

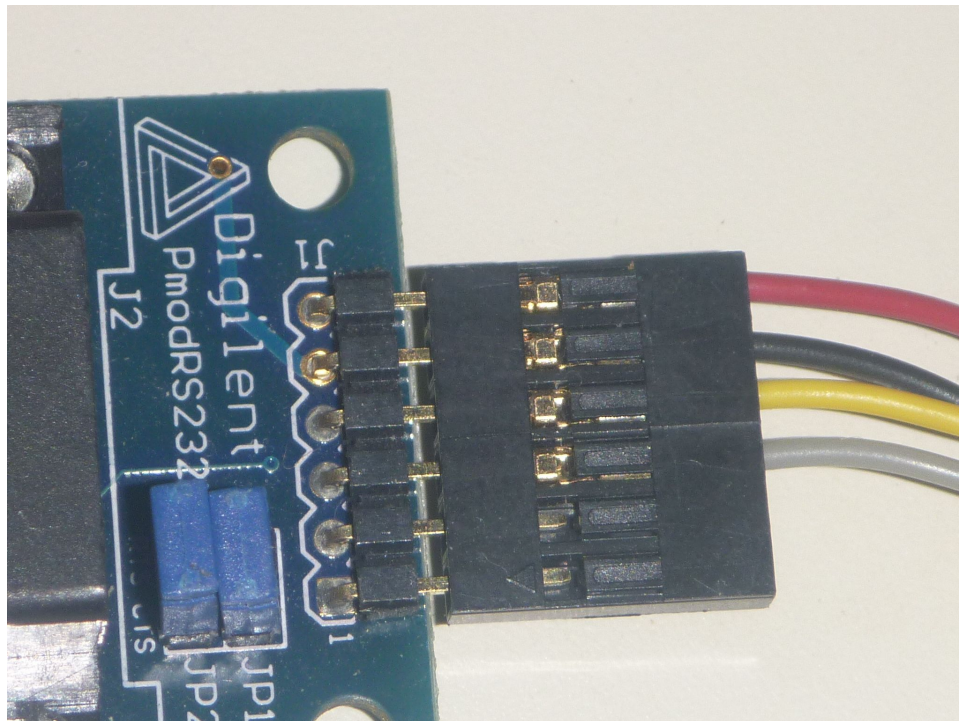
The associated code, schematics & pcb are completely free for you to use. There is NO warranty whatever, implied or otherwise.

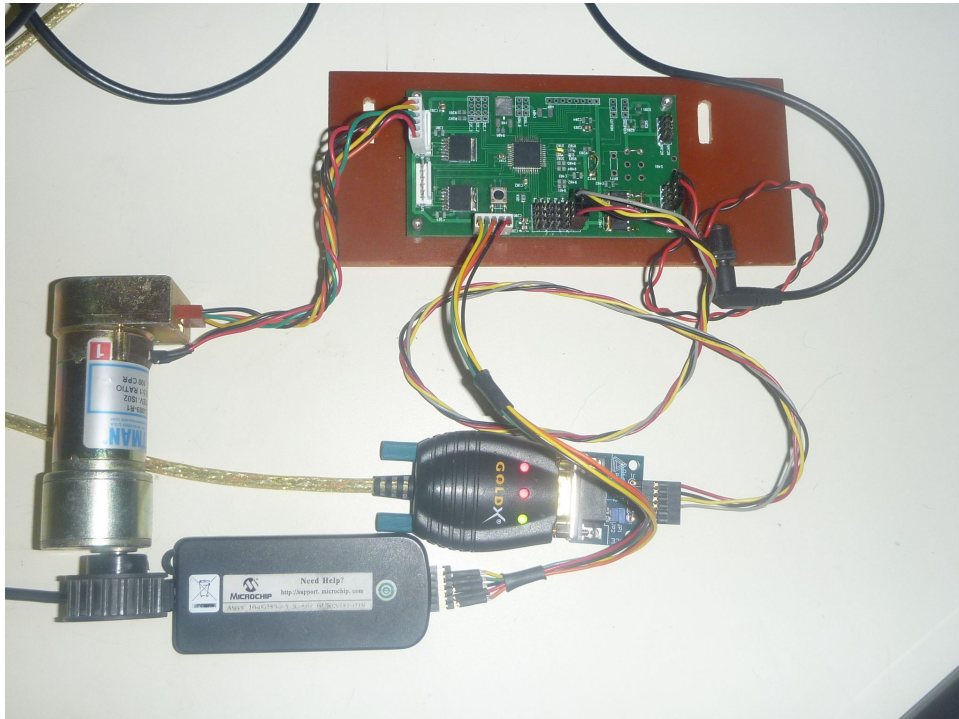
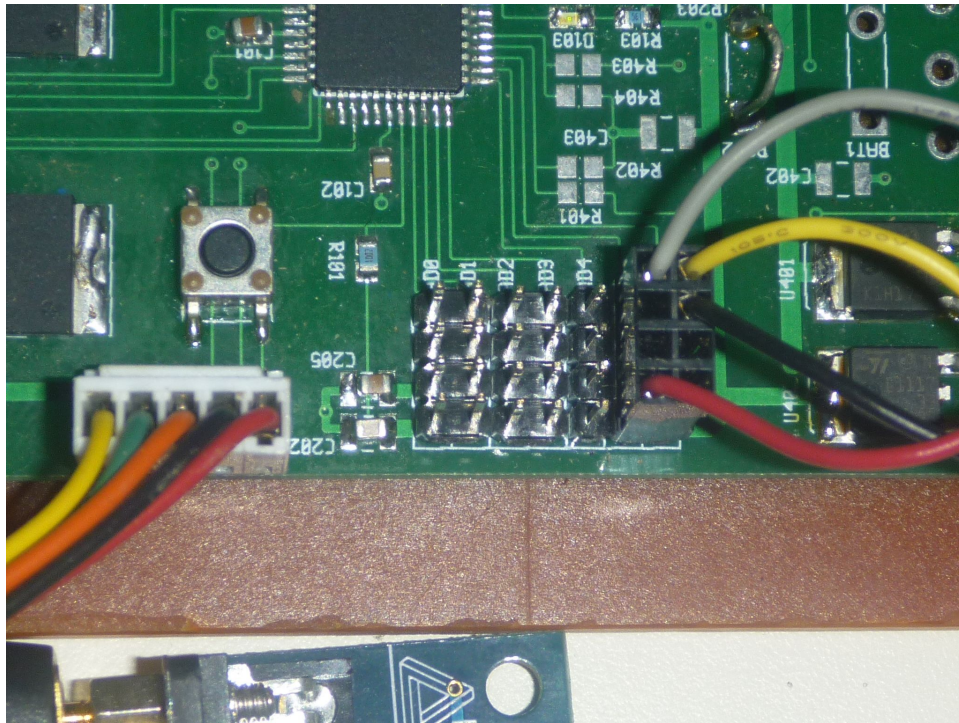
The entire project was developed on a Linux system using publicly available tools. The schematics and artwork were created using the GNU EDA tools *gschem* and *pcb*, the text and source using *emacs*, and the dsPIC compiler and libraries using Microchip's MPLABC30 tool-chain. All text files use the CR/LF end of line format and are compatible with MPLAB under Windows.

The schematics and pcb directories can be utilized to design your own controller. In the pcb directory there is a Makefile that will translate the schematic and artwork into viewable files and zip files suitable for pcb board fabrication. Send the pcb artwork, dsp-xxx.zip, to one of the online PCB fabrication shops. For something in the range of \$2.00 per square inch plus approx \$10.00 setup/shipping you get a blank pcb. Digikey or Mouser stock the electrical components. Contact me to see if I have any spare blank boards and or parts.

Electrical Hookup:

- 6-pin motor cable to the right motor drive.
- 8-pin serial cable to the pins labeled AN5 & AN6.
- PICKit-2 programmer to the 5-pin ICS header.
- 12 volt supply to one of the 4-pin power headers. I have the logic and motor supplies jumpered.





### Console:

Use a serial to USB converter to connect the embedded UART to the computer console. While the schematics and artwork designate AN5 & AN6 as analog inputs, the dsPIC has the ability to map specific I/O pins to various internal peripherals. Its quite convoluted reading/code, but the source code maps AN6 to the UART RX input and AN7 as the UART TX output. On the Linux system, I use **gkterm** to interact with the controller. Other

console emulators such as **hyperterm** and **teraterm** will work for Windows. Serial port setup is 115200 baud, 8 bit, 1 stop, no parity, and no flow control. There are a number of USB/serial converts available from the online shops for approximately \$25.00.

Usage:

Download the appropriate Microchip tools. You will need the MPLABC30 tools and depending on your environment of temperament you may also need the MPLAB IDE.

Linux

cd to the src code directory. There you will find a Makefile that contains the commands to build the project. From the command line type:

- "make" to translate the source code from ascii text to a downloadable hex file
- "make pk2" to build and download the hex file to the controller
- "make clean" to remove any locally generated files

Windows

Open the MPLAB IDE application. Create a new project. Select the processor as dsPICFJ64MC804. Use the navigator to add the source code to the project. Click the Build and download tool. The IDE supports many different programmers. If you have a PICKit3 or ICD3 you can set breakpoints and single step.

The following represents the project directory just prior to submitting this project to the NEMES web site. Your files sizes may differ.

```
-rw-rw-r-- 1 ggallant ggallant 70634 Oct  1 21:32 demo.pdf
-rw-rw-r-- 1 ggallant ggallant 16538 Oct  1 21:31 demo.odt

src:
total 580
-rw-r--r-- 1 ggallant ggallant  3550 Oct  1 21:05 uart.c
-rw-r--r-- 1 ggallant ggallant  1284 Oct  1 00:15 tmr.c
-rw-r--r-- 1 ggallant ggallant  1633 Sep 26 20:58 queue.c
-rw-r--r-- 1 ggallant ggallant   412 Sep 30 16:14 qei.c
-rw-rw-r-- 1 ggallant ggallant  1609 Sep 30 18:00 pwm.c
drwxrwxr-x 2 ggallant ggallant  4096 Oct  1 21:06 obj
-rw-r--r-- 1 ggallant ggallant  2263 Oct  1 21:04 Makefile
drwxrwxr-x 2 ggallant ggallant  4096 Oct  1 21:06 lst
-rw-rw-r-- 1 ggallant ggallant 143567 Oct  1 21:06 demo.map
-rw-rw-r-- 1 ggallant ggallant  51184 Oct  1 21:06 demo.hex
-rw-r--r-- 1 ggallant ggallant   2510 Oct  1 20:04 demo.h
-rwxrwxr-x 1 ggallant ggallant 140216 Oct  1 21:06 demo.elf
-rw-rw-r-- 1 ggallant ggallant 209958 Oct  1 21:06 demo.dis
-rw-r--r-- 1 ggallant ggallant   2066 Oct  1 21:04 demo.c

pcb:
total 152
drwxrwxr-x 2 ggallant ggallant  4096 Sep 30 14:14 seed
drwxrwxr-x 2 ggallant ggallant  4096 Sep 30 14:14 pdf
-rwxr-xr-x 1 ggallant ggallant  1524 Oct  1 00:10 Makefile
drwxrwxr-x 2 ggallant ggallant  4096 Sep 30 14:14 gbr
-rw-r--r-- 1 ggallant ggallant 86078 Sep 30 12:38 dsp.pcb
-rw-rw-r-- 1 ggallant ggallant 13564 Sep 30 12:38 dsp-5.sch
-rw-rw-r-- 1 ggallant ggallant  6480 Sep 30 12:38 dsp-4.sch
-rw-r--r-- 1 ggallant ggallant  3388 Sep 30 12:38 dsp-3.sch
-rw-rw-r-- 1 ggallant ggallant 12095 Sep 30 12:38 dsp-2.sch
-rw-rw-r-- 1 ggallant ggallant  6507 Sep 30 12:38 dsp-1.sch
```

Contact me via email for assistance on getting started with your particular environment.

George Gallant

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