

## BLT2 Instruction manual

### B2 Spice:

B2 Spice is the logic design editor that you will be using for your top level schematic after hand design. Begin by opening up B2 Spice. There will be a blank circuit window opened. Be sure that you are in digital mode by clicking *File* menu and checking to see if there is a *Switch to Digital Mode* option. If not, then you are already in digital mode. You may either save this circuit in your desired subdirectory or you can close it and open a previously saved circuit through the *File* drop menu. Before continuing, you must be sure to only use parts in the BLT2 database. Select *File > Select Database... >* browse for *BLT2\_database.mdb*.

To add digital devices to the window, you may either browse the database by selecting *Digital Devices > Browse for Part...*, or use the *Devices* window located on the left of your screen. In both cases, parts are named very simply to describe function and input size. Double click a device to add it to circuit window. Click *OK* when *Device and Section* pops up unless you are on the last option which contains *PWRN*. In this case, click the *New Device* button and select the first/top section, then click *OK*. An easy way to bypass this effect is to simply use copy and paste once you have already put the desired part in the circuit window.

When using the tri-state buffer or the multiplexor, please note that only the top device may be used in your circuit, the bottom three must be left hanging. In addition, when using the multiplexor, the enable (En) MUST be connected to ground permanently. This will keep the device constantly enabled during simulation and is necessary because L-Edit's multiplexor does not support an enable port, so to ensure proper function of your MOSIS chip, the enable must be held low.

Included in the database are a seven segment display and a light bulb. This is for DEBUGGING ONLY, you may not leave it as an output when you are ready to write the EDIF file.

Create your circuit using the included devices. Include input/output ports.

Input ports MUST be immediately followed by a buffer before connecting to the rest of your circuit (i.e. the output of your input port MUST ONLY connect to the input port of a buffer, the output of that buffer may then be connected to any device(s) in your circuit).

Input and output ports may only represent a single bit.

It is also imperative that you DO NOT change any of the device model parameters or the instance name of any device (except input/output ports, these you should change so it's easy to tell what they represent). This will make your circuit untranslatable by BLT2.

When your circuit is finished and ready to be exported, it's time to create the EDIF netlist. Select *File > Create EDIF File...*, and save the file in your subdirectory with an appropriate name.

Note that if you used combiners or splitters anywhere in your circuit, there will be an error message that pops up stating that there is an error connecting pins. Despite the error message, the EDIF file will still be written correctly. Depending on how many combiners/splitters you used, there could be many of these error messages that pop up. (We find it easy to just hold enter until they end)

Save your circuit and exit B2 Spice.

BLT2:

Open BLT2 by double clicking on the executable. Select the EDIF file you created by clicking the *Input File* button. Use the drop menu to select which L-Edit cell library you would like the tpr file to be formatted for (unless you are Dr. Osterberg, you probably want to pick *morbn20d.tdb*). Click *Run*. When clicked, BLT2 will ask you where to save the tpr file. By default, it will be put in the same subdirectory as the EDIF file with the same name (with *.txt* replaced with *.tpr*). There is also a *Help* button for further information.

L-Edit:

Open L-edit. Browse for your cell library via *File > Open...* (in most cases, this will *morbn20d.tdb*). Set your unit distance to *Microns*.

To create the final silicon layout, *Tools > SPR > Place and Route...*, then click *Setup...*, ensure that *morbn20d.tdb* (or other cell library) is the *Standard cell library file* and select your translated tpr file as the *Netlist file*. Select *Padframe Setup...*, then click the *Layout* tab, and set the *Width* and *Height* in microns. Click *OK > OK > Run*.