



## Needs and Requirements

### Customer Statement:

Design, implement, and tape out an Application Specific Integrated Circuit (ASIC) which will decode dual tone multi frequency (DTMF) signals.

### Customer Needs:

No.	Need/Statement
1	Uses an ASIC
2	ASIC decodes multiple digitized tones
3	ASIC interfaces with a microcontroller
4	ASIC can be taped out by efabless foundry
5	Software prototype of entire design
6	FPGA prototype of the ASIC
7	User's guide
8	Hardware design done in Verilog



# FAMU-FSU College of Engineering

## Customer Requirements:

No.	Need	Requirement/Interpretation
1	1, 4	Will meet efabless dimensions
2	1, 4	Will have verified tape out file for efabless
3	7	Will have user's guide for FPGA prototype, Software prototype, and final design
4	1, 3, 8	Will have Verilog interface submodule enabling ASIC and microcontroller integration
5	1, 2, 8	Will have Verilog submodule capable of decoding different tones enabling ASIC decoding
6	2, 5	Will have full MATLAB simulation of design
7	2, 3, 6, 8	Will have Verilog code for simulation on FPGA

## Discussion:

The customer provided documentation detailing all the goals and objectives of the project including all deliverables. The Needs and requirements were interpreted from this document, but because the customer was an engineer, they were all technically detailed requirements. Further questions and follow up with the customer resulted in some clarification such as what standard would be used for interfacing with the microcontroller (I2C) and the requirements to have our ASIC manufactured by efabless. An FFT will also be used for this design, which will require some additional research to decide which algorithm will be most optimal for our design.