MIAC controlled cooling system

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Abstract

Keeping The CPU in my PC has always been a big issue as has the noise of having many case fans constantly running, when I was introduced to the Advanced MIAC module I saw the perfect opportunity to create a temperature based fan control unit.

Requirements

Software:

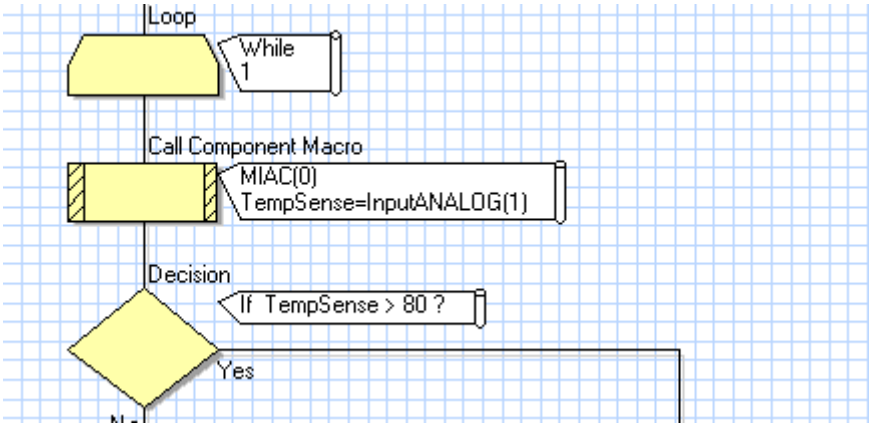
- Professional version of Flowcode V5

Hardware:

- MIAC Controller Unit
- MIAC Advanced Add On Unit
- Vernier Temperature Probe
- 2 X 12V DC case Fans

My personal computer has a tendency to get quite hot! I have been using 6 case fans to keep the temp down, this however brings along a problem of it own in which it is very noisy.
I had being getting to grips with the use of Flowcode and looking at the hardware that it can support and saw a perfect opportunity to create a solution the problem I have been having.
Using a MIAC controller & a MIAC Advanced add on unit was a great choice of kit to use as a temperature controlled cooling fan system as the sensor ports on the Advanced unit were perfect for a temp sensor. The solution to the problem I have been is easily solved as I can easily set a temperature reading to activate & De-activate the cooling fans.

The first part of the project was to find the correct hardware to use along side the MIAC controller unit I initially planned to use just the MIAC on its own and the using a really basic temp probe from Multi-meter via the input channel, however this didn't work I had to use a resistor through the temp sensor other wise the sensor got very hot! I soon realised this was not the best option for what I wanted.



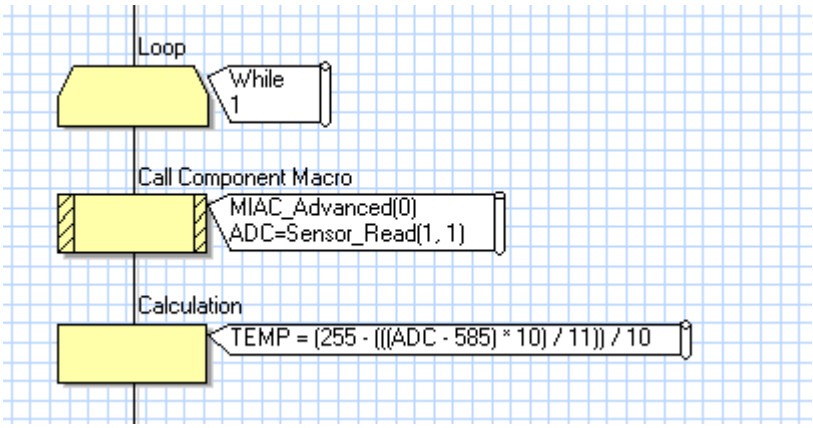
Snippet from first programme

By using the look up table that is available on the Matrix website I was able to determine what number I would need the byte at to replicate a certain temp (80 = 25C)

Once I had realised this was not the way forward I quickly decided to use the Advanced MIAC add on unit as this promised a much better reading as I could use a Vernier Temp probe

I quickly came aware how user friendly the Advanced unit is to use, it was really simple to set the unit up to read the signal.

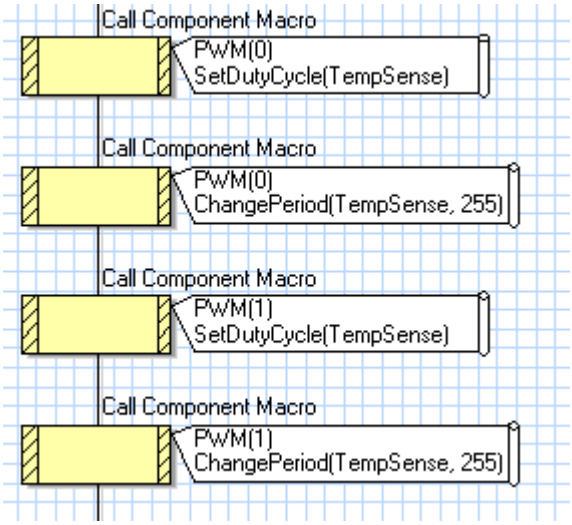
As you can see it is just a simple Macro that is need and Variable type as 'INT'



Once the Advanced unit was set up to read the signal the next thing to do to get the calculation correct.

As you can see on the left this is the calculation used with again a new variable as 'INT'

I initially chose to use the relay outputs to power the case fans but quickly realised the PWM outputs were much more flexible as there is always the opportunity alter the speed that the fans run at as the temperature rises.



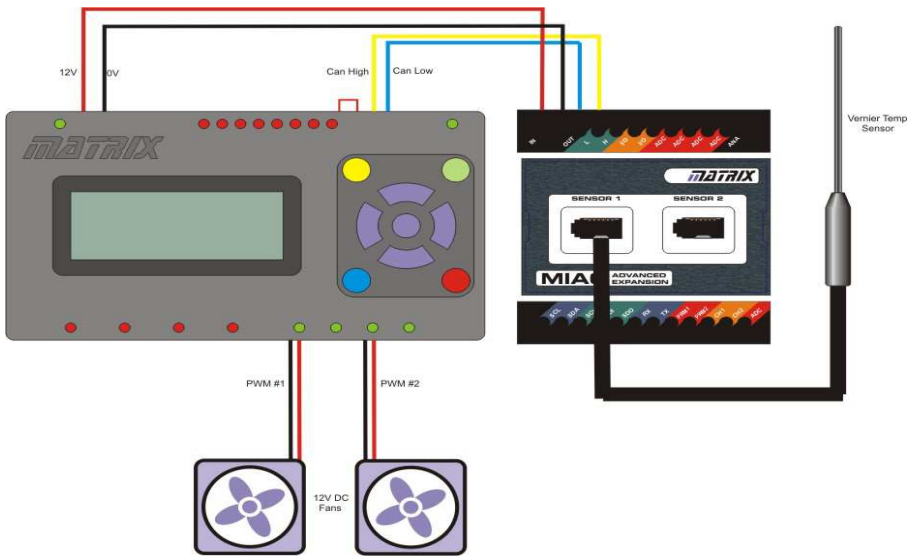
On the left here is how I wrote the programme to run the fans via the PWM.

I decided to add a macro to change the duty cycle of both PWM channels @ Byte - 255 as ATM I didn't want the fans to change their velocity depending on the temperature because my one of the reasons for this system was to reduce noise.

If the fans are at full velocity immediately, it reduces the time that they are on for.

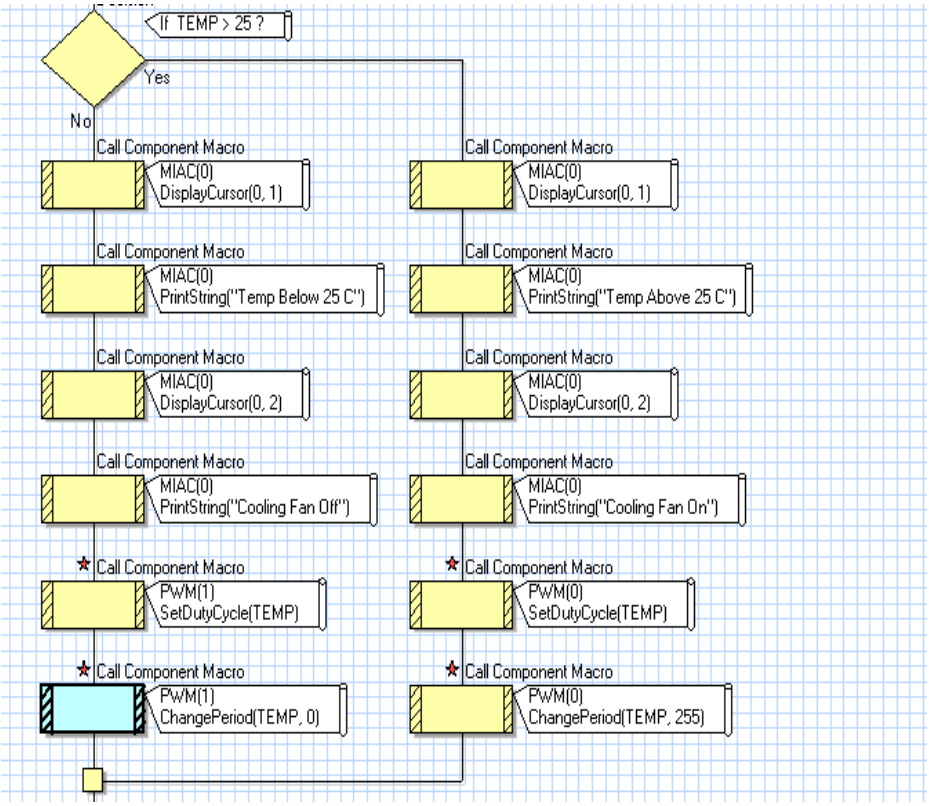
Now that I had the correct programme and the correct hardware it was then the process of wiring the system up

This is a Schematic of the whole system, it is fairly simple to wire up but I have found the whole system to be very effective.



The system works through a decision written into the programme in which I have told the system to only activate if the temp reaches above 25c this can easily be changed depending on what your preferences are.
The System broke down into steps is as follows:

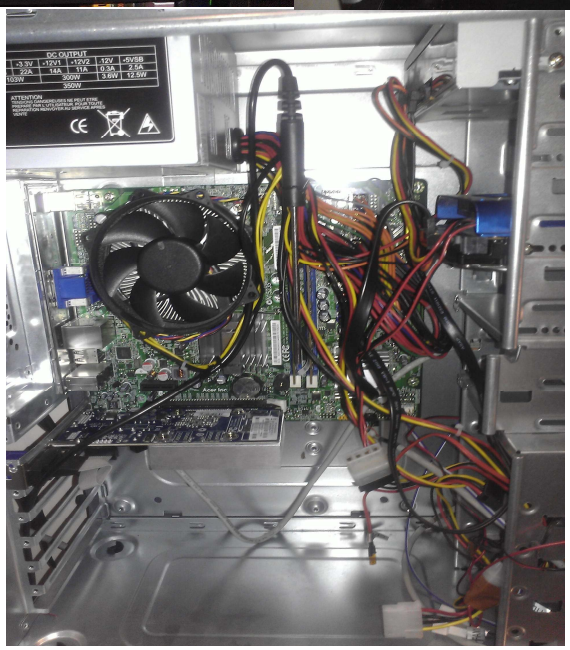
- Read sensor state via the Advanced unit
- If reading is below the variable set then nothing happens
- If the reading is higher than the variable is set to then the cooling fans come on via 2 PWM channels
- The fans will keep running until the temp drops below the parameters set



In this diagram I have only used 1 PWM output but it is easy to add another just simply add another macro and doe the same as the one on the diagram only change the PWM channel so you have 2.

I have found all the hardware & software very user friendly and how much flexibility there is with both the MIAC & MIAC Advanced unit. As of this there I many ways in which I can better and expand the project by easily using some of the options listed below

- Add a second temp sensor to detect external temperatures
- MIAC USB interface to the PC for temperature / fan speed logging.
- Change the Fan Velocity with a temp reading through the PWM Channels



Further reading

Below are some links to other resources and articles on related subjects, and technical documentation relating to the hardware used for this project...

Flowcode:	http://www.matrixmultimedia.com/flowcode.php
ECIO:	http://www.matrixmultimedia.com/ecio.php
Learning Centre:	http://www.matrixmultimedia.com/lc_index.php
User Forums:	http://www.matrixmultimedia.com/mmforums
Product Support:	http://www.matrixmultimedia.com/sup_menu.php