

FreeEMS Hardware Standards

0.2

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TAPR OHL

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Purpose

The purpose of this document is to ensure that hardware designed for this system is always compatible in terms of the core functionality and behaviour. This will ensure a consistent user experience and improve the overall quality and uniformity of the system.

It is anticipated that some special purpose board implementations will partially ignore this document, but also that those boards will not behave in the standard way expected of a compliant FreeEMS system.

Serial monitor

The FreeScale AN2546 Serial Monitor as delivered by Technological arts is required to be installed on the CPU and usable in the standard way. This requirement is automatically fulfilled for anyone designing mother boards for the TA XDP Prototype card to live on. For those designing systems with the CPU on the board directly, the Serial Monitor will need to be installed using a BDM prior to using it or shipping out to friends or customers. The s19 for this is available from the following URL :

[http:// ??](http://??)

Special function pins

reset pin – tied high to prevent false resets

monitor pin – exposed switch or jumper required, pull up and series resistance mandatory if used as O, can not be used for I!! (to prevent resets letting sm take control)

moda/b pins

other pins

Comms systems

The primary means of communication will be through the SCI0 UART module. As such it is expected that these pins will be attached to and buffered by either a max232 (or equivalent) or ftdi usb module (or equivalent).

SCI1 for datalogging ? Optional! TA has driver chip on board.

CAN optional, which chip? TA card uses two of them.

Power systems

Dual lm2940 ICs are preferred to provide the cpu supply with independence of the sensor supply which is at risk of being shorted and over loaded. If not doing this suitable protection should be put in place to ensure the CPU supply remains totally clean at all times. Additionally, the sleep mode will not be available with that configuration and the device will come out of a cold reset each time it is used.

Suitable filter capacitors should be in place and the two power circuits should be totally separated. One is to be hooked up permanently and the device is to go into sleep mode when it senses that the other has gone down. The other must be turned off with the key so as to avoid excess power drain from the 12v measurement bridge and sensors.

Finally, a dirty 12v feed should be present to catch all fly back spikes and operate any high side devices. Under no circumstances should the main power supplies be used for these tasks as it would compromise the integrity and linearity of them.

regulators and circuits
input pin, which
sleep state etc.

Analogue inputs

filtering required
min and recommended values for each sensor type
feature > pin mapping

RPM inputs

accumulators for nissan
primary protection/buffer/processing for each. Avoid caps as they skew, use intelligent filtering or new chip just about out.
secondary

Fuel injector outputs

primary - at least 1 compulsory, 4 preferred, 6 desired. Max 2 injectors per driver to ensure reliability. Min driver is 5 amp smd dpak parts with auto protect. Max is fully protected peak and hold capability through a variety of methods.
staged – optional – same specs as primary.

Ignition drive outputs

which pins pa/pb, what sort of buffers 20mA each pin, which master pin – shared with fuel pump or independent?

Fuel pump control

which pin, same as master pin? Serial monitor pin state!!

EXTRA STUFF

Idle control

which pwm pin? 16 bit capable pin!

Boost control

which pwm pin ? 16 bit capable pin!

Knock sensing

which format, which pin? Sort this out soon.