

## Final Project

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### Submission Guidelines:

1. You can work as teams. Each team contains no more than five people.
2. Submit your report on Oct. 29 . The presentation will be on Nov. 1.
3. Attached along with this instruction is the report template. Follow the given format. Your submission should include:
  - [1]. Title, Abstract, Index, Author
  - [2]. Introduction: why this work is worth designing, application background, etc.;
  - [3]. Spec: how to determine the specs (if you choose a CARFIC project you are currently working on)
  - [4]. Architecture: how to determine the topology
  - [5]. Design approach
  - [6]. Design calculations
  - [7]. Complete circuit schematic with device dimensions, passive component values and testbench with simulation condition.
  - [8]. Simulation results: tables and plots
  - [9]. Discussions/conclusions: what you have done
  - [10]. References
4. Your submission should be in English;
5. Print/Write your submission in A4 paper with your name and student ID on the cover page.
6. Do not forget to staple your pages together.

### Project Description:

1. Choose one topic from the given projects. Design a circuit satisfying the corresponding specs **INDEPENDENTLY** .
2. You are encouraged to use novel topology from papers. Try to optimize some specific parameters such as power dissipation, NF, IIP3 etc. A better circuit performance will earn you a higher score.
3. You could also choose the circuit you are currently busy with for CARFIC projects. Note that if you choose the CARFIC you are working on, a complete background information including what your job is, how the specs are determined, etc. should be clearly described in “Introduction” of your submission.
4. Tool: Cadence SpectreRF
5. PDK: TSMC0.18 RF CMOS



**6. Presentation**

- a) **Presentation will be held on Nov. 1, 2012**
- b) **Prepare slides for your presentation in English**
- c) **Your presentation should be within 10 minutes**
- d) **Try your best to make your presentation easily understood.**

**7. Grading: 50% by TA and Professor Jianjun Zhou and 50% by peer review.**

**Project Topics:**

**Project 1 Wideband LNA design**

<b>Specs</b>						
<b>Parameter</b>	<b>Comments</b>	<b>Min</b>	<b>Nom</b>	<b>Max</b>	<b>Units</b>	
Supply voltage		1.8	2.0	2.2	V	
Supply current			6	8	mA	
RF frequency			470-870		MHz	
S11, S22			<-10		dB	
S12			<-10		dB	
S21			>15		dB	
NF			<3.5		dB	
IIP3@652MHz&668MHz			>5		dBm	

**Project 2 Narrowband LNA design**

<b>Specs</b>						
<b>Parameter</b>	<b>Comments</b>	<b>Min</b>	<b>Nom</b>	<b>Max</b>	<b>Units</b>	
Supply voltage		1.8	2.0	2.2	V	
Supply current			6	8	mA	
RF frequency			1.575		GHz	
S11, S22			<-10		dB	
S12			<-20		dB	
S21			>15		dB	
NF			<3		dB	



IIP3@1.575GHz&1.580GHz

>-20

dBm

### Project 3 Active Mixer

Specs					
Parameter	Comments	Min	Nom	Max	Units
Supply voltage			1.8		V
Supply current			5	<8	mA
RF frequency			1.57542G		Hz
RF bandwidth			2.046M		Hz
LO frequency			1.569G		Hz
Gain		>12	15		dB
Gain variation@ RF BW			0.8		dB
NF			12	<15	dB
IIP3@gain=15		-10	-8		dBm