WITH A LITTLE HELP FROM THE CHIP
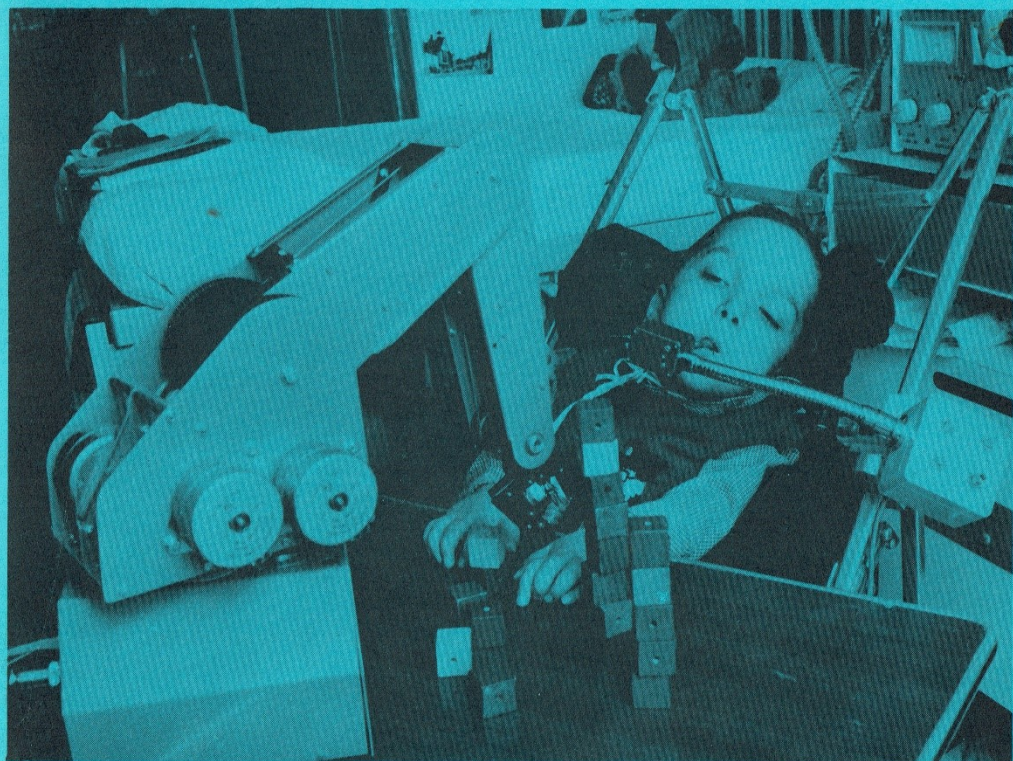
WITH A LITTLE HELP FROM THE CHIP

HOW MICRO-TECHNOLOGY CAN
HELP DISABLED PEOPLE TO LEAD
MORE INDEPENDENT LIVES.

HOW CAN MICRO-TECHNOLOGY HELP?

Disabled people have difficulty in achieving their full potential because of the limitations imposed by their disability. Micro-technology can sometimes help: it cannot work miracles, but increasingly it offers possibilities to disabled people that did not exist even a few years ago.

The "Micro Revolution" has already affected us all; we already take it for granted in items we would hardly think of as computers, like portable radios, televisions and washing machines. We are learning to use it at work, with robots in the factory and word processors in the office. Electronic toys are very popular with children and some people are even becoming used to a talking computer in their car.

THIS BOOKLET WILL OUTLINE THE SPECIAL ADVANTAGES AND USES OF MICRO TECHNOLOGY FOR PEOPLE WITH DISABILITIES AND HANDICAPS.

It will tell you:

* What MICRO TECHNOLOGY can do to help.

* What EQUIPMENT is available.

* How and where to get ADVICE about choosing the right equipment.

* How you can get FINANCIAL HELP to buy the equipment.

IT IS VERY IMPORTANT TO SEEK PROFESSIONAL ADVICE BEFORE CHOOSING ANY AID. There are many different types available and those which look most useful initially may not be the most suitable for you. This applies to choosing software as well. Some software is better designed or more suitable than others - so get advice before you spend your money.
See pages 61-68 and the Information Section for where to go for help.

WHAT IS
MICRO-TECHNOLOGY?

Micro technology is the use of very small electronic
components - a "chip" - to control other equipment. A washing
machine will only wash clothes; a car will only drive you
along - but micro technology is different in one very
important way: the micro computer is a general purpose machine
- and it is very versatile; the same micro can control either
a washing machine or a car depending on the instructions given
to it.
Micros can, of course, be designed to carry out just one
specific task: but the micro-revolution has come about because
these "chips" are so adaptable, and yet cheap to manufacture
in large numbers.

Graham Cook was paralysed in an industrial accident. He cannot
hear or speak, and has tunnel vision. With two head-switches
and his Elfin System he can operate his wheelchair, write, use
television, teletext, lights, radio, and page turner: the
Elfin BeebControl allows him to use standard commercial
software. Photo: Elfin.

WHY IS MICRO TECHNOLOGY SO VALUABLE?

* It enables us to do things which used to be impossible.

* It helps us to do things better or quicker.

THE COMPUTER.

The Machinery of the computer is called the hardware. There are different types of computer, but many are in the form of a system which might include various parts:

Hardware

This is the physical, visible part of the computer system and includes the micro-processor itself.

Sometimes the parts of a computer system are not easy to identify as they are all built into a single, convenient package. The main computer system can be expanded to do various jobs by adding on extra bits of hardware or by using extra software.

Software

A computer is controlled by a series of programmed instructions known as SOFTWARE. The software can be loaded into the computer in different ways, either from a cassette recorder, a disc drive or a plug-in cartridge (with a chip built in).

Skill

The hardware and software by itself can do nothing without the skills brought to it by the person operating the system: these can be simple skills or sophisticated interaction with the software.

The parts of a computer system

Display unit For the computer to show the results of its work. Usually a separate TV, but built-in to some computers

Games control Better than the keyboard for telling the computer what to do when using it for playing games
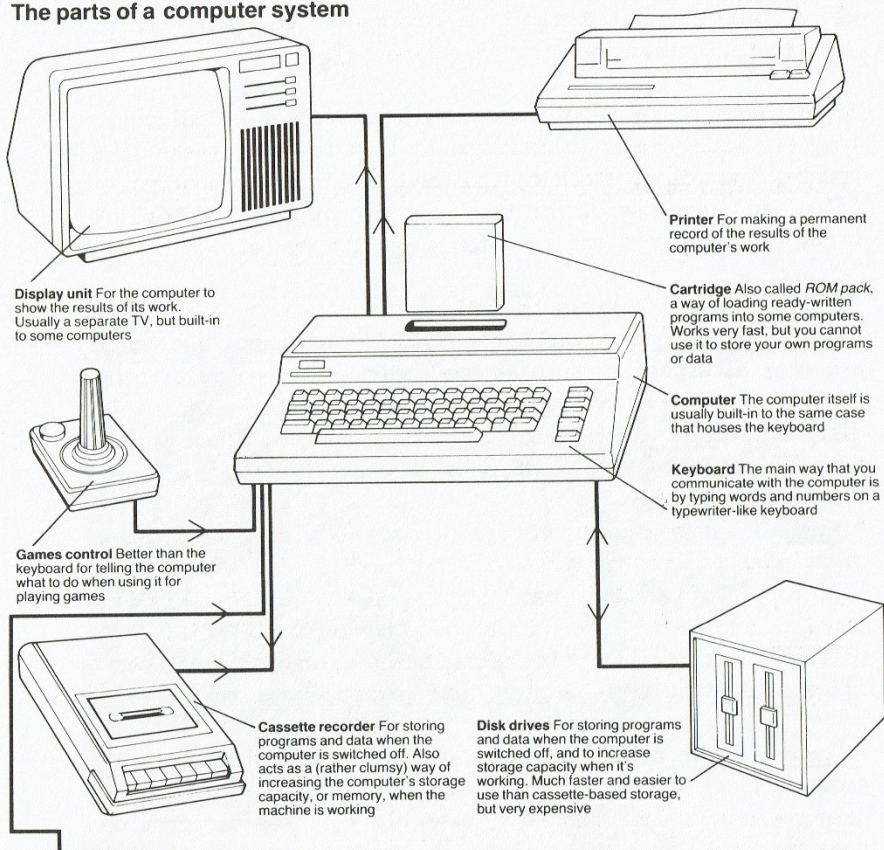
Special Switches and Keyboards Apart from the switches described on page 37, which are used instead of a computer keyboard, computers can be modified to be controlled by:
expanded keyboards a tough large keyboard, with widely spaced recessed keys for people with tremors or gross movement.
scanning control a panel in which all the keyboard characters light up in turn – you stop it at the one you want (using the appropriate switch for you).

Cassette recorder For storing programs and data when the computer is switched off. Also acts as a (rather clumsy) way of increasing the computer's storage capacity, or memory, when the machine is working

Printer For making a permanent record of the results of the computer's work

Cartridge Also called *ROM pack*, a way of loading ready-written programs into some computers. Works very fast, but you cannot use it to store your own programs or data

Computer The computer itself is usually built-in to the same case that houses the keyboard

Keyboard The main way that you communicate with the computer is by typing words and numbers on a typewriter-like keyboard

Disk drives For storing programs and data when the computer is switched off, and to increase storage capacity when it's working. Much faster and easier to use than cassette-based storage, but very expensive

Diagram: RICA.

WHAT CAN COMPUTERS DO?

Using the right software, computers can be made to:

* <u>Control</u> - other machines and equipment: For example the computer controls in washing machines; a disabled person can use a computer to control his environment - eg. switch on and off lights, television etc. (See page 52).

* <u>Calculate</u> - many people have their own pocket calculator; they are widely used in commerce to link together tasks like orders, invoicing, stock control and financial accounting. Calculators are useful for those who cannot write numbers by hand, and there are models which speak the numbers.

* <u>Write</u> - It is possible to "write" directly onto the screen, usually by using the computer's "QWERTY" keyboard, but there are many alternatives such as the modified keyboards or other controls (see pages 8 - 13) which are particularly useful for disabled people. Using Word Processing programs makes it easy to alter what has been written or to correct mistakes.

* <u>Print</u> - The computer can be linked to many different types of printer to produce a copy (often referred to as the "hardcopy") of what has been written on the screen. This is particularly useful for people whose handicap makes it difficult for them to write. Some printers can also produce illustrations which have been drawn onto the monitor screen.

* <u>Speak</u> - There are several voice simulation systems (speech synthesisers) which can be linked to a computer. These can help speech-impaired people to communicate. They can provide an alternative to the printed word for people with partial sight.

Communicate over long distances - some computers can be
linked together, sometimes by telephone, and used not only for
the transfer of information but for all the spoken or written
communication outlined above.

* Educate - the computer is a valuable tool in mainstream
education, and the child with special needs can also benefit
from the stimulus of good software. It can provide rewards,
develop problem solving skills, change with a child's needs
and give a child practice. Special software can also help the
partially-sighted and deaf child.

* Entertain - computers can be used for games ranging from the
new "Space Invader" types to traditional games like chess.
They can also be programmed so that one person plays against
the computer or for two or more people to play against each
other. For people who are isolated by their handicap these
attributes can be particularly valuable. The speed can be
varied and sound can be added.

Single-switch user operating CEDRIC system: computer, visual
display, software storage and printer. Photo: HPRU.

HOW ARE COMPUTERS CONTROLLED?

Initially the computer is controlled by its software program
and this can be built into the computer or loaded from a
cassette tape, a disc or a cartridge.
The computer can then be used with a wide range of controls or
switches tailored to suit either the program or the operator.

CONTROLS AND SWITCHES.

Direct Selection - means that you press the key or point to
the symbol you want directly. This is fast but needs some
physical control.

Keyboard - The most common control (or input device) is the
normal typewriter "QWERTY" keyboard. Many disabled people can
use this - even if they use only one hand or a head pointer to
press the keys. But there are alternatives which help people
who find this difficult.

Operating a keyboard with a mouth pointer. Photo: DTI.

Keyguards - a board which overlays the normal keyboard and allows access to the keys through holes. This enables a person who has poor finger control or who uses other aids such as a head pointer to use the keyboard more accurately.

Expanded Keyboard - a large tough keyboard in the normal "qwerty" layout but with widely spaced and recessed keys. These are useful for people who find fine finger control difficult. They all incorporate an electronic delay which reduces accidental key presses. There are also mini keyboards for people with restricted movement.

Special Technology Expanded Keyboard. Photo: ACE.

Microwriter - a hand-held keyboard with just six keys. Using different combinations it is possible to type all the normal letters and numbers as well as controlling other computer functions with one hand. The Microwriter is a computer in itself and can be used as a word processor on its own or in conjunction with other computers. There are also a number of adapted versions for people with handicaps - for example a scanning Microwriter which can be used with one switch. (see picture page 38)

Scanning System - a light or pointer moves over a panel containing a selection of letters, pictures, symbols, words or phrases. By operating the switch you can stop the indicator at the place you want. Anybody with any controlled movement can scan but it is slower than direct selection. Examples are "Possum" and "Steeper" aids used in a number of different applications.
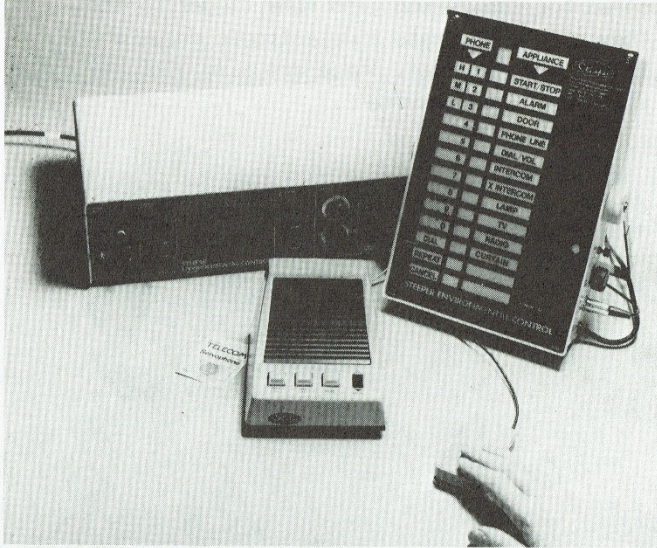
The "Steeper" Home Control Equipment operates on a scanning system from a single switch. Photo: Hugh Steeper Ltd.

Keyboard Emulators - these replace the keyboard as an additional display, either on a screen with a scanning cursor (e.g. Keymaster) or on a panel with a scanning light (e.g. Elfin Beebcontrol). A single switch can then select the "key" to be activated. This can, in theory make any mainstream software accessible to single switch users. However, some programs, especially games programs, demand short reaction times from the user, and a single switch user may not be able to move from one key press to another fast enough. Nevertheless it does give single switch users access to a wide range of software including word processors.

Special Switches - with suitable programs the functions of a computer can be controlled with a single or double switch. These can be made to suit individual needs and activated, for example, by using very small body movements, gross body movements, sucking and blowing, noises, or even eye movements.


Operating the computer with a single switch. Photo: DTI.

Joysticks - A gearstick-like lever which sends variable signals to the computer depending on which way it is moved. It can be used to move a point anywhere on the screen so it is often used to control games and programs for drawing on the screen (See cover picture).

Overlay Keyboards - boards made up of a number of touch sensitive pads which can each be assigned to a different function. They vary in design but the best known is the "Concept Keyboard" which is either 20 x 28cm or 43 x 28cm and has 128 pads. Individual layouts can be designed with letters, words, pictures or symbols assigned to each pad, or several pads grouped together to form larger areas. Many games or educational programs can be converted for use with overlay keyboards. See picture on page 28.

Touch Sensitive Screens - A special surround to the monitor
screen which makes it appear to be sensitive to being touched
by a finger or pointer. It works by beams of infra-red light
which are broken when the screen is touched. These screens are
very useful for those who find it difficult to relate the
activity on the screen to actions on the keyboard, and for
children with visual impairments, to train visual
discrimination and eye tracking. The software, however is
still at a development and demonstration stage.
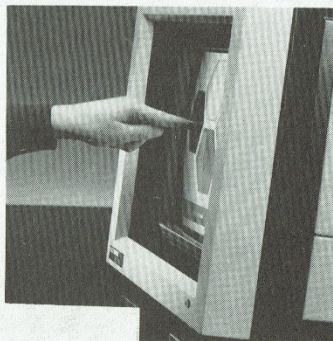
Touch sensitive screen. Photo: Microvitec.

Light Pen - A pen-like device which is activated by being
pointed at the screen. It is often used in drawing directly
onto the screen or for selecting something from it. The
"Photonic Wand", a special kind of light pen is very useful
for physically handicapped people when attached to a helmet or
spectacles as an alternative to a head pointer.

Photonic Wand. Photo: John Cole.

Sound-Controlled Switches - for example "Micro Mike", a
microphone connected to the computer to control programs by
sound. It is sensitive to noises made by the operator and can
be used by children for simple games and early learning
programs. It is used by speech therapists and teachers to
encourage vocalisation. Other switches work from a whistle or
a clap.

Christopher using a Micro Mike. Photo: BBC.

Voice Control - Some computers are under development which can
be programmed to respond to particular words and instructions.
They usually only respond to the one voice they have been
programmed to recognise. At the moment they are not reliable
enough to be recommended for use by disabled people.

TAILORING TECHNOLOGY TO YOUR NEEDS.

This list of controls and switches is not exhaustive, and new
ways of controlling micros are being developed all the time.
This is important because it means that the more flexible,
often cheaper, commercially available technology can be made
accessible to disabled people by the addition of particular
switches and software. Sometimes the switches and software are
specially made for disabled people - and they can even be
specially made for one person. The best switch for you will
depend on your physical abilities, the aids you want to use,
the circumstances in which you want to use them and your
environment. The position of the switch, the way you sit or
lie when using it and the mechanics of the whole system all
have to be taken into account. The right answers will only be
found if the proper advice and help is sought. Many
manufacturers produce a range of different switches: some
adapt them to suit you indvidually. Don't expect your speech
therapist or occupational therapist to come up with an instant
answer; some problems take some thinking about and the best
solution may only be found by a process of elimination. As you
try out the various controls additional features may be
thought useful, such as switches that have sound, touch or
visual signals to show you that they have registered. Your
speech therapist or occupational therapist will discuss this
with you.
Getting a system tailored to your needs is a complicated
business, but it may make the difference between whether or
not you are able to use micro-technology. See pages 61 - 68
and the information section for where to go for help and
advice.

SUPPORT AND FOLLOW-UP.

You will not only need professional help and advice in
choosing the right aid for your needs, you will also need
training in its use. Make sure your aid doesn't end up unused
in a cupboard - in the case of a communication aid, for
example, your speech therapist will give you the support and
follow-up you will need.

COMMUNICATING

Micro-technology can help us communicate. It can help with:

* speech and speech alternatives. * hearing and hearing alternatives. * reading. * writing. * using the telephone.

WHAT ARE THE ADVANTAGES OF MICRO-TECHNOLOGY IN COMMUNICATION?

* Flexibility - aids can be tailored to meet individual needs with varying levels of complexity.

* Portability - many communication aids are small, light and battery powered, so they are easily transported and can be used almost anywhere.

* Long Distance Communication - some aids can be connected together, by telephone for example, for communication over long distances.

* Speech Synthesisers - can allow a non-vocal person to vocalise.

* Can Convert - from one type of communication to another - for example print to Braille and vice versa, or print to sound.

* Single-Switch Access - to alphabet, words, phrases or commands.

MORE THAN ONE TYPE OF AID MAY BE NEEDED.

A person may need a different type of aid for speaking, for writing, at home, in the classroom or out and about. How you feel about the aid is important too - and if you are going to take it outside the home, you will want to feel comfortable with it. It may need to change or develop with your needs. Your Speech therapist will help you get the most from your aid.

Get advice from Communication Aids Centres, the ACE Centre, or in Scotland, the CALL Centre, via your therapist, social worker or doctor.

AIDS TO HELP SPEECH

There are a number of aids which produce a visual reaction to
sound.
They start with toys which are used to encourage children to
make sounds. Examples are the "Worm in the Apple" where a worm
gradually grows out of an apple, or the teddy bear whose eyes
light up as the child blows or makes a soft sound.

There are also attachments for micro-computers which enable
them to respond to sound. With children "Micro Mike" described
on page 13 is popular. Sounds made by the child are used to
control the movements on the screen and play games. The
therapist or teacher can control the level of the sound needed
to activate the program.

"Micro Mike" does not discriminate between sounds or words,
but systems like "C-Speech" and "Visispeech" will produce a
different pattern on the screen for each different sound made.
Therapists and teachers use this type of equipment to help
people with hearing difficulties to shape their words and
improve pronunciation, and to help people improve speech after
a stroke or accident.

A device which can help stammerers is called "Hektor": worn
around the throat, it senses the rhythm of the speech, and
gives an audible signal that the speaker may be speeding up.

Computers are being developed which respond to spoken
instructions. As they can be programmed gradually to require
greater accuracy in pronunciation, they will undoubtedly be
used in the future as another type of encouragement for both
children and adults.

SPEECH ALTERNATIVES

In the last few years there has been an improvement in the quality of speech synthesisers (artificial voices produced by a computer); many of the voices are now easier to understand. The simplest of the artificial voice aids are those with very limited vocabularies which use two large buttons to say "Yes" and "No". Slightly more complex is "Vocaid" which is operated by touching one of the 36 squares on the control panel to produce letters, words or phrases. This type of machine is particularly useful for people with limited communication skills.

Where a larger vocabulary is needed machines like the "WITS Chat" communicator are useful. Words can be spelled out and spoken, and words and phrases can be stored, and later recalled by using a code of three keys. "WITS Chat" is customised to individual needs: some contain a tiny printer, some can also be connected to a screen or bigger printer for written messages.
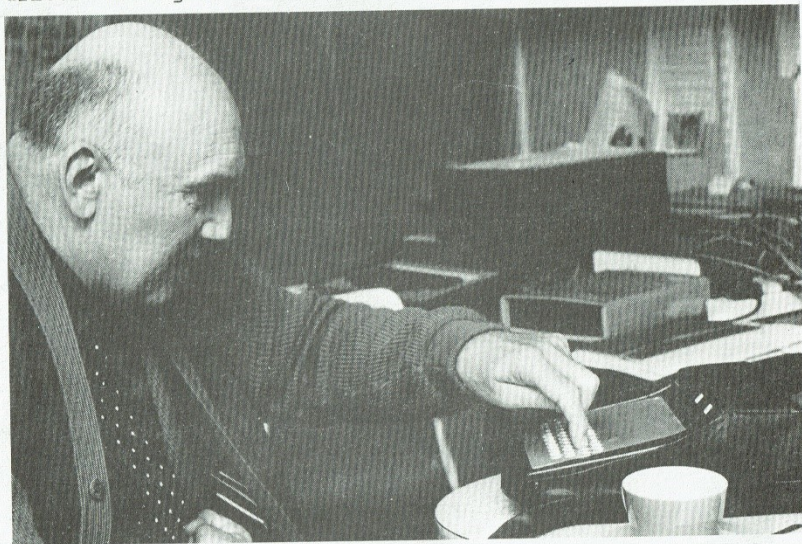
WITS Chat in use. Photo: ECCE Productions.

Not all speech alternatives use an electronic voice as the method of communication. The "Canon Communicator" for example is a very small electronic typewriter: the user types in a message which is printed onto paper tape. Others use letters which light up in a display window, rather like a big calculator. The "Lightwriter" (see picture on page 57) looks like a typewriter, has a keyboard and two display windows, one to face you, and one to face the person you are talking to. The letters are displayed like a moving news-strip.

Another type of communication system uses scanning controls like those described on page 10. The Chailey Communicator, for example, is a board divided into 160 squares: letters, numbers or symbols can be placed into each square. Each square lights up in turn and a special switch or switches stops the light at the appropriate square to give the message.
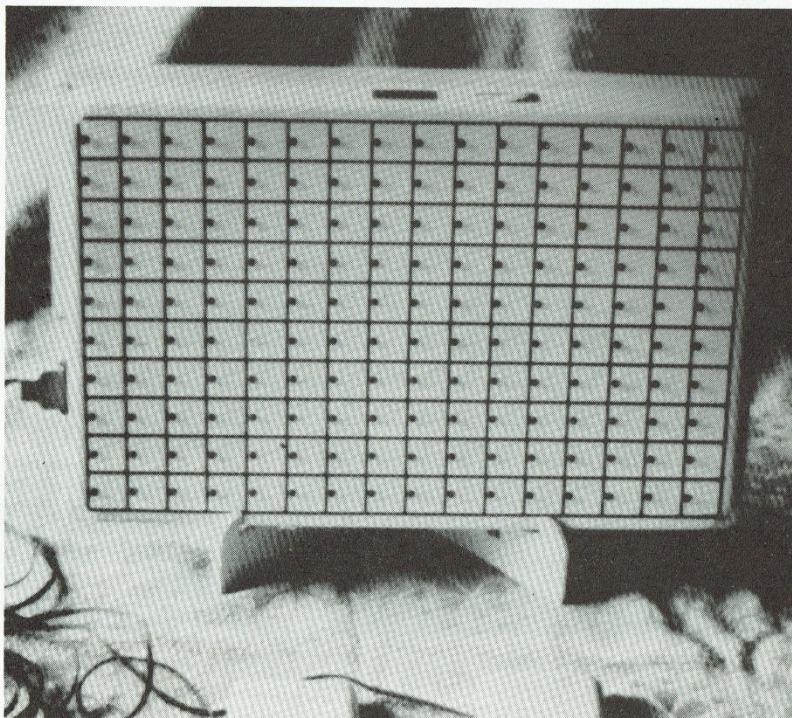
Chailey Communicator 160. Photo: Chailey Heritage.

AIDS TO HELP THE HEARING IMPAIRED.

Seeing the spoken word on a screen may help a deaf person:
"Palantype" is an expensive system, but it can enable a deaf
person to take part in meetings, make phone calls and so on.
The system needs a trained "Palantype" operator to type the
spoken word, in a kind of machine shorthand, onto a special
keyboard: the computer translates this into phonetic English
and displays the output on a screen; the deaf person reads the
spoken word on the screen.

Recent research at University College London has led to the
development of an aid for totally deafened people, called a
"cochlear implant." A cochlear implant is where an electrode is
placed on or in the cochlea (inner ear), and by passing
electrical currents through the ear it creates a sensation of
hearing. The electrical signal comes from a special processor
about the size of a normal body-worn hearing aid. The
processor extracts from speech certain vital elements which
allow the user to tell the difference between voiced and
unvoiced consonants such as - b & p, d & t, c & g & le,
information which is not available just by lip-reading.
Improvements in lip-reading speech and an accuracy of 50 -
150% have been reported. The aid also helps deafened people to
retain good control over their own voices.

Cochlear implants are being used throughout the world in
various forms, and in the U.K., University College Hospital
and the RNID also have a programme for implanting adults.

AIDS TO HELP READING.

To enable people who are partially sighted to read normal
print there are a number of systems which enlarge print by
using a video camera connected to a computer. One example is
the "Alphavision" which is able to enlarge between 2 and 75
times. It also reverses the image, so the print is white on a
black background, to make it easier to read.
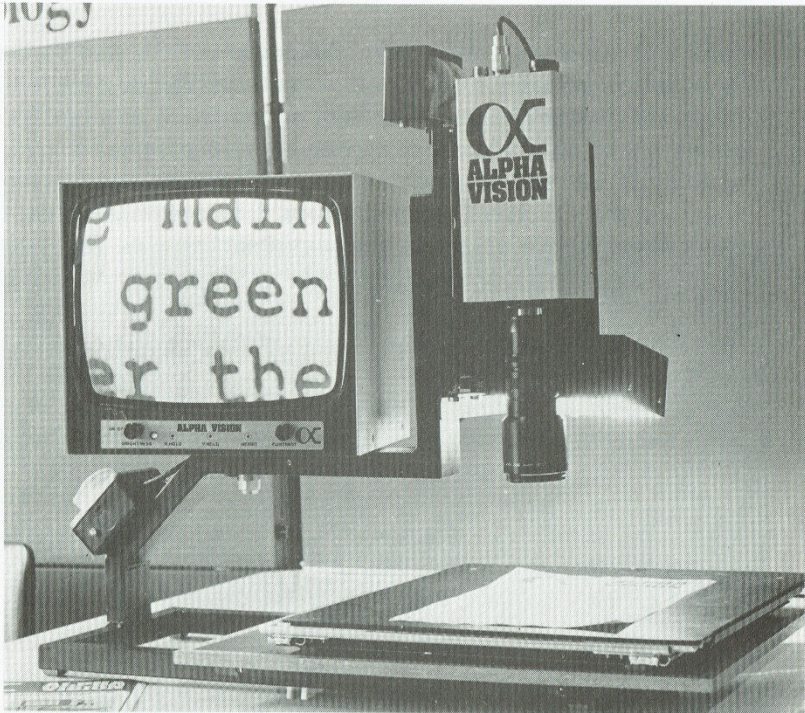
Alpha Vision. Photo: DTI.

The "Kurzweil" reading machine can make printed books
accessible to blind people: the user places the material face
down on the camera unit platform and the words are spoken by a
speech synthesiser. This system is very expensive and more
likely to be bought by large institutions - Manchester Public
Library has one, for example.

The "Optacon" print-reading machine allows blind people to read normal printed material by touch. The user holds a small camera in one hand and runs it along the line of print: a finger of the other hand feels the alphabetic (not Braille) shape of each letter on vibrating pins. This is an expensive but useful aid, although it needs training to use, and even then many people cannot feel the letters well enough to be able to use the equipment. A speech synthesiser can be added to speak aloud the words.

Using an Optacon. Photo: RNIB.

There are also a number of systems which convert print to Braille: a sighted user can type words onto a computer keyboard, which with suitable software is converted into digital data. This can then be embossed in Braille on a Braille printer - this is how the National Deaf-Blind Helpers' League produces its newspaper; or onto metal sheets for printing Braille books. This is how the Scottish Braille Press now prints many of its books.

AIDS FOR WRITING.

For the blind or partially sighted, the "Vincent Workstation" (see picture on page 32) can convert typing on a Perkins brailler into alphabetical script on a visual display unit and/or a printer. The Workstation is designed so that, if required, a speech synthesiser can be added to speak each letter as it is typed, to check accuracy. This system is very useful in teaching children to type Braille, as well as producing written work for sighted readers. A blind operator can also use the normal computer keyboard with the sound feedback from the speech synthesiser.

The "Versabraille" and "Brailink" are both portable machines on to which the user can type and store notes, which can then be played back on refreshable Braille pins. Both can be connected to a printer to produce a "hardcopy".

Patrick Murphy, who is deaf and blind, using a Versabraille.
Photo: Peterborough Evening Telegraph.

Word processing systems are particularly useful for people who have difficulty in writing. The typist types on the keyboard and the words are displayed on a VDU. Corrections and alterations are easy to make on the screen, and when the typist is satisfied, the text is transferred to the printer for hardcopy.

Many computers have word processing programs which can be used
with the alternative control systems described on pages 10-13.
Among these are:

"MacApple" (see page 34)
"Beeblinc" - one of about 15 programs for use with a BBC-B
computer.
"Bliss" Communication Programs - These are available for use
with either the BBC-B or the Apple Computers. They contain a
large number of "Bliss" symbols (see Glossary) which can be
selected by using either the keyboard or special switches.
Messages can be built up on the screen or printed either with
or without the corresponding English words. With a speech
synthesiser each symbol can be spoken. However this follows
Bliss rather than English syntax.

Some software has useful characteristics built in, such as
spelling-checkers, style helpers, word lists and word
predictors (See page 29, and the ACE publications listed in
the booklist).

The Nuffield project at the Ormerod School in Oxford is
developing hardware and software for severely physically
handicapped children.

There are a number of communication systems for the severely
handicapped. "Elfin" (see picture on page 3) comes as a
customised package with hardware and software, and a single
switch operates a scanning control to select letters and
commands. "Twinkle" uses a BBC micro-computer system, and an
eye-movement switch operates a scanning cursor. The Medical
Research Council's "CARE" project is developing letter
writing and other software for single switch users for the BBC
and Apple systems. The Handicapped Persons Research Unit has
developed CEDRIC (picture on page 7) - a single-switch
communication and environmental control system.

TELEPHONES AND ELECTRONIC MAIL.

Some computers can be connected over long distances by using a
telephone link. This requires a modem (described in the
glossary) to connect the computer to the telephone system.

Electronic Mail means that you can exchange letters and messages with any other person with a suitable computer, who subscribes to one of the electronic mail systems, such as "British Telecom Gold" or "Prestel". (B.T. Gold has special arrangements for deaf people, to help keep their costs down). You type in your message and address it, and it is held in the system until your correspondent wants to read it. Blind users can plug into a Versabraille to read the messages with their fingers. B.T. Gold and Prestel also make available a wide range of information, and access to other computers in the system.

Teletext is a service provided by the BBC and ITV: BBC's is called Ceefax, ITV's is called Oracle. If you have a television set adapted to receive Teletext, you can have access to news, current affairs and many other information pages. This is particularly useful for the deaf-blind, who can use special software to convert the Teletext signals to Braille, to be read with a Versabraille. This can mean instant access to up-to-date news. Teletext also provides sub-titles for the hearing-impaired for many popular television programmes.

Telephone Calls can be made by the deaf via the Telephone Exchange run by the Royal National Institute for the Deaf in London. Users with a Tandata terminal and a modem can make use of the system. The hearing person speaks to the exchange, who type the words into the exchange computer. These words are transmitted to the deaf person's computer at home or in the office, and are displayed on their screen. This allows distance communication between deaf and hearing people, and is particularly useful if the deaf person is able to speak their part of the conversation.

Deaf people can also communicate directly over distance using the more expensive Tandata models or standard computer equipment, back to back, and "speaking" through their modems and the screen. Standard computers are more useful because they have all the additional facilities offered by a computer.

LEARNING

Micro-Technology can help in Education:

* It enables access - by using suitable controls it makes many activities possible which may have been very difficult in the past. Programs can also be written to overcome individual problems.

* It is stimulating - a wide range of colour and sound can be used to hold a child's attention. It will also react to the child, often in different ways according to the child's particular response.

* It can be used for practice - at a pace and a level to suit individual needs and in a consistent and endlessly patient way. Some programs also include a method of monitoring progress and the level of success.

* It can promote social interaction when used by groups working or playing together.

* It can widen the curriculum.

* It develops skills with status - many people have been able to master complex computing skills even though they have some form of disability. Others have found that when they have mastered their specialised controls they can produce high quality work even though their disability has always made this difficult in the past.

IT IS IMPORTANT TO REMEMBER THAT COMPUTERS AND MICRO-TECHNOLOGY ARE NOT A SUBSTITUTE FOR THE TEACHER and are only of real value in education when used as part of a well-structured curriculum.

Christopher using a joystick in his mouth to operate a
program. Photo: BBC.

TOYS AND GAMES

The value of play in the development of a young child is well
known, and difficulties in handling ordinary toys put the
young handicapped child at a considerable disadvantage.
Micro-technology can help overcome some of the disadvantages.
It can also allow a child to have a visible effect on its
environment.

Battery Operated Toys which can be controlled by simple
switches. For example a cuddly dog which will walk or move
when the child touches a sensitive pad. The input required
from the child, e.g. the number of times the child must press
the switch to make something happen, can be controlled with
the computer so that learning takes place.

Radio or remote controlled toys e.g. car controlled by
joysticks.

Computer controlled toy vehicles e.g. "Big Trak". This has touch-sensitive keys which are used to program a series of movements. With practice it can be programmed to return to the start. It is particularly valuable in teaching sequencing and spatial concepts.

Sequencing and memory games. A good example is "Simon" which starts by showing a short sequence of sounds and coloured lights. The child repeats the pattern and as skills improve the sequences become increasingly difficult.

SMALL COMPUTERS

There are a number of small computers on the market: one example is "Speak and Spell". This has a speech simulator which will say the names of letters as they are typed in and read the completed word from its limited vocabulary. Other similar toys handle numbers and pictures.

Speak and Spell. Photo: Bob Mazzer.

EDUCATIONAL SOFTWARE

There is a great deal of educational software designed for use
by mainstream children which is just as valuable for students
with various forms of disability. For physically handicapped
children a keyboard emulator (see page 10) will allow access
to this software.

Early learning - There are some very good early learning
programs which are useful for young or slow learning children.
They cover work like colour and shape matching, sorting and
sequencing and many can be used in conjunction with controls
like "Micro Mike" or an overlay keyboard or a single switch.
These programs can stimulate interest and develop
concentration in addition to their prime aim of teaching the
concepts and providing reinforcement. They are also very
valuable for young children with physical handicaps who find
the conventional apparatus difficult to manage.

Luke is partially sighted: he uses an overlay keyboard to
operate a program which encourages him to make the best use of
his vision. Photo: ACE.

<u>Reading</u> - Programs start with letter recognition, word and picture matching and simple sentence construction.

<u>Decision making</u> - More advanced reading programs include adventure games which require the child to read a story and make choices and decisions. Progress through the adventure depends on the decisions made. These can be very useful used with groups of children developing their problem solving skills together. Teachers use these programmes to stimulate group discussion and interaction, and as starting points for projects across the curriculum. Examples are "Granny's Garden", "Dragon World" and "Flowers of Crystal".

<u>Writing</u> - Word processing software has tremendous value as it can enable children to write easily, and correct and edit their work. "Prompt 2" is a supportive word processor to help poor and hesitant writers. "Edspell" is a simple word processor with a 6000-word spelling checker. "Wordwise" is a professional standard word processor also usable by children. All these systems can play a part in freeing pupils from the fear of errors and untidy written work.

<u>Numeracy</u> - Programs are available for young or slow learning children starting with counting, figure recognition and matching quantities with the figure. More advanced programs deal with calculations such as addition or subtraction and move on to cover all aspects of school mathematics. Other software available covers learning to tell the time and number games.

<u>Curriculum enhancement</u> - The computer can support and enhance all the subjects in the curriculum - making rote-learning quicker and more fun, providing simulations of living conditions, climate, plant growth, battles, dangerous or expensive scientific experiments, running an economy, providing census information from history and encouraging pupils to classify in natural science.

Cognitive skills- The computer programming language "Logo" is now commmonly used in schools both to design and to draw on the screen and to control "Turtle" type robots. Logo uses straight forward commands like "forward", "left" and "right" to draw on the screen or to move the turtle. Children not only learn some computer programming and logical sequencing but also gain spatial concepts and awareness.

Children using a Turtle controlled by an overlay keyboard.
Photo: DTI.

Creativity and design - Design and drawing programs use joysticks, light pens and graphics tablets to make their designs. Typical is the "BeeBug Artist" program which uses a joystick to select colours and place shapes or draw lines onto the screen. "Rainbow" can be operated from two switches. With a suitable printer a "hardcopy" can be produced as a permanent colour record.

Music - There are music editor programs and one is being developed to enable single switch users to compose and play music. The "Photonic Wand" (see page 12) provides a glance-controlled synthesiser keyboard.

Information processing - Databases encourage children to gather and sort information on any topic in the curriculum.

As the child progresses more advanced material is available covering almost every area of the curriculum and most can be adapted for use with special control systems. Advice is available from the SEMERCs or from the ACE Centre. In Scotland you may get help from the CALL Centre and many schools use SEND, the Special Educational Needs Database. (See Information section).

Keyguard for BBC computer by Special Access Systems Ltd. Reduces risk of accidental key presses. Easily removed when not required. Photo: ACE.

FOR THE BLIND CHILD.

See "Vincent Workstation" page 22. This system can be
particularly useful when the student is integrated into a
mainstream school, or for taking examinations. It can also be
used with an overlay keyboard. A wide range of software has
been developed for the blind and partially-sighted child by
the Research Unit for the Visually Handicapped in Birmingham.
The Manchester SEMERC is beginning a project to provide
"talking" weighing, measuring and thermometer equipment for
science and mathematics work.

A visually handicapped girl using the Perkins Brailler on the
Vincent Workstation system, with reinforcement from speech
sythesis.

FOR THE DEAF CHILD

Special software is available, sometimes for use with an
overlay keyboard, to help teach a range of things including
grammar, syntax and comprehension. Donaldson's School for the
Deaf in Edinburgh uses a range of software designed by the
Educational Software Technology Research Group at Hull
University. Schools in the South West of England are
evaluating software from the Research Unit from the Department
of Education at Bristol University. Also at Donaldson's School
interactive laservision is being developed to help with
reading and comprehension.

"Hands CG" is a program designed in Nottingham to allow
profoundly deaf children to write using British Sign Language,
and then to progress to learn and write English. "Visispeech"
and "C Speech" help a child to improve stress, rhythm and
speech intonation (see page 16)
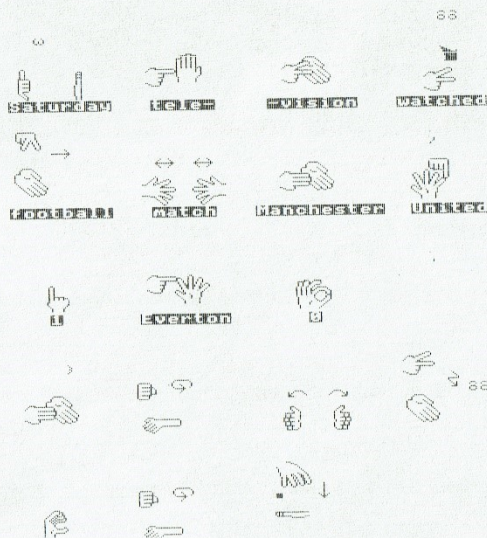
Mummy read a cookery book to Curly
then he made a cake.

A printout from the screen, of work using "Hands CG". Two
examples of different levels available from the program.

FOR THE SEVERELY PHYSICALLY HANDICAPPED CHILD

Keyboard emulators such as "Keymaster", "Possum scanning
control", and the Elfin "BeebControl" provide access to
mainstream educational software from a single switch.
(see page 10 and picture on page 51)

Possum ZX Spectrum is available in scanning and expanded
keyboard versions. Also available for BBC-B and Apple II.
Photo: Possum.

There are programs specifically designed to help overcome some
of the problems caused by disability.

Mac Apple is a word processing program designed by Patrick
Poon for an "Apple" computer. It displays, letters, numbers,
punctuation and special editing commands on the screen. These
are selected using either the keyboard or a special switch,
developed to suit the user.
The words which have been built up are shown at the top of the
screen. They can then be edited, memorised for later use or
printed. They can also be used to build up a dictionary which
can be shown page by page on the screen and then selected as
whole words - much faster than building up words letter by
letter.

Single Switch Education This is the result of a project
developed by the Manchester Polytechnic and the Lancasterian
School. It comprises a suite of programs to provide
communication between severely physically handicapped children
and their teacher, and allows a child to learn even when he or
she can only operate a single switch. There are a number of
options including writing messages on the screen from whole
words or from individual letters displayed on the screen;
drawing pictures on the screen; moving characters about;
printing the messages or the pictures; or playing games. The
teacher is provided with a method of building up the contents
of the package to suit each individual child's needs.

Lee uses two head-switches to operate his "Single Switch
Education" programs. Photo: Kathleen Newton.

CHILDREN WITH MODERATE LEARNING DIFFICULTIES.

By far the largest number of children with special needs are those with moderate learning difficulties. For these children the micro can offer motivation, and provide a setting for repeated practice but in a very attractive way. Programs on the micro can encourage disussion and get children solving problems together. Word processor programs can free a child from all the worries about making mistakes or producing a poor piece of work.

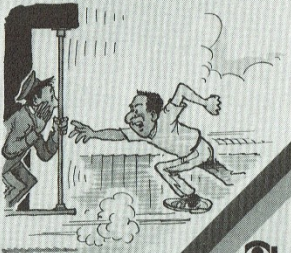SEMERCs can advise about suitable software.

One of the Microspecial pack programs for school leavers with moderate learning difficulties. Photo: SMDP.

School leaver groups can benefit from using the pack of 25
"Microspecial" programs developed by the Scottish
Micro-Electronics Development Programme, and funded by the
DTI. 1000 Micro-Special packs are being distributed to local
authorities to be passed on to schools for children with
moderate learning difficulties. The programmes relate to real
life outside school - planning a holiday, organising your own
diet, getting to know how to use timetables. There is a great
deal of valuable material and teachers will need to put in a
lot of work in order to explore the possibilities that it
offers. Hopefully teachers can join together in user groups or
attend in-service courses to look at some of the possibilities
offered: many of the programs which appear to be the least
useful on the surface turn out to be most useful in the class.
Teachers will have to develop supporting material, link the
software to outside visits, interviews with local residents
and so on.

CHILDREN WITH SEVERE LEARNING DIFFICULTIES.

This group of children can benefit from software which offers
a colourful visual stimulus on the screen and instant visual
and audible rewards for a simple action such as pressing a
switch of some kind. Overlay keyboards, with pictures or
symbols can be useful. For many children the micro can provide
a way to affect what happens, an opportunity to inter-act with
others, and the possibility of patient repetition. Many
teachers find that with the use of good software, a child's
concentration and self esteem can benefit.

FURTHER AND HIGHER EDUCATION

Many handicapped students use Micro Technology in Further and Higher Education. Much of the equipment is portable and easy to use in classes. A good example is the "Microwriter" (see page 9) which can be used as an electronic note taker, and will store information which can later be transferred to a computer.

The Open University provides courses in computer studies, which can be useful to the housebound student.

Using a Microwriter controlled by a single switch. Photo: DTI.

GETTING ABOUT

Micro-technology can help overcome the difficulties some people have with moving about:

* In mobility aids such as wheelchairs.

* In muscle stimulation and Bio-feedback machines.

* To provide information.

* In motor vehicles.

* To help to learn to drive.

Christopher's ventilator has been built into his Everaids chair. He will operate the chair from a joystick in his mouth. Photo: BBC.

WHEELCHAIRS.

Computer control in wheelchairs is beginning to be used in several different ways:

To improve the efficiency of the chair: Battery powered wheelchairs tend to be very limited because their batteries run flat quickly. Chairs like the Wayfarer have tackled this problem, not only by using a very efficient drive system, but also by using a built-in energy-saving computer. The computer detects any changes in power requirements caused by slopes or difficult surfaces and then controls the motors with maximum efficiency.

To make the chair more versatile: There are now a number of engineers who are using micro-technology to overcome the limitations of the standard wheelchair. A good example was designed by Dan Everard, originally for his daughter, Ruth. The battery powered "Everaids" chair will travel over most hard surfaces and climb kerbs without any additional aid. The child using it can raise and lower the seat to reach high shelves or to pick something up from the floor and it can either sit or be supported in a standing position. The chair is operated by a computer controlled joystick which can be programmed for individual needs. The chair has made it possible for Ruth to be integrated into normal nursery school.

To make the chair easier to control: The Everaids chair has used a computer-controlled joystick for easy adaptation to suit individual operators. The Kempf chair is entirely voice controlled. It will recognise 8 command phrases which are easily reprogrammed for different drivers. This type of control is particularly useful for users who would otherwise have to rely entirely on being pushed.

Another example is the Elfin system: a small TV monitor is added to a wheelchair and it is operated through a scanning control by two switches (see picture page 3).

PUBLIC TRANSPORT

Projects to help the sight- or hearing- impaired are being tried in various parts of the country.

Two types of Pelican Crossing: one is fitted with an audible device with a two-tone sound which cannot be confused with other noises; the other has a tactile device at the base of the push-button box which rotates when it is safe to cross the road.

A talking Bus stop in Weston-Super-Mare, known as ELSIE (Electronic Speech Information Equipment). When a button is pushed a computer controlled voice synthesiser will speak out the correct time, the bus routes served by that stop and the expected time of arrival of the next bus.

If these experiments are successful we hope they will spread to other parts of the country.

A blind passenger listens to information from ELSIE.
Photo: COI.

MOTOR VEHICLES.

Special Controls. Computers in cars are already quite common, but devices which will help disabled people to drive are still largely at the experimental stage.

There are already experimental cars in this country and in France which can be controlled by the driver's voice. The onboard computer converts the voice signals to the controls of the car and links appropriate functions together. It would, for example, automatically vary the speed as the car turns corners, or turn on the lights as it gets dark.

Assessment of Special Needs. Disabled people can get help to enable them to drive, either from the Banstead Place Mobility Centre or from the Mobile Assessment Van which travels around the country to advise potential drivers about their suitability to drive.

Two types of assessment are provided: for those who have to LEARN to drive from scratch, they will be given a full medical examination followed by a series of tests monitored by a computer. The equipment assesses reaction times, physical strength and so on.

For those who can already drive but need special adaptations to their cars, they will be given the same sort of assessment tests, but to identify the types of steering control or brake pedals, for example which give the best results on the computer.

An assessment at the Banstead Place Mobility Centre. Photo: Banstead.

BIO-FEEDBACK SYSTEMS.

Computer controlled Bio-feedback systems have been used for
some time for perfecting body movements in athletes. Signals
are sent from small sensors, fixed to muscles, back to the
computer: the computer analyses the signals and produces a
display on the monitor. The same sort of system can be very
successful when used to help overcome physical disabilities. A
model pattern is created on the screen for the patient to try
to copy by moving the appropriate muscle. In this way the
control of individual muscles can gradually be improved. For
children the muscle signals can be used as the control for
computer games or to activate a toy.

MUSCLE STIMULATION.

There have been a number of experimental studies into the use
of computer-controlled stimulus to help overcome neurological
disorders. Among the most interesting is the work of Dr.Hugh
Grenfell, who has been using a computer to provide a series of
stimulations to the muscles in the legs of his
wheelchair-bound patients. The process has led to greater
fitness amoung patients. This work is still very experimental
but already over 100 patients are using the equipment and 26
are actually standing, with the help of electronic equipment,
having been confined to a wheelchair for a number of years.
This is an area of development which holds great promise for
the future.

Taking a few steps with the help of Hugh Grenfell's equipment.
The micro-technology is on a belt strapped round her waist.
Photo: DTI.

WORKING

Micro-technology can help with employment.

* With aids which make it easier to do a job.

* By providing links to enable people to work from home.

* By creating jobs.

* By providing useful training.

Three years ago Margaret Puddy was diagnosed as having progressive muscular atrophy which has left her with a weakness of the legs. Although she was in full-time employment, she had to give it up because she was finding it increasingly difficult getting to and from work. With the aid of a micro-computer Margaret is now working full-time from her home in the South West for Dynamics Ltd. - a small electronics firm. Her job is very varied - she does invoice preparation and book keeping tasks and also some word processing.
Photo: South West Counties Newspapers Ltd.

AIDS TO HELP EMPLOYMENT.

Modern technology has made it much easier for disabled people
to use the ordinary equipment used in today's factories and
offices. Good examples are the electronic typewriter which
needs less finger strength and hand mobility than a
conventional one, or the factory machinery which can be used
sitting down rather than standing up.
Where adaptation is required, individually designed controls
and switches may solve the problem.

SPECIALISED EQUIPMENT

For some jobs specialised equipment is needed to help overcome
particular problems.

Control Systems. (see pages 9 -13).
Alternative switches and keyboard systems.
Control by voice.

In Communication. (see "Communicating" Section)
Communicators.
Print enlargers.
Visual telephones.
Word processing.
Braille converters and translators.
Speech synthesisers.

In Training. (see "Learning Section)
Design programs.
Computer based training programs.

GETTING THE RIGHT EQUIPMENT.

The main source of information about employment and special
aids is the Disablement Resettlement Officer who works from
the local Jobcentre. While DROs have considerable success in
obtaining employment for disabled people, they may not
necessarily know all the available aids on the market. A new
scheme developed by PERA (Production Engineering Research
Association) provides a computerised database of available
aids and case histories, which will aim to make it easier for
a DRO to match a disability to a suitable aid for employment.
Although this "Aidline" scheme is only operating in four
Jobcentres, in Bristol, Cardiff, Preston and Birmingham, the
hope is that it will soon be extended so that similar
information is available at Jobcentres, the offices of
Opportunities for the Disabled, libraries and so on.

TRAINING.

To be competitive in the commercial world full training is
vital. Many schools are using computers but some special
schools have realised that they do not have the range of
equipment and expertise necessary to prepare pupils properly.
One way of overcoming this is in close links with Colleges who
have a much wider range of hardware and expertise. Some of the
sheltered workshops have also realised their training role but
probably the best way of training is using ordinary facilities
alongside other students. Apart from special colleges for
disabled students many other colleges and training
establishments will now enrol students regardless of their
degree of disability. Further information about these courses
can be obtained from local Colleges of Further Education or
the Disablement Advisory Service at Jobcentres, or the
National Bureau for Handicapped Students.

WORKING FROM HOME.

An interesting development which has been encouraged with
funds from the Department of Trade and Industry are "Remote"
or home work units. Those people involved with the "remote"
work scheme are provided with computers in the home and in
some cases modems to link them to the office. Jobs undertaken
range from word processing to accountancy, software writing
and even industrial design.

This is particularly useful for people who have difficulty in
getting to a work place, and for many this has provided an
opportunity to work for the first time. A disadvantage is that
it can isolate the worker.
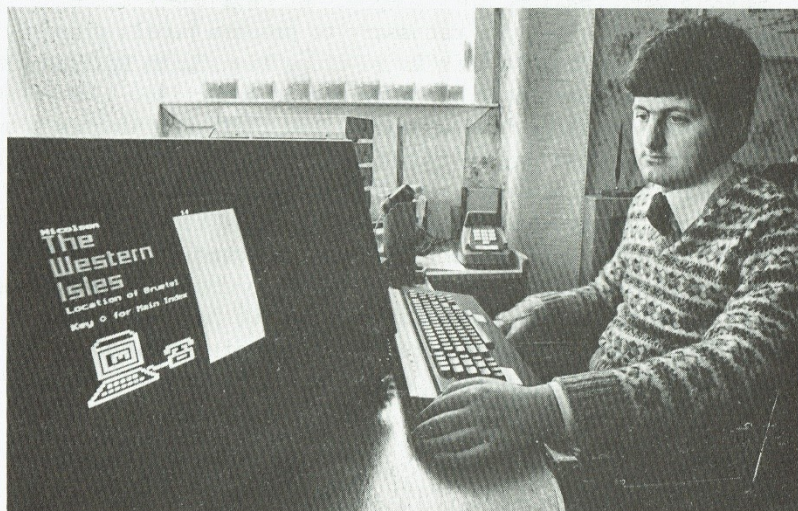
Kenny Matheson is employed as Co-ordinator of Computer-Related
Resources for the Education Department of the Western Isles
Islands Council. He is linked by modem to a number of schools
in the Western Isles. Photo: DTI.

OPEN EMPLOYMENT.

The same technology which enables people to work at home also helps when it comes to doing a job in the open employment market. The Manpower Services Commission has made some money available to provide specialised equipment on employer's premises, though it has to be said that this is often difficult to obtain. One woman who has been blind from birth had until recently been undertaking simple secretarial jobs. With the help of equipment including a Torch computer, a printer, a Brailink machine and an Optacon she is now a senior personal assistant at British Telecom.

Peter Baskett works from home for Vickers Shipbuilders in Cumbria. Multiple Sclerosis has prevented Peter from going to work regularly for about the last two years, but the company were keen to retain his valuable skills and knowledge. With help from the Remote Work Units Project they were able to keep him on but in a new capacity. With the aid of a micro-computer Peter is now developing software to be used by his colleagues back in the instrument department. He is able to stagger his hours to suit how he feels and he manages to meet all his work deadlines. Photo: North Western Evening Mail.

SHELTERED EMPLOYMENT.

Sheltered workshops have been established in many parts of the country. In the past much of the work has been of a simple, repetitive nature, but there are now a few workshops where employees with severe disabilities are able to learn to use computers and earn a reasonably competitive wage in fields like word processing, accountancy and office services. In one Milton Keynes workshop they have gone a stage further and now have a dealership to supply and service computer equipment as well. Unfortunately many of these projects are still not financially self-supporting and workers have to rely on state benefits for their income.

In Sunderland money from the MSC Enterprise Allowance, together with grants from the Borough Council and the County Council has helped train and set up a co-operative of disabled workers, Pallion Business Services Ltd., who do accounting for other firms. In London, Outset Office Services provide similar word processing and accounting services for others. The philosophy here is to provide an interesting job plus all the facilities and help needed by disabled people, while also offering the kind of social contact that remote working could not provide.

DAILY LIFE AND LEISURE

Micro-technology has already made a dramatic impact on our daily life and leisure, directly in the current boom in the use of home computers and indirectly in the micro electronics used in televisions, video recorders and personal hi-fi. Both areas are of just as much value to people with disabilities as to anyone else.

SHOPPING BY COMPUTER.

Computers are beginning to be used in some parts of the country for banking and shopping from home. A prototype Shopping and Information Service is operating in Gateshead funded by the Local Authority (Gateshead S.I.S): a number of computers are set up in libraries, day centres and homes for the elderly or disabled, and users order from a range of goods in a catalogue. Participating in the project are Tesco's, a chemist, a baker, C & A, and Kays Mail Order. The order goes from a computer keyboard connected via a modem to a terminal, in this case at Tesco's. The goods are delivered to the point of order. Bradford is starting a similar project and if there is interest from other local authorities, this type of scheme could be adopted in other parts of the country.
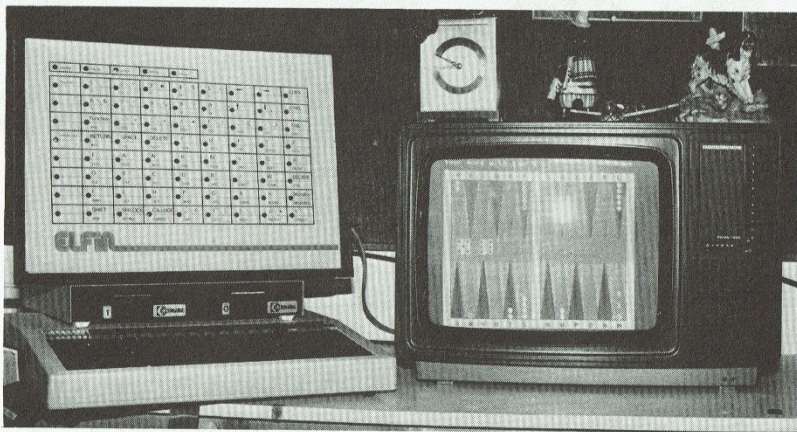
The Elfin BeebControl keyboard emulator allows a one- or two-switch user to operate standard computer software, for example some games. Photo: Elfin.

ENVIRONMENTAL CONTROLS

There are a number of systems which can be linked to the
controls of everyday equipment which will enable a person who
has difficulty in reaching the normal switches to have control
over their home environment. Some are simply linked to a
switch panel which can be conveniently placed for the user.
Others, like the photo sensors which close the curtains as it
gets dark, sense changes and react accordingly. Good examples
are Possum, Steeper, Elfin and CEDRIC, all of which can be
linked to a wide range of environmental facilities and can be
controlled by systems specially tailored for the individual
user. At the moment "Possum" and "Steeper" are the only
systems centrally funded. In recent years a number of
experiments have been taking place which use computers
controlled by the user's voice.

Possum PSU3 environmental control system controls alarm,
intercoms, door-lock, telephone, television and channel
changes, curtains, radio etc. Photo: Possum.

TELEPHONE LINKS.

Some people have found the telephone links via modem, useful
to help overcome isolation and loneliness. They use the links
to play games such as chess with people who live many miles
away. It can, however, be very expensive in telephone bills.
(See also "Communicating" for reading and writing letters).

GAMES

There are many games for home computers which are of special value for players with disabilities. In addition to being great fun to play some gradually extend valuable skills like hand-eye control, manipulation and reasoning.

Good examples are games such as "Snooker", often played with joysticks it follows the rules of the proper game. It not only helps develop manipulative skills and an understanding of the strategies, but gradually extends concepts like colour and simple geometry for people with learning and perceptual difficulties. It is also one of many games for more than one player where a person with physical difficulty can play anyone else on equal terms. "Flight Simulator" uses either the keyboard or joystick to emulate the controls of an aeroplane. Requires great concentration and a steady hand.
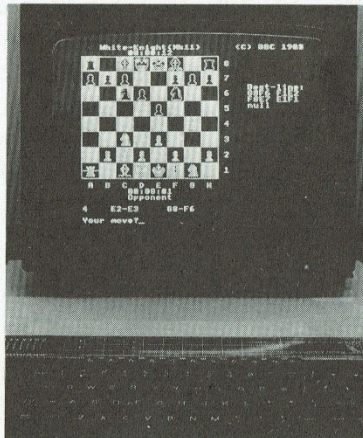
Chess on computer. Photo: Luke Finn.

There are many different types of adventure games at different levels. Versions are available for most home computers. The games usually follow a story line and the player has to make decisions and choices as the game progresses. This type of game is particularly valuable to help children and teenagers develop decision making skills. For children, a number of early learning programs can be fun to use, and there are many toys using micro-technology - see the "Learning" section.

CREATIVE ACTIVITIES

Music: it is possible to play or even compose using either electronic instruments or home computers. The range of alternative controls already described can be used to give access to a field which in the past may have been totally inaccessable.

Art and graphics: programs useful in education (see page 31) have many exciting possibilities for creative leisure activities.

REHABILITATION

Computers are being used increasingly by occupational therapists for the treatment and rehabilitation of patients, for example to improve physical function and co-ordination, and for assessment following a head injury. Micros are used to improve concentration, perception and memory, and to increase motivation and enjoyment.
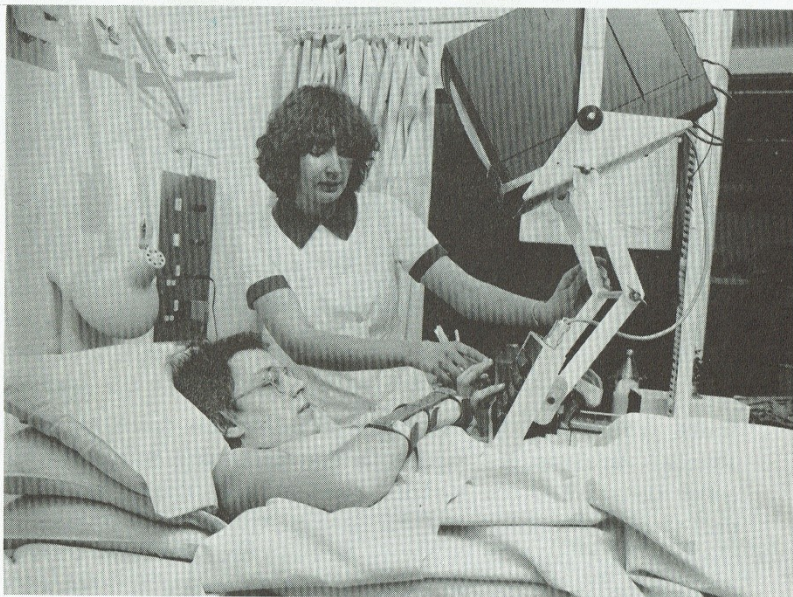
An occupational therapist uses a specially- positioned computer and display screen to encourage use of damaged limbs in a road accident victim. Photo: DTI.

INVENTING

Many of the most useful and exciting developments in the use of micro-electronics for people with disabilities have arisen from an inventor's desire to meet a special need.

DEVELOPING INVENTIONS AND SOFTWARE IDEAS.

The best ideas have not always been for complicated and expensive computer equipment, but often simple peripherals and additions which make it easier for a person to be able to use existing equipment. Good software is also essential for any equipment to be of real value.

Successful designers, inventors and programmers have already learnt that there are a number of important rules which are worth bearing in mind when developing an idea.
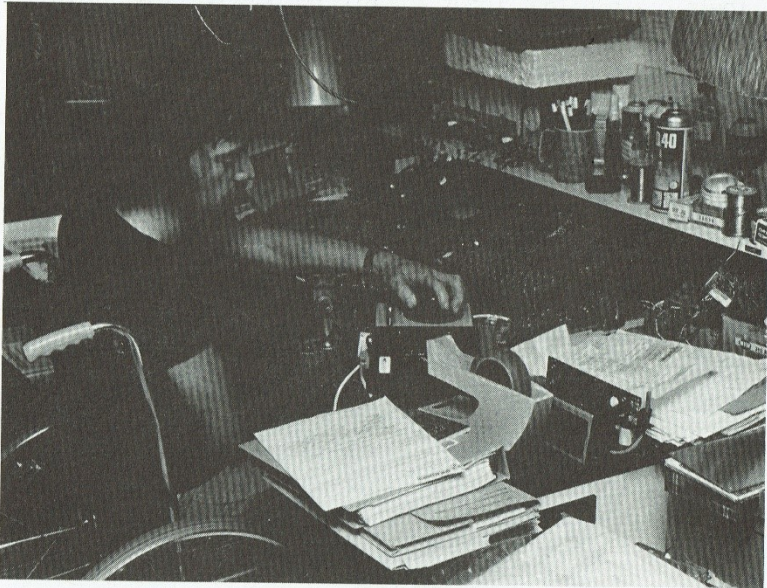
Toby Churchill became paralysed and lost his speech when he was 24. He had an engineering degree, so he set about inventing what he wanted - a flexible, portable aid for face-to-face communication. See Lightwriter on page 57.

<u>What are you trying to achieve?</u> Have a clear idea of what
you expect your idea to do and how it will work. This will
probably seem to be a very obvious starting point but it is
all too easy to be very vague. One very common trap is to
try to meet a need, without working out the best way of
meeting that need or considering the alternatives. It is
often worth asking if electronics are the best way: could
the need be met in a much less complex and inexpensive way?

<u>Who is going to use the invention?</u> It is a good idea to have
a person or small group of people in mind when starting
work. It may be that you are trying to help an individual
but a little research to find out if their needs are common
would be worthwhile. Also consider the progress the person
will make: will your design quickly become limited if they
become proficient in using it? If so, think about extensions
to the design or whether it will prepare the user for using
other equipment.

<u>Does it work?</u> Many inventors have found that <u>they</u> can use
their brainchild without any difficulty, but that other
people do not manage it with same ease. Ensure that it
actually does the job for which it was designed, and that
the person using it is able to manage all the controls
without difficulty. With software make sure that there are
no bugs which cause difficulties if the program is used
wrongly. Use the check list for good software on page 64 to
see if potential purchasers would agree that it is worth
buying.

<u>Does it already exist?</u> This is probably the area which
causes most disappointment. Inventors spend many months and
large sums of money producing what seems to them to be a
great original design only to discover that it has already
been developed by someone else. Always check with likely
user groups, information centres and possible manufacturers
before investing too much time or money.

Advice from professionals. When developing a new idea always
consult those experienced in working with people with the type
of disability you have in mind. For an idea designed to help a
person with physical difficulties for example, it is essential
to check with a physiotherapist that the idea will work. It is
very easy to make fundamental mistakes. There may be a branch
of REMAP (Rehabilitation Engineering Movement Advisory Panel)
near you.

Reliability. Equipment which breaks down and takes a long time
to repair is frustrating for everyone, but it can be
disastrous for a person whose disability makes them dependent
on it. Great care is needed at all stages to ensure that the
equipment is strong and reliable, and will not suffer from
everyday accidents like spilt drinks. It is also important to
make sure that it will not be damaged by inappropriate
responses or being used incorrectly.

Toby Churchill's "Lightwriter" communication aid. It is
portable and has 2 displays - one for the user and one for the
person "spoken" to. It can store commonly-used phrases.

MANUFACTURE.

After having made a good prototype, perfected the design and
tried it out with potential users, some inventors would like
to take the project a step further. This next step may be to
find a way of manufacturing and marketing the product. The
best approach will depend on the size of the likely market.
Before starting to manufacture it is a good idea to get
advice from:

User Groups (Organisations concerned with Disabled People
for example).

Information Centres (the SEMERCs or Communication Aids
Centres for example).

Other people with an interest in micro-electronics, such as
computer clubs.

Manufacturers of similar types of equipment.

Having established the size of the likely market the best
method of manufacture will be easier to decide. In general
terms there are four possibilities.

1) Make it yourself.

This will be suitable for a very small production. There are
some good examples of very useful equipment being
manufactured "on the kitchen table". This approach is often
valuable for software which is likely to have a limited
circulation. Sometimes it is a good idea to sub-contract the
production of components to a small electronics firm.
The advantage of this approach is that you retain full
control of the invention. The disadvantage is that it is
usually very time consuming and it is difficult to expand
production to meet fluctuation in demand. It is also
difficult to produce a "professional " product.

2) Contract out the manufacture but retain the marketing.

Some inventors have found small manufacturers who are
prepared to produce the product entirely and supply it ready
for sale.
The advantages are that full control of the product is kept
by the inventor, it is usually possible to increase
production if required, a more "professional" finish is
usually possible and it is easier to keep a check on quality
control and reliability.
The disadvantages are that a larger amount of capital is
usually required to finance the production run, and the
overall cost is likey to be higher than the "kitchen table"
approach.

3) Set up a manufacturing and marketing company.

This is really a combination of 1) and 2). It will require a
much larger amount of capital to set up and there are
obvious business risks involved. It is usually only viable
for a really good invention with a large market. It may
however be possible for several small inventors to get
together to share resources.

4) Sell the idea to an established manufacturer.

The advantage of this method is that much larger resources
will probably be available to develop the idea and to pay
for advertising and distribution. It may mean that a
national network for distribution and service is available
which will obviously be valuable to the customer. It may
also be financially more rewarding.
The disadvantage is that control of the product is lost and
the final product may not be quite what was intended.

FINANCE.

The appropriate method of financing the manufacture of an
idea will depend on the size of the enterprise. For
large-scale production the Bank Manager will probably be the
best source of advice about the loans and grants which may
be available. For small-scale manufacture or development,
grants and aid may be available from a number of sources.

In the past the SEMERCs have been able to commission
software development. They no longer have funds for this,
but they can provide advice about grants and sources of
funding for educational material. Try also the CACs and the
Department of Trade and Industry for ideas. The Manpower
Services Commission has a number of ways of providing grants
to new and small businesses, as well as the job creation
schemes which can be used for short term projects.

Some of the major charities are able to provide grants as
well as advice for products which will be of value to their
client groups.

Rachel using a communication aid designed and built for her
by Grimsby REMAP.The speech synthesiser reproduces a good
quality girl's voice. Photo: E. Lindsay.

FINDING THE RIGHT AID

Finding the right aid can be extremely complicated as there are many things which must be very carefully considered. Things which may look useful at first sight may turn out to be unsuitable, so to avoid expensive mistakes

ALWAYS GET GOOD PROFESSIONAL ADVICE.

Discuss your needs with your therapist, teacher, doctor or other professionals. They will know you well and will be able to help you identify what you need.

Discuss your needs with your family and friends. They will also be able to help you see when and where you are likely to use the aid.

Get advice from experts in electronic aids. If you can arrange a visit take a professional helper with you. If this is not possible, make sure you take a relative or friend who is able to see your needs objectively.

THINGS TO CONSIDER WHEN CHOOSING AN AID.

<u>Does it meet your needs?</u> Having carefully worked out what the aid is needed for, does the equipment being considered do what you want?

<u>How do you operate it?</u> Most ordinary computer based systems are controlled by a "Qwerty" keyboard. This is fine if you can already type or will be able to learn quickly, but if this is likely to be a problem you may find an alternative system better.

<u>Can the control system be adapted for your needs?</u> If you are not able to use the existing keyboard easily, check that the equipment can be adapted for use with alternative controls.

<u>Does it need to be portable?</u> For some purposes equipment is much more useful if it can be carried around and used in many different settings, so light weight and battery power are important. In other cases you will only need to be use the equipment in one place, so size and weight are not particularly significant.

<u>Where will you use the system?</u> Will you need to use it from a wheelchair or from a bed? Your choice may also depend on the amount of room you have and whether it will fit in with the rest of the family.

<u>Who needs to see the display?</u> Some equipment, such as communication aids, need to be seen by other people, so care needs to be taken in choosing the right type of display. Small Liquid Crystal Displays and paper tape are good for talking to just one person, for example, but not very useful for groups. They are also difficult for people with poor eyesight.

<u>Do you need a printed copy?</u> Some machines have a print-out, or can be connected to a separate printer. Printers vary a great deal in price, quality of print and capabilities, so ensure that you can use the type which will meet your needs.

How much will it cost? In many systems the basic machine does not seem to be expensive but by the time you have bought all the extras you will need, the cost may be four or five times the basic price. Is the system you are considering the best value for money or would something else be just as good but cheaper? Can you get what you want through the DHSS, (in Scotland, the Scottish Office: in Wales, the Welsh Office), the MSC or your local authority?

Do you need more than one aid? Would it be better to think of several systems rather than one that is supposed to do everything you want? Equipment designed to cover a wide range of uses often compromises on details: for example portable equipment may not do all the things a larger machine might do. You may need one aid for speaking and another for writing, so it might be better to buy several machines rather than one universal system.

What arrangements exist for maintenance? If you live in Preston, posting a large piece of equipment to Devon for a repair taking several weeks could be an embarrassment if you are dependent on the system. Is there a service contract available? What is the guaranteed call-out time? Where is the nearest service engineer for the system? If you have an existing system with poor maintenance arrangements, local volunteer help may be available. Try your local computer club, or see REMAP in the information pages.

Think ahead. Many people find that once they become confident in using an aid they become more ambitious and their needs develop and change. Can the system be expanded? If you need to change to a different aid will the user skills you learn be useful on other systems?

CHOOSING GOOD SOFTWARE.

Careful thought before buying software is essential to avoid
wasting money on programs which do not do the required job.

* Think very carefully about what you want to do.

* Wherever possible, try before buying.

* Does it work? (Some commercial software stops working if an
inappropriate response is made)

* Check the display, that it is clear and easy to understand.

* Does it have colour and sound if your system can handle
them?

* Can the speed of presentation be varied to meet your needs?

* Can it be used with any alternative control systems you may
need?

* Does it have any check or monitoring systems if you need
them?

* Is it good value for money?

* Is the level of understanding or reading ability needed to
use the program higher than the skills the program practises -
i.e. if you can use it, you don't need it - ?

GET ADVICE.

* From other people in your area with similar concerns, and
pool your ideas.

* From appropriate organisations listed in the Information
section. Many of them are familiar with good software and will
be able to advise you.

GETTING
AN AID

(This section is reproduced and adapted, with thanks, from
"Communication Aids" published by RICA.)

There are several ways in which you may be able to acquire an
aid. Your Doctor or Therapist will usually be able to offer
you advice and guidance about the the most likely source. The
main ways are:

THE NATIONAL HEALTH SERVICE.

Hospitals have a budget for equipment needed by their
patients. If you need a particular aid it may be provided
through the National Health Service. Aids of relatively low
cost may be obtained more easily and with fewer delays than
more complicated or expensive equipment. Sometimes more
elaborate aids may not be provided by hospitals at all,
depending on their budget and comparative urgency of other
demands. The main information about getting communication aids
is held at Communication Aid Centres (CACs) - see page 76.
Your speech therapist will advise you, and give you support
and follow up. If you are refered to a CAC by a Hospital
Consultant, the Health Authority may supply the aid the CAC
prescribes.

If you are very severely disabled and meet the Department of
Health and Social Security criteria for an environmental
control system (which makes it possible for you to control
household electrical equipment - to switch on lights, turn on
the radio and use the telephone for example), you may be able
to qualify for extra equipment as well, such as a Possum
GCTW12 typewriter. (In Scotland this would be dealt with by
the Home and Health Department; in Wales, by the Welsh Office)

To start the ball rolling ask your doctor who will make the
arrangements. You will be seen by an Environmental Control
Assessor. All this may take some time.

SOCIAL SERVICES.

Social Workers or in some areas, Occupational Therapists, are
employed by the Social Services Department of your local
authority (Social Work Department in Scotland).

If any assessment they make indicates that you need an aid,
the Social Services may be able to help you directly as they
often supply aids, either free of charge or at a reduced rate.
In some areas, the Social Services and Health Authorities may
have a joint scheme for the supply of aids.

Policies vary a great deal from area to area, however, so it
is not possible to say what is likely to happen in your area -
get in touch with your local Social Services Department for
information. Look under the name of your Local Authority in
the phone book.

AIDS FOR EDUCATION.

The Education Department of your Local Authority has a
responsibility for the special educational needs of children.
This usually takes the form of arrangements for special
classes or special schools, but they may provide special
equipment if it is vital to a child's education. These are
usually provided for use in schools and colleges rather than
for use at home. A problem can arise when the child leaves the
school and is unable to take the aid with him or her, although
it has become a vital part of their communication equipment.
School leavers should begin to make alternative arrangements
in plenty of time.

AIDS FOR WORK.

If you need help or special equipment for work, this is
organised through the Manpower Services Commission (MSC). See
the Disablement Resettlement Officer (DRO) at you local
Jobcentre or employment office. (Look under Jobcentre or
Employment Office in the phone book).

Through the DRO, the MSC can provide equipment on permanent
loan to help you at work and arrange for grants to be made to
your employer if any adaptations have to be made to the
premises. Aids provided for use at work cannot usually be
taken home.

LOAN SERVICE.

SEQUAL (Special Equipment and Aids for Living) is a charity run by people with disabilities, many of whom use aids themselves. They will help people with severe disabilities obtain suitable aids on permanent loan. You will be visited by a welfare officer who will advise you and make arrangements on your behalf. There are no charges for this service except that you have to become a member (£2 a year for disabled people, £4 a year for others), for which you will receive the magazine "Possibility" every quarter. Address in Information Section.

ONE-OFF AIDS.

REMAP (Rehabilitation Engineering Movement Advisory Panels). This is a part of RADAR, a voluntary organisation with 90 panels all over the country. Their main aims are to make "one-off" aids or adapt existing aids to your specific requirements, where no "off the shelf" aid is appropriate. Time and services are offered by members completely free of charge. Panel members include engineers, craftsmen, therapists, doctors and representatives of Social Services. Each year they solve problems for nearly 2,000 people with disabilities. To find out where your local panel is, see information section.

ACTIVE have informal groups who find ways of adapting aids or standard items of equipment to suit children or adults for play, teaching, leisure and communication. D.I.Y designs are published in a series of worksheets and information given in ARK - the journal of the Toy Libraries Association. Address in Information section.

PRIVATE PURCHASE.

This can be arranged directly with a manufacturer or supplier
but should not be done without seeking independent
professional advice first.

If you cannot obtain an aid through the sources we have
already described, and if you need financial help, and you are
not covered by insurance (following an accident for example)
you could try approaching charities for help. A reasonable
starting point might be to contact a charity which deals with
your own disability - for example a person with cerebral palsy
might contact the Spastics Society. Such charities are likely
to be familiar with specific problems, and even if they cannot
help, they may be able to provide appropriate advice as to who
may be able to do so.

Local organisations to try include the Rotary Club, Lions
Club, Round Table - your local library or Citizens' Advice
Bureau will know which of these are most active in your area.

Otherwise finding a likely charity may take some work in your
library. Books which may help, although they may need a
certain skill to use efficiently, are:

The Directory of Grant Making Trusts. Published by: The
Charities Aid Foundation, 48, Penbury Road, Tonbridge,
Kent TN9 2JD

The Charities Digest. Published by: The Family Welfare
Association, 501-505 Kingsland Road, Dalston, London, E8 4AU.

The King's Fund Directory for Patients and Disabled People, by
Kathy Sayer. Published by: The King's Fund Publishing Office,
126, Albert Street, London NW1 7NF.

Directory for Disabled People, by Ann Darnbrough and
Derek Kinrade. Published by: Woodhead Faulkner.

INSURANCE.

Sun Alliance have a special insurance scheme for aids.
Broadly, it covers you for loss or damage caused by fire,
flood, theft or accident. Policies cost 72p for each £100
insured and the minimum premium is £20 for a years insurance.
You have to pay the first £15 of any claim, unless the loss or
damage was caused by fire or explosion. More information and
details of the Policy from:

Special Aids Scheme for Disabled People, Sun Alliance,
Rickford House, 12, Rickford Hill, Aylesbury Bucks, HP20 2RZ.
Phone: 0296 24688.

Try other insurance companies as well, and get the best terms
for the equipment you want to cover.

INFORMATION, HELP AND ADVICE

NOTE: Enquiries should always be accompanied by a stamped self addressed envelope.

ACE Centre (Aids to Communication in Education)
   The ACE Centre has been set up by the Department of
   Education and Science. The staff will advise anyone who
   needs a micro-electronic communication aid for learning.
   They give information about equipment available, and where
   it can be obtained. Children can be brought to the centre to
   try out hardware and software. The Centre runs monthly
   workshops on Communication Aids in Education.
   As the Centre is attached to a Special School the staff have
   first hand knowledge of the communication problems of
   children with multiple handicaps. They also publish a number
   of useful booklets - see booklist.
   ACE Centre, Ormerod School, Waynflete Road, Headington,
   Oxford OX3 8DD. Phone: 0865 63508.

ACORN Computers
   Can provide information and fact sheets on both hardware and
   software for disabled users.
   ACORN Computers, Consumer Division, Cambridge Technopark,
   645, Newmarket Road, Cambridge CB5 8PD. Phone: 0223 24411

ACTIVE
   This organisation brings together teachers, therapists,
   parents, technicians and engineers to look into ways of
   sharing good non-commercial ideas to enhance the leisure
   activities of handicapped people.
   ACTIVE. Seabrook House, Darkes Lane, Willyotts Manor,
   Potters Bar, Herts, EN6 2HL.

AIDS CENTRES.

There are 14 Aids Centres. They are permanent exhibitions of all kinds of aids, (not just technological) and they vary considerably in size. Check beforehand to see what aids they have on show. (See also Communication Aids Centres).

Birmingham. - Disabled Living Centre, Broadgate House, Broadgate Street, Birmingham. B1 2HF. Phone: 021 643 0980

Caerphilly. - Aids and Information Centre, Wales Council for the Disabled, Caerbragdy Industrial Estate, Bedwas Road, Caerphilly, CF8 3SL. Phone: 0222 887325/6/7

Edinburgh. - South Lothian Aids Distribution and Education Centre, Astley Ainslie Hospital, Edinburgh, EH9 2HL. Phone: 031 447 9200

Leeds. - The William Merrit Aids and Information Centre for Disabled People, St. Mary's Hospital, Greenhill Road, Armley, Leeds, LS12 3QE. Phone: 0532 790121

Leicester. - British Red Cross Society, Medical Aids Department, 76, Clarendon Park Road, Leicester LE2 3AD. Phone: 0533 700747/8

Liverpool. - Merseyside Aids Centre, Youens Way, East Prescott Road, Liverpool L14 2EP. Phone: 051 228 9221.

London. - Disabled Living Foundation, Aids Centre, 380-384, Harrow Road, London W9 2HU. Phone: 01 289 6111.

Manchester. - The Greater Manchester Regional Centre for Disabled Living. 26, Blackfriars Street, Manchester, M3 5BE. Phone: 061 832 3678.

Newcastle-upon-Tyne. - Newcastle-upon-Tyne Council for the Disabled, Aids Centre, MEA House, Ellison Place, Newcastle-upon-Tyne NE1 8XS. Phone: 0632 323617

Southampton. - Southampton Aids Centre, Southampton General Hospital, Tremona Road, Southampton SO9 4XY. Phone: 0703 777222 ext. 3414/3233.

Sheffield. - Sheffield Aids Centre, Family and Community Services, 87-89 The Wicker, Sheffield 3 8HT. Phone: 0742 737025.

Stockport. - Aids/Assessment Unit, Stockport Health Authority, St. Thomas' Hospital, Shawheath, Stockport SK3 8BL. Phone: 061 480 7201 ex 15.

Swindon. - Swindon Aids Centre, The Hawthorne Centre, Crickdale Road, Swindon, Wilts. SN2 1AF. Phone: 0793 43966.

AIDS CENTRES are co-ordinated by the JOINT AIDS CENTRES COMMITTEE (JACC). Some centres, those listed below, are associated or do not (yet) belong. For information about developing centres contact the secretary of the JACC at the Leicester Aids Centre.

Wakefield. - National Demonstration Centre, Pinderfields Hospital, Aberford Road, Wakefield. Phone: 0924 375217.

Portsmouth. - Disabled Living Centre, Prince Albert Road, Eastney, Portsmouth, Hants. Phone: 0705 737174.

Blackpool. - Blackpool Aid Centre, 8 Queen Street, Blackpool, Lancs. Phone: 0253 21084.

There are also 3 Touring Aid Centres. To find out where they are, or to arrange an exhibition near you, contact:

Mobility Aid Centre, Scottish Council on Disability, Princess House, 5, Shandwick Place, Edinburgh EH2 4RG. Phone: 031 229 8632.

Travelling Exhibitions and Aids for Independence. RADAR, 25, Mortimer Street, London W1N 8AB. Phone: 01 637 5400.

The Visiting Aids Centre Unit, The Spastics Society, 16. Fitzroy Square, London W1P 5HQ. Phone: 01 387 9571.

ALAC (Artificial Limb and Appliance Centres).
   Run by the DHSS. Provides information about DHSS
   wheelchairs.
   Centres in Birmingham, Brighton, Bristol, Cambridge,
   Cleveland, Exeter, Gillingham, Harold Wood (Essex), Leeds,
   Liverpool, London (Kingston), London (Roehampton),
   Manchester, Newcastle, Nottingham, Oxford, Portsmouth,
   Preston, Sheffield.
   Look under ALAC in the telephone book or contact the
   Administrative Office, DHSS Disablement Services Branch,
   Warbeck Hill Road, Blackpool, FY2 0UZ. Phone: 0253 52311.

ASSOCIATION OF DISABLED PROFESSIONALS.
   Offer advice on computer-related jobs.
   Association of Disabled Professionals, The Stables,
   73, Pound Road, Banstead, Surrey.

BANSTEAD PLACE MOBILITY CENTRE.
   Can advise potential drivers on their suitability and the
   kinds of adaptations they may need for their cars. They can
   provide information about their mobile assessment van. They
   also have a special driving track, and a range of cars and
   wheelchairs can be tested. Details and cost on application.
   Banstead Place Mobility Centre. Park Road, Banstead, Surrey.
   Phone: Burgh Heath 56222.

BARD and BARDSOFT (British Database on Research into Aids for the
   Disabled)
   BARD is an information database on research projects in the
   area of aids for the disabled. BARDSOFT is a database on
   software for special needs, with suppliers and developers. A
   small charge is made for a printout of the databases, which
   can either be in response to a specific enquiry or a complete
   section for a particular computer. BARDSOFT contains
   information about software for most of the popular home and
   educational computers.
   BARD/BARDSOFT, Handicapped Persons Research Unit,
   Newcastle-upon-Tyne Polytechnic, No.1, Coach Lane, Coach Lane
   Campus, Newcastle-upon-Tyne. NE7 7TW.
   Phone: 0632 326002 ext.4211

BREAKTHROUGH TRUST DEAF/HEARING GROUP.
> Is researching the uses of the BBC micro but also has information about other equipment used by hearing-impaired people.
> Breakthrough Trust. Charles W. Gillett Centre, Selly Oak Colleges, Birmingham B29 6LE.
> OR: Mr. King-Beer, National Communications Officer, 14, Victoria Road,Bingham, Notts, NG13 8EG. Phone: 0949 38583.

BRITISH COMPUTER ASSOCIATION OF THE BLIND.
> Provides data tapes and a computer magazine.
> British Computer Association of the Blind, Box 950, London W1N 3XX.

BRITISH COMPUTER SOCIETY.
> Has a specialist group for the disabled and can provide information for both employers, and disabled potential employees.
> British Computer Society. 13, Mansfield Street, London W1M OBP. Phone: 01 637 0471.

BIMH - (British Institute of Mental Handicap)
> The BIMH run conferences and workshops on the use of micro-electronics in a variety of different settings.
> BIMH, Wolverhampton Road, Kidderminster, Worcestershire. DY10 3PP. Phone: 0562 850251.

BRITISH TELECOM AID (BTAID)
> A part of British Telecom, among whose aims are "to ensure that within the resources available the maximum help in the field of telecommunications is given to disabled customers".
> BTAID, Room B5049, British Telecom Centre, 81, Newgate Street, London, EC1A 7AJ. Phone: 01 356 4917/6022.

CALL CENTRE. (Communication Aids for Learners in Lothian).
> The CALL Centre provides information and an opportunity to try out communication aids for people who live in Lothian. They have a display of equipment and computer software, some of which may be borrowed.
> CALL Centre, University of Edinburgh, The Annex, 4 Buccleuch Place, Edinburgh, EH8 9JT. Phone: 031 667 1438.

CET (Council for Educational Technolgy)
Co-ordinates the SEMERCs and various other projects funded by the MEP (Micro-electronics Education Programme). Useful free publications and information sheets on the use of computers in Special Education.
CET, Mary Hope, 3, Devonshire Street, London W1N 2BA. Phone: 01 580 7553 or 01 636 4186.

COMET (Concerned Micros in Education and Training).
A unique bursary scheme which will make awards to young people who need micro-computers in their studies or training, but who are unable to get the money to buy suitable equipement. Organised by the Sunday Times and VNU Business Publications. Administered by: National Bureau for Handicapped Students, 336 Brixton Road, London SW9 7AA. Phone: 01 737 7167

COMMUNICATION AIDS CENTRES. (CAC)
A number of CACs have been set up by the Department of Health and Social Security and RADAR (The Royal Association for Disability and Rehabilitation) to specialise in all types of communication aids. At the CAC you will be assessed by expert staff to find out what kind of aid or combination of aids may be of use. They have specialists on hand for information and advice and have various aids to try and practise on. If the aid is in stock you may be able to borrow it for a short time to see how you get on. The CACs do not supply the aids themselves so you will need to be referred by a Hospital consultant who should also arrange the Health Authority funding. You or your speech therapist can get in touch with a CAC for advice and information about ways in which aids and adaptations can be obtained.

Belfast - Communication Aids Centre, Prosthetic, Orthotic and Aid Service, Musgrave Park Hospital, Stockmans Lane, Belfast BT9 7JB. Phone: 0232 669501
Bristol - Speech Therapy Department, Frenchay Hospital, Frenchay, Bristol BS16 1LE Phone: 0272 565656.
London - Communication Aids Centre, (Speech Therapy) Charing Cross Hospital, Fulham Palace Road, London, W6 8RF. Phone: 01 748 2040
London - Communication Aids Centre, The Wolfson Centre, Mecklenburgh Square, London, WC1N 2AP. Phone: 01 837 7618

<u>Newcastle</u> - Communication Aids Centre, Royal Victoria
Infirmary, Queen Victoria Road, Newcastle-upon-Tyne, NE1 4LP.
Phone: 0632 325131
<u>South Wales</u> - Rehabilitation Engineering Department, Rookwood
Hospital, Llandaff, Cardiff, South Glamorgan. CF5 2YN.
Phone: 0222 566281 ext 65.
<u>West Midlands</u> - Sandwell Health Authority CAC. Boulton Road,
West Bromwich, West Midlands B70 6NN. Phone: 021 5530908.

COMPAID - (Computer Aid for Speech Impaired and Disabled People)
Pioneer unit giving advice and help on micro-technology for
incurably disabled adults. Literature and newsletter
"INTERFACE".
<u>COMPAID,</u> Seven Springs Cheshire Home, Pembury Road,
Tunbridge Wells, Kent. TN2 4NB.

COMPUTING AND THE BLIND PROJECT
Researches anddevelops hardware systems and software for the
visually-impaired.
<u>Computing and the Blind Project</u>, Dr. Thomas Vincent, Institute
of Educational Technology, Open University, Walton Hall,
Milton Keynes, MK7 6AA. Phone: 0908 74066 ext. 3227.

DEARS - (Disablement Electronic Aids Reference Service)
DEARS has a list of electronic aids covering both one off and
manufactured aids. If you have an unusual problem DEARS will
not recommend an aid, but may be able to put you in touch with
someone who has developed one for a similar problem.
<u>DEARS,</u> 117, Wickham Chase, West Wickham, Kent. B44 0BQ.
Phone: 01 777 7560.

DEPARTMENT OF HEALTH AND SOCIAL SECURITY (DHSS)
Information and advice on technical standards and research
funding. Contact Shaun Kilcoin at,
<u>DHSS,</u> Scientific and Technical Branch, 14, Russell Square,
London WC1B 5EP. Phone: 01 636 6811 ext. 3543.

DEPARTMENT OF TRADE AND INDUSTRY (DTI)
For information about DTI projects contact:
<u>DTI,</u> John McCann, Information Technology Division,
29, Bressenden Place, London, SW1E 5DT. Phone: 01 215 7877.

DEPARTMENT OF TRANSPORT.
   Write for information about driving giving details of
   particular needs. They will also assess suggestions on all
   forms of public transport.
   Transport Policy Review Unit, 2, Marsham Street,
   London. SW1P 3EB. Phone: 01 212 3434.

DISABLED DRIVERS ASSOCIATION.
   Provides advice on all aspects of mobility and other general
   aspects of disability.
   Disabled Drivers Association, Ashwellthorpe Hall,
   Ashwellthorpe, Norwich NR16 1EX. Phone: 0508 41449.

DLF - (Disabled Living Foundation)
   The DLF gives up to date information to disabled people about
   aids, equipment, services and any aspect of disability apart
   from purely medical matters. They will give advice by
   telephone and letter and will send a list of aids and the
   addresses of manufacturers. The DLF have a number of useful
   information sheets and a Database.
   DLF, 380 - 384, Harrow Road, London, W9 2HU.
   Phone: 01 289 6111.

DISABLEMENT RESETTLEMENT OFFICER. (DRO)
   Present in Jobcentres throughout the country. Will offer
   advice and information about work and help with finding aids
   for work.

HANDICAPPED PERSONS RESEARCH UNIT (HPRU)
   The unit carries out interdisciplinary research and
   consultancy on topics concerned with disability. It also
   organises exhibitions and seminars, encourages the manufacture
   of aids from ideas formulated by the Unit, and runs the BARD
   and BARDSOFT Databases.
   HPRU, Newcastle-upon-Tyne Polytechnic, 1, Coach Lane,
   Coach Lane Campus, Newcastle-upon-Tyne, NE7 7TW.
   Phone: 0632 326002 ext. 4211.

HUGH GRENFELL.
   For information about muscle stimulation techniques, and
   suitability for inclusion in the scheme:
   Hugh Grenfell, Unit 39, Port Talbot Workshops, Addison Road,
   Port Talbot. Glam. Phone: 0639 890128.

HEREWARD COLLEGE OF FURTHER EDUCATION.
   The Hereward Development Project offers an advisory service
   for students and professionals and also residential
   Communication Aid Assessment Courses for disabled young people
   and adults in further education. Courses are tailored for
   individual needs but normally run for up to 3 days. Assessment
   of equipment, training in its use, and advice on making
   applications and studying in further and higher education are
   areas generally included on short courses.
   Hereward College of Further Education, Bramston Crescent,
   Coventry. Phone: 0203 461231.

ITECS - (Information Technology Centres)
   These exist throughout the country to provide unemployed
   school leavers with 12 months training in computing. The first
   ITEC set up specifically to train disabled young people is:
   Outset ITEC, 18, Creekside, Deptford, London SE8.
   Phone: 01 692 7141 Ex. 206.

IT WORLD
   Can provide information about the Government-run Remote Work
   Project.
   IT World, Asphalte House, Palace Street, London, SW1.
   Phone: 01 828 4377.

ROGER JEFCOATE
   Roger Jefcoate will visit and advise people with severe
   disabilities on computers, communication aids and electronic
   aids. There is no charge for disabled people. He can sometimes
   assist in obtaining financial help towards the cost of
   obtaining an aid.
   Roger Jefcoate, Technical Aids for Disabled People,
   Willowbrook, Swanbourne Road, Mursley, Bucks. MK17 OJA.
   Phone: 029 672533.

MENCAP (Royal Society for Mentally Handicapped Children and
   Adults)
   Have recently introduced lists and evaluations of equipment
   and software for people with mental handicaps.
   MENCAP, 123, Golden Lane, London EC1Y ORT.
   Phone: 01 253 9433.

MSC (Manpower Services Commission)
    Will provide information about training courses, employment
    opportunities and grants for small businesses. They will also
    provide aids for use in the workplace. Look up your local
    office in the phone book or contact:
    MSC, Moorfoot, Sheffield, S1 4PQ. Phone: 0742 753275

MOTABILITY
    An organisation which helps disabled people use their mobility
    allowance to buy a car or wheelchair.
    MOTABILITY, Boundary House, 91-93, Charterhouse Street,
    London, EC1. Phone: 01 253 1211.

NAIDEX. (National Aids for the Disabled Exhibition).
    A private company who have two exhibitions a year. One is
    usually held in London and the other is held in a different
    place each year. The exhibition in October 1985 is at
    Alexandra Palace, London.
    NAIDEX Conventions Ltd., Convex House, 43, Dudley Road,
    Tunbridge Wells, Kent. TN1 1LE. Phone: 0892 44027.

NATIONAL BUREAU FOR HANDICAPPED STUDENTS.
    Can provide information and advice about all aspects of
    Further and Continuing Education for Handicapped Students.
    (see also COMET above).
    National Bureau of Handicapped Students, 336, Brixham Road,
    London, SW9 7AA. Phone:01 737 7166

NATIONAL DEAF-BLIND HELPERS' LEAGUE.
    Works to improve the social conditions of the deaf-blind, to
    promote contacts between deaf-blind people and between them
    and the community. To provide information and advice.
    The National Deaf-Blind Helpers' League, 18, Rainbow Court,
    Paston Ridings, Peterborough, Cambs. Phone: 0733 73511/2.

NEAD (National Exhibition of Aids for Disability)
    A charity, run by a voluntary committee, which holds
    exhibitions of aids in Birmingham.
    Broadway Exhibitions Ltd., Bingley Hall, Broad Street,
    Birmingham B1 2EL. Phone: 021 236 0223.

NEATH HILL PROFESSIONAL WORKSHOPS.
> A sheltered workshop where severely disabled graduates can develop their own business and professional skills.
> Neath Hill Professional Workshops, 1, Fletchers Mews, Neath Hill, Milton Keynes, Bucks. MK14 6HW.
> Phone: 0908 660364.

COLLEGE OF OCCUPATIONAL THERAPISTS.
> Occupational Therapists have introduced micro-computers into their treatment and rehabilition programmes. New programs are being written and aids developed to assist severely handicapped people to use a computer.
> Occupational Therapy Special Interest Group in Microcomputers, College of Occupational Therapists, 20, Rede Place, London W2 4TU. Phone: 01 229 9738.

OPEN UNIVERSITY.
> Have a number of courses on micro-technology.
> Associate Student Office, Open University, Walton Hall, Milton Keynes, Bucks.

OPPORTUNITIES FOR THE DISABLED.
> A free employment service for employees with handicaps, and potential employers.Opportunities for the Disabled, 1, Bank Buildings, Princes Street, London, EC2. Phone: 01 726 4963.

PALLION BUSINESS SERVICES.
> A co-operative of disabled workers providing accountancy and data processing services.
> Pallion Business Services, Pallion Industrial Estate, Roper Street, Sunderland, SR4 65N. Phone: 0783 287911.

PERA (Production Engineering Research Association)
> Can provide advice about employment aids for the disabled.
> PERA, Melton Mowbray, Leicestershire, LE13 OPB.
> Phone: 0664 64133

THE CHARTERED SOCIETY OF PHYSIOTHERAPY.
> 14, Bedford Row, London, WC1R 4ED. Phone: 01 242 1941.

QUEEN ELIZABETH FOUNDATION FOR THE DISABLED.
    A residential training college and assessment centre which
    offers a variety of vocational training courses for people
    with disabilities, including a number in micro-technology
    related fields.
    Queen Elizabeth Foundation for the Disabled, Leatherhead
    Court, Leatherhead, Surrey. KT22 0BN. Phone: 037 284 2204.

RADAR (Royal Association for Disability and Rehabilitation).
    RADAR provides a wide range of services for disabled people
    including general literature and information in the fields of
    employment, education, social and health services and
    communications aids.
    RADAR, 25, Mortimer Street, London W1N 8AB.
    Phone: 01 637 5400.

REMAP - (Rehabilitation Engineering Movement Advisory Panel).
    Part of RADAR with groups throughout the country who will help
    with aids or manufacture specific equipment for disabled
    people.
    REMAP 25, Mortimer Street, London, W1N 8AB.
    Phone: 01 637 5400.

RESEARCH UNIT FOR THE VISUALLY HANDICAPPED.
    Develops software for partially sighted and blind people.
    Reasearch Unit for the Visually Handicapped, Selly Wick House,
    59, ~~South West~~ Road, Birmingham. Phone: 021 471 1303.
    Selly Wick   B29 7JE

RNIB - (Royal National Institute for the Blind).
    Has fact sheets on software and equipment available. They hope
    to introduce the same service on tape and in Braille fairly
    soon. They also answer queries on an individual basis.
    RNIB, 224, Great Portland Street, London W1N 6AA.
    Phone: 01 388 1266.

RNID (Royal National Institute for the Deaf).
    Has fact and information sheets on many aspects of the use of
    aids, particularly telephone devices.
    RNID, 105, Gower Street, London, WC1E 6AH. Phone: 01 387 8033

SCOTTISH COUNCIL FOR DISABILITY.

Has an information sheet on communications which includes details of establishments using micro-electronics. It can also provide general information about micro computers. Scottish Council for Disability, 18-19 Claremont Crescent, Edinburgh EH7 4QD. Phone: 031 229 8632.

SCOTTISH COUNCIL FOR SPASTICS.

Is pioneering work in micro-electronics and working on the adaptation of software. They are also able to answer specific enquiries. Scottish Council for Spastics, "Rhuemore", 22 Corstorphine Road,Edinburgh, EH12 6HP. Phone: 031 337 9876.

SCOTTISH SOCIETY FOR THE MENTALLY HANDICAPPED.

Can provide information to specific enquirers. Scottish Society for the Mentally Handicapped, 13, Elmbank Street, Glasgow, G2 4QA. Phone: 041 226 4541.

SEMERCs. (Special Education Microelectronics Resource Centres) Four SEMERCs have been established by the Department of Education and Science to help make sure that new electronic aids (such as computers) are used to their full in teaching children with special needs. They train teachers in the use of equipment, give demonstrations of particular computers, and develop computer programs to meet special requirements. They will generally give advice to anyone under 19.

Bristol SEMERC. Faculty of Education, Bristol Polytechnic, Redland Hill, Bristol BS6 6U2. Phone: 0272 733141.

Newcastle SEMERC. Newcastle Polytechnic, Coach Lane Campus, Newcastle-upon-Tyne NE7 7XA. Phone: 0632 665057.

Manchester SEMERC. Manchester College of Higher Education, Hathersage Road, Manchester M13 0JA. Phone: 061 225 9054.

Redbridge SEMERC. Dane Centre, Melbourne Road, Ilford, Essex. IG1 4HT. Phone: 01 478 6363.

SEQUAL. (Special Equipment and Aids for Living) Used to be known
    as Possum Users Association.
    A charity run by disabled people themselves. They will help
    people with severe disabilities obtain electronic/electric
    aids on permanent loan. Emergency packs are also available.
    Hås a full time welfare staff and visiting welfare officer.
    Publishes quarterly magazine, "Possibility".
    SEQUAL Co-ordination Office, Block 178, Milton Trading Estate,
    Abingdon, Oxon. OX14 4ES. Phone: 0235 833193.

SPASTICS SOCIETY.
    Do not have any standard information sheets but are well able
    to answer specific enquiries.
    The Spastics Society, 16, Fitzroy Square,
    London, W1P 5HQ. Phone: 01 387 9571.

COLLEGE OF SPEECH THERAPISTS.
    Do not keep specific micro-processor information but they list
    all speech therapists. Anyone with a communication problem
    should have a speech therapist's help.
    College of Speech Therapists, Harold Poster House, 6, Lechmere
    Road, London NW2 5BU.
    Phone: 01 459 8521/2/3

SEND (Special Educational Needs Database)
    Scottish Council for Education Technology,
    74, Victoria Crescent Road, Glasgow G12 9JN.
    Phone: 041 334 9314.

SMDP (Scottish Microelectronics Development Programme)
    Developed the Microspecial Pack for school-leavers with
    moderate learning difficulties.
    SMDP, Dowanhill, 74 Victoria Crescent Road, Glasgow, G12 9JN.
    Phone: 041 357 0340.

BOOKLIST

ACE PUBLICATIONS

Available from ACE Centre, Ormerod School, Waynflete Road, Headington, Oxford.

ACE Reporter A regular newsletter covering the latest developments in the field of communication aids. It includes hardware and software reviews, research projects, a diary of events and conference reports. Issue 1 is now available, free.

Communication aid programs for the BBC Model B. A 27 page document providing detailed information, descriptions and comments on a number of communication aid programs written for the BBC micro. The survey is updated at regular intervals and extended to include new and relevant software. Price £1.50

A survey of introductory switch systems and software for severely mentally handicapped children will be available in September 1985. Price £1.50

A survey of useful switches and interface boxes which are available commercially, also available in September 1985. Price £1.50

THE CENTRE FOR EDUCATIONAL TECHNOLOGY (CET), 3, Devonshire Street, London W1N 2BA.
Publishes many useful information sheets, for example "Micro-electronics and children with special educational needs", listing books, magazines and videos.

COMMUNICATION AIDS.
Published by Research Institute for Consumer Affairs (RICA), 14, Buckingham Street, London WC2N 6DS.
A guide for people who have difficulty in speaking. The guide outlines the types of equipment available and gives a review of many of the more common examples, with an illustration of each one. Price £2.50

COMPUTERS AND YOUR CHILD. (A plain Language Guide for Parents). by
Ray Hammond. Published by Century Publishing.
Includes a good chapter on the use of micros with children
with special educational needs and another on the potential of
Logo. Price £5.95

COMPUTERS, EDUCATION AND SPECIAL NEEDS. by E.P.Goldenberg.
Published by Addison Wesley.
This book takes a practical look at current work in mental
handicap as well as looking into the the possibilities for the
future. Price £14.00

ELECTRONIC AIDS FOR THE HANDICAPPED CATALOGUE. Published by
Handicapped Persons Research Unit.
An illustrated Catalogue (117 pages) Price £3.95

EQUIPMENT FOR THE DISABLED. (E for D) Published by Mary
Marleborough Lodge, Nuffield Orthopaedic Centre, Headington,
Oxford, OX3 7LD. Phone: 0865 750103
A series of 13 books which describe and show pictures of
different kinds of aids, with assessments of some of them.
They include large complicated equipment, such as wheelchairs
and hoists as well as simple aids. Although mainly written for
professionals, other people will find them useful to give an
idea of the range of equipment available.
Price £3.50 for each book plus 65p post and packing.

LEARNING TO COPE Published by Educational Computing,
30-32 Farringdon Lane, London EC1R 3AU.
Annual Educational Computing "Specials" about computers in
special education. So far 3 have been issued, the latest in
September 1984.

MICROCOMPUTERS AND SPECIAL EDUCATIONAL NEEDS: a guide to good
practice, by Bob Hogg.
Published by the National Council for Special Education.
Price £1.00

MICROS FOR HANDICAPPED USERS, by Peter Saunders. Published by
    Helena Press, Orchard Lane, Goathland, Whitby,
    North Yorkshire YO22 5JT.
    A book which describes the uses of microcomputers for people
    with handicaps. Also has a useful list of addresses and
    contacts. Price £5.95.

MICROTECHNOLOGY IN SPECIAL EDUCATION, by Andrew Rostron and David
    Sewell.
    Published by Croom Helm. Price £14.95

NEW INFORMATION TECHNOLOGY IN THE EDUCATION OF DISABLED CHILDREN
    AND ADULTS, by David Hawkridge, Tom Vincent and Gerald Hales.
    Published by Croom Helm. Price £16.95

A PARENT'S GUIDE TO EDUCATIONAL SOFTWARE, edited by Bill Tagg.
    Published by Telegraph Publications, 135, Fleet Street, London
    EC4P 4BL. Available from Advisory Unit for Computer Based
    Education, Endymion Road, Hatfield, Herts, AL10 8AU.
    Price £5.95.

SEMERCs have newsletters and information sheets.

ST ANDREW'S PROJECT - A working party to help teachers with the
    use of computers in Special Education. Three publications:
    Managing the Micro, Tackling the Task and
    Enhancing the Curriculum.
    available from: St Andrews College, Bearsden, Glasgow.
    Price £1.00 each.

YOUNG LEARNERS AND THE MICROCOMPUTER, by Daniel Chandler.
    Published by the Open University.
    An excellent guide for parents and teachers to the ways the
    micro can play a part in learning, both at school and at home.
    Price £5.95.

GLOSSARY

Bio-feedback. A method of sensing the impulses from nerves in the
    body.

Bliss Symbols. A communication system in which the user selects
    small symbols to convey the message. The symbols are usually
    printed onto sheets and the selection is made by pointing to
    the appropriate section.

Cartridge. A plug-in module containing a software program on a
    memory chip.

Communicator. A machine used as an alternative method of
    communication by people with speech difficulties.

Data Base. A collection of inter-related items of information
    stored in a computer which can be sorted and identified by the
    computer in several different ways.

Disc Drive. A machine which reads the data from a floppy disc.

Floppy Disc (or Disk). A disc of magnetic material used to store
    computer data or programs in the form of electronic signals.
    It is usually encased in a card or plasic sleeve to protect it
    from damage. The discs are usually, 3 inches, 5 1/4 inches or
    8 inches in diameter.

Graphics. Drawings and pictures, as opposed to text.

Hardware. The computer equipment, including the computer itself,
    the monitor, disc drives and printer.

LCD (Liquid Crystal Display). The grey display similar to the kind
    usually used on pocket calculators.

Modem (MODulator/DEModulator). A device used to aid the
    transmission of information between computers usually via
    telephone lines.

Monitor. The television-type screen which displays the computer's information. Monitors are usually taken to mean the specifically designed display units which give a clearer and better defined picture than a conventional television. Also called a VDU.

Peripheral. A device or component attached to the system to enlarge or improve the application. (An alternative keyboard for example).

Printer. A machine which can be linked to a computer to produce a printed copy of the screen display. There are various different forms:

Dot Matrix: which produces letters and graphics in a series of dots.

Daisy Wheel: which prints letters from a wheel which spins in the printer. This type will not produce graphics.

Ink Jet: which sprays a fine jet of ink to produce the image. Some work in several different colours, and will produce graphics.

Program. List of instructions which tell the computer what to do.

QWERTY Keyboard. The conventional typewriter layout keyboard.

Remote Work Unit. A computer workstation, usually based in the worker's home and sometimes linked via telephone lines to a central computer and office.

Software. The computer programs, built into the machine or stored on cassettes, discs, or cartridges.

Speech Synthesiser. A method of producing an electronic voice. There are several different types which produce varying quality of sound.

VDU (Visual Display Unit). The monitor or television which displays the computer's information.

Word Processor. A computer program which makes it possible to type text onto the screen. After typing it is usually possible to make alterations and move sections of text around before printing.