

Eight different clock types are supported:

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| 1) Westminster chime clock | 5) Ship's bells clock |
| 2) Grandfather clock (has strike only) | 6) Sonora Westminster chime shelf clock |
| 3) Cuckoo clock | 7) Dog barking clock |
| 4) Shelf clock | 8) Speech-Only Clock |

The two Westminster chime clocks make a sound every fifteen minutes. The ship's bells clock sounds every half hour. The others only strike on the hour.

Three switches are used to set clock, select clock type, etc. Layout, as viewed from rear of clock, is:

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Function Select	Up/On	Down/Off

Press "Function Select" until the setting you wish to change/adjust is spoken. Settings are:

"Set Clock Type" – Use Up or Down switches to select one of the eight clock types. Clock types will be traversed in the order listed above. Release Up or Down pushbutton when you hear the strike for the type of clock that you want. Speech-Only clock says "ten" when selected.

"Tick On/Off" – Use Up or Down switch to turn grandfather clock "tick tock" sound on or off. Turning tick off does not affect stored tick volume setting. This setting is independent of clock type, so if you turn off the tick, then change clock type, it will still be off.

"Night Mute On/Off" – Use Up or Down switch to turn muting of all sound (including tick/tock) between 10PM and 8 AM on or off. On means muting is enabled, so no sound will be heard at night. This setting is independent of clock type.

"Set Strike Volume" - Each clock type has its own volume settings for the tick sound and the strike/chime. These settings are saved in non-volatile memory, which is preserved when power is lost. Press Up switch to increase volume, Down to decrease it. Strike will be repeated as volume is adjusted. Speech volume is also controlled by current clock strike/chime volume setting.

"Set Tick Volume" - Press Up switch to increase tick/tock volume, Down to decrease it. Tick will be repeated as volume is adjusted.

"Set Time Zone" – Press Up switch to cycle through the four times zones. Eastern, Central, Mountain and Pacific. This setting is only used during WWVB syncing. Eastern is the default time zone setting.

"Set Hours" - Press and hold Up or Down switch, to get to the desired time. Voice will speak current value of hours. Hours value will say "PM" after it, if PM. When desired hour is reached, release Hours Up or Hours Down button. AM/PM information is used for "Night Mute" feature and "PM" when time is spoken. It also tells the clock when to sync with WWVB, which must happen at night for best chance of success.

"Set Minutes" - Press and hold Up or Down switch, to get to the desired time. Voice will speak current value of minutes. When desired setting is reached, release Up or Down switch.

"Daylight Saving Time On/Off" - If set to "On" clock will adjust time ahead one hour when DST bit in WWVB signal is set. If set to "Off" DST bit is ignored, and no DST adjustment will be made. This setting is only used during WWVB syncing.

"Set Announce" - All clock types can also have the time spoken every 5, 10, 15, or 30 minutes. Any chime or strike will override speaking at that time. This feature is turned off by default. To enable speaking the time, select the "Set Announce" function, then press the Up switch. This will cycle through the settings in the order 30, 15, 10, 5 and off. When you hear the number that corresponds to the desired interval, release the Up switch. This feature is independent of the clock type selected, so if you enable it, then change the clock type, it will still be enabled for the new clock type.

The clock contains a "super-capacitor" which should allow it to keep time (silently) for more than 48 hours without power. After that it will need to be set again, either manually, or using WWVB. Volume settings, clock type, time announcement mode, and time zone setting will be retained indefinitely, even without power.

WWVB Reception:

This clock is equipped with a radio receiver for WWVB. (accurate time information broadcast from Ft Collins, CO) While the signal is broadcast continually, reception is best when it's dark at both the transmitter and the receiver (clock) locations. Don't expect reliable WWVB reception during the day. Once the clock has the time, it tries to sync up with WWVB each night between midnight and 2 AM. If it's able to receive the time signal, it sets itself. If not, it can keep the time quite well for months, it just won't be quite as accurate.

For best reception, the clock should be near a westward-facing outside wall of the house, at a high location, like on a high shelf or on top of a piece of furniture, and the long dimension of the clock enclosure should be facing towards Ft Collins, Colorado. Experiment with various locations to see what works for you.

In general, while the clock is trying to receive WWVB, the switches have no effect. I.E. you can't set the time or anything else when the clock is trying to sync. The only exception to this is mentioned in the following paragraph.

When the clock is initially plugged in, before it has been set, it will automatically try to sync up with WWVB. This will continue until either it gets the time, or the Down switch is pressed. In other words, if you want to set the clock manually instead, press the switch while the clock is syncing. Within a few seconds, sync will end, the time will be set to 8:12 PM and now you can set the time manually, as explained above. (Wait until you hear the clock speak the time) You can also abort sync to set clock type, volume, etc, then force the clock to sync by unplugging it, then plugging the clock in while you are pressing the Up pushbutton switch. Release the switch when you hear the demo chime start to play.

There are two LED lights on the front of the clock, one green and one red. While the clock is trying to sync up with WWVB, the LEDs will flash to indicate relative signal quality. The best case is only the green light flashing on, every second. The amount of time that it's on will vary, so it won't look perfectly regular, but once/second is a good sign. The red light indicates errors in reception. A red plus green flash is bad, red by itself is worse. WWVB signal strength varies with atmospheric conditions, and it's typically unusable during the daylight hours, so don't worry if the clock seems to be having trouble getting the signal.

After a sync attempt ends, either because the time data was received, or it was 2 AM, the green LED will light if the sync was successful. The red LED indicates that it's been at least 4 days since we were last able to sync up with WWVB.

Time zone is set by selecting the "Set Time Zone" function, then by pressing and holding the Up switch. The default time zone is Eastern. Clock will say "Central", then "Mountain", then "Pacific", then "Eastern". When you hear your time zone, release the switch. The time zone setting is only used after a successful WWVB sync to set the clock to the correct time.

The WWVB time signal contains information about Daylight Saving Time. The clock should automatically adjust for DST if it is receiving WWVB when the time changes. Please allow a few days for the clock to get synced up. (If the red LED is on, the clock has been having trouble syncing with WWVB, so it won't correct for a DST change until it syncs the next time.)

There are several ways to get started:

Simplest: You can simply pick a spot that seems like a good bet for WWVB reception, and plug the clock in. It will try to sync up (silently) and if it succeeds, will begin normal operation. Using this method, you will need to wait until it syncs to set the clock type, time zone, and volume. If the clock is still trying to sync a few days later (the LEDs are still flashing) stop it by pressing the Down switch and set it manually. You may want to try a different location with better WWVB reception.

A little more work: Pick a spot that seems like a good bet for WWVB reception, and plug the clock in. Wait for the LEDs to start flashing, (after the initial sounds) then press the Down switch. This will terminate the sync attempt, and will set the clock to 8:12 PM. Now you can set the clock type, time zone, and volume. Now unplug the clock, and plug it in again while pressing the UP switch. Release the switch when you hear the demo chime play. This will force the clock to attempt to sync to WWVB, and it won't quit until it succeeds, which may not be until nighttime, and maybe not for a day or two. Monitor the green LED each day to see if the clock was able to get WWVB the previous night, or if you need to reposition it. If you need to move it, hold the UP switch at each new location, as you plug the clock in, to force the clock to sync. You won't hear any sound from the clock until it syncs to WWVB.

To hear the clock right away: You can set the clock initially by waiting for the LEDs to start flashing, (after the initial sounds) then pressing the Down switch. This will terminate the sync attempt, and set the clock to 8:12 PM. Now you can set the clock, time zone, clock type, and volume and try different locations to see which gives the best WWVB reception. The clock will be working in the meantime. It will try to sync each night at midnight, for two hours. Monitor the green LED each day to see if the clock was able to get WWVB the previous night, or if you need to reposition it.

Note: If you hear a dog bark when you plug the clock in, it thinks it has the correct time, so it won't try to sync to WWVB until 12 midnight. If the time seems to be incorrect, you can set it manually. Just wait until after the clock speaks the time.