

Variable Printing in Japan

(What is the Approach of TruePress)

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Abstract

Approximately 2,300 color print-on-demand systems and approximately 2,000 monochrome print-on-demand systems have been installed in Japan. Short-run printing business has been steadily growing with fulfilling various needs in the market. Variable printing application is becoming popular for such applications as product catalogs and brochures printing targeted only for selected audience, and printing of price lists which vary by an individual chain store. However the overall market size of variable printing still remains relatively small.

The report covers reality of variable printing market and explains about the background of a fact that variable printing is being only used for the limited applications. In addition, the report makes recommendations as to what system vendors of variable printing have to do in order to expand variable printing market. The report describes problems and solutions of PPML which is a key-word and a vital tool to establish multi-vendors network. Besides, the approach to variable printing by TruePress is also covered in the report.

Introduction

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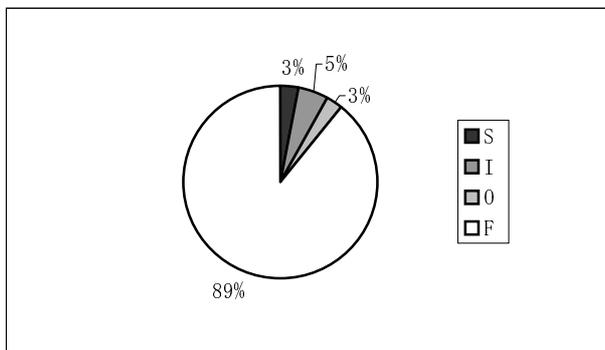


Figure 1. The market share of monochrome printing equipment in Japan (based on the number of units)

Businesses use equipment capable of variable printing for billing and financial streaming, professional mail, direct mail, and the publishing of books. In Japan, however, monochrome printing equipment is only used for variable applications - defined in the strictest sense - in the cases of billing and financial streaming and professional mail. In other words, most monochrome variable printing equipment is used as little more than a mainframe output printer. Furthermore, insofar as the equipment is being used for publishing, its scope tends to be limited to short-run printing of manuals and other similar publications.

Direct mail (individualized addressing and one-to-one business personalization) and book publishing (automated layout, database publishing) are hardly even a presence in the market at the moment, but can be expected to grow in importance in the future.

Figure 2 indicates the market share in Japan of monochrome printing equipment that offers variable printing.

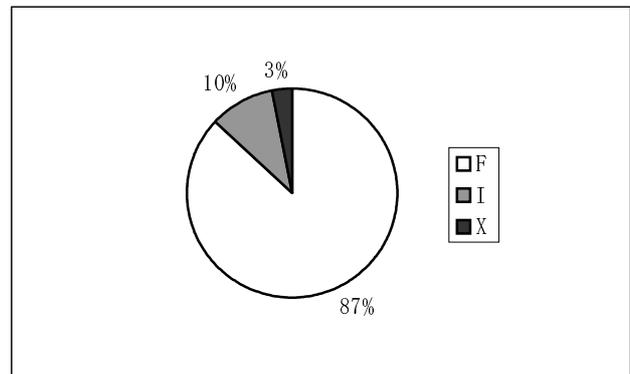


Figure 2. The market share of color printing equipment in Japan (based on the number of units)

10% of the total printing in Japan done by color equipment purchased in the past two years has involved personalization for one-to-one business and book publishing (automated layout, database publishing). In the United States, 20% of the total is reported to be in variable printing, slightly more than the 13% reported in Europe, with color used more commonly than monochrome.

Why Isn't Personalized Printing Taking Off In Japan?

The Japanese printing workflow is split up into smaller processing units, an arrangement that is ideal for printing large amounts of the same material. Large-scale printing of this sort features a certain looseness in the deadlines, and even when the individual price for a printed object is low, the high-volume promises a profit. With personalized and short-run printing, however, the conventional wisdom is that although the deadlines are tight, the profits are not very high considering the effort involved. Furthermore, manual page layout and type quality cannot be matched by automated layout in most cases. Another problem is that the personalizing software available in Japan consists mostly of localized versions of foreign-language programs that were developed overseas and do not effectively accommodate the unique needs of the Japanese market. Other barriers to the spread of personalized printing include the effort involved, as well as the apparent failure of vendors to take advantage of potentially helpful developments such as the spread and automation of processes related to the web, PPML, and JDF.

PPML and JDF

PPML has the potential to contribute both to the increased speed and acceptance of variable printing. Some of its specifications overlap with JDF, however, which leads to confusion among those in the printing business. The outstanding feature of PPML is its use of <REUSABLE_OBJECT>. It also, however, includes elements such as <SHEET_LAYOUT> and <IMPOSITION> that are part of JDF as well. Since, from the point of view of equipment makers, the two are not exactly the same, information is often lost in the conversion between PPML and JDF.

Applications that Create PPML

There are currently very few applications that can create PPML. In order to make it possible to use <REUSABLE_OBJECT> and <OCCURRENCE> it is necessary to create device-dependent data. The Japanese production market is order driven, and it is difficult for printing companies to control which applications their customers use. As a result, the printing companies must process whatever data is received with an order. Creating the additional device-dependent data described above is often necessary, which can become a problematic bottleneck in processing.

TruePress V200

Figure 3 shows an external view of TruePress V200. The equipment in its standard format includes an NP-V200 print engine and an HC-210-V controller. It has a print area that can be set to between A4 and A3 Wide, including space for

trim marks. It can also be used for binding, and since it can print saddle-stitched A4 documents with trim marks, it can be used for processing where the trim area is cut off, just as is generally done with documents produced by printing presses.



Figure 3. TruePress V200

The following are the standard TruePress V200 specifications.

Print Engine Specifications

Model name: NP-V200
 Printing method: Xerography
 Resolution: 600 dpi
 Printing speed: 400 ppm (A4 two-sided: 200 ppm)
 (A3 two-sided: 100 ppm)
 Maximum printing area: A3 Wide (318 x 469 mm)
 Supply Trays: Upper: 1000 sheets; Middle: 1000 sheets;
 Lower: 3,000 sheets.
 Each tray can accommodate paper of any size between A4 and A3 Wide.
 Discharge tray: Total discharge paper: 5000 sheets;
 Upper tray: 500 sheets.
 Dimensions: 3,210 x 780 x 1,436 mm (W x D x H)

Controller Specifications

Model name: HC-210-V
 Input format: PostScript3, PDF 1.3, TIFF
 GUI: Remote GUI compatible with web browsers
 Functions: Electronic collation, Hot Folders, Job scheduling, page previewing, variable data printing, RIP'ed data impositioning
 Platform: Windows2000 PC

The TruePress V200 includes two printing engines, as shown in figure 4. Among its class (sheet-fed digital printing engines that use toner), it has the highest printing speed in the world: 400 pages per minute (A4, two-sided).

The controller features a high-speed data pump design, as indicated in Figure 5, and is able to transmit data in real-time at high speed to the two printing engines.

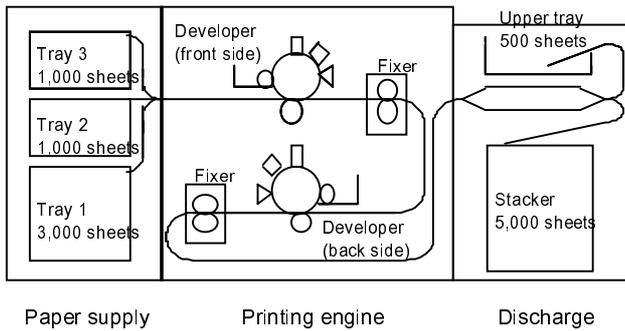


Figure 4. TruePress V200 printer diagram

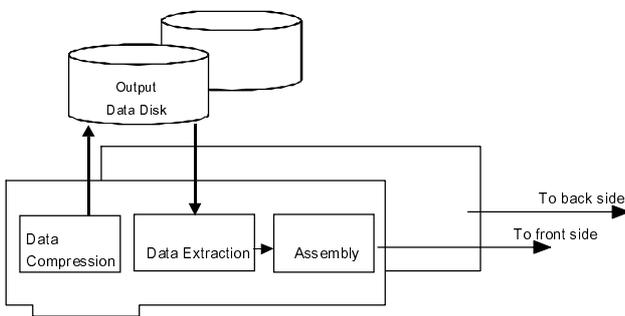


Figure 5. TruePress V200 data pump

The TruePress V200 Approach to Variable Printing

TruePress V200 is a sheet-fed printer that can print 400 ppm (both-sided). Its speed compares to that of conventional printing presses for a variety of reasons, including the fact that paper is transported inside the unit during printing. It is obviously very important to be able to transmit printing data to the unit at 400 ppm in order to avoid wasting any of this speed.

Unlike with billing and financial streaming or personal mail, all of which consist mostly of text, commercial printed products often include a variety of objects and large image data files. This makes it difficult to maintain the kind of RIP speed required for 400 ppm. Furthermore, it would be best not to have to limit the size or number of variable objects.

Bearing all of this in mind, Dainippon Screen decided to create a futuristic data pump design, as shown in figure 5, mounted onto a Windows 2000 Server. The data pumps for the front and back sides of the page are independent of each other and can transmit separate data to the printing engines. Furthermore, the data pumps feature hardware data compression and data extraction circuits, as well as hard disk storage, which makes it possible for them to store even extremely large objects. The data pumps work as a sort of cache memory, so that not only can they continue to store

objects, but they can also instantly reprint previously printed matter without the user having to devote any special attention to these functions. Best of all, since the board also includes a hardware assembly engine, objects can be synthesized in real time.

Application-Independent Assembly

The current TruePress V200 standard format supports easy variable printing using a multiple layer assembly for individual pages, as illustrated in figure 6. This function assigns a port for each layer, so that there is no need for the front-end application to support a particular personalization language. Furthermore, the user can check the results of assembly before actually printing using the preview function. All of this makes it possible to use the mail merge functions of commonly used software, such as Microsoft Word, for personalization.

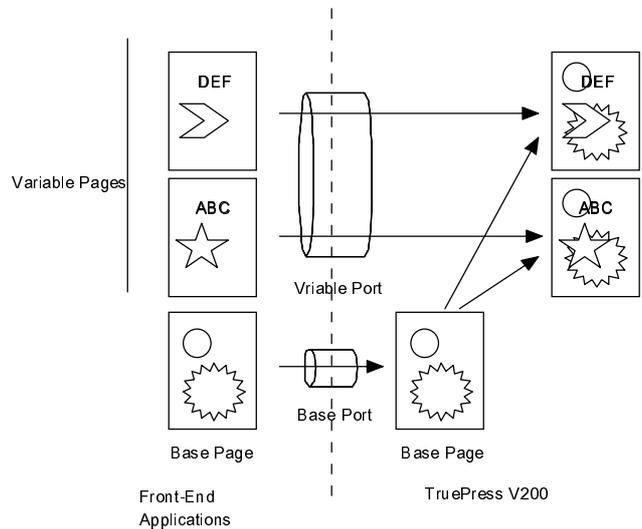


Figure 6. Application-independent Assembly

Multiple Cluster RIPs

The standard TruePress V200 format is used mostly for manual and book publishing. The TruePress V200 is also available in a format that is better suited for personalized printing. When PostScript data is used for manuals, the unit can process about 100 ppm, which means that the RIP does not become a bottleneck when four copies or more of a 100-page manual are made. Looking at this another way, however, whenever all the jobs involve variable printing, the RIP becomes the bottleneck. Expanding to multiple RIPs might appear to be the solution in this case, but multiple processing and threading by the RIPs alone will not increase the overall output speed. Since the RIPs put a great strain on input/output resources, as well as available storage space, input/output tends to become the bottleneck. In response to this problem, Screen is in the middle of

developing multiple-cluster RIPs, in which gigabit etherswitches can be hooked up to multiple PCs. This RIP format will allow the user to expand its variable printing resources simply by adding inexpensive PCs to the system.

Furthermore, since this format will make it possible for the controller to use an external RIP, it should be fairly easy to interface with systems such as Screen's TaigaSPACE or Trueflow, or to a non-PostScript / PDF RIP.

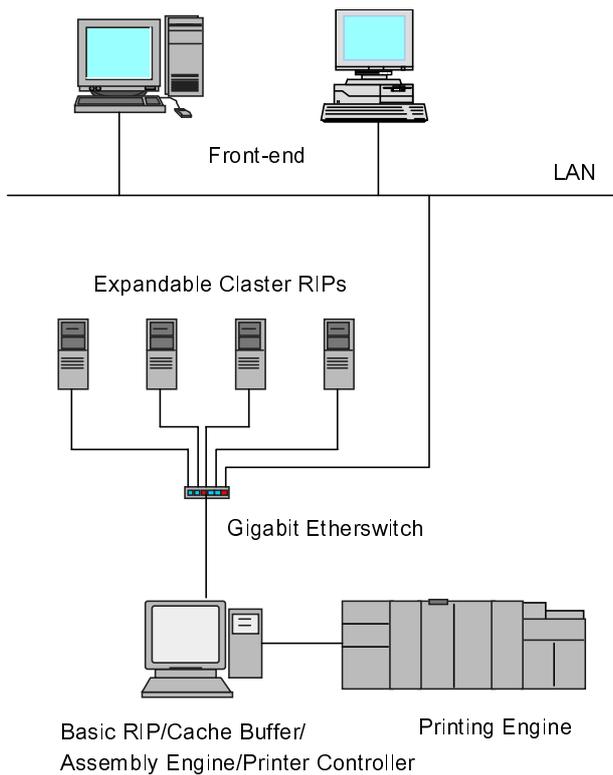


Figure 7. Multiple Cluster RIPs

Multiple Layer Cash and Assemble

When many PPML <REUSABLE_OBJECT> are used in the same page, if each individual object's surface area is large, the time required for assembly becomes extremely long. Complex pages of this nature are not used all that frequently, but it is important to avoid losing engine speed in these situations as well, in order to keep the system specifications accurate, if nothing else. For this reason, Screen is currently developing a processor that can cache and assemble reusable objects in two stages, as indicated in *figure 8*. This processor will make it possible for the first stage cache and assembly processing to be done in advance by the software, while the second stage of cache and assembly processing will be done in real-time by hardware.

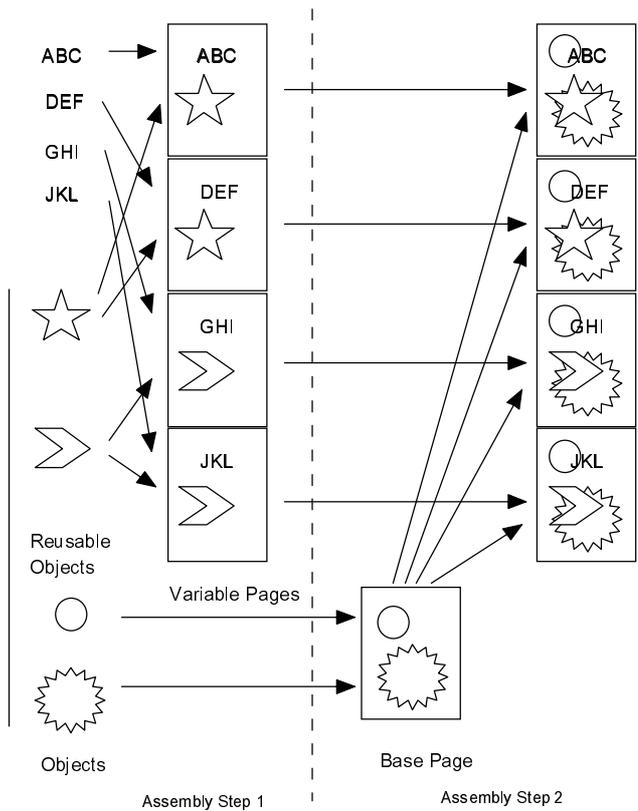


Figure 8. Multiple Layer Cash and Assemble

Conclusion

Japan today at the dawn of the age of variable printing. Monochrome equipment is used for billing and financial streaming, for professional mail, and for direct mail, while color machines are used for one-to-one business and personalization. The total market share for variable printing is only about 10% of all printing in the region. Front-end software suited for the Japanese market, a standardized personalization language such as PPML, and automation of processing through web data input and JDF are essential to the future spread of variable printing equipment.

Screen focused on providing the kind of productivity and running costs required for success in today's market when it created the TruePress V200 for use in commercial printing. In its standard format, the printer is perfectly suited for the publication of manuals and other short-run books. Furthermore, the same standard form makes easy personalization, regardless of the front-end application used, possible for short-run printing. What's more, since the TruePress V200 features both a cache buffer and an assembly engine, the RIP capabilities can be expanded to match the volume of variable printing being done.

References

1. Dainippon Screen Mfg. Co., Ltd. TruePress V200 Catalog (January, 2001)

Biography

Fumihiro Hatayama received his master degree in Electronics Engineering from the Osaka Institute of Technology in 1978. Since 1978 he has worked in Dainippon Screen MFG. CO., LTD.

His work has primarily focused on the development of scanners, imagesetters and digital printing controllers.