

# Equipment knowledge, the ins and outs.

At **AECS** Ltd we often assist garages with repairs on vehicles, in particular the diagnosis of electronic faults.

AECS has a technical help desk solely for its customers; we have been providing this service for many years now. I strongly believe that our support is worth its weight in gold and can compete, even eclipse, almost every other type of technical support in this country.

## Tech support

We strive to maintain our technical skills through research and attend training at the highest level possible. All this to be functional for your business, to help with those time consuming jobs where the very real danger of unhappy customers or unpaid labour exists.

I also believe that through our technical skills we have a sound judgement as to what diagnostic equipment is functional and which is not. This is not a matter of opinion, but a case of having daily exposure to sometimes the most intricate automotive technical (electronic) problems.

## Equipment demonstrations, the business case

Often we get asked to demonstrate diagnostic equipment in workshops throughout the country, this almost always results in an apology from us. When equipment gets sold a profit gets made. That profit can be spent either before the sale (a visit from a sales



person with little or no technical skill) or time spent with you after the sale when you need help, in the form of top level automotive and equipment technical support. I know what would be most useful to me if I would be up against that brick wall.

We do not employ sales staff, all our equipment is on our website with pictures, technical details, options and prices. Our equipment line up is extensive and ranges from scan tools, diagnostic scopes, emission testers, in floor brake testers, aircon service equipment, data base systems, injector test equipment and many more. All the equipment in our line up is selected by us as being the most useful and the best value for money, not just to create easy quick sales. We need to back it up.

We do have a beautiful demonstration room where all is set up for you to play with if you are looking at investing in the future of your business.

## Launch GX3

**\$5199.00 +gst**

- Can be used on 55 different car brands.
- Full function software



See our website for more info [www.aecs.net](http://www.aecs.net).

## Training

Many people bring their own scopes and scan tools to our training seminars and we invite you to bring your own tools as it is most important that you learn with your own equipment, so you can fully concentrate on the automotive knowledge being taught.

The side effect is that we also see the misinformation which is spread by some sales people who promote sometimes very expensive non effective gear to garages.

I thought that it would be good idea to highlight one strand of our equipment line up, and go into technical detail, just in case you were doing your home work and were looking at comparing specifications of equipment which don't always make sense.

By far the most effective and quickest way to get to the bottom of electronic faults is with a decent oscilloscope. If I were to start a diagnostic shop, I would spend my prime money on the highest quality scope I could find. Secondary I would buy a scan tool.

## Scopes

Outlined below are scope requirements for the automotive industry:

1. It has to have 2 channels at least. More is fine, but single channel is pointless.
2. It has to have a high sample rate.
3. It has to have a recording (data logging) and external trigger ability.
4. You need to be able to store and e-mail patterns for support and reference.
5. It has to have a direct voltage input of at least 80V without attenuators.
6. It needs to be portable to be able to be used during a road test.
7. It needs to be used in conjunction with a laptop or tablet for its screen size and storage ability.
8. It needs to be simple to use so that all brain power can go where it belongs, into fixing the vehicle fast.
9. It needs to have a signal generator, which can simulate all sensors' signals and test actuators, like coils, injectors, throttle bodies, etc.



Lets look at each requirement in detail:

### 1) Dual channel or more.

Dual channel enables you to look at the relation between signals. In our experience 2 channels is enough most of the time, sometimes more is better. The ATS 5000 has two channels; the ATS 5004d has four. The ATS 5004 does not have a signal generator.

### 2) Sample rate and what does 1GS/sec mean?

1GS/sec on the HS 805 means 1 giga samples per second. Which means in layman's terms that the scope's input checks what the voltage level is 1000 million times per second. These measurements will be plotted on a computer screen and joined with lines (interpolation).

As with any measurements, the more samples you take the more precise the displayed result. In dual channel mode the processor's speed drops to 500 million samples per second.

The ATS (automotive) series scopes measure at a more than adequate 50 million samples per second on each channel.

### 3) What is a recording buffer?

A recording buffer is the amount of measurements which can be held in the scope's own memory before it sends it via the USB cable to the computer or laptop in block mode.

The HS805 can hold 32 million measurement points in its memory, which is also extreme. Not one detail of a

# ATS5004

4 Channel scope, with accessories



- ▶ Top of the line 4 Channel automotive differential oscilloscope.
- ▶ 4 x 50 Ms/sec sample rate with four independent differential channels.
- ▶ The combination with ATIS makes this high quality tool a real easy to use frontline fault finder.

NB: Colours & laptop might vary from our picture.  
Call us for details and our special price today  
Ph 06-874 9077

## Did you know?

Did you know that most car manufacturers advise to service the aircon system once every twelve months. A service is to remove the refrigerant, clean it, dry it, de-acidise it, separate the oil, weigh the refrigerant and the oil.

Vacuum the system to get rid of any built up moisture, then reintroduce refrigerant and oil to the correct amount. A service with Ecotechnics Equipment only takes around 3 minutes low skilled labour, the machine does the rest. A normal charge for an Air-con service is between \$90 and \$180. Consumables are usually around \$15.

Your customer will not run into expensive Aircon repairs this way!

A destroyed compressor repair due to neglected maintenance will set your customer back around the \$2500.

signal needs to be missed! Even USB 2 signals can be measured, reviewed and processed. This means that also the fastest (future) CAN data bus signals can be recorded and analysed.

The ATS 5000/5004 has a memory of 131,000+ measurement points, before it needs to send it to the laptop screen. Many scopes will stop measuring between 'data dumps' the ATS does not suffer from this problem.

The scope can also be used in 'streaming mode' where the scope writes direct to the laptop screen/memory. This has on all scopes a restriction of measurement speed as result as USB 2 is not fast enough to transfer all that data. This has at very high sample rates an incomplete signal (gaps) as result. To circumvent this, a large recording buffer is needed.

### 4) Store and E-Mail

To configure a scope with a laptop enables you to connect to the internet. This enables the user to seek support as other users or the scope's supplier (AECS) can 'look over the shoulder'. We can also remotely change settings on the user's scope to enable better measurements. The storage ability lets you create your own library besides the thousands of sample patterns that come with the scope.

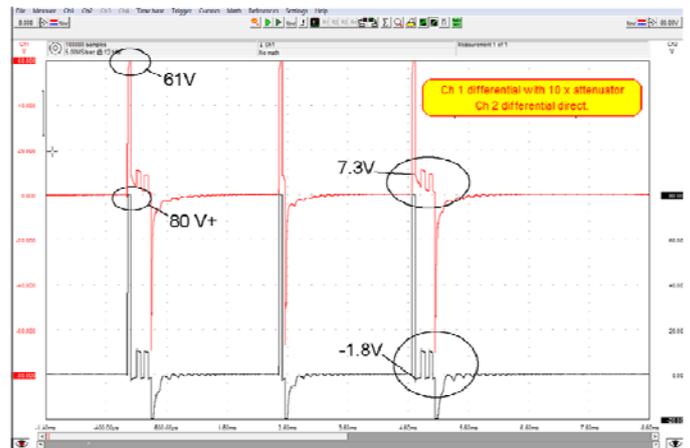
### 5) Direct voltage input of 80 Volts, so what?

What is the point of an 80 V direct input, some scopes have less and some seem to have more, what is the importance?

The ATS range and HS range of scopes have a direct input converter of 80 Volts, which means no attenuators need to be used up to 80 Volts. This makes it ideal for automotive high speed signals. On signals above 80V an attenuator needs to be used. Attenuators distort high speed signals.

Most scopes have a 20V max direct input or some even a 50V max direct input, which makes them immediately unable to measure most automotive signals, as an attenuator (sometimes built in) has to be used for higher voltages.

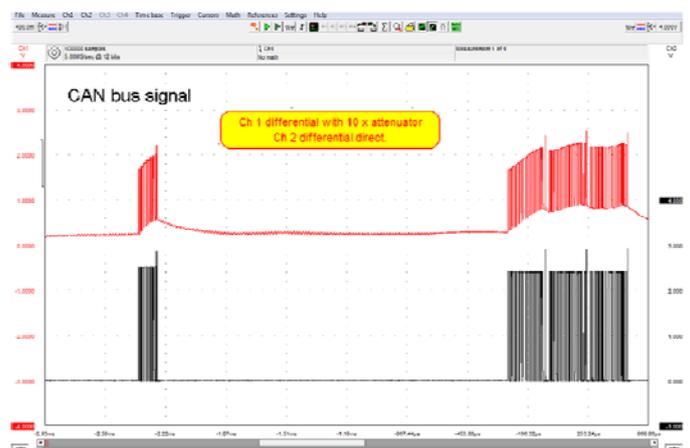
Please look at the picture below which has been measured on a standard common rail Diesel vehicle. The top pattern is measured with an 10:1 attenuator and the bottom pattern is measured without the attenuator.



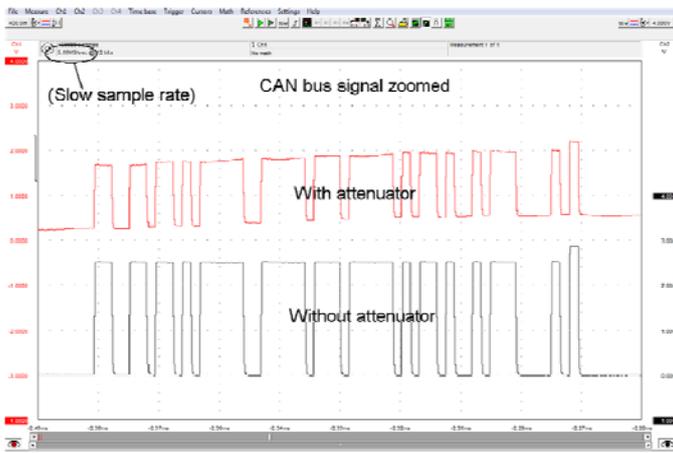
Dual channel measurement of the same signal, with and without attenuator.

The voltage differences are disturbing, to say the least. Various attenuators and attenuator leads have been tried and tested, all with pretty much the same result. Some attenuators can be adjusted; the correct adjustment procedure was followed.

We did the same on a CAN data bus signal, with equally disturbing results. It needs to be noted that the sample speed used was low (5 Million measurements per second) as most attenuators state a maximum response sample rate.



Dual channel CAN signal, with (CH1) and without (CH2)



Same CAN pattern zoomed in

How do you perform accurate diagnostics when you cannot trust the pattern displayed?

### 6) Portable

The scope needs to be portable, as the fault often only occurs while out on the road. This is why the ATS can connect to a laptop. It takes its power supply from the laptop's USB port. A decent laptop battery should last more than an hour.

The handy size of the scope and laptop in a tool case allows it to be easily placed in the car, with the shielded measurement leads connected to components under the bonnet.

### 7) Screen size

The laptop provides for a superior screen size, making detail visible which for example small handheld devices cannot even measure, let alone display. The battery power and internet connect ability is also far superior to any handheld device.

### 8) Easy to use

The key to any diagnostic tool is that it produces results, pretty much straight away. The ATS range scopes with the ATIS software make it all very easy. Colour pictures illustrate vehicle specific connections to the car (even wire colours are visible), and how to connect to the scope. The software has 10's of thousands of vehicle specific sample patterns which when selected correctly configure the scope. The nearest scope only has a hand full of preset scope settings. The ATS scope lets you concentrate on the vehicle, not on the tool.

To be a professional scope user or to be a professional car repairer is the difference.

### 9) Signal generator

The ATS 5000 and HS 805 both have arbitrary waveform generators. This means you can send out any signal you like between +12 V and - 12 Volt. Record and send out, build yourself or recall from an

extensive library. There is not one other scope out there which can do signal generation to the extent the ATS/HS scopes can.

### Multiple scopes, what is the point?

It is possible to connect the HS805 to one and the same laptop/PC together with any of the following instruments in almost any combination:

- Tiepie HS 3 series
- Tiepie HS 4 series
- GMTO ATS 5000
- GMTO ATS 5004d

This combination allows the user to create in the case of an ATS 5000 and HS805 combination a 4 channel scope with 2 signal generators. Or in the case of an ATS 5004d in combination with an HS 805 a 6 channel scope with 1 signal generator.

Or the ultimate a combination of the ATS 5000, ATS 5004d and HS805 to create an eight channel scope with 2 signal generators!

I hope that this extended technical write up makes it easier for you to read tool specifications on any brand tool.

For **A ECS**:

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### **A ECS Training coming up:**

<b>AED</b>	15th & 16th September	Tauranga
<b>AED</b>	12th & 13th October	Christchurch
<b>AED</b>	3rd & 4th November	Auckland
<b>DMS1-1</b>	17th & 18th November	Auckland

See our website for more details [www.aecs.net](http://www.aecs.net)