

Electronics Design Guide 4: The user interface

Reading the product

Your electronic product should explain itself to the user. The design should make the use obvious as many people do not read instructions. You can 'road test' the user interface by asking the kind of people for whom the product is designed to take a user trip.

Use this checklist to help with your design.

- ◆ List all the controls.
- ◆ Note what they do.
- ◆ List all the displays.
- ◆ Note what they show.

You can ensure that the purposes of controls and displays are made clear by their position and by adding lettering and/or symbols. Use widely accepted symbols if possible. If you design your own symbols, test them on others to ensure that they are understood. If you use word labels, make sure these are large enough and simple enough to be read by potential users.

- ◆ Make sure the output is appropriate and easily understood.

What does DSP mean?

What does SET/REMAIN mean?

What is P MODE?

What do the other buttons do?

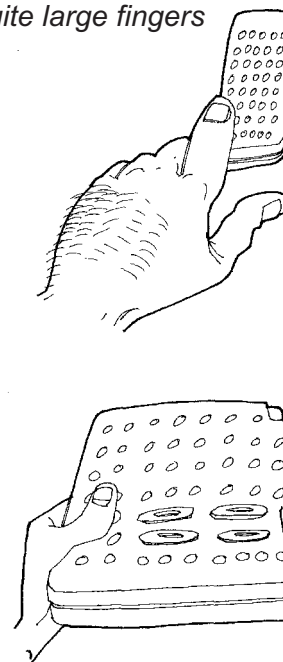
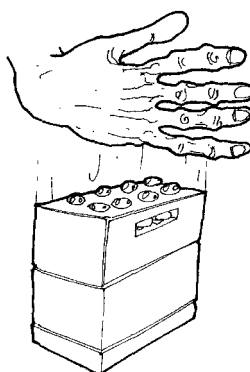
*Positioning, symbols and lettering have been used on this personal CD player
Can you think of any way to improve the user interface?*

Using the controls

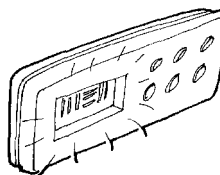
The controls should be easy to use. Different people will have different requirements, as shown below.

Adults often have quite large fingers

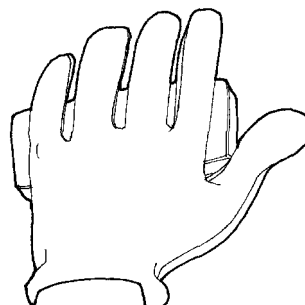
Older people may lose some strength in their hands and fingers



Portable devices should be able to be operated with the fingers of one hand



Sometimes controls need to be used in the dark



Sometimes the user will be wearing gloves

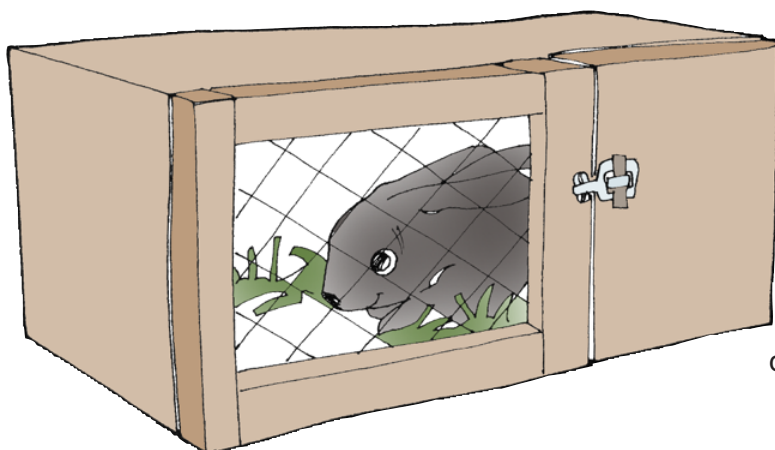
Electronics Design Guide 5: Sensing devices

A sensing device gives a user information about some physical conditions in the real world. This information is detected somehow and then carried by a signal. These devices indicate whether a signal is above or below a particular level (the reference level). They often have a control to adjust the reference level.

Situations

In each situation decide what your device needs to detect and how this may be carried out.

MUSTN'T GET TOO COLD



Sensing input signals

Usually very precise measurement of the physical signal isn't important as the device will be for situations that aren't critical. So, in some situations a digital sensor will be appropriate. Where an analogue sensor is used, cheaper non-linear devices would be suitable.

Producing output signals

The purpose of the main output is to indicate whether the physical signal is above or below the reference value.

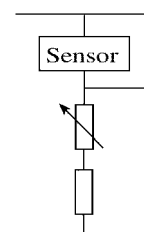
Will your device provide unintrusive information about the input signal level or will it provide a warning about the level by alerting the user?

Electronic processing

Your device may need some or all of the following features:

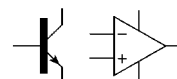
◆ The ability to adjust the reference signal

Put an analogue sensor in a potential divider with a variable resistor. If this signal rarely needs adjusting, use a preset variable resistor.



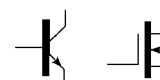
◆ Amplification of the signal size

In most cases a transistor will amplify the signal enough. If the sensor provides a very small signal change use a comparator.



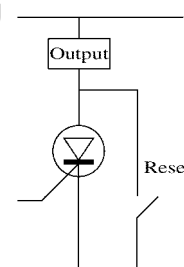
◆ Amplification of the current to drive an output device

Use a transistor matched to the power requirements of the output device.



◆ A latch to show that the signal has been above or below the reference signal

A thyristor will provide latching on an analogue input signal and also act as a driver for the output device.



Don't forget to include a reset. (This reset switch can also be used to check that the output device is working.)