SQM-LU-DL Current requirements

The SQM-LU-DL was designed to be used from either a PC USB connection or the supplied battery adaptor. This test shows that some USB battery chargers are not suitable for keeping the meter powered.

Some USB battery chargers are not strong enough to initially drive the meter when it is first connected or when it starts up every one minute for a self-check. These weaker battery chargers drop out then retry which results in the meter starting up more than once before a proper reading can be taken.

You can see below that the CUI charger has two starts 320ms apart before the charger finally stays on. The visible symptom is that the LED on the meter flashes more than once when the unit is connected to power. Do not confuse this flashing with the new feature of flashing on power-down to indicate battery voltage level.

Scope waveform notes:

- 10 ohm resistor on ground line for measuring current with the 1X probe on the oscilloscope.
- Yellow trace is current
- Blue trace is voltage on the USB line.

Tests performed with SQM-LU-DL with 128Mbit FLASH EEPROM
Date: 2014-06-11

For reference, the waveforms for connecting to the PC are below:

Note: The PC voltage is 5.2V, this does not matter too much.

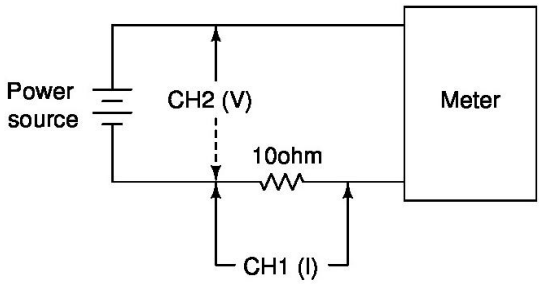

Illustration 2: Test circuit

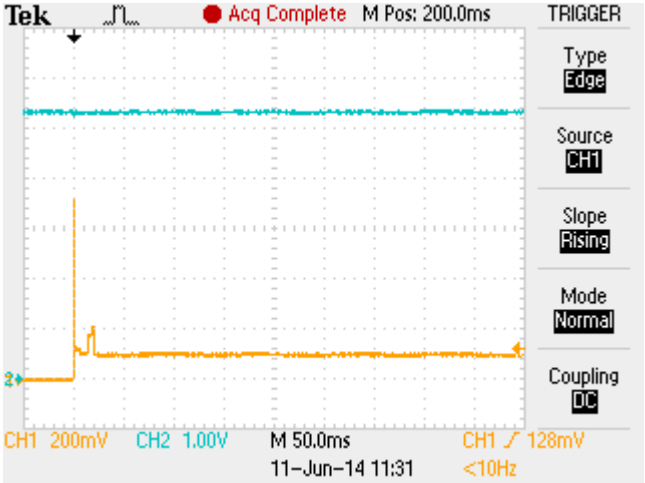

Illustration 1: PC connection start-up current and voltage

CUI charger

Comments:

1) Voltage charger drops out then picks back up, probably short circuit protection set too low.
2) The output voltage is greater than 5V which should not matter much.

Illustration 3: CUI power supply

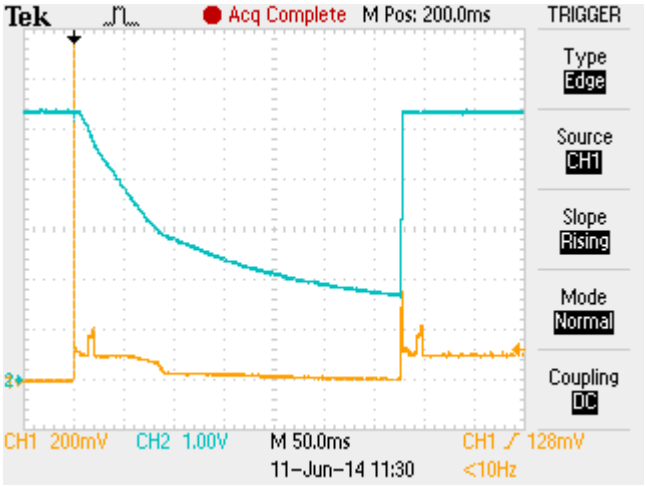

Illustration 4: CUI to meter start-up current and voltage

Intertek charger

Comments:

1) Tested fine.
2) Note that the voltage output is 5V.

Illustration 5: Intertek power supply

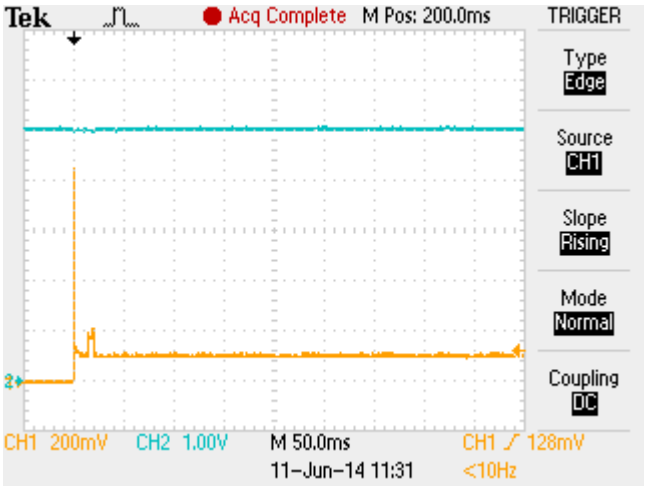

Illustration 6: Intertek to meter start-up current and voltage

AC adaptor with DL battery adaptor

The AC power supply from the SQM-LE kit is used with the battery adaptor from the DL kit. This implementation worked very well (there was no voltage dropout).

Illustration 7: LE power adaptor with DL battery adaptor

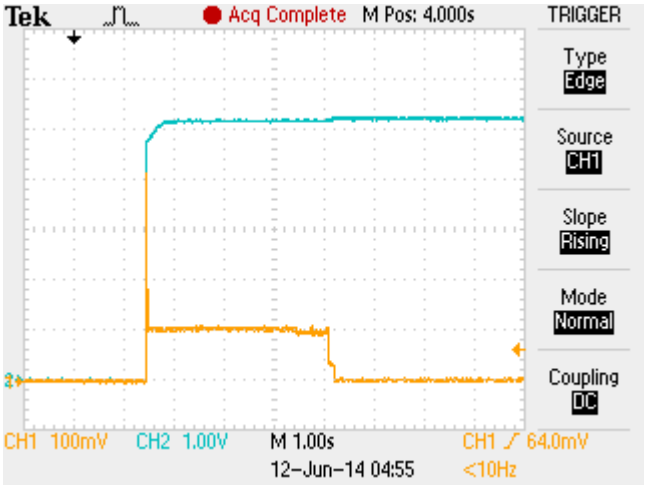

Illustration 8: LE connection. AC plugged in.

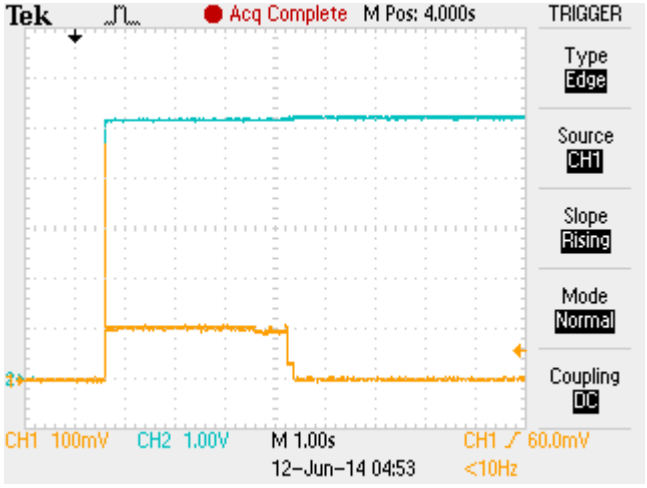

Illustration 9: LE connection. DC plugged in.

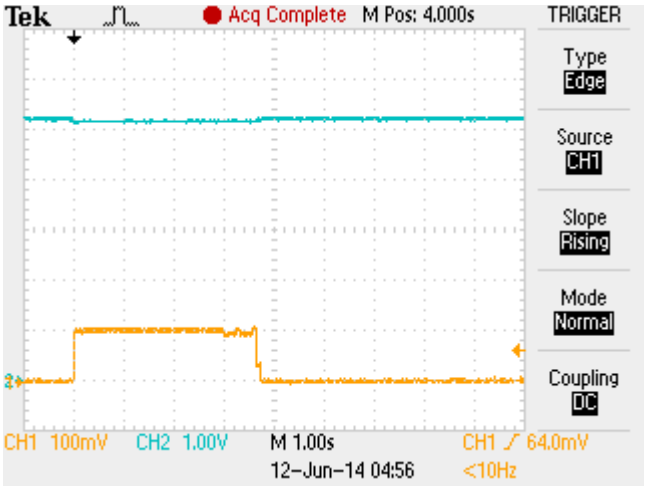

Illustration 10: LE connected. Every 1 Minute ("Off" mode).

Firmware feature 49 implements the following

Bugfixes:

1) Connection at :50-:57 seconds stalled for new RTC.
2) Initial false recording on USB connection not made anymore.

Features:

1) LED fading (~1 sec duration) to indicate wake from sleep every minute.
2) Initial and subsequent records marked separately.

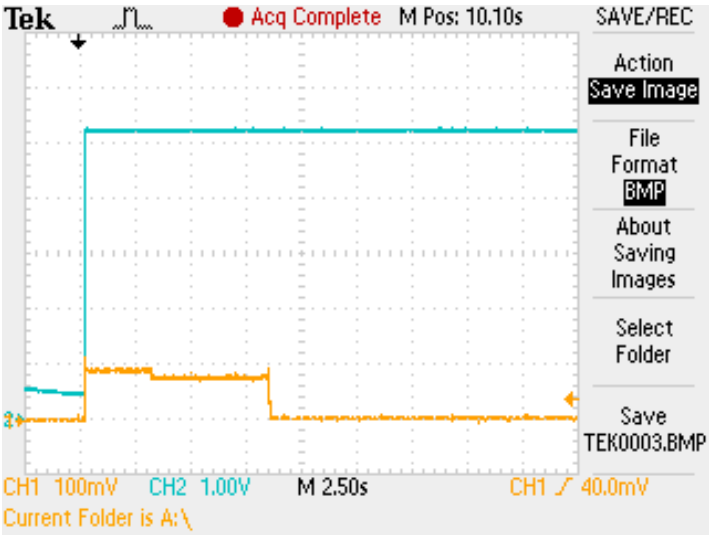

Illustration 11: Bootup

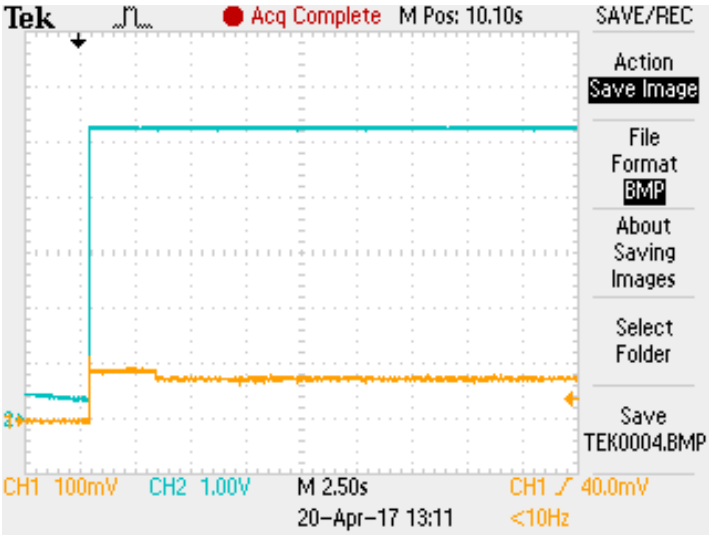

Illustration 12: Recording every 2 seconds.

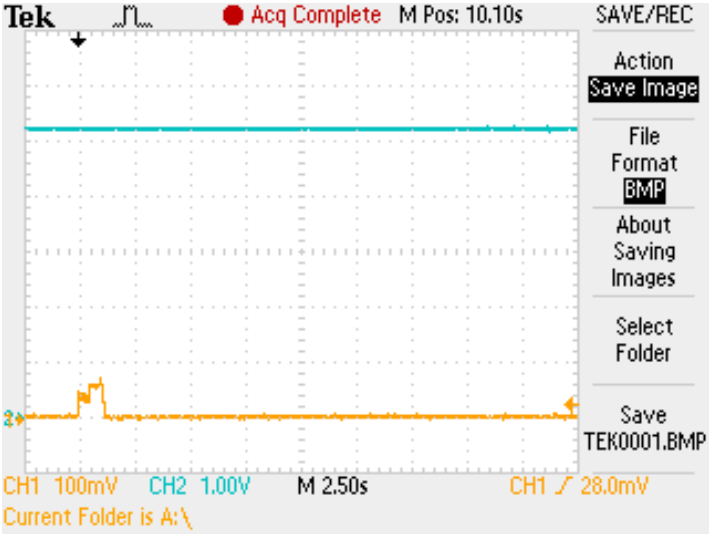

Illustration 13: Every x minute setting, when reading is not recorded.

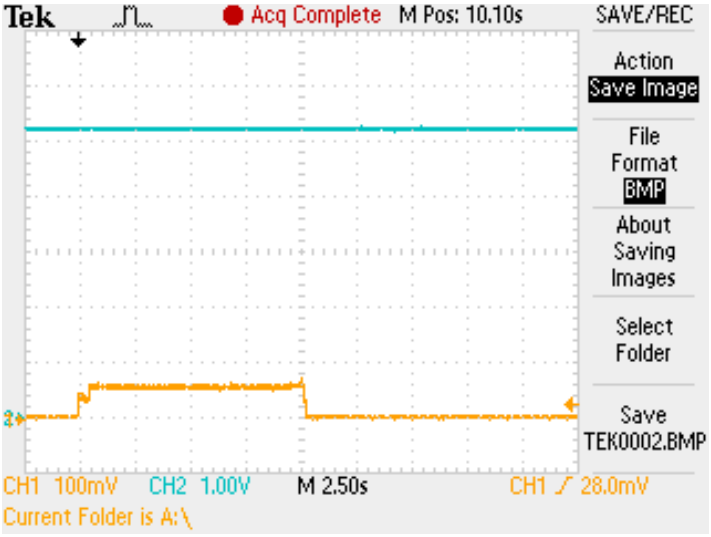

Illustration 14: Every x minute setting when reading is recorded.

The battery current during sleep (low level on oscilloscope plot) was measured at 230uA.