

# Final Purchasing Report

ECE 491 - Fall 2018

Latest Revision: 12/07/2018

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## Abstract

This report documents every purchase by the project. It provides tables showing each purchase request, what items were purchased in that request, when the items were received, and any returns/refunds. It also provides summary tables that give purchasing totals broken down by budget categories, by week, and by task group. Statistics is calculated for delivery elapsed time, shipping and delivery costs, sales tax, and other items of interest.

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| Disclaimer .....   | <b>Error! Bookmark not defined.</b> |

## Budget Allocation

The following pie chart represents the allocation of the total budget, **\$34,858.80**, among all subsystems as of December 07, 2018.

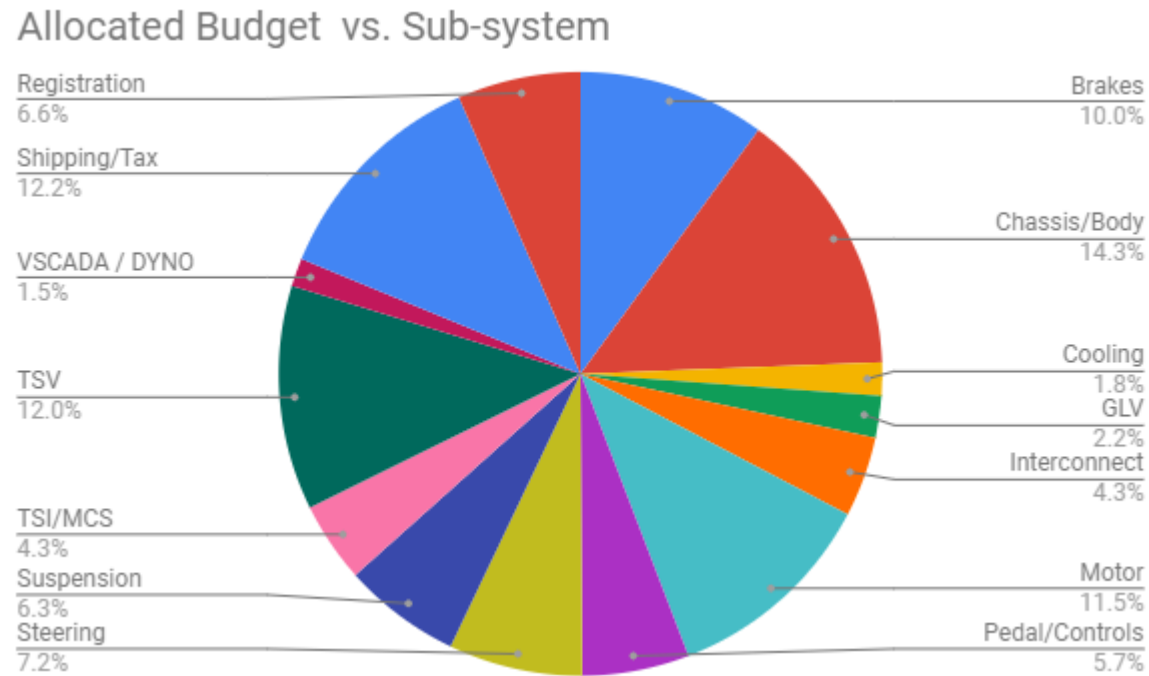


Figure 1: Budget Allocation as of 12/07/2018

## Budget Status

Table 1 below indicates that we have only spent **\$14,941.18** which is **42.86%** of our allocated budget **\$34,858.80**. We have also indicated subsystems that have overflowed their allocated budget as well as subsystems who have not made any purchases as of yet. Figure 2 below also shows the total expenditure percentage among subsystems. In addition, figure 3 shows the total expenses versus time in weeks.

| <b>Sub-system</b> | <b>Allocated Budget</b> | <b>Total Spent</b> | <b>Budget Remaining</b> | <b>Percentage Spent</b> |
|-------------------|-------------------------|--------------------|-------------------------|-------------------------|
| Brakes            | \$3,500.00              | \$0.00             | \$3,500.00              | 0.00%                   |
| Chassis/Body      | \$5,000.00              | \$0.00             | \$5,000.00              | 0.00%                   |
| Cooling           | \$620.00                | \$37.64            | \$582.36                | 6.07%                   |
| GLV               | \$780.00                | \$967.48           | -\$187.48               | 124.04%                 |
| Interconnect      | \$1,500.00              | \$1,440.87         | \$59.13                 | 96.06%                  |
| Motor             | \$4,000.00              | \$3,823.43         | \$176.57                | 95.59%                  |
| Pedal/Controls    | \$2,000.00              | \$0.00             | \$2,000.00              | 0.00%                   |
| Steering          | \$2,500.00              | \$0.00             | \$2,500.00              | 0.00%                   |
| Suspension        | \$2,200.00              | \$0.00             | \$2,200.00              | 0.00%                   |
| TSI/MCS           | \$1,500.00              | \$4,284.12         | -\$2,784.12             | 285.61%                 |
| TSV               | \$4,187.00              | \$1,270.55         | \$2,916.45              | 30.35%                  |
| VSCADA / DYNO     | \$525.00                | \$87.67            | \$437.33                | 16.70%                  |
| Shipping/Tax      | \$4,246.80              | \$729.42           | \$3,517.38              | 17.18%                  |
| Registration      | \$2,300.00              | \$2,300.00         | \$0.00                  | 100.00%                 |
| <b>Overall</b>    | <b>\$34,858.80</b>      | <b>\$14,941.18</b> | <b>\$19,917.62</b>      | <b>42.86%</b>           |

*Table 1: Final Budget Summary as of 12/07/2018*

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## Total Spent vs. Subsystem

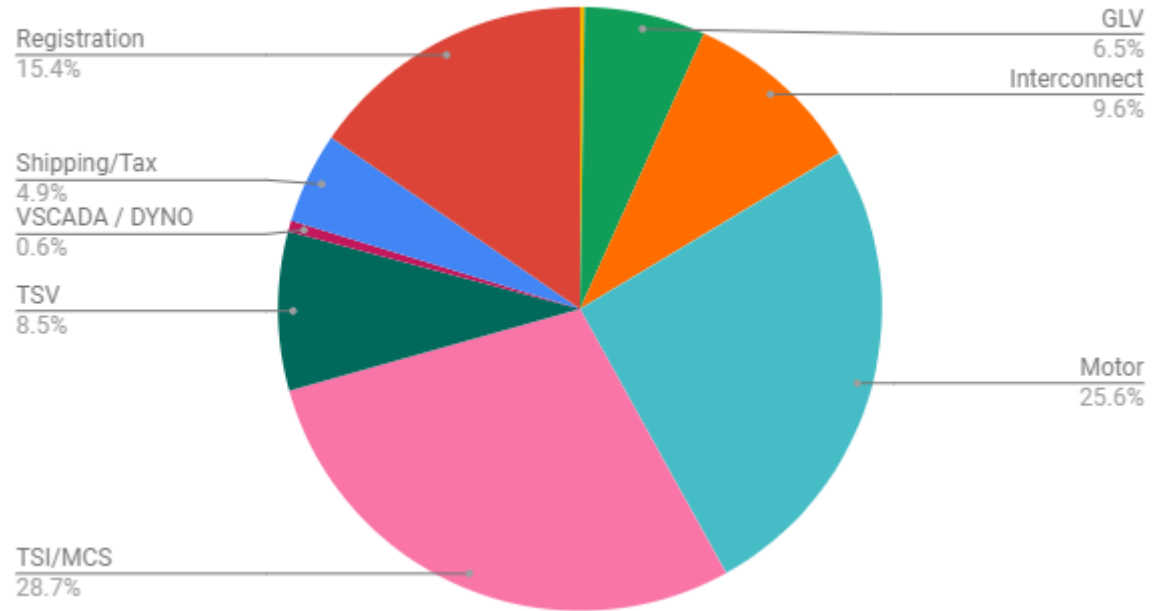


Figure 2: Total Spent vs. Subsystem as of 12/07/2018

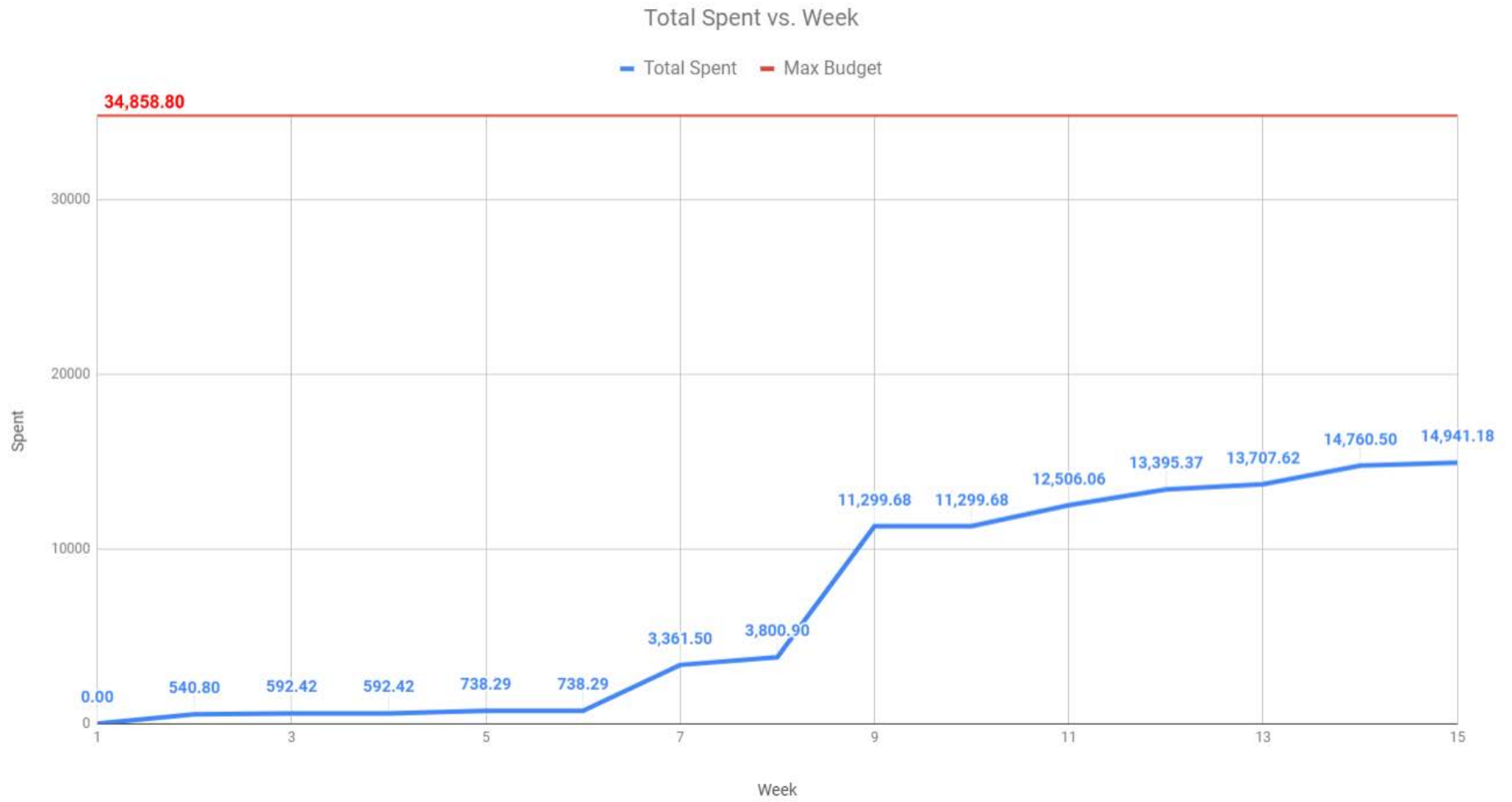


Figure 3: Total Spent vs Time in. weeks

## Weekly Spending Breakdown

| Weekly Spending Breakdown |           |                        |                             |               |               |                |               |               |                   |                 |                |                |                   |                   |                   |                 |               |                     |             |
|---------------------------|-----------|------------------------|-----------------------------|---------------|---------------|----------------|---------------|---------------|-------------------|-----------------|----------------|----------------|-------------------|-------------------|-------------------|-----------------|---------------|---------------------|-------------|
| From                      | To        | Week                   | Subsystem / Budget Category |               |               |                |               |               |                   |                 |                |                |                   |                   |                   |                 | Total of Rows | Total Spent To Date |             |
|                           |           |                        | Registration                | Brakes        | Chassis Body  | Pedal Controls | Steering      | Suspension    | TSI/MCS           | GLV             | VSCADA         | Cooling        | Interconnect      | Motor             | TSV               | Shipping Tax    |               |                     |             |
| 27-Aug-18                 | 2-Sep-18  | 1                      | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$0.00            | \$0.00          | \$0.00         | \$0.00         | \$0.00            | \$0.00            | \$0.00            | \$0.00          | \$0.00        | \$0.00              | \$0.00      |
| 3-Sep-18                  | 9-Sep-18  | 2                      | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$0.00            | \$0.00          | \$0.00         | \$0.00         | \$0.00            | \$0.00            | \$0.00            | \$483.75        | \$57.05       | \$540.80            | \$540.80    |
| 10-Sep-18                 | 16-Sep-18 | 3                      | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$0.00            | \$0.00          | \$0.00         | \$0.00         | \$0.00            | \$0.00            | \$0.00            | \$45.24         | \$6.38        | \$51.62             | \$592.42    |
| 17-Sep-18                 | 23-Sep-18 | 4                      | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$0.00            | \$0.00          | \$0.00         | \$0.00         | \$0.00            | \$0.00            | \$0.00            | \$0.00          | \$0.00        | \$0.00              | \$592.42    |
| 24-Sep-18                 | 30-Sep-18 | 5                      | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$0.00            | \$0.00          | \$0.00         | \$0.00         | \$0.00            | \$0.00            | \$0.00            | \$145.87        | \$0.00        | \$145.87            | \$738.29    |
| 1-Oct-18                  | 7-Oct-18  | 6                      | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$0.00            | \$0.00          | \$0.00         | \$0.00         | \$0.00            | \$0.00            | \$0.00            | \$0.00          | \$0.00        | \$0.00              | \$738.29    |
| 8-Oct-18                  | 14-Oct-18 | 7                      | \$2,300.00                  | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$283.25          | \$0.00          | \$0.00         | \$0.00         | \$0.00            | \$0.00            | \$0.00            | \$21.98         | \$17.98       | \$2,623.21          | \$3,361.50  |
| 15-Oct-18                 | 21-Oct-18 | 8                      | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$0.00            | \$246.23        | \$0.00         | \$0.00         | \$162.85          | \$0.00            | \$0.00            | \$30.32         | \$439.40      | \$3,800.90          |             |
| 22-Oct-18                 | 28-Oct-18 | 9                      | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$2,701.80        | \$543.68        | \$0.00         | \$0.00         | \$269.68          | \$3,678.65        | \$0.00            | \$304.97        | \$7,498.78    | \$11,299.68         |             |
| 29-Oct-18                 | 4-Nov-18  | 10                     | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$0.00            | \$0.00          | \$0.00         | \$0.00         | \$0.00            | \$0.00            | \$0.00            | \$0.00          | \$0.00        | \$0.00              | \$11,299.68 |
| 5-Nov-18                  | 11-Nov-18 | 11                     | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$304.54          | \$124.90        | \$10.50        | \$0.00         | \$323.47          | \$0.00            | \$416.00          | \$26.97         | \$1,206.38    | \$12,506.06         |             |
| 12-Nov-18                 | 18-Nov-18 | 12                     | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$686.83          | \$0.00          | \$0.00         | \$17.17        | \$0.00            | \$144.78          | \$0.00            | \$40.53         | \$889.31      | \$13,395.37         |             |
| 19-Nov-18                 | 25-Nov-18 | 13                     | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$33.00           | \$0.00          | \$77.17        | \$0.00         | \$86.55           | \$0.00            | \$0.00            | \$115.53        | \$312.25      | \$13,707.62         |             |
| 26-Nov-18                 | 2-Dec-18  | 14                     | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$274.70          | \$52.67         | \$0.00         | \$20.47        | \$598.32          | \$0.00            | \$0.00            | \$106.72        | \$1,052.88    | \$14,760.50         |             |
| 3-Dec-18                  | 7-Dec-18  | 15                     | \$0.00                      | \$0.00        | \$0.00        | \$0.00         | \$0.00        | \$0.00        | \$0.00            | \$0.00          | \$0.00         | \$0.00         | \$0.00            | \$0.00            | \$157.71          | \$22.97         | \$180.68      | <b>\$14,941.18</b>  |             |
|                           |           | <b>Subsystem Total</b> | <b>\$2,300.00</b>           | <b>\$0.00</b> | <b>\$0.00</b> | <b>\$0.00</b>  | <b>\$0.00</b> | <b>\$0.00</b> | <b>\$4,284.12</b> | <b>\$967.48</b> | <b>\$87.67</b> | <b>\$37.64</b> | <b>\$1,440.87</b> | <b>\$3,823.43</b> | <b>\$1,270.55</b> | <b>\$729.42</b> |               |                     |             |

Table 2: Final Weekly Spending Breakdown as of 12/07/2018



**Color scale in the Shipping Time column:** left to right corresponding to ascending order of shipping time in days.



| Name              | Subsystem   | Vendor              | Quantity | Direct URL to Part or Part No   | Item Description( with specs)  | Unit Price | Total Cost | Order Date | RCVD       |
|-------------------|-------------|---------------------|----------|---|--|------------|------------|------------|------------|
| Hayden Dodge      | TSV         | Battery Space       | 5        | <a href="https://bit.ly/2CYMMQa">https://bit.ly/2CYMMQa</a>                               | LiFeMnPO4 Prismatic Module:3.2V 60Ah,10CRate   | \$96.75    | \$483.75   | 9/3/2018   | 9/17/2018  |
| Hayden Dodge      | TSV         | McMaster-Carr       | 6        | 91287A116   | 18-8 Stainless Steel Hex Head Screw, M4 x 0.7 mm Thread, 20 mm Long                        | \$5.80     | \$34.80    | 9/10/2018  | 9/11/2018  |
| Hayden Dodge      | TSV         | McMaster-Carr       | 3        | 93475A230   | 18-8 Stainless Steel Washer for M4 Screw Size, 4.3 mm ID, 9 mm OD                          | \$1.86     | \$5.58     | 9/10/2018  | 9/11/2018  |
| Hayden Dodge      | TSV         | McMaster-Carr       | 3        | 92148A160   | 18-8 Stainless Steel Split Lock Washer for M4 Screw Size, 4.4 mm ID, 7.6 mm OD             | \$1.62     | \$4.86     | 9/10/2018  | 9/11/2018  |
| Hayden Dodge      | TSV         | Amazon              | 1        | <a href="https://amzn.to/2ytLXoe">https://amzn.to/2ytLXoe</a>                             | ESP8266 DEV  | \$13.98    | \$13.98    | 9/28/2018  | 10/2/2018  |
| Hayden Dodge      | TSV         | Amazon              | 2        | <a href="https://amzn.to/2S9FWeM">https://amzn.to/2S9FWeM</a>                             | ESP32 Dev  | \$8.39     | \$16.78    | 9/28/2018  | 10/2/2018  |
| Hayden Dodge      | TSV         | Amazon              | 2        | <a href="https://amzn.to/2PjAd7y">https://amzn.to/2PjAd7y</a>                             | Micro USB  | \$7.99     | \$15.98    | 9/28/2018  | 10/2/2018  |
| Hayden Dodge      | TSV         | Amazon              | 1        | <a href="https://amzn.to/2J9Y4Bl">https://amzn.to/2J9Y4Bl</a>                             | 4.2inch E-Ink Display Module Resolution 400x300 3.3v                                       | \$52.99    | \$52.99    | 9/28/2018  | 10/2/2018  |
| Hayden Dodge      | TSV         | Amazon              | 1        | <a href="https://amzn.to/2NXGgtN">https://amzn.to/2NXGgtN</a>                             | Diymore DS3231 AT24C32 IIC High Precision RTC  | \$6.99     | \$6.99     | 9/28/2018  | 10/2/2018  |
| Hayden Dodge      | TSV         | Amazon              | 3        | <a href="https://amzn.to/2EEdf7l">https://amzn.to/2EEdf7l</a>                             | ADC Module Precised Analog Digital Converter Develop Board                                 | \$8.89     | \$26.67    | 9/28/2018  | 10/2/2018  |
| Hayden Dodge      | TSV         | Amazon              | 1        | <a href="https://amzn.to/2CxCkPcQ">https://amzn.to/2CxCkPcQ</a>                           | 5 pcs TMP36 - Temperature Sensor   | \$12.48    | \$12.48    | 9/28/2018  | 10/2/2018  |
| Samuel Mwaura     | VSCADA/DYNO | Adafruit Industries | 1        | <a href="https://www.adafruit.com/product/2219">https://www.adafruit.com/product/2219</a> | HDMI/DVI Decoder   | \$29.95    | \$29.95    | Pending    | Pending    |
| Samuel Mwaura     | VSCADA/DYNO | Adafruit Industries | 1        | <a href="https://www.adafruit.com/product/3386">https://www.adafruit.com/product/3386</a> | RTC for pi   | \$5.95     | \$5.95     | Pending    | Pending    |
| Samuel Mwaura     | VSCADA/DYNO | Adafruit Industries | 1        | <a href="https://www.adafruit.com/product/1596">https://www.adafruit.com/product/1596</a> | Dashboard Screen   | \$39.95    | \$39.95    | Pending    | Pending    |
| Hayden Dodge      | TSV         | Amazon              | 2        | <a href="https://amzn.to/2RtjDjS">https://amzn.to/2RtjDjS</a>                             | HiLetgo ESP-WROOM-32 ESP32 ESP-32S Development Board                                       | \$10.99    | \$21.98    | 10/10/2018 | 10/15/2018 |
| Hongbo Du         | TSI/MCS     | Dig Key             | 1        | <a href="https://bit.ly/2A2Tnwp">https://bit.ly/2A2Tnwp</a>                               | development board for pic32mz2048efm064, which will be the microprocessor on TSI           | \$122.57   | \$122.57   | 10/10/2018 | 10/16/2018 |
| Hongbo Du         | TSI/MCS     | B&B electronics     | 1        | <a href="https://bit.ly/2ORheRJ">https://bit.ly/2ORheRJ</a>                               | CAN Optical Isolator, 9.3 x 8.6 x3.6 cm  | \$160.68   | \$160.68   | 10/10/2018 | 10/18/2018 |
| Maxwell Mefarlane | GLV         | Amazon              | 1        | B01K9X1ZCE  | Tractive System Energized Light  | \$30.00    | \$30.00    | 10/16/2018 | 10/19/2018 |
| Maxwell Mefarlane | GLV         | Deal Extreme        | 2        | 22003   | Car Rotating Battery/Electrical Master Switch  | \$7.83     | \$15.66    | 10/16/2018 | 11/13/2018 |
| Maxwell Mefarlane | GLV         | Super Bright LED's  | 3        | MDB-A12   | Rectangular LED Lights Amber/SSOK  | \$6.49     | \$19.47    | 10/16/2018 | 10/22/2018 |
| Maxwell Mefarlane | GLV         | McMaster-Carr       | 1        | 90272A096   | Steel Pan Head Phillips Screws, 3-48 Thread, 1/2" Long                                     | \$8.00     | \$8.00     | 10/17/2018 | 10/19/2018 |
| Maxwell Mefarlane | GLV         | McMaster-Carr       | 1        | 94639A470   | Off-White Nylon Unthreaded Spacer, 3/16" OD, 5/32" Long, for Number 4 Screw Size           | \$3.62     | \$3.62     | 10/17/2018 | 10/19/2018 |
| Maxwell Mefarlane | GLV         | McMaster-Carr       | 1        | 90272A192   | Steel Phillips Screws 8-32   | \$2.92     | \$2.92     | 10/17/2018 | 10/19/2018 |
| Maxwell Mefarlane | GLV         | Allied              | 3        | 70172680  | 22MMHW SeriesEmergency Stop Switches   | \$55.52    | \$166.56   | 10/17/2018 | 10/22/2018 |
| Drew Carleton     | IC          | Wire Care           | 100      | <a href="https://bit.ly/2COF0bs">https://bit.ly/2COF0bs</a>                               | solid contact size 16 socket   | \$0.34     | \$34.00    | 10/17/2018 | 10/22/2018 |
| Drew Carleton     | IC          | Wire Care           | 100      | <a href="https://bit.ly/2Es72ep">https://bit.ly/2Es72ep</a>                               | solid contact size 16 pin  | \$0.32     | \$32.00    | 10/17/2018 | 10/22/2018 |
| Drew Carleton     | IC          | Wire Care           | 25       | <a href="https://bit.ly/2pV9XIJ">https://bit.ly/2pV9XIJ</a>                               | 4 cavity plug  | \$0.99     | \$24.75    | 10/17/2018 | 10/22/2018 |
| Drew Carleton     | IC          | Wire Care           | 10       | <a href="https://bit.ly/2CNPula">https://bit.ly/2CNPula</a>                               | 4 cavity receptical  | \$1.03     | \$10.30    | 10/17/2018 | 10/22/2018 |
| Drew Carleton     | IC          | Wire Care           | 50       | <a href="https://bit.ly/2yDYpXq">https://bit.ly/2yDYpXq</a>                               | receptical wedgelock   | \$0.12     | \$6.00     | 10/17/2018 | 10/22/2018 |
| Drew Carleton     | IC          | Wire Care           | 10       | <a href="https://bit.ly/2PDHCM5">https://bit.ly/2PDHCM5</a>                               | 4 cavity receptical with flange  | \$4.88     | \$48.80    | 10/17/2018 | 10/22/2018 |
| Drew Carleton     | IC          | Wire Care           | 50       | <a href="https://bit.ly/2ynPUks">https://bit.ly/2ynPUks</a>                               | plug wedge lock  | \$0.14     | \$7.00     | 10/17/2018 | 10/22/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 2        | 102-2927-ND   | DC/DC CONVERTER 5V 20W   | \$35.52    | \$71.04    | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 2        | AD5593RBRUZ-ND  | IC ADC I/O PORT (ADC/DAC & Temp I2C)   | \$7.90     | \$15.80    | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | 296-34970-1-ND  | IC LOAD SW HIGH SIDE 6SOT (IC Switch)  | \$0.78     | \$7.78     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 3        | 296-29034-1-ND  | IC MONITOR PWR/CURR BIDIR 10MSOP (Current Monitor)   | \$2.88     | \$8.64     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 3        | CLA186-ND   | OPTOISO 3.75KV 2CH DARLING 8DIP (Opto-Isolator)  | \$2.07     | \$6.21     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | MCP6004-I/P-ND  | IC OPAMP GP 1MHZ RRO 14DIP (Quad Op-Amp)   | \$0.45     | \$4.50     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | Z2254-ND  | RELAY GEN PURPOSE SPST 10A 24V   | \$1.22     | \$12.20    | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | 478-1395-1-ND   | CAP CER 0.1µF ±10% 50V X7R 0805  | \$0.16     | \$1.61     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | SK310A-LTPMSCT-ND   | DIODE SCHOTTKY 100V 3A DO214AC   | \$0.44     | \$4.35     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | CSNL1206FT1L00CT-ND   | RES SMD 0.001 OHM 1% 1W 1206   | \$0.57     | \$5.66     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | RNCF0805TKY250RCT-ND  | RES SMD 250 OHM 0.01% 1/8W 0805  | \$1.91     | \$19.06    | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | YAG1852CT-ND  | 2.1 kOhms ±0.1% 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Thin Film                    | \$0.31     | \$3.13     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | RNCF0805DTE10K0CT-ND  | 10 kOhms ±0.5% 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Automotive AEC-Q200 Thin Film | \$0.14     | \$1.40     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 6        | WM16841-ND  | Connector Header Through Hole 12 position 0.224" (5.70mm)                                  | \$4.83     | \$28.98    | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | WM10390-ND  | 12 Position Rectangular Housing Connector Receptacle Black 0.224" (5.70mm)                 | \$1.19     | \$11.94    | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | WM11981CT-ND  | Socket Contact Tin 14-16 AWG Crimp   | \$0.24     | \$2.38     | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | 182-909ME-ND  | CONN D-SUB PLUG 9POS R/A SOLDER  | \$1.62     | \$16.17    | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | 732-5363-ND   | Male Header Pins Right Angle   | \$1.78     | \$17.78    | 10/24/2018 | 10/30/2018 |
| Maxwell Mefarlane | GLV         | Dig Key             | 10       | 952-3213-ND   | CONN RCPT 2.54" SMD DUAL 16POS   | \$2.11     | \$21.10    | 10/24/2018 | 10/30/2018 |

|                   |             |                        |     |   |  |            |            |            |            |
|-------------------|-------------|------------------------|-----|---|--|------------|------------|------------|------------|
| Maxwell Mcfarlane | GLV         | Dig Key                | 10  | 732-5468-5-ND   | Male SMD Header pins   | \$2.96     | \$29.63    | 10/24/2018 | 10/30/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 7   | 350-4053-ND   | Panel Mount Indicator (Green)  | \$8.85     | \$61.95    | 10/24/2018 | 10/30/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 3   | 350-4050-ND   | Panel Mount Indicator (Red)  | \$6.90     | \$20.70    | 10/24/2018 | 10/30/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 3   | Z6105-ND  | Pushbutton Switch SPST-NC Standard Panel Mount, Front  | \$10.71    | \$32.13    | 10/24/2018 | 10/30/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 2   | W28-XQ1A-10   | Circuit Breaker  | \$3.77     | \$7.54     | 10/24/2018 | 10/30/2018 |
| Drew Carleton     | IC          | Dig Key                | 50  | 1734-1125-ND  | solid contact size 14 socket   | \$0.58     | \$28.75    | 10/24/2018 | 10/30/2018 |
| Drew Carleton     | IC          | Dig Key                | 50  | 1734-1133-ND  | solid contact size 14 pin  | \$0.50     | \$25.20    | 10/24/2018 | 10/30/2018 |
| Drew Carleton     | IC          | Dig Key                | 50  | 1734-1517-ND  | 20 awg sold contact pin  | \$0.41     | \$20.52    | 10/24/2018 | 10/30/2018 |
| Drew Carleton     | IC          | Dig Key                | 50  | 889-1471-ND   | 20awg solid contact socket   | \$0.59     | \$29.56    | 10/24/2018 | 10/30/2018 |
| Drew Carleton     | IC          | McMaster-Carr          | 10  | 6084T14   | Sleeves for 14-12 Wire Gauge Washdown DC Connector Set   | \$7.51     | \$75.10    | 10/26/2018 | 10/29/2018 |
| Drew Carleton     | IC          | McMaster-Carr          | 10  | 6084T13   | Pins for 14-12 Wire Gauge Washdown DC Connector Set  | \$5.43     | \$54.30    | 10/26/2018 | 10/29/2018 |
| Drew Carleton     | IC          | McMaster-Carr          | 1   | 7082K24   | Cable:SJEOOW, Black Outer Insulation, 12 Gauge, 3 Wires (25FT)                                   | \$36.25    | \$36.25    | 10/26/2018 | 10/29/2018 |
| Antonio Exposito  | TSI/MCS     | Dig Key                | 100 | 100 A27817CT-ND   | CONN QC RCPT 18-22AWG 0.250  | \$0.18     | \$17.68    | 10/24/2018 | 10/30/2018 |
| Antonio Exposito  | TSI/MCS     | Dig Key                | 100 | 100 A27906CT-ND   | CONN QC TAB 18-22AWG 0.250 CRIMP   | \$0.31     | \$30.66    | 10/24/2018 | 10/30/2018 |
| Yuqiu Zhang       | TSI/MCS     | Dig Key                | 5   | NCD9830DBR2GOSDKR-ND  | 8 channels ADC I2C Expander  | \$2.70     | \$13.50    | 10/24/2018 | 10/30/2018 |
| Yuqiu Zhang       | TSI/MCS     | Dig Key                | 5   | MCP23016T-I/SOCT-ND   | 16 channels GPIO I2C Expander  | \$1.63     | \$8.15     | 10/24/2018 | 10/30/2018 |
| Yuqiu Zhang       | TSI/MCS     | Dig Key                | 2   | PIC32MZ2048EFH064-I/PT-ND                                   | MIPS32® M-Class PIC® 32MZ Microcontroller<br>IC 32-Bit 200MHz 2MB (2M x 8) FLASH 64-TQFP (10x10) | \$11.11    | \$22.22    | 10/24/2018 | 10/30/2018 |
| Hayden Dodge      | TSI/MCS     | <a href="#">emsiso</a> | 1   | emDrive 500_800/125   | emDrive 500_800/125 motor controller   | \$2,109.00 | \$2,109.00 | 10/25/2018 | 11/15/2018 |
| Hayden Dodge      | TSI/MCS     | <a href="#">emsiso</a> | 1   | emDrive 500_800/125   | emDrive modifications - isolated CAN   | \$22.80    | \$22.80    | 10/25/2018 | 11/15/2018 |
| Hayden Dodge      | TSI/MCS     | <a href="#">emsiso</a> | 1   | emDrive 500_800/125   | Accessroy- USB to CAN interface  | \$228.00   | \$228.00   | 10/25/2018 | 11/15/2018 |
| Hayden Dodge      | TSI/MCS     | <a href="#">emsiso</a> | 1   | emDrive 500_800/125   | Accessory - emDrive configurator license   | \$342.00   | \$342.00   | 10/25/2018 | 11/15/2018 |
| Nick Steele       | Motor       | eBay                   | 1   | <a href="https://bit.ly/2O6lwiF">https://bit.ly/2O6lwiF</a> | Emrax 208 (80kW, 108HP) Low Volt Aircooled Motor   | \$3,672.04 | €3,672.04  | 10/25/2018 | 11/2/2018  |
| Maxwell Mcfarlane | GLV         | Advanced Circuits      | 2   | BOB   | BOB PCB  | \$33.00    | \$66.00    | 10/25/2018 | 11/6/2018  |
| Maxwell Mcfarlane | GLV         | Advanced Circuits      | 2   | P2C   | Pi2CAN PCB   | \$33.00    | \$66.00    | 10/25/2018 | 11/6/2018  |
| Yuqiu Zhang       | TSI/MCS     | Dig Key                | 4   | MCP23016T-I/SOCT-ND   | MCP23016   | 1.63       | \$6.52     | 11/6/2018  | 11/13/2018 |
| Yuqiu Zhang       | TSI/MCS     | Dig Key                | 2   | PCB3001-1-ND  | SOIC-28 Breakout board   | 3.19       | \$6.38     | 11/6/2018  | 11/13/2018 |
| Yuqiu Zhang       | TSI/MCS     | Dig Key                | 4   | 296-48522-1-ND  | DAC5574 8bits D/C  | 3.72       | \$14.88    | 11/6/2018  | 11/13/2018 |
| Yuqiu Zhang       | TSI/MCS     | Dig Key                | 4   | PA0034-ND   | TSSOP-16 Board   | 4.19       | \$16.76    | 11/6/2018  | 11/13/2018 |
| Zian Geng         | VSCADA/DYNO | Dig Key                | 1   | 1528-1871-ND  | RASPBERRY PI PCF8523 RTC   | 5.95       | \$5.95     | 11/6/2018  | 11/13/2018 |
| Zian Geng         | VSCADA/DYNO | Dig Key                | 5   | P033-ND   | BATTERY LITHIUM 3V COIN 12.5MM   | 0.91       | \$4.55     | 11/6/2018  | 11/13/2018 |
| Drew Carleton     | IC          | Dig Key                | 10  | 889-1063-ND   | 6 Position Circular Connector Plug Housing Free Hanging (In-Line) Coupling Nut                   | 10.4       | \$104.00   | 11/6/2018  | 11/13/2018 |
| Drew Carleton     | IC          | Dig Key                | 10  | 889-1062-ND   | 6 Position Circular Connector Receptacle Housing Panel Mount                                     | 10.357     | \$103.57   | 11/6/2018  | 11/13/2018 |
| Drew Carleton     | IC          | Dig Key                | 10  | 1734-1103-ND  | strain relief end cap  | 5.16       | \$51.60    | 11/6/2018  | 11/13/2018 |
| Drew Carleton     | IC          | Dig Key                | 1   | 1734-1827-ND  | removal tool   | 1.19       | \$1.19     | 11/6/2018  | 11/13/2018 |
| Drew Carleton     | IC          | Dig Key                | 10  | 1734-1375-ND  | 2pin box mount   | 3.17       | \$31.70    | 11/6/2018  | 11/13/2018 |
| Drew Carleton     | IC          | Dig Key                | 10  | 1734-1420-ND  | 2 pin plug   | 1.038      | \$10.38    | 11/6/2018  | 11/13/2018 |
| Drew Carleton     | IC          | Dig Key                | 3   | 1734-1356-ND  | 8 pin box mount  | 7.01       | \$21.03    | 11/6/2018  | 11/13/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 10  | WM16837-ND  | Connector Header Through Hole 4 position 0.224" (5.70mm)   | \$3.81     | \$38.09    | 11/6/2018  | 11/13/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 10  | WM16836-ND  | Connector Header Through Hole 2 position   | \$3.29     | \$32.89    | 11/6/2018  | 11/13/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 5   | WM16838-ND  | Connector Header Through Hole 6 position 0.224" (5.70mm)   | \$4.28     | \$21.40    | 11/6/2018  | 11/13/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 10  | WM10386-ND  | 4 Position Rectangular Housing Connector Receptacle Black 0.224" (5.70mm)                        | \$0.63     | \$6.30     | 11/6/2018  | 11/13/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 10  | WM10385-ND  | 2 Position Rectangular Housing Connector Receptacle Black  | \$0.50     | \$4.95     | 11/6/2018  | 11/13/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 5   | WM10387-ND  | 6 Position Rectangular Housing Connector Receptacle Black 0.224" (5.70mm)                        | \$0.96     | \$4.80     | 11/6/2018  | 11/13/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key                | 100 | WM11981CT-ND  | Socket Contact Tin 14-16 AWG Crimp   | 0.1647     | \$16.47    | 11/6/2018  | 11/13/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key                | 1   | 255-5322-5-ND   | RELAY GENERAL PURPOSE SPST 5A 3V   | 5.71       | \$5.71     | 11/9/2018  | 11/16/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key                | 5   | MC7805CTGOS-ND  | IC REG LINEAR 5V 1A TO220AB  | 0.64       | \$3.20     | 11/9/2018  | 11/16/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key                | 1   | 1470-1595-5-ND  | DC DC CONVERTER 24V 2W   | 10.25      | \$10.25    | 11/9/2018  | 11/16/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key                | 1   | KAL25FB50R0-ND  | RES CHAS MNT 50 OHM 1% 25W   | 3.08       | \$3.08     | 11/9/2018  | 11/16/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key                | 1   | 696-1455-ND   | RES CHAS MNT 75 OHM 1% 25W   | 3.49       | \$3.49     | 11/9/2018  | 11/16/2018 |
| Tianyu Zhu        | TSV         | GIGAVAC                | 4   | <a href="#">GX14CB</a>                                      | 350+ Amp 12-800 Vdc Normally open relay  | 104        | \$416.00   | 11/10/2018 | 11/26/2018 |
| Tianyu Zhu        | TSI/MCS     | GIGAVAC                | 1   | <a href="#">GX14CB</a>                                      | 350+ Amp 12-800 Vdc Normally open relay  | 104        | \$104.00   | 11/10/2018 | 11/26/2018 |
| Tianyu Zhu        | TSI/MCS     | GIGAVAC                | 1   | <a href="#">GXNC14CB</a>                                    | 350+ Amp 12-800 Vdc Normally closed relay  | 156        | \$156.00   | 11/11/2018 | 11/26/2018 |

|            |         |         |    |                      |                                  |        |         |            |            |
|------------|---------|---------|----|----------------------|----------------------------------|--------|---------|------------|------------|
| Tianyu Zhu | TSI/MCS | Dig Key | 50 | S9001-ND             | CONN JUMPER SHORTING GOLD FLASH  | 0.0378 | \$1.89  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 2  | Z8752-ND             | JUMPER PLUG 16POS SING ROW       | 2.28   | \$4.56  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 6  | WM4830-ND            | CONN HDR VERT 8POS .100 TIN      | 1.44   | \$8.64  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 2  | 887-1751-1-ND        | CRYSTAL 24.0000MHZ 12PF SMD      | 0.66   | \$1.32  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 4  | 296-48522-1-ND       | IC DAC 8-BIT 12C QUAD 10-MSOP    | 3.72   | \$14.88 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 4  | NCD9830DBR2GOSCT-ND  | IC ADC 8BIT 8CH 12C 16TSSOP      | 2.7    | \$10.80 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 4  | MCP2551-1/SN-ND      | IC TRANSCEIVER CAN HI-SPD 8-SOIC | 1.05   | \$4.20  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 5  | MCP9700AT-E/TTCT-ND  | SENSOR ANALOG -40C-125C SOT23-3  | 0.32   | \$1.60  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 3  | WM3804-ND            | CONN HEADER 10POS 4.2MM VERT TIN | 1.62   | \$4.86  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 1  | 102-3862-ND          | DC DC CONVERTER +/-5V 10W        | 28.19  | \$28.19 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 4  | WM3801-ND            | CONN HEADER 4POS 4.2MM VERT TIN  | 0.81   | \$3.24  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 3  | LT1763CS8-3.3#PBF-ND | IC REG LINEAR 3.3V 500MA 8SOIC   | 4.23   | \$12.69 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 15 | TLP293(TPLECT-ND     | OPTOISOLATOR 3.75KV TRANS 4-SO   | 0.51   | \$7.65  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 2  | WM3789CT-ND          | CONN MOD JACK 6P6C VERT UNSHLD   | 1.16   | \$2.32  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 5  | P240KDACT-ND         | RES SMD 240K OHM 0.1% 1/8W 0805  | 0.36   | \$1.80  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 6  | WM3803-ND            | CONN HEADER 8POS 4.2MM VERT TIN  | 1.37   | \$8.22  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 3  | WM3805-ND            | CONN HEADER 12POS 4.2MM VERT TIN | 1.7    | \$5.10  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 1  | 811-2783-ND          | DC DC CONVERTER 12V 15W          | 67.33  | \$67.33 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 2  | 516-2578-5-ND        | IC OPAMP ISOLATION 100KHZ 8SO    | 5.66   | \$11.32 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 3  | NC7WZ00K8XCT-ND      | IC GATE NAND 2CH 2-INP US8       | 0.4    | \$1.20  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 3  | 497-2271-1-ND        | IC COMP LP DUAL CMOS VOLT 8 SOIC | 0.75   | \$2.25  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 4  | 497-10252-1-ND       | IC OPAMP GP 1.4MHZ RRO 8SO       | 1.54   | \$6.16  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 2  | 1715-1676-1-ND       | SWITCH TACTILE SPST-NO 0.1A 42V  | 2.77   | \$5.54  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 3  | SI8600AB-B-IS-ND     | DGTL ISO 2.5KV 2CH 12C 8SOIC     | 3.33   | \$9.99  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 4  | ST4ETB202CT-ND       | TRIMMER 2K OHM 0.25W GW TOP ADJ  | 1.43   | \$5.72  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 2  | MCP23016T-1/SOCT-ND  | IC I/O EXPANDER 12C 16B 28SOIC   | 1.63   | \$3.26  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 3  | 296-4180-1-ND        | IC GATE NAND 1CH 8-INP 14SOIC    | 2.36   | \$7.08  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 3  | 296-39512-1-ND       | IC ANLG SW SPDT SOT23-6          | 1.04   | \$3.12  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 3  | NC7SZ08P5XCT-ND      | IC GATE AND 1CH 2-INP SC70-5     | 0.36   | \$1.08  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | 311-2868-1-ND        | RES SMD 499 OHM 0.5% 1/8W 0805   | 0.133  | \$1.33  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 6  | MCP6004T-I/SLCT-ND   | IC OPAMP GP RRO 1MHZ 14-SOIC     | 0.45   | \$2.70  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | A126332CT-ND         | RES SMD 10K OHM 1% 1/8W 0805     | 0.049  | \$0.49  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | P123807CT-ND         | RES SMD 0.5% 0.125W 0805         | 0.103  | \$1.03  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 6  | MCP6002T-I/SNCT-ND   | IC OPAMP GP 1MHZ RRO 8SOIC       | 0.34   | \$2.04  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | 311-3.90KCRCT-ND     | RES SMD 3.9K OHM 1% 1/8W 0805    | 0.046  | \$0.46  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | 311-232CRCT-ND       | RES SMD 232 OHM 1% 1/8W 0805     | 0.047  | \$0.47  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 5  | P21060CT-ND          | RES SMD 2.4K OHM 0.5% 1/4W 0805  | 0.25   | \$1.25  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 5  | RHM120AECT-ND        | RES SMD 120 OHM 1% 0.4W 0805     | 0.17   | \$0.85  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | 311-137KCRCT-ND      | RES SMD 137K OHM 1% 1/8W 0805    | 0.047  | \$0.47  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | P4.02KDACT-ND        | RES SMD 4.02K OHM 0.1% 1/8W 0805 | 0.302  | \$3.02  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | 541-4.22MCCT-ND      | RES SMD 4.22M OHM 1% 1/8W 0805   | 0.069  | \$0.69  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | RMCF0805FT24K9CT-ND  | RES 24.9K OHM 1% 1/8W 0805       | 0.028  | \$0.28  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 15 | RG20N150KWCT-ND      | RES SMD 150K OHM 0.05% 1/8W 0805 | 0.827  | \$12.41 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 5  | SI1302DL-T1-E3CT-ND  | MOSFET N-CH 30V 600MA SOT323-3   | 0.5    | \$2.50  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 4  | ST4ETB102CT-ND       | TRIMMER 1K OHM 0.25W GW TOP ADJ  | 1.43   | \$5.72  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 5  | P15KDACT-ND          | RES SMD 15K OHM 0.1% 1/8W 0805   | 0.36   | \$1.80  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 5  | RHM1.00KAECT-ND      | RES SMD 1K OHM 1% 0.4W 0805      | 0.17   | \$0.85  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | P100KDACT-ND         | RES SMD 100K OHM 0.1% 1/8W 0805  | 0.302  | \$3.02  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 4  | 311-100CRCT-ND       | RES SMD 100 OHM 1% 1/8W 0805     | 0.1    | \$0.40  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 5  | P20705CT-ND          | RES SMD 9.31K OHM 0.1% 1/4W 0805 | 0.36   | \$1.80  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | P330DACT-ND          | RES SMD 330 OHM 0.1% 1/8W 0805   | 0.302  | \$3.02  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu | TSI/MCS | Dig Key | 10 | 311-2.40KCRCT-ND     | RES SMD 2.4K OHM 1% 1/8W 0805    | 0.047  | \$0.47  | 11/16/2018 | 11/26/2018 |

|                 |         |                            |    |   |  |         |         |            |            |
|-----------------|---------|----------------------------|----|---|--|---------|---------|------------|------------|
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 5  | MMBF170DKR-ND   | MOSFET N-CH 60V 500MA SOT-23   | 1.89    | \$9.45  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 5  | ZVP4525GCT-ND   | MOSFET P-CH 250V 0.265A SOT223   | 0.79    | \$3.95  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 6  | PNM0805-5.0KBCT-ND  | RES SMD 5K OHM 0.1% 1/5W 0805  | 2.76    | \$16.56 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 1  | 1951-2310-ND  | DC DC CONVERTER 24V 30W  | 76.2    | \$76.20 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 5  | 641-1310-1-ND   | DIODE GEN PURP 50V 1A DO41   | 0.11    | \$0.55  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | 490-15669-1-ND  | FIXED IND 28NH 1.2A 98 MOHM  | 0.28    | \$1.12  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 5  | P20916CT-ND   | RES SMD 665K OHM 0.1% 1/4W 0805  | 0.36    | \$1.80  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 10 | 160-1427-1-ND   | LED RED CLEAR SMD  | 0.229   | \$2.29  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 10 | 1516-1083-1-ND  | LED BLUE CLEAR 0805 SMD  | 0.277   | \$2.77  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | P95.3KDACT-ND   | RES SMD 95.3K OHM 0.1% 1/8W 0805   | 0.36    | \$1.44  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | PLT0805-500ACT-ND   | RES SMD 500 OHM 0.05% 1/4W 0805  | 4.27    | \$17.08 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 10 | 511-1285-1-ND   | LED GREEN CLEAR 0805 SMD   | 0.284   | \$2.84  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 5  | 497-3177-1-ND   | MOSFET N-CH 60V 4A SOT223  | 0.8     | \$4.00  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 10 | WM3843-ND   | CONN HEADER 2POS 4.2MM VERT TIN  | 0.504   | \$5.04  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 10 | 732-7817-1-ND   | CAP CER 33PF 16V C0G/NP0 0805  | 0.038   | \$0.38  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | 445-175206-1-ND   | FIXED IND 2.2UH 50MA 500 MOHM  | 0.25    | \$1.00  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | 478-10831-1-ND  | CAP CER 0.33UF 25V X7R 0805  | 0.72    | \$2.88  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 5  | 497-8106-1-ND   | IC VREF SHUNT ADJ SOT23-5  | 0.64    | \$3.20  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 5  | 478-10570-1-ND  | CAP CER 1UF 16V X7R 0805   | 0.36    | \$1.80  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | 490-10531-1-ND  | CAP CER 47UF 16V X6S 1210  | 0.97    | \$3.88  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 6  | WM3802-ND   | CONN HEADER 6POS 4.2MM VERT TIN  | 1.06    | \$6.36  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 6  | 490-5523-1-ND   | CAP CER 10UF 25V X5R 0805  | 0.54    | \$3.24  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 35 | 720-1752-1-ND   | CAP CER 0.1UF 50V X7R 0805   | 0.195   | \$6.83  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | 1276-6722-1-ND  | CAP CER 4.7UF 35V X5R 0805   | 0.24    | \$0.96  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | MC7805BDTRKGOSCT-ND   | IC REG LINEAR 5V 1A DPAK   | 0.64    | \$2.56  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 10 | 709-1271-1-ND   | CAP CER 100PF 500V C0G/NP0 0805  | 0.183   | \$1.83  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 30 | YAG3358CT-ND  | RES SMD 10K OHM 0.5% 1/8W 0805   | 0.133   | \$3.99  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 10 | 511-1290-1-ND   | LED YELLOW CLEAR 0805 SMD  | 0.284   | \$2.84  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | 445-7947-1-ND   | CAP CER 10UF 100V X7S 2220   | 3.1     | \$12.40 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | 445-14559-1-ND  | CAP CER 15UF 10V X7S 0805  | 0.88    | \$3.52  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 4  | CRM2512-FX-1000ELFCT-ND                                       | RES SMD 100 OHM 1% 2W 2512   | 0.63    | \$2.52  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 5  | 2SK1828TE85LFCT-ND  | MOSFET N-CH 20V 50MA S-MINI  | 0.5     | \$2.50  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 1  | KAL25FB50R0-ND  | RES CHAS MNT 50 OHM 1% 25W   | 3.08    | \$3.08  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 1  | 696-1455-ND   | RES CHAS MNT 75 OHM 1% 25W   | 3.49    | \$3.49  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 1  | Z2951-ND  | RELAY GEN PURPOSE SPDT 10A 24V   | 16.28   | \$16.28 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 1  | Z6224-ND  | RELAY GEN PURPOSE SPDT 10A 5V  | 22.81   | \$22.81 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 2  | Z855-ND   | RELAY SOCKET 5 POSITION DIN RAIL   | 6.18    | \$12.36 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 2  | PA0027-ND   | UMAX-10/USOP-10/MSOP-10TODIP-10  | 4.09    | \$8.18  | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Dig Key                    | 25 | S1112E-36-ND  | CONN HEADER .100 SINGL R/A 36POS   | 1.767   | \$44.18 | 11/16/2018 | 11/26/2018 |
| Tianyu Zhu      | TSI/MCS | Amazon                     | 1  | <a href="https://amzn.to/2qOjpYB">https://amzn.to/2qOjpYB</a> | WINGONEER YF-S201 1-30L/min Water Flow Hall Counter / Sensor Water control Water Flow Rate Switch Flow Meter Flowmeter Counter | \$8.99  | \$8.99  | 11/16/2018 | 11/20/2018 |
| Tianyu Zhu      | TSI/MCS | Amazon                     | 2  | <a href="https://amzn.to/2DI4S9m">https://amzn.to/2DI4S9m</a> | DIN Rail Terminal Blocks, 10-22 AWG, 30 Amp, 600 Volt  | \$17.80 | \$35.60 | 11/16/2018 | 11/20/2018 |
| Tianyu Zhu      | TSI/MCS | GMW Associates             | 1  | BBM-01  | Bus Bar Module Current Sensor, 12-160mm Bus Bar widths   | \$40.00 | \$40.00 | 11/16/2018 | 11/22/2018 |
| Nick Steele     | Motor   | McMaster-Carr              | 1  | 8961K15   | Steel DIN 3 Rail, 7.5mm Deep, 1m Long  | \$5.27  | \$5.27  | 11/7/2018  | 11/8/2018  |
| Nick Steele     | Motor   | McMaster-Carr              | 11 | 47065T142   | Steel End-Feed Fastener, 1/4"-20 Thread for T-Slotted Framing  | \$2.30  | \$25.30 | 11/7/2018  | 11/8/2018  |
| Jordan Vallance | Motor   | Midwest Steel and Aluminum | 1  | 6061  | 1 inch thick 11" x 11" Plate   | \$58.13 | \$58.13 | 11/6/2018  | 11/7/2018  |
| Jordan Vallance | Motor   | McMaster-Carr              | 4  | 47065T278   | Silver Tee Surface Bracket for 1" High Single Rail   | \$7.95  | \$31.80 | 11/6/2018  | 11/7/2018  |
| Jordan Vallance | Motor   | McMaster-Carr              | 4  | 47065T255   | Silver Straight Surface Bracket, 2" Long for 1" High Rail  | \$6.07  | \$24.28 | 11/6/2018  | 11/7/2018  |
| Drew Carleton   | IC      | McMaster-Carr              | 1  | <a href="#">7243K21</a>                                       | single crip, 16-14 awg 50 pack female  | \$14.39 | \$14.39 | 11/19/2018 | 11/20/2018 |
| Drew Carleton   | IC      | McMaster-Carr              | 1  | <a href="#">7243K22</a>                                       | single crip, 16-14 awg 50 pack male  | \$15.08 | \$15.08 | 11/19/2018 | 11/20/2018 |
| Drew Carleton   | IC      | McMaster-Carr              | 4  | <a href="#">8505K722</a>                                      | 1/8 in 12inx24in grey acrylic  | \$14.27 | \$57.08 | 11/19/2018 | 11/20/2018 |

|                   |             |                   |     |   |  |          |          |            |            |
|-------------------|-------------|-------------------|-----|---|--|----------|----------|------------|------------|
| Yuqiu Zhang       | TSI/MCS     | Advanced Circuits | 1   | <a href="#">TSI2019 V1</a>                            | TSI BOARD 2019   | \$33.00  | \$33.00  | 11/19/2018 | 11/29/2018 |
| Drew Carleton     | IC          | Amazon            | 1   | <a href="http://a.co/4auqClz">http://a.co/4auqClz</a> | AmazonBasics High-Speed HDMI Cable, 10 Feet, 1-Pack Offered by Amazon.com.   | \$7.99   | \$7.99   | 11/20/2018 | 11/26/2018 |
| Drew Carleton     | IC          | Amazon            | 1   | <a href="http://a.co/4auqClz">http://a.co/4auqClz</a> | [2 Packs] iXCC 10 Feet Long Micro USB to USB 2.0 Cable   | \$7.99   | \$7.99   | 11/20/2018 | 11/26/2018 |
| Drew Carleton     | IC          | Amazon            | 1   | <a href="http://a.co/4auqClz">http://a.co/4auqClz</a> | TNP USB 3.0 Flush Mount Cable  | \$9.99   | \$9.99   | 11/20/2018 | 11/26/2018 |
| Drew Carleton     | IC          | Amazon            | 2   | <a href="http://a.co/4auqClz">http://a.co/4auqClz</a> | 40pin Male to Female, 40pin Male to Male, 40pin Female to Female for Breadboard/Arduino Based/DIY/Robot Ribbon Cables Ki | \$6.99   | \$13.98  | 11/20/2018 | 11/26/2018 |
| Drew Carleton     | IC          | Amazon            | 1   | <a href="http://a.co/4auqClz">http://a.co/4auqClz</a> | ShineKee USB HDMI Mount Cable 2 Ports USB 3.0 HDMI   | \$11.90  | \$11.90  | 11/20/2018 | 11/26/2018 |
| Samuel Mwaura     | VSCADA/DYNO | Mouser            | 3   | 584-AD5593RBRUZ                                       | Data Acquisition ADCs/DACs - Specialized Configurable ADC/DAC 8 Channel, 12 Bit  | \$7.48   | \$22.44  | 11/20/2018 | 11/26/2018 |
| Samuel Mwaura     | VSCADA/DYNO | Mouser            | 3   | 538-171692-0106                                       | Headers & Wire Housings Mega-Fit Recept Hsg 6 ckt V-0  | \$0.96   | \$2.88   | 11/20/2018 | 11/26/2018 |
| Drew Carleton     | IC          | McMaster-Carr     | 1   | <a href="#">6452T45</a>                               | 100 feet 18awg 9 wire  | \$145.00 | \$145.00 | 11/27/2018 | 11/29/2018 |
| Drew Carleton     | IC          | McMaster-Carr     | 1   | <a href="#">6452T65</a>                               | 100 feet 16 awg 12 wire  | \$225.00 | \$225.00 | 11/27/2018 | 11/29/2018 |
| Drew Carleton     | IC          | McMaster-Carr     | 5   | <a href="#">7130K12</a>                               | zip tie 100 packs  | \$2.41   | \$12.05  | 11/27/2018 | 11/29/2018 |
| Drew Carleton     | IC          | McMaster-Carr     | 2   | <a href="#">7565K46</a>                               | cable tie (25 a pack)  | \$7.49   | \$14.98  | 11/27/2018 | 11/29/2018 |
| Drew Carleton     | IC          | McMaster-Carr     | 5   | <a href="#">7566K73</a>                               | Cable tie mount (25 a pack)  | \$3.82   | \$19.10  | 11/27/2018 | 11/29/2018 |
| Drew Carleton     | IC          | McMaster-Carr     | 2   | <a href="#">5945T83</a>                               | ables 1-45 (10 of each)  | \$19.83  | \$39.66  | 11/27/2018 | 11/29/2018 |
| Drew Carleton     | IC          | McMaster-Carr     | 4   | <a href="#">96144A120</a>                             | Fine-Thread Alloy Steel Socket Head Screw<br>M6 x 0.75 mm Thread, 20 mm Long 96144A120                                   | \$3.38   | \$13.52  | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 1   | Z1032-ND  | RELAY GEN PURPOSE 4PST 25A 24V   | 46.9     | \$46.90  | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 1   | Z1238-ND  | W-BRACKET FOR OMRON RELAY  | 2.1      | \$2.10   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 6   | WM2906-ND   | CONN HOUSING 8POS .100 W/LATCH   | 0.43     | \$2.58   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 3   | <b>WM3704-ND</b>                                      | CONN RECEPT 10POS DUAL   | 0.48     | \$1.44   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 4   | <b>WM3701-ND</b>                                      | CONN RECEPT 4POS DUAL  | 0.31     | \$1.24   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 6   | WM3703-ND   | CONN RECEPT 8POS DUAL  | 0.43     | \$2.58   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 3   | WM3705-ND   | CONN RECEPT 12POS DUAL   | 0.64     | \$1.92   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 10  | WM3700-ND   | CONN RECEPT 2POS DUAL  | 0.256    | \$2.56   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 6   | WM3802-ND   | CONN HEADER 6POS 4.2MM VERT TIN  | 1.06     | \$6.36   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 100 | RHM1.00KAECT-ND                                       | RES SMD 1K OHM 1% 0.4W 0805  | 0.0572   | \$5.72   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 25  | WM2512-ND   | CONN TERM FEMALE 22-24AWG GOLD   | 0.1416   | \$3.54   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 100 | WM2501CT-ND   | CONN TERM FEMALE 18-24AWG TIN  | 0.0555   | \$5.55   | 11/27/2018 | 11/29/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 250 | WM2512-ND   | CONN TERM FEMALE 22-24AWG GOLD   | 0.10168  | \$25.42  | 11/30/2018 | 12/04/2018 |
| Tianyu Zhu        | TSI/MCS     | Dig Key           | 250 | WM2501CT-ND   | CONN TERM FEMALE 18-24AWG TIN  | 0.04784  | \$11.96  | 11/30/2018 | 12/04/2018 |
| Drew Carleton     | IC          | Dig Key           | 250 | 1734-1143-1-ND  | CONTACT PIN 16-20AWG CRIMP NICKL   | 0.17184  | \$42.96  | 11/30/2018 | 12/04/2018 |
| Drew Carleton     | IC          | Dig Key           | 250 | 1734-1161-1-ND  | CONTACT SKT 16-20AWG CRIMP NICKL   | 0.3442   | \$86.05  | 11/30/2018 | 12/04/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key           | 250 | WM11981CT-ND  | CRIMP TERM TIN 14/16AWG  | 0.15308  | \$38.27  | 11/30/2018 | 12/04/2018 |
| Maxwell Mcfarlane | GLV         | Dig Key           | 5   | 296-29034-1-ND  | IC MONITOR PWR/CURR BIDIR 10MSOP   | 2.88     | \$14.40  | 11/30/2018 | 12/04/2018 |
| Tianyu Zhu        | TSI/MCS     | McMaster-Carr     | 1   | <a href="#">8010K31</a>                               | Elongated Ring Terminals<br>Nylon Insulated, 22-18 Gauge, for<br>Number 2, 4, 6 Screw Size Pack of 25 each               | \$6.10   | \$6.10   | 11/30/2018 | 12/04/2018 |
| Tianyu Zhu        | TSI/MCS     | McMaster-Carr     | 1   | <a href="#">91841A007</a>                             | 18-8 Stainless Steel Hex Nut Pack of 100 each  | \$3.40   | \$3.40   | 11/30/2018 | 12/04/2018 |
| Tianyu Zhu        | TSI/MCS     | McMaster-Carr     | 1   | <a href="#">9388K57</a>                               | Heavy Duty Ring Terminals<br>Vinyl Insulated, for 16-14 Gauge and 7/16" Screw Size Pack of 10 each                       | \$4.90   | \$4.90   | 11/30/2018 | 12/04/2018 |
| Tianyu Zhu        | TSI/MCS     | McMaster-Carr     | 1   | <a href="#">9910T66</a>                               | Garolite Sheet<br>6" Wide x 6" Long, 3/8" Thick  | \$27.89  | \$27.89  | 11/30/2018 | 12/04/2018 |
| Tianyu Zhu        | TSI/MCS     | McMaster-Carr     | 1   | <a href="#">9246K562</a>                              | 6061 Aluminum<br>3/4" Thick, 4" x 48"  | \$104.94 | \$104.94 | 11/30/2018 | 12/04/2018 |

|              |         |               |   |   |  |         |         |            |            |
|--------------|---------|---------------|---|---|--|---------|---------|------------|------------|
| Tianyu Zhu   | TSI/MCS | McMaster-Carr | 1 | <a href="#">92395A112</a>                                     | Screw-to-Expand Inserts<br>for Plastics, Brass, 4-40 Thread Size Pack of 50 each                           | \$11.00 | \$11.00 | 11/30/2018 | 12/04/2018 |
| Tianyu Zhu   | TSI/MCS | McMaster-Carr | 1 | <a href="#">8010K33</a>                                       | Elongated Ring Terminals<br>Nylon Insulated, 16-14 Gauge, for Number 2, 4, 6 Screw Size<br>Pack of 25 each | \$8.56  | \$8.56  | 11/30/2018 | 12/04/2018 |
| Hongbo Du    | Cooling | Amazon        | 1 | <a href="https://amzn.to/2KIB90w">https://amzn.to/2KIB90w</a> | pipe coupling  | \$6.49  | \$6.49  | 11/30/2018 | 12/04/2018 |
| Hongbo Du    | Cooling | Amazon        | 2 | <a href="https://amzn.to/2PbQXcS">https://amzn.to/2PbQXcS</a> | pipe fitting adapter   | \$6.99  | \$13.98 | 11/30/2018 | 12/04/2018 |
| Hayden Dodge | Motor   | McMaster-Carr | 1 | 91292A136   | 18-8 Stainless Steel Socket Head Screw   | \$10.81 | \$10.81 | 12/05/2018 | 12/06/2018 |
| Hayden Dodge | Motor   | McMaster-Carr | 2 | 91292A152   | 18-8 Stainless Steel Socket Head Screw<br>M8 x 1.25 mm Thread, 40 mm Long,<br>pack of 10 each              | \$5.81  | \$11.62 | 12/05/2018 | 12/06/2018 |
| Hayden Dodge | Motor   | McMaster-Carr | 1 | 91772A253   | Passivated 18-8 Stainless Steel Pan Head Phillips Screw<br>10-24 Thread, 2" Long,<br>pack of 50            | \$13.21 | \$13.21 | 12/05/2018 | 12/06/2018 |



| Subsystem | Vendor             | Quantity | Item Description( with specs)  | Unit Price | Total Cost | Order Date | RCVD       | Shipping Time (days) |
|-----------|--------------------|----------|--|------------|------------|------------|------------|----------------------|
| Cooling   | Amazon             | 1        | pipe coupling  | \$6.49     | \$6.49     | 11/30/2018 | 12/04/2018 | 4                    |
| Cooling   | Amazon             | 2        | pipe fitting adapter   | \$6.99     | \$13.98    | 11/30/2018 | 12/04/2018 | 4                    |
| GLV       | Amazon             | 1        | Tractive System Energized Light  | \$30.00    | \$30.00    | 10/16/2018 | 10/19/2018 | 3                    |
| GLV       | Deal Extreme       | 2        | Car Rotating Battery/Electrical Master Switch  | \$7.83     | \$15.66    | 10/16/2018 | 11/13/2018 | 28                   |
| GLV       | Super Bright LED's | 3        | Rectangular LED Lights Amber/SSOK  | \$6.49     | \$19.47    | 10/16/2018 | 10/22/2018 | 6                    |
| GLV       | McMaster-Carr      | 1        | Steel Pan Head Phillips Screws, 3-48 Thread, 1/2" Long                                     | \$8.00     | \$8.00     | 10/17/2018 | 10/19/2018 | 2                    |
| GLV       | McMaster-Carr      | 1        | Off-White Nylon Unthreaded Spacer, 3/16" OD, 5/32" Long, for Number 4 Screw Size           | \$3.62     | \$3.62     | 10/17/2018 | 10/19/2018 | 2                    |
| GLV       | McMaster-Carr      | 1        | Steel Phillips Screws 8-32   | \$2.92     | \$2.92     | 10/17/2018 | 10/19/2018 | 2                    |
| GLV       | Allied             | 3        | 22MMHW SeriesEmergency Stop Switches   | \$55.52    | \$166.56   | 10/17/2018 | 10/22/2018 | 5                    |
| GLV       | Dig Key            | 2        | DC/DC CONVERTER 5V 20W   | \$35.52    | \$71.04    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 2        | IC ADC I/O PORT (ADC/DAC & Temp I2C)   | \$7.90     | \$15.80    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | IC LOAD SW HIGH SIDE 6SOT (IC Switch)  | \$0.78     | \$7.78     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 3        | IC MONITOR PWR/CURR BIDIR 10MSOP (Current Monitor)   | \$2.88     | \$8.64     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 3        | OPTOISO 3.75KV 2CH DARLNG 8DIP (Opto-Isolator)   | \$2.07     | \$6.21     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | IC OPAMP GP 1MHZ RRO 14DIP (Quad Op-Amp)   | \$0.45     | \$4.50     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | RELAY GEN PURPOSE SPST 10A 24V   | \$1.22     | \$12.20    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | CAP CER 0.1µF ±10% 50V X7R 0805  | \$0.16     | \$1.61     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | DIODE SCHOTTKY 100V 3A DO214AC   | \$0.44     | \$4.35     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | RES SMD 0.001 OHM 1% 1W 1206   | \$0.57     | \$5.66     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | RES SMD 250 OHM 0.01% 1/8W 0805  | \$1.91     | \$19.06    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | 2.1 kOhms ±0.1% 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Thin Film                    | \$0.31     | \$3.13     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | 10 kOhms ±0.5% 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Automotive AEC-Q200 Thin Film | \$0.14     | \$1.40     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 6        | Connector Header Through Hole 12 position 0.224" (5.70mm)                                  | \$4.83     | \$28.98    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | 12 Position Rectangular Housing Connector Receptacle Black 0.224" (5.70mm)                 | \$1.19     | \$11.94    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | Socket Contact Tin 14-16 AWG Crimp   | \$0.24     | \$2.38     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | CONN D-SUB PLUG 9POS R/A SOLDER  | \$1.62     | \$16.17    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | Male Header Pins Right Angle   | \$1.78     | \$17.78    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | CONN RCPT 2.54" SMD DUAL 16POS   | \$2.11     | \$21.10    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 10       | Male SMD Header pins   | \$2.96     | \$29.63    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 7        | Panel Mount Indicator (Green)  | \$8.85     | \$61.95    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 3        | Panel Mount Indicator (Red)  | \$6.90     | \$20.70    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 3        | Pushbutton Switch SPST-NC Standard Panel Mount, Front                                      | \$10.71    | \$32.13    | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Dig Key            | 2        | Circuit Breaker  | \$3.77     | \$7.54     | 10/24/2018 | 10/30/2018 | 6                    |
| GLV       | Advanced Circuits  | 2        | BOB PCB  | \$33.00    | \$66.00    | 10/25/2018 | 11/6/2018  | 12                   |
| GLV       | Advanced Circuits  | 2        | Pi2CAN PCB   | \$33.00    | \$66.00    | 10/25/2018 | 11/6/2018  | 12                   |
| GLV       | Dig Key            | 10       | Connector Header Through Hole 4 position 0.224" (5.70mm)                                   | \$3.81     | \$38.09    | 11/6/2018  | 11/13/2018 | 7                    |
| GLV       | Dig Key            | 10       | Connector Header Through Hole 2 position   | \$3.29     | \$32.89    | 11/6/2018  | 11/13/2018 | 7                    |
| GLV       | Dig Key            | 5        | Connector Header Through Hole 6 position 0.224" (5.70mm)                                   | \$4.28     | \$21.40    | 11/6/2018  | 11/13/2018 | 7                    |
| GLV       | Dig Key            | 10       | 4 Position Rectangular Housing Connector Receptacle Black 0.224" (5.70mm)                  | \$0.63     | \$6.30     | 11/6/2018  | 11/13/2018 | 7                    |
| GLV       | Dig Key            | 10       | 2 Position Rectangular Housing Connector Receptacle Black                                  | \$0.50     | \$4.95     | 11/6/2018  | 11/13/2018 | 7                    |
| GLV       | Dig Key            | 5        | 6 Position Rectangular Housing Connector Receptacle Black 0.224" (5.70mm)                  | \$0.96     | \$4.80     | 11/6/2018  | 11/13/2018 | 7                    |

|     |               |     |  |          |          |            |            |   |
|-----|---------------|-----|--|----------|----------|------------|------------|---|
| GLV | Dig Key       | 100 | Socket Contact Tin 14-16 AWG Crimp   | 0.1647   | \$16.47  | 11/6/2018  | 11/13/2018 | 7 |
| GLV | Dig Key       | 250 | CRIMP TERM TIN 14/16AWG  | 0.15308  | \$38.27  | 11/30/2018 | 12/04/2018 | 4 |
| GLV | Dig Key       | 5   | IC MONITOR PWR/CURR BIDIR 10MSOP   | 2.88     | \$14.40  | 11/30/2018 | 12/04/2018 | 4 |
| IC  | Wire Care     | 100 | solid contact size 16 socket   | \$0.34   | \$34.00  | 10/17/2018 | 10/22/2018 | 5 |
| IC  | Wire Care     | 100 | solid contact size 16 pin  | \$0.32   | \$32.00  | 10/17/2018 | 10/22/2018 | 5 |
| IC  | Wire Care     | 25  | 4 cavity plug  | \$0.99   | \$24.75  | 10/17/2018 | 10/22/2018 | 5 |
| IC  | Wire Care     | 10  | 4 cavity receptical  | \$1.03   | \$10.30  | 10/17/2018 | 10/22/2018 | 5 |
| IC  | Wire Care     | 50  | receptical wedgelock   | \$0.12   | \$6.00   | 10/17/2018 | 10/22/2018 | 5 |
| IC  | Wire Care     | 10  | 4 cavity receptical with flange  | \$4.88   | \$48.80  | 10/17/2018 | 10/22/2018 | 5 |
| IC  | Wire Care     | 50  | plug wedge lock  | \$0.14   | \$7.00   | 10/17/2018 | 10/22/2018 | 5 |
| IC  | Dig Key       | 50  | solid contact size 14 socket   | \$0.58   | \$28.75  | 10/24/2018 | 10/30/2018 | 6 |
| IC  | Dig Key       | 50  | solid contact size 14 pin  | \$0.50   | \$25.20  | 10/24/2018 | 10/30/2018 | 6 |
| IC  | Dig Key       | 50  | 20 awg sold contact pin  | \$0.41   | \$20.52  | 10/24/2018 | 10/30/2018 | 6 |
| IC  | Dig Key       | 50  | 20awg solid contact socket   | \$0.59   | \$29.56  | 10/24/2018 | 10/30/2018 | 6 |
| IC  | McMaster-Carr | 10  | Sleeves for 14-12 Wire Gauge Washdown DC Connector Set                                 | \$7.51   | \$75.10  | 10/26/2018 | 10/29/2018 | 3 |
| IC  | McMaster-Carr | 10  | Pins for 14-12 Wire Gauge Washdown DC Connector Set                                    | \$5.43   | \$54.30  | 10/26/2018 | 10/29/2018 | 3 |
| IC  | McMaster-Carr | 1   | Cable:SJEOWW, Black Outer Insulation, 12 Gauge, 3 Wires (25FT)                         | \$36.25  | \$36.25  | 10/26/2018 | 10/29/2018 | 3 |
| IC  | Dig Key       | 10  | 6 Position Circular Connector Plug Housing Free Hanging (In-Line) Coupling Nut         | 10.4     | \$104.00 | 11/6/2018  | 11/13/2018 | 7 |
| IC  | Dig Key       | 10  | 6 Position Circular Connector Receptacle Housing Panel Mount                           | 10.357   | \$103.57 | 11/6/2018  | 11/13/2018 | 7 |
| IC  | Dig Key       | 10  | strain relief end cap  | 5.16     | \$51.60  | 11/6/2018  | 11/13/2018 | 7 |
| IC  | Dig Key       | 1   | removal tool   | 1.19     | \$1.19   | 11/6/2018  | 11/13/2018 | 7 |
| IC  | Dig Key       | 10  | 2pin box mount   | 3.17     | \$31.70  | 11/6/2018  | 11/13/2018 | 7 |
| IC  | Dig Key       | 10  | 2 pin plug   | 1.038    | \$10.38  | 11/6/2018  | 11/13/2018 | 7 |
| IC  | Dig Key       | 3   | 8 pin box mount  | 7.01     | \$21.03  | 11/6/2018  | 11/13/2018 | 7 |
| IC  | McMaster-Carr | 1   | single crip, 16-14 awg 50 pack female  | \$14.39  | \$14.39  | 11/19/2018 | 11/20/2018 | 1 |
| IC  | McMaster-Carr | 1   | single crip, 16-14 awg 50 pack male  | \$15.08  | \$15.08  | 11/19/2018 | 11/20/2018 | 1 |
| IC  | McMaster-Carr | 4   | 1/8 in 12inx24in grey acrylic  | \$14.27  | \$57.08  | 11/19/2018 | 11/20/2018 | 1 |
| IC  | Amazon        | 1   | AmazonBasics High-Speed HDMI Cable, 10 Feet, 1-Pack Offered by Amazon.com.             | \$7.99   | \$7.99   | 11/20/2018 | 11/26/2018 | 6 |
| IC  | Amazon        | 1   | [2 Packs] iXCC 10 Feet Long Micro USB to USB 2.0 Cable                                 | \$7.99   | \$7.99   | 11/20/2018 | 11/26/2018 | 6 |
| IC  | Amazon        | 1   | TNP USB 3.0 Flush Mount Cable  | \$9.99   | \$9.99   | 11/20/2018 | 11/26/2018 | 6 |
| IC  | Amazon        | 2   | 40pin Male to Female, 40pin Male to Male, 40pin Female to Female                       | \$6.99   | \$13.98  | 11/20/2018 | 11/26/2018 | 6 |
| IC  | Amazon        | 1   | ShineKee USB HDMI Mount Cable 2 Ports USB 3.0 HDMI                                     | \$11.90  | \$11.90  | 11/20/2018 | 11/26/2018 | 6 |
| IC  | McMaster-Carr | 1   | 100 feet 18awg 9 wire  | \$145.00 | \$145.00 | 11/27/2018 | 11/29/2018 | 2 |
| IC  | McMaster-Carr | 1   | 100 feet16 awg 12 wire   | \$225.00 | \$225.00 | 11/27/2018 | 11/29/2018 | 2 |
| IC  | McMaster-Carr | 5   | zip tie 100 packs  | \$2.41   | \$12.05  | 11/27/2018 | 11/29/2018 | 2 |
| IC  | McMaster-Carr | 2   | cable tie (25 a pack)  | \$7.49   | \$14.98  | 11/27/2018 | 11/29/2018 | 2 |
| IC  | McMaster-Carr | 5   | Cable tie mount (25 a pack)  | \$3.82   | \$19.10  | 11/27/2018 | 11/29/2018 | 2 |
| IC  | McMaster-Carr | 2   | lables 1-45 (10 of each)   | \$19.83  | \$39.66  | 11/27/2018 | 11/29/2018 | 2 |
| IC  | McMaster-Carr | 4   | Fine-Thread Alloy Steel Socket Head Screw<br>M6 x 0.75 mm Thread, 20 mm Long 96144A120 | \$3.38   | \$13.52  | 11/27/2018 | 11/29/2018 | 2 |
| IC  | Dig Key       | 250 | CONTACT PIN 16-20AWG CRIMP NICKL   | 0.17184  | \$42.96  | 11/30/2018 | 12/04/2018 | 4 |
| IC  | Dig Key       | 250 | CONTACT SKT 16-20AWG CRIMP NICKL   | 0.3442   | \$86.05  | 11/30/2018 | 12/04/2018 | 4 |



|         |                            |     |  |            |            |            |            |    |
|---------|----------------------------|-----|--|------------|------------|------------|------------|----|
| Motor   | eBay                       | 1   | Emrax 208 (80kW, 108HP) Low Volt Aircooled Motor   | \$3,672.04 | €3,672.04  | 10/25/2018 | 11/2/2018  | 8  |
| Motor   | McMaster-Carr              | 1   | Steel DIN 3 Rail, 7.5mm Deep, 1m Long  | \$5.27     | \$5.27     | 11/7/2018  | 11/8/2018  | 1  |
| Motor   | McMaster-Carr              | 11  | Steel End-Feed Fastener, 1/4"-20 Thread for T-Slotted Framing                                    | \$2.30     | \$25.30    | 11/7/2018  | 11/8/2018  | 1  |
| Motor   | Midwest Steel and Aluminum | 1   | 1 inch thick 11" x 11" Plate   | \$58.13    | \$58.13    | 11/6/2018  | 11/7/2018  | 1  |
| Motor   | McMaster-Carr              | 4   | Silver Tee Surface Bracket for 1" High Single Rail   | \$7.95     | \$31.80    | 11/6/2018  | 11/7/2018  | 1  |
| Motor   | McMaster-Carr              | 4   | Silver Straight Surface Bracket, 2" Long for 1" High Rail  | \$6.07     | \$24.28    | 11/6/2018  | 11/7/2018  | 1  |
| Motor   | McMaster-Carr              | 1   | 18-8 Stainless Steel Socket Head Screw<br>M6 x 1 mm Thread, 18 mm Long<br>pack of 50             | \$10.81    | \$10.81    | 12/05/2018 | 12/06/2018 | 1  |
| Motor   | McMaster-Carr              | 2   | 18-8 Stainless Steel Socket Head Screw<br>M8 x 1.25 mm Thread, 40 mm Long,<br>pack of 10 each    | \$5.81     | \$11.62    | 12/05/2018 | 12/06/2018 | 1  |
| Motor   | McMaster-Carr              | 1   | Passivated 18-8 Stainless Steel Pan Head Phillips Screw<br>10-24 Thread, 2" Long,<br>pack of 50  | \$13.21    | \$13.21    | 12/05/2018 | 12/06/2018 | 1  |
| TSI/MCS | Dig Key                    | 1   | development board for pic32mz2048efm064, which will be the microprocessor on TSI                 | \$122.57   | \$122.57   | 10/10/2018 | 10/16/2018 | 6  |
| TSI/MCS | B&B electronics            | 1   | CAN Optical Isolator, 9.3 x 8.6 x3.6 cm  | \$160.68   | \$160.68   | 10/10/2018 | 10/18/2018 | 8  |
| TSI/MCS | Dig Key                    | 100 | CONN QC RCPT 18-22AWG 0.250  | \$0.18     | \$17.68    | 10/24/2018 | 10/30/2018 | 6  |
| TSI/MCS | Dig Key                    | 100 | CONN QC TAB 18-22AWG 0.250 CRIMP   | \$0.31     | \$30.66    | 10/24/2018 | 10/30/2018 | 6  |
| TSI/MCS | Dig Key                    | 5   | 8 channels ADC I2C Expander  | \$2.70     | \$13.50    | 10/24/2018 | 10/30/2018 | 6  |
| TSI/MCS | Dig Key                    | 5   | 16 channels GPIO I2C Expander  | \$1.63     | \$8.15     | 10/24/2018 | 10/30/2018 | 6  |
| TSI/MCS | Dig Key                    | 2   | MIPS32® M-Class PIC® 32MZ Microcontroller<br>IC 32-Bit 200MHz 2MB (2M x 8) FLASH 64-TQFP (10x10) | \$11.11    | \$22.22    | 10/24/2018 | 10/30/2018 | 6  |
| TSI/MCS | emsiso                     | 1   | emDrive 500_800/125 motor controller   | \$2,109.00 | \$2,109.00 | 10/25/2018 | 11/15/2018 | 21 |
| TSI/MCS | emsiso                     | 1   | emDrive modifications - isolated CAN   | \$22.80    | \$22.80    | 10/25/2018 | 11/15/2018 | 21 |
| TSI/MCS | emsiso                     | 1   | Accessroy- USB to CAN interface  | \$228.00   | \$228.00   | 10/25/2018 | 11/15/2018 | 21 |
| TSI/MCS | emsiso                     | 1   | Accessory - emDrive configurator license   | \$342.00   | \$342.00   | 10/25/2018 | 11/15/2018 | 21 |
| TSI/MCS | Dig Key                    | 4   | MCP23016   | 1.63       | \$6.52     | 11/6/2018  | 11/13/2018 | 7  |
| TSI/MCS | Dig Key                    | 2   | SOIC-28 Breakout board   | 3.19       | \$6.38     | 11/6/2018  | 11/13/2018 | 7  |
| TSI/MCS | Dig Key                    | 4   | DAC5574 8bits D/C  | 3.72       | \$14.88    | 11/6/2018  | 11/13/2018 | 7  |
| TSI/MCS | Dig Key                    | 4   | TSSOP-16 Board   | 4.19       | \$16.76    | 11/6/2018  | 11/13/2018 | 7  |
| TSI/MCS | Dig Key                    | 1   | RELAY GENERAL PURPOSE SPST 5A 3V   | 5.71       | \$5.71     | 11/9/2018  | 11/16/2018 | 7  |
| TSI/MCS | Dig Key                    | 5   | IC REG LINEAR 5V 1A TO220AB  | 0.64       | \$3.20     | 11/9/2018  | 11/16/2018 | 7  |
| TSI/MCS | Dig Key                    | 1   | DC DC CONVERTER 24V 2W   | 10.25      | \$10.25    | 11/9/2018  | 11/16/2018 | 7  |
| TSI/MCS | Dig Key                    | 1   | RES CHAS MNT 50 OHM 1% 25W   | 3.08       | \$3.08     | 11/9/2018  | 11/16/2018 | 7  |
| TSI/MCS | Dig Key                    | 1   | RES CHAS MNT 75 OHM 1% 25W   | 3.49       | \$3.49     | 11/9/2018  | 11/16/2018 | 7  |
| TSI/MCS | GIGAVAC                    | 1   | 350+ Amp 12-800 Vdc Normally open relay  | 104        | \$104.00   | 11/10/2018 | 11/26/2018 | 16 |
| TSI/MCS | GIGAVAC                    | 1   | 350+ Amp 12-800 Vdc Normally closed relay  | 156        | \$156.00   | 11/11/2018 | 11/26/2018 | 15 |
| TSI/MCS | Dig Key                    | 50  | CONN JUMPER SHORTING GOLD FLASH  | 0.0378     | \$1.89     | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key                    | 2   | JUMPER PLUG 16POS SING ROW   | 2.28       | \$4.56     | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key                    | 6   | CONN HDR VERT 8POS .100 TIN  | 1.44       | \$8.64     | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key                    | 2   | CRYSTAL 24.0000MHZ 12PF SMD  | 0.66       | \$1.32     | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key                    | 4   | IC DAC 8-BIT I2C QUAD 10-MSOP  | 3.72       | \$14.88    | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key                    | 4   | IC ADC 8BIT 8CH I2C 16TSSOP  | 2.7        | \$10.80    | 11/16/2018 | 11/26/2018 | 10 |

|         |         |    |                                  |       |         |            |            |    |
|---------|---------|----|----------------------------------|-------|---------|------------|------------|----|
| TSI/MCS | Dig Key | 4  | IC TRANSCEIVER CAN HI-SPD 8-SOIC | 1.05  | \$4.20  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | SENSOR ANALOG -40C-125C SOT23-3  | 0.32  | \$1.60  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 3  | CONN HEADER 10POS 4.2MM VERT TIN | 1.62  | \$4.86  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 1  | DC DC CONVERTER +/-5V 10W        | 28.19 | \$28.19 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | CONN HEADER 4POS 4.2MM VERT TIN  | 0.81  | \$3.24  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 3  | IC REG LINEAR 3.3V 500MA 8SOIC   | 4.23  | \$12.69 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 15 | OPTOISOLATOR 3.75KV TRANS 4-SO   | 0.51  | \$7.65  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 2  | CONN MOD JACK 6P6C VERT UNSHLD   | 1.16  | \$2.32  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | RES SMD 240K OHM 0.1% 1/8W 0805  | 0.36  | \$1.80  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 6  | CONN HEADER 8POS 4.2MM VERT TIN  | 1.37  | \$8.22  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 3  | CONN HEADER 12POS 4.2MM VERT TIN | 1.7   | \$5.10  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 1  | DC DC CONVERTER 12V 15W          | 67.33 | \$67.33 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 2  | IC OPAMP ISOLATION 100KHZ 8SO    | 5.66  | \$11.32 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 3  | IC GATE NAND 2CH 2-INP US8       | 0.4   | \$1.20  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 3  | IC COMP LP DUAL CMOS VOLT 8 SOIC | 0.75  | \$2.25  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | IC OPAMP GP 1.4MHZ RRO 8SO       | 1.54  | \$6.16  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 2  | SWITCH TACTILE SPST-NO 0.1A 42V  | 2.77  | \$5.54  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 3  | DGTL ISO 2.5KV 2CH I2C 8SOIC     | 3.33  | \$9.99  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | TRIMMER 2K OHM 0.25W GW TOP ADJ  | 1.43  | \$5.72  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 2  | IC I/O EXPANDER I2C 16B 28SOIC   | 1.63  | \$3.26  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 3  | IC GATE NAND 1CH 8-INP 14SOIC    | 2.36  | \$7.08  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 3  | IC ANLG SW SPDT SOT23-6          | 1.04  | \$3.12  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 3  | IC GATE AND 1CH 2-INP SC70-5     | 0.36  | \$1.08  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 499 OHM 0.5% 1/8W 0805   | 0.133 | \$1.33  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 6  | IC OPAMP GP RRO 1MHZ 14-SOIC     | 0.45  | \$2.70  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 10K OHM 1% 1/8W 0805     | 0.049 | \$0.49  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 0.5% 0.125W 0805         | 0.103 | \$1.03  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 6  | IC OPAMP GP 1MHZ RRO 8SOIC       | 0.34  | \$2.04  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 3.9K OHM 1% 1/8W 0805    | 0.046 | \$0.46  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 232 OHM 1% 1/8W 0805     | 0.047 | \$0.47  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | RES SMD 2.4K OHM 0.5% 1/4W 0805  | 0.25  | \$1.25  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | RES SMD 120 OHM 1% 0.4W 0805     | 0.17  | \$0.85  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 137K OHM 1% 1/8W 0805    | 0.047 | \$0.47  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 4.02K OHM 0.1% 1/8W 0805 | 0.302 | \$3.02  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 4.22M OHM 1% 1/8W 0805   | 0.069 | \$0.69  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES 24.9K OHM 1% 1/8W 0805       | 0.028 | \$0.28  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 15 | RES SMD 150K OHM 0.05% 1/8W 0805 | 0.827 | \$12.41 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | MOSFET N-CH 30V 600MA SOT323-3   | 0.5   | \$2.50  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | TRIMMER 1K OHM 0.25W GW TOP ADJ  | 1.43  | \$5.72  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | RES SMD 15K OHM 0.1% 1/8W 0805   | 0.36  | \$1.80  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | RES SMD 1K OHM 1% 0.4W 0805      | 0.17  | \$0.85  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 100K OHM 0.1% 1/8W 0805  | 0.302 | \$3.02  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | RES SMD 100 OHM 1% 1/8W 0805     | 0.1   | \$0.40  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | RES SMD 9.31K OHM 0.1% 1/4W 0805 | 0.36  | \$1.80  | 11/16/2018 | 11/26/2018 | 10 |

|         |         |    |   |        |         |            |            |    |
|---------|---------|----|---|--------|---------|------------|------------|----|
| TSI/MCS | Dig Key | 10 | RES SMD 330 OHM 0.1% 1/8W 0805  | 0.302  | \$3.02  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | RES SMD 2.4K OHM 1% 1/8W 0805   | 0.047  | \$0.47  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | MOSFET N-CH 60V 500MA SOT-23  | 1.89   | \$9.45  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | MOSFET P-CH 250V 0.265A SOT223  | 0.79   | \$3.95  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 6  | RES SMD 5K OHM 0.1% 1/5W 0805   | 2.76   | \$16.56 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 1  | DC DC CONVERTER 24V 30W   | 76.2   | \$76.20 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | DIODE GEN PURP 50V 1A DO41  | 0.11   | \$0.55  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | FIXED IND 28NH 1.2A 98 MOHM   | 0.28   | \$1.12  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | RES SMD 665K OHM 0.1% 1/4W 0805   | 0.36   | \$1.80  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | LED RED CLEAR SMD   | 0.229  | \$2.29  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | LED BLUE CLEAR 0805 SMD   | 0.277  | \$2.77  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | RES SMD 95.3K OHM 0.1% 1/8W 0805  | 0.36   | \$1.44  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | RES SMD 500 OHM 0.05% 1/4W 0805   | 4.27   | \$17.08 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | LED GREEN CLEAR 0805 SMD  | 0.284  | \$2.84  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | MOSFET N-CH 60V 4A SOT223   | 0.8    | \$4.00  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | CONN HEADER 2POS 4.2MM VERT TIN   | 0.504  | \$5.04  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | CAP CER 33PF 16V C0G/NP0 0805   | 0.038  | \$0.38  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | FIXED IND 2.2UH 50MA 500 MOHM   | 0.25   | \$1.00  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | CAP CER 0.33UF 25V X7R 0805   | 0.72   | \$2.88  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | IC VREF SHUNT ADJ SOT23-5   | 0.64   | \$3.20  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | CAP CER 1UF 16V X7R 0805  | 0.36   | \$1.80  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | CAP CER 47UF 16V X6S 1210   | 0.97   | \$3.88  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 6  | CONN HEADER 6POS 4.2MM VERT TIN   | 1.06   | \$6.36  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 6  | CAP CER 10UF 25V X5R 0805   | 0.54   | \$3.24  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 35 | CAP CER 0.1UF 50V X7R 0805  | 0.195  | \$6.83  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | CAP CER 4.7UF 35V X5R 0805  | 0.24   | \$0.96  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | IC REG LINEAR 5V 1A DPAK  | 0.64   | \$2.56  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | CAP CER 100PF 500V C0G/NP0 0805   | 0.183  | \$1.83  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 30 | RES SMD 10K OHM 0.5% 1/8W 0805  | 0.133  | \$3.99  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 10 | LED YELLOW CLEAR 0805 SMD   | 0.284  | \$2.84  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | CAP CER 10UF 100V X7S 2220  | 3.1    | \$12.40 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | CAP CER 15UF 10V X7S 0805   | 0.88   | \$3.52  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 4  | RES SMD 100 OHM 1% 2W 2512  | 0.63   | \$2.52  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 5  | MOSFET N-CH 20V 50MA S-MINI   | 0.5    | \$2.50  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 1  | RES CHAS MNT 50 OHM 1% 25W  | 3.08   | \$3.08  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 1  | RES CHAS MNT 75 OHM 1% 25W  | 3.49   | \$3.49  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 1  | RELAY GEN PURPOSE SPDT 10A 24V  | 16.28  | \$16.28 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 1  | RELAY GEN PURPOSE SPDT 10A 5V   | 22.81  | \$22.81 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 2  | RELAY SOCKET 5 POSITION DIN RAIL  | 6.18   | \$12.36 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 2  | UMAX-10/USOP-10/MSOP-10TODIP-10   | 4.09   | \$8.18  | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Dig Key | 25 | CONN HEADER .100 SINGL R/A 36POS  | 1.767  | \$44.18 | 11/16/2018 | 11/26/2018 | 10 |
| TSI/MCS | Amazon  | 1  | WINGONEER YF-S201 1-30L/min Water Flow Hall Counter /<br>Sensor Water control Water Flow Rate Switch Flow Meter Flowmeter Counter | \$8.99 | \$8.99  | 11/16/2018 | 11/20/2018 | 4  |

|         |                   |     |  |          |          |            |            |    |
|---------|-------------------|-----|--|----------|----------|------------|------------|----|
| TSI/MCS | Amazon            | 2   | DIN Rail Terminal Blocks, 10-22 AWG, 30 Amp, 600 Volt  | \$17.80  | \$35.60  | 11/16/2018 | 11/20/2018 | 4  |
| TSI/MCS | GMW Associates    | 1   | Bus Bar Module Current Sensor, 12-160mm Bus Bar widths   | \$40.00  | \$40.00  | 11/16/2018 | 11/22/2018 | 6  |
| TSI/MCS | Advanced Circuits | 1   | TSI BOARD 2019   | \$33.00  | \$33.00  | 11/19/2018 | 11/29/2018 | 10 |
| TSI/MCS | Dig Key           | 1   | RELAY GEN PURPOSE 4PST 25A 24V   | 46.9     | \$46.90  | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 1   | W-BRACKET FOR OMRON RELAY  | 2.1      | \$2.10   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 6   | CONN HOUSING 8POS .100 W/LATCH   | 0.43     | \$2.58   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 3   | CONN RECEPT 10POS DUAL   | 0.48     | \$1.44   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 4   | CONN RECEPT 4POS DUAL  | 0.31     | \$1.24   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 6   | CONN RECEPT 8POS DUAL  | 0.43     | \$2.58   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 3   | CONN RECEPT 12POS DUAL   | 0.64     | \$1.92   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 10  | CONN RECEPT 2POS DUAL  | 0.256    | \$2.56   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 6   | CONN HEADER 6POS 4.2MM VERT TIN  | 1.06     | \$6.36   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 100 | RES SMD 1K OHM 1% 0.4W 0805  | 0.0572   | \$5.72   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 25  | CONN TERM FEMALE 22-24AWG GOLD   | 0.1416   | \$3.54   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 100 | CONN TERM FEMALE 18-24AWG TIN  | 0.0555   | \$5.55   | 11/27/2018 | 11/29/2018 | 2  |
| TSI/MCS | Dig Key           | 250 | CONN TERM FEMALE 22-24AWG GOLD   | 0.10168  | \$25.42  | 11/30/2018 | 12/04/2018 | 4  |
| TSI/MCS | Dig Key           | 250 | CONN TERM FEMALE 18-24AWG TIN  | 0.04784  | \$11.96  | 11/30/2018 | 12/04/2018 | 4  |
| TSI/MCS | McMaster-Carr     | 1   | Elongated Ring Terminals<br>Nylon Insulated, 22-18 Gauge, for<br>Number 2, 4, 6 Screw Size Pack of 25 each | \$6.10   | \$6.10   | 11/30/2018 | 12/04/2018 | 4  |
| TSI/MCS | McMaster-Carr     | 1   | 18-8 Stainless Steel Hex Nut Pack of 100 each  | \$3.40   | \$3.40   | 11/30/2018 | 12/04/2018 | 4  |
| TSI/MCS | McMaster-Carr     | 1   | Heavy Duty Ring Terminals<br>Vinyl Insulated, for 16-14 Gauge and 7/16" Screw Size Pack of 10 each         | \$4.90   | \$4.90   | 11/30/2018 | 12/04/2018 | 4  |
| TSI/MCS | McMaster-Carr     | 1   | Garolite Sheet<br>6" Wide x 6" Long, 3/8" Thick  | \$27.89  | \$27.89  | 11/30/2018 | 12/04/2018 | 4  |
| TSI/MCS | McMaster-Carr     | 1   | 6061 Aluminum<br>3/4" Thick, 4" x 48"  | \$104.94 | \$104.94 | 11/30/2018 | 12/04/2018 | 4  |
| TSI/MCS | McMaster-Carr     | 1   | Screw-to-Expand Inserts<br>for Plastics, Brass, 4-40 Thread Size Pack of 50 each                           | \$11.00  | \$11.00  | 11/30/2018 | 12/04/2018 | 4  |
| TSI/MCS | McMaster-Carr     | 1   | Elongated Ring Terminals<br>Nylon Insulated, 16-14 Gauge, for Number 2, 4, 6 Screw Size<br>Pack of 25 each | \$8.56   | \$8.56   | 11/30/2018 | 12/04/2018 | 4  |
| TSV     | Battery Space     | 5   | LiFeMnPO4 Prismatic Module:3.2V 60Ah,10CRate   | \$96.75  | \$483.75 | 9/3/2018   | 9/17/2018  | 14 |
| TSV     | McMaster-Carr     | 6   | 18-8 Stainless Steel Hex Head Screw, M4 x 0.7 mm Thread, 20 mm Long  | \$5.80   | \$34.80  | 9/10/2018  | 9/11/2018  | 1  |
| TSV     | McMaster-Carr     | 3   | 18-8 Stainless Steel Washer for M4 Screw Size, 4.3 mm ID, 9 mm OD  | \$1.86   | \$5.58   | 9/10/2018  | 9/11/2018  | 1  |
| TSV     | McMaster-Carr     | 3   | 18-8 Stainless Steel Split Lock Washer for M4 Screw Size, 4.4 mm ID, 7.6 mm OD                             | \$1.62   | \$4.86   | 9/10/2018  | 9/11/2018  | 1  |

|             |                     |   |   |         |          |            |            |         |
|-------------|---------------------|---|---|---------|----------|------------|------------|---------|
| TSV         | Amazon              | 1 | ESP8266 DEV   | \$13.98 | \$13.98  | 9/28/2018  | 10/2/2018  | 4       |
| TSV         | Amazon              | 2 | ESP32 Dev   | \$8.39  | \$16.78  | 9/28/2018  | 10/2/2018  | 4       |
| TSV         | Amazon              | 2 | Micro USB   | \$7.99  | \$15.98  | 9/28/2018  | 10/2/2018  | 4       |
| TSV         | Amazon              | 1 | 4.2inch E-Ink Display Module Resolution 400x300 3.3v                            | \$52.99 | \$52.99  | 9/28/2018  | 10/2/2018  | 4       |
| TSV         | Amazon              | 1 | Diymore DS3231 AT24C32 IIC High Precision RTC                                   | \$6.99  | \$6.99   | 9/28/2018  | 10/2/2018  | 4       |
| TSV         | Amazon              | 3 | ADC Module Precised Analog Digital Converter Develop Board                      | \$8.89  | \$26.67  | 9/28/2018  | 10/2/2018  | 4       |
| TSV         | Amazon              | 1 | 5 pcs TMP36 - Temperature Sensor  | \$12.48 | \$12.48  | 9/28/2018  | 10/2/2018  | 4       |
| TSV         | Amazon              | 2 | HiLetgo ESP-WROOM-32 ESP32 ESP-32S Development Board                            | \$10.99 | \$21.98  | 10/10/2018 | 10/15/2018 | 5       |
| TSV         | GIGAVAC             | 4 | 350+ Amp 12-800 Vdc Normally open relay   | 104     | \$416.00 | 11/10/2018 | 11/26/2018 | 16      |
| VSCADA/DYNO | Adafruit Industries | 1 | HDMI/DVI Decoder  | \$29.95 | \$29.95  | Pending    | Pending    | Pending |
| VSCADA/DYNO | Adafruit Industries | 1 | RTC for pi  | \$5.95  | \$5.95   | Pending    | Pending    | Pending |
| VSCADA/DYNO | Adafruit Industries | 1 | Dashboard Screen  | \$39.95 | \$39.95  | Pending    | Pending    | Pending |
| VSCADA/DYNO | Dig Key             | 1 | RASPBERRY PI PCF8523 RTC  | 5.95    | \$5.95   | 11/6/2018  | 11/13/2018 | 7       |
| VSCADA/DYNO | Dig Key             | 5 | BATTERY LITHIUM 3V COIN 12.5MM  | 0.91    | \$4.55   | 11/6/2018  | 11/13/2018 | 7       |
| VSCADA/DYNO | Mouser              | 3 | Data Acquisition ADCs/DACs - Specialized Configurable ADC/DAC 8 Channel, 12 Bit | \$7.48  | \$22.44  | 11/20/2018 | 11/26/2018 | 6       |
| VSCADA/DYNO | Mouser              | 3 | Headers & Wire Housings Mega-Fit Recept Hsg 6 ckt V-0                           | \$0.96  | \$2.88   | 11/20/2018 | 11/26/2018 | 6       |

| <b>Vendor</b>      | <b>Order Date</b> | <b>RCVD</b> | <b>Shipping Time (days)</b> |
|--------------------|-------------------|-------------|-----------------------------|
| Battery Space      | 9/3/2018          | 9/17/2018   | 14                          |
| McMaster-Carr      | 9/10/2018         | 9/11/2018   | 1                           |
| Amazon             | 9/28/2018         | 10/2/2018   | 4                           |
| Amazon             | 10/10/2018        | 10/15/2018  | 5                           |
| B&B electronics    | 10/10/2018        | 10/18/2018  | 8                           |
| Dig Key            | 10/10/2018        | 10/16/2018  | 6                           |
| Amazon             | 10/16/2018        | 10/19/2018  | 3                           |
| Deal Extreme       | 10/16/2018        | 11/13/2018  | 28                          |
| Super Bright LED's | 10/16/2018        | 10/22/2018  | 6                           |
| Allied             | 10/17/2018        | 10/22/2018  | 5                           |
| McMaster-Carr      | 10/17/2018        | 10/19/2018  | 2                           |
| McMaster-Carr      | 10/17/2018        | 10/19/2018  | 2                           |
| McMaster-Carr      | 10/17/2018        | 10/19/2018  | 2                           |
| Wire Care          | 10/17/2018        | 10/22/2018  | 5                           |
| Wire Care          | 10/17/2018        | 10/22/2018  | 5                           |
| Wire Care          | 10/17/2018        | 10/22/2018  | 5                           |
| Wire Care          | 10/17/2018        | 10/22/2018  | 5                           |
| Wire Care          | 10/17/2018        | 10/22/2018  | 5                           |
| Wire Care          | 10/17/2018        | 10/22/2018  | 5                           |
| Wire Care          | 10/17/2018        | 10/22/2018  | 5                           |
| Dig Key            | 10/24/2018        | 10/30/2018  | 6                           |
| Dig Key            | 10/24/2018        | 10/30/2018  | 6                           |
| Dig Key            | 10/24/2018        | 10/30/2018  | 6                           |







|                               |            |            |    |
|-------------------------------|------------|------------|----|
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| Dig Key                       | 11/6/2018  | 11/13/2018 | 7  |
| McMaster-Carr                 | 11/6/2018  | 11/7/2018  | 1  |
| McMaster-Carr                 | 11/6/2018  | 11/7/2018  | 1  |
| Midwest Steel<br>and Aluminum | 11/6/2018  | 11/7/2018  | 1  |
| McMaster-Carr                 | 11/7/2018  | 11/8/2018  | 1  |
| McMaster-Carr                 | 11/7/2018  | 11/8/2018  | 1  |
| Dig Key                       | 11/9/2018  | 11/16/2018 | 7  |
| Dig Key                       | 11/9/2018  | 11/16/2018 | 7  |
| Dig Key                       | 11/9/2018  | 11/16/2018 | 7  |
| Dig Key                       | 11/9/2018  | 11/16/2018 | 7  |
| Dig Key                       | 11/9/2018  | 11/16/2018 | 7  |
| GIGAVAC                       | 11/10/2018 | 11/26/2018 | 16 |
| GIGAVAC                       | 11/10/2018 | 11/26/2018 | 16 |
| GIGAVAC                       | 11/11/2018 | 11/26/2018 | 15 |
| Amazon                        | 11/16/2018 | 11/20/2018 | 4  |
| Amazon                        | 11/16/2018 | 11/20/2018 | 4  |







|                   |            |            |    |
|-------------------|------------|------------|----|
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| Dig Key           | 11/16/2018 | 11/26/2018 | 10 |
| GMW Associates    | 11/16/2018 | 11/22/2018 | 6  |
| Advanced Circuits | 11/19/2018 | 11/29/2018 | 10 |
| McMaster-Carr     | 11/19/2018 | 11/20/2018 | 1  |
| McMaster-Carr     | 11/19/2018 | 11/20/2018 | 1  |
| McMaster-Carr     | 11/19/2018 | 11/20/2018 | 1  |
| Amazon            | 11/20/2018 | 11/26/2018 | 6  |
| Amazon            | 11/20/2018 | 11/26/2018 | 6  |
| Amazon            | 11/20/2018 | 11/26/2018 | 6  |
| Amazon            | 11/20/2018 | 11/26/2018 | 6  |

|               |            |            |   |
|---------------|------------|------------|---|
| Amazon        | 11/20/2018 | 11/26/2018 | 6 |
| Mouser        | 11/20/2018 | 11/26/2018 | 6 |
| Mouser        | 11/20/2018 | 11/26/2018 | 6 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| Dig Key       | 11/27/2018 | 11/29/2018 | 2 |
| McMaster-Carr | 11/27/2018 | 11/29/2018 | 2 |
| McMaster-Carr | 11/27/2018 | 11/29/2018 | 2 |
| McMaster-Carr | 11/27/2018 | 11/29/2018 | 2 |
| McMaster-Carr | 11/27/2018 | 11/29/2018 | 2 |
| McMaster-Carr | 11/27/2018 | 11/29/2018 | 2 |
| McMaster-Carr | 11/27/2018 | 11/29/2018 | 2 |
| McMaster-Carr | 11/27/2018 | 11/29/2018 | 2 |
| Amazon        | 11/30/2018 | 12/04/2018 | 4 |
| Amazon        | 11/30/2018 | 12/04/2018 | 4 |
| Dig Key       | 11/30/2018 | 12/04/2018 | 4 |

|                     |            |            |         |
|---------------------|------------|------------|---------|
| Dig Key             | 11/30/2018 | 12/04/2018 | 4       |
| Dig Key             | 11/30/2018 | 12/04/2018 | 4       |
| Dig Key             | 11/30/2018 | 12/04/2018 | 4       |
| Dig Key             | 11/30/2018 | 12/04/2018 | 4       |
| Dig Key             | 11/30/2018 | 12/04/2018 | 4       |
| McMaster-Carr       | 11/30/2018 | 12/04/2018 | 4       |
|                     |            |            |         |
| McMaster-Carr       | 11/30/2018 | 12/04/2018 | 4       |
|                     |            |            |         |
| McMaster-Carr       | 11/30/2018 | 12/04/2018 | 4       |
|                     |            |            |         |
| McMaster-Carr       | 11/30/2018 | 12/04/2018 | 4       |
| McMaster-Carr       | 11/30/2018 | 12/04/2018 | 4       |
| McMaster-Carr       | 11/30/2018 | 12/04/2018 | 4       |
| McMaster-Carr       | 11/30/2018 | 12/04/2018 | 4       |
| McMaster-Carr       | 12/05/2018 | 12/06/2018 | 1       |
| McMaster-Carr       | 12/05/2018 | 12/06/2018 | 1       |
| McMaster-Carr       | 12/05/2018 | 12/06/2018 | 1       |
| Adafruit Industries | Pending    | Pending    | Pending |
| Adafruit Industries | Pending    | Pending    | Pending |
| Adafruit Industries | Pending    | Pending    | Pending |

|  |  |                              |  |                   |   |             |
|--|--|------------------------------|--|-------------------|---|-------------|
| <b>DATE:09/03/2018</b>                 |  |                              |  |                   |   |             |
| <b>ECE Department Material Request</b> |  |                              |  |                   |   |             |
| <b>Course:</b> ECE 491                 |  | <b>Req Number</b> 1          |  |                   |   |             |
| <b>Professor:</b> Nadovich             |  |                              |  |                   |   |             |
| <b>Requested By</b>                    |  | <b>Vendor:</b> Battery Space |  |                   | <b>Web Site:</b> <a href="http://batteryspace.com">batteryspace.com</a> |             |
| <b>Name</b>                            | Hayden Dodge   | <b>Phone:</b> 5105252328     |  |                   | <b>Ship By:</b> Ground  |             |
| <b>Email</b>                           | <a href="mailto:dodgeh@lafayette.edu">dodgeh@lafayette.edu</a> |                              |  |                   |   |             |
| <b>Phone</b>                           | 3035882848   |                              |  |                   |   |             |
| <b>#</b>                               | <b>Quantity</b>  | <b>Vendor Part</b>           | <b>Description</b>                           | <b>Unit Price</b> | <b>Total Price</b>  | <b>Rcvd</b> |
| 1                                      | 5  | LFP-G60                      | LiFeMnPO4 Prismatic Module:3.2V 60Ah,10CRate | \$96.75           | \$483.75  | 09/17/2018  |
|  |  |                              |  |                   | <b>Shipping Fees</b>  | \$57.05     |
|  |  |                              |  |                   | <b>Grand Total:</b>   | \$540.80    |
|  |  | Instructor Approval: _____   |  |                   |   |             |
|  |  | Department Approval: _____   |  |                   |   |             |
|  |  | (Over \$500)                 |  |                   |   |             |



DATE:09/10/2018

ECE Department Material Request

Course: ECE 491  
Professor: Nadovich

#2

Requested By

Name: Hayden Dodge  
Email: [dodgeh@lafayette.edu](mailto:dodgeh@lafayette.edu)  
Phone: (303) 588-2848

McMaster-Carr  
<https://www.mcmaster.com/>  
(609) 689-3000  
Ground

| # | Quantity | Unit        | Vendor Part | Description  | Unit Price | Total Price | Rcvd       |
|---|----------|-------------|-------------|--|------------|-------------|------------|
| 1 | 6        | Box of 50   | 91287A116   | 18-8 Stainless Steel Hex Head Screw, M4 x 0.7 mm Thread, 20 mm Long            | \$5.84     | \$35.04     | 09/11/2018 |
| 2 | 3        | Pack of 100 | 93475A230   | 18-8 Stainless Steel Washer for M4 Screw Size, 4.3 mm ID, 9 mm OD              | \$1.86     | \$5.58      | 09/11/2018 |
| 3 | 3        | Pack of 100 | 92148A160   | 18-8 Stainless Steel Split Lock Washer for M4 Screw Size, 4.4 mm ID, 7.6 mm OD | \$1.62     | \$4.86      | 09/11/2018 |

Shipping Fee \$6.38

Grand Total: \$51.86

Instructor Approval:

Department Approval:

(Over \$500)

DATE: 09/28/2018

ECE Department Material Request

|                                  |  |   |  |                   |                    |             |
|----------------------------------|--|---|--|-------------------|--------------------|-------------|
| <b>Course:</b> ECE 491           |  | <b>Req Number:</b> 3  |  |                   |                    |             |
| <b>Professor:</b> Prof. Nadovich |  |   |  |                   |                    |             |
| <b>Requested By</b>              |  | <b>Vendor:</b> Amazon   |  |                   |                    |             |
| <b>Name</b>                      | Hayden Dodge   | <b>Web Site</b> <a href="https://www.amazon.com">https://www.amazon.com</a> |  |                   |                    |             |
| <b>Email</b>                     | <a href="mailto:dodgeh@lafayette.edu">dodgeh@lafayette.edu</a> | <b>Phone</b> 1 (888) 280-4331   |  |                   |                    |             |
| <b>Phone</b>                     | 303-588-2848   | <b>Ship By:</b> Ground  |  |                   |                    |             |
| <b>#</b>                         | <b>Quantity</b>  | <b>Vendor Part</b>  | <b>Description</b>                                   | <b>Unit Price</b> | <b>Total Price</b> | <b>Rcvd</b> |
| 1                                | 1  | <a href="https://amzn.to/2ytLxoe">https://amzn.to/2ytLxoe</a>               | ESP8266 DEV  | 13.98             | \$13.98            | 10/02/2018  |
| 2                                | 2  | <a href="https://amzn.to/2S9FWeM">https://amzn.to/2S9FWeM</a>               | ESP32 Dev  | 8.29              | \$16.58            | 10/02/2018  |
| 3                                | 2  | <a href="https://amzn.to/2PjAd7y">https://amzn.to/2PjAd7y</a>               | Micro USB  | 7.99              | \$15.98            | 10/02/2018  |
| 4                                | 1  | <a href="https://amzn.to/2J9Y4Bl">https://amzn.to/2J9Y4Bl</a>               | 4.2inch E-Ink Display Module Resolution 400x300 3.3v | 50.34             | \$50.34            | 10/02/2018  |
| 5                                | 1  | <a href="https://amzn.to/2NXGgtN">https://amzn.to/2NXGgtN</a>               | Diymore DS3231 AT24C32 IIC High Precision RTC        | 6.88              | \$6.88             | 10/02/2018  |
| 6                                | 3  | <a href="https://amzn.to/2EEdf71">https://amzn.to/2EEdf71</a>               | ADC Module Precised Analog Digital Converter Develo  | 8.89              | \$26.67            | 10/02/2018  |
| 7                                | 1  | <a href="https://amzn.to/2CxKpCQ">https://amzn.to/2CxKpCQ</a>               | 5 pcs TMP36 - Temperature Sensor                     | 12.48             | \$12.48            | 10/02/2018  |
|                                  |  |   |  | Shipping Fee      | \$0.00             |             |
|                                  |  |   |  | Grand Total:      | \$142.91           |             |
|                                  |  | Instructor Approval:  |  |                   |                    |             |
|                                  |  | Department Approval:  |  |                   |                    |             |
|                                  |  | (Over \$500)  |  |                   |                    |             |

|                     |                   |  |   |                     |  |             |
|---------------------|-------------------|--|---|---------------------|--|-------------|
|                     | 10/10/2018        |  |   |                     |  |             |
|                     |                   | <b>ECE Department Material Request</b>                         |   |                     |  |             |
|                     | <b>Course:</b>    | ECE 491  |   | <b>Req Number:</b>  | 4  |             |
|                     | <b>Professor:</b> | Nadovich   |   |                     |  |             |
| <b>Requested By</b> |                   |  |   | <b>Vendor:</b>      | Amazon                                     |             |
|                     | <b>Name</b>       | Hayden Dodge   |   | <b>Web Site</b>     | <a href="http://amazon.com">amazon.com</a> |             |
|                     | <b>Email</b>      | <a href="mailto:dodgeh@lafayette.edu">dodgeh@lafayette.edu</a> |   | <b>Phone</b>        | 5105252328                                 |             |
|                     | <b>Phone</b>      | 3035882848   |   | <b>Ship By:</b>     | Ground                                     |             |
| <b>#</b>            | <b>Quantity</b>   | <b>Vendor Part</b>   | <b>Description</b>                            | <b>Unit Price</b>   | <b>Total Price</b>                         | <b>Rcvd</b> |
| 1                   | 2                 | <a href="https://amzn.to/2RtjDjS">https://amzn.to/2RtjDjS</a>  | HiLetgo ESP-WROOM-32 ESP32 ESP-32S Developmen | \$10.99             | \$21.98                                    | 10/15/2018  |
|                     |                   |  |   | <b>Shipping Fee</b> | \$0.00                                     |             |
|                     |                   |  |   | <b>Grand Total:</b> | \$21.98                                    |             |
|                     |                   | Instructor Approval:   |   |                     |  |             |
|                     |                   | Department Approval:   |   |                     |  |             |
|                     |                   | (Over \$500)   |   |                     |  |             |

**ON HOLD**

**ECE Department Material Request**

|                   |          |
|-------------------|----------|
| <b>Course:</b>    | ECE 491  |
| <b>Professor:</b> | Nadovich |

**Req Number: 5**

|                     |  |
|---------------------|--|
| <b>Requested By</b> |  |
| <b>Name</b>         | Samuel Mwaura  |
| <b>Email</b>        | <a href="mailto:mwauras@lafayette.edu">mwauras@lafayette.edu</a> |
| <b>Phone</b>        | 717-882-6143   |

|                 |  |
|-----------------|--|
| <b>Vendor:</b>  | Adafruit   |
| <b>Web Site</b> | <a href="http://www.adafruit.com">www.adafruit.com</a> |
| <b>Phone</b>    |  |
| <b>Ship By:</b> | Ground   |

| # | Quantity | Vendor Part   | Description      | Unit Price | Total Price | Revd |
|---|----------|---|------------------|------------|-------------|------|
| 1 | 1        | <a href="https://www.adafruit.com/product/2219">https://www.adafruit.com/product/2219</a> | HDMI/DVI Decoder | \$29.95    | \$29.95     |      |
| 3 | 1        | <a href="https://www.adafruit.com/product/1596">https://www.adafruit.com/product/1596</a> | Dashboard Screen | \$39.95    | \$39.95     |      |

|                      |                |
|----------------------|----------------|
| <b>Shipping Fees</b> | <b>\$0.00</b>  |
| <b>Grand Total:</b>  | <b>\$69.90</b> |

Instructor Approval:

Department Approval:  
(Over \$500)

|                     |  |   |   |                      |  |             |
|---------------------|--|---|---|----------------------|--|-------------|
|                     | <b>10/10/2018</b>  |   |   |                      |  |             |
|                     |  | <b>ECE Department Material Request</b>                      |   |                      |  |             |
|                     | <b>Course:</b>   | ECE 491   |   | <b>Req Number: 6</b> |  |             |
|                     | <b>Professor:</b>  | Nadovich  |   |                      |  |             |
| <b>Requested By</b> |  |   |   | <b>Vendor:</b>       | Digkey   |             |
| <b>Name</b>         | Hongbo Du  |   |   | <b>Web Site</b>      | <a href="http://www.digkey.com">www.digkey.com</a> |             |
| <b>Email</b>        | <a href="mailto:duh@lafayette.edu">duh@lafayette.edu</a> |   |   | <b>Phone</b>         | 1 (800) 858-3616                                   |             |
| <b>Phone</b>        | 484-478-3640   |   |   | <b>Ship By:</b>      | Ground   |             |
| <b>#</b>            | <b>Quantity</b>  | <b>Vendor Part</b>  | <b>Description</b>                      | <b>Unit Price</b>    | <b>Total Price</b>                                 | <b>Revd</b> |
| 1                   | 1  | <a href="https://bit.ly/2A2TNwp">https://bit.ly/2A2TNwp</a> | development board for pic32mz2048efm064 | \$122.57             | \$122.57   | 10/16/2018  |
|                     |  |   |   | <b>Shipping Fees</b> | <b>\$8.99</b>                                      |             |
|                     |  |   |   | <b>Grand Total:</b>  | <b>\$131.56</b>                                    |             |
|                     |  | Instructor Approval:  |   |                      |  |             |
|                     |  |   |   |                      |  |             |
|                     |  | Department Approval:  |   |                      |  |             |
|                     |  | (Over \$500)  |   |                      |  |             |

|                   |   |   |                      |  |             |
|-------------------|---|---|----------------------|--|-------------|
| <b>10/10/2018</b> |   |   |                      |  |             |
|                   | <b>ECE Department Material Request</b>                      |   |                      |  |             |
| <b>Course:</b>    | ECE 491   |   | <b>Req Number: 7</b> |  |             |
| <b>Professor:</b> | Nadovich  |   |                      |  |             |
| <b>Name</b>       | Hongbo Du   |   | <b>Vendor:</b>       | B&B electronics  |             |
| <b>Email</b>      | duh@lafayette.edu   |   | <b>Web Site</b>      | <a href="http://buy.advantech-bb.com">buy.advantech-bb.com</a> |             |
| <b>Phone</b>      | 484-478-3640  |   | <b>Phone</b>         | 1 (800) 858-3616   |             |
|                   |   |   | <b>Ship By:</b>      | Ground   |             |
| <b>Quantity</b>   | <b>Vendor Part</b>  | <b>Description</b>                      | <b>Unit Price</b>    | <b>Total Price</b>   | <b>Rcvd</b> |
| 1                 | <a href="https://bit.ly/2ORheRJ">https://bit.ly/2ORheRJ</a> | CAN Optical Isolator, 9.3 x 8.6 x3.6 cm | \$160.68             | \$160.68   | 10/18/2018  |
|                   |   |   | <b>Shipping Fees</b> | \$8.89   |             |
|                   |   |   | <b>Grand Total:</b>  | \$169.57   |             |
|                   | Instructor Approval:  |   |                      |  |             |
|                   |   |   |                      |  |             |
|                   | Department Approval:  |   |                      |  |             |
|                   | (Over \$500)  |   |                      |  |             |

DATE:10/23/2018

## ECE Department Material Request

Course: ECE 491  
Professor: Nadovich

Req Number 8

## Requested By

Name Robson Adem

Email ademr@lafayette.edu

Phone 4845919265

Vendor: Dig-Key

Web Site [digkey.com](http://digkey.com)

Phone 1 (800) 858-3616

Ship By: Ground

All items added to shopping cart : <https://www.digikey.com/short/jdvjqb>

| #                | Quantity | Vendor Part          | Description  | Unit Price | Total Price | Revd |
|------------------|----------|----------------------|--|------------|-------------|------|
| BOB              |          |                      |  |            |             |      |
| 1                | 2        | 102-2927-ND          | DC/DC CONVERTER 5V 20W   | \$35.52    | \$71.04     |      |
| 2                | 2        | AD5593RBRUZ-ND       | IC ADC I/O PORT (ADC/DAC & Temp I2C)   | \$7.90     | \$15.80     |      |
| 3                | 10       | 296-34970-1-ND       | IC LOAD SW HIGH SIDE 6SOT (IC Switch)  | \$0.78     | \$7.78      |      |
| 4                | 3        | 296-29034-1-ND       | IC MONITOR PWR/CURR BIDIR 10MSOP (Current Monitor)   | \$2.88     | \$8.64      |      |
| 5                | 3        | CLA186-ND            | OPTOISO 3.75KV 2CH DARLNG 8DIP (Opto-Isolator)   | \$2.07     | \$6.21      |      |
| 6                | 10       | MCP6004-I/P-ND       | IC OPAMP GP 1MHZ RRO 14DIP (Quad Op-Amp)   | \$0.45     | \$4.50      |      |
| 8                | 10       | Z2254-ND             | RELAY GEN PURPOSE SPST 10A 24V   | \$1.22     | \$12.20     |      |
| 9                | 10       | 478-1395-1-ND        | CAP CER 0.1µF ±10% 50V X7R 0805  | \$0.16     | \$1.61      |      |
| 10               | 10       | SK310A-LTPMSCT-ND    | DIODE SCHOTTKY 100V 3A DO214AC   | \$0.44     | \$4.35      |      |
| 11               | 10       | CSNL1206FT1L00CT-ND  | RES SMD 0.001 OHM 1% 1W 1206   | \$0.57     | \$5.66      |      |
| 12               | 10       | RNCF0805TKY250RCT-ND | RES SMD 250 OHM 0.01% 1/8W 0805  | \$1.91     | \$19.06     |      |
| 13               | 10       | YAG1852CT-ND         | 2.1 kOhms ±0.1% 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Thin Film                    | \$0.31     | \$3.13      |      |
| 14               | 10       | RNCF0805DTE10K0CT-ND | 10 kOhms ±0.5% 0.125W, 1/8W Chip Resistor 0805 (2012 Metric) Automotive AEC-Q200 Thin Film | \$0.14     | \$1.40      |      |
| 15               | 6        | WM16841-ND           | Connector Header Through Hole 12 position 0.224" (5.70mm)                                  | \$4.83     | \$28.98     |      |
| 16               | 10       | WM10390-ND           | 12 Position Rectangular Housing Connector Receptacle Black 0.224" (5.70mm)                 | \$1.19     | \$11.94     |      |
| 17               | 10       | WM11981CT-ND         | Socket Contact Tin 14-16 AWG Crimp   | \$0.24     | \$2.38      |      |
| 18               | 10       | 182-909ME-ND         | CONN D-SUB PLUG 9POS R/A SOLDER  | \$1.62     | \$16.17     |      |
| Pi2C             |          |                      |  |            |             |      |
| 19               | 10       | 732-5363-ND          | Male Header Pins Right Angle   | \$1.78     | \$17.78     |      |
| 20               | 10       | 952-3213-ND          | CONN RCPT 2.54" SMD DUAL 16POS   | \$2.11     | \$21.10     |      |
| 21               | 10       | 732-5468-5-ND        | Male SMD Header pins   | \$2.96     | \$29.63     |      |
| External Devices |          |                      |  |            |             |      |
| 22               | 7        | 350-4053-ND          | Panel Mount Indicator (Green)  | \$8.85     | \$61.95     |      |
| 23               | 3        | 350-4050-ND          | Panel Mount Indicator (Red)  | \$6.90     | \$20.70     |      |
| 24               | 3        | Z6105-ND             | Pushbutton Switch SPST-NC Standard Panel Mount, Front                                      | 10.71      | \$32.13     |      |
| GLV Battery      |          |                      |  |            |             |      |
| 25               | 2        | W28-XQ1A-10          | Circuit Breaker  | \$3.77     | \$7.54      |      |
| Interconnect     |          |                      |  |            |             |      |
| 26               | 50       | 1734-1125-ND         | solid contact size 14 socket   | 0.575      | \$28.75     |      |
| 27               | 50       | 1734-1133-ND         | solid contact size 14 pin  | 0.504      | \$25.20     |      |
| 28               | 50       | 1734-1517-ND         | 20 awg sold contact pin  | 0.4104     | \$20.52     |      |

|     |     |                           |  |        |                     |                 |
|-----|-----|---------------------------|--|--------|---------------------|-----------------|
| 29  | 50  | 889-1471-ND               | 20awg solid contact socket   | 0.5912 | \$29.56             |                 |
| TSI |     |                           |  |        |                     |                 |
| 30  | 100 | A27817CT-ND               | CONN QC RCPT 18-22AWG 0.250  | 0.1768 | \$17.68             |                 |
| 31  | 100 | A27906CT-ND               | CONN QC TAB 18-22AWG 0.250 CRIMP   | 0.3066 | \$30.66             |                 |
| 32  | 5   | NCD9830DBR2GOSDKR-ND      | 8 channels ADC I2C Expander  | 4.1    | \$20.50             |                 |
| 33  | 2   | PIC32MZ2048EFH064-I/PT-ND | MIPS32® M-Class PIC® 32MZ Microcontroller IC 32-Bit 200MHz 2MB (2M x 8) FLASH 64-TQFP (1 | 11.11  | \$22.22             |                 |
| 34  | 5   | MCP23016T-I/SOCT-ND       | 16 channels GPIO I2C Expander  | 1.63   | \$8.15              |                 |
|     |     |                           |  |        | Shipping Fees       | \$17.98         |
|     |     |                           |  |        | <b>Grand Total:</b> | <b>\$632.90</b> |
|     |     | Instructor Approval:      |  |        |                     |                 |
|     |     |                           |  |        |                     |                 |
|     |     | Department Approval:      |  |        |                     |                 |
|     |     | (Over \$500)              |  |        |                     |                 |



DATE:10/16/2018

ECE Department Material Request

**Course:** ECE 491  
**Professor:** Nadovich

**Req Number** 9

**Requested By**  
**Name** Maxwell Mcfarlane  
**Email** [mcfarlmt@lafayette.edu](mailto:mcfarlmt@lafayette.edu)  
**Phone** 8487026146

**Vendor:** Amazon  
**Web Site** [amazon.com](http://amazon.com)  
**Phone** (888) 280-4331  
**Ship By:**

| # | Quantity | Vendor Part | Description                     | Unit Price | Total Price | Rcvd       |
|---|----------|-------------|---------------------------------|------------|-------------|------------|
| 1 | 1        | B01K9X1ZCE  | Tractive System Energized Light | \$30.00    | \$30.00     | 10/19/2018 |

Shipping Fees \$0.00

Grand Total: \$30.00

Instructor Approval:

Department Approval:

(Over \$500)

|                            |                       |  |                                 |                       |                    |  |
|----------------------------|-----------------------|--|---------------------------------|-----------------------|--------------------|--|
| <b>DATE:10/17/2018</b>     |                       |  |                                 |                       |                    |  |
|                            |                       | <b>ECE Department Material Request</b> |                                 |                       |                    |  |
| <b>Course:</b> ECE 491     |                       |  |                                 | <b>Req Number</b> 10  |                    |  |
| <b>Professor:</b> Nadovich |                       |  |                                 |                       |                    |  |
| <b>Requested By</b>        |                       |  |                                 | <b>Vendor:</b> Allied |                    |  |
| <b>Name</b>                | Maxwell Mcfarlane     |  |                                 |                       | <b>Web Site</b>    | <a href="http://alliedelec.com">alliedelec.com</a> |
| <b>Email</b>               | mcfarlm@lafayette.edu |  |                                 |                       | <b>Phone</b>       | (866) 433-5722                                     |
| <b>Phone</b>               | 8487026146            |  |                                 |                       | <b>Ship By:</b>    | Ground   |
| <b>#</b>                   | <b>Quantity</b>       | <b>Vendor Part</b>                     | <b>Description</b>              | <b>Unit Price</b>     | <b>Total Price</b> | <b>Rcvd</b>  |
| 1                          | 3                     | 70172680                               | 22MMHW SeriesEmergency Stop Swi | \$55.52               | \$166.56           | 10/24/2018   |
|                            |                       |  |                                 | <b>Shipping Fee</b>   | \$13.34            |  |
|                            |                       |  |                                 | <b>Grand Total:</b>   | \$179.90           |  |
|                            |                       | Instructor Approval:                   |                                 |                       |                    |  |
|                            |                       | Department Approval:                   |                                 |                       |                    |  |
|                            |                       | (Over \$500)                           |                                 |                       |                    |  |

DATE:10/16/2018

ECE Department Material Request

|                            |                      |
|----------------------------|----------------------|
| <b>Course:</b> ECE 491     | <b>Req Number</b> 11 |
| <b>Professor:</b> Nadovich |                      |

|   |  |
|---|--|
| <b>Requested By</b>   | <b>Vendor:</b> Deal Extreme                        |
| <b>Name</b> Maxwell Mcfarlane   | <b>Web Site</b> <a href="http://dx.com">dx.com</a> |
| <b>Email</b> <a href="mailto:mcfarlm@lafayette.edu">mcfarlm@lafayette.edu</a> | <b>Phone</b> (866) 433-5722                        |
| <b>Phone</b> 8487026146   | <b>Ship By:</b> Ground                             |

| # | Quantity | Vendor Part | Description                                   | Unit Price | Total Price | Rcvd |
|---|----------|-------------|---|------------|-------------|------|
| 1 | 2        | 22003       | Car Rotating Battery/Electrical Master Switch | \$7.83     | \$15.66     |      |

|                     |                |
|---------------------|----------------|
| Shipping Fees       | \$0.00         |
| <b>Grand Total:</b> | <b>\$15.66</b> |

Instructor Approval: \_\_\_\_\_

Department Approval: \_\_\_\_\_  
(Over \$500)

**DATE:10/16/2018**

**ECE Department Material Request**

**Course:** ECE 491  
**Professor:** Nadovich

**Req Number** 12

**Requested By**  
**Name** Maxwell Mcfarlane  
**Email** [mcfarlm@lafayette.edu](mailto:mcfarlm@lafayette.edu)  
**Phone** 8487026146

**Vendor:** Superbrightleds  
**Web Site** [superbrightleds.com](http://superbrightleds.com)  
**Phone** (866) 433-5722  
**Ship By:** Ground

| # | Quantity | Vendor Part | Description                       | Unit Price | Total Price | Rcvd       |
|---|----------|-------------|-----------------------------------|------------|-------------|------------|
| 1 | 3        | MDB-A12     | Rectangular LED Lights Amber/SSOK | \$6.49     | \$19.47     | 10/24/2018 |

Shipping Fees \$5.50  
Grand Total: \$24.97

Instructor Approval:

Department Approval:

(Over \$500)

**DATE:10/17/18**

**ECE Department Material Request**

**Course:** ECE 491  
**Professor:** Nadovich

**Req Number: 13**

**Vendor:**  
**Web Site: wirecare.com**  
**Phone: (973) 300-9782**  
**Ship By: Ground**

**Requested By**  
**Name** Drew Carleton  
**Email** [carletod@lafayette.edu](mailto:carletod@lafayette.edu)  
**Phone** 858-605-8410

| # | Quantity | Vendor Part   | Description                     | Unit Price | Total Price | Revd       |
|---|----------|---|---------------------------------|------------|-------------|------------|
| 1 | 100      | <a href="https://bit.ly/2COF0bs">https://bit.ly/2COF0bs</a> | solid contact size 16 socket    | \$0.34     | \$34.00     | 11/15/2018 |
| 2 | 100      | <a href="https://bit.ly/2Es72ep">https://bit.ly/2Es72ep</a> | solid contact size 16 pin       | \$0.32     | \$32.00     | 10/24/2018 |
| 3 | 25       | <a href="https://bit.ly/2pV9XIJ">https://bit.ly/2pV9XIJ</a> | 4 cavity plug                   | \$0.99     | \$24.75     | 10/24/2018 |
| 4 | 10       | <a href="https://bit.ly/2CNPuIa">https://bit.ly/2CNPuIa</a> | 4 cavity receptical             | \$1.03     | \$10.30     | 11/15/2018 |
| 5 | 50       | <a href="https://bit.ly/2yDYPxq">https://bit.ly/2yDYPxq</a> | receptical wedgelock            | \$0.12     | \$6.00      | 10/24/2018 |
| 6 | 10       | <a href="https://bit.ly/2PDHCM5">https://bit.ly/2PDHCM5</a> | 4 cavity receptical with flange | \$4.88     | \$48.80     | 10/24/2018 |
| 7 | 50       | <a href="https://bit.ly/2ynPUks">https://bit.ly/2ynPUks</a> | plug wedge lock                 | \$0.14     | \$7.00      | 10/24/2018 |

**Shipping Fees** \$4.99  
**Grand Total:** \$167.84

Instructor Approval: APPROVED BY PROF. NADOVICH

Department Approval:  
(Over \$500)



DATE:10/24/2018

ECE Department Material Request

Course: ECE 491  
Professor: Nadovich

Req Number: 15

**Requested By**  
Name: Hayden  
Email: [dodgeh@lafayette.edu](mailto:dodgeh@lafayette.edu)  
Phone: 303-588-2848

**Vendor:** Emsiso  
**Web Site:** <https://www.emsiso.com/>  
"+386 2 4612907"  
**Phone:**  
**Ship By:** AIR

| # | Quantity | Vendor Part         | Description                          | Unit Price | Total Price | Total Price in \$ | Rcvd       |
|---|----------|---------------------|--------------------------------------|------------|-------------|-------------------|------------|
| 1 | 1        | emDrive 500_800/125 | emDrive 500_800/125 motor control    | €1,850.00  | €1,850.00   | \$2,109.00        | 11/15/2018 |
| 2 | 1        | emDrive 500_800/125 | emDrive modifications - isolated CA  | €20.00     | €20.00      | \$22.80           | 11/15/2018 |
| 3 | 1        | emDrive 500_800/125 | Accessroy- USB to CAN interface      | €200.00    | €200.00     | \$228.00          | 11/15/2018 |
| 4 | 1        | emDrive 500_800/125 | Accessory - emDrive configurator lic | €300.00    | €300.00     | \$342.00          | 11/15/2018 |

Shipping Fees: \$94.45  
Grand Total: \$2,796.25

Prof. Nadovich

ECE Department Approval:  
(Over \$500)  
ME Department Approval:  
(Over \$500)

DATE:10/24/2018

ECE Department Material Request

|                            |                      |
|----------------------------|----------------------|
| <b>Course:</b> ECE 491     | <b>Req Number</b> 16 |
| <b>Professor:</b> Nadovich |                      |

|                                    |   |
|------------------------------------|---|
| <b>Requested By</b>                | <b>Vendor:</b> Ebay   |
| <b>Name</b> Nick Steele            | <b>Web Site</b> <a href="https://www.ebay.com/">https://www.ebay.com/</a> |
| <b>Email</b> steelen@lafayette.edu | <b>Phone</b>  |
| <b>Phone</b> 408 630 0668          | <b>Ship By:</b>   |

| # | Quantity | Vendor Part   | Description                                      | Unit Price | Total Price | Rcvd       |
|---|----------|---|--|------------|-------------|------------|
| 1 | 1        | <a href="https://bit.ly/2O6IwiF">https://bit.ly/2O6IwiF</a> | Emrax 208 (80kW, 108HP) Low Volt Aircooled Motor | \$3,672.04 | \$3,672.04  | 11/02/2018 |

|                     |                   |
|---------------------|-------------------|
| Shipping Fees       | \$91.04           |
| <b>Grand Total:</b> | <b>\$3,763.08</b> |

Prof. Nadovich

ECE Department Approval:

(Over \$500)

ME Department Approval:

(Over \$500)



DATE:10/26/2018

ECE Department Material Request

Course: ECE 491  
Professor: Nadovich

Req Number 17

Requested By  
Name Maxwell Mcfarlane  
Email [mcfarimt@lafayette.edu](mailto:mcfarimt@lafayette.edu)  
Phone 8487026146

Vendor: ADVANCED CIRCUITS  
Web Site [www.my4pcb.com](http://www.my4pcb.com)  
Phone (866) 433-5722  
Ship By: Ground

| # | Quantity | Vendor Part | Description | Unit Price | Total Price | Rcvd       |
|---|----------|-------------|-------------|------------|-------------|------------|
| 1 | 2        | BOB         | BOB PCB     | \$33.00    | \$66.00     | 11/06/2018 |
| 2 | 2        | P2C         | Pi2CAN PCB  | \$33.00    | \$66.00     | 11/06/2018 |

Shipping Fees \$112.32  
Grand Total: \$178.32

Instructor Approval: APPROVED BY PROF. NADOVICH

Department Approval:  
(Over \$500)



DATE:11/06/2018

**ECE Department Material Request**

|            |          |
|------------|----------|
| Course:    | ECE 491  |
| Professor: | Nadovich |

**Req Number** 19

|                     |                     |
|---------------------|---------------------|
| <b>Requested By</b> |                     |
| <b>Name</b>         | Robson Adem         |
| <b>Email</b>        | ademr@lafayette.edu |
| <b>Phone</b>        | 4845919265          |

|                 |  |
|-----------------|--|
| <b>Vendor:</b>  | Dig-Key                                    |
| <b>Web Site</b> | <a href="http://digkey.com">digkey.com</a> |
| <b>Phone</b>    | 1 (800) 858-3616                           |
| <b>Ship By:</b> | Ground                                     |

**All items added to shopping cart :** <https://www.digikey.com/short/j0w49p>

| #       | Quantity | Vendor Part         | Description  | Unit Price | Total Price | Revd       |
|---------|----------|---------------------|--|------------|-------------|------------|
| TSI     |          |                     |  |            |             |            |
| 1       | 4        | MCP23016T-I/SOCT-ND | MCP23016   | 1.63       | \$6.52      | 11/13/2018 |
| 2       | 2        | PCB3001-1-ND        | SOIC-28 Breakout board   | 3.19       | \$6.38      | 11/13/2018 |
| 3       | 4        | 296-48522-1-ND      | DAC5574 8bits D/C  | 3.72       | \$14.88     | 11/13/2018 |
| 4       | 4        | PA0034-ND           | TSSOP-16 Board   | 4.19       | \$16.76     | 11/13/2018 |
| VSCADA  |          |                     |  |            |             |            |
| 5       | 1        | 1528-1871-ND        | RASPBERRY PI PCF8523 RTC   | 5.95       | \$5.95      | 11/13/2018 |
| 6       | 5        | <u>P033-ND</u>      | BATTERY LITHIUM 3V COIN 12.5MM   | 0.91       | \$4.55      | 11/13/2018 |
| IC      |          |                     |  |            |             |            |
| 7       | 10       | 889-1063-ND         | 6 Position Circular Connector Plug Housing Free Hanging (In-Line) Coupling Nut | 10.4       | \$104.00    | 11/13/2018 |
| 8       | 10       | 889-1062-ND         | 6 Position Circular Connector Receptacle Housing Panel Mount                   | 10.357     | \$103.57    | 11/13/2018 |
| 9       | 10       | 1734-1103-ND        | strain relief end cap  | 5.16       | \$51.60     | 11/13/2018 |
| 10      | 1        | 1734-1827-ND        | removal tool   | 1.19       | \$1.19      | 11/13/2018 |
| 11      | 10       | 1734-1375-ND        | 2pin box mount   | 3.17       | \$31.70     | 11/13/2018 |
| 12      | 10       | 1734-1420-ND        | 2 pin plug   | 1.038      | \$10.38     | 11/13/2018 |
| 13      | 3        | 1734-1356-ND        | 8 pin box mount  | 7.01       | \$21.03     | 11/13/2018 |
| GLV BOB |          |                     |  |            |             |            |
| 14      | 10       | WM16837-ND          | Connector Header Through Hole 4 position 0.224" (5.70mm)                       | \$3.81     | \$38.09     | 11/13/2018 |
| 15      | 10       | WM16836-ND          | Connector Header Through Hole 2 position                                       | \$3.29     | \$32.89     | 11/13/2018 |
| 16      | 5        | WM16838-ND          | Connector Header Through Hole 6 position 0.224" (5.70mm)                       | \$4.28     | \$21.40     | 11/13/2018 |
| 17      | 10       | WM10386-ND          | 4 Position Rectangular Housing Connector Receptacle Black 0.224" (5.70mm)      | \$0.63     | \$6.30      | 11/13/2018 |
| 18      | 10       | WM10385-ND          | 2 Position Rectangular Housing Connector Receptacle Black                      | \$0.50     | \$4.95      | 11/13/2018 |
| 19      | 5        | WM10387-ND          | 6 Position Rectangular Housing Connector Receptacle Black 0.224" (5.70mm)      | \$0.96     | \$4.80      | 11/13/2018 |
| 20      | 100      | WM11981CT-ND        | Socket Contact Tin 14-16 AWG Crimp   | 0.1647     | \$16.47     | 11/13/2018 |

|                     |                 |
|---------------------|-----------------|
| Shipping Fees       | \$17.98         |
| <b>Grand Total:</b> | <b>\$521.39</b> |

Instructor Approval:

Department Approval:

(Over \$500)

|   |  |   |                                  |                   |                     |  |  |
|---|--|---|----------------------------------|-------------------|---------------------|--|--|
| DATE:11/09/2018                           |  | <b>ECE Department Material Request</b>  |                                  |                   |                     |  |  |
| Course: ECE 491<br>Professor: Nadovich    |  |   |                                  |                   | <b>Req Number</b>   | 20   |  |
| <b>Requested By</b>                       |  |   |                                  |                   | <b>Vendor:</b>      | Dig-Key                                    |  |
| <b>Name</b>                               | Tianyu Zhu   |   |                                  |                   | <b>Web Site</b>     | <a href="http://digkey.com">digkey.com</a> |  |
| <b>Email</b>                              | <a href="mailto:zhuti@lafayette.edu">zhuti@lafayette.edu</a> |   |                                  |                   | <b>Phone</b>        | 1 (800) 858-3616                           |  |
| <b>Phone</b>                              | 484-542-8385   |   |                                  |                   | <b>Ship By:</b>     | Ground                                     |  |
| <b>All items added to shopping cart :</b> |  | <a href="https://www.digikey.com/short/j01dcp">https://www.digikey.com/short/j01dcp</a> |                                  |                   |                     |  |  |
| <b>#</b>                                  | <b>Quantity</b>  | <b>Vendor Part</b>  | <b>Description</b>               | <b>Unit Price</b> | <b>Total Price</b>  | <b>Revd</b>                                |  |
|   |  |   | TSI                              |                   |                     |  |  |
| 1   | 1  | 255-5322-5-ND   | RELAY GENERAL PURPOSE SPST 5A 3V | 5.71              | \$5.71              | 11/16/2018                                 |  |
| 2   | 5  | MC7805CTGOS-ND  | IC REG LINEAR 5V 1A TO220AB      | 0.64              | \$3.20              | 11/16/2018                                 |  |
| 3   | 1  | 1470-1595-5-ND  | DC DC CONVERTER 24V 2W           | 10.25             | \$10.25             | 11/16/2018                                 |  |
| 4   | 1  | KAL25FB50R0-ND  | RES CHAS MNT 50 OHM 1% 25W       | 3.08              | \$3.08              | 11/16/2018                                 |  |
| 5   | 1  | 696-1455-ND   | RES CHAS MNT 75 OHM 1% 25W       | 3.49              | \$3.49              | 11/16/2018                                 |  |
|   |  |   |                                  |                   | Shipping Fees       | \$8.99                                     |  |
|   |  |   |                                  |                   | <b>Grand Total:</b> | <b>\$34.72</b>                             |  |
|   |  | Instructor Approval:  |                                  |                   |                     |  |  |
|   |  | Department Approval:  |                                  |                   |                     |  |  |
|   |  | (Over \$500)  |                                  |                   |                     |  |  |

|  |                 |                      |   |                      |   |             |
|--|-----------------|----------------------|---|----------------------|---|-------------|
| <b>DATE:11/09/2018</b>                 |                 |                      |   |                      |   |             |
| <b>ECE Department Material Request</b> |                 |                      |   |                      |   |             |
| Course: ECE 491                        |                 |                      |   |                      | <b>Req Number</b> 21  |             |
| Professor: Nadovich                    |                 |                      |   |                      |   |             |
| <b>Requested By</b>                    |                 |                      |   |                      | <b>Vendor:</b> GIGAVAC  |             |
| Name Tianyu Zhu                        |                 |                      |   |                      | <b>Web Site</b> <a href="http://www.gigavac.com">http://www.gigavac.com</a> |             |
| Email zhuti@lafayette.edu              |                 |                      |   |                      | <b>Phone</b> 805-472-3704   |             |
| Phone 484-542-8385                     |                 |                      |   |                      | <b>Ship By:</b> Ground  |             |
| <b>#</b>                               | <b>Quantity</b> | <b>Vendor Part</b>   | <b>Description</b>                        | <b>Unit Price</b>    | <b>Total Price</b>  | <b>Rcvd</b> |
| 1                                      | 5               | <b>GX14CB</b>        | 350+ Amp 12-800 Vdc Normally open relay   | 104                  | \$520.00  | 11/26/2018  |
| 2                                      | 1               | <b>GXNC14CB</b>      | 350+ Amp 12-800 Vdc Normally closed relay | 156                  | \$156.00  | 11/26/2018  |
|  |                 |                      |   | <b>Shipping Fees</b> |   |             |
|  |                 |                      |   | <b>Grand Total:</b>  |   | \$676.00    |
|  |                 | Instructor Approval: |   |                      |   |             |
|  |                 | Department Approval: |   |                      |   |             |
|  |                 | (Over \$500)         |   |                      |   |             |

DATE:11/16/2018

## ECE Department Material Request

Course: ECE 491  
Professor: Nadovich

Req Number 22

## Requested By

Name Robson Adem  
Email [ademr@lafayette.edu](mailto:ademr@lafayette.edu)  
Phone 4845919265Vendor: Dig-Key  
Web Site [digkey.com](http://digkey.com)  
Phone 1 (800) 858-3616  
Ship By: Ground

## All items added to shopping cart :

<https://www.digikey.com/short/jv41dq>

| #  | Quantity | Vendor Part          | Description                      | Unit Price | Total Price | Revd       |
|----|----------|----------------------|----------------------------------|------------|-------------|------------|
| 1  | 50       | S9001-ND             | CONN JUMPER SHORTING GOLD FLASH  | 0.0378     | \$1.89      | 11/26/2018 |
| 2  | 2        | Z8752-ND             | JUMPER PLUG 16POS SING ROW       | 2.28       | \$4.56      | 11/26/2018 |
| 3  | 6        | WM4830-ND            | CONN HDR VERT 8POS .100 TIN      | 1.44       | \$8.64      | 11/26/2018 |
| 4  | 2        | 887-1751-1-ND        | CRYSTAL 24.0000MHZ 12PF SMD      | 0.66       | \$1.32      | 11/26/2018 |
| 5  | 4        | 296-48522-1-ND       | IC DAC 8-BIT I2C QUAD 10-MSOP    | 3.72       | \$14.88     | 11/26/2018 |
| 6  | 4        | NCD9830DBR2GOSCT-ND  | IC ADC 8BIT 8CH I2C 16TSSOP      | 2.7        | \$10.80     | 11/26/2018 |
| 7  | 4        | MCP2551-I/SN-ND      | IC TRANSCEIVER CAN HI-SPD 8-SOIC | 1.05       | \$4.20      | 11/26/2018 |
| 8  | 5        | MCP9700AT-E/TTCT-ND  | SENSOR ANALOG -40C-125C SOT23-3  | 0.32       | \$1.60      | 11/26/2018 |
| 9  | 3        | WM3804-ND            | CONN HEADER 10POS 4.2MM VERT TIN | 1.62       | \$4.86      | 11/26/2018 |
| 10 | 1        | 102-3862-ND          | DC DC CONVERTER +/-5V 10W        | 28.19      | \$28.19     | 11/26/2018 |
| 11 | 4        | WM3801-ND            | CONN HEADER 4POS 4.2MM VERT TIN  | 0.81       | \$3.24      | 11/26/2018 |
| 12 | 3        | LT1763CS8-3.3#PBF-ND | IC REG LINEAR 3.3V 500MA 8SOIC   | 4.23       | \$12.69     | 11/26/2018 |
| 13 | 15       | TLP293(TPLECT-ND     | OPTOISOLATOR 3.75KV TRANS 4-SO   | 0.51       | \$7.65      | 11/26/2018 |
| 14 | 2        | WM3789CT-ND          | CONN MOD JACK 6P6C VERT UNSHLD   | 1.16       | \$2.32      | 11/26/2018 |
| 15 | 5        | P240KDACT-ND         | RES SMD 240K OHM 0.1% 1/8W 0805  | 0.36       | \$1.80      | 11/26/2018 |
| 16 | 6        | WM3803-ND            | CONN HEADER 8POS 4.2MM VERT TIN  | 1.37       | \$8.22      | 11/26/2018 |
| 17 | 3        | WM3805-ND            | CONN HEADER 12POS 4.2MM VERT TIN | 1.7        | \$5.10      | 11/26/2018 |
| 18 | 1        | 811-2783-ND          | DC DC CONVERTER 12V 15W          | 67.33      | \$67.33     | 11/26/2018 |
| 19 | 2        | 516-2578-5-ND        | IC OPAMP ISOLATION 100KHZ 8SO    | 5.66       | \$11.32     | 11/26/2018 |
| 20 | 3        | NC7WZ00K8XCT-ND      | IC GATE NAND 2CH 2-INP US8       | 0.4        | \$1.20      | 11/26/2018 |
| 21 | 3        | 497-2271-1-ND        | IC COMP LP DUAL CMOS VOLT 8 SOIC | 0.75       | \$2.25      | 11/26/2018 |
| 22 | 4        | 497-10252-1-ND       | IC OPAMP GP 1.4MHZ RRO 8SO       | 1.54       | \$6.16      | 11/26/2018 |
| 23 | 2        | 1715-1676-1-ND       | SWITCH TACTILE SPST-NO 0.1A 42V  | 2.77       | \$5.54      | 11/26/2018 |
| 24 | 3        | SI8600AB-B-IS-ND     | DGTL ISO 2.5KV 2CH I2C 8SOIC     | 3.33       | \$9.99      | 11/26/2018 |
| 25 | 4        | ST4ETB202CT-ND       | TRIMMER 2K OHM 0.25W GW TOP ADJ  | 1.43       | \$5.72      | 11/26/2018 |
| 26 | 2        | MCP23016T-I/SOCT-ND  | IC I/O EXPANDER I2C 16B 28SOIC   | 1.63       | \$3.26      | 11/26/2018 |
| 27 | 3        | 296-4180-1-ND        | IC GATE NAND 1CH 8-INP 14SOIC    | 2.36       | \$7.08      | 11/26/2018 |
| 28 | 3        | 296-39512-1-ND       | IC ANLG SW SPDT SOT23-6          | 1.04       | \$3.12      | 11/26/2018 |
| 29 | 3        | NC7SZ08P5XCT-ND      | IC GATE AND 1CH 2-INP SC70-5     | 0.36       | \$1.08      | 11/26/2018 |
| 30 | 10       | 311-2868-1-ND        | RES SMD 499 OHM 0.5% 1/8W 0805   | 0.133      | \$1.33      | 11/26/2018 |
| 31 | 6        | MCP6004T-I/SLCT-ND   | IC OPAMP GP RRO 1MHZ 14-SOIC     | 0.45       | \$2.70      | 11/26/2018 |
| 32 | 10       | A126332CT-ND         | RES SMD 10K OHM 1% 1/8W 0805     | 0.049      | \$0.49      | 11/26/2018 |
| 33 | 10       | P123807CT-ND         | RES SMD 0.5% 0.125W 0805         | 0.103      | \$1.03      | 11/26/2018 |

|    |    |                     |                                  |       |         |            |
|----|----|---------------------|----------------------------------|-------|---------|------------|
| 34 | 6  | MCP6002T-I/SNCT-ND  | IC OPAMP GP 1MHZ RRO 8SOIC       | 0.34  | \$2.04  | 11/26/2018 |
| 35 | 10 | 311-3.90KCRCT-ND    | RES SMD 3.9K OHM 1% 1/8W 0805    | 0.046 | \$0.46  | 11/26/2018 |
| 36 | 10 | 311-232CRCT-ND      | RES SMD 232 OHM 1% 1/8W 0805     | 0.047 | \$0.47  | 11/26/2018 |
| 37 | 5  | P21060CT-ND         | RES SMD 2.4K OHM 0.5% 1/4W 0805  | 0.25  | \$1.25  | 11/26/2018 |
| 38 | 5  | RHM120AECT-ND       | RES SMD 120 OHM 1% 0.4W 0805     | 0.17  | \$0.85  | 11/26/2018 |
| 39 | 10 | 311-137KCRCT-ND     | RES SMD 137K OHM 1% 1/8W 0805    | 0.047 | \$0.47  | 11/26/2018 |
| 40 | 10 | P4.02KDACT-ND       | RES SMD 4.02K OHM 0.1% 1/8W 0805 | 0.302 | \$3.02  | 11/26/2018 |
| 41 | 10 | 541-4.22MCCT-ND     | RES SMD 4.22M OHM 1% 1/8W 0805   | 0.069 | \$0.69  | 11/26/2018 |
| 42 | 10 | RMCF0805FT24K9CT-ND | RES 24.9K OHM 1% 1/8W 0805       | 0.028 | \$0.28  | 11/26/2018 |
| 43 | 15 | RG20N150KWCT-ND     | RES SMD 150K OHM 0.05% 1/8W 0805 | 0.827 | \$12.41 | 11/26/2018 |
| 44 | 5  | SI1302DL-T1-E3CT-ND | MOSFET N-CH 30V 600MA SOT323-3   | 0.5   | \$2.50  | 11/26/2018 |
| 45 | 4  | ST4ETB102CT-ND      | TRIMMER 1K OHM 0.25W GW TOP ADJ  | 1.43  | \$5.72  | 11/26/2018 |
| 46 | 5  | P15KDACT-ND         | RES SMD 15K OHM 0.1% 1/8W 0805   | 0.36  | \$1.80  | 11/26/2018 |
| 47 | 5  | RHM1.00KAECT-ND     | RES SMD 1K OHM 1% 0.4W 0805      | 0.17  | \$0.85  | 11/26/2018 |
| 48 | 10 | P100KDACT-ND        | RES SMD 100K OHM 0.1% 1/8W 0805  | 0.302 | \$3.02  | 11/26/2018 |
| 49 | 4  | 311-100CRCT-ND      | RES SMD 100 OHM 1% 1/8W 0805     | 0.1   | \$0.40  | 11/26/2018 |
| 50 | 5  | P20705CT-ND         | RES SMD 9.31K OHM 0.1% 1/4W 0805 | 0.36  | \$1.80  | 11/26/2018 |
| 51 | 10 | P330DACT-ND         | RES SMD 330 OHM 0.1% 1/8W 0805   | 0.302 | \$3.02  | 11/26/2018 |
| 52 | 10 | 311-2.40KCRCT-ND    | RES SMD 2.4K OHM 1% 1/8W 0805    | 0.047 | \$0.47  | 11/26/2018 |
| 53 | 5  | MMBF170DKR-ND       | MOSFET N-CH 60V 500MA SOT-23     | 1.89  | \$9.45  | 11/26/2018 |
| 54 | 5  | ZVP4525GCT-ND       | MOSFET P-CH 250V 0.265A SOT223   | 0.79  | \$3.95  | 11/26/2018 |
| 55 | 6  | PNM0805-5.0KBCT-ND  | RES SMD 5K OHM 0.1% 1/5W 0805    | 2.76  | \$16.56 | 11/26/2018 |
| 56 | 1  | 1951-2310-ND        | DC DC CONVERTER 24V 30W          | 76.2  | \$76.20 | 11/26/2018 |
| 57 | 5  | 641-1310-1-ND       | DIODE GEN PURP 50V 1A DO41       | 0.11  | \$0.55  | 11/26/2018 |
| 58 | 4  | 490-15669-1-ND      | FIXED IND 28NH 1.2A 98 MOHM      | 0.28  | \$1.12  | 11/26/2018 |
| 59 | 5  | P20916CT-ND         | RES SMD 665K OHM 0.1% 1/4W 0805  | 0.36  | \$1.80  | 11/26/2018 |
| 60 | 10 | 160-1427-1-ND       | LED RED CLEAR SMD                | 0.229 | \$2.29  | 11/26/2018 |
| 61 | 10 | 1516-1083-1-ND      | LED BLUE CLEAR 0805 SMD          | 0.277 | \$2.77  | 11/26/2018 |
| 62 | 4  | P95.3KDACT-ND       | RES SMD 95.3K OHM 0.1% 1/8W 0805 | 0.36  | \$1.44  | 11/26/2018 |
| 63 | 4  | PLT0805-500ACT-ND   | RES SMD 500 OHM 0.05% 1/4W 0805  | 4.27  | \$17.08 | 11/26/2018 |
| 64 | 10 | 511-1285-1-ND       | LED GREEN CLEAR 0805 SMD         | 0.284 | \$2.84  | 11/26/2018 |
| 65 | 5  | 497-3177-1-ND       | MOSFET N-CH 60V 4A SOT223        | 0.8   | \$4.00  | 11/26/2018 |
| 66 | 10 | WM3843-ND           | CONN HEADER 2POS 4.2MM VERT TIN  | 0.504 | \$5.04  | 11/26/2018 |
| 67 | 10 | 732-7817-1-ND       | CAP CER 33PF 16V C0G/NP0 0805    | 0.038 | \$0.38  | 11/26/2018 |
| 68 | 4  | 445-175206-1-ND     | FIXED IND 2.2UH 50MA 500 MOHM    | 0.25  | \$1.00  | 11/26/2018 |
| 69 | 4  | 478-10831-1-ND      | CAP CER 0.33UF 25V X7R 0805      | 0.72  | \$2.88  | 11/26/2018 |
| 70 | 5  | 497-8106-1-ND       | IC VREF SHUNT ADJ SOT23-5        | 0.64  | \$3.20  | 11/26/2018 |
| 71 | 5  | 478-10570-1-ND      | CAP CER 1UF 16V X7R 0805         | 0.36  | \$1.80  | 11/26/2018 |
| 72 | 4  | 490-10531-1-ND      | CAP CER 47UF 16V X6S 1210        | 0.97  | \$3.88  | 11/26/2018 |
| 73 | 6  | WM3802-ND           | CONN HEADER 6POS 4.2MM VERT TIN  | 1.06  | \$6.36  | 11/26/2018 |
| 74 | 6  | 490-5523-1-ND       | CAP CER 10UF 25V X5R 0805        | 0.54  | \$3.24  | 11/26/2018 |
| 75 | 35 | 720-1752-1-ND       | CAP CER 0.1UF 50V X7R 0805       | 0.195 | \$6.83  | 11/26/2018 |
| 76 | 4  | 1276-6722-1-ND      | CAP CER 4.7UF 35V X5R 0805       | 0.24  | \$0.96  | 11/26/2018 |
| 77 | 4  | MC7805BDTRKGOSCT-ND | IC REG LINEAR 5V 1A DPAK         | 0.64  | \$2.56  | 11/26/2018 |
| 78 | 10 | 709-1271-1-ND       | CAP CER 100PF 500V C0G/NP0 0805  | 0.183 | \$1.83  | 11/26/2018 |
| 79 | 30 | YAG3358CT-ND        | RES SMD 10K OHM 0.5% 1/8W 0805   | 0.133 | \$3.99  | 11/26/2018 |

|    |    |                         |                                  |       |               |            |
|----|----|-------------------------|----------------------------------|-------|---------------|------------|
| 80 | 10 | 511-1290-1-ND           | LED YELLOW CLEAR 0805 SMD        | 0.284 | \$2.84        | 11/26/2018 |
| 81 | 4  | 445-7947-1-ND           | CAP CER 10UF 100V X7S 2220       | 3.1   | \$12.40       | 11/26/2018 |
| 82 | 4  | 445-14559-1-ND          | CAP CER 15UF 10V X7S 0805        | 0.88  | \$3.52        | 11/26/2018 |
| 83 | 4  | CRM2512-FX-1000ELFCT-ND | RES SMD 100 OHM 1% 2W 2512       | 0.63  | \$2.52        | 11/26/2018 |
| 84 | 5  | 2SK1828TE85LFCT-ND      | MOSFET N-CH 20V 50MA S-MINI      | 0.5   | \$2.50        | 11/26/2018 |
| 85 | 1  | KAL25FB50R0-ND          | RES CHAS MNT 50 OHM 1% 25W       | 3.08  | \$3.08        | 11/26/2018 |
| 86 | 1  | 696-1455-ND             | RES CHAS MNT 75 OHM 1% 25W       | 3.49  | \$3.49        | 11/26/2018 |
| 87 | 1  | Z2951-ND                | RELAY GEN PURPOSE SPDT 10A 24V   | 16.28 | \$16.28       | 11/26/2018 |
| 88 | 1  | Z6224-ND                | RELAY GEN PURPOSE SPDT 10A 5V    | 22.81 | \$22.81       | 11/26/2018 |
| 89 | 2  | Z855-ND                 | RELAY SOCKET 5 POSITION DIN RAIL | 6.18  | \$12.36       | 11/26/2018 |
| 90 | 2  | PA0027-ND               | UMAX-10/USOP-10/MSOP-10TODIP-10  | 4.09  | \$8.18        | 11/26/2018 |
| 91 | 25 | S1112E-36-ND            | CONN HEADER .100 SINGL R/A 36POS | 1.767 | \$44.18       | 11/26/2018 |
|    |    |                         |                                  |       | Shipping Fees | \$8.99     |
|    |    |                         |                                  |       | Grand Total:  | \$620.22   |
|    |    | Instructor Approval:    |                                  |       |               |            |
|    |    | Department Approval:    |                                  |       |               |            |
|    |    | (Over \$500)            |                                  |       |               |            |



|                            |                     |   |   |                      |                    |             |
|----------------------------|---------------------|---|---|----------------------|--------------------|-------------|
| 11/16/2018                 |                     | <b>ECE Department Material Request</b>                        |   |                      |                    |             |
| <b>Course:</b> ECE 491     |                     | <b>Req Number: 23</b>   |   |                      |                    |             |
| <b>Professor:</b> Nadovich |                     |   |   |                      |                    |             |
| <b>Requested By</b>        |                     | <b>Vendor:</b> Amazon   |   |                      |                    |             |
| <b>Name</b>                | Robson Adem         | <b>Web Site</b>   | amazon.com  |                      |                    |             |
| <b>Email</b>               | ademr@lafayette.edu | <b>Phone</b>  | 5105252328  |                      |                    |             |
| <b>Phone</b>               | 4845919265          | <b>Ship By:</b>   | Ground  |                      |                    |             |
| <b>#</b>                   | <b>Quantity</b>     | <b>Vendor Part</b>  | <b>Description</b>  | <b>Unit Price</b>    | <b>Total Price</b> | <b>Rcvd</b> |
| 1                          | 1                   | <a href="https://amzn.to/2qOjpYB">https://amzn.to/2qOjpYB</a> | WINGONEER YF-S201 1-30L/min Water Flow Hall Counter / Sensor<br>Water control Water Flow Rate Switch Flow Meter Flowmeter Counter | \$8.99               | \$8.99             | 11/20/2018  |
| 2                          | 2                   | <a href="https://amzn.to/2DI4S9m">https://amzn.to/2DI4S9m</a> | DIN Rail Terminal Blocks, 10-22 AWG, 30 Amp, 600 Volt   | \$17.80              | \$35.60            | 11/20/2018  |
|                            |                     |   |   | <b>Shipping Fees</b> | \$0.00             |             |
|                            |                     |   |   | <b>Grand Total:</b>  | \$44.59            |             |
| Instructor Approval:       |                     |   |   |                      |                    |             |
| Department Approval:       |                     |   |   |                      |                    |             |
| (Over \$500)               |                     |   |   |                      |                    |             |

|                     |                     |                      |   |                      |                                      |             |
|---------------------|---------------------|----------------------|---|----------------------|--------------------------------------|-------------|
|                     | 11/16/2018          |                      |   |                      |                                      |             |
|                     |                     |                      | <b>ECE Department Material Request</b>  |                      |                                      |             |
|                     | <b>Course:</b>      | ECE 491              |   |                      | <b>Req Number: 24</b>                |             |
|                     | <b>Professor:</b>   | Nadovich             |   |                      |                                      |             |
|                     |                     |                      | <a href="http://www.gmw.com/magnetic_sensors/ametes/BBM_pricing.html">http://www.gmw.com/magnetic_sensors/ametes/BBM_pricing.html</a> |                      |                                      |             |
| <b>Requested By</b> |                     |                      |   | <b>Vendor:</b>       | GMW Associates                       |             |
| <b>Name</b>         | Robson Adem         |                      |   | <b>Web Site</b>      | <a href="http://gmw.com">gmw.com</a> |             |
| <b>Email</b>        | ademr@lafayette.edu |                      |   | <b>Phone</b>         | 650-802-8292                         |             |
| <b>Phone</b>        | 4845919265          |                      |   | <b>Ship By:</b>      | Ground                               |             |
|                     |                     |                      |   |                      |                                      |             |
| <b>#</b>            | <b>Quantity</b>     | <b>Vendor Part</b>   | <b>Description</b>  | <b>Unit Price</b>    | <b>Total Price</b>                   | <b>Rcvd</b> |
| 1                   | 1                   | BBM-01               | Bus Bar Module Current Sensor, 12-160mm Bus Bar widths  | \$40.00              | \$40.00                              | 11/22/2018  |
|                     |                     |                      |   |                      |                                      |             |
|                     |                     |                      |   | <b>Shipping Fees</b> | \$0.00                               |             |
|                     |                     |                      |   | <b>Grand Total:</b>  | \$40.00                              |             |
|                     |                     | Instructor Approval: |   |                      |                                      |             |
|                     |                     |                      |   |                      |                                      |             |
|                     |                     | Department Approval: |   |                      |                                      |             |
|                     |                     | (Over \$500)         |   |                      |                                      |             |

|                             |                     |                                 |                                       |                   |                      |  |  |  |
|-----------------------------|---------------------|---------------------------------|---------------------------------------|-------------------|----------------------|--|--|--|
|                             | 11/19/2018          | ECE Department Material Request |                                       |                   |                      |  |  |  |
| <b>Course:</b> ECE 491      |                     |                                 |                                       |                   |                      | <b>Req Number: 25</b>  |  |  |
| <b>Professor:</b> Nadovich  |                     |                                 |                                       |                   |                      |  |  |  |
| <b>Requested By</b>         |                     |                                 |                                       |                   |                      | <b>Vendor:</b> <a href="http://www.mcmaster.com">www.mcmaster.com</a>  |  |  |
| <b>Name</b>                 | Robson Adem         |                                 |                                       |                   |                      | <b>Web Site</b> <a href="http://www.mcmaster.com">www.mcmaster.com</a> |  |  |
| <b>Email</b>                | ademr@lafayette.edu |                                 |                                       |                   |                      | <b>Phone</b>   |  |  |
| <b>Phone</b>                | 4845919265          |                                 |                                       |                   |                      | <b>Ship By:</b> Ground   |  |  |
| <b>#</b>                    | <b>Quantity</b>     | <b>Vendor Part</b>              | <b>Description</b>                    | <b>Unit Price</b> | <b>Total Price</b>   | <b>Revd</b>  |  |  |
| 1                           | 1                   | <a href="#">7243K21</a>         | single crip, 16-14 awg 50 pack female | \$14.39           | \$14.39              | 11/20/2018   |  |  |
| 2                           | 1                   | <a href="#">7243K22</a>         | single crip, 16-14 awg 50 pack male   | \$15.08           | \$15.08              | 11/20/2018   |  |  |
| 3                           | 4                   | <a href="#">8505K722</a>        | 1/8 in 12inx24in grey acrylic         | \$14.27           | \$57.08              | 11/20/2018   |  |  |
|                             |                     |                                 |                                       |                   | <b>Shipping Fees</b> | \$9.22   |  |  |
|                             |                     |                                 |                                       |                   | <b>Grand Total:</b>  | \$95.77  |  |  |
| <b>Instructor Approval:</b> |                     |                                 |                                       |                   |                      |  |  |  |
| <b>Department Approval:</b> |                     |                                 |                                       |                   |                      |  |  |  |
| (Over \$500)                |                     |                                 |                                       |                   |                      |  |  |  |

|                     |                   |  |                    |                   |                       |   |
|---------------------|-------------------|--|--------------------|-------------------|-----------------------|---|
|                     | 11/19/2018        | ECE Department Material Request                                  |                    |                   |                       |   |
|                     | <b>Course:</b>    | ECE 491  |                    |                   | <b>Req Number: 26</b> |   |
|                     | <b>Professor:</b> | Nadovich   |                    |                   |                       |   |
| <b>Requested By</b> | <b>Name</b>       | Yuqiu Zhang  |                    |                   | <b>Vendor:</b>        | Advanced Circuits   |
|                     | <b>Email</b>      | <a href="mailto:zhangyu@lafayette.edu">zhangyu@lafayette.edu</a> |                    |                   | <b>Web Site</b>       | <a href="https://www.4pcb.com/">https://www.4pcb.com/</a> |
|                     | <b>Phone</b>      | 717-882-6143   |                    |                   | <b>Phone</b>          | 1.800.979.4722  |
|                     |                   |  |                    |                   | <b>Ship By:</b>       | Ground  |
| <b>#</b>            | <b>Quantity</b>   | <b>Vendor Part</b>   | <b>Description</b> | <b>Unit Price</b> | <b>Total Price</b>    | <b>Rcvd</b>   |
| 1                   | 1                 | <u>TSI2019 V1</u>  | TSI BOARD 2019     | \$33.00           | \$33.00               | 11/29/2018  |
|                     |                   |  |                    |                   | <b>Shipping Fees</b>  | \$98.32   |
|                     |                   |  |                    |                   | <b>Grand Total:</b>   | \$131.32  |
|                     |                   | Instructor Approval:   |                    |                   |                       |   |
|                     |                   | Department Approval:   |                    |                   |                       |   |
|                     |                   | (Over \$500)   |                    |                   |                       |   |

|   | 11/20/2018 | ECE Department Material Request  |            |             |            |
|---|------------|--|------------|-------------|------------|
| Course: ECE 491<br>Professor: Pro. Nadovich                                       |            | Req Number: 27   |            |             |            |
| Requested By<br>Name Robson Adem<br>Email ademr@lafayette.edu<br>Phone 4845919265 |            | Vendor: Amazon<br>Web Site amazon.com<br>Phone 5105252328<br>Ship By: Ground   |            |             |            |
|   |            | All items added to shopping cart Link: <a href="http://a.co/4auqC1z">http://a.co/4auqC1z</a>                               |            |             |            |
| #   | Quantity   | Description  | Unit Price | Total Price | Rcvd       |
|   | 1          | 1 AmazonBasics High-Speed HDMI Cable, 10 Feet, 1-Pack  | \$7.99     | \$7.99      | 11/26/2018 |
|   | 2          | [2 Packs] iXCC 10 Feet Long Micro USB to USB 2.0 Cable   | \$7.99     | \$7.99      | 11/26/2018 |
|   | 3          | 1 TNP USB 3.0 Flush Mount Cable  | \$9.99     | \$9.99      | 11/26/2018 |
|   | 4          | 2 40pin Male to Female, 40pin Male to Male, 40pin Female to Female for Breadboard/Arduino Based/DIY/Robot Ribbon Cables Ki | \$6.99     | \$13.98     | 11/26/2018 |
|   | 5          | 1 ShineKee USB HDMI Mount Cable 2 Ports USB 3.0 HDMI   | \$11.90    | \$11.90     | 11/26/2018 |
|   |            | Shipping Fees  |            | \$0.00      |            |
|   |            | Grand Total:   |            | \$51.85     |            |
| Instructor Approval:  |            |  |            |             |            |
| Department Approval:<br>(Over \$500)  |            |  |            |             |            |

**2018-19 PURCHASE REQUEST FORM**

|                            |                        |
|----------------------------|------------------------|
| <b>Class/Project Name:</b> | <b>FSAE-Racecar</b>    |
| <b>Account #:</b>          |                        |
| <b>Advisor Approval:</b>   | Nesbit/Nadovich/Nestor |

|                                 |                    |               |    |                           |   |
|---------------------------------|--------------------|---------------|----|---------------------------|---|
| <b>Vendor Order Information</b> |                    |               |    |                           |   |
| PO_28                           |                    |               |    |                           |   |
| <b>Date:</b>                    | 10/17/2018         |               |    | <b>Web/email address:</b> | <a href="https://www.mcmaster.com/">https://www.mcmaster.com/</a> |
| <b>Vendor Name:</b>             | McMaster-Carr      |               |    |                           |   |
| <b>Address:</b>                 | 200 New Canton Way |               |    |                           |   |
| <b>City:</b>                    | Robbinsville       | <b>State:</b> | NJ | <b>Zip Code:</b>          | 8691  |
| <b>Telephone:</b>               | 609-689-3000       |               |    | <b>Fax:</b>               | 609-259-3575  |
| 0                               |                    |               |    |                           |   |

| ORDER INFORMATION |     |      |           |   |                 |         |
|-------------------|-----|------|-----------|---|-----------------|---------|
| #                 | Qty | Unit | Part #    | Description   | Unit Price      | Price   |
| 1                 | 1   | Pack | 90272A096 | Steel Pan Head Phillips Screws, 3-48 Thread, 1/2" Long          | \$8.00          | \$8.00  |
| 2                 | 1   | Pack | 94639A470 | White Nylon Unthreaded Spacer, 3/16" OD, 5/32" Long, #4 Screw S | \$3.62          | \$3.62  |
| 3                 | 1   | Pack | 90272A192 | Steel Phillips Screws 8-32, 3/8" Long                           | \$2.92          | \$2.92  |
|                   |     |      |           |   | <b>Shipping</b> | \$6.49  |
| <b>Total</b>      |     |      |           |   |                 | \$21.03 |

**2018-19 PURCHASE REQUEST FORM**

**Class/Project Name:** FSAE-Racecar

**Account #:**

**Approved by:** Nesbit/Nadovich/Nestor

**Vendor Order Information**

PO\_29

**Date:** 11/6/2018 **Web/email address:** <https://www.midweststeelsupply.com/>

**Vendor Name:** Midwest Steel and Aluminum

**Address:** 14255 James Road

**City:** Rogers **State:** MN **Zip Code:** 55374

**Telephone:** 763-582-1925 **Fax:**

| Line         | Qty | Unit  | Part # | Description                  | Web Link  | Unit Price      | Price   |
|--------------|-----|-------|--------|------------------------------|---|-----------------|---------|
| 1            | 1   | Sheet | 6061   | 1 inch thick 11" x 11" Plate | <a href="https://www.midweststeelsupply.com/store/6061aluminumplate">https://www.midweststeelsupply.com/store/6061aluminumplate</a> | \$58.13         | \$58.13 |
|              |     |       |        |                              |   | <b>Shipping</b> | \$7.00  |
| <b>Total</b> |     |       |        |                              |   |                 | \$65.13 |

**2018-19 PURCHASE REQUEST FORM**

|                            |                        |
|----------------------------|------------------------|
| <b>Class/Project Name:</b> | <b>FSAE-Racecar</b>    |
| <b>Account #:</b>          |                        |
| <b>Advisor Approval:</b>   | Nesbit/Nadovich/Nestor |

|                                 |   |
|---------------------------------|---|
| <b>Vendor Order Information</b> |   |
| PO_30                           |   |
| <b>Date:</b>                    | 11/7/2018   |
| <b>Web/email address:</b>       | <a href="https://www.mcmaster.com/">https://www.mcmaster.com/</a> |
| <b>Vendor Name:</b>             | McMaster-Carr   |
| <b>Address:</b>                 | 200 New Canton Way  |
| <b>City:</b>                    | Robbinsville  |
| <b>State:</b>                   | NJ  |
| <b>Zip Code:</b>                | 8691  |
| <b>Telephone:</b>               | 609-689-3000  |
| <b>Fax:</b>                     | 609-259-3575  |
| 0                               |   |

| ORDER INFORMATION |     |        |           |   |                 |         |
|-------------------|-----|--------|-----------|---|-----------------|---------|
| #                 | Qty | Unit   | Part #    | Description   | Unit Price      | Price   |
| 1                 | 1   | Length | 8961K15   | Steel DIN 3 Rail, 7.5mm Deep, 1m Long                         | \$5.27          | \$5.27  |
| 2                 | 11  | Pack   | 47065T142 | Steel End-Feed Fastener, 1/4"-20 Thread for T-Slotted Framing | \$2.30          | \$25.30 |
|                   |     |        |           |   | <b>Shipping</b> | \$7.00  |
| <b>Total</b>      |     |        |           |   |                 | \$37.57 |



|  |                      |                 |   |                   |   |                |  |  |
|--|----------------------|-----------------|---|-------------------|---|----------------|--|--|
|  |                      | 11/20/2018      |   |                   |   |                |  |  |
|  |                      |                 | <b>ECE Department Material Request</b>  |                   |   |                |  |  |
| <b>Course: ECE 491</b><br><b>Professor: Pro. Nadovich</b>                                |                      |                 |   |                   | <b>Req Number: 31</b>   |                |  |  |
| <b>Requested By</b><br>Name Robson Adem<br>Email ademr@lafayette.edu<br>Phone 4845919265 |                      |                 |   |                   | <b>Vendor:</b> Mouser<br><b>Web Site:</b> mouser.com<br><b>Phone:</b><br><b>Ship By:</b> Ground |                |  |  |
| <b>#</b>   | <b>Quantity</b>      | <b>Part #</b>   | <b>Description</b>  | <b>Unit Price</b> | <b>Total Price</b>  | <b>Revd</b>    |  |  |
| 1  | 3                    | 584-AD5593RBRUZ | Data Acquisition ADCs/DACs - Specialized Configurable ADC/DAC 8 Channel, 12 Bit | \$7.48            | \$22.44   | 11/26/2018     |  |  |
| 2  | 3                    | 538-171692-0106 | Headers & Wire Housings Mega-Fit Recept Hsg 6 ckt V-0                           | \$0.96            | \$2.88  | 11/26/2018     |  |  |
|  |                      |                 |   |                   | <b>Shipping Fees</b>  | \$7.99         |  |  |
|  |                      |                 |   |                   | <b>Grand Total:</b>   | <b>\$33.31</b> |  |  |
|  | Instructor Approval: |                 |   |                   |   |                |  |  |
|  | Department Approval: |                 |   |                   |   |                |  |  |
|  | (Over \$500)         |                 |   |                   |   |                |  |  |

|                            |                     |  |  |                     |                    |  |
|----------------------------|---------------------|--|--|---------------------|--------------------|--|
| 11/27/2018                 |                     | <b>ECE Department Material Request</b> |  |                     |                    |  |
| <b>Course:</b> ECE 491     |                     |  |  |                     |                    | <b>Req Number:</b> 32  |
| <b>Professor:</b> Nadovich |                     |  |  |                     |                    |  |
| <b>Requested By</b>        |                     |  |  |                     |                    | <b>Vendor:</b> <a href="http://www.mcmaster.com">www.mcmaster.com</a>  |
| <b>Name</b>                | Robson Adem         |  |  |                     |                    | <b>Web Site</b> <a href="http://www.mcmaster.com">www.mcmaster.com</a> |
| <b>Email</b>               | ademr@lafayette.edu |  |  |                     |                    | <b>Phone</b> (609) 689-3000  |
| <b>Phone</b>               | 4845919265          |  |  |                     |                    | <b>Ship By:</b> Ground   |
| <b>#</b>                   | <b>Quantity</b>     | <b>Vendor Part</b>                     | <b>Description</b>   | <b>Unit Price</b>   | <b>Total Price</b> | <b>Rcvd</b>  |
| 1                          | 1                   | <a href="#">6452T45</a>                | 100 feet 18awg 9 wire  | \$146.00            | \$146.00           | 11/29/2018   |
| 2                          | 1                   | <a href="#">6452T65</a>                | 100 feet 16 awg 12 wire  | \$225.00            | \$225.00           | 11/29/2018   |
| 3                          | 5                   | <a href="#">7130K12</a>                | zip tie 100 packs  | \$2.41              | \$12.05            | 11/29/2018   |
| 4                          | 2                   | <a href="#">7565K46</a>                | cable tie (25 a pack)  | \$7.49              | \$14.98            | 11/29/2018   |
| 5                          | 5                   | <a href="#">7566K73</a>                | Cable tie mount (25 a pack)  | \$3.82              | \$19.10            | 11/29/2018   |
| 6                          | 2                   | <a href="#">5945T83</a>                | labels 1-45 (10 of each)   | \$19.83             | \$39.66            | 11/29/2018   |
| 7                          | 4                   | <a href="#">96144A120</a>              | Fine-Thread Alloy Steel Socket Head Screw<br>M6 x 0.75 mm Thread, 20 mm Long 96144A120 | \$3.38              | \$13.52            | 11/29/2018   |
|                            |                     |  |  | Shipping Fees       | \$12.89            |  |
|                            |                     |  |  | <b>Grand Total:</b> | <b>\$483.20</b>    |  |
| Instructor Approval:       |                     |  |  |                     |                    |  |
| Department Approval:       |                     |  |  |                     |                    |  |
| (Over \$500)               |                     |  |  |                     |                    |  |

|  |                 |   |                                 |                      |                    |  |
|--|-----------------|---|---------------------------------|----------------------|--------------------|--|
| <b>DATE:11/27/2018</b>   |                 | <b>ECE Department Material Request</b>  |                                 |                      |                    |  |
| Course: ECE 491<br>Professor: Nadovich                             |                 |   |                                 |                      | <b>Req Number</b>  | 33   |
| <b>Requested By</b>  |                 |   |                                 |                      | <b>Vendor:</b>     | Dig-Key                                    |
| Name Robson Adem   |                 |   |                                 |                      | <b>Web Site</b>    | <a href="http://digkey.com">digkey.com</a> |
| Email <a href="mailto:ademr@lafayette.edu">ademr@lafayette.edu</a> |                 |   |                                 |                      | <b>Phone</b>       | 1 (800) 858-3616                           |
| Phone 4845919265   |                 |   |                                 |                      | <b>Ship By:</b>    |  |
| <b>All items added to shopping cart :</b>                          |                 | <a href="https://www.digikey.com/short/j1c33m">https://www.digikey.com/short/j1c33m</a> |                                 |                      |                    |  |
| <b>#</b>   | <b>Quantity</b> | <b>Vendor Part</b>  | <b>Description</b>              | <b>Unit Price</b>    | <b>Total Price</b> | <b>Revd</b>                                |
| 1  | 1               | Z1032-ND  | RELAY GEN PURPOSE 4PST 25A 24V  | 46.9                 | \$46.90            | 11/29/2018                                 |
| 2  | 1               | Z1238-ND  | W-BRACKET FOR OMRON RELAY       | 2.1                  | \$2.10             | 11/29/2018                                 |
| 3  | 6               | WM2906-ND   | CONN HOUSING 8POS .100 W/LATCH  | 0.43                 | \$2.58             | 11/29/2018                                 |
| 4  | 3               | <b>WM3704-ND</b>  | CONN RECEPT 10POS DUAL          | 0.48                 | \$1.44             | 11/29/2018                                 |
| 5  | 4               | <b>WM3701-ND</b>  | CONN RECEPT 4POS DUAL           | 0.31                 | \$1.24             | 11/29/2018                                 |
| 6  | 6               | WM3703-ND   | CONN RECEPT 8POS DUAL           | 0.43                 | \$2.58             | 11/29/2018                                 |
| 7  | 3               | WM3705-ND   | CONN RECEPT 12POS DUAL          | 0.64                 | \$1.92             | 11/29/2018                                 |
| 8  | 10              | WM3700-ND   | CONN RECEPT 2POS DUAL           | 0.256                | \$2.56             | 11/29/2018                                 |
| 9  | 6               | WM3802-ND   | CONN HEADER 6POS 4.2MM VERT TIN | 1.06                 | \$6.36             | 11/29/2018                                 |
| 10   | 100             | RHM1.00KAECT-ND   | RES SMD 1K OHM 1% 0.4W 0805     | 0.0572               | \$5.72             | 11/29/2018                                 |
| 11   | 25              | WM2512-ND   | CONN TERM FEMALE 22-24AWG GOLD  | 0.1416               | \$3.54             | 11/29/2018                                 |
| 12   | 100             | WM2501CT-ND   | CONN TERM FEMALE 18-24AWG TIN   | 0.0555               | \$5.55             | 11/29/2018                                 |
|  |                 |   |                                 | <b>Shipping Fees</b> | \$31.24            |  |
|  |                 |   |                                 | <b>Grand Total:</b>  | \$113.73           |  |
|  |                 | Instructor Approval: _____  |                                 |                      |                    |  |
|  |                 | Department Approval: _____  |                                 |                      |                    |  |
|  |                 | (Over \$500)  |                                 |                      |                    |  |

|   |                 |   |                                  |                      |                    |  |
|---|-----------------|---|----------------------------------|----------------------|--------------------|--|
| DATE:11/30/2018   |                 | <b>ECE Department Material Request</b>  |                                  |                      |                    |  |
| Course: ECE 491<br>Professor: Nadovich                              |                 |   |                                  |                      | <b>Req Number</b>  | 34   |
| <b>Requested By</b>   |                 |   |                                  |                      | <b>Vendor:</b>     | Dig-Key                                    |
| Name: Robson Adem   |                 |   |                                  |                      | <b>Web Site:</b>   | <a href="http://digkey.com">digkey.com</a> |
| Email: <a href="mailto:ademr@lafayette.edu">ademr@lafayette.edu</a> |                 |   |                                  |                      | <b>Phone:</b>      | 1 (800) 858-3616                           |
| Phone: 4845919265   |                 |   |                                  |                      | <b>Ship By:</b>    |  |
| <b>All items added to shopping cart :</b>                           |                 | <a href="https://www.digikey.com/short/j188dc">https://www.digikey.com/short/j188dc</a> |                                  |                      |                    |  |
| <b>#</b>  | <b>Quantity</b> | <b>Vendor Part</b>  | <b>Description</b>               | <b>Unit Price</b>    | <b>Total Price</b> | <b>Revd</b>                                |
| 1   | 250             | WM11981CT-ND  | CRIMP TERM TIN 14/16AWG          | 0.15308              | \$38.27            | 12/04/2018                                 |
| 2   | 250             | WM2512-ND   | CONN TERM FEMALE 22-24AWG GOLD   | 0.10168              | \$25.42            | 12/04/2018                                 |
| 3   | 250             | WM2501CT-ND   | CONN TERM FEMALE 18-24AWG TIN    | 0.04784              | \$11.96            | 12/04/2018                                 |
| 4   | 250             | 1734-1143-1-ND  | CONTACT PIN 16-20AWG CRIMP NICKL | 0.17184              | \$42.96            | 12/04/2018                                 |
| 5   | 250             | 1734-1161-1-ND  | CONTACT SKT 16-20AWG CRIMP NICKL | 0.3442               | \$86.05            | 12/04/2018                                 |
| 6   | 5               | 296-29034-1-ND  | IC MONITOR PWR/CURR BIDIR 10MSOP | 2.88                 | \$14.40            | 12/04/2018                                 |
|   |                 |   |                                  | <b>Shipping Fees</b> | \$23.40            |  |
|   |                 |   |                                  | <b>Grand Total:</b>  | \$242.46           |  |
| Instructor Approval:  |                 |   |                                  |                      |                    |  |
| Department Approval:  |                 |   |                                  |                      |                    |  |
| (Over \$500)  |                 |   |                                  |                      |                    |  |

|                                  |                 |  |   |                      |                    |             |
|----------------------------------|-----------------|--|---|----------------------|--------------------|-------------|
| 11/30/2018                       |                 | <b>ECE Department Material Request</b>                                 |   |                      |                    |             |
| <b>Course:</b> ECE 491           |                 | <b>Req Number: 35</b>  |   |                      |                    |             |
| <b>Professor:</b> Nadovich       |                 |  |   |                      |                    |             |
| <b>Requested By</b>              |                 | <b>Vendor:</b> <a href="http://www.mcmaster.com">www.mcmaster.com</a>  |   |                      |                    |             |
| <b>Name</b> Robson Adem          |                 | <b>Web Site</b> <a href="http://www.mcmaster.com">www.mcmaster.com</a> |   |                      |                    |             |
| <b>Email</b> ademr@lafayette.edu |                 | <b>Phone</b> (609) 689-3000  |   |                      |                    |             |
| <b>Phone</b> 4845919265          |                 | <b>Ship By:</b>  |   |                      |                    |             |
| <b>#</b>                         | <b>Quantity</b> | <b>Vendor Part</b>   | <b>Description</b>  | <b>Unit Price</b>    | <b>Total Price</b> | <b>Rcvd</b> |
| 1                                | 1               | <a href="#">8010K31</a>  | Elongated Ring Terminals<br>Nylon Insulated, 22-18 Gauge, for Number 2, 4, 6 Screw Size Pack of 25 each | \$6.10               | \$6.10             | 12/04/2018  |
| 2                                | 1               | <a href="#">91841A007</a>  | 18-8 Stainless Steel Hex Nut Pack of 100 each   | \$3.40               | \$3.40             | 12/04/2018  |
| 3                                | 1               | <a href="#">9388K57</a>  | Heavy Duty Ring Terminals<br>Vinyl Insulated, for 16-14 Gauge and 7/16" Screw Size Pack of 10 each      | \$4.90               | \$4.90             | 12/04/2018  |
| 4                                | 1               | <a href="#">9910T66</a>  | Garolite Sheet<br>6" Wide x 6" Long, 3/8" Thick   | \$27.89              | \$27.89            | 12/04/2018  |
| 5                                | 1               | <a href="#">9246K562</a>   | 6061 Aluminum<br>3/4" Thick, 4" x 48"   | \$104.94             | \$104.94           | 12/04/2018  |
| 6                                | 1               | <a href="#">92395A112</a>  | Screw-to-Expand Inserts<br>for Plastics, Brass, 4-40 Thread Size Pack of 50 each                        | \$11.00              | \$11.00            | 12/04/2018  |
| 7                                | 1               | <a href="#">8010K33</a>  | Elongated Ring Terminals<br>Nylon Insulated, 16-14 Gauge, for Number 2, 4, 6 Screw Size Pack of 25 each | \$8.56               | \$8.56             | 12/04/2018  |
|                                  |                 |  |   | <b>Shipping Fees</b> | <b>\$15.65</b>     |             |
|                                  |                 |  |   | <b>Grand Total:</b>  | <b>\$182.44</b>    |             |
| <b>Instructor Approval:</b>      |                 |  |   |                      |                    |             |
| <b>Department Approval:</b>      |                 |  |   |                      |                    |             |
| <b>(Over \$500)</b>              |                 |  |   |                      |                    |             |

|              | 11/30/2018                |   |                      |               |             |            |
|--------------|---------------------------|---|----------------------|---------------|-------------|------------|
|              |                           | ECE Department Material Request                               |                      |               |             |            |
|              | Course: ECE 491           |   |                      | Req Number:36 |             |            |
|              | Professor: Pro. Nadovich  |   |                      |               |             |            |
| Requested By |                           |   |                      | Vendor:       | Amazon      |            |
|              | Name Robson Adem          |   |                      | Web Site      | amazon.com  |            |
|              | Email ademr@lafayette.edu |   |                      | Phone         | 5105252328  |            |
|              | Phone 4845919265          |   |                      | Ship By:      |             |            |
| #            | Quantity                  | Vendor Part   | Description          | Unit Price    | Total Price | Rcvd       |
| 1            | 1                         | <a href="https://amzn.to/2KIB90w">https://amzn.to/2KIB90w</a> | pipe coupling        | \$6.49        | 6.49        | 12/04/2018 |
| 2            | 2                         | <a href="https://amzn.to/2PbQXcS">https://amzn.to/2PbQXcS</a> | pipe fitting adapter | \$6.99        | 13.98       | 12/04/2018 |
|              |                           |   |                      | Shipping Fees | \$23.54     |            |
|              |                           |   |                      | Grand Total:  | \$44.01     |            |
|              | Instructor Approval:      |   |                      |               |             |            |
|              |                           |   |                      |               |             |            |
|              | Department Approval:      |   |                      |               |             |            |
|              | (Over \$500)              |   |                      |               |             |            |

DATE: 12/05/2018

### ECE Department Material Request

**Course:** ECE 491  
**Professor:** Nadovich

**Req Number:** 37

**Requested By**  
**Name:** Hayden Dodge  
**Email:** [dodgeh@lafayette.edu](mailto:dodgeh@lafayette.edu)  
**Phone:** 303-588-2848

**Vendor:** McMaster-Carr  
**Web Site:** <https://www.mcmaster.com/>  
**Phone:**  
**Ship By:** Standard Shipping

| # | Quantity | Vendor Part | Description   | Link  | Unit Price | Total Price | Rcvd       |
|---|----------|-------------|---|---|------------|-------------|------------|
| 1 | 1        | 91292A136   | 18-8 Stainless Steel Socket Head Screw<br>M6 x 1 mm Thread, 18 mm Long<br>pack of 50            | <a href="https://www.mcmaster.com/91292a136">https://www.mcmaster.com/91292a136</a> | \$10.81    | \$10.81     | 12/06/2018 |
| 2 | 2        | 91292A152   | 18-8 Stainless Steel Socket Head Screw<br>M8 x 1.25 mm Thread, 40 mm Long,<br>pack of 10 each   | <a href="https://www.mcmaster.com/91292A152">https://www.mcmaster.com/91292A152</a> | \$5.81     | \$11.62     | 12/06/2018 |
| 3 | 1        | 91772A253   | Passivated 18-8 Stainless Steel Pan Head Phillips Screw<br>10-24 Thread, 2" Long,<br>pack of 50 | <a href="https://www.mcmaster.com/91772a253">https://www.mcmaster.com/91772a253</a> | \$13.21    | \$13.21     | 12/06/2018 |

**Shipping Fees:** \$3.27  
**Grand Total:** \$38.91

Instructor Approval:

Department Approval:  
 (Over \$500)

Ordering with Drew Embedded Order for reduced shipping. (Split with Embedded)

**2018-19 PURCHASE REQUEST FORM**

|                            |                     |
|----------------------------|---------------------|
| <b>Class/Project Name:</b> | <b>ME 497/ FSAE</b> |
| <b>Account #:</b>          |                     |
| <b>Approved by:</b>        | <b>Dr. Nesbit</b>   |

**Vendor Order Information**

|                     |                             |                           |  |
|---------------------|-----------------------------|---------------------------|--|
| <b>Date:</b>        | <b>11/27/2018</b>           | <b>Web/email address:</b> | <b><a href="https://8020.net/">https://8020.net/</a></b> |
| <b>Vendor Name:</b> | <b>80/20 Inc.</b>           |                           |  |
| <b>Address:</b>     | <b>1701 County Rd 400 E</b> |                           |  |
| <b>City:</b>        | <b>Columbia City</b>        | <b>State:</b>             | <b>IN</b>  |
| <b>Zip Code:</b>    | <b>46725</b>                |                           |  |
| <b>Telephone:</b>   | <b>844.802.0932</b>         | <b>Fax:</b>               |  |

| Line         | Qty | Unit | Part #  | Description  | Web Link  | Unit Price | Price   |                 |
|--------------|-----|------|---------|--|---|------------|---------|-----------------|
| 1            | 4   | Bars | 25-2525 | <b>670mm for Top Length Support</b>                    | <a href="https://8020.net/25-2525.html">https://8020.net/25-2525.html</a> | \$7.49     | \$29.96 |                 |
| 2            | 8   | Bars | 25-2525 | <b>395mm for Width Support</b>                         | <a href="https://8020.net/25-2525.html">https://8020.net/25-2525.html</a> | \$5.22     | \$41.76 |                 |
| 3            | 8   | Bars | 25-2525 | <b>285mm for Height Support</b>                        | <a href="https://8020.net/25-2525.html">https://8020.net/25-2525.html</a> | \$4.31     | \$34.48 |                 |
| 4            | 6   | Bars | 25-2525 | <b>620mm for Bottom Length Support and GLV Divider</b> | <a href="https://8020.net/25-2525.html">https://8020.net/25-2525.html</a> | \$7.08     | \$42.48 |                 |
| 5            | 2   | Bars | 25-2525 | <b>315mm for TSV Panel Divider</b>                     | <a href="https://8020.net/25-2525.html">https://8020.net/25-2525.html</a> | \$4.56     | \$9.12  |                 |
|              |     |      |         |  |   |            | \$19.70 |                 |
| <b>Total</b> |     |      |         |  |   |            |         | <b>\$177.50</b> |

**Comments: Shipping: \$19.70**