Tools of the Trade

The tool palette, on the left side of the task window, is used to switch modes of operation within BugLite. The current active tool is highlighted (inverted). Clicking on a tool will make it the current tool. The seven tools (from top to bottom) are shown in this section.

ARROW tool; used to select objects to position them on the screen and connect objects.

TASK tool; used to create a task.

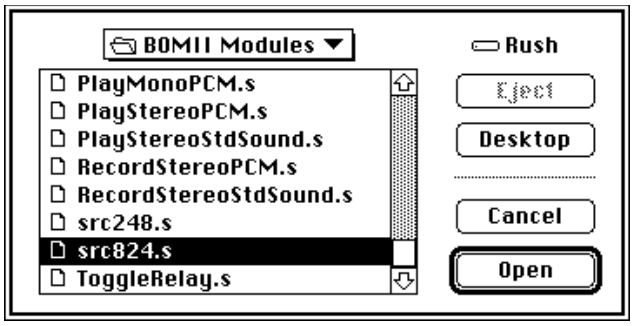
The task tool creates one task. Clicking anywhere in a task window will prompt you for the task name and add the new task to the window. The task can be moved around and connected to modules with the arrow tool.

BugLite supports multiple tasks within the task window.

MODULE tool; used to open a module resource file. The standard file selection box will ask for the file to be opened.

The module tool creates one module. Clicking anywhere in a task window will prompt you for the module resource file to open, as shown in Figure B-2.

Figure B-2 Open File dialog box



Normally a module resource file is created using the following steps:

1. **Use the MPW editor to create the DSP3210 source code (example:** `Reverb.s`**)**
2. **Use the** `d32asm` **script to build the resource and put it into the source file:**

   `d32asm Reverb.s Reverb.s` Builds resource and puts it back into the source file

INPUT tool; creates an object that provides access to the stereo sound input stream. This icon must then be connected to the appropriate input AIAO section. The data stream is 3210 floating-point numbers.

OUTPUT tool; creates an object that provides the ability to sum a signal into the stereo output stream. This icon must then be connected to the appropriate output AIAO section. The data stream is 3210 floating-point numbers.

DISK RECORD tool; used to create a new AIFF disk file that can be connected to a FIFO section to store data.

DISK PLAY tool; used to open an existing AIFF file that can be connected to a FIFO section for data input.

All objects in the task window have one or more triangular *nibs* ( ) associated with them. Nibs on the right side of an object are considered output and nibs on the left side are considered input. Two objects are connected by connecting their nibs with the arrow tool. These are the current valid connections:

- Task to module: installs module into task.
- Module to module: installs second module into task.
- Section to section (both sections have same data type and size): allows section data to be shared between two modules.
- Sound input to AIAO: provides real-time data acquisition from the built-in microphone.
- AIAO to speaker output: provides real-time data playback to the built-in speaker.
- AIAO section to disk object: provides access to data on disk or saving data to disk.

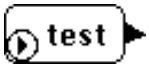
Using BugLite

Before attempting to install a task onto the DSP subsystem each module's specification must be reviewed so that correct connections of module sections can be done. BugLite does only minimal checking for incompatible buffers.

To make a task, follow these steps:

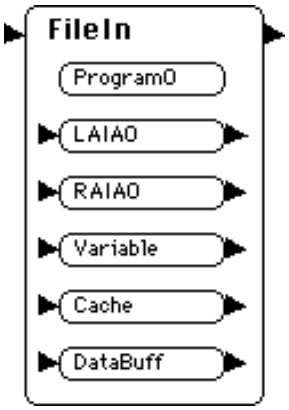
1. **Click anywhere in the task window with the TASK tool.**
   The TASK tool will ask for a name for the new task. The name "test" is used in the example, as shown in Figure B-3.

Figure B-3 Graphical representation of a task



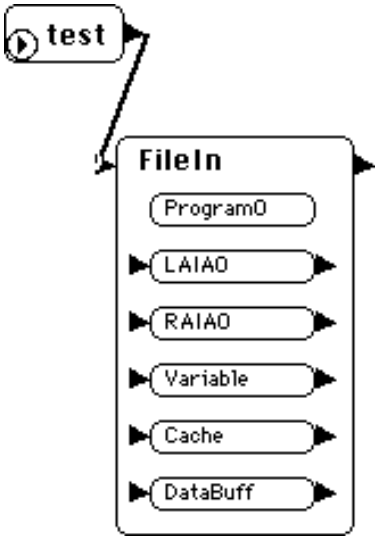
2. **Select the first module to be loaded.**
   Figure B-4 shows a file input module "File In" used for getting data into the DSP data stream. The MODULE tool uses the standard file selection dialog box to make the selection.

Figure B-4 Graphical representation of a module



3. **Connect the TASK to the MODULE using the ARROW tool.**
   Figure B-5 shows a task connected to a module.

Figure B-5 Task connected to a module



In this example there is a task called "test" that was created with the TASK tool. The task has one module, "File In," connected to it.

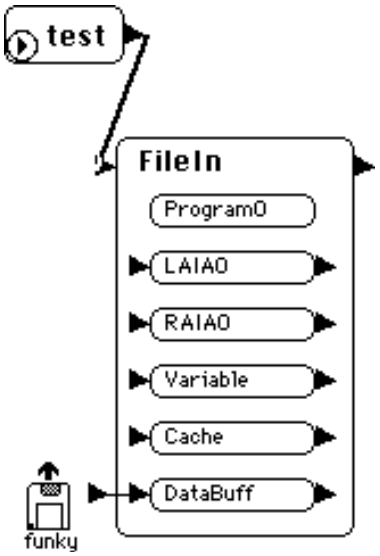
4. **Select the DISK PLAY tool.**
   The DISK PLAY tool uses the standard file selection dialog box to make the selection.

Figure B-6 Disk play of "funky" file

In this example there is a data file called "funky" that is stored on disk. This data is in the AIFF data format.

5. **Connect the DISK PLAY icon ("funky" file) to the "DataBuff" section using the ARROW tool.**

Figure B-7 Disk player connected to input buffer

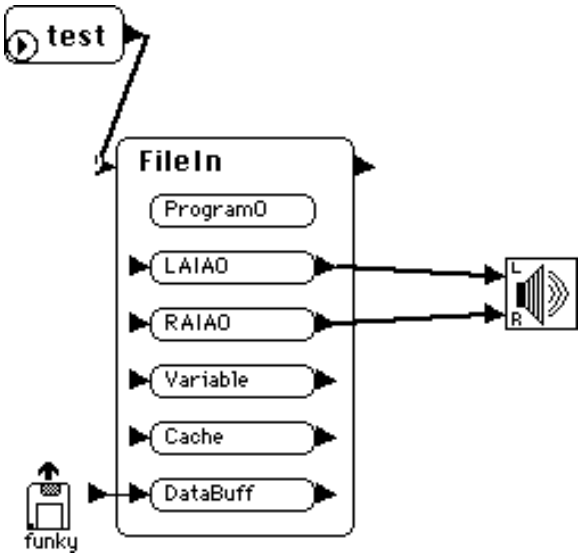


6. **Select the OUTPUT tool and place the icon to the right of the module.**

Figure B-8 Speaker connection icon

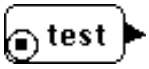
7. **Connect the L and R inputs of the OUTPUT icon to the "LAIAO" and "RAIAO"sections respectively using the ARROW tool.**

Figure B-9 Data output buffers connected to speakers



8. **Click once on the diamond shaped start button in the "test" task icon.** The diamond will change into a blinking square.

Figure B-10 Task with task active indicator



The task has now been loaded into the DSP subsystem and the sounds recorded in the "funky" data file will play out of the DSP subsystem audio output.

To disconnect two objects, click in one of the nibs and drag away from it. If the disconnected object is part of a task that is executing, the task is stopped and removed from the DSP.

To delete an object from the task window first select it by clicking on it with the arrow tool, then press the delete key. If the deleted object is part of a task that is executing, the task is stopped and removed from the DSP.

Getting Information

In the menu bar under Object is the Get Info selection. This selection provides information about the selected item. Each task, module, and section has specific kinds of data. Double-clicking an object will also bring up the object's information window.

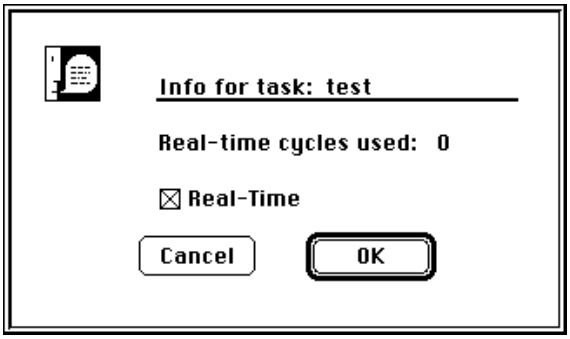
Task Info Window

The task info window provides information on

- real-time DSP cycles used in processor clock cycles
- real-time or timeshare mode selection

In Figure B-11 the task "test" shows zero real-time cycles used, indicating that the task has not been run. The task has been set up to be inserted into the real-time task list. This will result in it being allocated a guaranteed bandwidth on the DSP.

Figure B-11 Task Get Info window



Module Info Window

The module information window provides information on

- Real-time DSP cycles used in processor clock cycles
- Number of DSP frames that have been executed since the module was installed
- Skip count setting for this module

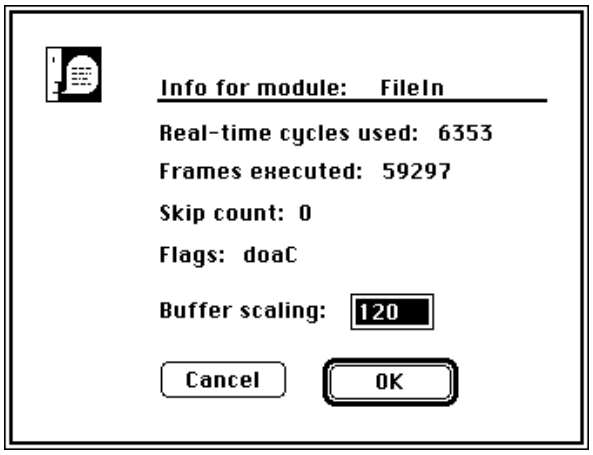
- Flags for the module: a capital letter means flag is set, a lowercase letter means the flag is clear:

Flag	Meaning
d	Demand cache
o	On-chip section table
a	Use actual GPB
c	Count this module in GPB calculation

- Buffer scaling for this module, user changeable for configuration testing

In the Get Info window shown in Figure B-12, the real-time cycles used are in DSP clock cycles. For this test, the DSP3210 had a frame time of 10 ms and a clock rate of 50 MHz. This results in a total of 500,000 DSP cycles per frame. This module used .0127 percent of the available DSP bandwidth. The value for real-time cycles used is the maximum cycles used in a single frame during a run of 59297 frames.

Figure B-12 Module Get Info window



Section Information

The section information window, shown in Figure B-13, provides information on

- Size of the section in bytes
- Type of section: capital letter means flag is set; lower-case means flag is clear:

Flag	Meaning
i	Input buffer
o	Output buffer
s	Scalable section
t	Static section

- Flag settings: capital letter means flag is set; lower-case means flag is clear:

Flag	Meaning
l	Load section
s	Save section
c	Clear section
w	Save on context switch
a	Bank A
b	Bank B
d	DSP use only (only DSP should modify this memory)

The Get Info window in Figure B-13 can be decoded as

- section size: 960 Bytes
- section type: Not a defined section type
- caching flags: Save section, Clear section, Save on context switch, Load section into Bank B, DSP use only

Figure B-13 Section Get Info window

Snoopy User's Guide

Snoopy is a powerful, browser/debugger, in the tradition of SourceBug, for the DSP programming environment. Like SourceBug, it provides breakpoint, single stepping, and code disassembly capabilities. Unlike SourceBug, it also provides editing capabilities and operates on code already installed in the system. Snoopy does not support source-level debugging at this time.

This appendix describes how to use the Snoopy debugger.

The section "Getting Started" tells how to install the Snoopy application and provides detailed information about how it works.

"Using Snoopy" provides valuable information about the menu commands and how to access additional controls and selections when available. The menu commands are listed in the order they would most likely be used. When a command invokes a dialog box, the selections available in the box are discussed immediately following the command. The windows available for displaying more information are detailed in "Additional Information Windows."

To run Snoopy, you need system software 7.1 or later and at least 128 KB of available RAM; preferred size is 768 KB.

Getting Started

This section tells you how to install and launch the Snoopy debugger.

Installation

Snoopy operates as an application running on the Macintosh Quadra 840AV or Macintosh Centris 660AV main processor. To use it:

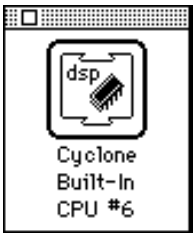
1. Copy the application to your hard drive.
2. Launch Snoopy.

Snoopy can reside anywhere on your hard drive. However, you may find it useful to have Snoopy in the same directory as your DSP object code so you don't have to search through multiple directories to locate your source or symbol files. See "Module Menu," later in this appendix, for instructions on loading and removing symbols.

What You See When You Launch Snoopy

When Snoopy is launched the DSP Control window will show information about the built-in DSP. In multiple DSP systems there would be an icon for each processor. To select the processor to debug, click on the ICON for the desired processor. Figure C-1 shows the ICON for the built-in DSP. To show and hide the DSP Control window see "Windows Menu," later in this appendix.

Figure C-1 DSP Control window



The Real Time Tasks window, shown in Figure C-2, is the primary display window for both code and data display. If there are tasks currently installed on the DSP, they are shown in the scrollable lists at the top of the window.

Note
Standard sound automatically installs itself onto the DSP to enable the sound functions. ◆

Task/Module/Section Lists

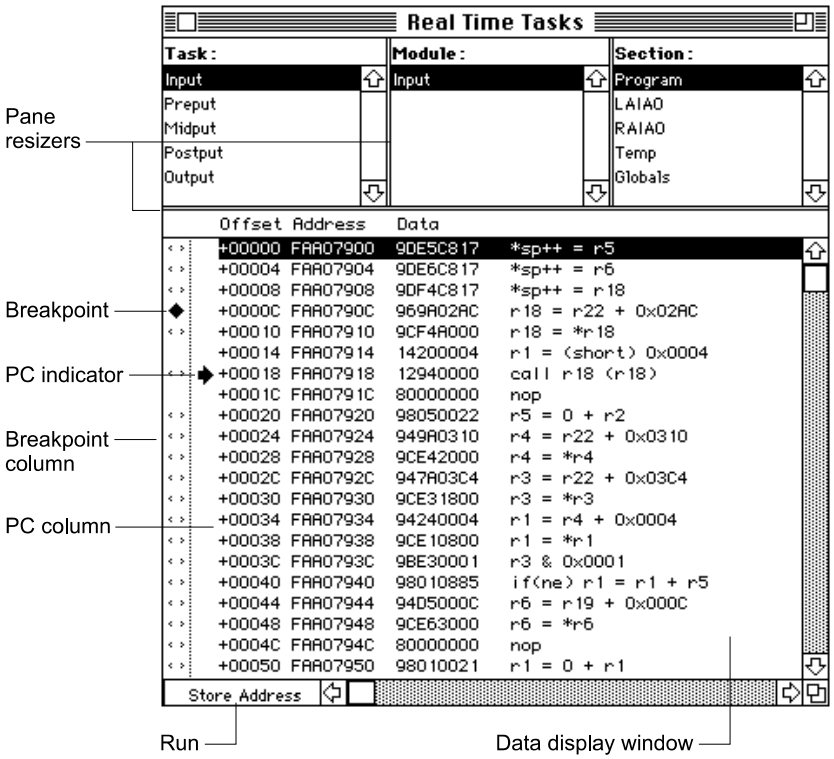
At the top of the Real-Time Tasks window are three scrollable lists that contain (from left to right) the currently installed tasks, the modules belonging to the currently highlighted task, and the sections belonging to the currently highlighted module. This hierarchical representation makes navigation through the potentially large number of tasks, modules, and sections straightforward and intuitive.

For example, in Figure C-2 there is one task installed in the system named Input. Task Input has one module, Input, that has four sections. The section currently being displayed in the Data Display window is Program. If you wanted to view the Temp section, you would simply click on Temp in the list, and it would appear in the Data Display window.

The Data Display Window

The lower half of the Real-Time Tasks window contains the Data Display window. The data belonging to the currently selected section is displayed here in the current format. See "Formatting," later in this appendix, for details.

Figure C-2 Real Time Tasks window



Run/Store Address Pop-up Menu

The DSP sections have (potentially) two containers; one at the "storage" address, and the other at the "run" address. The storage address, if there is one, is usually off-chip (in host DRAM or local SRAM), while the run address can either be off-chip or on-chip. The Run/Store Address pop-up menu, shown in Figure C-3, allows you to select which location you wish to view.

Note

Because the DSP operating system is a caching operating system, it is difficult, if not impossible, to present cached data in a meaningful way while the DSP is running. Consequently, when you switch to a cached "Run Address" and the machine is running, a message will appear in the Data Display window indicating that the data is unavailable. Similarly, if you stop the DSP and attempt to display a cached run address that has yet to be cached, a message will appear indicating that the section is out of scope. ◆

Figure C-3 Run/Store Address pop-up menu

PC Column

The PC (program counter) indicator (an arrow) appears in the PC column, at the appropriate offset, indicating where the DSP is stopped in the specified section. Any window showing the data where the program counter has stopped will also show the PC indicator arrow.

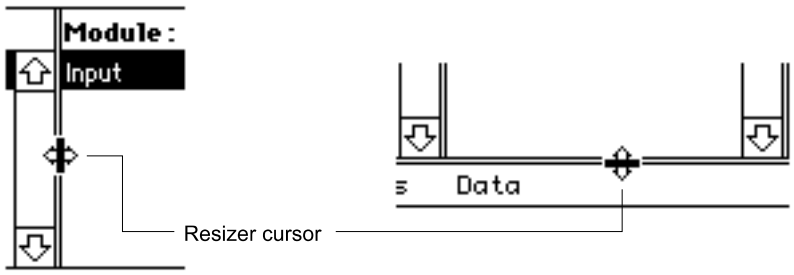
The Breakpoint Column

The breakpoint column, located at the left of the PC column, shows both the current breakpoints and the possible breakpoint/single step locations (called breakpoint candidates). Current breakpoints are indicated by a diamond, and breakpoint candidates are indicated by gray brackets. Breakpoint restrictions are discussed in detail in "Setting and Clearing Breakpoints," later in this appendix.

Pane Resizers

As you can see, the Real-Time Tasks window and the other data display windows are divided by double lines into panes, each of which is resizable. To resize a pane, simply place the cursor on the Pane Resizers, click, drag, and release at the desired point. The cursor becomes a pair of opposing arrows as shown in Figure C-4. Resizing allows you to optimize your screen's real estate.

Figure C-4 Vertical and horizontal pane resizers



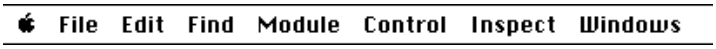
Using Snoopy

This section explains the use of all Snoopy's menu items. There are additional controls that are accessed using either a double click of the mouse or the Option key and a mouse click. These additional controls are explained where appropriate.

Menu Bar

There are two standard menus: File and Edit. The other five menus are specific to Snoopy, as shown in Figure C-5.

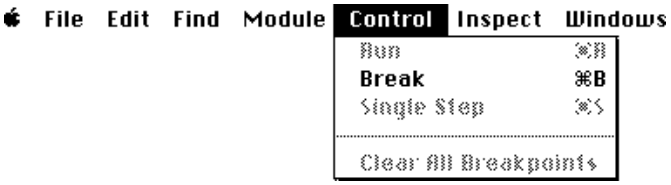
Figure C-5 Menu bar



Control Menu

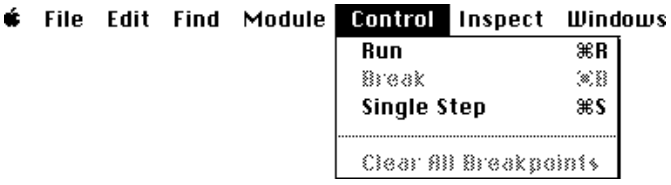
The Control menu has commands for running (Run), stopping (Break), and single stepping (Single Step) the DSP. If the DSP is running only the Break command will be available, as shown in Figure C-6. In order to view a cached program or data from a module, the DSP must be stopped while executing in the module's program section. This is done by first using the Break command to halt the DSP, then setting a breakpoint in the desired module. Breakpoints are explained in "Setting and Clearing Breakpoints," later in this appendix.

Figure C-6 Control menu



After the DSP has been stopped using the Break command, the Run and Single Step commands become available, as shown in Figure C-7.

Figure C-7 Control commands after break

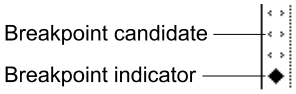


The Clear All Breakpoints command is available only if the DSP is stopped and there are one or more breakpoints set.

Setting and Clearing Breakpoints

To set a breakpoint in a section, move the mouse to the breakpoint column and click in any row that has a breakpoint candidate marker. See Figure C-8. (Notice that the cursor has changed to the breakpoint cursor.) To remove a breakpoint, simply click the breakpoint indicator. To remove all breakpoints use the Control menu's Clear All Breakpoints command.

Figure C-8 Setting breakpoints

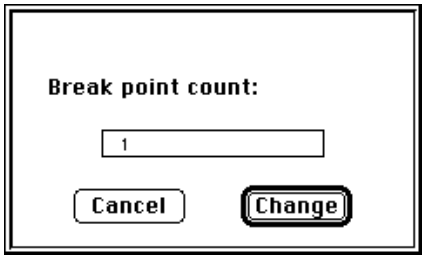


Note

You cannot set or clear a breakpoint while the DSP is running. ◆

Snoopy can also set a breakpoint to the *n*th occurrence of the instruction. To set a multiple breakpoint the breakpoint must already have been set. Use the Option key and click the breakpoint indicator to set the number of times the breakpoint instruction is to be executed before stopping the DSP. A dialog box will appear allowing you to change the pass counter on the specified breakpoint. See Figure C-9. The initial number is always one. If the breakpoint counter is set to four then the breakpoint instruction will execute three times and stop the DSP on the fourth occurrence of the instruction.

Figure C-9 Setting the breakpoint counter



Breakpoint Restrictions

Because the AT&T DSP3210 is a pipelined device, and because it has minimal provisions for debugging, there are restrictions as to where you can set breakpoints. You can only set a breakpoint at a location that has a breakpoint candidate marker.

Single Stepping

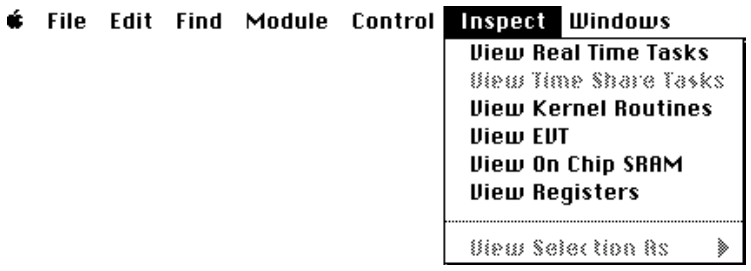
To step to the next available instruction (not necessarily the next instruction), select Single Step from the Control menu.

Note
Single Stepping is implemented using breakpoints (remember, no trace). Because of this, Snoopy can only step within a section or DSP operating system routine. ◆

Inspect Menu

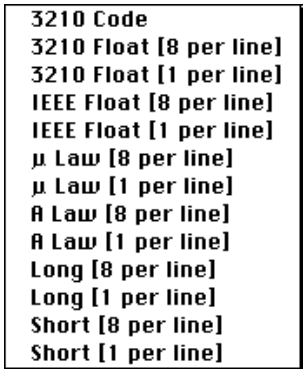
The Inspect menu provides access to additional display windows. These windows are available to view real-time tasks, timeshare tasks, DSP operating system routines, the EVT, the on-chip SRAM, and the registers. See Figure C-10.

Figure C-10 Inspect menu



Additionally, the Inspect menu has the View Selection As submenu. This menu is used to select the different data formats for viewing purposes only. See Figure C-11. Changes made in the View Selection As menu do not effect the actual data type. To coerce data into another data type see the "Editing Data" section.

Figure C-11 Data display format menu



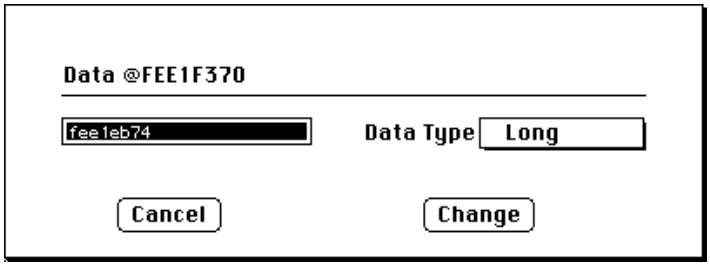
Formatting

Data can be displayed in several formats. To change the data format, highlight the display lines you wish to change and select a format from the View Selection As menu accessed through the Inspect menu. To highlight multiple lines hold down the shift key while dragging the mouse.

Editing Data

Editing data is a point-and-click operation. Simply point to the data element you wish to edit in the data display window and double-click. The dialog box shown in Figure C-12 will appear, allowing you to view and edit the data and the data type.

Figure C-12 Data editing window



Note

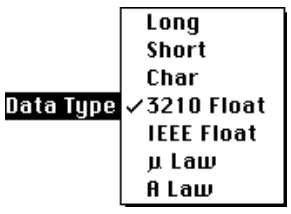
Data viewed as type DSP Code cannot be edited. ◆

▲ **WARNING**

DSP Code can be viewed as some other data type and the editor will allow it to be changed. Extreme caution should be used when changing DSP Code. There are no safeguards to prevent illegal opcodes from being entered. This could result in loss of data or code. ▲

The defined data types that can be selected are shown in Figure C-13. Changes in the data type will coerce the data into the new data type. Use the View Selection As menu if you only want to view the data in a different format.

Figure C-13 Defined data types



Windows Menu

When you launch the Snoopy application, you are presented with the Real-Time Tasks window and the Current PC window. As shown in Figure C-14, the Windows menu lists all open windows at the bottom of the menu and provides a quick way to bring any window to the front. Auto Hide Windows (not implemented) removes the current window when a new window is selected. The Windows menu also provides limited control over open windows.

Figure C-14 Windows menu

When the DSP is running the frontmost window is not automatically updated. The window must be told to update or the data display will show only old data. This can be done using the Update Front Window command in the Windows menu. Windows such as Registers, Real-Time Tasks, and Timeshare Tasks will not have their data display window updated if the DSP is running.

Windows can also be set to show the full title using the Full Titles command. This includes information describing the specific DSP chip that the module is running on. Also, the DSP Control window can be hidden or displayed from the Windows menu.

Additional Information Windows

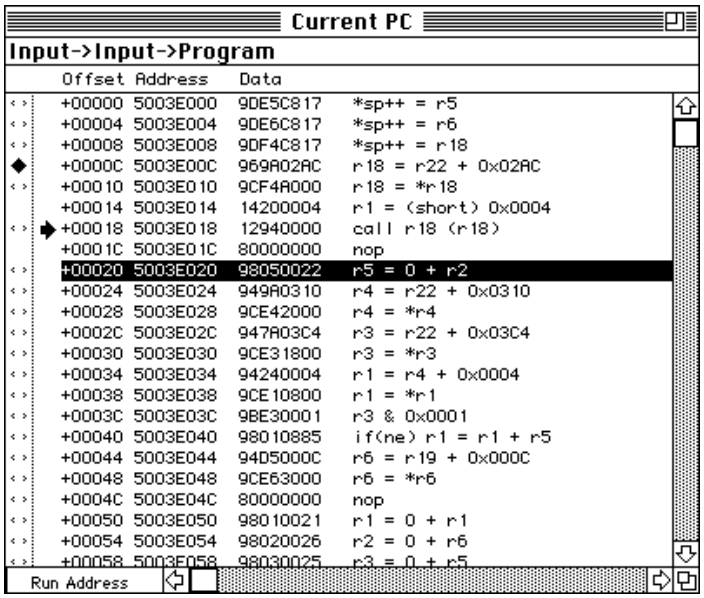
This section describes the additional display windows used to provide information about other parts of the DSP. The additional windows provide information about the inside operation of the DSP. There are five additional windows:

- Current PC
- Kernel Routines
- EVT (Exception Vector Table)
- On-Chip SRAM
- Registers (in the DSP)

Current PC

The Current PC window shows the section or DSP operating system routine that was running on the DSP when a break was initiated. This window can only show data when the DSP has been stopped. If the DSP has been stopped with no breakpoint set it will always stop at `ExternalIntOne` of the DSP operating system routines. Figure C-15 shows the current program counter when a breakpoint is set in the Standard Sound Input Task:Input Module:Program Section at address `5003E020`. The current PC location has been single stepped two times. Notice that the address `5003E014` has no breakpoint allowed. It will also be stepped over by the single-step procedure.

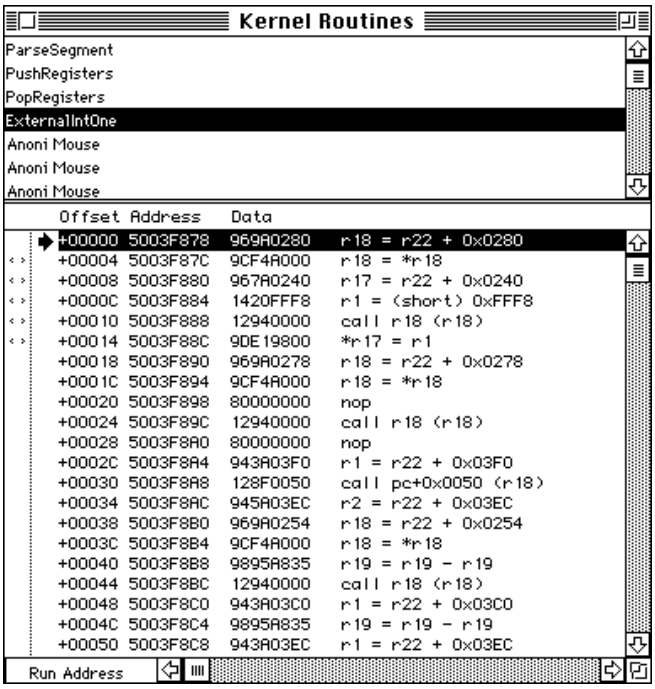
Figure C-15 Current PC window



The DSP Operating System Routines

DSP operating system routines are shown in the Kernel Routines window; simply select View Kernel Routines from the Inspect menu. The DSP operating system routines will be presented in a browser window similar to the Real-Time Tasks window with the exception of the list at the top. This window is shown in Figure C-16. You can manipulate DSP operating system routines (set breakpoints, single-step, and reformat) the same way you manipulate sections.

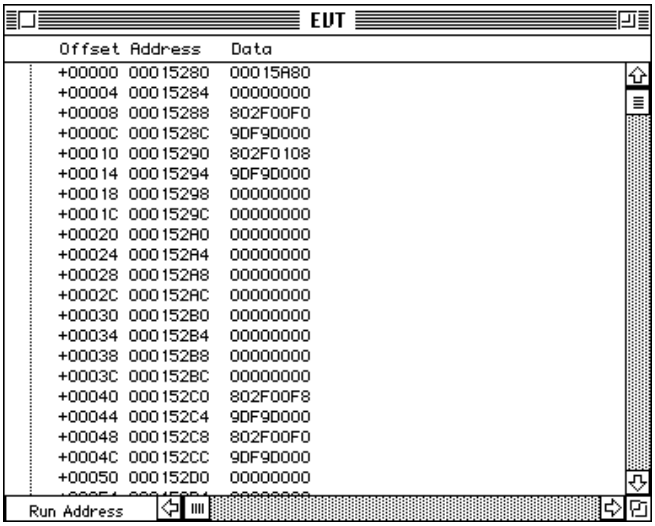
Figure C-16 DSP Operating System Routines window



The EVT

The DSP operating system places system information, such as run-time variables and routine addresses in the exception vector table (EVT). To view the EVT window, select View EVT from the Inspect menu. The resulting window is shown in Figure C-17.

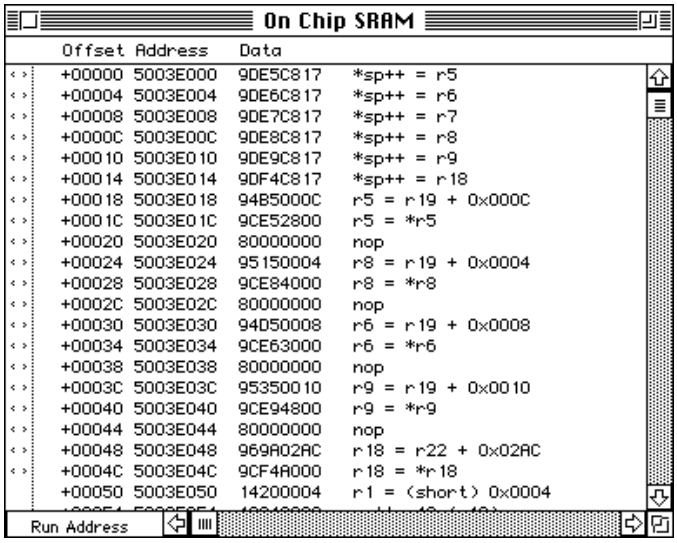
Figure C-17 EVT window



On-Chip SRAM

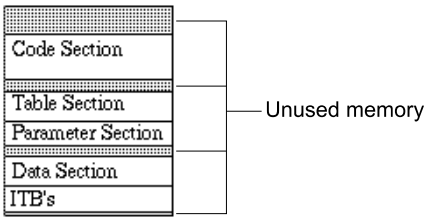
To view the On-Chip SRAM window, select View On Chip SRAM from the Inspect menu. The resulting window is shown in Figure C-18.

Figure C-18 On-Chip SRAM window



When the DSP has been stopped, all sections that are currently in it's cache can be viewed in the On-Chip SRAM window. The data displayed is an image of the cached code, buffers, tables, and other types of sections. Figure C-19 shows a possible SRAM layout.

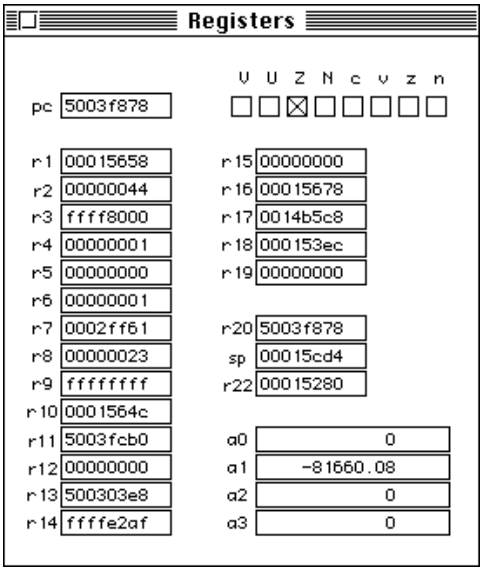
Figure C-19 Example of SRAM layout



Registers

To display the DSP registers, select Show Registers from the Edit menu. The resulting window is shown in Figure C-20. Notice that the processor status word is displayed as a group of check boxes in the upper right corner.

Figure C-20 Registers window



The Registers window displays the contents of all of the DSP registers for the instruction at the current PC location. The Registers window is not updated while the DSP is running. Manual update of the frontmost window is explained in "Windows Menu," earlier in this appendix.

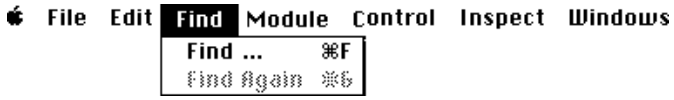
Standard Menus

Snoopy uses the two menus that resemble standard Finder menus: File and Edit. The File menu is used for opening, closing, and saving files. It uses the standard dialog box for all operations. The Edit menu operates like the standard Finder Edit menu.

Find Menu

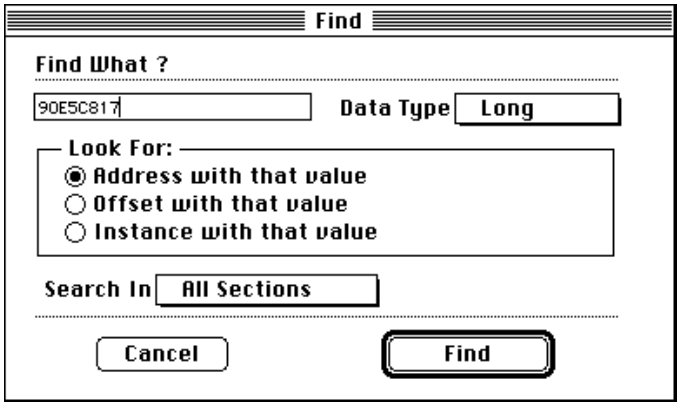
There are two commands in the Find menu. The Find command is used to locate specific strings within the currently selected window. The Find Again command finds subsequent occurrences of the specified information. See Figure C-21.

Figure C-21 Find menu



When the Find command is selected the dialog box in Figure C-22 will appear. The Find command can locate specific data values that are of a specific data type. If the specified value is in the display range of any of the windows, the required window will be selected and the address will be shown. The required window does not need to be the frontmost window or even open for the Find operation to select it.

Figure C-22 Find Command dialog box



There are three ways to look for specific locations in the data display. They are:

- look for an address with the specified value
- look for an offset with the specified value
- look for an instance with the specified value

When trying to locate a specific address location in the Data Display window use the Look For Address with that value. When looking for a relative address within the data display use the Look For Offset with that value. To look for a specific data word within the data window use the Look For Instance with that value.

The default data type is a Long word. This should be used whenever specifying an offset value. When looking for an Instance the data type may also be specified, as shown in Figure C-23.

Figure C-23 Find Data Types menu

You may also specify the section or sections to be searched, as shown in Figure C-24.

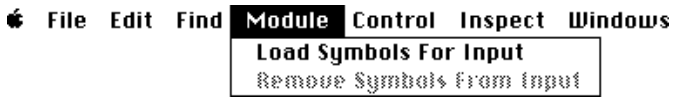
Figure C-24 Search In selection menu

If the data with the specified data type cannot be located, an alert box will display the message Not Found.

Module Menu

Snoopy has some symbolic capabilities. If you declare symbols as global (using the `.global` assembler construct) a symbol table is created with your object code. To access these symbols with Snoopy, choose the Show Symbols For ... command (replacing the ellipsis with the name of the currently selected module) from the Module menu and locate its object file. The currently selected module must be in either the Real-Time Tasks or Timeshare Tasks window. Figure C-25 shows that the module named Input was selected in the Real-Time Tasks window. A standard open-file dialog box is displayed for selecting the appropriate resource file.

Figure C-25 Module menu



To remove the symbols from the Data Display window select the Remove Symbols From Input command. This will remove the symbol lookup information from Snoopy's memory. This command cannot be undone. The symbol file must be reloaded to show symbols.

There are several error messages which may be encountered when attempting to load a symbolic file. For example, if the module symbol resource file cannot be loaded because it does not match the code resources available in the loaded module then the error window shown in Figure C-26 will appear.

Figure C-26 Error in loading symbolic table

Mechanical Details

This appendix provides details of the mechanical provisions for mounting internal SCSI devices in the Macintosh Quadra 840AV and Macintosh Centris 660AV enclosures and for installing accessory cards in the Macintosh Centris 660AV. It is intended to guide hardware engineers developing compatible equipment. The mechanical details for internal SCSI device mounting consist of the following seven foldout drawings:

- Figure D-1 reproduces Apple drawing number 815-1411-A, showing the bezel for the Macintosh Centris 660AV enclosure used with an internal CD-ROM drive.
- Figure D-2 reproduces Apple drawing number 815-1376-A, showing the blank bezel for the Macintosh Centris 660AV enclosure (without an internal CD-ROM drive).
- Figure D-3 reproduces Apple drawing number 815-1122-03, showing the mounting sled used for internal 5.25-inch hard disk drives.
- Figure D-4 reproduces Apple drawing number 805-0503-01, showing the magnetic shield for the Macintosh Centris 660AV bezel used with an internal CD-ROM drive.
- Figure D-5 reproduces Apple drawing number 805-0517-02, showing the magnetic shield for the Macintosh Quadra 840AV bezel used with internal CD-ROM or hard disk drives.
- Figure D-6 reproduces Apple drawing number 815-1189-05, showing the blank bezel for the Macintosh Quadra 840AV enclosure (without an internal CD-ROM drive).
- Figure D-7 reproduces Apple drawing number 815-1186-04, showing the bezel for the Macintosh Quadra 840AV enclosure used with an internal CD-ROM drive.

The following four foldout drawings give mechanical details for mounting expansion cards in the Macintosh Centris 660AV:

- Figure D-8 reproduces Apple drawing number 805-0530-06, showing the bracket in the Macintosh Centris 660AV that supports an expansion card.
- Figure D-9 reproduces Apple drawing number 725-0051-02, showing the insulator for the expansion card bracket.
- Figure D-10 reproduces Apple drawing number 630-0450-10, showing the electromagnetic interference (EMI) shield for the expansion card bracket.
- Figure D-11 reproduces Apple drawing number 630-0450-12, showing the NuBus adapter card for the Macintosh Centris 660AV. This card is discussed in "Slot Connections," in Chapter 2.

For details of expansion card mounting in the Macintosh Quadra 840AV, see *Designing Cards and Drivers for the Macintosh Family,* third edition.

NOTES :
(UNLESS OTHERWISE SPECIFIED)

1 INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M-1982

2 MATERIAL : ABS CYCOLAC KJC 34187-1. COLOR : APPLE PLATINUM PER COLOR APPLE COLOR CONTROL PANEL 912-0037. TOLERANCE PER COLOR TOLERANCE SET 912-1037.

3 ALL UNSPECIFIED DRAFT ANGLES TO BE 0° 30'.

4 ALL NON-APPEARANCE SURFACE EDGES TO HAVE A 0.25 ±0.03 RADIUS. EXCEPT AT PARTING LINE.

5 FLAT SURFACES TO HAVE A FLATNESS TOLERANCE OF 0.20 PER 25.00, NOT TO EXCEED 1.00 OVER THE ENTIRE SURFACE

6 STRAIGHT EDGES TO HAVE A STRAIGHTNESS TOLERANCE OF 0.05 PER 25.00, NOT TO EXCEED 0.20 OVER ENTIRE LENGTH

7 EXTERIOR (APPEARANCE) SURFACES TO BE TEXTURED PER APPLE SPECIFICATION 062-0222 (G-2).

8 MOLD FINISH ON INTERIOR (NON-APPEARANCE) SURFACES TO BE SPI-SPE 3.

9 FLASH NOT TO EXCEED 0.13

10 GATE TRIM TO BE 0.5 MAX.

11 PARTING LINE MISMATCH NOT TO EXCEED 0.10

12 NO SINK DEPRESSIONS TO BE VISIBLE ON APPEARANCE SURFACES

13 APPEARANCE SURFACES TO BE FREE OF COSMETIC DEFECTS INCLUDING, BUT NOT LIMITED TO, SPLAY INCLUDED PARTICLES, BURNED PLASTIC MARKS AND SIMILAR IMPERFECTIONS. SEE APPLE SPEC. 062-2006.

14 PART TO BE FREE OF MOLD RELEASE ON APPEARANCE SURFACES.

15 MOLD DESIGN TO MINIMIZE GATE BLUSH, FLOW LINES, AND MOLD MARKS. MOLD CONSTRUCTION TO CONFORM TO GOOD MOLDING INDUSTRY PRACTICE AS STATED IN THE CURRENT EDITION OF "STANDARDS AND PRACTICES OF PLASTIC CUSTOM MOLDERS" BY THE SOCIETY OF THE PLASTIC INDUSTRY, INC.

16 EJECTOR PIN, PARTING LINE, AND GATE LOCATION MUST BE APPROVED BY APPLE COMPUTER PRODUCT DESIGN ENGINEERING PRIOR TO MOLD FABRICATION.

17 MOLD TO BE PROPERTY OF APPLE COMPUTER, INC. AND SHALL BE MARKED WITH APPLE'S NAME, APPROPRIATE PART NUMBER AND DATE.

18 MARK APPLE PART NUMBER AND REVISION LETTER WITH 3.0 HIGH CHARACTERS APPX. 0.3 TALL, NOT TO EXCEED 0.5, IN LOCATION SHOWN.

19 TOLERANCE :

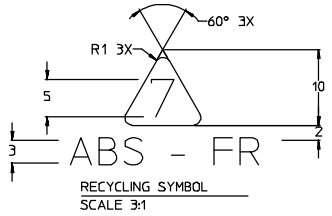
DIM.	TOL.
0 - <50	+/- 0.13
50 - <150	+/- 0.20
150 - <300	+/- 0.33
>300	+/- 0.50

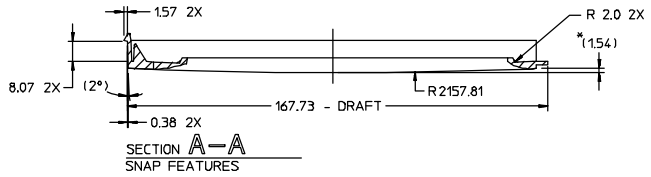
20 NOMINAL WALL THICKNESS 3

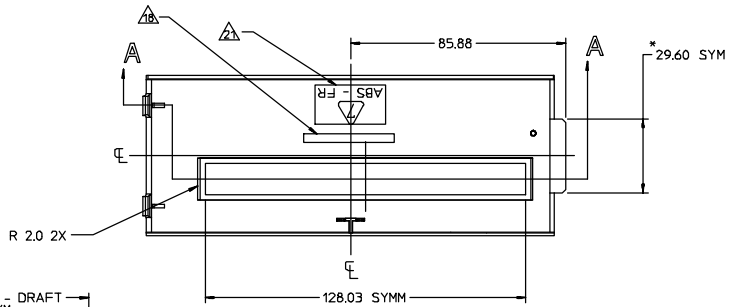
21 MARK MATERIAL WITH RECYCLING TRIANGLE AND MATERIAL IDENTIFIER APPX WHERE SHOWN. IDENTIFIER "ABS-FR" TO BE MARKED ON INTERIOR NON-FUNCTIONAL (NON-APPEARANCE) SURFACE USING 3.0 HIGH CHARACTERS. 2.0 BELOW ISOCELES TRIANGLE (10.0) TALL TO POINT OF INTERSECTION WITH 1.0 RADII AT CORNERS. MATERIAL CALLOUT "7" IN 5.0 HIGH CHARACTERS TO BE APPOX CENTERED IN TRIANGLE. ALL CHARACTERS TO BE RAISED 0.3, BUT NOT EXCEED 0.5 FROM SURFACE. SEE DWG BELOW.

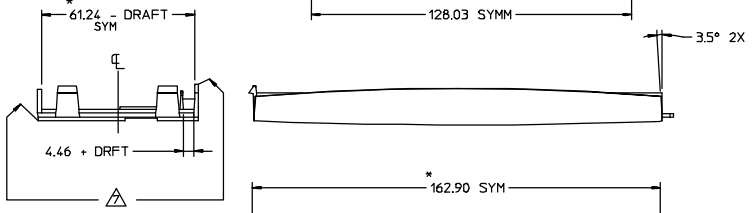
22 THIS IS A SUPPLIMENTAL CRITICAL FUNCTION DRAWING AND IS TO BE USED IN CONJUNCTION WITH FILE 815-1411-03wJg8. 815-1411-03bJg8 TO MANUFACTURE AND TO INSPECT THE PART.

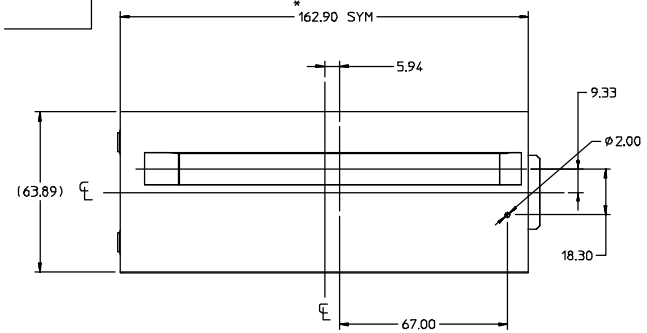
23 STARRED (*) DIMENSIONS ARE FOR INCOMING QUALITY CONTROL INSPECTION.

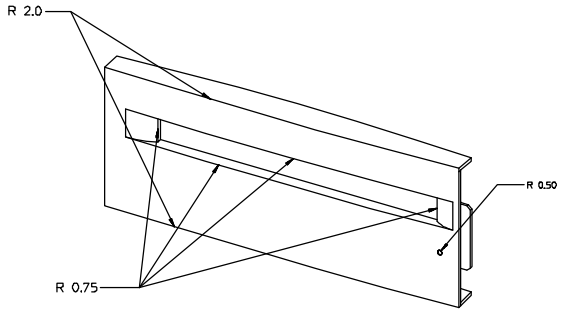












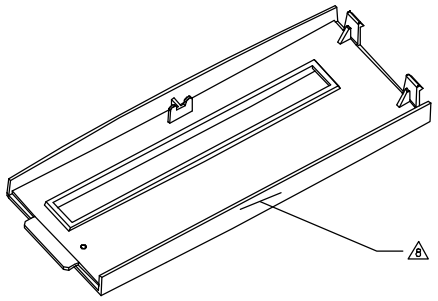


FIGURE D-1

CD bezel for Macintosh Centris 660AV

815-1411-A

NOTES :
(UNLESS OTHERWISE SPECIFIED)

1 INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M-1982

2 MATERIAL : ABS CYCOLAC KJE 3418T-1. COLOR : APPLE PLATINUM PER COLOR APPLE COLOR CONTROL PANEL 912-0037. TOLERANCE PER COLOR TOLERANCE SET 912-1037.

3 ALL UNSPECIFIED DRAFT ANGLES TO BE 0° 30'.

4 ALL NON-APPEARANCE SURFACE EDGES TO HAVE A 0.25 ±0.03 RADIUS. EXCEPT AT PARTING LINE.

5 FLAT SURFACES TO HAVE A FLATNESS TOLERANCE OF 0.20 PER 25.00, NOT TO EXCEED 1.00 OVER THE ENTIRE SURFACE

6 STRAIGHT EDGES TO HAVE A STRAIGHTNESS TOLERANCE OF 0.05 PER 25.00, NOT TO EXCEED 0.20 OVER ENTIRE LENGTH

△7 EXTERIOR (APPEARANCE) SURFACES TO BE TEXTURED PER APPLE SPECIFICATION 062-0222 (G-2).

△8 MOLD FINISH ON INTERIOR (NON-APPEARANCE) SURFACES TO BE SPI-SPE 3.

9 FLASH NOT TO EXCEED 0.13

10 GATE TRIM TO BE 0.5 MAX.

11 PARTING LINE MISMATCH NOT TO EXCEED 0.10

12 NO SINK DEPRESSIONS TO BE VISIBLE ON APPEARANCE SURFACES

13 APPEARANCE SURFACES TO BE FREE OF COSMETIC DEFECTS INCLUDING, BUT NOT LIMITED TO, SPLAY INCLUDED PARTICLES, BURNED PLASTIC MARKS AND SIMILAR IMPERFECTIONS. SEE APPLE SPEC. 062-2006.

14 PART TO BE FREE OF MOLD RELEASE ON APPEARANCE SURFACES.

15 MOLD DESIGN TO MINIMIZE GATE BLUSH, FLOW LINES, AND MOLD MARKS. MOLD CONSTRUCTION TO CONFORM TO GOOD MOLDING INDUSTRY PRACTICE AS STATED IN THE CURRENT EDITION OF "STANDARDS AND PRACTICES OF PLASTIC CUSTOM MOLDERS" BY THE SOCIETY OF THE PLASTIC INDUSTRY, INC.

16 EJECTOR PIN, PARTING LINE, AND GATE LOCATION MUST BE APPROVED BY APPLE COMPUTER PRODUCT DESIGN ENGINEERING PRIOR TO MOLD FABRICATION.

17 MOLD TO BE PROPERTY OF APPLE COMPUTER, INC. AND SHALL BE MARKED WITH APPLE'S NAME, APPROPRIATE PART NUMBER AND DATE.

△18 MARK APPLE PART NUMBER AND REVISION LETTER WITH 3.0 HIGH CHARACTERS APPX. 0.3 TALL, NOT TO EXCEED 0.5, IN LOCATION SHOWN.

△19 TOLERANCE :

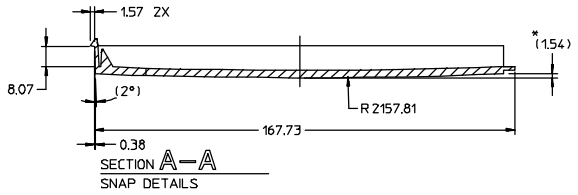
DIM.	TOL.
0 - <50	+/- 0.13
50 - <150	+/- 0.20
150 - <300	+/- 0.33
>300	+/- 0.50

20 NOMINAL WALL THICKNESS 3

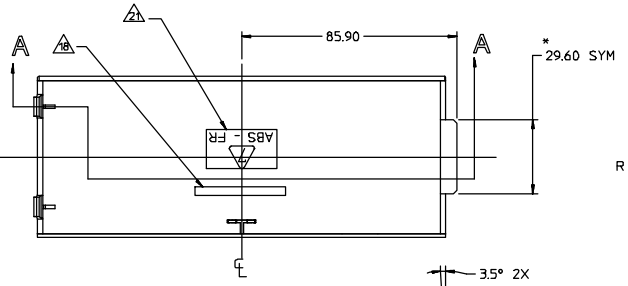
△21 MARK MATERIAL WITH RECYCLING TRIANGLE AND MATERIAL IDENTIFIER APPX WHERE SHOWN. IDENTIFIER "ABS-FR" TO BE MARKED ON INTERIOR NON-FUNCTIONAL (NON-APPEARANCE) SURFACE USING 3.0 HIGH CHARACTERS, 2.0 BELOW ISOCELES TRIANGLE (10.0) TALL TO POINT OF INTERSECTION WITH 1.0 RADII AT CORNERS. MATERIAL CALLOUT "7" IN 5.0 HIGH CHARACTERS TO BE APPOX CENTERED IN TRIANGLE. ALL CHARACTERS TO BE RAISED 0.3, BUT NOT EXCEED 0.5 FROM SURFACE. SEE DWG BELOW.

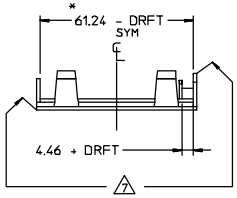
22 THIS IS A SUPPLIMENTAL CRITICAL FUNCTION DRAWING AND IS TO BE USED IN CONJUNCTION WITH FILE 815-1376-04w.igs. 815-1376-04s.igs TO MANUFACTURE AND TO INSPECT THE PART.

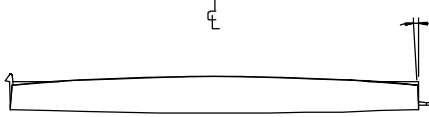
23 STARRED (*) DIMENSIONS ARE FOR INCOMING QUALITY CONTROL INSPECTION.

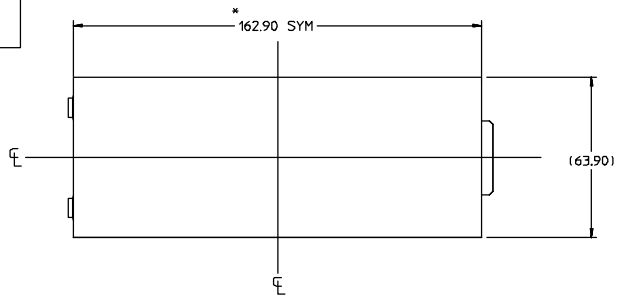


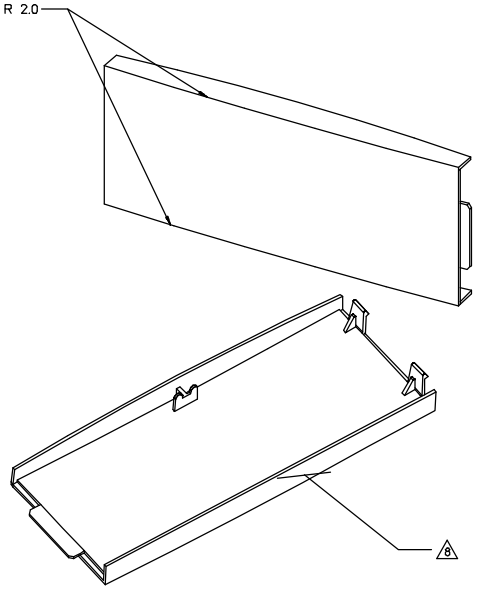
SECTION A–A
SNAP DETAILS

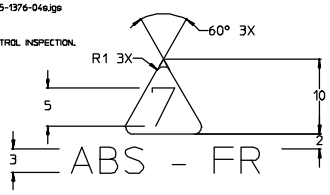












RECYCLING SYMBOL
SCALE 3:1

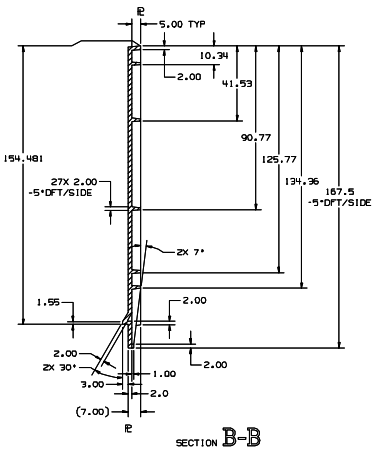
FIGURE D-2

Blank bezel for the Macintosh Centris 660AV

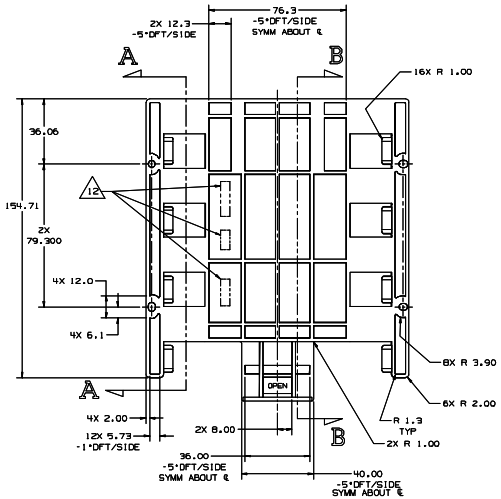
815-1376-A

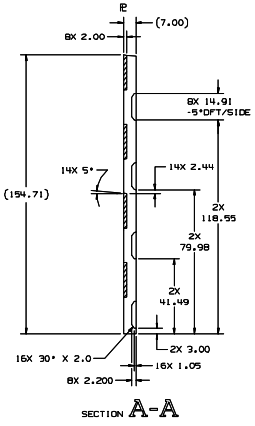
NOTES: (UNLESS OTHERISE SPECIFIED)

1. INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M-1982.
2. STARRED (*) DIMENSIONS INDICATE PROCESS CONTROL DIMENSIONS.
3. MATERIAL: G.E. CYCLOAC KJC #34187-Y.
   COLOR: APPLE PLATINUM PER COLOR CONTROL PANEL 912-0037.
   TOLERANCE PER COLOR TOLERANCE SET 912-1037.
4. NOMINAL WALL THICKNESS TO BE 2.00.
5. UNSPECIFIED DRAFT ANGLES TO BE 1°.
6. ALL EDGES TO BE 0.25 ±0.12 RADIUS, EXCEPT AT PARTING LINE.
7. GATE TRIM TO BE 0.3 MAX. FLUSH WITH SURFACE.
8. FLASH NOT TO EXCEED 0.13.
9. PARTING LINE MISMATCH NOT TO EXCEED 0.25.
10. STRAIGHTEDGES TO HAVE STRAIGHTNESS TOLERANCE OF 0.07 PER 25.0 NOT TO EXCEED 0.5 OVER THE ENTIRE SURFACE.
11. FLAT SURFACES TO HAVE FLATNESS TOLERANCE OF 0.10 PER 25.0, NOT TO EXCEED 1.0 OVER THE ENTIRE SURFACE.
12. MARK APPLE PART NUMBER AND REVISION LETTER WITH 2.0 MINIMUM HIGH CHARACTERS APPROXIMATELY WHERE SHOWN. REVISION LETTER TO BE LOCATED ON AN EJECTOR PIN.
13. MOLD FINISH ON ALL SURFACES TO BE SPI-SPE #3.
14. MOLD DESIGN TO MINIMIZE EJECTION PIN MARKS, GATE BLUSH, LINES AND WELD MARKS. MOLD CONSTRUCTION TO CONFORM TO GOOD MOLDING INDUSTRY PRACTICE AS STATED IN THE CURRENT EDITION OF "STANDARD PRACTICE OF CUSTOM MOLDERS" BY THE SOCIETY OF THE PLASTICS INDUSTRY, INC..
15. EJECTOR PIN, PARTING LINE, AND GATE LOCATION MUST BE APPROVED BY APPLE COMPUTER PRODUCT DESIGN ENGINEERING PRIOR TO MOLD FABRICATION.
16. MOLD TO BE PROPERTY OF APPLE COMPUTER INC. AND SHALL BE PERMANENTLY MARKED WITH APPLE'S NAME AND APPROPRIATE PART NUMBER.

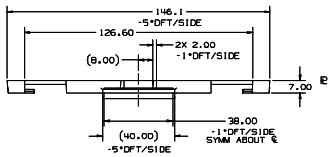


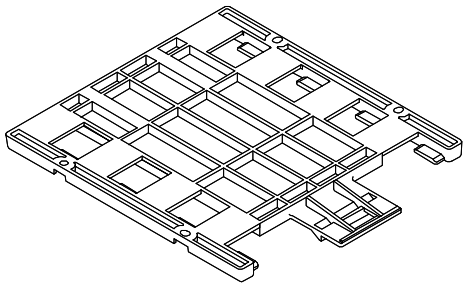
SECTION B-B

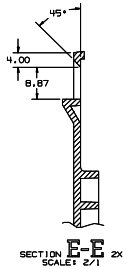




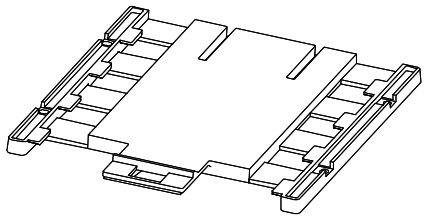
SECTION A-A

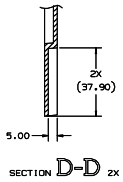




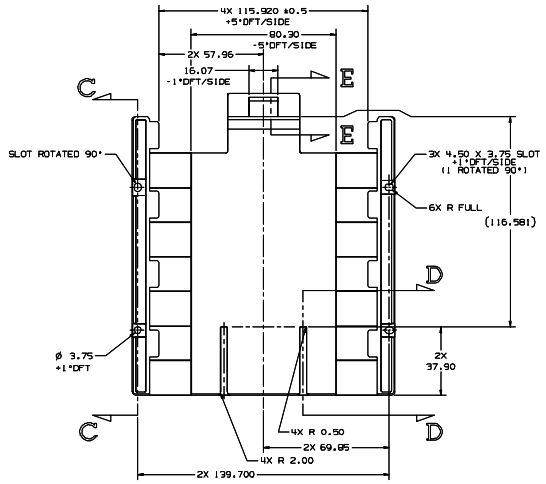


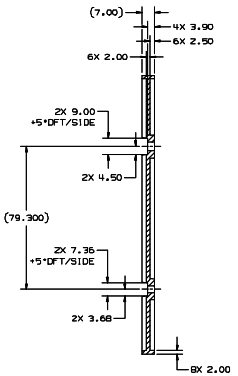
SECTION E-E 2X
SCALE: 2/1





SECTION D-D 2X





SECTION C-C

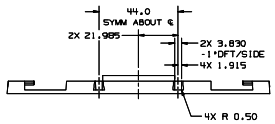


FIGURE D-3

Mounting sled for 5.25-inch SCSI devices

815-1122-03

NOTES (UNLESS SPECIFIED OTHERWISE):

1 MATERIAL: 0.25 (.010") THK DR9 (TIN PRE-PLATED CRS).

2 INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M-1982.

3 ALL DIMENSIONS ARE INCHES AND MILLIMETERS: USE METRIC TOLERANCE BLOCK.

4 ALL UNSPECIFIED INSIDE BEND RADII TO BE 0.3mm.

5 ALL UNSPECIFIED RIGHT ANGLE BENDS TO BE 90°±0.5°.

6 ALL SHARP CORNERS TO BE BROKEN 0.8 X 45°.

7 STRAIGHT EDGES TO HAVE A STRAIGHTNESS TOLERANCE OF 0.15mm PER 25.00mm, NOT TO EXCEED 0.5mm OVER THE ENTIRE LENGTH.

8 FLAT SURFACES TO HAVE A FLATNESS TOLERANCE OF 0.10mm PER 25.00mm, NOT TO EXCEED 0.50mm OVER THE ENTIRE SURFACE.

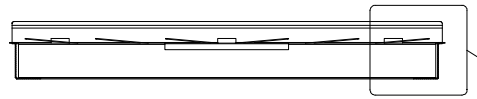
9 SURFACES TO BE FREE OF CONTAMINATES, METAL FLAKES, AND OIL.

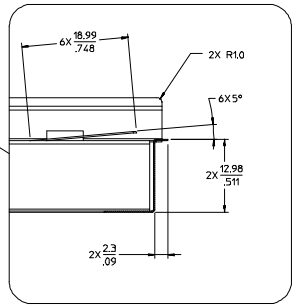
△10 MARK APPLE PART NUMBER AND REVISIONS LETTER WITH 3.0mm MINIMUM HIGH CHARACTERS APPROXIMATELY WHERE INDICATED.

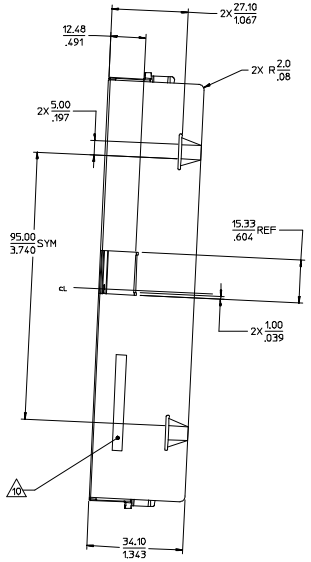
11 STEEL RULE DIES, SPECIAL PUNCHES, OR OTHER UNIQUE TOOLING REQUIRED TO FABRICATE THIS PART TO BE PROPERTY OF APPLE COMPUTER INC. AND SHALL BE PERMANENTLY MARKED WITH APPLE'S NAME AND APPROPRIATE APPLE PART NUMBER.

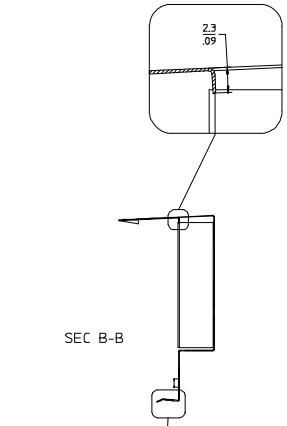
12 MAXIMUM BURR ALLOWANCE IS 15% OF MATERIAL THICKNESS.

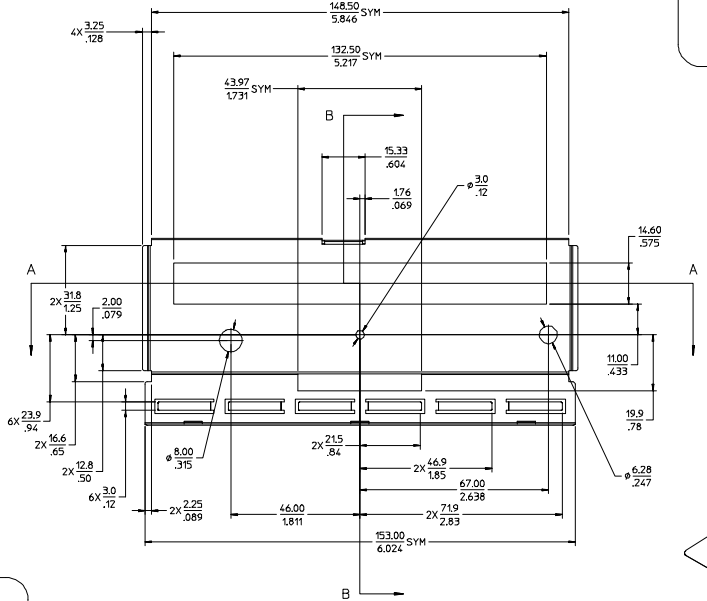
13 THIS IS A SUPPLEMENTAL DETAIL DRAWING AND IS TO BE USED IN CONJUNCTION WITH PART MODEL FILE shld300.igs TO MANUFACTURE AND TO INSPECT THE PART.

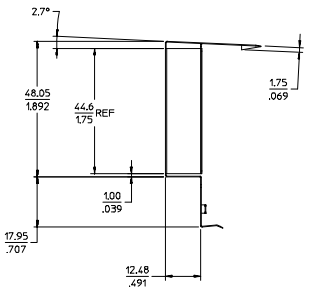


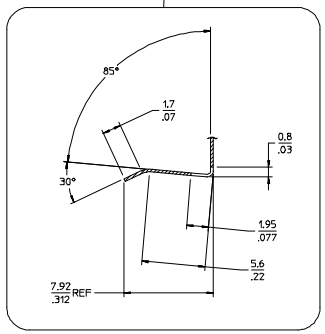


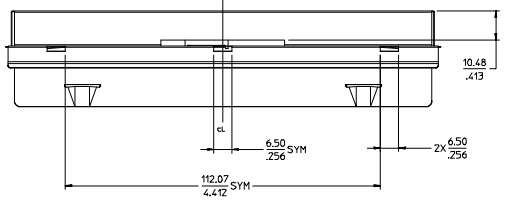


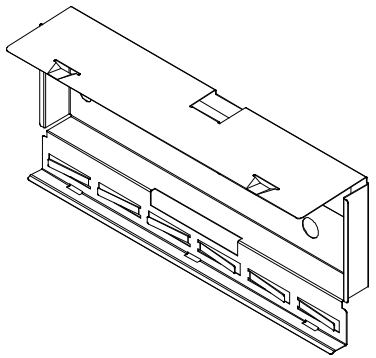












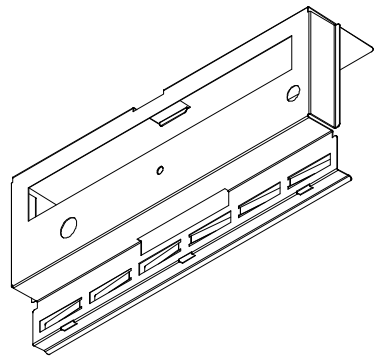


FIGURE D-4

Shield for the CD bezel for Macintosh Centris 660AV

805-0503-01

NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M-1982.
2. MATERIAL: 0.28 (.011") SUPER-ORTHOSIL-4 COATED WITH CARLITE OVER GLASS OR ENGINEERING APPROVED EQUIVALENT.
3. STARRED (*) DIMENSIONS ARE CONTROL DIMENSIONS.
4. ALL UNSPECIFIED INSIDE BEND RADII TO BE 0.3 .
5. ALL UNSPECIFIED RIGHT ANGLE BENDS TO BE 90° ±0.5 .
6. ALL SHARP CORNERS TO BE BROKEN 0.8 X 45°.
7. STRAIGHT EDGES TO HAVE A STRAIGHTNESS TOLERANCE OF 0.15 PER 25.00, NOT TO EXCEED 0.50 OVER THE ENTIRE LENGTH.
8. FLAT SURFACES TO HAVE A FLATNESS TOLERANCE OF 0.10 PER 25.00, NOT TO EXCEED 0.50 OVER THE ENTIRE SURFACE.
9. SURFACES TO BE FREE OF CONTAMINATES, METAL FLAKES, AND OIL.
10. MARK APPLE PART NUMBER AND REVISION LETTER WITH 3.0 MINIMUM HIGH CHARACTERS APPROXIMATELY WHERE INDICATED.
11. STEEL RULE DIES, SPECIAL PUNCHES OR OTHER UNIQUE TOOLING REQUIRES TO MAKE THIS PART TO BE PROPERTY OF APPLE COMPUTER, INC., AND SHALL BE PERMANENTLY MARKED WITH APPLE'S NAME AND APPROPRIATE APPLE PART NUMBER.
12. ADHESIVE: SCOTCH 3M P/N 9500 OR ENGINEERING APPROVED EQUIVALENT.
13. ADHESIVE TO BE APPLIED TO SURFACE AS INDICATED AND MUST BE COVERED WITH A REMOVABLE PAPER ELEMENT.

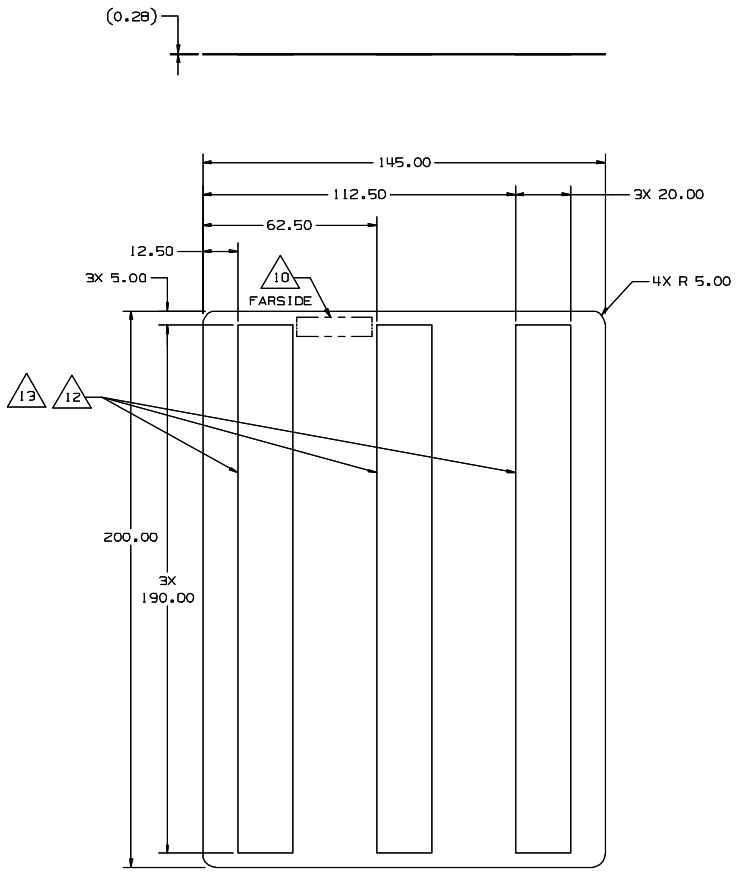


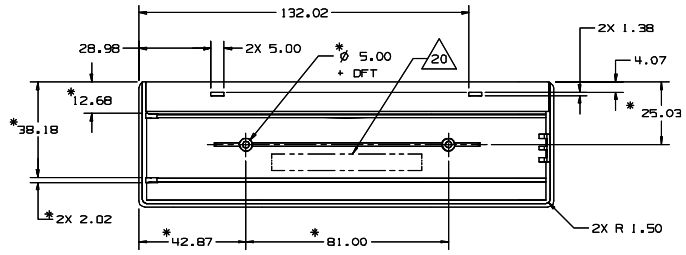
FIGURE D-5

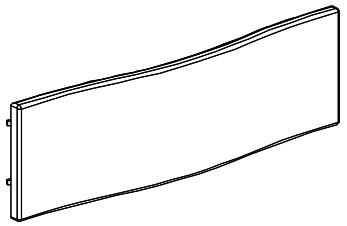
Magnetic shield for CD-ROM drives

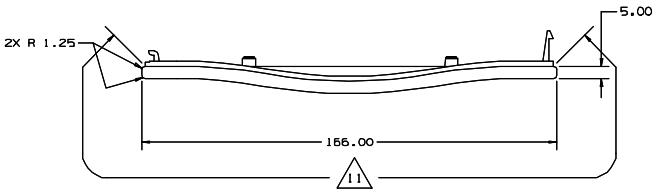
805-0517-02

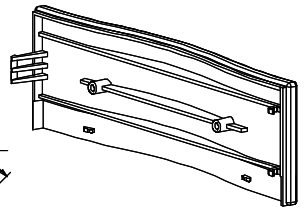
NOTE: UNLESS OTHERWISE SPECIFIED

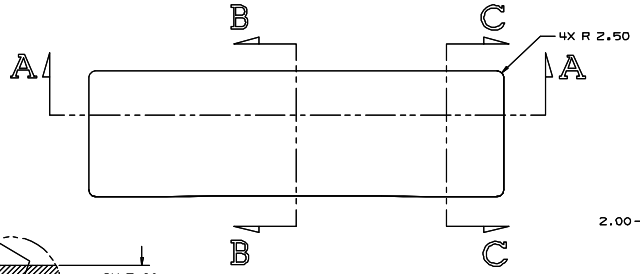
1. INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M-1982.
2. ALL DIMENSIONS ARE IN MILLIMETERS: REFER TO METRIC TOLERANCE BLOCK.
3. MATERIAL: ABS CYCOLAC KJC 34187-1, COLOR: APPLE PLATINUM PER COLOR CONTROL PANEL 912-0037, TOL PER COLOR TOL SET 912-1037.
4. WALL THICKNESS: 3.00.
5. DRAFT ANGLES: EXTERIOR SURFACES TO BE 0° PER SIDE. INTERIOR SURFACES TO BE 1° PER SIDE.
6. ALL EXTERIOR (APPEARANCE SURFACE) EDGES TO BE 0.15 RADIUS, EXCEPT AT PARTING LINE.
7. ALL INTERIOR (NON-APPEARANCE SURFACE) INSIDE RADII (90° CORNERS) TO BE 0.15 OUTSIDE RADII, (270° CORNERS) TO BE 0.50, EXCEPT AT PARTING LINE.
8. STRAIGHT EDGES TO HAVE A STRAIGHTNESS TOLERANCE OF 0.15 PER 25mm, NOT TO EXCEED 0.5 OVER THE ENTIRE LENGTH.
9. FLAT SURFACES TO HAVE FLATNESS TOLERANCE OF 0.15 PER 25mm, NOT TO EXCEED 0.5 OVER THE ENTIRE SURFACE.
10. APPEARANCE SURFACES ARE THOSE SURFACES TEXTURED PER APPLE SPEC 062-0222, PER NOTES 11, 12 & 14.
11. ALL EXTERIOR (APPEARANCE) SURFACES TO BE RE6642 G2 TEXTURE PER APPLE SPECIFICATION 062-0222 WHERE INDICATED.
12. TEXTURE TO BE SPI-SPE#3 (APPLE SPEC 062-0222) WHERE INDICATED.
13. MOLD FINISH ON INTERIOR (NON-APPEARANCE) SURFACES TO BE SPI-SPE#3.
14. TEXTURE TO BE RE6643 G-3 PER APPLE SPECIFICATION, WHERE INDICATED.
15. GATE TO BE MACHINE TRIMMED 0.15 BELOW SURFACE.
16. REFER TO APPLE SPEC 062-2006 FOR COSMETIC ACCEPTANCE CRITERIA.
17. FLASH NOT TO EXCEED 0.05.
18. PART TO BE FREE OF MOLD RELEASE ON APPEARANCE SIDE OF PART.
19. MOLD DESIGN TO MINIMIZE EJECTION PIN MARKS, GATE BLUSH, LINES AND WELD MARKS. MOLD CONSTRUCTION TO CONFORM TO GOOD MOLDING INDUSTRY PRACTICE AS STATED IN THE CURRENT EDITION OF "STANDARD PRACTICES OF CUSTOM MOLDERS" BY THE SOCIETY OF PLASTIC INDUSTRY, INC.
20. MARK APPLE PART NUMBER AND REVISION LETTER WITH 3.0 MINIMUM HIGH CHARACTERS APPROXIMATELY WHERE SHOWN.
21. EJECTOR PIN, PARTING LINE, AND GATE LOCATIONS MUST BE APPROVED BY APPLE COMPUTER PRODUCT DESIGN ENGINEERING PRIOR TO MOLD FABRICATION.
22. MOLD TO BE PROPERTY OF APPLE COMPUTER, INC. AND SHALL BE PERMANENTLY MARKED WITH APPLE'S NAME AND APPROPRIATE TOOL NUMBER.
23. STARRED (*) DIMENSIONS AND NOTES ARE CRITICAL CONTROL DIMENSIONS AND NOTES FOR QC INSPECTION.
24. THIS DRAWING CONTAINS CRITICAL TO FUNCTION DIMENSIONS ONLY, REFER TO UNIGRAPHICS CAD FILE (815-1189-04) FOR COMPLETE PART INFO.

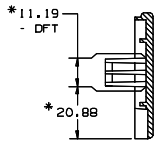




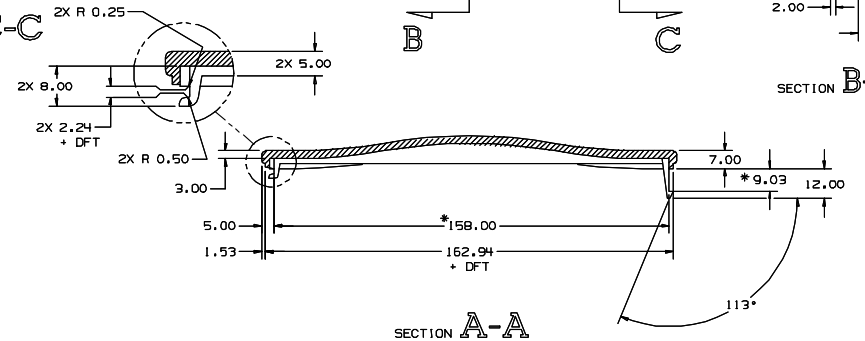




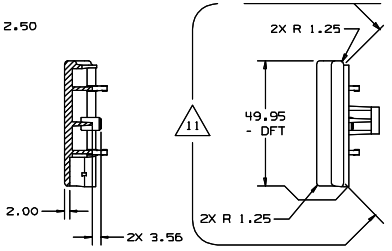




SECTION C-C



SECTION A-A



SECTION B-B

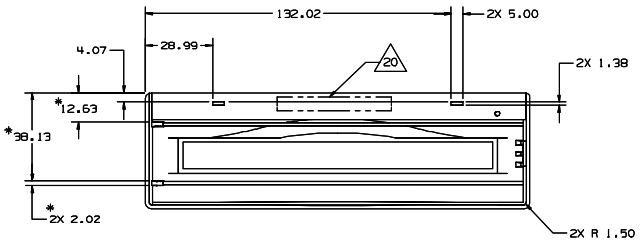
FIGURE D-6

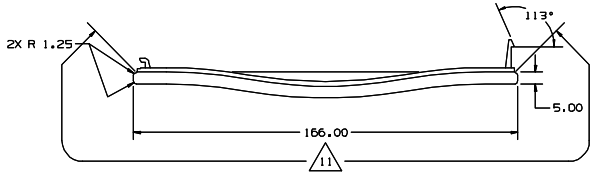
Blank bezel for the Macintosh Quadra 840AV

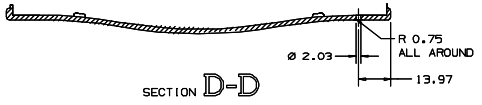
815-1189-05

NOTE: UNLESS OTHERWISE SPECIFIED

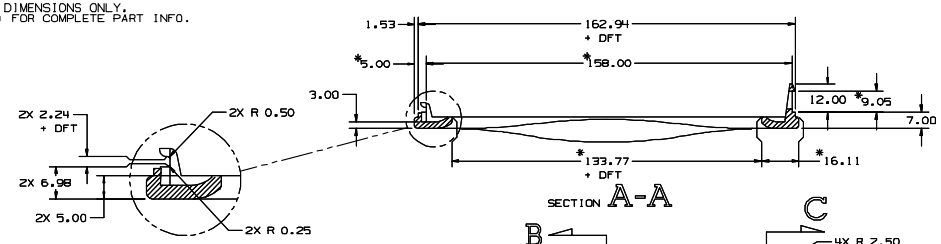
1. INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M-1982.
2. ALL DIMENSIONS ARE IN MILLIMETERS; REFER TO METRIC TOLERANCE BLOCK.
3. MATERIAL: ABS CYCOLAC KJC 34187-1, COLOR: APPLE PLATINUM PER COLOR CONTROL PANEL 912-0037, TOL PER COLOR TOL SET 912-1037.
4. WALL THICKNESS: 3.00.
5. DRAFT ANGLES: EXTERIOR SURFACES TO BE 0° PER SIDE. INTERIOR SURFACES TO BE 1° PER SIDE.
6. ALL EXTERIOR (APPEARANCE SURFACE) EDGES TO BE 0.15 RADIUS, EXCEPT AT PARTING LINE.
7. ALL INTERIOR (NON-APPEARANCE SURFACE) INSIDE RADII (90° CORNERS) TO BE 0.15 OUTSIDE RADII. (270° CORNERS) TO BE 0.50 EXCEPT AT PARTING LINE.
8. STRAIGHT EDGES TO HAVE A STRAIGHTNESS TOLERANCE OF 0.15 PER 25mm, NOT TO EXCEED 0.5 OVER THE ENTIRE LENGTH.
9. FLAT SURFACES TO HAVE FLATNESS TOLERANCE OF 0.15 PER 25mm, NOT TO EXCEED 0.5 OVER THE ENTIRE SURFACE.
10. APPEARANCE SURFACES ARE THOSE SURFACES TEXTURED PER APPLE SPEC 062-0222, PER NOTES 11, 12 & 14.
11. ALL EXTERIOR (APPEARANCE) SURFACES TO BE RE6642 G2 TEXTURE PER APPLE SPECIFICATION 062-0222 WHERE INDICATED.
12. TEXTURE TO BE SPI-SPE#3 (APPLE SPEC 062-0222) WHERE INDICATED.
13. MOLD FINISH ON INTERIOR (NON-APPEARANCE) SURFACES TO BE SPI-SPE#3.
14. TEXTURE TO BE RE6643 G-3 PER APPLE SPECIFICATION, WHERE INDICATED.
15. GATE TO BE MACHINE TRIMMED 0.15 BELOW SURFACE.
16. REFER TO APPLE SPEC 062-2006 FOR COSMETIC ACCEPTANCE CRITERIA.
17. FLASH NOT TO EXCEED 0.05.
18. PART TO BE FREE OF MOLD RELEASE ON APPEARANCE SIDE OF PART.
19. MOLD DESIGN TO MINIMIZE EJECTION PIN MARKS, GATE BLUSH, LINES AND WELD MARKS. MOLD CONSTRUCTION TO CONFORM TO GOOD MOLDING INDUSTRY PRACTICE AS STATED IN THE CURRENT EDITION OF "STANDARD PRACTICES OF CUSTOM MOLDERS" BY THE SOCIETY OF PLASTIC INDUSTRY, INC.
20. MARK APPLE PART NUMBER AND REVISION LETTER WITH 3.0 MINIMUM HIGH CHARACTERS APPROXIMATELY WHERE SHOWN.
21. EJECTOR PIN, PARTING LINE, AND GATE LOCATIONS MUST BE APPROVED BY APPLE COMPUTER PRODUCT DESIGN ENGINEERING PRIOR TO MOLD FABRICATION.
22. MOLD TO BE PROPERTY OF APPLE COMPUTER, INC. AND SHALL BE PERMANENTLY MARKED WITH APPLE'S NAME AND APPROPRIATE TOOL NUMBER.
23. STARRED (*) DIMENSIONS AND NOTES ARE CRITICAL CONTROL DIMENSIONS AND NOTES FOR QC INSPECTION.
24. THIS DRAWING CONTAINS CRITICAL TO FUNCTION DIMENSIONS ONLY, REFER TO UNIGRAPHICS CAD FILE (815-1186-03) FOR COMPLETE PART INFO.



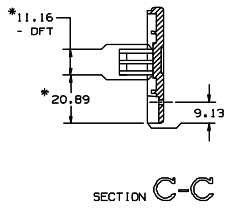




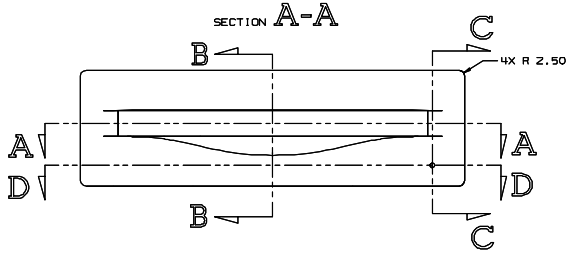
SECTION D-D

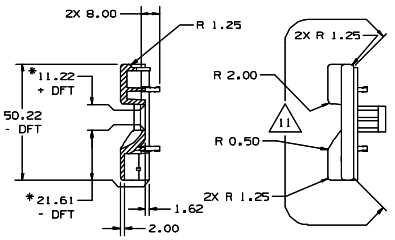


SECTION A-A

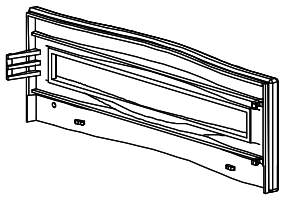


SECTION C-C





SECTION B-B



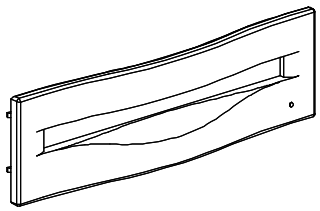


FIGURE D-7

CD bezel for Macintosh Quadra 840AV

815-1186-04

NOTES (UNLESS SPECIFIED OTHERWISE):

1 MATERIAL: CRS 1.00mm THICK
FINISH: ELECTROGALVANIZED ZINC PRE-PLATE
(FINGERPRINT-LESS)

2 TYPICAL INSIDE BEND RADIUS: 1.0mm.

3 UNSPECIFIED RADII TO BE 1.0mm.

4 BREAK AND DEBURR ALL SHARP CORNERS AND EDGES. MAXIMUM BURR ALLOWANCE IS 15% OF MATERIAL THICKNESS.

5 INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5-1982.

6 SURFACES TO BE FREE OF CONTAMINANTS, METAL FLAKES AND LUBRICANTS.

7 STRAIGHT EDGES TO HAVE A STRAIGHTNESS TOLERANCE OF 0.20 PER 25.0, NOT TO EXCEED 0.40 OVER THE ENTIRE LENGTH.

8 FLAT SURFACES TO HAVE A FLATNESS TOLERANCE OF 0.20 PER 25.0, NOT TO EXCEED 0.40 OVER THE ENTIRE SURFACE.

9 STEEL RULE DIES, SPECIAL PUNCHES AND OTHER UNIQUE TOOLING REQUIRED TO FABRICATE THIS PART TO BE PROPERTY OF APPLE COMPUTER, INC. AND SHALL BE PERMANENTLY MARKED WITH APPLE'S NAME AND APPROPRIATE APPLE PART NUMBER.

10 STAMP ASSEMBLY NUMBER 600-0627 AND REVISION LEVEL WITH 3.0mm MINIMUM HIGH CHARACTERS APPROXIMATELY WHERE INDICATED.

11 INSTALL M3 THREADED STANDOFF (PEM PART NO. SO-M3-10 OR EQUIV.) WHERE INDICATED (2 PLACES).

12 EXTRUDE HOLE AND TAP M3 THREADS WHERE INDICATED (2 PLACES). HOLES TO HAVE A MINIMUM OF THREE (3) THREADS.

13 THIS IS A SUPPLEMENTAL DETAIL DRAWING AND IS TO BE USED IN CONJUNCTION WITH PART MODEL FILE 805-0530-06w.igs TO MANUFACTURE AND INSPECT THE PART.

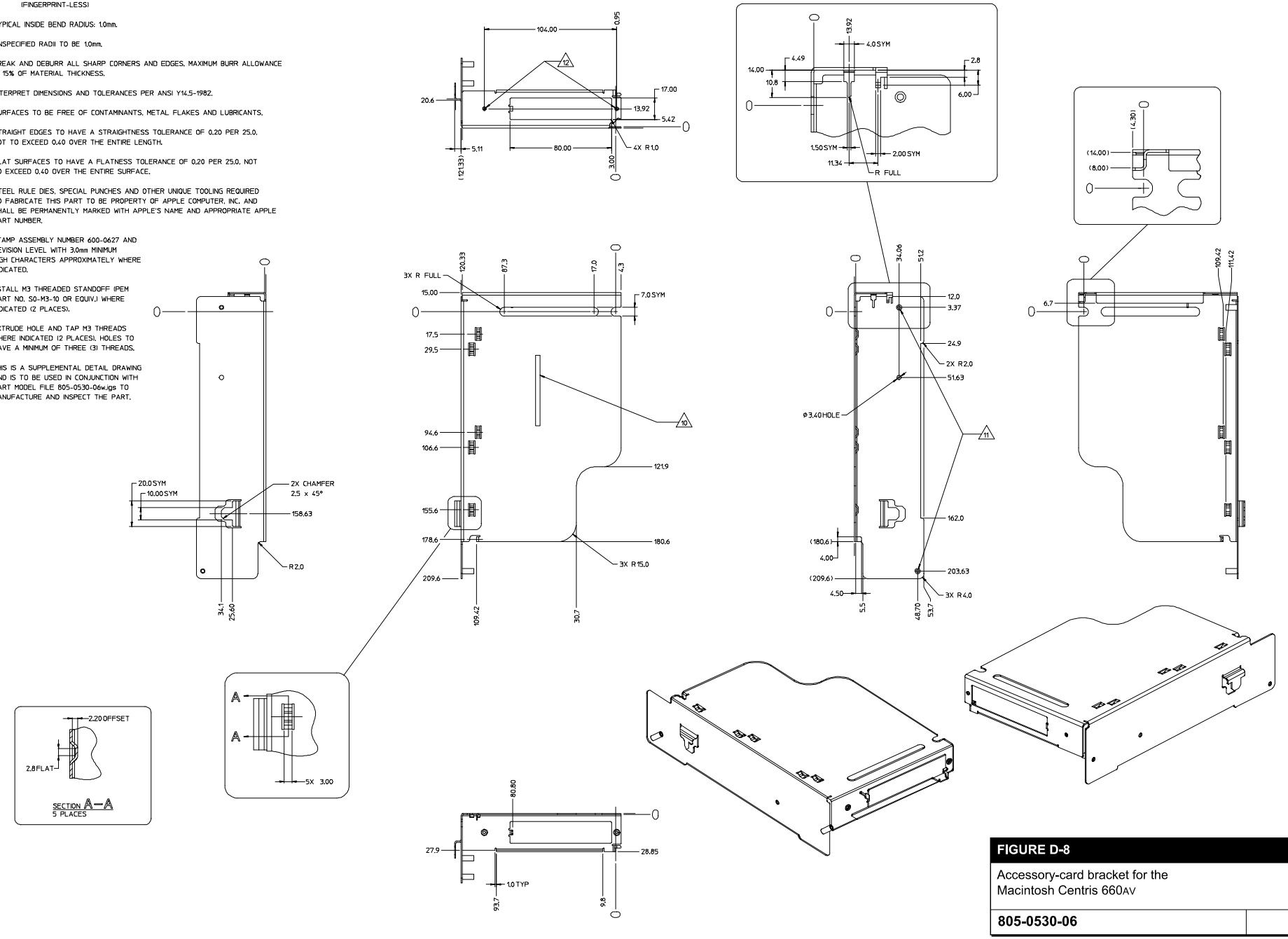


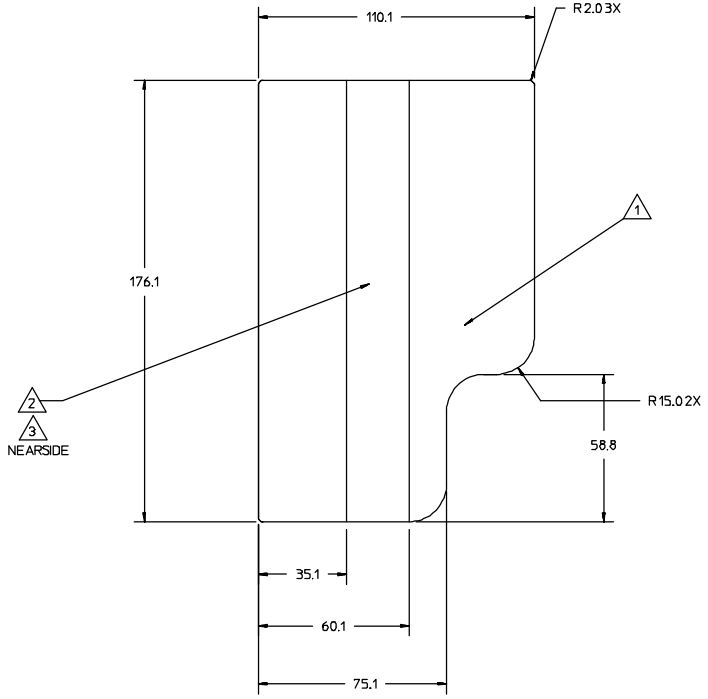
FIGURE D-8

Accessory-card bracket for the Macintosh Centris 660AV

805-0530-06

NOTES: UNLESS OTHERWISE SPECIFIED:

1. MATERIAL POLYCARBONATE SHEET, 0.20 (.008) THICK FLAMMABLILTY RATING TO BE LL94-V2 MINIMUM.
2. ADHESIVE MATERIAL 3M 467 ADHESIVE OR EQUIVALENT.
3. ADHESIVE TO BE APPLIED TO SURFACE AS INDICATED, AND MUST BE COVERED WITH A REMOVABLE PAPER ELEMENT.
4. ALL REQUIRED TOOLING TO BE PROPERTY OF APPLE COMPUTER, INC AND SHALL BE MARKED WITH APPLE'S NAME. APPROPRIATE PART NUMBER, AND DATE.



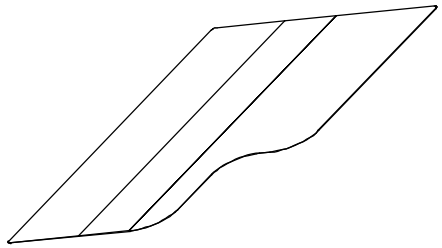


FIGURE D-9

Insulator for the Macintosh Centris 660AV accessory-card bracket

725-0051-02

NOTES (UNLESS SPECIFIED OTHERWISE),

1 MATERIAL: 0.20 (.008") THK STAINLESS STEEL 301 SERIES, HALF-HARD.

2 TYPICAL INSIDE BEND RADIUS: 0.15mm.

3 ALL SHARP CORNERS TO BE RADIUSED 0.5R.

4 BREAK AND DEBURR ALL SHARP CORNERS AND EDGES. MAXIMUM BURR ALLOWANCE IS 15% OF MATERIAL THICKNESS.

5 INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5-1982.

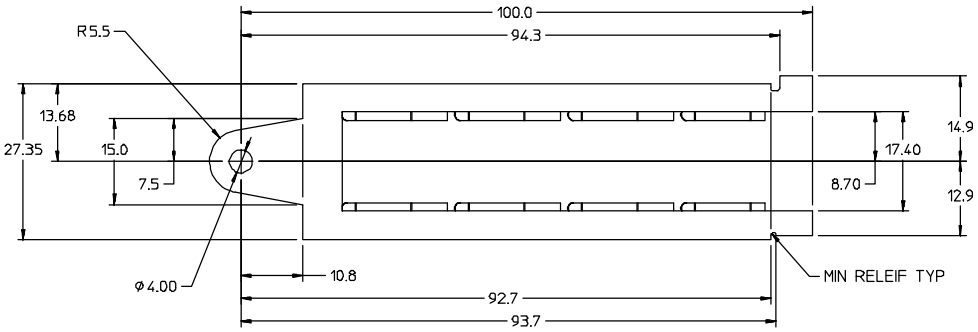
6 SURFACES TO BE FREE OF CONTAMINANTS, METAL FLAKES AND LUBRICANTS.

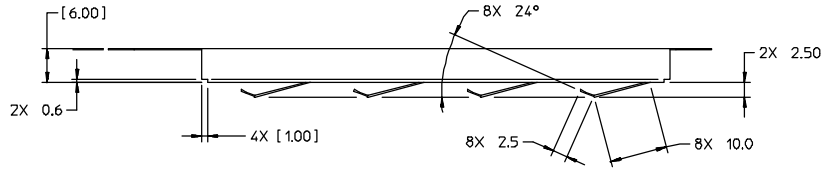
7 STRAIGHT EDGES TO HAVE A STRAIGHTNESS TOLERANCE OF 0.20 PER 25.0, NOT TO EXCEED 0.40 OVER THE ENTIRE LENGTH.

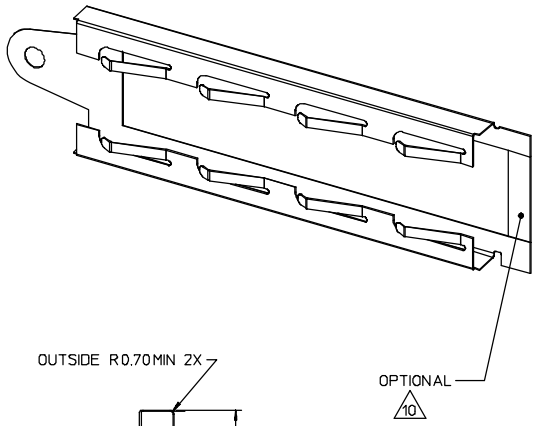
8 FLAT SURFACES TO HAVE A FLATNESS TOLERANCE OF 0.20 PER 25.0, NOT TO EXCEED 0.40 OVER THE ENTIRE SURFACE.

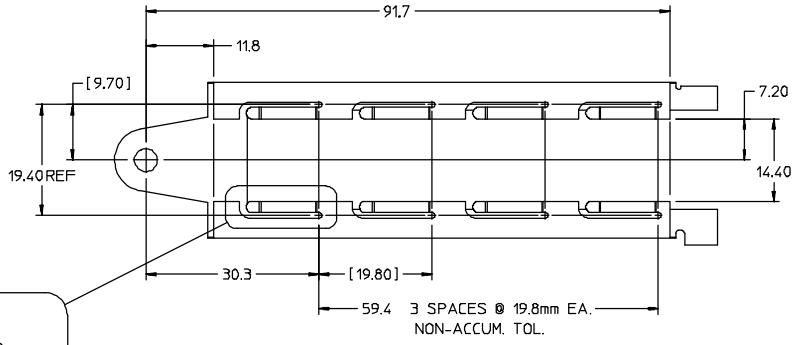
9 STEEL RULE DIES, SPECIAL PUNCHES AND OTHER UNIQUE TOOLING REQUIRED TO FABRICATE THIS PART TO BE PROPERTY OF APPLE COMPUTER, INC. AND SHALL BE PERMANENTLY MARKED WITH APPLE'S NAME AND APPROPRIATE APPLE PART NUMBER.

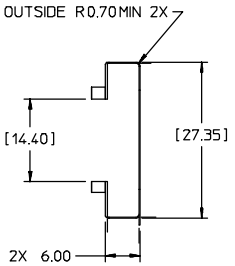
10 OPTIONAL STRIP MAY BE ADDED FOR SUPPORT DURING FORMING BUT MUST BE TRIMMED AWAY WHEN PART IS COMPLETED.











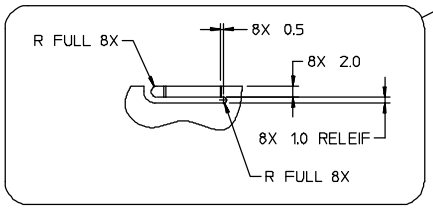


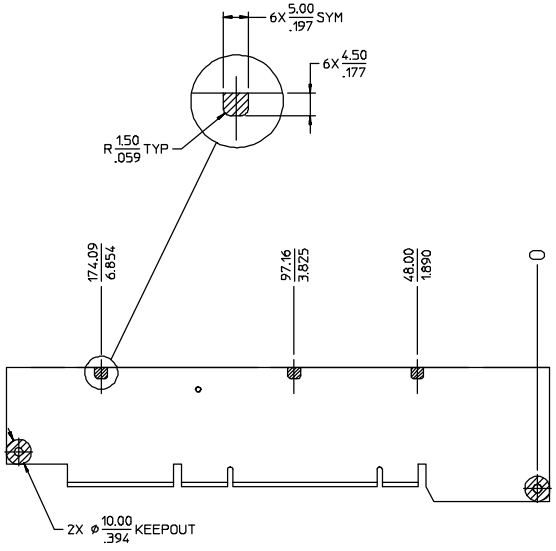
FIGURE D-10

EMI shield for the Macintosh Centris 660AV accessory-card bracket

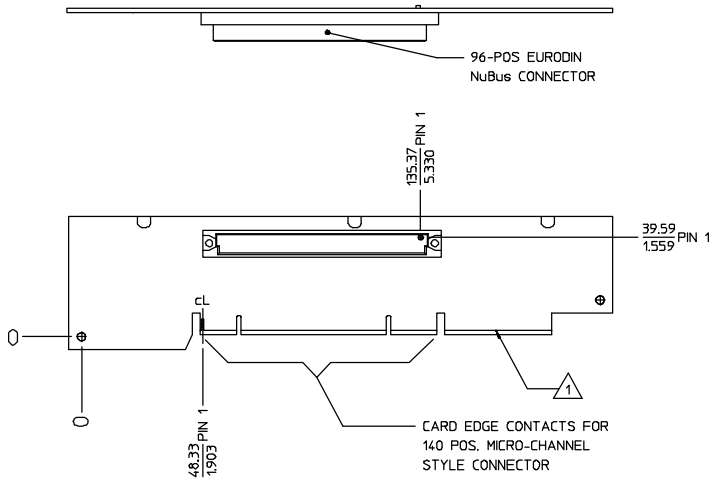
630-0450-10

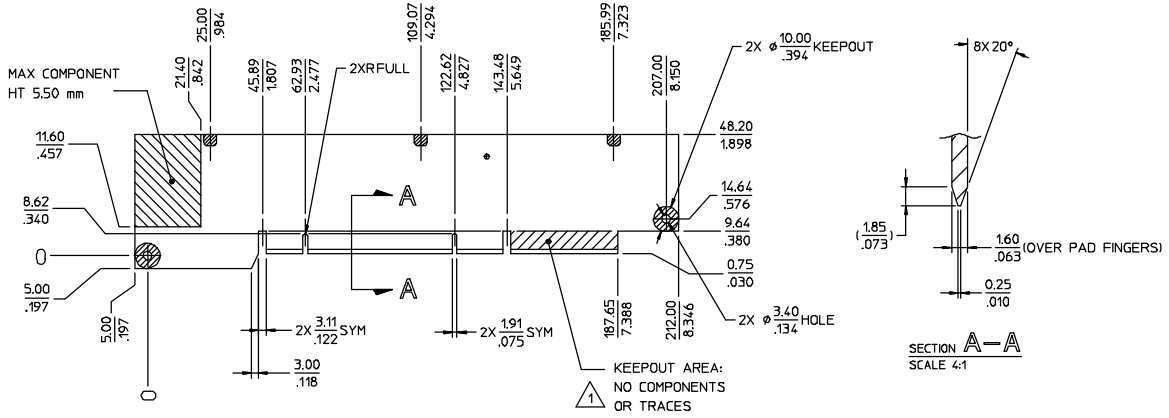
NOTES (UNLESS OTHERWISE SPECIFIED):

1. BOARD GEOMETRY ALLOWS THIS EDGE TO BE PLUGGED INTO 212 POSITION MICRO-CHANNEL STYLE CONNECTOR.



BACKSIDE





TOP SIDE
(COMPONENT)

FIGURE D-11

NuBus adaptor card for the Macintosh Centris 660AV

630-0450-12

Glossary

ADB See **Apple Desktop Bus.**

AIAO See **all-in/all-out buffer.**

all-in/all-out buffer (AIAO) A buffer that is completely emptied each time it is read.

ANSI American National Standards Institute.

APDA Apple's worldwide direct distribution channel for Apple and third-party development tools and documentation products.

API See **application programming interface.**

Apple Desktop Bus (ADB) An asynchronous bus used to connect relatively slow user-input devices to Apple computers.

Apple SuperDrive Apple's disk drive for high-density floppy disks.

AppleTalk Apple's local area networking protocol.

Apple Telecom External Clock Synchronizer (ATECS) A chip that synchronizes the DSP and sound subsystems to external clock signals received through a serial port.

application programming interface (API) A set of calls, instructions, and data structures in system software or a processor instruction set that application software can use to program the computer.

arbitration The process of determining which of several contending subsystems gains control of a bus at any given time.

ATA See **average timeshare available.**

ATECS See **Apple Telecom External Clock Synchronizer.**

ATT See **average total timeshare.**

ATU See **average timeshare used.**

AutoCache In digital signal processing, a visible caching model in which the DSP operating system performs all load and save functions automatically.

average timeshare available (ATA) The average amount of time per frame that the DSP is in sleep mode. This time can be used for timesharing tasks.

average timeshare used (ATU) The average amount of time per frame that the DSP spends executing timeshare tasks.

average total timeshare (ATT) The sum of **average timeshare available** and **average timeshare used.**

baud The maximum number of signal changes per second on a transmission line.

block transfer Data transfers of more than one longword at a time.

cache load In digital signal processing, the process of moving data from local memory to cache memory.

cache save In digital signal processing, the process of moving data from cache memory to local memory.

CAM See **Common Access Method.**

CAS See **column address strobe.**

Casper The code name for Apple's speech recognition human interface and technology.

CCIR Comité Consultatif International Radio.

CD-ROM See **compact disc ROM.**

CIVIC See **Cyclone Integrated Video Interfaces Controller.**

client In DSP programming, an application or system toolbox routine that uses the DSP.

Clifton Plus A functional equivalent of the Endeavor chip, used in the Macintosh Centris 660AV.

CMOS See **complementary metal-oxide semiconductor.**

codec A digital encoder and decoder.

color depth The number of bits required to encode the color of each pixel in a display.

column address strobe (CAS) A signal that captures the column component of a matrix addressing scheme from a bus that carries both row and column addresses.

command item A user-selectable button in a dialog box that can be operated by voice control—for example, the OK or Cancel button.

Common Access Method A specification for SCSI operation embodied in ANSI Standard X3T9.

compact disc ROM (CD-ROM) A read-only data storage disk 120 mm in diameter that can hold up to 550 MB of data.

complementary metal-oxide semiconductor (CMOS) A chip material and fabrication technology that features low power requirements and high noise immunity.

composite video A video signal that includes both picture information (with chroma and luminance combined) and the timing and other signals needed to display it. It is the standard signal form for communication between video cassette recorders, television sets, and other common video equipment.

container In DSP programming, a memory location occupied by a section.

convolution The process of smoothing alternate lines of a video signal to be shown in succeeding frames for a line-interlaced display.

CPU bus The bus connected directly to the main processor.

Cuda A microcontroller chip that manages the ADB and real-time clock, maintains parameter RAM, manages power on and reset, and performs other general system functions.

Curio An I/O chip that supports Ethernet, SCSI, SCC, and LocalTalk.

Cyclone Integrated Video Interfaces Controller (CIVIC) A video control chip that manages VRAM, generates video timing signals, and performs convolution where needed.

DAC See **digital-to-analog converter.**

data burst Multiple longwords of data sent over a bus in a single, uninterrupted stream.

delimiter A character or character pair used to set off embedded speech commands in speech synthesis.

DemandCache In digital signal processing, a visible caching model in which the program explicitly moves code and data blocks between on-chip memory and off-chip memory.

digital audio/video (DAV) expansion connector A connector in line with a NuBus slot that lets a plug-in card access digital sound and unscaled YUV video data directly.

Digital Multistandard Decoder (DMSD) A video chip that decodes the color information in NTSC, PAL, and SECAM video signals.

digital signal processor (DSP) A chip that performs fast real-time data processing tasks, such as speech recognition and audio compression.

digital-to-analog converter (DAC) Circuitry that produces analog electrical levels in response to digital data.

direct memory access (DMA) A process of transferring data rapidly into or out of RAM without passing it through a processor or buffer.

DMA See **direct memory access.**

DMSD See **Digital Multistandard Decoder.**

DRAM See **dynamic random-access memory.**

DSP See **digital signal processor.**

DSP map A data structure used by the Real Time Manager to hold intertask buffer information.

DSP operating system Software built into the DSP chip (independent of the Macintosh Operating System) that supports DSP programming and operation.

dumb lumpy algorithm A DSP operation that varies in running time and for which the program cannot determine before a frame how long it will take to run. See also **smart lumpy algorithm.**

duration control A control code in synthesized speech that determines the duration of one or more previous allophones.

dynamic random-access memory (DRAM) Random-access memory in which each storage address must be periodically interrogated ("refreshed") to maintain its value.

embedded speech command In speech synthesis, an instruction placed in text being spoken to indicate the rhythm, phrasing, modulation, or tone of delivery.

Endeavor A chip that generates video clock signals for a variety of different monitors.

ending prosody The modulation that distinguishes the end of a sentence or statement in normal speech.

Ethernet A high-speed local area network technology that includes both cable standards and a series of communications protocols.

exception vector table (EVT) A data structure in which the DSP operating system places system information, such as run-time variables and routine addresses.

facsimile (fax) A data format and transmission protocol for sending graphic images over telephone lines.

fax See **facsimile.**

FIFO See **first-in, first-out.**

first-in, first-out (FIFO) A data-buffering technique in which bytes are read out in the same order in which they were received.

floating-point format A data format that encodes real numbers, including decimals.

floating-point unit (FPU) A part of the MC68040 processor that calculates numbers in floating-point format.

frame In DSP programming, the repeating time period during which DSP code runs.

frame-based processing The DSP processing technique in which data is processed during a fixed time interval (a frame).

GCR See **Group Code Recording.**

GeoPort Apple's versatile, high-performance serial interface that communicates with most telephone systems worldwide by means of external pods.

GPB See **guaranteed processing bandwidth.**

Group Code Recording (GCR) The Apple recording format for floppy disks.

guaranteed processing bandwidth (GPB) A concept in DSP programming that lets the programmer make sure that the DSP will be able to complete its required tasks during every frame.

HAL See **hardware abstract layer.**

hardware abstract layer (HAL) An API layer in the DMA Serial Driver that makes the driver hardware independent.

HBA See **host bus adapter.**

host A Macintosh application from the viewpoint of a DSP program.

host bus adapter (HBA) The hardware associated with a specific SCSI bus adapter.

IEEE Institute of Electrical and Electronics Engineers.

I/O See **input/output.**

input/output (I/O) Parts of a computer system that transfer data to or from peripheral devices.

Integrated Services Digital Network (ISDN) A series of protocols that integrate voice and data transmission over telephone lines.

intermodule buffer A buffer used to pass data between DSP modules.

interrupt latency The maximum time that a program can delay responding to an interrupt without affecting the performance of the operating system or peripheral devices.

intertask buffer (ITB) A buffer used to pass data between DSP tasks.

ISDN See **Integrated Services Digital Network.**

ITB See **intertask buffer.**

LocalTalk The cable terminations and other hardware that Apple supplies for local area networking from Macintosh serial ports.

LocalTalk Patch Chip (LTPC) A chip that processes LocalTalk signals to and from the printer port.

logical unit number (LUN) A logical ID that identifies a SCSI device for the SCSI Manager.

LTPC See **LocalTalk Patch Chip.**

lumpy algorithm A DSP operation whose running time may vary from frame to frame. See also **smooth algorithm.**

LUN See **logical unit number.**

MACE See **Media Access Controller for Ethernet.**

Macintosh Universal NuBus Interface (MUNI) A control and interface chip between NuBus and the MC68040 processor.

MCA See **Memory Controller and Arbiter.**

MC68040 The model number of the Motorola processor used in the Macintosh Quadra 840AV and Macintosh Centris 660AV.

Media Access Controller for Ethernet (MACE) Circuitry within Curio that supports Ethernet I/O.

Memory Controller and Arbiter (MCA) A memory manager chip that controls access to ROM and RAM and performs arbitration for the CPU bus.

MFM See **Modified Frequency Modulation.**

Mickey A video encoder that produces composite and S-video outputs in NTSC and PAL formats.

mini-DIN An international standard form of cable connector for peripheral devices.

Modified Frequency Modulation (MFM) A recording format for floppy disks used by DOS computers.

module The basic unit of DSP programming. A module always includes DSP code and may also include data, I/O buffers, and parameter blocks.

MUNI See **Macintosh Universal NuBus Interface.**

New Age A controller chip for Apple floppy disk drives.

NTSC An acronym for National Television Standards Committee, the television signal format common in North America, Japan, parts of South America, and other regions.

NuBus A bus architecture in Apple computers that supports plug-in accessory cards. The Macintosh Quadra 840AV contains three NuBus slots.

Open Scripting Architecture (OSA) A standard for the operation of scripting systems (such as AppleScript and QuicKeys).

option item A radio button or checkbox in a dialog box, which may or may not be voice controlled.

OSA See **Open Scripting Architecture.**

PAL An acronym for Phased Alternate Lines, the television signal format common in Western Europe (except France), Australia, parts of South America, most of Africa, and Southern Asia.

parameter RAM Random-access memory in an Apple computer that retains data when the computer is turned off.

PBX See **Private Branch Exchange.**

PDS See **processor-direct slot.**

Peripheral Subsystem Controller (PSC) A control chip that manages DMA, handles system interrupts, and performs other tasks.

phoneme A single sound element of synthesized speech.

pitch In synthesized speech, the dominant frequency of an utterance.

pixel A single dot on a screen display.

Private Branch Exchange (PBX) The traditional transmission standard for voice telephone.

processor-direct slot (PDS) A connector in the Macintosh Centris 660AV only that lets a plug-in card access the CPU bus directly. The same connector also accepts a NuBus adapter card.

prosody The rhythm, modulation, and stress patterns of speech.

PSC See **Peripheral Subsystem Controller.**

RAS See **row address strobe.**

Real Time Manager A part of the system software for the Macintosh Quadra 840AV and Macintosh Centris 660AV that lets applications control the DSP.

real-time processing Data processing that occurs within the time constraints of another process, such as manipulating a digital video stream.

relative pitch control A control code in synthesized speech that determines the pitch relative to the pitch range for the current voice.

RGB Abbreviation for *red-green-blue.* A data format for each pixel of a color display in which the red, green, and blue values are separately encoded.

row address strobe (RAS) A signal that captures the row component of a matrix addressing scheme from a bus that carries both row and column addresses.

RS-232, RS-422 Standard communications protocols established by the Electronics Industries Association for serial data transmission.

scatter/gather (S/G) list A list of discontiguous locations in memory where a single run of data is located.

SCC See **Serial Communications Controller.**

SCSI See **Small Computer System Interface.**

SCSI Interface Module (SIM) A lower layer of the SCSI Manager 4.3, which interfaces with host bus adapters.

Sebastian A video color manager and digital-to-analog converter on one chip.

SECAM A French acronym for the television signal format used in France, Eastern Europe, the former Soviet Union, and many former French colonies.

section In DSP programming, a part of a module that is stored in a locked contiguous memory block.

section table A data structure maintained by the DSP operating system to keep track of active containers.

Serial Communications Controller (SCC) Circuitry on the Curio chip that provides an interface to the serial data ports.

S/G list See **scatter/gather list.**

SIM See **SCSI Interface Module.**

SIMM See **Single Inline Memory Module.**

Singer A digital encoder and decoder (codec) for analog sound data, including speech.

Single Inline Memory Module (SIMM) A plug-in card for expanding RAM that contains several RAM chips and their interconnections.

sleep mode The idle state of the DSP during the remainder of a frame after all required processing tasks have been completed.

Small Computer System Interface (SCSI) An industry standard parallel bus protocol for connecting computers with peripheral devices such as hard disk drives.

smart lumpy algorithm A DSP operation that varies in running time but for which the program can determine before each frame how long it will take to run. See also **dumb lumpy algorithm.**

SME See **Speech Macro Editor.**

smooth algorithm A DSP operation that always takes substantially the same time to run. See also **lumpy algorithm.**

speech macro A user-defined routine that specifies an utterance to be recognized plus a set of instructions to be followed when it is recognized.

Speech Macro Editor (SME) An application shipped with the Macintosh Quadra 840AV and Macintosh Centris 660AV that lets users edit speech macros.

Speech Monitor A background application that supports speech recognition.

speech rule An instruction to the Speech Monitor for recognizing and acting on certain words and phrases. Speech rules are kept in files in a special folder in the System Folder.

speech rules file A file in the System Folder or Extensions folder that contains speech rules.

Speech Setup control panel A control panel, accessible through the Apple menu, that lets users customize the computer's speech recognition behavior.

Standard Sound The DSP Sound Driver and a set of common sound-manipulation tasks, all of which are part of the Real Time Manager software.

S-video A video format in which chroma and luminance are transmitted on separate lines. It provides higher image quality than composite video.

task A group of DSP modules that always run together.

TIB See **transfer information block.**

timeshare processing Data processing that uses DSP facilities after real-time tasks are done, such as file compression.

transfer information block (TIB) A SCSI Manager data structure that communicates instructions about the transferring of data through the SCSI port.

transport (XTP) layer The upper level of the SCSI Manager 4.3, which interfaces with old and new SCSI drivers.

Truecolor A color range encoded by 24 bits.

VDC See **Video Data Path Chip.**

Versatile Interface Adapter (VIA) The interface for system interrupts that is standard on most Apple computers.

VIA See **Versatile Interface Adapter.**

Video Data Path Chip (VDC) A chip that converts video in YUV format to RGB format and performs video window scaling.

video frame buffer Memory that stores one or more frames of video information until they are displayed on a screen.

video RAM (VRAM) Random-access memory used to store both static graphics and video frames.

virtual memory (VM) A system of memory storage that translates addresses used by software into physical addresses that may be different.

visible caching A DSP programming technique in which off-chip code is stored on-chip in a cache accessible to the application.

VM See **virtual memory.**

voice A particular style of utterance in speech synthesis, such as male adult English.

voice synthesizer A utility that cooperates with the Speech Manager to generate speech of a particular kind.

volume control A control code in synthesized speech that determines the loudness of an utterance.

VRAM See **video RAM.**

XTP See **transport layer.**

YUV A data format for each pixel of a color display in which color is encoded by values calculated from its native red, green, and blue components.

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