



# Tracking the Changes

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No one can deny that computers and networking technology are now an integral part of modern life. They are at the heart of almost every process in businesses and homes throughout the world. And where there are computers, there is the vital need for fast and efficient communications. The ability to transfer information between different computers, operating systems and network topologies seems to grow ever more complex every day, with devices like printers, scanners, CD-ROM and DVD requiring faster and more reliable connections.

This is the need that Adaptec has filled since 1981 with products that move data between computers small and large. The company is a world leader for its local area network cards, modems and other peripherals, or as Adaptec describes it 'bandwidth management technologies'. Its products are incorporated into the systems of some of the world's best known computer brand names. One of its key technologies, SCSI I/O control cards, are produced in a country that boasts one of the world's most sophisticated information infrastructures; Singapore.

Visitors to Adaptec's Singapore manufacturing facility at the Chai Chee Industrial Park cannot fail to be impressed. Opened in 1999 and occupying over 2000 square metres the factory and test development centre is modern, clean and organised with typical Singaporean efficiency and since the plant employs over 700 staff and houses six state-of-the-art production lines, it needs to be. Maintaining high quality output and low field returns is a primary target and this is achieved by continuous investment in new technology and improved quality management systems. Not surprising then that the company regularly receives industry accolades, including the recent Singapore Quality Class award, for outstanding performance in the Asia Pacific region.

Adaptec 公司以其区域网络卡、调制解调器及其它电脑辅助设备而领先世界。它的产品装配在世界上一一些最著名电脑品牌的系统中。Adaptec 公司要求 GenRad 提供测试修理和控制软件。上述软件的优势包括：故障检测的平均时间下降到 30 分钟，只占原来的四分之一。

"In-circuit test and inspection are really important to us at Adaptec," says Test Development Manager Wee Chee Hong. The company has invested heavily in its test technology with six GenRad GR228X testers, configured with GR Accelerate and Philips in-line board handlers. A dedicated technical centre and test development team operates from the same building, developing customised functional test and inspection processes for the company's Singapore and US operations. Well placed lineside repair stations and a well equipped rework workshop handle defects with quiet efficiency but until recently the whole process had suffered from one problem. Chee Hong explains. "We used to collect test data from the lines manually, which could take one to two hours to analyse. We needed to react faster when a problem on the line was identified."





Adaptec turned to GenRad for a solution. After careful evaluation of the requirements of a single line, GenRad recommended TRACS (test, repair and control software). TRACS would enable the company to set up a central database of test data, collected automatically from the line in real time. By collecting data from both in-circuit and final functional test stations, it would be possible to identify line faults within minutes rather than hours. It had the added advantage of storing full manufacturing test data for individual boards, available at the press of a button, or swipe of a bar code. A two year process of evaluation and testing began in close co-operation with GenRad's engineers.

Associate Engineer in the test design team, Ng Huey Ching, commented on the project; "We had weekly meetings with GenRad to discuss technical issues and found TRACS easy to integrate with our functional testers. GenRad were very helpful." The relationship goes back to 1993 when the first GenRad testers were installed and depends on close technical co-operation and trust. This is essential where a manufacturer needs to integrate a complex generic product like TRACS with its own proprietary software.

The evaluation project has been a complete success. The most visible benefit is that fault detection has been reduced to an average thirty minutes (a quarter of the original response time), since TRACS reports recurring defects almost immediately on screen. However, faster response to line problems is by no means the only benefit. The software also provides real time warnings, keeping managers up to date on yield and highlighting boards with consecutive

fails, so that no product passes through rework more than twice. Customised reports can provide information to managers, engineers and designers, both on-site and potentially to executives world-wide via the Internet.

The company has also found it useful to be able to look up specific results on individual boards, especially where field returns are reported, and have access to the original manufacturing data. "It has taken some time for workers to get used to using the database," said Chee Hong, "Especially using the mouse; they were used to writing things by hand before. But our long term goal is to run TRACS across all our lines."

In recognition of the close working relationship, Mr K Y Lim, President of Manufacturing and Executive Officer of Adaptec Inc. awarded GenRad "Best in Class" at the 2000 Adaptec Suppliers' Day.

It would seem that two years of hard work is now paying off, giving Adaptec the ability to offer an even better service in a fiercely competitive marketplace. Even a world leader like Adaptec cannot rest on its laurels. They have the vision to strive for constant quality improvements. The breakthrough in the computerised test yield tracking system is only one of the team's achievements. To date the Adaptec Test Engineering team has been accredited as the first PCBA operation with built-in on-line in-circuit and functional testing capabilities. The company's quality policy, proudly displayed as you enter the modern, air-conditioned building, could not put that vision more succinctly - *"We shall do it right first time."*

