

2 TFT Defect Inspection in LCD Panel Assembly

Flat Panel Display Production

Taiwan

Introduction

During the LCD manufacturing process, having a zero fault tolerance is almost impossible. Moreover, LCD panels are very delicate products, and can frequently have minor defects. Therefore, defect inspection is essential at each assembly station. Our customer wanted to increase the efficiency of their defect inspection stations and speed up their overall LCD production. They were using the traditional method of inspection, which consisted of having just one camera to complete the process, which is slow and cumbersome. With a new PC-based automation solution from Advantech, more cameras can be set up for inspections, allowing a smoother and faster production flow.

Project Requirements

Defect inspection is an extremely important part of the production process. It prevents a vicious cycle by not allowing defects to continue further along the manufacturing process. With the implementation of more than one camera, increased processing speed and network expansion are necessary. In order to efficiently inspect each large LCD panel, using a PC-based operating system is the optimal way. Furthermore, it allows data communication between the database and each station. To formulate such a system, we need the following components to complete our automated solution:

- A master control card for handling all the commands and data flow
- A motion control card for all the camera orientations
- An isolated Digital I/O card for the command and handshakes between stations



Solution Description

Each camera at the inspection station takes photos of different segments of each LCD panel. The processed picture will be compared to reference pictures for examination. Even though the idea of having more cameras seems obvious, it is limited by the hardware and software capabilities. In the old proprietary system, the non user-friendly programming language and poor compatibility impeded the manufacturing resources.

With Advantech's automation solution, more cameras can be implemented due to the large expansion capabilities, and more motions and commands can be installed. PCI-1202 is a master control card which can be implemented in the PC to process all the motion instructions and data communications. As for the inspection station, ADAM-3212/J2S can be used for camera or conveyor motions and ADAM-3752/3754 can be used for sensors to ensure the inspection has operated thoroughly. Moreover, Advantech's AMONet has built-in CPU for each module and allows Ethernet communication between stations. This provides a real-time updates and monitoring.

Conclusion

Defect inspection can be a hassle if resources and expansion abilities are limited. With the automated solution provided by Advantech, more cameras can be set-up, increasing the defect inspection efficiency, and streamlining the entire LCD panel assembly process. Furthermore, it will provide real-time updates and monitoring, effectively upgrading quality control.

