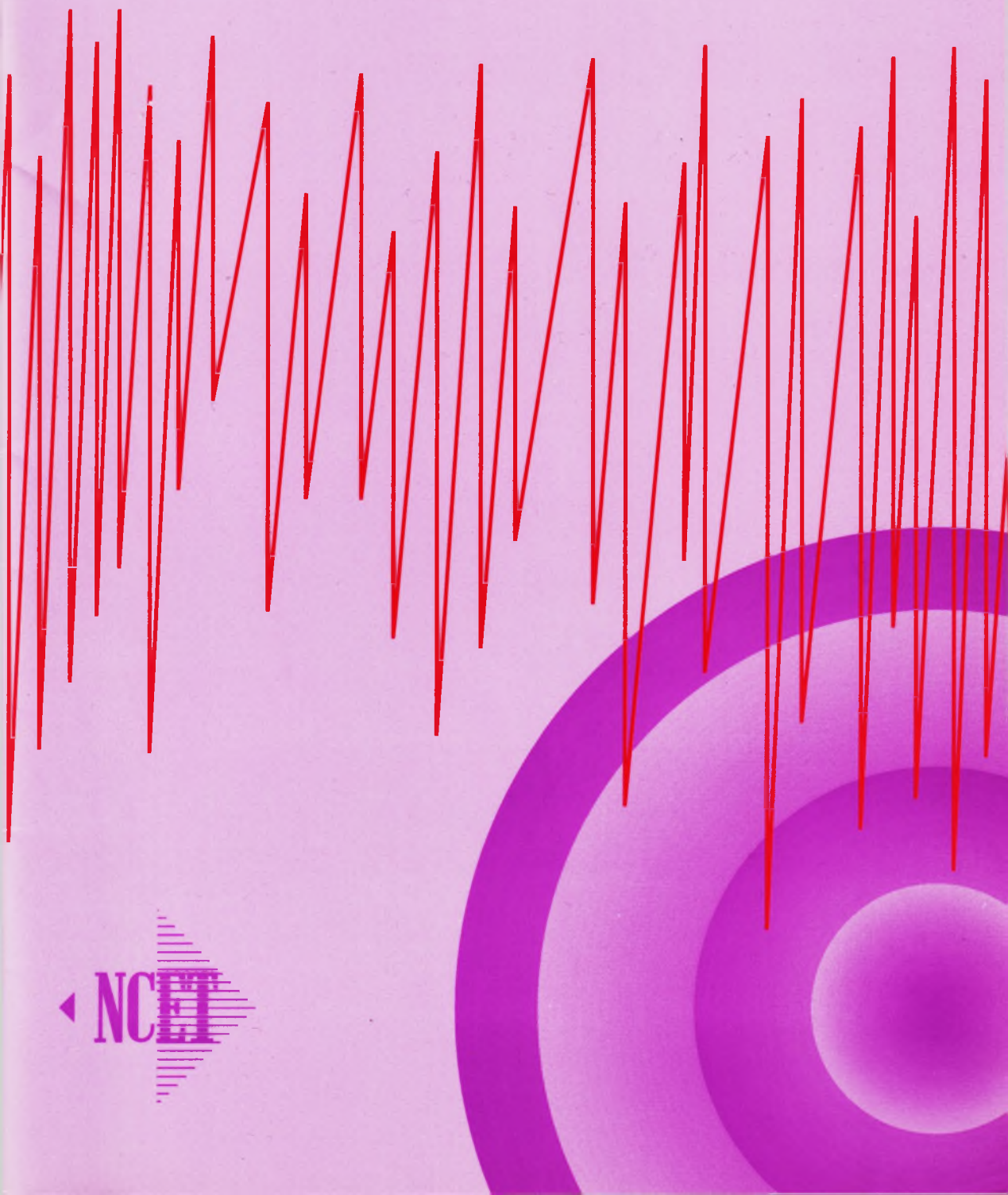
Sounding Out



Sounding Out

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Preface

The use of computer-controlled speech is not a recent development. However, with the advent of more powerful machines and multi-tasking operating systems, speech options are becoming the norm rather than the exception.

The objective of this booklet is to give a guide to some of the speech products available. It is by no means a list of all products, and inclusion does not imply endorsement of specific software and hardware products. NCET is already in the process of producing a more detailed publication about the use of speech in the curriculum.

Please remember also that in this fast-moving area of technology, it is difficult for any information to remain current for very long. Check with suppliers before you order products.

If you have information about products not mentioned here and would like to bring them to our attention, then please send the details to Mick Thomas at NCET.

Thanks to:	Dave Colven	ACE, Oxford,
	Roger Bates	ACE/ACCESS, Oldham
	Lucy Brown	RM Machines

Introduction

Imagine that you're preparing a worksheet for a group of students and that you have a word processor to help you. If you want to explain or expand some of the information such as the reasons for using particular words, you could be typing volumes. What if you could click on an area on the screen, record your voice into the computer, and then stop recording? The content on the screen would remain the same but the messages could be different for different groups of students, depending on age, ability or interests. When you pass the file to the students they will be able to hear your explanations simply by clicking on the screen.

Sound has become a common feature of many software products, ranging from home video games to 'serious' business applications. For many years educational software developers have been writing software that would enable the computer to provide speech feedback to the user. This has generally taken the form of talking word processors, such as Touch Explorer and Prompt Writer from NCET, Big Mac from CENMAC and From Pictures to Words from Widgit. These products were developed originally for special needs users and rely on the computer working with a device such as the Dolphin Apollo speech synthesiser or Covox speech digitiser. Now on some programs such as Full Phases on the Acorn and Write:Outloud on Apple Macintosh, speech facilities have been integrated into the word-processing package, but this is of poorer quality than the output from a speech synthesiser.

This technology is readily available, and is very easy to access. Some computer manufacturers predict that by the end of 1995 few systems will be purchased without sound capability. But speech is not just confined to talking word processors: there are numerous other possibilities, such as talking spreadsheets and databases.

Most of the new software now includes the ability to use sound in an obvious way. Look out for Writing with Symbols, and Choices, both on PC from Widgit software, and Plocka from the ACE centre.

Talking Computers?

Computers can provide audio feedback to the user in several ways other than the meaningless 'beep' that used to accompany most machines. For example, PC and Macintosh machines can have recorded sounds attached to certain critical events, such as the start-up of a machine or a 'disc error'. In this way the user has a better understanding of what is happening.

Synthesised speech

Synthesised speech is composed of two main elements. The first element is text to speech translation software. This works by analysing the text on screen, breaking it into phonemes (the constituent parts of speech), based on a series of rules. The software then passes on a message to the second element of the system which attempts to speak the message it receives. In this way it is possible to develop a method of interpretation for the software in order that it can understand more words and therefore 'say' more words correctly. This is achieved by creating a set of exceptions, or a 'look up' table, that contains all the 'difficult' words. However, some words, particularly proper nouns, will always present a problem.

Some software, such as Touch Explorer Plus, Pictures to Words and Writing with Symbols allows the user to enter an alternative 'phonetic' spelling for speech output.

The outcome is that the quality of speech reproduction varies. Sometimes this software is floppy-disc based, such as !Speech from Superior software or !Pep from Pep Associates and therefore has limited capabilities and quality, but is quite cheap to buy. Sometimes it is in an external device such as a Dolphin Apollo speech synthesiser or a Covox Speech Thing from IanSyst and Tandy which can be attached to most computers. These devices have superior text to speech facilities and a good quality output and are therefore more expensive. Apollo 2 from Dolphin Systems is very good and has a substantial English vocabulary. Dolphin also produce many foreign language chips, so speech with modern foreign langauges or English as a second language is also a realistic possibility.

There is another form of speech which is a mixture of the synthesised and digital. The phonemes are sampled by the developer and are therefore human tones. Software attempts to join them back together again when the user asks for a certain word. The speech quality is good, but there is only one voice. This area is still in its infancy and therefore few products currently exist that exploit this development. The DecTalk device is one example of this type of technology: it has a wide range of voices and other controls which make it a very versatile instrument. It is the only synthesisier currently available with a proper child's voice, and has the disadvantage of only having an 'American' accent and requiring a full stop and a <return> character for it to speak a sentence.

Digital Speech

All new computers have built-in speech facilities. These store the original sound in digital format. In other words, if you were to speak into the computer via a microphone, the computer would be able to replay that file just like a tape recorder. This is known as digital speech and is fairly impressive. The quality of the speech is only dependent on the recording or sampling hardware and software available on the machine that you are using. The content is dependent on the words that have been recorded but it is easily updated, and the speech quality is very high.

But be warned, a large disc is needed to store the information as the files can be quite large, depending on the sampling rate of the sound. As a rule, the higher the quality that the sound is recorded at, the larger the file that is created. However, speech can get by with poorer quality sampling than music. A speech file of around ten seconds can take up as much as 100kb on a disc, and therefore your floppy disc is soon filled up! However, ten seconds is plenty of time to say a sentence! Music files have to be recorded at a higher rate to maintain their quality and therefore take up a much larger amount of disc space.

A sound card such as the Sound Blaster can be fitted inside a PC-compatible computer to enable it to record and play back digital speech. It will also act as the link for a vast range of software and,

in the case of the Sound Blaster, provide the connection for a CD-ROM drive. A new card from Microsoft, the Windows Sound System, will provide the same interface as the Sound Blaster for Windows-based software. iANSYST is one company that has a wide range of software from the US that communicates either through Sound Blaster or the Covox Speech Thing.

What works with what?

This table gives some guidance on some of the most popular text to speech software titles and devices and the machines that they run on. It is meant only as a guide and is not a definitive list. The prices given are also guides and should be checked before purchasing.

Software	Cost	Supplier	Acorn	Apple	RM	PC
!Speech	24.95	Superior Software	✔			
!Pep	25.00	Pep Associates	✔			
Macintalk	Free	System Utility		✔		
Apollo 2 with Hal screen reading software	395.00	Dolphin systems	✔	✔	✔	✔
Covox Speech Thing	70.00	iANSYST+			✔	✔
Monologue	89.00	iANSYST+			✔	✔

Talking word processors

At present there is an enormous amount of interest in talking word processors and their impact on learning.

There are many advantages in using speech. It gives instant feedback so that users can hear words and make judgements about the spellings. If they type *recieved* it will be pronounced *re-sigh-ved*, and the user can hear the mistake. It can also help in those cases where the learner has typed in the wrong word:

I went home and had bacon and eggs for super.

Since *super* is correctly spelt, it would not be picked up by a spell checker, but with speech the writer can hear that it is wrong. So speech enables the user to identify mistakes – which is the first step to improved writing.

There is a variety of packages available which allow users to have their text read back to them. Some are integrated packages, others are a mixture of word processors with some speech support from third-party programs. Write:Outloud from Don Johnston Developments for Apple Macintosh is a talking word processor that is integrated with Macintalk (a free system utility for all Macintosh computers). This integration means that the software can speak words as you type, sentences after you have typed them, or the whole passage. The speech is synthesised, with all its drawbacks and strengths, but the package is easy to use and very flexible. Write:Outloud2 which is soon to be released uses a new Macintosh speech system. It works much faster than the original and the sound quality is much improved.

On the PC, Kidtalk from IanSyst is already being used in several areas to assist learners with specific learning difficulties, while programs such as the Puzzle Storybook provide an interactive story-writing environment.

Talking Pendown (Archimedes, Longman Logotron) and Full Phase (Archimedes, NW Semerc) are both good examples of the

second category of word processors. Both these packages existed for a long time without speech facilities and now they both use a program called !Speech from Superior Software for their sound. Again the speech is synthesised, but configurable for a male or female voice.

Within Windows, the technology is also available to add speech to any software. Using Monologue, available from IanSyst, any text on the screen can be translated into speech, using either a Sound Blaster-compatible sound card or an external sound device, such as the Logitech Soundman. Although the process of linking the software together is a little tricky at the moment, we will soon see products that take advantage of this system.

Talking Wordwise (BBC, Research Centre for the Visually Handicapped) and Prompt/Writer (BBC, RM, NCET & NSNSU) are word processors that allow for speech support via a speech synthesiser. The options are configurable from within the set-up menu on these packages, but require a relatively expensive, external device, such as the Dolphin Apollo to supply the speech. The quality is good.

Big Mac from CENMAC is a word-processing package with 'long lists' of words in alphabetical order and 'short lists' of subject-specific vocabularies. These can be deleted or adapted for individual learners. The speech synthesiser will read back these lists and also read word-processed files one character at a time, one word at a time or one paragraph at a time, or in any combination.

Microsoft Word on Macintosh and PC offers an interesting speech option. Voice annotations, such as extra notes for individual students, can be added with the inbuilt micophone.

The list below pulls together some of the most popular word-processing packages that have integral speech options.

Software	Cost £	Supplier	Acorn	Apple	RM	PC	Extras
Full Phase	30.00	Semerc	✔				✖
Talking Pendown	64.00	Longman Logotron	✔				✖
Big Mac	45.00	Cenmac			✔	✔	Speech Synthesiser
Prompt/Writer	10.75	NCET	✔		✔	✔	Speech Synthesiser
Write: Outloud	100.00	Don Johnson		✔			✖
Kidtalk	20.00	iANSYST			✔	✔	
Talking Wordwise	10.00	Northwest Semerc	✔				Speech Synthesiser
Microsoft Word	180.00	Microsoft		✔	✔	✔	✖
Startwrite	67.00	Icon Technology	✔				

Spreadsheets with speech support

In the Windows operating system on PC machines, the Microsoft Sound System allows users to record their own text into templates that can be activated when a word is typed. There is a good example of this within Excel. There are already thousands of pre-recorded words, such as numbers and business jargon, and when one of these words is typed, Excel recognises the word and reads it out. In addition, users can program the software to recognise particular words that they are likely to use, such as regularly used data fields or the students' names.

Good Classroom Resources

There will come a time when you will want to record and edit your own sounds and use them in a wide variety of ways. But for the moment you may not be quite ready to do this. You might just like to see and hear some software packages that already have sound integrated. This section shows a range of what is available and explains what it does.

Storybook Theatre (Mac), Cartooners (PC), and Screen Play (Arc) are similar packages in many ways. Each of them allows the user to manipulate images and sound in an interactive way in order to create a variety of scenarios from resources that come with the package. As an example, Storybook Theatre has a scene called 'Wacky Scientist'. This scene has a number of sounds, images and animations that the student can place anywhere on a background scene of a laboratory. This enables the students to create their own scenario. They can also add their own sounds if they want to.

Naughty stories for the Acorn Archimedes (Sherston Software) are a good example of the use of speech in an educational context. Digitised speech allows a paired reading approach or speech imitation by the students. Talking Pictures from Wyddfa Software, for the Acorn Archimedes, provides language and early reading development using high-quality digitised sound and attractive graphics. Kid Pix for Archimedes, Mac and PC is a painting package which combines special effects art tools, picture stamps, and sounds. Smart Alex, for the Acorn Archimedes, from Brilliant Computing is another good example of the use of speech in a program. The large cartoon character can do many things, including talk! It can be very effective for language activities or developing writing skills.

CD-ROMS

The huge storage capacity of CD-ROM offers many opportunities which have never existed before. Books can be transferred on the discs and made very appealing to readers. No longer is the author confined to words and static images: the stories can contain high-

quality images and animations, and also store large quantities of sound. This has led to a wide variety of resources being produced. Broderbund has produced Just Grandma and Me, and Arthur's Teacher Troubles for Mac and PC, which are interactive books. These are very entertaining and encourage the child to explore the 'pages' and find all the hidden extras. Cosmic Osmo and The Manhole (Mac) are good examples of adventure-type programs that are suitable for many different situations and include sound as a vital part of their appeal.

DIY

If, having looked at some of the products above and seen the potential and creativity that sound and speech offer, you have decided that you want to have a go at adding sounds to your own resources, then you will need sound sampling and editing software and hardware.

On new Apple computers, sound is integrated in the machine. A microphone is supplied to input sound, and software built into the system allows the user to record, play back and edit sounds. SoundEdit Pro, which includes Mac Recorder for the Macintosh, is a more sophisticated package (and therefore more expensive). It allows the user to record sounds and to edit them in many ways. For example you could add echo, play the sound backwards to create special effects, or make the sound fade in and out. Also included is a facility for mixing up to four sounds together in order to make one composite sound.

The Oak Recorder for Acorn machines is a simple to operate, plug-in microphone and comes complete with editing software. It attaches to the printer port on the computer and so needs no extra hardware. The editing software is easy to use but allows little flexibility over the original file, apart from the usual copying, cutting and pasting.

Armadeus is a sound sampling package for Acorn machines. New samples can be loaded, appended, inserted or overlaid onto an

existing sample. Processing features include echo, reverse, fade in and out, move and erase, replace or overlay marked areas, etc. Other features include a stereo effect option on replay. The software also includes two discs of sampled sound.

On PC machines with Windows software and a Sound Blaster card, a microphone is also supplied to input sound, and software built into the Windows operating system allows the user to record, play back and edit sounds.

How can I use these sound files?

Supposing that you had just been on a visit to a farm with a group of students. As part of the visit they had recorded on a tape recorder sounds from the farm such as animals, machinery, and interviews with the farm-workers. Having now collected these sound files, what can you do with them? A computer can help with the presentation of their farm visit. Magpie, Genesis or Optima on Acorn machines, allow the user to create 'pages' of information which can be linked together. These pages could include pictures, words and sounds. By clicking the mouse on an area of the screen the sound file (created by editing it in one of the packages mentioned earlier) would be replayed. This is a very powerful and motivating way of developing project work. The students are always in control and are leading the development of their project: they decide routes and content. Similar packages exist on other machines, in particular, Hypercard for the Apple Macintosh and Toolbook or MMbox for PC compatibles with Windows.

Talking to Computers?

As well as sound output, computers can also allow the user to control them with their voice. This effectively means using a microphone, rather than using the mouse or keyboard to make the software work. Once the computer has been trained to recognise a voice, the user can speak into the microphone and the computer will perform the required action, such as 'File', 'Open', 'Change Directory' etc.

Speech input was originally developed for business users, and so has had vast amounts of money poured into the research and development. Until recently the technology has been very expensive, but there are now several products that do this at a very reasonable cost particularly within Windows and in the Macintosh operating systems. There are obvious implications for education in general, and special needs users in particular.

Voice Type (£1650) and Dragon Dictate (£4000) for IBM compatible PCs are two examples of voice input systems. With both these systems the voice input software needs to be trained to your voice from scratch. Both systems are based on the same program, but work with different sized vocabularies. Voice Type has a vocabulary of 7,000 words, while Dictate has 20,000. In addition, Dictate allows you to add many more words of your own than Voice Type, but also needs needs a much larger memory. The Microsoft Windows Sound System also includes Voice Plot. Templates of words are trained by the user, with the system being able to save separate templates for individual users. The templates can also be used to input text into a document, although each template can only contain 64 words and is therefore rather limited.

Although there are voice recognition products similar to those available on the PC, notably Voice Navigator, Apple Macintosh has taken voice recognition a stage further. Through software available as part of the system and therefore effectively free, they have developed a system of voice recognition that is claimed to be speaker independent. It is said to recognise the difference between male and female voices and also deal with regional accents. At the moment this system is only available in the United States and requires a powerful machine with a large amount of memory to run it.

In the Classroom

Remember, as well as being a poweful support and motivating feature, sound can also be irritating in a classroom. This can be particularly important if there are several machines in use at once. Headphones can be a useful peripheral device. It is even possible to make or buy a simple device that allows several headphones to be attached to a computer.

This means that a small group could listen at the same time. Sometimes, such as in whole-class work, loud, good quality sound is important. In these situations external speakers are a vital extra, as the internal computer speakers are insufficient. They can be bought for as much money as you want to spend. Also remember that the sound can be turned up and down to suit your needs from within the operating systems of all new machines. Consult your manuals for specific details.

Addresses

AppleCentre Chester
Northgate Pavilion
Chester Business Park
Chester CH4 9QH
0244 680700

Aptech
Aptech House
Meadfield
Ponteland
Newcastle upon Tyne NE20 9SD
0661 860999

BlackCat Software
3 Beacons View
Mount Street
Brecon
Powys LD3 7LY
0874 622760

Brilliant Computing
PO Box 142
Bradford
West Yorkshire BD9 5NF
0274-497617/578239

CENMAC (Centre for Micro-Assisted Communication)
Charlton Park School
Charlton Park Road
London SE7 8HX
081-316-7589

Clares Micro Supplies
98 Middlewich Road
Rudheath
Cheshire CW9 7DA
0606-48511

Dolphin Systems Ltd
Unit 96C
Blackpole Trading Estate West
Worcester
Hereford and Worcester WR3 8TU
0905-754577

Electronic Arts
90 Heron Drive
Langley
Slough
Berkshire SL3 8XP
0753 549442

ESM
Duke Street
Wisbech
Cambridgeshire PE13 2AE
0945 63441

iANSYST Ltd
United House
North Road
London N7 9DP
071-607-5844

Icon Technology Ltd
5 Jarrom Street
Leicester
Leicestershire LE2 7DH
0533 546 225

Longman Logotron
124 Cambridge Science Park
Milton Road
Cambridge
Cambridgeshire CB4 4ZS
0223-425558

Microsoft Ltd
Microsoft Place
Winnersh
Wokingham
Berks RG11 5TP
0734-270000

North West SEMERC (Oldham)
1 Broadbent Road
Watersheddings
Oldham
Lancashire
Greater Manchester OL1 4HU
061-627-4469

NSNSU Ltd
c/o RESOURCE
Exeter Road
Wheatley
Doncaster DN2 4PY
0302 340331

Oak Solutions
Broadway House
149-151 St Neots Road
Hardwick
Cambridgeshire CB3 7QJ
0954 211760

Papworth Ability Services (UK) Ltd
Papworth Everard
Cambridge CB3 8RG
0480 830345

PEP Associates
34 Tiverton Way
Cambridge CB1 3TU
0223 212251

RCEVH
Birmingham University
Edgbaston
Birmingham
West Midlands B15 2TT
021-414-6736

Research Machines plc
New Mill House
183 Milton Park
Oxford
Oxfordshire OX14 4SE
0235 826000

Sherston Software
Swan Barton
Malmesbury
Wiltshire SN16 0LH
0666 840048

Superior Software
PO Box 6
Brigg
South Humberside DN20 9NH
0652-658585

TAG Developments Ltd
19 High Street, Gravesend, Kent DA11 0BA
0800-591262/0474-357350

Tandy Education Supplies and Services
Tandy Centre
Leamore Lane
Bloxwich
Walsall WS2 7PS
0922 434036

Westpoint Creative
Delta House
264 Monkmoor Road
Shrewsbury
Shropshire
0743 248590

Widgit Software
102 Radford Road
Leamington Spa
Warwickshire CV31 1LF
0926-885303

Wyddfa Software
3 Preswylfa
Llanberis
Gwynedd LL55 4LF
0286-870101

For further information about communication devices, contact:

ACE
Ormerod School
Waynflete Road
Headington
Oxford
OX3 8DD
0865 63508

ACE/ACCESS
1 Broadbent Road
Watersheddings
Oldham
Lancashire
Greater Manchester OL1 4HU
061-627-1358

CENMAC
Charlton Park School
Charlton Park Road
London SE7 8HX
081-316-7589

Foundation for Communication for the Disabled
25 High Street
Woking
Surrey
GU21 1BW
0483 727848

Products

Arthur's Teacher Troubles
Broderbund
£32
from Mac and some CD-ROM suppliers

Armadeus
Clares Micro Supplies
£82.00 Acorn Archimedes (software)
£ 205.00 (software and Armadeus sound sampler board)

Cartooners
Electronic Arts
£24.50
PC, RM186

Choices
Widgit
£35 + vat
Archimedes/PC

Cosmic Osmo
Cyan
£40
from Mac & some CD-ROM suppliers

Dolphin Apollo II
Dolphin Systems
£395
BBC/PC without HAL software

Dragon Dictate
Dragon Systems Inc.
£4000
available from Aptech and other suppliers

From Pictures to Words
Widgit
£27.50 BBC
£35 Nimbus
Arc, PC

Genesis
Software Solutions
£69.95 Acorn Archimedes (education)

Genesis 2
Oak Solutions Ltd
£99.95 Acorn Archimedes

Hypercard
Claris
£129

Just Grandma and Me
Broderbund
£32
available from Mac suppliers

Kidworks 2
Davidson
£42.95
MacIntosh/PC
available from Ablac, TAG

Kid Pix
ESM
£55.00 IBM PC and compatibles
£37.50 Acorn Archimedes
£45.00 Apple Macintosh

Kidtalk
iANSYST
£20
Amiga/PC

Mac Recorder
Mac suppliers

Magpie
Longman Logotron
£59.00 Acorn Archimedes (stand-alone)

MMbox
RM

Naughty Stories
Sherston
£9.95 Archimedes

Oak Recorder II
Oak Solutions
Archimedes£35

Optima
NW SEMERC
£20.00 Archimedes

Screen Play
Widget
£35 + vat Archemedes

Smart Alex
Brilliant Computing
£25.00 Acorn Archimedes

Sound Blaster
Westpoint Creative
£99
PC

SoundEdit Pro
from Mac suppliers

Storybook Theatre
TAG
£69.95 Mac

Talking Pictures
Wyddfa software

The Manhole
Cyan
£35
from Mac & CD-ROM suppliers

Toolbook
PC suppliers

Touch Explorer
NCET
£19.75 BBC
NSNSU
£32 Nimbus, PC, Archimedes

Voice Navigator
Mac suppliers

Voice Type
Papworth Ability Services (UK) Ltd
£1690

Write: OutLoud
Don Johnston
US £100
available from AppleCentre Chester

Writing with Symbols
Widgit
available 1994
PC, Arc

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