



# E-Bay Wagon

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

## Vehicle

Audi A3 2008 1.8 TFSI Petrol Turbo Direct injected



*Audi A3 2008 1.8 TFSI (picture sourced from internet).*

## Problem presented to the Technical Support Team

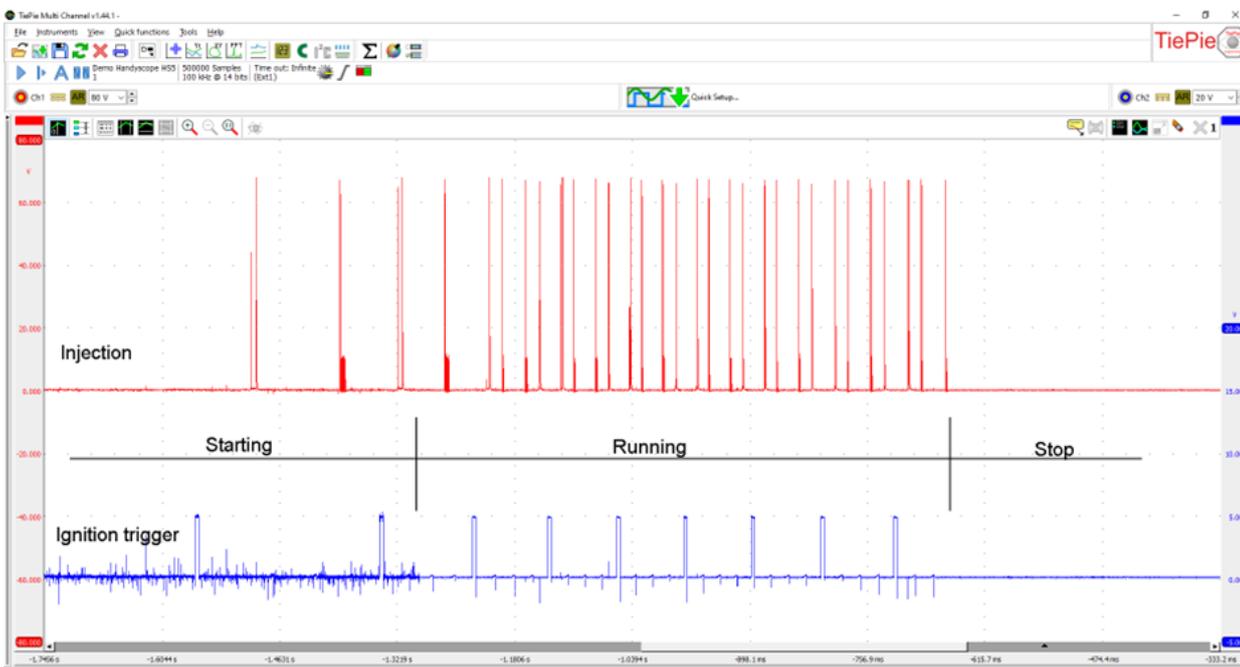
### Problem presented to the technical support team

We have an Audi 2008 Audi A3 with an unknown background which refuses to start, it winds over and runs briefly and dies. The car has been bought by this customer to do up, we have been asked to make it run.

We have the ATS scope and have done AECS training. We have measured the following:

### Ignition vs Injection:

As we teach in the EMS1-1 when you have a no start or stall situation, you want to know if you lose ignition, injection, or both. He followed the right path .



*ATS 500XM scope recording ignition (trigger) and injection.*



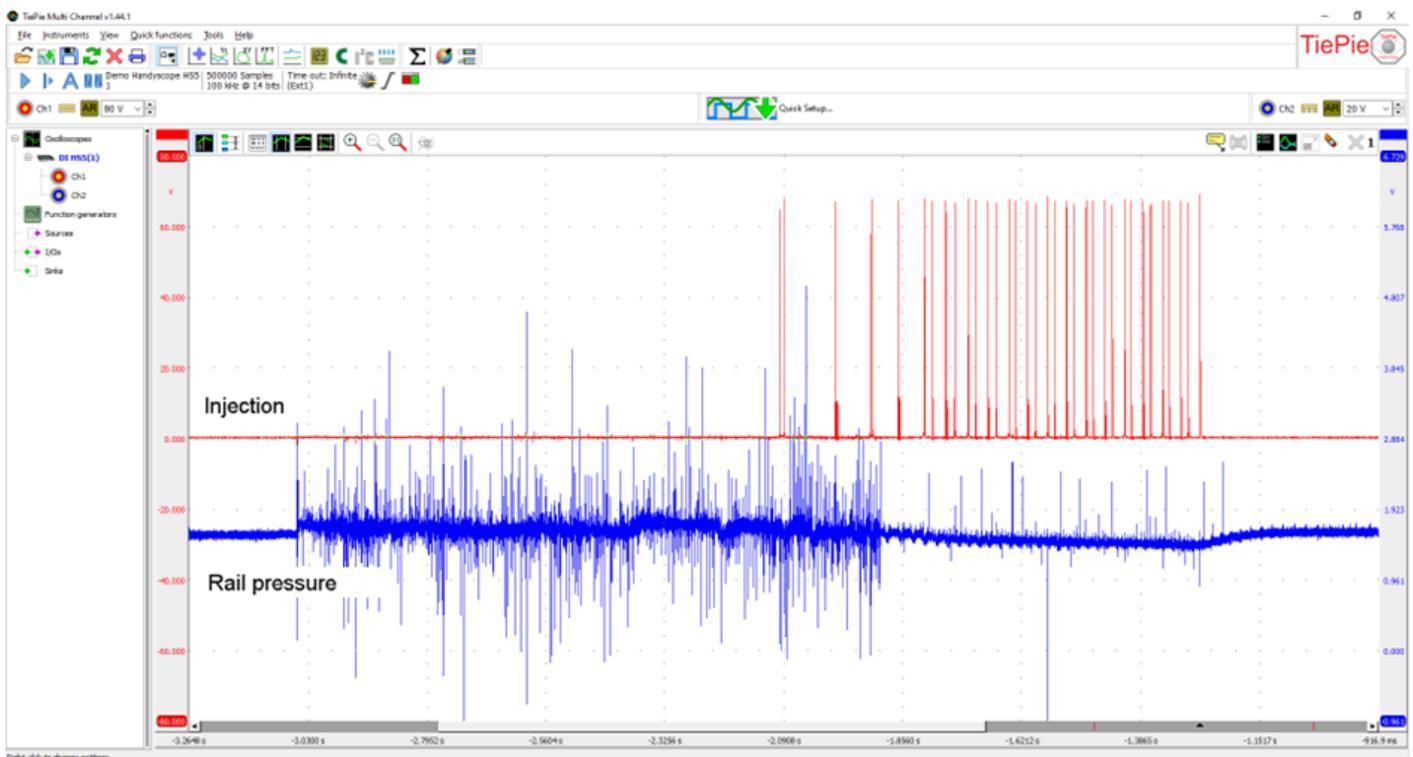
Because the diagnostician could not see anything wrong with this recording, other than that when the engine had stopped, the ignition and injection had disappeared, he proceeded with a recording of the fuel pressure vs injection.

The whole thing sounded and to him looked like it was running out of fuel, plus these vehicles are notorious for fuel pump issues (low pressure and high pressure pumps).

Let's face it, when the engine runs out of fuel, the engine stops and both the ignition and injection stop pretty much at the same time, something that they clearly do in the recording.

## Rail pressure vs Injection

So he measured the rail pressure with the injectors as a reference



*ATS scope recording of the injectors and rail pressure*

## Proof!

Clearly visible in this recording is that the rail pressure falls when the injectors begin to inject fuel. The fuel used by the engine is not replenished by the obviously faulty pump!

A new (in tank) low pressure pump and pump driver was ordered as they most often fail.

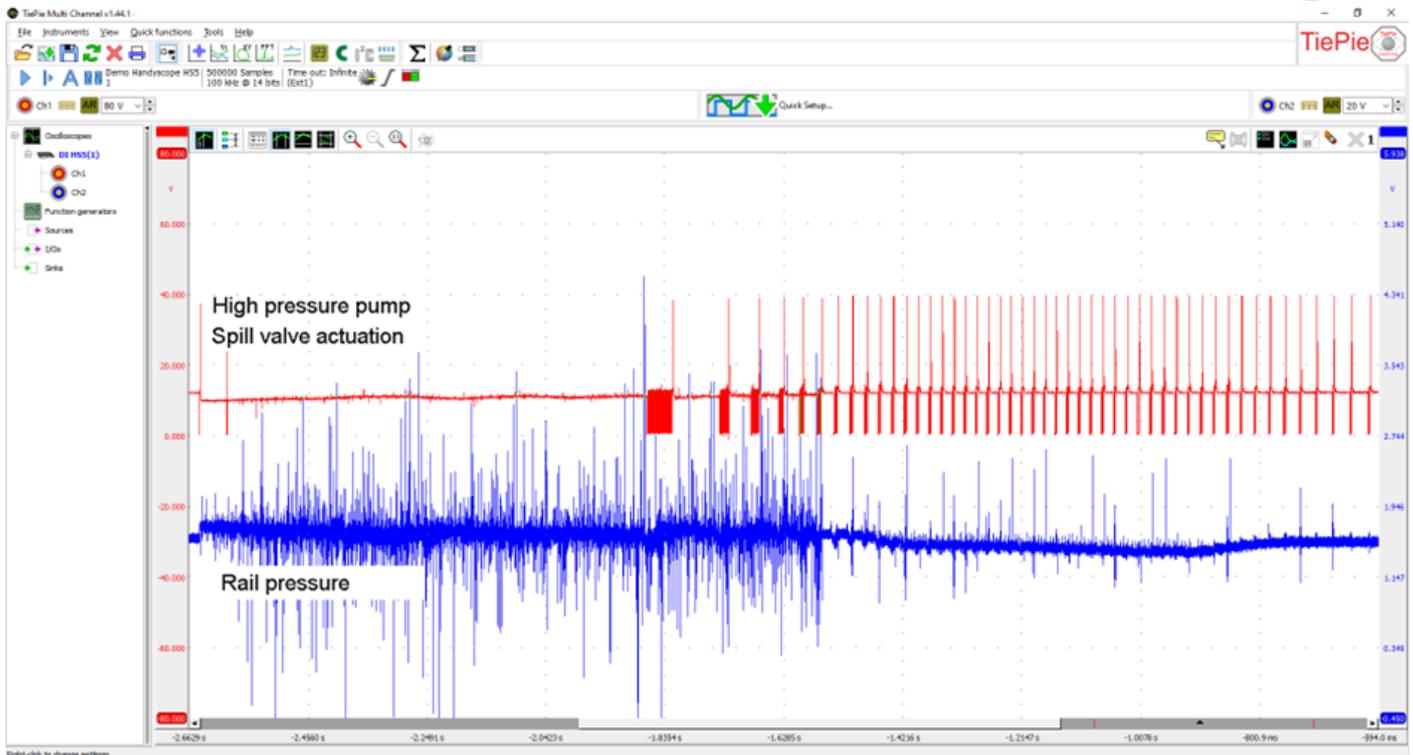
*The pump was fitted and presto...?*

Still exactly the same! The engine would fire up and die.

The diagnostician felt a bit uneasy after such a mistake but to give him credit, it is a bit hard to detect the difference between a faulty low pressure pump and a faulty high pressure pump.

To prove that the high pressure pump was faulty he recorded the spill valve on the pump vs rail pressure, to see if there was perhaps a control fault, or if the pump itself was faulty.

Just to make sure.



*ATS 500XM recording of the high pressure pump's spill valve vs the rail pressure when the engine is starting and dying.*

The above recording clearly shows that the ECU is doing an effort in trying to keep the pressure high enough (Spill valve actuation), but that at the same time the rail pressure drops.

## HP Pump

The pump was removed and replaced. Problem still exactly the same, this was the confidence killer for the diagnostician. He needed assistance from the AECS help desk. To be honest we were impressed by the determination of the diagnostician and also by the path he took. However when we asked him what codes he had in the car the answer was less desirable.

## Too many codes

He told me that there were far too many codes in this car to take them seriously... The codes were reset and what you see reported below are only the codes that came back.

For you the reader I have highlighted the codes that sparked our technical help desk' interest. We have blacked out the shop and car details for privacy reasons.

*ATS 500XM scope*



Vehicle Diagnostic Report

Pre-Repair

Repair Shop



Vehicle Information

Year:2008
Make:Audi
VIN:WAUZZZ8P58A
Odometer:193720 km
Vehicle Software Version:V28.81
Diagnostic Application Version:V7.03.020
Diagnostic path:Health Report

System fault code

The following system is abnormal:

- 01 Engine Electronics 3 problems exist
1.P0513 Incorrect Immobilizer Key
2.P3089 Fuel Pump Electronics Signal Wire:electrical Error
3.P0685 EMC/PCM Power Relay:control Circuit Open
03 Brake Electronics 2 problems exist
1.00668 Vehicle Voltage Terminal 30
2.01130 ABS Operation
08 Climate Control Module 5 problems exist
1.01334 Right Rear Door Ctrl. Module
2.00716 Recirculation Flap Motor
3.01317 Instrument Cluster Control Module
4.01331 Driver Side Door Control Module
5.00532 Supply Voltage
09 Electronic Central Electric 10 problems exist
1.01502 Left Rear Fog Light Bulb
2.01259 Fuel Pump Relay
1.01812 Supply Voltage For Door Control Module, Frt. Pass. Side
2.01331 Driver Side Door Control Module
3.01334 Right Rear Door Ctrl. Module
55 Headlamp Range Control 2 problems exist
1.01317 Instrument Cluster Control Module
2.00446 Function Limitation Due To Insufficient Voltage
56 Radio 3 problems exist
1.00446 Function Limitation Due To Insufficient Voltage
2.01317 Instrument Cluster Control Module
3.00871 Right Front Bass Speaker
62 Left Rear Door Electronics 3 problems exist
1.01813 Supply Voltage For Door Control Module, Left Rear
2.00098 Left Rear Central Locking SAVE Motor
3.00930 Lock Unit For Central Locking:left Rear
72 Right Rear Door Electronics 1 problem exist
1.01814 Supply Voltage For Door Control Module, Right Rear
The following systems are OK:
1.02 Transmission Electronics



Wow!

- 3.00834 Signal For Heated Rear Window Activation
4.00532 Supply Voltage
5.01334 Right Rear Door Ctrl. Module
6.01331 Driver Side Door Control Module
7.00059 Terminal 30 For Interior Illumination
8.00447 Function Limitation Due To Excessive Voltage
9.00446 Function Limitation Due To Insufficient Voltage
10.01317 Instrument Cluster Control Module
15 Airbag 2 problems exist
1.01317 Instrument Cluster Control Module
2.01221 Side Airbag Crash Sensor:driver Side
16 Steering Column Electronics Systems 1 problem exist
1.00883 Ignition/starter Switch (Terminal S)
17 Instrument Cluster 2 problems exist
1.00532 Supply Voltage
2.00532 Supply Voltage
19 Data Bus OBD Interface 3 problems exist
1.01334 Right Rear Door Ctrl. Module
2.00381 Instrument Cluster Data Bus
3.01331 Driver Side Door Control Module
25 Anti-Theft Immobilizer 1 problem exist
1.01176 Key
42 Driver's Door Electronics 3 problems exist
1.01811 Supply Voltage For Door Control Module, Driver Side
2.02071 Local Data Bus
3.01706 Mirror Adjustment Switch
44 Power Steering 1 problem exist
1.00778 Steering Angle Sensor
46 Comfort System Central Control Module 5 problems exist
1.01331 Driver Side Door Control Module
2.01334 Right Rear Door Ctrl. Module
3.00352 Terminal 30A
4.00849 S-contact At Ignition Starter Switch
5.01038 Central Locking Overheating Protection
47 Sound System 1 problem exist
1.00422 Right Rear Midrange Speaker
52 Passenger's Door Electronics 3 problems exist



Launch Auscan3, fully automatic performed health check report. Only one ECU without trouble codes, something very common for European cars.

Information overload

As you can see, this is information overload for most! However I can sort of see why the diagnostician went for the fuel pump.

Don't like

What the help desk tech did not like at all were the immobiliser key faults. What was that all about? Let's for a moment forget about the fuel pump, why is there an immobiliser fault code? Could you ask the customer if there recently been a key change or if they have a spare key? The customer asked the previous owner, who told us that this was the only key.

Could the key have lost its memory perhaps?

We at AECS have not seen that before, where a key suddenly has lost its memory, when all components are in good working order, but I guess there is always a first.

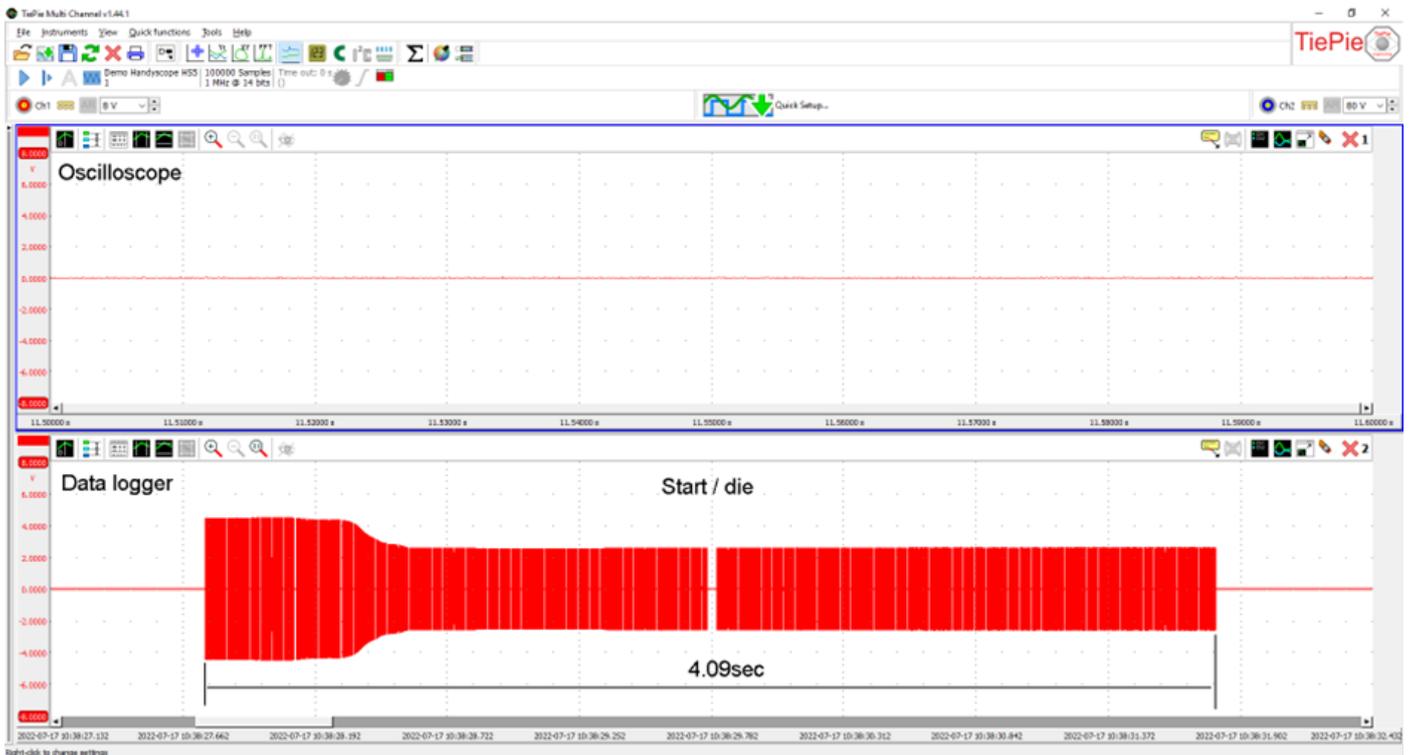


The diagnostician googled the vehicle and immobiliser issues and found that it is 'real common' for these vehicles to loose the connection between the immobiliser ECU and the aerial in the steering column. If that was the case the Key would never be recognised which would likely set the key not recognised codes.

## Really... Google?

We have learned over the years that the information from google is pretty much next to useless as most of the information is written by hobbyists and google graduates. We still entertained the thought and proceeded to test the RF signal around the ignition barrel.

A 100x coil was placed around the ignition barrel with the scope connected in datalogger mode so we could record at high speed for a longer period of time



*ATS 500XM in scope and data logger mode, recording of RF around the key barrel.*

Without knowing a good pattern, it was immediately clear that;

- 1) The aerial around the key barrel was working correctly, so no wiring issues there as google suggested.
- 2) That the immobiliser did NOT recognise the key, and kept calling for the key for a prolonged period of time (4seconds is very long for immobilisers to call).

## Key Memory lost?

We needed to look at the key and reprogram. It looks like it had lost its memory after all. I guess there is always a first time.

No matter what we tried with the Launch and its XProg extension for recoding keys and ECUs, we where not successful.

We at the helpdesk started to seriously doubt the Launch at that stage. In a clear moment we realised that the Launch has not let us down yet, maybe there was more than what met the eye.

We asked the diagnostician to open the key and look for the RFID (radio frequency Identity) chip. We have had before where on keys the little chip falls out of the key particularly when the key has gone through a hot washing machine.

## Found it!

We got sent the following pictures:



*Picture of the E-Bay key, highlighted where the chip is supposed to be*

No damage to this key, but no RFID chip either! How do you explain that? How can a chip disappear without any trace that it has ever been there. This key is screwed together so it actually really hard for any chip to get out.

Please be mindful of the fact that this key did lock and unlock the doors.

## Awkward

The customer was asked to find the previous owner and ask them if they had done any work with the key. Now that is an awkward conversation!

The lady who owned the vehicle before the customer that brought the car in, was contacted and was open to the conversation. She told the customer that to make the car look more attractive they had the key replaced by a new one (from e-bay)...

With a stroke of luck the lady had not thrown out the old key yet. She was so kind to send the key to the workshop.

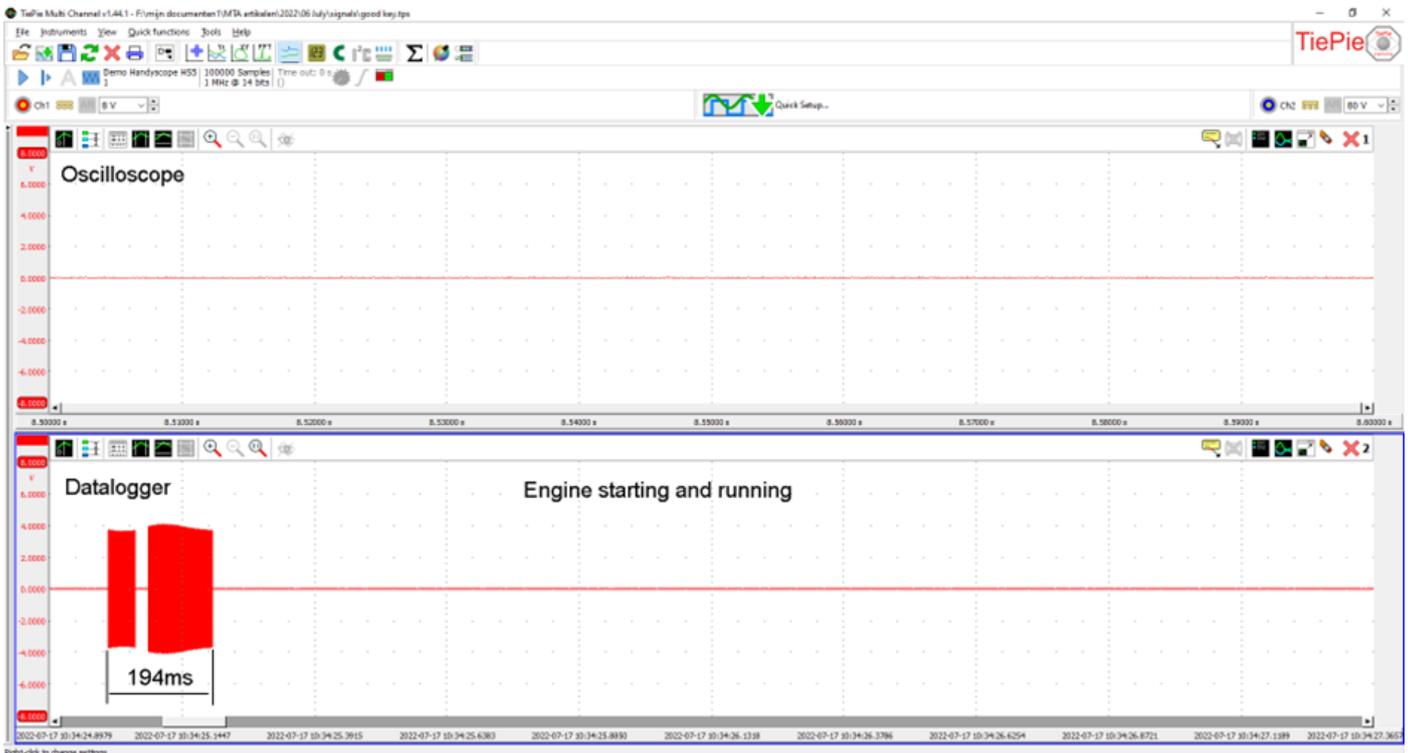
Guess what we found!



*Picture of the original key with the chip still glued in place.  
Please note that this key has a gasket and is also of better build than our E-bay key.*



Holding the key fob close to the key barrel when trying to start the car with the E-bay key made the car fire up and run.  
The internals of the genuine key were put back in place and a recording of the immobiliser communication was made with the ATS 500XM scope and the 100x coil placed on the barrel.



*Recording of accepted key*

## 100%

There is simply no better and quicker way to determine if a key has been accepted and if the immobiliser system actually tries to figure out the key, than with the ATS scope and a 100x coil. We even check the key's remote buttons with those coils, in the AECS training.

Car was going and fixed with a not so nice looking key, better get a new key from the official channels next time!

## Conclusion

The diagnostician made right at the very beginning of the story an, for him, unusual mistake and made one further along also after he got lost in the case.

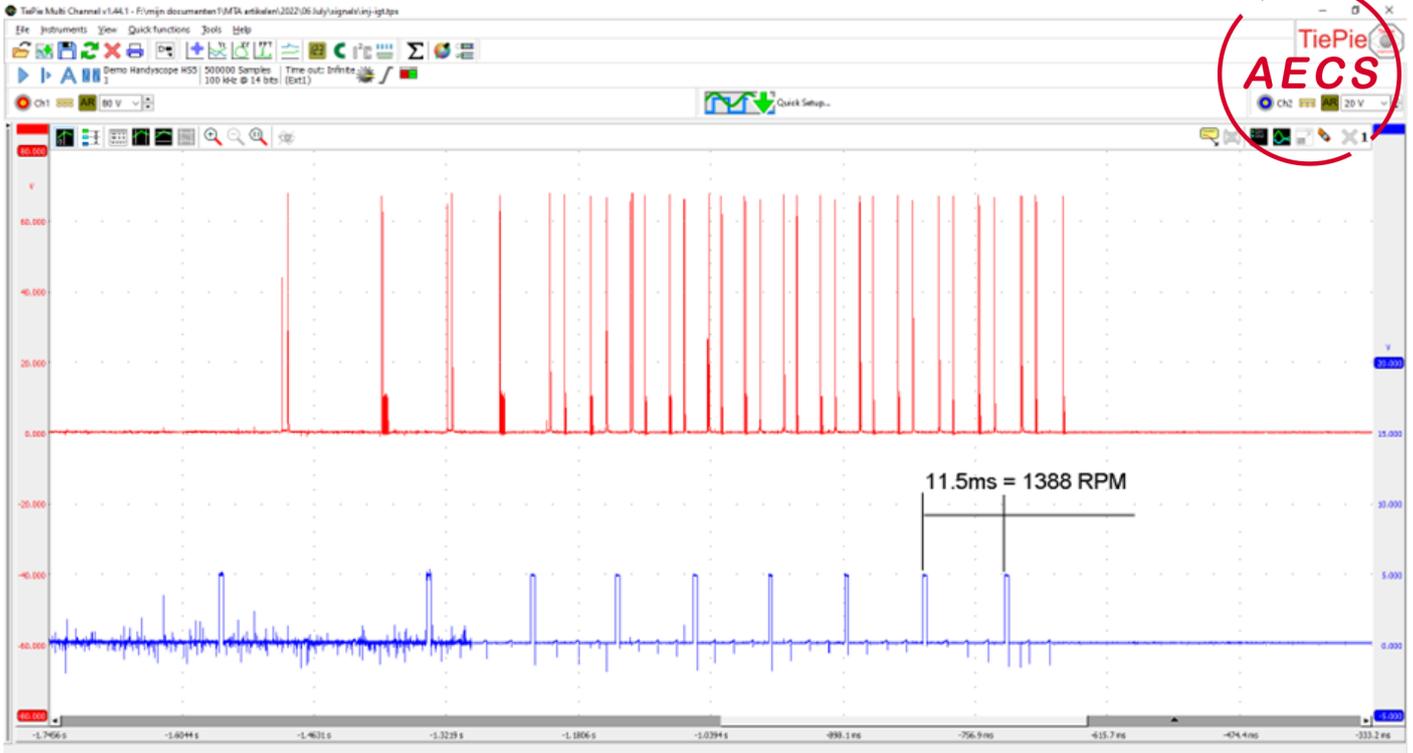
The first mistake was to not look at the ignition and injection recording in enough detail.

The ignition and injection suddenly stop, when the engine is running at 1388 RPM. This means that the ECU stops the ignition and injection, not because the engine physically stopped rotating, but because it was 'unhappy' to carry on keeping the engine running.

This is a classic sign of an 'immobiliser signal not accepted' issue.

The second mistake was to ignore the immobiliser fault codes buried between the sheer amount of fault codes.

Please realise that this diagnostician is of high caliber. Why this was missed is not sure to me, I guess we are all human and mistakes are a normal part of life.



*Ignition and injection when the engine stalls*

I am happy that the AECS help desk has been able to assist with this case.

Tools used: ATS500XM scope, 100x coil, Launch Auscan3, and a lot of knowledge.

For **AECS** Ltd  
Herbert Leijen  
Trainer/Research  
www.aecs.net

**AECS Equipment used for this case:**

*ATS 500XM scope  
2CH +signal generator  
\$3654+gst*



*LAUNCH Auscan3  
Professional scanner  
\$4,224+gst*



*AECS 100x coil  
\$69.50+gst*

Thank you for reading this article.  
 Could I please ask you kindly to have a quick look at our workshop equipment?

## The Launch SLD-501 Smoke machine

This great *new* Launch product is the quickest way to find leaks in intake manifolds, vacuum or air pressure hoses, exhaust systems, and more.

Find out why you have fuel trim adaption fault codes or low boost problems, just to name a few. The SLD501 has an onboard air pump to distribute the smoke.

An onboard pressure gauge and flow meter show if you are chasing your tail or a true leak, imagine you waiting for smoke to appear *while there is no leak*.

The pressure it can achieve is high enough to test high level boost engines' manifolds.

The fluid reservoir is easy to top up with oils available from any supermarket.

A timer will turnoff the smoke producer after 5 minutes.

The power supply is 12V. The unit is built sturdy with a steel casing, yet it is still light (3.3KG) to make it hyper mobile.

We at AECS absolutely love this machine!  
 Look at the pictures below:



- It comes with a carry case for the accessories like:
- 12V Power cord
  - Smoke tube with nozzle
  - Intake manifold adapter cone, to fit in round tubes (manifolds) from 26mm to 85mm
  - A set of 18 plugging caps from 5mm to 97mm
  - Balloon plug set with hand pump and spare balloon, to plug off unusual shaped pipes greater than 40mm.



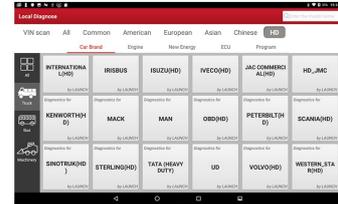
Complete kit: \$1,583.00+gst

**LAUNCH is celebrating 30 years of making diagnostic equipment.**

**LAUNCH 30 YEAR CELEBRATION!!**



**AUSCAN 3**



**LAUNCH HD (truck, bus and machines).  
A true powerful 24V expansion kit for the  
Auscan3 and Eurotab**



**EUROTAB 2**



**COMBO DEAL: AUSCAN3 & HD \$5,724.GST EUROTAB2 & HD \$9,700.GST**



**LAUNCH** started building humble communication equipment in 1992, a little after the introduction of EFI in vehicles.

**AECS** has been a very proud distributor of Launch since 2004. And what a ride it has been! The depth of the LAUNCH tooling combined with the training and technical support of AECS has been copied often but never quiet matched. It makes LAUNCH and AECS leading in the NZ market.

Enjoy the celebrations!

A breath of fresh air in this world of negativity: we have actually **dropped our pricing** for the month of August if you order one of the kits above in August!!

- AUSCAN3 (\$4,224+) combined with the HD expansion kit (\$2,990+) for a staggering **\$5,724+gst**
- EUROTAB2 (\$8,297+) combined with the HD expansion kit (\$2,990+) for a **\$9,700+gst!** (limited stock)

Call us as soon as you see this to reserve your deal!

**NOTICE:** In the week 8<sup>th</sup> to 12<sup>th</sup> of Aug we have a big company training event. We will be hard to get hold of during this week. Please email or leave messages. Thank you for your understanding.

**AECS**  
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