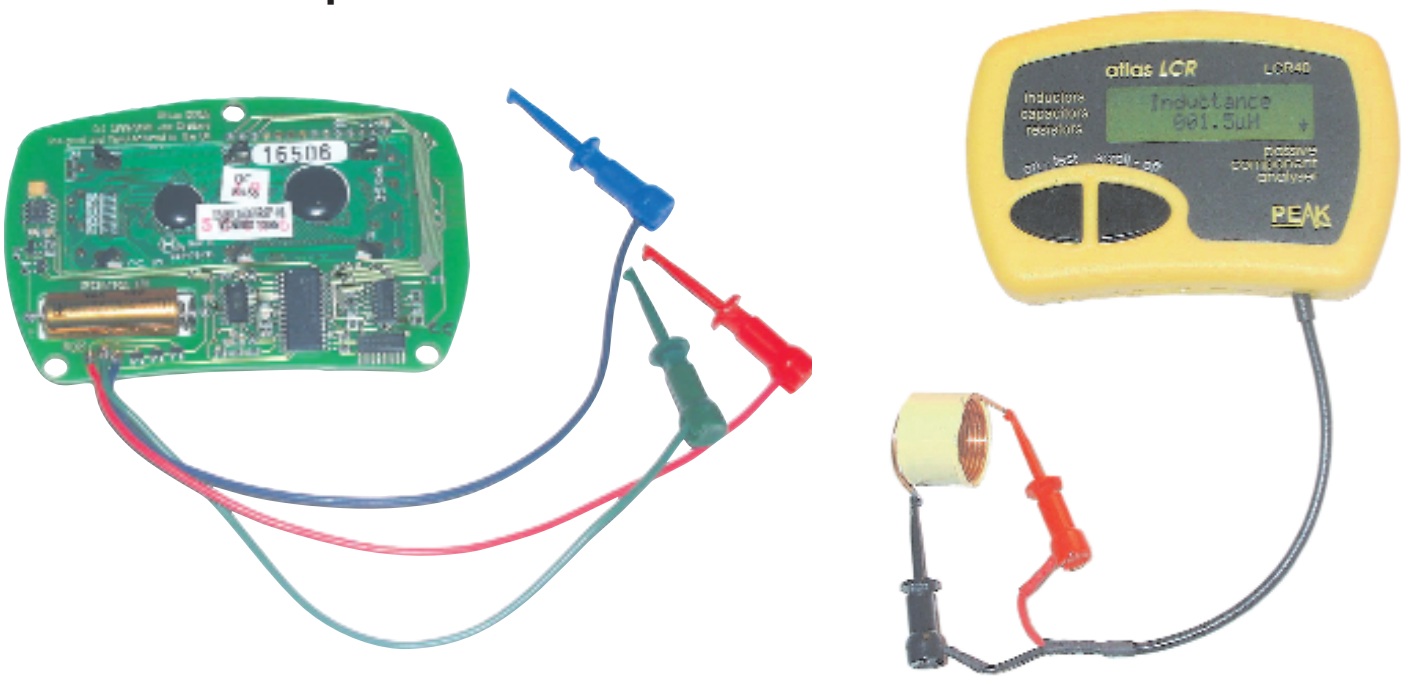
Chris Lorek, G4HCL

PO Box 400, Eastleigh SO53 4ZF.

E-mail: g4hcl@rsgb.org.uk

Peak Electronics Design's 'Atlas'

G4HCL tests the family of 'Atlas' analysers, and finds them more than equal to the task



When I was about 12 years old, I built myself a simple transistor tester, made out of bits I'd salvaged from a non-working transistor radio, together with a small meter I'd bought for a few pence from a friend. It proved invaluable in later years in testing the totally-unmarked active devices I subsequently bought by mail order in 'bumper bags' from surplus component dealers. As my interest in building radio circuits developed, I later built myself a small inductance bridge so that I could wind coils to the required inductance value, again finding this invaluable. Time passed by and I eventually found myself in a job actually designing two-way radio equipment, using rather larger and considerably more sophisticated (and heavy!) bench-top measurement equipment for inductance and so on. But how time has changed things!

When I first held one of the tiny range of Atlas component testers in my hand, I initially thought they would just be a digital type of what I built those many years ago. I was very, very wrong. These aren't just 'test' instruments, they're each a rather sophisticated analyser in a tiny case, yet each being very easy indeed to use.

Designed and produced by Peak Electronic Design Limited in Buxton, the range includes the 'Atlas LCR', which is a passive component analyser; the 'Atlas DCA', which is a semiconductor component analyser; the 'Atlas ESR', which is an equivalent series resistance meter, and the 'Atlas SCR', which is a thyristor and triac analyser. Each measures 103mm x 72mm x 20mm and is powered by a small internal 12V 'car key fob'-type battery. Various accessories including a protective carry case are available as options.

ATLAS LCR

As its three-letter title suggests, this measures inductance, capacitance and resistance in passive components. You just clip the two test leads to your component, press the 'On-Test' button, and within a few seconds the unit will have identified the type of component and its parameters for you, displaying these in sequence on the LCD. During its automatic analysis, it decides for itself whether to use direct voltage or an alternating voltage of either 1kHz, 15kHz or 200kHz, the display also telling you which has been used for the analysis. It'll measure inductance between 1µH and 10H, capacitance between 0.4pF and 10,000µF, and resistance between 1Ω and 2MΩ. If, say, an inductor has an associated resistance (for example, if it's a large inductance with plenty of turns) the analyser will, as well as giving you the inductance value, also display the DC resistance of the coil. Successive displays are shown when you press the 'scroll-off' button on the unit, the display cycling round until it reaches the first displayed value. Holding the 'scroll-off' button down for a second or so switches the unit off; alternatively, it'll automatically switch itself off after 20 seconds.

ATLAS DCA

This unit automatically identifies and measures the parameters of silicon and germanium transistors, Darlington transistors, MOSFETs, Junction FETs, low power thyristors and triacs, LEDs including dual-colour types, together with diodes and dual-diode networks. Three coloured test leads, blue, red and green, are used and you simply connect your semiconductor terminals to any of these leads. The unit then identifies what the semiconductor is, and which terminal (eg base, collector and emitter) is connected to which coloured test lead. It'll measure the transistor gain, MOSFET gate threshold, diode pn junction characteristics, semiconductor leakage current, base-emitter voltage and so on. Some recent transistors also contain other internal features, for example a protection diode across the collector and emitter (the Philips BU505DF is a typical example of one of these), or a resistor shunt across the base and emitter, or

analysers

two of these in the case of a Darlington pair. In these cases, the analyser is intelligent enough to also detect these and indicate the parameters on the display for you.

ATLAS ESR

If you've ever built an AC-to-DC power supply, perhaps either a 13.8V supply or a higher-voltage supply for valve linear amplifier use, you'll know the importance of a smoothing capacitor's Effective Series Resistance (ESR), as this is a good indicator of the capacitor's condition. It's usually rather difficult to measure, yet dedicated ESR meters are available from various sources, primarily aimed at the electronic repair sector. But, like the other analysers, the Atlas ESR meter goes one further, as it can measure capacitors in-circuit and can even compensate for the effects of other circuitry. It'll also automatically determine and allow for the capacitor polarity, so it doesn't matter which way round you connect the probes. Of course, many electrolytic capacitors retain a charge voltage after a significant time since power has been removed. With this in mind, the meter will identify this and automatically carry out a controlled voltage discharge of the capacitor before it starts measuring. The results show you the ESR with a resolution down to 0.01Ω and, if the capacitor is measured in isolation (ie out of circuit), it'll also display the measured capacitance value.

ATLAS SCR

Although the Atlas DCA will measure low power thyristors and triacs, the SCR goes further and can measure devices which require gate triggers from anywhere from a few tens of microamps right up to 90mA. Again, you simply connect your thyristor or triac any way round to the three test leads and press the 'On-test' button. The analyser will progressively increase the gate trigger in eight current steps from 100µA to 90mA until the device you're testing is triggered, using a load current of up to 100mA. The test currents are however only applied for a very short duration, typically less than 200µs, to minimise the possibility of damaging any sensitive semiconductors. Again it'll automatically detect which component terminal has been connected to which of the three coloured test leads, and will display the type of component identified and show the trigger current used.

PROBE COMPENSATION

Each of the analysers comes ready-supplied with clip-on test probes, and accessories such as SMD (Surface Mount Devices) tweezer probes. Other probe types, such as long range grabbers, are available as options. Where required, for example in the LCR analyser and the ESR analyser, the unit can also be placed into a 'probe compensation' mode where it will run a short compensation procedure to ensure the probe's own inductance, capacitance and resistance is taken account for subsequent measurements.

IN USE

As well as being a bit of an experimenter during the review period, I was certainly able to make use of some of the units 'in anger' in helping me with some faultfinding work. Firstly, when a switched-mode power supply decided to die, I was around 90% sure that a given power switching FET was blown, although a replacement was rather expensive and difficult to obtain (it seems most such things are made in China nowadays, including the semiconductors!). The Atlas DCA confirmed this and I was, in fact, rather glad of this as I'd have been pretty annoyed if I'd gone to the trouble and expense of getting a replacement if the original had been OK! I'm also currently 'playing' with compact loop antennas, especially in configuring an automatic tuner for one. The Atlas LCR was a great help here in measuring the actual inductance of the various loops and of the high voltage 'doorknob' capacitors I'm using. In fact, simply using it together with a bit of RAE-style resonant formula maths saved me many hours worth of 'try it and see' experimental work.

CONCLUSIONS

Overall I found the analysers extremely easy to use, as well as being very thorough and informative in their measurements. I feel the Atlas DCA and LCR would be a useful addition to the keen constructor or electronics experimenter's workshop, or even to add to an active radio club's equipment. These, as well as the SCR and ESR, would likewise be of value to those engaged in electronic equipment maintenance and repair.

The analysers are available direct from the manufacturers as well from distributors such as Maplin, Farnell, CPC, Rapid and RS. The current retail price of the Atlas LCR is £69, the Atlas DCA, £49, the Atlas SCR, £99 and the Atlas ESR, £79.

Our thanks go to Peak Electronic Design in Buxton (Tel: 01298 70012) for the loan of the units for this review. ♦

Far left:
Inside the DCA.

Centre:
Measuring inductance.

Right:
Using SMD tweezers.