

Cost and Space Efficient Backlighting for Small LCD Panels


by Jim Williams

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A generation of small, portable, "palmtop" computing devices has recently appeared. These products have small LCD displays that use cold cathode fluorescent lamps (CCFLs) for backlighting. These lamps require high voltage AC current drive. Circuitry for this purpose should be physically small, cost effective and electrically efficient.

Figure 1 shows a design that meets the above criteria. The configuration is a current-fed resonant Royer converter driven by an LT1317B micropower switching regulator. The LT1317B effects a switch-mode cur-

rent sink, supplying the required Royer drive to close a loop at the FB pin. This path includes the lamp and a filter network that rectifies T1's high voltage AC output into DC. In this case, the circuit's operating point, and hence, the lamp current, is set by a potentiometer. Operating-point variation can also be achieved by voltage controlling the optional input, indicated on the schematic.¹ With the components shown, size is about 10mm (W) by 5mm (H) by 40mm (L). The Shutdown pin facilitates circuit turnoff, although removing power from the V_{IN} pin has similar results.

The closed loop operation yields excellent line regulation while ensuring that lamp currents never violate minimum or maximum values. These characteristics allow operation directly from the battery without intensity variation, flicker or shortening of lamp life. Simplicity, low component count, small size and cost effectiveness make this circuit an excellent choice for "palmtop" LCD illumination. 

¹ Those finding this description intolerably brief are directed to LTC Application Note 65, where this circuit receives more scholarly attention.

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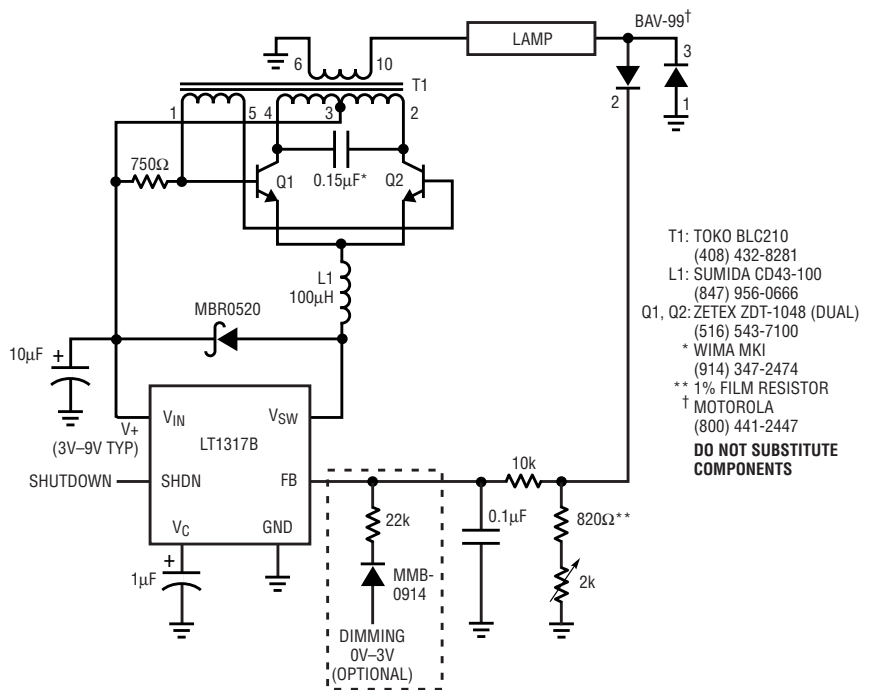


Figure 1. Palmtop computer LCD backlight supply

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