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**FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION**

**GUIDELINE FOR QUALITY CONTROL  
OF IMAGE SCANNERS**

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**CATEGORY: HARDWARE STANDARD    SUBCATEGORY: CALIBRATION, VALIDATION, AND TESTING**

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Gaithersburg, MD 20899

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## GUIDELINE FOR QUALITY CONTROL OF IMAGE SCANNERS

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National Computer Systems Laboratory  
National Institute of Standards and Technology  
(formerly National Bureau of Standards)  
Gaithersburg, MD 20899

Issued September 13, 1989



**U.S. Department of Commerce**  
Robert A. Mosbacher, Secretary

National Institute of Standards  
and Technology  
Raymond G. Kammer, Acting Director

## Foreword

The Federal Information Processing Standards Publication Series of the National Institute of Standards and Technology (NIST) is the official publication relating to standards and guidelines adopted and promulgated under the provisions of Section 111(d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235. These mandates have given the Secretary of Commerce and NIST important responsibilities for improving the utilization and management of computer and related telecommunications systems in the Federal Government. The NIST through its National Computer Systems Laboratory provides leadership, technical guidance, and coordination of Government efforts in the development of standards and guidelines in these areas.

Comments concerning Federal Information Processing Standards Publications are welcomed and should be addressed to the Director, National Computer Systems Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899.

James H. Burrows, Director  
National Computer Systems  
Laboratory

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## Abstract

This guideline announces the adoption of the American National Standard for Information and Image Management—Recommended Practice for Quality Control of Image Scanners ANSI/AIIM MS44-1988 as a Federal Information Processing Standards Publication Guideline. MS44 provides procedures and physical test objects that can be used by document processing system analysts, designers, and operators for calibrating monochrome, digital image scanners. In addition, MS44 procedures and test objects are designed to be used to maintain an acceptable image quality level through periodic testing of scanners and other system components, i.e., displays, typesetters, laser printers, and accompanying software systems, etc. MS44 procedures and test objects can also be used to set scanner parameters to match specific characteristics of documents being scanned so that the system produces optimum image quality. The test objects provided with the Guideline are the Association for Information and Image Management (AIIM) #2 Scanner Test Chart, Institute for Electrical and Electronics Engineers, Inc., (IEEE) 167A-1987 Facsimile Test Chart, and the Rochester Institute of Technology (RIT) Process Ink Gamut (PIG) Chart.

Key words: calibration; digital; document; image scanner; Federal Information Processing Standards Publication Guideline; image quality; monochrome; scanner; scanner parameters; test objects.

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**Announcing the  
GUIDELINE FOR QUALITY CONTROL OF IMAGE SCANNERS**

Federal Information Processing Standards Publications (FIPS PUBS) are issued by the National Institute of Standards and Technology (NIST) after approval by the Secretary of Commerce pursuant to Section 111(d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235.

- 1. Name of Guideline.** Guideline for Quality Control of Image Scanners (FIPS PUB 157).
- 2. Category of Guideline.** Hardware; Calibration, Validation, and Testing.
- 3. Explanation.** This Guideline announces the adoption of the American National Standard for Information and Image Management—Recommended Practice for Quality Control of Image Scanners, ANSI/AIIM MS44-1988, as a Federal Information Processing Standards Publication Guideline. MS44 provides procedures and physical test objects that can be used by document processing system analysts, designers, and operators for calibrating monochrome, digital image scanners. In addition, MS44 procedures and test objects are designed to be used to maintain an acceptable image quality level through periodic testing of scanners and other system components, i.e., displays, typesetters, laser printers, accompanying software systems, etc. MS44 procedures and test objects can also be used to set scanner parameters to match specific characteristics of documents being scanned so that the system produces optimum image quality. The test objects that are included with this Guideline are recommended for use when implementing the Guideline. Using reproductions of these test objects will not provide meaningful results.  
This Guideline includes MS44 Appendices A through F which cover producing custom test objects, scanning low contrast materials, preparing continuous tone images for scanning, issues of using line/space resolution test targets on digital systems, and thresholding/enhancement scanning characteristics.
- 4. Approving Authority.** U.S. Department of Commerce, National Institute of Standards and Technology (National Computer Systems Laboratory).
- 5. Maintenance Agency.** U.S. Department of Commerce, National Institute of Standards and Technology (National Computer Systems Laboratory).
- 6. Related Documents (Test Object Packages).**
  - a. This Guideline includes Association for Information and Image Management (AIIM) "X440: Scanner Test Targets," which consists of 10 copies of #2 AIIM Scanner Test Charts, one copy of the Institute of Electrical and Electronics Engineers, Inc., (IEEE) 167A-1987 Facsimile Test Chart and two copies of a Rochester Institute of Technology (RIT) Process Ink Gamut (PIG) Chart.
    - Additional copies of X440 can be purchased from AIIM, 1100 Wayne Avenue, Suite 1100, Silver Spring, MD 20910.
    - Additional, individual copies of IEEE 167A can be purchased from the IEEE Publications Department, 445 Hoes Lane, Post Office Box 1331, Piscataway, NJ 08855-1331. The IEEE 167A target can also be purchased from AIIM.
    - Additionally, individual copies of the RIT PIG Chart can be purchased from AIIM, 1100 Wayne Avenue, Suite 1100, Silver Spring, MD 20910.



**7. Objectives.** The objectives of this Guideline are to:

- provide procedures that can be used to ensure the calibration and maintenance of adequate image quality in a document processing system.
- maintain cost-effectiveness in office document processing systems by maximizing the quality and throughput of the scanning, display, and printing processes.
- assist managers in understanding and evaluating scanning systems and services.
- disseminate a complete package of physical test objects that can be used to evaluate visual density, tone reproduction, and resolution of office scanners.

**8. Applicability.** This Guideline is intended to provide procedures and test objects for Federal ADP managers, document processing system analysts, designers, and operators to use to ensure the calibration and maintenance of adequate image quality in scanners and other system components, i.e., displays, typesetters, laser printers, accompanying software systems, etc., that are used in document processing systems. Its use is encouraged but not mandatory.

**9. Implementation.** This Guideline can be used whenever Federal departments or agencies evaluate new scanning equipment and associated software, undertake major expansions to existing scanning equipment and software, or evaluate work performed by a service bureau for document conversion.

**10. Specifications.** ANSI/AIIM MS44-1988, American National Standard for Information and Image Management—Recommended Practice for Quality Control of Image Scanners.

**11. Qualifications.** The recommendations of this Guideline are directed toward office document processing systems that use monochrome, digital image scanners for document input. These scanners may require adjustments during calibration and daily use, to ensure an adequate image quality. The procedures and test objects in this Guideline can be used to make these adjustments, in addition to setting scanner parameters to match specific characteristics of documents that are being scanned, so that the system produces optimum image quality.

**12. Where to Obtain Copies of this Guideline.** Copies of this publication are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. Sale of the included specification is by arrangement with the Association for Information and Image Management (AIIM). When ordering, refer to Federal Information Processing Standards Publication 157 (FIPSPUB157), and title. Payment should be made by check, money order, or deposit account.



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