

ATR100

Use Case & Target Market Guide

Working document for sales & marketing — add/remove use cases, drop in final images, and adapt copy per channel.

Product Snapshot

What it is: 500W bidirectional 4-switch buck-boost DC-DC converter

Input range: 12-85V

Output range: 1-85V, adjustable

Control: Digital CC/CV regulation via TI UCD3138

Configuration: Isolated USB-C HID interface (no external programmer needed)

Price point: \$199 target (Amazon FBM launch)

Core Sales Pitch

Lab bench power supplies cost \$300-800+ and only work in one direction. The ATR100 does buck AND boost, bidirectionally, from a single 500W board — 12 to 85V in, 1 to 85V adjustable out, with digital CC/CV control and USB-C configuration. At \$199, it's the converter for makers, solar/battery projects, and prototyping engineers who need real flexibility without lab-supply money.

Differentiator 1: Bidirectional — most budget buck-boost boards are one-direction only

Differentiator 2: Digital precision — UCD3138-controlled CC/CV, not analog pot tuning

Differentiator 3: USB-C HID config — software-driven setup, not DIP switches

Differentiator 4: Wide range — covers most 12V-72V battery chemistries in one board

Use Cases

Each use case below includes the target audience, a usage scenario, why the ATR100's spec sheet fits it, and a placeholder for a supporting image. Reorder, cut, or expand these based on which markets we prioritize for launch.

1. Off-Grid Solar Battery Charging & Regulation

Target audience: Off-grid homeowners, cabin owners, solar DIY builders

Scenario: Solar panel arrays produce variable voltage as sunlight changes. The ATR100 regulates that variable input (12-72V typical arrays) into precise CC/CV charging for 12V, 24V, or 48V battery banks, protecting cells from over-voltage and over-current.

Why the ATR100 fits: Wide 12-85V input range absorbs panel voltage swings; adjustable 1-85V output covers all common off-grid battery voltages; digital CC/CV protects battery chemistry (lead-acid, LiFePO4, Li-ion).



2. RV & Marine Power Systems

Target audience: RV owners, boat owners, marine electricians, van-life builders

Scenario: Onboard systems often mix 12V, 24V, and 48V circuits — alternator charging the house battery, or stepping power down for accessories. The ATR100 can sit between banks and convert in either direction as needed.

Why the ATR100 fits: Bidirectional operation lets one board serve double duty (charge or supply) depending on which bank has surplus energy; compact size suits tight marine/RV electrical bays.



3. EV, E-Bike & E-Scooter Battery Charging

Target audience: EV hobbyists, e-bike/e-scooter builders, micromobility repair shops

Scenario: Lithium packs across the micromobility world land at very different voltages (36V, 48V, 52V, 72V). The ATR100 charges these packs with adjustable CV set points and current-limited CC charging, and doubles as a bench tool for pulled packs.

Why the ATR100 fits: 1-85V adjustable output covers essentially every common e-bike/e-scooter pack voltage from one board; CC/CV protects cells during charge; USB-C HID app lets a tech dial in exact voltage per pack.



4. Battery Cell/Pack Testing & Cycling (Bidirectional)

Target audience: Battery researchers, pack assemblers, QA/reliability engineers

Scenario: Capacity and cycle-life testing requires repeated charge/discharge cycles. Instead of dumping discharge energy into a resistive load as heat, the ATR100's bidirectional topology can route it back to a source battery or bus.

Why the ATR100 fits: True bidirectional buck-boost is the standout differentiator here — most budget converters are one-direction only; digital control supports scripted charge/discharge test sequences.



5. Robotics & Drone Power Systems

Target audience: Robotics teams, drone builders, university robotics clubs, hobbyists

Scenario: Robots and drones often run several subsystems at different voltages off one battery. The ATR100 regulates and adjusts voltage for motor controllers, sensor arrays, or companion computers, and doubles as a bench tool for power-budget testing.

Why the ATR100 fits: Compact 500W module fits inside robot chassis or a test cart; digital adjustability lets builders iterate on voltage requirements without swapping hardware.

IMAGE PLACEHOLDER

Robotics or drone workbench with a battery pack and wiring harness connected to electronics

6. Ham Radio / Amateur Radio Power Supply

Target audience: Amateur radio operators, emergency communications volunteers

Scenario: Radios typically need a clean, precise 12-13.8V supply, often fed from batteries or solar during field or emergency operation. The ATR100 regulates whatever source voltage is available down to the radio's exact requirement.

Why the ATR100 fits: Precise digital CV regulation holds a steady set point; USB-C configuration lets an operator lock in exact radio voltage; wide input range works from batteries, solar, or bench supplies.

IMAGE PLACEHOLDER

Amateur radio station or field-day setup with a transceiver and battery power supply

7. Engineering Lab / Bench Power Supply Replacement

Target audience: EE students, hobbyist engineers, small hardware startups, R&D labs

Scenario: A general-purpose adjustable, current-limited power supply is a staple of any electronics bench. The ATR100 offers lab-supply behavior (CC/CV, digital setpoints) at a fraction of typical bench supply pricing.

Why the ATR100 fits: CC/CV control mirrors lab supply behavior; wide voltage range covers most prototyping needs; USB-C HID app replaces physical knobs with precise digital entry.

IMAGE PLACEHOLDER

Electronics workbench with a bench power supply, oscilloscope, and a circuit board under test

8. Motor Test Benches & Regenerative Braking Simulation

Target audience: Motor control engineers, EV drivetrain testers, dynamometer operators

Scenario: Testing motor controllers or drivetrains under regenerative braking requires a load that can absorb and route power backward, not just dissipate it. The ATR100's bidirectional design supports this kind of energy-recovery test setup.

Why the ATR100 fits: Bidirectional power flow is essential for regen simulation; digital control allows scripted load/voltage profiles during test sequences.

IMAGE PLACEHOLDER

Motor or dynamometer test bench setup in an engineering lab

9. Telecom & 48V Backup Power Systems

Target audience: Telecom technicians, network infrastructure installers, data closet integrators

Scenario: Telecom equipment commonly runs on a 48V DC plant with battery backup. The ATR100 can regulate or convert within that 48V standard and manage battery charging for backup strings.

Why the ATR100 fits: Output range comfortably covers the 48V telecom standard; CC/CV charging suits backup battery maintenance; compact form factor fits equipment racks or cabinets.

IMAGE PLACEHOLDER

Telecom equipment rack or cabinet with 48V DC power distribution and battery backup units

10. Portable Power Stations & DIY Solar Generators

Target audience: Preppers, van-lifers, DIY portable power builders, outdoor enthusiasts

Scenario: DIY portable power station builders need a core charge controller/converter to manage input from solar panels or wall chargers and regulate output to an internal battery pack.

Why the ATR100 fits: Compact, high power density (500W) fits inside a portable enclosure; adjustable output supports different battery chemistries (LiFePO4, lead-acid, Li-ion).

IMAGE PLACEHOLDER

DIY portable power station enclosure with battery pack and solar panel input

11. University & Educational Engineering Labs

Target audience: Professors, lab managers, power electronics curriculum coordinators

Scenario: Teaching digital power control and buck-boost topology benefits from real hardware students can probe and reconfigure, rather than a black-box commercial supply.

Why the ATR100 fits: Exposes genuine digital power control (TI UCD3138) with a USB-C interface for live parameter viewing/logging — a hands-on teaching tool, not just a power source.

IMAGE PLACEHOLDER

University electronics teaching lab with students working at benches with power supplies

12. Field Service / Repair Technician Bench Supply

Target audience: Electronics repair shops, field service technicians, device refurbishers

Scenario: Technicians diagnosing or repairing battery-powered devices need a portable, precise adjustable supply that can substitute for a missing or damaged battery pack during testing.

Why the ATR100 fits: Compact and rugged enough for a service bench or field kit; wide voltage range covers most consumer and industrial device voltages; precise CC/CV avoids damaging the device under test.

IMAGE PLACEHOLDER

Repair technician's workbench with a device under repair connected to a power supply

13. High-Power LED / Grow Light Systems

Target audience: Indoor growers, LED lighting integrators, horticulture equipment builders

Scenario: High-power LED arrays need tightly regulated constant current to avoid thermal runaway and ensure even brightness across strings of varying forward voltage.

Why the ATR100 fits: CC mode is purpose-built for LED current regulation; adjustable output voltage matches different LED string configurations without hardware changes.

IMAGE PLACEHOLDER

High-power LED grow light array or LED string installation

14. Home Energy Storage & Voltage Bus Matching

Target audience: DIY home battery/solar storage builders, energy storage hobbyists

Scenario: Home battery storage setups often combine mismatched voltage buses — e.g., a 24V solar array feeding a 48V battery stack. The ATR100 bridges these buses bidirectionally as energy needs shift.

Why the ATR100 fits: Bidirectional buck-boost bridges two different battery voltage domains in a single board; digital control supports automated bus-balancing logic.

IMAGE PLACEHOLDER

Home battery energy storage wall unit or battery rack with visible wiring

15. Desktop PC & Workstation Backup Power (DC UPS)

Target audience: PC builders, home-lab/server hobbyists, small office/home office (SOHO) users, workstation owners

Scenario: Instead of a traditional AC UPS, a battery bank paired with the ATR100 can sit between mains-derived DC power and a PC's power supply, charging the battery during normal operation and discharging to sustain the PC through short outages or brownouts.

Why the ATR100 fits: Bidirectional operation charges the battery when line power is present and switches to supply mode on outage; digital CC/CV protects the battery through repeated charge/discharge cycles; adjustable output matches common PSU input or battery-elimination voltages.

IMAGE PLACEHOLDER

Desktop PC or home server rack with a battery backup unit and DC wiring nearby