The Journey Inside[SM]: Technology and Society

Student Handout: Chips and More Chips

Chips and More Chips

Integrated circuits are used in many devices. For example, a digital watch contains a microprocessor—called an embedded processor—and some memory. All modern cars contain a number of embedded processors, as do handheld calculators, electronic games, television sets, portable telephones, and tape and CD players.

An embedded processor can make a product easier to use and more versatile. For example, an electronic thermostat is a very smart device. It can monitor the temperature in your house. If you decide the house should be 70º F before you get up at 7 a.m., the thermostat is able to determine when the furnace should be turned on so the temperature of the house is ready for you. You can set the thermostat to produce different temperatures at different times of the day and for different days of the week.

There are many more examples all around us. An electronic postal scale has postal rates and ZIP code information stored in its memory. When you put a package on the scale and indicate the ZIP code information, the scale can calculate the postage. An electronic chess game can be set to play at different levels of expertise. If you are a beginner, you want an "easy" opponent. If you are an expert player, you want a "harder" opponent.

Devices that make use of integrated circuits have caused new industries to develop. Think about all the companies now making, selling, and servicing pagers, cellular telephones, digital cameras, or digital musical instruments and equipment.

Activities

1. Create a collage or original drawing of 10 different devices that contain embedded processors.

2. If you had to get along without five of these devices, which would you choose to do without and why have you made these particular choices?

3. Choose one item from your collage or drawing. Think about the things this device does. Create a list of new features you think would make the device even better. You will need to keep in mind the kinds of things that an embedded processor can help you do.

4. Think of something that you do on a regular basis that is tedious or repetitious. Design a device that uses an embedded processor to make this task easier and less

tedious. Draw your device and label the parts. Think carefully about making the device user-friendly. You need to be able to activate its power easily and quickly.

5. Sometimes the designer of a particular device would be surprised at the novel use being made of their work. For example, the pager is frequently used to keep a person constantly in touch with their own phone calls. Nevertheless, a dairy farmer used the same technology to solve a daily problem he faced. His 250 head of dairy cattle needed to be brought into the barn twice a day for milking. He identified 12 cows that usually took the lead in this event. He trained this group to respond to the beeping of an electronic pager. Now when it is time for milking, the entire herd arrives in response to the page—providing a high-tech solution to a daily chore.

   Choose some item that you frequently use and see if you can find new ways to make it useful. For example, you might use a sock for a purse, or a pen could be used to hold your shirt closed. List at least five new uses for the everyday item.