

| LFEV 2015 - TSV | | Bill of Materials | | | | |
|-----------------|----------------------|-------------------|---|--|--------------------------------------|----------|
| AMS BOARDS | | | | | | |
| Manufacturer | Part Number | Quantity | Description | Use in System | Purchased or in Supply | Cost |
| 4PCB | 4048778 | 30 | Advanced Circuits PCB 30 AMS Boards | Physical AMS Board | Purchased | \$269.84 |
| DigiKey | LT1307BCS8#PBF | 5 | IC REG BOOST ADJ 0.1A 8SOIC | U2 | Purchased | \$37.35 |
| Mouser | MCP1825S-3302E/DB | 25 | Microchip LDO Voltage Regulators 500 mA CMOS LDO | U3 | Purchased | \$15.34 |
| Mouser | 567-173-7-220P | 17 | Wakefield Thermal Interface Products T0-220 .007" GRAY | Thermal Pads used to interface RPOW and Q1 to the heat sink | Purchased | \$7.14 |
| Mouser | 859-LTV-357T | 20 | Optocoupler | U6 | Purchased | \$3.80 |
| McMaster Carr | 91772A108 | 1 pack of 100 | 4-40x3/8 SS Phillips Pan head | Screws used to attach RPOW and Q1 to the heat sink | Purchased | \$4.30 |
| Mouser | 634-SI8600AB-B-IS | 43 | 2.5 kV Bidirectional I2C Isolator Interface | U7 | Purchased | \$134.44 |
| DigiKey | MCP9700T-E/TTCT-ND | 30 | IC SENSOR THERMAL 2.3V SOT23-3 | U5 (A or B) | Purchased | \$6.30 |
| Mouser | 579-PIC16LF1827-I/SO | 28 | 8-bit Microcontrollers - MCU 7KB Flash 384 byte 32 MHz Int. Osc | U4 | Purchased | \$28.06 |
| DigiKey | RMCF0805FT20K0CT-ND | 52 | RES SMD 200K OHM 1% 1/8W 0805 | R11 | Purchased | \$1.20 |
| DigiKey | MCP6242-E/SN-ND | 30 | IC OPAMP GP 550KHZ RRO 8SOIC | U1 | Purchased | \$9.00 |
| Mouser | 652-SRN8040-100M | 30 | Fixed Inductors 10uH 20% SMD 8040 | L1 | Purchased | \$11.96 |
| Mouser | 538-70543-0040 | 45 | Headers & Wire Housings VERTICAL HDR 6P single row | J2 & J3 | Purchased | \$33.25 |
| Mouser | 532-7721-7PPS | 15 | Insul Shoulder Washer (for No. 4 screw) | Thermal Fastener used on screws which connect RPOW and Q1 to the heat sink | Purchased | \$2.70 |
| DigiKey | 450-1759-1-ND | 50 | SWITCH TACTILE SPST-NO 0.05A 24V | SW1 | Purchased | \$13.50 |
| DigiKey | TIP102TU-ND | 11 | TRANS NPN DARL 100V 8A TO-220 | Q1 | Purchased | \$9.00 |
| McMaster Carr | 91831A005 | 1 pack of 100 | 4-40 SS Nut package | Nuts used with screws connecting RPOW and Q1 to heat sink | Purchased (some in supply from 2014) | \$4.07 |

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| DigiKey | 475-2560-1-ND | 40 | LED CHIPLED 588NM YLW 0805 SMD | D3 | Purchased | \$2.88 |
| DigiKey | 475-1278-1-ND | 30 | LED CHIPLED 633NM RED 0805 SMD | D2 | Purchased | \$2.19 |
| DigiKey | MBR0520LCT-ND | 12 | Diode Schottky 20V 500MA SOD123 (D1) | D1 | Purchased | \$3.99 |
| DigiKey | 587-1300-1-ND | 100 | CAP CER 10UF 10V 10% X5R 0 | C4, C5, C9 | Purchased | \$6.65 |
| DigiKey | 490-1691-1-ND | 50 | CAP CER 1UF 16V 10% X7R 08 | C3, C11 | Purchased | \$2.62 |
| DigiKey | 655K-ND | 3 | Banana Plug | Banana Jacks used to plug AMS boards into aluminum bars | Purchased (some in supply from 2014) | \$6.57 |
| DigiKey | 475-1410-1-ND | 30 | LED CHIPLED 570NM GREEN 0805 SMD | D4 | Purchased | \$2.07 |
| DigiKey | 311-1.02MCRCT-ND | 250 | RES 1.02M OHM 1/8W 1% 0805 SMD | R3 | In Supply | \$0.00 |
| DigiKey | RMCF0805FT324KCT-ND | 250 | RES 324K OHM 1/8W 1% 0805 | R4 | In Supply | \$0.00 |
| DigiKey | P100KDACT-ND | 50 | RES 100K OHM 1/8W 1% 0805 SMD | R5 | In Supply | \$0.00 |
| DigiKey | 541-10.0KCCT-ND | 1000 | RES 10.0K OHM 1/8W 1% 0805 SMD | R2, R10, R12, R13 | In Supply | \$0.00 |
| DigiKey | P1.0KACT-ND | 250 | RES 1.0K OHM 1/8W 5% 0805 SMD | R14 | In Supply | \$0.00 |
| DigiKey | RMCF0805FT470RCT-ND | 250 | RES 470 OHM 1/8W 1% 0805 SMD | R1, R6, R7, R9 | In Supply | \$0.00 |
| DigiKey | 311-1126-ND | 100 | CAP CER 680PF 50V 10% X7R 0805 | C2 | In Supply | \$0.00 |
| DigiKey | RMCF0805FT383RCT-ND | 250 | RES 383 OHM 1/8W 1% 0805 SMD | R8 | In Supply | \$0.00 |
| DigiKey | 399-7367-2-ND | 100 | CAP CER 0.1UF 50V 10% X7R 0805 | C1, C6, C7, C8, C9, C10 | In Supply | \$0.00 |
| Mouser | 652-PWR220T-20-R750F | 10 | TO-220 Resistor 20watt 0.75ohms 1% | RPOW | Purchased | \$40.00 |
| Mouser | 567-657-15ABPN | 10 | TO-220 Vertical Board Mount Heatsink | Heat Sink | Purchased | \$13.10 |
| Mouser | 538-50-57-9706 | 20 | 6-PIN SL Locking Plug w/TPA | for J2 & J3 wire connects | Purchased | \$15.00 |
| Mouser | 538-73838-0006 | 20 | 6-PIN SL TPA Piece | for J2 & J3 wire connects | Purchased | \$5.20 |
| Mouser | 538-16-02-0096 | 100 | SL Socket 24-30 AWG | for J2 & J3 wire connects | Purchased | \$6.00 |
| BREAKOUT BOARD | | | | | | |
| Manufacturer | Part Number | Quantity | Description | Use in System | Purchased or in Supply | Cost |

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| DigiKey | P100KACT-ND | 50 | RES SMD 100K OHM 5% 1/8W 0805 | R3, R8, R12 | Purchased | \$5.00 |
| DigiKey | 160-1339-1-ND | 10 | OPTOISOLATOR 3.75KV TRANS 4-SOP | U3,U9, U10 | Purchased | \$3.65 |
| DigiKey | 490-8307-1-ND | 10 | CAP CER 0.02UF 50V 5% NP0 0805 | C15 | Purchased | |
| DigiKey | RMCF0805FT10K0CT-ND | 50 | RES SMD 10K OHM 1% 1/8W 0805 | R1, R2, R14, R15, R16, R17, R18 | Purchased | \$5.00 |
| DigiKey | 390-1133-ND | 5 | DGTL ISO 2.5KV 2CH CAN 16SOIC | | Purchased | \$26.30 |
| DigiKey | 576-1220-ND | 5 | IC REG BUCK 3.3V 1A 8SOIC | U18 | Purchased | \$25.71 |
| DigiKey | LTC4151CMS#PBF-ND | 5 | IC CURRENT MONITOR(12BIT) 10MSOP | | Purchased | \$27.75 |
| DigiKey | B260A-FDICT-ND | 10 | DIODE SCHOTTKY 60V 2A SMA | D2, D6, D7 | Purchased | \$3.68 |
| DigiKey | 296-8439-1-ND | 5 | IC BUFF/DVR HEX NON-INV 14SSOP | | Purchased | \$2.40 |
| DigiKey | ADM1232ARNZ-ND | 4 | IC SUPERVISOR FOR CPU 8SOIC | U11 | Purchased | \$9.32 |
| DigiKey | P1.0KACT-ND | 100 | RES SMD 1K OHM 5% 1/8W 0805 | R4, R9 | Purchased | \$5.98 |
| DigiKey | P2.00KCCT-ND | 100 | RES SMD 2K OHM 1% 1/8W 0805 | R5, R6 | Purchased | \$6.44 |
| DigiKey | 493-2192-1-ND | 25 | CAP ALUM 220UF 25V 20% SMD | C6, C16, C17 | Purchased | \$12.75 |
| DigiKey | 811-2478-1-ND | 25 | FIXED IND 68UH 200MA 2.55 OHM | L2, L3 ,L4 | Purchased | \$8.00 |
| DigiKey | A98333-ND | 20 | TERM BLOCK 2POS SIDE ENT 2.54MM | | Purchased | \$15.98 |
| DigiKey | 576-1221-1-ND | 5 | IC REG BUCK 5V 1A 8SOIC | U6, U19 | Purchased | \$20.30 |
| DigiKey | MCP6242-E/SN-ND | 6 | IC OPAMP GP 550KHZ RRO 8SOIC | U14, U16, U20 | Purchased | \$2.58 |
| DigiKey | 568-4569-5-ND | 3 | IC GATE NOR 2CH 4-INP 14-SO | U8 | Purchased | \$1.71 |
| DigiKey | AT90CAN32-15AZCT-ND | 4 | IC MCU 8BIT 32KB FLASH 64TQFP | U2 | Purchased | \$47.40 |
| DigiKey | A98334-ND | 10 | TERM BLOCK 3POS SIDE ENT 2.54MM | | Purchased | \$12.40 |
| DigiKey | 887-1081-1-ND | 4 | CRYSTAL 12MHZ 18PF SMD | Y1 | Purchased | \$3.16 |
| DigiKey | A103799CT-ND | 10 | RES SMD 1.5M OHM 0.1% 1/10W 0805 | R13 | Purchased | \$6.50 |
| DigiKey | 1276-1130-1-ND | 10 | CAP CER 30PF 50V 5% NP0 0805 | C1, C2 | Purchased | \$2.50 |
| DigiKey | P1.5KDACT-ND | 50 | RES SMD 1.5K OHM 0.1% 1/8W 0805 | R11, R17 | Purchased | \$31.50 |
| DigiKey | 1276-2908-1-ND | 10 | CAP CER 22UF 25V 20% X5R 0805 | C5, C11, C12 | Purchased | \$11.30 |

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| DigiKey | RHM470KCT-ND | 50 | RES SMD 470 OHM 5% 0.4W 0805 | R10 | Purchased | \$5.00 |
| DigiKey | 1N4148WXTPMSCCT-ND | 10 | DIODE GEN PURP 75V 150MA SOD323 | D3, D4, D5 | Purchased | \$1.40 |
| DigiKey | WM4826-ND | 5 | CONN HDR VERT 4POS .100 TIN | P2 | Purchased | \$5.05 |
| DigiKey | Z945-ND | 3 | RELAY GENERAL PURPOSE SPST 5A 5V | | Purchased | \$17.28 |
| PCB | xx | 4 | Custom Breakout Board PCB | BoB | Purchased by Professor Nadovich | XX |

LCD

| Manufacturer | Part Number | Quantity | Description | Use in System | Purchased or in Supply | Cost |
|--------------|------------------|----------|--------------------------------|---------------|------------------------|--------|
| DigiKey | WM2902-ND | 10 | CONN HOUSING 4POS .100 W/LATCH | LCD | Purchased | \$2.55 |
| DigiKey | WM2571-ND | 50 | CONN TERM FEMALE 24-30AWG TIN | LCD | Purchased | \$6.85 |
| DigiKey | MCP9700A-E/TO-ND | 5 | IC SENSOR THERMAL 2.3V TO-92-3 | LCD | Purchased | \$1.85 |

PACK PARTS

| Manufacturer | Part Number | Quantity | Description | Use in System | Purchased or in Supply | Cost |
|--------------|-------------------|----------|--|----------------------------|------------------------|---------|
| Mouser | 579-MCP9700A-E/TO | 4 | Board Mount Temperature Sensors Lin Active Therm | Ambient Temperature Sensor | Purchased | \$1.48 |
| Mouser | 651-3001682 | 3 | MT1.5 Twin DIN Rail Terminal Block | DIN Rail Component | Purchased | \$13.86 |
| Mouser | 651-1421659 | 4 | DIN 15 End Clamp | DIN Rail Component | Purchased | \$5.12 |
| Mouser | 651-3100305 | 20 | MT1.5 Feed-Thru DIN Rail Terminal Block | DIN Rail Component | Purchased | \$52.40 |
| Mouser | 651-1402940 | 6 | MBK5/EZ Feed-Thru DIN Rail Terminal Block | DIN Rail Component | Purchased | \$18.90 |
| Mouser | 504-BK/HKP-R | 6 | Fuse Holder 1/4 X 1-1/4 PANEL MOUNT | Fuse Mount - CHR+/+ | Purchased | \$28.32 |
| Mouser | 504-C10G0.5 | 6 | Fuse, Bussman .5A/500V | Fuse | Purchased | \$79.56 |
| Mouser | 5912-4414FD | 2 | DC Fans Axial 119x119x25mm 100cfm 24VDC 43dBA | Fan | Purchased | \$67.16 |
| Mouser | 562-0945030 | 2 | Fan Accessories BLK FLTR ASSM 4.65" | Fan Filter | Purchased | \$4.46 |
| Mouser | 562-09123-G | 3 | Fan Accessories PLASTIC GUARD 120MM | Fan Grate | Purchased | \$3.63 |

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| Mouser | 653-MGN1C-DC24 | | 3 | General Purpose Relays SHRT BASE SPDT 24VDC | Pack Relay | Purchased | \$78.12 |
| Mouser | 571-14807030 | | 50 | Pin & Socket Connectors CAP HOUSE 4 POS | Safety Loop Connector | Purchased | \$9.50 |
| Mouser | 571-14807050 | | 50 | Pin & Socket Connectors CAP HOUSE 6 POS | GLV PD Connector | Purchased | \$11.50 |
| Mouser | 571-32950 | | 25 | Terminals RING TONGUE 22-16 MIL 6 | Wire Terminal | Purchased | \$7.25 |
| Mouser | 538-19070-0121 | | 25 | Insul. Ring Terminal, 10-12 AWG, #8/M4 stud | Wire Terminal | Purchased | \$5.00 |
| Mouser | 571-35492 | | 10 | Insul. Ring Terminal, 12-10 AWG #1/4 /M6 stud | Wire Terminal | Purchased | \$4.30 |
| Mouser | 879-1470G1 | | 4 | Heavy Duty Power Connectors PP PAK 2-4P HSG SNAP-IN RECEPT | Safety Loop Dummy Plug Connector | Purchased | \$8.40 |
| Mouser | 879-1327FP | | 3 | Heavy Duty Power Connectors PP15/45 FINGERPROOF HOUSING ONLY, RED | Power Plug Housing | Purchased | \$2.55 |
| Mouser | 879-1327G6FP | | 3 | Heavy Duty Power Connectors PP15/45 FINGERPROOF HOUSING ONLY, BLACK | Power Plug Housing | Purchased | \$2.46 |
| Mouser | 879-269G1-LPBK | | 3 | Heavy Duty Power Connectors PP30 HD LOOSE CONT #12-16 AWG | Power Plug Housing | Purchased | \$2.10 |
| Mouser | 879-4827G6 | | 3 | Heavy Duty Power Connectors PPMX 2-PIECE BLACK HOUSING ONLY | Signal Housing | Purchased | \$2.40 |
| Mouser | 879-261G2 | | 25 | Heavy Duty Power Connectors PP45 REELED CONTACT #10- 14 AWG, TIN | Housing Contacts | Purchased | \$4.00 |
| Mouser | 651-5602099 | | 1 | 15mm DIN Rail Perf | DIN Rail | Purchased | \$9.64 |
| Mouser | 651-3100321 | | 3 | MT1.5 End Plate | End Plate | Purchased | \$2.34 |
| Mouser | 651-1421659 | | 4 | Terminal Block Tools & Accessories END BRACKET FOR NS15 | End Bracket for DIN Rail | Purchased | \$5.12 |
| Mouser | 651-1725711 | | 2 | Fixed Terminal Blocks 8P 2.54mm 90DEG | Used in old BoB | Purchased | \$10.80 |
| Mouser | 651-1725656 | | 3 | Fixed Terminal Blocks 2P 2.54mm 90DEG | Used in old BoB | Purchased | \$4.26 |
| Mouser | 651-1725669 | | 4 | Fixed Terminal Blocks 3P 2.54mm 90DEG | Used in old BoB | Purchased | \$8.64 |
| Mouser | 571-3506891 | | 100 | Pin & Socket Connectors SOCKET 24-18 AWG | Socket Connectors | Purchased | \$9.20 |
| Mouser | 571-3506901 | 100 | | Pin & Socket Connectors PIN 24-18 AWG | Socket Connectors | Purchased | \$8.80 |