9,745	HCJB	Quito, Ecuador	
9,770	Austrian Radio	Vienna, Austria	
9,800	Radio Kiev	Kiev, Ukraine	
9,835	Radio Budapest	Budapest, Hungary	
10,040	Voice of Vietnam	Hanoi, Vietnam	
11,655	Israel Radio	Jerusalem, Israel	
11,690	Radio Kuwait	Kuwait City, Kuwait	
11,705	Radio Sweden	Stockholm, Sweden	
11,720	Radio Moscow	Moscow, Russia	
11,735	Radio Sofia	Sofia, Bulgaria	
11,745	Voice of Free China	Taipei, Taiwan	
11,815	Radio Japan	Tokyo, Japan	
11,825	Radio Tahiti	Papeete, Tahiti	Programs in Tahitian
11,835	4VEH	Cap Haitien, Haiti	
11,845	Radio Canada International	Montreal, Canada	
11,850	Deutsche Welle	Cologne, Germany	
11,890	Voice of Chile	Santiago, Chile	
11,900	Radio RSA	Johannesburg, South Africa	
11,910	BBC	London, England	
11,930	Radio Havana Cuba	Havana, Cuba	
11,935	Radio Portugal	Lisbon, Portugal	
11,945	Radio Beijing	Beijing, China	
11,955	Voice of Turkey	Ankara, Turkey	
11,980	Radio Moscow	Moscow, Russia	
15,038	Saudi Arabian Broadcasting Service	Riyadh, Saudi Arabia	Programs in Arabic

kHz	Station	Location	Remarks
15,084	Voice of Iran	Tehran, Iran	Programs in Farsi
15,135	Radio Moscow	Moscow, Russia	
15,165	HCJB	Quito, Ecuador	
15,190	ORU	Brussels, Belgium	
15,205	All India Radio	New Delhi, India	
15,260	BBC	London, England	
15,265	Finnish Radio	Helsinki, Finland	
15,275	Radio Sweden	Stockholm, Sweden	
15,305	Swiss Radio International	Berne, Switzerland	
15,310	Radio Japan	Tokyo, Japan	
15,320	Radio Australia	Melbourne, Australia	
15,400	BBC	London, England	
15,430	Radio Mexico	Mexico City, Mexico	Programs in Spanish
15,465	Radio Pakistan	Islamabad, Pakistan	Programs in Urdu
17,720	Radio France International	Paris, France	
17,825	Vatican Radio	Vatican City	
17,860	Austrian Radio	Vienna, Austria	
21,495	Israel Radio	Jerusalem, Israel	
21,525	Radio Australia	Melbourne, Australia	
21,625	Israel Radio	Jerusalem, Israel	
21,645	Radio France International	Paris, France	
21,735	Radio-TV Morocco	Rabat, Morocco	Programs in Arabic
25,790	Radio RSA	Johannesburg, South Africa	

BIRDIES

Birdies are the products of internally generated signals that make some frequencies difficult or impossible to receive. If you program a birdie frequency, you hear only noise on that frequency. The most common birdies to watch for on this receiver are:

450 kHz	3,844 kHz	9,000 kHz	10,250 kHz
18,000 kHz	20,490 kHz	21,835 kHz	21,868 kHz

Notes:

- See “Storing SW Frequencies in Memory” on Page 28 for more information about using the shortwave page 29.
- Interference from devices such as dimmer switches and motors and atmospheric conditions can disrupt shortwave listening. You can minimize interference by moving the receiver away from the source of noise, or turning off the offending device. Shortwave stations sometimes change their operating frequency to avoid interfering with other stations, to improve reception during different seasons, or to take advantage of signal propagation changes due to sun spots. For this reason, a given station might not be found on the frequency listed in memory. Reception of these stations can also be affected by rapid changes in the ionosphere. Sometimes the station you are listening to might fade out completely. These occurrences are normal shortwave listening conditions.

AMATEUR SHORTWAVE BANDS IN THE US

Amateur radio operators in the U.S.A. are found in the bands listed here. They operate mostly in LSB (Lower Side Band) mode. Morse code operators are generally found in the lower areas of each band. The amateur radio operators with the most advanced classification are found in the upper areas of each band.

Amateur Shortwave Bands (in MHz)

3.500 – 4.000 MHz	80 Meters	7.000 – 7.300 MHz	40 Meters
10.100 – 10.150 MHz	30 Meters	14.0 – 14.350 MHz	20 Meters
18.068 – 18.168 MHz	17 Meters	21.000 – 21.450 MHz	15 Meters
24.890 – 24.990 MHz	12 Meters	28.000 – 29.700 MHz	10 Meters

TROUBLESHOOTING

We do not expect you to have any problems with your receiver, but if you have a problem, the information in this chart might help. If the problem persists, take the receiver to your local RadioShack store for assistance.

SYMPTOM	POSSIBLE CAUSE	SUGGESTION
Weak or intermittent sound.	The internal batteries are weak.	Check the batteries and replace or recharge them as necessary.
	The antenna must be adjusted.	Adjust the telescoping antenna or connect an external antenna.
	The signal is blocked by metal or concrete.	Move the receiver near a window when you use it inside a vehicle or metal-frame building.
	The frequency is not tuned properly.	Fine-tune the frequency. See "Tuning Stations" on Page 18.
Scanning stops on a frequency that has an unclear transmission.	The frequency is not tuned properly.	Fine-tune the frequency. See "Tuning Stations" on Page 18.
	The frequency is one of the receiver's birdie frequencies.	Tune another frequency.
Frequency does not change when you turn ROTARY TUNING .	FAST/SLOW/STOP is set to STOP .	Set FAST/SLOW/STOP to FAST or SLOW .
ROTARY TUNING and front panel buttons do not respond.	The keypad is locked ( appears on the display).	Press  .

CARE AND MAINTENANCE

Your RadioShack DX-398 All-Band Shortwave Receiver with Radio Data System is an example of superior design and craftsmanship. The following suggestions will help you care for your receiver so you can enjoy it for years.



Keep the receiver dry. If it gets wet, wipe it dry immediately. Liquids might contain minerals that can corrode the electronic circuits.



Use and store the receiver only in normal temperature environments. Temperature extremes can shorten the life of electronic devices, damage batteries, and distort or melt plastic parts.



Keep the receiver away from dust and dirt, which can cause premature wear of parts.



Handle the receiver gently and carefully. Dropping it can damage circuit boards and cases and can cause the receiver to work improperly.



Use only fresh batteries of the required size and recommended type. Batteries can leak chemicals that damage your receiver's electronic parts.



Wipe the receiver with a damp cloth occasionally to keep it looking new. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the receiver.

Modifying or tampering with the receiver's internal components can cause a malfunction and might invalidate its warranty and void your FCC authorization to operate it. If your receiver is not performing as it should, take it to your local RadioShack store for assistance.

RESETTING THE DISPLAY

If the display shows random characters or does not work properly, you might need to reset it.

Important: This procedure clears the set time and resets the receiver's microprocessor (the component that controls how the receiver operates), but all stations remain stored. Reset the receiver only when you are sure it is not working properly.

To reset the display, insert a pointed object, such as a straightened paper clip, into the **RESET** hole on the bottom of the receiver. Then gently press and release the button inside the hole.

SPECIFICATIONS

Circuit:

FM Heterodyne
LW/MW/SW Dual-Conversion Heterodyne

Frequency Range:

FM 88–108 MHz
LW 153–519 kHz
MW 520–1,710 kHz
SW 1.711–29.999 MHz

SW Sub-Bands:

2.300 – 2.495 MHz (120 meters)	11.600 – 12.100 MHz (25 meters)
3.200 – 3.400 MHz (90 meters)	13.500 – 13.870 MHz (21 meters)
3.900 – 4.000 MHz (75 meters)	15.100 – 15.800 MHz (19 meters)
4.750 – 5.060 MHz (60 meters)	17.480 – 17.900 MHz (16 meters)
5.900 – 6.200 MHz (49 meters)	18.900 – 19.020 MHz (15 meters)
7.100 – 7.350 MHz (41 meters)	21.450 – 21.750 MHz (13 meters)
9.400 – 9.990 MHz (31 meters)	25.600 – 26.100 MHz (11 meters)

Antenna:

LW/MW Built-In
SW Telescoping or Optional External
FM Telescoping
Output 300 mW @ 10% THD

Jacks:

External Power DC IN 6V
Stereo Headphones $\frac{1}{8}$ -Inch
AM External Antenna DC IN 6V
Record Standby $\frac{3}{32}$ -Inch Mono
Record Line Out $\frac{1}{8}$ -Inch Mono

Power Sources:

Primary 4 AA Batteries
AC (Requires Optional Adapter) 6V/300mA, Center Tip Negative
DC (Requires Optional Adapter) 6V/300mA, Center Tip Negative

Battery Life (with Alkaline Batteries) 13 Hours @ 50 mW

Dimensions (HWD) $5\frac{1}{8} \times 8\frac{3}{4} \times 1\frac{1}{4}$ Inches (130 × 223 × 33 mm)

Weight (without batteries) 24.7 oz (700 g)

Included Accessory Carrying Pouch

Specifications are typical; individual units might vary. Specifications are subject to change and improvement without notice.

NOTES

Limited Ninety-Day Warranty

This product is warranted by RadioShack against manufacturing defects in material and workmanship under normal use for ninety (90) days from the date of purchase from RadioShack company-owned stores and authorized RadioShack franchisees and dealers. EXCEPT AS PROVIDED HEREIN, RadioShack MAKES NO EXPRESS WARRANTIES AND ANY IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE DURATION OF THE WRITTEN LIMITED WARRANTIES CONTAINED HEREIN. EXCEPT AS PROVIDED HEREIN, RadioShack SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO CUSTOMER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS OR DAMAGE CAUSED DIRECTLY OR INDIRECTLY BY USE OR PERFORMANCE OF THE PRODUCT OR ARISING OUT OF ANY BREACH OF THIS WARRANTY, INCLUDING, BUT NOT LIMITED TO, ANY DAMAGES RESULTING FROM INCONVENIENCE, LOSS OF TIME, DATA, PROPERTY, REVENUE, OR PROFIT OR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, EVEN IF RadioShack HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow the limitations on how long an implied warranty lasts or the exclusion of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

In the event of a product defect during the warranty period, take the product and the RadioShack sales receipt as proof of purchase date to any RadioShack store. RadioShack will, at its option, unless otherwise provided by law: (a) correct the defect by product repair without charge for parts and labor; (b) replace the product with one of the same or similar design; or (c) refund the purchase price. All replaced parts and products, and products on which a refund is made, become the property of RadioShack. New or reconditioned parts and products may be used in the performance of warranty service. Repaired or replaced parts and products are warranted for the remainder of the original warranty period. You will be charged for repair or replacement of the product made after the expiration of the warranty period.

This warranty does not cover: (a) damage or failure caused by or attributable to acts of God, abuse, accident, misuse, improper or abnormal usage, failure to follow instructions, improper installation or maintenance, alteration, lightning or other incidence of excess voltage or current; (b) any repairs other than those provided by a RadioShack Authorized Service Facility; (c) consumables such as fuses or batteries; (d) cosmetic damage; (e) transportation, shipping or insurance costs; or (f) costs of product removal, installation, set-up service adjustment or reinstallation.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

RadioShack Customer Relations, 200 Taylor Street, 6th Floor, Fort Worth, TX 76102

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