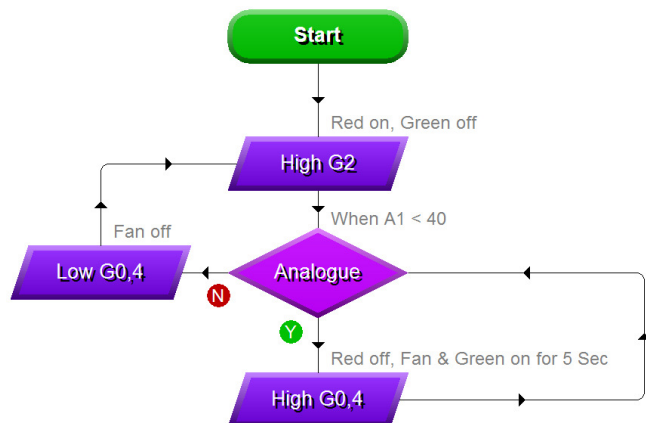


Automatic Hand Dryer

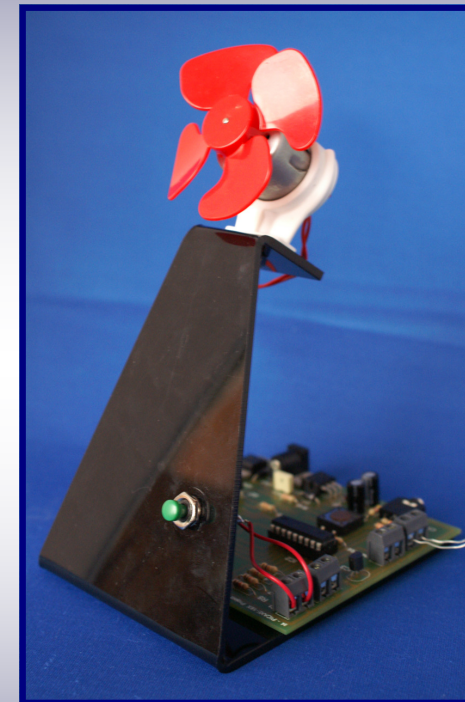
This program uses 2 led's to indicate state, an LDR to measure light level and a fan connected to a motor. When the program starts (power on) it will turn on the red led. If the light level is above 40 it follows the N loop and continues to keep checking light level. When the light level falls below 40 (e.g. hands placed under dryer) it will follow the Y loop. This will turn off the red led, turn on the green led and the fan for 5 seconds and then return to check light levels. Depending on the light level it will then follow the N or Y loop. Fan will continue to run and green led remains on until the light level rises above 40.



T4—Technology Subjects Support Service
Galway Education Centre, Cluain Mhuire, Wellpark Galway
Phone: 091 – 745650 E-Mail: admin@t4.ie
Web Site: www.t4.ie



**E.T.T.A.
Conference 2009**



**Interactive Control in
Engineering Projects**

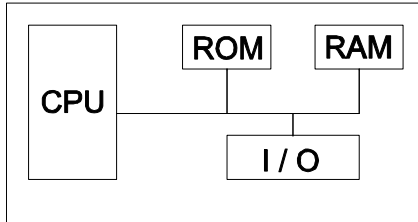
(Electronics and Control)

PIC (Peripheral Interface Controller)

A PIC is an Integrated Circuit which can be programmed from a computer to respond to one or more inputs and control one or more outputs, i.e. it can be compared to 'a computer on a chip'.

The reason why it is often called a computer on a chip is that a PIC contains

- ROM (Read Only Memory)
- RAM (Random Access Memory)
- I / O (Input / Output)
- CPU (Central Processing Unit)



Examples of PIC Applications:

- Household appliances - Washing machines / microwaves
- Alarm systems
- Medical equipment
- Vehicle subsystems - engine management / remote locking
- Traffic lights
- Car barriers
- Entertainment industry
- Toys
- Vending machines
- Display units

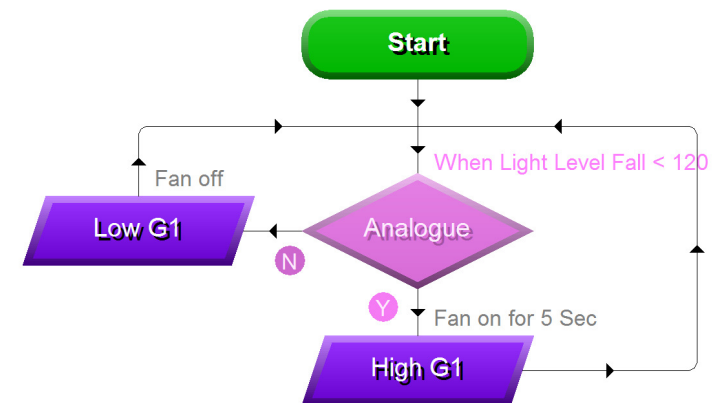


Advantages of PICs :-

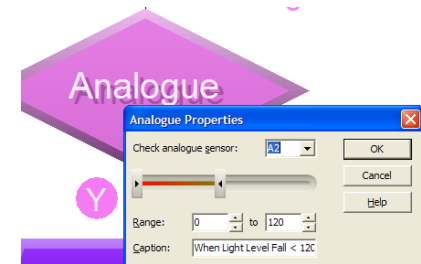
- PICs can be repeatedly programmed and reprogrammed
- Increased reliability due to less circuitry requirements
- Rapid product changes can be made by changing the program and not the electronic hardware
- Greater product flexibility and adaptability
- Provides a platform to support the development of simple to complex solutions i.e. What If ?

Light Activated Desk Fan

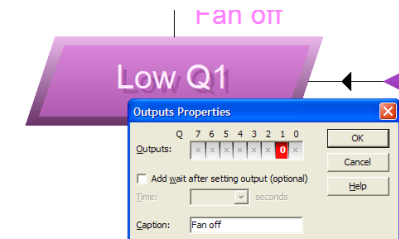
This program is similar to the previous Desk Fan, but uses an Analogue input (LDR) to automatically turn on the fan. If the light level remains above 120 the N Loop is followed and the fan remains off. If the light level falls below 120 the Y loop is followed, the fan is turned on for 5 seconds and the program returns to the start to repeat the program cycle.



Setting the sensitivity of the LDR which will act as the switch. Note: LDR is connected to input 2 (A2)

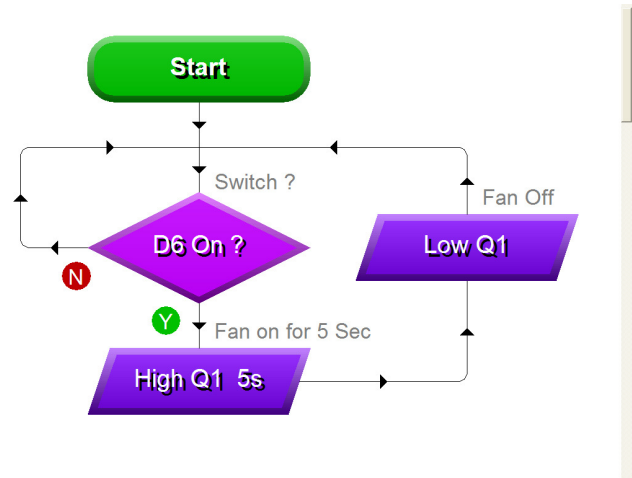


Setting for having the fan turned off. Motor is connected to output 1, which is set to low (0 = off).

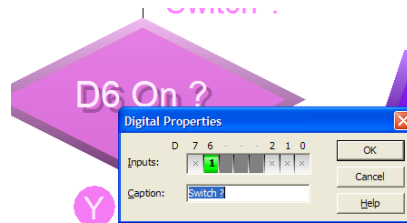


Desk Fan

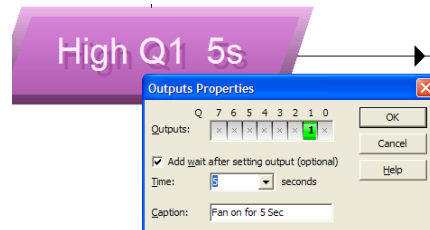
The program checks to see if the switch is pressed. If the switch is not pressed (on) it will return to the start and continue checking (N loop). When the switch is pressed (Y loop) the program proceeds to turn on the fan (Output 1) and will run the fan for 5 seconds. It will then turn off the fan and return to the start. Note this program runs continuously.



Setting the program to check that Switch (Input 6) is on (high)



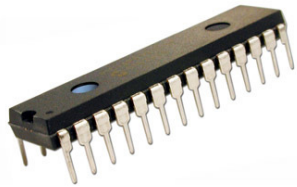
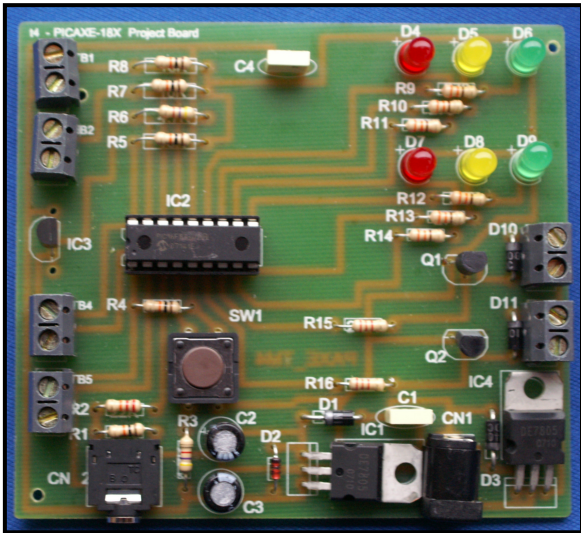
Setting Output 1 to high (1) to turn on fan.



Control Software

There are various software programs such as PIC Logicator, Genie Design Studio and others that can be used to program PIC's. As a teaching resource T4 commissioned the manufacture of a special PCB board for use by schools implementing the Technology syllabus. These boards are available to all schools. The t4 Project Board has five on board inputs and eight outputs. Using the appropriate software to match the onboard PIC the PIC can be programmed and re-programmed to control the various inputs and outputs.

T4 PICAXE 18X Project Board (5 inputs, 8 outputs)



Genie Design Studio Control Software

The software uses a flowchart to control the various inputs and outputs.

A series of command boxes are available on the right of the screen in the Gallery and these are selected by clicking on them, holding down the mouse button and dragging them on to the work area.

To complete the program each block is linked by a connecting line to show the sequence of operation as shown opposite.

This sample program will carry out the following commands:

- Turn on all the Red LED's on the t4 board. (The Red LED's are connected to outputs number 2 and 5 on the Project Board)
- Wait for 2 seconds.
- Play a sound for 2 seconds
- Stop the program

A simulation of the program can be run on screen to check the for any errors.

When the program is ready it can be downloaded to the PIC chip using a USB cable.

When the program is downloaded it will turn on the requested LED's and play the sound.

The Program shown on page 6 will operate the Desk Fan.

The program on page 7 will activate the fan automatically depending on the light levels present.

The program on page 8 uses 2 led's to indicate state, an LDR to measure light level and a motor.

Genie Design Studio Control Software

