

List of things i think need. Please correct me if I am wrong

ECU: MegaSquirt II Extra PCB V3.57 (with Siamese code) I need to do a lot more research on this.

Re. the “siamese code”, it is simply part of the MS2-Extra code. It's just an alternative set of settings withing the code. If you buy an MS2 from any of the usual suppliers the MS-E code will be loaded as standard, I don't think anyone uses the very old “B&G” code any more. You may come across it if you pick up and old secondhand unit but even if you did it's easy enough to load the MS-E code anyway. To get a feel download the “free” version of TunerStudio (you are going to need TunerStudio anyway) and create an MS2 project just to see how it works. Once you get started for real I would recommend registering it (ie, paying for the license) as you will need some of the additional features the registered version brings but playing with the unregistered version first will help you decide on the best way to proceed (or put you off completely...)

Re. the V3.57 PCB, it has the advantage that it is mostly modern surface mount components, it has the extra connector available but it has no “proto” area so you have to build the extra bits you need on something else (which kind of defeats having the extra connector). You do need some extra bits, ie, for the second wideband and to drive a coilpack and the opto-isolator circuit needs a slight modification if using an optical trigger rather than a hall switch for your cam input and I can't comment how easy doing that on a 3.57 PCB is, I've only ever worked on the 3.0 PCB and even then, only truly DIY, never a pre-assembled one.

Injectors: Im thinking 2 800cc, port injection, Not sure what dis/advantages there are to High/Low impedance

800cc should get you to your N/A target, you would need more for forced induction for which the sensible way is to move to four injectors, staged operation, which then needs four drive circuits rather than the standard two. It's here that the choice of high or low z becomes important so best thought through now if you are going forced induction in the future.

High z vs low z can be quite an emotive debate ie, I'm waiting for everyone to tell me that high z is “modern” and “superior” and easier to configure, etc. etc. from which you can probably gather I'm in the minority using low z. Research it and make your own mind up but research particularly their different characteristics when operating at very low pulse widths where they are most likely in their non-linear operating range. Using the siamese code to put fuel through the inlet valves only when they are open needs very large injectors (as you already know) operating at very low duty cycle, so very short pulse widths, so at idle at least, will almost certainly be in the non-linear range of either type.

Read this thread, the bit about when Graham borrowed my low z injectors and ECU

<http://www.turbominis.co.uk/forums/index.php?p=vt&tid=611542>

Now the reason you should decide up front if you are ultimately going forced induction is because a standard MS2 only has 2 injector drivers (which can be configured for either high z or low z). The MS-E code allows for 4 drivers (after a small modification to the daughterboard) but you cannot just replicate the existing 2 if you choose low z. That is because the standard drivers use PWM when they are configured as low z and the PWM element is generated on two of the CPU output pins, and those two pins get re-allocated as the third and fourth channel by TunerStudio when you select any 4 driver setup including siamese sequential staged. Even if you chose high z, it would be a nightmare trying to replicate the existing driver circuits, there are just too many parts involved, mainly to allow the low z configuration, and nowhere to fit them. Which means the majority of people who use a 4 channel setup use an add-on driver board instead. Jean (jbelanger on this forum) who wrote the siamese code anyway, sells both a high z (simple mosfet drivers) and a low z (peak and hold drivers using a dedicated IC switch to control injector current) and, in practice half of the components on either the 3.0 or 3.57 PCB become redundant. (another reason why I build my own boards).

Injector bungs: I would like to get a couple weld in style and cut into the carb intake

Presumably you mean inlet manifold ??? For siamese port injection they have to be as close as possible to the head face with no interaction between the two runners. Most of us have either fabricated our own or used the MPI one. If you go turbo for forced induction in the future, consider now the interaction with whatever exhaust manifold you want in the future.

Throttle Body: No idea. leaning towards something around 50mm. Whats a good option for this?.

Junkyard ??? I'm assuming as you mention prices in US\$ that you're the wrong side of the pond so I don't know what's common over there. If you're planning forced induction in the future get one that is either flanged on the inlet side or has some sort of raised lip that the hose slides over and gets clamped behind or it will just blow off under boost.

Fuel Pump: No idea . Is a return line required?

Return line, yes – the standard regulators spill excess fuel straight back to the tank to control pressure. There are dead end type regulators but they give all sorts of issues with vapour locks and will kill a normal fuel injection pump. Pump itself, anything common on modern cars. Over here there is a very common generic Bosch pump (or chinese clones on eBay)

Fuel Rail: likely something custom based on location of injectors

Yes

Mechanical Fuel Pump block off plate. Not sure if this can be purchased or made.

Over here

<https://www.minispares.com/product/Classic/Engine/Block/2A265.aspx?1001&ReturnUrl=/search/classic/fuel%20pump%20blank.aspx|Back%20to%20search>

For turbo applications we generally drill a hole and weld a stub onto these to use as the oil return path.

Ignition Coil: diyautotune has a IGN 4 tower coil pack with 2 inputs for around 72 USD. I will likely do wasted spark.

Over here the Ford EDIS-4 (wasted spark) coil pack is common in junkyards. There is only one high current ignition output on a standard MS-2 so you have to add another, or use one of Jean's driver boards. You can also run logic level coilpacks (which are usually individual sparks, not wasted spark) from an MS-2, again, additional circuitry but I think one of Jean's latest driver boards has it already there.

Crank Position Sensor: 36-1, I see a few sites offer these specific to the A series motor, not sure if i can just use a generic one from diyautotune and make my own bracket.

Depends if you have any of the aftermarket crank damper pulleys, then the trigger wheel becomes a bit specific. I just have the standard damper (turbo engines don't need high RPMs) so used a generic and made my own bracket. What quite a lot of people over here have done is had the cutouts machined into the back of the pulley itself to make the pattern.

Cam Phase Sensor: Already hacked up an old distributor to convert to a slotted

optical switch (picture attached). I need to shorten the shaft but i am waiting on me choosing a switch and how it will mount.

Only comment is to repeat what I said earlier about the second tach circuit on the mainboard has to be configured slightly differently for an optoswitch (in standard form it is better suited to hall) and I'm not sure how easy that is on a 3.57

Fuse Box: wont need much. but need to plan this out still.

Read the MS-2 manual, it's not just extra fuses you need but relays configured right.

Wideband Sensor: Im thinking i might need 2 of these.

Not "might", but essential if you are going to try to configure the siamese code. And gets a bit more involved with forced induction if it's a turbo because of the heat load and the sensor pressure dependency.

Coolant temp Sensor: Do i need a buy this aftermarket or can i use the original mini sensor.

You need a two wire one specifically for use with ECUs, in the USA probably the GM one (which is the default calibration in the MS-2) or one where you know the temperature/resistance curve so you can enter the calibration yourself.

Intake Air Temperature Sensor: Do i need one?

Yes, a fundamental part of the speed/density fueling equation, density is affected by temperature, esp. in forced induction applications.