

# High Technology Aids to Communication

*Deborah Jans and Sue Clark*

Within our modern society, the general public is utilising high technology equipment more and more within daily life. For people with disabilities also there are many applications for the use of high technology equipment in communication, learning, employment, and leisure / recreation activities.

This chapter focuses on high technology equipment designed for people with communication impairments. In discussing electronic communication aids, we will consider the common features of the communication aids currently on the market and being implemented in this country. Additionally, we will review different input methods and issues surrounding implementation of a device for an individual user.

Most of the equipment discussed here was originally designed for individuals with a physical impairment, but there are many different client groups which can benefit from communication aids, as listed in Chapter 1. Assessment procedures, for the selection of a suitable AAC system for a particular user have been discussed in Chapter 5, however it is important to emphasise that any potential user of a communication aid will require a detailed assessment. This is best performed by a multi-disciplinary team with the appropriate expertise.

High Technology aids to communication are here defined as equipment which is electronic in nature and requires a power supply – either battery or mains powered. High technology communication equipment can be divided into two main categories:

- dedicated communication aids
- computer based communication equipment.

## ***Dedicated Communication Aids***

Dedicated communication aids were designed solely for the means of providing an alternative to oral speech or to augment an individual's oral speech. Although some aids do provide access to additional activities such as writing and environmental control, their main purpose is to provide a means to communicate in conversation. Appendix 1 provides a summary of the most widely used dedicated communication aids available in the United Kingdom.

As shown in Appendix 1, there are many communication aids available on the market today. To better discuss and evaluate each communication aid, four factors in particular need to be considered: access; the selection set; the output mode and portability.

## ***Accessing the Communication Aid***

There are two main avenues that an individual can use to access a communication aid: *direct selection* or *indirect selection via scanning*. The physical positioning of the individual user and his/her physical abilities will form the basis for deciding which access method is to be preferred.

### ***Direct selection***

Direct selection is defined as the ability of the user to select by physically touching the equipment. This may be a keyboard, touch window, or a membrane keypad. This definition can also be extended to include the use of a head pointer (either a head or chin stick, head mounted optical pointer or infrared head control unit) or a mouth stick. Direct selection can be done with any part of the body e.g. foot, hand, nose etc. The most common is accessing directly with the hand, either by fist pointing or finger pointing or in combination.

Communication aids can have varying types of keyboards with variable sensitivity and feedback to the user, usually in the form of a click or a beep. In addition, as indicated in Appendix 1, some aids allow the user and facilitator to choose different sizes for the individual keys on the keyboard. This allows for more flexibility for an individual user, or across a range of users.

### ***Indirect selection***

The second type of access method is indirect selection via scanning. This requires the user to activate a switch or number of switches connected to the communication aid. The communication aid must be able to accept a switch and have some type of scanning array available to the user.

When discussing indirect selection, it is important to have an idea of the different types of switches available to an individual user. Switches come in an almost infinite variety and can be customised to suit each individual. For example, they can be activated by movement or pressure with different parts of the body, by heat, breaking a light beam, or sound, or by pneumatic control (suck/puff). Switches may come in single, double, four-way or multiple configurations. Commonly used switches include:

- Simple lever switches, operated by pressing on the hinged 'lid' of a lightweight box.
- Platform switches, requiring the user to press a large 'lid' or button resting on a few switches; light pressure on any part of the 'lid' activates one or other of the switches.
- Bead switches mounted on a necklace and activated by the chin or cheek.
- Head switches, mounted into a wheelchair / headrest.
- Push switches and joysticks – operated by pushing a handle or plate.
- Wobble switches and spring sticks -the user can hit the switch in any direction.
- Suck and puff switches (which require a user with good breath control).
- Tongue switches.
- Sound operated switches (difficult to set correct sensitivity in noisy environments).

Switch access is discussed in greater detail in the next chapter.

Some communication aids are designed specifically *either* for direct selection *or* indirect selection via scanning. Over recent years, manufacturers have often combined these two different types of access methods into one single aid. This can be seen in communication aids such as the *ORAC*, *MessageMate*, *Liberator*, *AlphaTalker*, *DeltaTalker* and *Macaw*, to name a few. This allows for more flexibility for an individual user as it allows the user to choose different access methods during the time they are using the communication aid. This may be important as the user either develops more consistent physical abilities over time, or, in the case of users with progressive conditions, as their physical capabilities become more limited over time.

### ***Selection Set***

Dedicated communication aids may be used with different types of representational system. The system chosen for use may be known as the *selection set*. The most commonly used selection sets are either symbol / icon based or text-based.

### ***Text-based Systems***

Text-based systems usually use a standard form of alphabetic letters and numbers. The display of these letters may be the QWERTY layout as seen on computer keyboards, or an alphabetical layout, or a special display based on the statistical frequency of occurrence of letters in the language. In the case of some special codes, e.g. with Morse Code, the user does not really have a display of letters as such at all; the system provides an access technique whereby the dots and dashes are transmitted as switch presses through an emulator that translates these codes into letters and numbers.

### ***Symbol / Icon-Based Systems***

The different symbol / icon systems available have been described in Chapter 3. It is important to note when considering a particular communication aid, whether that aid utilises symbols or icons as an interface, or alphabetic letters and/or numbers. Communication aid designers often combine both types of interfaces into one aid to extend the choice available to the user. This can be seen in the *Canon Communicator*, for example, which can be transformed from a text-based communication aid to a symbol based aid by utilising the Canon Memory Mates provided with the communicator. Dynamic screen devices, such as the *DynaVox 2*, the *Cameleon* and the *Vanguard* can be set up for use with symbols / icons, text, or a mixture of both.

### ***Output***

Another major factor to consider when looking at individual communication aids is the output that is available.

### ***Visual Output***

Visual output refers both to a visual display unit such as a small screen, and to printed copy of the messages through a printer. Screens and printers may be internally built ('on-board'), or connected externally to the communication aid.

It is important to evaluate the clarity of the visual display (especially in differing light conditions); the size of the display; how many lines / characters the display will show at any one time. If the display is small and only shows a limited number of characters there is usually a buffer built in to save the data as it scrolls off the screen. A cursor can then move to retrieve it later as needed.

### ***Auditory Output***

An important form of auditory output is the type of speech output the communication aid supports. There are two different types of speech output: *digitised* and *synthetic*.

*Digitised speech* is a real voice recorded into a communication aid. The advantages of digitised

speech are that different languages, regional accents, or dialects, and age / gender of voice can be used. Digitised speech may sound more 'natural' and acceptable, for some listeners. Digitised recording also allows the user or his facilitator to use environmental sounds such as a doorbell ringing. The main disadvantage of digitised speech is that the user has to work with a fixed vocabulary at any given time, as he or she cannot create and store new messages by him/herself but is dependent on others for this. Digitised speech also takes up a lot of memory, in a device.

*Synthetic speech* is speech generated by a computer. There are many different types of synthetic speech available commercially. Some are used in a whole variety of different communication aids (such as *DECtalk / Multivoice*) while others are specific to a particular aid (such as *EuroTalk* in *Lightwriters*, or *Oratalk* in the *ORAC*). One of the advantages of synthetic speech is that it uses less memory than digitised. Also, synthetic speech is open-ended and allows spelling in of an unlimited range of new messages. This can be done by users themselves, if they are able and wish to do so. The disadvantages are that it may be more complicated and time-consuming to program a device with synthetic speech, than one with digitised, and that sometimes the pronunciation is not 100% accurate (although most systems now have a 'pronunciation adjustment' facility).

It is becoming more popular to have a combination of different types of speech outputs available in the same communication aid. (This facility is available on the *ORAC*, *DeltaTalker* and *Vanguard*, for example.) This offers the user more choice, for example in placing emphasis on different messages or types of message, and in taking decisions about the most efficient use of the device.

When evaluating different communication aids, it is important to note the clarity of the speech output, ability to represent different voices, gender, pitch variations etc. Choice of voice is a very personal decision made by individual users as to which voice they feel most comfortable with, and can best understand or be understood.

### **Feedback**

Communication aids may also supply a special type of output, whose function is to support and give information to the user, rather than to the listener. This is known as *feedback*.

*Auditory feedback* options mainly consist of a choice of click or beep when a key is pressed on the keyboard (or selected some other way). Some communication aids give users an auditory prompt as they scan along each message, before they make their selection; such auditory scanning methods may be particularly useful for people with visual impairments.

*Tactile feedback* (where users feel the length of a keypress, or a definite click as a key is activated) may also be helpful to tell users when they have been successful in their selection and may move on to the next (Some keyboards, e.g. membrane, lack this).

*Visual feedback* would include the lights on a scanning system. A useful form of visual feedback is the 'icon-prediction' feature seen in devices such as the *DeltaTalker* and the *Vanguard*. As the user builds up a message, the keys that are 'possible' as the next keypress (i.e. those keys that have messages attached to them), light up to guide the user to them. This places less strain on the user's memory, and speeds up selection for scan-switch users.

### **Portability**

The issue of portability has important practical implications for the user. As technology advances, it is becoming much easier to find equipment in a range of different shapes, sizes and weights. It is important to keep in mind whether a communication aid is indeed truly portable or just transportable. If our goal is to provide equipment to help an individual become independent in their daily life, then we need to make sure that the user can carry or transport the aid to different locations if necessary. This has different implications for people who are ambulant as opposed to people who use a wheelchair.

A number of communication aid manufacturers / suppliers also sell specialised mounting systems, for use with wheelchair users to allow the communication aid to be portable.

Designers have taken up this challenge of portability with respect to ambulant users. Some suppliers now have carry bags available in varying shapes and sizes, including bags you can wear around your waist. It is sometimes a major deterrent to successful use of a communication aid if the user cannot carry the aid around while shopping or perhaps switching classes in school or college. Other communication aids have been designed specifically for the ambulant user, for example, the *Cameleon CV* and the *DynaMyte* have been designed as "small" versions of the *Cameleon* and *DynaVox 2*, respectively.

Appendix 2 provides an overview of the different dedicated communication aids and the features that they support.

### ***Computer based Communication Equipment***

Computer based communication aids mainly consist of software programs which can transform a computer into a communication aid. For the most part such systems still maintain use of the equipment as a computer as well. There may be many reasons why a user might opt to use a computer based communication system rather than a dedicated aid.

For example, many households have a computer readily available and people may already be familiar with it. In addition, for those users who may need the full range of capabilities of a computer for certain situations (such as writing with a word processor) *and* a communication system, this can now be provided in one piece of equipment rather than two different systems. This minimises the amount of equipment the user has to deal with. Furthermore, as the computer based systems are mainly software controlled, it is much easier to upgrade or change the system as a user's needs change.

Disadvantages of computer-based communication systems may be that they are often not neatly portable packages; it can be difficult to know which extra 'bits' to buy; their battery life is often poor, again restricting portability; there are few ready programmed vocabulary packages available.

There are now many communication systems available for both the PC based computer and the Apple Macintosh computers. These are listed in Appendix 3.

### ***Use and Integration of Communication Technology***

A discussion of different communication aids would not be complete without a look at the issues surrounding the use and integration of the technology into the users' daily environment. Two main areas need to be considered: *support* and *training*.

#### ***Support***

The level of support required for each individual and their significant partners will vary from individual to individual. However, it is imperative that some type of support is arranged from the very beginning. All too often technology fails, not because the wrong communication aid was supplied, but because there was little or no support given to the individual and his/her facilitators.

Support may be provided in various forms. Some users will require regular support and advice with regard to use of the communication aid and any mechanical or instructional problems that may arise, over a long period of time. In other cases, infrequent phone support may be all that is required.

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Support can also come from within the user's own family. It is important to identify the level of support each individual user has within their own environment. Significant family members can be of great help in supporting the user especially in the initial stages of using the communication aid.

#### ***Training***

In order to ensure that the user obtains the maximum benefit from the new technology, training must be provided. Training may be required both by the user and by the significant partners or facilitators in the user's environment.

One of the most immediate training needs for the user and his/her facilitator(s) is that which leads to the acquisition of basic operational competence in the use of the communication aid. This should consist of instruction in the operation of the particular communication equipment as well as maintenance and charging of the equipment. It may be important to identify a key person who will be responsible for the maintenance of the equipment. This may be the user him/herself, or may be his/her facilitator.

Facilitators may be parents, spouses, other family members or key workers who are involved in the implementation of the communication aid. Some facilitators will be working with many users and would benefit from a general and broad type of training. Training may need to be kept up over a period of time for some facilitators as aids may be upgraded from time to time as the user's needs change and as advances in technology occur. In some cases, new facilitators may need to be trained at regular intervals due to staff changes in schools and residential homes. Many users may have a large number of carers or facilitators in order to maintain an independent life style. It may be important to provide training to *all* the carers, or it may be appropriate to select a few to be trained to deal with different aspects of the communication aid and its use in the environment.

## **Integration**

The user and his/her facilitator will need training in integrating the communication aid into their daily life. The introduction of any new technology into an individual's environment inevitably requires adjustments to be made. Individuals with progressive conditions who have lost the ability to speak and who must now rely on technology to communicate will require time for psychological adjustment.

For individuals with congenital speech difficulties, using an augmentative communication aid may be a tangible recognition that their speech is not likely to improve very significantly, which again may require emotional adjustments. Family and friends will also need time to get used to the use of the communication aid.

As well as training in the use of the device, facilitators and users will require training in the introduction of the communication aid into their natural environment. It is often beneficial to introduce the communication aid in planned steps so as not to overburden the user and/or their facilitator(s).

Communication aids have their limitations. The use of a communication aid makes for a slow communication process. The vocabulary available with which to express their ideas may be more limited than previously, in the case of an adult user who has lost their ability to speak. Training and counselling in coping with these changes will be necessary if the communication aid is to be successfully utilised.

In conclusion, technology can have a significant impact on the lives of people with communication impairments. However, it is not an exact science. The use of high technology can benefit a great number of people, but provision of a high technology communication system might not always be the answer for everybody. Low-tech systems may also be necessary as a back up system and/or in combination with a high tech communication aid to maximise an individual's communicative competence.

*Deborah Jans, Coordinator and Specialist Speech & Language Therapist,  
Sue Clark, Community Occupational Therapist  
KEYCOMM – Lothian Communication Technology Service  
St Giles Centre  
40 Broomhouse Crescent  
Edinburgh EH11 3UB*

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## **APPENDIX 1 – Portable Communication Aids commonly used in the U.K.**

*The prices shown here are a guide only, as prices may vary with different 'models' of aid, or may change over time. All price guides are excluding VAT (which may not be payable, if the aid is purchased by or for use by a disabled person). Although only one supplier is indicated for each device, many suppliers now have a wide range of devices so it is worth getting catalogues from different suppliers and consulting them with regard to support and exact prices before reaching final decisions on purchasing equipment.*

*Aids are listed in alphabetical order, within each category.*

### **Text Aids (no speech)**

**Memowriter** – Small, portable communicator with a QWERTY keyboard, a 24 character display and a printer. Up to 24 personal / emergency messages of up to 55 characters can be stored and printed at the touch of only 2 keys. No speech output. **Price Guide: £625.** Available from QED, Ability House, 242 Gosport Road, Fareham, Hants PO16 0SS. Tel: 01329 828444.

### **Digitised Speech Aids**

**AlphaTalker** – Digitised speech aid with 4, 8, or 32 message locations (up to 30 minutes of speech). Can be used with pictures or symbols, Allows direct selection, multiple switch access (8 locations only), optical head pointer access, and scan-switch access. No screen. Icon prediction. Memory expansion available. **Price Guide: £1,275.** Available from *Liberator Ltd., Whitegates, Swinstead, Lincolnshire NG33 4PA. Tel: 0800 622457.*

**Ablenet BIGmack** – This is a big, colourful communicator into which a single message of up to 20 seconds can be recorded. Can be connected to an external switch and to a toy or appliance. **Price Guide: £99.** Available from *Inclusive Technology, Saddleworth Business Centre, Delph, Oldham OL3 5DF. Tel: 01457 819790.*

**AbleLink One-Step Communicator** – This is similar to the BIGmack, but smaller. Messages can be up to 20 seconds long. Can be connected to an external switch and to a toy or appliance. Communicators can be connected together to provide the user with a choice of messages. **Price Guide: £115.** Available from *Inclusive Technology, (as above).*

**Canon Communicator** – Small, highly portable text-based communication aid using digitised speech (4 minutes of recording time), with a mini QWERTY or ABC keyboard. Offers both direct selection and switch-scan access. Tiny ‘ticker- tape’ printer built-in; small detachable screen available (at extra cost). **Price guide: £800.** Available from: *Easiaids Ltd., 5 Woodcote Park Avenue, Purley, Surrey CR8 3NH. Tel: 0181 763 0203.*

**ChatBox** – Light portable aid with 16 locations accessed directly, or by switch / scan. Symbol sequencing, with icon prediction, allows access to up to 450 vocabulary items using digitised speech (3 minutes). Can be used with Minspeak MiniMap which allows progression to larger devices. **Price Guide: £465.** Available from *Liberator Ltd., (as above).*

**Digivox 2** – Digitised speech aid (between 16 and 142 minutes of recorded speech) with up to 48 message levels divided into 6 user groups. Direct selection and switch-scan access options, including auditory scanning; no screen. Disk drive available (at extra cost). **Price Guide: £2,150 to £3,995** depending on model. Available from: *Sunrise Medical, Dynavox Systems Department, Sunrise Business Park, High Street, Wollaston, West Midlands DY8 4PS. Tel: 0138 444 6789.*

**Eclipse** – Robust slimline aid offering up to 40 minutes of recorded speech in direct-selection and scanning models. The keyboard can be divided into between 2 and 128 squares, while a “talking menu” provides help in setting up the device for an individual user. **Price Guide: £1600** Available from *MARDIS, Fylde Avenue, Lancaster University, Lancaster LA1 4YR. Tel: 01524 593692.*

**FourTalk** – A family of very small portable aids capable of storing up to 4 messages with a total recording time of between 16 and 32 seconds. Different models allow direct selection, or access by switch and scan through 1 or 2 switches. **Price Guide: £305 to 375.** Available from *QED, Ability House, 242 Gosport Road, Fareham, Hants PO16 0SS. Tel: 01329 828444.*

**MessageMate** – Range of small portable digitised speech aids, offering both scan-switch (single or double switches) and direct access (membrane keyboard) in 1 machine. Various models, depending on the number of locations (8 to 40) and the number of seconds of recording time available (the second number on the Model name). No screen. **Price guide: £260 to £715.** Available from: *Cambridge Adaptive Communication, The Mount, Toft, Cambridge CB3 7RL. Tel: 01223 264244.*

**Portacom 40** – Small, robust aid providing multiple scanning options for single and double switch users and direct access. Up to 40 locations can be used in 4 levels to provide up to 160 messages with a total recording time of between 4 and 7 minutes. **Price Guide: £1,175 to £1,425.** Available from: *QED, (as above).*

**SpeakEasy** – Digitised speech aid (total of 2 minutes recording time) to record and play back up to 12 short messages. Direct access (membrane keyboard) or switch access. No scanning – each message location has its own switch socket, so useful for beginning switch users, or up to twelve different users can activate the device, as a group. Can be used with pictures or symbols; no screen. **Price guide: £399.** Available from: *Liberator Ltd., (as above)*

**Spokesman** – Small, lightweight aid with direct access through 1 to 17 keys, depending on model. Scanning not available, but uses up to 2 switches on a “one switch per message” basis. **Price Guide: £475.** Available from: *Easiaids Ltd., (as above).*

**Talking Buddy** – Single-message communicator, similar to the BIGmack, but based on the TASH Big Buddy. Can be connected to an external switch. Can record message up to 20 seconds of digitised speech. **Price guide: £69.** Available from: *Cambridge Adaptive Communication*, (as above).

**Ultimate 8** – Lightweight communicator with 8 messages of 4 seconds each accessed by keypad. Can be used with a switch, but only 4 messages can then be accessed. **Price guide: £180.** Available from: *QED*, (as above).

**Zygo Macaw 3** – Digitised speech aid (9 minutes recording time). 2 Models:- one for direct access only, and one for direct access and/or switch-scan switch access. Allows 2,4,8,16 or 32 message locations; can be used with pictures or symbols. Some pre-programmed vocabularies available. No screen. Extra memory modules available. **Price guide: £1,630.** Available from: *Toby Churchill Ltd., 20 Panton Street, Cambridge CB2 1HP, Tel: 01223 576117.*

**Zygo Parrot** – Small digitised speech aid (32 to 64 seconds recording time), offering 16 message locations only. Can be used with pictures or symbols, no screen. 2 models: – Direct or Switch-scan access. **Price guide: £650.** Available from: *QED*, (as above).

**Zygo Secretary** – This is a text-based communicator, identical to the Memowriter, but with the facility for recording up to 20 messages using digitised speech. There is a total recording time of 64 seconds. **Price Guide: £1,421.** Available from *QED*, (as above).

### Synthetic Speech Aids

**Lightwriter(s)** – A range of text-based communication aids with synthetic speech (choice of three speech qualities/ prices – *DECTalk* available) and memory for storage of large numbers of messages. Single line screen, one facing the user, and one facing the ‘listener’, with options for extra-bright screens; QWERTY or ABC keyboard layout; two keyboard versions, for deaf-blind users. Switch-Scanning versions available (different versions) Small (portable), ‘medium’ (wheelchair tray size) and ‘giant’ size devices available. Large memory, supportive typing features (e.g. prediction, smart punctuation), highly adjustable settings. **Price guide: £750 to £1725**, depending on model. Available from: *Toby Churchill Ltd.* (as above)

### Digitised and Synthetic Speech Aids

**DeltaTalker** – Successor to the *TouchTalker* and *LightTalker*, allowing direct selection through keypresses and headpointer, and switch access to 8, 32 and 128 locations. Most output is by synthetic speech (*DECTalk*), but can record up to 150 seconds of digitised speech for “special messages”, e.g. greetings and introductions. Includes auditory prompting and icon prediction, and supports Minspeak applications. **Price Guide: £4,985.** Available from *Liberator Ltd.* (as above).

**DynaVox 2** – Portable but heavy digitised and synthetic (*DECTalk*) speech aid based on design of a laptop computer, using a built-in symbol library of ‘*Dynasyms*’. Dynamic display system allows message screens to be configured to different numbers of locations of different sizes on each display, with the user ‘stepping through’ to new screens of symbols, as s/he talks. Can be used as a touch-screen, by joystic, or by switch-scan access. The *DynaVox3100*, an even more powerful device, will be available from late 1998. **Price Guide: £4,995** (b & w, 8MB) to **£6,995** (colour, 20 MB). Available from: *Sunrise Medical*, (as above).

**DynaMyte** – A “miniaturised” version of the *DynaVox 2*, designed for people who are ambulant. **Price Guide: £5,995** (8MB) to **£6,495** (20 MB). Available from: *Sunrise Medical*, (as above).

**ORAC** – Allows 4, 8, 16, 32 or 128 locations and direct access and switch-scan access in 1 machine (and can also take the concept keyboard as external input device). Offers both digitised speech, and synthesised speech within the one machine. Two line screen. Some preprogrammed speech sets are available. Extra memory version, and disk-drive, available. **Price guide: £1,100** Available from *MARDIS*, (as above).

**Vanguard** – Very heavy, but powerful, dynamic display device with customised pages containing 4, 8 or 45 locations. Direct access through touch-sensitive screen and can also be used with infrared headpointer or switches. Over 15 minutes of digitised speech available, in addition to *DECTalk* synthetic speech. Can be used with *Unity* or *LLL Minspeak* applications. **Price Guide: £6950.** Available from *Liberator Ltd.* (as above),

**APPENDIX 2 Communication Aids – Features**

<b>NAME OF DEVICE</b>	<b>ACCESSING METHOD</b>	<b>SELECTION SET</b>	<b>OUTPUT MODE</b>	<b>PORTABILITY</b>
<b>AlphaTalker</b>	Direct Selection: Scanning	picture:symbol	digitised speech	portable
<b>BIGmack</b>	Direct selection	picture:symbol:text	digitised speech	highly portable
<b>Canon Communicator</b>	Direct Selection: Scanning	picture:symbol:text	digitised speech	highly portable
<b>ChatBox</b>	Direct Selection: Scanning	picture:symbol	digitised speech	highly portable
<b>DeltaTalker</b>	Direct Selection: Scanning, Head Pointing	picture:symbol	digitised,synthetic speech	portable
<b>DigiVox 2</b>	Direct Selection: Scanning	picture:symbol	digitised speech	portable
<b>DynaVox 2</b>	Direct Selection: Scanning	picture:symbol	digitised, synthetic speech	transportable
<b>DynaMyte</b>	Direct Selection: Scanning	picture:symbol	digitised, synthetic speech	portable
<b>Eclipse</b>	Direct Selection: Scanning	picture:symbol	digitised, synthetic speech	portable
<b>FourTalk</b>	Direct selection Scanning	picture:symbol:text	digitised speech	highly portable
<b>Lightwriter</b>	Direct Selection: Scanning	text	synthetic speech	portable
<b>Memowriter</b>	Direct Selection	text	none	highly portable
<b>MessageMate</b>	Direct Selection: Scanning	picture:symbol	digitised speech	highly portable
<b>One-step Communicator</b>	Direct selection	picture:symbol:text	digitised speech	portable
<b>ORAC</b>	Direct Selection: Scanning	picture:symbol	digitised, synthetic speech	portable
<b>Portacom</b>	Direct Selection: Scanning	picture:symbol	digitised speech	highly portable
<b>SpeakEasy</b>	Direct Selection: Modified Direct Selection	picture:symbol	digitised speech	portable
<b>Spokesman</b>	Direct Selection: Scanning	picture:symbol	digitised speech	highly portable
<b>Talking Buddy</b>	Direct selection	picture:symbol:text	digitised speech	highly portable
<b>Ultimate 8</b>	Direct Selection: Scanning	picture:symbol	digitised speech	highly portable
<b>Vanguard</b>	Direct Selection: Scanning, Head Pointing	picture:symbol	digitised,synthetic speech	transportable
<b>Zygo Macaw</b>	Direct Selection: Scanning	picture:symbol	digitised speech	portable
<b>Zygo Parrot</b>	Direct Selection	picture:symbol	digitised speech	highly portable
<b>Zygo Secretary</b>	Direct Selection	text	digitised speech	highly portable

### APPENDIX 3 – Computer-Based Communication Systems used in the U.K.

The prices shown here are a guide only, as prices may vary with different versions or may change over time. All price guides are excluding VAT (which may sometimes not be payable, if the system is purchased by, or for use by a disabled person). It is advisable to consult individual suppliers for exact prices and details of the computer requirements for each package.

Systems are listed in alphabetical order, within each category.

#### For Apple Macintosh Computers

**Speaking Dynamically Pro** – Symbol based communication program using Mayer Johnson Picture Communication Symbols (PCS) and can import other symbols / graphics. Offers auditory scanning options. Supports different input devices (mouse, keyboard, switch-scan, touch screen), and digitised speech and different types of synthetic speech output (*Macintalk*, *DEctalk*, etc.). Will be available for Windows in 1999. **Price guide: £241.** Available from: *Don Johnston Special Needs, 18 Clarendon Court, Calver Road, Winwick Quay, Warrington WA2 8QP. Tel. 01925 241642.*

**Talk:About** – Text-based system, based on research from University of Dundee, MicroCentre, in which ‘stories’, and decisions about who you might want to say what to, and in which style – informal, formal, humorous, etc. – structures how messages are stored and recalled. **Price guide: £335.** Available from: *Don Johnston Special Needs* (as above).

#### For IBM PC Compatible Computers

**Clicker 3** – Latest in a family of programs, providing an on-screen keyboard, speech output, and the ability to use text, or graphical displays. Although not designed as a communication aid, it could be used for communication. **Price guide: £79.** Available from: *Crick Software Ltd., 1 The Avenue, Spinney Hill, Northampton NN3 6BA. Tel: 01604 671691.*

**Talking Screen** – A pictographic communication program with pages of symbols. Actions are assigned to symbols, e.g. to speak a message, go to another page. Auditory cues are available and programme can be accessed by mouse, touch screen and switches. **Price guide: £1,030** including PCS symbols. Available from: *Cambridge Adaptive Communication*, (as above).

**WINSPEAK** – A symbol based communication program using IBM compatible computer under Windows. Utilises any symbol libraries or pictures in electronic form. Speech output, supports digitised and synthetic speech and a wide range of special access methods. **Price guide: £150.00.** Available from: *The Foundation for Communication for the Disabled, Hassell House, Link Industrial Estate, Howsell Road, Malvern WR14 1TF. Tel: 01684 576188.*

**Writing with Symbols** – A Windows program designed mainly for writing, rather than communication, with speech output providing a simple supported symbol-processor, where words and symbols (Rebus, or other symbol libraries if installed) are automatically matched, with full control of fonts, colours, symbol size and thicknesses, personalised word lists etc. **Price Guide: £85** with basic Rebus symbols to **£145** with full set. Available from: *Widgit Software, 102 Radford Road, Leamington Spa, Warwicks.CV31 1LF. Tel: 01926 885303*

#### Integrated Systems

These generally come as a package comprising a computer, software and possibly an access system. The advantage of an integrated system is that compatibility can be assured, the ‘trailing wire syndrome’ kept to a minimum, and ‘friendliness’ and ease of use are facilitated. Integrated systems may more easily be wheelchair mounted.

**Cameleon II** – Wheelchair mountable, rugged PC compatible lap top with Words+ communication software (*EZ Keys / Scan WSKE / Talking Screen*), switch-scan input and speech output. **Price guide: £5,650.** Available from: *Cambridge Adaptive Communication*, (as above).

**Cameleon CV** – Smaller, lighter version of the Cameleon designed for an ambulant user. **Price guide: £6,000** (excluding software). Available from: *Cambridge Adaptive Communication*, (as above).