

## Choosing a battery analyzer

There are two types of battery analyzers: *fixed current* and *programmable* versions. While fixed current units are lower priced, programmable analyzers provide more accurate readings and enable higher battery throughput. In addition, programmable units are better suited to service new battery systems and are more effective in restoring weak batteries.



**Cadex C7400**  
battery analyzer  
/reconditioner

The programmable Cadex C7400 battery analyzer services four batteries independently. Custom Battery Adapters accommodate all common batteries; universal adapters serve specialty packs. The *QuickTest™* program measures battery state-of-health in 3 minutes. *Auto* reconditions nickel-based batteries affected by memory and *Prime* prepares new batteries for field use. A printer generates reports and battery labels.

The Cadex BatteryShop™ software enables PC interface to control and monitor the Cadex battery analyzers. Clicking the mouse on the selected battery or swiping the bar code configures the analyzer to the correct setting. Battery performance, history and vendor information is available on demand. A fully extended system supports 120 analyzers.

## The Company

Founded in 1980, Cadex combines engineering strength with innovative design and dedication to quality. Cadex is ISO9001 certified and the products are sold in over 100 countries.

## World Leader

Cadex is a world leader in the design and manufacture of advanced battery chargers, analyzers, battery maintenance software and specialty battery packs. Our award-winning products have gained global acceptance in wireless communications, mobile computing, medical and defense industries.

## Customer Satisfaction

Whether you purchase a Cadex model off-the-shelf, a modified version for special applications or a custom OEM unit, you are assured of advanced design, superior quality and competitive pricing. Cadex has 20 years of experience in engineering and manufacturing.



Cadex is located on the banks of the scenic Fraser River near Vancouver, Canada.

Represented by



### Cadex Electronics Inc.

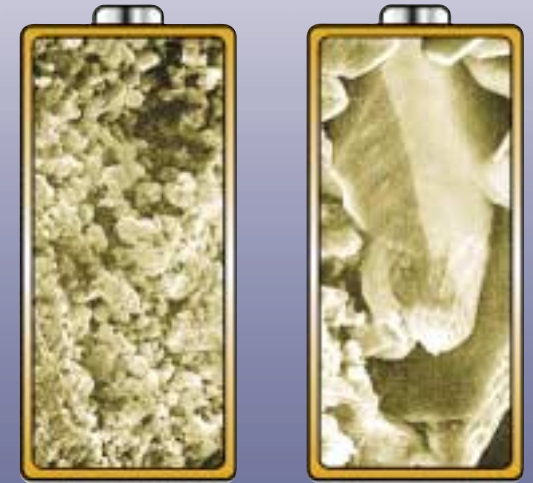
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# Why do Batteries only last one year?



### New nickel-cadmium

The anode is fresh, exposing large surface area to the electrolyte for maximum performance.

### Nickel-cadmium with crystalline formation (memory)

Large portions of the active material are concealed from the electrolyte

## Batteries need more than charging....

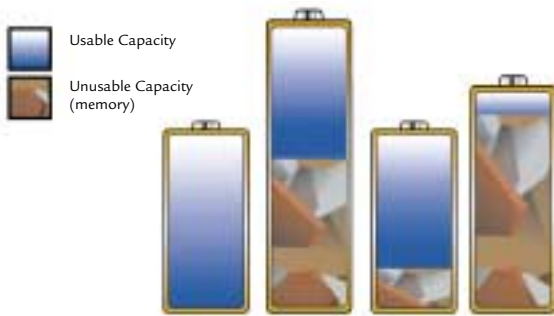
The active materials of a nickel-cadmium battery consist of finely divided crystals. On a good battery, these crystals are small and obtain maximum surface area. Over time, the crystals grow and the charge acceptance (capacity) drops. Applying a periodic full discharge (*Exercise*) reverses this condition, also known as "memory". In advanced stages, *Recondition* is needed.



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## The green light lies

Does the green 'ready' light on the charger indicate a good battery? No. Even a low performing battery will show 'ready' when full.



|                         | A        | B       | C        | D       |
|-------------------------|----------|---------|----------|---------|
| Nominal battery rating: | 1000mAh  | 1500mAh | 1000mAh  | 1200mAh |
| Usable Capacity:        | 100%     | 50%     | 80%      | 10%     |
| Charge/discharge times: | 144 min. | 72 min. | 115 min. | 14 min. |

Larger batteries do not necessarily carry more energy. Memory ridden batteries B and D (above) retain less energy than battery A. Weak batteries go to 'ready' quicker than good packs. They gravitate to the top and become the target for the unsuspecting user.

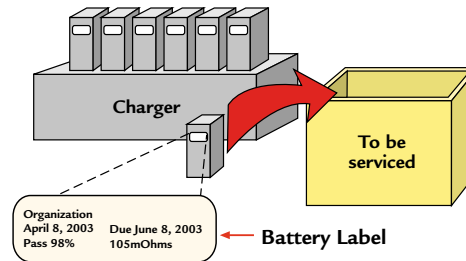
Carrying larger batteries or switching to energy-dense chemistries does not improve system reliability if weak packs are left in the fleet.

## Battery maintenance made simple

Battery service prolongs battery life, weeds out the non-performers and increases user confidence. A simple, self-governing system is illustrated on the next page. The time required maintaining a large battery fleet should take less than 30 minutes per day.

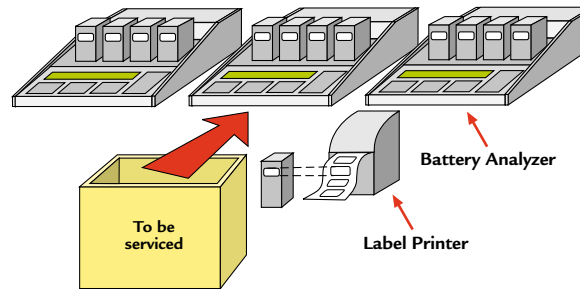
The user only picks a battery that is properly documented with service date and capacity readings printed on a battery label. Expired packs are brought in for service. With such a system, the user has full confidence that the battery will last through the shift.

### 1 Sorting batteries for servicing



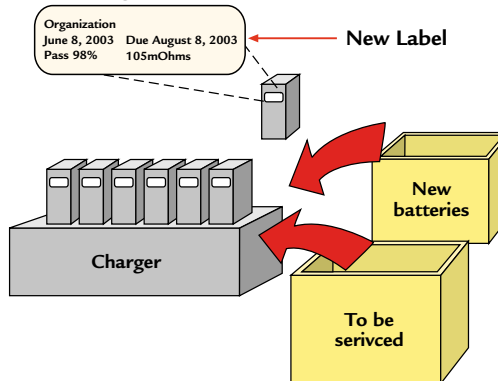
Each time a battery is taken from the charger, the user checks the service date on the label attached to the battery. If expired, the battery is placed in the "To be serviced" box.

### 2 Servicing expired batteries



The batteries are re-energized with Cadex battery analyzers and re-certified by attaching a new label with dates and capacity reading.

### 3 Returning batteries to circulation



The restored batteries go back into circulation; those that failed are replaced with new ones. Battery maintenance assures that all packs perform at the required capacity level.

## How often should I service a battery?

The recommended interval is once every 1-2 months for nickel-cadmium and once every 3 months for nickel-metal-hydride. No further maintenance is needed between these service requirements.

## What are the cost savings?

GTE Government Services completed a cost analysis on nickel-cadmium for two-way radios used on US Naval Ships. Three maintenance methods were applied: Charge-and-use, Exercise and Recondition. Exercise is a discharge to 1 volt per cell; Recondition is a secondary deep discharge exclusive to Cadex analyzers.

| Maintenance method  | Annual % of batteries requiring replacement | Annual battery cost (US\$) |
|---------------------|---|----------------------------|
| Charge-and-use only | 45%   | \$40,500                   |
| Exercise            | 14%   | \$13,500                   |
| Recondition         | 5%  | \$4,500                    |

Based on the remarkable cost savings achieved with the Cadex Recondition feature, GTE is endorsing Cadex battery analyzers for all their operations.

## Can I restore older batteries?

Yes. Typically 50-70% of discarded nickel-cadmium packs can be restored when using the recondition methods of a Cadex battery analyzer.

Some older nickel-cadmium may exhibit high self-discharge. A 10% self-discharge in the first 24 hours after charging is normal. Discard the battery if the self-discharge reaches 30%. If in doubt, check the battery with the Cadex battery analyzer. A high self-discharge may reveal elevated readings on the OhmTest program.