NOTES & ERRATA FOR PROJECTS PUBLISHED IN SILICON CHIP (2005)

Please note: errata apply primarily to the print edition of SILICON CHIP as online issues are normally changed when an error is identified. However some errata may still apply to the online edition; check carefully before making any changes to a project.

V8 Doorbell, January 2005: Further research has enabled us to improve the characteristic "V8" sound. Some changes to the circuit are involved plus revised software. First, the resistor changes are: (1) The eight 100kΩ resistors connecting to the RB0 to RB2, RA3 and RB4 to RB7 outputs of IC1 are changed to 2.2kΩ. This boosts the cylinder output levels. (2) The 47kΩ resistor between pins 6 & 7 of IC3b is changed to 2.2kΩ. This reduces the gain of IC3b to compensate for the added cylinder output signal. (3) The 1kΩ resistor at pin 3 of IC3a is changed to 10kΩ to increase the engine ambient noise level. (4) The 100kΩ resistor feeding pin 5 of IC4 from the filtered PWM signal connecting to the top of VR2 is changed to 8.2kΩ to increase the RPM range.

In addition, it is recommended that the 10μF capacitor in series with the 1kΩ resistor at pin 2 of IC5a be connected to ground rather than to the 5V rail.

In addition, capacitor changes have been made to the filter components connecting between IC2b and IC2a. These are larger to provide a smoother sound: (1) The 68nF capacitor at the drain of Q1 is changed to 220nF; (2) The 56nF capacitor at the drain of Q2 is changed to 100nF; (3) The 1nF capacitor connecting between ground and the filter is changed to 100nF.

Finally, the software changes alter the revving response and rev build up and decay rates. The revised software is designated ENGINE3.hex and is available on the ***SILICON CHIP*** website. (03/05)

Windmill Generator, January 2005: Visit the author's website **www.thebackshed.com** for further information.

Inductance & Q-Factor Meter, February & March 2005: (1) The specifications incorrectly stated the measurement range of the meter and its power requirements. The correct measurement range is 200nH – 999μH and the maximum current demand is about 300mA.

Also, the orientation of the ISP header on the overlay diagram (Fig.9) and various photos is opposite to that used on the ISP programmer (***SILICON CHIP***, October 2002). To use a pin-to-pin cable between the ISP programmer and the meter, install the ISP header the opposite way around to that shown on the overlay.

In addition, the 1N4148 diode above IC6 on the overlay diagram (Fig.9) should be labelled D8 instead of D9 and there are several discrepancies in the parts list, as follows: change 9 x 100Ω to 8 x 100Ω resistors; change 1 x 8.2nF to 2 x 8.2nF MKT capacitors; change 6 x 1N4148 to 7 x 1N4148 diodes; and add 1 x 130Ω resistor.

The lack of over-range indication in the original release of the microcontroller code is being looked at by the author and we hope that an update will be available on our website shortly. (07/05)

(2) An update for the AT90S2313 microcontroller firmware (v1.1) is now available from our website. The update incorporates two major changes from the initial release, which are: (1) the meter now reads up to 10mH as originally described; and (2) the meter indicates when both L and Q values are out of bounds (indicated by the letter "E" on the display).

In addition, to improve meter performance when measuring certain combinations of L & Q, install two pairs of series diodes in parallel with the test terminals, as shown on p117 of the January 2006 issue. The diodes can be fitted on the copper side of the PC board and must be 1N4148 small-signal types. The diodes act as dampers, serving to lower the peak of the ringing waveform to below 1.2V as quickly as possible.

The author also offers the following additional information on the meter's operation in regard to out-of-bounds detection and display:

The meter measures frequency and decay constant, so L and Q are derived quantities. This means that a Q value will be out of bounds when the meter can not acquire sufficient periods of oscillatory decay to reliably calculate a decay constant. This can occur for one of three reasons: (1) the Q is too low; (2) the Q is too high, so that negligible decay is observed on the scale of several hundred oscillations; or (3) the decay occurs on a very large time scale outside the range of the meter (this can occur when the measured frequency drops to several tens of kilohertz).

Note that an out-of-bounds Q does not automatically indicate that L and F are also unobtainable. These parameters will continue to be displayed, although their precision generally drops to around 10-20% of nominal. If no stable value for F can be had, then the L and F displays will blank out and a sole "E" will show in the Q position.

Constructors should also be aware that LC circuits can have parasitic oscillations. If these are large, they can register as an incorrect value for L.

This occurs because some inductors can not be well approximated by a simple theoretical L, so there is no unique answer to "what is the value of this inductor?". Nevertheless, the value derived from the frequency of oscillation with a given capacitor is a perfectly legitimate result, though if one were to make measurements at other frequencies, or use V = L x dI/dt to get L, a different answer could be obtained. In other words, some thought must be given to the details of the measurement, rather than relying solely on the instrument to produce the magic number! (01/06)

Pool Lap Counter, March 2005: On the circuit diagram (Fig.1), the seven outputs from the 4511B (IC3) are shown connected to the LED array in reverse order. For example, pin 13 of IC3 should go to pin 7 (segment "a") of the LEDs, pin 12 of IC3 to pin 6 (segment "b") of the LEDs, etc. Also, the decimal point (pin 8) of DS1 is shown connected to ground via a 1.5kΩ resistor. Instead, this resistor should go to the +12V rail. The overlay diagram (Fig.2) and the PC board (Fig.4) are correct. (04/05)

PICAXE Freezer Thermostat, Circuit Notebook, March 2005: The serial programming input (pin 2) and output (pin 7) for IC1 (page 73) are shown connected in reverse. (05/05)

Bass Extender, April 2005: Under the "Circuit Details" section on page 62, the text in the fifth paragraph states that the circuit shows a sealed enclosure when it actually shows a vented enclosure. The paragraph should be changed to read: "Accordingly, the values of resistors R1, R2 & R3 on the circuit are for vented enclosures. If you have sealed enclosures, R1 should be changed to 27kΩ, R2 to 47kΩ and R3 to 39kΩ. (07/05)

Meter Probe Extensions, Circuit Notebook, May 2005: The PC board pin sockets supplied by Jaycar (Cat. HP-1260) may vary from those described in the text. If the original items prove to be too small for your probe tips, then an alternative is to use standard female bullet connectors. These will need to be gently squeezed with pliers to close the contacts slightly for a snug fit over the probe tips. (08/05)

Shunt Regulator, June 2005: Transistors Q3 & Q4 are shown incorrectly oriented on the overlay diagram and photos and must be rotated 180°. The source and drain markings for the SDP55N03L Mosfet shown at the foot of the circuit diagram are reversed and the 47kΩ resistor in the collector circuit of Q3 connects to 5V rather than V+ as shown.

Depending on circuit tolerances, it may not be possible to adjust the trip voltage to 15V as described in the text. To improve the adjustment range, some changes to the resistive divider connected to pin 2 of the L4949 are required. For use with 12V systems, replace the 120kΩ resistor with a 100kΩ value, the 12kΩ with a 9.1kΩ and the 1kΩ resistor with a wire link. All resistors must be 1% tolerance types. Assuming a nominal reference of 1.23V, this will give an adjustment range of about 13.1V to 15.9V.

For 24V systems, replace the 120kΩ resistor (connected to VR1) with a 24kΩ value, the 12kΩ with a 4.7kΩ value and the 1kΩ with a wire link. The 120kΩ resistor connected to V+ must be replaced with a 15V, 0.5W zener diode. The effect of the zener is to reduce the hysteresis voltage so that it remains about the same as for the 12V system. Assuming nominal reference and zener voltages, the adjustment range after these changes will be about 25.9V to 30.5V. (08/05)

Coolmaster Fridge/Freezer Temperature Controller, June 2005: A 2.2kΩ resistor was erroneously included in the parts list and is not required. (09/05)

Lead-Acid Battery Zapper, July 2005: (1) The parts list on page 43 states that Q2 is a 60V device, whereas its VDSS rating is actually 100V. Also, on the circuit diagram (Fig.2), the pinout diagram for Q2 is labelled "IRF640N" instead of "IRF540N".

In certain situations, the Mosfet (Q2) may fail due to excessive drain-to-source voltage. To ensure that this cannot occur, a clamp circuit should be added to limit the peak voltage to a safe level. The clamp consists of a 75V, 1W zener diode (ZD2) in series with a UF4004 ultra-fast rectifier (D4), connected between the drain and source of Q2 (see page 107, September 2005 issue).

A modified PC board design that accommodates these extra parts will be available in the future. For those that have the original published PC board design, the two components are easily added to the copper (underside) of the board, as shown on page 107 of the September 2005 issue.

The anode lead of the UF4004 is soldered to drain pin of Q2, whereas the anode of the 75V zener is soldered to the source pin of Q2. Their cathode leads are then trimmed and soldered together. Note that both components must be positioned flat against the PC board surface, with their leads shaped roughly as shown. Overall lead length should be kept to a minimum, and as a final step, the diodes can be glued to the PC board to ensure long-term reliability.

Finally, we recommend that a switch be fitted in series with the positive battery lead to allow the unit to be isolated during connection and disconnection. This eliminates the possibility of arcing at the battery terminals. Any miniature mains-rated switch would be suitable, such as the Jaycar SK-0975 miniature toggle switch.

A 10nF 100V polyester capacitor (Jaycar RG-5065) must be fitted directly across the switch terminals, as shown on page 107 of the September 2005 issue. (09/05)

(2) This project must not be permanently installed across the battery in a car or any other vehicle. The high voltage pulses it generates could easily damage the electronics in the vehicle. (11/05)

Automatic Lamp Dimmer, July 2005: The 4-band colour code listed for the 470Ω 1% resistor is incorrect. It should be yellow violet brown brown. (09/05)

Serial LCD Driver, August 2005: Transistor Q2 on the overlay diagram (page 76) is shown reversed. The various photos and the silk screen on the PC board show the correct orientation. (09/05)

Carbon Monoxide Alert, August 2005: The 4-band colour code listed for the 470Ω 1% resistor is incorrect. It should be yellow violet brown brown. (09/05)

Programmable Flexitimer, August 2005: On some timers, the LCD module does not initialise correctly. Instead, it displays just a single row of black squares and does not progress to showing the opening greeting and then the timer settings. As a result, we have revised the PIC firmware to prevent this problem, which occurs on modules that are "slow to wake up". The updated firmware file is designated PICTIME2.hex and can be downloaded from **www.siliconchip.com.au**

Some readers have also asked how to give the timer a continuous cycling mode. This has now been achieved and the continuous cycling mode is set simply by entering zero (00) as the setting for "Cycles". The second line of the display shows "Cont" when the timer is in this mode. It can be returned to finite multiple cycle mode simply by setting the number of "Cycles" to any allowed non-zero value – ie, 1-99. (12/05)

Automatic Alternate Motor Switch, Circuit Notebook, September 2005: The pole of switch S1a should connect to +12V via the contacts of the time clock, not to +5V as shown. (10/05)

VoIP Analog Phone Adaptor, September 2005: The line (speaker) output connector on most PC sound cards is colour-coded green, not blue as stated in the article. Also, the adaptor will not work with professional audio sound cards that lack an internal microphone preamp. (05/06)

Filter For Ripple Control Mains Tones, Circuit Notebook, September 2005: WARNING: Do not use this circuit. Due to a major oversight, this circuit was not tested at 240VAC which would have highlighted the following drawback. Regardless of the values of the capacitors selected for the circuit, their reactance will be quite low, resulting in the application of high voltage to the 2W potentiometer which will fail at switch-on. (10/05)

Alcohol Level Meter, October 2005: The text on page 71 regarding a standard drink being a 200ml nip of spirits is wrong. A standard drink contains 10g of alcohol such as in a 285ml glass of full strength beer or a 30ml measure of spirits. (11/05)

PICAXE iButton Reader, October 2005: On the circuit diagram, pin 1 of the serial socket (CT1) should connect directly to pin 7 of the PICAXE chip, not to the anode of the LED as shown. The circuit board and overlay are correct. (12/05)

Studio Series Stereo Preamplifier, October 2005: the parts list erroneously shows transistors Q1-Q5 as BC337 types, instead of BC327. The circuit and overlay diagrams are correct. (02/06)

Serial IO Controller & Analog Sampler, November 2005: (1) The 10kΩ resistor going to the base of transistor Q3 on the circuit (Fig.3) should be changed to 4.7kΩ. The parts layout diagram (Fig.4) is correct. In addition, the parts list should show 4 x 4.7kΩ resistors, 2 x 10kΩ resistors and 16 x 100nF MKT capacitors. (12/05)

(2) The PC board pattern erroneously connects the positive lead of the 220µF supply-rail filter capacitor to the anode of diode D1. It should instead go to D1's cathode. The circuit diagram on page 73 (Fig.3) of November 2005 is correct.

While the circuit will still work in this configuration, there is no reverse polarity protection for the 220µF capacitor if the power supply is connected the wrong way around. The solution is to mount the 220µF capacitor as shown in the diagram on p117 of the January 2006 issue. This involves drilling a small hole in the PC board at the indicated location, to accept the capacitor's positive lead. This lead can then be bent flat against the PC board and soldered to D1's adjacent cathode pad.

Note that only early kit versions should need this modification, as later kit versions will be supplied with a corrected PC board. Check your supplied PC board carefully to see if the modification is necessary.

In addition, there was a bug in the Windows interface software that prevented the input values from being displayed on machines running Windows XP. This has now been corrected and the revised software posted on our website. (01/06)

(3) The Windows-based software program can crash after running for an extended period – ie, when the logger reaches its maximum 2048 number. This bug has been fixed and the revised software posted on the ***Silicon Chip*** website. (07/06)

Universal High-Energy Ignition System, December 2005: There are several errors in the parts list published in Pt.1. In the main section, there should be three (not two) 100µF capacitors, the LM2940CT-5 regulator should be designated REG1 and there should be three (not two) crimp eyelets. In addition, the 22Ω resistor listed under the "Optical Pickup Version" heading should in fact be 22kΩ. (01/06)