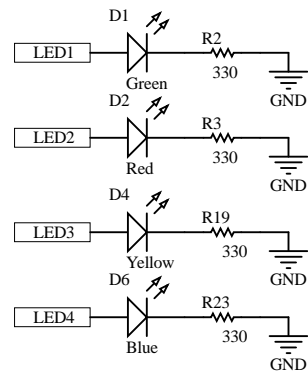
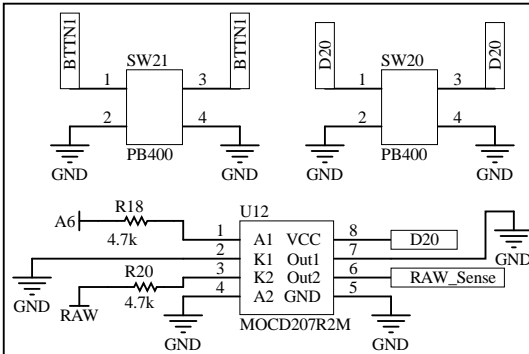


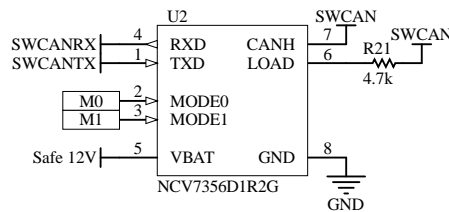
Breakout Headers



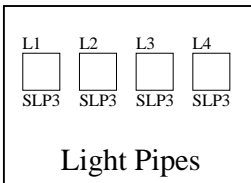
LED Indicators



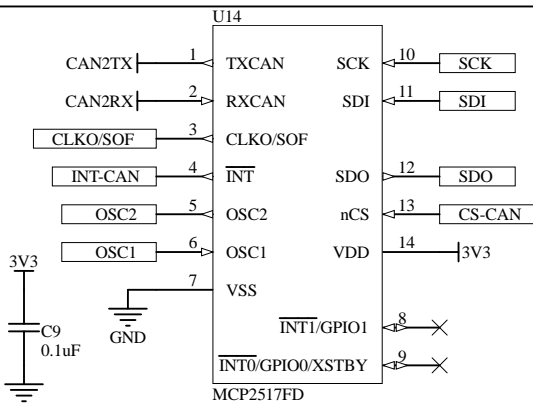
Optically Isolated Inputs



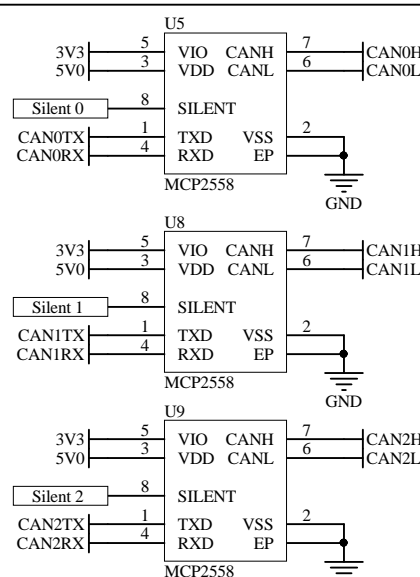
Single Wire CAN (GMLAN)



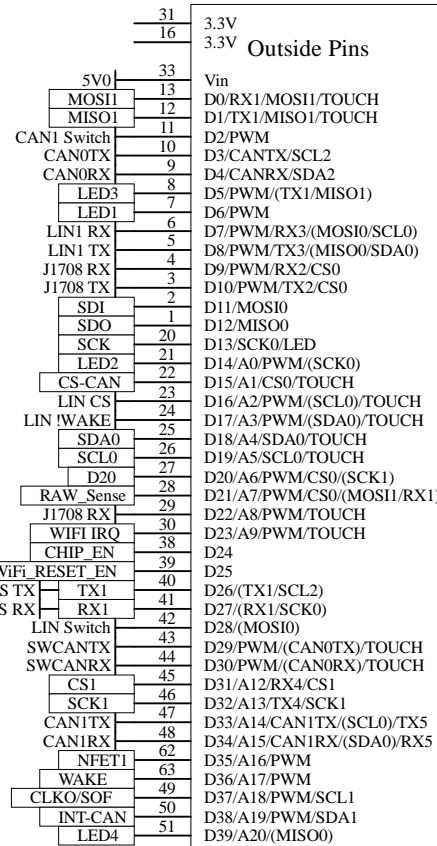
Light Pipes



Third CAN



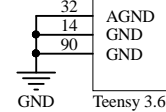
CAN Transceivers



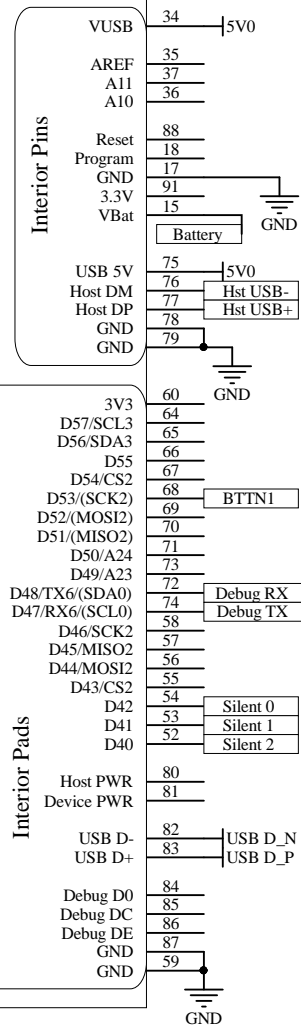
Teensy 3.6 32-Bit

Arduino-Compatible

Microcontroller

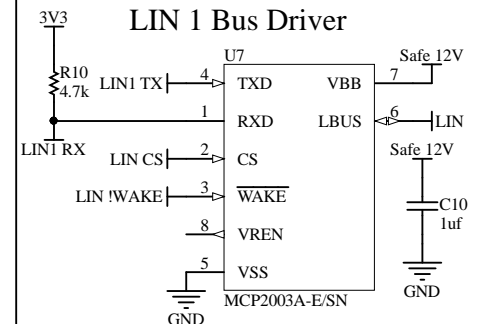


Biasing Resistors



Interior Pins

LIN 1 Bus Driver

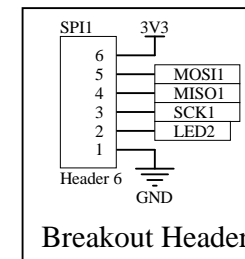
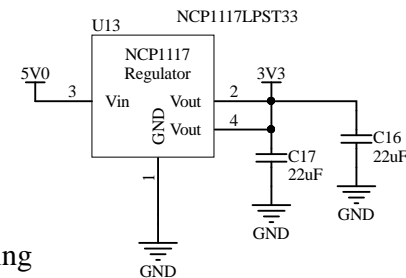
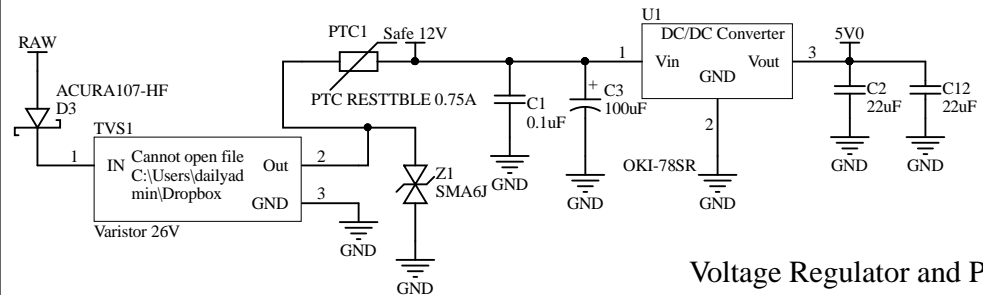
Title: **Secure Handheld J1939 Logger**Subtitle: **Hands-On Heavy Duty Networking**

Revision: 3

Date: 1/31/2019 Time: 2:00:44 PM Size: Letter Sheet 1 of 2

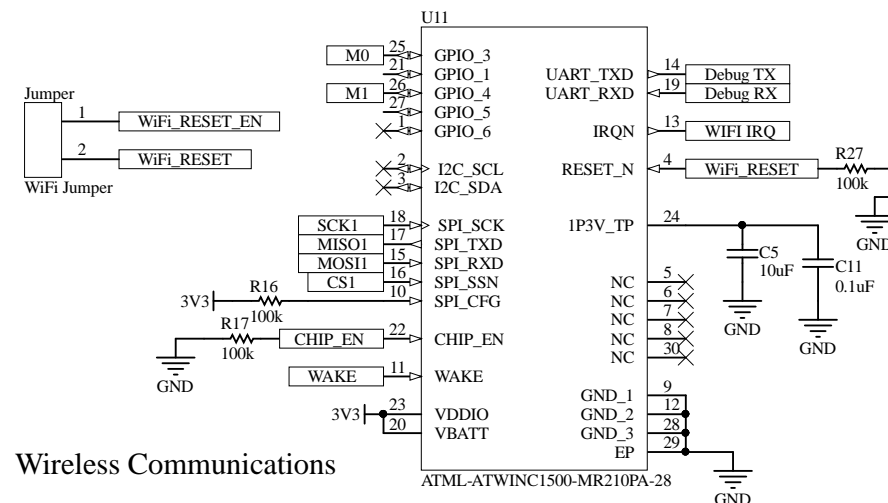
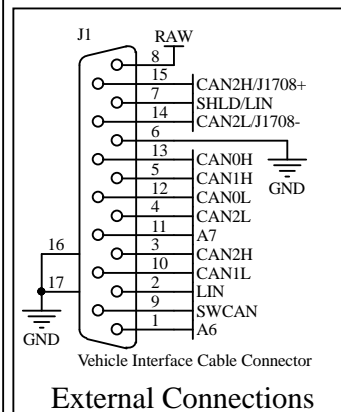
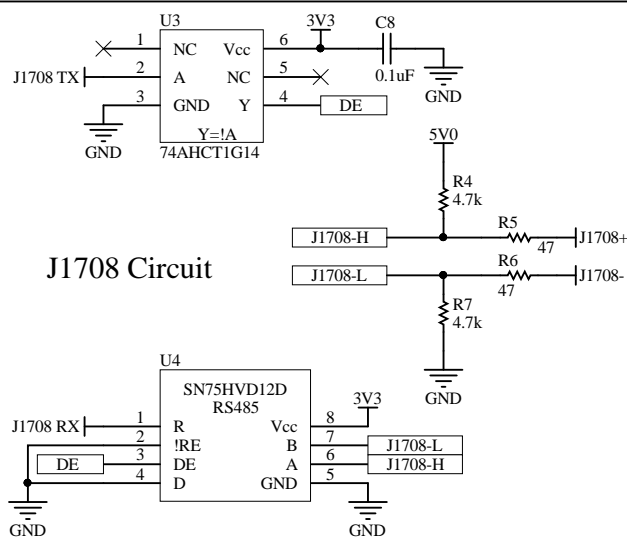
File: C:\Users\jeremy-daily\Downloads\Handheld Teensy 3.6 Logger Rev3\Altium Files\Teensy 3.6 with J1939 - Handheld Rev3.SchDoc

Dr. Jeremy Daily  
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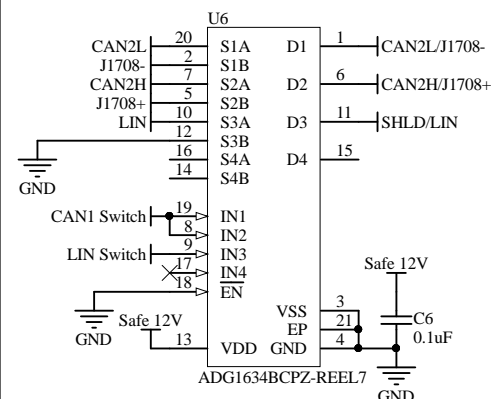
Voltage Regulator and Power Conditioning

Breakout Header

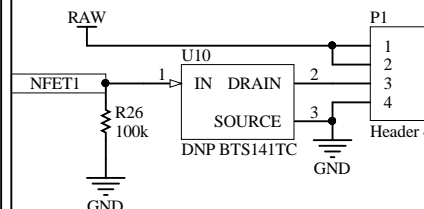


Wireless Communications

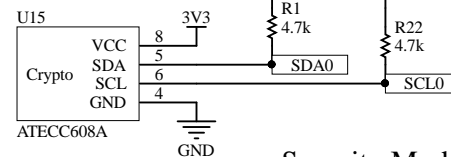
Pin Multiplexing Switch



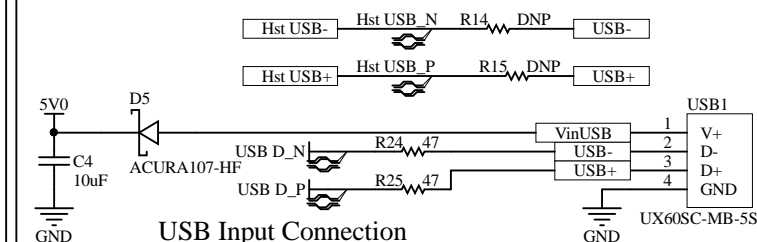
High Current Low-Side Driver



Security Module



USB Input Connection



Fits Bud HP-3561 Enclosure

Title: **Secure Handheld J1939 Logger**

Subtitle: **Wifi, J1708, USB, and Dsub**

Revision: 3

Date: 1/31/2019 Time: 2:00:45 PM Size: Letter Sheet 2 of 2

File: C:\Users\jeremy-daily\Downloads\Handheld Teensy 3.6 Logger Rev3\Altium Files\Additional Circuits - Handheld - Rev 3.SchDoc

Dr. Jeremy Daily  
Mechanical Engineering  
The University of Tulsa  
800 S. Tucker Dr.  
Tulsa, OK 74104



| Item # | Quantity | Designator                                | Comment                           | Footprint                    | Description  | Manufacturer                     | PartNumber             | Supplier 1 | Supplier Part Number 1                    | Name Error:Alt |
|--------|----------|---|-----------------------------------|------------------------------|--|----------------------------------|------------------------|------------|---|----------------|
| 1      | 1        | Batt1                                     | CR1225                            | Battery Clip - CR1225        | Lithium Battery Non-Rechargeable (Primary) 3V Coin, 12.5mm   | Linx                             | BAT-HLD-012-SMT        | Digi-Key   | <a href="#">BAT-HLD-012-SMT-ND</a>        |                |
| 2      | 5        | C1, C6, C8, C9, C11                       | 0.1uF                             | 0603                         | CAP CER 0.1UF 50V X7R 0603, CAP CER 0.1UF 50V 10% X7R 0603   | KEMET                            | C0603C104K5RACAUTO     | Digi-Key   | <a href="#">399-6856-1-ND</a>             |                |
| 3      | 4        | C2, C12, C16, C17                         | 22uF                              | 1206                         | 22uF ±20% 25V Ceramic Capacitor X5R 1206 (3216 Metric)   | Murata Electronics North America | GRT31CR61E226ME01L     | Digi-Key   | <a href="#">490-12451-1-ND</a>            |                |
| 4      | 1        | C3  | 100uF                             | Elec. Cap - G                | Aluminum Electrolytic Capacitors Radial, Can - SMD 5000 Hrs @ 105°C                                    | Panasonic Electronic Components  | EEE-HC1H101P           | Digi-Key   | <a href="#">P19732CT-ND</a>               |                |
| 5      | 3        | C4, C5, C7                                | 10uF                              | 0603                         | 10uF ±20% 25V Ceramic Capacitor X5R 0603 (1608 Metric)   | Murata Electronics North America | ZRB18AR61E106ME01L     | Digi-Key   | <a href="#">490-10991-1-ND</a>            |                |
| 6      | 1        | C10                                       | 1uf                               | 0603                         | 1uF ±20% 50V Ceramic Capacitor X5R 0603 (1608 Metric)  | Murata Electronics North America | GRT188R61H105ME13D     | Digi-Key   | <a href="#">490-12331-1-ND</a>            |                |
| 7      | 2        | C13, C14                                  | 18pF                              | 0603                         | 18pF ±5% 50V Ceramic Capacitor C0G, NP0 0603 (1608 Metric)   | Kemet                            | C0603C180J5GACAUTO     | Digi-Key   | <a href="#">399-16019-1-ND</a>            |                |
| 8      | 1        | D1  | Green                             | 0805 Polarized               | Green 570nm LED Indication - Discrete 2.2V 0805 (2012 Metric)  | OSRAM Opto Semiconductors Inc.   | LG R971-KN-1           | Digi-Key   | <a href="#">475-1410-1-ND</a>             |                |
| 9      | 1        | D2  | Red                               | 0805 Polarized               | Red 633nm LED Indication - Discrete 2V 0805 (2012 Metric)  | OSRAM Opto Semiconductors Inc.   | LS R976-NR-1           | Digi-Key   | <a href="#">475-1278-1-ND</a>             |                |
| 10     | 2        | D3, D5                                    | ACURA107-HF                       | SMA with A and K             | Diode Schottky 1000V 1A Surface Mount DO-214AC (SMA)   | Comchip Technology               | ACURA107-HF            | Digi-Key   | <a href="#">641-1884-1-ND</a>             |                |
| 11     | 1        | D4  | Yellow                            | 0805 Polarized               | LED YELLOW DIFFUSED 0805 SMD   | OSRAM Opto Semiconductors Inc.   | LY R976-PS-36          | Digi-Key   | <a href="#">475-2560-1-ND</a>             |                |
| 12     | 1        | D6  | Blue                              | 0805 Polarized               | Blue 470nm LED Indication - Discrete 3.3V 0805 (2012 Metric)   | Broadcom Limited                 | HSMN-C170              | Digi-Key   | <a href="#">516-1437-1-ND</a>             |                |
| 13     | 3        | I2C, P1, UART1                            | Header 4                          | HDR1X4                       | Header, 4-Pin  |                                  |                        |            |   |                |
| 14     | 1        | J1  | Vehicle Interface Cable Connector | DSUB1.385-2H15               | Receptacle Assembly, 15 Position, Right Angle  | Amphenol FCI                     | D15S33E4GV00LF         | Digi-Key   | <a href="#">609-1498-ND</a>               |                |
| 15     | 1        | Jumper                                    | WiFi Jumper                       | WiFi Jumper                  |  |                                  |                        |            |   |                |
| 16     | 4        | L1, L2, L3, L4                            | SLP3                              | PCBComponent_1               |  | Bivar Inc.                       | SLP3-150-250-R         | Digi-Key   | <a href="#">492-2517-ND</a>               |                |
| 17     | 1        | P2  | DNP GP-20U7 JST Header            | MHDR1X3                      | CONN HEADER PH SIDE 3POS 2MM SMD   | JST                              | S3B-PH-SM4-TB(LF)(SN)  | Digi-Key   | <a href="#">455-1750-1-ND</a>             |                |
| 18     | 1        | PTC1                                      | PTC RESTTBLE 0.75A                | 1812                         | PTC RESTTBLE 0.75A 33V CHIP 1812   | Bel Fuse Inc.                    | 0ZCG0075BF2B           | Digi-Key   | <a href="#">507-1765-1-ND</a>             |                |
| 19     | 8        | R1, R4, R7, R10, R18, R20, R21, R22       | 4.7k                              | 0603                         | ±1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric) Automotive AEC-Q200, High Voltage Thick Film          | Rohm Semiconductor               | KTR03EZPF4701          | Digi-Key   | <a href="#">RHM4.7KAYCT-ND</a>            |                |
| 20     | 4        | R2, R3, R19, R23                          | 330                               | 0603                         | 330 Ohms ±1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric) Automotive AEC-Q200, High Voltage Thick Film | Rohm Semiconductor               | KTR03EZPF3300          | Digi-Key   | <a href="#">RHM330AYCT-ND</a>             |                |
| 21     | 4        | R5, R6, R24, R25                          | 47                                | 0603                         | ±1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric) Automotive AEC-Q200, High Voltage Thick Film          | Rohm Semiconductor               | KTR03EZPF47R0          | Digi-Key   | <a href="#">RHM47AYCT-ND</a>              |                |
| 22     | 9        | R8, R9, R11, R12, R13, R16, R17, R26, R27 | 100k                              | 0603                         | ±1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric) Automotive AEC-Q200, High Voltage Thick Film          | Rohm Semiconductor               | KTR03EZPF1003          | Digi-Key   | <a href="#">RHM100KAYCT-ND</a>            |                |
| 23     | 2        | R14, R15                                  | DNP                               | 0603                         | RES SMD 47 OHM 1% 1/10W 0603   | Panasonic Electronic Components  | ERJ-3EKF47R0V          | Digi-Key   | <a href="#">P47.0HCT-ND</a>               |                |
| 24     | 1        | SPI1                                      | Header 6                          | HDR1X6                       | Header, 6-Pin  |                                  |                        |            |   |                |
| 25     | 2        | SW20, SW21                                | PB400                             | PB400                        | Pushbutton Switch DPST-NO Standard Through Hole, Right Angle   | E-Switch                         | PB400OAGR1BLK          | Digi-Key   | <a href="#">EG5548-ND</a>                 |                |
| 26     | 1        | Teensy 3.6                                | Teensy 3.6                        | Teensy 3.6 Surface Mount     | K66 Teensy 3.6 Kinetis MCU 32-Bit ARM® Cortex®-M4 Embedded Evaluation Board                            | PRUC                             | Teensy 3.6             | Digi-Key   | <a href="#">1568-1442-ND</a>              |                |
| 27     | 1        | TVS1                                      | Varistor 26V                      | Transfeed                    | 34.5V 80A Varistor 1 Circuit Surface Mount 0805 (2012 Metric)  | AVX                              | V2AF126C600Y2EDP       | Digi-Key   | <a href="#">478-10038-1-ND</a>            |                |
| 28     | 1        | U1  | OKI-78SR                          | OKI-78SR                     | 5V DC/DC Converter (7805 replacement)  | Murata Power Solutions Inc.      | OKI-78SR-5/1.5-W36H-C  | Digi-Key   | <a href="#">811-2692-ND</a>               |                |
| 29     | 1        | U2  | NCV7356D1R2G                      | ONSC-SOIC-8-751-07_V         | Single Wire CAN Transceiver, 5 to 27 V, 8-Pin SOIC, Pb-Free, Tube                                      | On Semiconductor                 | NCV7356D1R2G           | Digi-Key   | <a href="#">NCV7356D1R2GOSCT-ND</a>       |                |
| 30     | 1        | U3  | 74AHCT1G14                        | SOT-353                      | IC SCHMIT-TRIGG INV GATE SOT353  | Diodes Incorporated              | 74AHCT1G14SE-7         | Digi-Key   | <a href="#">74AHCT1G14SE-7DICT-ND</a>     |                |
| 31     | 1        | U4  | SN75HVD08DR                       | SOIC-SN8_N                   | IC RS485 TXRX 3/5V 8-SOIC  | Texas Instruments                | SN75HVD08DR            | Digi-Key   | <a href="#">296-37893-1-ND</a>            |                |
| 32     | 3        | U5, U8, U9                                | MCP2558                           | TDFN                         | Microchip CAN FD Transceiver with Silent Mode  | Microchip Technology, Microchip  | MCP2558FDT-H/MNY       | Digi-Key   | <a href="#">MCP2558FDT-H/MNYCT-ND</a>     |                |
| 33     | 1        | U6  | ADG1634BCPZ-REEL7                 | ADI-CP-20-4_N                | IC SWITCH QUAD SPDT 20LFCSP  | Analog Devices                   | ADG1634BCPZ-REEL7      | Digi-Key   | <a href="#">ADG1634BCPZ-REEL7CT-ND</a>    |                |
| 34     | 1        | U7  | MCP2003A-E/SN                     | SOIC-SN8_N                   | LIN J2602 Transceiver, 8-Pin SOIC, Extended Temperature, Tape and Reel                                 | Microchip Technology             | MCP2003A-E/SN          | Digi-Key   | <a href="#">MCP2003A-E/SN-ND</a>          |                |
| 35     | 1        | U10                                       | DNP BTS141TC                      | INF-PG-TO263-3-2_N           | Smart Low-Side Power Switch HITFET, 60 V VDS, 12 A ID, -40 to 150 degC, PG-TO263-3-2, Reel, Green      | Infineon                         | BTS141TCBUMA1          | Digi-Key   | <a href="#">BTS141TCBUMA1CT-ND</a>        |                |
| 36     | 1        | U11                                       | ATML-ATWINC1500-MR210PA-28        | ATML-ATWINC1500-MR210PA-28_V | SMARTCONNECT ATWINC1500B-MU-T MO   | Microchip Technologies           | ATWINC1510-MR210PB1140 | Digi-Key   | <a href="#">ATWINC1510-MR210PB1140-ND</a> |                |
| 37     | 1        | U12                                       | MOCD207R2M                        | SOIC-8                       | Optoisolator Transistor Output 2500Vrms 2 Channel 8-SO Tall  | Fairchild/ON Semiconductor       | MOCD207R2M             | Digi-Key   | <a href="#">MOCD207R2MCT-ND</a>           |                |
| 38     | 1        | U13                                       | NCP1117LPST33                     | SOT-223                      | Linear Voltage Regulator IC Positive Fixed Output 3.3V 1A SOT-223                                      | On Semiconductor                 | NCP1117LPST33T3G       | Digi-Key   | <a href="#">NCP1117LPST33T3GOSCT-ND</a>   |                |
| 39     | 1        | U14                                       | MCP2517FD                         | SOP14                        | CANbus Controller CAN 2.0 SPI Interface 14-VDFN (4.5x3)  | Microchip Technology             | MCP2517FDT-H/JHA       | Digi-Key   | <a href="#">MCP2517FDT-H/JHACT-ND</a>     |                |
| 40     | 1        | U15                                       | ATECC608A                         | SOIC-8                       | Authentication Chip IC Networking and Communications 8-SOIC  | Microchip Technology             | ATECC608A-SSHCHZ-T     | Digi-Key   | <a href="#">ATECC608A-SSHCHZ-TCT-ND</a>   |                |
| 41     | 1        | USB1                                      | UX60SC-MB-5S8                     | USB Mini UX60S               | USB - mini B USB 2.0 Receptacle Connector 5 Position Surface Mount, Right Angle; Through Hole          | Hirose                           | UX60SC-MB-5S8          | Digi-Key   | <a href="#">H11589CT-ND</a>               |                |
| 42     | 1        | X1  | 16MHz                             | XTAL 2 pad                   | CRYSTAL 16MHZ 18PF SMD   | TXC CORPORATION                  | 7A-16.000MAAJ-T        | Digi-Key   | <a href="#">887-1086-1-ND</a>             |                |
| 43     | 1        | Z1  | SMA6J                             | SMA                          | TVS DIODE 20VWM 36.8VC SMA   | Micro Commercial Co              | SMA6J24CA-TP           | Digi-Key   | <a href="#">SMA6J24CA-TPMSTCT-ND</a>      |                |