

Project Status Letter Week 6
 Covering Period from 3/3/2019 to 3/10/2019
 Prepared by Alex Kmetz and Katie Lee

Weekly Team Goals

Week		Complete
6	3/4/2019 - 3/10/2019	
1	2D "Enclosures" Planned, Designed, and Reviewed	
2	Budget Summary and Plan Rev. 2 Complete and Delivered	
3	First Draft ATP submitted to Professors for review	

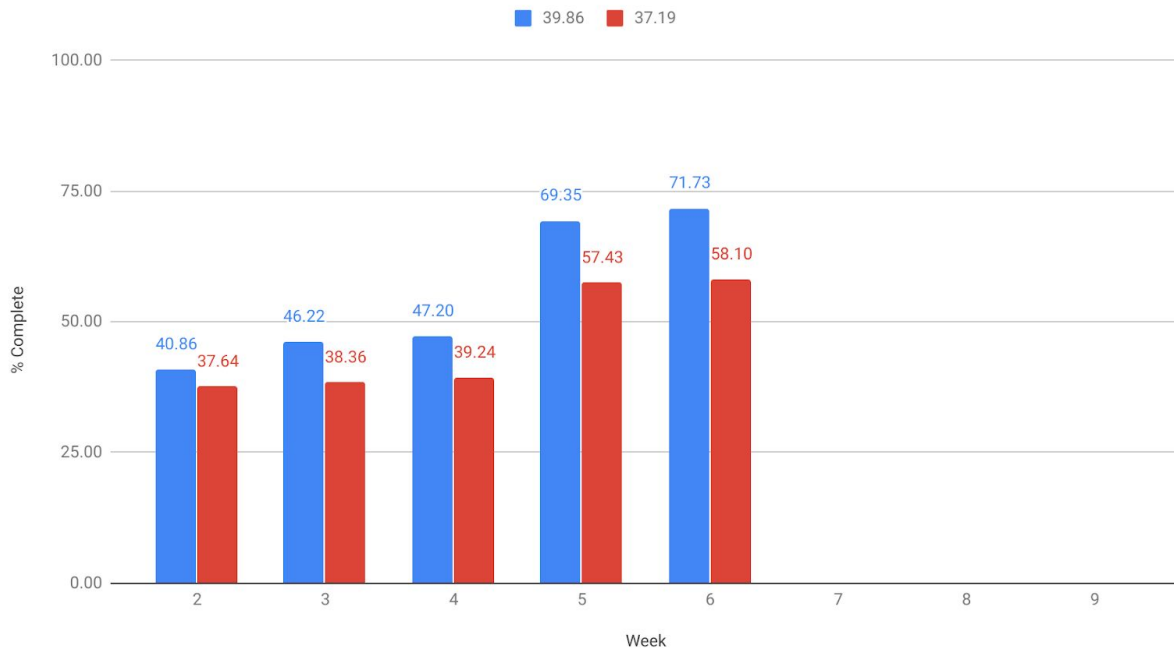
DYNO and CAR Integration Action Tracking

Completion of Previous Semester Goals: 91%

- Missing Completions: SCADA Connectivity, Full Motor Testing Setup, TSI Board

Completing of Current Semester Goals: 58.10%

Projected Progress and Actual Progress



Task / Item	In Progress Projected (%)	In Progress Actual (%)	Complete	Dependencies
Motor Spinning in Dyno Room	100.00%	100.00%	No	Motor Purchased Motor Controller Purchased Pulley / Shaft Fabricated Motor Installed in Motor Mount MCS Installed in Fixture Pulley / Shaft Connected to Motor
Motor Purchased	100.00%	100.00%	Yes	
Motor Controller Purchased	100.00%	100.00%	Yes	
Motor Controller Connected to TSI, Cooling, and Motor in Dyno Room	100.00%	83.33%	No	Motor Controller Purchased MCS / TSI / Cooling Fixture Fabricated TSI Board Complete TSI Mounting Plate Complete
Motor Mount Fabricated	100.00%	100.00%	Yes	
Motor Installed in Motor Mount in Dyno Room	100.00%	100.00%	Yes	Motor Purchased Motor Mount Fabricated
Pulley / Shaft Fabricated	100.00%	100.00%	Yes	
Pulley / Shaft Connected to Motor and Mounted in Dyno Room	100.00%	100.00%	No	Motor Purchased Pulley / Shaft Fabricated
MCS / TSI / Cooling Fixture Fabricated	100.00%	100.00%	Yes	
MCS Installed in TSI Enclosure	50.00%	0.00%	No	TSI Enclosure Fabricated
GLV Board Manufactured	78.57%	71.43%	Yes	
GLV Mounting Plate Manufactured	100.00%	33.33%	Yes	
Safety Loop Testing Panel Mounted in Dyno Room Rack	100.00%	85.00%	Yes	
Safety Loop Functional In Dyno Room	100.00%	66.67%	Yes	GLV Board Manufactured
GLV Enclosure Manufactured	33.33%	0.00%	No	
TSI Board Manufactured	78.57%	71.43%	No	
TSI Mounting Plate Manufactured	62.50%	25.00%	Yes	
TSI Throttle / Brake Control Panel Manufactured	66.67%	66.67%	Yes	TSI Board Manufactured TSI Mounting Plate Manufactured
TSI Enclosure Manufactured	50.00%	0.00%	No	
TSI Firmware Written	83.33%	50.00%		
Cooling Loop Filled with Water	100.00%	100.00%	Yes	

and Tested For Leaks				
Cooling System Mounted on Fixture in Dyno Room	100.00%	100.00%	Yes	MCS / TSI / Cooling Fixture Fabricated
Cooling System Connected to MCS and Motor in Dyno Room	100.00%	100.00%	Yes	MCS / TSI / Cooling Fixture Fabricated
Cooling System Connected to TSI in Dyno Room	100.00%	80.00%	No	
Cooling Enclosure Manufactured	20.00%	0.00%	No	
TSV Packs Manufactured	33.30%	16.67%	No	
TSV Packs Connected to Motor Controller in Dyno Room	0.00%	0.00%	No	
TSV CellMan Boards Fabricated	38.46%	30.77%	No	
TSV SegMan Boards Fabricated	33.33%	6.67%	No	
TSV PackMan Boards Fabricated	37.50%	31.25%	No	
TSV Powering Motor via Motor Controller in Dyno	0.00%	0.00%	No	TSV Packs Manufactured PackMan Boards Fabricated CellMan Boards Fabricated SegMan Boards Fabricated
TSV Firmware Written	12.50%	0.00%		
SCADA Recording Data and Writing to a File	100.00%	71.43%	No	
SCADA Displaying Data to Rack Monitor in Dyno Room	75.00%	75.00%	No	
SCADA Communicating with GLV in Dyno Room	100.00%	100.00%	Yes	GLV Board and Mounting Plate Integrated
SCADA Communicating with TSI in Dyno Room	75.00%	75.00%	No	TSI Board and Mounting Plate Integrated
SCADA Communicating with Motor Controller in Dyno Room	100.00%	75.00%	No	
SCADA Communicating with TSV in Dyno Room	0.00%	0.00%	No	
SCADA Displaying Data to GLV Screen	0.00%	0.00%	No	
All Connecting Wires Produced with Correct Connector Types	100.00%	100.00%	Yes	
Dyno Room Testing Plan Complete	100.00%	100.00%	Yes	
Dyno Room Wiring Diagram Complete	100.00%	100.00%	Yes	

All Subsystems fully wired in Dyno Room	100.00%	100.00%	Yes	
All Tests According to Test Plan Run in Dyno Room	100.00%	0.00%	No	

Project Item Completion Chart:

Team	Tasks Completed	Tasks Planned for Next Week	Proposed Changes	Overdue WBS Items
VSCADA	none	<p>Sam: SCADA Configuration changes</p> <p>Implement a software watchdog</p>	<p>Sam: SCADA.5.4 was descoped last semester</p> <p>Add a task for SCADA post-processing</p>	<p>Sam: SCADA.5.1 - VSCADA and MCS connected via CAN</p> <p>SCADA.5.2 - VSCADA receiving data from MCS Sensors</p> <p>SCADA.5.3 - VSCADA sends warning for error sensor data</p> <p>Zian: SCADA.2.1 - VSCADA and TSI Connected via CAN</p> <p>SCADA.2.2 - Receiving Data from TSI Sensors</p>
TEST	none	<p>Katie: M.2.3 - ATP Submitted for Review</p> <p>ATP_Draft_6 (Fall)</p> <p>ATP_Draft_1 (Spring)</p>	none	<p>Katie: M.2.3 - ATP Submitted for Review</p> <p>ATP_Draft_6 (Fall)</p> <p>ATP_Draft_1 (Spring)</p>
GLV	<p>Max: GLV.1.9 - PCB Schematic Revised</p> <p>GLV.1.10 - PCB Layout Revised</p> <p>GLV.1.3 - PCB Purchase Order Approved and Submitted</p>	<p>Max: GLV.1.4 - PCB Parts List Purchase Order Approved and Submitted</p> <p>GLV.2.1 - Enclosure Designed, Approved, and Submitted to machine shop</p> <p>GLV.3.1 -</p>	<p>Max: Remove GLV.3.4</p>	<p>Max: GLV.1.4 - PCB Parts List Purchase Order Submitted and Approved</p> <p>GLV.1.11 - PCB Respun and Populated</p> <p>GLV.2.1 - Enclosure Designed, Approved, and Submitted to</p>

		Subsystem Testing Plan Submitted and Approved by System Engineers		<p>machine shop</p> <p>GLV.2.2 - Enclosure Parts Acquired</p> <p>GLV.2.3 - Enclosure Assembled</p> <p>GLV.3.1 - Subsystem Testing Plan Submitted and Approved by System Engineers</p>
TSI	<p>Yuqiu: TSI.4.1 - Firmware Block Diagram Delivered and Approved</p> <p>TSI.4.2 - Firmware Logic / State Machine Delivered and Approved</p> <p>Tianyu: TSI.1.4 - PCB Parts List Purchase Order Approved and Submitted</p> <p>Antonio: Made CAD model of sign box and connectors and finalized electrical and mechanical components.</p>	<p>Zian: TSI.4.4 - Firmware I/O Functionality Delivered</p> <p>Xiaonan: TSI Wiring Diagram Complete</p> <p>Tianyu: TSI.2.4 - High Voltage Mounting Plate Drawing Approved and Submitted to Machine Shop</p> <p>TSI.3.1 - Verify and Correct 2018 Block Wiring Diagram</p> <p>TSI.5.3 - IMD Purchased and Acquired</p> <p>Yuqiu: TSI.4.3 - Fall Semester Bugs Fixed</p> <p>TSI.4.4 - Firmware I/O Functionality Delivered</p>	none	<p>Tianyu: TSI.5.3 - IMD Purchased and Acquired</p> <p>Zian: TSI.4.4 - Firmware I/O Functionality Delivered</p>

TSV	<p>Sam: TSV.3.5 - First PackMan PCB Parts List Purchase Order Submitted and Approved</p> <p>Yishak: TSV.1.3 - First CellMan PCB Purchase Order Approved and Submitted</p> <p>TSV.2.1 - First SegMan PCB Circuit Schematic</p>	<p>Alex: SleepMan Block Diagram Submitted</p> <p>SleepMan Circuit Schematic Submitted</p> <p>Robson: TSV.8.9 - Implement State of Charge Algorithm</p> <p>TSV.8.10 - Incorporate Cell Characterization with SOC Algorithm</p> <p>Weston: TSV.5.9 - High Voltage / Testing in Progress Signs Designed and Manufactured</p> <p>TSV.5.9 - High Voltage / Testing in Progress Signs Acquired and Installed</p> <p>Yishak: TSV.6.2 - A high-level block diagram of the battery packs (with wiring)</p> <p>Zian: TSV.9.3 - Firmware I/O Functionality Delivered</p>	none	<p>Weston: TSV.4.6 - Cell Connecting Bar Designs</p>
Cooling	none	<p>Weston: COOL.1.1 - Cooling Enclosure</p>	none	<p>Weston: COOL.1.1 - Cooling Enclosure</p>
Interconnect	<p>Drew: Cockpit Panel Designed</p>	<p>Drew: Cockpit Panel Manufactured</p>	none	<p>Drew: INT.2.2 - Full wiring purchase order submitted</p> <p>Cockpit Panel</p>

				Manufactured
Mech	<p>Hayden: PART.6.8 - SCADA and Motor Controller Connected and Communicating via CANBus</p> <p>Fixed Dyno Valve</p> <p>PART.6.2 - Pulley / Shaft Connected to the Dyno Belt</p>	<p>Hayden: PART.6.9 - Motor Controller Configured</p> <p>Design safety enclosure for the motor in the DYNO</p>	<p>Hayden: Dyno motor mount and shaft redesign</p>	none
Management	<p>Robson: Ordered all materials for all the boards that have been ordered</p>	<p>Alex: M.2.3 - ATP Submitted for Review</p> <p>Katie: M.1.4 - Electrical Systems Form</p> <p>M.2.3 - ATP Submitted for Review</p> <p>Robson: Formally request funding from the engineering division</p>	none	<p>Alex: M.2.3 - ATP Submitted for Review</p> <p>Katie: M.1.4 - Electrical Systems Form</p> <p>M.2.3 - ATP Submitted for Review</p>

Purchasing Summary from Previous Week:

★ Chassis/Body includes what we have spent plus what we have committed to spending.

Sub-system	Previously Allocated Budget	Total Spent	Budget Remaining	Percentage Spent
Brakes	\$3,500.00	\$0.00	\$3,500.00	0.00%
Chassis/Body	\$5,000.00	\$11,000.00	-\$6,000.00	220.00%
Cooling	\$620.00	\$37.64	\$582.36	6.07%
Drivetrain	\$0.00	\$2,175.00	-\$2,175.00	
GLV	\$780.00	\$1,143.52	-\$363.52	146.61%
Interconnect	\$1,500.00	\$1,367.78	\$132.22	91.19%
Motor/MCS	\$4,000.00	\$6,781.02	-\$2,781.02	169.53%
Pedal/Controls	\$2,000.00	\$0.00	\$2,000.00	0.00%
Steering	\$2,500.00	\$1,840.34	\$659.66	73.61%
Suspension	\$2,200.00	\$0.00	\$2,200.00	0.00%
TSI	\$1,500.00	\$2,737.73	-\$1,237.73	182.52%
TSV	\$4,187.00	\$3,751.12	\$435.88	89.59%
VSCADA / DYNO	\$525.00	\$83.68	\$441.32	15.94%
Shipping/Tax	\$4,246.80	\$1,152.07	\$3,094.73	27.13%
Registration	\$2,300.00	\$2,300.00	\$0.00	100.00%
Overall	\$34,858.80	\$34,369.90	\$488.90	98.60%

Purchases from Previous Weeks:

ME Department

Autotech Sport Tuning * Corp. - CREDIT	\$300.00	01/29/19	03/05/19	Autotech Sport Tuning - Drexler LTD, Slip FSAE V2. V2 140mm non-adjustable externally. C73030 Lafayette College FSAE - Trans. Act. ID: 34G734145W195001L 1/29/19 - Changed product purchased due to backorder status of original product being mid-March.
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*This is now accounted for in the Drive Train Subsystem

Norelem Normelemente KG - Inv. #: 3010382358	-\$62.90		02/25/19	(2) Rotary shaft lip seal's - radial 28 x 40 B=7. Form: A nitrile rubber
McMaster - Inv. #: 87552443	-\$199.54		02/25/19	Garolite sheet, 24" x 24" x 1/8"; (1) HDPE sheet, 12" x 24" x 2"
BSCI Ord. #: ??	-\$106.00		02/26/19	Impaxx™ Foam - 700 series 4" x 24" x 20"
McMaster - Inv. #: 87811015	-\$132.09		02/27/10	(1) HDPE sheet, 12" x 24" x 2"
McMaster - Inv. #: 88596402	-\$122.03		03/07/19	4140 alloy steel tube, 5/8" wall thickness, 4" OD, 1' long

Total: 622.56

3/5/2019

ECE Department Material Request

Course: ECE 491	Req Number: 47
Professor: Nadovich	

Requested By	Vendor: Amazon
Name Robson Adem	Web Site amazon.com
Email ademr@lafayette.edu	Phone
Phone 4845919265	Ship By: Ground

#	Quantity	Vendor Part	Description	Unit Price	Total Price	Rcvd
1	1	https://goo.gl/pqwDL9	JOYLIT DC 24V Red Flexible Waterproof LED Strip Lights Super Bright 300 Units 5050 LEDs Light Strip 5m/reel For truck	\$9.99	\$9.99	

Shipping Fees	\$0.00
Grand Total:	\$9.99

Instructor Approval: _____

Department Approval: _____

(Over \$500)

3/8/2019						
ECE Department Material Request						
Course: ECE 491 Professor: Nadovich				Req Number: 48		
Requested By				Vendor: ADVANCED CIRCUITS		
Name: Robson Adem				Web Site: www.my4pcb.com		
Email: ademr@lafayette.edu				Phone: (866) 433-5722		
Phone: 4845919265				Ship By: Ground		
#	Quantity	Vendor Part	Description	Unit Price	Total Price	Rcvd
1	1	GLV BOB V2	GLV BOB V2	\$33.00	\$33.00	
				Shipping Fees	\$58.66	
				Grand Total:	\$91.66	
Instructor Approval: _____						
Department Approval: _____						
(Over \$500)						

3/8/2019						
ECE Department Material Request						
Course: ECE 491 Professor: Nadovich				Req Number: 49		
Requested By				Vendor: DIGKEY		
Name: Robson Adem				Web Site: digkey.com		
Email: ademr@lafayette.edu				Phone: _____		
Phone: 4845919265				Ship By: Ground		
Index	Quantity	Cart Link Part Number	Description	Unit Price	Extended Price USD	
1	3	https://www.digkey.com/short/p87hg BKCT3149-0-ND	CONN BANANA JACK SOLDER BLACK	1.2	3.6	#1-27 TSI Test Fixture
2	4	BKCT3149-2-ND	CONN BANANA JACK SOLDER RED	1.2	4.8	#28-47 Cell Man
3	6	PIC32MZ2048EFM064-I-P1-ND	IC MCU 32BIT 2MB FLASH 64TQFP	11.32	67.92	#48-149 TSI PCB
4	20	311-1141-1-ND	CAP CER 0.1UF 25V X7R 0805	0.113	2.26	#150-188 PackMan
5	5	490-15669-1-ND	FIXED IND 28NH 1.2A 98 MOHM	0.28	1.4	#189-208 GUV
6	5	WM4803-ND	CONN HEADER VERT 5POS 2.54MM	1.14	5.7	
7	6	WM6270-ND	CONN HEADER VERT 15POS 2.54MM	3.18	19.08	
8	4	WM3802-ND	CONN HEADER VERT 6POS 4.2MM	1.06	4.24	
9	4	WM3801-ND	CONN HEADER VERT 4POS 4.2MM	0.81	3.24	
10	4	WM3803-ND	CONN HEADER VERT 8POS 4.2MM	1.37	5.48	
11	4	WM3803-ND	CONN HEADER VERT 8POS 4.2MM	1.37	5.48	
12	4	3310C-001-502L-ND	POT 5K OHM 1/4W PLASTIC LINEAR	2.9	11.6	
13	2	277-1273-ND	TERM BLK 2P SIDE ENT 2.54MM PCB	1.65	3.3	
14	2	360-1802-ND	SWITCH TOGGLE SPDT 6A 125V	3.76	7.52	
15	2	PDB182-K220K-502B-ND	POT 5K OHM 1/8W CARBON LINEAR	2.08	4.16	
16	5	WM3804-ND	CONN HEADER VERT 10POS 4.2MM	1.62	8.1	
17	1	MCP2551-I/SN-ND	IC TRANSCEIVER CAN HI-SPD 8-SOIC	1.05	1.05	
18	1	LT1763CS8-3.3#PBF-ND	IC REG LINEAR 3.3V 500MA 8SOIC	4.23	4.23	
19	10	587-1291-1-ND	CAP CER 1UF 25V X5R 0805	0.143	1.43	
20	10	RHM1.00KAECT-ND	RES SMD 1K OHM 1% 0.4W 0805	0.146	1.46	
21	10	160-1428-1-ND	LED YELLOW CLEAR CHIP SMD	0.244	2.44	
22	10	160-1427-1-ND	LED RED CLEAR SMD	0.229	2.29	
23	10	160-1423-1-ND	LED GREEN CLEAR CHIP SMD	0.215	2.15	
24	10	160-1645-1-ND	LED BLUE CLEAR CHIP SMD	0.368	3.68	
25	3	WM4804-ND	CONN HEADER VERT 6POS 2.54MM	1.15	3.45	
26	2	WM3478-ND	CONN HEADER VERT 10POS 2.54MM	1.12	2.24	
27	2	WM4130-ND	CONN HEADER VERT 10POS 2.54MM	1.81	3.62	
28	10	WM3801-ND	CONN HEADER VERT 4POS 4.2MM	0.714	7.14	

29	10	WM4347-ND	CONN HEADER VERT 2POS 5.08MM	0.377	3.77			
30	10	S1011EC-02-ND	CONN HEADER VERT 2POS 2.54MM	0.073	0.73			
31	10	S9001-ND	CONN JUMPER SHORTING GOLD FLASH	0.059	0.59			
32	12	445-3954-1-ND	CAP CER 68UF 6.3V X5R 1210	1.739	20.87			
33	12	1276-6461-1-ND	CAP CER 3.3UF 10V X5R 0805	0.144	1.73			
34	12	490-10510-1-ND	CAP CER 100UF 4V X5R 0805	0.765	9.18			
35	12	399-15473-1-ND	CAP CER 0.022UF 16V X7R 0805	0.242	2.9			
36	12	399-15506-1-ND	CAP CER 0.047UF 10V X7R 0805	0.273	3.28			
37	12	399-5763-1-ND	CAP CER 1UF 10V X8L 0805	0.362	4.34			
38	12	RR08P100KDCCT-ND	RES SMD 100K OHM 0.5% 1/16W 0603	0.098	1.18			
39	12	408-1545-1-ND	RES 0.012 OHM 1% 1/2W 0805	0.448	5.38			
40	12	P4.7KDBCT-ND	RES SMD 4.7K OHM 0.1% 1/10W 0603	0.3	3.6			
41	12	P4.99KDBCT-ND	RES SMD 4.99KOHM 0.1% 1/10W 0603	0.3	3.6			
42	12	RHM10DCT-ND	RES SMD 10 OHM 5% 1/4W 0603	0.087	1.04			
43	10	A31698-ND	SHUNT STANDARD 2POS 200 TIN	0.64	6.4			
44	10	LT8584EFE#PBF-ND	IC BATT CELL BALANCE 16TSSOP	6.43	64.3			
45	10	160-1445-1-ND	LED ORANGE CLEAR SMD	0.2	2			
46	10	497-10392-1-ND	DIODE SCHOTTKY 100V 3A SMB	0.478	4.78			
47	10	SBR8U60PSDICT-ND	DIODE SBR 60V 8A POWERDI5	0.923	9.23			
48	5	P24.9KDACT-ND	RES SMD 24.9K OHM 0.1% 1/8W 0805	0.36	1.8			
49	5	P2.4KDACT-ND	RES SMD 2.4K OHM 0.1% 1/8W 0805	0.36	1.8			
50	30	P150KDACT-ND	RES SMD 150K OHM 0.1% 1/8W 0805	0.302	9.06			
51	15	P499DACT-ND	RES SMD 499 OHM 0.1% 1/8W 0805	0.302	4.53			
52	5	ST4ETB202CT-ND	TRIMMER 2K OHM 0.25W GW TOP ADJ	1.43	7.15			
53	3	ST4ETB102CT-ND	TRIMMER 1K OHM 0.25W GW TOP ADJ	1.43	4.29			
54	3	296-39512-1-ND	IC ANLG SW SPDT SOT23-6	1.04	3.12			
55	3	1715-1676-1-ND	SWITCH TACTILE SPST-NO 0.1A 42V	2.83	8.49			
56	3	1951-2008-ND	DC DC CONVERTER 24V 3W	26.8	80.4			
57	3	MCP2551-I/SN-ND	IC TRANSCEIVER CAN HI-SPD 8-SOIC	1.05	3.15			
58	25	TLP293(GB-T)LECT-ND	OPTOISOLATOR 3.75KV TRANS 4-SO	0.4164	10.41			
59	3	296-26324-1-ND	IC VREF SERIES 3.3V SOT23-3	1.43	4.29			
60	3	MCP9700AT-E/TTCT-ND	SENSOR ANALOG -40C-125C SOT23-3	0.32	0.96			
61	3	296-1187-1-ND	IC GATE NAND 4CH 2-INP 14SOIC	0.48	1.44			
62	3	MCP6002T-I/SNCT-ND	IC OPAMP GP 1MHZ RRO 8SOIC	0.34	1.02			
63	3	MC7805BDRKGOSCT-ND	IC REG LINEAR 5V 1A DPAK	0.64	1.92			
64	3	497-2271-1-ND	IC COMP LP DUAL CMOS VOLT 8 SOIC	0.75	2.25			
65	3	NCD9830DBR2GOSCT-ND	IC ADC 8BIT 8CH I2C 16TSSOP	2.7	8.1			
66	10	MCP6004T-I/STCT-ND	IC OPAMP GP 1MHZ RRO 14TSSOP	0.45	4.5			
67	3	296-48522-1-ND	IC DAC 8-BIT I2C QUAD 10-MSOP	3.72	11.16			
68	3	516-2578-5-ND	IC OPAMP ISOLATION 100KHZ 8SO	5.66	16.98			
69	3	102-3862-ND	DC DC CONVERTER +/-5V 10W	28.19	84.57			
70	3	LT1763CS8-3.3#PBF-ND	IC REG LINEAR 3.3V 500MA 8SOIC	4.23	12.69			

71	3	SI8600AB-B-IS-ND	DGTL ISO 2.5KV 2CH I2C 8SOIC	3.33	9.99
72	10	497-10252-1-ND	IC OPAMP GP 1.4MHZ RRO 8SO	1.373	13.73
73	5	MCP23016T-I/SOCT-ND	IC I/O EXPANDER I2C 16B 28SOIC	1.63	8.15
74	3	296-4180-1-ND	IC GATE NAND 1CH 8-INP 14SOIC	2.36	7.08
75	3	PIC32MZ2048EFM064-I/PT-ND	IC MCU 32BIT 2MB FLASH 64TQFP	11.32	33.96
76	10	1276-6851-1-ND	CAP CER 0.47UF 50V X7R 0805	0.189	1.89
77	10	1276-1123-1-ND	CAP CER 0.33UF 50V X7R 0805	0.137	1.37
78	10	1276-6462-1-ND	CAP CER 4.7UF 25V X5R 0805	0.156	1.56
79	5	478-9622-1-ND	CAP CER 10UF 100V X7R 2220	2.47	12.35
80	10	399-8062-1-ND	CAP CER 33PF 50V C0G/NP0 0805	0.084	0.84
81	20	311-1111-1-ND	CAP CER 100PF 50V C0G/NP0 0805	0.097	1.94
82	5	445-9078-1-ND	CAP CER 15UF 25V X5R 0805	0.75	3.75
83	10	587-2985-1-ND	CAP CER 10UF 25V X5R 0805	0.138	1.38
84	10	1276-2396-1-ND	CAP CER 1UF 50V X5R 0805	0.138	1.38
85	100	1276-1007-1-ND	CAP CER 0.1UF 50V Y5V 0805	0.0195	1.95
86	10	160-1423-1-ND	LED GREEN CLEAR CHIP SMD	0.215	2.15
87	10	160-1428-1-ND	LED YELLOW CLEAR CHIP SMD	0.244	2.44
88	10	160-1427-1-ND	LED RED CLEAR SMD	0.229	2.29
89	10	732-4982-1-ND	LED BLUE CLEAR 0805 SMD	0.18	1.8
90	10	641-1310-1-ND	DIODE GEN PURP 50V 1A DO41	0.099	0.99
91	5	F11388CT-ND	FUSE BOARD MNT 200MA 125VAC/VDC	2.864	14.32
92	5	497-8106-1-ND	IC VREF SHUNT ADJ SOT23-5	0.64	3.2
93	10	WM3802-ND	CONN HEADER VERT 6POS 4.2MM	0.929	9.29
94	6	WM3803-ND	CONN HEADER VERT 8POS 4.2MM	1.37	8.22
95	4	WM3847-ND	CONN HEADER VERT 10POS 4.2MM	1.43	5.72
96	2	WM3789CT-ND	CONN MOD JACK 6P6C VERT UNSHLD	1.16	2.32
97	14	WM3800-ND	CONN HEADER VERT 2POS	0.61	8.54
98	4	WM3801-ND	CONN HEADER VERT 4POS 4.2MM	0.81	3.24
99	2	WM4806-ND	CONN HEADER VERT 8POS 2.54MM	1.55	3.1
100	3	255-5324-5-ND	RELAY GENERAL PURPOSE SPST 5A 5V	6.31	18.93
101	2	Z3124-ND	RELAY GEN PURPOSE SPST 10A 24V	4.73	9.46
102	5	732-2953-1-ND	FIXED IND 2.2UH 700MA 230 MOHM	0.81	4.05
103	5	490-15669-1-ND	FIXED IND 28NH 1.2A 98 MOHM	0.28	1.4
104	1	1951-2310-ND	DC DC CONVERTER 24V 30W	76.2	76.2
105	5	ZVP0545GCT-ND	MOSFET P-CH 450V 0.075A SOT223	1	5
106	5	MMBF170CT-ND	MOSFET N-CH 60V 500MA SOT-23	0.49	2.45
107	5	ZVP1320FCT-ND	MOSFET P-CH 200V 0.035A SOT23-3	0.67	3.35
108	5	497-3177-1-ND	MOSFET N-CH 60V 4A SOT223	0.8	4
109	5	SI1302DL-T1-E3CT-ND	MOSFET N-CH 30V 600MA SOT323-3	0.51	2.55
110	10	P499DACT-ND	RES SMD 499 OHM 0.1% 1/8W 0805	0.302	3.02
111	10	P300DACT-ND	RES SMD 300 OHM 0.1% 1/8W 0805	0.303	3.03
112	100	P10KDACT-ND	RES SMD 10K OHM 0.1% 1/8W 0805	0.1182	11.82

113	20	P1.0KDACT-ND	RES SMD 1K OHM 0.1% 1/8W 0805	0.302	6.04
114	10	P95.3KDACT-ND	RES SMD 95.3K OHM 0.1% 1/8W 0805	0.302	3.02
115	10	P2.0KDACT-ND	RES SMD 2K OHM 0.1% 1/8W 0805	0.302	3.02
116	10	P100KDACT-ND	RES SMD 100K OHM 0.1% 1/8W 0805	0.302	3.02
117	15	P330DACT-ND	RES SMD 330 OHM 0.1% 1/8W 0805	0.302	4.53
118	10	P4.02KDACT-ND	RES SMD 4.02K OHM 0.1% 1/8W 0805	0.302	3.02
119	15	P4.99KDACT-ND	RES SMD 4.99K OHM 0.1% 1/8W 0805	0.302	4.53
120	5	P3.0KDACT-ND	RES SMD 3K OHM 0.1% 1/8W 0805	0.36	1.8
121	10	P20630CT-ND	RES SMD 2.2K OHM 0.1% 1/4W 0805	0.306	3.06
122	10	P9.31KDACT-ND	RES SMD 9.31K OHM 0.1% 1/8W 0805	0.302	3.02
123	10	A129738CT-ND	CRGCQ 0805 120R 1%	0.051	0.51
124	10	P2.4KDACT-ND	RES SMD 2.4K OHM 0.1% 1/8W 0805	0.302	3.02
125	10	P123793CT-ND	RES SMD 0.5% 0.125W 0805	0.103	1.03
126	10	P3.90KCCT-ND	RES SMD 3.9K OHM 1% 1/8W 0805	0.102	1.02
127	10	P150CCT-ND	RES SMD 150 OHM 1% 1/8W 0805	0.082	0.82
128	5	P56KDACT-ND	RES SMD 56K OHM 0.1% 1/8W 0805	0.36	1.8
129	5	P15KDACT-ND	RES SMD 15K OHM 0.1% 1/8W 0805	0.36	1.8
130	18	WM3702-ND	CONN RECEIPT 6POS DUAL	0.363	6.53
131	8	WM3703-ND	CONN RECEIPT 8POS DUAL	0.43	3.44
132	8	WM3704-ND	CONN RECEIPT 10POS DUAL	0.45	3.6
133	14	WM3700-ND	CONN RECEIPT 2POS DUAL	0.254	3.56
134	8	WM3701-ND	CONN RECEIPT 4POS DUAL	0.31	2.48
135	2	WM2906-ND	CONN HOUSING 8POS .100 W/LATCH	0.43	0.86
136	4	WM23944-ND	CONN SHUNT CLOSED TOP .100 TIN	0.44	1.76
137	2	WM23944-ND	CONN SHUNT CLOSED TOP .100 TIN	0.44	0.88
138	100	WM2512-ND	CONN SOCKET 22-24AWG CRIMP GOLD	0.1149	11.49
139	3	WM1257-ND	CONN HEADER VERT 3POS 6.35MM	0.71	2.13
140	3	WM1244-ND	CONN PLUG 3POS .084	0.32	0.96
141	50	WM1270-ND	CONN SPLIT PIN 14-20AWG CRIMP TIN	0.0382	1.91
142	5	AP2204K-5.0TRG1DICT-ND	IC REG LINEAR 5V 150MA SOT23-5	0.47	2.35
143	10	1276-1085-1-ND	CAP CER 2.2UF 10V XSR 0603	0.085	0.85
144	5	F2987-ND	FUSE CERM 2A 500VAC 400VDC 5X20	1.572	7.86
145	2	KAL25FB25R0-ND	RES CHAS MNT 25 OHM 1% 25W	3.08	6.16
146	2	HSS050RF-ND	RES CHAS MNT 50 OHM 1% 50W	4.11	8.22
147	10	A127568-ND	3P, SPLICING WIRE CONNECTOR, GRE	0.82	8.2
148	5	A127569-ND	5P, SPLICING WIRE CONNECTOR, GRE	1.36	6.8
149	200	WM2501CT-ND	CONN SOCKET 18-24AWG CRIMP TIN	0.0555	11.1
150	20	1276-1007-1-ND	CAP CER 0.1UF 50V Y5V 0805	0.044	0.88
151	10	1276-2396-1-ND	CAP CER 1UF 50V XSR 0805	0.138	1.38
152	5	160-1427-1-ND	LED RED CLEAR SMD	0.31	1.55
153	5	732-4982-1-ND	LED BLUE CLEAR 0805 SMD	0.18	0.9
154	5	160-1423-1-ND	LED GREEN CLEAR CHIP SMD	0.29	1.45

155	10	BAT54-FDICT-ND	DIODE SCHOTTKY 30V 200MA SOT23-3	0.151	1.51
156	3	WM3802-ND	CONN HEADER VERT 6POS 4.2MM	1.06	3.18
157	3	WM3702-ND	CONN RECEPT 6POS DUAL	0.38	1.14
158	3	WM3801-ND	CONN HEADER VERT 4POS 4.2MM	0.81	2.43
159	3	WM3701-ND	CONN RECEPT 4POS DUAL	0.31	0.93
160	3	WM3802-ND	CONN HEADER VERT 6POS 4.2MM	1.06	3.18
161	3	WM3702-ND	CONN RECEPT 6POS DUAL	0.38	1.14
162	3	WM3801-ND	CONN HEADER VERT 4POS 4.2MM	0.81	2.43
163	3	WM3701-ND	CONN RECEPT 4POS DUAL	0.31	0.93
164	3	WM4803-ND	CONN HEADER VERT 5POS 2.54MM	1.14	3.42
165	3	WM2903-ND	CONN HOUSING 5POS .100 W/LATCH	0.36	1.08
166	3	WM8248-ND	CONN HEADER VERT 8POS 2.54MM	1.73	5.19
167	3	WM8036-ND	CONN HOUSING 8POS .100" DUAL	1.05	3.15
168	2	Z224-ND	RELAY GEN PURPOSE SPST 10A 24V	1.55	3.1
169	10	490-15669-1-ND	FIXED IND 28NH 1.2A 98 MOHM	0.253	2.53
170	5	2N7002NCT-ND	MOSFET N-CH 60V 115MA SOT-23	0.39	1.95
171	5	P1.0KDACT-ND	RES SMD 1K OHM 0.1% 1/8W 0805	0.36	1.8
172	3	P10KDACT-ND	RES SMD 10K OHM 0.1% 1/8W 0805	0.36	1.08
173	3	P1.21KDACT-ND	RES SMD 1.21K OHM 0.1% 1/8W 0805	0.36	1.08
174	5	P787DACT-ND	RES SMD 787 OHM 0.1% 1/8W 0805	0.36	1.8
175	5	P200DACT-ND	RES SMD 200 OHM 0.1% 1/8W 0805	0.36	1.8
176	10	P123896CT-ND	RES SMD 0.5% 0.125W 0805	0.103	1.03
177	3	P51DACT-ND	RES SMD 51 OHM 0.1% 1/8W 0805	0.36	1.08
178	5	P2.4KDACT-ND	RES SMD 2.4K OHM 0.1% 1/8W 0805	0.36	1.8
179	1	PIC32MZ2048EFM064-I/PT-ND	IC MCU 32BIT 2MB FLASH 64TQFP	11.32	11.32
180	1	102-2731-ND	DC DC CONVERTER 5V 2W	5.97	5.97
181	1	LT1763CS8-3.3#PBF-ND	IC REG LINEAR 3.3V 500MA 8SOIC	4.23	4.23
182	2	MCP2551-I/SN-ND	IC TRANSCEIVER CAN HI-SPD 8-SOIC	1.05	2.1
183	1	LTC6820IMS#3ZZPBF-ND	ISOSPI ISO COMMUNICATIONS INT	6.07	6.07
184	5	TLP291(GB-TPSECT-ND	OPTOISOLATOR 3.75KV TRANS 4-SO	0.51	2.55
185	10	1276-6454-1-ND	CAP CER 10UF 25V X5R 0805	0.213	2.13
186	4	553-1776-1-ND	PULSE XFMR 1:1 785UH	2.63	10.52
187	3	WM4826-ND	CONN HEADER VERT 4POS 2.54MM	1.06	3.18
188	3	WM2902-ND	CONN HOUSING 4POS .100 W/LATCH	0.26	0.78
189	10	478-1395-1-ND	CAP CER 0.1UF 50V X7R 0805	0.153	1.53
190	10	P10.0KCCT-ND	RES SMD 10K OHM 1% 1/8W 0805	0.082	0.82
191	10	CSNL1206FT1L00CT-ND	RES 0.001 OHM 1% 1W 1206	0.566	5.66
192	10	RMCF0805JT120RCT-ND	RES 120 OHM 5% 1/8W 0805	0.02	0.2
193	10	RNCF0805TKY250RCT-ND	RES 250 OHM 0.01% 1/8W 0805	1.906	19.06
194	10	311-1.0KARCT-ND	RES SMD 1K OHM 5% 1/8W 0805	0.037	0.37
195	10	RMCF0805FT2K10CT-ND	RES 2.1K OHM 1% 1/8W 0805	0.028	0.28
196	10	RMCF0805FT200RCT-ND	RES 200 OHM 1% 1/8W 0805	0.027	0.27

197	10	VAOL-S8GT4CT-ND	LED YELLOW/GREEN CLEAR 0805 SMD	0.291	2.91
198	6	WM13971-ND	TERM BLK 3POS SIDE ENTRY 5MM PCB	1.6	9.6
199	5	BSS84CT-ND	MOSFET P-CH 50V 130MA SOT-23	0.45	2.25
200	5	2N7002NCT-ND	MOSFET N-CH 60V 115MA SOT-23	0.39	1.95
201	5	Z2618-ND	RELAY GEN PURPOSE SPDT 16A 24V	2.17	10.85
202	3	296-34872-1-ND	DGTL ISO 2.5KV 2CH I2C 8SOIC	4.32	12.96
203	3	497-1182-1-ND	IC REG LINEAR 5V 100MA 8SO	0.35	1.05
204	3	ED2989-ND	CONN RCPT TYPEA 4POS R/A	0.5	1.5
205	2	CLA186-ND	OPTOISO 3.75KV 2CH DARLNG 8DIP	2.07	4.14
206	2	WM10385-ND	MEGA-FIT RECEP 2 CKT V-0	0.52	1.04
207	2	S1012EC-40-ND	CONN HEADER VERT 40POS 2.54MM	0.51	1.02
208	1	AD5593RBRUZ-ND	IC ADC I/O PORT	7.98	7.98
Instructor Approval:					
Department Approval:					
(Over \$500)					
				Shipping Fees	
				Grand Total:	\$1,265.65