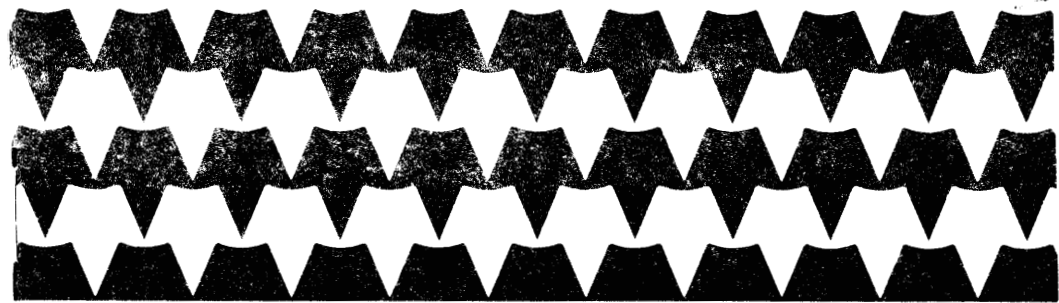


# SmartWatch



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## Introduction

The SmartWatch is a sophisticated state-of-the-art integrated circuit which can easily be installed in your personal computer to keep time down to 1/100 of a second. The SmartWatch imbeds a clock chip and a Lithium energy source inside the hollow of a 28 pin DIP socket. This socket is designed to be inserted into either an empty or occupied ROM socket within your personal computer. If the ROM socket is occupied, the integrated circuit that belongs in the socket is then plugged into the SmartWatch. Once installed in your computer the SmartWatch software can be used to automatically set the MS-DOS date and time. The SmartWatch automatically compensates for months with 31 days and even corrects for Leap Year.

The Lithium energy cells which are built into the SmartWatch maintain the clock and calendar time for over ten years in the absence of power to an accuracy within one minute a month. The SmartWatch also saves I/O slot space since it is mounted under a ROM IC and takes up no more area than the ROM alone.

Please take time to read through this guide prior to installing the SmartWatch in your computer. This text will guide you through the installation and operation of the SmartWatch. If you encounter any problems or if you have concerns about the installation please contact the Radio Shack Service Center.

## Before You Begin

- **WARNING!** Leave the SmartWatch in its anti-static shipping foam until actual installation to prevent damage caused by static electricity.
- **BEFORE** you install the SmartWatch, be sure your computer operates properly.
- If you have a hard disk drive installed in your computer, run the **shiptrak** utility before you proceed (refer to the MS-DOS documentation for instruction).
- Disconnect the computer AC power cord.
- Disconnect any peripherals that are attached to the computer.

## Required Tools

You will need some tools to install the SmartWatch in your computer. While the tools required will vary depending on the model of your computer, the list below should be adequate.

- 1/4" blade straight slot screwdriver
- Phillips screwdriver
- 1/4" nut driver
- Long-nose pliers

## Installation

You should consult your owner's manual on your personal computer for instructions on removing the cover and locating the appropriate printed circuit board which contains the ROM or ROM socket where the SmartWatch will be installed.

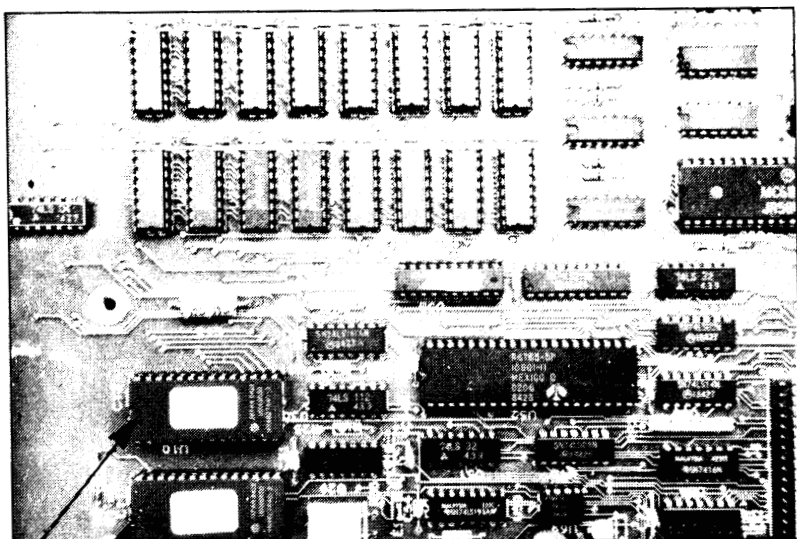
## Identifying the ROM Socket

The location of the ROM socket where the SmartWatch will be installed is dependent on your computer model. In some cases you may be required to remove one or more printed circuit cards and/or disk drives in order to get access to the appropriate ROM socket. Table I relates the model number of the computer to a figure which illustrates board location and lists mechanical requirements to make the ROM socket accessible.

**TABLE I**

Computer	Cat No.	Socket	Remove Drives?	Figure No.	Notes
TANDY 1000	25-1000	U-10	YES*	1	Install under ROM
TANDY 1000	25-1000A	U-51	NO	2	Install under ROM
TANDY 1000 HD	25-1001	U-10	YES*	1	Install under ROM
TANDY 1000 HD	25-1001	U-14	NO	3	Install under ROM of Hard Drive Controller Board
TANDY 1000 HD	25-1000A	U-14	NO	3	Install under ROM of Hard Drive Controller Board
TANDY 1000 HD	25-1001A	U-51	NO	2	Install under ROM
TANDY 1000 SX	25-1051	U-41	NO	4	Install under ROM
TANDY 1200 HD	25-3000	U-80	YES*	5	Install in Unused ROM Socket
TANDY 1200	25-3001A	U-14	NO	6	Install in Unused ROM Socket
TANDY 1200 HD	25-3000A	U-14	NO	6	Install in Unused ROM Socket
TANDY 1000 HX	25-1053	U-12	NO	7	Install under ROM
TANDY 1000 TX	25-1600	U-38	NO	8	Install under ROM

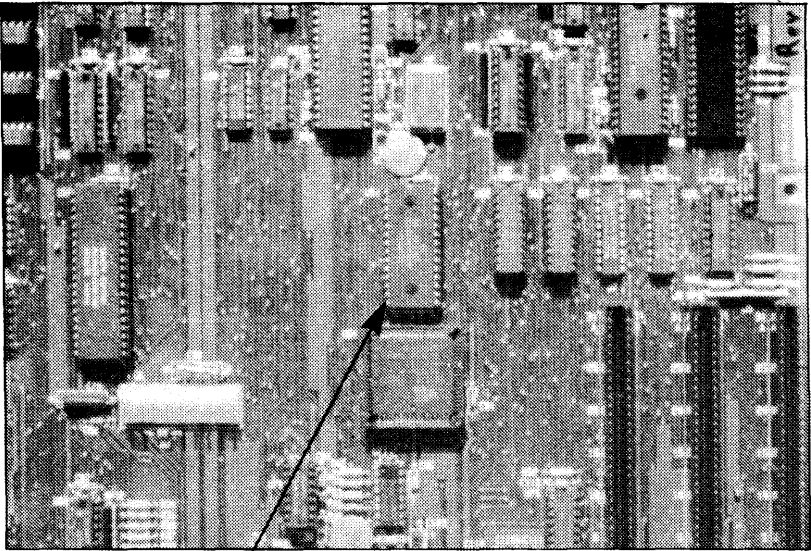
\*NOTE: For these installations it is recommended that you have the SmartWatch installed by a Radio Shack Service Center.



U-10 U-11 Figure 1

## Instructions for Tandy 1000 (25-1000) / Tandy 1000 HD (25-1001)

1. Remove computer case; the computer case is fastened with Phillips screws on the front of the computer cabinet.
2. Since the ROM (U-10 and U-11) is located under the drive tower, it will be necessary to remove the Phillips screws that connect the drive tower to the computer frame. Either ROM socket U-10 or U-11 can be used for the SmartWatch. The power and drive cables must also be disconnected. Place the drive tower to the rear of the computer while installing the SmartWatch.



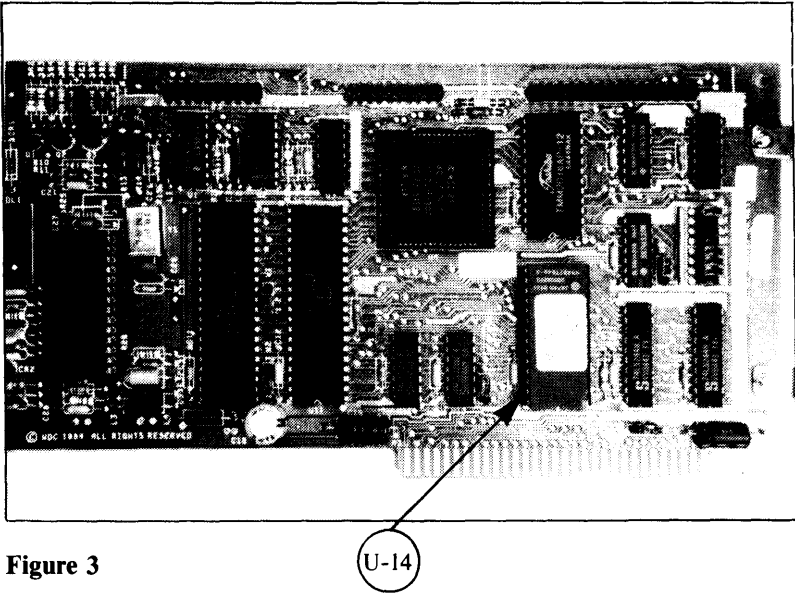
U-51

**Figure 2**

### **Instructions for Tandy 1000 (25-1000A) / Tandy 1000 HD (25-1001A)**

1. Remove computer case; the computer case is fastened with Phillips screws on the front of the computer cabinet.
2. Remove any expansion slot printed circuit cards which obstruct access to the U-51 ROM. This ROM is located in front of the expansion slots.

**NOTE:** Expansion cards may need to be moved to a different I/O slot to avoid interference.

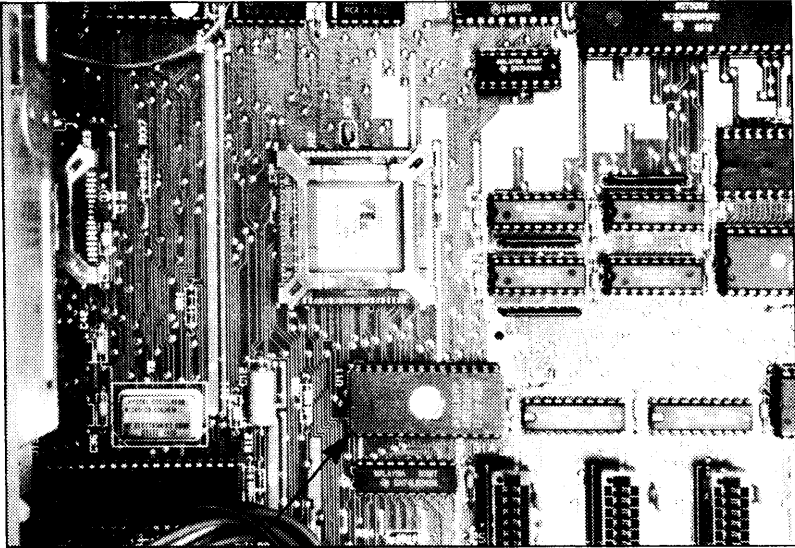


**Figure 3**

U-14

### **Alternate Instructions for Tandy 1000 HD (25-1001/25-1001A)**

1. Remove computer case; the computer case is fastened with Phillips screws on the front of the computer cabinet.
2. The U-14 ROM is located on the hard disk controller board in one of the expansion slots.
3. After the hard disk controller board is located, it must be removed for installation of the SmartWatch. The ROM will be located just above the card edge connector and has a small white label on it.



U-41

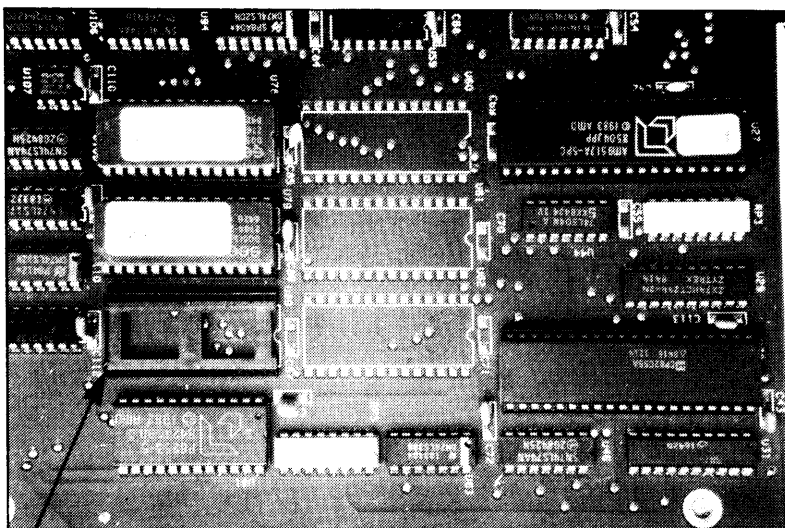
**Figure 4**

### **Instructions for 1000 SX (25-1051)**

1. Remove computer case; the computer case is fastened with Phillips screws on the front of the computer cabinet.
2. Remove any expansion slot printed circuit cards which obstruct access to the U-41 ROM. This ROM is located in front of the expansion slots.

**NOTE:** Expansion cards may need to be moved to a different I/O slot to avoid interference.



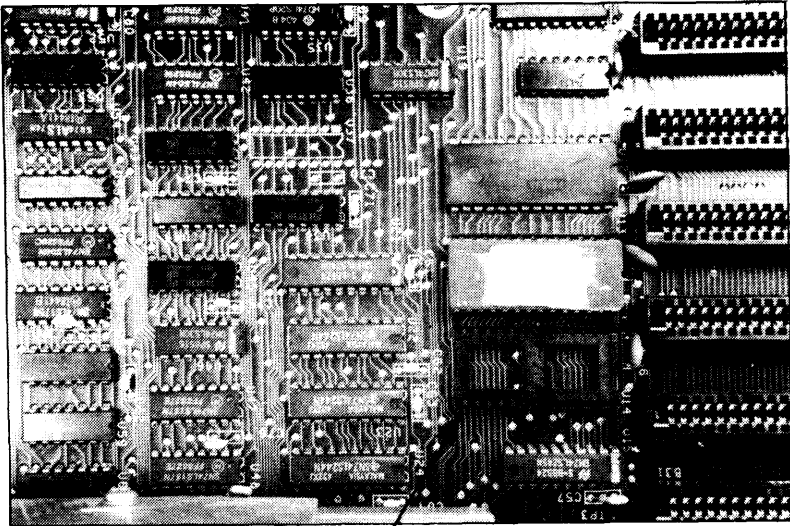


**Figure 5**

### **Instructions for Tandy 1200 HD (25-3000)**

1. Remove computer case; the computer case is fastened with Phillips screws on the rear of the computer cabinet.
2. ROM socket U-80 is located under the floppy disk drive. Therefore, the logic board should be removed by taking out eight Phillips screws which mount the board to the computer frame and sliding the logic board out to the left.
3. The SmartWatch must be installed in empty ROM socket U-80.

**NOTE:** A floppy drive may have to be removed to access some of the Phillips screws which mount the logic board.



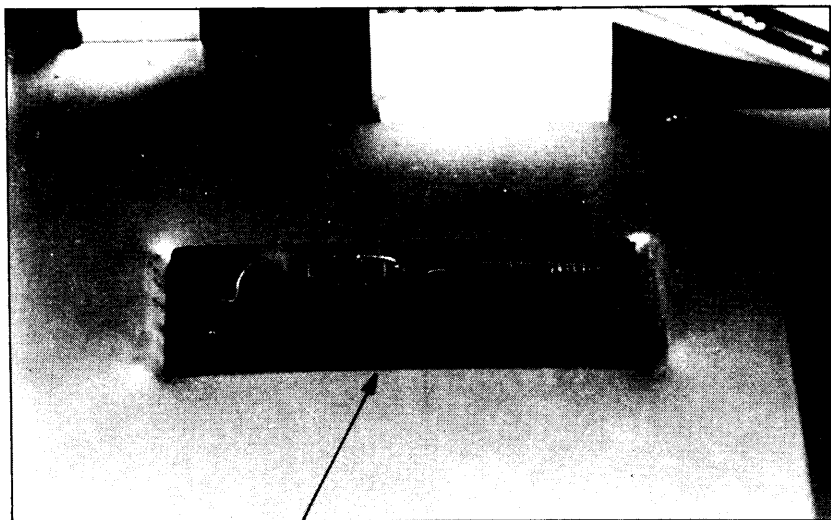
**Figure 6**

U-14

### **Instructions for Tandy 1200 (25-3001) / Tandy 1200 HD (25-3000A)**

1. Remove computer case; the computer case is fastened with Phillips screws on the front of the computer cabinet.
2. Remove any expansion slot printed circuit cards which obstruct access to the U-14 ROM socket. This ROM socket is located at the front end of the expansion slot.

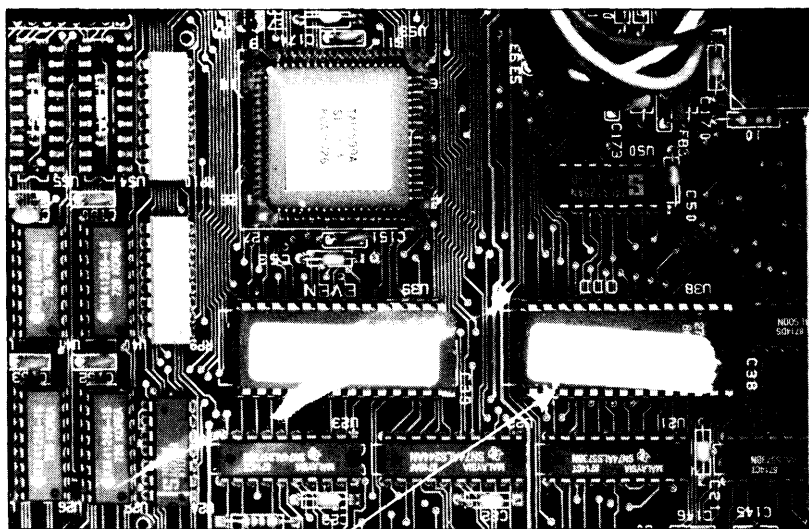
**NOTE:** Expansion cards may need to be moved to a different I/O slot to avoid interference.



U-12

### **Instructions for Tandy 1000 HX (25-1053)**

1. Remove the expansion slot cover
2. Locate the rectangular opening near the front of the computer in the RFI shield that contains the ROM U-12.



U-38

### Instructions for Tandy 1000 TX (25-1600)

1. Remove computer case; the computer case is fastened with Phillips screws on the front of the computer cabinet.
2. Remove any expansion slot printed circuit cards which obstruct access to the U-38 ROM. This ROM is located near the Drive Tower.

## **Instructions for Use in Non-Tandy PC Compatibles**

The SmartWatch can be installed in other PC compatibles as well as Tandy computers. Locate the 28-pin socket on the main board and follow the installation instructions below. For further assistance in use with non-Tandy PCs, consult the Technical Reference Manual of your PC.

### **Removing the ROM**

**(Refer to Figures 9-11)**

Depending on the model of your computer, a ROM may have to be removed and reinstalled on the top of the SmartWatch. If the ROM must be removed, care must be taken to avoid bending pins. A small straight-slot screwdriver can be used to gently pry the ROM from its socket site. The ROM should be lifted out evenly by lifting one end and then the other in a gentle rocking manner to avoid bending pins (see Figure 9). After you remove the ROM IC you should place it on a metal surface of your computer until you are ready to reinstall it on top of the SmartWatch.

**CAUTION:** Both the ROM IC and the SmartWatch can be damaged by static electricity. To avoid static damage, place the devices on a metal surface while they are waiting to be installed.

### **Installing the SmartWatch**

When you install the SmartWatch and reinstall the ROM, all pins must line up perfectly with the holes of the mating socket. You may need to straighten the leads of the ROM and SmartSocket for proper insertion. To straighten the leads, hold the ROM or SmartWatch in one hand and place the other hand on a metal work surface before you touch the ROM or SmartWatch to that surface. This will equalize the static charge between the work surface and the ROM or SmartWatch. While holding the device, lay it down on its side as shown in Figure 10 and very carefully roll it towards the pins to bend the lower pins into line. Then turn the ROM over and bend the pins on the other side in the same manner.

When you install the SmartWatch into the ROM socket, the pin orientation must be correct. Pin 1 can be identified by a notch which is located on the Pin 1 end of the socket (see Figure 11). After you locate Pin 1 on the SmartSocket and Pin 1 on the ROM socket make sure that all of the pins are properly aligned and started into the socket. Then press the SmartWatch into the ROM socket.

**NOTE:** A pin on the SmartWatch can become bent under the device and it will appear as though it is correctly installed in the ROM socket. Be careful that this does not happen. If you have a problem after installation, check the SmartWatch (remove it, if necessary) to be certain all pins are correctly inserted.

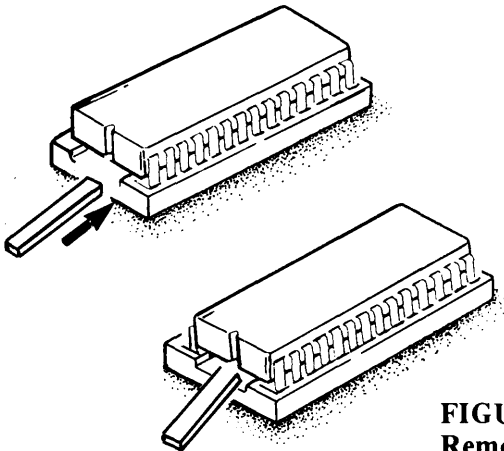
## Reinstalling the ROM into the SmartWatch

After the SmartWatch is correctly installed into the ROM socket, you will need to reinstall the ROM into the SmartWatch socket. Once again, make certain the Pin 1 end is positioned correctly (see Figure 12 and Figure 13).

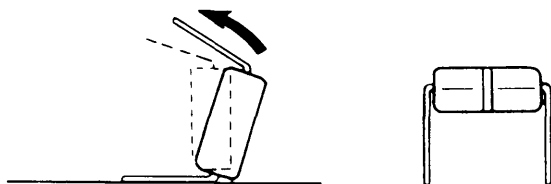
## Closing the Computer Cabinet

Again, you should consult your owner's manual on your personal computer for instructions on reassembling your computer. If you have removed disk drives or printed circuit boards, they must be correctly replaced before the computer cabinet is closed. After completing the reassembly procedure, you can reconnect all peripherals that were previously connected to your computer and plug in the power line cord. Be sure to double check all of the assembly work before applying power.

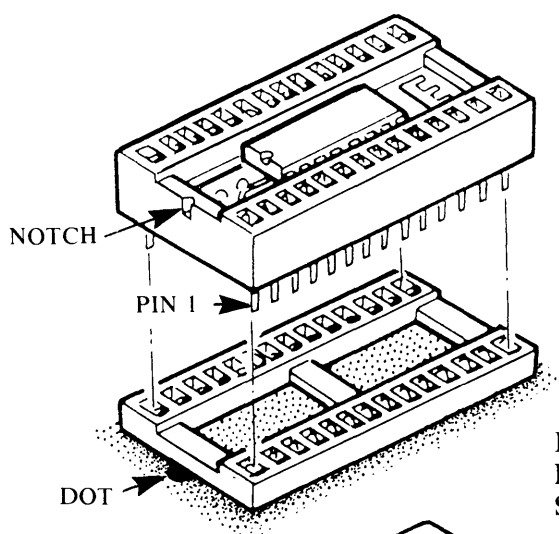
This completes the installation of the SmartWatch.



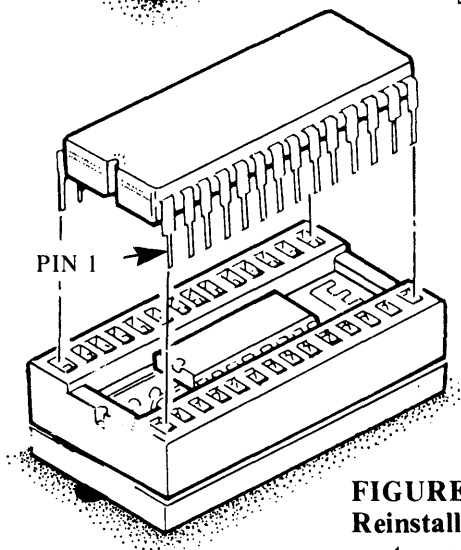
**FIGURE 9.**  
**Removing an IC**



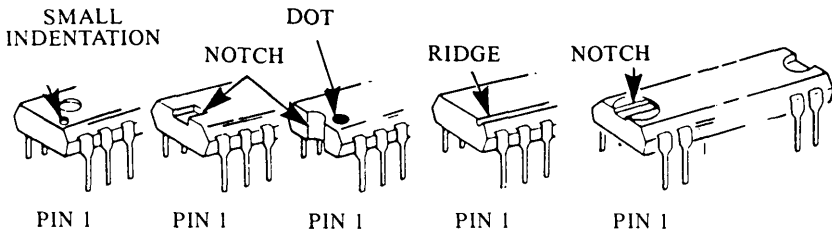
**FIGURE 10.**  
Bending pins on an IC



**FIGURE 11.**  
Installing the  
SmartWatch



**FIGURE 12.**  
Reinstalling a ROM  
on top of SmartWatch



**FIGURE 13.**  
**Identifying marks on**  
**ROM chips**

## Using the SmartWatch

The SmartWatch comes with a utility diskette which has a program to read and set time. There are three instructions which serve to permanently link the SmartWatch to MS-DOS.

The instructions are as follows:

- “SMWCLOCK” - This instruction finds the SmartWatch and displays the SmartWatch date and time on the monitor.
- “SMWCLOCK C” - This instruction transfers the value of time and date which is resident in MS-DOS to the SmartWatch.
- “SMWCLOCK S” - This instruction transfers the value of time and date which is resident in the SmartWatch to MS-DOS.



The step-by-step procedure for linking software supplied with the SmartWatch to MS-DOS follows:

1. Turn on your computer and boot up the MS-DOS operating system.
2. Next, using the MS-DOS "Copy" command, copy the entire floppy disk you received with the SmartWatch onto your MS-DOS disk or diskette. The appropriate command is "COPY [SOURCE DRIVE]: \*.\* [TARGET DRIVE]:"
3. Enter the correct time value into MS-DOS using the "time" command (again, consult the MS-DOS manual if you are not familiar with this command).
4. Enter the correct date value into MS-DOS using the "date" command.
5. Now type "SMWCLOCK C" and press the return key. This will update the SmartWatch with the time and date you have just entered into DOS.
6. To have the correct time entered for you when you boot up your system, it will be necessary to modify (or create) an "AUTOEXEC.BAT" file. This is the file that MS-DOS automatically looks for every time you boot up. MS-DOS will run the commands that the "AUTOEXEC.BAT" file contains, one after another.

If you already have an "AUTOEXEC.BAT" file, follow the instructions in your MS-DOS manual to add a line which says "SMWCLOCK S" in the file (if you create a new "AUTOEXEC.BAT" file, the existing one will be destroyed). If you want to create a new "AUTOEXEC.BAT" file, at the system prompt type:

"COPY CON: AUTOEXEC.BAT"

then press the return key. While nothing obvious happens, the next things typed will be entered in the "AUTOEXEC.BAT" file. Now type:

"SMWCLOCK S"

then press the return key. Press "F6" or "Control Z" to close the "AUTOEXEC.BAT" file. Now MS-DOS will run the clock function whenever MS-DOS is started.

This concludes the physical installation and linking of software for the SmartWatch. If problems are encountered please contact the Radio Shack Service Center.

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