SMTidbits

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# SMT Electronics in Education and Industry

Many schools teaching electronics in the United States are not yet teaching Surface Mount Technology (SMT). The general perception is that implementation is expensive and difficult due to the high equipment cost and small component size. Taking a quick look at SMT, it is easy to see how this perception has come into play. The reality is this: the high-end equipment is not practical in most educational environments. Nevertheless, the knowledge of running SMT equipmentis an industry worthy skill. Additionally, there is greater value in the skill of reworking SMT PC boards.

PCBs are not really "Plug-and-Play". As technology advances the cost of components and complex assemblies will increase, forcing manufacturers and repair shops into board level troubleshooting. The removal and replacement of these components requires skill and much practice to avoid destroying the PCB. With little investment, a good SMT assembly kit can be turned into an invaluable rework training aid when combined with a Solder Paste Dispenser, a Hot Air Station or Reflow Oven and a good set of SMT Tweezers. Having good rework skills and a sound foundation of SMT component identification and assembly documentation, will bring a student farther, faster, in the continually evolving world of SMT electronics.

Circuit of the Month . . .

Microcontroller Replacement Circuit for 7-Segment Display Decoder/Driver

This circuit is a great replacement for a 7447 BCD to 7-Segment Display Decoder/Driver IC, utilizing a Microchip PIC16C54C or PIC16F84 microcontroller. The MCU programming is a basic lookup table with outputs RB0-RB6 referencing segments A-G. The output should be programmed as a high to accommodate a common cathode display as shown in the diagram. If your display is a common anode, your outputs should be low. If your binary input is automated, change the value for R2 or replace with a 1M potentiometer to adjust the display refresh rate so your count is displayed when written to the MCU.
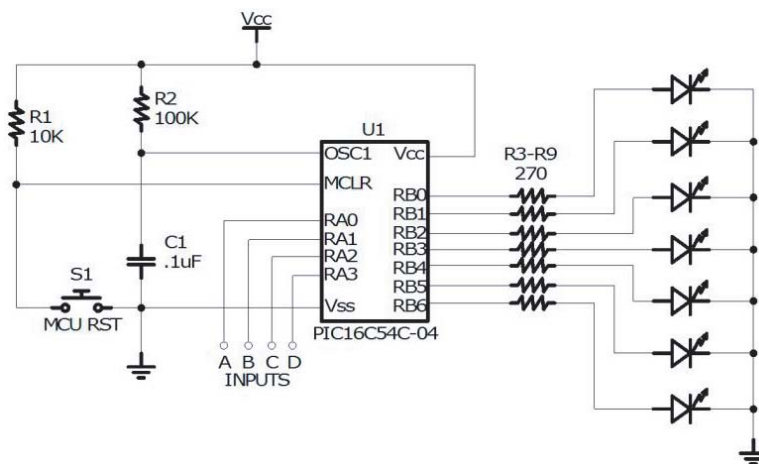
Microcontrollers in the Classroom

Microcontrollers (MCUs) are an essential component in electronic design. Using an MCU in a design not only adds programmability to a design, but also allows the designer to create smaller Printed Circuit Boards with fewer components resulting an overall smaller device. MCUs come in many types and package styles with different memory sizes and various numbers of I/O points and peripherals. Students with basic knowledge of MCUs or skills in MCU programming are a great asset to the electronics workforce.

One of the most widely used MCUs is manufactured by Microchip. Microchip's PIC MCUs are a great solution for teaching in the classroom. Utilizing just over 30 instructions, students can be implementing this technology into circuits in a short period of time. There are many good books out there, written about the PIC MCUs and usually contain circuits and programming which can aid implementation in the classroom.

There are many tools available to aid the teaching of MCUs in your classroom. Easy Microcontrol'n, available at www.sq-1.com is a great book for beginners and provides some excellent labs and projects. Many programmers are available; however Microchip's PICSTART Plus Programmer is the best choice for ease of use and support and can be purchased for under $200.00. The software comes with the programmer and is also free for download at www.microchip.com . To start using MCUs you will have to choose a PIC from the many ICs, manufactured my Microchip. The PIC16F84 is an excellent chip to start with. This chip is easy to use has good memory and twelve I/O points. The memory is also flash (designated by the "F" in the part number), so it can be erased using the programmer many times. MCUs with the "C" designation are one time programmable (OTP). For more information please contact us at Support@SMTKit.com .

INTELLITRONIC DEVICES