



Disability Services

Community and Home Support SA

Information Sheet

Environmental Control Units (ECU)

An Environment Control Unit (ECU) is a purpose-designed device or system that allows a person to operate appliances within their environment. Most people during the course of their everyday life use some form of basic ECU, such as a remote control for the television or stereo.

An ECU can increase a person's independence and quality of life by removing the requirement to control standard remote controls or switches.



What can be operated by an ECU?

- ▶ Audio visual equipment (such as television, stereo and DVD player)
- ▶ Lighting
- ▶ Fans
- ▶ Air-conditioning
- ▶ Door locks and door opening
- ▶ Curtains
- ▶ Security systems
- ▶ Specialised telephones
- ▶ Many other items.

Environmental Control Units will not be able to operate an item if it requires further manual operation. For example, an ECU cannot operate a toaster because it requires somebody to manually insert the bread, depress a lever and then retrieve the toast.

How do ECUs work?

Firstly, there needs to be some form of input to the ECU. This is how the user accesses and operates the ECU and may be:

- ▶ **Direct**—where a function is directly selected, such as by pressing a button on a remote control or selecting an option with a computer mouse.
- ▶ **Indirect**—where an external switch (or switches) are plugged into the ECU to provide the input (access). The user then activates the switch/s to operate the device. Switches provide an alternative method of operation and are customised to the specific physical or cognitive abilities of the user.
For example:
 - If the user has very little movement or strength, a switch that is smaller and extremely sensitive to touch might be used.

- If the user can only make very big movements, a larger, more robust switch might be appropriate.
 - Some ECUs will automatically scroll through the available options (scanning) and when the desired option is highlighted the user makes a selection by activating a switch.
- ▶ **Voice Control**—where the user speaks a word or phrase into the ECU that corresponds and activates the desired function. These systems must be trained to the person’s voice and rely on the user reproducing the same sound. It is important to remember that illness and fatigue can have an effect on the reliability of voice control.

A combination of all of these methods may sometimes be used.

Once it is activated, the ECU will create an output response signal that tells the selected appliance or device what to do. This signal can be in different forms depending on the ECU and the item to be controlled. For example:

- ▶ **Infrared**—where the signal is transmitted via infrared light waves. This type of transmission requires a direct line of sight between the ECU and the device being controlled.
- ▶ **Radio control**—where the signal is transmitted via radio waves. These signals can travel longer distances and are not usually blocked by walls or other objects. However, they can be affected by interference from other items that use radio frequencies, such as cordless phones and microwaves.
- ▶ **Electrical (home) wiring**—where the signal is transmitted via existing or additional wiring built into the home. Costs (including installation) of these systems can vary greatly; however, they may be relatively low if the wiring is already in place or if it is a new home under construction. If multiple power circuits exist within a home, an appliance on one circuit will not be able to receive a signal from an ECU connected to a different power circuit.
- ▶ **Bluetooth technology**—where the signal is transmitted via Bluetooth signals. This allows reliable environment control from many other devices including mobile phones. This technology is sometimes combined with switch access.

Examples of ECUs

- ▶ **Single function ECUs**—are basic level ECUs that are designed to enable alternative on/off control for a single appliance. For example, using a big button switch to turn a lamp on and off.
- ▶ **Universal remote controls**—can usually operate a number of different appliances and can be used in place of supplied remote(s). A number of remote controls can be combined into the one universal control that can be pre-programmed or learn the codes for many major audio visual equipment items. Large button universal remotes are available for users that have difficulty seeing or pushing the smaller buttons on a standard remote control.
- ▶ **Remote controls with switch input**—are remote controls that have been either manufactured or adapted to have a number of different switches plugged into the remote to operate desired functions. Macro functions can often be programmed with this type of remote. This means that multiple commands can be sent with a single button/switch press (for example ‘DVD power’, ‘AV channel select’, and ‘Play’).

- ▶ **Remote controls with voice input**—are generally programmed to suit one user's voice and are able to learn the infrared or radio commands for many appliances.
- ▶ **Other specialised remote controls**—a variety of other remote controls can learn the signals to control the functions of many different items or appliances. Some of these have interactive displays that change as items are selected to make them easier to understand. Some also have the ability to automatically scroll ('scan') through the available functions that can then be selected via an external switch.
- ▶ **Computer software and hardware**—a number of systems are available to operate appliances from a computer. They usually involve software that requires some level of set-up, as well as some sort of output interface that is plugged into the computer (such as an infrared transmitter). If a user has difficulty operating their computer via a standard keyboard or mouse, there are alternatives that may assist with computer control.
- ▶ **Telephone controller**—allows a specialised telephone to be controlled via a remote control, including putting the phone onto loudspeaker and dialling numbers.
- ▶ **Home automation systems**—these systems may be operated using some of the remote controls or computer systems already mentioned. However, they generally require some additional hardware or components, which may vary from items that simply plug into existing power outlets and either communicate wirelessly or by using the existing electricity wiring, through to systems that are wired into the home in addition to existing wiring. Depending on the sophistication of the home automation system, it can completely integrate control of lighting, security, entertainment equipment, climate control and so on.

Considerations for choosing an ECU

- ▶ Which appliance(s) require an alternative control device?
- ▶ What abilities does the user have to operate an ECU (for example, physical abilities to control the ECU, and cognitive abilities to learn new tasks and remember the processes to use the ECU)?
- ▶ What area will the ECU be used in (for example one room or the whole house)?
- ▶ What back-up systems are in place for the person if their ECU breaks down, they are unwell, or in the event of an emergency?
- ▶ Does the ECU need to be portable or fixed into place?
- ▶ What impact will the ECU have on others using the environment?
- ▶ Is integration required with other systems that are already in use like a powered wheelchair, computer, communication devices, telephones and mobiles?
- ▶ What is the cost of the ECU and any installation required?
- ▶ Is there availability of assistance with set-up, training and ongoing local technical support?
- ▶ Who will conduct any regular maintenance on the ECU?
- ▶ Are there any professionals with knowledge about ECUs that can be included in the selection process?

