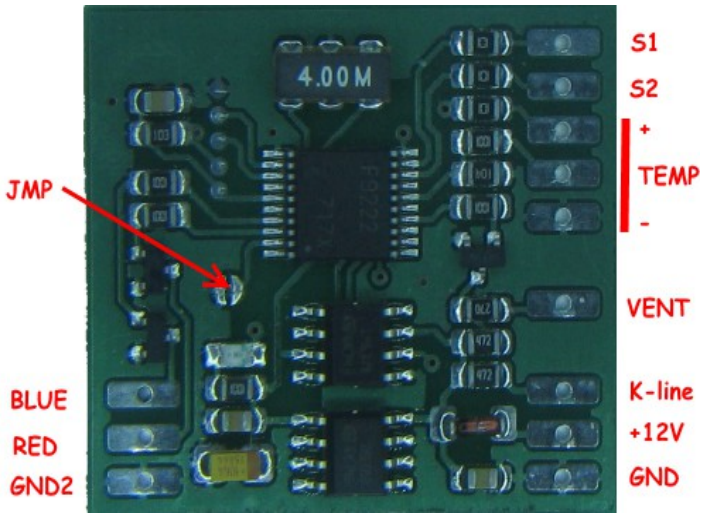


FAN

control module - Mercedes, programmable.

Description:

Monitors engine temperature using original temperature sensor, controls fan speed. Temperature levels are freely programmable. Soft start / stop, additional inputs and outputs.

Inputs:

- **TEMP**: temperature sensor, allowed input level 0...5v. (+) and (–) near TEMP can be used for potentiometer connection (+5v) if necessary, otherwise unused.
- **S1, S2**: forced cooling, desired fan levels are programmable for each input, from 00 (inactive) to 08 (max cooling). Can be "active high" or "active low" according to programmed settings. Pins has weak pullup (~30k ohm). TTL compatible.
- **K-line**: connection for module programming via standard K-line adapter.
- **+12v, GND**: power supply (terminal "15" and ground). Additional circuit protection is recommended if module is installed as standalone unit.

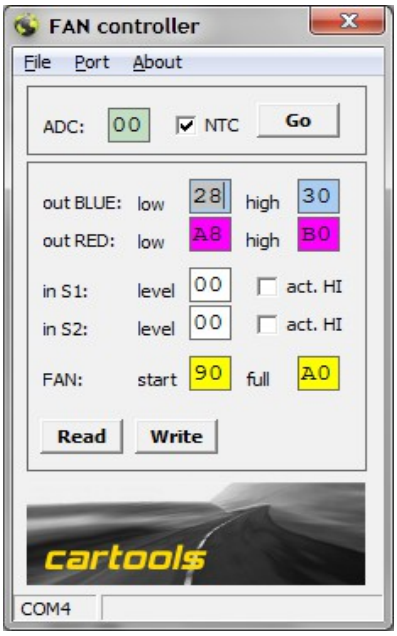
Outputs:

- **VENT**: output for fan control (according to original MB wiring it is brown wire, green wire is terminal "15"). You can configure two temperature thresholds - **start** and **full**. If **start** threshold reached, fan starts to rotate at lowest possible level. If temperature still rises, fan level increases. If **full** reached fan rotates at maximum possible speed.
- **BLUE**: open collector output, 100mA, can activate LED ("engine cold") or additional heater. Active if engine is cold. Levels are freely programmable – **low** and **high**. Output is activated as follows: if **T<low** always on, if rises and **T>high** turns off, if drops below T<**low** turns on again.
- **RED**: open collector output, 100mA, can drive LED or additional hardware like relay. Active if engine is warm or overheat occurs. Levels are freely programmable. Output is activated as follows: if **T>high** reached, goes on. If drops below **T<low** output turns off.

Things to know:

- largest requested fan level is executed: if **TEMP** requests 05, S1 or S2 requests 03 – fan rotates at 05. If **TEMP** requests 05, but **S1** or **S2** requests 07, fan rotates at 07.
- module always executes "soft start" / "soft stop": fan level rises from min to max in 4 seconds. Module is increasing or decreasing fan level each 0.5 seconds until desired level reached.

Software:



No reason to explore how to set COM port and how to **load** or **save** file and what **read** and **write** buttons mean, so we are focusing only on specific things:

- ADC: Analog to Digital conversion result, measured on temperature sensor, 0...5v corresponds to 0x00 to 0xFF. Note that all values are in HEX!
- NTC temperature sensor: voltage on sensor drops if temperature rises. We use inversion in this case (NCT checked), 00 becomes FF and FF becomes 00 to simplify mathematics and make more easy to understand overall processes - ADC result becomes proportional to temperature, larger temperature = larger ADC value.
- Button **Go** turns on automatic requests for ADC value – data is updated twice a second. This allows to determine necessary levels for correct module operation.
- **high** must be >= **low**, **S1** and **S2** levels from **00** to **08**, full must be larger than start.
- Data can be updated "on the fly", new settings become active immediately.
- If **JMP** is shorted by solder joint, module becomes "protected" - stored thresholds, levels and operation modes are not changeable. Although you can always read settings and ADC value, only write is prohibited.

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