

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 Ω 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 Ω , 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 Ω , 5%, 0.125W, 200ppm/ $^{\circ}$ C, 0805	2	Digikey	0.1515	0.303
R_S7, R_S8	Chip Resistor, 0 Ohm, Jumper, $\pm 5\%$, 0.125 W, -55 to 155 degC, 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 Ω , 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
Micro SD	1GB SanDisk Micro SD Memory Card	1	Mobilexbuy e-Bay Store	13.97	13.97
W1	UFL TO SMA CONNECTOR	2	DigiKey	5.99	11.98
A1	HELICAL ANTENNA M1516HCT-P-SMA	2	Mouser Electronics	98.42	196.84
PCB	PCB FABRICATION AND MANUFACTURING	1	PCBWay	25.97	25.97
Total Cost					396.39347

Cost Associated with Radio Triangulation Base Station					
Designator on Schematics	Description	Quantity	Supplier	Supplier Unit Price (AUD)	Total Price (AUD)
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	2	Amazon	24.69	24.69

	Devkit			(pack of 2)	
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 and Reel	2	Digikey	50.45	100.9
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
Total Cost					351.77

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	5	Mouser	0.377	1.885

	Term AEC-Q200				
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, \pm 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
Total Cost					\$ 139.85

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	2	Mouser Electronics	10.27	20.54
	Total Cost				40.24

TOTAL COST OF THE PROPOSED DESIGN (AUD)	928.2537
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