uC Training System Two Page Quick Guide Rev. 3

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Hardware:
There many elements such as LED drivers, DIP switch inputs, 7-segment connections & drivers, Max232 configurations, DAC connection, EEPROM connections, 2.4 GHZ MRF24J40MA RF module, SPI interface, LCD connections, 3*4 or 4*4 keypad pins pull up, optical isolator connections, power FET configurations, 8 bit SPDT hardware switch debounce, and connection sockets for TI Tiva C series launch pad with ARM M4 MCU are already done on the PCB (Printed Circuit Board). Users are only required to use proper interface between the PIC microcontroller pins and available modules on board to do the desired experimentations.

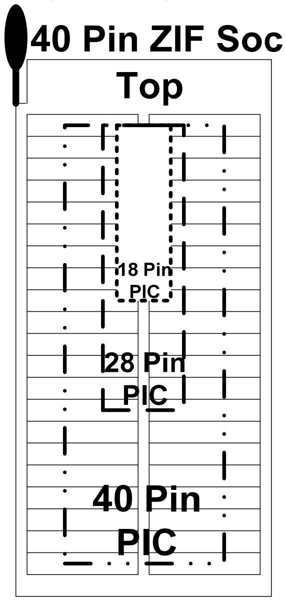
Software:
The software that can run on this training system. The "PICKit2" that is downloadable from www.microchip.com/pickit2 or www.ucdistancetraining.org runs on a PC USB port and its operations are detailed in the first part of "Software Operation" section.

PIC MCU Programming mode vs. Operation mode:

This uC Training System is capable to program and re-program the PIC MCU that stays in the 40 Pin ZIF socket and running user's operation software without relocating the MCU. Here are the ways of exchange between these programming and operation modes:

Note: Keep all switches of S6 in OFF positions, and S5 switches: 1-4 in ON and 6-8 in OFF postions.

Programming:



1. Place the MCU properly in the 40Pin ZIF socket as presented on the left and lock it with the arm down.
2. Set the package selection switches **S1**:
   (1) DIP switch 1-5 OFF and 6-10 ON ➔ Used with 18 Pin PIC
   (2) DIP switch 1-5 ON and 6-10 OFF ➔ Used with 28 or 40 Pin PIC
3. Set the **S4** switch properly for target MCU in programming/operation mode:
   (1) SW1 OFF & SW2 ON ➔ Use with 18 Pin PIC Programming
   (2) SW1 OFF & SW2 ON ➔ Use with 18 Pin PIC Normal Operations
   (3) SW1 ON & SW2 OFF ➔ Use with 28 or 40 Pin PIC Programming
   (4) SW1 ON & SW2 OFF ➔ Use with 28 or 40 Pin PIC Normal Operations
4. Connect the power to J1 power jack.
5. Connect USB cable to USB connector X1.

6. Run PICKT2 or MPLAB software
7. The software should recognize the target MCU in the 40Pin ZIF socket.
8. From here you can **Import** the .HEX file then click **Write** to program the MCU.

Operation:

1. Leave **S1** package selection switches unchanged and **S4 ON/OFF properly shown above in item #3**.
2. Simple press the **S2** or **S3** (for different package MCU) RESET switch, the MCU should boot and run the loaded source code (your .HEX file).

Re-programming:

1. Leave **S1** package selection switches unchanged and set **S4** for different PIC programming settings:
   (1) SW1 OFF & SW2 ON ➔ Use with 18 Pin PIC Programming
   (2) SW1 ON & SW2 OFF ➔ Use with 28 or 40 Pin PIC Programming

Note: PIC programming uses RB6, RB7, & MCLR pins on the MCU, so there may be a conflict between normal operation and programming function. If this happed, follow the suggested steps below:

2. Under PICKit2 "**Tools**" manual, select "**Check Communication**". This should stop the operation mode of the MCU and force it in programming mode. The software should recognize the target MCU in the ZIF socket.
3. If it is not successful, **press and hold the RESET switch** (**S2** or **S3** depends on the PIC package) do it again, then the PICKit2 should recognize the target MCU.
4. If the target MCU still can NOT be recognized, check/do the following:
   (1) Make sure your application interfaces are not pulled the RB6 and RB7 I/O pins down.
   (2) If they are, then your choices are
      (a) **Press and hold the RESET** switch (**S2** for 18 Pin MCU or **S3** for 28 or 40 Pin MCU), then click the "**Check Communication**" make sure the target MCU is recognized by the software, the re-program the MCU in following step #5, after it is done, then power down reconnect the RB6 and RB7 interfaces, then power up. The system should run with your new .HEX file, ignore a signal if it says "Verification Failed".
      (b) Power down the system, disconnect the RB6 and RB7 interfaces, power up then click the "**Check Communication**" make sure the target MCU is recognized by the software, the re-program the MCU in following step #5, after it is done, then power down reconnect the RB6 and RB interfaces, then power up. The system should run with your new .HEX file, ignore a signal if it says "Verification Failed".
      (c) Power down the system, disconnect the OSC1 and OSC2 resonator interface between SV4 and MCU oscillator pins, power up the system, then click the "**Check Communication**" make sure the target MCU is recognized by the software, the re-program the MCU in following step #5, after it is done, then power down reconnect the OSC1 and OSC2 interfaces, then power up. The system should run with your new .HEX file, ignore a signal if it says "Verification Failed".
5. **Press and hold the RESET switch** (**S2** or **S3** depends on the PIC package), under the main manual "**File**", select "**Import Hex**", choose the proper .HEX file then click on "**Write**" to re-program the target MCU. At this point you may encounter a verification fail, but the .HEX should be already programmed and the MCU should start running with your new code. Ignore a signal if it says "Verification Failed".

TI Tiva C series launch pad with the uC trainer board:

The TI Tiva C series software can be downloaded from: **www.ti.com** or **www.ucdistancetraining.org.** This uC Training System is capable to run with TI ARM M4 MCU when the TI Tiva launch pad is inserted into the sockets: SV7 (TI_CONN_1_L) and SV8 (TI_CONN_2_R), the switches setups are:

S1: 1-10 in OFF, S4: 1-2 in OFF, S5: 1-8 in OFF, and S6: 1-8 in OFF positions.