

BRAINSTORMING IDEAS

What Could Be Done To Improve ECU?

- Create a list of 50 things which could be implemented on the ECU to improve operation.
 - Ideas do not need to be possible to implement (failed ideas can breed fresh thinking)
 - Ideas must improve the existing version of the ECU
- Divided in Priority, Secondary, and Implausible Ideas
 - Primary ideas should be completed before end MSD II
 - Secondary ideas should be considered and at least attempted
 - Implausible ideas should be ignored
- 40 out of the intended 50 design ideas were recorded
 - 11 ideas were considered Primary
 - 8 ideas were considered Secondary
 - 21 ideas were considered Implausible

Ideas to Improve ECU

Primary Ideas

(Ideas to Implement Before Project Completion)

1. Working Voltage Start-Up
2. Write Document On How ECU Operates
3. Add Code Defining When Engine is Off
4. Diodes Added to Op-Amp to Prevent Burn-Out
5. "Better" Op-Amp to Prevent Burn-Out
6. Heat Resistant
7. Vibration Resistant
8. Waterproof
9. Well Written, Detailed Bill-of-Materials
10. Adjust Hole Sizes for Pins on PCB
11. New PCB Layout

Secondary Ideas

(Ideas to Consider Before Project Completion)

1. O2 Sensor
2. Graphical User Interface (GUI)
3. Robust Switches
4. Remove R2 & R6 from PCB Layout
5. Fix Fuse Blowing Problem
6. Add Traces for Unused Pins on μ PC
7. Write up a Standard Test Procedure
8. Add Status LED's for Board Failure Detection

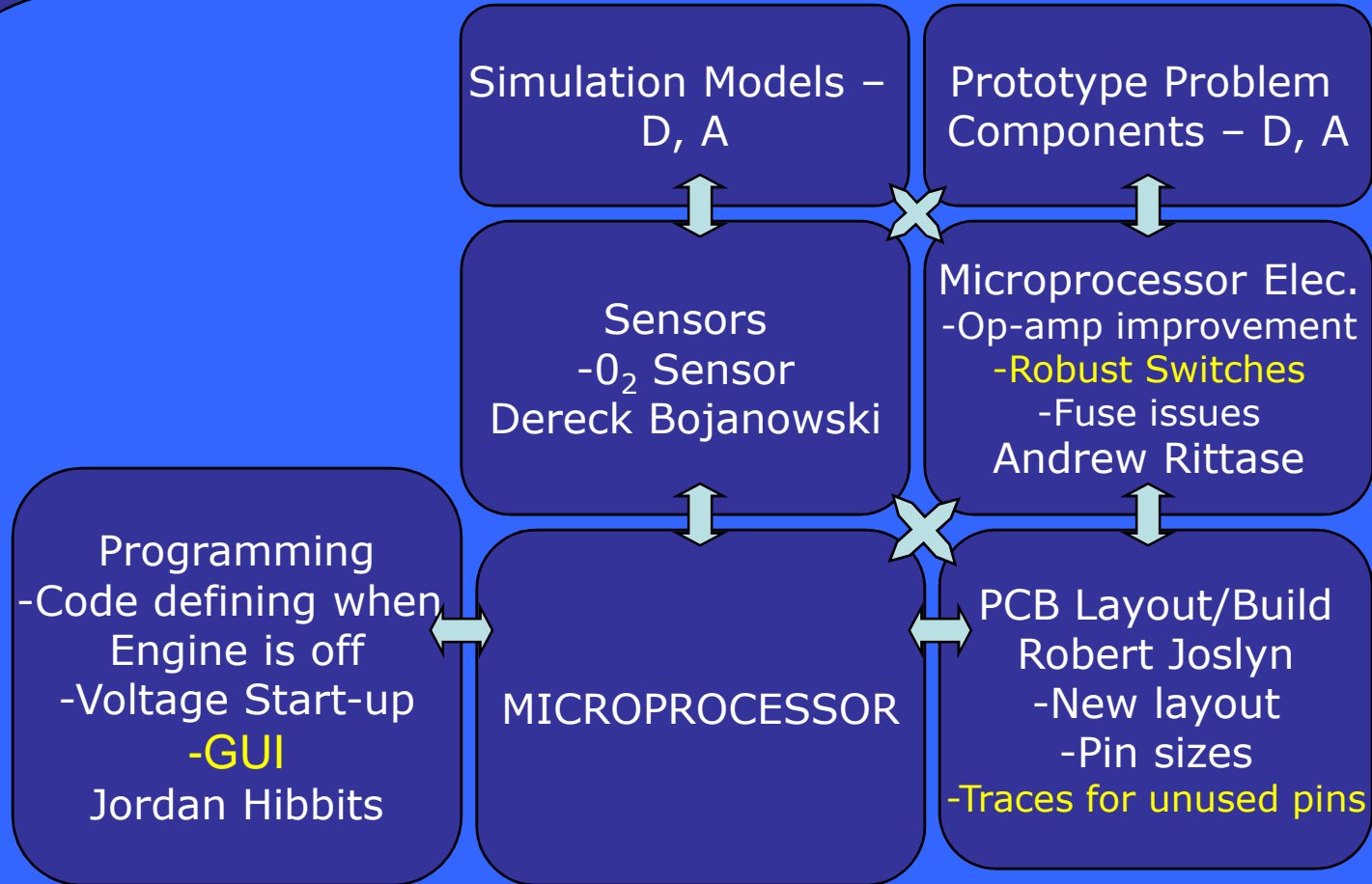
Implausible Ideas

(Ideas too Difficult to Add to ECU)

- Backup System
- RoHS Compliant
- Automatic Threshold Adjustment
- Save/Record Sensor Data

Functional Block Diagram

Functional Product



Casing/Dynamics

- Vibration resistant
- Thermal resistance
- Waterproof
- Case size

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Lab Testing
All Members

Field Testing
All Members/
Customer

Concepts – Group Requirements

- Document how it operates
- Detailed BOM
- Standardized test procedures
- Status LEDs

Specifications

Specification Number	Customer Need Number	Design Specification	Importance	Unit of Measure	Marginal Value	Ideal Value
1		Size	1	mm	174x105x40	80x50x20
2	1	Weight	1	kg	1	0.5
3		Number of digital inputs	3		8	10
4		Number of digital outputs	3		16	20
5		Serial interface	3	USB	2	2
6		Number of Analog inputs	3		16	20
7		Number of Analog outputs	3		2	4
8		Pulse width modulated outputs	3		4	6
9	2	Timing granularity	9	degrees	1	0.5
10	3	Injector pulse width and time	9	ms	0.1	0.01
11		Processor speed	9	MHz	24	32
12		RAM memory	9	kB	512	512
13		Flash memory	9	kB	512	512
14		Burn in	3	oC/hr.	10-70/10 hrs	10-70/32 hrs
15		Battery transient protection	3	mV	0.1	0.001
16	4	Max RPM	3	RPM	12500	15000
17		Internal temperature range	3	oC	-20-85	-50-125
18		Operating voltage	1	V	9-24	6-24
19		Operating current	1	Amp	10	8
20	5	fuel calibration accuracy	9	us	2	0.042
21	6	Ignition calibration accuracy	3	us	2	0.042
22	7	tach output	3	RPM	15000	18000