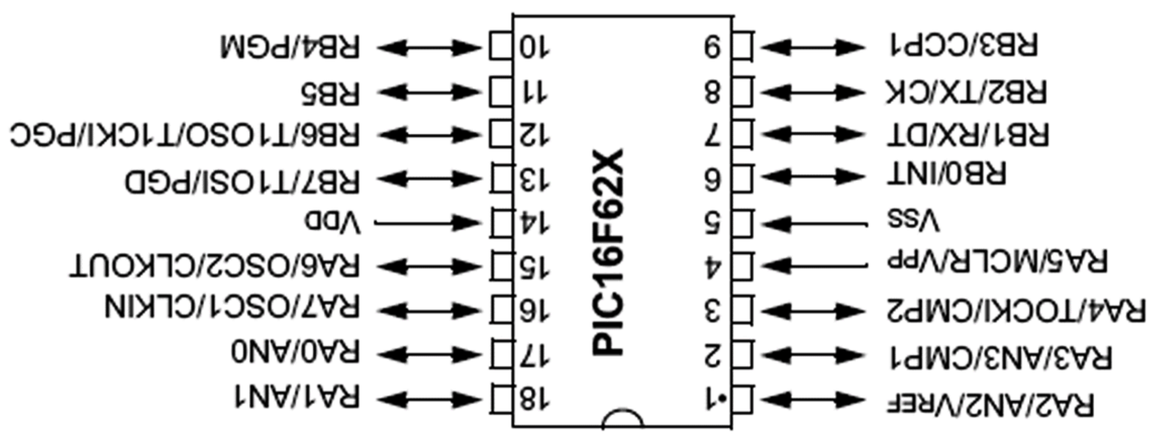
What's a PIC?

PICs (programmable interface controllers) are inexpensive microcontrollers. Simply speaking, they are little chips that can be programmed in order to give your electronics computing power.

Languages that you can use to program the PIC include Assembly, BASIC, and C. A special piece of hardware called a PIC programmer is also used so you can get your code off your computer and into the PIC. (More about programming a PIC later.)

There are many different models of PICs. Some are itty bitty (only 6 input/output pins) but have limited functionality; others might have 80 pins, faster processing speeds, more memory, built-in serial ports, and numerous other goodies.

PIC16F62X PIN DIAGRAM (PDIP AND SOIC*)



* The hardest part of learning anything technical is getting use to all the acronyms. When it comes time to buy your first chip, you'll see PDIP, SOIC, SSOP, QFN, etc. all over the place. These acronyms refer to the package type that it comes in (typically a rectangular black plastic shell with metal side leads for the input/output pins -- kind of bug-like).

Unless you're a soldering jedi master, you'll want to stick with a chip that has the letters DIP in it since the leads are spaced 0.1 inches apart and are fitted for prototyping your circuit on a breadboard. The other package types are smaller and were designed for machines to do precision soldering.

PIC16F62X PIN DESCRIPTIONS (EXAMPLE)

Name	Function	Input Type	Output Type	Description
RA0/AN0	RA0	ST	CMOS	Bi-directional I/O port
	AN0	AN	—	Analog comparator input
RA1/AN1	RA1	ST	CMOS	Bi-directional I/O port
	AN1	AN	—	Analog comparator input
RA2/AN2/VREF	RA2	ST	CMOS	Bi-directional I/O port
	AN2	AN	—	Analog comparator input
	VREF	—	AN	VREF output
RA3/AN3/CMP1	RA3	ST	CMOS	Bi-directional I/O port
	AN3	AN	—	Analog comparator input
	CMP1	—	CMOS	Comparator 1 output
RA4/T0CKI/CMP2	RA4	ST	OD	Bi-directional I/O port
	T0CKI	ST	—	Timer0 clock input
	CMP2	—	OD	Comparator 2 output

Programming a PIC

So now that you've got an idea of what a PIC is, how do you get it to do anything? As mentioned earlier, you can use a few different programming languages.

Assembly is a simple, human-readable notation for machine language -- so instead of `10110000 01100001`, you'll write `MOV AL, 0X61`.

C is a medium-level programming language -- still close to machine language but more readable than Assembly.

And BASIC is a high-level programming language in which the level of abstraction from machine language is higher than Assembly or C -- so you'll find more words that look like English.

For beginners, BASIC is great to start with so here's a code example using a BASIC-variant especially designed for PIC programming:


```
CMCON = 7
TRISA = %00100000
TRISB = %00000010
ROW VAR BYTE

MAIN:
  FOR ROW = 0 TO 7
    IF ROW=1 THEN ROW=2
    PORTL = %11011111
    HIGH ROW
    PAUSE 100
    PORTL = 0
    LOW ROW
    PAUSE 100
  NEXT ROW

GOTO MAIN
```

Sorry, no room in this booklet for code commenting! This snippet of code simply loops through the rows of a LED matrix and turns them on with a HIGH, pauses for 100 milliseconds, and then turns them off with a LOW.

Check the (fly)light weblog for the full version (comments included!) and diagrams of the circuit board.

Glossary

I/O – Input/Output
LED - Light Emitting Diode
CMOS - Complementary Metal-Oxide-Semiconductor
OD – Open Drain
PIC - Programmable Interface Controllers
DIP - Dual In-line Package
PDIP - Plastic DIP
SPDIP - Skinny Plastic DIP
SMT - Surface Mount Technology
SOIC - Small-Outline Integrated Circuit
SSOP - Shrink Small-Outline Package
QFN - Quad Flat No-Lead
Vss – power source
Vdd – ground
BASIC - Beginner's All-purpose Symbolic Instruction Code

DISCLAIMER:

THE AUTHOR OF THIS BOOKLET IS NOT AN ELECTRONICS EXPERT. TO THE BEST OF THE AUTHOR'S ABILITY, THE CONTENT CONTAINED WITHIN HAS BEEN VERIFIED FOR ACCURACY BUT, YOU KNOW, MISTAKES HAPPEN. YOU CAN, HOWEVER, BE REST ASSURED THAT THE AUTHOR HAS NOT MADE ANYTHING UP IN ORDER TO HIDE HER LACK OF ELECTRONICS EXPERTISE. SO USE CAUTION WHILE HANDLING LIVE ELECTRICAL COMPONENTS AND, IF EVER IN DOUBT, DON'T BE AFRAID TO ASK STUPID QUESTIONS.

QUESTIONS, COMMENTS, OR ERRATA?
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