How Electronic Forms are Changing Office Printing

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1 Introduction

The efficiencies associated with electronic forms systems have made them so attractive that many organizations, large and small, are actively working on implementations. The following discussion is targeted toward assisting people in their understanding of the "world" of electronic forms. From historical aspects to modern day reality, the focus will be on forms and how to make this basic communication tool more efficient, productive, and cost effective. Also, the discussion will focus briefly of some of the elements that should be considered when evaluating an electronic forms system. A comprehensive look at the electronic forms world is beyond the scope of this document; however, a general understanding should be easily derived from the material presented.

So as to ensure that we all start with the same understanding of the elements of this discussion, the following key definitions are provided:

Form - the basic business tool for collecting and transmitting information, the catalyst for getting things done, and the record of what was done.

Electronic Forms - for the purpose of this discussion, electronic forms are images displayed on the computer screen. Where the the screen is filled in by an operator or the computer itself and then printed.

The use of electronic forms will be considered from the following perspectives:

- o Traditional Forms Development and Management;
- o Model for Electronic Forms;
- o Components of an Electronic Forms System; and
- o Determining What You Want to Accomplish.

2 Traditional Forms Development and Management

Historically, forms have been developed and managed via tedious, time consuming methods. To demonstrate this idea consider the following process, one representative of traditional forms development and management:

Concept

A need is identified or an idea born that can be most suitably catered to through the use of a form. A certain quantity of time is consumed at this stage determining if a form is actually the most productive way to handle the need or display the idea. If a form is deemed desirable for this application, comprehensive analysis must take place.

Analysis

The analysis stage is very critical because the form will be used as a basic business tool for collecting and transmitting information. To highlight the complexity of proper forms analysis, consider that by definition forms analysis is the systematic execution of those steps necessary to assure the following:

- o Productivity is increased in preparation, use, filing, and retrieval;
- o The total number of forms within the system is minimized;
- o Data element relationships are apparent through consistency and adherence to standards;

- o The effectiveness of the entire system , as well as the individual form, is enhanced; and
- o The resulting business tool communicates.

As is evident from this definition, forms analysis has been and still is a critical and extremely time consuming part of developing and managing forms.
Once the analysis stage has been successfully completed, the design of the form can begin.

Design

Traditionally, the design stage entails layout, proofreading, and approval. Of these activities, design is the largest time consumer - unless the organization must deal with an extensive approval process. Typically design has been shopped out or done in house with "crude" tools such as ruler and pencil and then taken to a typesetter. Once the design task is complete, production must commence.

Production

The production stage commonly includes the ordering, printing, and assembly of the desired form. Considerable time is required at this stage - often just waiting for forms to come back form a production facility. Once a production run comes back, inventory and storage become an issue.

Inventory/Storage

Traditionally, receiving, warehousing, requisitioning, and distribution are the major aspects of inventory/storage management. These are often the most costly elements of managing forms. Floor space is consumed and individuals need to be dedicated to managing the inventory aspects.

Processing

Processing consists of data entry, approval, filing, retrieval, transmittal, distribution, referencing, and copying. This is the stage where many people throughout the organization get involved with the form. The forms would be filled out and distributed manually. Once a form has been used, it often must be filed or maintained.

File/Maintenance

Some of the key elements of file maintenance are storage, retrieval, transfer, retention, and disposition. Historically, each of these have been done manually. Therefore, making the associated time and costs quite high.

In general, the traditional methodology of forms development and management have been time consuming, slow, and costly. A search for alternate solutions should lead a person directly to the concept - and reality - of electronic forms. The next section discusses the "new" way of dealing with the development and management of forms.

3 Model For Electronic Forms (adopted from the CG Corp. model)

As electronic forms have become a reality the forms development and management process has become significantly simplified. To demonstrate, consider this model for

electronic forms in relation to the process previously described. Note: the elements of concept and analysis still exist in this model; however, since these areas have not been dramatically improved via the adoption of computers they are omitted.

Forms Design

In the world of electronic forms, forms design is computer aided layout and typography. Also, text, rules, and content are described at this stage. Further elements that make the form intelligent or linked to other forms can be added at this time.

Forms Integration/Conversion

During this stage, the necessary graphics elements are scanned and integrated into the form. Elements such as logos and signatures are common. Another scenario has a preprinted form being scanned and converted through a tracing function. Although this is time consuming, it is far less so than a total redesign. During this stage, completed forms are converted into files compatible with the main forms processing system and prepared for uploading. Also, a printer file is downloaded to the printer to await incoming data.

Communications

Communications links between the creation/integration workstation and the main forms processing system allow the form, or a reasonable facsimile thereof, to be uploaded for "mass" processing. This form is simply an interface for data entry, not a piece to be passed on to the printer with each print job.

Data Collection

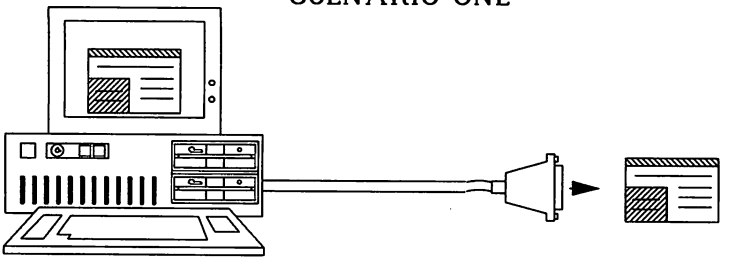
Terminals or integrated personal computers collect data from a data base or from screen entry and merge this variable data into the form waiting at the printer. Note that the data being sent around the system is ASCII data.

Output

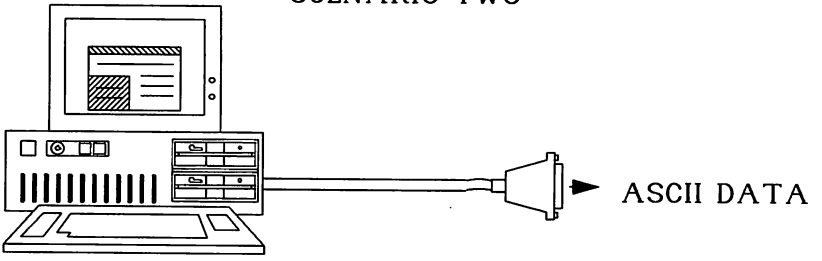
Completed forms are printed on demand by sending the ASCII data to the form waiting in the printers memory (downloaded early in the process).

Consider the following illustrations:

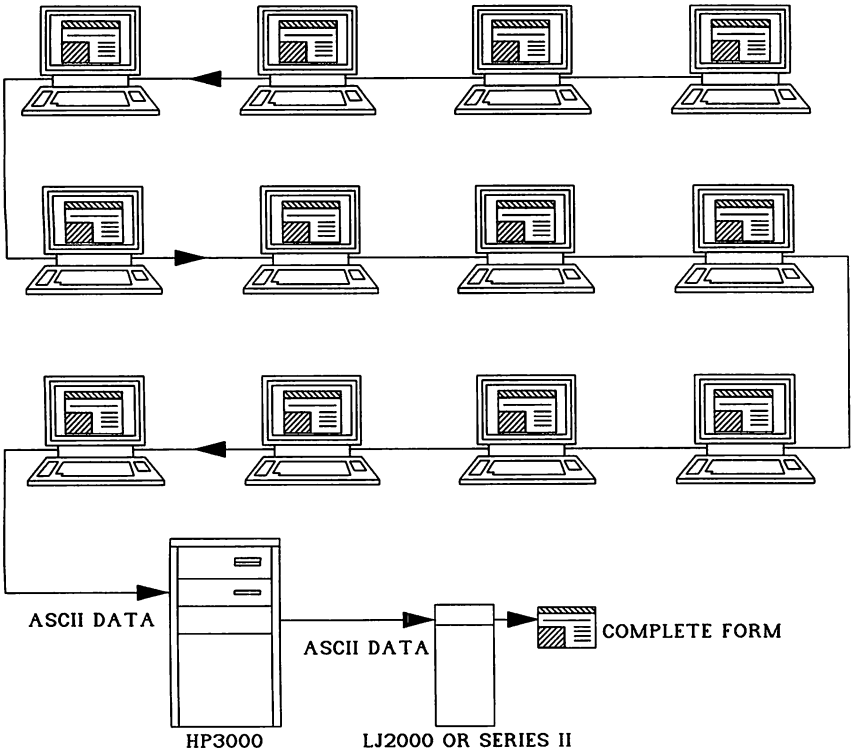
SCENARIO ONE



SCENARIO TWO



In this illustration, scenario one demonstrates a completed form being passed along to the printer. Scenario two assumes that the form has already been downloaded to the printer and that all that must be passed to the printer is the variable data. Of the two scenarios, number two is more efficient for jobs requiring more than one printing of the same form; primarily because the time to download just the ASCII data is less the time to download the form and the ASCII data for each job.



This illustration depicts an ideal configuration for a forms production environment. The user interface is a facsimile of the form, so the user can accurately place data in the appropriate fields. Once the form is completed and sent for printing, ONLY THE ASCII DATA will be passed down the line. The appropriate form (which was previously download to the printer) will pick up the data as it comes into the printer and a completed form will be printed.
Note that the same process could be occurring via data base input rather than user input.

As we can see, electronic forms generation differs quite dramatically from the traditional processes. What we should also be able to derive from this model is a tremendous number of efficiencies. Timeliness is dramatically improved, inventory costs are reduced, accuracy is improved, forms management is made easier, and so on.

4 Components of an Electronic Forms System

In order to obtain the greatest benefit from an electronic forms system, the proper system components must be in place. The next section describes, in greater detail, the elements of an electronic forms system.

An idea of what the major components of a forms system are can be acquired through the illustrations previously presented. However, for the sake of clarification, a description of the key components of an electronic forms system follows.

PC

A high speed workstation with advanced graphic capability is required for the forms design process. This workstation could be as sophisticated as a dedicated CAD station; however, that type of computing power should not be required. A typical forms design system should require no more than a 286 based PC with hard disc, graphics display, serial port, parallel port, and a mouse.

Mini/Mainframe System

The typical configuration would be multiple terminals hooked to the system for user entry or data base entry. The forms are designed on the PC workstation and passed on to the system for integration into the forms production environment. The fields associated with the forms are displayed to screen for easy, less error prone entry. Or, data can be acquired directly from the system data base; where no on screen entry is required. Optimally, the system contains the most up-to-date version of the form. Due to everyone obtaining the new form simultaneously, smooth and timely forms rollover is ensured. Consideration should be given to the idea that a forms system could as easily be a PC network. PC networks are quite common and can be used in a similar fashion as the mini/mainframe.

Software

The software used to design and manage forms is the most important aspect of the entire system. To ensure that software meets the basic requirements of forms design and management many aspects need to be considered. Further expansion of the subject is necessary to describe the more important elements of both forms design and forms management systems:

Forms Design:

The following are key attributes of an adequate forms design application:

- o High performance
- o Ease of use
- o WYSIWYG
- o Form conversion capabilities
- o Support for scanned images (logos, signatures)
- o Support a complete set of graphics elements
- o Support for LaserJet forms primitives
- o Support of bit-map graphics
- o Font variety
- o Font justification
- o Word wrap
- o Spell checking

- o Carbon black out
- o Build in security
- o Develop multi part forms
- o Inclusion of bar codes
- o Separate module

Forms Management:

The Following are key attributes of an adequate forms management system:

- o Ease of use
- o Data base merging capability
- o On screen data entry
- o Sophisticated filing functions
- o File portability
- o Support for multiple operating systems
- o Ability to merge variable data into a printer based, static, form
- o Forms security
- o File compatibility
- o Separate module

Each of these elements play an important role in a successful forms application. Many other aspects offer less significant value to the system; however, these aspects are beyond the scope of this general discussion.

Laser Printer

Laser printer technology has reached a point where the image quality is quite acceptable for most forms. There are many low cost laser printers available; however, very few are well adapted to the forms environment. Consider the key features of a printer that has been designed to offer advantages to the electronic forms world:

- o Built in forms design primitives such as lines, grey scale, and patterns
- o Macro handling capabilities for efficient processing of batch jobs
- o A full line of forms specific fonts
- o Easy to use
- o Broad range of software support
- o Compatible with other printers in a product line
- o Guaranteed file compatibility

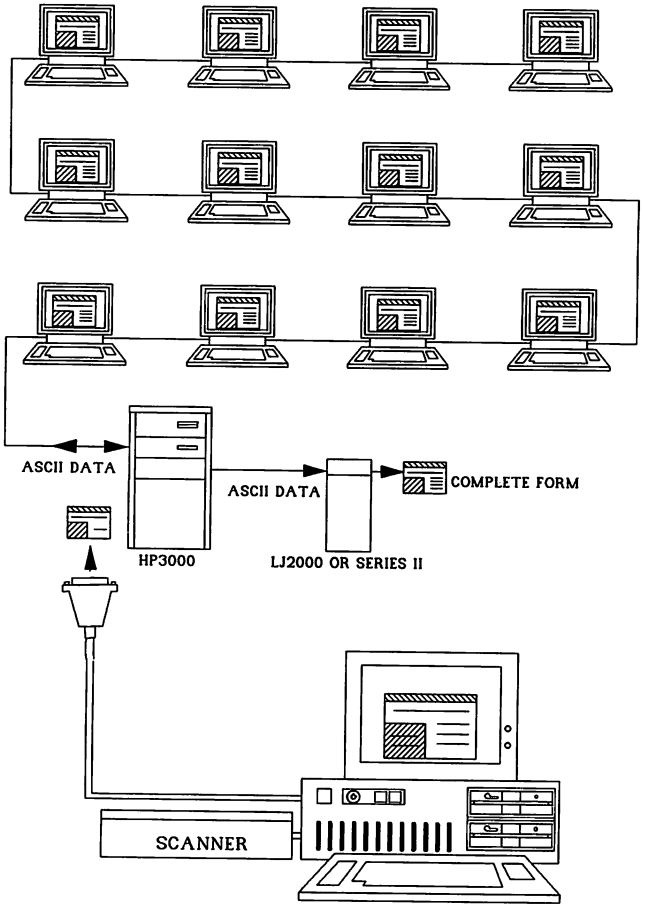
The last item in the list is possibly the most important. If the printing device is constantly changing the way it handles features, the forms files that have been designed

will require rework. A situation such as this is unacceptable because it places the user in the awkward mode of updating the form for each new device.

Scanner

The scanner is the fundamental tool used to bring in data and images that currently do not exist on the system. Scanners are used in the design aspect of electronic forms; where images are being transported into the form from an outside source. Since design is the focus of the scanner, it is typically connected to the design workstation. Note that scanners should not be used to transform a preprinted form into a computer form; simply because scanners produce very large binary files.

The following diagram illustrates a typical electronic forms system:



Additionally, a standard system would likely have a scanner for input and a personal laser printer for proofing the forms output - Prior to uploading it to the system or network.

5 Determining What You Want to Accomplish

While considering the implementation of an electronic forms system, determining objectives is key. The remaining discussion focuses on certain of the key aspects that may help in the evaluation of an electronic forms system.

Design Only

If the objective is to elevate the burden (slow layout, long lead times for revisions, and high production costs) placed on the organization by a manual forms design system, than a complete electronic forms system is not the most appropriate tool. However, since good forms system software is modular the design function can be purchased as a stand alone piece. This allows for forms design of the type described previously, while setting the stage for potential future growth into a comprehensive system.

Reduce Cost Associated With Traditional Paper Forms

Preprinted forms are very costly to maintain and are often considered likely candidates for computer automation. Often the objective of an electronic forms system will not be focused strictly on design, but rather how to reduce the costs associated with forms already being used. The cost that are traditionally associated with preprinted forms are as follows:

- o Processing time
- o Paper and printing costs
- o Obsolescence
- o Warehousing and out of stock

Each of these cost can be dramatically reduced through the power of a properly implemented electronic forms system. Consider how the associated costs can be reduced; long processing times associated with "wander-net" are reduced via the speed of electronic interchange; paper and printing costs are minimized since nearly all aspects are handled inhouse; forms that have become obsolete can be quickly updated and produced and minimal inventory of the old forms will be on hand; and, floor space and rush orders costs will be greatly reduced by having the system online. If the objective is to reduce such costs, a more comprehensive electronic forms system should be employed

Establish Demand Printing

If the the objective is ensure that information is distributed then printed, rather than the reverse, a fully functional electronic forms system should be considered. To establish demand printing, all the elements of the system should be in place. This is to ensure that the organization has control over the information flow, from the basic transmission device (the form) to the way the information is acquired (screen, data base) and printed. The benefits associated with computer design and reduction of costs are also present but are not considered to be the key attraction of the system.

React More Quickly to Business Needs

If the organizational environment is constantly changing, and in turn so are the forms being used, the implementation objective might be to react more quickly to that environment. An electronic forms system will help reduce the time devoted to printing, improve the organizations ability to comply with changing government regulations and

tax laws, and help in responding to company restructuring, departmental changes, and acquisitions. The degree of electronic forms integration required to meet this objective will vary depending on the organizations environment.

Level of Implementation

To a certain extent the components that are chosen will depend on the desired level of implementation. Basically there three possible levels; personal, departmental, and organizational. For example:

- The personal level would likely be comprised of a PC, software, scanner, and a laser printer.
- The departmental level might consist of a network, software, a centralized design center (PC), scanner, and a network (distributed) laser printer.
- The organizational level may require a mini/mainframe, integrated software, a centralized design and management center (PC and system), scanner, and multiple laser printers - connected to both workstations and the mini/mainframe.

6 Conclusion

What has been presented here just scratches the surface of the electronic forms world. Hopefully this discussion has provided some insight on the history and current potential of forms design and management. While evaluating electronic forms systems, an organization should go far beyond this general discussion. Needs should be evaluated, system requirements defined, and appropriate forms system components investigated.