View Control System™
for the Apple Macintosh Computer

Installation and Operation Manual

Personics Corporation

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Introduction

You're about to experience a whole new way of commanding your Macintosh. A way that is faster, easier, and more convenient than the Mouse. A way that will keep your hands on the keyboard as you move the cursor, and free up valuable desk space now consumed by the Mouse.

The VCS performs the same function as the Mouse, but with an entirely new technology: the VCS moves the cursor where you look on the screen. When you look to the right, the cursor moves right. When you look down and to the left, the cursor moves accordingly.

The VCS measures changes in the rotation and angle of the Headset and translates these movements into cursor commands. Since your head and eyes work together instinctively as you direct your vision, the VCS is a natural extension of the viewing process. No exaggerated head movement is required. You'll find that the VCS positions the cursor as accurately as the Mouse and lets you keep your hands on the keyboard. No more reach, grab, roll, click, and return. With the VCS, you will simply look and click.

The VCS consists of the Headset, Button Pad, and Control Unit as shown at left installed on the Macintosh. The Control Unit is placed on top of the Macintosh and the Button Pad is clipped to the keyboard immediately below the space bar. The Headset and Button Pad are connected to the Control Unit with flexible cables.

The Headset allows you to move the cursor by viewing rather than rolling the Mouse around on your desktop. The Button Pad lets you execute "clicking" and "dragging" directly from the keyboard rather than using the Mouse button. The Control Unit serves as the central processor for the VCS. If you wish, you may connect your mouse and VCS to the Macintosh at the same time, and use them interchangeably.

How The VCS Works

Personics has developed a proprietary ultrasonic technology for the VCS. Three ultrasonic transducers housed in the Headset receive a signal transmitted from the Control Unit. By comparing the signal received at three points on the Headset, changes in the angle and rotation of the head are tracked. The Control Unit takes measurements of the Headset position hundreds of times per second to detect the slightest change in relative position. These changes are electronically translated into quadrature signals just like those received by the Macintosh from the Mouse.

The transmitted signal is sound, at a frequency well above the audible range. Ultrasonic technology is currently used in a variety of consumer products, including remote controls, burglar alarms, and auto-focus systems for instant cameras. Personics has refined the use of ultrasonics for precise measurement of angular displacement. The VCS is the first application of the Personics technology, adapted especially for the Macintosh.

A remarkable feature of the Personics technology is that it does not restrict your motion. You can move freely in your chair. Sit forward or back. Rock from side to side. Adopt any posture that is comfortable. The signal from the Control Unit can reach the Headset from a range of distance and angles. Only rotational head motion is tracked. All other movement is ignored.

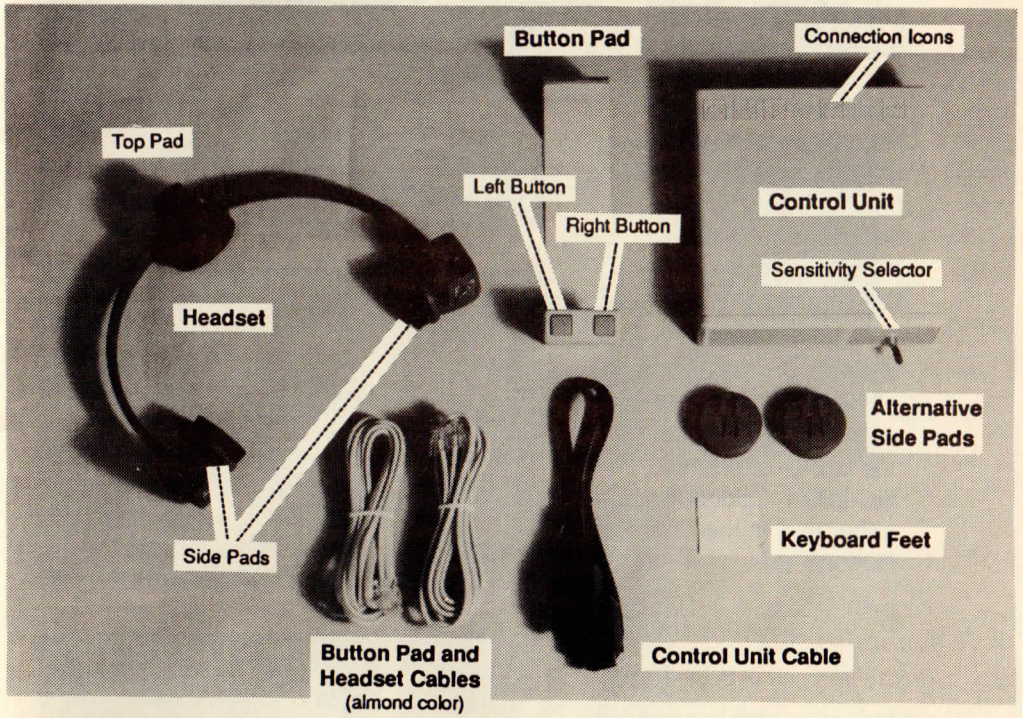
The VCS uses sophisticated algorithms to translate head rotation into cursor movement commands. The VCS does more than simply track where you look on the screen. It measures the rate at which you look from one spot to another. By monitoring this rate, the VCS can tell whether you are moving slowly to zero in on a small target, or moving more quickly across the full width of the screen. In either case, the VCS automatically adjusts to give you the right amount of head-to-cursor translation. This rate-dependent translation is crucial in providing pin-point accuracy and comfortable ease of use.

The VCS works with any 128K or 512K Macintosh and off-the-shelf software. No hardware or software modifications are required to use the VCS. Just plug it into your Macintosh and you're ready to go.

Setting Up The VCS

VCS Components

The VCS packaging should contain all of the parts shown below.

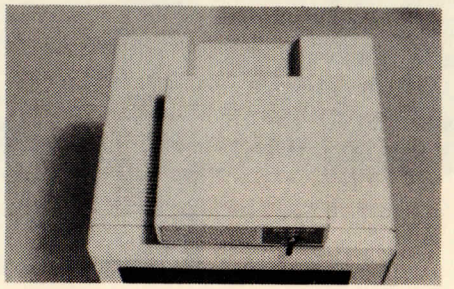


VCS Installation on the Macintosh

The VCS will take just minutes to install. Before getting started, be sure your Macintosh is plugged into a grounded outlet (3-prong).

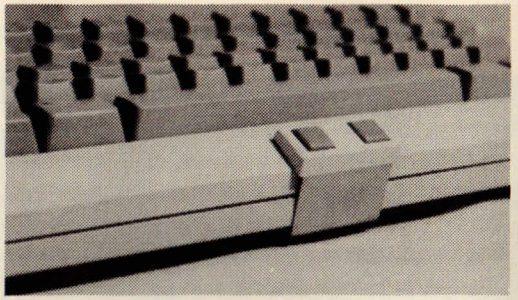
Step 1 - Switch the Mac power off, and disconnect the Mouse.

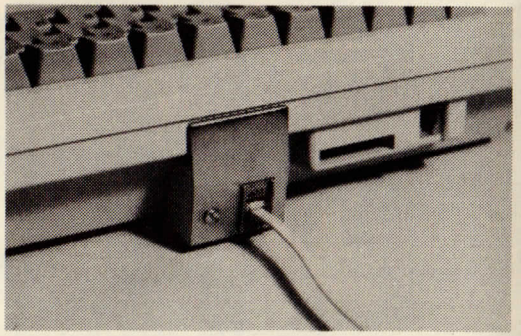
Step 2 - Place the Control Unit on top of the Mac between the vents and in front of the handle.



Step 3 - Adhere the VCS Keyboard Feet to the underside of the Mac keyboard. Place them on top of the keyboard's own feet.

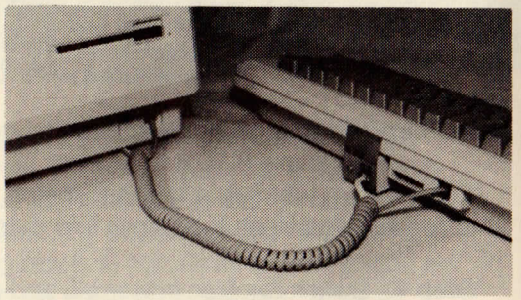
Step 4 - Clip the Button Pad onto the Mac keyboard. First, place the front of the Button Pad (with the two keys) below the space bar. Then secure the back of the Button Pad by fitting the teeth of the metal bracket into the groove of the keyboard.



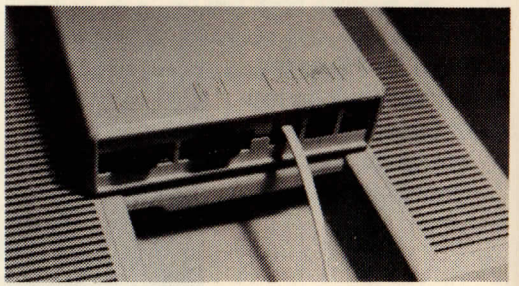


Step 5 - Select one of the almond-colored cables. (Stretch out the cable to remove its kinks.) Connect either end to the Button Pad.

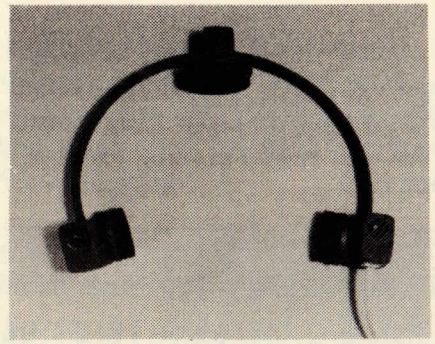
You may wish to wrap the coiled keyboard cable of the Mac around the Button Pad cable, as shown.



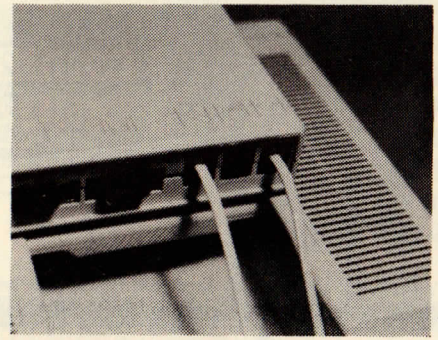
Run the cable under the Mac to the back of the Control Unit. Connect it to the port marked with the Button Pad icon.



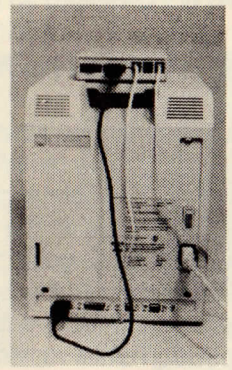
Step 6 - Stretch out the kinks of the other almond-colored cable. Connect one end to the left or right side of the Headset, whichever you prefer.



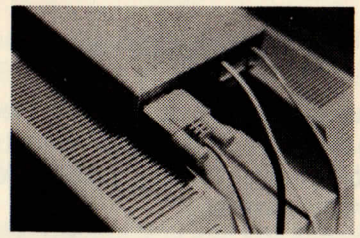
Connect the other end to the Control Unit port marked with the Headset icon.



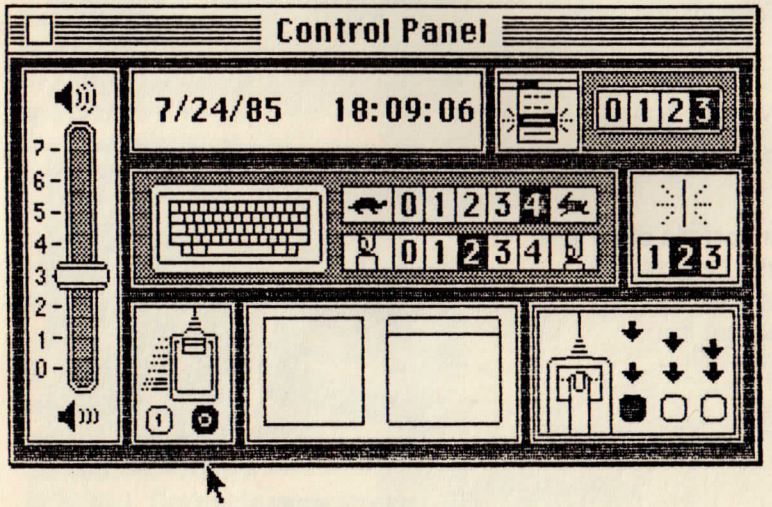
Step 7 - Connect the female end of the black cable to the Mouse port on your Mac. Connect the male end to the port of the Control Unit marked with the Mac icon.



Step 8 - optional
Connect the Mouse to the Control Unit port marked with the Mouse icon.



Step 9 - Power on the Mac. Load a workdisk such as MacWrite. Using the Mouse on your desktop, open up the Macintosh Control Panel in the Apple pull-down menu, and set the Mouse Tracking speed to "0."



Positioning Yourself in Front of the Macintosh

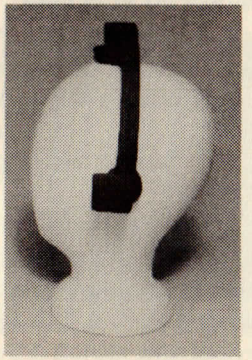
The VCS does not require that you sit in a fixed position centered to the Macintosh screen, or that you move only your head. You can position yourself in any comfortable and relaxed position. Sit close to the Mac, or further back. Lean to the left or to the right. The VCS measures only changes in the angular position of the Headset caused by rotational movement of the head. It does not matter where your head is positioned relative to the screen. You may even change your sitting position while moving the cursor.

Wearing and Adjusting the Headset

Unlike stereo headphones, the VCS Headset does not have to rest on your ears. Instead, it rests comfortably above or in front. A comfortable position for long sessions is directly above the ears away from the temples.

Position the Headset with the front pointing toward the Control Unit on top of the Mac. (The front of the Headset is distinguished by the

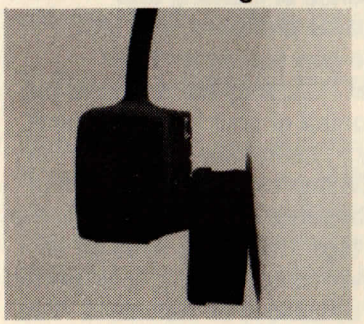
grille pattern covering the transducers housed in the Headset.) Some hair in front of the transducers will not affect the normal performance of the VCS. However, if the Top Pad of the Headset is too far back on your head, as shown below, the signal from the Control Unit will not reach the top transducer.



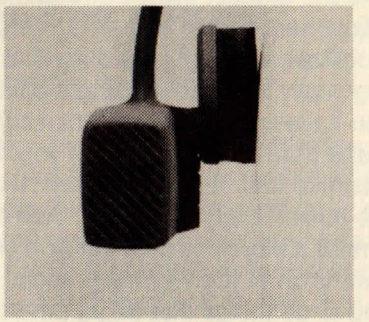
Correct Position

Incorrect Position

You can adjust the position of the Side Pads along their brackets (up for smaller head sizes and down for larger head sizes). Even smaller head sizes can be fit by removing the Side Pads from the brackets and rotating them 180°.



Largest Head Size



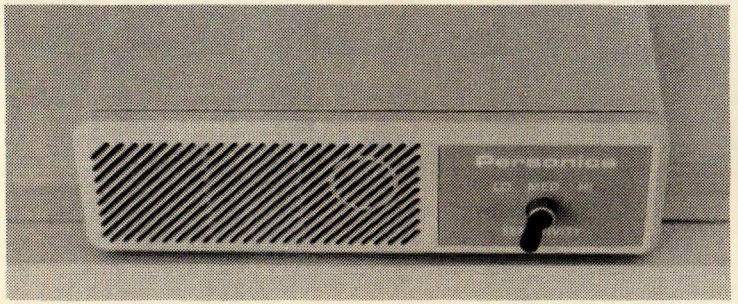
Smallest Head Size

If the Headset feels too loose, try the Alternative Side Pads which have slightly thicker pads. Experiment to find a comfortable fit.

Selecting the Sensitivity Setting

The Sensitivity Selector on the Control Unit lets you adjust the amount of cursor motion that results from a given amount of head motion. This feature is discussed in detail later on.

To make learning the VCS easy, start by setting the Control Unit to LO. Cursor movement is slower at this setting, and is less affected by the rate of head motion. You will quickly graduate to the more sensitive settings as you become an experienced VCS user.



Learning To Use The VCS

Like the Mouse, the VCS requires a period of learning and adjustment before first-time users become proficient. The VCS mobilizes a part of your body that up to now has never been physically involved in using a computer. You may not realize it, but you have very good neuromuscular control of your head and neck, better than any other part of your body. That makes the VCS a very effective tool. Like most tools, the VCS serves as an extension of the human body and mind. Just as a hammer is an extension of the arm or a bicycle is an extension of the legs, the VCS serves as an extension of the viewing process. When used skillfully, tools permit you to do things that might otherwise be difficult or inefficient. You take time to develop skill in the use of tools because they improve your capability.

Using the VCS will feel a bit awkward at first, just like the Mouse when you first sat down with the Mac. Moving the cursor by viewing is a totally new concept, and will require a new set of skills. But learning will be easy and fun, and you will grasp the VCS very quickly. After 20 to 30 minutes of experience, you will manipulate screen objects with ease. You'll continue to improve and refine the skill with the first few hours of use until moving the cursor with the VCS will be second nature.

Moving the Cursor with the VCS

I. Engage the Headset for cursor movement by touching the Right Button on the Button Pad.

When using the Mouse, the cursor doesn't move on the screen unless you take hold of the Mouse and move it on the desktop. The VCS operates in a similar way. When you want the cursor to move, touch the Right Button. If you aren't touching the button, free head movement will not result in cursor activity.

The Right Button is touch-sensitive, much like an elevator button or the control panel of an appliance. You don't have to press it; just touch it lightly. Simply resting your right thumb on the button will engage it. Keep your thumb or finger resting on the button as you move the cursor with the Headset.

2. Move the cursor on the screen by "viewing".

Look directly at the cursor. With the Right Button engaged, move the cursor around the screen with head motion. For now, don't press the Left Button. Just try to get the feel of moving the cursor with the Headset. Move up and down, side to side, etc.

3. Maintain a natural and comfortable head position.

With the Mouse, you sometimes run out of room on the desktop. When this happens, you lift the Mouse and put it down again where you have more room. Lifting the Mouse doesn't move the cursor. The VCS has a similar feature. If you want to reposition your head relative to the cursor, simply release the Right Button, reorient your head to a comfortable position, then touch the Right Button again.

4. Use the Left Button exactly like the Mouse button for clicking and dragging commands.

The Left Button performs exactly like the Mouse button. You will even feel and hear a distinctive "click" when the button is engaged. Located below the space bar, both of the Button Pad keys may be touched or clicked with the thumbs, while allowing you to keep your fingers on the "home keys." The Button Pad has a low-profile design which will not interfere in any way with normal operation of the Macintosh keyboard.

Mastering The VCS

Using the Sensitivity Settings

The VCS lets you do do everything the Mouse can do, from moving quickly across the entire screen to selecting an individual pixel. With the VCS, you are able to move clear across the screen with very little head movement -- just a quick glance. But you can also zero in on a small target with ease and comfort.

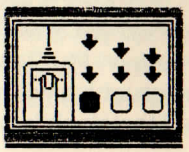
The key to doing both lies in mastering the MED and HI settings on the Control Unit. These settings measure not only the amount of head motion, but the *rate* with which you move your head. Head motion is translated into a greater amount of cursor movement when you glance quickly than when you slow down to approach a target.

Let's say you are using MacWrite, and the cursor is in the lower-right corner of the screen. You want to jump to the upper-left and insert the cursor between two letters of a word. You would move your head quickly to get the cursor across the screen. As you come close to the word, you would begin to move your head more slowly to insert the cursor exactly where you want. It is more difficult to describe than it is to experience. The best way to see how this works is to try it. Once you've mastered the MED and HI settings, you should never find your head in an uncomfortable position.

Changing the Macintosh Control Panel Settings

The Control Panel lets you set your preference for MouseTracking and Double-Clicking Speed. Because the Mac thinks the VCS is the Mouse, these controls also affect tracking of the Headset and double-clicking speed of the Left Button on the Button Pad.

The "0" setting for Mouse Tracking keeps the cursor speed constant with Mouse movement. The "1" setting is sensitive to velocity just like the MED and HI settings on the VCS. Changing the Mouse Tracking setting from "0" to "1" will have the effect on the VCS of giving you even greater acceleration of the cursor. After some experience on the "0" setting, try the VCS with Mouse Tracking set to "1" for even greater cursor speed.



Constant-On Mode

Ordinarily, the cursor remains at rest on the screen until you touch the Right Button. You may prefer for the Headset to be constantly activated, eliminating the need to touch the Right Button while moving the cursor.

To put the Headset in constant-on mode, you must have the Mouse connected to the VCS Control Unit. Click the Mouse button while holding down the Left Button on the Button Pad. Repeat the procedure to return to the normal mode. While in constant-on mode, touching the Right Button stops the cursor (just the reverse of the button's normal function).

Scrolling with the VCS

To scroll text continuously on a line by line basis, you activate the scroll arrow on the top or bottom of the scroll bar. With the VCS, position the cursor on the scroll arrow, then release the Right Button. Use the Left Button to activate the scrolling. The cursor will now remain on the scroll arrow while you move your head freely to review your document.

Selecting Text with the VCS

A comfortable and convenient way to select text is with the "Shift-Click" function. To Shift-Click:

1. position the cursor at the beginning of the text you wish to select and click the Left Button.

2. position the cursor at the end of your selection.

3. while holding down the Shift Key on the Macintosh keyboard, click the Left Button again.

This technique is particularly useful for making long selections, where Step #2 above is accomplished using the scroll bar or scroll box rather that dragging through the text line by line. When selecting individual words in a MacWrite document, position the cursor anywhere on the word and double click. You may find this easier than dragging the cursor through each individual character.

Warranty

Personics warrants the View Control System against defects in materials and workmanship for a period of one year from the date of original purchase. If you discover a defect or if your VCS should require service, call Personics toll-free:

Nationwide: 800-445-3311
Massachusetts: 800-447-1196

Personics will repair or replace it at no service charge to you. (You pay only the cost of sending your VCS to us. We pay the return postage.) This warranty does not apply if the product has been damaged by accident, abuse, misuse or misapplication, has been modified without written permission of Personics, or if any Personics serial number has been removed or defaced.

If your VCS should require service beyond the warranty period, call our toll-free number for information on repair procedures and charges. You can also call us if you have any questions about the VCS, or would like to order additional units or components.

Personics is in business to serve you. We would like to hear about your experiences with our product. Please let us know how we can improve this documentation, or the product itself.

Technical Support

The VCS is based on phase-tracking technology invented by Keith Davison of Personics Corporation. The concept and implementation are proprietary to Personics. Patents on the technology are pending.

The VCS is an "open" system: we will tell you what its external characteristics are, how it is built, and how it works.

The ultrasonic frequency is 40 KHz. The Control Unit contains a computer, based on the 6502. Low-power CMOS circuitry is used. In fact, the VCS uses less power than the Mouse itself!

To obtain further technical information, write us a letter:

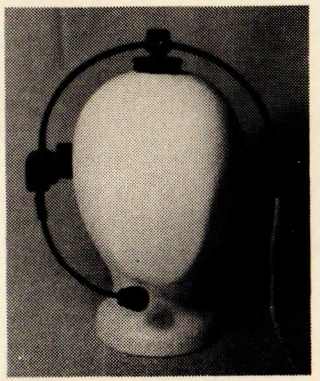
Personics Corporation
2352 Main Street, Building 2
Concord, MA 01742
Attn: Technical Support.

Tell us who you are, what your level of expertise is, what you think you would like to know, and why you want to know. We will do our best to be helpful.

Personics plans to support and enhance the VCS technology in the future with several voice upgrade products. Speech recognition is a natural partner for the VCS. Together, these technologies can provide a powerful new mode of interaction with the computer - - viewing and vocalization. Imagine entering spreadsheet data by looking at a cell then speaking the entry!

Speech is an efficient and increasingly popular means for entering simple data and commands. But it is a poor way to position the cursor. Cursor control is a spatial exercise which is not easily put into words. Voice commands such as "move forward 7 and up 13" or "45 pixels left and l82 pixels down" are clearly less convenient that simply viewing with the VCS.

Personics has designed the VCS for easily modular upgrade to speech recognition. A microphone will plug into the open Headset connector. The Control Unit has an open port (labelled with a speech icon) to route the speech signals from the Headset to a separate Speech Unit.



Personics also plans to make available a telephone microphone/ earphone assembly which will plug into the Headset. VCS users will be able to operate the computer while talking on the phone, leaving their hands free to enter data on the keyboard.

The VCS is dedicated to the memory of Don Davison.