Augmentative Communication News

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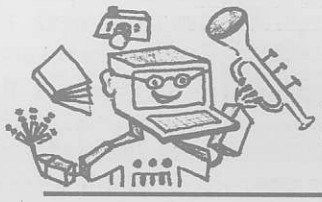
UPFRONT

I was very excited — almost breathless upon returning from Los Angeles where I attended the California State University-Northridge (CSUN) Technology and Persons with Disabilities conference from March 16-19. For one thing, my flight took off from the LA airport just minutes before the latest earthquake, a 5.3 *After Shock*. Phew! For another, my decision to complete the March issue after, rather than before the conference, was a good one. Although I'm late, what I learned was relevant.

Manufacturers of augmentative and alternative communication (AAC) devices are bringing more computer memory, smaller components, intelligible speech, high-resolution displays and color graphics to our field. They are revolutionizing our tools and making communication more accessible to people with severe speaking and writing impairments.

I asked manufacturers, master clinicians, and developers what features of AAC devices they are most excited about this year. They said *really* intelligible speech (synthesized and digitized), dynamic displays, auditory scanning, and increased portability. This issue will explore these features *(cont. in UPFRONT on pg. 2)*



Dynamic Displays

A "dynamic" or "transient" display is a computer screen that changes in response to user input. Information on the display can be pictographic or text-based. Color, various fonts, high resolution graphics, animation, speech, sound, and even video are possible.

Powerful laptop computers with high resolution displays have made dynamic display technology portable and useful for AAC devices. In a summary article, Woltosz contrasts the use of dynamic displays on AAC devices with static displays, i.e., symbols/words/letters printed on paper.[1] For years static displays were our only option, he says. Persons using AAC devices with static displays rarely have access to more than 128 symbols/messages unless their overlays are changed or they learn codes (e.g., semantic encoding, abbreviation expansion). Literate users who spell and have unlimited access to language, need to learn codes or use linguistic prediction to reduce keystrokes and increase speed.

AAC devices with static displays place cognitive, motor, perceptual, and learning requirements on persons using devices to communicate. Professionals also have experienced difficulty learning to use this equipment. Many feel transient displays substantially reduce these demands, as well as enhance rate. Why? The technology *(cont. on pg 2)*

UPFRONT *(from page 1)*
in more detail and provide information about devices which use them. Each section focuses on one feature. The Tables give examples and describe characteristics of devices. Thanks to all listed in **Resources and References** on page 8 for their thoughtful input. I know! Many AAC devices and features are not discussed, and no device or feature is covered in detail. In only eight pages, inclusiveness is precluded. I've tried to be accurate, but please contact companies directly for more information. This is only a beginning. A major purpose of this issue is to invite ACN subscribers to participate (with me and the Applied Science and Engineering Laboratories in Delaware) in revising the 1990 *Wall Chart of Portable Communication Devices*. Let me know your ideas and opinions on the hotline 1-408-649-3050 (voice) or by FAX (408-646-5428). What devices and features should we include? How should we organize the information? How should it be presented— a chart? mural? calendar? software program? Finally, THANKS for supporting *Alternatively Speaking*. The first issue will be out in mid-April. For those who haven't subscribed . . . Hey, it's never too late! Sarah W. Blackstone, Ph.D.

Dynamic Displays *(cont. from page 1)*

allows individuals to change screens quickly and to configure the size, color and arrangement of symbols, words and phrases on their screen. They can select (or construct) messages without remembering codes or physically switching overlays. Also, sufficient computer memory allows storage of libraries of pictures, symbols, animation, text, sounds and speech.

Features inherent in dynamic displays also carry cognitive, motor, visual-perceptual and learning loads that challenge some users. For example, moving between and among screens to construct messages requires visual attention and decision making. Although memory demands are reduced, automaticity in generating messages (or parts of messages) may be difficult to achieve. *Off-the-shelf* computers are not designed to be mounted on wheelchairs and used as communication aids; however, concerns raised about their ruggedness remain unsubstantiated. We simply don't know about a lot of things — despite all the claims being made! Users, researchers, manufacturers, and clinicians need to document their experiences so we can determine which individuals, with what types of abilities, benefit from what types of technology.

AAC devices with dynamic displays and several communication software packages are listed in Table I. The *Dynavox* and *Lingraphica* are dedicated to communication; they are computers turned into communication devices. *Lingraphica* has features carefully designed for people with aphasia. The *Dynavox* is used by people across a broad spectrum of ages and disability categories. *Dynasyms*, a symbol system developed by Faith Carlson, and *Dynawrite*, a word processing program, make this a versatile device.

System 2000 is a complete communication system including an IBM-compatible computer, voice synthesizer and input device. *Talking Screen* and *EZ Keys* are software for use on *System 2000* or other computers. Symbol options for *Talking Screen* are *Mayer-Johnson, Blissymbols, Compic* and *PCX graphics*. *EZ Keys* is a widely used, text-based program that supports conversation.

The *Gus Multimedia Speech System* converts any Windows-compatible PC into a dynamic display device. It supports standard Windows bitmap pictures or any PC-compatible symbol set (e.g., *Mayer-Johnson, Imaginart*) and includes a synthesizer.

Speaking Dynamically runs on a Macintosh laptop computer. Developed at Mayer-Johnson for use with *Boardmaker*, this popular program provides access to their entire symbol set, a talking word processor, and more.

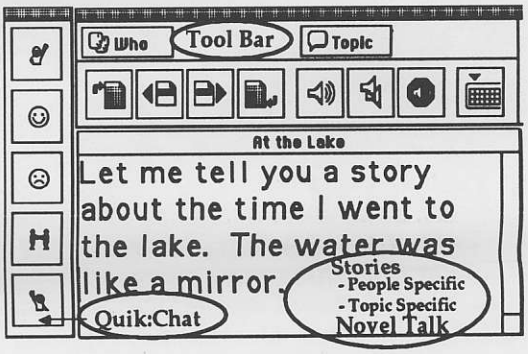


Figure 1. ***Talk-About*** **Screen**

Talk-About will be released by Don Johnston Inc. in June, 1994. This text-based program is for literate individuals. It uses a dynamic display to provide a conversational structure. Based on pragmatic research at the University of Dundee, *Talk-About* allows users to identify their partner. The program can automatically shift conversational style and highlight topics and vocabulary relevant to that dyad. The display is config-

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Table I. Dynamic Display Devices and Features

FEATURES	*DYNAVOX*	GUS	KE:NX	*LINGRAPHICA*	*SPEAKING DYNAMICALLY*	SYSTEM 2000 VERSA	*TALKING SCREEN*	*TALK-ABOUT*
Hardware requirments	Dedicated	Any Microsoft Windows compatible PC	Macintosh System 7 w/ 8 MB RAM and 80MB hard drive	Dedicated	Macintosh-Classic w/hard disk, 4 mb Mac-LC 1,2,3, quadra performa	NEC Ultra-Lite, VERSA	IBMcompatible 386, 4 mb ram, 40 mg hard drive. w/ color	Macintosh System 7 w/ 8 MB RAM and 80MB hard drive
Display	12 x 9" Built-in touch panel monochrome	Microsoft Windows display mono/color	Mac display mono/color. Supports ext. moniotr	10 inches diagonal mono	Mac display. mono/ color. Supports external monitor	9.5" diagonal mono/color Supports ext. monitor	IBMcompatible mono/color. Supports ext. monitor	Mac display. mono/color. Supports ext. monitor
Language options	*8 languages* 2000 Dynasyms; Dynawrite or both included	*4+ languages* Any Windows bitmap or symbol set	English Mayer-Johnson, Dynasyms, COMPIC, etc.	English 2000 concept scenes, images, text	9 languages Mayer-Johnson symbols/Boardmaker. Word processing	Runs IBM software. Talking Screen (next column) EZ Keys (*English)* included	*5 languages* Mayer-Johnson, Compic, Blissymbols. PCX files	*English* Text based. For use with Co-Writer
Speech Options	Built-in DecTalk; 15 secs recorded speech/sound	Synthesizer included; recorded speech/sound	MacinTalk II/Pro; ext synthesizer recorded speech/sound	Digitized built-in	Macintalk Pro (or ext. synthesizer); recorded speech/sound	VocaLite or Multivoice synthesizer; recorded speech/sound	Voca Lite or Multivoice synthesizer	MacinTalk II/Pro; ext. synthesizer; recorded speech/sound
Other options	Printer, ECU	Printer Modem, CD	Printer	Printer	Printer, CD	Printer, ECU, CD, Modem	Printer, ECU, CD	Printer
Physical access options	Includes touch screen, keyboard, Sup ports all but optical pointer and eyegaze	Includes switch interface. Supports all except direct eyegaze	Supports all except direct eyegaze	Includes trackball, keyboard	Supports all except direct eyegaze	Includes touch-screen, switch interface, joystick. trackball. Supports: all except eyegaze	Includes switch interface. Supports all except direct eyegaze	Supports all except direct eyegaze
Approximate cost of system (B/W and color)	*Software* $500-750 *Hardware* $3995	*Software* $795 *Hardware* mono $1000+ color $1500+	*Software* $50 - $250 *Hardware* Ke:nx $780 mono$1500+ color$2700+	Indiv. $5950 Clinic $6450	*Software* $299 *Hardware* mono $1500+ color $2700+	Includes Talking Screen/EZ Keys both+$40 *Hardware* mono $6240 Color $7240	*Software* $1395 *Hardware* mono $1400+ color $2400+	*Software* $490 *Hardware* mono $1750+ color $2700+

ured so components of conversation are accessible. Users can greet, chat, introduce a new topic, tell a story or related experience, and create novel messages using Co:Writer. Text can be saved on-the-spot and retold later.

KE:NX is a combination of hardware and software that now allows a user to address a broad range of communication needs.

When selecting a device with a dynamic display, consider the:

Display. Size, color and resolution of a display are inherent to the specs of laptops. Dedicated systems don't offer options. Displays may not be visible in sunlight, but can be in the dark. For work station use, consider an external monitor, as well.

Language. Devices/systems currently support pictographic sets, graphic systems, speech, sound and text. Most have word processing capabilities.

Speech. Most listed support both internal and external speech synthesizers. Digitized speech/ sound are options.

Other options. All support external printers. Environmental control units (ECU), modems, and CD ROMs are options.

Access. Most devices with dynamic screens allow a range of direct selection and scanning techniques: touch screen, keyboard (alternate), mouse, trackball, joystick, and switches for auditory, linear, row/column, inverse, and step scanning. Consider using multiple techniques to lessen fatigue and difficulties with repetitive motion syndrome

Final Comments

Will dynamic displays replace all devices with static displays? I doubt it. For one thing, people need access to language everywhere. Low-tech aids, which are static displays, will continue to be important. Also, some people prefer to use what is already familiar. Finally, the use of dynamic displays is relatively new. We need to document our observations and share information about whose needs can be met by this technology. There is, however, a growing chorus of enthusiasts in the AAC community for dynamic display technology; and many are consumers.

Voice output

Digitized speech technology has definitely hit the market—you can even record your own greeting cards! Until recently, widespread use of recorded voice output communication aids (VOCAs) was limited to tape recorders with loop tapes or magnetic card readers. Now a plethora of devices talk.

Features of VOCAs that use recorded speech are summarized in Table II (cost less than $500) below and Table III on page 5 (cost more than $500). Note: Information about features and simple VOCAS was adapted from Smith and Walker's CSUN presentation.[2]

Output time. How much recording time is available? Each device has limitations. As the time increases, so does the cost.

Language options. The kind of language (text, symbols) and the strategies for accessing vocabulary (coding, levels, prediction) are important considerations. The *DAC* and *Digivox* allow users to do some spelling. Some devices allow recordings to be stored on a computer disk. Note: You can back up any overlay on a tape recorder. Then just record from the tape to the device.[3]

Table II. Portable Recorded VOCAs Costing Less than $500 US (adapted from Lourie Smith & Autumn Walker, 1994)

FEATURES	Cheap Talk 4 $69	Lynx $250	Say It Switch $40	Say It Rocking $50	Scan Mate 4 $385	Speak Easy $365	Switch Module 4 $45	Switch Mate 4 $360	Talk Back III $275	Voice Pal $424	Message Mate 20 $499+
Output time	20 sec	16 sec	20 sec	20 sec	16 sec	2 min	20 sec	16 sec	20 sec	20	20 sec
Max # of messages	four	four	one	two	four	twelve	four	four	three	five	twenty
Time per message	5 sec	4 sec	20 sec	10 sec	4 sec	120 secs recorded in sequence	5 sec	4 sec	5, 10, 20 sec	4 sec	variable
Message space	2 x 2"	knobs/ switches	5 x 8"	4 x 12"	3/4 x 7/8"	5/8"	depends on switch	3/4 x 7/8"	buttons/ switches	Any size taction pad	3/4 x 3/4" variable
Physical access options	*Direct*— touchpad	*Direct*— knob/switch *Scan*— vis/aud	*Direct*— touchpad	*Direct*— rocking plate	*Direct*— touchpad *Scan*— visual	*Direct*— touchpad or 12 switches	*Direct*— four switches	*Direct*— touchpad 1 or 2 switches	*Direct*— buttons; 3 switch-es	*Direct*— taction pad	*Direct*— touchpad *Scan*— visual

Digitized devices are easy to program, affordable and available. As a result, more people with AAC needs have speech output. Messages literally can be changed on the spot. Also, an individual's age, gender, dialect, language, culture and personality can be reflected; and people can choose the voice they will use.

While disadvantages are few, recorded speech is not likely to replace machine generated text-to-speech, particularly for those needing access to large vocabularies across multiple contexts and for literate users. Organizing vocabularies, overlays and recordings often is difficult. Recordings must be made carefully. Another difficulty arises when the chosen "voice/person" is not available.

Devices in Table III allow more recording time (at more cost). Some also permit a person to select "high-quality" or "extended" (somewhat poorer quality) speech. It is best to listen to the speech quality of a device to determine if it is satisfactory.

Maximum number of messages and time per message. Some VOCAs allow messages of variable length to be recorded in any location. Other VOCAs do not.

Message space. Dimensions of the space (square/circle) where messages are located and symbols can be placed, are important for those with motor and/or visual difficulties.

Access options. A variety of direct selection and scanning techniques are available.

Portability. Most VOCAs with recorded speech weigh less than 3 lbs. All VOCAs in Table III have carrying cases; some have straps. See page 7 for more information about portability.

Thirteen application ideas for simple VOCAs

VOCAs with several minutes to an hour of recorded speech can provide a range of communication options across multiple contexts. Simple VOCAs also can play an important role in a person's communication system. For those with limited language capabilities and those just being exposed to technology, simple VOCAs can be a sufficient choice and can significantly increase participation. For more sophisticated AAC users, simple VOCAs can be a *best solution* for some tasks. Ideas

Table III. Digitized Speech Devices Costing more than $500 US							
FEATURES *=additional cost	**ALPHA TALKER $1095 - 1990**	**DAC $3295**	**DIGIVOX $2150 - $2995**	**MACAW $1150 - 2295**	**PARROT $750**	**MESSAGE MATE 20 or 40 $599 - 999**	**WALKER TALKER $1195 - 1495**
Output time	3 - *25 minutes	18-*72 minutes	4.5-*35.5 min.	1- *8.5 minutes	32-64 secs	40 sec - *4 min	1 - *8 minutes
Max # of messages	variable	variable	variable	variable	16 recorded in sequence	variable	variable
Time per message	variable	variable	variable	variable	variable	variable	variable
Message space	32 locations 1"+ squares	128 locations 3/4" or 1" squares	48 locations 3/4"+ squares	32 locations 1 1/8"+ squares	16 locations 7/16" squares	20 or 40 locations	16 locations 3/4" squares
Physcical access options	*Direct*- touchpad, *optical pointer, *remote switch box *Scan*-vis/aud	*Direct*- touchpad *Scan*-visual	*Direct*- touchpad *Scan*-vis/aud	*Direct*- touchpad *Scan*-visual	*Direct*- touchpad & external switches	*Direct*- touchpad *Scan*- vis- 20 vis/aud - 40	Direct- touchpad
LCD Display	no	16 characters	16 characters	no	no	no	no
Language access option	Minspeak, icon prediction	Levels 1 - 4 Coding	Levels 1 - 4 coding/sequencing	Levels Coding	no	no	Minspeak
Language options	symbol, word, computer emulation	symbol, word, limited vocabulary spelling	symbol, word	symbols, word	symbol, word	symbol, word	symbol, word
Storage on disk	yes	yes	*yes	no	no	no	no
Carrying case	*yes	*yes	*yes	*yes strap on unit	*yes strap on unit	*yes	yes
Weight	2.2 lbs	8.5 lbs	3.8 lbs	2.7 lbs	13 oz	1.5 and 1.8 lbs	1.8 lbs

below are adapted from Smith and Walker's presentation.[2]

1. **Use the telephone.** To begin a phone conversation, use a *Cheap Talk*, "Hello, my name is ___. I have difficulty speaking. Please don't hang up on me. I use a computer with a speech synthesizer to talk. Please be patient."
2. **Make choices/requests.** In a lunch room, several people can use the *Speak Easy* to make choices, requests and comments.
3. **Improve self management.** Use the *Switch Mate 4* to help someone learn the steps to a task.
4. **Manage others.** Use the *Say It Switch* to enable a student who is mainstreamed to give directions for the spelling test.
5. **Participate in choral activities.** Use *CheapTalk* so a student can give a soliloquy in the class play.
6. **Meet and greet.** Mount *Say It Rocking* on a wheelchair for easy hellos and goodbyes.
7. **Initiate interaction.** To initiate interactions and raise the status of a user, program questions about a weekly current even into the *Lynx* "What do you think about the economy?"
8. **Tell jokes and stories.** *Use Switch Module 4* so everyone can share a joke.
9. **Relate experiences.** Share information in a fun/easy manner by sending *Switch Mate 4* back and forth from home to school or work.
10. **Follow daily schedule.** Use touch sensitive transparent adhesive microswitches (Taction Pads) attached to concrete objects with the *Voice Pal*. Try it as a calendar box.
11. **Deal with an emergency situation.** Put *Say It Switch* by the phone. Dial 911 and hit the switch. "I need help! My address is 1 Surf Way. Please call the police."
12. **Deliver goods and services.** Use *Voice Pal* attached to a cup to enable a severely involved student to collect the daily lunch count.
13. **Call for attention.** Use a *loop tape* to say, "Please come here."

Final Comments

Digitized speech is not the only improvement in AAC speech devices. Intelligible, text-to-speech synthesis allows people who are literate to say "anything." Text-to-speech gives people with visual impairments (and those who are unable to read because of learning problems) access to text. It provides feedback to those learning to write. DECtalk/MultiVoice and the Infovox are highly rated, intelligible text-to-speech synthesizers that can be plugged into computers (including AAC devices.) Male, female and children's voices are available in several languages. The *Dynavox*, *Liberator*, *Lightwriter*, and *Vois 160* have DECtalk built in.

Note: The Touch Talker and Light Talker offer built in DECtalk or built-in Infovox syntesizers as options.

Look for more devices to offer both digitized sound and synthesized speech like those listed in Table I.

Auditory Scanning

For individuals with severe visual and motor impairments, auditory scanning may be the only way to access language. What's auditory scanning? Saying "What did you do last night . . . Go to bed early?— watch TV?—go for a walk?" That's auditory scanning. In fact, *partner-assisted (or live-voice)* scanning may be our most widely used AAC strategy. Clinicians report auditory scanning techniques also are useful as a scaffold to visual scanning and for switch training.

An increasing number of AAC devices and communication programs now offer an auditory scanning option. The person listens as the device speaks and then hits a switch when a desired message is heard. An example of an interaction follows:

Waitress: How are you today?
Ann: Hits switch. Device says *Greetings, Comments, Waitress, Music.* It begins to repeat, *Greetings.* This time Ann hits the switch and hears, *Hello. Fine.* She hits the switch. The device says, *"I'm fine. How are you doing?"*
Waitress: I'm okay, what's new?
Ann: Hits switch and hears, *(again) Greetings, Comments, Waitress.* She hits the switch. *Menu, Order.* She hits the switch. The device says, *"I'm ready to order."*

Two major problems exist. First, items must be presented one at a time so access to vocabulary is limited and slow. A person may need to hit the switch multiple times for each message. Second, auditory scanning can be disruptive to others in the environment. Some characteristics to consider when selecting an auditory scanning device are summarized in Table IV below. Note: Information about features was adapted from Barker and Henderson's CSUN presentation.[4]

Language presentation: While initially someone may select from only 2 messages ("I want juice" "I want cracker"), the need to access more vocabulary occurs *real fast*. Thus, how language is organized and presented is important. *Branching* is a technique that allows users to navigate through multiple levels until they

Table IV. Features of Portable Auditory Scanning Devices (Adapted from Margaret Barker & Judy Henderson, March, 1994)

FEATURES shaded areas = + feature n/a = not applicable	Alpha-talker	Digivox	Dynavox	Ke:nx	Liber-ator	Macaw	Message Mate	Speak Easy	Speaking Dynam-ically	Talking Screen	Whisper Wolf
LANGUAGE PRESENTATION and AUDITORY STRATEGIES (Way device presents language auditorily and strategy options)											
Number of branches allowable	3	2	+3	+3	+3	2	2	0	+3	+3	2
Sequencing locations											
Auditory word prediction	icon		w/ Dyna write	w/Co-writer	icon				w/Co-writer		
VOICE OUTPUT (Whether speech output is digitized or synthesized. Whether device allows for two speakers—one for the user to listen to the scan and the other for the partner to hear the selected message. Whether voices heard by the user and partner are different.)											
Digitized/recorded											
Synthesized											
More than 1 voice option											
Personal speaker/earphone				n/a					n/a	n/a	
Vol control for ext. speaker Vol control for int. speaker				n/a n/a					n/a n/a	n/a n/a	
User volume control				n/a					n/a	n/a	
SINGLE SWITCH SCANNING OPTIONS (Type of scanning strategies available to user)											
Step or manual											
Automatic											
Inverse											
LANGUAGE PRESENTATION—VISUAL (Way device displays language visually)											
Symbols–Text	S,T	S,T	S,T	S,T	S,T	S,T	S,T	S,T	S,T	S,T	S,T
Display—Static											
Dynamic- mono											
Dynamic- color				optional					optional	optional	

find what they want to say. Goals are to get to the message, and limit the number of times a person must hit a switch. Correcting errors can be tedious, at best. In the example, Ann's first branch was a list of specific categories (*Greetings, Comments.)*. When she selected *Greetings*, a second branch of words within that category was presented (*Hello* and *Fine*). She selected the cue "Fine," and her message was spoken *"I'm fine. How are you doing?"* The concept of "branching" seems to underlie all language presentation strategies used in auditory scanning. Thus, when a device can *sequence locations* (coding, Minspeak, linking), the user selects a location, which automatically puts her in a branch linked to specific vocabulary. Auditory icon prediction means the device scans only those icons linked (or in the branch). True *auditory word prediction* is available in linguistic prediction word processing programs.

Number of branches. While some devices have 2 branches, others have an "unlimited number." It is useful, but often not possible to navigate back and forth through branches.

Kind of cueing. At the end of each branch, is a message. "Quick cueing" is a fast preview of options at any juncture of a branch. It prepares the user and reduces errors. "Message cueing" is a short version (single word) of the longer message, which is spoken as soon as the cue is selected.

Voice output. Characteristics of speech (type and quality) and how it is presented are important. Many prefer using two different voices and two speakers—one voice and speaker for the scan and a different voice and speaker for the message. Volume control of each is important.

External speaker (outside the device). This speaker allows the person to listen to the scan privately. It can be mounted on a headrest or in an earphone. Please note: Hearing can be damaged by loud sounds, particularly in an earphone. Change the noise level in the environment before automatically increasing the volume of a personal speaker.[5]

Internal speaker (inside the device). This speaker "says" the selected message.

Scanning Option. Most people use a single switch with automatic scanning. However, large vocabulary users with residual vision may want to try proportional controls (joystick, mouse).

Visual presentation. For persons with residual vision, the visual presentation of information is very important. Color is useful.

Final comments

Many devices and communication software provide auditory scanning options. Barker and Henderson[4] are identifying device characteristics. Buzolich and King[6] have carefully described approaches to assessment and intervention. We need more information about how to arrange vocabulary on today's devices and how to optimize auditory scanning.

Port-Ability

Today people who walk and don't talk can select from a variety of portable speech devices. For example, the *Walker Talker*, a computer and speaker worn around someone's waist, looks like a waist (fanny) pack, but delivers up to 60 recorded messages using a small 16 location touchpad.

Portability is a relative concept. It is relative to an individual's age, weight, manual dexterity, ambulation skills, and how they are likely to manage a device while walking. A person's characteristics can make any piece of equipment more (or less) portable. Important questions to ask in selecting a device are "What do you want it to do?" "Where do you want it to go?" and "How do you want to get it there?" Small, portable devices are not necessarily a person's only communication device. Many find them useful additions to their more powerful devices. They may be more effective in the car, for example. Table V gives examples of VOCAs weighing less than 3 lbs. (1360 gms). Some are text-based and have small keyboards. People can type messages and retrieve a limited number of stored messages that can be spoken. These devices have speech synthesizers. Many have at least some text-to-speech capability. An exception is *Finger Foniks*, which combines phonemes to produce speech. Light-weight devices for people who use graphic symbols also are listed. See Tables II and III for a more complete description.

Table V. Portable Devices (less than 3lbs/1360gms)

DEVICES	WEIGHT	SPEECH
TEXT		
Canon	18.5 oz.	
Crestalk	9.0 oz.	All use
Finger Foniks	12.2 oz	synthesized
Franklin	2.7 lbs.	speech
Lightwriter	1.8 lbs.	
Say It All	2.3 lbs.	
Secretary	2.0 lbs.	
SYMBOLS		
Alphatalker	2.8 lbs.	
Digivox	2.1 lbs.	All use
Macaw	2.7 lbs.	digitized/
Message Mates	1.8 lbs.	recorded
Parrot	13 oz.	speech
Walker Talker	2.0 lbs	

When making decisions about devices that will be carried by an individual, those interviewed suggest we consider the size, weight, battery-life, availability of a carrying case, ruggedness, attractiveness, desired vocabulary size, positioning on the person's body, effect on an individual's weight distribution, and the nature and orientation of the display.

Your Resources

Peggy Barker, Lucile Salter Packard, Children's Hospital-Stanford, 5200 Sand Hill Rd., Palo Alto, CA 94304

Bill Forde, Phonic Ear Co. 3880 Cypress Drive, Petaluma, CA 94954

Gordon Harris, Gus Communications, Inc., 3838 W. King Edward Avenue, Vancouver, BC Canada V6S-1N1

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Walter Woltosz, Words+ Inc., 40015 Sierra Highway, B-145, Palmdale, CA 93550

References

[1] Woltosz, W. (submitted for publication) *Dynamic Displays: the Changing Face of Augmentative Communication.*

[2] Smith, L. and Walker, A. *Functional applications of simple voice output communication aids.* Presented at CSUN Technology and Persons with Disabilities Conference, Los Angeles, CA, March, 1994.

[3] Larry Weiss (March 1994). Personal communication.

[4] Buzolich, M. & King, J. *Auditory Scanning: Communication for the visually impaired AAC system user.* Presented at the ISAAC Biennial Conference, Philadelphia, PA, August, 1992.

[5] Beth Sinteff (April, 1994). Personal communication.

[6] Barker, P. & Henderson, J. *Auditory scanning device characteristics.* Presented at CSUN Technology and Persons with Disabilities Conference, Los Angeles, CA, March, 1994.

Table VI. Companies and Devices LISTED IN THIS ISSUE

Device	Cost $	Dimensions	Rental	Warranty
AbleNet, 1081 Tenth Avenue S.E. Minneapolis, MN 55414 USA (1-800-322-0956) FAX 612-379-9143				
Speak Easy	$365	6.4 x 8.3 x 2.9	Tech training	1 year
ACS Technologies, Inc. 1400 Lee Drive Suite 3, Coraopolis, PA 15108 (800-227-2922) FAX 412-269-6675				
DAC	$3295+	16 x 12 x 2"	$100 wk	1 year
Adamlab, 33500 Van Born Road, Wayne, MI 48184 USA (313-467-1610) FAX 313-326-2610				
Lynz *Whisper Wolf*	$250 $450	5 x 5.3 x 2.6" 14.5 x 9.5 x 1.2"	30 day trial	no charge for most repairs
Adaptech, Inc., ISU Research, 2501 N. Loop Dr., Ames IA 50010 USA (800-723-2783) FAX 515-296-9910				
Voice Pal	$424	6 x 3.6 x 1.6	15 day loan	120 days
Crestwood Co., 6625 N. Sidney Pl., Milwaukee, WI 53209 USA (414-352-5678) FAX 414-352-5679				
Canon 7S *CRESTALK* *Talk Back III*	$1100 135 $275	7 x 4.2 x 1.5" 3.5 x 8.3 x 1"	no no no	1 year 1 year 6 months
Don Johnston, Inc., 1000 N Rand Rd, Bldg 115, POBox 639, Wauconda IL 60084 USA (800-999-4660) FAX 708-526-4177				
Ke:nx *Talk-About*	$780 $490+	n/a n/a	no no	1 year n/a
Franklin Learning Resources 122 Burrs R, Mt. Holly, NJ 08060 (800-525-9673) FAX 609-261-1631				
Speaking Language Master Special Edition	$450+	5.6 x 5.6 x 1"	no	1 year
Gus Communications, Inc., 3838 W. King Edward Ave, Vancouver, BC CANADA V6S-1N1 (604-224-6699) FAX 604-224-5516				
Gus version 4.0	$795	n/a	no	n/a
Innocomp, 25210 Emery Rd, #302, Warrensville Hgts, OH 44128 (800-382-8622) FAX 216-464-3638				
Say It All	$1995	15 x 7 x 1.5"	$300 45 days	1 year
Mayer-Johnson Co., P.O. Box 1579, Solana Beach, CA 94075 (619-550-0084) FAX 619-550-0449				
Speaking Dynamically	$299	n/a	no	n/a
Phonic Ear Co., 3880 Cypress Drive, Petaluma, CA 94954-7600 (800-227-0735) FAX707-769-9624				
Vois 160	$4,352	3.18 x 16.50" x 8.9"	$50 wk	1 year
Prentke Romich Co., 1022 Heyl Road, Wooster, OH 44691 (800-262-1984) FAX 216-263-4829				
Alpha Talker *Liberator* *Walker Talker*	$1095+ $7345 $1195	13.8 x 8.3 x 2.3" 13.8 x 10.4 x 3.8" belt 13.4 x 2.7 x 1.4"	$100 month $400 month no	1 year 1 year 1 year
Sentient Systems, Inc., 2100 Wharton St, Ste 630, Pittsburgh, PA 15203 (800-394-1778) FAX 412-381-5241)				
Dynavox *Digivox*	$4495+ $2150+	13.2 x 10.9 x 3" 11.6 x 8.8 x 1.8"	$50 wk $35 wk	1 year 1 year
TASH, Inc. Unit 1, 91 Station St., Ajax, Ontario, L1S 3H2, CANADA (905-686 4129) FAX 905-686-6895				
SwitchMate 4: *ScanMate 4*	$360 $385	3 x 2.6 x 1.6" 3 x 2.6 x 1.6"	no no	1 year 1 year
Tolfa, 1001 N. Rengstorff Ave. Mt. View, CA 94043, USA (415-494-3220) FAX 415-390-9593				
Lingraphica	$5950+	2.25 x 11.25 x 9.3"	not direct	Lifetime
Toys For Special Children 385 Warburton Ave, Hastings-On-Hudson, NY 01706 USA (800-832-8697)				
Say It Switch Plate, *Say It Rocking* *Cheap Talk 4* *Switch (module 4)*	$40 $50 $69 $45	9.6 x 7 x 14" 14 x 5.6" 8 x 8" 6 x 3 x 2.3"	no no no no	no no no no
Words+ Inc., 40015 Sierra Hwy, B-145, Palmdale, CA 93550 USA (800-869-8521) FAX 805-266-8969				
Finger Foniks *Message Mate 20/40* *System 2000* *Talking Screen/EZ keys*	$995 $499+ $6240 $1395	1.3 x 3 x 7.3" 11.7 x 1.3 x 3/4" 12.4 x 8.6 x 1.6" n/a	short loan short loan no short loan	1 year 1 year 1 year free upgrades
Zygo Industries, P.O. Box 1008, Portland, OR 97209 USA (800-234-6006) FAX 503-684-6011				
Lightwriter *Macaw* *Parrot* *Secretary*	$895+ $1150+ $750+ $2295	8.4 x 5.1 x 2" 8.5 7.8 x 2" 5,2 x 4 x 1,5" 9.7 x 6 x 1.9"	$50+ wk $150 month $75 month $230 month	1 year 1 year 1 year 1 year