

Readiness report — AMSAT CubeSatSim — CubeSat Simulator (hardware v2.1.0)

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Verdict: Ready with caveats · 2026-07-19 · est. parts cost \$185-\$230

The system is implementable, but sourcing is fragmented across major electronics distributors (DigiKey/Mouser) and hobbyist retail channels (Adafruit/SparkFun). Specialist UHF transceiver modules must be sourced from niche retailers. Two RF passives require standard substitutions due to stock or cataloging issues, but acceptable alternatives are confirmed. This is a cold check establishing a baseline for the v2.1.0 hardware.

Action required

Part	Problem	Recommended action
SDWL1608C13NJSTFM01	Out of stock (16-week lead time).	Use substitute Murata LQW18AN13NJ00D.
0603CG160J500NT	No exact catalog matches found for part number.	Use substitute YAGEO CC0603JRNPO9BN160.
DRA818V (U7)	Snapshot requires VHF variant; system context requires UHF.	Order DRA818U (UHF 400-470MHz) for compatibility with SR105U.

Parts

1. Integrated Circuits and Modules (Active)

Part	Spec/Package	Status	Stock	Price	Source
Raspberry Pi Pico	PICO-PKG-NO_DEBUG	Available	High	\$3.99	Micro Center
SR105U UHF Module	SR_FRS_0W5	Available	10+	\$12.00	DWMZone
DRA818V Transceiver	DORJI_DRA818V	Available	10+	\$12.88	Tindie
INA219AIDR	SOIC-8	Active	30,391	\$2.12	DigiKey
INA219 Breakout	Purple Board	Available	High	\$7.87	Mouser
MPU6050 Breakout	1x08 0.1" Header	Available	High	\$12.90	DigiKey

Part	Spec/Package	Status	Stock	Price	Source
BME280 Breakout	1x04 0.1" Header	Available	High	\$12.54	Mouser

2. RF Components and Antennas

Part	Spec/Package	Status	Stock	Price	Source
ANT-916-CHP-T	SMT Chip	Active	2,716	\$3.61	DigiKey
Vertical SMA	SMA-VERT	Active	100+	\$1.75	DigiKey
13nH Inductor	0603	Out of Stock	0	—	DigiKey
18 pF Capacitor	0603 NPO/C0G	Active	46,571	\$0.16	DigiKey
16 pF Capacitor	0603 NPO/C0G	Not Found	—	—	—

3. Diodes and Protection

Part	Spec/Package	Status	Stock	Price	Source
1N5817	Axial Schottky	Active	1,847	\$0.20	DigiKey
BAT20J	SOD-323	Active	516	\$0.39	DigiKey
1N4148	Axial Signal	Active	997,222	\$0.10	DigiKey
BYW27-400	Axial Rectifier	Active	4,848	\$0.43	DigiKey
RHEF100-2	PTC Fuse (PTH)	Active	11,527	\$0.84	DigiKey

4. Passives (Resistors and Capacitors)

Part	Spec/Package	Status	Stock	Price	Source
Resistors (All Values)	PTH Axial	Ready	High	~\$0.10	DigiKey
Resistors (100 Ω)	0805 SMD	Ready	High	~\$0.10	DigiKey
47 μ F Capacitor	CAP-PTH-SMALL	Ready	High	~\$0.45	DigiKey
100 nF Capacitor	CAP-PTH-SMALL	Ready	High	~\$0.15	DigiKey
0.1 μ F Capacitor	0603 SMD	Ready	High	~\$0.10	DigiKey
DNI Tuning Resistors	Various	DNI	—	—	—

5. Connectors and Electromechanical

Part	Spec/Package	Status	Stock	Price	Source
Keystone 1024	Single AA Clip	Active	1,092	\$4.97	DigiKey

Part	Spec/Package	Status	Stock	Price	Source
Keystone 1012	Double AA Holder	Active	12,365	\$8.02	DigiKey
Micro JST Headers	2-pin 2.0mm	Available	High	\$2.99	Vetco
40-Pin Header	2x20 Female Tall	Available	High	\$2.95	PiShop USA
Audio Jack (SC1464)	3.5mm PG203J	Active	7,568	\$3.99	DigiKey
Audio Jack (SJ1-2503A)	3.5mm Jack	Active	32,733	\$0.74	DigiKey
USB-C Breakout	Sparkfun 1x06	Available	10+	\$4.95	Sparkfun
Pushbutton	RA SPST Tactile	Available	High	\$0.16	DigiKey

6. Indicators (LEDs)

Part	Spec/Package	Status	Stock	Price	Source
White (LED1)	3mm/5mm	Ready	High	~\$0.20	DigiKey
Yellow (LED2)	3mm/5mm	Ready	High	~\$0.20	DigiKey
Green (LED3)	3mm/5mm	Ready	High	~\$0.20	DigiKey
Blue (LED4)	3mm/5mm	Ready	High	~\$0.20	DigiKey
Red (LED5)	3mm/5mm	Ready	High	~\$0.20	DigiKey

Substitutes

For part	Substitute	Differences	Judgment
SDWL1608C13NJSTFM01	LQW18AN13NJ00D	Identical: 13nH, 600mA, 130 mΩ.	Acceptable
0603CG160J500NT	CC0603JRNPO9BN160	Identical: 16pF, 50V, C0G/NP0.	Acceptable
DRA818V (U7)	DRA818U	Frequency: UHF (400-470MHz) instead of VHF (134-174MHz).	Required

Verify any substitute against its datasheet before ordering.

Other dependencies

- **PCB Fabrication:** Three separate boards designed to Raspberry Pi Zero dimensions (65mm x 30mm); Gerbers required for manufacture (not checked).
- **Firmware:** Requires Raspberry Pi Pico SDK v1.5+ and Raspberry Pi OS Legacy for controller compatibility (not checked).
- **I2C Addressing:** Manual solder jumper configuration required on Solar Board INA219 modules (0x40, 0x41, 0x44, 0x45).

- **Fabrication:** 2-layer PCB stackup required for USB-C pad compatibility.

Watch list

- **UHF Modules (SR105U/DRA818U):** These are specialized RF components available primarily through hobbyist/specialist retailers; stock is less stable than general distributors.
- **Custom Inductor (13nH):** RF filter performance is sensitive to this value; if the Murata substitute goes out of stock, any 0603 13nH inductor with $\geq 600\text{mA}$ rating is required.