



www.ExtraEFI.co.uk

Instructions for setting up your Temperature sensors for use with MegaTune or Tuner Studio and the Megasquirt ECU.

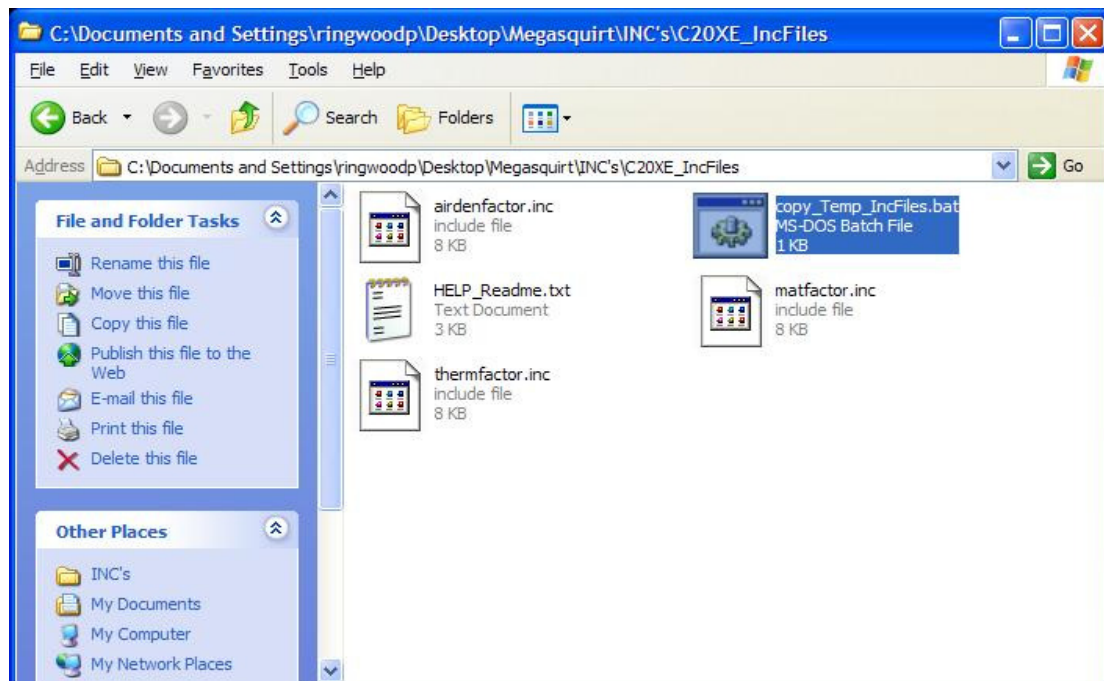
If you're using the standard Megasquirt Sensors that I have supplied or that you have bought elsewhere then don't bother with any of the following!

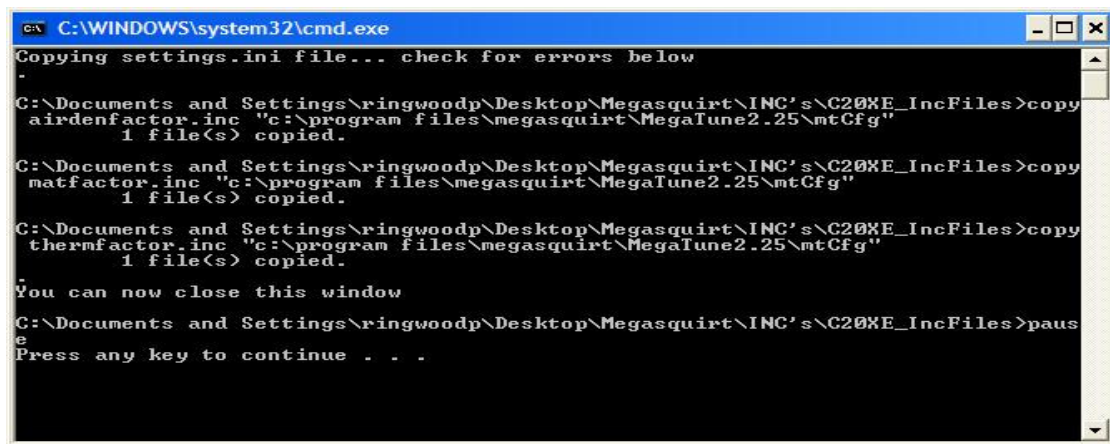
Configuring the tuning software MegaTune:

If you have sent me the measurements from your sensors, or I have told you I have them, then they will be on the CD I sent you under the name of your engine,

EG: C20EX_IncFiles.

If you go into that dir you'll find a batch file called "Copy_Temp_IncFiles" Double click on this and it will automatically copy the temperature settings from the directory over into the MegaTune Dir on your computer so that MegaTune displays the correct temperatures. That's all you need to do, the rest of the instructions are if you've chosen to sort your temperature sensors out yourself.



A screenshot of a Windows command prompt window. The title bar reads "C:\WINDOWS\system32\cmd.exe". The window contains the following text:

```
Copying settings.ini file... check for errors below
-
C:\Documents and Settings\ringwoodp\Desktop\Megasquirt\INC's\C20XE_IncFiles>copy
airdenfactor.inc "c:\program files\megasquirt\MegaTune2.25\mtCfg"
1 file(s) copied.
C:\Documents and Settings\ringwoodp\Desktop\Megasquirt\INC's\C20XE_IncFiles>copy
matfactor.inc "c:\program files\megasquirt\MegaTune2.25\mtCfg"
1 file(s) copied.
C:\Documents and Settings\ringwoodp\Desktop\Megasquirt\INC's\C20XE_IncFiles>copy
thermfactor.inc "c:\program files\megasquirt\MegaTune2.25\mtCfg"
1 file(s) copied.
-
You can now close this window
C:\Documents and Settings\ringwoodp\Desktop\Megasquirt\INC's\C20XE_IncFiles>paus
e
Press any key to continue . . .
```

Upload temperature files to ECU:

If the MegaSquirt has already been setup for you with a base Configuration (e.g. it came from www.extraefi.co.uk) or it has been running in your car and you have tuned it, then save the configuration file (*.msq) in MegaTune before doing the following changes as the settings will ALL be deleted from the ECU's memory when you download the modified firmware!!

Stage 1: Measuring the resistance of the sensors

You will need 2 pairs of wires, an accurate thermometer and an ohmmeter (multimeter)

Connect the wires to the 2 terminals on your temperature sensors so you can measure the resistance of them without moving them or touching them.

We need to tell the software (Easytherm) what the resistance is at 3 temperatures over the operating range of the sensors. Easytherm will then generate 3 files (*.inc files) for the Megasquirt ECU and MegaTune (tuning software) to use for your sensors.

First temperature around Zero deg C -

Pop your sensors in the fridge with the thermometer and leave them for around 1/2hr to stabilize.

Read the temp on the thermometer and then the resistance of both sensors.

Make a note of each resistance and the temperature from the thermometer.

Next pop them both under your arm, let them warm up first if they have just come from the fridge :-). Your body is around 36 deg C, so let them warm up

and measure the resistance again of both sensors. Make a note of the resistance of both.

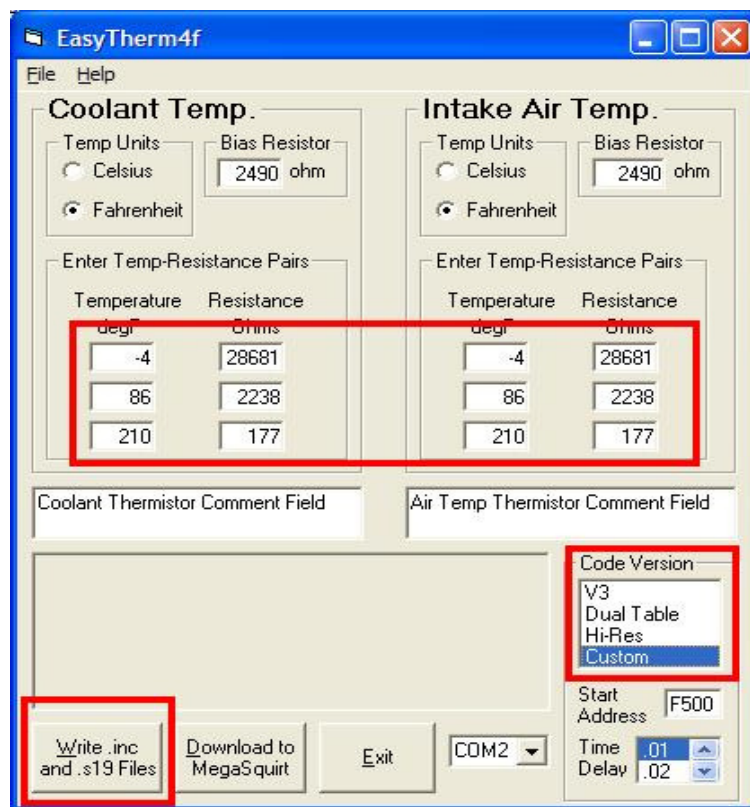
Next hold them so the sensor area is in some boiling water or just off boiling (you can hold them using some thick gauge wire or pliers, etc). Being carefull, measure the resistance and tempeature of the water with the thermometer, I use a coffee machine's water for this as its usually around 88C, obviously the temp needs to be checked but a temperature of around 80-100 deg C is fine. You now have 3 resistances for each sensor and 3 temperatures.

Stage 2: Generate the 3 inc files

IF THE ECU IS DIRECTLY DRIVING A COIL OR COIL PACKS UNPLUG THE COIL FROM THE ECU NOW!!!!!!!
See the final stage (Stage 4) before plugging them back in!!

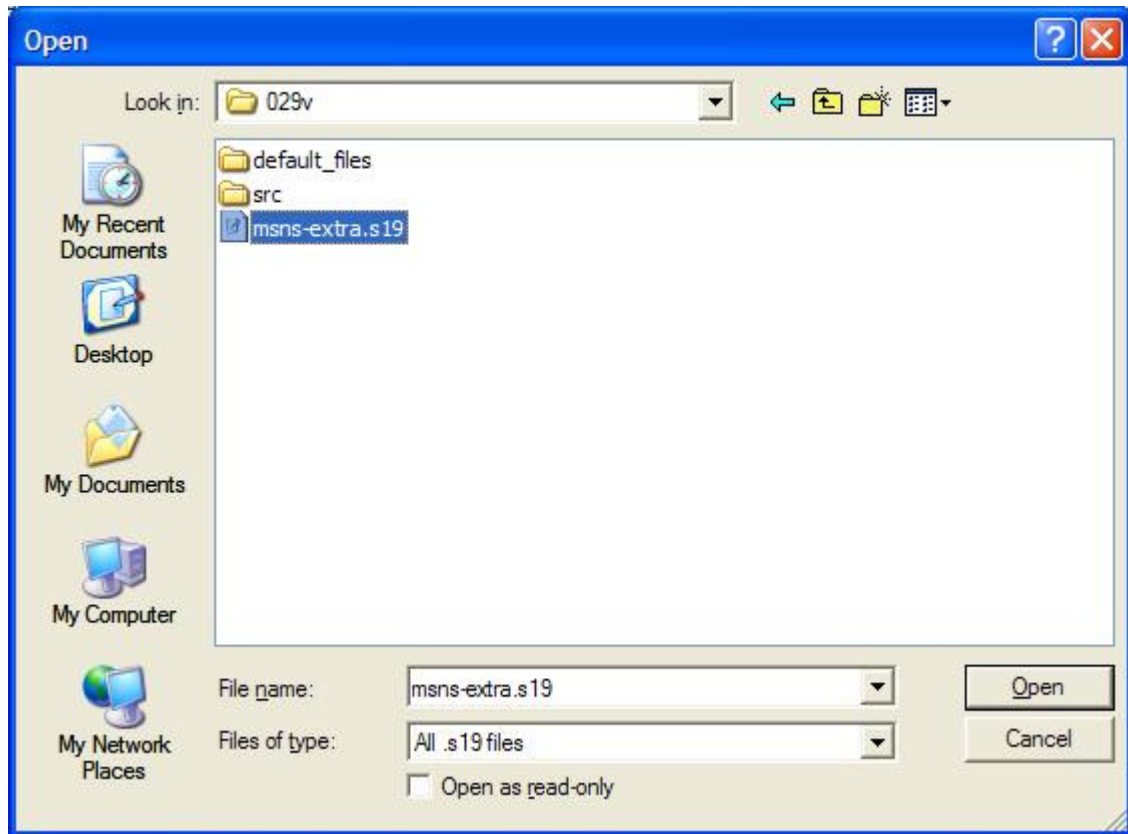
Run the EasyTherm program installation and then run the program. (this is on the CD or on my website www.ExtraEFI.co.uk)

You will see it has 6 boxes to fill in for each sensor. There is also a "Biased Resistor" box, ensure that's at "2490"



Fill in your sensor info into the chart, ensure you select Farenheit or Celcius. once filled in select : "CUSTOM" in the Code Version list, Start Address should read F500.

Next select: "Write inc and s19 files", this will bring a box up to select the file. You need to select the file msns-extra.s19 that's inside the 029y4 directory



(c:\programfiles/megasquirt/029y4/) this was installed during the MegaTune install.

the display should read "OUTPUT DONE..."

To Download the files to your Megasquirt ECU you have 2 options:

***** **Option A** *****

You need to run Easytherm and ensure the correct comm port is selected in Easytherm and your MS is powered up and connected to the cable I supplied. Ensure that "Custom" is selected in the code type.

Next remove the lid from your MS ECU and with the POWER OFF short the bootloader link out with a peice of wire. (**2 small holes next to the microprocessor labeled 'boot'**)

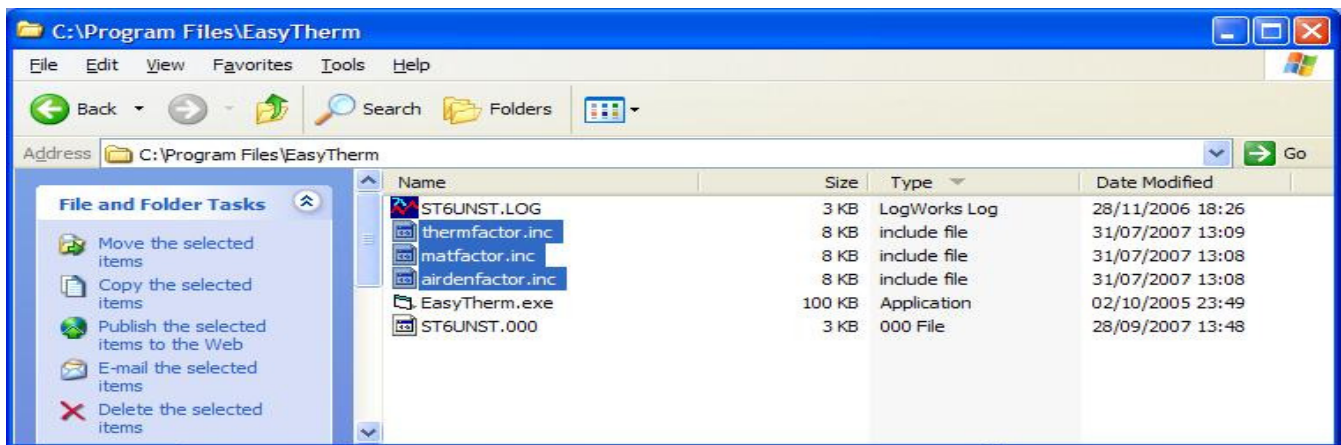
Turn the power on with the short in place. This has put you MS ECU into Bootloader Mode! Now you can select "Download to Megasquirt"
Select the file "msns-extra_mod.s19" in the c:/programfiles/megasquirt/029t the display will show downloading then the MS will start up after a few minutes. You have now finished re programming the ECU, you can move to Stage 3 (MegaTune)

***** Option B) *****

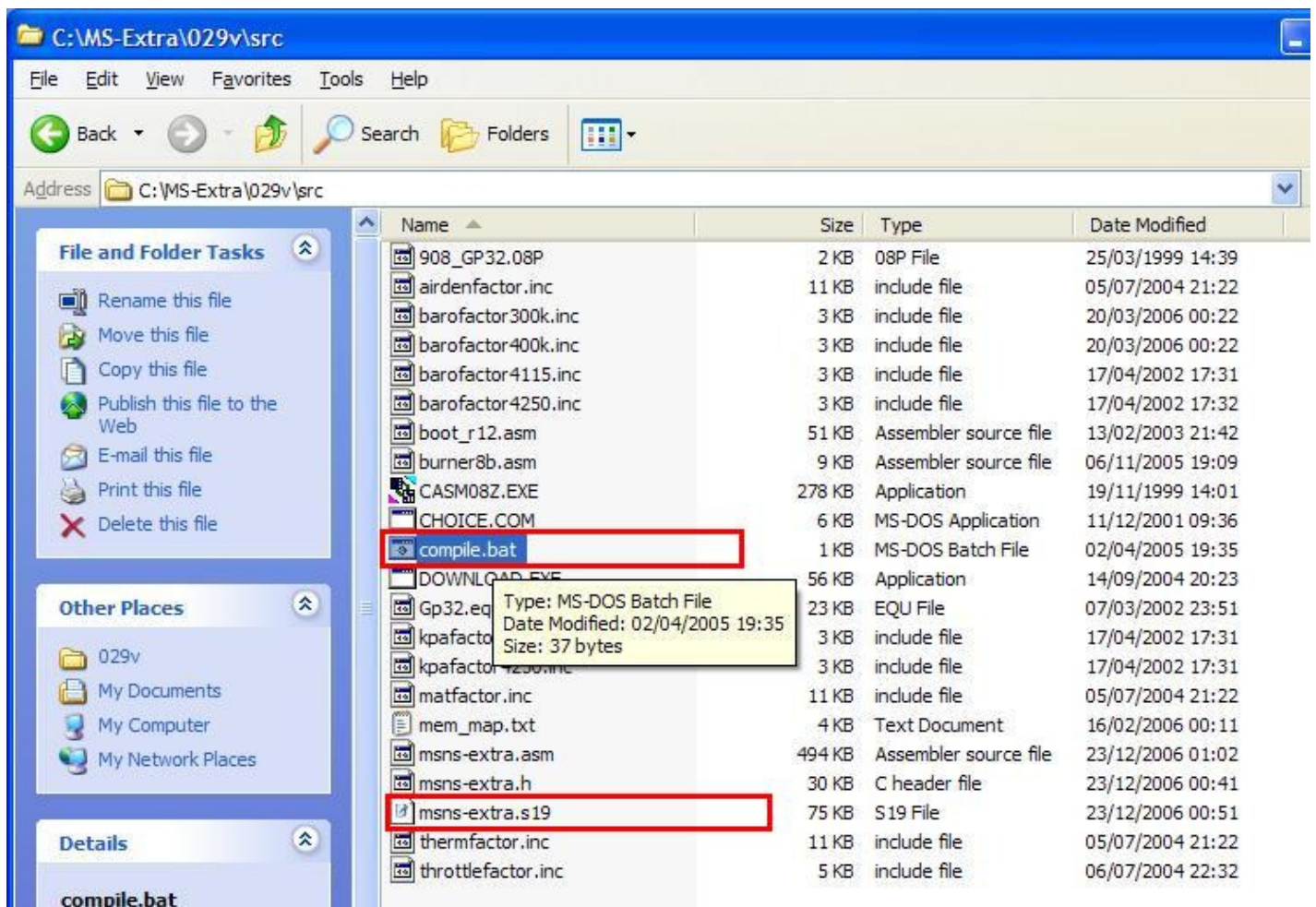
You have generated 3 *.inc files inside the EasyTherm directory at the previous stage:

- airdenfactor.inc - Thats for the inlet Air Temp sensor
- matfactor.inc - Thats also for the Air temp sensor
- thermfactor.inc - this is for the coolant temp sensor

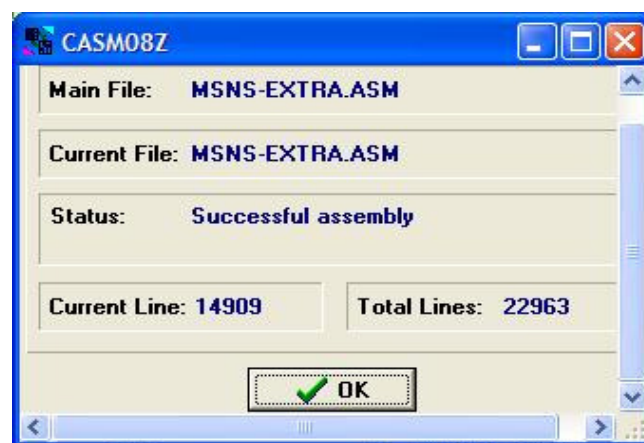
Find these 3 files in C:\Program Files\EasyTherm\ directory and copy all 3 of them.



Next go to the 029y4 dir (c:/programfiles/megasquirt/029y4) that was installed on your computer when you installed MegaTune Extra 029y4. Inside that dir go into "src" directory, you will see 24 files in there. Paste the 3 inc files from the Easytherm dir into there, it will over write the 3 that are already there.



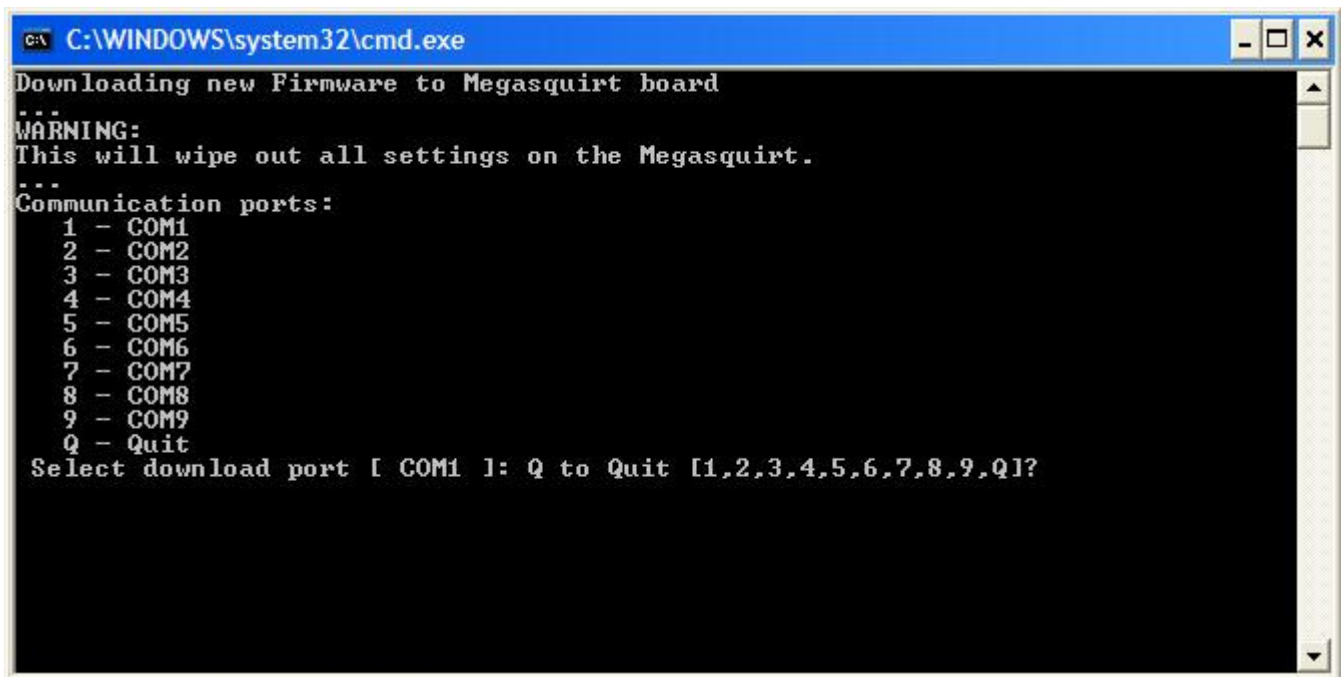
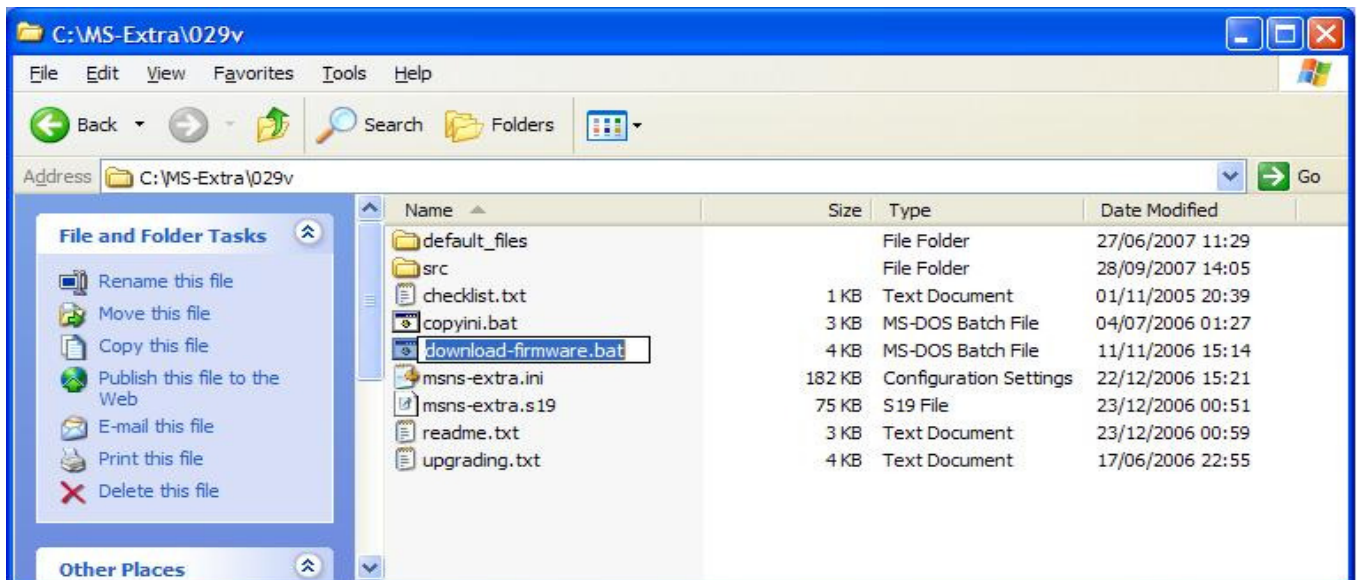
Next double click on the "compile.bat" file, it will bring up a box which will generate an S19 file for you, it will say OK at the end.



As long as it says Successfully Assembled - OK, we can now copy the newly generated "msns-extra.s19" file (this file is about 62KB, dont confuse it with the msns-extra.asm file which is 447KB. Copy the msns-extra.s19 and paste it into the dir up one, the 029y4 dir. It will over write the one that is in there.

Power up the MS ECU, don't remove the lid, there is no need to with this method.

Now double click on the "download-firmware.bat" file, or go to START - PROGRAM FILES - MEGASQUIRT - Download-firmware.



Select your Comm port (e.g. 1) then select "N"

It will count up to 1750 odd

Then your MS will run again.

You have now finished re programming the ECU, you can move to Stage 3 (MegaTune)

IF THE ECU IS DIRECTLY DRIVING A COIL OR COIL PACKS DO NOT PLUG THEM BACK IN YET!!!!!!
See the final stage (Stage 4) before plugging them back in!!

Stage 3: MegaTune / Tuner Studio

After installing MegaTune or Tuner Studio, copy your generated inc files from the above stage (c:/programfiles/easytherm/) into the directory

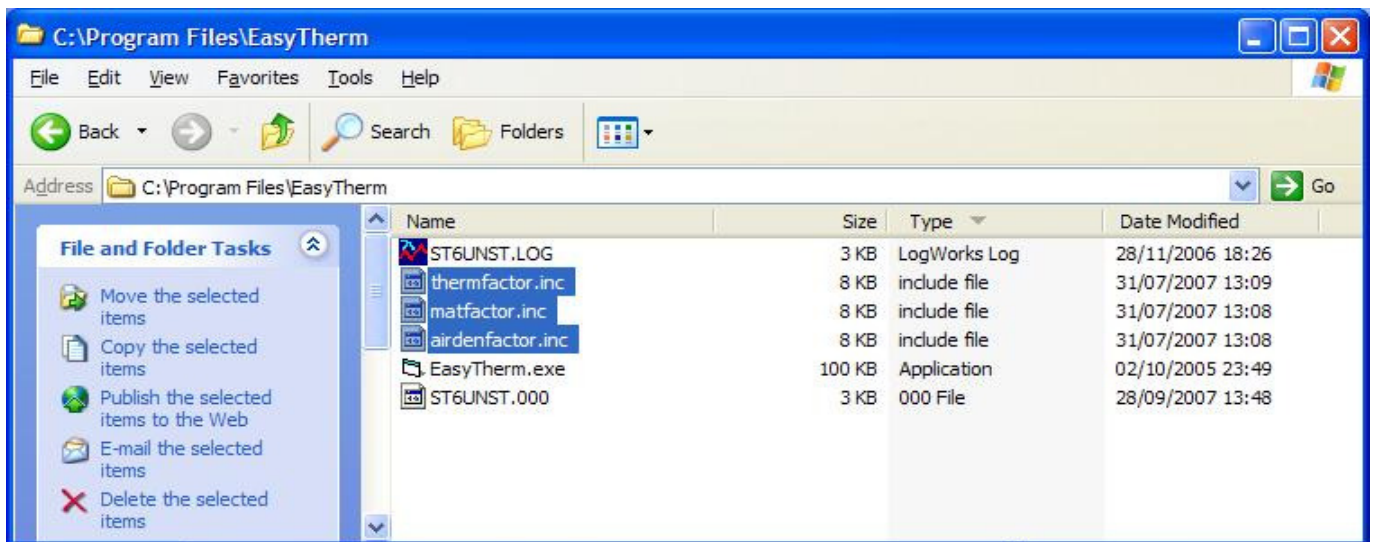
MegaTune users: c:/programfiles/megasquirt/Car1/mtCfg/

Tuner Studio Users: mydocuments/TunerStudioProjects/Car1/inc/

airdenfactor.inc - That is for the inlet Air Temp sensor

matfactor.inc - That is also for the Air temp sensor

thermfactor.inc - This is for the coolant temp sensor



Your display should now correspond to the temperature your sensors are at. If you had saved the config (msq) file before doing the above then re-load it now, before plugging in the coil packs.

Stage 4: Re-load configuration

After installing the new temperature files into the ECU (downloaded firmware s19 file) run MegaTune or Tuner Studio and ensure that the Outputs are setup for your ECU before connecting the Coils back to the ECU.

To check this run Open the msq file you saved and when asked whether to burn click "Yes".

If you are driving the spark coils directly then follow these instructions:

Now goto Spark Settings and set the Spark Inverted Output = YES

Then go to Code Config - Codebase and Output Functions:

Single Spark output MS ECU (MSD or Distributor or EDIS module, TFI, etc)

LED17 (D14) = SparkA

LED18, LED19 and Output3/SparkD must NOT be a Spark output

Two Spark output MS ECU (4 cylinder wasted spark)

LED17 (D14) = SparkA

LED18 (D15) and Output3/SparkD must NOT be a Spark output

LED19 (D16) = SparkB

Three Spark output MS ECU (6 cylinder wasted spark)

LED17 (D14) = SparkA

LED18 (D15) = SparkC

LED19 (D16) = SparkB

Output3/SparkD must NOT be a Spark output

Four Spark output MS ECU (8 cylinder wasted spark)

LED17 (D14) = SparkA

LED18 (D15) = SparkC

LED19 (D16) = SparkB

Output3/SparkD = SparkD

Now it is safe to plug the spark coils back into the MS ECU!!!!!!