

Q: If I'm unlucky enough to have a chip but little else, how should I go about testing it?

Using the HILEVEL AutoLearn

As long as you are satisfied that your chip is a "golden part" you may be able to use AutoLearn for obtaining vectors. You will still need to do the following:

- Prepare a DUT board and PinList. For this you will need (at the very least) information about the pin configuration of your DUT.
- Create a SET file as illustrated in the User Manual Section 5, **Defining Pins**. Use the PinList information you (hopefully) obtained for the step above. In addition to this you will need timing information as well as logic level settings. Be sure to save the file as soon as you finish your definitions.
- Assign **DUT Power** and perform the **Run Setup**. This requires that some specifications on the DUT be available to determine the test rate and Vcc. You won't need to enter the Last Vector and Stop Vector yet.
- Create valid stimulus vectors to properly exercise the DUT. If you do not have intimate knowledge of the DUT, you'll at least need a thorough truth table.

AutoLearn works by running the stimulus vectors that you've created in the **Vectors** window into the DUT (with applied timing and Vcc defined earlier) and capturing the resulting output data in the **Analysis** window. This captured data will be displayed at first with many failures present, but disregard that until AutoLearn is finished. The captured results will be written into the Expected Response Vector RAM, and viola! You have just created a functional test vector set. Click the RUN button and you will notice that the "failed" message is replaced with "passed".

You can see that it is important to have correct information about timing in order to acquire meaningful DUT output data. If you do not strobe the output compare delay at the proper time within the cycle you may miss the valid output data. If you are unsure about the valid output strobe time, it is somewhat common that the output compare strobes are set late in the cycle. For example, with a test rate of 100ns the outputs are often valid at around 80ns or later. But if one of your inputs is a dynamic output enable that "goes away" before the end of each cycle, your compare strobe must be applied before that trailing edge. Otherwise, your DUT output pins may be disabled before you compare the expected output.

Similarly, if you have input data that requires a minimum amount of setup time before a clock latches it in, be sure to account for that. A good way to look at your timing relationships is by using the Vector Graph mode of display. After entering some vectors and defining timing, open the Vector window and click the Vector Graph icon on the Extended sidebar.

The final step is to save the vector file with the extension TRN. You can either use the "File" or "Vector + Upload" function on the command bar, or the "L" button on the toolbar to upload your vectors. AutoLearn is also covered in Section 12 of the User Manual.

Related info

Q'nApp #E1: The PinList function

Q'nApp #E26: Functional Test Preparation