CAPE SYSTEM
Directions-for-Use
Software Version 2.2

CHAPTER 1

Installing CAPE

1.1 HARDWARE INSTALLATION

Caution:
The supplied CAPE printed circuit board is susceptible to electro-static discharge damage when handled. Please use precautions when installing the board.

1) With power off, remove cover from computer. Please refer to computer system's instructions if not familiar with the procedure.

2) Locate an empty slot. On AT (or above) class machines, either a 8 or 16 bit slot is compatible with the CAPE board. However, the slot must be at least 3/4 length.

3) Remove protective backing plate from the slot and install board.

4) Replace the computer system's cover.

5) Attach the DB-25 cable supplied with CAPE to the back of the board and to the connection box.
   Note: The DB-25F connector on the CAPE board is similar in appearance to a parallel port found on many computers. Please make sure that the proper connection is made to the CAPE connection box.

1.2 SOFTWARE INSTALLATION

The CAPE software consists of 18 high density 3.5" disks. Each data file requires approximately 400Kb of disk space. The user will be given a choice of which files to install onto the hard disk based on the type of waveforms desired. The following is the breakdown of space required for CAPE installation:

Program Files & Necessary Data "Core files"	1 Mb
Each Data File	0.4Mb
Complete Installation (50 Data files)	21 Mb

To run the install program, insert the INSTALLATION (#1) diskette into the appropriate drive and type:

```
B:                    (assuming installation drive is B:)

install
```

The 'install' program will first verify the drive from which the installation is being done.

Installation source [B:] :

Press return to confirm that installation drive is B: The destination directory is by default \CAPE on the C: drive, however, the user can change that at the next prompt:

Installation destination: [C:\CAPE]

Press enter to confirm the default destination. The install program will now check the space availability on the destination drive you have selected. If free space on the hard disk is not sufficient to copy all files a message will be displayed indicating how many data files will fit in the available space.

The next screen will ask if essential program and data files ("core files") should be copied. These files will only need copying when no previous copy of CAPE has been loaded into selected directory or when upgrading from an older version of CAPE.

1.2.1 SELECTING DATA FILES

A list of data files will be displayed on the screen for selection of the desired types of waveform types. To aid selection, a brief description of waveform conditions found in each file will be

```
.
.
7       file7    Normal Sinus Rhythm
8       file8    Ventricular Tachycardia
9       file9    Bradycardia, .....
.
.
```

The user will be presented with the following choices of selection:

S	Single file
A	Load All files listed on the screen
N	Load None of the files, go to next screen
E	Exit the Install program

Selecting single files can also be accomplished by typing in the numbers as listed in the leftmost column. The numbers must all be on one line separated by space.
The following example will load data files 12,13, and 18:

Enter Choice: 12 13 18

The installation is complete when the user has reviewed, and optionally loaded, all 50 files or exited from the above menu using the 'E' option.

1.3 GENERAL CONFIGURATION HINTS

1.3.1 MOUSE

The CAPE software requires a Microsoft-compatible mouse. The mouse driver can be loaded from the DOS prompt each time CAPE is invoked, or can be placed in the system's *autoexec.bat* or *config.sys* configuration files for automatic loading at startup. Below is an example of a Microsoft-compatible mouse driver being automatically loaded at startup. Refer to system's manuals for detailed information on how to install a mouse.

File: c:\autoexec.bat

```
.
.
prompt $p$g
c:\mouse\mouse.com
.
.
```

1.3.2 CACHE

The CAPE software requires 512Kb of free RAM in conventional memory. However, to improve performance, it is recommended that a disk cache of approximately 1Mb be set up in the extended memory. This cache speeds repetitive disk reads making the output of CAPE smoother. There are numerous ways to set up a cache depending on which version of DOS the computer is running. Below is an example of a typical configuration file setting up the computer to use a cache of 1Mb under MS-DOS 5.0. Refer to MS-DOS manuals for detailed information on how to install a cache.

File: c:\config.sys

```
device=c:\dos\himem.sys
device=c:\dos\smartdrv.sys 1024 256
files=20
buffers=20
.
.
```

1.3.3 DISPLAY

The CAPE software is compatible with CGA, EGA and VGA graphics displays. By default, the software will use the color mode which may not provide a sharp image on some monochrome monitors, especially those found on many lap-top computers: (LCD, Gas Plasma displays). Although the color definition is fixed for each of the software screen objects, an improvement may be seen if the software is switched to a monochrome mode. To switch CAPE to a monochrome mode follow this procedure:

In CAPE's directory (i.e. C:\CAPE) invoke a DOS editor. An example of a DOS editor could be 'edit' in DOS 5.0 or 'edlin' in previous DOS versions. In the editor, call up file named: 'colormap'. The file will contain number 16, representing maximum of 16 colors available to the CAPE software. To change to a monochrome display, change the number 16 to 2 and save the file.

CHAPTER 2

Running CAPE

After program installation, the user can run CAPE. Since the install program leaves the user in the *C:* directory, the user must switch to the directory chosen for CAPE software. If the default destination, type at the DOS prompt:

```
cd \CAPE
```

And to invoke the CAPE software:

```
CAPE
```

An introduction screen will appear and remain displayed for approximately 4 seconds. The user can press <ENTER> to immediately proceed to the next screen. The software will immediately calibrate its delay mechanism to make the output of CAPE correspond to real-time.

This process will take approximately 20 seconds. As a result the program will store a default "delay" value which is used to calibrate the output of waveforms to real time. This delay can be manipulated manually for fine tuning. See "Output Speed" for further details. This calibration will only be done the first time CAPE is invoked or on request.
A help screen describing CAPE's basic commands will appear next.

2.1 BASIC COMMANDS

All commands to CAPE are issued through a mouse. No menu or object selection is possible through the use of a keyboard. The basic concepts of issuing commands are summarized below:

To select waveforms

Left Mouse Button
- Click on top bar to activate window
- Click again for menu
- Click on menu selection

Right mouse button
- Click to cancel menu selection

To begin playback

Click on top bar with left mouse button

To stop playback and freeze waveforms for analysis

Click on waveform area with left mouse button
Position vertical cursor over desired point and read value from display panel on left portion of screen

2.2 MENU SELECTION

To select a menu, click on the top bar. The cursor will change from a pointer (or crosshair) to the highlighted selection bar and the box with the next level menu will appear. Use the left mouse button to go forward in the menu tree, right button to go back in the menu tree.
To load a sample data file, choose the 'Select Epoch' menu choice, followed by 'Arrhythmia', 'Normal Sinus Rhythm', 'Waveform File7'. CAPE will load file7, patient waveforms will appear on the screen.

The user can play a loaded waveform file by clicking the left mouse button on the top bar of the window. By clicking again on the top bar of the window, the user will stop the playback of the waveform file and the 1st level menu will appear again. Once a waveform file is being played back, the user can also click on the waveform part of the screen. Clicking outside the top bar, i.e. on the waveform screen, will halt the playback of the waveforms. The waveforms will be frozen on the screen and a 'crosshair' cursor will appear.

2.3 OUTPUT SPEED

The output speed is estimated by CAPE to approximate real-time. However, depending on specific computer hardware that the software is running on, the speed may need adjustment. The following procedure is suggested to fine tune the output speed of CAPE.

1) Load 'zerocal' which is available through the 'Select Epoch' second level menu.

2) Attach all system components, including a patient monitor to the CAPE connections box.

3) Set up patient monitor to read lead I of ECG.

4) Play zerocal by clicking the left mouse button on the top bar of window.

5) Observe patient monitor for ECG rate readout. The rate should be 150 bpm.

6) CAPE's speed is controlled through a 'delay' variable which is adjustable by the user. If the ECG rate as read by the monitor is above 150 bpm, the 'delay' would have to be increased. If the ECG rate is below 150 bpm, the 'delay' will have to be decreased.

7) Adjust the 'delay' variable through 'Special Functions', 'Adjust Scan Speed' 'Custom' menu choices. Before change, note the default value that CAPE estimated. For example on a 80386 machine, that value should be around 2500. To increase the scan speed, decrease the 'delay' value.

8) After the scan 'delay' adjustment, CAPE will automatically resume playback of 'zerocal'. Repeat steps 5 through 8 to arrive at 150 bpm readout on the patient monitor.

9) After the 'delay' value has been determined, the user may make that value the new default, so that this procedure won't have to be repeated the next time CAPE is used. To make the 'delay' value the new default, the user must first exit from CAPE program, then, from the DOS prompt run program: SPEED. 'Speed' will print out the old default value as it existed before adjustments, then prompt the user to input the new value. Type in the new value and press 'enter'. A confirmation line should appear, telling the user the new 'delay' value was saved properly.