Choosing microfilm readers and reader/printers

South Carolina Department of Archives and History
Archives and Records Management Division

Introduction

When people discuss the merits of microfilm, they often cite user resistance as a drawback. Many people dislike microfilm and when given a choice, will refuse to use it. They complain of eyestrain, headaches, and illegible images. While these symptoms may sometimes be caused by microfilm of poor quality, they are more often brought on by readers that are either badly designed, badly selected, or badly maintained.

When you choose the right microfilm reader or reader/printer, complaints will decrease. Readers and reader/printers are big investments, however, and their purchase must be taken seriously. In purchasing one or the other, therefore, you should be as careful as you are when you produce the microfilm itself. This leaflet discusses factors that you, as a records management officer or other official, should take into account before you buy this equipment.

Reader or reader/printer?

The choice between a reader or a reader/printer often depends on your need for hard copy prints of the film. If your users want prints, you will need a reader/printer; if they do not want prints, a reader will do. If you are buying

more than one piece of equipment, however, you might benefit from a mix of readers and reader/printers. Consider the matter carefully. Gauge your user-needs and purchase your equipment accordingly.

Choosing a reader

Before you buy a reader, consider the following features:

Microforms accepted

Be sure the reader you have selected will accept the type of microform your office uses. Some readers accept only one type; other readers accept more than one, but not all. Some reader manufacturers offer accessories that can make the readers they sell accept all microforms, but the purchase of these accessories will increase your cost. If you use more than one type of microform, you will have to weigh the cost effectiveness of buying readers and accessories against that of buying single-purpose readers.

Lens magnification

You can decrease user resistance to microfilm if the lens being used has appropriate magnification. You have three choices:

- Full-size magnification (the magnification ratio of the lens equals the reduction ratio of the microfilm being used). A lens with this magnification produces a full-size image. If, for example, the original source document was 8.5" x 11", the screen image will be 8.5" x 11" as well. Because users are comfortable with full-sized magnification, you should use this sort of lens for most applications.

- Partial-size magnification (the magnification of the lens is less than the reduction ratio of the film). A lens with this magnification produces a partial-size image. If, for example, the source document was 8.5' x 11", the screen image might be 6" x 8". Users often find it difficult to read a partial-size image of a document that is letter-size or smaller. You should avoid a lens with partial-size magnification unless the source document is larger than 8.5" x 11" (a map, for example) or the film is computer output microfilm (COM).

Users who say a reader makes them feel sick are probably moving the film across the screen as they read the images. They will avoid this problem if they keep the film still while they read.

■ Oversize magnification (the magnification of the lens is greater than the reduction ratio). A lens with this magnification produces an oversize screen image. If, for example, the original source document was 3" x 5", the image might be 8.5" x 11". Thus, only a section of the image will appear on the screen. Oversize magnification can be of benefit when source documents have fine detail or are very small. Generally, however, most users dislike oversize magnification because they have to scan the image to find the information they need.

Lens interchangeability

Some microfilm readers come with a single fixed lens. If you know that all your microfilm will be filmed at the same reduction ratio, this type of reader will do. Unfortunately, this is seldom the case. Usually, images are filmed at different reduction ratios. To enable users to project images with different reduction ratios at full-size magnification, you should purchase a reader that can switch magnification.

Interchangeable or drop-in lens: Some readers allow users to remove one lens and insert another of different magnification. Extra lenses cost relatively little, and most manufacturers supply a variety. These lenses have drawbacks, however, for often during the exchange, they are lost, damaged, or soiled.

Zoom lens: Some readers with only one lens have a zoom, which users can manipulate to change magnification.

Multiple lens: Some readers have two or more lenses. Users can switch these lenses back and forth to change magnification. Readers with interchangeable lenses provide the most flexibility.

Image rotation

Most readers have a feature that will let users rotate the image on the screen. The ability to rotate is an important consideration because microfilm is not always filmed in the same mode. Readers without this feature force users to read images that are sideways or upside down. The degree of

rotation varies; some readers rotate 90°, some 270°, and some 360°.

Screen illumination and focus

Users will complain about a reader that has poor screen illumination or poor focus. An unevenly focused image irritates users because they have to make constant adjustments; an unevenly illuminated screen can cause eye fatigue because the screen will be brighter in some places than in others.

Screen size

The size of the documents your users will be viewing will dictate the size the screen should be. If users try to view a large document on a small screen, they will be unable to view the entire image. Letter-size documents require a screen of 8.5" x 11"; COM, at full magnification, requires a screen of at least 11" x 14"; engineering drawings or plans usually require even larger screens.

Film transport

The way the film is transported is an important consideration if you use roll film, but less so if you use unitized microforms like microfiche. You have two options—a mechanized transport, which uses a motor to draw the film through the reader; or a manual transport, which requires the user to turn a crank. If you will be using your reader frequently, the additional cost of a mechanized transport may be justified; otherwise, a manual reader will do.

Ease of use

The way the film loads and the location of the controls can often make a reader harder or easier to use. Novices find some readers difficult to load, and some controls are unsuitable for left-handed users.

Size of reader

The space in your office or your need for mobility could dictate the size of the reader. You must have enough space for the reader, for users, and for maintenance activities; or you may need a reader that is small and light enough to be moved to different locations.

Method of projection

Readers project the image onto the screen from either the front or the back. There is little difference between the two

methods. Projection from the rear has a slight advantage when the reader is used in brightly lit rooms like a county clerk's office; projection from the front is slightly better for users who wear bifocals.

Maintenance contract

Like all machinery, a microfilm reader needs periodic maintenance. Ask yourself what sort of maintenance you will require and how much of it you will need; find out how much a maintenance contract will cost and what coverage you will have under the warranty. To minimize the inconvenience of reader down time, you might want to include in a maintenance contract a minimum time for response to a service call.

Scanning ability

If your users will be viewing oversize documents, you should purchase a reader that can move the image up and down.

Retrieval

Blips: If you use blips on your 16mm rolls as image markers for fast retrieval, select a reader that can count those blips.
Computer Assisted Retrieval: If you will be using information you have stored in your computer to locate images on your film, select a reader that can connect to your computer.

Reader/printers

The factors that apply to the selection of a reader apply to the selection of a reader/printer as well. When you are selecting a reader/printer, however, you should also consider the factors that apply to the print function.

Facts about the printing process

The printing process a reader/printer uses falls into one of two broad categories: dry silver (photographic) or electrostatic.

Dry silver

The dry silver process develops the print almost the way a photograph is developed. It exposes special photographic paper to light to form a latent image, then heats that image to develop it. The process reverses the polarity of the film image—a negative image produces a positive print, and a positive image produces a negative print. The process requires no chemicals, but it does use a special dry silver paper,

which has a drawback—the silver, because it sometimes contains mercury, can be potential health hazard.

Electrostatic

The electrostatic process is similar to the photocopy process and can produce a paper image in one of two ways:

Plain bond, or xerographic

This process projects the latent image onto a selenium cylinder, charges the cylinder electrostatically, applies toner to the charged cylinder to form the image, transfers the image to paper, then heats the image to fuse it. This process has distinct advantages: it uses plain bond paper, and it makes copies that resemble those produced by photocopiers or laser printers. These printers can maintain polarity, reverse polarity, or do both.

Electrofax, or coated paper

This process projects the image directly onto the paper, charges the paper electrostatically, then heat fuses liquid or powdered toner to form the image. This process requires specially coated paper. The printer can maintain polarity, reverse polarity, or do both.

Printing considerations

Type of paper

The dry silver and the electrofax processes require special paper that cannot be annotated with a pencil or pen. If you want the copy to look like the original, if you want it to print on office stationery, or if you want to make annotations, only the plain bond method will meet your needs.

Size of paper

Some printers use paper of only one size (8.5" x 11", for example); some use paper that has one width but different lengths (8.5" x 11" and 8.5" x 14" for example); and some use paper of various widths and lengths. Your needs will dictate your selection.

Cost of supplies

To calculate the cost of supplies, you should find out how much it will cost you to produce one print and then multiply that cost by the number of prints you estimate you will be making. If you choose a reader/printer that uses the dry silver process rather than one that uses the electrostatic

When you are choosing equipment, use checklists like those on pages 9–10 to compare key features.

process, you will have to base your calculations on the cost of the significantly more expensive dry silver paper; if you choose the reader/printer that uses the electrostatic process, you will have to calculate both the price of bond paper and the price of toner.

Exposure control

Because the density of an image can vary both within one roll and from one roll to another, a reader/printer that allows users to change the exposure will help to produce a print of high quality. Some reader/printers have exposure controls, others do not. Some have manual controls, others have automatic. A reader/printer with an automatic control costs more but is easier to use and cuts down on user errors. If you select a reader/printer with automatic controls you will lose less paper and less time and gain greater user satisfaction.

Printing speed

Find out how long it takes various reader/printers to print. The speed you will require will depend on the number of copies you will be making routinely .

Routine maintenance

Your ability to maintain your equipment yourself will dictate your need for a service technician. Make sure the paper and supplies you will be using are readily available, however, and ask if the machine you buy will lock you into a single supplier.

Conclusion

In overcoming user resistance to microfilm, the quality of readers or reader/printers is second only to the quality of the microfilm. A reader that is easy to use and a reader/printer that produces crisp, clean copies will encourage people to abandon bulky paper files in favor of space saving microfilm.

Definitions

Dry silver process

The development of an image on sensitized paper through the application of heat.

Blips

Markers that are exposed under each image on 16mm film; they are used to retrieve those images quickly.

Computer Assisted Retrieval

Retrieving information about images on microfilm by using

a computer that is connected to a reader or a reader/printer and holds information about the images (name, social security number, file number, or blip number, for example).

Electrostatic process The formation of latent images by the action of light on paper coated with charged photoconductive material. The latent image is made visible by applying charged powders or particles in a liquid, either directly onto the paper or by transfer.

Lens magnification The degree to which an optical system like a microfilm reader magnifies the image. Magnification is expressed as 24x or 24:1. A reader with a 24x lens will blow up a one inch film image to 24 inches.

Microform A form that contains microimages. It can be microfiche, an aperture card, jacketed microfiche, or roll microfilm.

Negative image An image with light characters against a dark background.

Polarity The dark-to-light relationship of an image; a printer that produces a negative print from negative film maintains polarity, while a printer that produces a positive print from a negative film reverses polarity.

Positive image An image with dark characters against a light background.

Reader A device that enlarges microimages for viewing but cannot produce a paper copy of the image.

Reader/printer A device that enlarges microimages for viewing and has the capacity to produce a paper copy of the image.

Checklist for a reader/printer	
	Manufacturer name and model number
Microforms accepted	
Transport type	
Magnification	
Multiple lenses:	
Image rotation?	
Size of reader	
Warranty	
Maintenance contract?	
Scan?	
Screen size	
Projection method	
Cost	
Printing process used	
Paper size	
Polarity	
Special paper?	
Cost per copy	
Other _____	

Completed checklist for a reader/printer	
	Manufacturer name and model number ABC Co. Model #95
Microforms accepted	Microfiche, jackets
Transport type	n/a
Magnification	24x
Multiple lenses?	yes, 18x, 21x, 31.5x, 37x, 42x
Image rotation?	yes 360 degrees
Size of reader	desktop
Warranty	full, 90 days
Maintenance contract?	yes, $216 per year
Scan?	yes
Screen size	13" x 12"
Projection method	rear
Cost	$1,800
Printing process used	electrostatic, plain bond
Paper size	8.5 x 11, 8.5 x 5.5
Polarity	bi-modal
Special paper?	yes
Cost per copy	$.08
Other _____	

For more information

This leaflet is one of a series issued by the Archives & Records Management Division, which has statutory responsibility for advising government officials on micrographics. The Division also issues publications and gives advice and help on records management and archival administration. For more information please contact: SC Dept. of Archives & History, Archives & Records Management Division, State Record Center, 1919 Blanding St., Columbia, SC 29201 (803) 734-7914.

Public information leaflets from the Archives

no. 1 *Legal requirements for microfilming public records (1992)*
no. 2 *On choosing records for microfilming (1992)*
no. 3 *Service bureau or in-house microfilming (1992)*
no. 4 *Targeting and certification of microfilm (1996 revised)*
no. 5 *Choosing a microfilm camera (1992)*
no. 6 *Quality testing of microfilm (1992)*
no. 7 *Microfilm and microforms (1992)*
no. 8 *Choosing a micrographics service bureau (1992)*
no. 9 *Choosing microfilm readers and reader/printers (1992)*
no. 10 *Computer assisted retrieval systems (1992)*
no. 11 *Microfilm storage (1992)*
no. 12 *Preservation microfilming (1992)*
no. 13 *Optical Disk: policy statement and recommended practices (1996 revised)*
no. 14 *Storing records in the State Records Center (1993)*
no. 15 *The deposit of security microfilm (1993)*
no. 16 *Disaster preparedness and recovery in state and local government records offices (1993)*
no. 17 *How to conduct a records inventory (1993)*
no. 18 *How to establish records retention schedules (1993)*
no. 19 *Photographic media (to be announced)*
no. 20 *Editing and splicing roll microfilm of long-term or archival value (1994)*
no. 21 *Managing E-Mail (to be announced)*
no. 22 *Standards for microfilm service bureau certification (1996)*