

EMBEDDED MULTI-SPEED FAN FUNCTIONAL TEST SYSTEM

Brief Description:

Emerging Technologies, LLC. was called upon to develop an embedded functional test system for a multi-speed cooling fan sub-assembly. The customer-provided specification called for an easy to use sequential tester that would loop on failure of any step in the sequence. Sub-assemblies reaching the final step of the sequence are considered passing units.

A multi-step test sequence consisting of discrete and analog I/O is employed to completely test the functionality of the sub-assembly. Current draw and airflow are verified at each of three speeds. Test results and barcode scanner acquired information are stored to a CSV (comma separated value) file on the Secure Digital Media card. A custom developed PC based application is used to create and modify configurable parameters. The configuration file is transferred to the tester via the SD card.

Emerging Technologies, LLC. prepared a design package for customer review prior to fabrication of the tester. The design package included: System Layout Diagrams, Schematic Diagrams, Firmware Flow Diagram, Configuration Screen Layout, and Sequence of Operation (provided by the customer). Once approved by the customer, the tester was fabricated, tested, and then commissioned at the customer site.

Customer Benefit:

The customer is able to test sub-assemblies, using the Emerging Technologies, LLC. custom test system, to verify correct operation prior to assembly into the final product. The new system saves time and money by detecting faulty assemblies, before they are implemented, resulting in reduction of final product rework. Troubleshooting modes allow "on the spot" rework of defective sub-assemblies.

Special Features:

- Bar code scanner input capability.
- SD card results storage & configuration capability.
- Compact size and portability.
- No PC required for operation.
- Automatic Sequencing.
- Loop on sequence step failure.
- Data Collection mode to gather & store additional data.
- Manual step mode.



Components Used:

- Custom designed, Microchip 16F877A, Microcontroller based motherboard.
- AC Current sensor.
- Air Flow Sensor.
- Secure Digital Media Card interface.
- Handheld Barcode Reader.
- Custom Test Fixture w/modular connection.

Emerging Technologies, LLC.

Responsibilities:

- Functional Specification Generation
- ✓ Design / Engineering
- ✓ Fabrication
- ✓ Programming – Software
- ✓ Programming – Firmware
- ✓ Circuit & PCB Design
- ✓ On-Site Commissioning
- ✓ Post Commissioning Support
- Other

Technologies:

- Embedded Computers
- ✓ Microcontrollers
- ✓ Visual Software
- ✓ Control Software
- ✓ Data Acquisition
- Computer Based Control
- ✓ Communications – serial
- System Integration
- Other

Customer Category:

- ✓ OEM
- Custom Equipment
- Utility
- R&D

SPECIALISTS IN TEST, MEASUREMENT, AND DATA ACQUISITION

Emerging Technologies, LLC.

PH: (920) 684-0216

www.emergingtech-llc.com