

## Case Study

Centerm\* D3810  
Mobile Intel™ Celeron™ Processor  
Intel™ 852GM Chipset

# Intel Embedded Solutions Help Centerm Forge Embedded Terminals



### Analysis of Case Background

As the world's largest general-purpose microprocessor manufacturer, Intel has always been regarded as the leading provider of desktops, laptops, servers, and network solutions. However, this does not present a complete picture of Intel's strengths, as Intel maintains a leadership role in the embedded systems market. Over the past 30 years - since entering the field - Intel products and solutions have significantly improved in terms of technology, performance, and function. Consequently, these high performance products have been favored by many hardware and software manufacturers as they ably satisfy customer needs.

### Related Information

Centerm Information - founded in 2002 - was one of the first enterprises involved in the R&D, production, and sales of embedded terminals in China. It has since become the largest domestic supplier of embedded terminal solutions, embedded terminal hardware, and management software. Currently, it produces an extensive product line of embedded terminals including the Windows product series terminals, Linux terminals, UNIX terminals, as well as other embedded products such as intelligent handheld devices, and self-service equipment. Since its parent company, Fujian Star-Net Communication Co., Ltd. bought out Centerm 2000 - the first China patented Windows terminal - sales of Centerm's Windows terminal products have maintained first for eight consecutive years, up to 50% of the domestic market share.

### Challenges Facing Centerm Information

Centerm Information pays close attention to domestic users' requirements for embedded terminal products. Centerm recently noticed that traditional embedded terminal application modes that assign computing and storage tasks to remote servers force local embedded terminals to undertake only input and output functions. Despite all of the advantages - low power consumption, low cost, easy to manage and maintain, and highly centralized - these terminals could not satisfy the comprehensive computing requirements for the finance, insurance, telecommunications, and education industry



Centerm D3810



Centerm C3820



Centerm N3820



Centerm M3820



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Zhang Yeping

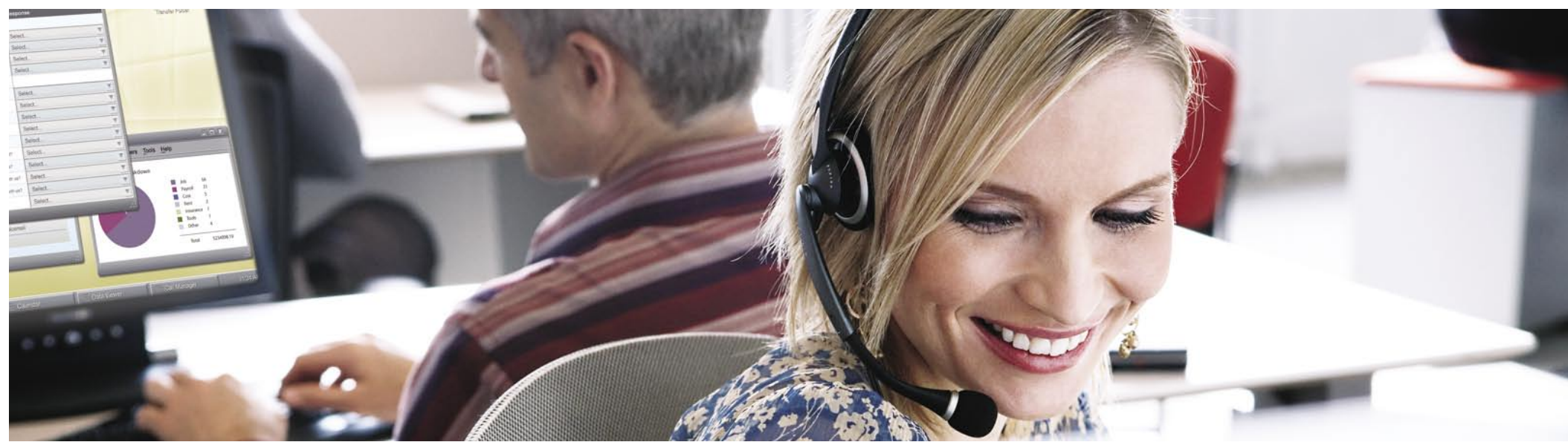
## **Analysis of Case Background**

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Consider the following case of Fujian Centerm Information Co., Ltd. (Centerm Information): The D3810 Windows terminal - the next generation of embedded terminals for commercial use - demonstrates the intense collaboration between embedded system manufacturers and Intel. The new product - developed by Centerm Information - uses a Mobile Intel™ Celeron™ Processor and an 852GM chipset to optimize size, performance, and power consumption. The embedded system manufacturers can utilize the Intel processor’s capabilities to augment their products and solutions.

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Today, Centerm Information boasts the highest revenues and the broadest consumer coverage in the domestic Windows terminal market. Its products have been successfully utilized in finance, telecommunication, taxation, electric power, transportation, customs, education, and government organizations. They have also been favorably received in overseas markets.



**We have decided to continue to use the Intel processor for future embedded terminal products. With the supports of a partner like Intel, we will lead in the domestic embedded terminal industry.”**

Zhang Yeping

### **Challenges Facing Centerm Information**

There has been fierce competition in the domestic embedded terminal enterprises market. However, Centerm has maintained its leading market position for many years. This success can be attributed to its strategy to design “industry based” solutions that “focus on specific applications”. This strategy provides customized products for core industry businesses by developing innovative solutions to specific user demands.

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Users expected the embedded terminal to enhance computing performance and functions, and to handle more complex tasks than just simple input and outputs. Some run customized software applications such as multimedia players and Java virtual machine.

Users place higher demands on the performance and function of embedded terminals, expecting them to be as powerful as a PC. At the same time, they are unwilling to sacrifice the small size, the low power consumption, low costs, high security, and a user-friendly interface. They want better performance without negative side-effects such as an increase in cost or device size.

To satisfy the above-mentioned requirements, Centerm Information developed the next generation of Windows embedded terminals. With abundant relevant product design experience, Centerm Information realized that processor platform selection was crucial to satisfying consumer demands. The terminal must be equipped with a high performance/watt processor.



For previous Windows, Linux, and UNIX embedded terminal products, Centerm Information used industry-standard general purpose processor platforms. These platforms are continuously enhanced and remain price competitive. Consequently, Centerm Information is still inclined to choose such kind of products.

After an intense assessment of all third-party embedded processor platform manufacturers in the market, Centerm Information found that a combination of the Mobile Intel™ Celeron™ Processor and the Intel 852GM chipset would be the most suitable for meeting the performance demands of the Windows embedded terminal processor platform. Furthermore, Intel's comprehensive technological support is unparalleled. All of these factors combined made the Intel processor the obvious choice for Centerm Information. Centerm Information's confidence in Intel's products is justified: By using Intel's 1.2GHz Mobile Intel™ Celeron™ Processor and 852GM chipset, Centerm Information's new generation Windows embedded terminal, D3810 has exceeded expectations.

### **Intel's Role**

Intel's Mobile Intel™ Celeron™ Processor adopted by D3810 - the new generation of commercial Windows embedded terminals - is a 1.2GHz processor with a Northwood core. Although the Thermal Design Power (TDP) only supplies 12 watts, it provides computing capabilities that meets embedded application requirements.

Together with Mobile Intel™ Celeron™ Processor, the 852GM chipset integrates the graphic card and sound card functions. This not only allows D3810 to support XGA requirements - 24-digit real colored CRT or a LCD Display output and a 2-channel audio output system - but it also effectively controls the overall power consumption (less than 36 watts) and ensures a compact of the layout design (266mm\*222mm\*66mm). In addition, Centerm Information fully utilizes the powerful expansion capabilities of 852GM chipset; this includes double network cards and interfaces (100Mb/Gigabit), using CF cards or laptop hard disks as a storage medium, and the optional wireless communication modules with 802.11 a/b/c standard or GPRS and CDMA standards. Considering the excellent computing performance capabilities, the various application functions, and the low energy consumption, the D3810 is a bargain.

The above mentioned advantages of D3810 are maximized by the incorporation of edge-cutting dual-boot technology by Centerm Information, which makes it possible for D3810 to start in CE mode or NDC (Network Disk Compute) mode. In CE mode, the D3810 operates its own storage medium. For instance, the Windows CE.net operating system built in the CF card deals only with input and output - with computing storage tasks handled by the server. In NDC mode, the D3810 is more like a PC with a local HD and runs various operating systems such as Windows, Linux, or UNIX. Thus, the full capabilities of the Mobile Intel™ Celeron™ Processor are utilized, relieving pressure on the server. The two modes can be employed and alternated seamlessly to address user demands.





Besides dual-boot technology, Centerm Information also adopted a variety of technology for the D3810 such as internal and external network physical separation, USB mapping, KEY safety certification, VNC remote monitoring function, and terminal management tools. These services guaranteed network safety and make it easier for users to use the USB terminal. They also augmented the terminal interface for real-time monitoring and remote access; thus increasing the security and utility of the D3810.

“The integration of the high performance Intel processor and Centerm Information technology made the D3810 capable of performing PC functions and satisfied the demands of professional users,” added Zhang Yeping. “The design and development of the D3810 would be impossible without the powerful performance and capabilities of the Intel processor and without Intel’s professional technical support.”

According to Zhang Yeping, Centerm Information and Intel have cooperated for year with storage products, but the D3810 is the first cooperation in the development of new generation Windows embedded terminals. Intel provided Centerm

Information with complete technical information regarding the processor platform and organized special training session to familiarize Centerm Information employees with their product. Intel even sent a hardware engineers to assist Centerm Information development personal and to provide constant technical support.

The excellent products and technical support from Intel strengthened Centerm Information’s confidence in their long-term cooperation with Intel. It has been reported that Centerm will adopt the Intel™ Celeron™ M ULV Processor with Banias core and the 852GM chipset in new embedded terminal products - M3820 and N3820. These products satisfy the noise-sensitive demands of various clients working in physically constrained environment.

Zhang Yeping confirmed, “We have decided to continue to use the Intel processor for future embedded terminal products. With the supports of a partner like Intel, we will lead in the domestic embedded terminal industry.”

## Case Summary

The successful application of the Mobile Intel™ Celeron™ Processor and Intel™ Celeron™ M ULV Processor with 852GM chipset in Centerm Information's new generation Windows embedded terminal D3810, M3820 and N3820, demonstrates the advantages brought to Centerm Information by using Intel's advanced embedded processor platform. The cooperation with Intel enabled Centerm Information to further to enhance embedded terminal products. Centerm Information went on to utilize Intel capabilities in the majority of its products. This is just the beginning of their fruitful cooperation; in the future, they will provide unparalleled embedded product solutions.



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