Notes from Tamas Varga, Motty Electronics, 7 July 2008

Environmental

Water

The AFR Tuner enclosure is definitely splash proof, however the connectors are unsealed types.

Temperature

All components are industrial (85C) or higher temperature versions. Most likely the device will work near the throttle bodies, but if you can find a cooler place that would be better.

Map Switching

The unit has the map resolution to combine different goals in the same map, so you shouldn't really need the map switching feature. You can have the rich micture for best power at the high TP columns while leaning the cruising area of the map for best fuel economy, then richen the mixture back for the closed throttle for good off-on throttle response.

The problem with a map switch (digital input) is the saving of the self mapping results made so far. The saving is only possible with the engine stopped, so when using the map switch in runtime then the new mapping results would be lost. So far I haven't decided if this will be implemented and it is not yet supported in the firmware.

It wouldn't be necessary to use the kill switch for the map switch. I wrote that the engine should be stopped, because the processor can't save the map and handle the injector events at the same time. But in fact it could save the map while the engine is turning, but during the saving it would not inject any fuel and the engine would cut out. If you do it on closed throttle while engine braking then it wouldn't be noticable. While on idle it may stall the engine (might trigger injector ECU fault codes too). The whole thing would take about 0.25 second.

I will look into this feature in the future. I think I will make it user configurable what happens when a switch is installed on the digital input. It could be used for: nothing; starting/stopping the data logger; or map switching. In case of map switching it would either be with map saving or without.

(later)

Just thought some more about this and the datalogger wouldn't work as expected during the map switching.

How about if the status of the switch is only read at start up? Then it would be the equivalent of the control gestures and before the switch you would have the chance to either save the map or not.

(EK reply)
That would be fine. The Benelli TNT changes maps this way. (It uses a different ECU to mine)

I'll think more about this later, but anyway this won't be implemented soon.

System Grounding

The ECU usually has many ground pins. For best electrical noise suppression the one needs to be found which is only used for the logical circuits and are independednt from the higher currents of the ignition and injection system.

It is enough to use the internal data logger in the AFR Tuner to see if the chosen ground is suitable. The TP line will look noisy when it is not a "good" ground.

Gear Parameters

For calculating the gear database parameters could you tell me on which axle the speed sensor is located and how many pluses it counts with one revolution?

(EK reply)
Speed sensor is on the rear axle. It detects the 6 brake disc bolts, so 6 pulses per revolution.

There was a typo in the gear ratio table in the manual for the 4th gear. I used the 23/30 ratio in the gear database calulation. Please check from an other source what the correct ratio is and please let me know. If my assumption was not correct then I will recalculate the 4th gear value.

On the Japanese bikes the speed sensor is measuring the rotation of the output shaft of the gearbox, but on the

Tornado with only 6 pulses per wheel revolution the frequency is significantly lower, and the speed scaling factor will fall out of range. It means that it is not possible to set the speed scaling factor so that it gives the correct vehicle speed. Instead let's **set up the speed measurement for giving half of the actual speed by using 1 & 2 for the front & rear sprocket teeth counts.**

Verbose Firmware

I have loaded the debug/verbose version of the v2.24 firmware into your unit. This will log an additional 18 hidden data channels which will be useful for verifying the installation. Please find attached the .mfw file of the same firmware just in case we have to switch to another variant.

Tornado Manual Conflicts

There were some conflicts in the manual about the wire colors as the EFI diagram and the full electrical diagram seems to swap the colors in the color1/color2 marking for bicolor wires.

Installation

When doing the installation please let me know the correct wire colors so I can update the info in the manual. Also please inform me which ECU GND pin to use.

For the +12V I chose the speed sensor power feed, as it comes straight from the ignition switch through a 10A fuse and we are making a connection near the speed sensor anyway. If you find a different/better place then please let me know.