QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 516
LOW OUTPUT VOLTAGE, SYNCHRONOUS BOOST CONVERTER
LTC3423 and LTC3424

DESCRIPTION

Demonstration circuit 516 is a low output voltage, synchronous boost converter featuring LTC3423 (DC516A-A) or LTC3424 (DC516A-B).

The LTC3423/LTC3424 is ideal for applications that require an output voltage between 1.5V to 2.6V from a single alkaline or NiCd/NiMH cell. A bias voltage of 2.7V to 5.5V is required to power the internal circuitry. The output voltage is set at 1.8V. For 1V minimum battery voltage, the LTC3423 can provide up to 350mA, and the LTC3424 can provide up to 600mA.

The switching frequency is set at 1MHz, which gives a good trade-off between efficiency and size. See data sheet for efficiency data at different frequencies.

Design files for this circuit board are available. Call the LTC factory.

Table 1. Performance Summary

PARAMETER	CONDITION	VALUE
Maximum Load Current, Min (LTC3423)	V_{IN} = 1V	350mA
Maximum Load Current, Min (LTC3424)	V_{IN} = 1V	600mA
Typical Output Ripple V_{OUT} (LTC3423)	V_{IN} = 1V, I_{OUT} = 350mA	18mV_{P-P}
Typical Output Ripple V_{OUT} (LTC3424)	V_{IN} = 1V, I_{OUT} = 600mA	34mV_{P-P}
Nominal Switching Frequency		1MHz
Typical Efficiency (LTC3423)	V_{IN} = 1.5V, I_{OUT} = 300mA	90%
Typical Efficiency (LTC3424)	V_{IN} = 1.5V, I_{OUT} = 600mA	85%

QUICK START PROCEDURE

Demonstration circuit 516 is easy to set up to evaluate the performance of the LTC3423 and LTC3424. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

NOTE: When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the Vin or Vout and GND terminals. See Figure 2 for proper scope probe technique.

NOTE: The board should be connected to the bench power supply with short, thick wires. If long connection wires are used, electrolytic capacitors are recommended between VIN and GND, also VDD and GND to damp the voltage overshoot during plug-in. Refer to application note 88 for details.

1. Place jumper JP2 in the FIXED FREQ. position.

2. With power off, connect the input power supply to VIN and GND. This voltage is less than 1.8V.
3. With power off, connect the bias voltage to VDD and GND. **This voltage is between 2.7V to 5.5V.**
4. Turn on both power supplies. **The voltage applied at VDD has to be higher than VIN and VOUT.**
5. Place jumper JP1 in the RUN position.
6. Check for the proper output voltage. Vout = 1.746V to 1.854V.
7. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

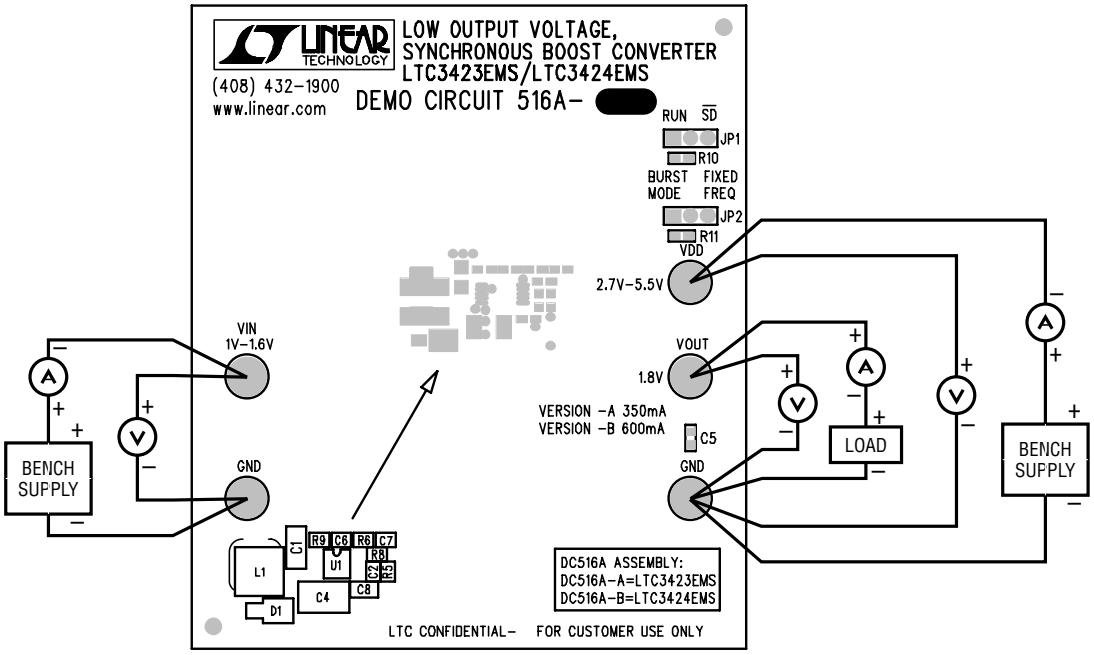

Figure 1. Proper Measurement Equipment Setup

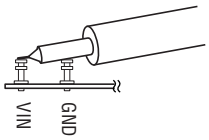

Figure 2. Scope Probe Placement for Measuring Input or Output Ripple

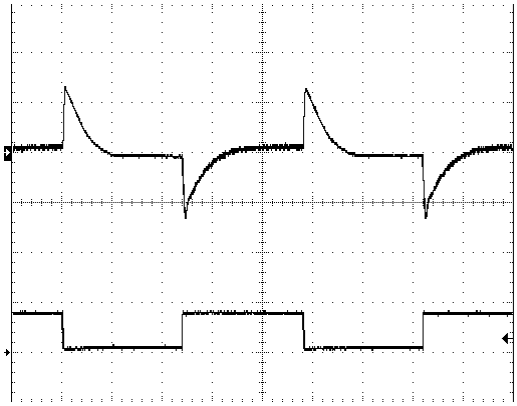

Figure 3. LTC3423 Transient Response (V_{IN}=1.2V, I_{OUT} from 50mA to 350mA; Top Trace:V_{OUT}, 50mV/DIV AC coupled; Bottom Trace: I_O, 500mA/DIV)

Figure 4. LTC3423 Transient Response (V_{IN}=1.5V, I_{OUT} from 50mA to 350mA; Top Trace:V_{OUT}, 50mV/ DIV AC coupled; Bottom Trace: I_O, 500mA/ DIV)

Figure 5. LTC3424 Transient Response (V_{IN}=1.2V, I_{OUT} from 50mA to 500mA; Top Trace:V_{OUT}, 50mV/ DIV AC coupled; Bottom Trace: I_O, 500mA/ DIV)

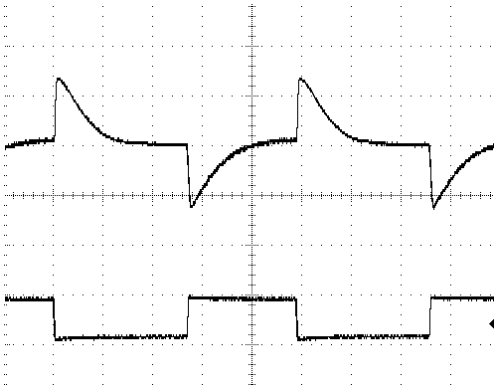

Figure 6. LTC3424 Transient Response (V_{IN}=1.5V, I_{OUT} from 50mA to 500mA; Top Trace:V_{OUT}, 50mV/ DIV AC coupled; Bottom Trace: I_O, 500mA/ DIV)