



## Remtron Technical Note Battery Life

Some operators have experience with transmitters that only last for one work shift or about 10 hours and then require recharging. Remtron's transmitters last over 130 hours of operation, depending on the model. That typically means months of operation without being interrupted by a dead battery. Long battery life makes a big difference in how you operate and whether you need a rechargeable unit or can use standard, off-the-shelf AA batteries.

Why do Remtron transmitters last so much longer than other wireless transmitters? The secret is in the design. Remtron transmitters are designed to be very frugal with the available battery power. We use the following three design techniques to greatly extend battery life:

- **Efficient "Packet Mode" Transmission** - Transmitting is the largest drain on battery power. Remtron Command Pro transmitters operate in the 900 MHz band, where wide-band operation is feasible. Many competitors operate in the 400 MHz band or lower, where narrow-band transmission is required to get the needed operating range. Operating wide-band allows a lot of data to be sent in a very short time. This in turn means that "packet mode" transmission can be used to send data in a short burst. Then the transmitter turns off until a new data packet is to be sent. Furthermore, using a data compression scheme that greatly decreases the transmitted bytes necessary to convey the necessary information further reduces transmission time. A transmitter that is turned on only for short periods of time requires less power to transmit data. Most of our competitors operate in a narrow band that requires almost continuous transmission to get the data sent.
- **Circuit Design Efficiency** - Our transmitter circuits are designed to be very efficient. The microprocessor is used sparingly and the transmitter is powered on only when sending data. Further, if no new data needs to be sent (no change in command switch positions), the transmitter duty cycle is further reduced to the minimum that will safely keep the system alive.
- **Smart Battery Management** - A battery power converter is used so that the maximum amount of power can be withdrawn from each cell before its useful life is expended. If a linear regulator is used to derive power from a battery, up to 70% of the available energy in the battery may be wasted. The power converter allows about 92% of the power to be withdrawn.

Remtron Command Pro transmitters boast the longest battery life in the industry. It was a goal during the design of the Command Pro series to minimize the battery issues. Most industrial remote controls require rechargeable batteries, with their inherent problems, or require the purchase of expensive specialized batteries from the manufacturer. In most cases, the batteries do not have very good battery life. For the convenience of our customers, Remtron designs its transmitters to use commonly available AA cells. Our transmitters also accept rechargeable AA batteries.