Chapter 3

Starting Cadence and Library Management

This chapter starts by describing how to initialize the environment and to start and shut down the Cadence Design Framework II Environment. After that some tips on how to make the work easier will be given. Some window commands and how to mark objects, which works in the same way for several of the tools, are also covered. The chapter ends with a description of libraries and cells and how they can be treated.

3.1   Initializing and Starting

There are several different commands to start the environment depending on what tools and modules should be included in the environment. The following commands will describe how to set up Cadence 4.45 with the design kit for AMS 0.35 μm CMOS process.

The programs are available from the department, in the es-domain, and from the efd-machines used by the students. Since the environments are not identical there are two set of start-up scripts.

Cadence should always be run in a sub-directory. The programs will copy a lot of files and place them in the current directory. However, there will still be some files placed in the home-directory.

The command **inittde dig2001** (**ana2001** for the analog course) should be used on the efd-machines. The first time this is done the script will ask for confirmaton before building the setup files. Only an answer of "yes" will do. Then Cadence will start up unless a second parameter **nostart** is supplied.

At the department it is slightly more complicated. Follow this procedure

source ~amslibs/v3.30/ams_setup defines the search paths needed for Cadence and AMS.

ams_cds -mode fb -tech csx -tool artist that generates a number of initialization files from a set of templates. This is only required the first time Cadence is started. In the future only

ams_cds -mode fb is required since the information about technology and selected tools now resides in the setup files created.

The first window to appear is the *Command Interpreter Window* (CIW), fig. 3.1, shows one. The *Library Manager* should also emanate but more of it later.
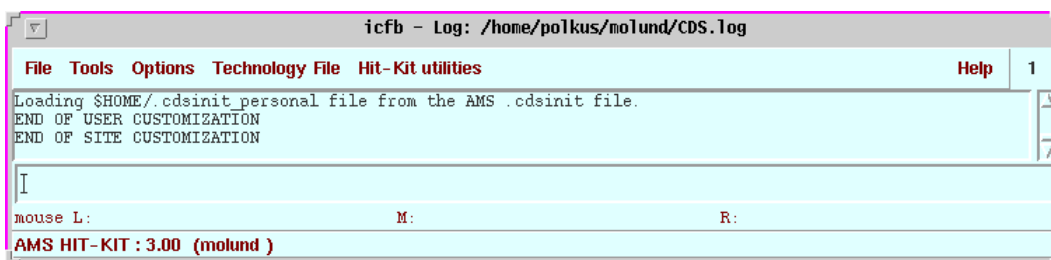

Figure 3.1: The Command Interpreter Window.

The CIW will log any messages concerning the start up phase, when all the initialization files are read, and report any errors in the window.

3.1.1 Syntax Conventions

The following typographic and syntax conventions have been used in this manual.

Design > Plot > Submit means that the command can be found among the menues in the window being curently described. Some frequently used commands also have a *bindkey* attached, i.e. a single button on the keyboard that will launch the command. This is written like this *Add > Wire Name* (**l**). It could also look like

CIW: File > New > Library when the command can be found in another window, in this case the Command Interpreter window.

Create New File stands for a name of a form or a field in a form.

3.1.2   Shutting Down a Session

The various tool windows in Cadence can be separately shut down by the command *File > Exit* or *Window > Close*. When shutting down the entire session it is sufficient with *CIW: File > Exit*.

Do not quit the X-window environment with Cadence applications still running, it might cause processes to hang and block licenses.

3.1.3   Working Strategies

The CIW should always be visible. Important log and error messages concerning the design work will appear here.

When a command is activated before the object that is to be affected it will remain active, i.e. the same command can be applied directly on another object. Contrary, if the object are selected first and then the command it will be executed only once. If a form command is to be used several times it is better to execute it with **Apply** since the form disappears with **OK**.

The active command is shown in the status banner of the working window and in the prompt line at the bottom the system gives instructions on how to complete the command. Any active command can be aborted by pressing the *Esc* button. If a command results in something unpleasant it can be undone by *Edit > Undo* (**u**). All the changes since last save can be removed with *Design > Discard Edits*.

Save the designs constantly during the work, both the computer system and Cadence can have a bad day.

If a form, that is called upon, does not appear on the screen it might be because it pops up below the ones already visible.

If an object cannot be selected, check the selection filters that stipulates what objects can be choosen, for the schematic editor the command is *Edit > Select > Filter*.

3.2   Menu Commands

The menu banner in the working window have some common titles for several of the different tools used. These are:

Tools The contents of the tool menu varies with the application. By choosing one of the tools the environment will change to reflect the new application. The

simulation environment are started from the schematic editor window in this way.

Design The design menu contain commands to save the design and to traverse in the hierarchy. Other designs can also be called upon.

Window This menu lists commands to zoom and pan in the design. It is also from here the tool is closed.

Edit The Edit commands are used to move, copy, modify, or delete objects.

Add or **Create** is used when new objects or instances are to be created.

3.3 Object Selection

In order to perform an operation on an object it has to be selected. The left mouse button is used for selecting objects. The selected object will be marked by a white rectangle. The objects that can be selected are controlled by *Edit > Select > Filter*. Default is all objects.

All objects selected can be deselected by clicking on a blank part in the working window or by pressing ctrl-d.

3.3.1 Selecting One Object

When the object is outlined by a dashed line it will be selected when the left mouse button is pressed. When a new object is selected the old one is dismissed.

3.3.2 Selection Sets

When several objects are choosen they form a *selection set*. Several object can be choosen at the same time by pressing, and holding down, the left button, then sliding the cursor to form a rectangle covering the interesting objects and then releasing the button. Objects can be added to the set by holding down the *shift* button when selecting, or *ctrl* to remove them.

3.4 Libraries

Cadence will store all design data in library files. Besides the schematics and layouts created by the designer a library will contain information specific to the design process, available layers, design rules etc. This information are compiled

to the library from the technology files, supplied by the vendor, when the library is first created.

3.4.1   The Library Manager

The *Library Manager* window, fig. 3.2, will start up automatically when Cadence is started, otherwise it can be started by *CIW: Tools > Library Manager*. This tool gives an overview of what libraries are available and what cells and their views they contain. Libraries and cells can be copied, renamed, or deleted from the *Library Manager*.
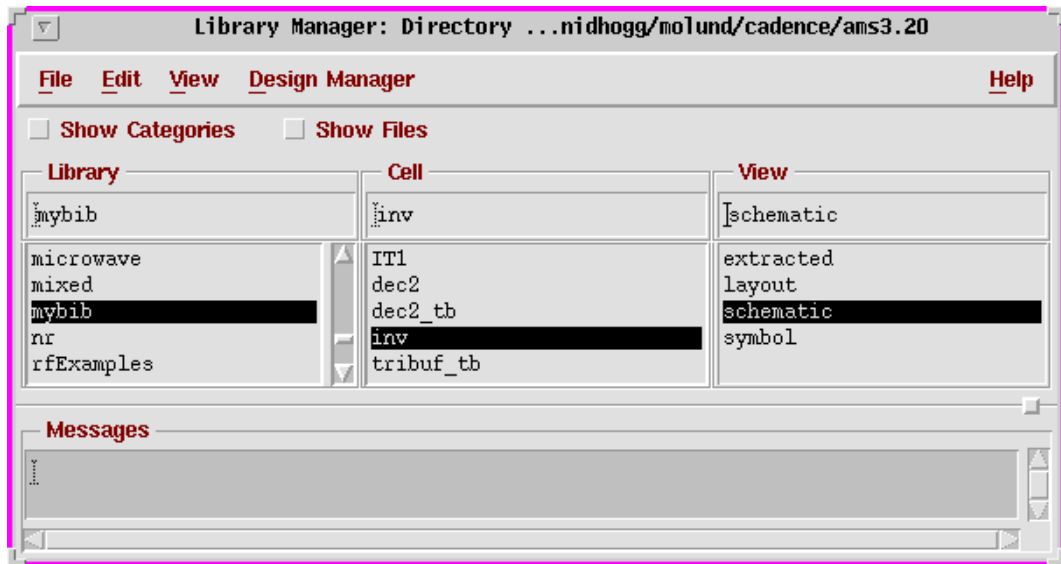

Figure 3.2: Library Manager

3.4.2   Creating a Library

Cadence starts up with a set of predefined libraries, both some basic signal and power generators from cadence and specific transistor models and cell libraries from the design kit. The designer cannot modify these so in order to do any designs a new, personal, library must be created which is done by the command *CIW: File > New > Library*. This will cause a form named **New Library**, fig. 3.3, to appear where the name of the library has to be entered. The path to the library is visible at the bottom of the form, default is the directory from which Cadence was started, which is a good choice. The button at **Attach to an existing techfile** should also be selected before pressing **OK**. In the new form popping up the technology can be choosen, select **TECH_CSI**.

Figure 3.3: Creation of a library

3.4.3 Creating a Cellview

New cells are created by *CIW: File > New > Cellview* and in the form **Create New File** apearing there are some selections to be made.

Library Name Where to store the cell. It must be a library in which the user may create new files. Usually this is only in the own libraries.

Cell Name The selected name of the cell. It is recommended that the name says something about the intended function of the cell.

View Name says what view is to be created. It can either be filled out with the appropriate name, *schematic, layout*, etc. or the tool can be choosen at **Tool** and the corresponding view name will be selected, *Composer-Schematic* for a schematic drawing or *Virtuoso* for layout.

3.4.4 Copying and Deleting

To copy libraries, cells, or views is a simple procedure in Cadence.

1. Mark the library or cell that is to be copied in *Library Manager*.

2. Activate the pop-up menu with the middle button on the mouse and select *Copy*.

3. In the form appearing the destination of the copy can be filled in. If a view is copied destination library, cell, and view has to be entered.

Views, cells, or libraries can also be deleted by the pop-up menu. To do this select the unwanted library object and click on *Delete*. After confirmation the object will wanish.

If a library needs to be copied but there is no path to it, say it belongs to an other designer, a link has to be defined for it. This can be done by a tool, fig. 3.4, started with *CIW: Tools > Library Path Editor*. Here the name and complete path to the name can be filled in. It is important to save (*File > Save*) the changes before quitting the *Library Path Editor*. When the link is ready the library can be treated as any other reference library.
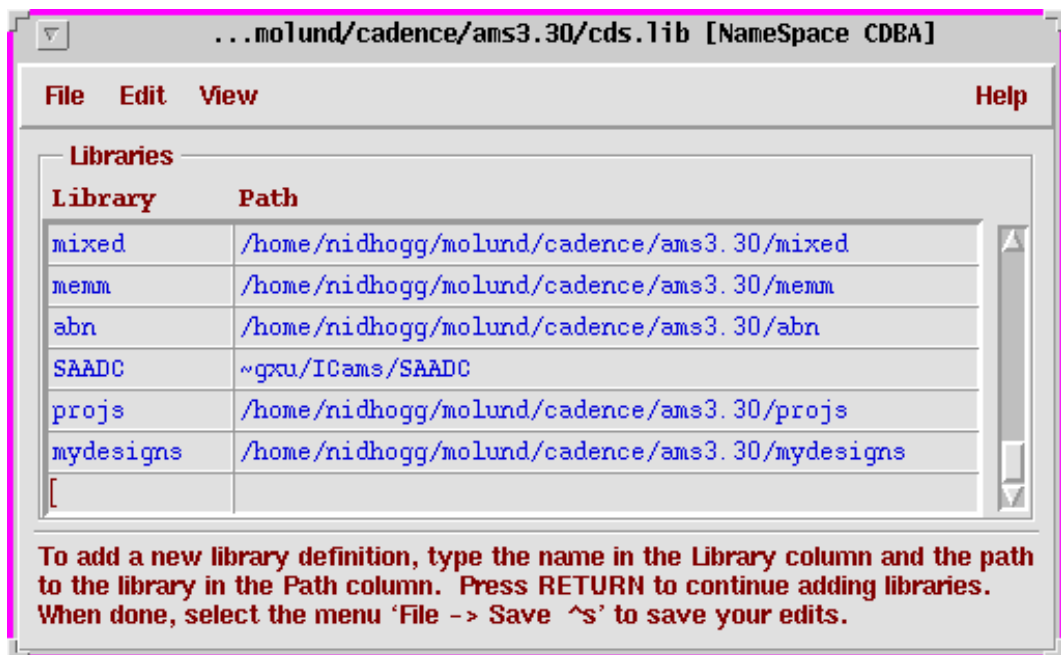

Figure 3.4: The Library Path Editor

3.4.5   Opening an Existing Cell

The pop-up menu in *Library Manager* is also used to open an existing cell for further editing. Select the wanted view and choose *Open* in the pop-up menu and the correct tool will start.