3

The Graphical User Interface

3.1 Environment Setup

Before you can start the CADIC system you have to set some environment variables in order to tell the system where its temporal and global data files are located. For example you have to specify a basic cell library which you want to use during a design. You can find some sample environment setups in the shell scripts within the directory `Examples`, a subdirectory of the top installation directory. The contents of the sample startup file `arith_circuits` is the following. As the name indicates this file sets the environment for some sample designs of arithmetical circuits (conditional sum adder as it is shown in chapter 4 and Wallace tree multiplier).

```
#!/bin/csh

setenv DAGDIR      ../Data/Designs/Arithmetic
setenv CELLDIR     ../Data/Cells/Ims/Right
setenv TECHDIR     ../Data/Cells/Ims/Power/Tech
setenv SLICEDIR    ../Data/Slices
setenv SIMDIR      ../Data/Sim
setenv MACROLIB    ../Data/Designs/Arithmetic
setenv PARLIB      ../Data/Designs/Arithmetic
setenv PWRDIR      ../Data/Power
setenv HILODIR     ../Data/Formats
```

```
setenv NBSDIR      ../Data/Formats
setenv CADENCEDIR  ../Data/Formats
setenv VENUSDIR    ../Data/Formats
setenv EDIFDIR     ../Data/Formats

../System/cadic
```

You can create yourself such a shell script for a special design. Another method to setup the environment variables is to add the needed commands to your `.cshrc` which is executed, when you start a new shell.

For the correct setup of the system environment you have to give values to the following variables:

- `CELLDIR`: This variable points to the library of basic cells, you want to use during the design. The cell libraries in the current CADIC distribution are contained in the subdirectories `Data/Cells` of the top installation directory. A description of the available libraries is given in chapter 11. Note that you cannot use the system, if `CELLDIR` has no legal value.

- `DAGDIR`: This variable points to the directory, which contains the schematic inputs of your designs. Initially this directory may be empty. Note that you must set this variable to a legal value, i.e. the given directory must exist. If this is not yet the case, you must create it with the command

  `mkdir -p <`*directoryname*`>`

- `TECHDIR`: This variable points to the subdirectory which contains technological data about the cells in the basic cell library. Normally it is just a subdirectory of `CELLDIR` which is called `Tech`. If you only want to enter a design, it is not necessary to set this variable. In the case that you do not set it, you cannot use the tools for power supply and place&route. If you have already set the variable `CELLDIR`, you can simply use the command

```
setenv TECHDIR $CELLDIR/Tech
```

- SLICEDIR: This variable points to a directory, which will contain data files that are temporarily generated during the design process. If you do not set this variable to a legal value, i.e. an existing directory, you cannot use the tools for power supply and place&route.
- PWRDIR: Just like SLICEDIR this variable points to a directory for temporarily generated data. If you do not set this variable to a legal value (existing directory) you cannot use the tool for power supply.
- SIMDIR: The directory given by this variable contains data which is generated by the tool for logic simulation. If you want to use the simulator, you must set this variable to a legal value.
- MACROLIB, PARLIB: These two files contain information about created macros and parameterized macro cells. They are used by the schematic editor. It is recommended to set these variables to legal file names.
- HILODIR, NBSDIR, CADENCEDIR, VENUSDIR, EDIFDIR: These variables can be set to directories for files, which are created by the netlist converter. They contain specific exchange formats which can be used as input for commercial design systems. In order to distinguish between the different formats, you can set each of these variable to its own value.

If you do not like to distinguish between the different directories for the temporarily generated data, you can set all these variables (SLICEDIR, PWRDIR, SIMDIR, HILODIR, NBSDIR, CADENCEDIR, VENUSDIR, EDIFDIR) to the same value, e.g. to /tmp or /usr/tmp.

3.2 The Components of the Graphical User Interface

If you startup the CADIC system, the basic graphical user interface is displayed on your screen as it is shown in figure 3.1.

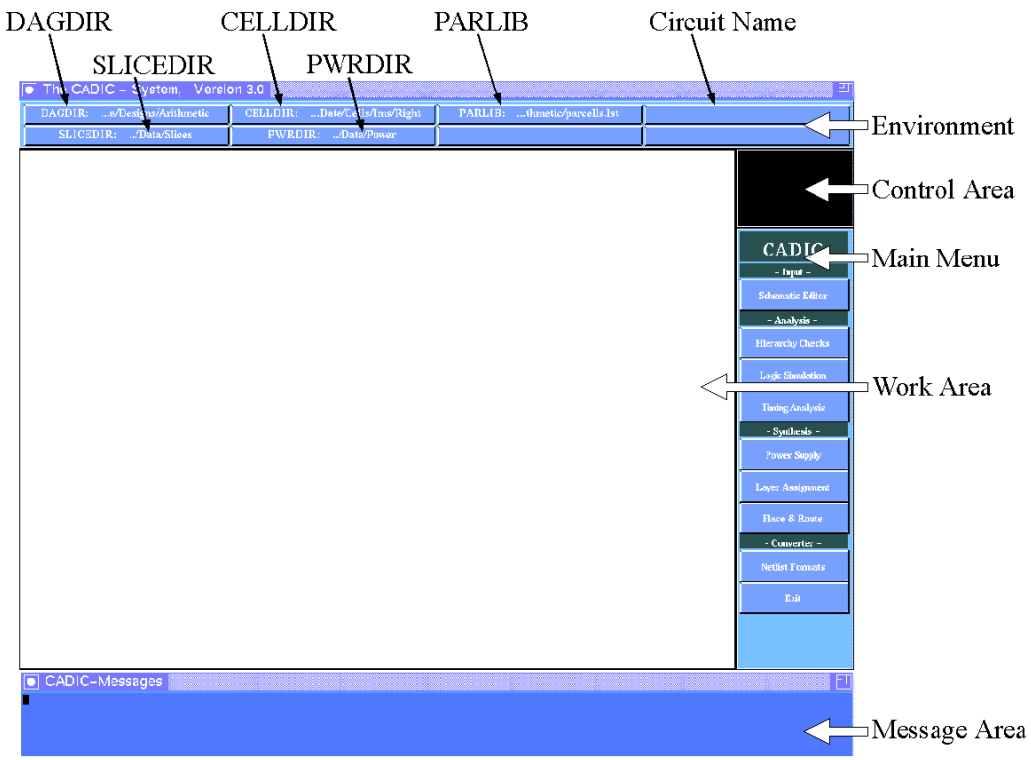

Figure 3.1: Basic structure of the graphical user interface

The structure of the user interface is basic to all integrated design tools. But each tool can add its own components, as dialog windows or information displays. The basic graphical user interface can be divided into the following parts:

- *Work area*: This is the main part of the user interface. It is used to display the currently loaded circuit. The display mode depends on the active tool. During an editor session you will see the netgraph of the circuit which can be interactively modified, as it is described in chapter 4. This mode is also used for other design tools, for example during logic simulation. Here the simulation results are displayed directly on the graphical input of the circuit. Another display mode is used, when the place&route tool is active. In this case the wires have physical widths, and they will be displayed as polygons as it is described in chapter 9.

- *Environment*: The environment area is divided into eight panels. Here you can see the values of the environment variables of CADIC . The library of basic cells currently used is displayed as well as the directory where your design files are located. The right panel in the first row which is initially empty, will contain the name of the currently loaded circuit.

- *Control area*: If you change the current view of a loaded circuit by zooming or scrolling in the work area, you can see in this window the relation between the currently visible part of the circuit and its total area.

- *Message area*: Control and error messages of CADIC are displayed in this area. Every integrated design tool prints information messages while it is performing its task. If you are using a window manager (`twm`, `mwm`, `fvwm`, ...), you will see that this window is decorated as a usual shell window. This enables you to change its size, if the default height of five text lines is not sufficient. You can also add a scroll bar to the window, if you want to take a look at some previously displayed messages. For information about how to change the size of a window or how to add a scroll bar, you should look at the manual of your window manager.

- *Main menu*: The menu line of CADIC is organized hierarchically. At the topmost level you will see the list of integrated design tools which are grouped according to their specific tasks (e.g. there are some tools for analysis and others for synthesis of the currently loaded circuit). Each tool has its own menu, sometimes including several sub menus. You activate a certain menu or function by pressing the left mouse button, when the appropriate push button is highlighted. To leave an activated menu or sub menu you simply must press the right mouse button within the menu line, when you are in menu selection mode.