



TECHNICAL LEAFLET

Approved by the State and Local Government Records Commissions

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GUIDELINES FOR MAINTAINING PERMANENT OR LONG-TERM RECORDS ON DIGITAL IMAGING SYSTEMS

Properly employed, digital imaging offers unparalleled advantages for storing short-term records. No other medium can match it for convenience, speed of access, and high storage capacity. What may be less apparent is that digital imaging is also an expensive, volatile technology that requires frequent system upgrades and data migrations. It is not designed for records preservation and is unproven as a reliable means of long-term records storage. These factors dictate caution in using digital imaging for creating and storing permanent or long-term records, and in deciding whether this technology will be the only format in which such records are maintained.

Under records disposition authorities (RDAs) approved by the State and Local Government Records Commissions, retention requirements for all public records are based on the records' administrative, legal, fiscal, and historical value, not the format in which they are maintained. Whatever the storage medium, record information must be maintained for the period legally required. Therefore, if public officials choose to keep permanent records only in digital format, they commit themselves and their successors to funding and implementing any future system upgrades or conversions that become necessary to ensure the records' permanent preservation and accessibility. This long-term commitment may become costly (perhaps 50-100% of the initial cost of digitizing) as record-keeping technology continues to advance.

1. Alabama Law Pertaining to Digitizing Public Records

Act 458-2001 of the Alabama Legislature (now codified under the Code of Alabama 1975, Sections 8-1A-1 through 8-1A-20) provided for the legal recognition of electronic signatures and certain electronic records, so long as the parties to a transaction agree to their use. The act also stipulated that electronic records, like all other records, are subject to the legal retention requirements set forth in RDAs.

Both the Attorney General's Office and Alabama courts have generally tended to accept digital imaging as a legal storage medium for government records. In *Birmingham News v. Mark D. Perry and Alabama Department of Public Safety* (1993), the circuit court for Montgomery County found that "computer tapes themselves are 'public writings' and are therefore under the purview of

Alabama Code 36-12-40[1991].” Other cases and opinions are cited in *Government Records News*, vol. 1, no. 2 [October 1996], available on the ADAH website at www.archives.alabama.gov/ol_pubs/grn1_2.html and in the leaflet “Alabama Public Meetings and Records,” compiled by the Attorney General’s Office and Alabama Press Association. Copies are available from the Government Records Division.

Nevertheless, public officials should be aware that statutes, laws, and court decisions seldom keep pace with innovations in technology. This fact places a special burden on an agency that decides to adopt digital imaging as its only record-keeping format. The agency must be able to satisfy the same requirements for an authentic, reliable record-keeping system that “well-bound books” helped to assure.

2. To Digitize or Not to Digitize?

If an agency has never had a records management program, chances are that digital imaging is not the place to start. Before investing in any reformatting technology, the agency should evaluate the current record-keeping system and try to project future needs. It is also important to conduct a cost/benefits analysis. In order to justify the expense of hardware and software, a digital imaging system should reduce records personnel and storage costs and allow agency staff to manage records more productively. If the agency invests in digital imaging without first assessing its overall records management concerns and goals, it may end up spending more money than necessary (for example, on converting large backfiles of temporary records), without improving aspects of its records program that do not pertain to current records.

A good first step in making a decision is to conduct a records inventory of each agency subdivision and records storage area. Employ the RDA to identify all permanent and disposable records, and destroy any backlog of outdated temporary records. Once this preliminary work is done, it should be easier to estimate storage requirements for the remaining paper records and to decide which of them require reformatting. Digital imaging may not be the best reformatting option. From an archival perspective, it is primarily a means of quick access to frequently-used records, not a reliable medium for preserving records of ongoing value. Agencies that wish to back up or replace their permanent or long-term records should consider silver-halide microfilm, a less glamorous but more archival medium.

3. General Recommendations for Implementing Digital Imaging Systems

Once an agency has made the decision to employ digital imaging, the following recommendations may be useful.

3.1. Select, or train, a qualified agency staff member as systems administrator. The vendor should provide a project director to install the digital imaging system and train staff who will be using it. However, the agency will also need a fully qualified staff member on-site to manage the system on a daily basis. It is unwise—and expensive—to rely on the vendor to keep the system up and running “after the sale.”

3.2. Employ an open systems architecture and develop a migration strategy. An *open systems architecture* uses hardware and software that are standard in the industry, as opposed to *proprietary* (non-standard) hardware and software. Although the computer industry is becoming more standardized, some items (such as indexing software) may still be proprietary. The danger is that records locked into non-standard or outmoded technology may not be readable in future years. (Remember aperture cards and floppy disks?) Whatever system is selected, the vendor should provide a bridge for migrating records from its hardware and software to alternative back-up media and to newer technologies.

3.3. Create a specific plan for migrating or converting long-term and archival records from older to newer hardware and software platforms. As noted in item 4.2, the agency should plan for the future migration and/or conversion of its digitized records as technology continues to evolve. The migration strategy should be specific, set down in writing, and available with current system documentation. It should address plans to: upgrade equipment and software as technology changes; periodically copy disks or other back-up media, based on the medium's projected longevity and periodic inspection of the records; and transfer record information from an obsolete generation of disks to newly-emerging technology.

3.4. Use industry standard digital image file formats. Employ the Tagged Image File Format (TIFF) for text images or combination documents. Because different versions of TIFF exist (TIFF-6, TIFF-5, etc.), there is no absolute guarantee that images even in this widely used standard can be transported seamlessly from one system to another. For images of graphic materials (such as photographs, maps, etc.), use either Joint Photographic Experts Group (JPEG) format or Portable Document Format (PDF-a). Both are industry standard. Avoid the use of proprietary image formats. Although a large number of other file formats exists, their portability from system to system will rely on their companies' ability and willingness to support their products five years from now, ten years from now, etc.

3.5. When determining scanning resolution, consider data storage requirements and accurate reproduction of the document. Perform a visual quality control inspection of each scanned image. A digital image consists of black and white dots, or pixels, measured in dots per inch (dpi). The higher the number of dpi, the higher the resolution of the scanned image. However, images scanned at higher dpi rates use more storage space and may require longer scanning times.

3.5.1. Determine the proper dpi. To obtain good-quality images of modern office records, agencies should use a scanning density of at least 200 dpi. A higher scanning density (600 dpi or higher) is appropriate for handwritten, faded, or deteriorating documents, as well as engineering drawings, maps, or documents with background detail. When scanning photographs, maps, or illustrations, use gray scale or color imaging technology. To determine the best scanning resolution, have the vendor test a broad sampling of agency documents at various dpi settings.

3.5.2. Ensure the quality of scanned images. System quality control works best when scanned images are corrected through rescanning while still stored on magnetic media. Before transferring digitized records to other storage media, agency staff

should perform a visual inspection to ensure the accuracy of each scanned image or index entry. Proper staff training and supervision is essential to maintain acceptable image and index quality, as well as user satisfaction with the system.

3.6. Where data longevity or records integrity is a consideration, use a recording medium that is *not* rewritable. Today there is a variety of both rewritable and non-rewritable digital recording media available. Rewritable media include: Compact-Disk Rewritable (CD-RW), Compact Disk-Read Only Memory (CD-ROM), Compact Disk-Recordable (CD-R), and Digital Video Disk Rewritable (DVD-RW or DVD+RW). Each type has its own advantages and disadvantages. Write Once Read Many (WORM), Computer Output to Laser Disk (COLD), CD-ROM/CD-R, DVD-R, and DVD+R disks are not rewritable. Non-rewritable disks offer a high level of data security, because alteration of data is not achievable without destruction of the disk itself. Security of record information is particularly important for permanent or long-term records.

3.7. Employ an indexing database that is easy to use and efficiently retrieves records stored in the digital imaging system. Check index entries against source documents. Reliable access to digital images depends on an accurate, up-to-date indexing database. Normally, index information is scanned or manually key-entered, either using original documents at the time of image capture or scanned images later in the process. It is essential to compare index entries with the original source documents, as a faulty index may prevent the retrieval of related images. Indexing software should be based on reliable, open-systems architecture that allows data to be easily migrated to another open system.

3.8. Create back-up security copies for digitized records. For permanent records, or those with a retention period of 10 years or more (“long-term” with this technology), create back-up copies and store them in an off-site, environmentally-controlled location. A variety of back-up media is available; those below may be considered for permanent or long-term records. The agency should choose whichever option best meets its record-keeping requirements, although ADAH strongly recommends a paper or microfilm back-up for permanent or long-term records.

3.8.1. Silver-halide microfilm. Silver-halide microfilm remains an excellent long-term records storage medium. It is extremely stable and benefits from well-established national standards. If properly produced and stored, LE-500 silver-halide microfilm has a projected life expectancy of 500 years, which far exceeds most estimates for digital media. For more information, see the technical leaflet “Preparing a Contract for Archival-Quality Microfilming Services,” available on the ADAH website at www.archives.alabama.gov/ol_pubs/microfilmleaflet04.pdf.

3.8.2. Original paper records. Although one goal of digitizing is to prevent agencies from being swamped by paper records, there are some instances in which the paper originals should be considered for retention. Such records as early minute books, articles of incorporation, or old estate files have intrinsic historical or artifactual value. In addition, the Local Government Records Commission *requires* that

county or municipal records created prior to 1900 be retained permanently in their original form. If original records are retained after digitization, they provide a perfectly viable back-up to the digital imaging system.

3.8.3. “Gold” CD-Rs and DVD-Rs. Archivists do not consider any electronic medium suitable for storing records that are permanent or must be retained longer than 10 years. CDs, DVDs, computer tape, and other electronic media have a very short life span, either because the technology changes so rapidly or because their components require special care and maintenance. For agencies that choose to rely on an electronic back-up, ADAH recommends non-rewritable “gold” CD-Rs or DVD-Rs that have a reflective layer made of gold, or gold and silver, and use phthalocyanine dye (considered the most stable). An example is the Mitsui “Gold Archive” CD-R. Among electronic media, this type of disk would seem to offer the best security for permanent or long-term records.

3.9. Provide proper environmental conditions for the storage of digital optical disks. Adverse storage conditions can cause rapid deterioration of digital media. Ideally, back-up disks should be maintained in a stable environment, with temperature at 50 degrees Fahrenheit and relative humidity between 30% and 50%. If such conditions are not attainable, try to maintain a steady temperature at no more than 70 degrees Fahrenheit and relative humidity at no more than 50%. Never place digital storage media in direct sunlight or near sources of heat or pressure. Keep disks free of dust, debris, and fingerprints and away from food and beverages. Stored media should be inspected at least annually and recopied should signs of deterioration appear.

4. Ensuring that Digital Records Are Legally Admissible in Court

In order to ensure the legal admissibility of digitized public records, state and local agencies should take the following steps:

4.1. Establish system operational and maintenance procedures. It is the responsibility of agency administrators to maintain written documentation of record-keeping system operational procedures (Standard Operating Procedures or SOPs). The agency should develop security and access policies to protect the system and records from unauthorized use or alteration. Record administrators should become familiar with how rules of evidence apply to the legal admissibility of digital records. For help, see AIIM TR31/1-1992, *Performance Guideline for the Admissibility of Records Produced By Information Technology Systems as Evidence*. This AIIM standard stresses the importance of specifying the processes used to create records, demonstrating that records are produced and relied on in the regular course of business, establishing quality control and audit procedures, conducting formal training programs, and providing written documentation for each procedure. For more information on Alabama’s rules of evidence, see “Legal Admissibility of Public Records,” available on the ADAH website at: www.archives.alabama.gov/ol_pubs/legadmss04.pdf.

4.2. Maintain written documentation of the record-keeping system’s hardware, software, and operational procedures. Ensure that staff who create or maintain digital records are fully trained in system procedures. Proper documentation is vital, not only for legal admissibility, but for maintaining and updating the record-keeping system. Documentation of the system and the records creation process can be entered into evidence, along with staff testimony, for demonstrating that agency records are reliable and accurate. Without documentation, witnesses must rely solely on memory. If an agency can show the court that its staff knew what procedures should be followed, it can usually demonstrate the likelihood that those procedures were followed.

4.3. Maintain all records—regardless of format—for the full periods required by the agency’s RDA. Act 458-2001 specified that digital public records—like those in any other format—must be kept for the full retention periods established in agency records disposition authorities (RDAs) approved by the State or Local Government Records Commission. Depending on the storage medium and back-up methods used, it may become necessary to copy record information periodically or to transfer it to an alternative storage format, in order to complete the record’s mandated retention period.

Agencies may also wish to consult the leaflets “Guidelines for Managing E-Mail” (www.archives.alabama.gov/ol_pubs/e-mail01.html) and “Guidelines for the Preservation and Transfer of Agency Website Records” (www.archives.alabama.gov/officials/websiteleaflet06.pdf) on the ADAH website. For assistance from ADAH staff with electronic records concerns or other records management questions, call the Government Records Division office at (334)242-4452, or send e-mail to records@archives.alabama.gov.