

Special Edition on System Components

Passbook/Transaction Slip Printer for Foreign Markets

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Abstract

In the domestic (Japanese) market for automated equipment for financial applications, Oki is one of the major manufacturers, offering products with the No.1 market share in categories such as ATM's and passbook/transaction slip printers. However, in foreign markets for financial automated equipment, our name is still not well known. The reason for this is that market needs overseas are completely different from those in Japan and thus it is very difficult to divert a product for the Japanese market to a foreign market and have it be well accepted.

The FP-21 passbook/transaction slip printer is a product that is at the forefront of Oki Electric's financial terminal business and is aimed at the Asian market (China, Korea, Taiwan, etc.) and the US/European market. In this paper, particularly focusing on the Chinese market, we report on how differences in foreign market needs compared to those of Japan resulted in specification differences. We also describe some new technologies we developed to achieve these specifications.

Passbook/transaction Slip Printer Specifications for Japanese Financial Institutions

As part of the work of tellers and counter attendants in Japanese financial institutions, transaction slip processing is done simultaneously with passbook processing. Therefore, a 2-pocket type passbook/transaction slip

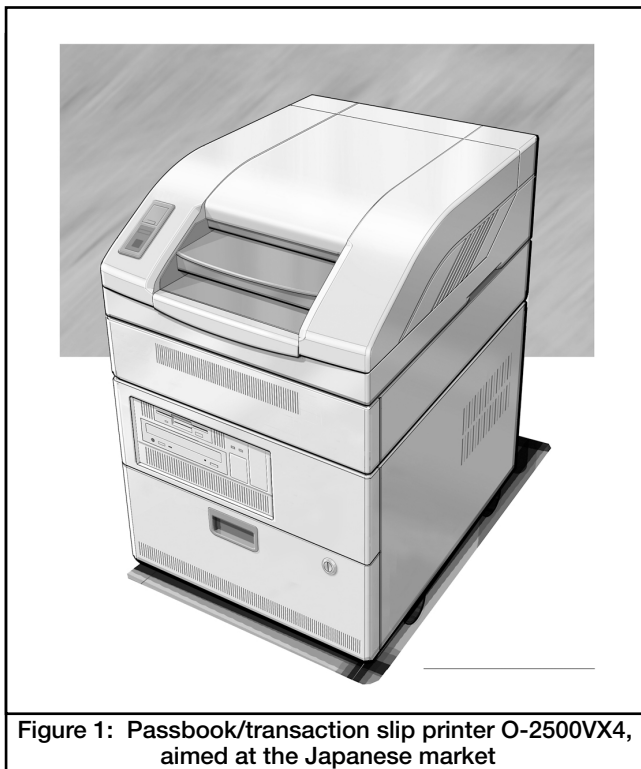


Figure 1: Passbook/transaction slip printer O-2500VX4, aimed at the Japanese market

printer is used, which simultaneously accepts both the passbook and the slip. Figure 1 shows our company's Model O-2500VX4 passbook/transaction slip printer which we supply to financial institutions in Japan. The O-2500VX4 accepts the passbook and slip simultaneously in a 2-level (over and under) pocket and achieves complete automation of passbook and slip processing for one transaction. Specifically, the two can be inserted simultaneously-the slip in the upper slot and the passbook in the lower, and after first executing the passbook processing, the passbook is automatically ejected. Next, the slip is drawn in and printing processing of the slip is done. Consequently, the operator does not have to bother taking out the passbook and inserting the slip in its place, nor does the operator have to execute passbook processing instructions or slip processing instructions-the task is completed with a single set up of the media (materials) and a single execution instruction. Even processing of the magnetic stripe is done automatically by means of a magnetic stripe reader/writer mounted inside the printer. The printer has thus been designed with the primary objective of improving work efficiency at financial institutions in Japan.

The Needs of Chinese Financial Institutions and Specifications for a Passbook/Transaction Slip Printer for China

The usage environment in the Chinese market is different from that of Japan in many respects, and to adapt printers to those differences, special designs and technical developments suited to the Chinese market were needed.

1. The 2-pocket domestic product and the 1-pocket product for the Chinese market

The financial systems of China are currently in the

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midst of rapid development and, because of this latent potential, the market is extremely attractive.

Early in the 1990's, Oki's horizontal printers (products of Oki Data^{*1}) were widely accepted by Chinese financial institutions and the situation at one time was that they held the top market share at 70% or more. However, as shown in Figure 2, these Oki printers were 1-pocket type general-purpose printers, not particularly adapted to financial applications. In the mid-'90's, even in China, introduction of specialized printers specially adapted to financial work began and the share of general-purpose printers dropped dramatically as the market transitioned to printers specialized for financial jobs.

In China, even today, 1-pocket type passbook/transaction slip printers are the mainstream, probably due to the background that they evolved from the multipurpose printer base. However, even in China, the usefulness of the 2-pocket printers so widely adopted by Japanese financial institutions is recognized and latent needs do exist. Unfortunately, transitioning to 2-pocket equipment requires renovation of the host system, and in China, where full conversion of financial systems to networks has not yet occurred, the barriers to transitioning to 2-pocket equipment, such as difficulties with system compatibility, are high. For this reason, in our specifications for a printer aimed at the Chinese market, we decided to make it the 1-pocket type.

2. The financial market situation in China and the need for fonts

Because of the huge amount of font data required, the financial equipment currently operating in China does not contain fonts for all the kanji used for people's names, so for those "name-kanji" for which there is no font, similar kanji are used instead. Substitution of these "similar kanji" means that the name for one person can be recorded with any number of kanji combinations. As a result of the use of these substitute kanji, the problem of people establishing accounts with false names occurs.

In April, 2000, the Chinese government, as a means of preventing "false name account establishment," put into effect the "true name system," which stipulated that an account could only be established by a person using their true name. However, to enforce this "true name system," it is essential that all financial equipment be able to display customer names using the original (true) kanji of the names, in order to prevent the substitution of kanji in the name.

To achieve this "font infrastructure," the Chinese government issued a standard called "National Standard GB18030-2000 of the People's Republic of China." In this new national standard, all the kanji fonts needed to handle the kanji used in names are specified. In addition to the 1-byte and 2-byte codes of the past, 4-byte codes are now provided for as well, and the required data has grown to a huge amount. Although it is something hard



Figure 2: General purpose dot printer 5630SP, made by Oki Data

to imagine in Japan, in January, 2001, the Chinese government made this new standard a compulsory standard, and after the provisional grace period ended in September, 2001, the standard has been strictly enforced and sales of non-conforming products inside China are prohibited. For that reason, it is necessary that even passbook/transaction slip printers have font configurations which conform to the new national standard.

3. Development of a long-life ink ribbon cartridge

Oki Electric's development of a passbook/transaction slip printer for China started initially from study of whether to adopt a small, re-ink type cartridge (ribbon length: 1.6m) to improve ease of use and reduce the cost of consumables. However, the Chinese slips are of poorer paper quality than what is used in Japan and large amounts of paper dust are generated during printing. With re-ink type recyclable ribbons, that paper dust accumulates in the mechanism and can cause operation failures. As a means of solving these problems, in the FP-21 we did away with re-ink type ribbons and instead developed a large ink cartridge equipped with a 35m ribbon, something that is quite unusual for this class of product. By adopting a cartridge with an ultra-long ribbon we were able to achieve long useful life of 10 million characters, while still suppressing troubles due to paper dust.

4. Magnetic recording/read out method

Figure 3 shows a comparison of the magnetic stripe portion of the passbook as used by Japanese financial institutions and that used by Chinese financial institutions.

At Japanese financial institutions, in most cases a longitudinal stripe which is attached with an adhesive ("pasted on") is used, and the passbooks themselves have advantageous conditions both as to surface flatness and uniformity of stripe position. In contrast, in China, the mainstream is horizontal (sideways) stripes. Furthermore, although books with the stripe pasted on,

*1 Oki Data Co., Ltd.; spun off as a separate company in 1994.

similar to those of Japan, are used, so-called “direct coat types” (in which the magnetic paint is coated directly onto the passbook surface) are also widely used. Because with these “direct coat types” the paper base is directly coated, unevenness may occur on the surface due to the effect of the underlying material. In addition, even in the pasted on types, products wherein the position of the pasted-on stripe is not fixed, but varies considerably, are released into distribution. Such unevenness in the stripe surface and variation in stripe position can cause reading/writing errors, and at Chinese financial institutions the number of passbooks which must be scrapped due to such magnetic errors is huge. With the FP-21 we suppress the occurrence of reading/writing errors by gathering a selection of local media (stripes on passbooks), measuring their variation, and then setting machine parameters to the most appropriate values.

In addition, at many financial institutions in China, the printer is connected to an externally mounted magnetic reader/writer and magnetic stripe processing (“swiping”) of passbooks and cards is done manually. For this reason, with the FP-21’s designed for the Chinese market we provide the magnetic reader/writer as an option, while the standard model is a printer which has no magnetic processing capability but is made to connect to an external magnetic reader/writer.



Pasted on type (longitudinal type: Japan)



Direct coat type (horizontal type: China)



Pasted on type (longitudinal type: China)

Figure 3: Comparison of Japanese and Chinese magnetic stripe formats

5. Method of setting the media

As explained above, from the mid-1990's, 1-pocket type printers specially designed for financial business proliferated in the Chinese market. This kind of a market transition caused technologies not found in the Japanese market to be used in China's financial market.

At Japanese financial institutions, the so-called “side-contact” method has been adopted. With it, by pressing the side edge of the media, such as a passbook or slip, against the side edge of the insertion slot, the position for the start of printing is established. Furthermore, the media is inserted into the printer perpendicular to the printing direction. In contrast, in China, the mainstream method is called the “insert free” method because the medium may be inserted in any position or in any direction and printing is done after both automatic alignment of the media direction (skew correction) and detection of the media edge position (edge detection). Because the operator need not be concerned about the media insertion direction or insertion position, he or she can feed the medium into the printer freely and this method is very to use. As a result, the feature has become firmly established in the North American, European, and Chinese markets.

“Insert free” is a feature that was thought to be necessary in the Japanese market also, but in Japan, the longitudinal stripe is the mainstream format, so up until this time, we at Oki had not adopted the “insert free” system. However, with the FP-21, since it is a product conforming to foreign market requirements, our objective was for operators in foreign markets to learn to use it smoothly, without any feeling of strangeness, so we developed our own proprietary “insert free” mechanism and incorporated it in the product.

6. Design engineering and the necessity to manufacture locally in China

In supplying products to the Chinese market, if finished products are exported from Japan, a high tariff rate is applied and competitive strength in the market will be lost due to the resulting high price. In addition, when Chinese financial institutions make purchases, whether a product is made in China or not becomes an important selection criterion for them. For this reason, we decided to adopt local manufacturing, using a company which we established in July, 2001 in Shenzhen, China.

For manufacturing the FP-21 in China, we designed the main parts to be of stamped plate. This choice was made on the basis of the differing cost structure, including labor cost, die and tooling investment cost, etc. That is, compared to Japan where the mainstream approach is to use, for the major parts, molded parts which require few manual steps in production, in China, the alternative of a structure using primarily stamped plate parts, although more labor intensive is actually better in terms of cost. In addition, it is easier to procure the required components and materials, and increasing the percentage of parts which

are locally procured is also an important factor from the cost standpoint. Eventually with the FP-21 we achieved a local procurement ratio of 90% or more. Due to the differences in these manufacturing environments, the design philosophy for FP-21 had to be totally different from that of products manufactured in Japan, and we adapted our designs specifically for manufacturing in China. Local manufacturing is also very advantageous as a means for enabling faster response to user needs.

7. FP-21: our passbook/transaction slip printer for the China market

As described above, we developed technology for the FP-21 which was totally different from that used for Japanese specifications and achieved the following:

- ① 1-pocket format (to accept a media width of 245mm),
- ② long-life ribbon to deal with the poor paper quality of Chinese media,
- ③ a magnetic recording method adapted to the magnetic stripes of Chinese passbooks,
- ④ “insert free” method, and
- ⑤ equipment design optimized for manufacturing in China.

In addition, as shown in Figure 4, we placed importance on visual design and came up with a novel external appearance. In terms of speed also, we achieved 330cps (characters per second) for ANK printing, which is the highest speed among passbook/transaction slip printers of this class.

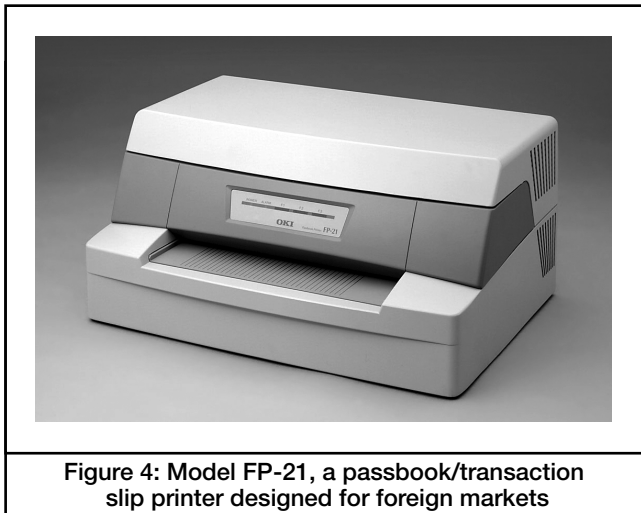


Figure 4: Model FP-21, a passbook/transaction slip printer designed for foreign markets

Dealing with the Specifications of the Countries of Asia and Europe

FP-21 is a product not just for the Chinese market, but one we plan to deploy in the Asian market (Korea, Taiwan, etc.) and in the European and North American markets as well. As one would expect, market needs are different in each country, according to the local environment, and specifications must be adapted accordingly. With FP-21, to respond to the varying needs of each country, we used a design which

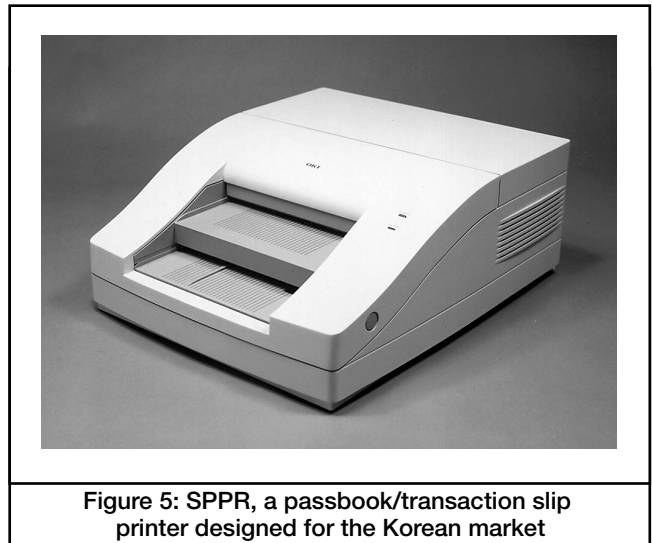


Figure 5: SPPR, a passbook/transaction slip printer designed for the Korean market

facilitated spec adaptation. Below, we describe some of the different needs of various countries and the FP-21 spec changes we made in response.

1. Specifications for Korea

The situation with Korean financial institutions, especially the Agricultural Cooperative which is the largest organization, is that historically they have adopted Japanese financial systems, so the system environment is very close to that of Japan. The same is true for passbook printers: 2-pocket types are the mainstream and, like Japan, a longitudinal magnetic stripe is used. In this kind of environment, our company's passbook printer SPPR (Smart Passbook PRinter) shown in Figure 5 has been widely accepted, and enjoys a large market share.

Recently however, “business culture” has migrated to Korea from China and Europe, which are relatively close geographically, and as a result a need for 1-pocket passbook printers has appeared. To respond to this need, we prepared an FP-21 with a longitudinal stripe spec for the Korean market. With the longitudinal stripe, since the direction of passbook insertion and the readout direction of the magnetic head are parallel, a fixed head (not a self-advancing head) must be used. With this Korean version of FP-21, because the magnetic head is fixed, we have adopted the “insert free” method for slip processing and the “right-side contact” method for passbook processing.

In addition, because of the special electric power situation of Korea where 100V and 220V co-exist, the Korean version of the FP-21 uses a 100-220V “universal” power supply.

2. Specifications for Taiwan

In many respects, Taiwan is an environment very close to that of China, but unlike China, mainstream passbook/slip printers are equipped with magnetic stripe reader/writers as a standard feature. For that reason, our Taiwan version of the FP-21 has magnetic stripe processing capability built in as a standard feature. The power supply specification for this model is 110V.

3. Specifications for Europe and North America

In Asia, where many languages use ideograms (kanji, etc.), font configurations are based on 2-byte codes. In contrast, in Europe and North America where a phonetic alphabet is used, we had to incorporate international standard fonts based on 1-byte codes. For the FP-21, while leaving 2-byte control as the standard, we developed a control mechanism which can be used to control international standard fonts as well. For font data exchange only, we have Asia/Europe-North America compatibility.

Conclusion

To create the FP-21, we incorporated many new technologies and did not let ourselves be bound by concepts of the financial terminals which Oki Electric had made for the Japanese market in the past. Our design enables core parts to be adapted flexibly to the differing needs of each country. We expect that from here on, the FP-21 will be Oki Electric's front runner in penetrating foreign markets for financial terminals.