Reducing Serial PROM Quiescent Current to Zero

XC1700D family serial PROMs produce a high quiescent current because the read amplifiers are kept active. Because such a high quiescent current level does not allow for low-current applications, this situation has been changed in newer versions of these devices.

In the meantime, it is possible to achieve zero quiescent current by disconnecting the PROM ground lead from the system ground and connecting it to the LDC pin of the LCA. As a result, the PROM powers up together with the LCA (LDC goes Low immediately after power-up) and the PROM stays powered-up until start-up. When the user outputs go active, LDC goes 3-state and thus cuts off the PROM supply current. LDC must be configured as an input with pull-up resistor, not an active High output.

The PROM operating current (typically <5 mA) causes a voltage drop of typically 100 mV on the LDC output, reducing the PROM supply voltage by that amount. This violates the specification, but is guaranteed to work, since all PROMs are factory-tested at 4.5 V Vcc.

Multiple PROMs increase the LDC sink current by only 0.5 mA per additional PROM. LDC must never be active High, because there might be a few more CCLK pulses which would pull the PROM's CLK input below the level of the PROM Ground pin. Therefore, in user mode, avoid driving the PROM with any active levels. That means that the LDC and DIN pins cannot be used in user mode; they should both be configured as inputs with a pull-up resistor.

The CE input must be tied to the SCP ground pin, i.e. to LDC. If RESET is active High, it must be tied to LDC, the same as CE. If RESET is active Low, it must be tied to Vcc.

This assumes a simple design with one configuration stored in one or multiple PROMs. It is inherently impossible to use this design when multiple bitstreams are stored in one PROM or one daisy chain of PROMs. ♦