Gain and Phase Analyzer

Interim Report

2014, December 12th

BINGHAMTON UNIVERSITY
STATE UNIVERSITY OF NEW YORK

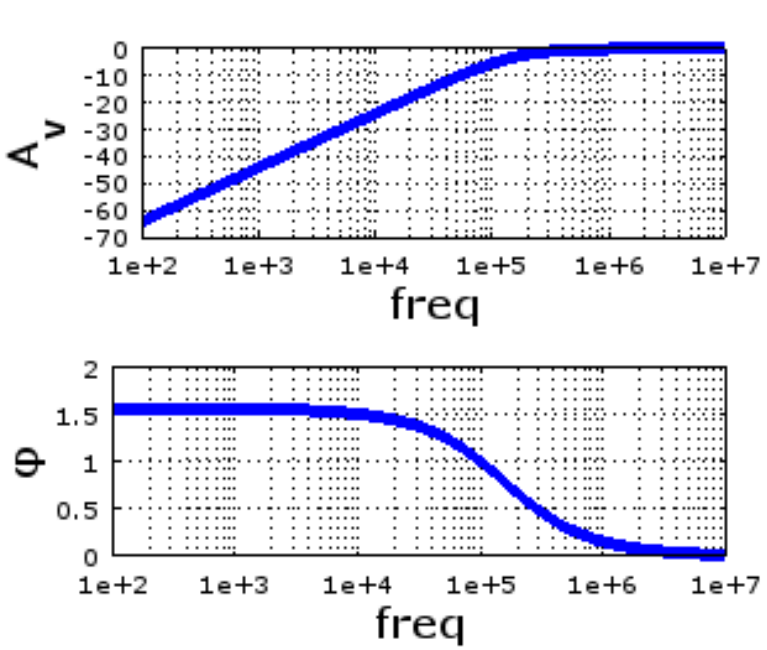
WCP-52
Gain and Phase Analyzer

Gain and Phase Analyzer

- Purpose
- Requirements
- Design
- Schedule
- Budget
- Next Steps

Purpose

- Test the performance of filters, amplifiers
- Generate Bode plot with amplitude and phase



Uses

Applications

- Signal filters
- Signal amplifiers
- Control systems

Education

Testing and characterizing circuits

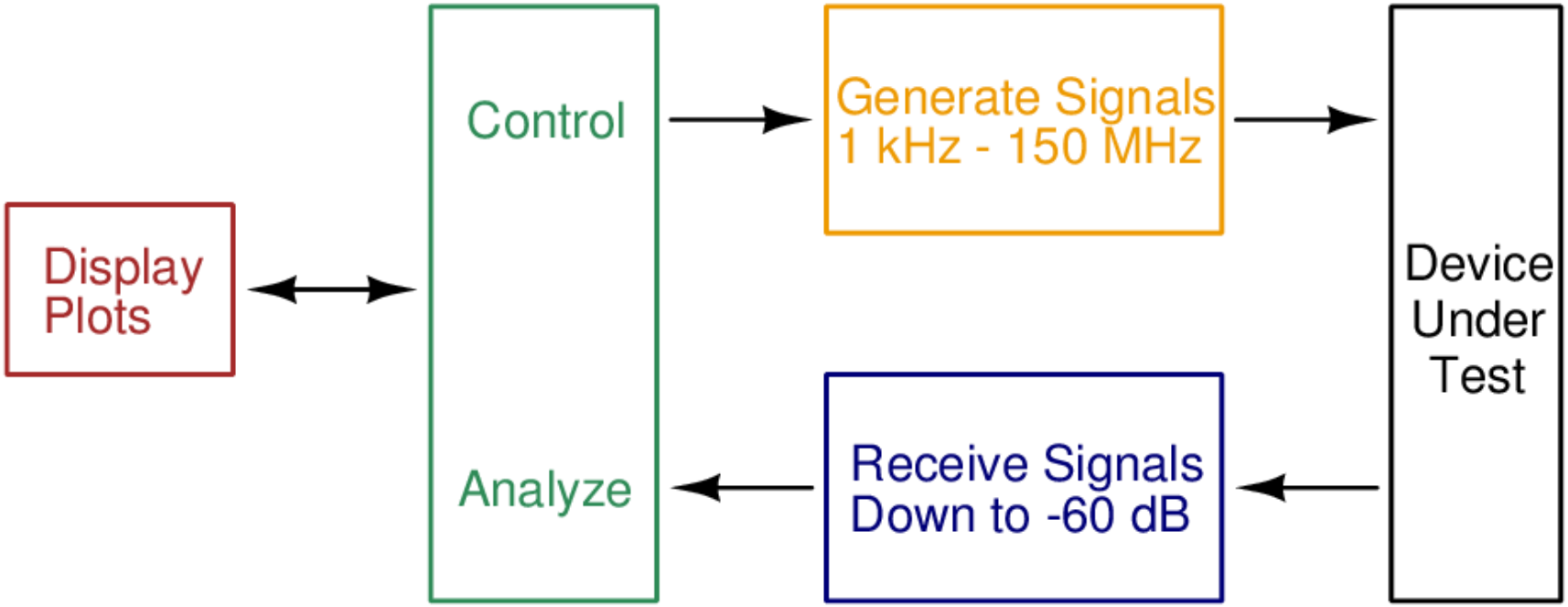
Design

Why?

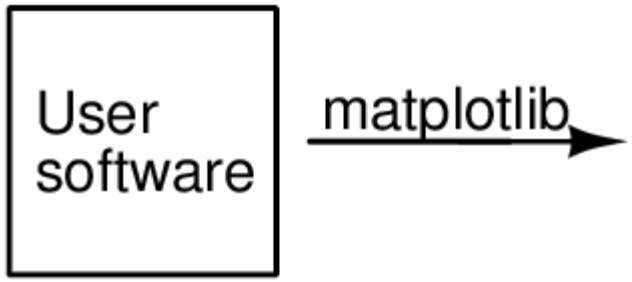
- Current state of industry
  - Large
  - Expensive
  - Learning curve
  - Students can’t see how it works!

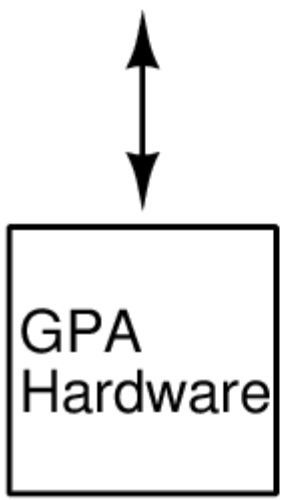
- Our Goal
  - Portable
  - Cost around $200
  - Easy to use for students and teachers
  - Open source

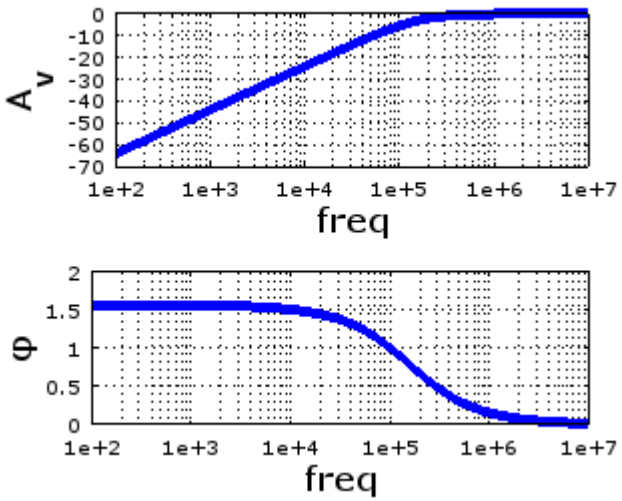
Requirements

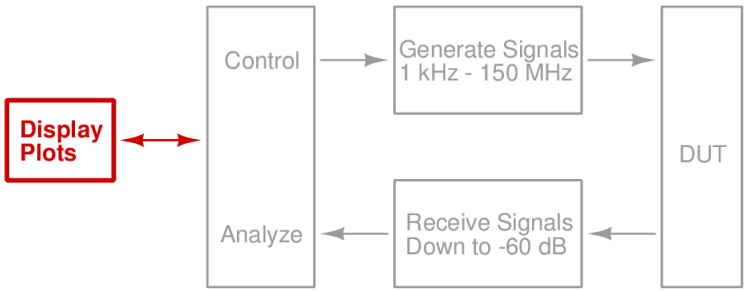


Design — Software

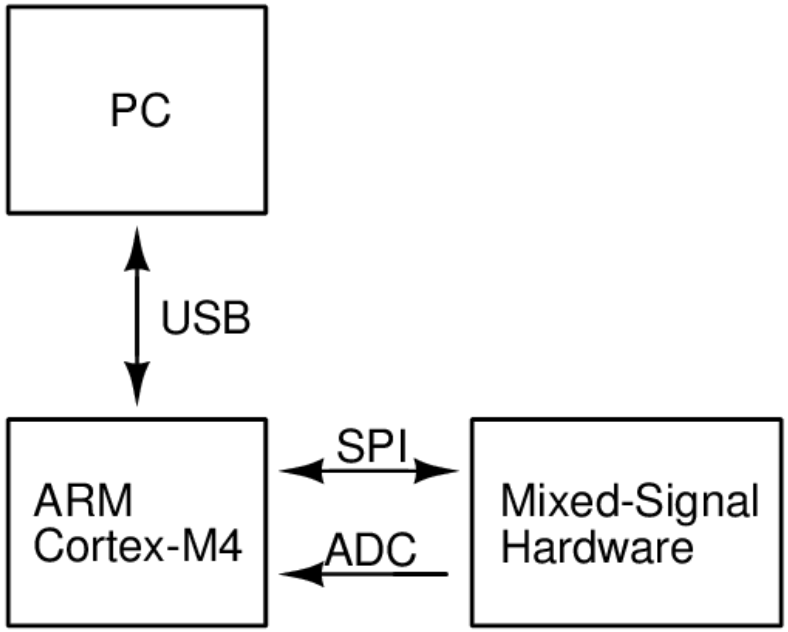


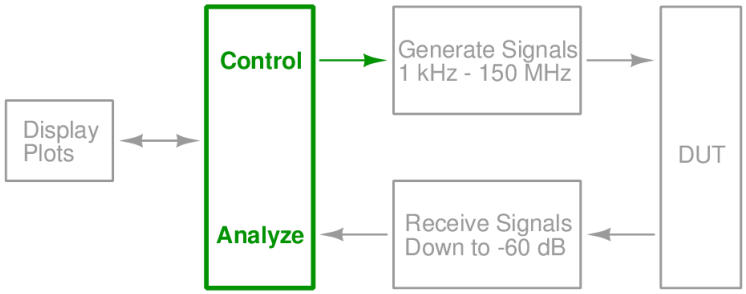




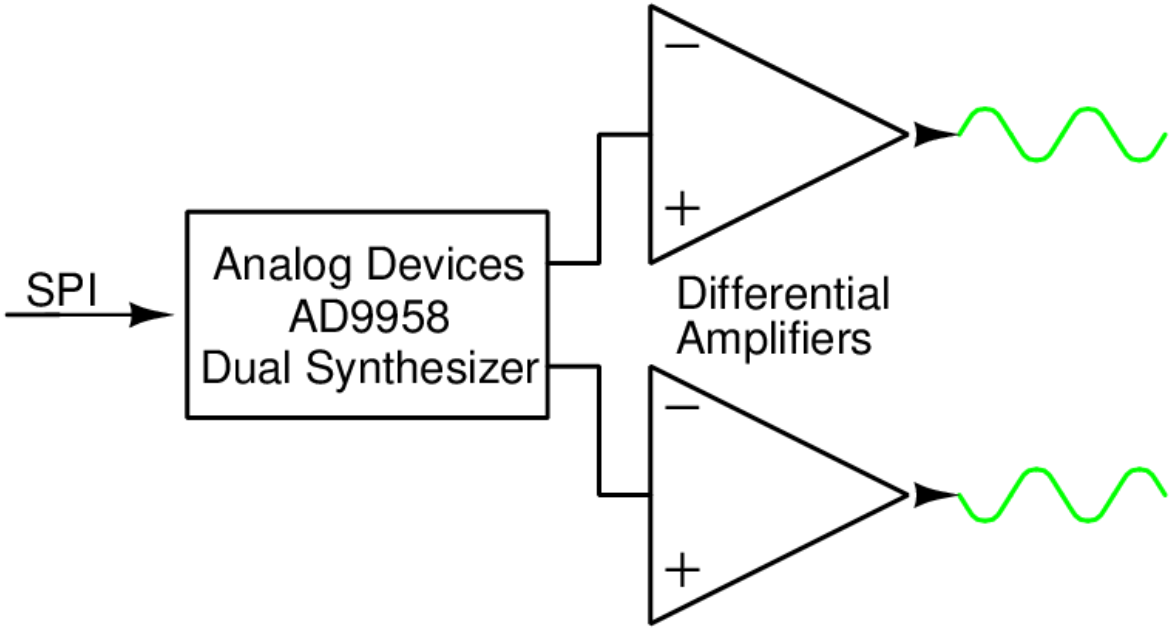


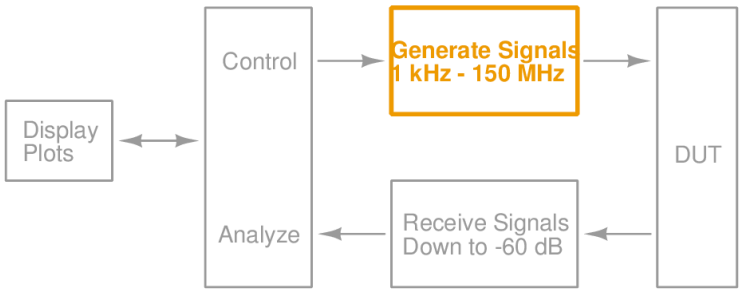
Design — Microcontroller

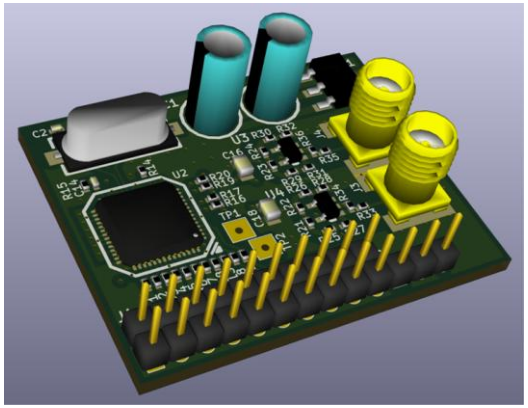




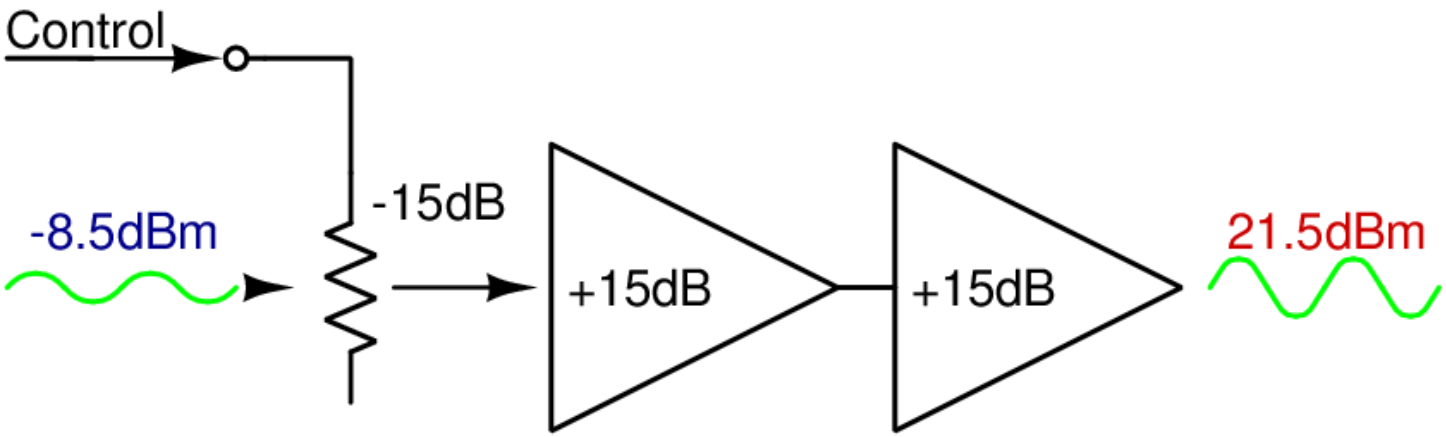
Design – Signal Generation

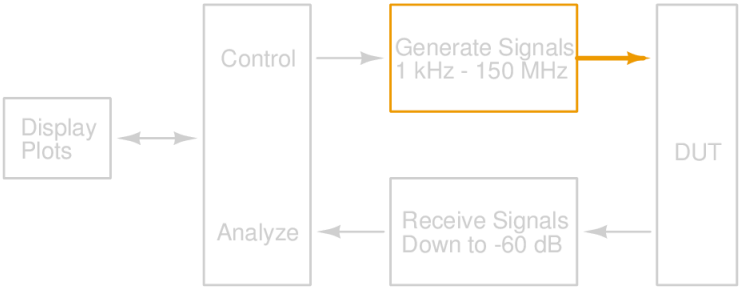


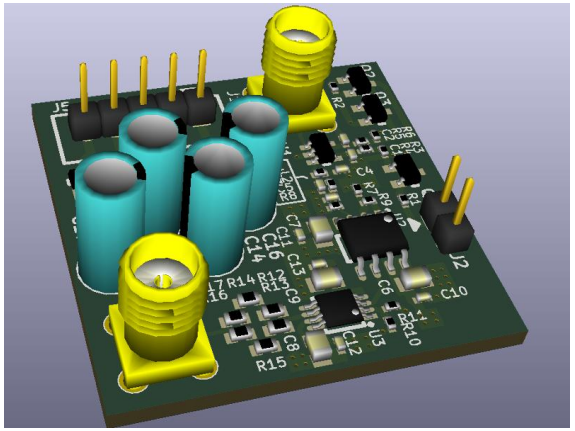




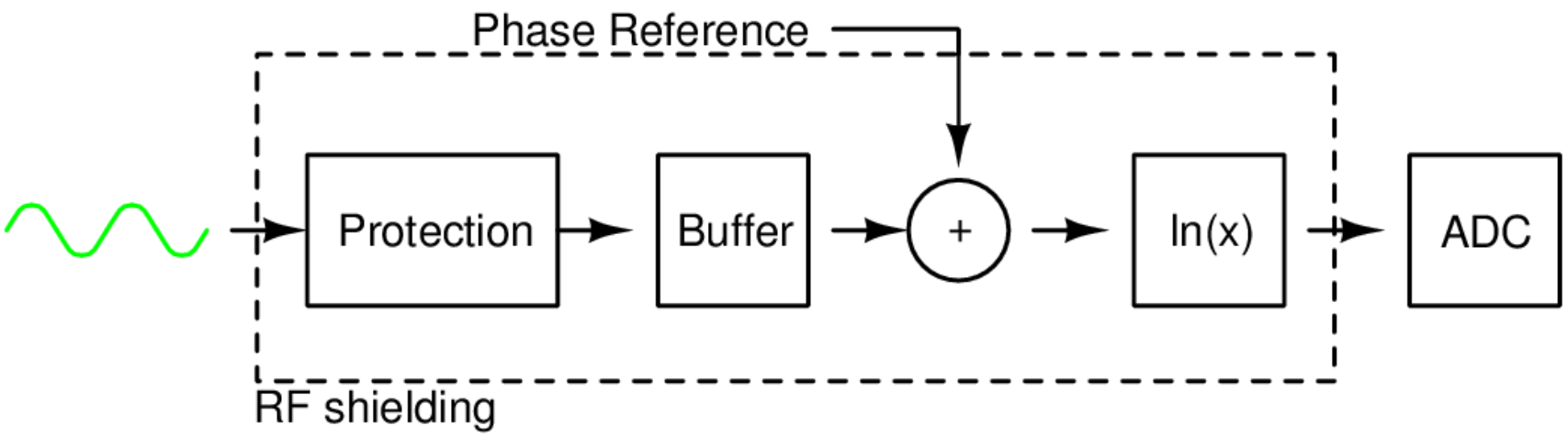
Design – Signal Output

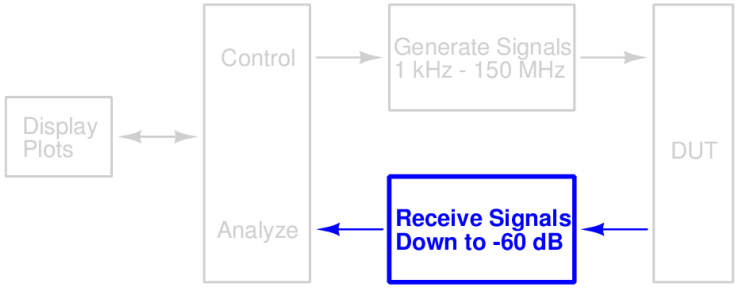


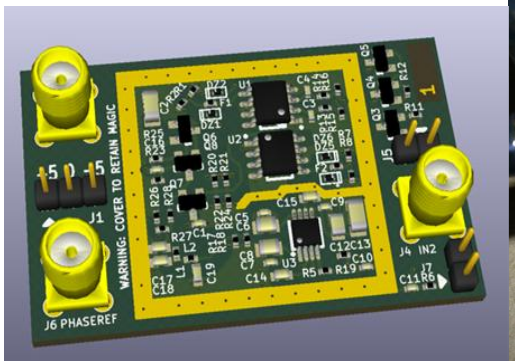


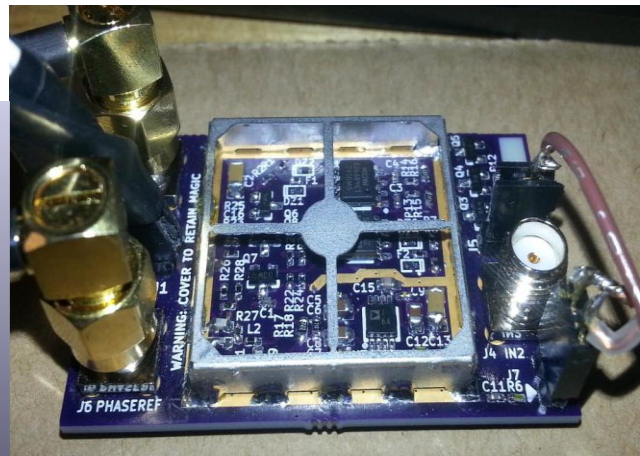


Design – Detection

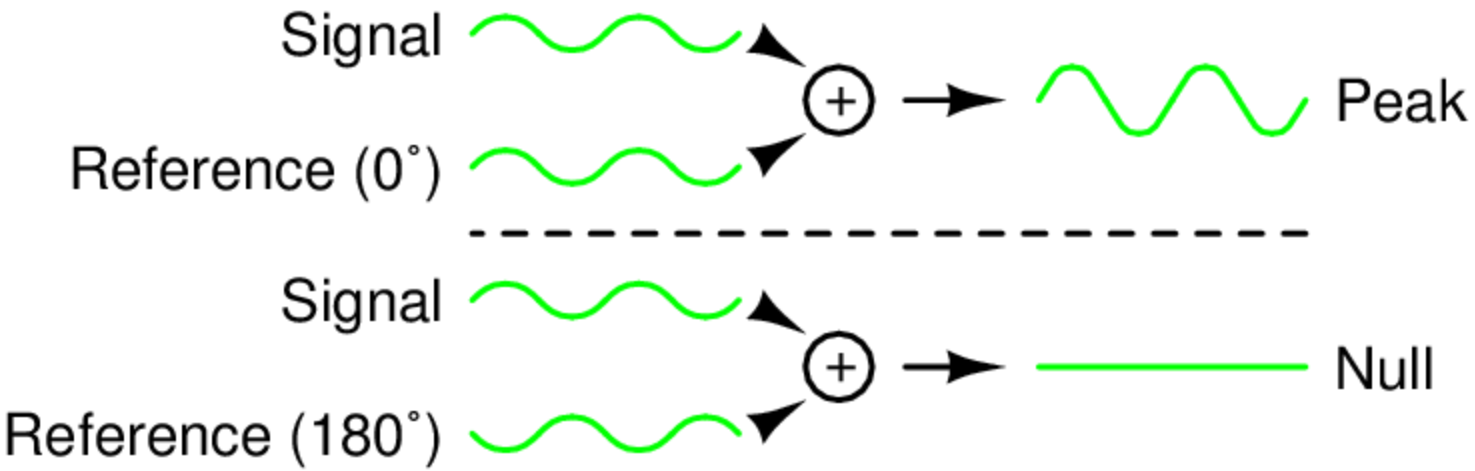




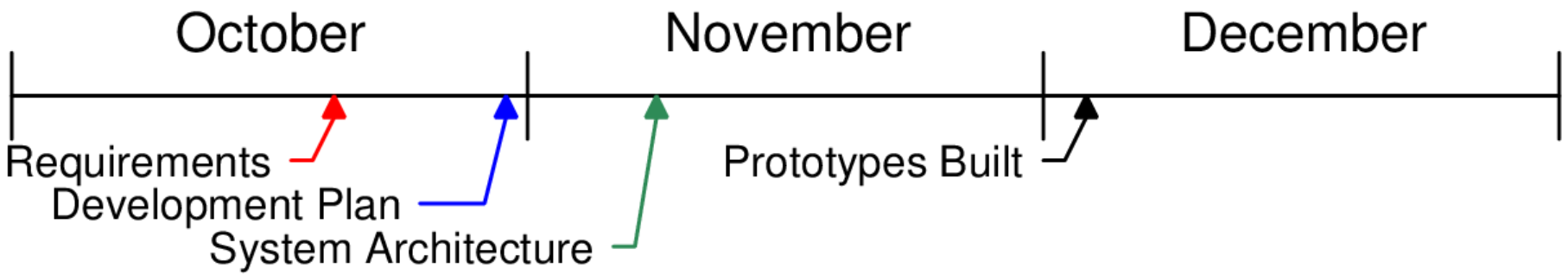




Design — Phase Detection



Timeline


October
November
December
Requirements
Development Plan
System Architecture
Prototypes Built

Schedule

Item	Start Date	End Date	Percent Complete
Specification	2014-10-03	2014-10-17	100%
Development Plan	2014-10-17	2014-10-31	100%
Architecture	2014-10-31	2014-11-14	100%
Interim Report	2014-11-14	2014-12-05	100%
Proto. built	2014-11-14	2014-12-05	100%
Proto. firmware	2014-11-10	2014-12-05	100%

Budget

Item	Expended	Actual	Estimated to Completion	Estimated at Completion
Synthesizer	$60	$60	$0	$60
Input	$70	$70	$0	$70
Output amp.	$66	$66	$0	$66
Power supply	$0	$0	$0	$0
Final build	$0		$120	$120
Enclosure	$0		$30	$30
Misc/re-spins	$0		$100	$100
Total	$196	$196	$250	$446

Next Steps

Hardware

- Combine prototypes into a final product

Software

- Finish firmware with full analysis capability
- Write PC software that receives and plots data

Conclusion

- Product can capture Bode plots
- Uses signal synthesizer, output amplifier, input frontend, ADC, and microcontroller
- These have been prototyped and tested

Demo

Questions?