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the EXTENSION

A Technical Supplement to control NETWORK

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Contemporary Controls Commits to SMT Manufacturing in China

In his remarks at the Grand Opening of the Suzhou facility, George Thomas explains why Contemporary Controls is expanding in China.

Welcome to the Grand Opening of Contemporary Controls (Suzhou) factory. My name is George Thomas, and I am president of Contemporary Controls USA operation. Thank you all for participating in this exciting event for our company. Greetings to Yasuo Suzuki, President of Standard Microsystems Corporation Japan (SMSC-Japan) for making the trip to China for this event. A welcome to SND Director Ms. Wang, and to Mr. John O'Connell, from the USA Department of Commerce. And finally, a welcome to the Vice-Mayor of Suzhou Mr. Li Ye Ye.

Our company was formed 27 years ago in the United States as an engineering and system integration company specializing in industrial control and industrial automation systems. We would design automation systems in order to improve the productivity of our customers' plants or processes. These systems would include programmable logic controllers, process controllers and even computers. We would design systems, select components, program the machines and provide startup services.

In the early 80s we decided the best way to grow our business was to move away from that of a service company to that of a manufacturing company by investing in electronic manufacturing. We designed microprocessor-based electronic circuit board assemblies that were sold to other system integrators so that they could build automation systems. We then became a manufacturing company and our business expanded throughout the United States and into different parts of the world.

Initially our own manufacturing processes were crude with much manual parts insertion and the superiority of our production was not the

best. However, we learned how we could improve the quality of our processes because our customers were demanding higher and higher levels of excellence. In the mid-90s we invested in surface mount technology, which is called SMT, providing us with higher quality and improved productivity. With SMT, assembly is now done with machines that can place components with higher accuracy and speed than can be done by a human operator. With the continuous miniaturization of electronic components, the need for sophisticated SMT equipment is increasingly important and is the future of electronic assembly. In order for our company to continue to be a world-class producer of electronic equipment, we must continue to invest in the latest SMT equipment.



After the speeches, the host and honored guests cut the ribbon. A tour of the new facility followed.

In 1996, about 5% of our business was outside the United States. In 1997, we opened a subsidiary in the United Kingdom in order to better serve the European market. This subsidiary was strictly a sales, marketing and distribution facility. The manufactured products were all sourced from the United States. Even with this arrangement, we were able to expand our international business to become 25% of our total sales demonstrating that we could compete on a worldwide basis. This year we established another subsidiary in Germany so that we could better support our German-speaking customers. Germany is important to us since much of the industrial networking

technology used in the world was developed in Germany or other parts of Europe.



Welcome to Contemporary Controls (Suzhou) Co. Ltd!

Contemporary Controls designs and manufactures industrial networking products that are widely used in applications such as building and process automation, motion and machine control. Our products facilitate communication between computers, controllers, sensors and actuators, utilizing various fieldbus technologies such as ARCNET, BACnet, Controller Area Network, DeviceNet and Industrial Ethernet. These products include network interface modules, wiring hubs, repeaters, bridges, routers and gateways. These products have worldwide appeal including countries like China.

Our company became interested in China when I participated in a China trade mission sponsored by the World Trade Center Chicago during 1997. We visited Beijing, Tianjin, Suzhou, Shanghai, Fuzhou and Hong Kong. It was an exhausting trip but I was impressed with Suzhou New District. Initially, we did nothing with our China plans since we were consumed establishing our European presence. It was not until the year 2000 that we decided to reconsider our China plans and visit Shanghai and Suzhou. After reviewing both locations, we decided to establish our representative office and sales office in Shanghai and our manufacturing facility in Suzhou. We established a wholly-owned foreign enterprise called "WFOE" in Suzhou and obtained our business license in 2001.

People back in the states ask me why are we expanding in China when we already have manufacturing in the United States. We are committed to the electronic manufacturing of our own products and intend on retaining our US operation. Our engineering designs currently come from the

US and we need to validate our new products in a convenient manner and that is best done in the US. We do not want to export any design problems so we must thoroughly test our new products before having them produced overseas. China offers us both a growing market for our industrial automation products and a low cost source of supply. Our company needs to be realistic with our manufacturing plans. Although we want the US to retain its manufacturing base, the future of low cost electronic manufacturing is in China, and we need to find ways to take the best from our US and Chinese operations.



Accountant Rose Yin and Administrative Clerk Lily Wu greet guests at the reception area before the guests take a tour of the new manufacturing facility.

This Suzhou plant has been equipped with the latest generation of Panasonic and Vitronics SMT equipment. The capability of this equipment exceeds that in the US. We cannot produce certain SMT technologies such as Ball Grid Arrays (BGAs) in the US, but we can in China. We cannot handle lead-free soldering in the US, but we can in China. We have a world-class facility here at Suzhou with a competent supplier base as well. That was another reason why we selected the city of Suzhou.

It is not only low-cost manufacturing that we are interested in but access to an exploding Chinese market for industrial and building automation equipment. As China modernizes, we want to be part of the modernization effort. We have assembled an experienced and enthusiastic team in both Shanghai and Suzhou and are excited about our potential. I have been impressed with the dedication and hard-work ethic of the Chinese people. I want to especially thank our Chinese staff lead by Mr. Don He and the US staff for assisting in the startup efforts. I welcome my Chinese employees to the Contemporary Controls family and wish them personal and professional success. I want to thank our Japanese partner

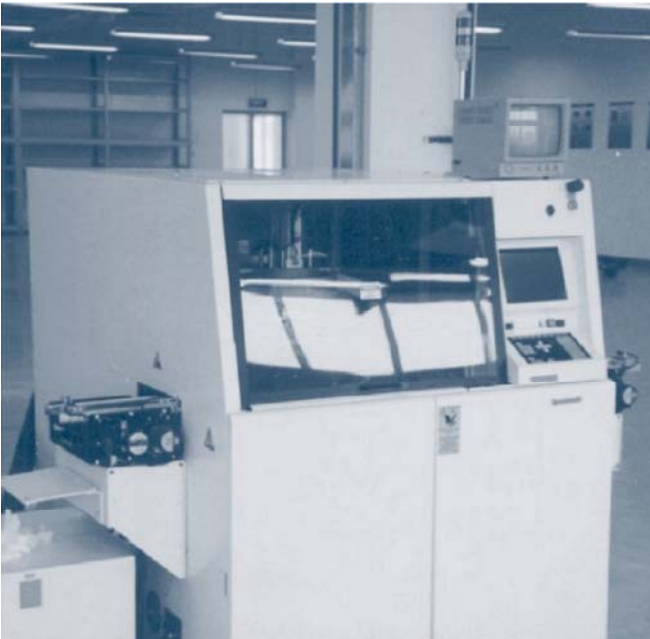
SMSC-Japan and their president Suzuki-san for supporting our efforts. I also received much help from numerous US organizations such as World Trade Center Chicago, the State of Illinois Shanghai office, the American Electronics Association and several US companies located in Suzhou. Finally, I want to thank the Suzhou New District people for guiding us through the process. They made the experience very rewarding.



After the opening ceremony, the guests were invited to view the facility and the new equipment. The guests were able to witness the first board being built on the SMT line.

Thank you all for coming and being part of this event. We have made many new friends in China and look forward to a long, rewarding and prosperous relationship.

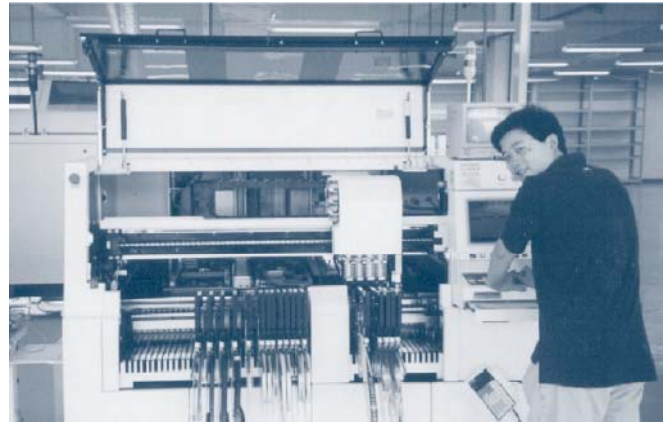
A Look Inside the Suzhou Facility



The screen printer is a critical step in the SMT process. Solder paste is automatically applied to the board through a stencil.

The ancient city of Suzhou was established in 514 B.C. and is located approximately 80 km west of Shanghai. Our new plant is located in a hi-tech

industrial development zone called Suzhou New District (SND) just west of the city. There are over 300 foreign enterprises in the district and many of them are involved in electronics manufacturing. We intend to manufacture electronic assemblies in our new 1500-m² factory using both surface mount technology (SMT) and through hole technology (THT). We equipped the plant with the latest generation SMT equipment from Panasonic Factory Automation and Vitronics/Soltec.



Martin Sun, manufacturing technician, gets to test drive the new Panasonic placement machine. Notice the reel feeders mounted on the front of the machine.

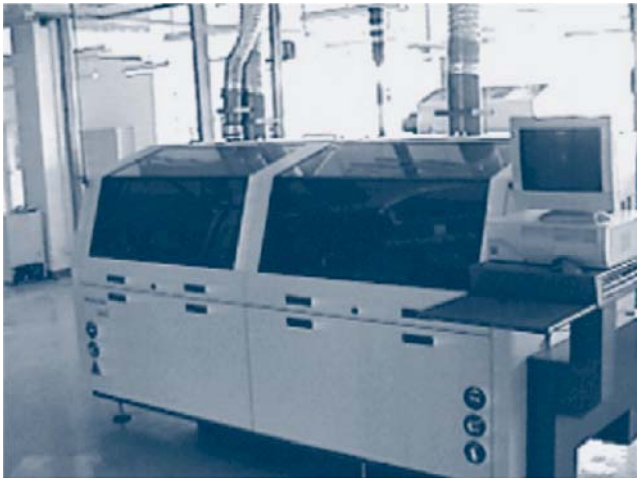
With a SMT line, it is necessary to have a minimum of three machines in a process line. The first machine is the Solder Paste Printing Machine, which is usually referred to as the screen printer. A stencil is installed into the machine representing the pads of the particular printed circuit board to be "pasted." The paste is actually liquid solder with the consistency of toothpaste. The machine applies the paste and the stencil restricts the paste to be deposited only on the exposed pads. A Panasonic SPPG3 was selected for this operation.



The Vitronics reflow oven has eight heating and two cooling zones and is the last step in the SMT process.

Once the board is pasted, it travels by conveyor or is hand carried to the All-Visual Multifunctional Placement Machine which we call the pick and place machine. This machine is pro-

grammed to place particular parts in correct locations on the printed circuit board. The machine



Through-hole components are inserted by hand and the complete assembly is subjected to wave soldering on this Soltec machine. After lead cutting, the board is ready for test.

uses sophisticated optics in order to precisely lay the electronic component on the correct pads with proper alignment. The placed parts adhere to the board by the tackiness of the paste. Component parts are purchased on reels, tubes or waffle trays. Appropriate feeders occupy assigned locations on the placement machine each loaded with a unique component. We are using a Panasonic MPAV2B placement machine which has four heads that travel together as parts are pulled from feeders and placed onto boards. By using four heads, movement is not wasted as four different parts can be picked and placed before returning to the feeders for more parts.



Neil Maloney (r), CCSI manufacturing engineer, proudly displays the first board produced on the SMT line. John O'Connell, from the U.S. Dept. of Commerce seems impressed.

Once parts are placed, the board travels either by conveyor or hand carried to the reflow oven. The Full Forced Convection Reflow Soldering System or reflow oven is used to melt the solder paste in order for the parts to bond to the board.

We use a Vitronics 6736, which has eight heating and two cooling zones. Heaters are located both above and below the board to be soldered. A heating profile must first be entered into the machine in order to program all the heating and cooling zones to ensure that the solder melts and solidifies according to process requirements. Once the board leaves the reflow oven, all SMT component assembly is complete. All that remains is the hand insertion of through-hole components such as large connectors or large capacitors which are placed by hand.

Once the through-hole components are inserted, the board is subjected to machine wave soldering using our Soltec Delta C Soldering system. The machine moves the board over a wave of solder thereby adhering the through-hole components to the bottom of the board. Once soldering is complete, any leads protruding from the board can be trimmed and the board tested.

Reception and Dinner Cap Off the Evening

Upon completion of the plant tour, guests were invited to attend a dinner along with entertainment at the four-star New City Garden Hotel. The event was in the Chinese tradition exposing the western guests to China's unique culture and Suzhou's proud past through dance and song. The dance was an artistic representation of a young girl's fancy in Suzhou embroidery, a famous handicraft in China. Before their marriage, the young girls in Suzhou would make small articles such as incense bags or overspreads for that special day—their wedding.



Contemporary Controls China, along with their Western startup team, pose after all the guests left.