

Cranky Camry

This article is a true description of an AECS technical help desk problem and how it was solved.

AECS has been assisting NZ and Australian workshops with diagnostic trouble cases for over ten years. Many cases have not been published, as they were either too complex or too simple to write about. In a number of cases, the information we received was too incomplete to be able to publish, but one thing is for sure we deal with thousands of cases a year. This service is for AECS customers and serves for us at AECS as a method to keep our training seminars current, as we are in touch with what happens out there.

Following is yet another lovely case, which happened recently.

Vehicle:

2003 Toyota Camry 2.4 Ltr 2AZ-FE Petrol.

Problem presented to the help desk

This car came into our workshop from a "car computer repair guy", local to the workshop involved. He is good at diagnosing difficult ECU problems but this one had him stumped, according to the diagnostician.

The car would not start when cold. It would crank and try to fire but would not start. No fault codes stored in the engine ECU. He had scanned the vehicle for codes, checked live data, and used a not so good oscilloscope to test most signals. He could not find the fault. As it cranked the starter, made grinding/clunking sounds as the spark fired all wrongly timed.

With disconnected the coils (4 COP coils) the engine cranked smoothly. If you could get the engine to start, it ran and drove perfectly. It would start when hot but still would not fire straight away and still made clunking/grinding noises.

Only a few left!!!!

This IS special...

We have achieved a major price wind back!

The **ATS scope** has dropped in price due to the following set of circumstances:

- 1) favourable exchange rate
- 2) a bulk purchase deal,
- 3) **AECS** has achieved a higher dealer level,
- 4) political changes in the factory, and
- 5) severe economic pressures in the EU.

Use this to your advantage, the prices won't be like this for long!



A super level scope has never been so close within **your reach!**

- ▶ **ATS 5000** (2 channel + signal generator) or
- ▶ **ATS 5004d** (4 channel differential scope)

For a staggering low **\$3,470.00**

Expand your existing scope set (multichannel sw), build a set up, or buy a whole set for **\$6,692.00**

Call us at 06 8749 077 or, check out the spec's at www.aecs.net



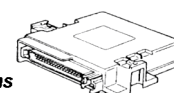
ATS 5004d scope in tool



ATS 5000 50Mhz Scope

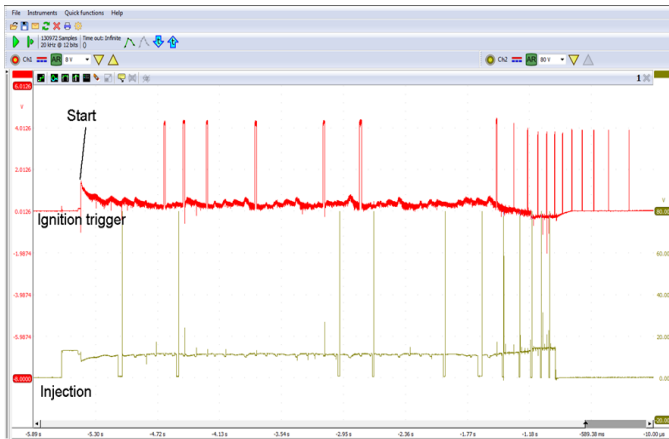
Many modern high tech options available, like G sensor, pressure sensor, return flow sensor, AC pressure sensor.

Check out our web catalogue, *this is a very special deal !!*



Measure

As usual with these jobs you need to start with, measuring ignition over injection to make visible what is going on. The recording, which was first performed, was the coil trigger signal and injector signal both on Cylinder 1.



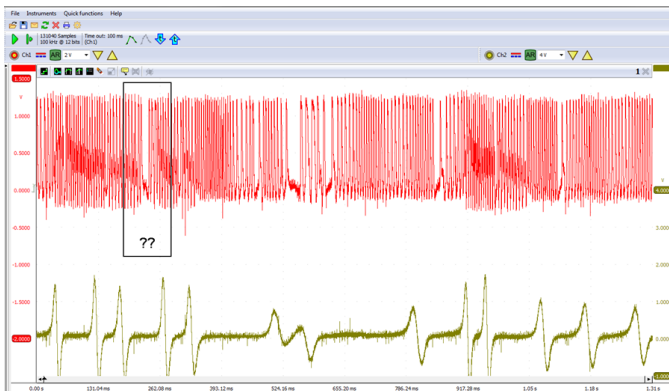
ATS 5000 scope recording of ignition vs. injection while winding over

Clear is that the ignition and injection both are very irregular. It IS injecting and it IS igniting, but all at the wrong time. The fuel injected and ignited at the incorrect time caused the 'funny' starter motor noises.

If anyone would listen to pulses on the injectors, (some technicians find this a good method to inspect..) or if anyone would connect a coil to a spark plug on the rocker cover (also a popular inspection method...), they would not have seen anything untoward.

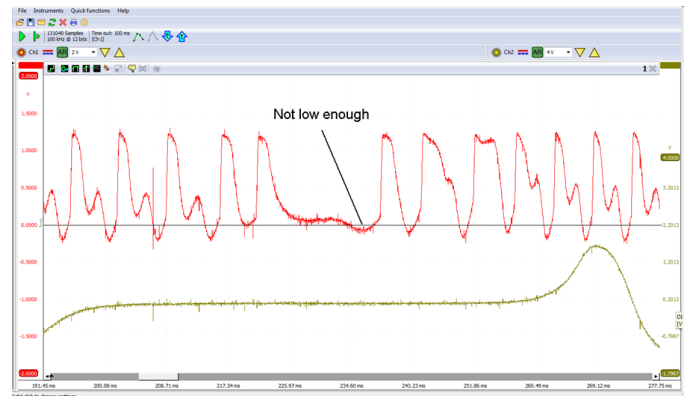
Second measurement

Obviously are there timing and calculation issues. Seeing this pattern makes even the untrained technician progress to the crank/cam sensor signals.



ATS 5000 Cam/crank shaft sensor recording

Well there are some spots, which require attention on the crankshaft pattern. Zoomed in it looks like the picture following:



Zoomed in pattern of crank vs. cam shaft sensor

The crankshaft is clearly the problem, the signal is not balanced around the zero volt line. The 'arm and fire points' (AED training) are not achieved at various times during starting.

This makes the ECU not reading the correct quantity of teeth in relation to the camshaft sensor.

No fault was set as the ECU still 'saw' crankshaft sensor activity.

AECS equipment



**Automatic
air-conditioning station for
recovering, recycling, and
recharging refrigerant.**



Standard Features:

- ▶ Weight scales
- ▶ Heated storage bottle
- ▶ Recovery compressor
- ▶ Vacuum pump
- ▶ Automated solenoid valves
- ▶ Oil separation + injection
- ▶ Filtration and de-acidising
- ▶ Charge volume database
- ▶ Component flushing software
- ▶ Serviced on your premises!
- ▶ AECS technical support.

**Aircon
Season
Special**

\$5690.- + gst

Standard price is \$7,916 + GST.
Printer in picture is optional

Profit from our bulk buying

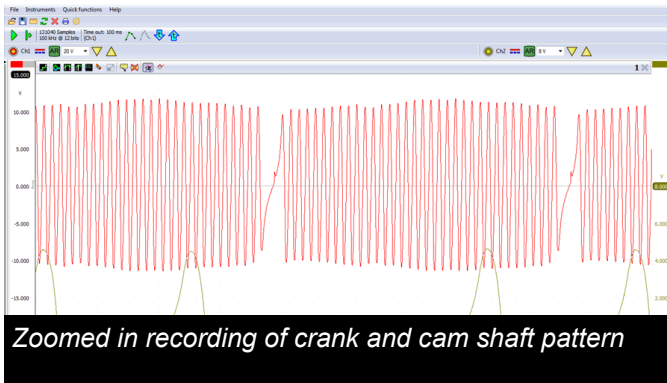
If you want to take advantage of this low price, or want to know more about our finance options! Contact the AECS equipment team on **06 8749077**.

Only 2 left from this season's container load!

Idea: Purchase on your Capricorn account!

Why did it start when hot?

The engine would have been winding over a bit quicker when hot, increasing the sensor voltage (higher signal amplitude), and crossing the 'arm and fire' points. This is also, why the engine would keep running when it finally did start.



Sure.

That leaves no doubt, a perfect pattern plus a good starting and running engine confirms that the repair was done properly and most of all efficiently. No niggly thoughts like "the car runs fine now, is this because we disturbed something?" Just a decent feeling that the job was done perfectly thanks to the ATS scope.

Conclusion:

This job was easy, it did not take more than about 45 minutes to locate the fault. No modern technician should struggle with this, certainly not anyone who is in electrical repairs!

The technician on the job had attended a number of AECS training seminars and gained the skill needed to get to the bottom of such problems quick and direct.

It should again be clear that attempting jobs like these without a proper scope like the ATS 5000 or ATS 5004d makes even a good technician look bad.

Choose your equipment, training and support supplier with consideration for quality and track record.

Herbert

For **AECS Ltd:**
H.P. Leijen
(trainer/research)
E-Mail: hpleijen@aecs.net



LAUNCH

X-431

GX3 Latest model SCAN TOOL

X431 GX3 scan tool is the new look **scan tool** developed by Launch. It's a perfect complete unit, it out performs all other diagnostic tools you have seen so far!

Great value!

Features:

- ▶ Touch Screen PDA
- ▶ Inbuilt printer
- ▶ Able to be used on **57 car brands**
- ▶ Very simple to operate
- ▶ Many protocols are almost identical to factory software
- ▶ 1 year free updates and 12 month warranty
- ▶ Strong carry case for all connectors and tool
- ▶ **AECS** technical support.

AECS Training

We have very strong demand for almost all our seminars, and a number of them are already full. If you want to be in look on the training calendar on the next page and contact us.

Lets put a training plan together for your shop now!

Phone Christine (06) 874 9077
(Training Co-ordinator)

