

## **BILL OF MATERIALS**

Cost Associated with Payload Electronic Component					
Designator on Schematics	Description	Qty	Supplier	Supplier Unit Price (AUD)	Total Price (AUD)
Components on the PCB					
C1_SW2, C2_SW2, C_M2, C_S2, C_SW1	CAP CER 0.1UF 50V X7R 0603	5	Newark	0.0303	0.1515
C_G1	CAP CER 0.027UF 50V X7R 0805	1	Arrow Electronics	0.01636	0.01636
C_A1	CAP CER 0.1UF 16V X7R 0402	1	Newark	0.00909	0.00909
C_M1	Multilayer Ceramic Capacitors 22μF ±20% 10V X5R SMD 0805	1	Newark	0.18029	0.18029
C_S1	CAP CER 4.7UF 6.3V X5R 0603	1	Mouser	0.1818	0.1818
C_U1	CAP CER 0.1UF 200V 10% X7R 1206	1	Newark	0.10302	0.10302
C_V1	CAP CER 4.7UF 10V X5R 0402	1	Newark	0.13938	0.13938
C_V2, C_V3, C_V4	CAP CER 10UF 6.3V X5R 0402	3	Mouser	0.22725	0.68175
D1, D2, D3	TVS DIODE 6V 10.3V DO214AA	3	Newark	0.14847	0.44541
J1	Male Header, Pitch 2 mm, 1 x 2 Position, Height 5.5 mm, -25 to 85 deg C, RoHS, Tape and Reel	1	Digikey	0.61	0.61
J2	Micro-USB B Receptacle, Right Angle, Bottom Mount, Surface Mount, with Solder Tabs, -30 to 85 deg C, 5-Pin USB, RoHS, Tape and Reel	1	Arrow Electronics	0.56055	0.56055
J3	CONN MICRO-D PLUG 9POS R/A SLDR	1	Arrow Electronics	17.61	17.61
J4	CONN MICRO SD CARD PUSH-PULL R/A	1	Newark	1.77	1.77

L_G1	Wire Wound RF Inductor 27nH $\pm 2\%$ 440mA 0.21 $\Omega$ 0603 (1608)	1	Mouser	0.22725	0.22725
L_V1	Fixed Inductors 2.2uH Shld 20% 5.5A 38.7mOhms AECQ2	1	Mouser	3.58	3.58
Q1, Q2	NPN TRANSISTOR 1.5A 40V SOT-23 R	2	Digikey	0.43935	0.8787
R 2	RES 100K OHM 1% 1/16W 0402	1	Newark	0.00606	0.00606
R_G1	RES 100 OHM	1	Arrow Electronics	0.00773	0.00773
R_S1	RES 22K OHM	1	Newark	0.00455	0.00455
R_S2, R_S4	RES Thick Film, 100 $\Omega$ , 5%, 0.1W, 200ppm/ $^{\circ}$ C, 0603	2	Digikey	0.1515	0.303
R_S3	RES SMD 47K OHM 5% 1/10W 0603	1	Newark	0.00455	0.00455
R_S5	RES 10K OHM	1	Newark	0.00455	0.00455
R_S6, R_SW2	RES Thick Film, 10k $\Omega$ , 5%, 0.125W, 200ppm/ $^{\circ}$ C, 0805	2	Digikey	0.1515	0.303
R_S7, R_S8	Chip Resistor, 0 Ohm, Jumper, +/- 5%, 0.125 W, -55 to 155 deg C, 0805 (2012 Metric), RoHS, Tape and Reel	2	Mouser	0.02424	0.04848
R_SH1, R_SH2	RES 10K OHM	2	Newark	0.00303	0.00606
R_V1	RES Thick Film, 453k $\Omega$ , 1%, 0.063W, 100ppm/ $^{\circ}$ C, 0402	1	Mouser	0.1515	0.1515
SW1, SW2	SWITCH TACTILE SPST-NO 0.05A 24V	2	Digikey	0.68175	1.3635
U1	ESP 32 WROOM 32 D WIFI MODULE 32MBITS SPI FLASH	1	Digikey	7.21	7.21
U2	RX TXRX MODULE ISM < 1GHZ SMD	1	Digikey	21.88	21.88
U3	U-Blox M8 Concurrent Gnss Module, 3.6 V, -40 to 85 deg C, 24-Pin SMD, RoHS, Tape and Reel	1	Mouser	47.72	47.72
U4	3-axis Gyroscope, Accelerometer and a Digital Motion Processor(TM) (DMP), 2.375 to 3.46 V, -40 to 85 deg C, 24-pin QFN, RoHS, Tape and Reel	1	Digikey	13.2	13.2

U5	IC REG BUCK ADJ 2A SOT23-5	1	Arrow Electronics	0.64539	0.64539
U6	IC BRIDGE USB TO UART 28QFN	1	Digikey	7.46	7.46
UFL1, UFL2	Ultra-Small Coaxial Connector, 6 GHz, -40 to 90 deg C, 3-Pin SMD, RoHS, Bulk	2	Newark	1.31	2.62
Other Misc. & connectors					
B1	BATTERY 3.7V 2000mAH	1	Core Electronics	17.55	17.55
W1	UFL TO SMA CONNECTOR	2	DigiKey	5.99	11.98
A1	HELICAL ANTENNA	2	Mouser Electronics	98.42	196.84
PCB	PCB FABRICATION AND MANUFACTURING	1	PCBWay	25.97	25.97
<b>Total Cost</b>					<b>382.417</b>

<b>Cost Associated with Radio Triangulation Base Station</b>					
<b>Designator on Schematics</b>	<b>Description</b>	<b>Quantity</b>	<b>Supplier</b>	<b>Supplier Unit Price (AUD)</b>	<b>Total Price (AUD)</b>
U1	LP963450  Lithium Polymer Battery 3.7V,  1800mAh	2	Amazon	18.88	37.76
U2	TLV62569DBVR Voltage Regulator	2	Digikey	0.74	1.48
U3	ESP-WROOM-32 Devkit	2	Amazon	24.69 (pack of 2)	24.69
U4	RFM95W-915S2R LoRa, 868/915 MHz, +20 dBm - 100 mW,	2	Digikey	\$35.33	70.66
U5	U-Blox M8 Concurrent Gnss Module, 3.6 V, -40 to 85 deg C, 24-Pin SMD, RoHS, Tape	2	Digikey	50.45	100.9

	and Reel				
ANT1	GNSS ANTENNA MOLEX 211624-0001	2	Digikey	20.88	41.76
LCD1	1.8-inch LCD st7735	2	Tempero Systems	9.45	18.9
Other Misc & Connectors					
Enclosure	1591XXGSFLBK ENCLOSURE BOX	2	Digikey	12.14	24.28
PCB	PCB FABRICATION AND MANUFACTURING	2	PCBcart	31.34 (pack of 5)	31.34
<b>Total Cost</b>					<b>351.77</b>

Cost Associated with Receiving Base Station					
Designator On Schematic	Description	Quantity	Supplier	Supplier Unit Price (AUD)	Total Price (AUD)
MCU	ESP32-WROVER-I-N4R8 MCU	1	Amazon	5	5
LORA	RFM95W-915S2R LoRa	1	Digikey	35.33	35.33
GPS	NEO-M8N-GNSS RECEIVER U- BLOX	1	Digikey	50.45	50.45
ANT1	GNSS ANTENNA MOLEX 211624- 0001	1	Digikey	4.71	4.71
C1, C2, C3, C4, C5	Multilayer Ceramic Capacitors MLCC - SMD/SMT 100V 0.1uF X7R 5% -55 +125C 0603 Flex Term AEC-Q200	5	Mouser	0.377	1.885
R1,R2,R7	Thin Film Resistors - SMD 10K OHM .1% 10PPM 1/4W	3	Panasonic	1.99	5.97
R5,R6,R8	Ferrite Bead, 0603 [1608 Metric], 2 kohm, 200 mA, MMZ Series, 0.9 ohm, ± 25%	3	TDK	0.098	0.294
R3,R4	Ferrite Beads 470 OHM 25%	2	Murata Electronics	0.33	0.66

U3,U5	Bipolar Transistors - BJT NPN Silicon Plastic-Encapsulate Transistor	1	Micro Commercial Components (MCC)	0.33	0.33
C6,C7	Multilayer Ceramic Capacitors MLCC - SMD/SMT 6.3V 10uF X5R 0402 20% HI CV	2	Mouser	0.37	0.74
D1	B5819WSL-TP, Schottky Diodes & Rectifiers 1A SCHOTTKY BARRIER	1	Micro Commercial Components (MCC)	0.52	0.52
LED1, LED2, LED3	Red-LED	3	Jaycar	0.45	0.45
U11	Linear Voltage Regulator IC Positive Fixed 1 Output 1A SOT-223-3L	1	Digikey	0.77	0.77
U8	2Mbps Transceiver USB 2.0 SOP-16 USB Converters ROHS	1	LCSC Electronics	0.46	0.46
INPUT1	Micro-USB B Receptacle, Right Angle, Bottom Mount, Surface Mount, with Solder Tabs, -30 to 85 deg C, 5-Pin USB, RoHS, Tape and Reel	1	Arrow Electronics	0.56055	0.56055
Enclosure	CBEAC-02-WH ENCLOSURE BOX	1	Digikey	7.23	7.23
PCB	PCB fabrication	1	PCBcart	14.5	14.5
	Other components				10
<b>Total Cost</b>					<b>\$ 139.85</b>

*Note\*: Prices listed above are based on real-time data as of 25 May 2024 and may vary at the time of procurement due to market fluctuations and other factors.*

Cost Associated with Antennas for the payload and base stations					
Designator On Schematic	Description	Quantity	Supplier	Supplier Unit Price (AUD)	Total Price (AUD)

TX1	TE Connectivity ANT-916-CW-HWR-SMA	1	Mouser Electronics	19.70	19.70
TX2	TE Connectivity ANT-916-CW-RCS	3	Mouser Electronics	10.27	30.8
	<b>Total Cost</b>				<b>50.51</b>

<b>TOTAL COST OF THE PROPOSED DESIGN (AUD)</b>	<b>924.54</b>
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