



Cadex C7000 Series Battery Analyzers

Fast, Simple, Efficient and Innovative

Gone are the days when a battery analyzer did nothing more than cycle a battery to eliminate memory. Much has changed with modern batteries. So have the service requirements for battery analyzers.

The Cadex C7000 Series battery analyzers offer 17 programs to meet all needs of the modern battery. Fast and simple service is essential. *QuickTest™* measures the battery state-of-health in just three minutes. *Boost* activates batteries that appear dead because of over-discharge. *Prime* prepares new or stored batteries for field use. *Auto* restores batteries affected by memory with the proprietary *Recondition* cycle.

Cadex C7000 Series are built to make batteries run longer



“ Upsetting my customer over a battery is the last thing I want to do”

The battery gets blamed for most cell phone problems. To help the customer, the battery is often replaced without testing. More than 80 percent of returned batteries can be restored with the Cadex C7000 Series battery analyzer. *QuickTest™* checks the battery while the customer waits. *Boost* re-energizes packs that have gone to sleep due to low discharge. Only batteries with genuine faults are replaced. The Cadex analyzers are built for storefronts and require minimal training.

“Our engineers liked the C7000 best because it is unique in its programmability and has an open, upgradeable design to handle any battery model”

– Jeff Sorrels, Sprint's Subscriber Equipment Group, Sprint PCS - Kansas MO, USA



“ Sure, the ‘ready’ light is lit – but can I trust the battery?”

Weak batteries charge more quickly than good ones (because there is less to fill) and remain on ‘ready’ longer than strong packs. Bad batteries tend to gravitate to the top and become a target for the unsuspecting user. The Cadex C7000 Series analyzer automatically restores nickel-based batteries that fall below the set target capacity; those that do not recover are identified and replaced. With the Cadex system, the user has full confidence that the battery will last through the shift. Only 30 minutes per day is required to service an entire battery fleet.

“We did market research and the Cadex product best met our needs. We found this was the most intelligent product on the market.”

– Wayne Young, Ottawa Carleton Regional Police, Ottawa, ON, Canada



“ Equipment failure is simply not an option”

Batteries are corrosive devices that gradually weaken over time. In the first year everything works well because the batteries are fresh. During the second year, some batteries start losing capacity and the system reliability declines. New packs are added and in time the battery fleet becomes a jumble of good and failing batteries. That’s when the battery headache begins. The Cadex C7000 Series analyzer assures that the battery capacity never drops below a critical level. *QuickTest™* verifies the battery before use. *Prime* prepares new batteries for field use and *Auto* restores packs that have become weak.

“I notice the Cadex analyzer has been going 24hr-7 days per week and has reduced our radio problems due to bad batteries to zero!! I wish all the products we have gotten would perform as well.”

– Jim Torine Micko, Hennepin County Medical Center. Minneapolis, MN, USA



“ My department tests 2000 batteries per day”

High throughput and ease of use are key attributes for service centers and battery manufacturers. The *OhmTest* measures the internal battery resistance in six seconds; *QuickTest™* looks at six battery parameters to estimate state-of-health. Four *Custom* programs allow specific sequences of charge, discharge, resistance test, waits and repeats. *BatteryShop™* software provides a simple yet powerful PC interface to control the analyzers and store test data. The rugged design stands up to a demanding industrial environment.

“I’ve been using the Cadex C7400 analyzer around the clock. It’s been exactly the tool we needed to do our root-cause failure analysis on field-return batteries.”

– Adam Kuenzi, Supra Products, Salem, OR, USA

World class battery analyzers designed with the future in mind

The Cadex battery analyzers are tailored for small and large battery users. The units use the same Battery Adapters, share the simple, intuitive user interface and run on common PC operating systems. The instruments work equally well in stand-alone mode or networked with a PC through *BatteryShop™* software.

The Cadex C7200 services two batteries simultaneously. This compact unit suits storefront operations and smaller battery users. It offers 40 watts of charge power at 4 amps per station and shares most features with the C7400 and C7400ER.



The four-station Cadex C7400 provides 80 watts of charge power at 4 amps per station. This unit is most economical in terms of cost per station. The stations can easily be re-organized to make room for a battery needing immediate service.



The extended range Cadex C7400ER is the most powerful of the C7000 Series battery analyzers. It offers 170 watts of charge power and accommodates batteries up to 36V. The maximum charge and discharge current is 6 amps per station.



Automated programs provide effective test – advanced programs enable

Unique battery interface



The Cadex *SnapLock™* Battery Adapters allow convenient interface to all battery types. The adapters contain C-codes that automatically configure the analyzer to the correct setting. Each adapter can be programmed with 10 C-codes to service different battery types. Cadex offers over 1000 custom adapters; specialty adapters can be ordered.

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 any contacts. Magnetic guides keep the battery in horizontal or vertical position. A temperature sensor monitors the battery.



The FlexArm™ adjusts to handle a variety of batteries



The Smart Cable accommodates larger batteries

The Cadex *Smart Cable* services larger batteries by placing them outside the unit. The temperature sensor attaches to the battery by a magnet.

17 programs support all battery needs

The service programs are grouped into Basic, Advanced and Custom programs. This allows easy access to the common programs and leaves the more technical tasks to the experts.

Basic Programs

- QuickTest™ - Checks the battery state-of-health in 3 minutes by measuring 6 variables: capacity, internal resistance, self-discharge, charge acceptance, discharge capabilities and mobility of electrolyte.
- Auto – Exercises batteries and applies *Recondition* if the user-set target capacity cannot be reached.
- Prime – Prepares new and stored batteries for field use by repeated cycling until the maximum capacity is reached.
- Charge – Applies fast charge.

Advanced Programs

- Self-Discharge – determines the rate at which a battery loses charge when not in use.
- Life Cycle - counts the number of charge/discharge cycles a battery can endure before the capacity drops to the preset target level.
- Discharge Only - Discharges a battery for storage; tests chargers.
- Extended Prime - applies a 16-hour trickle charge, followed by *Prime*. Prepares difficult to charge batteries.
- OhmTest - Measures internal battery resistance in 6 seconds.
- Run Time – allows 3 different discharge levels, programmable in hours and minutes. Simulates 5-5-90 and 10-10-80 loads for two-way radios.
- Boost – Reactivates seemingly dead batteries that have been discharged too low.
- Q-Learn - Provides initial QuickTest™ matrix by scanning a good battery. Service time is 3-5 minutes.
- Learn - Improves QuickTest™ matrix by scanning batteries with different state-of-health status. Service time is 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.

and restoration functions engineers to perform in-depth test analysis

Saint Mary Hospital
April 8, 2003 Due June 8, 2003
Pass 98% 75mOhm



The label printer prints the test results on a label after each service

Streamline battery management with service labels

Attaching a small battery label containing service date, due date and capacity reading simplifies the management of fleet batteries. The system is self-governing because the user only picks a battery that has been properly serviced and labeled.

The label printer connects to the analyzer or PC with *BatteryShop™* software. *Auto-Print* automatically generates a label when the battery is removed. The system also produces full service reports on a regular printer.

Chicago's 911 Center announced that Cadex Electronics will be the preferred supplier of battery analyzers and chargers.

"The compatibility of the C7000 with our asset management program is a money saver! Our use of 10 different batteries makes the C7000 an integral part of our communications equipment."

— Richard Nowakowski, Radio Frequency Coordinator for the Office of Emergency Communications, Chicago, IL, USA

"Cadex analyzers have been used very effectively by the Japanese Police Agency".

— Kaneko-san, NTT Do-Co-Mo, Tokyo, Japan

Security code safeguards against tampering

A password protected security system provides three modes: Level 0 allows full access, Level 1 provides limited access and Level 2 inhibits most programming functions. Being able to lock the unit minimizes staff training and prevents unauthorized changes.

Additional features

The Cadex C7000 Series battery analyzers offer features that reduce the memory phenomenon on nickel-based batteries and automate service.

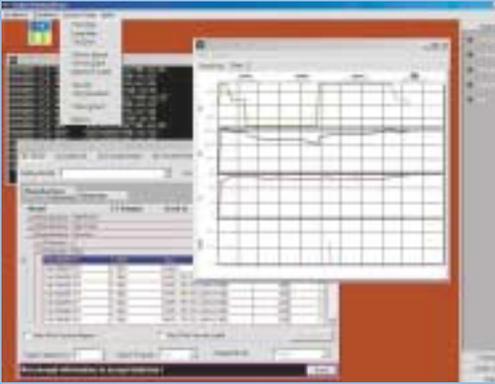
- Recondition restores nickel-based batteries that otherwise would be discarded. Recondition reverses memory with a controlled secondary discharge.
- Target Capacity sets the battery pass/fail criteria. Auto automatically applies Recondition if the capacity of nickel-based batteries falls below the target setting.
- Reverse Load Charge intersperses discharge pulses between charge pulses to improve charge efficiency and reduce memory on nickel-based batteries.
- Standby automatically applies a discharge if the battery is left on charge for 30 days. Only one battery per analyzer is put on discharge at any time.

"Just a quick note to let you know that the performance of the C7400 has exceeded all of our expectations. It has basically eliminated the battery failure problems that plagued us for a very long time. Using your recommended procedure to initially "prime" new batteries, and systematically recondition older batteries, has led to fantastic results."

— Pete Petrie, Manager, Ultrazone Lasertag, San Diego, CA, USA

"The Cadex C7000 allows us to easily maintain all the different types of batteries we use. We have adapters for our radios and monitor batteries, enabling us to automatically test and condition the batteries as necessary. We simply put a battery in the adapter, press Enter and the Cadex does the rest. The Cadex system is user friendly"

— Glenn Miller, Market General Manager, Rural Metro Ambulance Service, Memphis, TN, USA



Battery current, voltage and temperature readings are shown in real time graphics

Computerized battery testing

Delivering batteries with consistent high quality is a concern for battery manufacturers and distributors alike. Managing a battery fleet can be challenging, especially when observing periodic service needs. In addition, some battery models are changing almost weekly, making it difficult to keep up.

BatteryShop™ can help.

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. You can extend the library by adding your own models or download the most current list from www.cadex.com. The Internet enables sending the test results to a central location.



BatteryShop™ performs equally well with one analyzer or a fully extended system of 120 units, serving 480 batteries

BatteryShop™ applications

- Cell Phone Dealers benefit from *BatteryShop™* by testing the batteries at point-of-sale. The clerk simply clicks the mouse on the selected battery model on the PC monitor and inserts the battery into the correct Battery Adapter installed in the analyzer. The results are available in minutes. Most batteries can be repaired while the customer waits. Only packs with genuine faults need replacing.
- *BatteryShop™* enables Service Centers to test and restore batteries quickly and with little training. Clicking the mouse on the battery of choice configures the analyzer to the correct settings. *Boost* activates packs that appear dead; *QuickTest™* checks the state-of-health in 3 minutes. Batteries needing full service are segregated and run on separate analyzers. *BatteryShop™* is cost effective, whether run with one analyzer or in a fully extended system of 120 units.
- Fleet Batteries are best serviced by first marking the packs with a unique ID number. The label printer generates the label in bar code format, which is attached to the battery. Scanning the label configures the analyzer to the correct battery setting, ready to service the battery. The service date and test results are stored and updated in the database under the assigned ID number. Performance readings, maintenance history and vendor information can be reviewed with a click of the mouse.
- *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 graphics. The Cadex system, small or large, generates test information at a fractional 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 Services batteries up to 24Ah. If set above 4A (6A), the current automatically scales down.	100mA to 4A in 25mA increments	100mA to 6A in 25mA increments
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	50W 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		<i>SnapLock™</i> system; custom and universal types. Contain C-code to configure analyzer to the correct setting. Each adapter has room for 10 C-codes to service different battery types. Re-programmable with menu function. Temperature controlled.		
Service programs		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		80-character LCD, backlit; each station also features RUN, READY, FAIL signal lights		
Data Ports		RS-232 interfaces to PC, serial printer or label printer. <i>BatteryShop™</i> supports special printers.	RS-232, parallel port and USB (future release).	
Throughput	QuickTest™ Full service	30-40 batteries per hour Fleet of 80 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.	60-80 batteries per hour Fleet of 160 batteries typical	60-80 batteries per hour Fleet of 160 batteries typical
Physical	Length Width Height Weight	12.1"; 312mm 9.4"; 240mm 3.5"; 90mm 7.1 lb; 3.2 kg	14.4"; 36mm 11.0"; 280mm 3.8"; 100mm 10.05 lb; 4.54 kg	15.4"; 398mm 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 <i>BatteryShop™</i> over the Internet, flash memory. Lifetime upgrade subscription available.		
Approvals		Tested and approved by ITS and TUV to comply with CSA/UL/CE/PSE standards. (PSE not available on C7400ER)		
Warranty		Cadex warrants the analyzer against defective materials and workmanship for a period of three (3) 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 readings 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	<i>BatteryShop™</i> is licensed for 1, 4, 16, 32, 64 and 120 analyzers; field expandable. RocketPorts (by Control) or USB-to-serial converter (by InsideOut) supports multiple analyzers. A fully expanded system services 480 batteries independently. The maximum file size is 2GB.
Computer requirements	Dedicated PC with MS Windows; 4GB hard drive; 256MB of RAM main memory; increases with more analyzers.
Recommended peripherals	Label printer (DYMO 320 or SE320), windows compatible printers for reports; bar code scanner.

Why buy Cadex?

Batteries have become the lifeline in our society. Cadex has realized the importance of this development and designed products to enhance battery performance and increase longevity.

History

Cadex Electronics was founded in 1980 when Isidor Buchmann recognized that the full potential of nickel-cadmium batteries was not being achieved. The proprietary *Recondition* feature, which Buchmann developed, was so effective in restoring weak batteries that the Cadex analyzers soon became the workhorse for servicing two-way radio, cell phone and medical batteries.

World Leader

With the introduction of the programmable battery analyzers in the early 1990s, the Cadex battery analyzers gained global acceptance in wireless communications, mobile computing, medical and defense industries. Cadex set new standards and became the world leader in the industry. Today, Cadex products are sold in over 100 countries.

Engineering strength

Cadex combines engineering strength with 24 years of manufacturing excellence. Committed to quality solution, Cadex covers all aspects of battery service, including rapid testing of automotive and stationary batteries. Cadex is ISO 9001 certified and all products are made to the highest standards.

Customer Satisfaction

When purchasing a Cadex product, you are assured of advanced design, superior quality and competitive pricing. The award-winning products are built with one goal in mind – to make batteries run longer. The name Cadex is synonymous with innovative design and dedication to quality.

Working with natural beauty



The new Cadex headquarters is set in a natural surrounding with a public park to the east and the scenic Fraser River to the south. Joggers and cyclists enjoy the quiet nature path along the river. With the wonders of nature at its door, Cadex offers its staff a tranquil alternative to noisy city streets.



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