Active Suspension System Test Platform

Bradley University
Department of
Electrical & Computer Engineering

By:
Brian Groth & Melanie Hagar

Advisor:
Steven Gutschlag

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Outline

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- Functional Description
- System Block Diagram
- Block Diagrams
- System Block Diagram
- Original Schedule
- Tasks Completed
- Tasks Remaining
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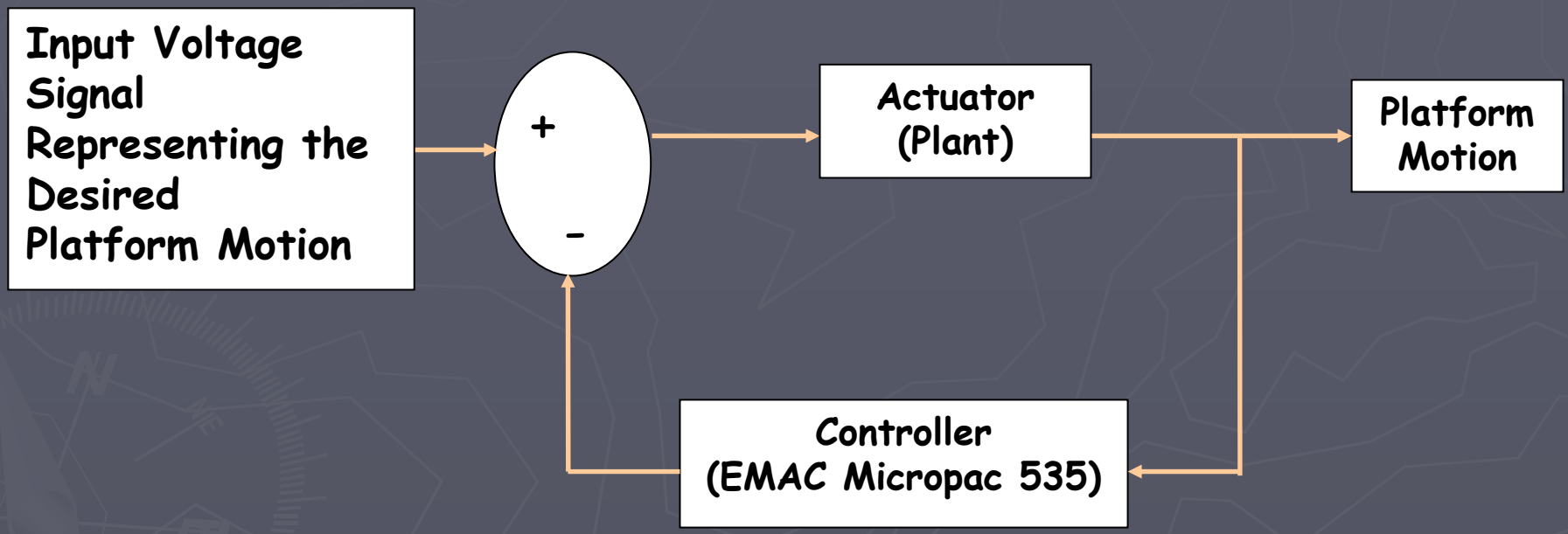
Project Summary

- **Drive a platform load with a 115[VDC] motor**
- **Microcontroller based feedback control system**
- **User selects starting position and waveform**
- **Optional analog position input**

Functional Description

- Responds to a platform load via feedback system
- The mode of operation will be determined by an external signal applied to the micro-controller.
  - Sinusoidal
  - Step
  - Triangular
  - Ramp
- Flexibility in selecting desired frequency and amplitude of the platform's motion

Control Block Diagram



Inputs & Outputs

System

INPUTS	OUTPUTS
Desired platform motion	Platform movement

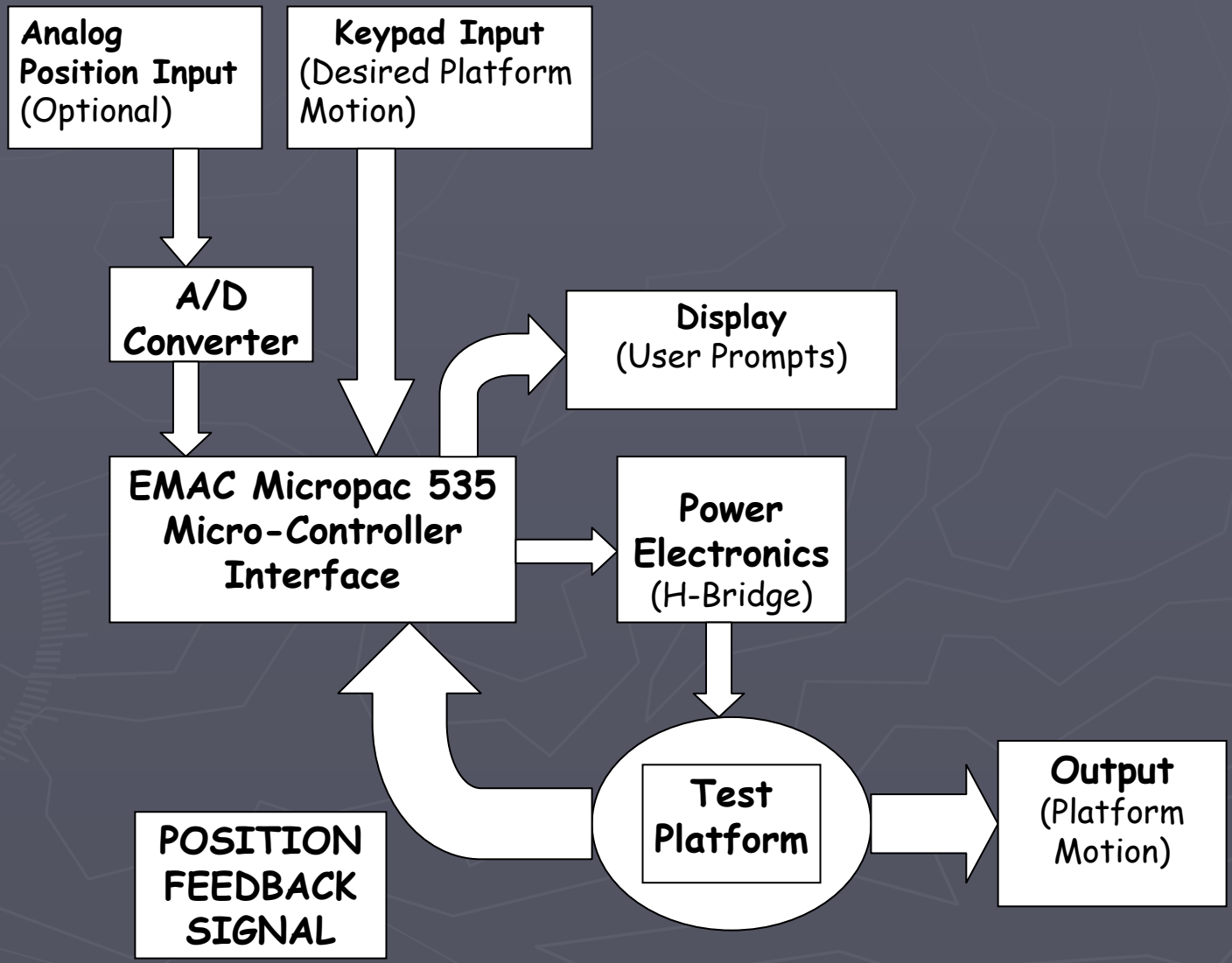
EMAC Micropac 535 micro-controller

INPUTS	OUTPUTS
Keypad	Platform movement
Waveform Generator	LCD Display
Feedback Sensor	

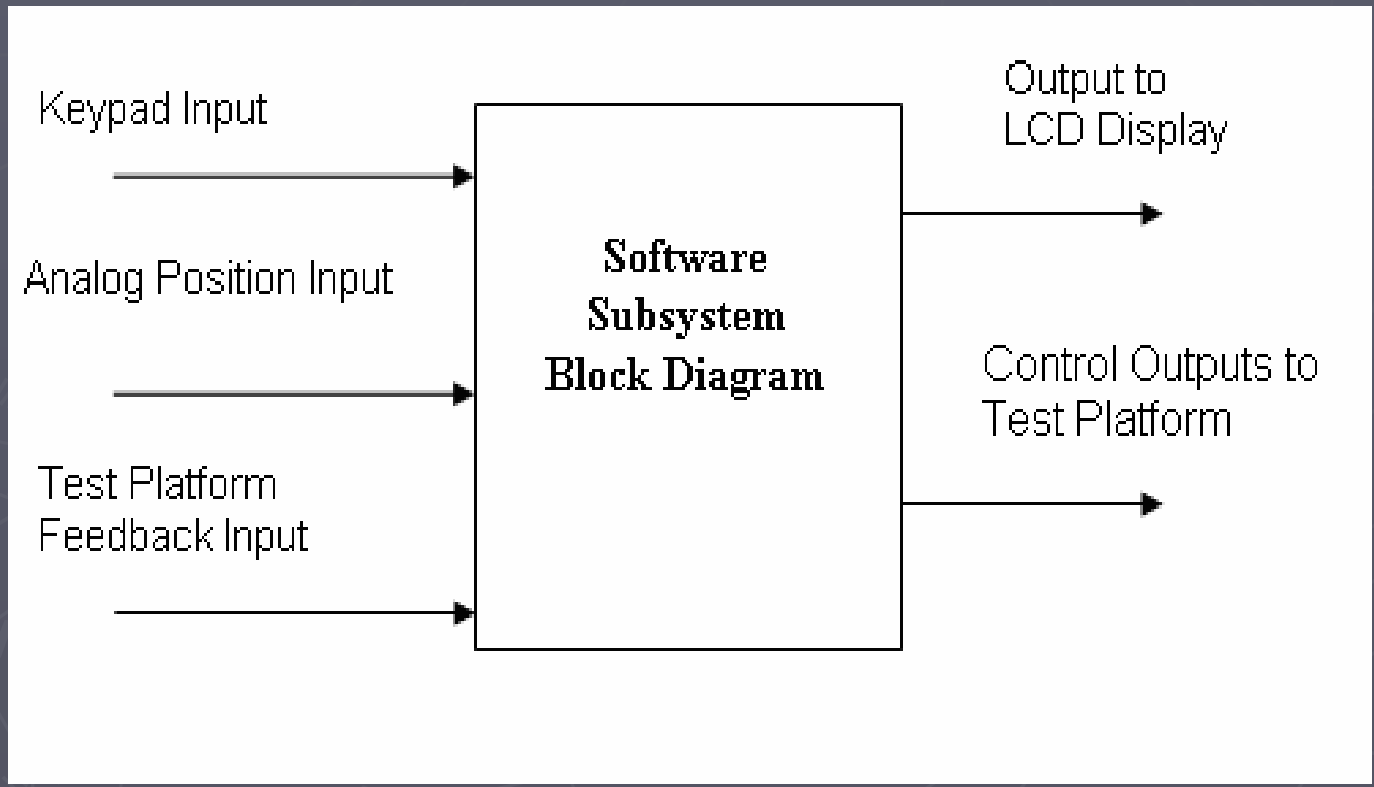
Actuator

INPUTS	OUTPUTS
Error signal from controller	Platform movement

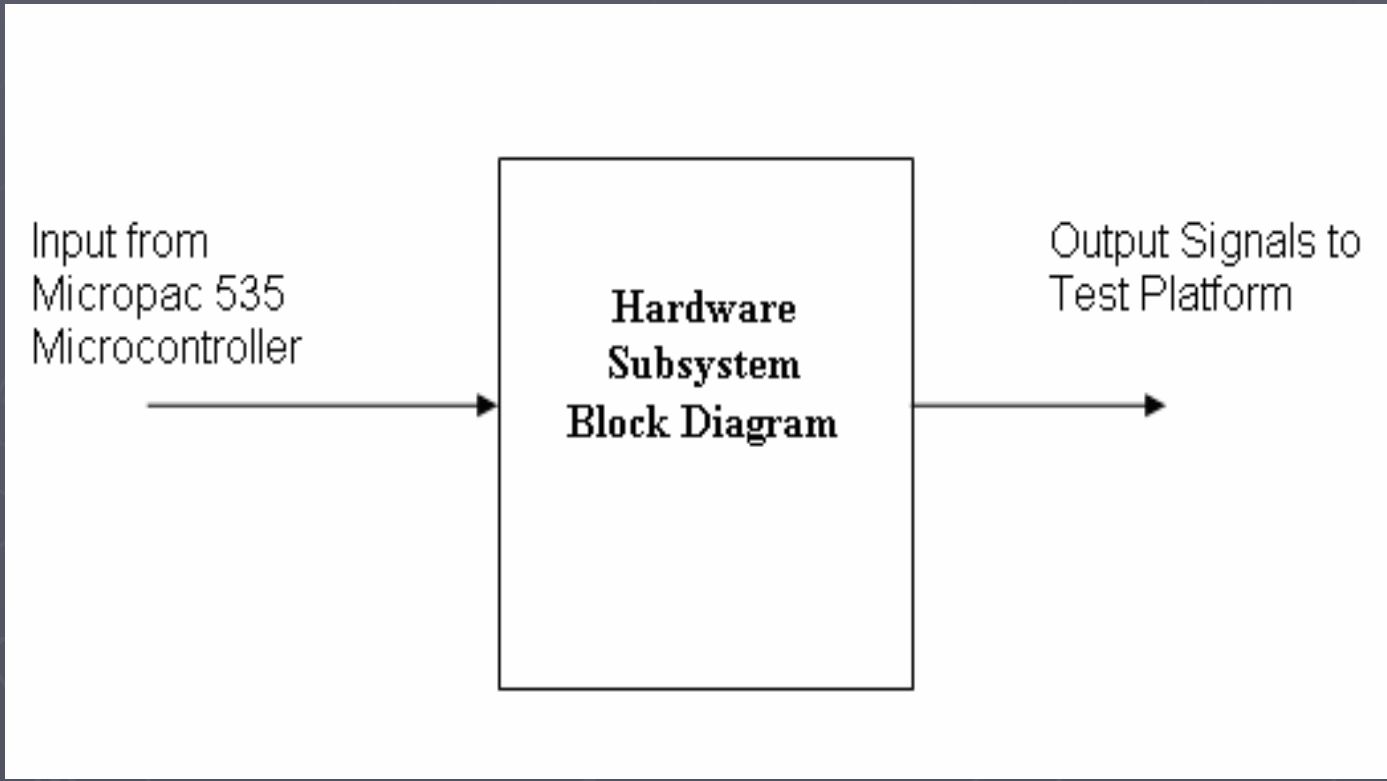
System Block Diagram



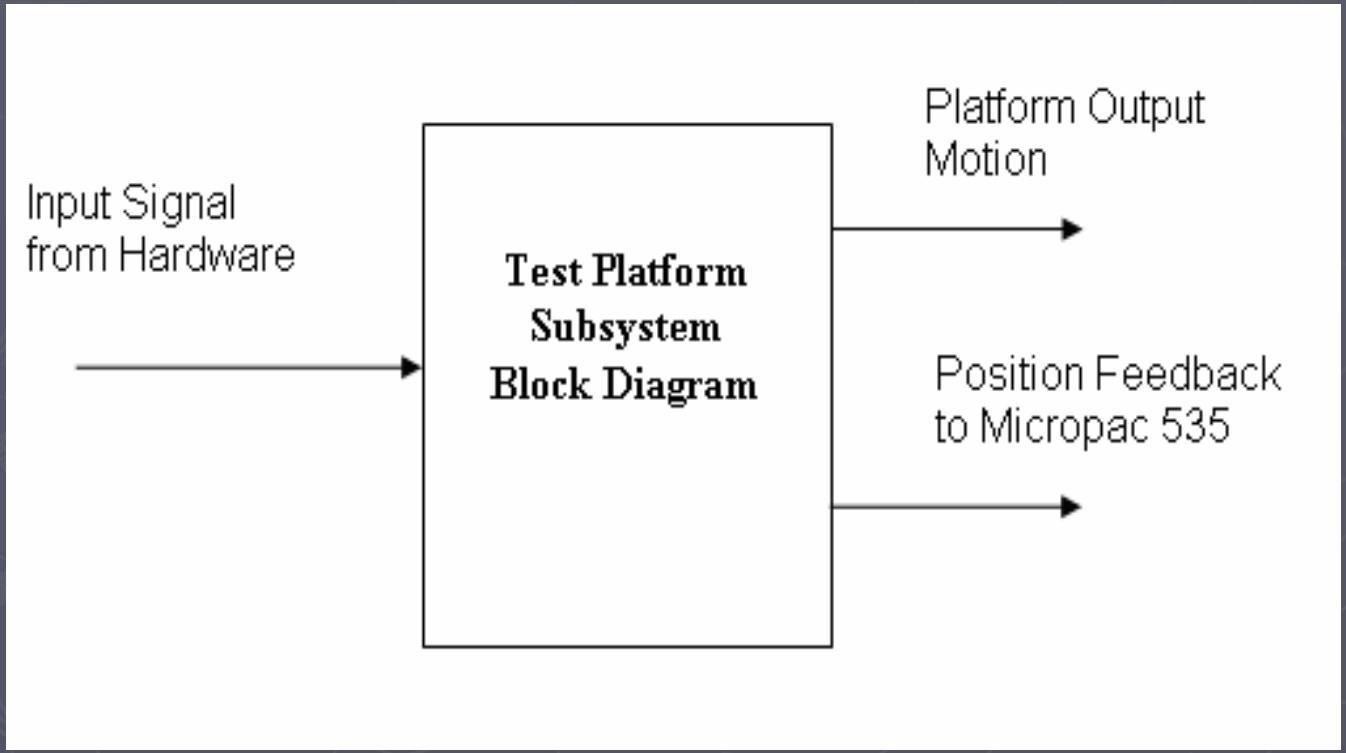
Software Subsystem



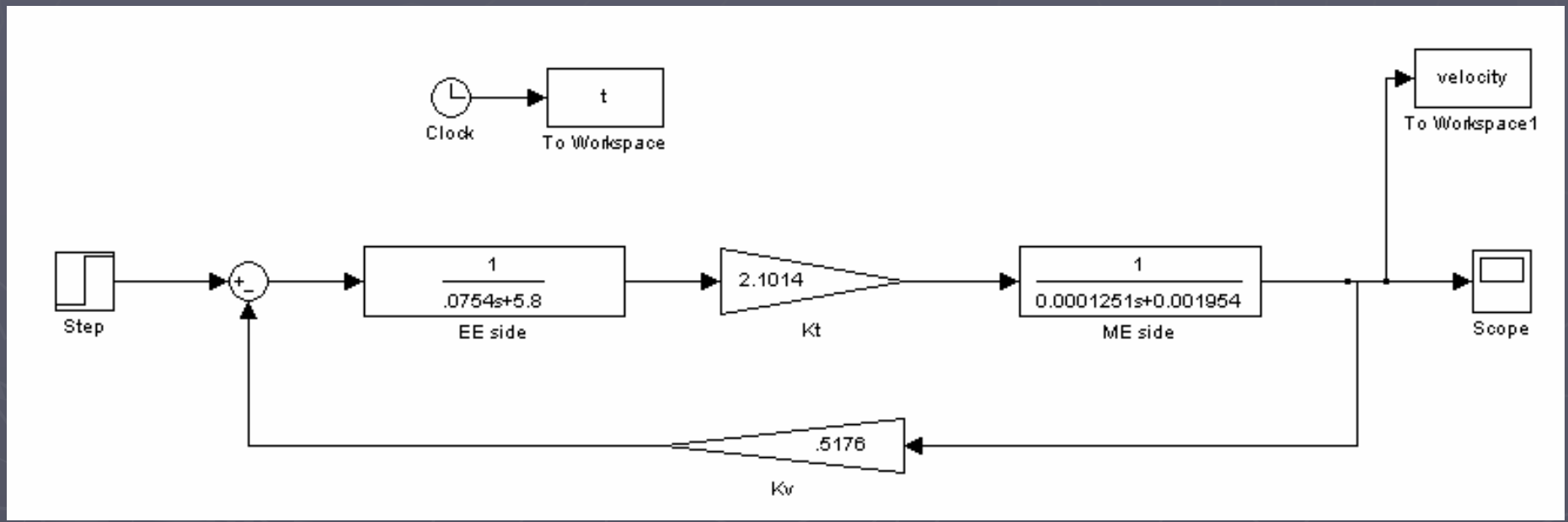
Hardware Subsystem



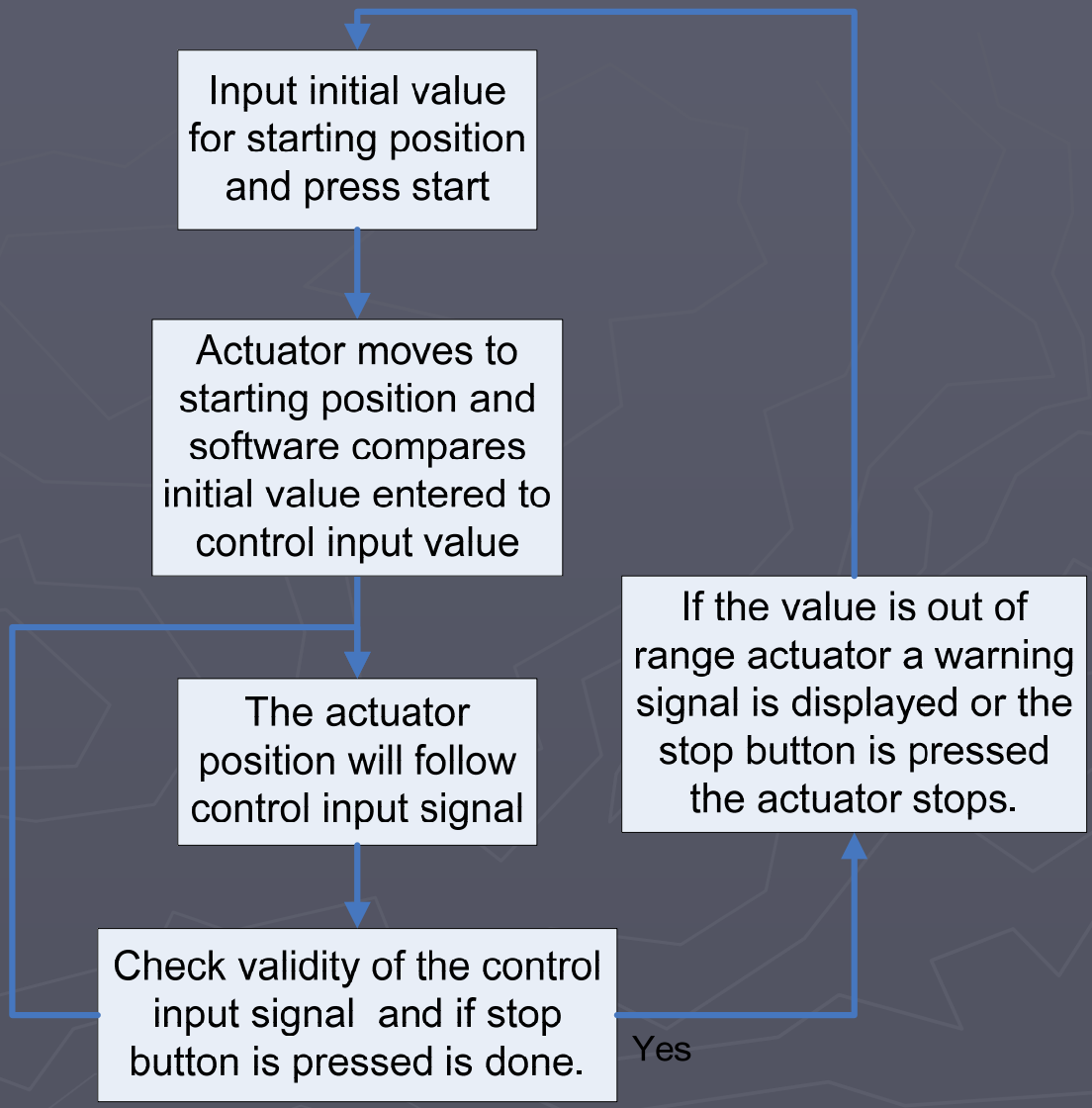
Test Platform Subsystem



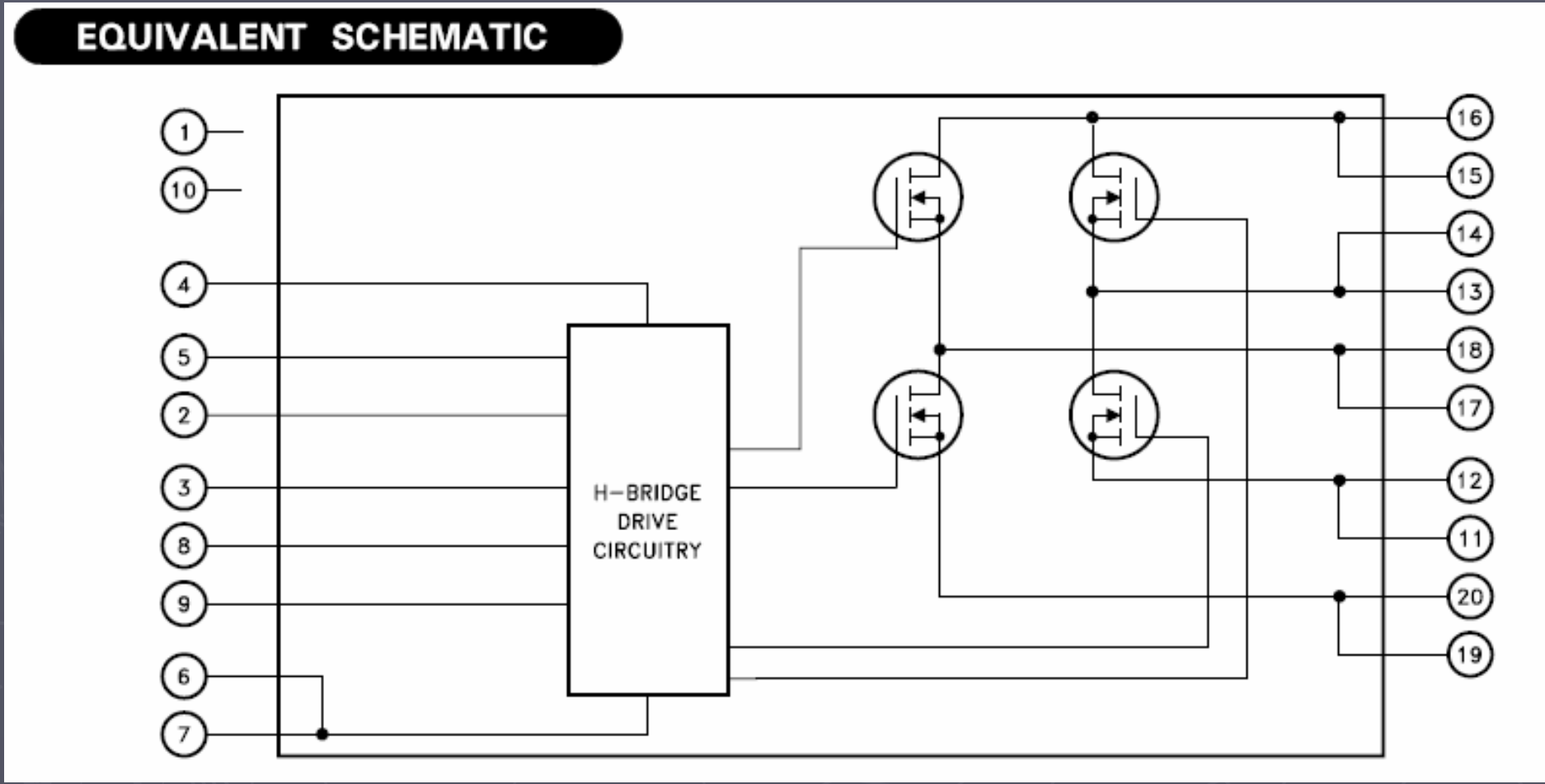
Motor Model


Clock
t
To Workspace
velocity
To Workspace1
Step
1
.0754s+5.8
EE side
2.1014
Kt
1
0.0001251s+0.001954
ME side
Scope
.5176
Kv

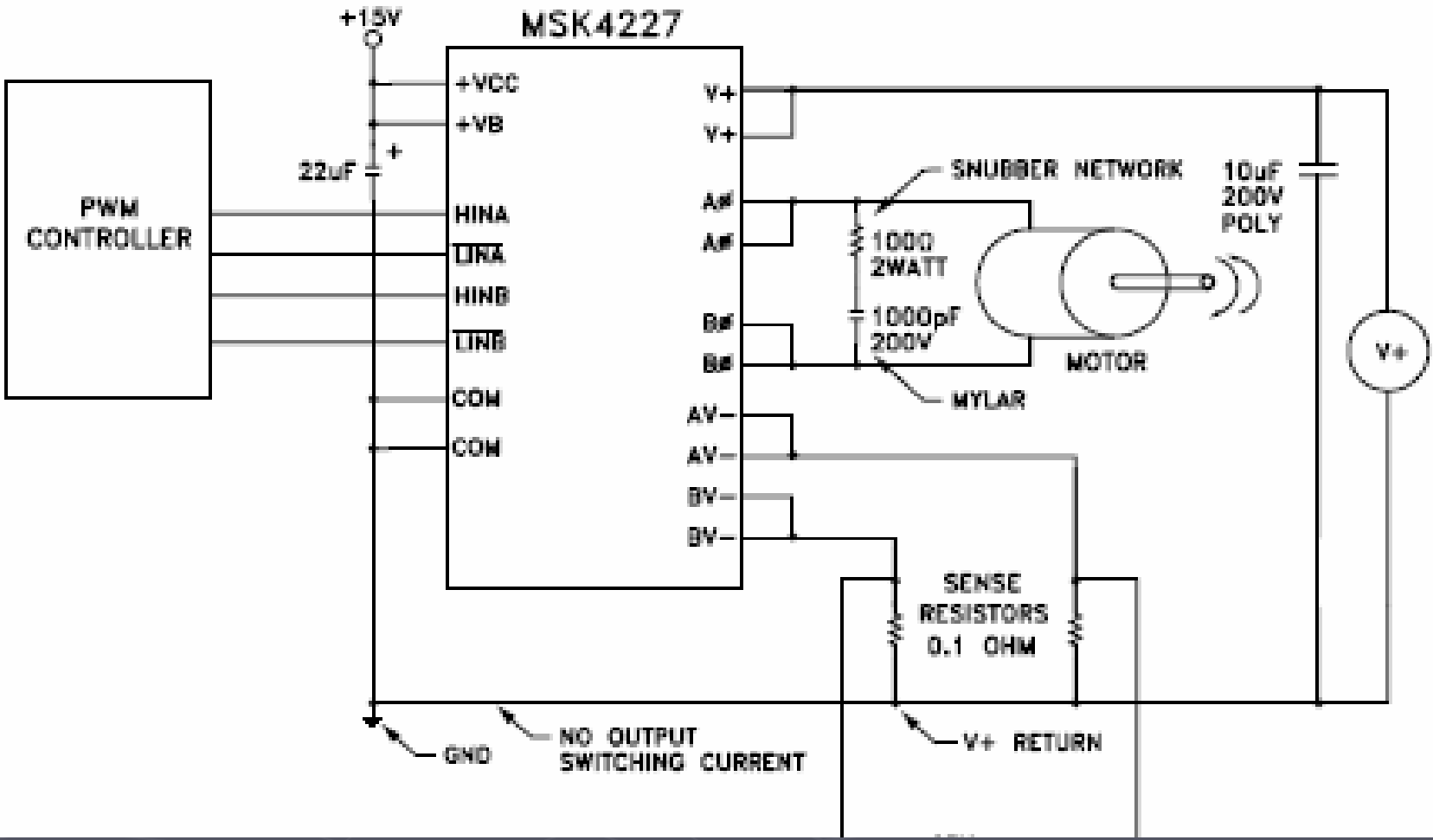
Software Flow Chart



H-Bridge


EQUIVALENT SCHEMATIC
1
10
4
5
2
3
8
9
6
7
H–BRIDGE
DRIVE
CIRCUITRY
16
15
14
13
18
17
12
11
20
19

H-Bridge Continued



Work Completed

- Simulink Motor Model
- Emac Code
  - User selectable PWM signal
    - Inverse is also available
  - User interface
- H-Bridge Integration Research
- Gear Train Research

Work Remaining

- Build Platform
- Snubber Circuitry
- Controller Design and Testing
- H-Bridge Control
- Complete Design and Testing
- Final Presentation Preparation

Work Schedule

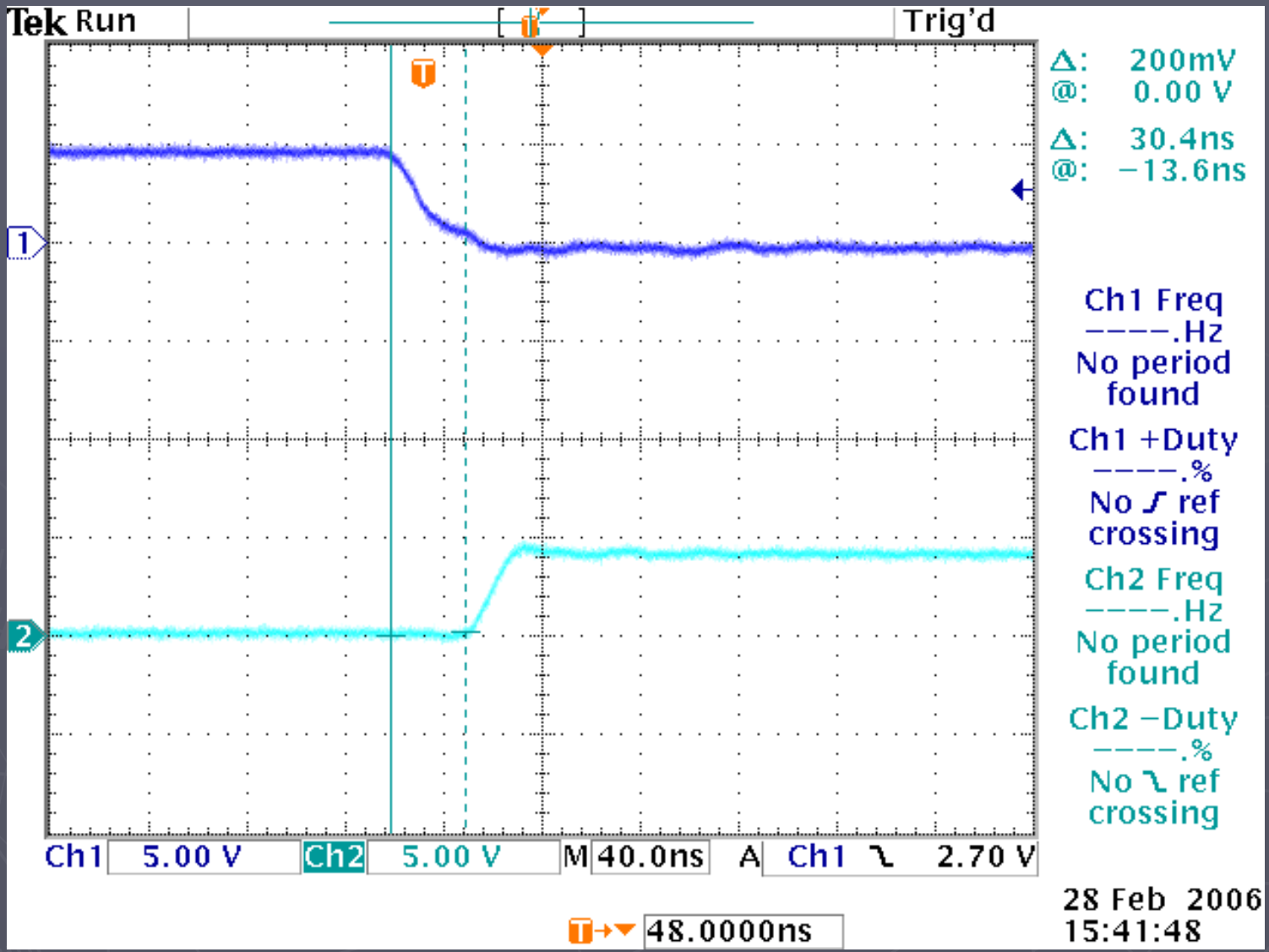
Fall Semester

- ACTIVEST Project Research
- 115 [VDC] Motor Modeling

Spring Semester

- Week 1-2 Software Design
- Week 3-7 Software Coding and Software Debugging
- Week 8-11 Software Testing, System Integration of Hardware and Software Subsystems, and Platform Construction
- Week 12-13 Research on project expansion and senior presentation preparation

Questions


Tek Run
Trig'd
Δ: 200mV
@: 0.00 V
Δ: 30.4ns
@: −13.6ns
Ch1 Freq
----.Hz
No period found
Ch1 +Duty
----.%
No ∫ ref crossing
Ch2 Freq
----.Hz
No period found
Ch2 −Duty
----.%
No ∫ ref crossing
Ch1 5.00 V
Ch2 5.00 V
M 40.0ns
A Ch1 ∫ 2.70 V
48.0000ns
28 Feb 2006
15:41:48