

Automated Quality Testing of Cathode Ray Tubes (CRTs)

[Advanced Automation Associates](#), a control and information system integrator, had a very interesting production line application that utilized QuadTech's 1910 Inductance Analyzer – automated testing of CRTs. Cathode ray tubes have been in existence since the late 1850s and today are commonly used as picture tubes in televisions and monitors. A CRT manufacturer using a QuadTech 1910 Inductance Analyzer to perform quality testing on CRTs contacted Advanced Automation for systems help.

A Manufacturing Run

The problem is each lot of CRT's is custom-designed for the customer. Previously, prior to each run, the plant operators made the quality test setup changes manually and entered parameters from a typed or hand written sheet through the front panel interface on the Inductance Analyzer. Manual configuration of the test setup and constant changing of individual test parameters increased the chance of errors or omissions. In addition, operator training and/or availability sometimes resulted in the setup changes not being made at all.

The test process started as the CRT moved down a conveyor and stopped at the test station. The CRT triggered a photo eye, which triggered a barcode reader to scan the CRT's barcode. The test using the inductance analyzer began. Pass or fail was displayed on the LED screen of the inductance analyzer and the operator tagged the tube with a pass or fail sticker and sometimes a test value. There was no record of set test parameters and no printout of test results.

Typically, physically apparent CRT problems are quickly remedied with simple process adjustments but what about other tube characteristics that may not be so obvious? Quality Control needed the test parameters and results for each tube to make decisions on the lot. There was no physical proof of the success of the tests because the test parameters and results from each product were not logged to a database. That's when the manufacturer approached Advanced Automation for a system to setup and collect the CRT tube test data from the 1910 Inductance Analyzer.

Advanced Automation consulted with the manufacturer, investigated the test setup and identified the following process deficiencies:

- No Test Result Data (not logged to any database)
- No Test Results marked on individual parts
- No Record of Test Setup (no setup parameters saved)
- Manual Configuration of Test Setup (no automatic recall of test setups)
- Inductance Analyzer located on production floor (no protection from accidental manual configuration)

Solution

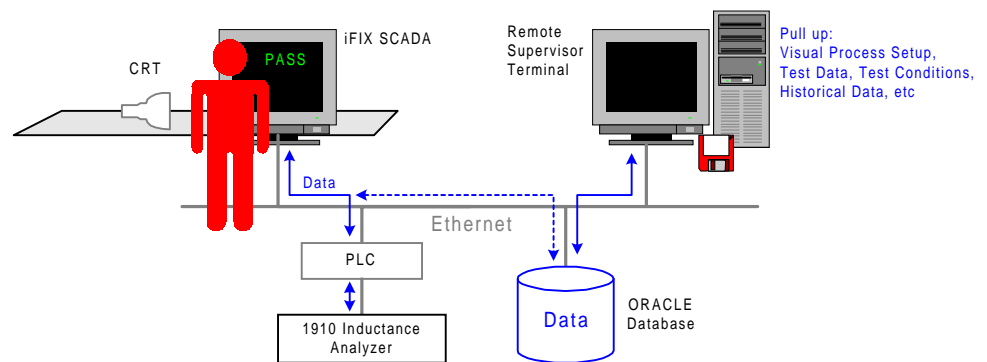
In tune with the manufacturer's needs, the following changes to the test process were suggested:

- Eliminate the manual entry of parameters with remote configuration through a Visual Basic (VB) (serial/ethernet) interface
- Log product-specific test result data to a database
- Setup Test Parameters in database & load like a recipe card for specific part or customer

Advanced Automation Associates developed an application to configure the inductance analyzer remotely from a PC thereby eliminating any possible chance of manual interference or error.

The human machine interface (HMI/SCADA) is powered by GE Fanuc (formerly Intellution) iFIX software that provides process visualization graphics, data acquisition & management and supervisory control of the CRT production line. To track test results for each customer, the test data for each CRT is logged to the database. The Advanced Automation Network for this Manufacturer included:

- Software application located on an iFIX SCADA
- iFIX SCADA communicates to ORACLE (Ethernet), OMRON PLC (Ethernet) and 1910 Inductance Analyzer (Serial)



The Resulting New Manufacturing Run

As in the previous process, the CRT moves down the conveyor to the test station and triggers the barcode scanner. Only now, at this point the inductance analyzer that has the customer-specific test setup already loaded in it, tests the CRT. When the test is completed, the 1910 Inductance Analyzer sends the test results out the serial port via the PLC to the SCADA. The SCADA determines the final result and turns on a pass or fail light. The data is displayed on the SCADA screen and logged to an ORACLE database. Now the CRT manufacturer not only has a pass/fail part in front of him, he also has the customer-specified test setup saved, the actual test data (voltage across DUT/current through DUT) saved and the test results (resistance, capacitance values) – All very nice quality assurance tools that can be called up from the database at any time.

Contact Information

This CRT manufacturing line application proved an interesting test of QuadTech's and Advanced Automation Associates' Integrator Partnership. QuadTech designed and developed the 1900 Series instruments with the flexibility of software interfacing. Advanced Automation Associates created a software package, incorporated it into a SCADA system and added data logging to an ORACLE database. This test system neatly solved the manufacturer's need for test setup & result data plus awarded QuadTech and Advanced Automation Associates the opportunity to fine-tune their products and service. The success of our Integrator Partnership lies in the knowledge that not only was the job well done, but this CRT manufacturer was well served.

The logo for Advanced Automation Associates features the company name in a bold, sans-serif font. The text is white and is set against a dark grey rectangular background. A horizontal orange bar is positioned below the text, extending across the width of the logo.

Advanced Automation Associates (A3) develops and delivers cost-effective, integrated systems that improve client productivity, quality, competitiveness and profitability. Services include consulting for automation planning, spec system development, engineering and design, programming, field installation & start-up, training and long-term support. For more information, visit Advanced Automation at <http://www.aaainc.com> or reach them by telephone at 1-610-458-8700.

For complete product specifications on the 1910 Inductance Analyzer or any of QuadTech's products, visit us at <http://www.quadtech.com/products>. Call us at 1-800-253-1230 or email your questions to info@quadtech.com.

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