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VLSI III: Test and Fabrication of VLSI Circuits

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Exercise 01

Understanding datasheets

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1 Goal of the Exercise

The datasheet is *the* document that tells how a chip can be used in practice. It contains all information that allows a designer to understand what is needed to make the chip work and lists all relevant technical parameters. You should be able to take any chip into operation if there is a *decent* datasheet.

In this exercise the goal is to learn what information needs to be specified in a datasheet. At the end of the exercise you should be able to have a better idea about what a *good* datasheet looks like.

2 What to do

The following is a list of industrial datasheets for relatively small IC designs from a variety of applications and manufacturers. Use these as a reference.

Company	Name	URL
Fairchild	74LS138	http://media.digikey.com/pdf/Data%20Sheets/Fairchild%20PDFs/DM74LS138.pdf
Microchip	PIC16F5X	http://ww1.microchip.com/downloads/en/DeviceDoc/41213D.pdf
Atmel	TS68C000	http://media.digikey.com/pdf/Data%20Sheets/Atmel%20PDFs/TS68C000.pdf
ST	STOTG04E	http://www.st.com/web/en/resource/technical/document/datasheet/11931.pdf
TI	ADC081S021	http://www.ti.com/lit/ds/symlink/adc081s021.pdf
NXP	PCA2125	http://www.nxp.com/documents/data_sheet/PCA2125.pdf
Maxim	MAX6682	http://datasheets.maximintegrated.com/en/ds/MAX6682.pdf

Everyone will be given one datasheet prepared by students that previously worked on an IC design project at IIS.

Assume that you need to make this IC work, list everything that is missing from your sample datasheet and explain why this is important. Keep your explanations brief, for example:

Note: Supply voltage has not been specified, can not run the chip as is, a higher value might damage chip, a lower value may result in performance targets not being met.

Submit a short document containing what is missing for the third week during the lecture.

3 Discussion Points

The following are some questions to which you should have better answers following the exercise.

- Are there differences between academic IC designs and industrial designs with respect to information presented in the datasheet?
- Does information related to testing belong in a datasheet?
- The datasheet is meant for taking a chip into operation. What additional information would be needed to facilitate knowledge transfer within the design house so that the development of the design could continue?
- If a design has multiple operating points (i.e. different possible VDD) what is the most practical way to convey this information in a datasheet?
- Are printed datasheets outdated? Is there a way of making a more interactive datasheet? What benefits could be expected from such a system?