

# **JEWELRY BOX**

**SERIES A - TEXT OR SOUND VERSION**

**OWNER'S MANUAL**

## Concept of the Jewelry Box:

The Jewelry Box is designed to mirror a long-term relationship. It will pass through several stages in its lifetime, and, in doing so, its message and behavior will change. The amount of time it takes to pass from one stage to the next (hence the complete lifespan of the relationship) is, for the most part, in the hands of the owner: by the number of times the box is opened and the time that has passed since the last opening.

In effect, the artwork is about investment; both in precious objects (jewelry and/or artwork), as well as in relationships (human to human and/or human to technology); and the behavior of the object (e.g. the content of the messages) reflects this concept.

At the beginning of each stage, the piece estimates the maximum amount of times it can be opened before passing to the next stage, and the perfect length of time between openings. Ideally, each time the owner opens the box counts as one time only; but if it is opened too frequently or too seldomly, then 'penalties' will be incurred, and the behavior of the object might change. Penalties are equivalent to 'real' openings of the box. For example: the piece has not been opened for a month. The next time it is opened, 100 penalties are incurred. The Jewelry Box, having been without the owner's attention for a month, has decided to add on an extra 100 times opened, thus hastening the point at which this stage of the relationship will end. The message from the piece also changes (e.g. it becomes 'angry'), and this will influence the ideal opening time.

There will *a/ways* be at least one perfect length of time to wait before opening the box (thereby getting no extra penalties and keeping the piece 'content'). It might be a day, 4 days, a week, or longer; it will vary from stage to stage, and by the 'mood' of the relationship at that particular moment. The Penalty Count always reflects how many times the box considers itself to have been opened at that particular stage. When a new stage is started, the Penalty Count is reset, and new parameters are calculated according to the attention of the owner during the previous stages.

Remember: at some junctures in the relationship it is best to open the box quite often, while at other times fewer penalties will be incurred by opening it rarely. The Jewelry Box could take 60 years to pass through all of its stages to its 'finish', or it might take only 5. It is up to the owner to gauge the impact of his/her behavior on the piece, at any time, in each particular stage.

## Technical Description of the Jewelry Box:

The Jewelry Box is an extremely small microcomputer based around an 8XC751 microcontroller. It has nonvolatile memory in the form of PROM for the program code, EEPROM for permanent data storage, and battery-powered RAM for back-up data storage and other variables. The assembly language software is designed to be adaptive, and to alter its behavior and output over many years based on the interaction of the user.

## Using the Jewelry Box - Both Versions:

**Turn on the power switch (see figure #1 or 3), then open the Jewelry Box.**

When the Jewelry Box is opened, it presents a message based upon the current stage of the relationship (and the time since it was last opened).

After the message has finished, the owner may retrieve time/status information about the piece by using the two small black buttons mounted on the front inside edge of the piece (see figure #1 or 3). Pressing the ENTER button (left) will provide either the total times the box has ever been opened or the current relationship status: the number of 'real' times opened for this stage; the Penalty Count ('incurred' times opened) for this stage; and the stage number. Pressing the SET button (right) will alternately give the current time or date.

30 seconds after the Jewelry Box has finished its message or neither button has been pressed, the piece will enter power-down mode in order to conserve battery life. After this happens, it is no longer possible to push the buttons to get time/status information. The box will have to be closed and reopened to use the buttons again. Although the piece does try to conserve power in this way, it will still consume much more current when open than closed, so it is always best to close the box after use.

**A NOTE OF CAUTION:** Please avoid turning off the power switch while the Jewelry Box is open. The computer in the piece will sometimes save information while running. If the power is shut off when the box is open, there is a small risk of corrupting data. It is always safer to close the box first, then turn off the power.

## Extra features - Text Version:

### Scroll speed:

The SET button can be pressed and held in whenever text is being scrolled, causing the speed of scrolling to increase considerably. This allows the owner to quickly bypass the message in order to use the clock or status functions.

## Extra features - Sound Version:

### Clock function:

When the box is turned on and closed, pressing the black clock button on the back of the box (see figure #3) will cause the piece to state the current date and time. This feature can be disabled by lifting up the clock enable switch (see figure #3).

### Alarm function:

By setting the alarm variables (see Section I.F.3 in the Detailed Instructions), the owner can have the piece play an alarm message at a predetermined time, if the box is turned on *and* closed. The alarm message will be spoken 7 times and then automatically stop to conserve power. It also can be stopped manually by pressing the clock button (see figure #3) during the alarm. This feature can also be disabled by lifting up the alarm enable switch (see figure #3).

Note: The behavior and tone of the clock or alarm message will depend on the current stage and mood of the Jewelry Box. It may not always function as expected.

### Volume adjust:

The volume of the sound can be lowered by using a small screwdriver in the blue adjustment pot (see figure #4). Refer to Section II.B in the Detailed Instructions for information on removing the board to access the adjustment pot.

# DETAILED INSTRUCTIONS FOR THE JEWELRY BOX

## I. SOFTWARE VARIABLES:

### A) Purpose of the software variables:

The variables hold the current time and date, plus additional options which allow the owner to customize the functioning of the Jewelry Box.

### B) Entering the variable setting routine:

- (1) **Manual entry:** Make sure the Jewelry Box is turned off, then open it. While holding the ENTER button pressed in (the small button on inside left; see figure #1 for Text Version or #3 for Sound Version), turn on the power switch. After letting go of the ENTER button, the piece will enter the variable setting routine.
- (2) **Automatic entry:** When first opened, the Jewelry Box may automatically enter the variable setting routine. This occurs after the backup battery has been replaced, as explained in Section II.B. In this case, all of the time variables (Century through Seconds) must be set to the correct current time.

### C) Altering the variables:

Once the routine has been entered, either automatically or manually, any or all of the variables may be changed. Each variable is changed in exactly the same way: by using the SET button (the small button on inside right; see figure #1 or 3) to alter it, and, once the correct value is set, pressing the ENTER button to continue to the next variable. If the SET button is pressed and held in, the value will change quickly, allowing a fast method of looping through the possible settings. If ENTER is pressed before using the SET button, the variable will be left unchanged.

### D) Description of the variables for Text Version:

The variables which can be altered appear in the following order:

- (1) **"Bright = ?"** This variable allows a choice of 6 different levels of brightness for the LED display. It is best to set this to the minimum acceptable brightness in order to conserve battery life.
- (2) **"Name = ?"** This variable allows the owner to enter a name (or any word up to 16 characters long) which will be inserted by the software at certain places in the texts (to personalize the text, so to speak). If this variable is left blank (\*), then nothing will be inserted.

The altering of this variable is a little different than the others, since it involves changing up to 16 characters. The SET button works as usual, looping through the possible values (<, \*, a-z, A-Z), but the only character which is changed is the one which is currently blinking (the cursor position). The cursor always starts on the first character in the name, and pressing the ENTER button accepts that letter and moves the cursor right to the next character; with two exceptions: (1) if you select < with the SET button, pressing ENTER will move the cursor back left to the last character; (2) if you choose \* with SET, pressing ENTER will finish the name there.

(a) **Example 1:** To change from no name to the name 'Paul':

|            |                                              |
|------------|----------------------------------------------|
| Name=*     | Use SET to change '*' to 'P', & press ENTER. |
| Name=P*    | Use SET to change '*' to 'a', & press ENTER. |
| Name=Pa*   | Use SET to change '*' to 't', & press ENTER. |
| Name=Pat*  | Oops...mistake.                              |
| Name=Pat<* | Use SET to change '*' to '<', & press ENTER. |
| Name=Pa<*  | Use SET to change '<' to 'u', & press ENTER. |
| Name=Pau*  | Use SET to change '*' to 'l', & press ENTER. |
| Name=Paul* | Press ENTER once more to finish.             |

(b) **Example 2:** To change the name 'Paul' to the name 'Ed':

|           |                                              |
|-----------|----------------------------------------------|
| Name=Paul | Use SET to change 'P' to 'E', & press ENTER. |
| Name=Eaul | Use SET to change 'a' to 'd', & press ENTER. |
| Name=Edul | Use SET to change 'u' to '*'.                |
| Name=Ed*1 | Press ENTER to finish.                       |

Whenever the ENTER button is pressed while the cursor is on \* (or the 16th character), the routine exits and the name up to the \* character is stored in memory.

- (3) The next four date variables (Century, Years, Month, and Date) will *not* appear (and can *not* be changed) unless the Jewelry Box *itself* automatically enters the variable setting routine (as explained above). Otherwise the routine will skip directly to the Hours setting below. None of the date/time variables will actually be stored in memory until *all* of the time variables have been entered (Century to Seconds).

**WARNING:** For data integrity reasons, the Jewelry Box will *not* allow these date variables to be set backwards in time, but it *will* allow them to be set forward in time. But if that is done, it will be impossible to set the date backwards again. So be extremely careful that only the correct current date is entered, and not a future date. *If* a mistake is made while setting the date (for example: the year 1999 is accidentally entered instead of 1998), turn the piece off *before* exiting the setting routine (otherwise the mistake will be permanently etched in the piece's memory). Then just turn on the power again, and start the whole routine over.

- (a) **"Cen = ?"** (Century) See above.
- (b) **"Yrs = ?"** (Years) See above.
- (c) **"Month = ?"** See above.
- (d) **"Date = ?"** See above.
- (e) **"Hours = ?"** This and the next two time variables (Minutes and Seconds) should be kept set to the current local time. These variables can be set forward or backward in time, to allow for different time zones or Daylight Savings Time.
- (f) **"Mins = ?"** (Minutes) See above.
- (g) **"Secs = ?"** (Seconds) See above.

**E) Exiting the variable setting routine:**

See Section I.G.

## F) Description of the variables for Sound Version:

The variables which can be altered are spoken in the following order:

- (1) **"AM/PM setting"** This variable allows the owner a choice of times being spoken in 12 hour format (with AM/PM indication), or as 24 hour format (also known as Army or European time). ON = 12 hour format; OFF = 24 hour format.
- (2) **"Alarm setting"** This variable allows the owner to turn on or off the alarm function of the piece via the software. If this setting is turned off, then the following three variables will *not* be spoken (and can *not* be changed).
  - (a) **"Hours"** (Alarm) This and the next two time variables (Minutes and Seconds) should be set to the desired alarm time. To distinguish these variables from the identical clock settings, the phrase "Alarm time setting" is spoken first, and two of the small LEDs will remain lit while setting all of the alarm variables.
  - (b) **"Minutes"** (Alarm) See above.
  - (c) **"Seconds"** (Alarm) See above.

Remember: To hear the alarm message spoken at the correct time, the alarm setting variable must be on, the alarm enable switch (see figure #3) must be down, the power switch must be turned on, and the box must be closed.

- (3) The next four date variables (Century, Year, Month, and Date) will *not* be spoken (and can *not* be changed) unless the Jewelry Box *itself* automatically enters the variable setting routine (as explained above). Otherwise the routine will skip directly to the Hours setting below. None of the date/time variables will actually be stored in memory until *all* of the time variables have been entered (Century through Seconds).

**WARNING:** For data integrity reasons, the Jewelry Box will *not* allow these date variables to be set backwards in time, but it *will* allow them to be set forward in time. But if that is done, it will be impossible to set the date backwards again. Please read the WARNING in Section I.D.3 for complete details.

- (a) **"Century"** See above.
  - (b) **"Year"** See above.
  - (c) **"Month"** See above.
  - (d) **"Date"** See above.
- (4) **"Hours"** (Clock) This and the next two time variables (Minutes and Seconds) should be kept set to the current local time. These variables can be set forward or backward in time, to allow for different time zones or Daylight Savings Time. To distinguish these variables from the identical alarm settings, the phrase "Clock time setting" is spoken first.
- (5) **"Minutes"** (Clock) See above.
- (6) **"Seconds"** (Clock) See above.

### G) Exiting the variable setting routine:

Once the last variable (**Secs / Seconds**) has been entered, the software will automatically exit the variable setting routine and start normal operation.

## II. POWER SUPPLIES:

### A) Normal batteries:

The Jewelry Box runs on four alkaline batteries (type AAA for Text Version; type N for Sound Version). When the batteries need replacing, the error message "Low Bat!" will appear (or the phrase "Battery error" will be spoken) when the box is opened. They are installed inside the lid of the box, and can be replaced as follows:

- (1) The piece should be switched off, then opened.
- (2) Using a pin or thin piece of metal, *carefully* loosen the top edge and both side edges (but not the bottom edge) of the cloth-lined covering inside the lid of the box. When fully loosened, pull the lining forward from the top, and just let it rest over the electronics in the bottom of the box (as if turning the page of a book). **DO NOT TRY TO REMOVE IT COMPLETELY:** a portion of the cloth-lining is glued to the inside bottom of the box.
- (3) If there is tape holding the batteries in place, then remove or cut it.
- (4) Remove the old batteries and insert the new ones; with the + side as indicated on the battery holders.
- (5) If tape was removed or cut, place one or two pieces of new tape tightly across the batteries to prevent them from jarring loose when the lid is closed.
- (6) Carefully insert the cloth-lined covering, using gentle pressure to slowly push in the edges until it is fully seated.
- (7) Turn on the piece to test it.

### B) Backup battery:

The Jewelry Box also has a lithium backup battery (type CR1220). The backup battery is used to retain the clock time and other internal variables, and has a lifespan of approximately 3 to 5 years. When the battery needs replacing, the error message "Clk Bat!" will appear (or the phrase "Clock error" will be spoken) when the box is opened. An equivalent replacement can be obtained at an electronics store, a camera shop, or directly from the artist. The battery is installed on the bottom of the electronics board, and can be replaced as follows:

- (1) The piece should be switched off, then opened.
- (2) Place one hand at the back of the box for support, and grasp the LED display (or memory chip on Sound Version) with the thumb and forefinger of the other hand (as indicated in figure #1 or 3). Push firmly towards the back of the box, while lifting out only the front edge of the velvet-covered electronics board.

- (3) Once the front edge is lifted free, raise the entire board slightly back and up until the bottom of the box is cleared, then carefully turn the board over, while not disturbing the connected cable(s).
- (4) Lay the open Jewelry Box on it's side, and the electronics board upside-down next to it.
- (5) Using a fingernail or a small screwdriver, pry the old battery slightly up and out of the small black battery holder (as indicated in figure #2 or 4).
- (6) Insert the new battery in the holder with the + side of the battery facing up.
- (7) Lift up the board, and place the Jewelry Box back in it's normal upright position.
- (8) Turn the board over carefully, and, while holding it by the side edges, insert only the back edge into the bottom of the box, making sure that the switches go through the small holes at the back (check by looking at the back of the box).
- (9) Once the switches are correctly positioned, grasp the LED display / memory chip (as before), and, while pushing firmly towards the back of the box, drop the front edge of the board back into the bottom until it is completely seated.
- (10) After the piece is turned back on, the error message will occur again (to indicate bad clock data). Just turn the Jewelry Box off, then back on again, and the piece will automatically enter the variable setting routine. Follow the instructions in Section I to reset the internal variables.

### III. TROUBLESHOOTING:

#### **A) If the Jewelry Box does not function when opened:**

- (1) ***The power switch is turned off.*** See figure #1 or 3.
- (2) ***The batteries are loose.*** Try pushing gently against the batteries (inside the lid of the box) to check if they have become slightly ajar.
- (3) ***The batteries are completely dead.*** Refer to Section II.A to replace the batteries.

#### **B) If an error message occurs when opened:**

- (1) ***"Low Bat!" ("Battery Error")*** This message occurs when the alkaline batteries need replacing. To change the alkaline batteries, refer to Section II.A.
- (2) ***"Clk Bat!" ("Clock Error")*** This message occurs when the lithium backup battery needs replacing. To change the lithium battery, refer to Section II.B.
- (3) ***"Mem Err!" ("Memory Error")*** This message occurs if the permanent memory chip fails or if the permanent data gets corrupted. This error is unlikely to occur, but if it does, the artist should be contacted for a replacement chip.