CADEX

Cadex C7200 and C7400 Battery Analyzers

The Cadex C7000 Series battery analyzers offer a platform that fulfills virtually all battery testing and conditioning needs. With features such as *QuickSort™* that checks lithium-ion batteries in 30 seconds and *Boost* that revives packs that have gone to sleep, the C7000 places the command at your fingertips. Slide a battery into one of the 1000 configured Battery Adapters or use the Universal Adapter and you will discover why the C7000 is so easy to operate. Add the optional PC-BatteryShop™ software and it becomes clear why the Cadex C7000 system is the leading battery analyzer on the market.

We make batteries run longer

Cellular phones

Batteries are blamed for almost all problems. To satisfy the customer, the pack is replaced, often without testing. This liberal battery-return policy is costing the industry millions of dollars. The Cadex C7000 Series battery analyzer can help reduce costs by checking and restoring these batteries.

Two-way radios

Public safety and emergency response teams depend heavily on batteries for two-way communications. The Cadex battery analyzer serves in two ways: It restores weak batteries and extends service life. This cuts costs and assures that all batteries meet performance level.

Mobile computing

Users of laptops and portable scanners depend on the Cadex battery analyzer to check, condition and calibrate batteries. Regular battery maintenance guarantees sufficient runtime and makes removal of the non-performers possible.

Medical devices

Medical manufacturers emphasize the importance of scheduled maintenance for battery operated, life-saving devices. With regular use of the Cadex analyzer, battery fading is monitored and batteries are conditioned or replaced to help keep equipment safe and reliable.

Defense

Military organizations take great pride in deploying the best equipment and batteries are no exception. Portables are only as reliable as the batteries. Regular battery analysis and conditioning assure that only well-performing batteries are deployed in the theater.
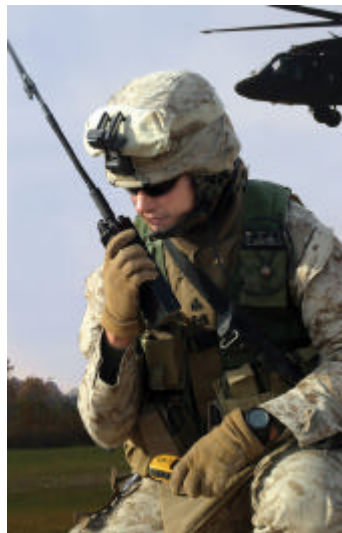
Department of Defense

Manufacturing

Engineers and manufacturers ask for an analyzer with simple operation and fast service. The C7000 Series goes beyond these requirements. With BatteryShop™, the analyzers can be operated from a PC, the results displayed in real time and the data shared with other laboratories.

World-class battery analyzers designed with the future in mind

To serve all battery users, Cadex offers three modes of C7000 Series battery analyzers, all sharing the same functionality, accessories, Battery Adapters and intuitive user interface. The analyzers work equally well in stand-alone mode or networked with a PC through optional BatteryShop™ software.

The **Cadex C7200** services two batteries simultaneously. This compact unit suits smaller battery users and storefront operations servicing cellular phones. 40 watts of charge power at 4 amps per station ensure quick service of larger batteries. The C7200 shares most features with the C7400.

- Battery voltage range 1.2 to 15V
- Charge/discharge current up to 4A per station
- Maximum charge power 40 watts per station
- Maximum discharge power 35 watts

With four-stations and 80 watts of charge power, the **Cadex C7400** is most economical in terms of cost per station. Besides doubling throughput, the extra stations provide a level of flexibility that will help accommodate batteries that require immediate service.

- Battery voltage range 1.2 to 15V
- Charge/discharge current up to 4A per station
- Maximum charge power 55 watts per station
- Maximum discharge power 35 watts

The *extended range* Cadex **C7400ER** is the most powerful of the C7000 Series battery analyzers. Six amps per station, extended range to run 36 volts batteries and 170 watt of continuous power satisfies the need to service larger batteries.

- Battery voltage range 1.2 to 36V (Li-ion)
- Charge/discharge current up to 6A per station
- Maximum charge power 75 watts per station
- Maximum discharge power 75 watts

Unique battery interface

Custom-built *SnapLock*™ adapters allow convenient interface with commercial packs. The adapters contain C-codes that configure the analyzer to the correct setting. Each adapter can be programmed with 10 C-codes to service different battery types. Specialty adapters on request.

Custom Battery Adapters are most convenient for common batteries

The Cadex *FlexArm™* accommodates batteries when no custom adapter is on hand. The probes on the flexible arms reach the tiniest contacts. Magnetic guides keep the battery in position. A temperature sensor monitors the battery. The gold-plated contacts are replaceable for easy service.

The FlexArm™ adjusts to handle a variety of batteries.

The Cadex *Smart Cable* services larger batteries that are placed outside the unit. The temperature sensor attaches to the battery by a magnet. The Smart Cable is best suited for batteries with protruding terminals.

The Smart Cable accommodates larger batteries

Automated programs support all battery needs

The 18 service programs are grouped into *Basic*, *Advanced* and *Custom*.

Basic programs

- **Auto** – Exercises batteries and applies *Recondition* if the user-set target capacity cannot be reached. (For nickel-based batteries only)

- **Charge** – Applies fast charge.

- **Prime** – Prepares batteries for field use by repeated cycling until the maximum capacity is reached.

- **QuickSort**™ – Checks lithium-ion batteries in 30 seconds.

Advanced programs

- **Self-Discharge** – Determines the rate at which a battery loses charge.

- **Life Cycle** – Counts number of charge/discharge cycles a battery can endure before the capacity drops to the selected target level.

- **Discharge Only** – Prepares a battery for storage.

- **Extended Prime** – Applies a 16-hour trickle charge prior to *Prime*. Prepares difficult to charge batteries.

- **OhmTest** – Measures internal battery resistance.

- **Run Time** – Discharges in 3 current levels to simulate 5-5-90, 10-10-80 and other user patterns.

- **Boost** – Reactivates safety circuit of low voltage batteries to enable recharge.

- **QuickTest**™ – Estimates battery state-of-health in 3 minutes. Needs specific battery matrix.

- **Q-Learn** – Generates QuickTest™ matrix by scanning a good battery. Service time 3-5 minutes.

- **Learn** – Improves QuickTest™ matrix by scanning batteries with different state-of-health status. Service time 3-8 hours per battery.

Custom programs

Four separate *Custom* programs allow user-defined programs composed of charge, discharge, *Recondition*, wait and repeats. The programs follow a different path if a certain condition occurs.

The Cadex C7000 Series offers features not found on competitive units

Test batteries in 30 seconds

The *QuickSort*™ program is a fast sorting tool, identifying cellular batteries as:

- **Good**, can be returned to customer
- **Low**, suspect pack; needs further testing
- **Poor**, faulty pack; remove from service

QuickSort™ is based on the electrochemical dynamic response of the battery, a method that is superior to resistance readings. Like a mechanical arm, a good battery is solid and produces little lag. A weak battery, on the other hand, appears soft and bends to the applied force. QuickSort™ establishes its test results on the resiliency of the battery.
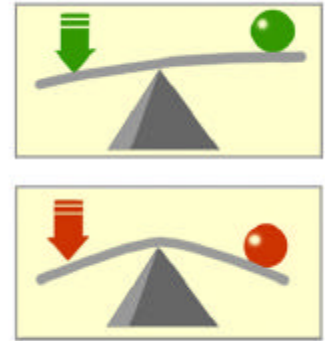
Reactivating lithium-ion batteries
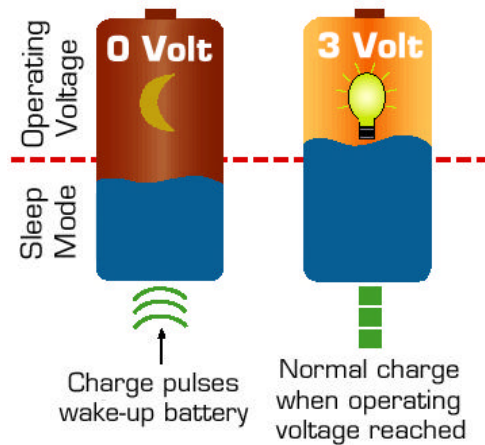
When discharged too low, some lithium-ion batteries appear dead and cannot be recharged. The *Boost* program reactivates the pack's safety circuit with charge pulses, often restoring the battery to full service.

Streamline battery management with labels

Attaching a small battery label containing service date, due date and capacity reading simplifies battery management. Only batteries with valid service date and good capacity readings are used.

Adjustable Target Capacity sets battery pass/fail criteria

The *Target Capacity* allows customizing performance criteria. Increasing the threshold above 80% produces tighter tolerances; lower settings enables to keep the batteries longer at the cost of lower performance standards.
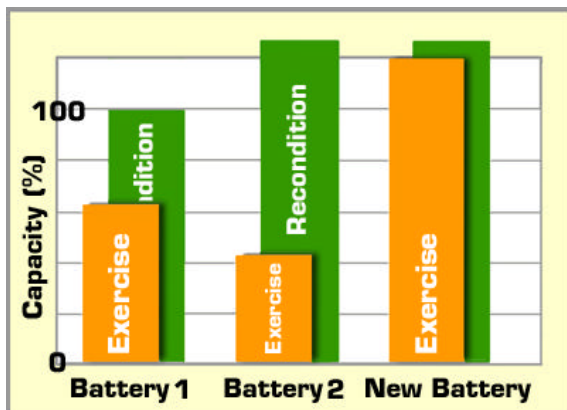
Recondition restores nickel-based batteries

Capacity loss on nickel-based batteries is often reversible with a discharge cycle to 1V/cell (*Exercise*). In many cases, Exercise is not sufficient and *Recondition* is required. *Recondition* is a deep discharge that dissolves the crystalline formation or memory. The chart shows a doubling of capacity with Recondition on faded batteries and a further performance improvement on a new battery.

Computerize battery testing

BatteryShop™ provides a simple yet powerful PC-interface to control and monitor Cadex C7000 Series battery analyzers. Clicking the mouse on any of the 3000 batteries in the database or swiping the bar code on the battery label configures the analyzer to the correct setting. Extend the library by adding your own models or download the most current list from www.cadex.com.

Cell phone batteries

The Cadex C7000 systems lower battery replacement cost by restoring rather than discarding the packs. BatteryShop™ keeps track of the battery movement and retains the test results. The analyzer works on two fronts:

Point-of-Sales: The customer brings the faulty pack to the store. The Cadex analyzer checks the battery while the customer waits, or is given a replacement pack that has been refurbished prior with the battery analyzer.

Service Centers: Warranty batteries are sent to large refurbishing centers where Cadex battery analyzers sort, test and refurbish the packs for reuse as B-grade products.
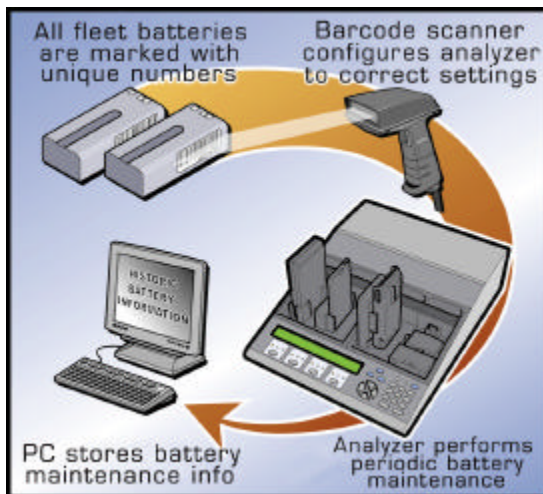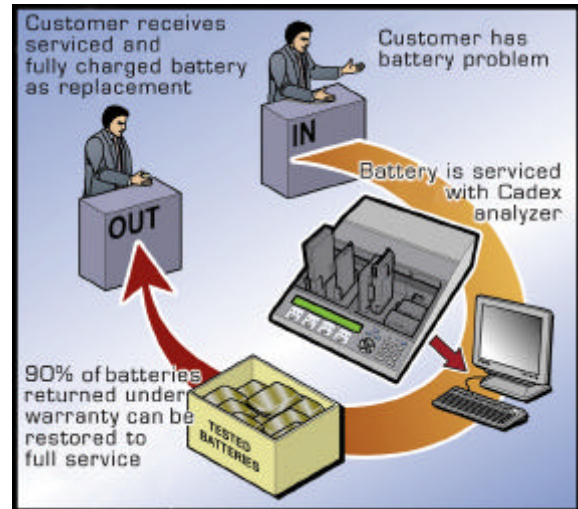
Battery maintenance

Fleet batteries are marked with a unique ID number. An optional label printer generates labels in bar code format. When servicing the batteries, the user simply scans the label and inserts the battery into the analyzer. The ID number configures the analyzer to the correct setting and recalls the entire service history of the battery, including vendor information and performance data. This information is updated each time the battery is serviced.

Battery manufacturers

BatteryShop™ allows battery manufacturers to perform complex battery analysis by setting unique test parameters through the PC. Voltages and currents can be entered in 25mA increments, the charge termination customized and the end-of-discharge fine-tuned. Battery current, voltage and temperature readings are shown in real-time. Whether applied in a small or large system, the Cadex C7000 Series analyzer generates test information at a fraction of the cost to competitive systems.

Product Specifications

Battery Analyzers		C7200	C7400	C7400ER
Independent stations		2	4	4
Battery voltage range		1.2 to 15V	1.2 to 15V	1.2 to 36V
Charge/discharge current		100mA to 4A in 25mA increments	100mA to 4A in 25mA increments	100mA to 6A in 25mA increments (With 6A capable Battery Adapters)
		Services batteries up to 24Ah. If set above 4A (6A), the current automatically scales down.		
Maximum charge power		40W per station; 40W total	55W per station; 80W total	75W per station; 170W total
Maximum discharge power		35W per station; 70W total	35W per station; 140W total	75W per station; 200W total
Power management		On high load demands, the current scales down; large batteries may go on waiting queue		
Line voltages		100 to 240VAC, 50-60Hz 1.5A max	100 to 240VAC, 50-60Hz 1.75A max	100 to 120 / 200 to 240VAC, 50-60Hz; 4A max
Chemistries		Lithium-ion, nickel-metal-hydride, nickel-cadmium, lead-acid		
Charge method		Lithium-ion and lead-acid: constant voltage with current limit. Nickel-based: constant current with Reverse Load Charge adjustable from 5-12%. Customized charge methods possible. Automatic full charge detection, safe termination under all conditions. Temperature controlled.		
Discharge method		Constant discharge current to end-of-discharge voltage threshold		
Battery Adapters		*SnapLock™* system; custom and universal types. Contain C-code that configures analyzer to the correct setting. Each adapter has room for 10 C-codes. Re-programmable possible with menu function. Battery Adapters are equipped with a temperature sensor.		
Service programs		18, grouped into *Basic*, *Advanced* and *Custom* programs. Allows manual and automated service.		
Security	Level 0 Level 1 Level 2	Open, no programming restrictions (default) Password protected (low); allows C-code selection and display options Password protected (high); most programming choices locked		
Display		2x40-character LCD, backlit; each station also features RUN, READY, FAIL signal lights		
Power failure recovery		Retains the test data on power failure and resumes when power is restored. The time stamp on power failure and resumption is recorded.		
Data Ports		RS-232 or USB interfaces to PC (RS-232 recommended). Label printer for direct connection available.		
Throughput	QuickTest™ Full service	30-40 batteries per hour Fleet of 80 batteries typical	60-80 batteries per hour Fleet of 160 batteries typical	60-80 batteries per hour Fleet of 160 batteries typical
		Throughput on full service is based on monthly maintenance. Each analyzer services two battery batches every 24h (day and night run), 20 days per month.		
Physical	Length Width Height Weight	12.1"; 307mm 9,4"; 240mm 3.5"; 90mm 7.1 lb; 3.2 kg	14.4"; 366mm 11.0"; 280mm 3.8"; 97mm 10.05 lb; 4.54 kg	15.4"; 391mm 11.0"; 280mm 4.2"; 107mm 12.1lb; 5.5 kg
Environmental		Recommended operating temperature 41°F to 95 °F; 5°C to 35°C Recommended storage temperatures –4°F to 159°F; -20°C to 70°C		
Firmware		Upgradeable with BatteryShop™ over the Internet, flash memory. Lifetime upgrade subscription available.		
Approvals		Tested and approved by ITS to comply with CSA/UL/CE standards. RoHS and WEEE compliant		
Warranty		Cadex warrants the analyzer against defective materials and workmanship for a period of two (2) years from the original purchase date.		

BatteryShop™ software

Provides PC-interface to Cadex C7000 Series battery analyzers. Programming is enabled by selecting a battery model from a database of approximately 3000 batteries, scanning the battery's bar code label, or entering the battery parameters through the PC. Current, voltage and temperature are shown in real time graphics. Stores test data, vendor and customer information. Prints battery labels, bar codes and service reports. Supports English, German, French and Spanish.

Expandability   BatteryShop™ is licensed for 1, 4, 16, 32, 64 and 120 analyzers; field expandable with USB-to-serial converter (by Digi). A fully expanded system services 480 batteries independently. The maximum file size is 2GB.

Computer requirements: Dedicated PC with MS Windows 2000 or XP; 4GB hard drive; 700 MHz or better CPU; 256MB of RAM main memory; increases with more analyzers.

Recommended peripherals Label printer (DYMO 400), windows compatible printers for reports; bar code scanner.