TECH NOTE:	**005-01**
TITLE:	**SpreadSmart/Dual Spread Backup Battery**
DATE:	**01/25/05**

This document describes the procedure for testing and replacing the backup battery in the Cirus Controls middle of the line and top of the line spreaders.

The following spreaders use a battery to store non-critical information:

Dual Spread, Liquid Control, SpreadSmart, SpreadSmart Rx, and SpreadSmart RDS.

Description:

The following information is stored using battery backed RAM:

- Screen contrast (if different than factory default)
- The last rate at which the spreader was operated in automatic mode
- The material selection
- Storm and season totals
- Liquid tank levels
- Real time clock for logging information

The following information is NOT stored in battery backed RAM, but instead in non-volatile FLASH memory:

- Calibration constants such as trims and granular material calibration
- System settings like the IP address, coil frequency, tank size
- Which functions are password protected
- Advanced calibration parameters
- Any other settings besides the system clock which are accessed using the setup menu

The above settings will be retained indefinitely, regardless of battery state or system power.

Diagnostics:

Firmware released after 1/24/05: a lowercase “b” will show up on the screen when the battery is exhausted. On the large display spreaders (SpreadSmart), the “b” will appear at the top left of the system menu. On the integral display spreaders (Dual Spread & Liquid Control), the “b” will appear on the copyright screen when the unit is first powered on.

All prior firmware releases , an exhausted battery will reveal itself when the automatic rate settings are not retained between power cycles, or the screen contrast changes when the unit is powered down.

Life cycle:

The CR2450 battery used in all spreaders since 3/1/03, with a rating of 620 mAh, should last 51,666 hours, or 5.9 years. (The backup functions on the spreaders draw around 12 uA (microamps)).

(On the few units shipped prior to 03/01/03, the BR2020 battery has a capacity rating of 100 mAh (milliamp hours), and would be exhausted in 8333 hours, or roughly a year. Old spreaders can be retrofitted to use the newer battery, however, this is not a field repair, and would require return of the unit to Cirus Controls for rework.)

Replacement:

Replacement of the backup battery requires disassembly of the spreader to the point that the battery can be physically removed. This operation should be performed by someone comfortable with working on electronics, as care should be taken to avoid static discharge. The battery is most easily removed using a pair of small screwdrivers. The new battery can be slid into the socket without the use of tools.

Part availability:

Any battery which cross references to the BR2020 number or the CR2450 number can be used as a suitable alternative. Please verify the physical dimensions and the 3V rating before inserting the new battery in the spreader.

Batteries can be found at most battery stores, and various electronic stores. They can also be ordered online at http://www.digikey.com and other online vendors.

Radio Shack part numbers:

CR2450: 23-189
BR2020: 960-0427

Duracell part numbers:

CR2450: DL2450