

April 1974

B73-10486

# NASA TECH BRIEF

## *Marshall Space Flight Center*



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### Rechargeable, Silver-Zinc Battery Conditioner/Monitor Unit and State-of-Charge Indicator

A new conditioner/monitor unit has been developed for use with rechargeable silver-zinc batteries. The unit automatically charges the batteries to the desired state-of-charge levels, monitors functional battery parameter data both on meters and a printer, and automatically activates an alarm in the event of battery malfunctions. The unit consists of six assemblies:

1. the state-of-charge indicator panel,
2. the control panel,
3. the monitor panel,
4. the power panel,
5. the charging-current power supply, and
6. the load panel.

The state-of-charge indicator-panel assembly computes the state-of-charge by summing the charging and discharging ampere-hours. It provides output pulses for each predetermined incremented quantity of ampere-hours applied to, or removed from a battery. The outputs from the state-of-charge assembly are applied to the monitor and control panels.

The control-panel assembly provides both automatic and manual controls to determine the charging and discharging modes of a system. In addition, it determines charging-current magnitude.

The monitor-panel assembly acquires, conditions, processes, and displays battery parameter data. It incorporates a multiplexer (scanner), which has 30 channels (25 of which are used), to time share battery parameter data. In addition, a digital voltmeter is incorporated; it has a range of 0 to 19.999 volts and an accuracy of 0.01 percent.

The power-panel assembly regulates the output voltage, limits the overload current, and protects against

overvoltage. It supplies three signals: (1) a +5-volt, dc, 12-ampere supply; (2) a +15-volt, dc, 2-ampere supply; and (3) a -15-volt, dc, 2-ampere supply.

The charging-current power-supply assembly has a 21-ampere dc output. It is adjustable over the range of 40 to 44 volts, dc, regulated to  $\pm 1$  percent.

The load-panel assembly provides a control for the input power to the charging-current power supply, switches a battery between the charger and the load, provides a load resistor for battery discharge, and regulates the charging current.

The entire conditioner/monitor unit includes commercially available assemblies to reduce overall system cost. Wherever possible, the system incorporates integrated circuits.

#### Note:

Requests for further information may be directed to:  
Technology Utilization Officer  
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Reference: B73-10486

#### Patent status:

NASA has decided not to apply for a patent.

Source: C. E. Thomas of  
Chrysler Corp.  
under contract to  
Marshall Space Flight Center  
(MFS-22835)

Category 02