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**Sonifex streamlines its UK manufacturing operation with dScope Series III**

For more than 40 years, UK-based Sonifex has been manufacturing broadcast audio equipment for the radio, TV, security and telecommunications industries. Committed to excellence in design, Sonifex has earned a reputation for building high quality, reliable professional audio products, 100% engineered and manufactured in their UK factory and used in facilities all over the world.

Based in Northamptonshire, Sonifex is privately owned by its directors and headed by Marcus Brooke, son of its original founder Paul Brooke. The company's premises houses offices, engineering, warehousing and manufacturing, including its own dedicated metalworking facilities. Sonifex's best known products include the award winning Courier portable flash-card recorder, which was selected as a Millennium Product by the UK's Design Council; the Redbox range of audio interfaces, which are designed for systems integrators and the recently introduced Reference Monitor Range, a new series of rack-mount audio monitors that utilise the latest DSP technology. In total, the company's range includes more than 80 products and this number is increasing all the time.



**Increasing manufacturing efficiency**

In the late 1990s, during the drift towards overseas manufacturing, Sonifex recognised the need to overhaul its entire operation if it were to maintain its status as a leading UK manufacturer and to retain its expert manufacturing staff. Sonifex launched a project to develop its own in-house software system that would form the backbone of the organisation, greatly improving the working efficiency of the company in almost every department. This software package was designed to integrate all areas of its operations into a single system, including Development, Logistics, Purchasing, Manufacturing, End-of-Line Test, and Shipping, CRM and Servicing.

Technical Director, Chris Stills, explains: "In the late 1990s, we realised that we needed to modify the way we controlled our manufacturing process so that we could incorporate stock control, invoicing and accounts. We bought an Exel system called EFACS, which allowed us to do a lot of what was needed in terms of stock control and production planning. However, the system was very cumbersome and wasn't really suited to the needs of a smaller company where one person usually has more than one task to perform. EFACS required the user to open different screens for different applications and therefore it was very clunky if you were trying to multi-task."

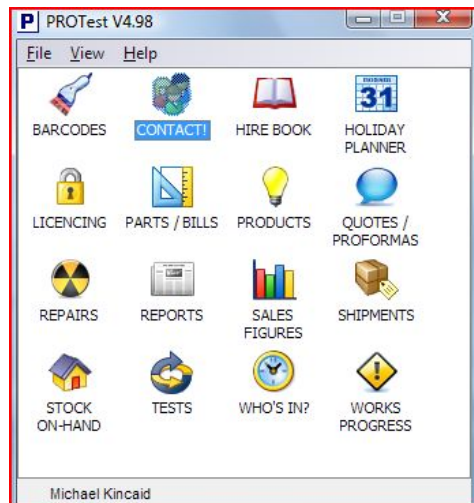


Figure 1: Main menu screen of ProTest system

Sonifex had its own in-house software expert take a look at the system to see how it could be improved. A new front end was created - and was dubbed "ProTest" as a deliberate play on words. This subsequently evolved further, enabling Sonifex to integrate its contacts database for email, its stock control and its works order process. Figure 1 shows the main menu screen of the ProTest system, complete with quick access icons to each of the main areas of software functionality.

**Integrated Audio QC tests**

"Eventually, all we were missing was a way of integrating QC test," Chris Stills says. "QC testing relied on the tester manually entering a serial number into ProTest to confirm a unit had been tested, and there was no way of linking that serial number with the unit's test result data. We ended up with lots of bits of paper being printed out and photocopied, but not kept in the system."

In their search for an audio test solution that could integrate seamlessly with its custom software system, Sonifex found Prism Sound's dScope Series III audio analysis platform, a system which provided exactly the kind of automation integration and flexibility that Sonifex needed.

Every Sonifex product is thoroughly tested at various stages during the manufacturing process, with these tests covering both individual modules and final testing once the finished product is ready to be shipped to the customer.

**Adding dScope Series III**

Stills adds; "We were one of the first companies to invest in dScope Series III audio analyzers - in fact we were involved in helping Prism Sound beta test the unit as early as 1999," he says. "We saw a prototype at a broadcast convention and after the show I twisted Prism Sound's arm to let us have one to beta test because it seemed the perfect fit for us. The price was a factor - it is incredibly competitive when compared to the test equipment offered by other manufacturers - but that wasn't the only reason we chose it. We were also convinced by its incredible feature-set and by its user-friendliness, but the main deciding factor was that the system could be easily integrated into our ProTest system, enabling us to develop our own user interface, integrating dScope seamlessly into our own software system."

Based in Cambridgeshire, UK, Prism Sound has been manufacturing a range of high quality professional audio test equipment since its

inception in 1987. Prism Sound test equipment is used by many major electronics brands in automotive, home entertainment, personal mobile, communications and other market sectors as well as most of the world's leading broadcasters including the BBC.

The company's dScope Series III is a comprehensive and powerful measurement system for analogue and digital audio generation and analysis, including digital audio carrier analysis, acoustic transducer testing and testing of Windows® sound devices. This industrial strength audio test and measurement system comprises a Windows PC software application (XP® and Vista® compatible) coupled with an external high-precision audio I/O processor for equipment-under-test (EUT) connections.

### ActiveX control of test automation

In Sonifex's case, dScope is automated using ActiveX control from the ProTest software suite. The net result is very rapid diagnosis and correction of any manufacturing faults, with detailed test records being written directly into the ProTest system, giving a complete record associated with every serial number of every product ever built. This has, in turn, led to far more effective component batch control of products on the manufacturing lines, and more efficient technical support of products in the field. A complete test and service record for any individual product can be instantly recalled, and this can be cross-referenced to individual part numbers or batches of raw materials and components. Figure 2 shows an individual test log, complete with product reference and part number. The serial number has been scanned into the ProTest software by the test engineer, and this in turn automatically loads the automatic optical inspection results and photographs for the PCB assemblies within the unit.

Stills says "The best thing about the new system is that it is very easy to use and gives us full traceability on any component in any of our products. PCB bar codes are matched to product serial numbers, so if there is a problem we can not only find it quickly but also see who assembled each part and who inspected it. If recurring problems occur, we can address them by designing out weaknesses, improving operator training and by checking products against known fault lists from the previous six months."

### From product design to production line

Sonifex has thus been able to standardise on the dScope Series III platform for both development and QC testing purposes, allowing engineers to share results and test procedures between departments. According to Sonifex's Technical Director Chris Stills there are now ten dScope Series III units at the company's facility - four in R&D and six on the production lines. Figure 3 shows the production line dScope system in operation, running through distortion tests and automatically prompting the engineer to adjust the controls of the EUT as instructed during the test process. The test results are then passed from dScope to ProTest and the user can view the test report as per Figure 4.

Simon Woollard, Applications Engineer at Prism Sound, says: "Sonifex was originally testing products manually with equipment that could not be automated, and needed a test solution that could be integrated within their own system. dScope was able to provide the features the company was looking for, thus helping to reduce test time and reduce manufacturing costs accordingly."

### Faster testing through automation

Chris Stills agrees that the new automated test system has dramatically reduced the amount of time it takes to test each Sonifex product.

"Before we implemented our new software and automated test procedures, we were testing each unit individually, which took forever," he says. "Now we have designed and manufactured our own automated switcher unit designated "The Beast" that can take up to 24 balanced audio feeds at any one time and present them to any of the dScope Series III inputs or outputs. We have sections of 25-way D connectors with a breakout cable to whatever product we are testing. Because many of our products have the same connectivity, it is possible for us to use these cables across a variety of different products under test. Occasionally a product will have a bespoke connector, but in that situation we simply make up a new lead. For the testers, the procedure is very simple - all they have to do is match up the right colour lead, plug it in and press go." Figure 5 shows the ProTest routing matrix for controlling the switching functionality. The complete test bench setup, including dScope and "The Beast" is shown in Figure 6.

Sonifex's automated testing process is now an integral part of its new software package, which was developed in-house because the company wanted to find solutions to specific issues that a proprietary software package couldn't address.

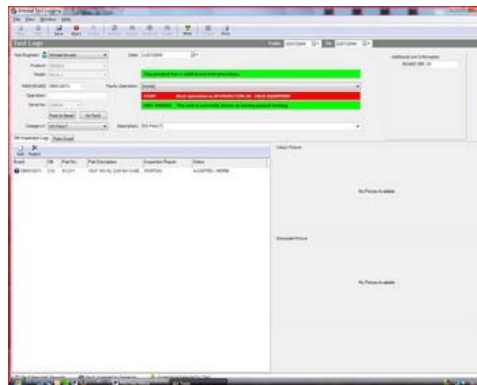


Figure 2: ProTest test log



Figure 3: Production line dScope Series III in operation

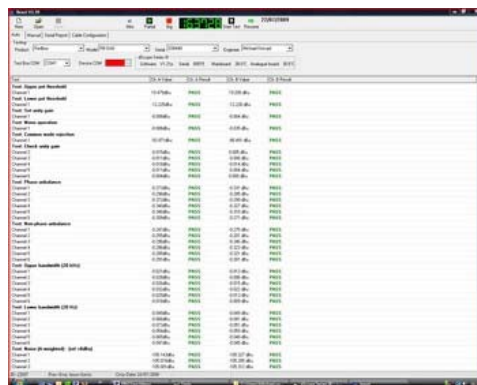


Figure 4: ProTest test report

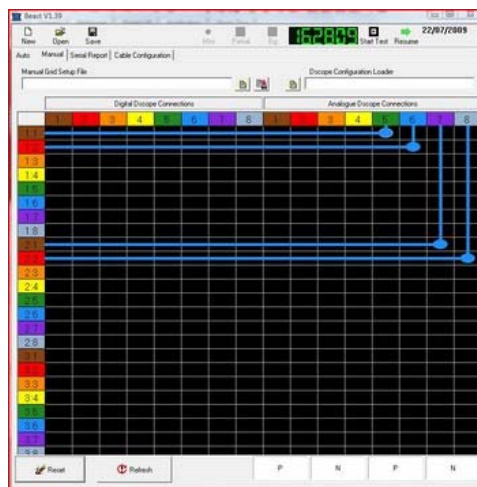


Figure 5: ProTest routing matrix for controlling the switching functionality

"Now, if someone needs a specific test result, they can simply call it up as a PDF," Stills says. "The whole thing is done automatically."

### Reaping the benefits of efficient automation

The new efficiencies afforded by automating audio testing procedures has already benefited Sonifex in terms of helping reduce staff costs.

Chris Stills adds that dScope Series III's audio analysis results are a vital part of the company's performance criteria.

"We couldn't have achieved what we have achieved without dScope's ability to integrate easily with our own scripting language," he says. "At the moment we write our programmes on a product by product basis but we are looking to change that to make it test-specific. This would allow us to perform each test against a specific set of criteria rather than having a particular test programme for each product. We are now working to implement this and once we do we think it will save even more time. We are currently also evaluating the possibilities in time savings that dScope's multi-tone testing tools could offer. We feel we definitely made the right decision in specifying dScope! We have retained our manufacturing operation in the UK when many of our competitors have had to move overseas, and we continue to develop quality designs and to manufacture the quality products that our customers have come to expect from us."



Figure 6: complete test set-up including "The Beast" automated switcher

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