

**SAFARI** **ARMAX**

**Performance ECU**

**X-SERIES**



**More Power. More Torque. Engine Protection.**

**Powered by *M1* Technology.**

***Power Without Compromise***



**Safari 4x4 Engineering Pty Ltd**  
Melbourne, Australia. [www.safari4x4.com.au](http://www.safari4x4.com.au)

# Engine Protection

When abnormally high EGT values are reported by the EGT sensor, mounted in the vehicles exhaust system, the ECU decreases the amount of fuel injected into the engine. This reduction allows the EGT to return to safe operating levels reducing load on the engine.

Once this has occurred the ECU will then gradually increase the amount of fuel injected, allowing the engine to return to full power in a controlled manor.

Adversely, if the EGT value is too cold (low engine temperatures), the ARMAX ECU progressively adds power as the operating temperature of the vehicle increases.



Another feature of the total EGT protection system is the ARMAX ECU carries out a number of plausibility checks, this system ensures the closed loop exhaust temperature feedback system is always precise in its reporting. If a check falls outside the allowable tolerance the unit simply reduces the power level and protects the engine.

This feature is unique to the Safari ARMAX ECU providing total peace of mind.

The ARMAX ECU also calculates the engine cooling system temperature, this is important as a large percent of engine wear occurs when the engine is cold. Accordingly, the ARMAX ECU doesn't apply any additional power whilst the engine is cold i.e. on start up. As the engine warms up the ARMAX ECU progressively increases its influence, once full operating temperature is achieved the unit will perform to its full potential.



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# SAFARI ARMAX

The Safari ARMAX Engine Control Unit (ECU) is designed to work harmoniously with your vehicles OE Engine Control Unit resulting in more power, more torque, better throttle response, less fuel consumption and less turbo lag. This is all backed up by Safari's sophisticated engine protection systems which are constantly live monitoring your vehicle for total drivetrain safety and ultimate reliability. The ARMAX ECU has 5 pre-calibrated maps for all user conditions but can be altered to suit specific applications. The plug and play wiring harness makes installation quick and easy and vehicle specific mounting bracketry complements the installation. The Safari ARMAX ECU is the total package, no upgrades required, no additional units needed. It is a total system solution specifically designed for your 4x4 vehicle.

The ARMAX ECU increases the open duration and the injection timing point of the fuel injector, allowing more diesel fuel to enter the combustion chamber. Due to the increase in fuel, the boost pressure the engine receives from the turbocharger is increased, optimizing the air fuel ratio. The result is increased engine power, torque, and better throttle response. In some applications, the fuel system pressure is increased at specific engine RPM points and load demands to ensure accurate fuel delivery to the injector. This approach ensures the service life of the mechanical components in the fuel system are not influenced. Another Standard feature of the ARMAX ECU is the ability to change the throttle sensitivity, this feature can be tailored to individual driver requirements.

The ARMAX ECU blends seamlessly with the factory ECU due to its ability to sense engine load from multiple sources such as Engine RPM, Manifold Pressure, Fuel Pressure, Throttle Position and Exhaust Gas Temperature. From here the ECU very precisely calculates the engine load and accordingly adjusts the parameters to meet the pre-calibrated demand.

The ARMAX ECU delivers a strong yet very smooth power enhancement, as the driver demands more power the ECU delivers more power.

Safari ARMAX  
– Power Without Compromise



## TEMPERATURE CONTROL

Exhaust Gas Temperature (EGT), is the single most important factor to the long-term life of your internal combustion diesel engine. If EGT values increase to dangerous levels then engine failure is imminent. That is why the ARMAX ECU utilizes a closed loop sensor feedback system to constantly monitor the vehicles exhaust gas temperature allowing for instant response.

# ARMAX

## Engine Control Unit (ECU)

### IP68 RATED

The Safari ARMAX ECU enclosure proudly earned an IP68 (Ingress Protection) rating meaning it is protected from dust, dirt and sand ingress and can be continuously submerged in water beyond 1m.

The Safari ARMAX ECU received such an impressive IP (Ingress Protection) rating with the use of several key features:

- The enclosure has a billet aluminium base which also acts as the main heatsink for the printed circuit board (PCB).
- An ABS plastic glass reinforced housing which offers excellent impact protection.
- A unique and cleverly designed perimeter sealing system.
- An automotive vent which continuously balances the internal pressure of the enclosure as well as removing any internal condensation.
- Resin filled enclosure to protect the PCB against vibration and aid in thermal shock protection.



## MAP SELECTION

The Safari ARMAX Engine Control Unit (ECU) includes an illuminated in-cab adjustable map selection switch.

The press of a button changes your vehicles driving characteristics between 5 different modes (maps).

1. COMFORT – Progressive power and torque delivery, great for everyday driving.
2. SPORT – Enhanced throttle response with strong power and torque delivery.
3. TOWING – With an emphasis on low end torque and reduced top end power to protect your vehicle whilst towing extra weight at ease.
4. TRACTION ASSIST – Slow and smooth throttle response whilst maintaining full power and torque to navigate difficult terrain.
5. STANDARD – Vehicle set to standard OEM power and torque output. Allows ECU to be fitted to brand new vehicle for run-in period.

## CALIBRATION FILES

Safari 4x4 Engineering have an extensive library of calibration files (tuning maps) to suit standard vehicles as well as multiple combinations of popular vehicle modifications. These include items such as Snorkels, Intercoolers and Exhaust systems. It is critical that the correct calibration file for your vehicle is installed to ensure the maximum power level is achieved reliably. These are available for download by an approved Safari ARMAX dealer, files can be changed in a matter of seconds allowing for future modifications to your vehicle.

## WIRING HARNESS

Each ARMAX ECU application has a vehicle specific wiring harness to ensure a precise fit which is tailored to each vehicle, it is necessary to route the harness through the vehicle in a specific way, so that the harness is not subject to abnormal vibration, heat, movement and interference. This is vital to ensure the wiring loom lasts the life of the vehicle.

Every connector fitted to the wiring harness is of the highest quality, fully sealed and waterproof, there are no exceptions. Safari uses gold plated terminals at each connection point on the harness.

The internal wires have a dual layer of external protection the same as high quality OE wiring harnesses, the harness breakout points are clearly labelled.

The Safari ARMAX wiring harness is a true "Plug and Play" solution that requires no cutting or soldering into the vehicles original wiring harness, it can be removed and the vehicle can be returned to its original form without any trace.



The map selection switch comes with a 500mm long flying lead so the switch can be easily installed in any position conveniently located to the driver.



## MOUNTING BRACKETERY

The Safari ARMAX ECU mounting bracketery which supports the unit is laser cut and folded 3mm plain carbon steel, all brackets are then zinc plated and powder coated. This dual layer offers superior corrosion resistance with great aesthetic appeal. All mounting hardware is high grade stainless steel and utilizes existing factory mounting points.

All components in the design phase were CAD modelled to ensure a perfect fit first time but most importantly analysed to ensure they would survive the life of the vehicle as well as fitting with commonly used aftermarket accessories such as secondary fuel filters, engine catch cans, auxiliary batteries and air compressors.



## M1 TECHNOLOGY

The Safari ARMAX Engine Control Unit (ECU) is powered by M1 technology. M1 technology is comprised of a suite of tools for developing automotive control systems, with a focus on engine control. It includes features such as a purpose built tuning solution in which Safari has included the most vital engine tuning parameters, data logging and PC communications as well as M1 specific hardware such as the Safari ARMAX PCB (Printed Circuit Board).

## DRIVETRAIN PROTECTION

OE manufacturers utilize a system on vehicles called torque reduction on gear change. This reduces the torque applied by the engine to the transmission when a gear change occurs. This allows the vehicle to shift gears smoothly but most importantly protect the life of the internal components of the transmission.

The Safari ARMAX ECU is specifically programmed to sense when the gear change is occurring and also reduces the torque to ensure the transmissions performance and service life is totally preserved. This feature, coupled with the engine protection systems offers a total drivetrain protection solution.

## INCREASED GVM COMPENSATION

Commonly a vehicles GVM (Gross Vehicle Mass) is increased due to the addition of aftermarket accessories for touring/4WD driving, the additional weight results in a significant reduction in vehicle acceleration. The ARMAX ECU compensates for this by safely adding power/torque to support the new vehicle weight at all times, this makes towing and overtaking easier and safer.

## HOUSING ENCLOSURE

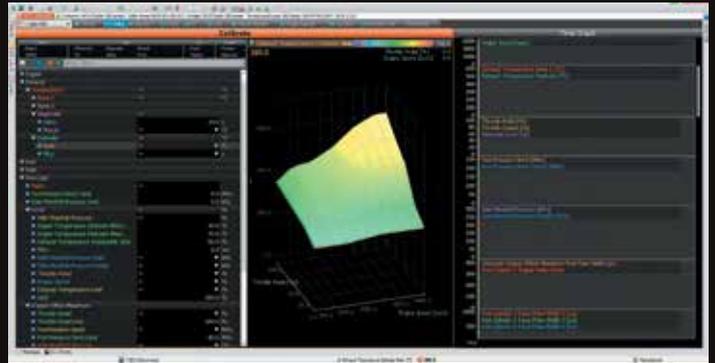
The housing enclosure features a billet T6 6061 aluminium base for the ultimate in thermal transfer, this heatsink provides the perfect solution to ensure ECU temperature remains constant. Additionally, the ABS glass reinforced top housing is a completely rigid and durable product with great aesthetic appeal offering excellent impact and radiant thermal protection.

## THROTTLE MANAGEMENT

The Safari ARMAX Performance ECU incorporates the ability to adjust the sensitivity of the vehicles throttle pedal, this greatly improves throttle response and can be custom tuned to your individual needs.

## AUXILLARY INPUTS/OUTPUTS

The Safari ARMAX Engine Control Unit (ECU) features additional inputs and outputs. This allows the user to connect extra sensors and/or devices offering an additional 4 digital inputs, 8 analogue voltage inputs/ outputs, 2 thermocouple inputs, 2 low side outputs and 2 half bridge outputs this flexibility allows for all custom applications to be electronically controlled or monitored.



## ETHERNET COMMUNICATIONS

The Safari ARMAX Engine Control Unit (ECU) has high speed reliable and extremely robust Ethernet communication between the ECU and your PC. The benefits are precise real-time data analysis and instantaneous download of updates as well as different engine maps.

Ethernet connectivity is also used to provide data logging, this enables engine analysis to be viewed live via the M1 tune software whilst connected to a PC, or be down loaded and viewed remotely. This gives Safari the ability to perform engine diagnostics and troubleshooting.



## AUSTRALIAN MADE

Safari's excellent reputation in Australia for manufacturing high quality 4x4 components is unchanged with the Safari ARMAX Performance ECU.

All components are proudly made and assembled in Australia to ensure the highest quality is achieved as well as being rigorously tried and tested for countless hours in some of Australia's harshest environments.



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# Performance ECU



## Available to suit:

Toyota LandCruiser 70 Series 1VD-FTV 4.5L Diesel Models  
(Non DPF Model) 03/2007 - 08/2016

Toyota LandCruiser 70 Series 1VD-FTV 4.5L Diesel Models  
(DPF Model) 09/2016 Onwards

Toyota LandCruiser 200 Series 1VD-FTV 4.5L Diesel Models  
(Non DPF Model) 2008 - 10/2015

Toyota LandCruiser 200 Series 1VD-FTV 4.5L Diesel Models  
(DPF Model) 09/2015 Onwards

Ford Ranger PX MkII & MkIII P5AT 3.2L 5Cyl Diesel Models  
06/2015 Onwards

Ford Everest P5AT 3.2L 5Cyl Diesel Models 08/2015 Onwards

## QUALITY AFTERMARKET

### 4X4 COMPONENT MANUFACTURER.

Safari's signature lies in the quality and durability of its components, the attention to detail in every system and the absolute requirement that "product performance must always be achieved with total reliability".

## CUSTOM TUNING

The Safari ARMAX ECU can be live tuned by an industry professional, this feature allows customized features and files to be created for specific customer requirements. This ensures complete flexibility when auxiliary products are fitted to the engine for further increased performance.

## SERVICE PLUG

Included in every Safari ARMAX application kit is a service plug. This enables the Engine Control Unit to be bypassed for the purpose of diagnostics or to allow the vehicle to be returned to standard in the event the 'Standard' map selection has been used for a user defined map. The connector can be fitted or removed in a matter of seconds.

## CAN COMMUNICATIONS

Controller Area Network (CAN Bus) allows microcontrollers to communicate. The Safari ARMAX ECU incorporates a CAN bus which allows for auxiliary device connection i.e. digital display or integrate further with on-board OE controllers.

## WARRANTY

Adding to your peace of mind is Safari 4x4 Engineering's warranty program, offering an unlimited kilometre 3 year warranty on all components. This is also backed up by an industry leading vehicle drivetrain warranty.

## PATENT PENDING

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