
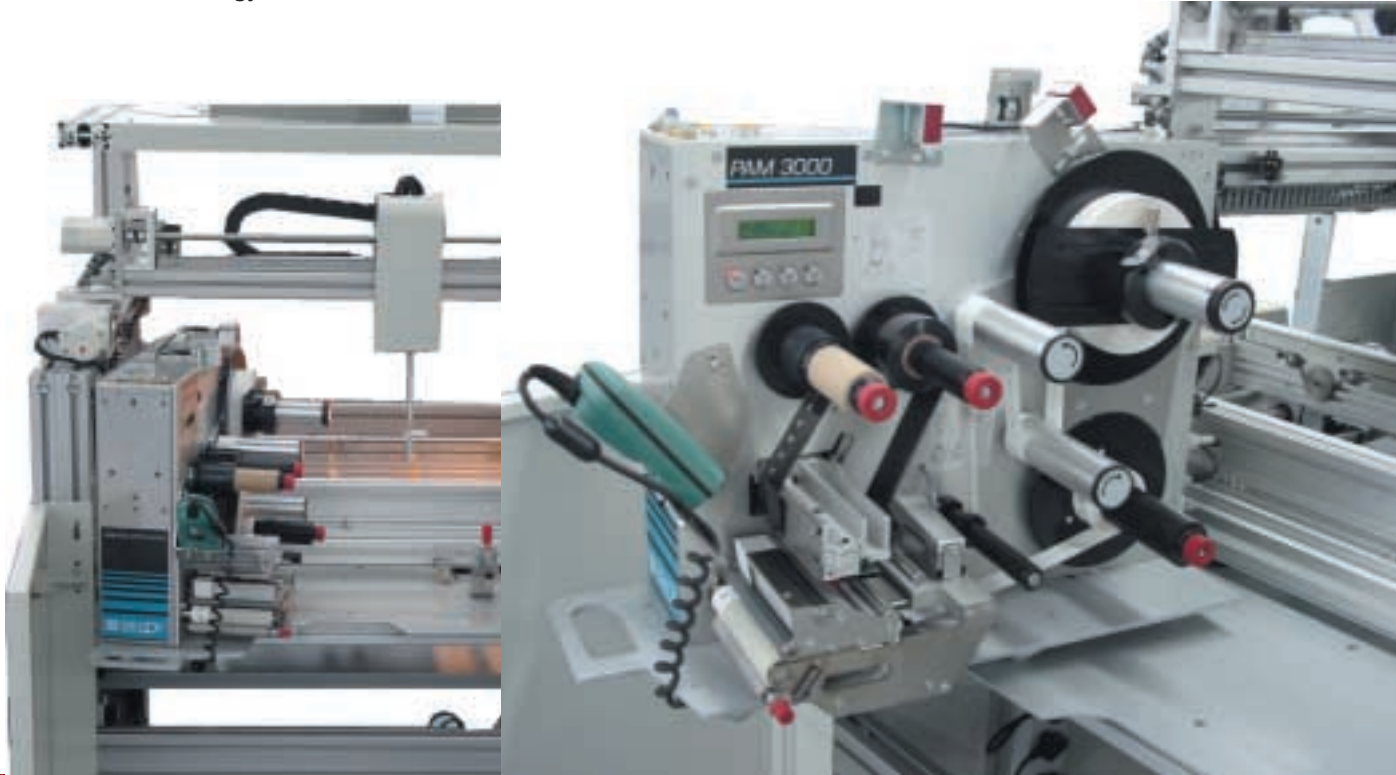


## Nutek: Flexible bar code labeling machine with new control technology



→ Since 1989, Nutek has been developing and manufacturing customer-specific systems for populating PCBs. The company always competed against strong national and international competition. Now it is facing new requirements: Nutek replaces its traditional PLC control technology, which has reached its limits after 15 years of development, with a system that combines better user-friendliness with more flexible visualization technology, networking capability and remote maintenance options.

## Prepared for the Future

For its new production prototype of a PCB labeling machine, Nutek in Singapore decided to use a PC-based controller from Beckhoff. The bar code labeler is part of a larger system product line used for populating PCBs. The systems currently supplied by Nutek consist of feed and discharge machines, inspection and connection conveyor belts, storage buffers, vertical buffers, traversing equipment, rotary conveyors and further system components. The traditional PLC has reached its capacity limit due to the exacting requirements in terms of product tracking and batch monitoring functions.

### The aim: 100% labeling precision

A new control concept will enable Nutek to achieve its ambitious goal of labeling every single PCB with correct labels at high speed, using appropriate product tracking and batch monitoring functions.

Right from the start it was clear that a flexible bar code labeling system would require PC-based control that supports both PLC and NC functions. The programming language had to be simple, since the Ladder Diagram (LD) programming language is a requirement on the South Asian market, which is dominated by Japanese PLC manufacturers. Since the control solution from Beckhoff meets these requirements, Nutek started using Beckhoff products. Nutek's efforts were supported by TDS Technology (S) Pte Ltd., the sole Beckhoff agency in Singapore. The crucial factor for Nutek was the integration of PLC and motion control within a single package. Further advantages are the standardized development environment based on IEC 61131-3, the comprehensive positioning and axis control, the diagnostic functions and the flexible data interfaces. Moreover, the use of the TwinCAT ADS interface enables communication between the bar code labeling software and the PC control.

The control solution of the bar code labeler is based on a C5102 Industrial PC from Beckhoff, TwinCAT NC PTP and communication with the Beckhoff Bus Terminals via the Lightbus system.

## The technology of the BLC 2000HE bar code labeler from Nutek

The system has 24 digital inputs, 24 digital outputs and 3 servo drives, which are connected to the control system via the Lightbus Bus Coupler. The Industrial PC is a 19 inch C5102 model with Pentium III, 850 MHz and 128 MB RAM; a 15 inch LCD monitor serves as operating panel. With an NC task of 2 ms, a PLC task with a cycle time of 10 ms and a fast RS232 communication task with 2 ms, CPU loading is only 6%.



### The TwinCAT serial communication library

Nutek has implemented bar code labeling via three real axes, i.e. the XY-axes and the Z-axis for attaching the labels. The serial communication library of TwinCAT is used for the communication between the bar code printer and the PC control. The labels are attached to the PCBs with a speed of 4 labels per 12 seconds. For simplified operation, the machine positions can be taken up in the "teach and store" mode. Individual operations, passes and part-resets can be carried out.

### Increases in performance are only limited by the hardware

The application of Beckhoff products at Nutek Singapore is a great success. The flexible system can integrate different bar code printers and enables flexible integration of the Nutek products. If a bar code label has to be changed, the user can generate it on the same PC. This tremendously increases the flexibility for Nutek customers.

While programming via Ladder Diagram is still a de-facto standard in South-East Asia, the Nutek engineers have mastered the development language for the bar code labeling machine: Structured text (ST), function block diagrams (FBD) and sequential function charts (SFC) are used during development. The Nutek technicians prefer programming languages based on IEC 61131-3. The visualization system is developed with Visual Basic.

An advantage for Nutek is the option of simple remote maintenance. Data protocols, statistical analyses and intranet integration can be realized within a single system. The software poses no limits on increases in speed. The optimization of the mechanics and the drive systems will lead to further increases in performance.

→ TDS Technology (S) Pte Ltd. [www.tdstech.com](http://www.tdstech.com)



### Nutek Pte Ltd.

Nutek has more than 500 staff in development centers, production facilities and sales offices on six continents. The company develops and builds PCB handling systems for the electronics industry, particularly for SMT applications. It also acts as OEM and installs soldering system under licence from the Japanese company Tamura Corp.

Nutek's customers include the world market leaders for electronics production such as Seagate, Sony, Philips, Hewlett Packard, Motorola, Flextronics, Solectron and Natsteel Electronics, to name but a few. Over the years, Nutek has been able to consolidate its position as a global market leader in the production of automated PCB handling systems for the electronics industry.

> Nutek Pte Ltd. [www.nutek-sg.com](http://www.nutek-sg.com)