

## **Cyanosense 2.0 Bill of Materials**

This is the Finalized Bill of Materials for Cyanosense 2.0. Note that the Prices are based on the EXACT number to build the Prototype, unless noted otherwise. Tax and any shipping costs are NOT included. The total cost to build the Prototype was \$1,300.33, which is over two times cheaper than Cyanosense 1.0.

| <u><b>Item</b></u>  | <u><b>QTY</b></u> | <u><b>Price</b></u> | <u><b>Link</b></u>   | <u><b>Reason</b></u>                         |
|---|-------------------|---------------------|--|--|
| <b><i>Electronics Parts</i></b>                           |                   |                     |  |  |
| Hamamatsu C12880MA Micro-Spectrometer                     | 2<br>(\$350 Each) | \$700               | <a href="#">BO-HAMA-C12880-V2-SENSOR GroupGets LLC   Development Boards, Kits, Programmers   DigiKey</a> | Spectrometers for Cyanosense 2.0             |
| TLP3556A Photorelay                                       | 1                 | \$4.20              | <a href="#">TLP3556A(TP1,F Toshiba   Mouser</a>  | Turns Sensors On and Off                     |
| ROCKBLOCK 9603 Iridium Satellite Modem                    | 1                 | \$299.95            | <a href="#">RockBLOCK 9603 with USB Cable - Iridium Satellite Modem Bundle : ID 4521 Adafruit</a>        | Satellite Communication to Transfer Lab Data |
| ROCKBLOCK 9603 Accessory Cable                            | 1                 | \$4.95              | <a href="#">RockBLOCK 9603 Accessory Cable : ID 4529 : Adafruit</a>                                      | Adaptor Cable to ESP Interface               |
| M1600HCT-P-SMA Iridium Passive Antenna                    | 1                 | \$64.95             | <a href="#">Iridium/GPS/GLONASS Passive Antenna - GPS-16838 - SparkFun</a>                               | Antenna for the Iridium Modem                |
| SMA Male with Waterproof Ring SMA Female Bulkhead Antenna | 1                 | \$3.63              | <a href="#">RedYutou SMA Male to with Waterproof Ring SMA Female Bulkhead nut o-Ring RG316</a>           | Antenna Cable for Iridium Modem              |

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| Cable 30cm   |                 |         |   |   |
| ESP32-S2 Saola Dev Kit   | 1               | \$14.50 | <a href="#">ESP32-S2 Saola 1R Dev Kit featuring ESP32-S2 WROVER : ID 4693 Adafruit</a>  | Microcontroller for the system  |
| DS3231 Real Time Clock   | 1               | \$3.80  | <a href="#">Wishiot DS3231 Real Time Clock Module High Precision (amazon.com)</a>   | RTC to control wakeup and sleep for ESP32-S2                                |
| DIYHZ 1P2T SPFT Vertical Slide Switch  | 1               | \$0.09  | <a href="#">Amazon.com: DIYhz 100Pcs High Knob 3 Pin 2 Position 1P2T SPDT Vertical Slide Switch with PCB Panel for Arduino, 0.5 Amp, 50V DC, 2 mm</a> | Slide Switch used to put ESP32-S2 to Download Data Mode or Normal Operation |
| Voltaic 2 Watt Solar Charger Kit (Includes Voltaic V25 Battery, 2W Solar Panel, and adaptor) | 1               | \$59.99 | <a href="#">2 Watt Solar Panel Kit with USB Battery Pack (voltaicsystems.com)</a>   | Solar Panel and Battery   |
| 0.5ft Micro USB Cable to USB   | 1               | \$4.99  | <a href="#">CableCreation Short USB to Micro USB Cable 0.5 FT, USB2.0 Micro USB (amazon.com)</a>  | Connects ESP32-S2 to Battery  |
| SchmalzTech Premium 470 Position Breadboard ST-BB-   | 2 (\$8.99 Each) | \$17.98 | <a href="#">SchmalzTech Premium 470 Position Breadboard</a>   | Breadboard for System   |

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| 470   |   |                     |  |                                |
| Jumper Wire Kit   | 1 | \$11.99 (Not Exact) | <a href="#">560 Pieces Jumper Wire Kit 14 Lengths Assorted Preformed Breadboard Jumper Wire Amazon.com</a>   | Wires for Breadboard           |
| 120pcs 10cm Breadboard Jumper Wires Assorted Kit                | 1 | \$6.98 (Not Exact)  | <a href="#">Amazon.com: EDGELEC 120pcs 10cm Breadboard Jumper Wires Assorted Kit</a>   | Jumper Wires for RTC           |
| 120pcs 40cm Breadboard Jumper Wires Assorted Kit                | 1 | \$11.99 (Not Exact) | <a href="#">Amazon.com: EDGELEC 120pcs 40cm Breadboard Jumper Wires Assorted Kit</a>   | Jumper Wires for Spectrometers |
| <b>Mechanical Parts</b>   |   |                     |  |                                |
| TICONN Waterproof Electrical Junction Box IP67 (5.9"x5.9"x3.5") | 1 | \$19.99             | <a href="#">TICONN Waterproof Electrical Junction Box IP67 ABS Plastic Enclosure with Hinged Cover with Mounting Plate, Wall Brackets, Cable Glands (Off-White, 5.9"x5.9"x3.5") (amazon.com)</a> | Electronics Housing            |
| 3/4in PVC 1-Gang Type FSE Box                                   | 1 | \$7.68              | <a href="#">Kraloy 1-Gang Gray PVC Weatherproof New Work/Old Work Standard Rectangular</a>   | Sensor Housing                 |

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|   |   |        | <a href="#">Exterior Electrical Box in the Electrical Boxes department at Lowes.com</a>  |   |
| TayMac 1-Gang Rectangle Plastic Weatherproof Electrical Box Cover | 1 | \$3.58 | <a href="#">TayMac 1-Gang Rectangle Plastic Weatherproof Electrical Box Cover in the Electrical Box Covers department at Lowes.com</a>             | Cover for Sensor Housing                                    |
| CANTEX 3/4in 10ft Schedule 40 PVC Conduit                         | 1 | \$2.06 | <a href="#">CANTEX 3/4-in x 10-ft Non-metallic Schedule 40 PVC Conduit in the Conduit department at Lowes.com</a>                                  | Used to Connect Sensor and Electronic Housings. Cut to 2ft. |
| CANTEX 3/4in Schedule 40 PVC Bushing Connector Conduit Fitting    | 1 | \$0.60 | <a href="#">CANTEX 3/4-in Schedule 40 Schedule 80 PVC Bushing Connector Conduit Fittings in the Conduit Fittings department at Lowes.com</a>       | Attaches PVC Pipe to Electronics Housing                    |
| Sigma ProConnex 3/4-in Zinc-plated Steel Conduit Locknut          | 1 | \$0.39 | <a href="#">Sigma ProConnex 3/4-in Zinc-plated Steel Conduit Locknut Conduit Fittings (2-Pack) in the Conduit Fittings department at Lowes.com</a> | Screws the Bushing Connector to the Electronics Housing     |

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| Hillman 1-in Zinc-plated Standard Flat Washer                                       | 1 | \$0.78             | <a href="#">Hillman 1-in Zinc-plated Standard Flat Washer in the Flat Washers department at Lowes.com</a>                         | Adds Support to the Inside of the Electronics Housing to prevent flex |
| 1-1/2 Inch Oversize Union Washer Flat Plumbing Slip Joint Washer Rubber Flat Washer | 1 | \$0.30             | <a href="#">Amazon.com: 30 Pack 1-1/2 Inch Oversize Union Washer Flat Plumbing Slip Joint Washer Rubber Flat Washer</a>           | Waterproofs Electronics Box to Pipe Connection                        |
| Uxcell M3x30mm Round Aluminium Column Standoffs                                     | 4 | \$4.60             | <a href="#">Amazon.com: uxcell 10Pcs M3 x 30mm Round Aluminum Column Alloy Standoff</a>   | Standoff to Support Top Layer in Electronics Box                      |
| Uxcell M3x16mm Thumb Screws   | 4 | \$5.20             | <a href="#">Amazon.com: uxcell M3x16mm Knurled Head Thumb Screws Black 10pcs</a>  | Thumb Screws to screw down Top Layer                                  |
| Hillman 4/40 Hex Machine Nuts   | 4 | \$0.24             | <a href="#">Hillman 140009 Hex Machine Screw Nuts, 4-40, Zinc, 100 Piece: Amazon.com</a>  | Nuts to screw Solar Panel   |
| M3x Screws  | 4 | \$0.94             | <a href="#">Amazon.com: uxcell M3x10mm Machine Screws Pan Phillips Cross Head Screw 304 Stainless Steel Fasteners Bolts 30Pcs</a> | Screws Standoffs to Mounting Plate in Electronics House               |
| Microscope Cover Glass Slips  | 2 | \$8.99 (Not Exact) | <a href="#">MOTUO 50 Pieces Microscope Slides and</a>   | Cover Glass (20mm x 20m x   |

|                      |   |                     |   |   |
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|                      |   |                     | <a href="#">100pcs Pre-Cleaned 20mm x 20mm Microscope Cover Slips Glass Amazon.com</a>  | 0.13-0.17mm) were used as the lens for the Sensor Housing   |
| GE Advanced Silicone | 1 | \$14.99 (Not Exact) | <a href="#">GE Advanced Silicone Window And Door Sealant Clear, 2.8 Oz. (amazon.com)</a>  | Sealed Solar Panel and Cable for Waterproofing. Was also used to attach glass lends in Sensor Hosuing |
| Miscellaneous        | 1 | \$20 (Not Exact)    | This Covers TPU Material used for 3D Printed FOV Adaptor, PETG Material Used for the other 3D Printed Parts, and Foam Pads used for Battery |   |
| Total Cost:          |   | \$1,300.33          |   |   |