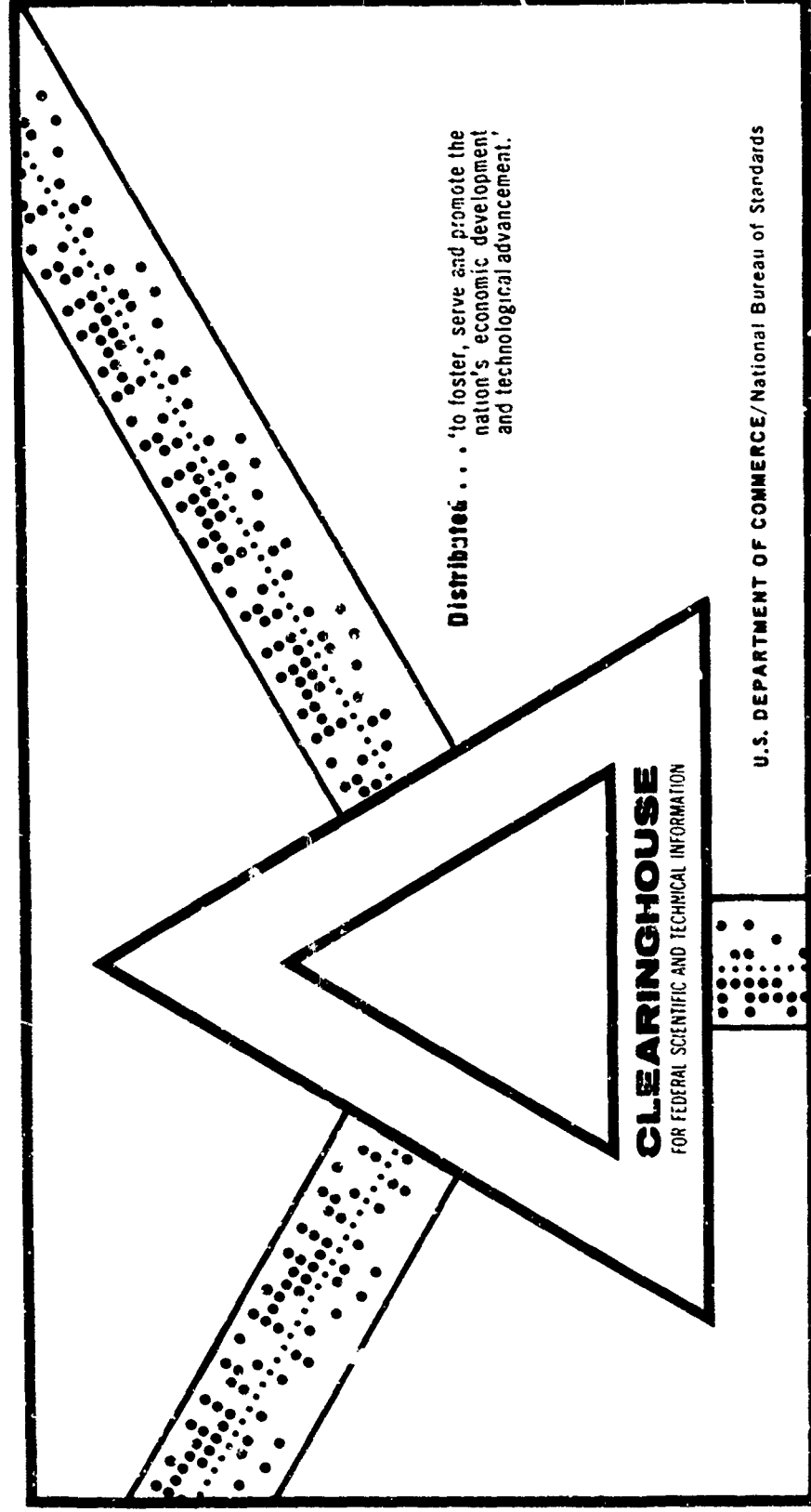


AD 700 014

APPLICATIONS FOR MICROGRAPHICS IN LARGE SCALE INFORMATION
SYSTEMS OF THE FUTURE. VOLUME II: PART III. A REVIEW OF MICRO-
GRAPHICS STATE-OF-ART

Information Dynamics Corporation
Reading, Massachusetts

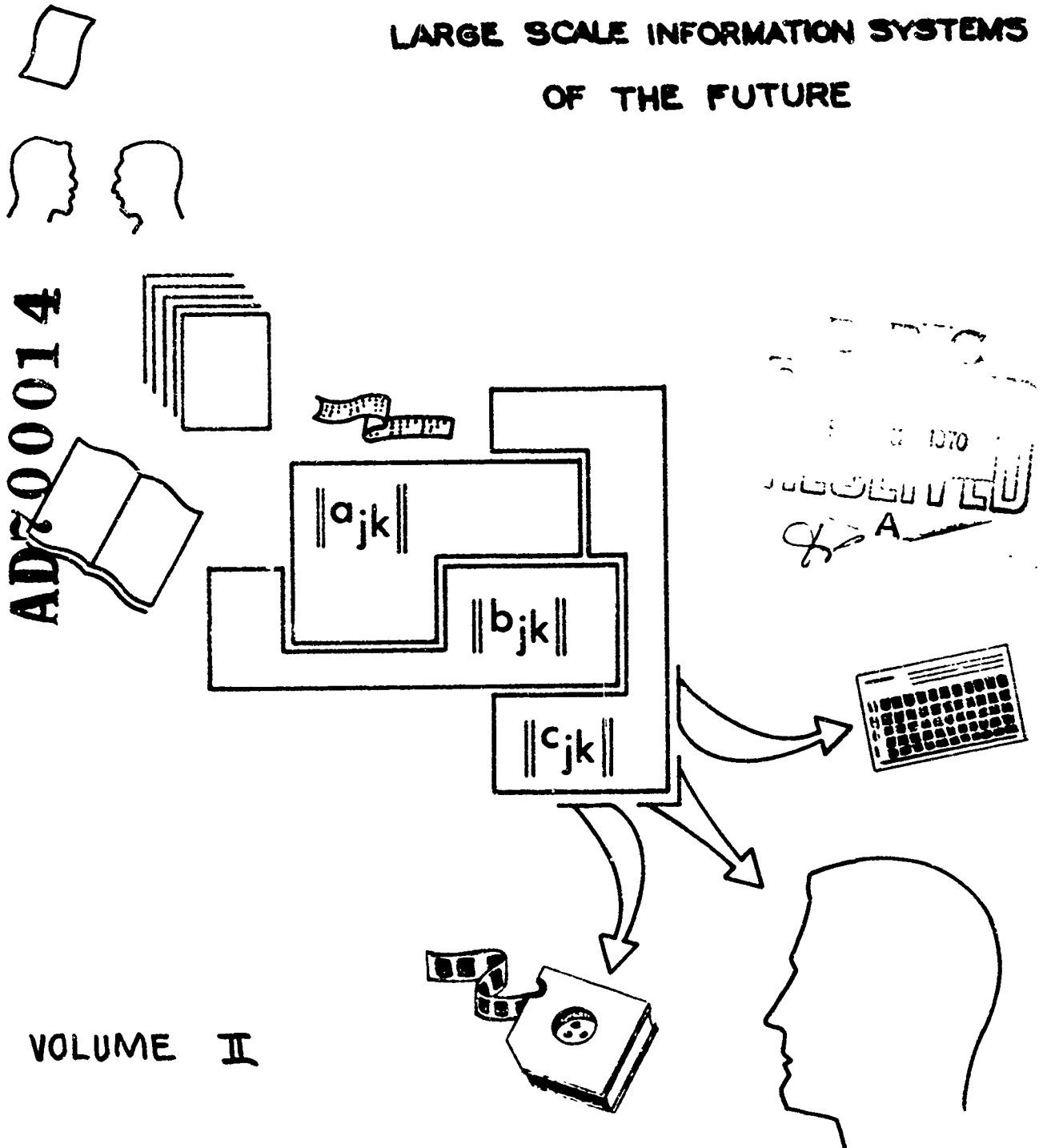
August 1966



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APPLICATIONS FOR MICROGRAPHICS IN LARGE SCALE INFORMATION SYSTEMS OF THE FUTURE

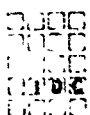


VOLUME II

A 5-YEAR DEVELOPMENT PROGRAM PLAN
FOR THE DEFENSE DOCUMENTATION CENTER

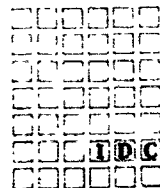
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INFORMATION DYNAMICS CORPORATION

349



APPLICATIONS FOR MICROGRAPHICS IN
LARGE SCALE INFORMATION SYSTEMS OF THE FUTURE

A 5-Year Development Program Plan
For the Defense Documentation Center

PART III

A Review of Micrographics
State-of-the-Art

August 1966

Prepared for

Defense Documentation Center
Cameron Station, Virginia

by

INFORMATION DYNAMICS CORPORATION
80 Main Street
Reading, Massachusetts

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IMPORTANT
NOTICE

This supporting volume contains information considered proprietary to certain suppliers of equipment and materials -- especially in areas concerning new developments. The material has been bound separately so that distribution could be limited to the Defense Documentation Center without confining the distribution of the main body of the report presented in Volume I.

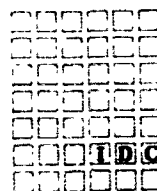


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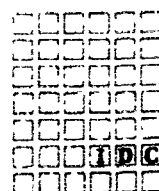
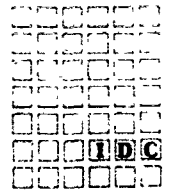


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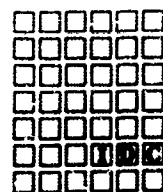
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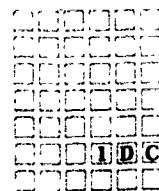


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A. INTRODUCTION

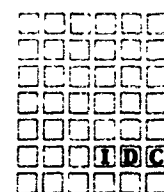


This part of the report presents in summary form the results of various surveys and reviews performed in selected areas of micrographics to support the other technical efforts of the study program previously described. Exhibits of supporting documentation are also contained herein, together with a discussion of areas where significant technical developments may occur during the period of interest covered by the study.

An analysis of the status of selected areas of micrographic technology, equipment development, and micrographic utilization was performed by IDC in parallel with the detailed investigation of DDC microfiche system requirements. This analysis placed special emphasis on the identification and status determination of those areas of micrographic technology of interest and potential usefulness to a system configuration geared to provide the microfiche production capacity essential to meeting mission requirements of the DDC (as projected over a span of five years).

The extent of research and development activity, in areas related to microfiche production and use, by several of the major microfilm equipment and material suppliers was reviewed and is reported to the extent that proprietary disclosure agreements permit. This review was directed both toward assessing the future role that the present microfiche format is expected to play in publishing and disseminating information, and toward identifying areas of significant research and development activity which warrant continuing observation during the next five years because of their potential for utilization in a high-productivity microform system.

Representative microform-user organizations were selected from the list of organizations participating in the DDC microfiche dissemination program. An analysis of the user reaction to, and acceptance of, the microfiche as an information communication medium was performed.



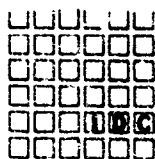
B. REVIEW METHODOLOGY

The data-gathering activities associated with the study program were performed through (1) development and mass mailing of form letters (Exhibits B-1 and B-2) requesting data from microfilm equipment and film manufacturers (Table B-1) and materials handling equipment manufacturers (Table B-2); (2) extraction of pertinent data from IDC equipment and technology files; (3) personal and telephone contact with representatives of the microfilm industry and government organizations engaged in microfilm programs (Table B-3); and (4) a selected sampling of the DDC microfiche-user community. Information and manufacturing data sheets were requested for the following:

- (a) Microfiche step-and-repeat cameras
- (b) Camera film (4-inch widths and larger)
- (c) Copy film (silver, diazo, Kalvar, etc.)
- (d) Film processors (capable of processing film 4 inches wide and larger)
- (e) Film duplicating equipment (silver, diazo, Kalvar, etc.)
- (f) Microfiche reader/printers
- (g) Hard-copy printers (using microfiche as input)
- (h) Offset plate-making equipment (using microfiche as input)
- (i) Microfiche storage and retrieval equipment
- (j) Microfiche handling and packaging equipment
- (k) Film and paper cutting equipment
- (l) Microfilm and paper collating and sorting equipment
- (m) Microfilm and paper packaging equipment
- (n) Manual and automatic labeling equipment
- (o) Manual and automatic materials transport equipment
- (p) Manual and automatic microfilm and hard-copy storage equipment

Upon receipt, the material was assembled and organized to permit comparisons and analyses to be made in the following areas of particular interest to this study:

- (a) Microfiche equipment and materials currently available



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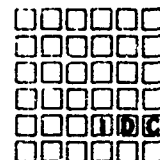
Gentlemen:

Information Dynamics Corporation is a consulting engineering firm specializing in information handling systems. We are presently under contract with one of the U. S. Government agencies to make a comprehensive study of all existing and planned equipment, materials and techniques related to the operation of a microfiche production and distribution system. We therefore require technical data and price information on the following equipment and materials.

- ★ Microfiche Step-and Repeat Cameras
- ★ Films (4-inch widths and over, black and white, and color)
- ★ Copy Films (Silver, Diazo, Kalvar, etc. in widths of 4-inches and over)
- ★ Film Processors (capable of processing film 4-inches wide and over)
- ★ Duplicators (for producing Silver, Diazo, Kalvar, etc. duplicate copies)
- ★ Microfiche Reader/ Printers
- ★ Hard-Copy Printers (using Microfiche input)
- ★ Offset Platemaking Equipment (using Microfiche input)
- ★ Microfiche Storage and Retrieval Equipment
- ★ Microfiche Handling and Packaging Equipment

Please send me 2 copies of the latest specification sheets, advance news bulletins and price information on equipment and materials which you manufacture related to the above list. The final report to our client will include one copy of this data - the other copy will be retained in our technical data file.

EXHIBIT B-1 Form Letter Sent to Microfilm Equipment & Material Manufacturers



-2-

Please indicate the proprietary classification of any information submitted in regards to new developments.

Because of the urgency of our program, your immediate attention to this request will be greatly appreciated.

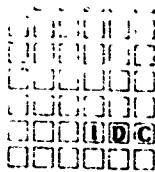
Sincerely yours,

INFORMATION DYNAMICS CORPORATION

Joseph E. Poirier

Joseph E. Poirier,
Systems Engineer

JEP:sv



INFORMATION DYNAMICS CORPORATION

80 MAIN STREET, READING, MASSACHUSETTS 01867

TEL 944-2224

AREA CODE 617

June 28, 1965

Gentlemen:

Information Dynamics Corporation is a consulting engineering firm specializing in information handling systems. We are presently under contract with one of the U. S. Government agencies to make a comprehensive study of all existing and planned equipment, materials, and techniques related to the operation of a microfiche production and distribution system. We therefore require technical data and price information on materials handling equipment and materials which may be of use in this application and which are currently in production or planned for production during the next three years. Categories of interest include:

- Cutters (film and paper) -- manual; automatic
- Collating and Sorting (microfilm 4"x6" and paper (8-1/2"x11") -- manual; automatic
- Packaging (microfilm 4"x6" and paper (8-1/2"x11")
- Labelling -- manual; automatic
- Transport -- manual; automatic
- Storage

Please send two (2) copies of the latest specification sheets, advance news bulletins and price information on equipment and materials which you manufacture related to the above list. The final report to our client will include one copy of this data; the other copy will be retained in our technical data file.

Please indicate the proprietary classification of any information submitted relative to new developments.

Because of the urgency of our program, your immediate attention to this request will be greatly appreciated.

Sincerely yours,

INFORMATION DYNAMICS CORPORATION

Joseph E. Poirier

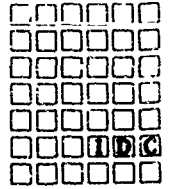
Joseph E. Poirier
Systems Engineer

EXHIBIT B-2 Form Letter Sent to Materials Handling Equipment Manufacturers

Addressograph-Multigraph Co.	M.P. Goodkin Company
Afga-Gevaert	Gordon Enterprises
Atlantic Microfilm Corp.	Giscombe Products
Audio Visual Research	Hampton Chemical Equipment
Aeroflex Laboratories, Inc.	Houston Fearless Corp.
Bell & Howell Co.	Hudson Photographic Ind., Inc.
British Columbia Ind., Ltd.	Hypag Company, Inc.
Bruning, Inc.	Ilford, Inc.
Caeser Manufacturing Corp.	International Business Machine Co.
Caps Equipment Ltd.	Industrial Design & Service Co.
Cardona Company, Inc.	ITEK Business Products
CBS Laboratories	Kalvar Corporation
Canon	Keuffel and Esser Co.
Cordell Engineering Co.	Macheth Instrument Corp.
Data Reproduction Systems	Magnavox Systems, Inc.
Documat, Inc.	Microcard Corp.
Documentation, Inc.	Microdealers, Inc.
Dukane Corporation	Microreader Mfg. & Sales Corp.
Durst (U.S.A.), Inc.	Microseal Corporation
Dynacolor Corporation	Mosler Safe Company
Diebold, Inc.	Minnesota Mining & Mfg. Co.
Eastman Kodak Co.	National Cash Register Co.
B. K. Elliot Company	National Reproductions Corp.
Federal Division	Photo Devices, Inc.
Oscar Fisher Co., Inc.	Frederick Post Company
FMA, Inc.	Printec Corp.
Fotomatic Corporation	Randomatic Data Systems, Inc.
Fairchild Hiller	Recordak Corp.
FUJI Microfilm	Remington Office Systems
General Aniline and Film Co.	Richardson Camera Co., Inc.

TABLE B-1 (CONT'D)

MAILING LIST OF MICROFILM
EQUIPMENT AND FILM MANUFACTURERS



L. L. Ridgway Enterprises
Rolor Corporation
Simmonds Omega, Inc.
Taylor-Merchant Corp.
Tecnifax Corporation
Thomas Publishing Company
U. S. Industries, Inc.
University Microfilms
Welch Scientific Company
Xerox Corporation

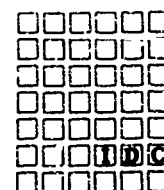


TABLE B-2

LIST OF COMPANIES CONTACTED
FOR MATERIALS HANDLING EQUIPMENT INFORMATION

Accoway Division
Acco Products
Ogdensburg, New York

Bankers Box Co.
Franklin Park
Illinois

Acme Letter File Corp.
128 Mott Street
New York, New York 10013

Bell & Howell Co.
Phillipsburg Division
6800 McCormick Road
Chicago, Illinois 60645

Acme Visible Records, Inc.
7905 West Allview Drive
Crozet, Virginia

H. A. Bohn & Co.
3525 West Peterson Avenue
Chicago, Illinois 60645

Acorn Products Co.
Franklin Park
Illinois

Borroughs Mfg. Co.
3036 North Burdick Street
Kalamazoo, Michigan

Angle Steel Incorporated
Plainwell
Michigan

Arthur Brown & Co., Inc.
2 West 46th Street
New York, New York 10036

Apex Business Systems
99 Hudson Street
New York, New York 10013

M. Brown & Co., Inc.
1303 Tremont Street
Boston 20, Massachusetts

Art Metal, Inc.
Jamestown
New York

B. H. Bunn Co.
7605 Vincennes Avenue
Dept. 0-56
Chicago, Illinois 60620

Atlas Stencil Files Corp.
16716 Westfield Avenue
Cleveland 10, Ohio

Cel-u-Dex Corp.
New Windsor
(Newburgh), New York

Avery Label Corp.
1616 South California Avenue
Monrovia, California

Chandler & Price Co.
6000 Carnegie Avenue
Cleveland, Ohio

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A. B. Dick Co.
5700 West Touhy Avenue
Dept. 11-A
Chicago 48, Illinois

Diddle-Glaser, Inc.
50th Highway & 12th Street
Emporia, Kansas

Dolin Metal Products, Inc.
315 Lexington Avenue
Brooklyn 16, New York

Durham Mfg. Co.
Durham
Connecticut

Dymo Products Co.
Box 1030
Berkeley, California

Elliot Business Machine, Inc.
Randolph Industrial Park
Dept. 0-2
Randolph, Massachusetts

Equipto Company
Aurora
Illinois

Fairchild Davidson
5004 East Jerico Turnpike
Conmack, New York 11725

Felins Tying Machine Co.
3350 North 35th Street
Milwaukee, Wisconsin

			I	D	C

Haskell, Inc.
Pittsburgh 6
Pennsylvania

Heyer, Inc.
1865 South Kostner Avenue
Chicago, Illinois

Holga Metal Production Co.
Van Nuys
California

Hunt Manufacturing Co.
Camden
New Jersey

Interior Steel Equipment Co.
2352 East 69th Street
Cleveland 4, Ohio

Jayem Sales Corp.
5214 1st Avenue
Brooklyn, New York

Kay-Dee Co.
Lincoln
Nebraska

Keyless Lock Co.
Indianapolis
Indiana

Lakeside Mfg. Co.
1966 South Allis Street
Milwaukee, Wisconsin 53207

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Monarch Metal Products
MacArthur Avenue
New Windsor (Newburgh), New York

Moore Business Forms, Inc.
900 Buffalo Avenue
Niagara Falls, New York

**Mosler Safe Co.
Systems Division
Grand Boulevard
Hamilton, Ohio**

Multiplex Display Fixture Co.
St. Louis 7
Missouri

Murphy Mfg. Co.
Louisville
Kentucky

National Bundle Tyer Co.
1931 Adrian Avenue
Blissfield, Michigan

National Cash Register Co.
Dayton
Ohio 45409

Northwest Metal Products
Green Bay
Wisconsin

Norwich Manufacturing Co.
3959 West Railroad Street
Norwich, New York

			X	D	C

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☐	☐	☐	☐	☐	☐

Sengbusch Self-Closing Ink-stand Co.
Milwaukee 3
Wisconsin

			I	D	C

Systems Manufacturing Corp.
Binghamton
New York

Tab Products Co.
550 Montgomery Street
San Francisco, California

Thomas Collators, Inc.
Dept. H-4
100 Church Street
New York, New York

**The Tie Company
Bishop and Main Streets
Unadilla, New York**

Union Steel Chest Corp.
Le Roy
New York

**Victor Safe & Equipment
Division of Sperry Rand Corp.
310 West Polk Street
New York 17, New York**

Visible File Corp.
105 Chambers Street
New York, New York

VISIrecord, Inc.
Long Island
New York

Visi-Shelf File, Inc.
105 Chambers Street
New York 7, New York

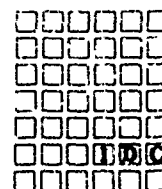


TABLE 3-2 (CONT'D.)

LIST OF COMPANIES CONTACTED FOR
MATERIALS HANDLING EQUIPMENT INFORMATION (CONT'D.)

Vue Fax Division
Logan Business Products, Inc.
Westbury, New York

Wassell Organization, Inc.
225 State Street
Westport, Connecticut

Watson Mfg. Co.
Rol-dex Division
Jamestown, New York

Wheeldex, Inc.
1000 North Division Street
Peekskill, New York

Work-Organizer Specialists Co.
Detroit 9
Michigan

Wright Line
Division of Barry Wright Corp.
160 Gold Star Boulevard
Worcester 6, Massachusetts

Yawman & Erbe Mfg. Co., Inc.
Rochester 3
New York

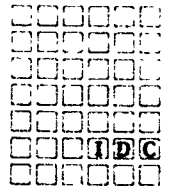


TABLE B-3
INDIVIDUALS CONTACTED DURING REVIEW TASK

Addressograph-Multigraph Corporation
Cleveland, Ohio 44132

Mr. A. Mignone, Vice President of Research

Armed Forces Institute of Pathology
Washington, D. C.

Miss G. Evans, Chief of Pathology Records
Col. R. O. Preston, Chief of Professional Records

Azoplate Corporation
Murray Hill, New Jersey 07971

Mr. E. Fritz, President

Battelle Memorial Institute
Columbus, Ohio 43201

Mr. L. E. Walkup, Chief of the Applied Physics Division

Bell and Howell Company
Chicago, Illinois 60645

Mr. A. Kraft, Vice President, Micro Data Division

Clearinghouse for Federal Scientific and Technical Information
Springfield, Virginia 22151

Mr. P. Urbeck

A. B. Dick Company
Chicago 48, Illinois

Mr. R. Allen, Sales Division

Documation, Incorporated
Schenectady, New York

Mr. K. Baird

Eastman Kodak Company
Rochester, New York 14604

Mr. M. Asterita, Government Marketing Division
Mr. H. Rodell, Industrial Marketing Division
Mr. W. Townsend, Commercial Marketing Division

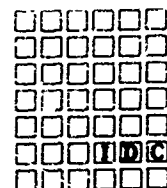


TABLE B-3 (CONT'D.)

INDIVIDUALS CONTACTED DURING REVIEW TASK

Eastman Kodak Company
Boston, Massachusetts

Mr. R. McVickar, Business Systems Market Division
Mr. P. Underhill, Business Systems Market Division

Ehrenreich Photo-Optical Industries, Inc.
Garden City, New York 11533

Mr. S. Held, Special Products Division

General Aniline & Film Corporation
New York, New York 10020

Mr. W. Leach, Manager, District Sales

General Aniline & Film Corporation
Boston, Massachusetts

Mr. R. Kilonsky, Repro Marketing

Information and Records Management Magazine
New York, New York

Mr. R. Exelbert, Editor

International Business Machines Corporation
Princeton, New Jersey

Mr. J. Heule, Information Records Division

International Business Machines Corporation
Boston, Massachusetts

Mr. R. Cronin, Microfiche Document Processing

KALVAR Corporation
New Orleans, Louisiana 70125

Dr. N. Notley, Director Chemical Research and Development

Keuffel & Esser Company
Hoboken, New Jersey 07030

Mr. H. Blankneyer, Director of Research and Development

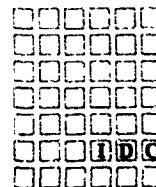


TABLE B-3 (CONT'D.)
INDIVIDUALS CONTACTED DURING REVIEW TASK

National Microfilm Association
Anapolis, Maryland

Mr. A. Baptie, Vice President

Microcard Corporation
West Salem, Wisconsin

Mr. C. B. Gelatt, General Manager

Microcopy Incorporated
Los Angeles, California

Mr. L. Weber, Vice President

Minnesota Mining & Manufacturing Company
St. Paul, Minnesota 55119

Mr. C. Goodsall, Printing Products Division

Dr. M. Hatfield, Director of Research

Mr. W. Ludka, Printing Products Division

National Cash Register Company
Dayton, Ohio 45409

Mr. C. N. Hansen, PCMI Systems and Sales Manager,
Central Division

National Weather Records Center
Ashville, North Carolina

Mr. J. Bosen

Photo Devices, Incorporated
Rochester, New York 14608

Mr. D. S. Kuebler, Sales Manager

Pitney-Bowes, Incorporated
Stamford, Connecticut 06902

Mr. N. Coleman, Development Design Section

Frederick Post Company
Chicago, Illinois 60618

Mr. C. Seipp, Director of Marketing

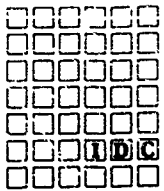


TABLE B-3 (CONT'D.)

INDIVIDUALS CONTACTED DURING REVIEW TASK

Readex Microprint Corporation
New York, New York

Mr. A. Boni, President

Research and Engineering Council
Of the Graphic Arts Industry

Mr. R. Rossell

Systems Magazine
New York, New York

Mr. J. Hughes, Microfilm Editor

Tecnifax Corporation
Holyoke, Massachusetts 01040

Mr. J. Lonovan, Regional Sales Office

Mr. C. Yerkes, Microforms Product Manager

University Microfilm Incorporated
Cambridge, Massachusetts

Mr. C. Amsden, Regional Sales Office

Veterans Administration
Washington, D. C.

Mr. J. F. Dickson, Director of Publications

Mr. H. J. Reed, Assistant Director of Office Operation Service

Xerox Corporation
Rochester, New York 14603

Mr. R. Ashlock, Business Development and Market Research
Department

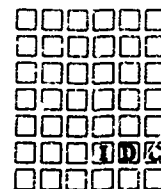
Caps Equipment Incorporated
New York, New York and London

Mr. Terry Wilson, Manager of United States Operations

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- (b) Microfiche production techniques (conventional and nonconventional)
- (c) Microfiche end-point utilization
- (d) Microfiche applications
- (e) Forecast of future developments affecting microfiche production

Details of the analyses of the data collection and the conclusions derived therefrom are presented in the subsequent sections.



C. REVIEW OF EQUIPMENT AND MATERIALS

1. MICROFICHE PRODUCTION EQUIPMENT

To present the following analysis, the study team mailed out over 100 letters of inquiry to manufacturers. The letter stated that a comprehensive study was being conducted of all existing and planned equipment, materials, and techniques related to the operation of a microfiche production and distribution system. The manufacturers were asked to indicate the proprietary classification of any information submitted regarding new developments. They were requested to submit all technical data, specification sheets, and price information on the following equipments and materials:

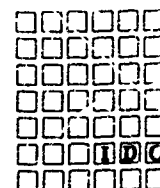
- (a) Microfiche step-and-repeat cameras
- (b) Films (4-inch widths and over, black and white, and color)
- (c) Copy films (silver, diazo, Kalvar, etc., in widths of 4 inches and over)
- (d) Film processors (capable of processing film 4 inches wide and over)
- (e) Film duplicators (for producing silver, diazo, Kalvar, etc., duplicate copies)
- (f) Microfiche readers and reader/printers
- (g) Hard-copy printers (using microfiche input)
- (h) Offset platemaking equipment (using microfiche input)
- (i) Microfiche storage and retrieval equipment
- (j) Microfiche handling and packaging equipment (including cutters, collating and sorting, packaging, labelling, transport and storage)

All of the data received as a result of these inquiry letters, plus information received in subsequent discussions with the manufacturers, is presented in matrix form to facilitate comparison among specific equipment types. Copies of data sheets are included in Appendix A.

1.1 Step-and-Repeat Camera Equipment

Information about step-and-repeat camera equipment capable of producing microfiche was received from the following manufacturers:

Audio Visual Research Corporation
Bell & Howell (Micro-Data Division)
Caps Jeffree



Eugene Dietzgen Company
Houston Fearless Corporation
Fuji Photofilm Company, Ltd.
Microcard Corporation
Photo Devices Incorporated
Records Service Corporation

The data provided by these manufacturers is summarized in Table C-1-1. The following paragraphs describe some of the more unusual camera characteristics.

1.1.1 Film positioning and indication

All of the camera evaluated, except for the Audio Visual Research "Dagmar", are designed to provide automatic film positioning. The Audio Visual Research "Dagmar" is equipped with a film transport mechanism (operated in a manner similar to a typewriter carriage) which has to be manually reset to the first column at the completion of exposures in each row.

Both the Dietzgen and the Houston Fearless cameras are equipped with matrix panel indicators which give a direct indication of the sequence of filming throughout the construction of the microfiche. All of the other step-and-repeat cameras are equipped with numerical counters which indicate the row position and frame number within the row.

1.1.2 Microfiche format variations

The Bell & Howell camera can be modified by interchangeable grids and apertures to permit imaging in selected formats including COSATI. The Audio Visual Research "Dagmar" can accommodate a variation of aperture plate sizes and racks for producing a large variety of microfiche formats (including that described in the NMA Standard Specification M-1-1963). The Dietzgen microfiche camera has a capability for use of a single frame (11.25 x 16mm) or a double frame (16 x 23mm) and allows variations to be made in the number of rows or number of frames per row. The Fuji Microfiche Camera Processor also provides an option of a single frame (11.25 x 16mm) or a double frame (16 x 23mm) at a fixed reduction ratio of 20:1. The Records Service Corporation "Microfax" can be modified with a single frame (11.25 x 16mm) or double frame (16 x 23mm) aperture plate and accommodates a variation in sheet film sizes from 3 x 5 to 8-1/2 x 11 (including the 4 x 6 microfiche which conforms to COSATI standards).

MANUFACTURER * MODEL	Maximum Film Capacity			Auto. Film Positioning	Film Position Indicator	Auto. Film Cutter	Reduction Ratios	Reduction Changes				
	Width	Length	Sheets					Cont.	Steps	Manual	Remote	Motorized
Audio Visual Research - DACMAR-Super	105 mm	148 mm	x		0		10X to 28X	x		x		
B. Green Co.	105 mm	190		x	x		10X to 26X	x				x
Cros-office, Ltd.	105 mm	148 mm	x	*	x		20X max	x				x
Engene Dietzgen Co.	105 mm	148 mm	*	x	x		16X to 20X	x				x
Fuji Photo Film Co., Ltd. 3540	75 mm	125 mm	x	x	x		20X					x
Houston-Fearless Corp. FilmCARD Camera-Processor	105 mm	148 mm	x	x	x	0			x	*		
Microcard Corporation SR-1	105 mm	100'		x	x	x	18X		x			
Photo Devices, Inc. PD 1442	6 in.	400'		x	x	x	10X to 36X	x				x
Records Service Corp. SR-1	8 1/2"	11"	x	x	x		15X to 25X	x		x		

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*See comments on page 16

*See contents of

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MICROFICHE
STEP-AND-REPEAT CAMERAS
(CONT'D)

MANUFACTURER & MODEL	SPECIAL FEATURES	* COMMENTS
Audio Visual Research DAGMAR-Super		* Separate Camera
Ben A. Howell Co.	Image field light	* Coded for cutting ** Auto. illumination controls override necessity of const. volt. regulation
Capps-Jeffree, Ltd.	To produce KALVAR - direct positive masters, partially exposed for adding material at a later date	Prototype in development Production expected by end of 66 * Will be optional ** Use contact printer
Eugene Dietzgen Co.	Table top	* Sheets or roll film
Fuji Photo Film Co., Ltd. 3540	Integral Processor	Not capable of producing microfiche to COSATI specs.
Houston-Fearless Corp. FILM CARD Camera-Processor	Integral Processor	* Illumination by Electronic Flash * Reduction changes by lens variations
Micromax Corporation SR-1		
Photo Devices, Inc. PD 1342		* To specifications desired up to 35mm
Records Service Corp. Micromax		* Operator controls light level to match pre-set indicator * 195 lines/mm in lab cond.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1

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MANUFACTURER	MODEL	FILM WIDTH	FILM LENGTH	SELF-THREADING	LEADER REQS.	DAYLIGHT OPERATION	PROCESSING SPEED FT./MIN.	TANK CAP.	
								DEVELOPER	FIXER
MODEL ENGINEERING CO.	VARIFILM	16 max	Rolls or sheet	x	o	x*	1/2 to 10	2 gal	-
CASAR FISHER CO., INC.	A	12 max		x	o	x	6 to 10	8 oz.	8 oz
	B	20 max		x	o	x	0 to 10	16 oz	16 o
CASAR FISHER CO., INC.	G-6N	6 max	400'	x	o	x	0 to 20	6 gal	6 ga
	G-12N	12 max	400'	x	o	x	0 to 20	8 1/2 gal	3 1/2 ga
HOUSTON FEARLESS CORP.	105	105 mm							
KPUFFEL & ESSER CO.	52-2049	105 mm		o	60'	x	5 or 2 1/2	6 gal	3 ga.
PHOTO DEVICES INC.	PD 1420	5 max	350'	x	o		1 to 7	6 qts	
WINSTON OFFICE SYSTEMS DIV. (Kearny Rand Corp.)	UNIPICO Mark II (modified)	105 mm	100'	o	45'	x	100' in 20 min.	2 gal	2 gal
CLARK CORPORATION	Trans. lo 120	12 max	5 to 250'	x	o	x		2 gal	

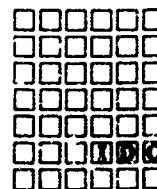
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Table C-1-2

FILM PROCESSORS

SHORT STOP	NEUTRALIZER	THERMOSTATIC CONTROL	DIMENSIONS & WEIGHT			POWER RECG. (A.C.)	SPECIAL FEATURES	
			W	H	D			
	-	x	67	26	17	110V 20A	(dry to dry) 20 sec. to 2 min. processing portable	
3 oz.		x	24	10	30 1701b	110V 25A	Surface Application only	
16oz		x	48	10	30 3401b	110V 25A		
		x	17	52	62 2901b	220V 15A		
		x	22	53	62 3751b	220V 25A		
		x						
1 gal	3 gal	x	21"	6'4"	5' 1601b	115V 1200W		
		x					2 minute cycle (dry to dry)	* minimum of 10
		x	14	55	51 1601b	115V 15A		
		x	26	20	16 1101b	110V 15A	3 to 1 minute processing	



direction of travel of film or paper, depositing a thin meniscus of solution from each drum onto the photo-sensitive side of the film without wetting the back of the material. This results in a requirement for a very small chemical supply and allows extremely fast drying of the film after processing.

1.3 Film Duplicators

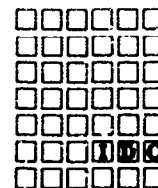
In response to requests for information on film duplicators capable of producing copies of microfiche on silver, diazo, or Kalvar, technical data was obtained from the following manufacturers:

Arbee Associates
Atlantic Microfilm Corporation
Canon Incorporated
CBS Laboratories
CRC Microprinter Manufacturing Company, Inc.
Documentation Inc.
General Aniline & Film Corporation
Kalvar Corporation
Keuffel & Esser Company
Frederick Post Company
Recordak Corporation
Tecnifax Corporation

The operational characteristics of the film duplicators evaluated are summarized in Table C-1-3. Specific comments relative to unusual operational features are presented below.

1.3.1 High production duplicators

The Arbee Associates Model 3000 roll-to-roll duplicator is of a flat bed construction allowing the use of a linear light source which, according to the manufacturer, permits faster printing and better registration of master image and duplicate image. The CBS Laboratories Model 601 card-to-card duplicator will duplicate and process microfiche and other non-rigid cut films and groups up to 19 inches wide and, therefore, can process several copies of sheet diazo simultaneously as rapidly as the operator can feed them into the equipment. The General Aniline & Film model is a sheet film duplicator with a double-width throat and twin printer belt. This configuration allows the feeding of two duplicates at once, side by side. The Recordak card-to-roll and roll-to-roll silver printers must be operated in a dark room (amber light) situation and



require a separate film processor. This equipment has been produced for limited internal and external use only. (Prototypes are currently undergoing test at DDC.) The Tecnifax "Hi-R" printer has very high resolution because of its exclusive light collimator. accommodates rolls and sheets up to 11 inches wide, and appears to be the only high-volume, roll-to-roll production diazo film duplicator currently available as standard equipment.

1.3.2 Low production duplicators

The Atlantic Microfilm Corporation duplicator is equipped with a rotary light source and developer tube for both exposing and processing sheet film diazo duplicates. The Canon "Kalfile Printer 310" has an effective printing area of 9 x 12 and is a vacuum contact printer used for duplication onto sheets of Kalvar film. The CRC Micro-printer is a roll-to-card printer with selective frame duplication capability, allowing the composing of a microfiche from any combination of selected frames within a roll of microfilm. The Documentation, Inc., CRM processor is a card-to-roll diazo duplicator which can process 15 cards (105 x 148mm) per minute. The Kalvar K10 contact printer employs a vacuum frame for high resolution duplication and will print any cut sheet film up to 9 x 9. A separate developing unit is required in conjunction with this printer.

2. SENSITIZED MATERIALS

2.1 Camera Films

In response to the request for information on silver emulsion films (roll and sheet) for use in step-and-repeat camera operations, two manufacturers -- Eastman Kodak and Bell & Howell -- replied with specific data on their standard line of 105mm roll film products. It is interesting to note that none of these films has a dyeback antihilation coating on the film base. Both the Bell & Howell Code 729M and Eastman Kodak product 1790 have a tinted base, while the Eastman Kodak Type AIIU film is manufactured with an antihilation layer directly under the emulsion which is cleared upon high temperature processing. All of these film products are being used quite successfully, according to the manufacturers, in a number of microfiche operations. These products are compared in Table C-2-1 and copies of data sheets are shown in Appendix A.

FIRM NAME	MODEL	CONTINUOUS		INPUT MATERIALS	FILM WIDTH	FILM LENGTH FT.		PROCESSING SPEED	DEVELOPING AGENT
		ROLL	REEL			SHEET	ROLL		
ASSOCIATES	Model 3000	x		Silver or Diazo	10 Max		x	10' / min	
PHOTIC MICROFILM CORP.	Printer & Developer	x		5x8 Silver & Diazo		x			Ammon.
TRAC INC.	Kalfile Printer 340VC with 310VS Developer		x	8x12 Silver or Diazo		x			
CBS LABORATORIES	Model 601	x		Silver & Diazo	19 Max			5' / min	anhyd. Ammon.
CRC MICROPRINTERS INC. CO. INC.	CRC Micro-printer		x	Silver Diazo	8	x			
DOCUMENTATION INC.	CRM Processor		x	Silver Diazo Micro-fiche	105 mm		x	1000 15-ft. 4x6 / min.	
GENERAL ONLINE FILM	Microline Sheet Film Duplicator	x		Silver Diazo	Two 9			15' / min	anhyd. Ammon.
KODAK RP.	K-10 Contact Printer		x	9x9 Silver Diazo		x			*
	Kalfile Printer		x	5x6		x			*

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OUTPUT PRODUCT	LAMP SPECIFICATIONS	POWER REQUIREMENTS	SIZE & WEIGHT			REMARKS
			W	D	H	
Roll Dupl.	150W point	110V	40" x 15 x 21			flashed construction and linear light source
Microfiche						
Kalvar Microfiche	8-15W lamps	115V	25" x 15 x 8-3/4"			33 lbs.
	4000 W UV	220 V 36A	41 x 36" x 41"			390 lbs.
	700 watt Merc. Vapor	115V	32" x 24 x 16			70 lbs.
Microfiche	4-3000 watt merc. arc.	208V 90A	24" x 14" x 34"			1000 lbs. Minimum resolution less than target from 127 lines/in. pasters
Microfiche	2200 watt	220V 15A	33 x 24" x 23"			420 lbs.
Kalvar		115V	32 x 16 x 23"			150 lbs.
Kalvar		115V	21 x 12 x 11"			1 lb.

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Table C-1-3 (Cont'd)

FILM DUPLICATORS

* GUINTEPS

OUTPUT PRODUCT	LAMP SPECIFICATIONS	POWER REQUIREMENTS	SIZE & WEIGHT			FILM DUPLICATORS
			W	D	H	
						* 10 SHEETS
Diazo sheets	UV	115V 15A				
Sheet Diazo	400 Volt. Mercury Vapor	115V 6A	21 x 23"x 16 90 lbs.			
Roll Duplicate		115V	20 x 30"x 5' 200 lbs.			* Darkroom operation (not in production) Requires separate processing - Not in production-
Roll Duplicate		115V	20 x 40 x 5 1/2' 350 lbs.			
Microfiche or Rolls (Diazo)	300 watts per inch	220V 60A	50 x 60"x 72" 3750 lbs.			Can be set for 200 watts per inch

C-10

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Table C-2-1. Silver Camera Films

<u>Manufacturer</u>	<u>Product Number</u>	<u>Size</u>	<u>Anti-halation</u>	<u>Spectral Sensitivity</u>	<u>Speed</u>	<u>Resolution</u>	<u>Processing</u>
Bell & Howell	Code 729M	105 mm x 100 ft. roll	Tinted Base	Panchromatic	Medium	250 l/mm	Standard Silver
Eastman Kodak	1790	105 mm x 100 ft. roll	Tinted Base	Panchromatic	Medium	180	Standard Silver
Eastman Kodak	1796	105 mm x 100 ft. roll	AHU Under- coat	Panchromatic	Medium	250 l/mm	High Temperature

MANUFACTURER	PRODUCT NUMBER	FORM	SIZE	SPECTRAL SENSITIVITY	CONTRAST	BASIS (THICKNESS / MILS)
GENERAL ANILITH & FILM CORPORATION	Unit 2612	Sheet & Roll on	Assorted & 105mm x 100'	UV	Medium	7.5
EASTMAN KODAK CO.	SO-220	Roll	105mm x 100'	ortho-chromatic	low	8
EASTMAN KODAK CO.	1123 1321	Roll	105mm x 400 ft 105mm x 675 ft	ortho-chromatic	Medium	1.2
FREDERICK POST CO.	200EA75 200GA75 200VA75	Sheet & Roll	Assorted & 105mm x 500'	UV	High Medium Medium	7.5
KALVAR CORPORATION	10 20 30 50 80	Sheet & Roll on Special Order Basis	Assorted & 105mm x 500'	UV	Medium Medium High Medium Variable	3 &
TECNIFAX CORP.	T-202R TB-202R TSG-202R TB-3202R TB-202R	Sheet & Roll	Assorted & 105mm x 300'	UV	Medium	7.5

Table C-2-2
COPY FILMS

BASE THICKNESS (MILS)	IMAGE COLOR	BLUE COLOR	PROCESSING	TYPE OF FILM	RESOLUTION LINES/MM	COMMENTS
7.5	Black	Clear	Armonia	Diazo	1000	
8	Black	Clear	Std Silver	Silver	290	Low-speed direct duplicating silver film
3.2	Variable	Clear	Std Silver	Silver	160	Positive duplicating silver film
7.5	Sepia Black Black	Clear	Armonia	Diazo	1000	Sepia film for duplication and Copy film for generation of dup Copy film for dissemination and
3 & 5	N/A	Clear	Heat Heat Heat Heat Light	Kalvar	200 161 225 144 250	General purpose proj. viewing film Wide latitude proj. viewing film High contrast proj. viewing film Direct duplicating proj. viewing film Var contrast - light devel. film
7.5	Black	Clear Red Green Blue Yellow	Armonia	Diazo	1000	Special surface coating for high-speed duplication

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2.2 Copy Films

2.2.1 Silver films

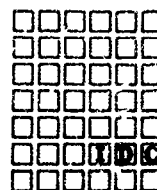
In response to the request for information on silver films available in the 105mm size, the only reply was from Eastman Kodak who submitted data on two film products. One of these films (Product No. 1821) is a standard orthochromatic positive silver copy film used for producing intermediate masters in silver microfiche systems. The other is a newly developed thick-based, direct duplicating film (Type SO-220). This film is a low-speed, low contrast, extremely fine grain, high resolution, orthochromatic film developed to yield a negative duplicate of a camera negative by means of conventional processing (rather than the usual reversal processing). This film is said to exhibit resolution characteristics in excess of 290 lines/mm. The film is supplied on an 3 mil thick base in 105mm by 100-foot rolls for use in microfiche duplication systems. These products are compared in Table C-2-2 and copies of data sheets are shown in Appendix A.

2.2.2 Diazo films

In response to the request for technical information on diazo copy films for use in the roll-to-roll and sheet-to-sheet duplications of microfiche, three companies provided catalog data on their standard ammonia-developable diazo products. These companies -- Tecnifax Corporation, General Aniline & Film Corporation, and Frederick Post Company -- will provide diazo film in 105mm rolls for use in roll-to-roll duplication activities and also in a number of sheet sizes for sheet-to-sheet duplication activities. At the present time, one manufacturer -- Tecnifax Corporation -- will also provide diazo film on any one of four color-tinted base materials for use in coding classification and ease of filing. These diazo films are compared in Table C-2-2 and copies of data sheets are shown in Appendix A.

2.2.3 Kalvar films

The Kalvar Corporation responded to the request for information on copy film by submitting data on five types of projection-viewing print film currently in use in a wide range of microfilm operations for the production of duplicate film copies. These films are currently available in a range of sheet sizes on either a 3- or 5-mil base, and 105mm rolls can be provided on a special order basis. The Kalvar system is unique in that the opaque area of the heat-developed image is composed of



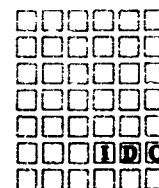
light-scattering centers or vesicles rather than light-absorbing grains or dyes as are present in the previously described film products. Developments are underway to reduce the exposure time required for development of the latent images in Kalvar films so that they can be used as camera films. A number of equipment manufacturers indicate that cameras are in various stages of development to use the newly developed Kalvar film when it becomes available. These Kalvar films are compared in Table C-2-2 and copies of data sheets are shown in Appendix A.

3. MICROFICHE HANDLING EQUIPMENT

Letters were sent to over 100 manufacturers of materials handling equipment requesting technical data on materials handling equipment applicable to the automating of a microfiche production and distribution system. Categories of equipment for which information was requested included: cutting equipment, manual and automatic; collating and sorting equipment, manual and automatic; packaging equipment; labelling equipment; transporting equipment; and microfiche storage and retrieval equipment. Many of the companies responded with general statements to the effect that, although equipment had not been designed specifically to handle microfiche, it was possible that present lines of equipment could be modified for this special application. Other companies responded without qualification that they did not produce equipment which could be of use, and in some instances general catalogs of equipment were the only replies received.

As a result of this rather disappointing response, contact was made with some of the representative companies in the industry in order to determine the reasons for the apparent lack of interest in development of microfiche handling equipment. The answer was not too surprising. In this industry, as in most, the principal factor affecting management decisions to devote research and development time and money to particular product areas is the size of the potential market. Among the individuals contacted, the consensus of opinion was that the market appears to be somewhat limited for equipment designed primarily for handling microfiche. In their opinion, a relatively small number of microfiche distribution systems are expected to operate on a production scale where automation of several of the production activities could be justified.

The data collected was not sufficient in quantity and quality to permit a comprehensive evaluation of a wide range of equipment which could be useful in solving the materials handling problems peculiar to the DDC



microfiche program. What little information was obtained regarding the development status and general availability of microfiche cutting equipment, microfiche envelope insertion equipment, and microfiche storage and retrieval equipment and systems, is discussed in the following paragraphs.

3.1 Microfiche Envelope Insertion Equipment

As a result of the award of a contract under the Educational Division of the Department of Health, Education and Welfare, attention was focused by one microfilm manufacturer on the development of automated equipment for inserting microfiche into storage envelopes.

A four-station machine (to allow the insertion of four different items into each envelope) was developed for this program. This equipment has a demonstrated capability of 7200 insertions per hour; however, the realistic production capacity is estimated by the manufacturer to be anywhere from 2500 to 3000 microfiche insertions per hour. Investigation is currently under way to find methods of speeding up the basic machine for higher production system requirements.

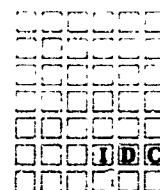
The design of this machine requires that a special envelope configuration be used in order to permit the automatic insertion. This envelope configuration is slightly larger than the normal range of envelope sizes currently used in 4 by 6 microfiche dissemination. All testing to date has been with silver-positive film; however, it is assumed by the manufacturer that other types of microfiche film base could be satisfactorily used in the equipment.

It is interesting to note that because of the limited market identified for this type of equipment, the manufacturer has decided not to refine the machine to meet other user requirements. The cost of this equipment in its present form is expected to be \$6000 to \$7000 per unit.

Contact with another manufacturer has indicated that some discussions were held with DDC concerning possible modification of existing equipment to provide the microfiche insertion capability. However, to date no design modification or testing activity has been undertaken.

3.2 Microfiche Cutting Equipment

Documentation, Inc. has announced the development of diazo microfiche cutting equipment designed to cut 105mm roll film into unit



records. This equipment is said to be capable of cutting and stacking microfiche at a rate of approximately 2000 microfiche per hour. Cutting tolerances are $148.75 \pm 0 - 0.75\text{mm}$. This equipment is expected to sell for under \$4000 per unit. Additional information is not available at the present time.

According to the manufacturer of the automated microfiche cutting equipment prototype currently at DDC, this unit will not become a production item. However, this equipment will be made available on a special order basis. According to the manufacturer, a purchase stipulation will be made requiring any customer procuring this equipment to have the necessary skill in-house to keep the equipment operational as no extensive field service program is planned. The manufacturer also indicated that no additional engineering effort will be devoted to refining the design beyond the capabilities currently available in the prototype equipment at DDC.

3.3 Microfiche Storage and Retrieval Equipment

3.3.1 Motorized-manual microfiche storage and retrieval equipment

Two manufacturers (Diebold and Sperry Rand Corp.) responded to this category by sending in data sheets on a number of motorized files which can be used for the storage and retrieval of 4 by 6 microfiche. The detailed comparison between these equipments is shown in Table C-3-1. One of the principal advantages of the motorized file is that this configuration serves to optimize storage areas through utilization of vertical storage space. The storage compartment is brought to operational level by means of pushbutton controls; however, the actual retrieval of the unit record from the storage compartment remains a manual operation. One of the major differences between Sperry Rand's Lektriever II and Lektriever III models is that within the latter model the carrier in which the unit record has been filed is not only transported to an operational level but is also physically delivered to the work area in front of the machine.

Motorized filing equipment produced by Diebold is currently in use in the film library unit of DDC for the storage of the microfiche master collection. Data sheets on the above equipments are located in Appendix A.

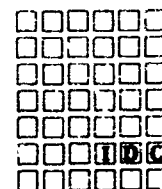
MANUFACTURER	MODEL	CARD SIZE	FILING INCHES	CARRIERS PER UNIT	TAPES PER CARTRIDGE	COPY BY T.M.	OVERALL DIMENSIONS	
							HEIGHT	WIDTH
Hobold Card Series Extractor Files	66211	4x6	505	8	4	✓	43	56
	66221	4x6	519	9	7	✓		69
	66231	4x6	1170	9	10	✓		
	66241	4x6	1194	9	10	✓		
Hobold Card Power Files	10971-2164	4x6	3927	24	11	✓	100	91
	10972-2164	4x6	4522	23	11	✓	100	91
	10973-3264	4x6	5236	32	11	✓	100	91
	62401	4x6	424	24	12	✓	100	91
Hobold Card Power Files	62402	4x6	4904	28	12	✓	100	91
	62403	4x6	5712	32	12	✓	120	99
Hobold Rotary Files	10860-08	4x6	58	8	1	✓	43	16
	10861-13	4x6	116	8	2	✓		21
	10863-26	4x6	232	16	2	✓		34
	10864-39	4x6	348	24	3			49
Hobold Rotary Files	10865-46	4x6	406	24	2	✓		36
				8	1	✓		
Berry Rand Corp. Extractor II	912-6424	4x6	3525	24	10	✓	106	92
	912-6423	4x6	4112	23	10	✓	106	
	912-6432	4x6	4700	32	10	✓	106	
Berry Rand Corp. Extractor III	9125-6424-2	4x6	3525	24	5	✓	106	92
	9125-6423-2	4x6	4112	23	5	✓	106	
	9125-6432-2	4x6	4700	32	5	✓	106	

Table C-3-1

AUTHORIZED PERSONNEL ONLY
STORAGE AREA - 211-111-111

BRALL
DIMENSIONS

ITEM	HEIGHT	TRAY REMOVAL	APPROXIMATE WEIGHT (LBS.)	SLIPPING HEIGHT
56 69 7 100	40	Man Man Man Man	2810 1015 1270 1110	1000 1215 1040 1120
91 91 11 10	46 46 46 46	Man Man Man Man	5090 6415 6510 6370	4550 1470 6240 1150
99 99	46 46	Man Man	6635 6900	1070 1340
16 21 34 49	44	Man Man Man Man	423 637 994 1335	370 400 430 600
56		Man	1510	750
92 42 42 12	42 42 42	Man Man Man	625 6230 6230	4470 110 110
100	41	Auto Auto Auto	1040 1040 1040	1000 1000 1000



3.3.2 Manual microfiche files

In response to the request for information on manual microfiche storage equipment, only two companies (Bell & Howell Company and Atlantic Microfilm Corporation) responded.

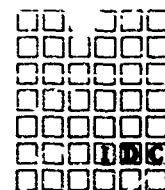
Bell & Howell's Product No. 19107 is an eight-drawer microfilm cabinet (two compartments in each drawer) capable of storing 4 x 6 microfiche. Outside dimensions are 14-3/4 wide by 50-3/4 high by 28 deep. Each cabinet can store approximately 15,000 microfiche masters.

Atlantic Microfilm's Model 2636 is a six-drawer microfilm cabinet (two compartments in each drawer) designed to store 4 x 6 microfiche masters. Outside dimensions are 15 wide by 40 high by 26-1/2 deep. This cabinet can store approximately 11,000 microfiche masters. A second cabinet, Model 2644, is an eight-drawer microfilm cabinet (two compartments in each drawer) with a capacity for holding up to 15,000 4 x 6 microfiche masters. Dimensions for this cabinet are 15 wide by 52 high by 26-1/2 deep.

Because only two companies responded with data on cabinets specifically designed for the manual storage and retrieval of microfiche, this analysis is by no means to be considered exhaustive. There are certainly many manufacturers of filing cabinets designed for the storage of card files who did not respond, and it is likely that there is a large number of other equipments which could be used just as effectively in this application.

3.3.3 Automated unit record storage and retrieval equipment - open loop

A number of equipments have been designed for the automatic retrieval of unit records, either individually or in groups. Most of these systems were developed primarily for the rapid retrieval of information from card files; however, many of the manufacturers indicate that these systems work equally as well for the storage and retrieval of microfiche and aperture cards. The equipments described in this paragraph are considered open loop equipments in that the microfiche is removed and refiled manually.



A detailed comparison of a number of these equipments is shown in Table C-3-2, and data sheets are located in Appendix A. These equipments are discussed briefly below.

Acme Visible Records, Incorporated, Cossette, Virginia, has produced a random access, pushbutton, automatic card-retrieval system called Electrofile. This equipment stores the unit records in trays, each with a capacity of from 800 to 1000 cards. The five-tray unit is, therefore, capable of storing and retrieving approximately 5000 microfiche. Modifications to the unit record require a notched metal strip to be affixed to the bottom edge of the unit record. Coding of the unit records is accomplished by breaking off one or more of the notches. These cards, after insertion in a random fashion within a particular storage tray, are retrieved via a mechanism which moves a set of bars running the entire length of the tray into one or more of the notches. An electromagnetic mechanism is then actuated which pulls the properly coded unit record to the side and up. Removal of the unit record is then performed manually. The unit records are manually refiled by being placed in the appropriate tray in a random fashion. The present equipment configuration requires each tray to be searched separately.

The Access Corporation of Cincinnati, Ohio, has also produced a system for selection of randomly stored unitized records. In this system the unit records are coded by notching along either one or both edges. The unit records must be modified by the attachment of a small metal strip at the end of the unit record on the side containing the code notches. A unit record is retrieved from the collection through keyboarding the appropriate code into the system. The properly coded unit record is then magnetically lifted above the rest of the collection and can be removed. Unit records are refiled manually in a random fashion.

The Mosler Safe Co. has recently developed equipment (Selectriever) for the automatic storage and retrieval of any document which can be reduced to tab card size (3-1/4 x 7-3/8). In this system the unit record is coded with 35 round holes along the bottom edge. Specific holes are notched to identify the card for automated handling. The documents are stored in plastic cartridges (100 unit records per cartridge), with approximately 1000 cartridges in each equipment. In response to commands entering the system by means of a keyboard or other suitable input device, the equipment retrieves the

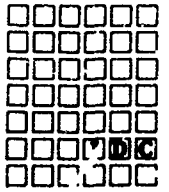
	DATA RECORD - POSITIVE FORMAT	DATA RECORD SIZE RECOMMENDED	RESPONSE TIME (RETRIVAL) (SEC)	COLLECTION SIZE ACCOMMODATED	RANDOM & RETRIEVAL CAPABILITY	ON-LOOP - RETRIVAL SYSTEM	ON-LOOP - RETRIVAL SYSTEM
1. 1/2 13L CO. Microfilm	No	5x8 (4x6 on special order)	2	Single tray = 1000 sheets 3 trays 3000 sheets	1000 in tray or 1000 unit 10000	✓	---
2. 13L	No	2 1/4 x 7 3/8 to 9 x 12	1 or less	1 tray 1200 sheets <u>Not limited</u>		✓	---
3. 13L 13L 13L 13L-13L Mark II 13L 13L	No	4 x 4 4 x 5	1 or less	2501 images per chip 5202 per chip	N/A	---	✓
4. 13L-13L-13L Card System	No	4 x 6	4	750 fiche - 70K images	N/A	---	✓
5. 13L 13L 1350	No	35mm x70mm Film chip	3-6	Approx. 500K images	N/A	N/A	✓
6. 13L 13L CO. 13L 13L	No	3 1/4 x 7 3/8	6 1/2	200K sheets	N/A	✓	Opt
7. 13L 13L 13L 13L	No	3 1/4 x 7 3/8	4-7	200K sheets		✓	---
8. 13L 13L 13L 13L	No	3 1/4 x 7 3/8	5-8	200K sheets		✓	---

OPEN LOOP - RETRIEVAL SYSTEM		CLOSED LOOP - RETRIEVAL SYSTEM		ON-DECK STORAGE CAPABILITY		UNIT RECORD FORMAT NOTIFICATION		INTEGRAL VIEWING EQUIPMENT		INTEGRAL HARD COPY EQUIPMENT		INTEGRAL DUPLICATING EQUIPMENT		INTEGRAL COMMUNICATIONS EQUIPMENT	
✓	--	--	Within tray or 1000 sheets		Metal strip- Edge notching	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
✓	--	--	✓	✓	Metal strip - Edge notching	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Keyboard	
--	✓	N/A			Reflection 26011 Matrix 99 x 99 77 x 77	✓ Remote viewing stations	None	N/A	N/A	Front panel switching	Back IV 20 chip automatic operation				
--	✓	N/A			Metal strip- Edge notching	24X mag. ✓	Option	N/A	N/A	Keyboard					
N/A	✓	N/A			Magnetic stripping on chip	None	None	Aperture card Haze print	Keyboard, manual card, or video link						
✓	Opt	✓			Edge notching	Option - Reader/Printer Remote viewing stations	Option aperture card or video link print	Keyboard							
✓	--	Within 100 card punch			Edge notching	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
✓	--	✓			Edge notching	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table C-2 2

UNIT RECORD FORMAT NOTIFICATION

INTEGRAL COMMUNICATIONS
EQUIPMENT



desired cartridge and delivers it to a selection unit which then extracts the appropriate unit record from the cartridge and presents it to the operator. By means of additional input commands, the card can be automatically returned to its cartridge and the cartridge to its assigned storage location.

The Mosler Safe Company also produces two other document retrieval systems capable of automatically retrieving an individual unit record. The Open Access Rotriever will store EDP-size aperture cards, documents, or microfiche in 100-card pockets. By means of a pushbutton control system, any one of these unit records is brought out of the main collection to within easy reach of the operator who then manually removes the unit record. The unit record is manually refilled at random within the 100-card pocket. Modification to the unit record consists of edge-notching the last two digits of the document file number. A second piece of equipment called the Manual Access Rotriever differs only slightly from the Open Access Rotriever in that the cards are raised into a special holder for ease of manual access. Refiling is accomplished by placing the card into the holder and actuating the appropriate button; the equipment then automatically refiles the card into the appropriate card pocket.

Randomatic Data Systems, Inc., of Trenton, New Jersey, has developed a number of equipment configurations capable of retrieving randomly filed unit records. The equipment concept requires that the microfiche be notched in binary form along the bottom edge. Retrieval of the microfiche is effected through the use of a keyboard console which activates a vibrating system causing the properly coded microfiche to raise above the others in the collection. The microfiche is then removed manually. Refiling of the microfiche is performed manually in a random fashion. As an option, equipment used for punching binary code into the edge of the microfiche can be furnished as an on-line unit or as a completely separate unit for off-line microfiche coding. According to the manufacturer, multiple console units could be interconnected permitting all the file trays in the system to be controlled from a single keyboard.

3.3.4 Automated unit record storage and retrieval - closed loop

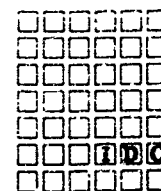
A number of companies have developed equipment for the retrieval and viewing of unit record microfilm sheets without the necessity for removing the sheet from the storage equipment con-



figuration (closed loop). Thus, a number of problems pertaining to wear and tear on the materials, file integrity, misfiling, etc. are solved. One of the limitations of these closed loop microfiche systems is that, as presently designed, the unit record stored does not comply with the COSATI standards for microfiche. These closed loop systems use reduction ratios higher than those allowed, physical configurations other than the 105 by 148 mm size, or require attachment of an appendage to the microfiche for manipulation purposes. The automated unit record closed loop systems are compared in Exhibit C-3-2 and are discussed briefly below to the extent information supplied by the manufacturer would permit.

Fairchild Hiller Corporation, Farmingdale, Long Island, under contract to the Council on Library Resources, is engaged in the development of a high density information system (Micro-vue) for the storing, retrieving, enlarging, and displaying of microimage information filmed at linear reductions of 260 to 1 on a 4 inch film chip. Two different types of equipment have been identified as follows: The Mark II is a portable, high density information system, capable of storing approximately 9,801 frames (0.026 by 0.026 inch) in a matrix configuration consisting of 99 rows and 99 columns. The Mark IV portable, high density information system utilizes a 4 by 5 microchip, capable of holding 5,852 frames (0.041 by 0.053 inch) in a matrix configuration consisting of 77 rows and 76 columns. Both of these equipments use an electronic scan, and readout is accomplished via a cathode ray tube presentation; thus, remote viewing of the graphic imagery is possible. A 20-chip (nominal) autoloader is available as an accessory, which would give the system an approximate capability for viewing in excess of 100,000 pages of stored information.

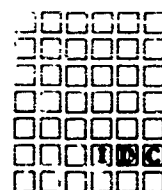
The Houston Fearless Corporation of Los Angeles, California, has recently unveiled a desk-top self-contained microfilm reader. This equipment is capable of the storage of approximately 750 microfiche of the 105 by 148 mm standard size. However, each microfiche must be modified by having a metallic binary-coded strip attached along one edge of the unit record. The microfiche are stored in a carousel storage bin within the equipment. When the control keys are pressed, the selection cycle is initiated so that the metallic strips on each microfiche are transported by a readout station. Once the proper microfiche is identified by the readout station, the microfiche is withdrawn from the carousel and transported to a viewing location where the appropriate image row and column are registered in the correct location for viewing on the screen. At the present time the equip-



ment requirements necessitate filming the original documents at a reduction ratio of 24 to 1 on a step-and-repeat camera, since it is necessary that image registration be closely controlled. Viewing is accomplished on a rear-projection screen of approximately 9 by 12 inch size. Special equipment modifications can be obtained which will increase the internal storage capacity to 100,000 pages and also provide hard-copy printout capability.

The International Business Machines Corporation has recently announced the development of the IBM 1350 system, which is a photo-image retrieval system with a storage capacity of 504,000 microfilm images. Each image is filed as a unit record on a 35 by 70 mm polyester film chip. On the opposite side of the film chip from the diazo emulsion is a horizontal stripe of magnetic oxide coating on which can be recorded 108-bit characters of data. The container in which the chips are stored and transported is a plastic cell approximately 3 by 1-1/2 inches wide by 1 inch deep; each cell has a capacity for the storage of 32 chips. Input of data to the system is accomplished through reproduction of imagery contained on aperture cards (keypunched for proper code identification). Internal to the equipment, the image is transferred from the aperture card to diazo-coated film chips, and the magnetic strip is coded with the appropriate digital data. To read out information from this system requires an additional transfer of the image from the stored chip to an output aperture card. The output card is punched and interpreted to provide the same coding information that was entered into the system.

The Mosler Selectriever System, previously described under the open loop category, has a number of options which permit it to operate in a closed loop fashion. In one of these options the microfiche (tab card size) are kept captive within the system and are automatically transported to a copying station. At this station the information contained on the microfiche is contact copied either onto diazo or Kalvar film contained within aperture cards or on roll film automatically fed into the system from magazines. Upon completion of the copying operation, the file microfiche is then returned to storage and another can be retrieved during the development cycle. In the case of aperture card outputs, the input identification number is automatically printed onto the aperture card when it leaves the system. In addition to the image-copying capability of this equipment, there is a reader/printer subsystem which allows for visual inspection of the images contained on the stored microfiche and for the generation of an enlarged silver



print if desired. Both of these functions are accomplished without the document leaving the system configuration. Upon release, the file document is automatically returned to the proper cartridge and the cartridge to its assigned storage location within the system. A further option allows inquiry of the data collection from remote stations. This remote keyboard reader configuration allows the system to be queried, and the retrieved image is then conveyed via video signals to a cathode ray readout for image viewing.

4. END-USE EQUIPMENT

Evaluated in this category is that equipment used for viewing, enlarging, and printing of microfiche images. This includes microfiche readers, microfiche reader/printers, and automatic microfiche hard-copy printers capable of providing full-size hard-copy or offset masters.

4.1 Microfiche Readers

In response to the request for information, technical data sheets were received from the following manufacturers:

Argus Incorporated
Atlantic Microfilm Corporation
Audio Visual Research
Bell & Howell Co.
Canon Incorporated
Data Reproduction Systems
Eugene Dietzgen Company
Documentation Incorporated
Dukane Corporation
Griscombe Products Corporation
Keuffel & Esser Co.
Frederick Luther Company
Microcard Corporation
Recordak Corporation
Ross Ltd.

A summary of the operational characteristics is shown in Table C-4-1. Specific comments relative to some of the more important operational features of the equipments are presented below.

MANUFACTURER	MODEL	MAXIMUM SHEET SIZE	SCREEN SIZE	SCREEN COLOR	TRANSLUCENT	OPAQUE	LENS TYPE	RELATING APERTURE	MAGNIFICATION RATIO	IMAGE ROTATION
ATLANTIC MICROFILM CORP.	MJR-35	5x	10x10	White	x		Proj.	f/3.5	11x 15x 22x 19x 24X	
	F-66	4x6	8½x11							
ARGUS INCORPORATED	DIAL-A-PAGE	4x6	12x12	Green	x		20mm	f/3.5	25x	
AUDIO VISUAL RESEARCH	DAGMAR-SUPER	No limit	12x26 and higher			x			12 to 28X	
BELL & HOWELL CO.	Model 509	5x8	14x14	Blue	x		30mm		24X	360
	MASCOT	6x6	11x11						21X	
CANON INC.	UNIVERSAL 300	5x8	12x12				86mm 50mm 44mm 32mm 22mm		6.6X 13X 15X 21X 32X	
EUGENE DIETZGEN CO.	Series KE	6½x unlim.	12x12		x				17X 24X 30X 43X	
DOCUMENTATION INC.	1010	5x8	10x10	White		x	23mm	f/2.8	18X 19.7X	90°
DRS REPRODUCTION SYSTEMS	DRS-114	7x7	11x14						13X 24X	
ELECTRA CORPORATION	27A5	5x8	9x13	Grey	x					
	576-11	5x8	11x14	Grey	x				21X	

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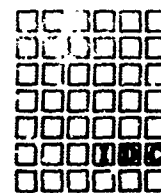
TABLE C 4-1
MICROFICHE READERS

MAGNIFICATION RATIO	IMAGE ROTATION	LAMP SPECS	POWER REQUIREMENTS	CONSTRUCTION			DIMENSIONS & WEIGHT			COMMENTS
				FLOOR	TABLE	PORTABLE				
							W	D	H	
11x 15x 22x 19x 24x		150W	115V			x	9 x 12 x 17 19 lbs. 20 x 10 x 16			Dual magnification
25x		50CP	110V		x		14 1/2 x 27 1/2 x 26 28 lbs			Positive positioning when page is dialed (not standard format)
12 to 28X		45W	115V		x	x	9' x 9' x 19 16 lbs.			Can be projected on screen Comfortable reading position Zoom mirror gives variable magnification
24X 21X	360°	300W	115V		x	x	28"x 20"x 23" 65 lbs. 7"x 13 x 20' 15 lbs.			360° Image rotation by control dial - Variable illumination Cigarette lighter plug-in Auxiliary Power Pack
6.6X 13X 15X 21X 32X			115V		x		12 x 15"x 23"			16-35mm Aperture cards & microfiche
17X 24X 30X 43X			100- 200V 100 watts		x					
18X 19.7X	90°		115V 1.5A			x	20"x 11"x 13 14 1/2 lbs			Opaque reading surface
18X 24X			115V		x		14"x 15" 17 1/2"			Variable illumination One-hand operation
24X			115V		x		14" x 15" x 22 22 lbs.			Variable illumination One-hand operation

MANUFACTURER	MODEL	MAXIMUM SHEET SIZE	SCREEN SIZE	SCREEN COLOR	TRANSLUCENT	OPAQUE	LENS TYPE	RELATIVE APERTURE	MAGNIFICATION RATIO	IMAGE ROTATION
DISCOMBE PRODUCTS CORP.	KL5	5x3	12x12	Green	x		Tessar	f/3.5	24X	
NEUFEL & ESSER CO.	52-2034		10 $\frac{1}{2}$ x12						15X	
FRANCIS LUTHER CO.	Mark 26 Engineer	11x11	24x36	Day- Vue Green	x			f/4.5	22X	36
MICROCARD CORP.	Mark IV	5x3	9 $\frac{1}{4}$ x11	Green				f/3.0	18X	
	Mark VII	5x -	9-3/4 x 10 $\frac{1}{2}$	White	x		28mm	f/3.0	23X	
	FR-5	6x6	7 $\frac{1}{2}$ x 9-1/8	Green	x		31mm	f/3.3	16 $\frac{1}{2}$ X 22X	
ROSS LTD	RTU (Microreader)	7x9	7x9		x				37X	36
KEY-OAK CORP.	PFC-46-1	4x6	10 $\frac{1}{2}$ x 13-1/4	Green	x		35mm	f/4.5	18X	
	PFC-50									
	PK-1013	5x8	10 $\frac{1}{2}$ x 13-1/4	Green	x		40mm	f/3.0	18X	90
	PFC-66	6x6	8x10	Green	x				17X 22X	
	P-R (Strip Reader)	16" x 12	14x14	Green	x				17.5X 20.5X	360

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MAGNIFICATION RATIO	IMAGE ROTATION	LAMP SPECS	POWER REQUIREMENTS	CONSTRUCTION			DIMENSIONS & WEIGHT	COMMENTS
				FLOOR	TABLE	PORTABLE		
24X			115V		x		12' x 22½' x 23 35 lbs	
15X								
22X	360°	300W	110V 10A				30' x 51' x 57	Hinged screen Engineering table-angle screen Up to 11x11 sheet film
18X		100W	110V		x		9 x 13 x 19 23 lbs.	
23X		300W	110V		x		10½ x 15' x 17½ 23 lbs.	
16½X 22X		15CP	110V			x	7½" x 10' x 12" 11-3/4 lbs.	
37X	360°	24 watt	115V			x	3 x 13 x 17	16mm - 35mm aperture card & microfiche
18X		50CP	115V		x		13½ x 18½" x 27 43 lbs.	Image selector scales indicating row & image
18X	90°	50CP	115V		x		13½ x 18½" x 27 39 lbs.	Glass flats automatically open & close Single knob controls Z-axis positioning
17X 22X			115V		x		21 x 10' x 15 31 lbs.	
17.5X 22.5X	360°		115V		x		21 x 10' x 22' 52 lbs.	Designed for use with microfiche



4 1.1 Screen characteristics

Nearly all of the microfiche readers evaluated are equipped with translucent screens utilizing rear projection of imagery. Exceptions were the "Dagmar Super" and the Documentation Inc. Model 1010. The Audio Visual Research "Dagmar Super" projects the image onto a desk-top surface or any other suitable surface. The zoom mirror which gives variable magnification is also a unique feature. The Documentation Inc. Model 1010 reader is equipped with an opaque reading surface angled at 25 degrees to assure comfortable sharp image viewing. The Frederick Luther Co. (Mark 36 Engineer) is equipped with an engineering table angle screen completely hooded for daylight viewing.

4.1.2 Image location

The Argus, Inc. "Dial-A-Page" microfiche reader provides for location of the exact image desired by control knobs on the front panel. However, the microfiche used in this reader uses a format of 100 images and thus does not conform to COSATI and NMA standards. The Recordak Corp. Model PFC-58 features image selection scales which indicate the column and row position of the microfiche being viewed.

4.2 Microfiche Reader/Printers

In response to requests for technical data on microfiche reader/printers, information was received from the following manufacturers:

Atlantic Microfilm Corporation
Documat Incorporated
Fuji Photofilm Company, Ltd.
Itek Corporation
Minnesota Mining & Manufacturing Co.
Recordak Corporation

A summary of the technical data obtained from the specification sheets and in later conversations with the manufacturers is shown in Table C-4-2. Some of the salient features of these equipments are presented below.

[illegible]

Table C 1-2
MICROFICHE READER/PRINTER

COM - XPM

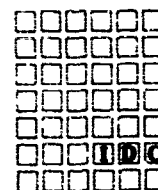
LA P SPECS	MAGNIFICATION RATIO	ENLARGEMENT SIZE	IMAGE AREA	PRINT- OUT			TYPE OF PROCESS			DIMENSION & WEIGHT	POWER REQUIREMENTS	Table C 1-2 MICROFICHE READERS/PRINTERS COMMON
				OPAQUE	TRANSLUCENT	OFFSET PLATE	PHOTOGRAPHIC	ELECTROSTATIC	ELECTROLYTIC			
	6.5x 2.4x 1.1x 18.7x	8 1/2 x 11 3/4					x			15 1/2x17x29 1/2	115V 150W	Separate Processor
300W	13.1x 20.1x 27.0x 14x	1-x24	17x23	x	x		x			35x35x34 200 lbs.	115V	Integral processing
300 :	14.7x	17-7/8 x 24	17-7/8 x 24	x	x	x	x			46x31x51 1/2 350 lbs.	115V	Variable print length 8 to 24 inches Integral processing
200V	15x	8 1/2x12 1/2	8x10-3/4	x					x	17x21 1/2x26 1/2	110V 10A	Integral processing
	11.8x to 38x 17.5x 22.5x	8 1/2x11 1/2 8 1/2x10	8.1x 10.1	x x			x 			30x17x27 105 lbs. 21"x20 x23 132 lbs.	115V 115V	Integral processing Used with Recordak Micro strip holders only
120W	17.5x	8 1/2 x 11-5/8	7-7/8 x 11-1/8				x			29 1/2x15x 17-5/16 44 lbs.	115V	Separate processor

MANUFACTURER	MODEL	FILM INPUT	READING SCREEN SIZE	MAGNIFICATION	PRINTOUT SIZE	PRINTOUT PAPER	EXPOSURE TIME
DOCUMENTATION INCORPORATED	Micromaster Page Printer	2x2 5x8	3 1/2 x 11 3/8 0	6X 12X 23X 40X	3 1/4 x 1 1/4 2 up	Photocopy Matte Glossy Trans-luc.	2-5 secs
MICROCARD CORP.	PL-4	*	No		3 1/2 x 11 single image	Dry Silver	1-5
CRPS-HEPPEL LTD	V-1	5x2 max	*	6X to 16X steps	12x24 316X 20 x 30	{Diaz Silver Offset Plates **	{Var wit nat use
	M-4	5x3 max	*	6X to 20X	20 x 30		
XEROX CORPORATION	18 - 24	5x8 max		14.5X	8 1/2 x 11 to 18x24	Ordinary paper vellum Offset plates	21 s

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Table C-4- HARD-COPY PRINTERS

[illegible]



4.2.1 Screen characteristics

All of the microfiche reader/printers evaluated were equipped with translucent screens utilizing rear projection systems. The Itek Corporation 18-24 has an unusually large viewing screen giving the operator a full 18 by 24 viewing field.

4.2.2 Print-out characteristics

Most of the reader/printers evaluated utilized the photographic process for producing prints. The Documat 18-24 reader/printer can deliver any length of print desired by the operator from 3-1/2 to 24 inches. Translucent paper is also available for multiple reproduction requirements.

The Itek 18-24 reader/printer, like the Documat 18-24, will produce a print which is infinitely variable from 8 to 24 inches. The Itek 18-24 may also be equipped with modular sections such as the stacker module or the Project-a-Lith processor for making offset plates directly from microfilm.

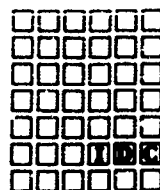
The Atlantic reader/printer Model B-1 permits simultaneous viewing and printing, but requires a separate processor. The Fuji Model Q4F also requires a separate processor. All of the other reader/printers evaluated are provided with integral processing.

4.3 Hard-copy Printers

In response to the inquiry, data sheets on hard-copy printers utilizing microfiche input were received from the following manufacturers:

Caps Jeffree
Documentation Incorporated
Microcard Corporation
Xerox Corporation

A summary of the operational characteristics of the hard-copy printers evaluated may be found in Table C-4-3. Specific comments on salient operational features are as follows:



4.3.1 Reading screen

Documentation Inc. "Microsystem Page Printer" and the Xerox 1824 hard-copy printers are both equipped with viewing screens. The Caps Jeffree system projects the image to be printed on to a visible printing surface, so that it may be viewed during the production of hard copy.

4.3.2 Magnification

The Documentation Inc. "Microsystem Page Printer" is normally supplied with an objective lens of 12X; however, as optional equipment they also offer objective lenses of 6X, 23X, and 45X.

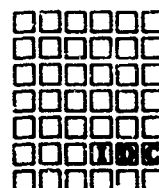
The Caps Jeffree V-1 offers magnification ratios of 6X to 16X in steps specified by the customer. The Caps Jeffree M-4 offers a magnification ratio of 6X to 20X, which is infinitely variable and adjusted by motorized control.

4.3.3 Print-out size

The Documentation Inc. "Microsystem Page Printer" prints two pages up, each being 8.25 by 5.75. The Microcard EL-4 prints a single page on an 8-1/2 by 11 sheet of paper. The Caps Jeffree V-1 prints on any desired size sheet of paper up to a maximum of 18 by 24. The Caps Jeffree M-4 prints on any desired size up to 20 by 30. The Xerox 1824 print-out varies from 8-1/2 by 11 to 18 by 24.

4.3.4 Print-out characteristics

The Documentation Inc. "Microsystem Page Printer" allows the use of several types of print-out paper including photocopy, matte, glossy, and translucent. The Microcard EL-4 prints on a heat developing dry silver paper (3M Co.) which requires no chemicals or toners to process. The Caps Jeffree V-1 and M-4 will produce copies on any material which is sensitive to ultraviolet light, including diazo, silver, and offset plate materials. The Xerox 1824 produces prints on ordinary white paper and vellum. It can also produce offset plates.



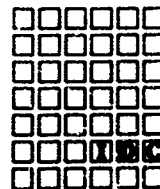
4.3.5 Print-out cycle

The Documentation Inc. "Microsystem Page Printer" has an exposure time of 3 to 5 seconds on an average, with a processing and drying time of 10 to 14 seconds.

The Microcard EL-4 enlarges and dry processes one page every 5 seconds, giving a production capacity of approximately 5000 pages per 8-hour shift.

The Caps Jeffree printer exposure times vary with the materials used and the enlargement ratio used. A typical exposure cycle for producing letter-size prints on diazo paper is in the order of 4 to 6 seconds.

The Xerox 1824 printer cycle includes automatic exposure, development, transfer and delivery in 21 to 30 seconds, depending on the size of print.



D. REVIEW OF MICROFICHE PRODUCTION TECHNIQUES

1. CONVENTIONAL PRODUCTION TECHNIQUES

Contact with representatives from the microfilm industry, as well as with personnel from organizations currently engaged in microfiche production and dissemination, has identified four basic photographic techniques which are currently in use for the production of microfiche. These techniques are: (1) strip-up from roll film; (2) step-and-repeat image placement on roll film; (3) contact printing from roll film to sheet film; and (4) contact printing from film strips inserted in thin-walled film jackets.

1.1 Strip-up Techniques

This technique offers certain advantages in that it does not require special camera equipment to be used during the initial filming operation. Thus, those organizations currently engaged in microfilm programs using either planetary or rotary camera equipment can convert from the present roll film operation to microfiche production with nominal equipment expense. Microfiche prepared in this manner will not exhibit the precise image placement currently attainable through step and repeat precision filming techniques, unless the equipment has been modified to meet the accurate pull-down requirements of the COSATI standards.

Various methods are being employed for locating and holding the silver film strips during the microfiche master duplication operation. At the NASA Scientific and Technical Information Facility, this is accomplished by means of a die-cut acetate mask which is placed on a light table. The silver film strips are then fastened to the mask with an adhesive tape. Precise image placement is accomplished by using a grid to control the location of rows and columns within the microfiche. Other strip-up techniques currently being used employ variations in the configuration of the acetate film holder. One technique uses small pieces of acetate to which are fastened either one or both ends of the silver film strips; and in the Atlantic Microfolio technique, the silver film is fastened to a sheet of acetate by means of an adhesive binder which has been applied to the top and bottom edges of the microfilm strips by special equipment designed for that purpose.

Production of the first-generation copy from the stripped-up silver master is usually accomplished using a vacuum-frame-type contact printer. Subsequent generations are then produced on a number of types of equipment: card-to-card printers, card-to-roll printers, etc. The



stripped-up silver master is then usually stored either in the stripped-up form or disassembled into separate film strips for storage within protective envelopes or folders.

One of the distinct advantages offered by the strip-up technique for the production of masters is that single frames of material within the microfiche can be updated and revised with a minimum of refilming effort since it is only necessary to refilm the sequence of images in the row affected.

One of the disadvantages of using the strip-up technique is that the silver film master cannot itself be utilized in any high-production, high-speed duplicating equipment utilizing a cylindrical exposing drum due to difficulties in controlling film alignment. Difficulties have also been encountered using the Atlantic Microfolio approach in that repeated use of the stripped-up master in equipment utilizing a belt-driven cylindrical exposing platen has resulted in a loosening of the adhesive material holding the silver film strips to the acetate sheet.

1.2 Step-and-Repeat Equipment Techniques

At the present time, it appears that most organizations using a step-and-repeat camera for production of silver microfiche masters are using equipment supplied by either Microcard Corporation or Bell & Howell Company. Although there are a number of step-and-repeat cameras currently being marketed by other companies, many of these still appear to be in some state of development (refer to Section C, Paragraph 1.1 of this Part for development status).

Step-and-repeat production of microfiche differs from the strip-up technique in that both filming and formatting of the microfiche master are performed in the camera operation, and the microfiche masters are then usually processed in roll form. Some of the step-and-repeat equipment now under development will produce microfiche masters in sheet form.

In the majority of high-volume microfiche production systems surveyed, the generation of the initial production quantities of duplicate copies from the roll of silver microfiche masters is accomplished on roll-to-roll printer processing equipment. The silver master is then separated into the individual microfiche unit records and stored. Further duplicates are made on sheet-to-sheet duplicating equipment.

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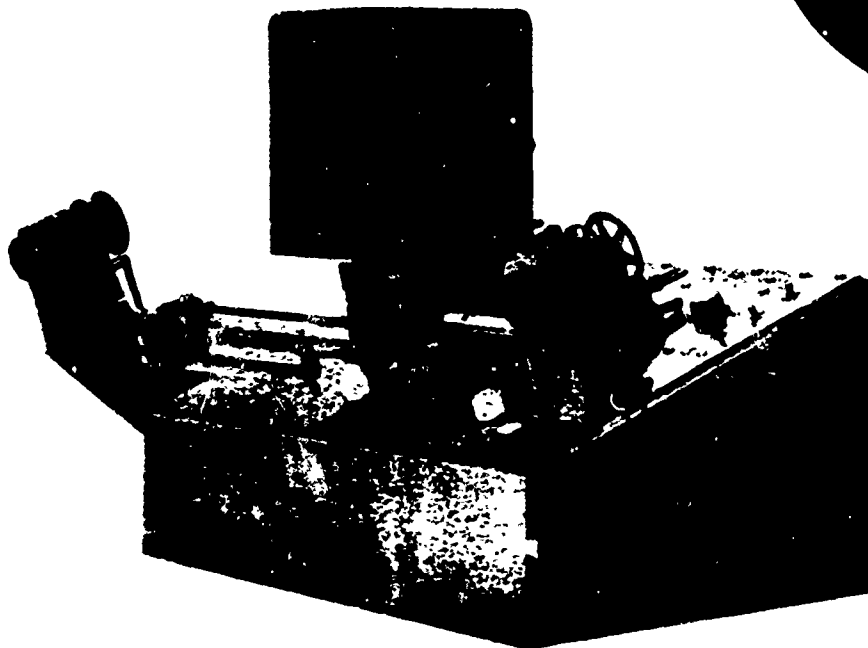
1.3 Contact Printing Using Roll Film Techniques

Because of the particular requirement for station-month unit record indexing of the National Weather Records Center, microfiche of the COSATI standard size format (105mm by 148mm) could not be used. The observation report sheets are currently being filmed four up on 35mm film at a reduction of 24X by means of a planetary camera. Use of the 5 x 8 format allows each unit record to cover a complete month's observations without need for trailer fiche. The roll film records are placed in archival storage, and the microfiche are used for dissemination to various decentralized user locations. The present use of the file does not require consideration of revision or updating of the unit record.

microline

MICROFILM EQUIPMENT

ACTIFILM
PRINTER



Build a unitized, accessible film library . . . without damage to original film strips

At last you can unitize any microfilm image from any spot on any roll (up to 35mm) without cutting or harming the film.

The new Microline Actifilm Printer duplicates images from rolls or strips onto Actifilm—diazotype sheet film in card weights and card sizes.

Why unitize microfilm? Because it streamlines your records control—saves you time, space, and money—in these four important ways:

- **Faster filing, faster finding**—because Actifilm sheets are both the index and the record
- **Big savings in file space**—up to 95%
- **Built-in security**—because the original documents can be retired or destroyed; even the microfilm roll can be filed in a vault
- **Quick availability of enlargement prints**—even on translucent paper for running white-prints.

With Actifilm and the Actifilm Printer, you can unitize your microfilm on a *selective* basis—duplicate only those images you want or need at any given time. You never harm the original roll or strip, can file it away intact for reference or security. You save work by unitizing only what you actually need.

And with the Actifilm printer, you can put up to one hundred 16mm images on a single Actifilm sheet. You can group related images for easier reference. You really save filing space.

The Actifilm Printer is a *dry process* machine, needs no darkroom or solutions. It makes direct one-to-one copies in seconds, speeds your unitizing and reproduction. Any microfilm, positive or negative, up to 35mm can be handled.

Actifilm sheets are available in standard card sizes up to 6½" x 8". Other sizes supplied on special request.

ACTIFILM
PRINTER

- Automatic film take-up mechanism
- Variable masking for selected image duplication
- Automatic, variable card-staging mechanism for film economy
- Detachable viewer (6" x 6") for easy image selection. Viewer has prism for rotating image, reversal mechanism for reversing image

Actifilm Printer with viewer and rewinder
Microline Catalog Number 794250

Viewer

Screen size 6" x 6"
Magnification 12X

Height 26" with viewer attached
16" without viewer

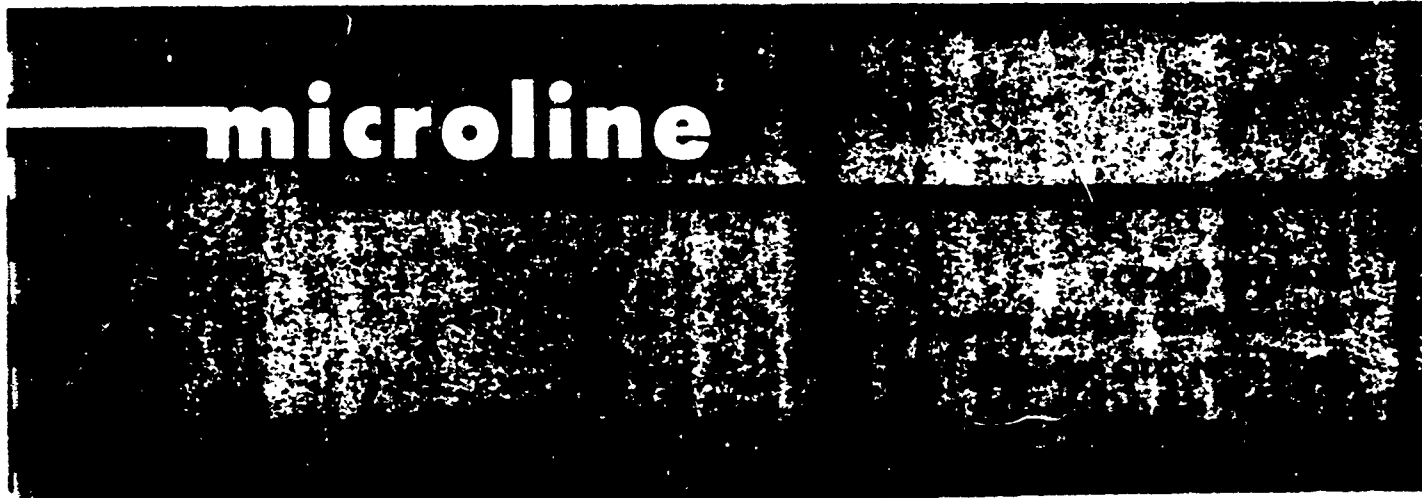
**Width 43 1/2" with film rewind out-
rigger fully extended**

Depth **21 3/4"**

Weight **160 lbs.**

Wired for 110 VAC, 60 cycle

Electrical consumption at 110 V 10 amps



microline

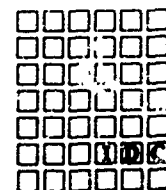
1.4 Film Jacket Contact Printing Technique

Recent improvements in the manufacture of thin-walled film jackets has led to more widespread use of film strips in jackets as masters for the production of microfiche in non-standardized formats. The film-ing is accomplished using either planetary or rotary microfilm equipment on either 16mm or 35mm roll film. The film is then cut into strips or film segments and inserted into the film jacket to produce a desired format. Film jackets are available in a wide range of sizes and configurations to accommodate 16mm and 35mm film and combinations of both, thus providing flexibility of format. The film jacket can be used in a contact printing operation to provide the required number of duplicate copies either on silver, diazo or Kalvar. The resolution capability of this technique is not as high as that obtainable with the other systems described since the film master, due to its being contained in a transparent envelope, cannot be held in intimate contact with the duplicate copy during the printing operation. However, this procedure is being used successfully in some commercial applications such as gas company reporting, where no attempt is made to meet COSATI standards for resolutions loss from copy to copy, and a microfiche copy is usually judged suitable if it can be read at all.

One of the significant advantages of this rather simple approach to making microfiche is that individual frames in the master can be changed at will, since it only requires that the affected film strip be removed from the transparent envelope and a new frame inserted in the appropriate location. The add-on capability of this system is also excellent.

1.5 Duplicate Copy Header Opaqueing

As far as could be determined, there appear to be four techniques currently in use to back up the microfiche header area to facilitate visual location of microfiche and manual retrieval from the file. These techniques are (1) use of a microfiche envelope appropriately designed to back up the microfiche header strip area (used by DDC); (2) use of a hot-stamping method to opaque the negative-reading side of the header strip area (used at NASA Scientific and Technical Information Facility); (3) use of an acetate paint to opaque the negative-reading side of the header strip (used in microfiche produced for the Thomas Register Microcatalog System); and (4) application of a thin, mylar colored tape to the negative-reading side of the microfiche header strip area (used in the Atlantic Microfilm production technique).



Research and development work is being undertaken by one copyfilm manufacturer to eliminate the present need for a production step to perform this opaquing operation.

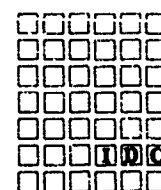
1.6 Microfiche Updating Techniques

From discussions with microfiche equipment and film manufacturers and with members of organizations currently distributing microfiche, it appears that little progress has been made in finding a practical solution to the problem of updating or revising microfiche masters which have been produced by either the strip-up, step-and-repeat, or contact printing methods described above. Suitable solutions to the add-on requirements of silver film microfiche masters produced by the step-and-repeat technique also remain to be discovered.

Updating of microfiche masters, regardless of the originating processed used (except film jackets), now requires refilming a portion or all of the material on a microfiche in order to change a single frame. A number of updating techniques have been proposed, but as far as can be determined, none have been successfully developed for use in a production system. For example, Ehrenreich Photo-Optical Industries proposed a technique for updating Kalvar microfiche masters by employing optical flooding of the affected area with high-intensity light and then superimposing new imagery in the area. According to Ehrenreich this concept never progressed much beyond an initial discussion stage because not enough interest could be generated to provide the necessary development funding.

2. NON-CONVENTIONAL MICROFICHE PRODUCTION TECHNIQUES

Management representatives of the major microfilm equipment and film manufacturing companies have implied that a significant amount of research and development activity is being directed towards the development of new approaches and techniques for the production of microfiche. Due to the sensitivity of the subject area and the desire on the part of manufacturers to limit general knowledge of these activities, specific and detailed information was not generally provided. However, enough data was gathered to indicate that a number of techniques for micrographic imagery production are currently being researched. Those techniques are described herein for which information was supplied.



2.1 Multiplex-Recording Photography

The Photo-Optical Sciences Division of Aeroflex Laboratories, Inc., New York, recently unveiled a technique whereby hundreds of separate and distinct pictures can be produced on a single negative, wherein all the pictures are the same size as the negative. The resultant negative is, therefore, a composite of the many hundreds of pictures taken; and, when the negative is processed and developed in the normal manner and placed in special viewing equipment, each individual picture can be retrieved at the discretion of the equipment operator. According to the company, this technique could be employed to produce microfiche containing up to 285 images at an optical reduction ratio of 6:1 on a single 4 x 6 negative, with the end product picture resolution of around 14 lines per millimeter. If true, this would be a significant improvement over the current end-product picture resolution capabilities of reader/printers which is on the order of 4 to 6 lines per millimeter. Exhibits D-2, D-3 and D-4 represent the extent of information which Aeroflex Laboratories, Inc., has provided to date. This area surely warrants continuing attention since it may have a significant impact on future microfiche format and production processes.

2.2 Photochromic Microimaging

The National Cash Register Company has been experimenting for some time with photochromic coatings which consist of a molecular dispersion of light-sensitive organic dyes in a suitable coating material. These coatings are similar to photographic emulsions in that they can be coated on the same general types of base materials and can be made to retain two-dimensional patterns or images which have been optically transferred to their surface. This new technique, referred to as PCMI (photochromic microimaging), has made possible very high density document storage. Another interesting property of the process is that the information stored on photochromic coatings is semi-permanent, as the individual molecules can be switched to either a colored or non-colored state by radiation of light of the proper wavelength. Information can thus be optically erased and rewritten repeatedly, thereby providing a means of updating or revising individual frames without any effect on adjacent imagery.

This process does not entirely eliminate use of conventional microfilm since, as it presently exists, high resolution microfilm must be used as the input medium and as the master for any subsequent copy-generation process. The process may be described as follows: The

PHOTO-OPTICAL SCIENCES DIVISION

AEROFLEX LABORATORIES INCORPORATED

SOUTH SERVICE ROAD · PLAINVIEW · LONG ISLAND · NEW YORK 11803

TEL: 516-654-6700

TWX: 516-654-3300

June 21, 1966

Refer to: H-51

Information Dynamics Corporation
80 Main Street
Reading, Massachusetts 01867

Attention: Mr. R. D. Morrison, Jr.
Systems Engineer

Dear Mr. Morrison:

Referring to your letter of June 10, (RDM-66-048), the enclosed announcement concerning typical capabilities of MRP is the only document we are permitting to be made public at this time.

The area of technical disclosure, how MRP is accomplished, can only be made via confidential disclosure agreements made in person at our facilities. As a most revolutionary development, I am sure you can appreciate the need for maintaining this security level until such time as the many patents we have applied for have attained proper legal status.

It is interesting to note the relationship you have drawn between microfiche production and MRP. An analysis was made by us a few months ago concerning this area and a typical answer was as follows:

Microfiche technique - 72 pictures on one 4 x 6 negative at a 22 to 1 optical reduction ratio with an end picture product resolution of 6.2 1/mm. Using MRP, 285 pictures, all 4 x 6 pictures on one 4 x 6 negative, optical reduction ratio approximately 6 to 1 with end product picture resolution around 14 1/mm, obviously a vast improvement over microfiche and the complex optical instrumentation required to accomplish their task.

EXHIBIT D-2

AEROFLEX LABORATORIES INCORPORATED

Information Dynamics Corporation -2-

June 21, 1966

If you desire to pursue MRP further, we would be pleased to provide a demonstration and disclosure at our facilities at our mutual convenience. Accordingly, the enclosed disclosure agreement is offered for your Legal Department's review and we await your telephone call for an appropriate time.

Very truly yours,

AEROFLEX LABORATORIES INC.



C. W. Houghton, General Manager
Photo-Optical Sciences Division

CWH:mt

enc.

ANNOUNCEMENT

A NEW DEVELOPMENT

OF

PHOTOGRAPHY AND PHOTO RECORDING

BY

PHOTO-OPTICAL SCIENCES DIVISION

OF

**AEROFLEX LABORATORIES INCORPORATED
SOUTH SERVICE ROAD
PLAINVIEW, L. I., N. Y.**

EXHIBIT D-3

D-11

Photo Optical Sciences Division of Aeroflex Laboratories, Inc.,
South Service Road, Plainview, New York is pleased to announce
a revolutionary development in photography and film data recording,
known as Multiplex-Recording Photography (MRP).

This development, created by the Photo Optical Sciences Division
of "Aeroflex", is a technique whereby hundreds of separate and
distinct pictures are produced on one (1) negative, wherein all the
pictures are the same size as that negative. For example, 300-400
separate pictures, taken at the discretion of the operator of any
subject matter, with all pictures the same size as the photographic
negative, in either color or black and white, regardless of negative
size and at a rate capable of exceeding normal photography.

The resultant one (1) negative is therefore a composite of the many
hundreds of pictures taken. When developed and processed in the
usual manner, and placed in a special viewer or projector (also
part of the development) each individual picture will appear at the
selection of the operator (in sequence or at random selection).

The subject concept is applicable to most sizes and types of
cameras or photographic recording systems and completely eliminates

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the need for rolls of film, film magazines and the mechanical or electrical assemblies used in cameras or projectors to handle the subject film. It also greatly simplifies camera construction and complexity in that resultant new cameras can be made smaller with less weight and simpler operating mechanisms.

In a typical application, the operator inserts one (1) MRP photographic negative in the camera or recording unit. He then operates one lever to take a picture. Each time the lever is operated, a different picture is recorded and a small counter will indicate the number taken. (Remote operation designs, use one electrical pulse for each picture).

Upon completion of all exposures, for example 300, the one (1) negative is removed from the camera and processed. Remember, processing the one (1) negative automatically processes hundreds of pictures.

The finished composite negative is now placed in the special viewer, where each individual picture may now be viewed rapidly without complex film handling mechanism. The operator simply selects a number to view any of the pictures taken.

Prints may be made of each picture by the usual contact printing process in either color or black and white.

For reasons of company security, Aeroflex Laboratories is not disclosing the technical details on how this is accomplished via this paper. However, demonstrations with a laboratory model are being made to interested organizations and the government. Technical detail disclosure is made only via Confidential Disclosure Agreement between companies.

CONCEPT ADVANTAGES

1. Applicable to most camera or photo recording systems from 8 millimeter size to 9 x 18 inch film formats.
2. No rolls of film needed. The one (1) negative eliminates many hundreds of feet of film in the camera or recorder and thus the need for film magazines or film handling mechanisms.
3. Cameras or recorders are simplified, smaller, lighter, less complex and easier to operate.
4. Processing the one (1) negative, eliminates the film processing of many hundreds of feet for the same number of pictures.

5. Processing equipment becomes extremely simplified with small chemical quantities.

6. The one (1) photographic negative is semi-secure.

No one can view the negative without having the "keys" as to how the pictures were taken.

7. Storage of one (1) negative instead of the equivalent in many feet of film.

8. Retrieval - Each picture is retrieved in milliseconds instead of searching through many feet of film and film negatives.

9. Useable with positive or negative plates, thus covering a wider range of emulsion types, resolution and speed.

Color or black and white.

10. Exposure rates - Typical of or faster than normal photography.

TYPICAL APPLICATIONS

1. Ground Photography.

2. Aerial Reconnaissance Photography - Frame, Strip, Panoramic, etc.

3. Space Photography.

4. Photo Transmission - (Processing and scanning the one negative transmits hundreds of pictures in the same time it takes to scan and transmit one picture.)
5. Multi -Sensor Recording (Example - Radar, Infrared and Photo at the same time, or different times on the same negative plate.)
6. Secure Systems.
7. Data Recording, Storage and Retrieval Systems (several types).
8. Spectral Analysis Systems (Several pictures with different filters can be created at the same time through the same lens on the same negative.
9. Color photography or black and white negatives, and chemistry.
10. Microfilm and data storage applications.
11. Time Lapse Systems.
12. Computers.
13. Displays (several)
14. Correlation and Measurement Photography.
15. CRT Recording and Data Display.
16. Stereo Systems.

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TECHNICAL DATA

1. Number of pictures per negative - A function of the principal camera lens focal length, size, and the average (not negative size) picture resolution requirements.
2. Resolution - A function of the desired number of pictures per negative and the principal camera lens capability.
3. Exposure - Nearly identical to or faster than standard photographic techniques.
4. Contrast - Same as present standards, full gamma range.
5. Films - Emulsions of all types, providing of course the resolution capability matches the desired system requirements.
6. Processing - Standard Chemistry for each film emulsion.
7. Viewing and Projection - At a one to one ratio or larger.

MULTIPLEX RECORDING PHOTOGRAPHY

PRODUCT BULLETIN

NO. 1

June 1966

INTRODUCTION

Since the inception of Multiplex Recording Photography, (MRP), many hundreds of individuals and organizations have reflected high interest in this development and its potential application to their photographic or optical recording instrumentation problems.

As a basic development requiring additional research it is therefore the intent of this bulletin to keep these potential users aware of the progress we have made SINCE their introduction to this major invention and the rather limited breadboard demonstration that was initially given.

TECHNICAL GENERAL

To eliminate some previous and misconceived confusion, MRP is not Image Dissection, Holography, or Micro Photography. The ability to record on one negative large quantities of pictures all the same size as the one negative and regardless of negative size can only be accomplished via the MRP technique.

TECHNICAL FINDINGS TO DATE

1. MRP is an f2.0 to an f2.4 (depending on the application) exposure level system regardless of the f number in the principal lens.

-1-

EXHIBIT D-4

D-18

2. Picture quantities - With the final component designs we have selected, the maximum number of pictures we could produce on one (1) negative is 400 under controlled environment and depending upon the resolution requirements. In uncontrolled environment, 280 pictures per negative is the maximum feasible but again depending upon resolution needs.
3. Picture resolutions up to 125 photographic line pairs per millimeter can be attained.
4. Light Requirements - A function of the f2.0 to f2.4 and ASA rating of the emulsion selected for the application.
5. Projection, printing or reconstitution - No loss of information or picture content will be experienced.

PROGRESS TO DATE

Because of the importance of MRP a separate division known as the Photo-Optical Sciences Division of Aeroflex Laboratories has been formed dedicated to this effort.

Accordingly, with in-house funds, we have completed to date all individual laboratory tests and are proceeding with the design and manufacture of a complete Research Camera System capable of "proof" photographing, projecting and printing any subject matter desired by a potential user to prove his end result.

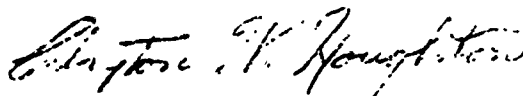
In addition, we are in process of designing and building the enclosed one version of MRP to sell as an "off the shelf" product to any potential user.

We have also just released contracts for the production of MRP negatives and positives.

All of the above (Research Camera, Product Camera and MRP negatives) are expected to be complete by December 1966, ready for demonstration to the public as a completed major advancement in the photographic arts.

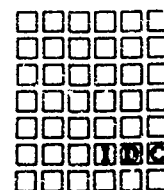
As an interested potential user we therefore welcome any questions you may have concerning our progress or inquiries concerning your particular application.

Additional Bulletins will be issued between now and December to keep you abreast of our efforts and informed of major developments which may enhance your planned version for MRP.



C. W. Houghton, General Manager
Photo-Optical Sciences Division
South Service Road
Plainview, New York 11803

CWH:mt



original documents are filmed with conventional roll film cameras using a high resolution microfilm. This film is processed in the usual manner. The processed film is then placed in the PCMI camera recorder which records the microimages onto photochromic film in a step-and-repeat manner. These images are reduced through the camera recorder optical system to linear reductions of approximately 150:1. When the composition of the microimage matrix is completed, a contact printer is used to make a high resolution photographic film master which is then processed under highly controlled conditions. This photographic film master is then used for subsequent microcopy generation. Through the reduction ratio capabilities of this process, it is possible to store images of approximately 3200 pages (8-1/2 x 11) on a single 105X148mm microfiche.

2.3 Thermoplastic Recording

The thermoplastic recording process was first described by its inventor, Mr. W. E. Glenn of the General Electric Company, in the Journal of Applied Physics, December 1959. The technique of recording is accomplished by scanning the thermoplastic surface of a moving tape in a vacuum chamber with a modulated electron beam. The tape consists of a transparent base, with a high melting temperature, coated with a transparent conductor which is, in turn, coated with a thin film of low-melting thermoplastic. The electron beam scans the thermoplastic surface horizontally while the tape moving past the recording zone provides vertical scan. The tape is then heated to soften the thermoplastic which, being a good electrical insulator, retains the charge pattern during the heating. This charge pattern forms a latent image of the subject. During the heating process, the electrostatic forces between the charges and the conductive layer sandwich depress the fluid surface of the thermoplastic. The magnitude of these depressions at any point is dependent upon the magnitude of the charge at that location. The tape is then cooled prior to spooling to freeze the deformations in place, thus giving a permanent record. Readout of the image ripples is accomplished by means of a Schlieren projection system. In this system, a series of thin-line light sources are focused on a set of bars by a lens system. The tape is then transported between the condensing and projection lenses where there are no ripples, the light is blocked by the bars and the screen appears black. However, any ripple will deflect the light which will then pass between the bars and appear as a light spot on the screen. The information pattern on the tape can be erased by heating the tape above the original development temperature for a short time, thus removing the electrostatic charge and permitting the thermoplastic to flow and level the surface. According to General Electric, the film thus produced exhibits very high resolution

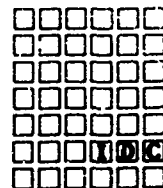
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the opaque card approach. Development work is underway within the company to produce a reader/printer which the company feels will make the opaque card information dissemination system more acceptable to a greater number of users.

Discussions with other individuals active in the graphic arts industry suggested that the quality of microprint currently obtained from the offset press technique was not consistent. Opinions were expressed that the production of microfiche by this technique would probably require a more extensive inspection program. In general, most of the people in the industry felt that the present state of the graphic arts process would permit production of microfiche by this technique under laboratory-controlled conditions, and that it would certainly be possible within a span of five years to have the printing techniques developed to the point where normal printshop production would result in a highly acceptable micrographic product.

At this time, therefore, it appears that the offset press technique for production of micrographics, under investigation by several companies in the printing industry, is perhaps further along in development than other techniques under investigation in other quarters. Careful attention should be given to maintaining a continuing cognizance of progress by the graphic arts industry and others in this and related production techniques.

E. A SAMPLING OF THE END-POINT UTILIZATION



In this section a presentation is made of an opinion sampling from eleven Department of Defense contractors and government organizations regarding the status and present uses of microfiche and other microform products. The interviews were structured to obtain the following information:

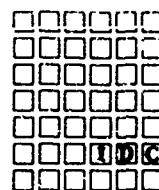
(a) Regarding microfilm files:

- (1) Source of microfiche or other microfilm products
- (2) Kind of information contained in micro-reduced form
- (3) Year of first acquisition
- (4) Present collection size for each category of film
- (5) Frequency of use
- (6) Date of last use
- (7) Type of access, i. e., degree of control over access
- (8) File structure and organization
- (9) Location of files
- (10) Kind of use
- (11) Information programs supported by the use of microfiche or other microfilm products

(b) Regarding microfilm equipment:

- (1) Description of the equipment
- (2) Number of units
- (3) Location of the units
- (4) Current status, i. e., units on hand, on order, or planned for future acquisition
- (5) Equipment characteristics

The results of the interviews were analyzed to obtain an indication of the degree to which the use of microfiche was accepted at each installation and the degree to which microfiche and microfilm are presently used (refer to Microfiche Usage Data Sheets at end of this section).



1. ACCEPTANCE OF COSATI MICROFICHE STANDARDS BY THREE TYPES OF USER GROUPS

The degree of acceptance of COSATI standards was analyzed for three types of user groups:

- (a) Producers (internally supported micro-reduction programs)
- (b) Librarians (internal storage and retrieval programs)
- (c) Ultimate users

It was found that each of these groups accepted facets of the COSATI standards to various degrees, depending upon the particular problems encountered by each group.

1.1 Microfiche Size

It was found that those who read microfiche had no strong preference for a particular size. For the reader, the significant factor was that the microform product was unitized rather than continuous (as in roll film). Whether the microfiche was 3 x 5, 5 x 8, tab card size, or COSATI standard size, made little difference to the user as long as the microfiche would fit conveniently into the throat of a microfilm reader. Thus, the COSATI standard size microfiche was as acceptable to the reader as any other unitized microfilm size. In terms of experience, more users have had exposure to aperture cards than to any other unitized microform product. Therefore, there was a slight preference for this size unit over any other.

The librarians had more preference for the 3 x 5 or 5 x 8 microfiche size. Several libraries were utilizing 5 x 8 card files to store the COSATI standard microfiche because these files were readily available. From the librarian's point of view, there was little to be gained by introducing a "new" size standard for unit record storage. Some librarians who had developed a degree of automation in the library expressed preference for a tab card size, since these files were already in use within the library.

There was a stronger set of opinions among those who produce microform products under internally sponsored microreduction programs. Of all the groups sampled, the producers were the most adamant in supporting their own preferences. Because the COSATI standard represents

REF ID: A66000

a standard film width, the selection of a 105mm film base was considered by the majority of producers as the most acceptable since many cameras were designed to accept this width. On the other hand, those producers having experience in the field of data processing preferred a tab card size since they felt this would ultimately permit the automatic processing of microfiche by present electronic data processing equipment. Least preferable were 3 x 5 and 5 x 8 formats since present microfilm equipment was not widely available to handle this size film base.

In summary, the degree of preference expressed was least for the user group, most for the producer group, and intermediate for the librarians. The most significant factor in all three groups was the change-over from roll film format to unitized film format. The most significant factor in determining opinions for the user group was exposure to other unitized film formats. The most significant factor for the librarians and producers was exposure to electronic data processing techniques.

1.2 Image Placement

All three groups expressed little opinion about image placement. To each, it made little difference whether the sequence of images went from left to right or from top to bottom. The election of COSATI to sequence images from left to right seemed most reasonable from a human engineering standpoint.

1.3 Title Strip

From the standpoint of both librarians and users, the title strip was found to be desirable. The producers, however, raised objections to the difficulty of producing a title strip by techniques other than microfilming. The addition of the title strip to the first microfiche in a set also presented difficulties in machine-processing, such as in the process of blowing back the microfiche to full size. A different procedure must be followed for the first microfiche in each set. Also, there was some objection to using part of the microfiche for other than microimage.

In some installations the librarians had utilized the title strip to produce an accessions list of items received on microfiche (Exhibits E-1 and E-2). Microfiche were shingled so that only the title strip showed and either Xeroxed or photocopied to produce a master from which multiple copies could readily be obtained by standard reproduction techniques. Although the title strip reduced the chance of removing the wrong microfiche

EXHIBIT E-1

Shingling Techniques to Produce Announcement Bulletins

PROPULSION SYSTEMS AND ENERGY CONVERSION

UCRL-11503 ALPHA PARTICLE BOMBARDMENT OF SI AND GaAs DIODES; ENERGY CONVERSION AND RADIATION DAMAGE (thesis). Posey, Lawrence D. UNCLAS (Lawrence Radiation Lab., Univ. of California, Berkeley). June 1965. Contract W-7406-eng-48. 307p. UC-34-4

PHYSICS

ANL-TRANS-215 DETERMINATION OF HALF-LIVES OF THE NATURAL RADIOACTIVE NUCLIDES Sm-137 AND Lu-176 BY MEANS OF LIQUID SCINTILLATORS. UNCLAS Donheffer, Dieter. Translated by Elmar K. Willip (Argonne National Lab., Ill.). from Oesterr. Akad. Wiss., Math.-Naturw. Kl., Anz., No. 10, 186-92(1963). 7p. UC-34-4

CU-1932-244 ANNIHILATION OF ANTIPROTONS IN HYDROGEN AT REST. II. ANALYSIS OF THE ANNIHILATION INTO THREE PIONS. Balfay, C.; Franzini, P.; Gelfand, N.; Luetjens, G.; Severions, J. C.; Steinberger, J.; Tycko, D.; Zanelli, D. (Nevis Labs., Columbia Univ., Irvington-on-Hudson, N. Y.). July 1965. Contract AT(28-1)-1932. 16p. (NEVIS-138; R-510). UC-34-4

IC 65 63 GENERALIZED SPHERICAL FUNCTIONS FOR THE NON-COMPACT ROTATION GROUPS. Fischer, J.; Niederle, J.; Raczka, R. (International Centre for Theoretical Physics, Trieste (Italy)). June 1965. 20p. UC-34-3

IC 65 64 SU₃ SYMMETRY AND NON-LEPTONIC DECAYS. Cocho, G. (International Centre for Theoretical Physics, Trieste (Italy)). June 1965. 7p. UC-34-3

NEIC-RR-8 NUCLEAR ASTROPHYSICS. A BIBLIOGRAPHICAL SURVEY. PART I. Kuchowicz, S. (Nuclear Energy Information Center, Warsaw (Poland)). 1965. 89p. UC-34-2

NEIC-RR-9 NUCLEAR ASTROPHYSICS. A BIBLIOGRAPHICAL SURVEY. PART II. Kuchowicz, S. (Nuclear Energy Information Center, Warsaw (Poland)). 1965. 190p. UC-34-2

NEIC-RR-10 NUCLEAR ASTROPHYSICS. A BIBLIOGRAPHICAL SURVEY. PART III. Kuchowicz, S. (Nuclear Energy Information Center, Warsaw (Poland)). 1965. 123p. UC-34-2

NP-15208 ON THE STABILITY OF THE HYPERNUCLEUS Λ MB⁶. Bulletin No. 20. Willain, G. (Brussels Univ. (Belgium)). May 1965. 19p. UC-34-3

NP-15205 THE APPLICATION OF UNITARY GROUPS IN PARTICLE PHYSICS WITH PARTICULAR EMPHASIS ON SU₃. Lectures given at Universitetets Institut for Teoretisk Fysik and NORDITA, Copenhagen. Brane, N.; Mellesen, B. (Nordisk Institut for Teoretisk Atomfysik, Copenhagen (Denmark)). Mar. 1965. UC-34-3

ORNL-TR-630 HIGH LEVEL PATH OF HIGH ENERGY NUCLEONS IN THE ATMOSPHERE. Babyan, Kh. P.; Grigorev, N. L.; Manidzhanyan, E. A.; Shestoporev, V. Ya. Translated for Oak Ridge National Lab., Tenn., from Dokl. Akad. Nauk Arm. SSR, No. 2, 101-4(1964). 7p. UC-34-4

ORNL-TR-631 SOLUTION OF THE EQUATIONS OF THE 1-DIMENSIONAL CASCADE THEORY OF ELECTRON-PHOTON SHOWERS FOR ARBITRARY BOUNDARY CONDITIONS AND IN THE FORM OF A SOURCE FUNCTION. Bakhtadze, A. K. Translated for Oak Ridge National Lab., Tenn., from Vestn. Mosk. Univ., Ser. III: Fiz. Astron., No. 3, 22-27(1964). 12p. UC-34-4

ORNL-TR-706 HOW VALID IS THE EXPONENTIAL LAW FOR α -DECAY? Petzold, Joachim. Translated for Oak Ridge National Lab., Tenn., from Z. Physik. UNCLAS 158: 422-23(1959). 15p. UC-34-4

RPU-519 STATISTICAL CHARACTERISTICS OF SUDDEN IONOSPHERIC DISTURBANCES. Scientific Report No. 19. Mitra, A. P.; Subrahmanyam, G. V.; Karabin, Miriana. (Radio Propagation Unit, National Lab., New Delhi (India)). Feb. 15, UNCLAS

AEC

This is a sample sheet of a quick taking "sample page" - with these as "back notes" with a note-shingling built - this is a sample to present in the future primary shingling.

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 OAK RIDGE NATIONAL LABORATORY
Libraries

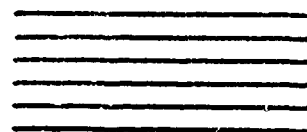
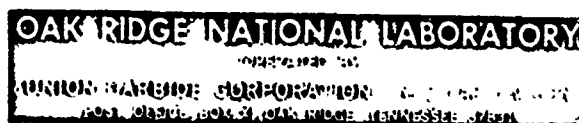
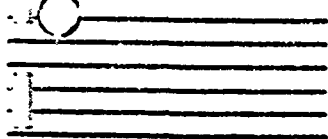
TECHNICAL INFORMATION DIVISION

REPORTS RECEIVED

JULY 11 - 15 1966

MICROFICHE

NO. 66 - 28



Shingling Technique to Produce Accessions List

E-5

EXHIBIT E-2

MICROFICHE

The reports listed below were distributed only in Microfiche form (4" x 6" sheet film). Reader-printers are available for your use in the ORNL and Y-12 Libraries. Any requests for reports received in Microfiche form will be filled by sending a duplicate Microfiche for your files.

Readers have been placed in most Divisions throughout the Laboratory. If a reader is not located near you, call the Librarian's Office (3-6836) and make arrangements for one to be placed in a convenient location.

AEROSPACE SAFETY

LA-DC-7641 ON THE EFFECTS OF COOLDOWN REQUIREMENTS UPON MISSION APPLICATIONS FOR NUCLEAR ROCKETS. Fenstermacher, Charles
UNCLAS (Los Alamos Scientific Lab., Univ. of California, N. Mex.); Oakley, Donald T. (Public Health Service, Nev.). 1965. 14p. UC-36-4

LA-DC-7649 DESIGN AND ANALYSIS OF AN EMERGENCY COOLDOWN SYSTEM FOR NUCLEAR ROCKET REACTOR GROUND TESTS. Nutter, Murlin J.; et al
UNCLAS (Los Alamos Scientific Lab., Univ. of California, N. Mex.). (nd). 22p. (CONF-660608-6). UC-36-4

BIOLOGY AND MEDICINE

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2

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from the file, the information on the heading did not constitute an aid to retrieval since in most installations microfiche were filed by the issuing agency number. Other retrieval devices had to be used for determining the accession number of the microfiche to be pulled from file.

The heading was of most use to the person who actually used the microfiche to obtain information. Since most users who had accumulated a collection of microfiche stored them not by number but by subject, the microfiche heading was very useful for retrieval purposes. In small user collections, which was the most frequent case, the user merely stored the microfiche in random order and used the title information for retrieval.

1.4 Reduction Ratio

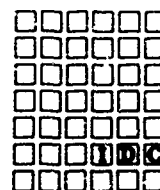
The reduction ratio of approximately 20:1 was acceptable to all three groups

1.5 Conclusions

The overall attitude of users, producers and librarians was that the COSATI standards are acceptable, if any standard must be selected at all. Each group expressed preferences for variations in size, image placement, content and format of title strip, and reduction ratio, but some of these comments can be attributed to past experience with other media and other information systems. Indeed, many installations are presently planning the adoption of the COSATI standard as a company-wide or organization-wide standard for the microreduction of documents. On the other hand, a few installations have elected to depart from the COSATI standard because of what they feel are overriding individual considerations. It was also recognized by the three groups that, although the COSATI standard applies to documentary information, other standards must be utilized in recording other types of information, such as engineering drawings, data sheets, photographs and correspondence. Thus, there will always be a problem in operating several kinds of production, in storing and retrieving different formats, and in using microfilm products.

2. EQUIPMENT IN USE

The study showed that most of the recipients of NASA, AEC, DDC, and other externally produced microfiche do not have adequate equipment



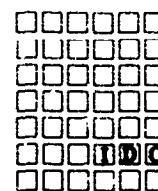
for storing, viewing, reproducing or enlarging the microfiche. Very few libraries are committed at the present time to the exclusive use of microfiche as a primary information communication medium. On the other hand, other departments of the organizations showed a much higher utilization of microfiche or other microform products. For instance, many purchasing departments are utilizing microfilmed buyer guides such as ASCAM, VSMF or Thomas Register. The use of aperture cards is well entrenched in most engineering drawing departments. Microreduction is also becoming a regular data reduction technique in the electronic data processing facilities in reducing voluminous computer printouts to a manageable size. Even such activities as personnel departments and records control departments utilize microfilm for storage of archival records.

2.1 Viewing Equipment

Every recipient of externally produced microfiche had at least one reader, and in most instances this reader was equipped with a printer. In all cases in which one or more readers were available, at least one of these was located in the library. If two machines were located in the library, at least one of these was a reader/printer. In all cases, the reader/printer was not located in a special room set aside solely for the purpose of viewing microfilm, but rather was on the main floor of the library where other types of reading were conducted.

Although the sampling was not sufficiently large to obtain any real measure of the popularity of particular types of equipment, in the libraries visited, the Minnesota Mining and Manufacturing reader/printer was most often available. However, film readers of many other types were also seen. Only one of the film readers examined was equipped with a microfiche holder. All others were geared primarily for the viewing of roll microfilm.

Because of the low use rate of most of the readers, personnel in charge of the reader/printer equipment were not encouraged to carry out a thorough preventive maintenance program. This led to deterioration in the operating condition of either the reader or the printer or both. Since in most installations the equipment cannot be serviced by the personnel who are in charge of it, small annoyances such as loose knobs, misalignment, and erratic operation were tolerated rather than repaired. In one installation the bulb burned out in the reader.



The most frequent commend made by both users and librarians was the difficulty in viewing on currently manufactured reader/printer screens. The next most frequent comment was on the poor quality of printout and the type of paper and process used in printing. Users complained about paper curling, or about paper being too thin and flimsy or too heavy and bulky. There were also complaints about images darkening with age or exposure to light. In all cases, the eye level of the screen was not adjustable to the height of the user so that short people had to look up and tall people had to look down. Some of the chairs stationed in front of the reader were also uncomfortable and not conducive to a relaxed reading position.

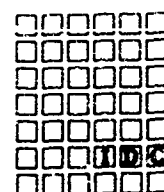
The number of readers available ranged from several hundred in one installation to only one in another. The number of readers available obviously affects the usability of microfiche, since use of microfiche is almost inversely proportional to the distance the user must travel to the nearest reader. Installations which positioned readers close to the users had the greatest use of their microfiche collection. In installations in which the reader was located outside the building housing the user, very little use was made of the microfiche.

2.2 Hard-Copy Production

All installations sampled had at least one machine capable of producing enlarged hard copy from microfiche. All organizations having a microreduced engineering drawing program had equipment for producing hard copy from roll film, microfiche or aperture cards. Often this equipment was used by the library for production copying of microfiche.

For the most part, hard copy was obtained from a single-shot reader/printer. Both the user and the librarian complained about some reproduction techniques taking too long or using a wet process. For the most part, Minnesota Mining and Manufacturing Company machines were found quite acceptable except for the infrequent erratic operating conditions caused by equipment breakdown.

In all installations studied, use of the printer was not encouraged, but in most installations it was not discouraged either. The compromise of classified information was not a problem in most installations studied, since the reader/printer was located in an open area and arrangements had not been made by the library for maintaining a classified document log. In some instances the librarian could copy classified information and carry it immediately to a document control room where it could be signed out properly to the user who requested it.



2.3 Filing Equipment

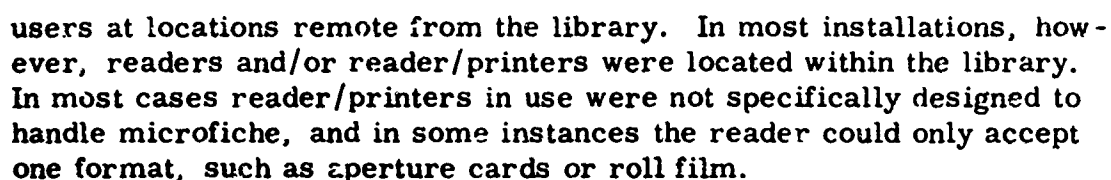
Most installations did have the proper filing equipment for storing the COSATI standard microfiche. However, some installations were using 5 x 8 card files or other files not specifically designed to receive 105mm microfiche. A problem was encountered in filing because of the natural curl of the film base which caused some of the microfiche to slip underneath the microfiche in front so that location and removal was difficult. In some installations drawers were not properly labeled, and the user had to open several drawers before he could find the number sequence for which he was searching. A further difficulty was that retrieval tools such as card indexes or announcement bulletins were not filed close to the microfiche filing cabinets. In many installations the technical abstract bulletins and indexes were not readily available to the user. In all installations the classified STAR, received from NASA, was filed in a locked container.

2.4 Production Equipment

All equipment necessary to produce original microfiche or film and to control its quality was considered. Several installations had 16mm or 35mm cameras, but none had a camera for producing microfiche directly. In one installation microfiche were produced by photographing documents on 16mm film and stripping up the 16mm film onto a clear acetate base (Atlantic Microfilm technique). Installations which performed original microfilming had densitometers and magnifying lenses for checking the quality of density and resolution. These installations also had equipment for developing 16mm or 35mm microfilm. If original microfilming was performed at all, some of the microfilm output was inserted in aperture cards for storing engineering drawings and office records.

2.5 Conclusions

About half of the installations studied had equipment for producing original microfilm. However, only one installation was using this equipment to record technical research documents obtained from external sources or produced internally. In two installations plans were underway for recording only internally produced documentation. All installations had at least one reader/printer and most had at least one extra reader. Production equipment for hard copy was usually located in the engineering drawing or records control areas rather than the library. In two installations reader/printers or readers were readily accessible to

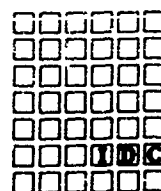


Since the greatest use of microfilm products has been in conjunction with office record keeping or engineering drawings, most microfilm files were located outside the library. Only the files inside the library, however, were studied.

Of the files maintained, the largest in terms of both size and completeness were those containing NASA microfiche. The second largest were files of AEC microcards and microfiche. The third largest were files of individual rolls of 16mm or 35mm film containing extraneous documentation, periodical issues, university theses, and other isolated documents; and the smallest were files containing microfiche and film received from DDC.

Since AEC and NASA distribute microfiche on an automatic distribution list, it is only natural that these products should accumulate to the greatest extent. In the installations studied, a nearly complete NASA collection was available on microfiche, since these installations performed a broad base of research in aerospace technology. Admittedly, this sampling was pointed towards large companies as it was expected that these would have the greatest use for microfiche and other film formats. A difficulty frequently encountered was the systematic storage of 3 x 5 microcards formerly issued by AEC and DDC, the 5 x 8 microfiche formerly issued by NASA, and the COSATI standard microfiche currently issued by AEC, DDC and NASA. Coupled with this was the problem of storing both 16mm and 35mm microfilm, 16mm and 35mm aperture cards and various other film jacketed formats.

Most installations filed the microfiche by the issuing agency's accession number. In the AEC collection this number constitutes a coding used in Nuclear Science Abstracts to identify the corporate source of the original document. Thus, the user of an AEC collection has direct



access to the microfiche by corporate source. The DDC and NASA accession numbers, however, are keyed to a periodically published accessions bulletin which is provided with periodic cumulative indices. Thus, for the most part, access can be gained to the microfiche collection only by reference to the agency-published indices which translate corporate sources, personal authors, subjects, and other document numbers into the agency accession numbers. One installation filed NASA generated reports by NASA Technical Note number, rather than NASA accession number, because this was the file point most frequently referenced by the user. Since an accession number is used for retrieving microfiche from the files, the microfiche heading printed at the top is of little help in retrieving specific items. The heading, however, does provide the necessary information for confirming the right microfiche is being pulled from the file.

3.3 Accessibility to the User

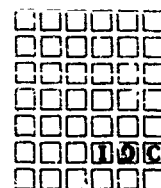
In all installations, the microfiche file of unclassified documents was easily accessible to the user. If the user knew the number of the microfiche he wanted, he could go directly to the file without seeking permission from the librarian or other custodian. In most cases, however, the librarian requested that the user not return microfiche to the file because of the chance of misfiling. Classified files, of course, were kept locked and could only be referenced by the librarian who would remove single documents and supervise the viewing of them.

Even though files were readily accessible, most users preferred to present a list of the required documents and to wait while the librarian retrieved those documents from the microfiche files.

3.4 Age and Completeness

AEC and NASA microfiche files were most likely to extend to the earliest microfiche produced and were most likely to be complete. DDC microfiche collections were all incomplete and had a much lower input rate than that from NASA or AEC. The input rate of DDC microfiche in most installations was comparable to the input of other documentary information contained on 16mm and 35mm microfilm. Some installations only had a handful of DDC microfiche.

The age and completeness of a microfiche collection is very important in terms of the potential uses to which it can be put. In installations which had a relatively complete collection of microfiche, any



request for a full-size document was met by a counter proposal from the librarian to use microfiche instead. In many instances this proposal was accepted by the user but was usually followed, after screening of the microfilm, by a reaffirmation of the desire to obtain a full copy. One installation estimates that ten percent of hard-copy users were eliminated as a result of referring the user to microfiche. In those instances, the user was either satisfied to copy only selected pages from the document or was able to determine that the document was not useful to him.

4. UTILIZATION OF MICROFORMS

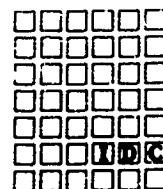
The use of microform material is primarily determined by the type of information contained in the microreproduction. Those materials which require scholarly perusal are least used in any way in microform. Tabular information, numerical data, tables, reference drawings and superseded or outdated information are most readily accepted in microform by the user. The uses to which microforms have been put in the field follow this division of information type very closely. In essence, the acceptability of reference to microform materials is inversely proportional to the time that must be spent in directly viewing the information by means of a reader or reader/printer. Short viewing times are tolerated; long viewing times (over ten minutes) are generally considered inconvenient.

4.1 Use as a Primary Information Source

In terms of frequency, this mode of usage represents the highest proportion of the total use of microform products. In terms of time spent in viewing, this represents the smallest portion of use. Most uses of microfilm, either in roll or unitized format, are for quick reference to a specific item. The information on the image must be readily comprehended by the user. Most information of this type consists of engineering drawings and other graphic information which can be conveyed visually in a short time period. Although a few users will sit for hours in front of a reader and study very difficult materials on microfilm or microfiche, most users cannot comfortably maintain a reading pose in front of a viewer for more than five minutes.

4.2 Use of Microfiche as a Master for Generating Hard Copy

To reduce reading time at the viewer, most users print selected pages from documents. For quick reference some hand notes are



made, but a copy of the page on which the information is recorded is much preferred to note-taking. Only about ten percent of the users will personally copy a complete document, and this is done only if the document is relatively short. The average user either requests the full copy of the document from the library or sends a subordinate to copy the complete document.

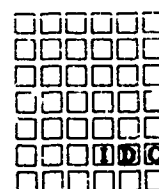
In all installations studied, the reduction in ordering of hard copy had been noticable but not substantial. Some installations had attempted to provide copying service for the user instead of ordering full-size documents from originating agencies or document supply services such as DDC, AEC or NASA. No matter what approach to copying has been used, this practice has turned into an expensive proposition. One installation indicated a cost of 30 cents per page for copying certain kinds of film and microfiche.

Three of the installations studied had high-volume copy equipment directly under the control of the library. In the other installations, if equipment was available at all, it was under the control of another department such as a separate reproduction section. The use of such non-library controlled services presented some problems in obtaining rapid copy service and, in some cases, acceptable quality. Because of the heavy demands for full-size copies, some installations have contracted out the production of full-size copies, from its microfiche collection. This service was offered only if sufficient reason were given by the requestor for obtaining rapid service.

Although there was some use of microfiche-to-microfiche duplication, no studies had been conducted by the users to determine whether a personal copy of the microfiche reduced the necessity for having a full-size copy of the document at hand. At one installation, any microfiche copy could be ordered by any individual, but the individual had access to a reader/printer which he often used himself to produce hard-copy.

4.3 User Reaction to Proposed Reduction in Hard-Copy Dissemination by Government Organizations

Since the user has not, apparently, accepted microfiche as a primary information source, the cost of producing hard-copy would become a problem to individual companies should the Government agencies curtail dissemination of full-size documents. The cost would surely be reflected through overhead or direct charges in the cost incurred by the Government in contracting out research and development



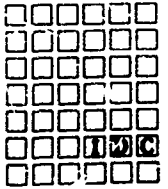
projects. Indeed, some installations are already talking about charging the cost of a reader/printer directly to a project. Several installations produce hard-copy on demand, but charge the cost of the copying either to a Government-funded project or to the department which employs the individual requestor.

Another factor to consider is the present unavailability of equipment which is capable of the necessary high production rates for producing hard-copy from microfiche in the required quality. Equipment which is available is slower than hard-copy production equipment presently used for copying from roll microfilm and is much more expensive. The smaller organization which could not support an efficient reproduction department would be at a distinct disadvantage because of the higher cost of copying and the time delay incurred in contracting out the reproduction of documents.

4.4 Screening of Documents

By far the greatest use of microfiche containing technical documentation is for screening large numbers of reports for selection of those to be ordered in full size. Since selection can only be based on knowledge of the information requirements of the user, this process is most often conducted directly by the user. The use of microfiche for Screening Microfiche accounts for most of the time spent at readers or reader/printers. Even though the user may copy portions of documents during screening, he is still likely to order the full-size copy for his file.

In some installations the librarian will perform the screening operation as part of the preparation of a bibliography requested by individual users. In this case the librarian assembles a package of microfiche for the user to scan, from which he selects documents for full-size order. Even with the screening process, only about ten percent of hard-copy orders are eliminated. Approximately sixty percent of the documents scanned, however, are eliminated from further consideration. These two figures combined would indicate that the potential reduction in hard-copy orders as a result of scanning is much higher than the ten percent currently being experienced in most libraries. This would indicate that relatively few personnel are willing to scan documents on microfiche. This in turn may be due to the fact that, in most cases, the individual must come to the library in order to perform the scanning because readers are not available close to his work area.



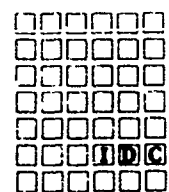
5. IN-HOUSE MICROFORM PROGRAMS

Of eleven installations studied, three are currently carrying on an internal microfilming program to record internally produced documents and to reformat some documents externally received in other microfilm formats. One of these records internal documents on 16mm microfilm; the other two record on microfiche. Several other installations have discussed document microfilming programs, but these are still in the planning stage. For the most part, internal microfilming is presently confined to recording engineering drawings on 35mm microfilm or recording office correspondence on 16mm or 35mm microfilm. In addition, several of the installations participate in the Inter-Service Data Exchange Program (IDEP) on electronic and electrical components. These files, however, are produced externally and merely used like any other microform input, except that the participating institutions submit test data to the central processing facility. Several installations are using microfiche or microfilm as a data base for the selective dissemination of information. Recipients of document notices can view documents of interest at strategically located stations which are stocked with internally produced microfilm records and other microform products received from DDC, AEC and NASA.

6. ADDITIONAL COMMENTS

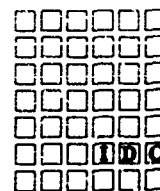
Installations which are on automatic distribution for AEC and NASA microfiche do not index the information for retrospective retrieval. This is a departure from the normal procedure of subject indexing and descriptive cataloging of all incoming documents. This practice puts additional responsibility on the issuing agency to provide adequate indexing and abstracting so that retrospective searches can be conducted to determine which microfiche are applicable to a given problem.

To the librarian the major advantages of microfiche are ease of storage because of uniform size, and the extreme reduction in storage volume. Because so much more information can be stored in a small volume at low cost, the necessity for weeding out superceded or outdated information is sharply reduced. In most cases, the library can afford to store a ten-year accumulation of materials, so that any material older than this can be weeded out automatically. Thus, there is no problem of scanning individual documents to determine value on a case-by-case basis.



All libraries experience difficulty in keeping up with changes to the microfiche collection, such as new microfiche issued under the same accession number replacing previously shipped microfiche and changes in security classification and grade.

F. REVIEW OF MICROFICHE APPLICATIONS



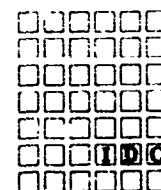
Contacts were made with personnel engaged in several of the large Government microfiche-dissemination programs, as well as with representatives from those microfilm equipment companies which are engaged in microfiche production for a variety of non-Government information systems utilizing the microfiche as the prime medium for information distribution. At the present time there appear to be six organizations within the Government engaged in formal programs utilizing the microfiche. Of these, four -- DDC, AEC, NASA's Scientific and Technical Information Facility, and the Clearinghouse for Scientific and Technical Information -- are utilizing the COSATI microfiche standards. The National Weather Records Center and Armed Forces Institute of Pathology are presently engaged in programs utilizing non-standard microfiche. In the non-Government area a number of systems have been implemented using both standard and non-standard microfiche formats. The following is a brief description of these typical microfiche applications.

1. GOVERNMENT USE OF MICROFICHE

Government agencies were among the first to make extensive use of the microfiche form. NASA and AEC both use it for the world-wide distribution of technical and research reports. Within the last two years the Clearinghouse for Federal Scientific and Technical Information and DDC have also established report dissemination systems utilizing the microfiche as the prime information communication medium. In each of these dissemination systems the microfiche product conforms to the COSATI standard, both in format and physical size. There are, however, two other organizations within the Government producing microfiche for dissemination which, because of considerations unique to their particular application, do not conform to COSATI standards. These dissemination systems are described below.

1.1 National Weather Records Center

At the National Weather Records Center a microfiche system has been set up for the dissemination of Observation Data received from approximately 300 stations located within the continental United States. In this particular system the decision was made to use the 5 x 8 microfiche size in order to permit each unit record to contain a complete month of observations from each of the 300 reporting stations. Each microfiche contains a minimum of 60 data sheets. Such data is disseminated to 45 weather field stations, state climatologist offices, and to the major airlines; thus, the dissemination requirements of this system range from 1500 to 1800 microfiche copies per month.



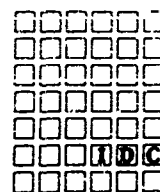
The microfiche are prepared and used in the following manner: the material is filmed four-up of 35mm microfilm using a Recordak MRG camera at a reduction ratio of 24X. The film is then processed in a normal manner. A microfiche master is prepared by use of a modified General Aniline and Film Corporation Actifilm Printer. This printer has been modified by the installation of an egg crate collimation system which has been mechanized to provide a light dodging capability during the exposure cycle. In this manner 5 x 8 microfiche masters are produced without destroying the original roll of film which is currently being archived. A sheet-to-sheet printer is then used to produce the desired number of copies for dissemination. At each of the user locations the microfiche are filed according to the station month. Because of this requirement that each unit record contain one complete month's observations from any one station without a need for trailer fiche, the COSATI standards were not followed.

In addition to the above system, the Weather Bureau is also reformatting 35mm cloud photography obtained from satellites into unit records (8-1/2 x 11) by use of automated step-and-repeat equipment.

1.2 Armed Forces Institute of Pathology

A microfiche system is currently being instituted at the Armed Forces Institute of Pathology, located at the Walter Reed Hospital in Washington, D. C. This system is set up to permit the dissemination of patient records. Each unit record consists of a 5 x 8 microfiche which contains data on the patient's medical history, including pathology reports, lab reports, EKG's, autopsy reports, etc. Due to the need for the unit record to contain more information than would be possible using the standard COSATI format, the decision was made to use the larger size 5 x 8 microfiche format. At the present time and for reasons of personal preference, the patient record data is being filmed on a modified Recordak RR2 rotary camera at a reduction of 20 to 1, and the output product is 16mm roll film. The microfiche master is then prepared and used in the following manner.

The 16mm film is stripped up on acetate sheets (approximately 5-1/4 x 8-1/4) by means of Recordak equipment designed for that purpose. This stripped up master is then used in a Kalvar contact printer to produce the necessary copies for dissemination. At the present time a backlogging operation is under way and there has been no formal dissemination of the microfiche. (However, in some instances, copies of the Kalvar microfiche have been sent to



doctors located within the immediate vicinity of the pathology institute.) Due to the need for a microfiche system wherein the material can be changed and added to, a recent decision has been made to use ultra-thin microfilm jacket for the microfiche master. This change-over will be put into effect as soon as the present supply of acetate sheets is exhausted.

2. NON-GOVERNMENT USE OF MICROFICHE

Industry has lagged behind the Government in the application of microfiche, but all indications seem to point to a usage trend which will far outstrip the Government activities within the next few years. The following examples of microfiche use by commerce, industry and the professional communities are included to show typical categories of information storage and dissemination systems considered candidates for increased utilization of microfiche within the next few years.

According to information obtained from a supplier of a low-volume microfiche production system the following list represents a sampling of the organizations being served and their particular applications of this microfiche system:

<u>Organization</u>	<u>Application of Microfiche</u>
American Cyanamid Corp.	Journal reprint files
Eclipse Pioneer Corp.	Reliability reports
Western Electric Corp.	Technical documents
Bell Laboratories	Internal reports
Simmonds Precision Laboratories	Personnel files
Winthrop Sterling Research Institute	New drug applications
Olin Mathieson Chemical Corp.	Progress reports
National Bureau of Standards	Thermo-chemical articles
Derivation & Tabulation Associates	Electronic component data
Warner-Lambert Research Institute	New drug applications, infra-red spectra
Sandoz Pharmaceutical Corp.	New drug applications-reprint file

In addition to the above, a number of hospitals are currently using microfiche for storage and dissemination of medical case histories. Among these are: Latter-Day Saints, Salt Lake City, Utah; McGee Woman's, Pittsburgh, Pennsylvania; Wesley Memorial, Chicago, Illinois; Doctor's Hospital, Coral Gables, Florida; University Hospital, Augusta, Georgia; Beth Israel, New York City.

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According to information obtained from one of the large microfilm equipment manufacturers, a microfiche system has been developed for the Appliance Parts Distribution Association (made up of appliance manufacturers such as General Electric, Hotpoint, RCA and Westinghouse). This system uses a standard 4 x 6 size microfiche, however, the format does not conform to the COSATI standards. A film reduction ratio of 24X is used, and each microfiche can contain up to 96 pages of parts data. A strip-up technique is employed to make the microfiche masters used in this dissemination system. Typical end use of the microfiche to be distributed by this system is explained in Exhibit F-1.

A catalog storage and retrieval system, based on the use of the 4 x 6 microfiche, has been in widespread use during the last few years. In this system pages of manufacturer's catalog data are photographed with a step-and-repeat camera on a microfiche format consisting of 6 rows and 12 columns. Thus each individual microfiche can hold up to 72 8-1/2 x 11 catalog page images. These cards are normally filed alphabetically by the manufacturer's name, and storage and retrieval are accomplished manually.

Many of the microfilm equipment manufacturers expressed the opinion that maintenance manual, parts list, and instruction book publication areas represent prime candidates for large potential usage of microfiche. At the present time Air Canada is using microfiche for the dissemination of parts and maintenance information to its various repair depots. The microfiche collection is accessioned by subject area (e.g., landing gear). Each of the subject areas has been assigned an accession number, and the microfiche collection is usually arranged numerically by subject areas. The microfiche system in use at Air Canada makes use of tinted-base diazo material for coding as follows: red-based microfiche denotes components associated with the DC 9 aircraft, while blue-tinted microfiche denotes similar components for DC 8 aircraft. It is interesting to note that two other airlines, United Air Lines and Eastern Airlines, are utilizing roll film systems for similar applications.

3. GOVERNMENT-OPERATED UNIT RECORD SYSTEMS NOT EMPLOYING MICROFICHE

Queries were made to discover information dissemination systems where the use of microfiche had been considered and, for one reason or another, a decision was made to go to some other type of dissemination medium. Of particular interest are two systems where decisions were made to reject microfiche on an economic basis. These systems are described below:



Westinghouse TELEMATIC "RAPID SYSTEM" FILM CARD PARTS CATALOGUE

Telematic **RAPID SYSTEM**

**Recordak
Appliance
Parts
Information
Distribution**

The "Rapid System" was developed by the Recordak Division of Eastman Kodak Co. and offers the following advantages:

- Complete parts catalogues in a minimum amount of counter space.
- Rapid location of any part number.
- Easy to keep up-to-date.
- Uniformity of parts data presentation for easy reading.
- You can now have several or all manufacturers parts data in one convenient space saving location.
- Bulky paper books no longer essential to successful operation of a parts department.

EXHIBIT F-1

here's how to use the Westinghouse Telematic "Rapid System"

1 Refer to Westinghouse "Renewal Parts Data Master Index" to find parts catalogue No. (RPD #) covering the appliance model being serviced.

Appliance model Nos. are listed in alphabetical or numerical sequence in the master index.

In this example model LB-6 washer is listed in RPD (renewal parts data) publication No. 289-045.

2 Next refer to Filmcard Index to find location of RPD #289-045 on filmcard. RPD Nos. are listed in numerical sequence on Filmcard Index. For example - RPD 289-045 begins (first page) on Filmcard #1 Row C Column 3.

3 Next place filmcard in the reader and position to read Row "C". Turn center knob to locate correct column (in this example Col. # 3). The first page of RPD 289-045 is now projected on the reader screen. Rotate knob to proceed through catalogue to the correct page.

Each filmcard contains up to 98 pages of parts data.

Westinghouse Parts Data 289-063			
WESTINGHOUSE ELECTRIC LAUNDRY EQUIPMENT			
MASTER INDEX			
TO			
LAUNDRY EQUIPMENT RENEWAL PARTS DATA			
LAUNDROMAT, WASH 'N DRY LAUNDROMAT WASHER AND DRYER			
Model No.	Renewal Part Data	Model No.	Renewal Part Data
LAUNDROMAT			
LB-6	289-045	LB-6	289-045
LB-6M	289-045	LB-6M	289-045
LB-6SA	289-045	LB-6SA	289-045
LB-6SD	289-045	LB-6SD	289-045
LB-6S	289-045	LB-6S	289-045
LB-6SV	289-045	LB-6SV	289-045
LB-6SW	289-045	LB-6SW	289-045
LB-6W	289-045	LB-6W	289-045
LB-6WS	289-045	LB-6WS	289-045
LB-6WSV	289-045	LB-6WSV	289-045
LB-6WSW	289-045	LB-6WSW	289-045

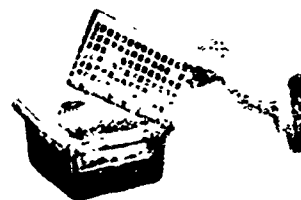
WESTINGHOUSE LAUNDRY EQUIPMENT			
MASTER FILMCARD LOCATION INDEX			
TO			
LAUNDRY EQUIPMENT RENEWAL PARTS DATA			
LAUNDROMATS		DIP LOCKS	
Renewal Part Data	Row	Renewal Part Data	Row
289-045	1-4-3	289-045	1-4-3
289-045-1	1-4	289-045-1	1-4
289-045-2	1-5	289-045-2	1-5
289-045-3	1-6	289-045-3	1-6
289-045-4	1-7	289-045-4	1-7
289-045-5	1-8	289-045-5	1-8
289-045-6	1-9	289-045-6	1-9
289-045-7	1-10	289-045-7	1-10
289-045-8	1-11	289-045-8	1-11
289-045-9	1-12	289-045-9	1-12
289-045-10	1-13	289-045-10	1-13
289-045-11	1-14	289-045-11	1-14
289-045-12	1-15	289-045-12	1-15
289-045-13	1-16	289-045-13	1-16
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289-045-15	1-18	289-045-15	1-18
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289-045-22	1-25	289-045-22	1-25
289-045-23	1-26	289-045-23	1-26
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289-045-38	1-41	289-045-38	1-41
289-045-39	1-42	289-045-39	1-42
289-045-40	1-43	289-045-40	1-43
289-045-41	1-44	289-045-41	1-44
289-045-42	1-45	289-045-42	1-45
289-045-43	1-46	289-045-43	1-46
289-045-44	1-47	289-045-44	1-47
289-045-45	1-48	289-045-45	1-48
289-045-46	1-49	289-045-46	1-49
289-045-47	1-50	289-045-47	1-50
289-045-48	1-51	289-045-48	1-51
289-045-49	1-52	289-045-49	1-52
289-045-50	1-53	289-045-50	1-53
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289-045-69	1-72	289-045-69	1-72
289-045-70	1-73	289-045-70	1-73
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289-045-74	1-77	289-045-74	1-77
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289-045-93	1-96	289-045-93	1-96
289-045-94	1-97	289-045-94	1-97
289-045-95	1-98	289-045-95	1-98
289-045-96	1-99	289-045-96	1-99
289-045-97	1-100	289-045-97	1-100

how to obtain and install the Rapid System

See ordering instructions on back page.

- Order Catalogue and Subscription from your Westinghouse Distributor, Parts Center or Parts Distributor.
- Contact nearest Eastman "Recordak" offices for Readers and equipment needed plus training in its use.

Distributors can now have several or all of the latest parts data in one convenient space saving location. Bulky paper books no longer essential to successful operation of a parts department.

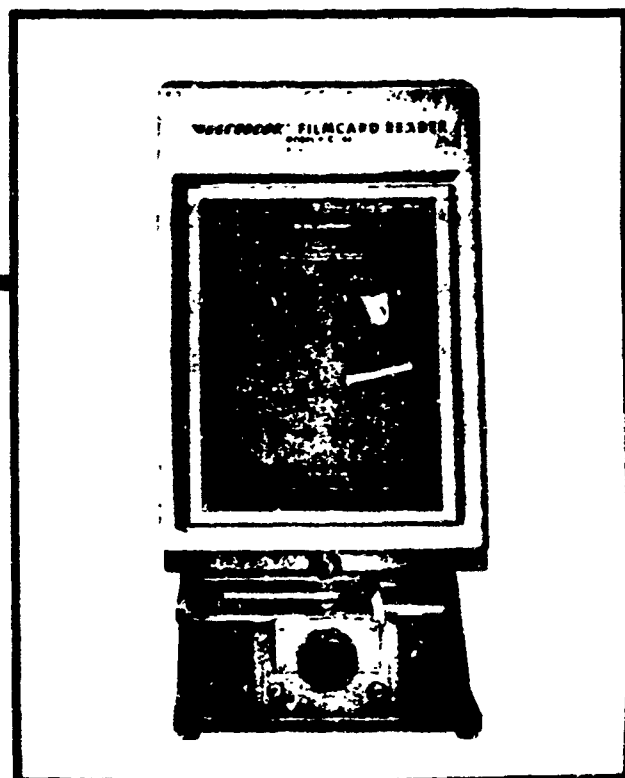


	PARTS DATA LAUNDRY EQUIPMENT													CARD #1
G														
F														
E														
D														
C														
B														
A														
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This is an actual size filmcard. Photo at right shows image projected on screen.

Filmcard readers

Recordak Model PFC46-1 may be ordered from local Recordak offices at a cost of approximately \$210.00. Accessories such as index binders, magnetic trays (for filmcards) are also available and must be ordered from Recordak. Training in the use of reader machines will be supplied by Recordak personnel if requested.



F-7 SEE BACK PAGE FOR SUBSCRIPTION PLAN

how to secure the Westinghouse Telematic "Rapid System" Filmcard Catalogue

Westinghouse is making available:

1. 15 year major appliance filmcard parts catalogue with:

A. Filmcards for each product line.

B. Index (master and filmcard).

Products covered — refrigerators, freezers, ranges, washers (domestic and commercial), dryers, water heaters, dishwashers, disposers, room air conditioners, water coolers, dehumidifiers.

2. Subscription service update includes mailing of all catalogues printed during year as they are issued and new filmcards updating complete filmcard catalogue twice a year.

PRICE —

A 15 year Filmcard Major Appliance Parts Catalogue covering period 1950 through January 1966. Order —

Form #6SE-9962 Filmcard Catalogue \$24.75

SUBSCRIPTION SERVICE

Biannual update, includes all catalogues as issued in 12 months following catalogues included in package #6SE-9962 and Filmcards, to bring Filmcard Catalogue up to date twice a year. Order —

Subscription #6SE-9971 Price \$10.00 a year.

Order from: Westinghouse Major Appliance Distributor, Parts Center or Franchised Parts Distributor.

Contact nearest Recordak offices for equipment —

NOTE: Do not confuse this Catalogue and Subscription Plan with other Subscription Plans for Service Manuals, Beacon and other Service Data such as Plans A, B, C, L and S.



WESTINGHOUSE APPLIANCE SALES AND SERVICE COMPANY
A Division of Westinghouse Electric Corporation
Major Appliance Service Information Dept. • Mansfield, Ohio

ORDER BLANK

Quantity	Form #	Description	Unit Price	TOTAL
	6SE-9962	15 year catalogue	@ \$24.75	
	6SE-9971	Subscription	@ \$10.00 per year	

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

COMPANY _____

Send order to your Westinghouse distributor

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**G. MICROGRAPHICS - A FORECAST OF FUTURE
SIGNIFICANT DEVELOPMENTS**

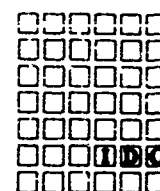
The discussions and observations which follow are intended to reflect the attitudes, opinions, and understanding among various representative members of the microfilm and graphic art industries. These people were requested to reflect on the general future of microfiche and to identify areas of significant development activities within their organizations. The great majority of the companies queried labelled such disclosures as proprietary; however, where it became obvious that a number of companies were working on parallel approaches to the same problem, it was assumed that the general areas of research and development effort could be identified without violating the proprietary understandings. Most of the companies were extremely reluctant to discuss details of their research and development activities and, in some cases, were reluctant even to identify areas of interest outside of their present product lines. However, sufficient intelligence was gained from this effort to identify those development activities with a high enough potential of success to result in hardware and process technology which could be of significant importance to DDC microfiche production activities during the time span of interest in this study program.

**1. INFORMATION DISSEMINATION - THE FUTURE ROLE OF
MICROFICHE**

An intense interest and enthusiasm in the future of microfiche was revealed in the discussions with microfilm equipment and materials manufacturers. Considerable effort in terms of research and development money is being committed to the development of equipment and materials capable of producing high-quality, lower-cost microfiche, and no indications have been uncovered which signify that the usage of microfiche will do anything but increase within the next five-year period. No unusual microform configurations were identified which appear to threaten the significant role of the 4 x 6 size microfiche as a principal information dissemination tool. However, some equipment manufacturers indicated that present COSATI format will have to be changed to accommodate higher reduction ratios (24X, 30X, etc.) in order to increase the information capacity of each microfiche. Another change recommended was the elimination of the segmentation of documents larger than 8-1/2 x 11 as is now required, since it was generally agreed that format changes to allow filming report foldouts as a single frame were highly desirable.

2. INCREASED PARTICIPATION IN THE MICROFILM FIELD

One of the most significant observations gained through the discussions is that groups not heretofore considered as microfilm-oriented are conducting vigorous research programs geared towards high-volume



production of microfiche. It is expected that the increased competition brought about by the entrance of these new companies into the microfilm field will prove extremely healthy for both the industry and the microfiche-user community.

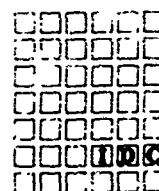
3. LOW-COST MICROFILM PRODUCTION

The extent of research and development activity in this area was perhaps the most difficult to identify. With the exception of the development activity under way by a number of printing equipment manufacturers (production of microfiche via offset techniques), no other approaches were suitably defined to permit any detailed discussion of expected results within the next five years. The majority of microfilm equipment and film manufacturers were of the opinion that any significant breakthroughs in the microfiche production area would be based on photographic processes, possibly brought about through the development of: higher speed camera films, fully automated microfiche camera operations, higher speed conventional copy films, improved photopolymer films, and/or automation in the microfiche handling and duplicating capabilities. On the other hand, representatives of the graphic arts industries felt that printing techniques offered a great opportunity for low-cost mass dissemination of information either on opaque or transparent-based materials.

4. END-USE EQUIPMENT DEVELOPMENT

4.1 Reader/Printer Equipment

Considerable research and development activity is under way in the development of improved reader/printer equipment to handle all types of microfilm imagery. Some of the interesting developments that will be seen in equipment over the next five years are: larger screen sizes to permit viewing in full size the 11 x 17 foldouts which are prevalent in research and development reports and documentation; aperture devices to eliminate the nauseous effects of eye strain associated with viewing film imagery as it moves through the reader/printer; hard-copy production processes with image reversal capability to permit producing positive prints from positive film imagery, negative prints from negative film imagery, and combinations therefrom; and lower cost hard-copy printouts (goals are less than 5¢ per 8-1/2 x 11 sheet). Some development work has been aimed towards meeting the psycho-physical requirements of the users of reader/printers. Advances in the electronics and optical industries may make possible the miniaturization of the reader to a point where it can be held by the user in much the same manner that a book or report can be held and manipulated.



4.2 Hard-Copy Printout Equipment

No information was uncovered in this review to indicate that significant development programs are under way to produce high production, hard-copy printout devices, although some companies expressed the opinion that in-house technology was suitably advanced to the point where such equipments could be developed provided a suitable market could be identified. The proposed use of the electrostatic process in the Microcard EL4 may provide a speed up in hard-copy printout capability, although this is not a prime consideration in the program.

4.3 Offset Plate-Making Equipment Development

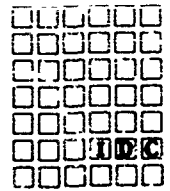
There is a great deal of research and development activity within both the microfilm and graphic arts industries to produce automated plate-making equipment capable of using a microfiche input. These programs have developed to the point where prototype equipments will be available for evaluation during the next two years.

4.4 Sensitized Material Developments

Many manufacturers of sensitized materials are engaged in programs to develop faster materials with better contrast to provide higher production capabilities. One manufacturer of copy films is currently considering pre-stripping film with a material capable of transmitting actinic light to allow the color coding of microfiche header areas with no compromise in the utilization of the microfiche copy as a master for subsequent generation processes. Other manufacturers are engaged in producing conventional sheet film with modifications to allow usage in automated material handling systems. Another manufacturer is actively engaged in a program to improve paper being supplied to DDC to provide a whiter background, improved contrast, and longer image life. In general, all developments seem to be aimed towards speeding up the copying operations (both film and hard-copy duplication) to provide faster duplication at lower cost with a superior quality end product.

Research effort in photopolymers is under way in several companies. However, results of testing to date have not been reported to the extent that advantages of use for microfiche production have been clearly identified.

Companies engaged in the production of diazo film products have been working on the development of a heat-developable diazo product. At the present time one company appears to be fairly close to solving some



of the major problems associated with this technique and has expressed confidence that within the next two years production control techniques will have been perfected to the point where this material will be available for commercial use.

4.5 Materials Handling Equipment Developments

Discussions with the manufacturers of paper and materials handling equipment indicate that this industry is not engaged in development of equipment specifically for use in microfiche production and associated activities. It was generally felt that, where practical, equipment which is currently utilized for the handling of hard-copy materials could be modified for microfiche handling if the manufacturers were convinced that a suitable market existed. There is some question as to sales potential because of the small number of customers who have a requirement for high-volume microfiche production during the next few years.

With regard to materials handling equipment which has been specifically developed for microfiche, it appears that the most significant developments have been made by the microfilm equipment manufacturers themselves, and one company in particular appears to have made the most significant contribution to date in the development of microfiche cutting and envelope insertion equipment. However, it is interesting to note that, since the company feels that such automated equipment will be of practical use only in high production systems for which there appears to be a limited market at the present time, future research and development effort to refine the equipment from its present form is not contemplated.

Data sheets for:

STEP-AND-REPEAT CAMERA EQUIPMENT

(Section C-1, 1)

1509 8TH STREET S.E.
WASHINGTON, D.C. 20003

J.L. MULLENS N.V. - P.O.B. 6109 - THE HAGUE HOLLAND
Newtonstraat 419 - Tel 395343 - Cables: MICROFICHE THE HAGUE

DAGMAR MICROFICHE STEP- AND REPEAT CAMERA EQUIPMENT

With the DAGMAR Microfiche Step- and Repeat Camera (photo 1) microfiches can be made in the sizes 105x148 mm and/or 90x120 mm and/or 3x5 inches (7½x12½ cm).

The originals are exposed one by one (of course two pages of a book or report make one exposure).

After each exposure the camera automatically transports the holder with the filmsheet to its next position till the pre-set number of exposures per row is reached.

Then the camera is blocked and a buzzer signals for a new row to be started. The slide which keeps the holder with its filmsheet is then pushed back again to the left and a new row of exposures can be started. While pushing the slide to the left the filmholder will be brought automatically into its new position for the next row. This system is equal to that of a typewriter.

Illumination is done by incandescent lamps which are invariable, however, exposure-times are set on an electronic timer which ensures constant times throughout the work. Of course exposure times must be altered as soon as originals are of various natures.

The DAGMAR Microfiche Step- and Repeat Camera can take originals up to 16x24" (40x60 cm) on the table (or if necessary under the glass-top) whereas books can be photographed two pages at a time on the special foot-controlled book-accessory up to a size of 12x16" (30x40 cm) open and a thickness of about 2½" or 9 cm.

The installation for 9x12 cm and/or 3x5" microfiches also includes a title-camera (photo 3), a complete set of masks and racks (photo 2), simple processing tools (the main part shown on photo 4) and a positive printer (photo 5).

The built-in lenses (French and/or German made) are of excellent quality.

The Step- and Repeat Camera is made for variable reductions. Because of the many existing sizes of books, reports, papers, documents etc, the varying quality of the prints, writings and of the paper used this proves to be absolutely necessary.

The installation for the 105x148 mm size does not include a positive printer.

Upon request the camera can be supplied with facilities to produce microfiches as described in the N.M.A. standard specification M-1-1963, thus for five rows of 6 double or 12 single frames on the title microfiche and for six rows of 6 double or 12 single

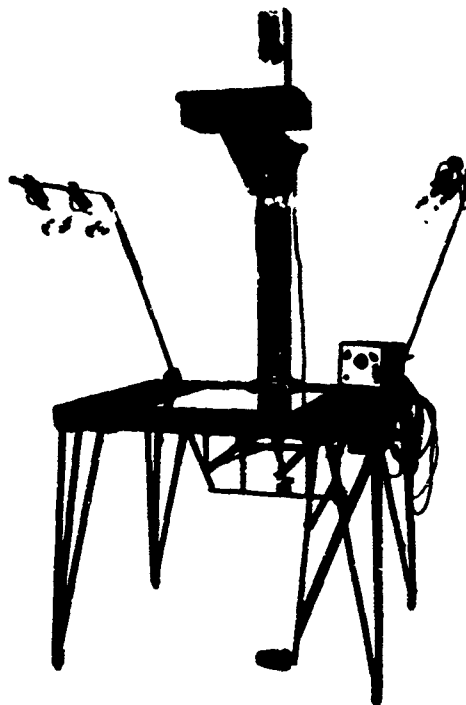


Photo 1

J.H.MULLIENS N.V. - P.O.B. 6109 - THE HAGUE HOLLAND
Newtonstraat 419 - tel. 395343 - Cables: MICROFICHE THE HAGUE

More-over also a complete set of masks and racks can be supplied but then both first and trailer-microfiches will have a title-space which after all facilitates the filing of the microfiches and the finding again.

In case a complete set of masks and racks is supplied the user will be able to use the filmsheets in the most economical way,

With each camera a simple graph is supplied to determine the maximum number of images that can be placed on each microfiche to ensure easy reading and perfect reproduction.

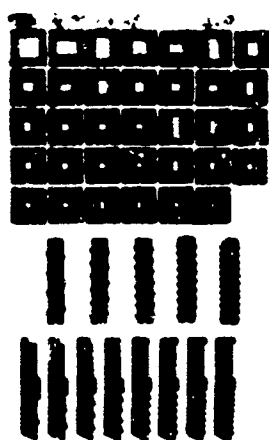


Photo 2

The titlecamera photographs the titles (type- or handwritten) onto each microfiche after the Step- and Repeat Camera has done its job. Right after the last exposure on a microfiche has been made the camera refuses to take more automatically till a fresh holder has been inserted. The filmholder with the exposed film is taken out and put in the title-camera. After exposing the title, which only takes three to five seconds, the holder is passed on to the darkroom for emptying and refilling. The immediate processing ensures a most efficient production. Retakes, if any, can be made at once because the originals are still at hand and no useless production is made

because of mistakes, technical troubles etc. are being discovered too late.

The speed of the camera depends always on the speed of the operator turning the pages. A quantity of 5.000 single frames of documents or double frames of books is possible. The photographer in the darkroom is able to process the production easily (he even will be able to do the work for two cameras) and to supervise the work. In a continuous production 300 to 500 negative microfiches can be processed with our basically very simple development tools.

The positive printer is only for duplicating on photographic (silver) materials. One operator and an aid can do up to 500 prints per day easily including the processing.

Special auxilliary parts for all equipment can be supplied on request.

The installation is all-metal, painted in grey-green.

It is heavy and steady, of a simple but very reliable construction, with very few switches and easy to operate.

No special maintenance is necessary. Keeping it clean is the most important condition to ensure trouble-free operation.

With the installation a booklet is

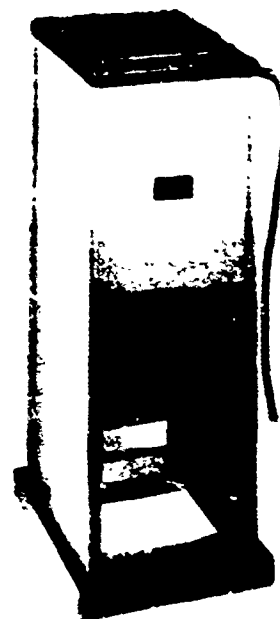


Photo 3

J.H.MULLENS N.V. - P.O.B.6109 - THE HAGUE HOLLAND
Newtonstraat 419 - Tel. 395343 - Cables: MICROFICHE THE HAGUE

supplied, describing the set-up, the production of microfiches, the lay-out of a darkroom and many other things whereas a list of parts of the camera itself and photographs of those parts are included.

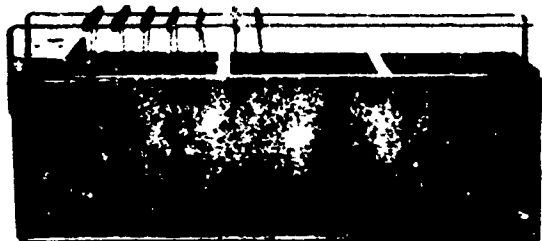


Photo 4

If necessary experts are available to instruct and train future operators.

Ask for further information with the manufacturers:

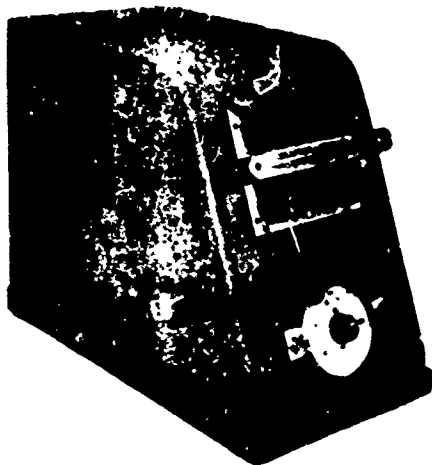


Photo 5

J.H.MULLENS N.V.,
P.O.B.6109,
The Hague, Holland.
Telephone 395343,
Cables: Microfiche the Hague

specifying your needs and wishes.
And always remember

D A G M A R D O E S I T

-0-0-0-0-0-0-

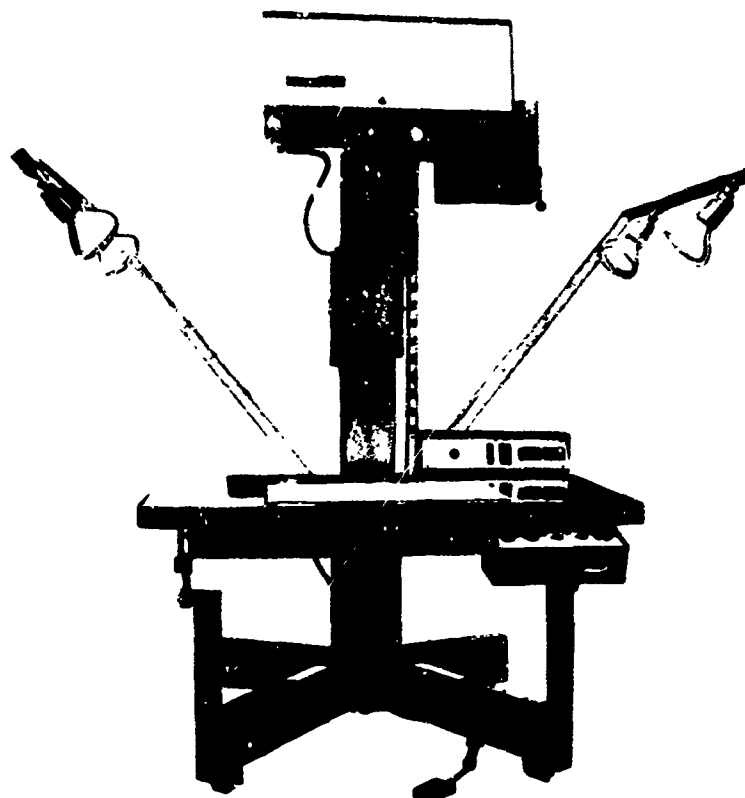
AUDIO VISUAL RESEARCH
1509 8TH STREET S. E.
WASECA, MINN. 56093

The DAGMAR range consists of

the DAGMAR SUPER readers
the DAGMAR TWIN COMBI 2133 reader-printer
the DAGMAR MICROFICHE Step- and Repeat camera

fine Approx 6.000
Delivered 4-6 months

THE NEWEST
QUALITY-BUILT
MICROFICHE
CAMERA
AVAILABLE



MICROFICHE CAMERA

For years there has been a need for a quality, production Microfiche Camera, backed by a well-known, experienced company with nationwide sales and service facilities. At last, such a camera is now available from Bell & Howell—a name known and respected throughout the world for making precision photographic equipment.

The Bell & Howell Microfiche Camera is quality built. It has been carefully engineered and extensively tested in conjunction with the needs of an actual production operation. It is a completely flexible, planetary exposure unit that photographs a given piece of copy, and then accurately steps the film to the next row position automatically.

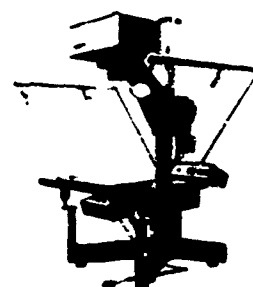
Upon finishing each row, the unit automatically advances to the starting column, and at the same time, advances to the next row. As all photography uses the optical center of the lens, maximum resolving capability is assured.

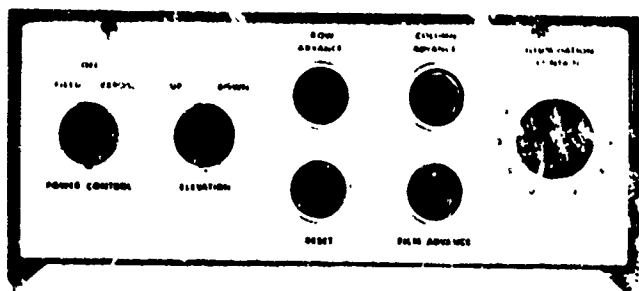
Pre-determined and definitive stepping segments within the camera unit further assure totally uniform image-to-image spacing, and more importantly, complete uniformity from fiche to fiche. The image field light enables documents of varying sizes to be photographed uniformly on the fiche in a simple rapid operation.

Also contained within the camera is a film titling system set up to permit totally automatic operation. The title of the microfiche subject is exposed to the header portion upon completion of the fiche.

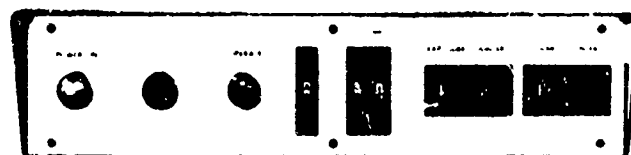
The unit is equipped with a Selectron control to assure top image quality of all images, regardless of the color of the document.

Other automated features make the Bell & Howell Microfiche Camera the most flexible unit available today.





CONTROL PANEL



OPERATION INDICATOR PANEL

Bell & Howell MICROFICHE CAMERA

SPECIFICATIONS

FILM SUPPLY—100 ft. of 105mm roll film with uniform pull down of 148mm.

REDUCTION RATIO—Automatic 10 to 26 continuously variable. Easily operated motorized camera elevation controls. Illumination level of photo lamps automatically controlled when reduction ratio changes.

IMAGE FIELD—Image field light enables operator to determine exact size and proper placement of original document to be filmed at any reduction ratio.

MICROFICHE FORMAT—Interchangeable grids and apertures permit imaging in selected formats including the COSATI government format.

FILM CUT OFF SIGNAL—Automatic device which codes film for future automatic cutting.

TITLING—Automatic operation at 1-1 reduction at any elevation of camera. Can be omitted to comply to government trailer fiche system where title area is used for imaging.

FOCUS—Automatic at any ratio.

EXPOSURE CONTROL—Exclusive "Selectron" automatically adjusts exposure lamps to compensate for document color. Light is measured at point of photography for unmatched light control using the "Selectron" designed especially for this camera.

RESOLUTION—Meets or exceeds D.O.D. specs. through all reduction ratios.

OPERATION CONTROLS—Push button row and column advance allow completion of a row or complete fiche without filling the remaining grid areas. This capability is essential when fiche will contain more than one file.

IMAGE LOCATOR COUNTERS—Immediately indicates row and column location of next document on the fiche.

AUTOMATIC COLUMN AND ROW ADVANCE—Depression of foot treadle initiates exposure cycle. At end of exposure, film automatically advances to the next sequential column position. After exposure of last column in a row, film automatically advances to the next row position and returns to the initial column position.

EXPOSURE CYCLE TIME—Less than one second per exposure.

6800 McCORMICK ROAD • CHICAGO, ILLINOIS 60645

In Canada Bell & Howell Micro-Data products are distributed by Ditto of Canada, Ltd., 45 Jutland Road, Toronto 18, Ontario

CAPS - JEFFREE LTD

Step-and-Repeat Camera

Subject equipment is still in development and no data sheets have been printed as of the date this report was submitted.

Some of the proposed operational characteristics contemplated according to statements of Terry Wilson, Manager of U. S. Operations are as follows:

- ☆ Use of Kalvar and other U. V. sensitive materials
- ☆ Exposure, development and instant viewing
- ☆ Partial exposure of microfiche with ability to add images later
- ☆ Film Positioning optional - automatic or manual
- ☆ Film Position Indicators will show row and column position
- ☆ Reduction ratio variable up to 20X
- ☆ Exposure cycle time at 20X is 5 seconds
- ☆ Maximum copy area is 9 x 13 inches
- ☆ Resolution up to 120 lines/mm
- ☆ Tilting accomplished with separate contact printer
- ☆ Power: 115 volts a. c.

FROM: Eugene Dietzgen Co.
2425 N. Sheffield Avenue
Chicago, Illinois 60614

FOR IMMEDIATE RELEASE
May 17, 1966

To meet the growing demand in the field of micro-publications, DIETZGEN has introduced a new MICROFICHE CAMERA which can microfilm pages from books, single sheets - documents, vouchers, computer print-out data - in fact everything printed, typed, written or drawn on a single sheet of film in a continuous operation.

The Dietzgen-Minolta Microfiche Camera, table-top model, with unmatched versatility, is a planetary unit which will accept documents up to 13" x 18½ inches size at 20X reduction.

OUTSTANDING FEATURES

- FILM CAPACITY:** Three Microfiche Formats
75 x 125 mm.
105 x 148 mm.
3½ x 7-3/8 inches.
- INSTANTLY READY:** The camera is made ready for operation by simply inserting a film magazine and closing the cover. A rollfilm adapter is available for continuous film supply.
- FRAME CHANGE:** Both single and double frame selection can be easily made and is infinitely variable on the same microfiche.
- AUTOMATIC FOCUS:** The reduction-focus relationship is automatic. The reduction ratio is clearly indicated in a window on the camera base.
- REDUCTION RATIOS:** Variable from 16x to 20x.
- AUTOMATIC COLUMN AND ROW ADVANCE:** Column and row advances are automatically performed after each exposure.
- IMAGE POSITION INDICATOR:** A large and very readable image position indicator located on the front of the camera head permits instant observation of the filming sequence. This feature should reduce page sequence errors to a minimum and is an exclusive feature of this equipment.

DOCUMENT SIZE

The document size capacity is automatically indicated on the copy board and is synchronized with the camera head framing mechanism.

BOOK COPY
HOLDER:

A well designed, sturdy and simple-to-use book copy holder flattens bound pages for high quality microfilm images.

TITLES:

Titles are filmed automatically at a 1 to 1 ratio, and at any level of reduction.

HIGHEST RESOLUTION: The world famous Minolta Rokkor lens, capable of a very high resolution, produces film images required for the most critical work. The camera will easily meet the high legibility, resolution and uniform density standards required by government agencies. The film in the camera is held flat by a vacuum system during exposure.

SPECIFICATION

CAMERA TYPE: Planetary

<u>FRAME (GRID) TYPES:</u>	<u>FILM SIZE</u>	<u>DOUBLE FRAME</u>	<u>SINGLE FRAME</u>
	75x125(mm.)	4 rows of 5 grids	4 rows of 10 grids
	105x148(mm.)	6 rows of 6 grids	6 rows of 12 grids
	3½x7-3/8(in.)	4 rows of 7 grids	4 rows of 15 grids

<u>FRAME (GRID) SIZES:</u>	<u>DOUBLE FRAME</u>	<u>SINGLE FRAME</u>
	16 x 23 mm.	11.25 x 16 mm.

<u>REDUCTION RANGE: COPY SIZE</u>	<u>DOUBLE FRAME</u>	<u>SINGLE FRAME</u>
	11-3/4 x 16 inches	8 x 11-3/4 inches
	13 x 18½ inches MAXIMUM	

COLUMN ADVANCE: Automatic Time interval: 1 sec.

ROW ADVANCE: Automatic. Time interval: 4 sec. double frame;
8 sec. single frame.

SHUTTER: Electronic. Time interval: 1/8 sec.

TITLE FILMING: An automatic flow system by slit exposure, at a 1 to 1 ratio.

<u>FILM SIZE</u>	<u>TITLE SPACE</u>
75x125mm.)	(Top row
105x148 mm.)	(10mm above top row
3½x7-3/8 in.)	

ILLUMINATION
CONTROL: Variable transformer.

LIGHT SOURCE: Four 150 watt flood lamps.

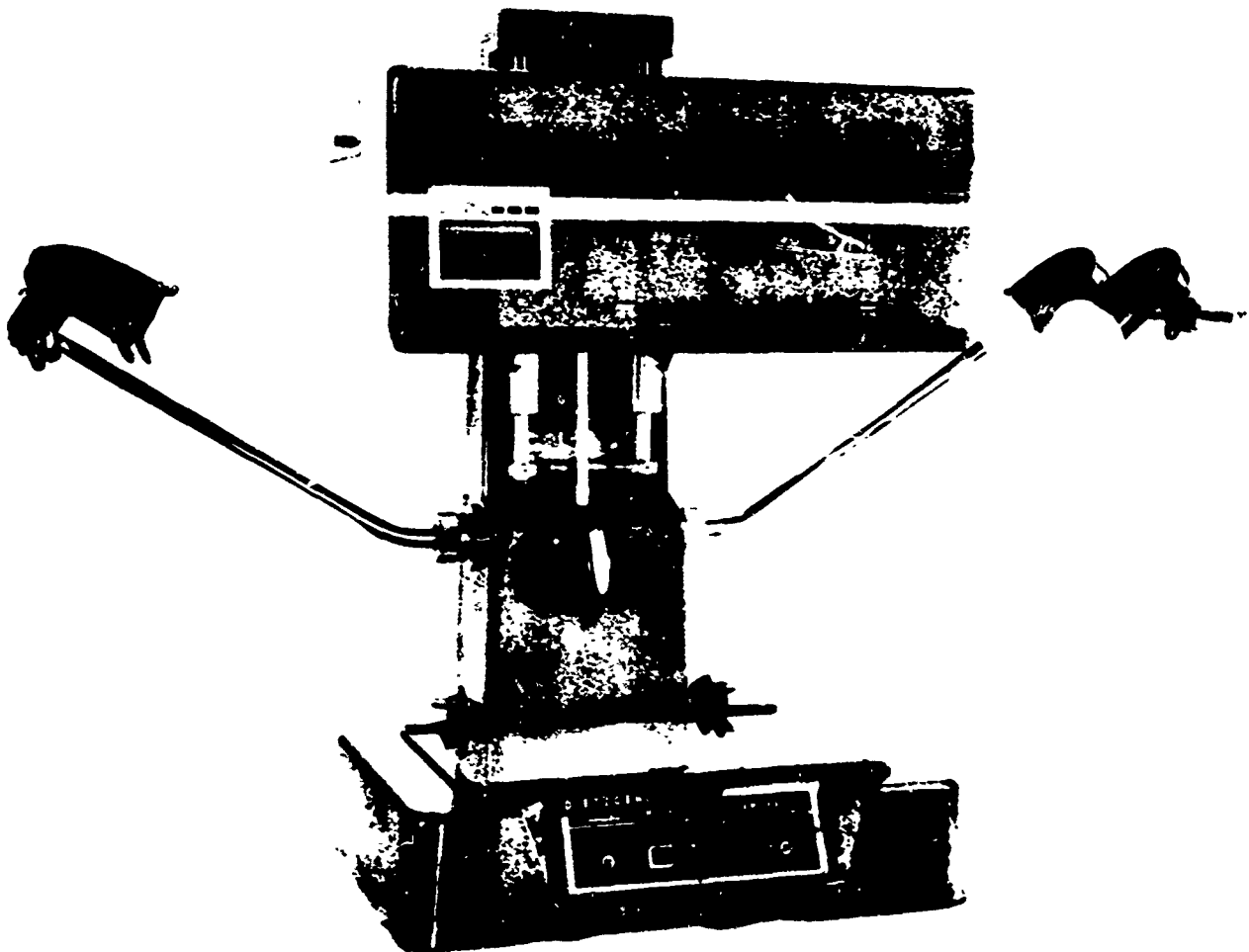
DIMENSIONS: 27½ inches wide, 27½ inches deep and 36½ inches high.

WEIGHT: 132 pounds.

POWER: 7 amps. 115v. AC.

FOR FURTHER INFORMATION:

Eugene Dietzgen Co.
2425 N. Sheffield Avenue
Chicago, Illinois 60614



FUJI MICROFILMING SYSTEM



Accurate and Simple Operation Microfiche Camera and Processor All in One

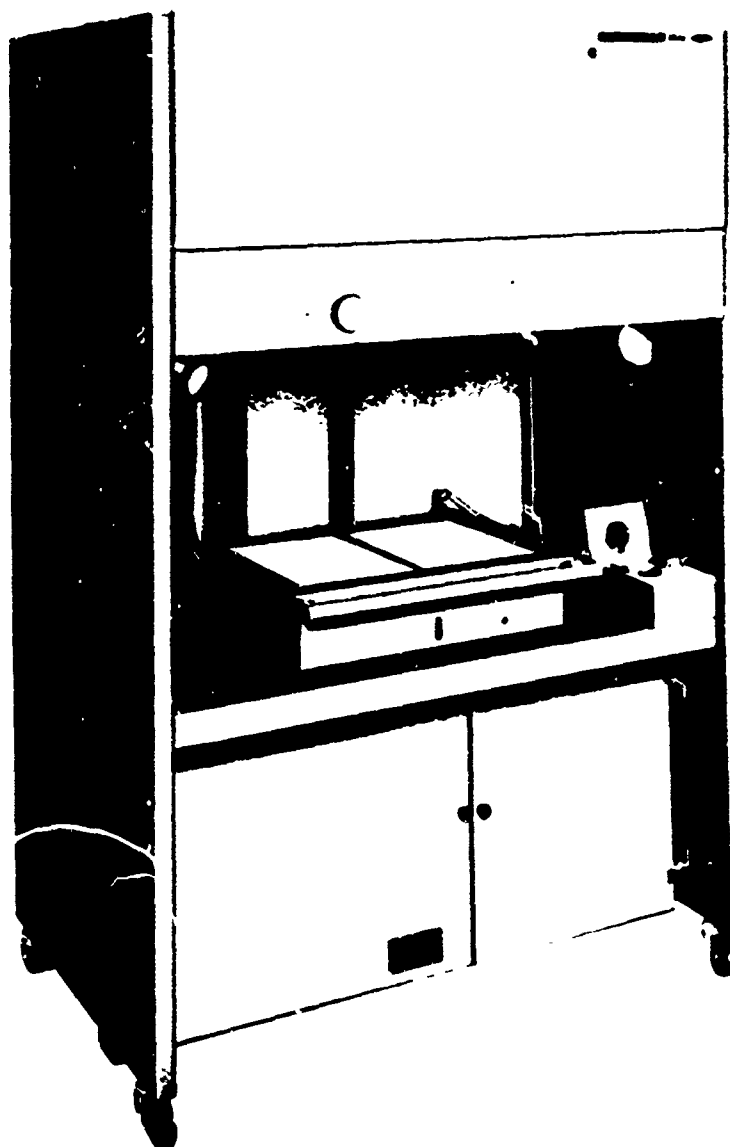
Reduction Ratio and Maximum Original Size

1:1 to 1/20 (vertical)

Copying Speed

Approx. 90 sec. for double 15 frames with title.

FUJI MICROFICHE CAMERA-PROCESSOR 3540



UNIQUE FEATURES OF FUJI MICROFICHE CAMERA 3540

Fully automatic push-button operation. Anyone can do it.

Equipped with book holder for simple and accurate photography.

Each exposure processed individually if desired. Processing and photography may be done simultaneously.

A standardized microfiche with international potentials.

Titling done with the turn of a switch.

Titling is selective depending on the requirements.

SPECIFICATIONS (Proto Type)

Lens	High resolution Fujinon-M 30 mm. f 8, fixed
Film	75 x 125 mm (3 x 5") sheet film.
Frame size	16 x 23 mm (double frame), 16 x 11.25 mm (single frame)
Reduction ratio	1:20th, Title 2:3rd.
Original size	320 x 460 mm or 320 x 225 mm. Title 30 x 175 mm
No. of frames	Max. 5 frames x 4 rows = 20 frames (double frame) equivalent to 40 single frames.
Film advance & shifting rows	All automatic
Holder	Book holder
Processing	All automatic. Time required: approx. 5 min.
Simultaneous photography & processing	Possible
Filming speed	Approx. 90 sec. for double 15 frames with title.
Shutter speed	1/2 fixed
Power required	2 Kw, 100-120V under 20 A
Dimensions	110 W x 156 H x 71 L cm 43 3/4" x 61 1/4" x 28"

FUJI PHOTO FILM CO., LTD.
3-2-chome, Giza-Machi, Chuo-ku, Tokyo, Japan
FUJI FILM
FUJI PHOTO FILM U.S.A. INC.
New York, N.Y. 10017, U.S.A.



WESTWOOD DIVISION

HOUSTON FEARLESS CORPORATION

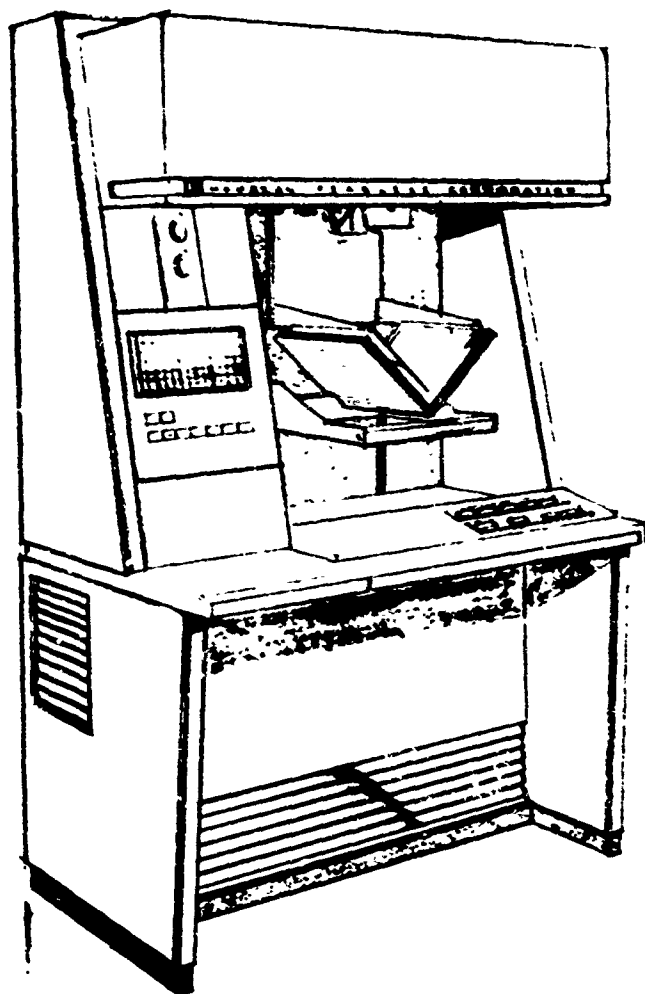
11801 WEST OLYMPIC BOULEVARD ■ LOS ANGELES, CALIFORNIA 90064

TELEX 06-7 4291 TWX 213-490-3519 ■ BRADSHAW 2-4331

AUTOMATIC

MICROFICHE

CAMERA - PROCESSOR



DOCUMENTS MICROFILMED WHILE YOU WAIT BY NEW FilmCARD CAMERA-PROCESSOR

APPLICATION

The Houston Fearless FilmCARD Camera-Processor can be used in public and university libraries, reference microfilm departments, business and industry. In fact, virtually any type of paper, newspaper, or work notebook can be processed and microfilm can be made in a matter of minutes. Copies made by other methods, in addition to this field production, can all be put into a microfilm for use for rapid and low-cost dissemination of news and other documents.

TITLED FILMCARDS, ARCHIVAL- PROCESSED WITHIN ONE MINUTE

DESCRIPTION

Engineers at the Houston Fearless Corporation have developed an automated camera-processor that produces microfiche (filmcards) on demand. After being exposed, the filmcard is automatically inserted into the processor and within one minute emerges completely processed, washed, dried, and ready to use. The filmcards, which measure approximately 4 by 6 inches, can contain a maximum of 60 micro-images plus a full-size title.

Until now, microfilm has been used chiefly for archival retention of documents as a means of saving space. However, with the adoption of microfiche as a standard microform publishing tool by NASA, AEC, DOD, DDC, and OTS, a microfiche explosion has occurred in the United States. The shift to microfiche is expected to invade public and university libraries, business, industry, science, and medicine. It has been given impetus through standardization efforts of COSATI and NMA.

Although filmcards have previously been produced in microfilm service centers, the Houston Fearless FilmCARD Camera-Processor is the first camera particularly designed to be operated in a library or office environment.

Experts in the field of library science expect many areas of today's circulating library to become a duplicating library. Using this principle, libraries would distribute copies of books and periodicals--on filmcards--at little or no cost to the user. The user would not have to reserve a book he wanted, nor return it when due, and could even build up his own library (because he could keep the filmcard instead of returning a book). Houston Fearless is participating in a pilot operation of this new concept at a university library for a six-month trial period.

NO INSTALLATION NEEDED

The FilmCARD Camera-Processor requires connection only to a 220-volt, 60-cycle ac power source to make it operational. The unit does not require plumbing; chemicals are supplied as ready-mixed solutions, and water needed for washing film is continuously recirculated (closed loop) in a device called the Water Conservation System (WCS ☺). The WCS ☺ unit is a Houston Fearless proprietary concept; it maintains accurate control of flow and contaminant level, constantly rejuvenating the water to improve the quality of washing in the integral SEPRATRON ☺ processor. Under normal operation, the WCS ☺ unit can be used for more than a year without recharging.

OPERATION

Capable of being operated by untrained personnel, the camera can copy single page documents, periodicals, or books in a face-up rather than a face-down position. An even-pressure system holds bound volumes precisely positioned for exposure, preventing damage to the binding. An electronic flash source supplies uniform illumination without heat. After exposure, the film is rapidly and automatically processed and dried in an integral Houston Fearless SEPRATRON ☺ processor.

FEATURES AND SPECIFICATIONS

CAMERA

- **FILM** - 105mm by 148.75mm sheets, contained in removable magazine having 250-sheet capacity. Film does not have to be cut in camera; no film loss; no roll curl.

- **TITLING** - Automatic in-camera photo-titling at 1:1 ratio (full-size) from typewritten master. Typewriter slide-out shelf integral with camera for operator convenience. Optional use of title area complies with COSATI trailer fiche specification.

- **FORMAT** - Available to conform with COSATI, NMA, or other formats and reduction ratios.

- **RESOLUTION** - More than 127 lines per millimeter. Exceeds COSATI requirements.

- **PLATEN** - Vacuum platen insures absolute film flatness and steadiness during exposure.

- **LIGHTING** - Electronic flash. No heat to damage documents. No blurred negatives from subject movement or vibration.

- **IMAGE MATRIX** - Row and column location automatically indicated on lighted matrix panel.

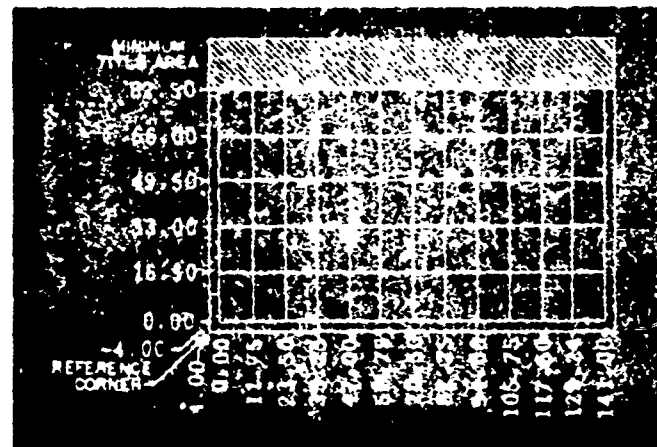
- **FILM TRANSPORT** - Step and repeat. Automatically advances frame-to-frame and row-to-row. Stop at any position without filling entire fiche. **DISCHARGE** button inserts film into processor.

- **PULL-OUT SHELF** - For work surface or typewriter.

PROCESSOR

- **TYPE** - SEPRATRON ☺ straight-through, automatic, continuous processing, featuring high impingement and rapid recirculation for uniform processing.

- **TEMPERATURE CONTROL** - Automatic. Needs no refrigeration.



- **SPEED** - Complete processing, washing and drying in 1 minute.

- **WCS ☺** - Accessory. Allows archival processing without running water. Processor can operate without connections to water and drain lines.

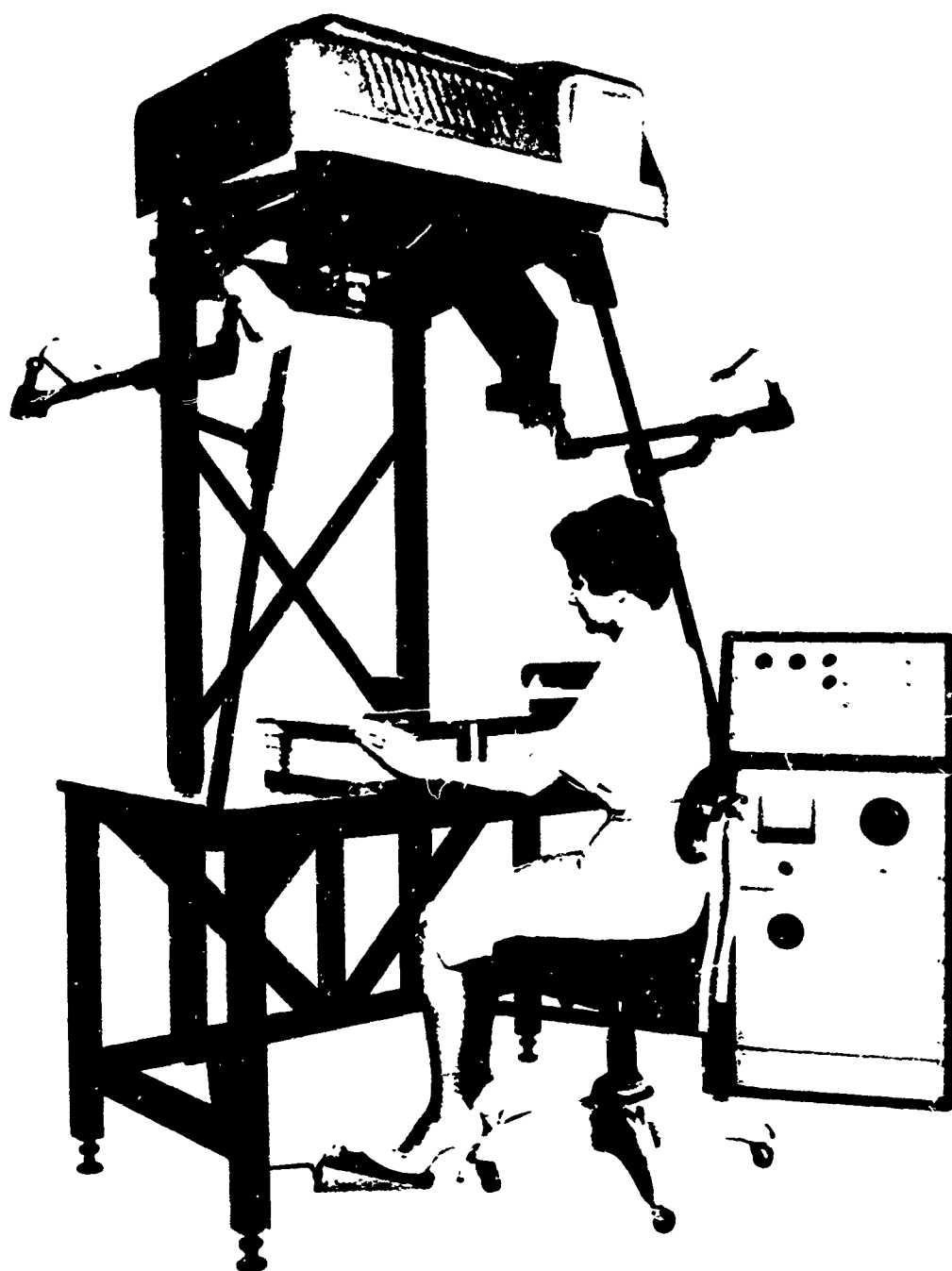
OPTIONAL FEATURES

Optional features for the Houston Fearless FilmCARD Camera-Processor include automatic exposure control, interchangeable lenses, uniformity of COSATI, DOD, or NMA formats, back or front easels, and various reduction ratios.

For additional information regarding the FilmCARD Camera-Processor and assistance in selecting the particular features needed for your application, please contact:

Alfred S. Tauber
Manager, Product Planning
Westwood Division

HF HOUSTON FEARLESS CORPORATION
11801 West Olympic Blvd. ■ Los Angeles, Calif. 90064
TELEX 06-7 4291 TWX 213-490-3919 ■ BRadshaw 24331
LITHO IN U.S.A.



Step and Repeat Camera Model SR-1

The Microcard SR-1 Step & Repeat Camera is similar in operation to the familiar planetary microfilm camera. Unskilled or semi-skilled persons can operate the equipment competently after a minimum amount of instruction.

The SR-1 is available for either 105 mm or 75 mm roll film, in 100 ft. lengths. After exposure, these rolls can be kept intact to reproduce additional master negatives or microfiche copies. Duplicate master negatives can be cut individually for sequential filing and for individual printing of microfiche copies. Image or frame placement on the negative is held to close tolerances. Camera output meets or exceeds specifications set forth under Federal Microfiche Standards.



Microcard®
Step & Repeat
Camera
Model SR-1

Standard Features:

1. Choice of one film chamber size:
 - a. 105mm x 148mm; approximately 200 unitized negatives from 100 ft. roll of 105mm film.
 - b. 75mm x 125mm; approximately 225 unitized negatives from 100 ft. roll of 75mm film.
2. Shorter lengths of film can be cut off roll in camera as required.
3. Automatic cycling, including stepping from frame to frame and film advance.
4. 18X-20X—standardized format—16mm x 23mm frame.
5. Maximum document text area approximately 11 1/2" x 16 1/2". Accepts two 8 1/2" x 11" sheets per frame.
6. "Locator" panel on camera console shows camera position on film at all times.
7. Vacuum platen automatically holds film flat during exposure.
8. Resolution of 127 lines / mm or better.
9. Automatic masking; exposes border around each negative. (Floating image also available).
10. Automatic blanking circuit. Exposes blank frames if only part of card is required.
11. Built-in voltage stabilizer. Manual control of light intensity to accommodate different types of material.
12. Rugged and precise construction; proven during 7 years of continuous production.
13. Plug-in relays and motors to aid in simple maintenance.
14. Automatic integral titling; facilitates photographing headings on a 1-to-1 basis from typewritten sheet. Completely eliminates negative stripping.



MICROCARD
CORPORATION

1601 SOUTH OAK STREET, N.W., WASHINGTON 7, D.C.
(Address correspondence to Microcard Corporation 901 26th St. N.W., Washington 7 D.C.)

MODEL SR-1 STANDARD STEP-AND- REPEAT CAMERA

Microcard's precision SR-1 Microfiche Camera is similar in operation to the familiar planetary microfilm camera. It can be operated competently by unskilled personnel after a minimum of instruction. The SR-1 uses 105mm film in 100 ft. rolls. After exposure, these rolls may be kept intact to reproduce additional master negatives or microfiche copies, or rolls and duplicates may be cut into individual fiche for filing in sequence and printing unit microfiche copies.

Image and frame placement on the negative are held to close tolerances. Camera output meets Federal Microfiche Standard Specifications adopted by the President's Committee on Science and Technical Information (COSATI) and similar specifications for documents 8½" x 11" or smaller drafted by the National Microfilm Association.



MODEL SR-1 FEATURES & SPECIFICATIONS

1. Film chamber size: 105mm x 148mm; approximately 200 unitized negatives from 100 ft. roll of 105mm film. Shorter lengths may be cut from roll in camera as required.
2. Automatic cycling: advances film and steps from frame to frame. "Locator" panel on camera console shows camera position on film at all times.
3. 18x-20x reduction, 16mm x 23mm frame; resolution of 127 lines/mm or better guaranteed. Conforms to NMA and COSATI standards.
4. Maximum document text area approximately 11½" x 18". Accepts two 8½" x 11" sheets per frame.
5. Automatic masking: exposes border around each negative. (Floating image also available.) Vacuum platen automatically holds film flat during exposure.
6. Automatic blanking circuit: exposes blank frames if only part of card is required.
7. Built in voltage stabilizer. Manual control of light intensity for different types of material.
8. Automatic integral titling: headings are photographed on a 1-to-1 basis from typewritten sheet; completely eliminates negative stripping.
9. Rugged, precise construction; proved during 8 years of continuous production. Plug-in relays and motors to aid in simple maintenance.
10. Operates on 120V, 60 cycle AC, 1600W. Dimensions: 84" high, 54" wide, 39" deep; 835 lbs. (uncrated). Allow for normal operator area plus 21" x 18" for control console.

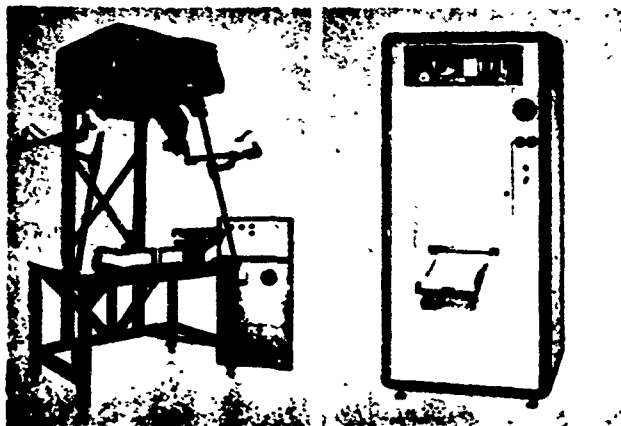
GOVERNMENT PURCHASE PRICE: \$24,500 f.o.b. West Salem, Wisconsin (See General Conditions)

Amendment No. 3, Effective February 11, 1966
AUTHORIZED FEDERAL SUPPLY SCHEDULE PRICE LIST
FSC GROUP 67, PART IV, PHOTOGRAPHIC EQUIPMENT

CONTRACTOR
MICROCARD® CORPORATION
Contract No. GS-00S-50571
Period: July 1, 1965 through June 30, 1966

GENERAL SERVICES ADMINISTRATION
Federal Supply Service
GSA Distribution Code: C-153
Item No. 21-1

MICROFICHE SYSTEMS EQUIPMENT



SR-1 Standard Stop-and-Repeat Camera

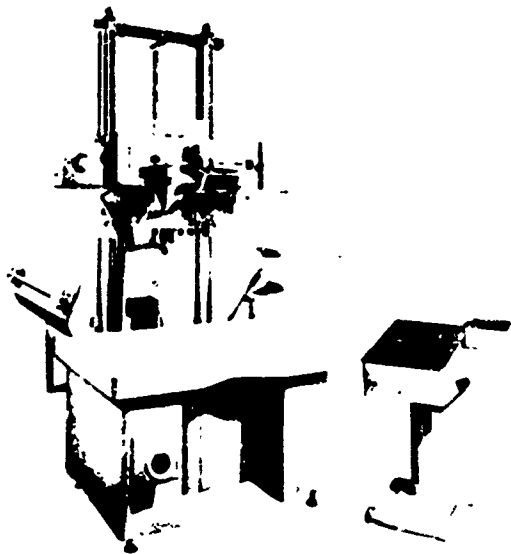
EL-4 Automatic Microfiche Enlarger-Printer

Used extensively by major U.S. Information Agencies.



MICROCARD®
CORPORATION
365 SOUTH OAK STREET, WEST SALEM, WISCONSIN

TECHNICAL DATA SHEET 66-1C



**MODEL PD1342
STEP AND REPEAT "CARSTAR"
AUTOMATIC ROLL FILM CAMERA**

**GUARANTEED TO MEET THE
FEDERAL MICROFICHE "COSATI"
STANDARD SPECIFICATIONS
AUTOMATIC FOCUS
AUTOMATIC REDUCTION SELECTOR
AUTOMATIC EXPOSURE CONTROL
AUTOMATIC TITLER**

The PD1342 Ultra High Precision Automatic Roll Step and Repeat Camera "CARSTAR" has been designed to satisfy every microfiche requirement in one single unit. The camera will accommodate any width of film from 35 mm to 6 inches; any length of film from 100 ft. to 400 ft. and will produce by simple programming change any size microfiche including title from the smallest to 6" x 9" maximum. It will satisfy any microfiche standard specifications, COSATI, D.O.D., A.S.A., N.M.A. or any future specification.

SPECIFICATIONS

FILM SIZE: 35 mm to 6 inches.

FILM CAPACITY: Up to 400 ft.

FILM CONTROL: The film is held in the exposure plane by a high precision suction plate insuring maximum resolution and maximum accuracy from image to image and row to row with NO cumulative error.

REDUCTION RATIO: From 10X to 36X.

LENS: Highest quality specially formulated.

FOCUS: Automatic.

ILLUMINATION: Green slimline lamps with individual reflectors for uniform film illumination. Special illumination for specific purposes can be furnished on request.

EXPOSURE CONTROL: Automatic.

CALIBRATION GAUGE: The camera is equipped with proper calibration tapes to indicate reduction ratios.

LOADING MAGAZINE: Detachable loading magazines permit the easy and instant change from one film width to another.

TAKE UP MAGAZINE: A detachable take-up magazine with cut-off knife permits the instant removal of short strips or full rolls.

IMAGE COUNTER: Will automatically indicate the number of images exposed in a single row and will reset to zero whenever the camera is moved to the next row.

ROW COUNTER: Will automatically indicate the position of the camera in a specific row and will automatically reset to one, whenever a new microfiche is positioned in front of the lens.

FRAME COUNTER: Will totalize all of the frames exposed within a microfiche, a roll, or a job. (Manually reset to zero.)

AUTOMATIC TITLER: The Automatic Titler will accept negative or positive original material and copy at 1:1 ratio to the appropriate edge of the film.

TITLE TIMER: The title exposure is automatically pretimed for negative or positive original materials selectively.

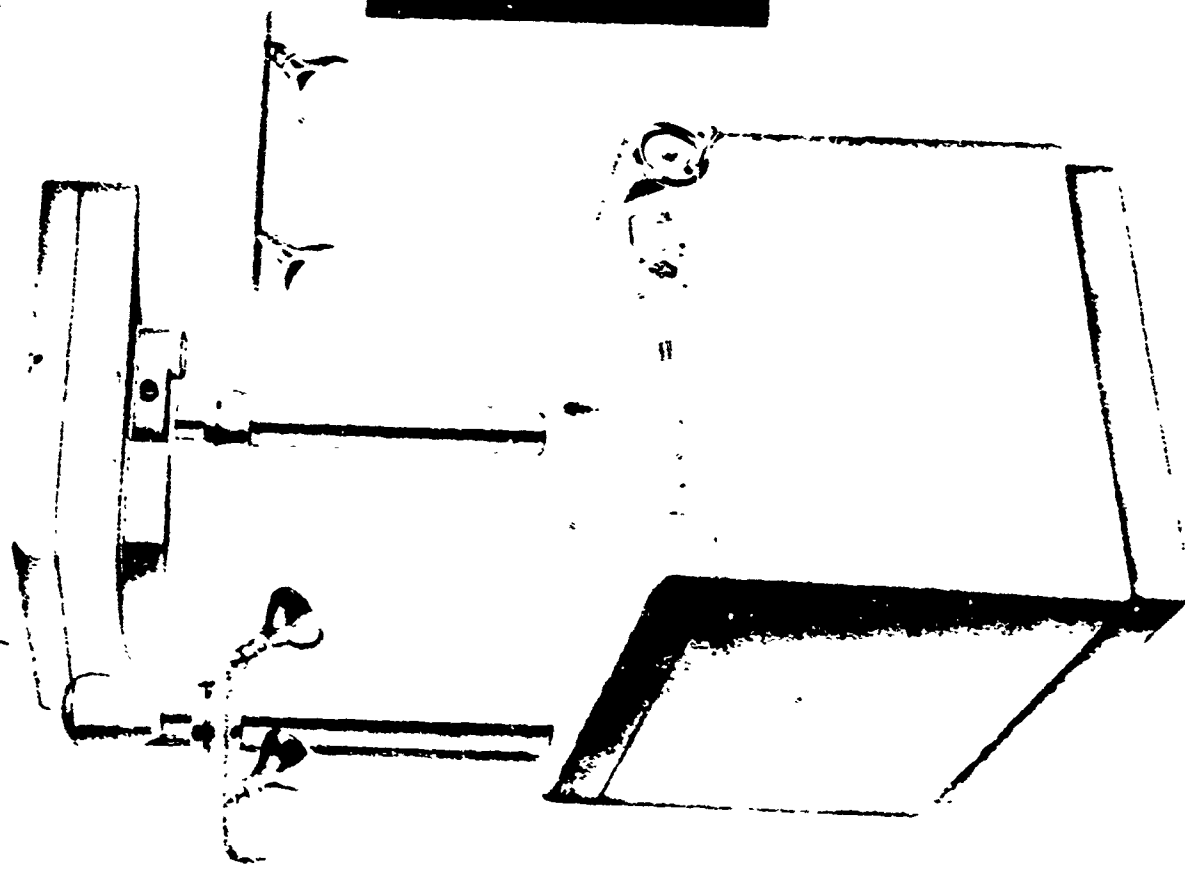
LIST PRICE: Model PD1342 Step and Repeat CARSTAR Camera \$35,000.00, F.O.B. Rochester, N.Y., uncrated.

Prices and Specifications Subject to Change Without Notice.

P H O T O D E V I C E S I N C O R P O R A T E D

— 33 LITCHFIELD STREET, ROCHESTER, NEW YORK 14608 —

Printed in USA 66-1C



MICROFAX

RECORDS SERVICE CORPORATION

TYPICAL MICRODOCUMENT

made with the

MICROFAX Camera

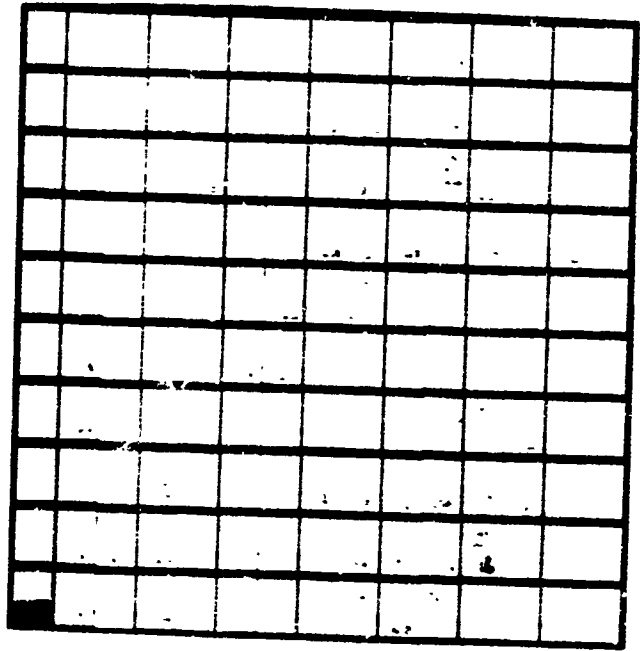
This is a copy of the "Style Manual" published by the U.S. Govt. Printing Office. It is a 300-page book easily reproduced on a single 8 1/2 x 11-in. Microfax Sheet, 150 double-frame, 16-mm images are used.

Original book size.....5 1/2 x 9 1/2 in.
Linear reduction.....18 times
Area reduction.....324 times

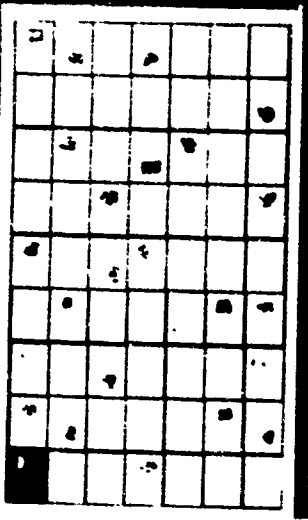
441 00
United States Government
Printing Office
Washington 25, D.C.

Printing-Publishing
STYLE MANUAL
Reprinted
Second Edition 1955

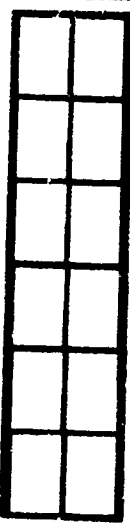
Microfax 615 000
Reduction 18
Time 1.19 x 10⁻²
Page 10 of 100



Shown here is a copy of Dickens's "Christmas Carol". This book of 126 pages is carried on a single 3x5-in. Microfax Card. 63 single-frame, 16-mm images are used. Identifying material is letter-printed on the back side of the card. Reduction (linear) is 19 1/2 times from original book size of 6x9 in.



629
Library Science-Microfiling
Book 17.1 Non-Linear Arrangement (in Los Angeles 41)
U.S. GOVERNMENT PRINTING OFFICE
Microfilm Edition
Library Science-Microfiling
Book 17.1 Non-Linear Arrangement (in Los Angeles 41)
U.S. GOVERNMENT PRINTING OFFICE
Microfilm Edition



RECORDS SERVICE CORPORATION

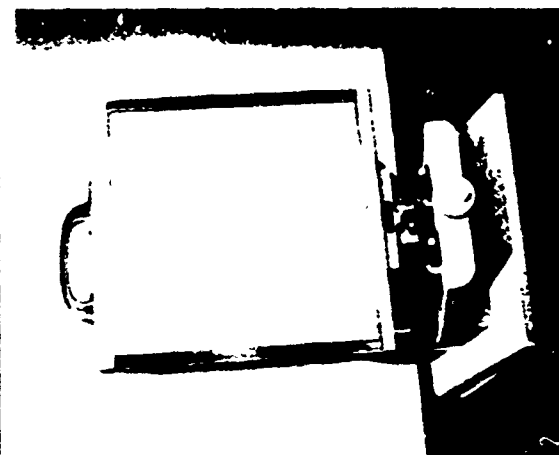
Typical Viewers by means of which MICROFAX Documents can be read

Miniaturized text, in sheet or card form, can be quickly and inexpensively produced with the Microfax Camera. Such Microfax documents can be printed in all sizes up to 8 1/2 x 11 in., in either opaque or transparent forms (i.e., as "micro-opaques" or as "micro-transparencies"). They are suitable for an almost unlimited number of business, professional, educational, and governmental uses. Operating economies can result from the use of these microdocuments for practically every person or organization which employs active visual records (written, printed, drawn, etc.).

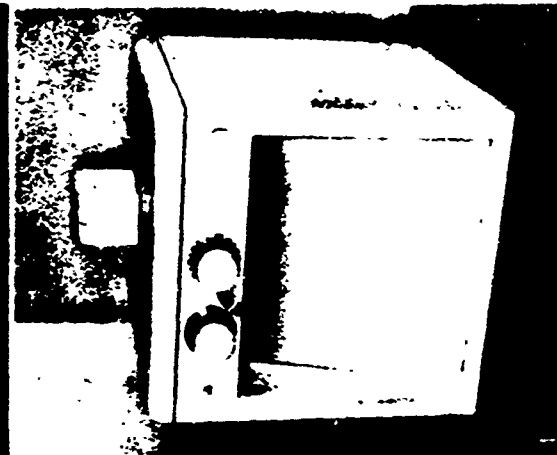
Material suitable for copying is such as the following:

- Legal documents
 - deeds, contracts, patents
- Engineering records
 - technical reports, drawings, maps, photographs
- Business records
 - auditor's reports, financial statements, accounts, personnel records, correspondence files
- Publications
 - books, periodicals, catalogs, bulletins, technical papers
- Library material
 - index cards, manuscripts, rare or expensive reference volumes or sets (usually obtainable in microform, at from 1/16 to 1/8 the purchase cost of the full-sized editions)

Microfax documents possess the acknowledged advantages of sheet form and vertical filing, as compared with the well-known disadvantages of older roll microfilm. Storage costs of microdocuments are approximately 1/100 as much as those of the full-sized originals which they replace.



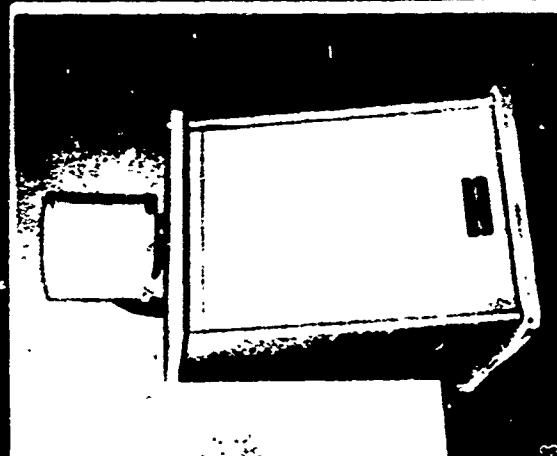
1 **Kodagraph Microprojector, Model A**
This reader projects images from opaque microdocuments of any size up to 8 1/2 x 11 in. on an enlargement of 22:1, or 22 in. on an 8 1/2 x 10 1/2 in. screen. This viewer projects images from opaque microfilm of an enlargement of 23 times or less, or 9 1/2 x 10 1/2 in. screen in its limited to handling microdocuments of height not greater than 1 in. but of any length. It is more portable and less expensive than the full-sized reader.



2 **Grainombe Filmed Reader, Models KB17 and KB24**
This reader projects images from transparent microfilm of a choice of two enlargements: ratios either 17 or 24 to 1 on a 10 x 17 in. screen. It handles microdocuments up to 9 in. high by any length.



3 **Minsky Microsheet Film Reader**
This reader projects images from microfilm of any size up to 8 1/2 x 11 in. on a 17 x 22 in. square screen. It handles microdocuments of any size up to 8 1/2 x 11 in. on a 17 x 22 in. square screen. It handles microdocuments of any size up to 8 1/2 x 11 in. on a 17 x 22 in. square screen. It handles microdocuments of any size up to 8 1/2 x 11 in. on a 17 x 22 in. square screen.



4 **Minsky Microsheet Film Reader**
This reader projects images from microfilm of any size up to 8 1/2 x 11 in. on a 17 x 22 in. square screen. It handles microdocuments of any size up to 8 1/2 x 11 in. on a 17 x 22 in. square screen. It handles microdocuments of any size up to 8 1/2 x 11 in. on a 17 x 22 in. square screen. It handles microdocuments of any size up to 8 1/2 x 11 in. on a 17 x 22 in. square screen.

All prices and specifications and terms of sale are available from

RECORDS SERVICE CORPORATION

The MICROFAX Camera (Patent Pending) possesses the following important features:

1. Field of view.....6x8 in. to 24x36 in.
2. Image sizes.....Single and double 16mm and 35mm.
4. Range of reductions.....ca. 15 to 25
(achieved by varying distance from lens to copy-table between limits of 40 and 70 inches, with simultaneous automatic focus adjustment)
5. Operating speeds.....1 1/2 to 3 seconds per exposure
6. Frame location and size.....self-indicating
7. Dimensions: Table height.....30 in.
Table width and depth.....37 1/2 in.
Overall height, min.....65 1/4 in.
Overall height, max.....97 1/4 in.

This camera is available to customers on a sale, rental, or service basis.

The private manufacture of MICROFAX documents upon order for its customers, as well as the general publication and sale of others, is an activity engaged in by RECORDS SERVICE CORPORATION. Besides these aforementioned items, the company also offers an interesting variety of other macro- and microphotographic and documentary products and services to its customers, including, thru its direct factory dealership, EASTMAN KODAK microfilm equipment and supplies. Of particular note are:

1. The P-12 automatic processor for paper and film up to 12 in. wide. This machine (together with the RAPIDEL and RAPIDFIX chemicals used in it, all Patent Pending by RECORDS SERVICE CORPORATION) is especially useful for high-speed development, fixing, washing, and drying of oscillographic records.
2. Expert assistance in the planning and setting-up of modern indexing and filing systems.

MICROCOPY INC.
3808 W. 54TH STREET
LOS ANGELES 43, CALIF.

Data sheets for:

FILM PROCESSORS

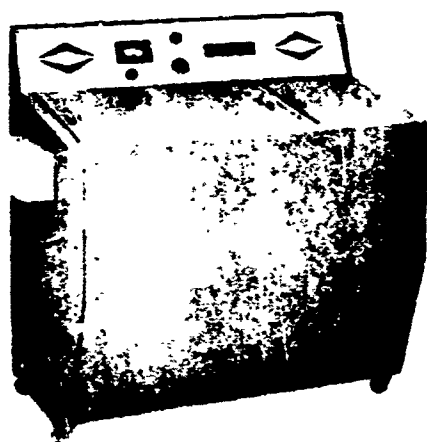
(Section C-1.2)

Houston Fearless Corporation

Sepratron Film Processor Model 105

(105mm Microfilm/Neg/Pos)

Data sheets were not supplied by the manufacturer.

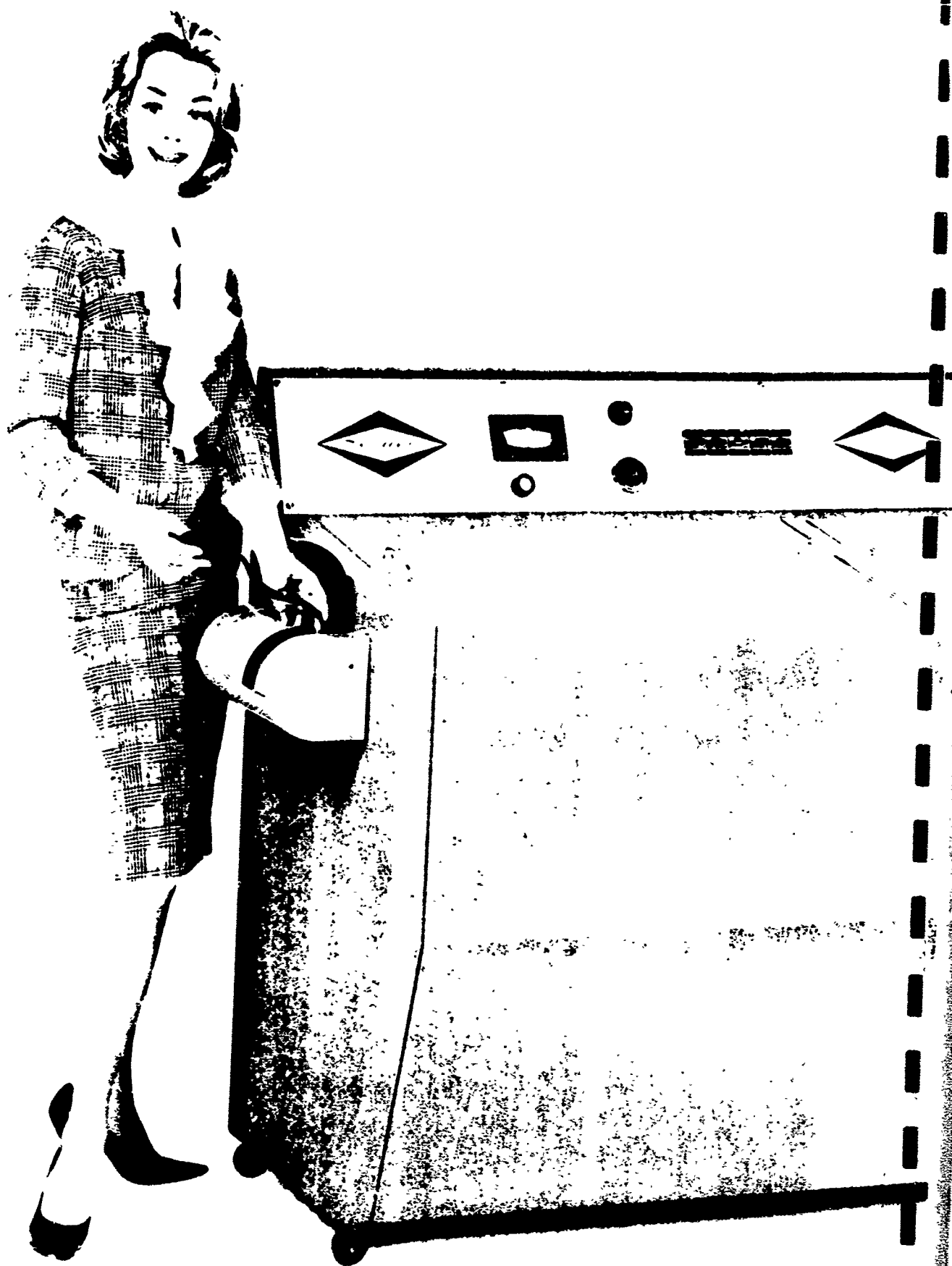


VARIFILM

60-SECOND

AUTOMATIC

FILM PROCESSOR



VARI-FILM

Economical variable width processing for soluble dye-back microfilm, microfiche, sheet and roll film.

Leaderless and Versatile

Roll film, microfiche, strip film, virtually any type of soluble dye-back microfilm or standard photographic film can be processed without leader, interchangeably and at random.

Complete Solution Agitation

The Varifilm solution application and recirculation system provides complete agitation for uniform rapid development. Generously sized 2 gallon tanks require no frequent solution changes.

Archival Wash

The Varifilm employs a thorough, gentle wash which meets archival standards, so necessary for the

permanent storage of photographic record.

Impingement Drying

Film processing is completed by a rapid and efficient, single pass, thermostatically controlled impingement dryer.

Completely Portable

The Varifilm is caster mounted and requires only three external connections: 110 volt, 20 ampere "household current", a tempered water supply and a drain.

Rugged Construction

The processing section and tanks are of unitized construction that affords easy accessibility for maintenance and maximum protection from leakage or deterioration. All service connections are convenient and unobstructed.

**FROM THE
CAMERA —**



ORIGINAL REEL
is placed in
Varifilm
— no leader,
no rewinding,
no time wasted.



**Through the
VARIFILM —**
in just
60 seconds



**WINDS
DIRECTLY —**
onto filing reel,
ready for use.

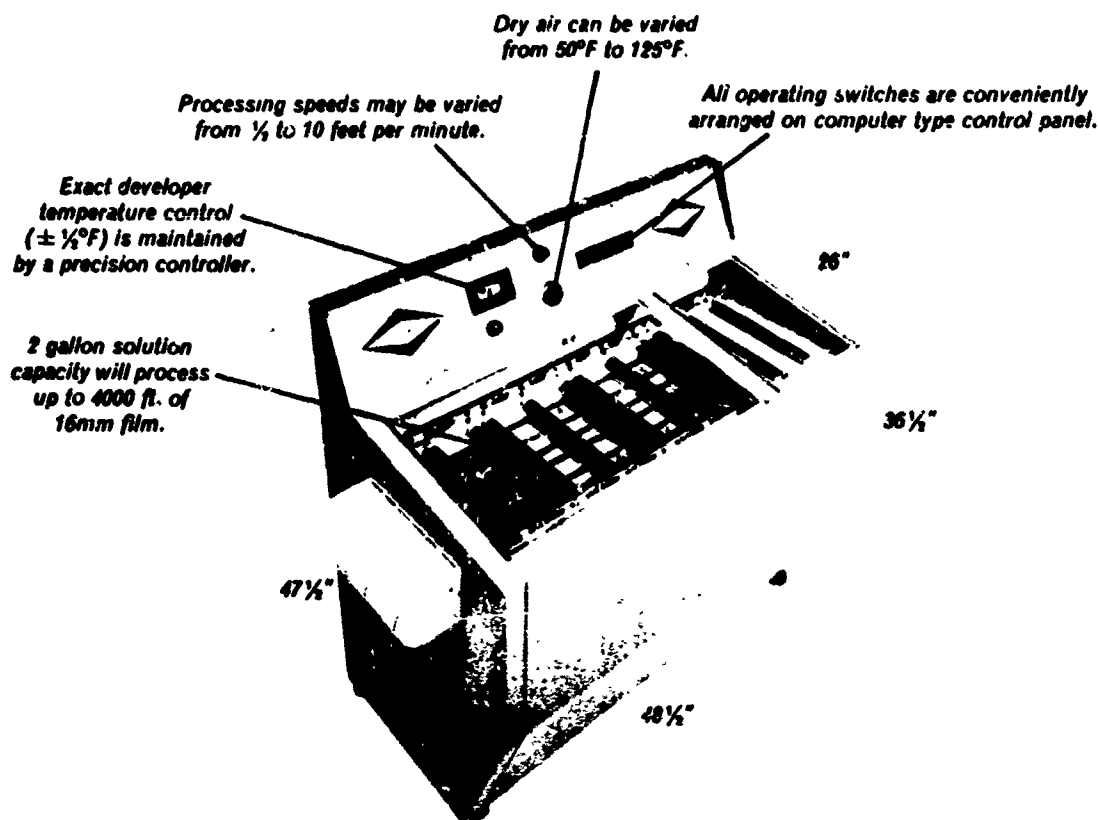


The Varifilm Processor has been developed specifically to meet the demand for a simple, reliable and versatile processor. Economical in both original and operating cost, its performance far outstrips that of more expensive machines. Remarkably versatile and practical, the Varifilm will process *without any adjustment*, leaderless strip film, cut film, or sheet film of

various sizes *simultaneously*. Operation and maintenance are so simple, your secretary can be trained in just minutes.

The handsome, space-saving cabinet and convenient control panel are visible evidence of the engineering and design excellence that has made the Varifilm a machine of unsurpassed quality and performance.

VARI-FILM



GENERAL DESCRIPTION: The VARIFILM is a unique machine, designed to process a wide variety of black and white film. Completely portable, it may be operated without a water supply for short runs.

INSTALLATION REQUIREMENTS. ELECTRICAL: The VARIFILM requires 20 amperes under maximum load conditions and may be plugged into any standard 110 volt 20 ampere-watt socket that is provided with a ground wire connection. **WATER:** Flexible tubing connection for five gallons per minute mixed to the desired wash temperature. Successful washing has been obtained with water temperatures from 58 F to 110 F. **DRAIN:** 5 GPM sink or floor drain is required. However, no special connections are needed since the VARIFILM is provided with a built-in sump tank and pump.

PROCESSING DATA: The VARIFILM requires no leader for cut film 5 inches or more in length. It will process films from 16mm up to 10 inches in width interchangeably without adjustment to the machine. With standard chemicals as recommended for use with the VARIFILM, residual hypo levels are achieved that meet archival standards (less than .005 mg/m²).

OPERATION: The operation of the VARIFILM is simple. It is self-threading and therefore needs no leader. All controls are conveniently located on a console facing the front of the machine.

ACCESSIBILITY: All electrical connections are located in a totally enclosed space ABOVE the solution level. All tanks, pumps, rollers and solution plenums are easily accessible. All routine maintenance may be carried out without the use of tools.

TEMPERATURE CONTROLS: The developing and fixing solutions are held to within $\pm \frac{1}{4}^{\circ}\text{F}$ through the use of a precision controller. Use of this highly accurate instrument allows the operator to obtain uniformly consistent and repeatable results with the VARIFILM.

DRIVE SYSTEM: The film is carried through the complete dry to dry processing cycle in thirty to eighty seconds, depending upon the film type and developer solutions.

PROCESSING SECTION: The processing section is a rugged, unitized construction of chemically inert material which provides maximum protection from leakage or deterioration. All tanks and plumbing are readily accessible and easily cleaned.

DRYER: Rapid and efficient drying is accomplished through use of an impingement dryer. The dryer is thermostatically controlled with an adjustable air temperature range of 50 F to 125 F.

MAINTENANCE: The VARIFILM maintenance requirements are minimal. A simple water flush at the end of a day's operation will suffice. All rollers and solution plenums are easily removed (without the use of tools) for cleaning.

DIMENSIONS: Height — 47 $\frac{1}{2}$ inches; Length — 46 $\frac{1}{2}$ inches; Depth — 26 inches. With optional film loading cassette and film take-off sections, the machine length is 57 inches.

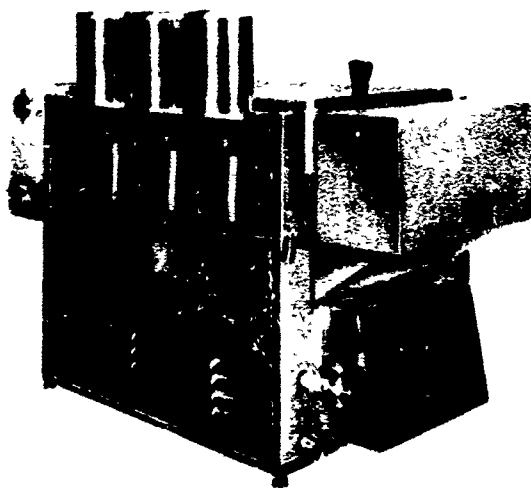
CONSTRUCTION AND DESIGN: The VARIFILM is constructed of stainless steel, rugged plastics and corrosion resistant materials throughout.

ACCESSORIES:

1. Daylight loading cassettes for 16mm film, 35mm film, and 70-106mm film.
2. Motor driven take-up section for roll film.
3. Automatic replenisher system — 5 gallons each, developer and fixer.
4. Water temperature control system.
5. Darkroom loading section.
6. Custom finish.

210 Broadway • Everett, Massachusetts 02149
(617) 288-4200

FILM - SURFACE APPLICATOR - ROSSOR - AND PAPER PROCESSOR

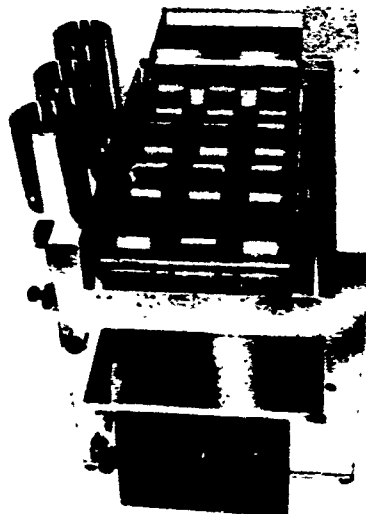


**dry-to-dry processing of photosensitive films
and paper in widths up to 12 and 20 inches**

**FINE GRAIN • ACCESS TIME OF SECONDS • DRY-TO-DRY • MINIMAL
INFECTIOUS DEVELOPMENT • SHARPER IMAGE DEFINITION • LOWER BASE
FOG • HIGHER CONTRAST • COMPACT • PORTABLE • ABSOLUTE
DEPENDABILITY • TROUBLE-FREE, 316L STAINLESS STEEL CONSTRUCTION.**

© MINISCOMAT: simple operation - efficient

*Miniscomat
Processing chamber
reveals a study in
uncluttered simpli-
city and easy ac-
cessability.*

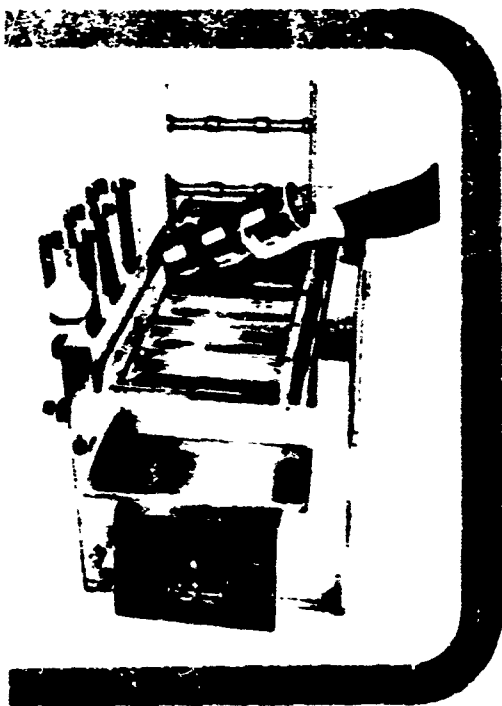
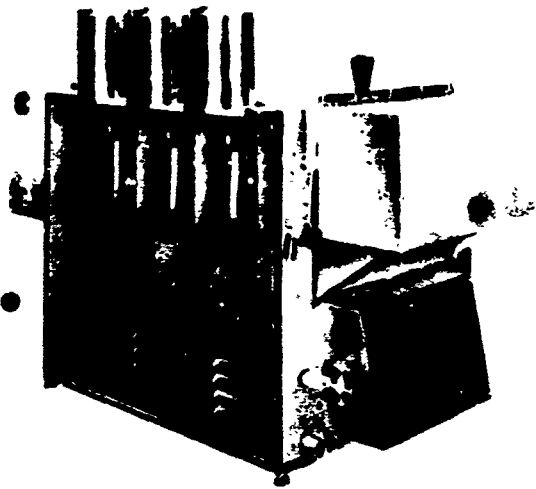


*Processing drums
are interchangeable
to meet any special
threading require-
ments or combina-
tions.*

Miniscomat is a selective composite of the best features in a long line of dependable and efficient film and paper processors by the Oscar Fisher Company.

Many years of research and operational study are combined with proficient engineering to produce the industry's most practical processor of its type. Miniscomat's characteristics have been shaped by the specific needs of the job it is built to do. Only the best is retained. Only miniscomat offers these features.

efficient - adaptable.....



PRINCIPLE OF OPERATION: Miniscomat is a surface application processor, utilizing drums which rotate counter to the direction of travel of film or paper. A thin meniscus of solution is maintained on each drum surface by means of centrifugal force. Photosensitive materials contact fresh solutions only. The back of the material is not wetted. Only 8 ounces of each chemical are required for "start-up".

CHEMICAL PROCEDURE: The processor has four drums, the last being wash. The first three drums can utilize the chemical sequence of choice, e.g.; developer, short stop, fixer; or developer-fixer, or monobath throughout, etc.

All drums are removable for cleaning, changing of chemicals, etc. Special drum sizes are available for processing perforated materials.

THREADING: Threading is accomplished by means of a clamp bar which engages the lead edge of the material and draws it through the processor. Sheets are deposited in a receptacle after drying and rolls are automatically threaded onto a take-up reel.

REPLENISHMENT: Replenishment is automatic and continuous. Solutions are fed from one quart replenisher bottles through flow-meters to their respective pans. The rate is adjustable from 0-200 cc. minute.

TEMPERATURE CONTROL: Temperature control is thermostatically maintained to $\pm 1/4^\circ$ by means of a tempered water supply and water jacket.

WARM-UP: The unit can be warmed up and maintained in a stand-by condition by means of thermostatically controlled water jacket heater.

DRYING: Is by means of a high impingement air knife and suction device. Compressor and heat source are integrally mounted.

S P E C I F I C D A T A

Model A

1. **CAPACITY:** films and papers up to 12 inches in width.
2. **OPERATION:** daylight; self threading.
3. **DRIVE:** positive take-up; constant torque; variable speed (0-10 F.P.M.).
4. **TEMPERATURE:** controlled throughout, thermostatically.
5. **SOLUTION CAPACITIES:** 8 ounces each.
6. **DIMENSIONS:** 24" x 40" x 30".
7. **CUBAGE:** 16.5 cu. ft.
8. **WEIGHT:** uncrated - 170 lbs.; crated-200 lbs.
9. **ELECTRICAL REQUIREMENTS:** 110 volts; 60 cycle; AC; single phase; total 25 amps.
10. **PLUMBING REQUIREMENTS:** 1/2" hot and cold water lines to temperature control unit; 1" line to drain - hoses or pipe; requires one quart of blended water per minute.

Model B

1. **CAPACITY:** films and papers up to 20" in width.
2. **OPERATION:** daylight; self threading.
3. **DRIVE:** positive take-up; constant torque; variable speed (0-10 F.P.M.)
4. **TEMPERATURE:** controlled throughout, thermostatically.
5. **SOLUTION CAPACITIES:** 16 ounces each.
6. **DIMENSIONS:** 48" x 40" x 30".
7. **CUBAGE:** 33 cu. ft.
8. **WEIGHT:** uncrated - 340 lbs.; crated - 400 lbs.
9. **ELECTRICAL REQUIREMENTS:** 110 volts; 60 cycle; AC; single phase; total 25 amps.
10. **PLUMBING REQUIREMENTS:** 1/2" hot and cold water lines to temperature control unit; 1" line to drain - hose or pipe; requires one quart of blended water per minute.



**OSCAR FISHER
COMPANY, INC.**

NEWBURGH, N.Y., U.S.A.

M I N I S C O M A T

PRINTED IN U.S.A.

AUTOMATIC ROLL FILM PROCESSING

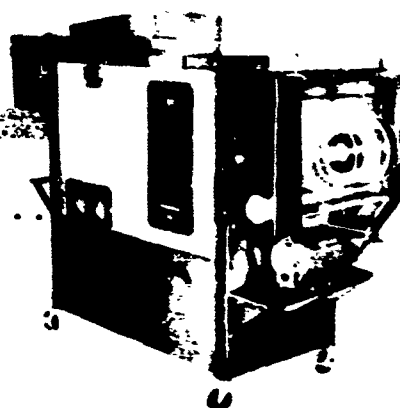


**ALL SIZES: TO
12 INCHES WIDE**

**SPEEDS: TO 12 F.P.M.
FOR EACH ROLL IN
MULTIPLE THREADINGS**



for roll films...



or roll papers

finer grain yield . better resolution . rapid development.
fixation and drying : variable speed and temperature control
automated processing consistency . absolute dependability
trouble free 316L stainless steel construction throughout



THE PROVEN DRY-TO-DRY, "TURBULENT AGITATION" PROCESSOR

**OSCAR FISHER COMPANY, INC.
NEWBURGH, NEW YORK, U.S.A.**

PROCESSALL

APPLICATION

Completely automatic processing, Dry-to-Dry, of any photo-sensitive film or paper in roll form up to 6" wide (model G-6N) or up to 12" wide (model G12N) or simultaneous processing of more than one roll of lesser widths.

SPECIAL FEATURES

1. Rapid automatic processing to high quality results.
2. Speeds up to 12 feet per minute each roll.
3. The unit is daylight-operated and self-threading.
4. The unit is compact and portable with installation requirements minimal.
5. Transport speed is variable by Constant-Torque Motor.
6. Solutions are thermostatically controlled.
7. The Turbulent processing technique is utilized.
8. An Air-Implugement Squeegee removes all surface moisture before film or paper enters Turbulent-Mixed air drying chamber.
9. Perfect tracking assured — the unit contains a Positive-Drive with a demand drive to assure positive tracking. It is necessary only to

connect the leader to a standard reel and place between the rollers of the demand drive.

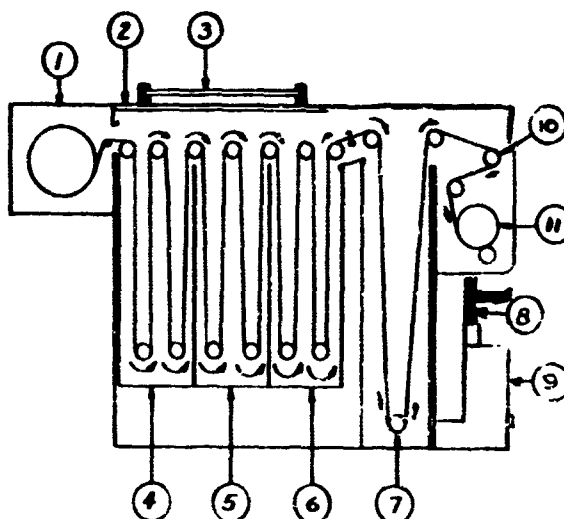
It is possible to process roll film or paper at 12 feet per minute as per the following table simultaneously:

SIZE OF ROLL	MODEL G-6N	MODEL G-12N
16 MM	3 Rolls	4 Rolls
35 MM	3 Rolls	4 Rolls
70 MM	2 Rolls	3 Rolls
6"	1 Roll	1 Roll
12"		1 Roll

10. The unit is built entirely of type 316L (18-12) low carbon stainless steel, braze welded, ground with non-ferrous bearing materials, and painted to assure extra long, trouble free life.

THREADING PROCEDURE

1. Cassette
2. Light tight cover
3. Cover handle
4. Developer tank
5. Rinse tank
6. Wash tank
7. Dryer roller assembly
8. Drying chamber
9. Insulated blower housing
10. Positive drive roller
11. Take-up



1. Load cassette No. 1, and place on machine.
2. Pull out drying assembly No. 8.
3. Load cassette No. 1, and place on machine.
4. Guide leader to film or paper in cassette.
5. Roll leader straight across machine.
6. Load cover No. 2 to thread.
7. Replace dryer roller assembly No. 8.
8. Load dryer "A" frame No. 8 in position.
9. Thread onto take-up reel No. 11.

SPECIFIC DATA

MODEL G-6N

1. CAPACITY — Conventional film and paper up to 6" in width, up to 400 feet long.
2. OPERATION — Daylight, self-threading.
3. DRIVE — Positive, constant-torque, constant speed, 0-20 feet per minute.
4. TEMPERATURE — Thermostatically controlled.
5. TANK CAPACITIES — Developer - 6 gallons; Fixer - 6 gallons.
6. DIMENSIONS — 31" long x 17" wide x 61 1/2" high.
7. CUBAGE — 23 cubic feet.
8. WEIGHT — 300 lbs. crated.
9. ELECTRICAL REQUIREMENTS — 220 volts, 60 cycle A.C., 15 amps.
10. PLEADING REQUIREMENTS — Immersion under, 1/2" hose or pipe to temperature control unit. Drain — 1 1/2" hose or pipe.

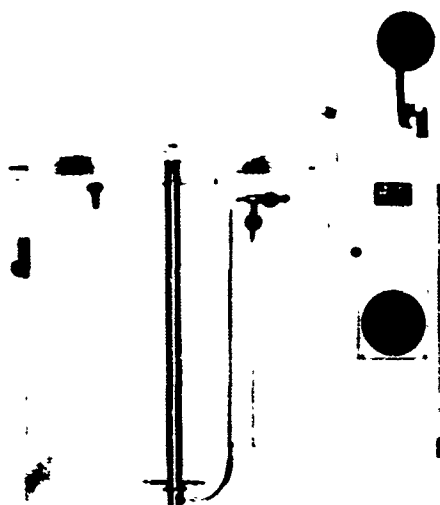
MODEL G-12N

1. CAPACITY — Film or paper up to 12" wide, up to 400 feet long.
2. OPERATION — Daylight, self-threading.
3. DRIVE — Positive, constant-torque, constant speed, 0-20 feet per minute.
4. TEMPERATURE — Thermostatically controlled.
5. TANK CAPACITIES — Developer - 12 gallons; Fixer - 12 gallons.
6. DIMENSIONS — 31" long x 21" wide x 61 1/2" high.
7. CUBAGE — 33 cubic feet.
8. WEIGHT — 475 lbs. crated.
9. ELECTRICAL REQUIREMENTS — 220 volts, 60 cycle A.C., 25 amps.
10. PLEADING REQUIREMENTS — Immersion under, 1/2" hose or pipe to temperature control unit. Drain — 1 1/2" hose or pipe.

MICRO-MASTER

Automatic Film Processors

for 16mm, 35mm, 70mm and 105mm Microfilm & Miniaturization Systems



52 2049

These automatic processors offer the user a practical and economical method of developing, fixing, washing and drying roll film without a darkroom. Their low initial cost will make in-plant processing a logical move for many reproduction departments which previously required outside processing service. In-plant processing means added security, convenience, speed and quality.

52 2049 MICRO-MASTER 105mm Film Processor — A compact, low-cost unit designed for continuous operation. Processes all types of clear, tinted or dye-back microfilm up to 105mm size. Equipped with a developer and fixer replenisher at no additional cost.

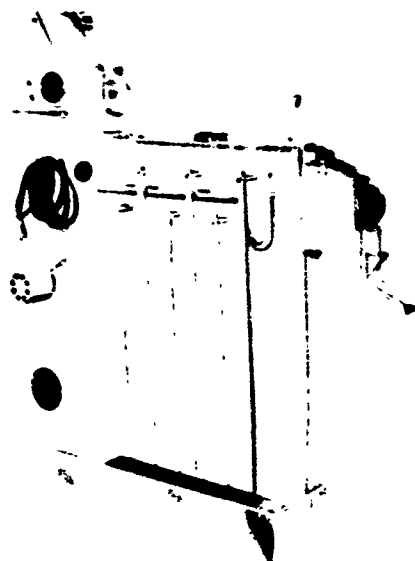
52 2050 MICRO-MASTER 16/35mm Microfilm Processor — A compact, low-cost unit designed to provide fast, safe processing of all types of clear, tinted or dye-back microfilm in 16 and 35mm sizes. With 100' supply and take-up capacity.

52 2051 — Same as 52 2050 except with 1000' supply and take up.

52 2052 — Same as 52 2050 except with 100' supply and 1000' take up and automatic roll end alarm.

OPTIONAL ACCESSORY FOR 16/35MM PROCESSOR

52 2053 Replenisher Unit — Can be used for either developer or fixer on 16/35mm processor. Two units are needed to replenish both developer and fixer.



52 2052

KEUFFEL & ESSER CO.

MICRO-MASTER

FILM PROCESSOR SPECIFICATIONS

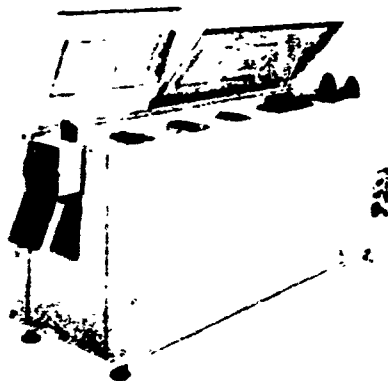
	105mm PROCESSOR	16/35mm PROCESSOR
	S2 2049 - 350 ft. Supply & 350 ft. Take-up	S2 2050 - 100 ft. Supply & 100 ft. Take-up S2 2051 - 1000 ft. Supply & 1000 ft. Take-up S2 2052 - 100 ft. Supply & 1000 ft. Take-up
FILM SIZES	Up to 105mm	16mm & 35mm
PROCESSING SPEED	5 ft. per minute (2½ ft. per minute with special drive sprocket furnished.)	5 ft. per minute (Other speeds available on special order.)
PROCESSING LOOPS	Eight loops, each with 5 feet of film. The developer tank with 2 loops will have 10 feet of film in it at all times; all other tanks, 5 feet, except the final spray wash which will have 10 feet.	Eight loops, two in the developer (one of which is adjustable); one for rinse or short stop; one for fixing bath; one for rinse; one for hypo eliminator; and two loops for washing.
FILM SUPPLY BOX	Detachable for darkroom loading.	
TIME IN SOLUTIONS	At a processing speed of 5 feet per minute, devel. per 2 minutes, short stop 1 minute, fixer 1 minute, wash 1 minute, hypo neutralizer 1 minute, and final wash 2 minutes.	At a processing speed of five feet per minute, developing time is 2 minutes, rinse (or short stop) 1 minute; fixing 1 minute; rinse 1 minute; hypo eliminator 1 minute; wash 2 minutes.
TEMPERATURE CONTROL	All models have a built-in water jacket for maintaining proper solution temperature. Tempered water, after passing through the water jacket is used for the spray washes. A Weston stem thermometer is supplied. A thermostatic water control valve (Powers Foto-guard or equal) is recommended to maintain proper temperature of water input.	
FILM WASHING	Tempered water from the solution water jacket is used in spray washes.	
FILM DRYING	The film is dried in an aluminum assembly utilizing a high-velocity filtered air element with thermostatically controlled heat input.	
LENGTH OF LEADER	60 feet.	
CHEMICAL CAPACITIES	Developer 6 gals., short stop 3 gals., fixer 3 gals., hypo neutralizer 3 gals.	Developer 2 gals., short stop 1 gal., fixer 1 gal., hypo neutralizer 1 gal.
DYE-BACK REMOVAL	Dye-backing is removed by soft, viscous sponges in the wash tanks.	
FILM STAPLING	A stapler and supply of staples are furnished.	
CONSTRUCTION	Processing tanks are made of Kraylastic, other components are of polyvinyl chloride and stainless steel - all corrosion-resistant and durable materials.	
DIMENSIONS	Length: 6' 4" (With film supply box open). Width: 21" (With tank top up and rotated) Height: 5'	Approximately 12" wide, 41" long and 50½" high. (The S2 2051 is slightly longer and higher).
REPLENISHERS	1 quart capacity replenisher unit supplied for developer and fixer.	Available as an accessory No. S2 2953.
PLUMBING REQUIRED	All solution tanks set in and drain into a stainless steel sump assembly with a drain outlet. Only two plumbing connections are required: ½" plastic hose connection to the tempered water supply; and a 1" hose connection for the common drain. Both hoses supplied.	
WATER CONSUMPTION	3 gallons per minute; maximum water pressure 6 lbs. (water pressure regulator supplied).	1 gallon per minute; maximum water pressure 2 lbs., (water pressure regulator supplied).
ELECTRICAL CABLE	7, 3 wire line with ground supplied.	
ELECTRICAL REQUIREMENTS	115 volts, single phase, AC, 60 cycle, 1200 watts.	115 volts, single phase, AC, 60 cycle, 1000 watts.
RECOMMENDED FILM DRYING TEMPERATURE	100" - 120" at 5 feet per minute.	120" at 5 feet per minute.
CRATING	Crated at no charge for shipment within the United States. Export crating available at additional cost.	
WEIGHTS	Net 160 lbs., Gross 260 lbs. Export 360 lbs.	Net 70 lbs., Gross 150 lbs., Export 250 lbs.



KEUFFEL & ESSER CO.

TECHNICAL DATA SHEET 66-1D

**MODEL PD1420
16 mm TO 5 INCH FLODITRON
AUTOMATIC PROCESSOR**



**NO LEADER
VARIABLE SPEED
UP 28 FT. PER MINUTE
SHORT STRIPS OR
MULTIPLE ROLLS**

The unique Model PD1420 FLODITRON utilizes a patented principle of straight line processing. It eliminates all the trouble causing array of rollers, deep tanks, belt transports, etc.

Its versatility accommodates all film width from 16 mm to 5 inches with no change to the processing unit, and permitting the simultaneous processing of several rolls of 16 mm or 35 mm film. It will also accommodate, with absolutely no leader, short strips of film, minimum 10 inches long.

The FLODITRON Automatic Processor requires only a few minutes warm-up time and can be maintained in standby condition ready to accept short strips or full rolls of film.

The total DRY to DRY cycle for normal microfilm emulsions and normal background densities is only 2 minutes.

SPECIFICATIONS

FILM SIZE: 16 mm to 5 inches.

FILM CAPACITY: Up to 350 ft. per roll.

MULTIPLE ROLL CAPACITY: Four 16 mm, three 35 mm, two 70 mm, one 105 mm or 5 inch wide strand.

PROCESSING SPEED: Variable from a minimum of one ft. per minute to a maximum of 7 ft. per minute per strand.

PROCESSING SOLUTION CAPACITY: Six quarts per supply tank.

SOLUTION AGITATION: Flow rate up to 200 ft. per minute.

DRYING: High velocity warm air impingement system.

MAINTENANCE FACILITY: Electric drain valves and automatic sump pump. The entire unit can be disassembled for cleaning without tools.

WATER SUPPLY AND DRAIN REQUIREMENT: Warm water supply (80° or more preferable) at minimum 15 pound pressure and sink for drain required, since the unit is equipped with its own sump pump.

*LIST PRICE: Standard Model \$2,600.00, Archival Model \$3,200.00,
F.O.B. Rochester, New York, Uncrested.*

Prices and Specifications Subject to Change without Notice.

SPECIAL ATTACHMENTS:

1. Daylight loading magazines for various widths of film. Prices upon request.

DISTRIBUTED BY:

P H O T O D E V I C E S I N C O R P O R A T E D

— 35 LITCHFIELD STREET, ROCHESTER, NEW YORK 14608 —

FILM-A-RECORD®

UNIPRO MARK II

MICROFILM PROCESSOR



UNQUESTIONABLY THE FINEST
'ON-PREMISE' PROCESSOR

UNQUESTIONABLY, THE FINEST!

Radically new, the Hi-Speed UNIPRO Mark II automatically develops, fixes, washes, and dries a hundred foot roll of 16, 35, or 70mm film without a maze of "how-to" instructions in less than twenty minutes. Just set it and forget it!

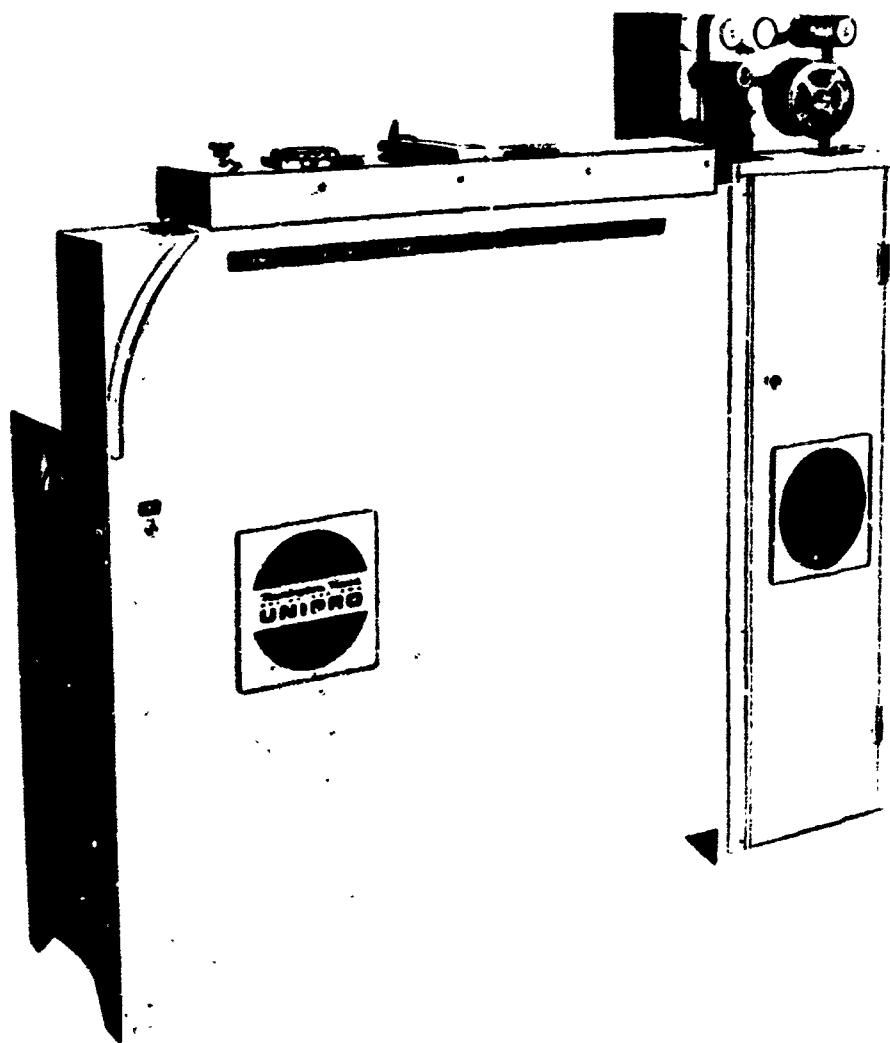
With UNIPRO Mark II and complete daylight operation, precision processing is no longer a job for a technician, no longer a complex messy operation, and no longer a gamble in processing quality.

Years ago, simplified operation made UNIPRO the first really practical "on-premise" processor. Today, UNI-

PRO Mark II, with straight line loading and fully automatic controls, is universally accepted in business and industry as the finest, most practical "on-premise" processor.

UNIPRO Mark II is offered in both standard and high-speed models and film processing on all units is guaranteed to meet A.S.A. and N.B.S. standards for archival permanency.

You can depend upon uniform, trouble-free, precision processing with UNIPRO Mark II, unquestionably, the finest...



UNIPRO SPECIFICATIONS

MARK II

MODEL F202.1 STANDARD and MODEL F202.2 HI-SPEED

CONSTRUCTION—The unit is made entirely of non-corrosive laminated plastic and stainless steel. Occupies ½ the area of an average office desk.

Height—51", Length—55", Width—14", Weight—approximately 168 lbs., Color—Surf green, Power Requirements—Plugs into standard 110-120 AC electrical outlet (15 amps.)

WATER SUPPLY—5 gallons per minute at 8 lbs. pressure; temperature 75-80° F.

WATER OUTLET—Gravity drain.

CONTROL AND ADJUSTMENTS—The developer temperature is automatically and adjustably controlled and held within plus or minus ½ degree by a heater and thermostat. A visible dial shows the temperature and a ruby light indicates when heater is on. Water pressure is controlled by valve and indicated by gauge.

DEVELOPER CIRCULATING PUMP—Oscillating pump circulates developer at the rate of ½ gallon per minute. The agitation distributes the developer strength evenly and produces film of consistent density with high contrast.

DEVELOPER TEMPERATURE—F202.1 UNIPRO MARK II operates at 86° F. F202.2 Hi-Speed UNIPRO MARK II operates at 89° F.

THREADING—Fast, simple threading is accomplished in approximately two minutes. Leader length is 45 ft. Hydraulic lift raises cover with the touch of a finger.

FILM CAPACITY—100 foot reels.

FILM SIZE—16mm, 35mm, and 70mm continuous and interchangeable without any mechanical changes whatsoever.

FILM TYPE—Any manufacture. Dye back, blue base, anti-halo undercoat and positive.

SPEED—F202.1 UNIPRO MARK II operates at 3.7 FPM or 100 feet in thirty minutes. F202.2 Hi-Speed UNIPRO MARK II operates at 5.4 FPM or 100 feet in twenty minutes.

PRERINSE AND DYE BACK REMOVAL—Controlled water spray.

SHORT STOP RINSE—Controlled water spray.

WASH—Controlled aerated water spray.

SQUEEGEES—Rubber roller type.

SAFEGUARDS—Automatic end of film audible signal and brake. Single drive roller pair engages only dry film, reduces possibility of film breakage to absolute minimum. Loading elevator allows ½ minute for splicing new supply film in position. End of roll alarm at take-up. Magazine door lock eliminates the possibility of film fog.

SIMPLIFIED SOLUTION CHANGING—Developer and fixer drainage is valve controlled from the top of the unit. Empties directly into water drain basin. Operator's hands never come in contact with solution.

REPLENISHER—Built-in feature allows for replenishing to keep results within desired specification.

SOLUTION LIFE—Using F107.3 Developer without replenisher—

16mm film—up to 4,000 ft.

35mm film—up to 2,000 ft.

70mm film—up to 1,000 ft.

F107.3 Developer with replenisher—change solution only when necessary to clean unit. Fixer life same as F107.3 Developer without replenisher. F107.4 Hi-Speed Developer must be replenished after every roll.

DRYING—Two cross-over polishing rollers after squeegee rollers remove moisture drops from the film strand before entrance into dry box. Warm air impingement system using air filter fan and electric heater. Temperature control and pilot light for variable drying control to compensate for ambient conditions.

RECOMMENDED PROCESSING SOLUTIONS—

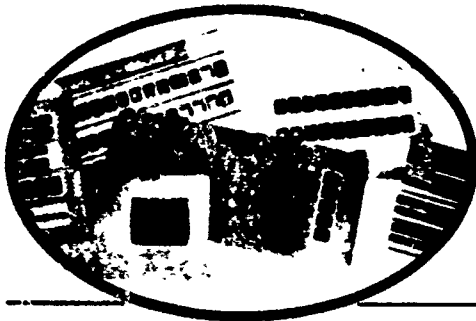
F107.3 FILM-A-RECORD Developer/Replenisher

F107.4 FILM-A-RECORD Hi-Speed/Developer Replenisher

F108.3 FILM-A-RECORD Fixer

All solutions are liquid for ease of mixing and are packaged in polyethylene bottles.

MORE EXCEPTIONAL PRODUCTS FROM THE MICROFILM CENTER OF REMINGTON RECORDS RETRIEVAL

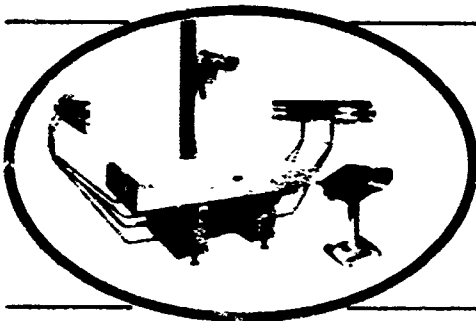
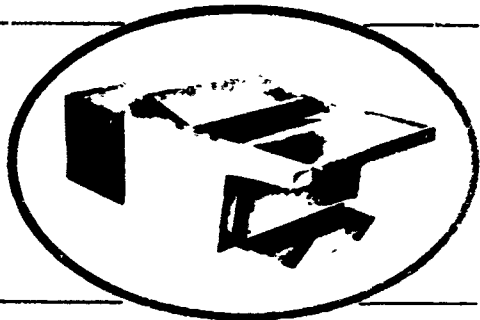


JACKETS, CARDS, AND FILMS

A complete line of KARD-A-FILM® jackets and aperture cards are available for unitizing microfilmed images. Remington also offers four types of superior microfilms in both 16mm and 35mm size.

HIGH SPEED ROTARY CAMERA F444

Amazingly compact, light enough to carry, and error-proof in operation. Designed-in *Automatic Exposure Control* automatically adjusts exposure for dark records, light records, or mixed records.

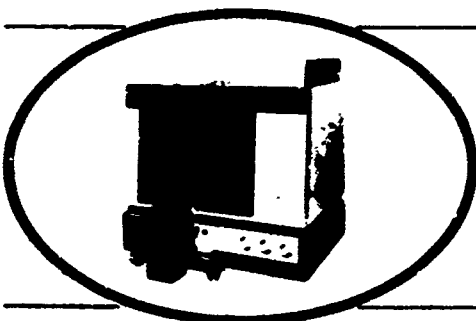
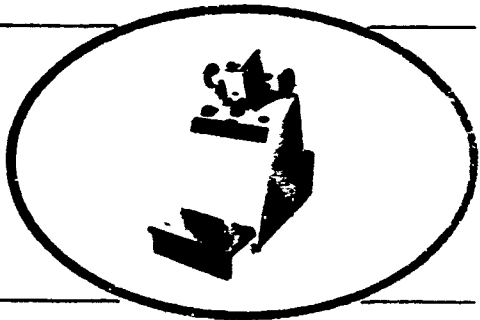


PLANETARY CAMERA F1083

The top performing planetary camera on the market today. Exclusive built-in features, combined with simplicity in operation makes the F1083 the ideal planetary for engineering drawings or any over-sized records.

READER-PRINTER F468

A compact combination reader-printer that makes sharp, bright paper prints in seconds. The F468 produces 8½" X 11" letter-size black-on-white prints from roll film or unitized film in aperture cards or jackets.



READER PRINTER F1824

Big, sharp, bright paper prints from 8½" to 24" long by 18" wide are produced in 30 seconds. Ideal for engineering drawings, newspapers and other large size records. Accommodates both roll and unitized film.

Your local Specialist from Remington Records Retrieval will offer you his expert advice without obligation. You'll have full access to all the facts, figures, and specific recommendations your operation needs. Remington offers you the most complete line of modern microfilm products and the most extensive array of national microfilm services from any one source. Call us today.

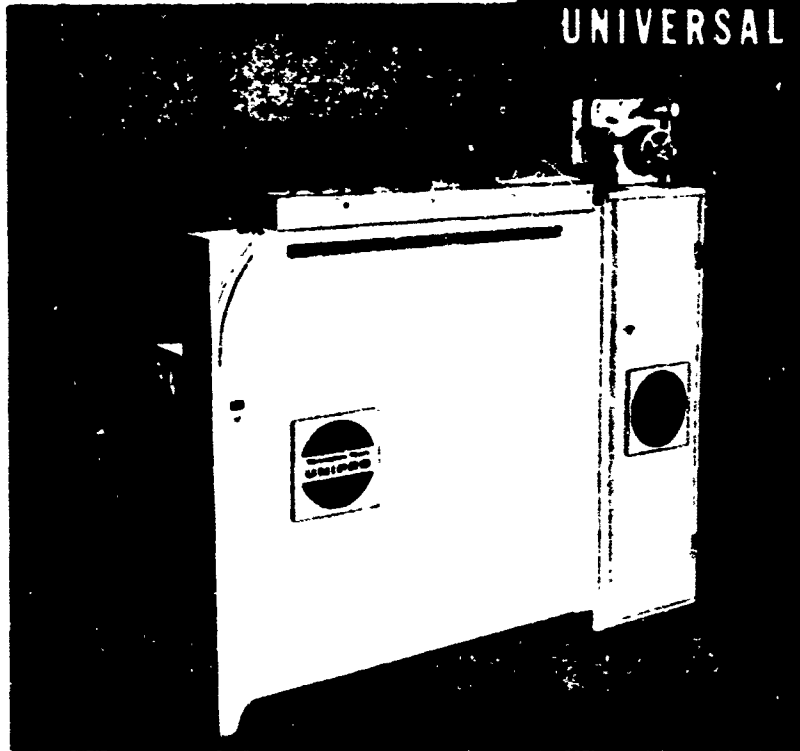


Remington Records Retrieval

REMINGTON OFFICE SYSTEMS DIVISION SPERRY RAND CORPORATION

UNIPRO

MARK II UNIVERSAL MICROFILM PROCESSOR



Cat. No. F202.1

**AUTOMATICALLY
DEVELOPS**

**16mm, 35mm and 70mm
MICROFILM**

This revolutionary new universal type microfilm processor automatically develops, fixes, washes and dries 16, 35, or 70mm microfilm interchangeably. Straight line loading and automatic controls make this processor simple to operate for

film of any length up to 100 feet. Film processed in accordance with instructions meets A.S.A. and N.B.S. standards for archival permanency. This processor is designed to be loaded and operated in normal room light.

SPECIFICATIONS

CONSTRUCTION—The unit is made entirely of non-corrosive laminated plastic and stainless steel.

Height—51"

Length—55"

Width—14"

Weight—approximately 168 lbs.

POWER REQUIREMENTS—Plugs into standard 110-120 volt AC electrical outlet (15 amps.).

WATER SUPPLY—(Tempered) 4 gallons per minute (8 lbs. pressure) for 16 or 35mm; 5 gallons for 70mm; at 75°F.

WATER OUTLET—Gravity drain.

CONTROLS AND ADJUSTMENTS—The developer temperature is automatically and adjustably controlled (86°F) and held within plus or minus ½ degree, by a heater, thermostat and oscillating developer pump. A visible dial shows the temperature and a ruby light indicates when the heater is on. Water pressure is controlled by valve and indicated by gauge.

THREADING—Fast, simple threading is accomplished in approximately two minutes. Leader length is 45 ft.

FILM CAPACITY—100 foot reels.

FILM SIZE—16mm, 35mm and 70mm continuous and interchangeable without any mechanical changes whatsoever.

FILM TYPE—Dye back, blue base and positive.

SPEED—100 ft., 30 minutes.

SOLUTION CAPACITY—Two gallons of developer, two gallons of fixer.

PRERINSE AND DYE BACK REMOVAL—Controlled water spray.

SHORT STOP RINSE—Controlled water spray.

WASH—Controlled aerated water spray.

SQUEEGEES—Rubber roller type.

SAFEGUARDS—Automatic end of film audible signal and brake. Single drive roller pair engages only dry film, reduces possibility for film breakage to absolute minimum. Loading elevator allows ¼ minute for splicing new supply film in position. End of roll alarm at take-up.

SIMPLIFIED SOLUTION CHANGING—Developer and fixer drainage is valve controlled and empties directly into water drain basin. Operator's hands never come in contact with solutions.

SOLUTION LIFE—16mm film—up to 4,000 ft.

35mm film—up to 2,000 ft. 70mm film—up to 1,000 ft.

DAYLIGHT LOADING AND OPERATING

DRYER—Heat controlled thermostatically and adjustable. Warm air impingement system using air filter, fan and electric heater.

RECOMMENDED PROCESSING SOLUTIONS—

F107.3 Film-A-Record Developer replenisher (Liquid for ease of mixing).

F108.3 Film-A-Record Fixer (Liquid for ease of mixing).

OPTIONAL—Hi-Lo Speed Changer permits operation at either 3.7 FPM or 7.4 FPM. Stepless Speed Changer permits variable speed range from 1.5 FPM to 11.1 FPM.

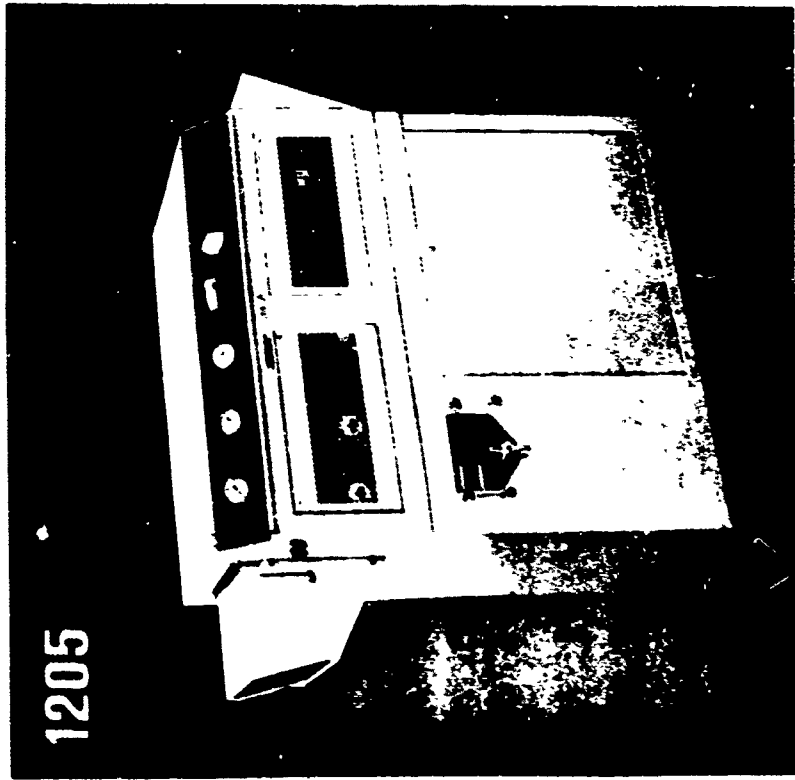


REMINGTON - RAND
UNIPRO MARK II (MODIFIED FOR 105mm)

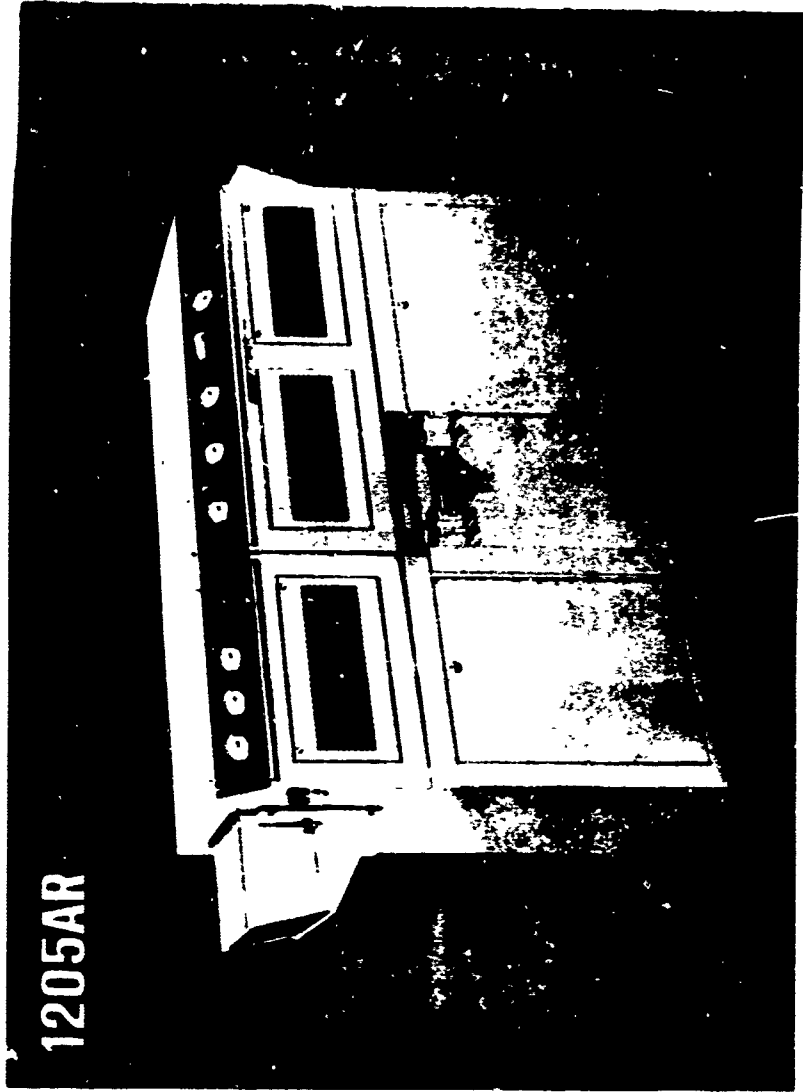
(Data sheets not available from the manufacturer)

Roller Transflo 120.5

rapid access dry-to-dry film and print processor
for black and white photo-sensitive materials



1205



1205AR

Portrait and School Photography • Photo-composition • Industrial and Press Photography • Instrumentation Photography • Law Enforcement Photography

features

Design Simplicity



A unique straight-line transport is used, thus eliminating extensive vertical arrays of rollers, deep tanks and plastic belts. Lifting the top covers of the processor exposes the processing chambers for easy access to the removable rollers, solution applicators and tanks. Simple installation, no required floor drain, no concrete base, no special heavy electrical power... Transflo 1205 requires only normal 115 volt service.

Versatility

Most black and white films or papers can be processed with the Transflo 1205. Because of its straight path and special rollers, standard variations in base thickness present no operational limitations. As the solution tanks contain only 2 gallons, processing chemicals may be readily changed.

Various Film Sizes

The Transflo 1205 processes film or paper of any width up to 12 inches, and lengths from 5 inches to 250 feet. To increase output, multiple strands of film can be processed simultaneously.

Rapid Dry To Dry Cycle

Dry-to-dry time can be as short as 90 seconds. Most films can be processed and dried, to recommended gammas, in 3 to 4 minutes at 80° to 85° F solution temperatures. Actual development time is only 20 to 30 seconds! Processing speed can be precisely adjusted depending on film types, chemicals and solution temperatures. Average capacity of the Rotor Transflo 1205 is over 250 sheets of 4" x 5" film per hour — or equivalent.

Ease of Operation

The Transflo 1205 processor is self-threading and leaderless for most materials. Conveniently grouped automatic controls precisely maintain process variables, assuring complete repeatability. The Transflo 1205 is ready to process after only a few minutes warm-up, thereafter, it may be left in a "stand by" condition for immediate use.

Self-Threading

No time-consuming pre-threading is required. The operator simply feeds the sheet or roll film into a slot. In some instances, a short leader tab is required for unusually thin materials.

Processing Solutions

The Rotor Transflo 1205 is designed for use with standard replenishable developers, and rapid fixers. Optional automatic replenishment systems, with either built-in or external storage modules, maintain precise activity of the 2 gallon chemicals in the solution tanks.

Pilot lights automatically indicate when the solutions have been brought to operating temperatures.

Solution Agitation

The short throughput cycle is primarily achieved by the highly efficient solution circulation system. Special applicators circulate solutions and wash water at high velocity on both sides of the film. In addition to increasing the processing rate, this rapidly moving layer of liquid provides uniform development and acts as a cushion to protect film surfaces from abrasion. Flow rates across the film surfaces actually exceeds 200 ft/min!

Process Controls



Developer and Fixer Temperatures are separately controlled to $\pm 1/4^\circ$ F by sensitive adjustable thermo-regulators. An additional thermo-regulator is provided for the dryer. Wash water, when regulated through the optional Transflo Water Tempering System, is automatically maintained within $1/2^\circ$ F regardless of pressure fluctuation. Accurate liquid-filled thermometers are furnished for all adjustable temperature components.

The transport rate control scale is accurately calibrated for repeatable through-put times. Chemical solution efficiency is assured by the optional automatic replenishment system which precisely accommodates for sensitive materials of varying dimensions and emulsion characteristics.

Drying

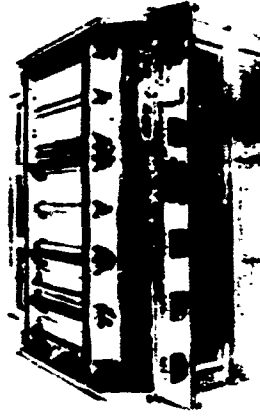
Drying is accomplished by a high velocity warm air impingement system. Balanced pressure and uniform removal of surface water minimize curling and maintain dimensional stability. Even double weight paper is dried in less than one minute!

Drive System

An adjustable speed motor synchronously drives all rollers to transport material horizontally through the Processor. Dependability of drive actuation is assured through the use of electronic solid-state circuitry. A calibrated dial permits continuously variable adjustment of speed for total dry-to-dry time.

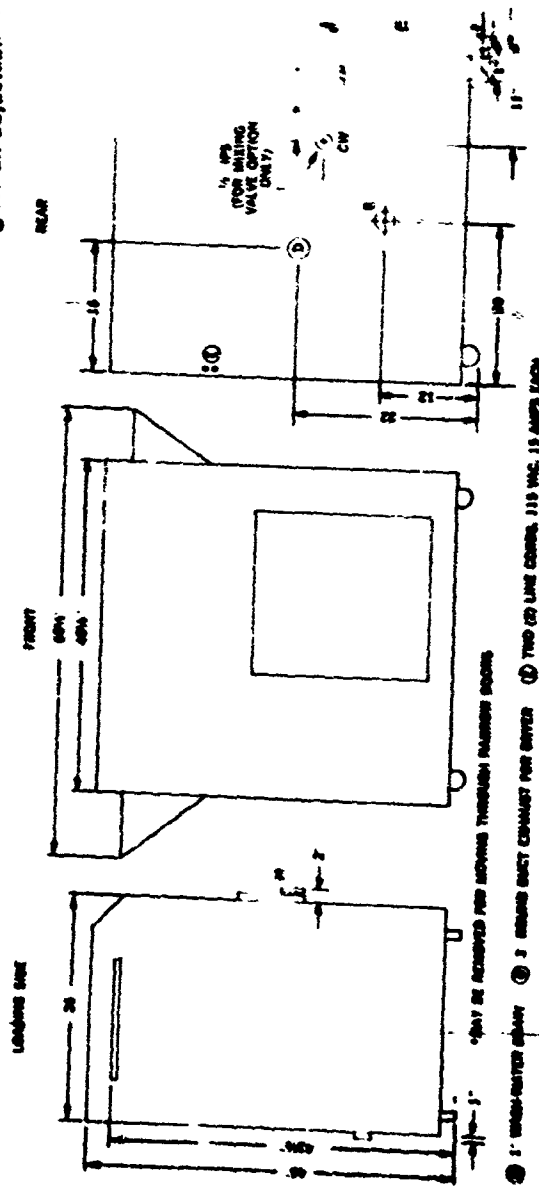
Ease Of Maintenance

Because of its reliability and simple design, the Transflo 1205 requires minimum maintenance. Any point in the film path can be reached in seconds in the unlikely event of a film break or jam. The roller transport system uses just 11 pairs of rollers which can be removed, cleaned and replaced in minutes. The rollers, solution applicators and solution tanks are all easily accessible through the conveniently hinged covers.



The Rotor/Transflo 1205 Film and Print Processor has been designed for extended, dependable service and incorporates the finest construction features. Type 316 stainless steel and other non-corrosive materials are used throughout. All panel controls are conveniently situated and include regulation for solution

circulators, solution tempering systems, dryer blower/heats, and film transport. A water-saving feature is offered as part of the optional Water Tempering Control System whereupon full wash water flow is effected only upon the operation of the transport while allowing for an adjustable stand-by minimal rate.



40" long x 36" high x 26" wide - Doublet Loading Magazine and Roll-Film Take-Up - length is 60"

OPTIONAL ACCESSORIES AND FEATURES

Automatic Repositioner MODEL TR-50
Complete with material sensor flow-meters, dimension/speed flow control, and 2.5 gallon S. - size Modules housed in Traffic Base.

MODELS TR-15, TR-25 and TR-35

metric with material sensor for level, dimension/speed
control, and 2 Pressure Storage Modules with pressure
regulation and low level indicator. An external Rack
Assembly Storage Modules offered in 2, 20 and 50 Gallons
capacity.

... of accuracy for water at low temperatures, regardless of pressure fluctuations, pressure is limited to also provide for solution tank cooling. A device to transport water for water economy;

For discharge to sinks, or drains higher than 10 inches above floor

Permits dark/light operation.

Recirculating Solution Tank, Chiller Assembly

Required when incoming cold water is not 10°F. below desired processing temperature.

For short term operation without external wash water input, the plant also permits use of Transflo with de-ionized water storage tanks.

Jackroom Rot Feed Device -- MODEL RF-12

For longer roll lengths up to 250 ft...

OR DAYLIGHT OPERATION

or Sheet film and standard roll lengths

sed with RF-12 for daylight

TRANSFLO Dryers

TRANSFLO-12036P

For processing of the five glass plates.

For photo (15)...

THE UNIVERSITY OF CHICAGO

For the graphic showing of high contrast photo-copies, use materials.

Electrician: I have two 15 amp. grounded receptals.

100

1. The system is designed to be used with a standard 1000-watt power supply. The power supply is connected to the system via a standard power cord. The power supply is connected to the system via a standard power cord.

... more than 10" above floor

Warning: When reconnected, the duct can be connected for outside venting.

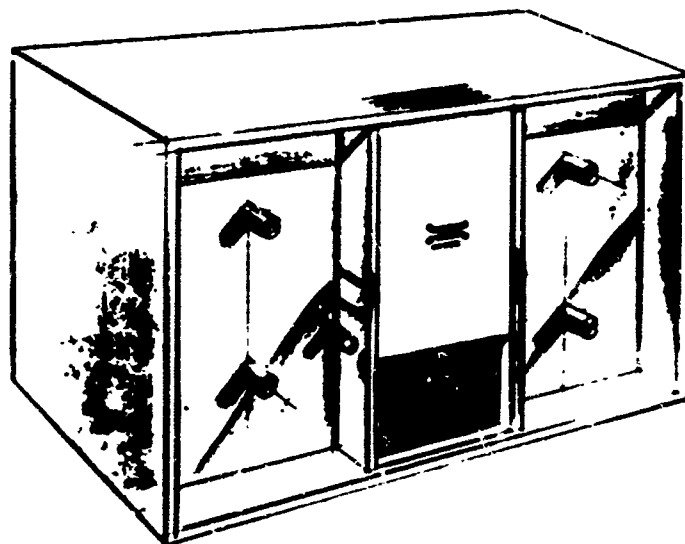
APPROX. SHIPPING WEIGHT:

Data sheets for:

FILM DUPLICATORS

(Section C-1, 3)

WITH THE **ARBEE 3000** ALL OTHER SYSTEMS GO..



ARBEE 3000*

**THE FIRST MAJOR BREAKTHROUGH IN ROLL TO ROLL DUPLICATION
SINCE THE INVENTION OF FILM**

THE ARBEE 3000 is the first continuous printer to utilize a revolutionary vacuum principle.

THE ARBEE 3000 is the first continuous tensionless printer.

THE ARBEE 3000 is the first printer with a built-in tracking channel to eliminate linear drift.

THE ARBEE 3000 is the first printer to eliminate slippage.

THE ARBEE 3000 is the first roll to roll continuous printer that is planetary in concept.

THE ARBEE 3000 is the first printer to accommodate any width film on the market from 16mm to 10 inches and wider.

THE ARBEE 3000 is the first continuous printer designed to handle both perforated and non-perforated film.

THE ARBEE 3000 is the first printer that can be ordered as a multiplex unit for silver or Diazo, sprocketed.**

THE ARBEE 3000 is the first continuous printer that handles short segments.

ARBEE ASSOCIATES, 5662 N. Milwaukee Ave., Chicago, Illinois 60630, (312)-774-9156

The ARBEE 3000 is the newest, fastest, most versatile and accurate machine ever conceived for duplicating film.

Its revolutionary vacuum principle eliminates the necessity for tension and therefore eliminates all possibility of stretching and distortion. The flatbed construction allows for the use of linear light source which permits faster printing. (In Diazo printing, speeds in excess of 100 ft. per minute have been obtained). The unique combination of vacuum and duplex design make it possible to move both webs at identical speed throughout the entire exposure cycle, so film remains in perfect registration.

There is no design that can compare with this machine. It not only leaps ahead of the field, it makes all other roll to roll printers obsolete.

THE ARBEE 3000 TAKES OUT THE GUESSWORK THAT TOO OFTEN GOES WITH DUPLICATING

ARBEE 3000 - Specifications, Model A35*

Power:	110 Volt; 60 Cycles
Lamp:	150 Watt point source
Dimensions:	40" L: 21" H: 15" D
Speed:	Variable
Aperture:	Fixed
Film:	35mm: non-perforated, silver
Price:	\$ f.o.b. Chicago, Ill.
Terms:	Net

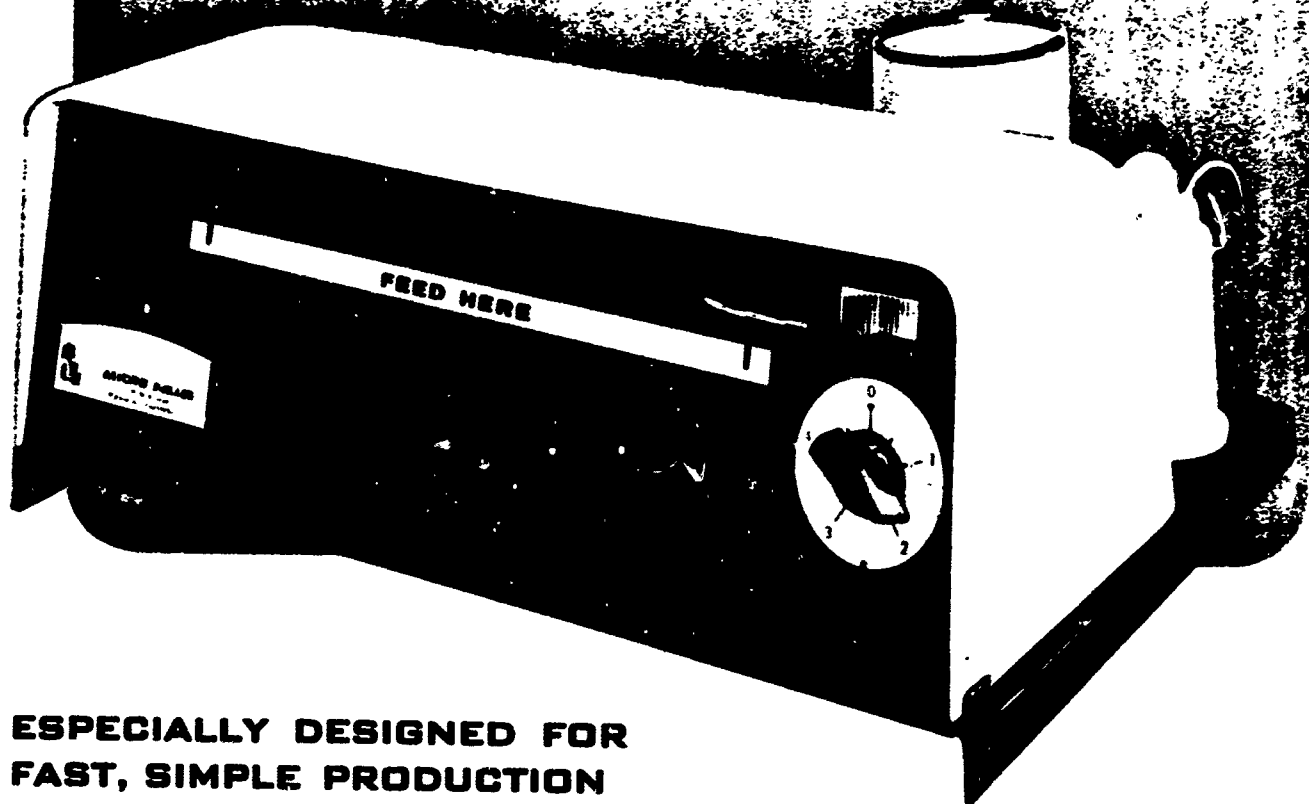
* Specs/Price available on request re models for other film sizes

* Pats. Pend.

** For Diazo, non-perforated, contact Frederick Post Co., Des Plaines, Illinois (Licensee)

**MICRO-
FOLIO®**

**SEMI-AUTOMATIC,
DIAZO PRINTER**



**ESPECIALLY DESIGNED FOR
FAST, SIMPLE PRODUCTION
OF DIAZO TRANSPARENCIES**

**MICRO-FOLIO • DIVISION OF:
atlantic microfilm corp.**

SPRING VALLEY, NEW YORK, U.S.A.



MICRO-FOLIO®

DIAZO PRINTER

- **UNIQUE SEMI-AUTOMATIC OPERATION**
- **SIMPLE TO OPERATE**
- **TRIM, MODERN DESIGN**
- **"AUTO-FEED" AMMONIA DEVELOPER**

Your MICRO-FOLIO Diazo Printer is the easiest to use, semi-automatic diazo transparency exposing and developing device available. It is designed for the printing and developing of 5 x 8 inch and smaller dry diazo materials. It is especially suitable for the production of diazo transparencies using Atlantic's exclusive MICRO-FOLIO Microfiche system. And, its operating functions, though simple, are unique in diazo printers.

By following a few basic rules when setting up and operating the MICRO-FOLIO Printer, you are assured excellent reproductions from a wide variety of original material.

The MICRO-FOLIO Printer consists essentially of two operating assemblies: 1. the basic unit incorporating the rotary light source and 2. the developer tube, the polyethylene ammonia feed bottle, and the sponge base container.

Remove these basic components from the shipping carton. Loosen the locking nuts on each end of the printer unit housing, raise the cover, and remove the packing material contained inside and around the light source. Reclose the cover locking it in position.

Assemble the components of the developer assembly removing all packing material. Fill the polyethylene bottle approximately two-thirds full of strong ammonia water (26-28% ammonia water solution). Do not use household ammonia since it is not strong enough to assure maximum development of diazo materials. Position the developer tube into the sponge-containing base after removing the cap, and plug the heater outlet into the built-in electrical receptacle located at the rear of the base of the printing unit. Turn on the ON/OFF switch located on the front panel. (The light will glow when unit is on.) Allow the devel-

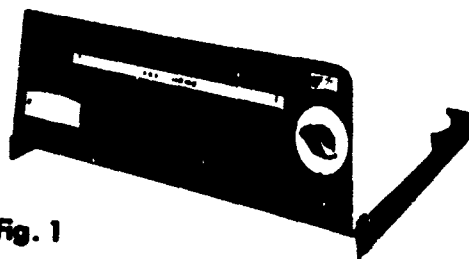


Fig. 1

oper assembly to warm up for approximately two minutes. Open valve on ammonia bottle feed line and squeeze bottle to start ammonia flow into sponge base. Exclusive automatic replenisher keeps vapor strength constant. No failures or half-developed transparencies. Your MICRO-FOLIO Diazo Printer and developer assembly are now ready to operate.

OPERATING INSTRUCTIONS

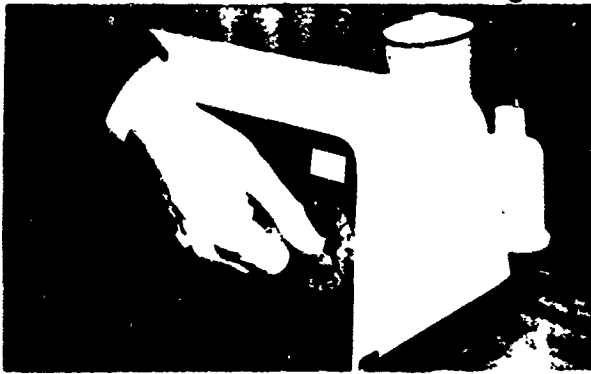
The MICRO-FOLIO Printer will accept and print up to 5 x 8 inch diazo material. Operating this device is comparable, from the standpoint of exposure to the light source, to any rotary diazo printer on the market. The principle involved is that the light from the black-light fluorescent tube is transmitted through the master, and strikes the surface of the emulsion side of the diazo film to produce the print. Since this device is designed primarily for the production of Microfiche materials, it is important that you remember to feed the master and film into the MICRO-FOLIO Printer on its horizontal plane.

DIAZO PRINTING

Set the timer dial (figure 2) to the appropriate exposure time.

Place your original (Micro-Folio master) face-to-face in contact with the emulsion side of the MICRO-FOLIO Diazo Film, as shown in figure 3. (You can find the emulsion side of your MICRO-FOLIO Diazo Film by holding it in position where the notch is located in the lower right-hand corner; the emulsion side then faces you.) Use the white side of the paper inter-leaf sheet as a back-up sheet to your MICRO-FOLIO diazo film during the printing process.

Hold this sandwich in its horizontal position, and place it in line in the lower feed slot of the MICRO-FOLIO Printer. Hold it snugly against the in-



terior of the printer and in an even alignment. Then push the release button (figure 4) on the timer dial.

Pushing the release button activates the motor. The material, in position in the feed slot, will be picked up by the rotary assembly and fed into the MICRO-FOLIO Printer. At the point where the material is completely wrapped around the diazo printing cylinder, the motor will automatically stop (figure 5). The light will burn for the designated exposure period, at which time the timer will go off and the motor will automatically start again to return the material to you through the return slot (figure 6). When the material has been removed from the return slot, the machine will automatically stop.

Once having exposed your diazo material remove the film and roll it in a vertical direction (emulsion side rolled in); open the diazo developer tube and insert your diazo film. Wait approximately two minutes for complete development of the film. Remember, however, that you cannot over-develop MICRO-FOLIO Diazo Film, so if it is left longer in the developer tube no damage will occur.

APPROXIMATE EXPOSURE TIMES

Exposure times with the MICRO-FOLIO Diazo Printer will vary according to the density of the original material being reproduced and the type of material being reproduced on. As a rule of thumb, printing from a high quality Microfilm

MICRO-FOLIO Microfiche Master onto MICRO-FOLIO Diazo Film will take approximately two minutes exposure time. When using a high speed film reproducing master (such as a SEPIA Intermediate) onto diazo film, exposure time should be approximately one minute.

In judging the proper exposure with diazo materials remember that a very weak, washed out image indicates over-exposure. If there is background or color in the clear areas of the finished print, this indicates under-exposure. Adjust your exposure time accordingly.

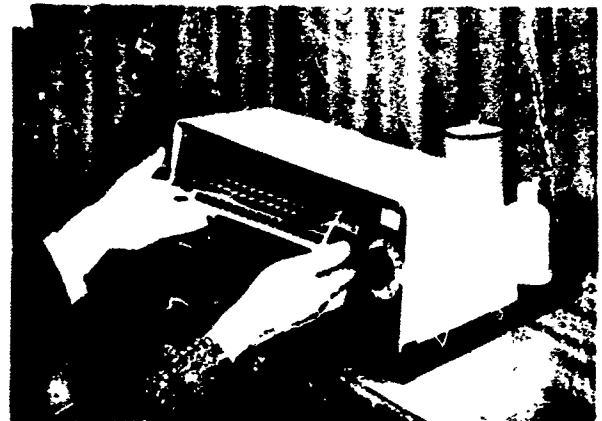


Fig. 3



Fig. 4



Fig. 6

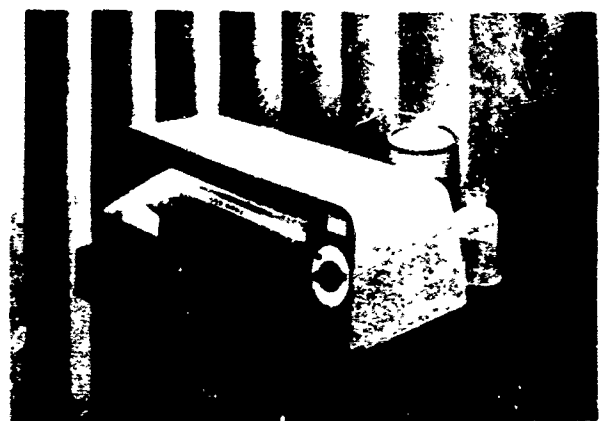


Fig. 5

MAINTAINING YOUR MICRO-FOLIO DIAZO PRINTER

Little or no maintenance is required for the MICRO-FOLIO Diazo Printer except the occasional changing of a lamp and maintaining cleanliness throughout the system. When not in use, or when the unit is to be stowed for a short period of time, e.g.: overnight, weekends etc., arrange the developing components as shown in figure 7.

CLEANING THE DEVELOPER ASSEMBLY

Water residue from the ammonia water solution will collect in the base sponge container of the developer assembly. When you add 28% ammonia water to this water solution, you are further diluting the potency of the ammonia vapor. It is, therefore, necessary to empty the excess water from the developer sponge and container on a regular basis so that only 28% ammonia water is maintained in the system during the developing step. To do this simply remove the developer tube from the sponge base container and pour out the water residue, squeezing the sponge as dry as possible. Be sure cleaning is done with adequate ventilation to avoid excessive ammonia fumes in regular work areas.

CHANGING THE LAMPS

To change the lamp on the MICRO-FOLIO Diazo Printer simply release the lamp at both ends of the sockets, raise it slightly, and slide it out of the cylinder (figure 8). No other dismantling is necessary. Fluorescent black-light lamps of this type have a long life expectancy. However, they do fall off in their richness of ultraviolet light through regular use. When exposure times on the MICRO-FOLIO Diazo Printer seem to become excessive with normal reproduction materials, the lamp should be replaced so that UV emission is maximum.

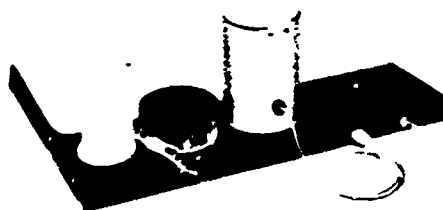


Fig. 7



Fig. 8



ATLANTIC DIAZO DEVELOPER-D-22

for diazo duplicates
from microfiche masters

- fast, automatic processing
- no venting required
- accommodates all COSATI-standard fiche
... up to 105mm x 148mm (4x5")

Used with the Atlantic Model A-9 Diazo Printer, the new Atlantic D-22 Diazo Developer processes microfiche duplicates automatically and in just seconds ... at the rate of two 105mm x 148mm dupes every 10 seconds.

Attractively styled, rugged, but extremely lightweight, the D-22 uses liquid ammonia — not vapors, so there's no need for venting, no obnoxious odors. Unit also features automatic recirculation of the liquid ammonia in the completely closed system.

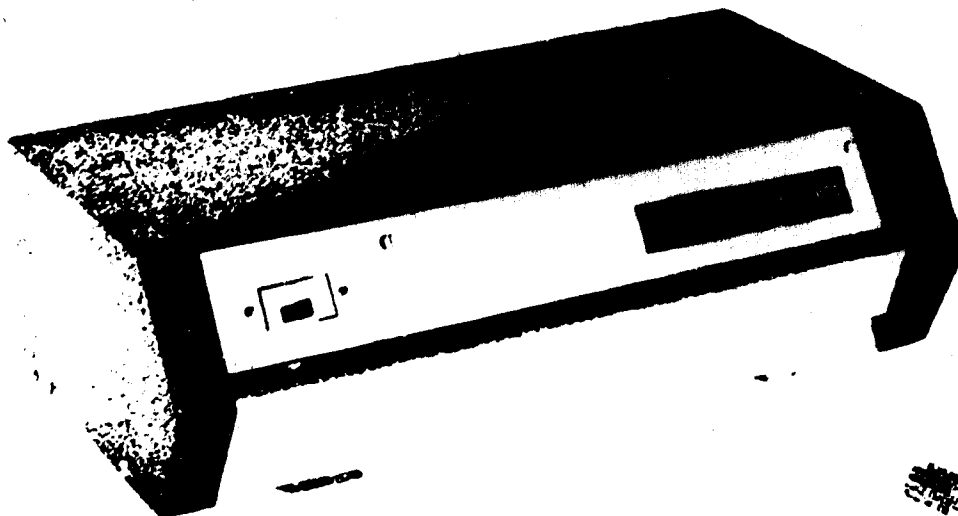
Using the D-22 is as easy as feeding the exposed sheet of diazo print film into the front take-up

rollers. In fact, that's all there is to it. The D-22 takes over from there to automatically carry the duplicate film through the developing cycle, then delivers it from the ejection roller at the rear of the processor. Delivered duplicate is completely dry and ready to use.

And, your duplicate fiche is completely scratch-free. Exclusive smooth neoprene teflon rollers guide it through the developing cycle.

SPECIFICATIONS:

Controls: On/Off
Dimensions: 14½" w x 4¾" h x 8" d
Weight: 12 lbs.
Power Requirements: 110-120v, AC, 50-60 cycle
Warm-up Time: 10 minutes
Capacity: Accommodates two 105mm x 148mm
fiche simultaneously



ATLANTIC D-22 Diazo Developer

- compact size, modern styling
- automatic, closed system liquid ammonia recirculation



another milestone in microfilming technology

atlantic microfilm corp.

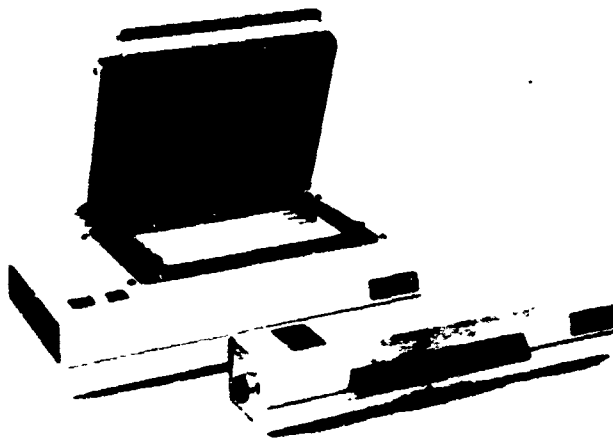
Canon

Canon Kalfile Printer 340 VC

This unit is a multipurpose contact printer for Kalvar sheet film and Kalvar paper.

Both original and Kalvar films are placed on the printing screen. As soon as the cover is closed, vacuum contact is effected so as to ensure an excellent resolving power.

The forced cooling of the print surface, the high-accuracy exposure control by means of a transistor timer, etc., make this printer especially suitable for Kalvar film. The light source is an ultraviolet ray fluorescent lamp engineered to meet the characteristic features of Kalvar film. This printer is useful, also, for taking a large number of copies because its screen is large enough to allow a plurality of microfiches and aperture cards to be printed simultaneously.



Canon Kalfile Printer 340 VC and
Canon Kalfile Developer 310 VS

Type	Vacuum contact type (0.9 p.s.i.)
Effective printing area	12" x 8" (A letter-size sheet or four 4" x 6" sheets can be placed.)
Light source	Eight 15-watt α V ray fluorescent lamps of preheated rapid-start type
Exposure control	Light source turned on and off by a preset transistor timer
Cooling	Built-in dual fan motor with washable air filter units
Power consumption	440 VA (Lamps on)
Power supply	115V, 60 C/S; Kalfile Developer plug socket attached
Dimensions and weight	25" x 18" x 8 $\frac{1}{2}$ ", 38 lbs.

Canon U.S.A., INC.

500 First Avenue • New York, N.Y. 10022

TELEPHONE (212) 512-2000



Canon Kalfile Developer 310 VS

This thermal developer is used for Kalvar sheet film and Kalvar paper, and finds wide applications such as processing the Kalvar microfiches, aperture cards, and others printed by the Canon Kalfile Printers and developing various types of Kalvar films used for printing.

The heated silicone rubber belt is adjusted in temperature by a thermocontroller so that according to the type and use of film the most desirable result is always attainable.

Max. document width 12"
Developing speed 2"/sec. approx.
Developing temp Variable from 180°F to 300°F centering
at 250°F
Temperature control By a capillary-type thermostatic switch
Power consumption 115V, 60 C/S, 550 VA
Dimensions and weight 25" x 7.2" x 4.7"; 18.7 lbs.

Canon Kalfile Developer 310

This developer is a popular version of the Canon Kalfile Developer 310 VS and has its developing temperature fixed at 250°F. Designed to keep the optimum temperature, this device has an established reputation that its developing condition is stable and uniform.

Max. document width 12"
Developing speed 2"/sec. approx.
Developing temp
at 250°F
Temperature control By a bimetallic thermostatic switch (Fine-
control screw equipped)
Power supply 115V, 60 C/S, 550 VA
Dimensions and weight 25" x 7 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ "; 18 $\frac{1}{2}$ lbs.



CBS LABORATORIES

**DIAZO
MICROFILM
DUPLICATING
EQUIPMENT**

MODEL 601 DIAZO MICRODUPLICATOR

The CBS Laboratories Model 601 Diazo Card Microduplicator™ is a rotary-type printer-processor designed for the diazo duplication of microfiche and all other non-rigid cut films. It is the only machine available that can do this with the precision and speed required for today's microfilm duplication and distribution programs.

Using DIAZO, the ultimate method of microimage duplication, the Model 601 produces diazo duplicate negatives at costs as low as one-third of conventional methods. In addition, it matches or exceeds the output of competitive equipment costing several times as much, and does it with resolution far above those "tough specifications" you've been reading about.

The Model 601 uses totally new concepts in the film transport and optical systems. For instance, we've built-in a film handling system that will not scratch or damage silver originals. Once the operator puts a master/copy set into the machine, the next step is a clear, sharp duplicate. The Model 601 even picks off the master automatically and returns it to the operator after the exposure cycle.

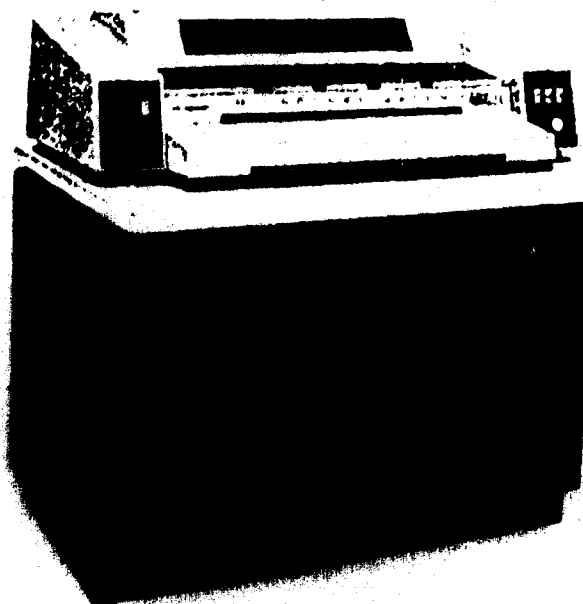
Unlike other rotary-type machines, the Model 601 has a super-cooled printing cylinder which can be cleaned with the machine running. It has an automatic anhydrous ammonia developing system designed to eliminate the residual film fog sometimes associated with diazo film.

The Model 601 Diazo Card Microduplicator can be bought or leased by anyone who has the problem of duplicating microfiche in production quantities at high speed and high resolution. It's the only machine that can do it!

And here's another bonus—With the automatic vacuum pick-off system turned off, the 601 is the world's finest rotary offset plate exposure unit! If your microfilm department is

near your office duplicator, you get two pieces of equipment for the price of one.

If you want more information on how you can achieve faster and better microfilm duplication, write us today, or, if you're really in a hurry, call us collect.



MODEL 601 DIAZO MICRODUPLICATOR

SPECIFICATIONS

FILM SIZE: Standard microfiche and all other non-rigid cut films in groups up to 19 inches wide.

OPTICAL SYSTEM: 4000 watt UV system radiating through a precision opto-mechanical collimating system.

DEVELOPING: Completely automatic anhydrous ammonia recirculating system designed to eliminate residual film fog.

SPEED: Synchronized, continuously adjustable printing and developing speeds.

VENTING: Self-contained blower connects to standard 6-inch ducting.

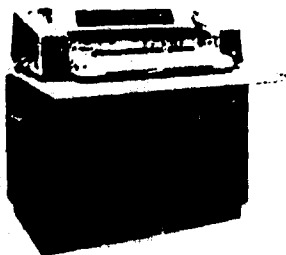
SIZE: 41" wide; 41" high; 36" deep.

POWER REQUIREMENTS: 220 volts AC, single phase, 36 amperes.

FILM SEPARATION: Automatic.

WEIGHT: Approx. 390 lbs.

PRODUCTION CAPACITY: 5" x 8" microfiche (3 up)—21 cards per minute; 4" x 6" microfiche (4 up)—40 cards per minute. This is based on operation at 5 lineal feet per minute which encompasses most normal exposures.



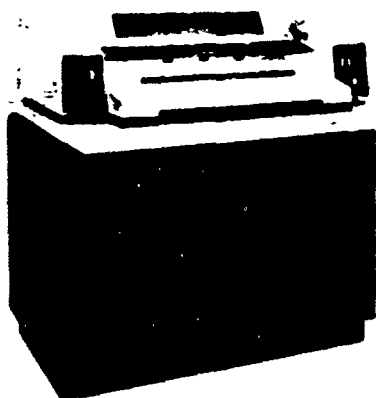
CBS Laboratories' unique research and development capabilities are available for the custom design of systems and equipment in the broad field of diazo technology. For further information, please call or write the Professional Products Department at:

CBS LABORATORIES

Stamford, Connecticut
A Division of Columbia Broadcasting System, Inc.

Tecnifax equipment for DIAZO microduplication

Model 601 Diazo Microduplicator



The Model 601 Diazo Card Microduplicator™ is a rotary-type printer-processor designed for the diazo duplication of microfiche and all other non-rigid cut films. It is the only machine available that can do this with the precision and speed required for today's microfilm duplication and distribution programs.

Using DIAZO, the ultimate method of microimage duplication, the Model 601 produces diazo duplicate negatives at costs as low as one-third of conventional methods. In addition, it matches or exceeds the output of competitive equipment costing several times as much, and does it with resolution far above those "tough specifications" you've been reading about.

The Model 601 uses totally new concepts in the film transport and optical systems. For instance, we've built-in a film handling system that will not scratch or damage silver originals. Once the operator puts a master/copy set into the machine, the next step is a clear, sharp duplicate. The Model 601 even picks off the master automatically and returns it to the operator after the exposure cycle.

Unlike other rotary-type machines, the Model 601 has a super-cooled printing cylinder which can be cleaned with the machine running. It has an automatic anhydrous ammonia developing system designed to eliminate the residual film fog sometimes associated with diazo film.

The Model 601 Diazo Card Microduplicator can be bought or leased by anyone who has the problem of duplicating microfiche in production quantities at high speed and high resolution. It's the only machine that can do it!

And here's another bonus - With the automatic vacuum pick-off system turned off, the 601 is the world's finest rotary offset plate exposure unit! If your microfilm department is near your office duplicator, you get two pieces of equipment for the price of one.

If you want more information on how you can achieve faster and better microfilm duplication, write us today, or, if you're really in a hurry, call us collect.

SPECIFICATIONS

Film Size: Standard microfiche and all other non-rigid cut films in groups up to 19 inches wide.

Optical System: 4000 watt UV system radiating through a precision opto-mechanical collimating system.

Developing: Completely automatic anhydrous ammonia recirculating system designed to eliminate residual film fog.

Speed: Synchronized, continuously adjustable printing and developing speeds.

Venting: Self-contained blower connects to standard 6-inch ducting.

Size: 41" wide; 41" high; 36" deep.

Power Requirements: 220 volts AC, single phase, 36 amperes.

Film Separation: Automatic.

Weight: Approx. 390 lbs.

Production Capacity: 5" x 8" microfiche (3 up) - 21 cards per minute, 4" x 6" microfiche (4 up) - 40 cards per minute. This is based on operation at 5 lineal feet per minute which encompasses most normal exposures.

TECNIFAX

Sold and serviced by Tecnifax Corporation. For further information, please contact your nearest Tecnifax Sales Office or write Microforms Department, Tecnifax Corporation, Holyoke, Mass. 01040

Affiliated with Scott Paper Company

Equipment Designed and Manufactured by

CBS LABORATORIES

A Division of Columbia Broadcasting System, Inc.

**SPECIFICATIONS FOR DOC INC CARD-TO-ROLL AUTOMATIC
DIAZO MICROFICHE PROCESSOR (CRM PROCESSOR)**

Manufacturer: Documentation Incorporated
4833 Rugby Avenue
Bethesda, Maryland 20014

Distributor: Documentation Incorporated

Model Name: Doc Inc Card-to-Roll Automatic Diazo
Microfiche Processor (CRM Processor)

Date Introduced: May 1, 1966 **Availability:** 160 days ARO

Type: Step

Film Width: 105mm **Film Length:** 1000 feet

Speed: 15 cards (105 x 148mm)/minute

Lamp Specifications: UV radiation source: 4-3000 watt high pressure
mercury arc lamps

Power Requirements: 208v AC-3 phase, 60 cps. 90 amps

Dimensions: 8 1/2' x 5 1/2' x 2 1/2' (180 sq. ft. all inclusive area)

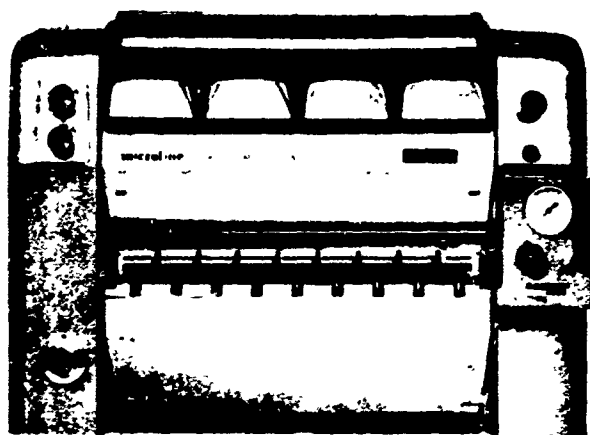
Weight: Approximately 1000 pounds

Features:

- (1) Input may be either silver or diazo microfiche master which is used to produce a predetermined number of quality diazo duplicates, or distribution copy, in an automatic step and repeat cycle.
- (2) No distribution copy shall have a resolution of less than 90 lines/mm and resolution loss shall not exceed one target from a 127 line/mm master.
- (3) Duplicate fiche conform to all applicable quality specifications, i.e. Federal Microfiche Standard PB 167630 dated September 1965.

Price: \$27,500 **Date:** February 1, 1966

MICROLINE SHEET FILM DUPLICATOR



*Gives you
quality duplicates
in quantity...*

*Makes microfilm
practical for mass
data distribution...*

Speed and simplify your multiple distribution operations with the Microline Sheet Film Duplicator.

Duplicate decks for distribution

A major link in any unitized microfilm system, it makes direct negative-to-negative (or positive-to-positive) copies of sheet film or card originals on Actifilm... diazo film in card weights and sizes.

Unitize documents up to 72 pages on a single 5" x 8" sheet... then turn out multiple decks of duplicates... for fast distribution of data in volume... to easily set up decentralized microfilm files... to cut the time and cost of providing full or half-size prints... to avoid wear and tear on original films.

Convenient and capable

The Microline Sheet Film Duplicator combines exposure and development in one convenient unit. It works in full room light, ends the need for darkrooms.

Operation is simple. Controls are few... easy to reach and work.

During normal runs, the speed control is the only one the operator need adjust.

For maximum output, the double-width throat and twin printer belts permit feeding two duplicates at once, side-by-side.

Quality duplicates... ready to use

And you get quality reproduction: Duplicates as good as (or better than) originals, for blow-backs of original clarity. Duplicates that retain resolution, hold density... even in generation printing.

A special collimating reflector prevents distortion and undercutting. Controlled tracking prevents blurs. Balanced cooling banishes sticking, rippling.

Duplicates are fully developed by an anhydrous ammonia system. The stainless steel mesh conveyor keeps them scratch-free, curl-free... delivers them dry, ready for immediate use.

Special features for special performance

- Optical-quality ground printing cylinder assures maximum retention of detail.
- Anhydrous ammonia developer system* eliminates liquid ammonia, cuts warm-up time, blocks corrosion.
- Duplicates are delivered and stacked in sequence, to end the need for hand collating.
- Automatic timer keeps blower working after unit is turned off, to prevent harmful condensation.

*Ammonia tank or supply not furnished with machine.

SPECIFICATIONS

General

Printing widths: Two 9" tracks
Mechanical speed: Up to 60 f.p.m.
Printing speed, varies with translucency of original Up to 15 f.p.m.
Maximum cylinder temperature rise over ambient: 60° F.
Finish: Gray and white washable vinyl paint

Electrical

Wired for: 220 V.A.C., 60 cycles, single phase
Amperage: 15 Amps. at 220 V.A.C.
Lamp: 2200 Watts (100 W.P.I.)
Stabilized lamp circuit to operate at nominal 220 volts
with fluctuations in range 220-240 volts.
Machine power factor: 85% minimum

Dimensions and Weights

Height: 28 $\frac{1}{4}$ "
Width: 33 $\frac{1}{8}$ "
(40" with feedboard)
Depth: 24 $\frac{1}{2}$ "
(41 $\frac{1}{2}$ " with feedboard)
Net weight: 420 lbs.
Shipping weight: 490 lbs. domestic
500 lbs. export
Export shipping cube: 34.5

Note: The anhydrous ammonia supply is not included with the machine and should be ordered as a separate item.



MICROLINE
MICRO IMAGE PRODUCTS
GENERAL ANILINE & FILM CORPORATION
BINGHAMTON, NEW YORK

KALVAR EQUIPMENT PRICE LIST

**MULTIMODE REPRODUCER
MODEL 400**

**\$4,950.00
F.O.B. San Carlos, California**

Instantly produces 16 mm and 35 mm roll microfilm duplicates in one continuous operation with heat and light only. Printing speeds up to 25 feet per minute. Capable of producing direct or reversal images.

Dimensions: 34"L x 23"W x 19"H

Weight: 145 pounds

Electrical Characteristics: 115 vac., 60 cycle, 20 amps
Equipped with power cord and standard grounding plug.

Delivery: 30 days from receipt of order

K-10 CONTACT PRINTER

**\$895.00
F.O.B. Minneapolis, Minnesota**

Completely dry process contact exposer for duplicating microfilm, aperture cards, and any cut sheet film up to 9" x 9". Employs a vacuum frame for high resolution duplication.

Dimensions: 32"L x 19"W x 28"H

Weight: 110 pounds

Electrical Characteristics: 115 vac., 60 cycle, 15 amps
Equipped with power cord and standard grounding plug.

Delivery: 30 days from receipt of order

KALFILE PRINTER

\$245.00

F.O.B. Palo Alto, California

Completely dry process contact roll to sheet film duplicator. Also duplicates microfiche, aperture cards, sheet film up to 5" x 8" size. Automatic timer control exposure.

Dimensions:

24"L x 13"W x 11"H

Weight:

24 pounds

Electrical Characteristics:

115 vac., 60 cycle, 8 amps
Equipped with power cord and standard grounding plug.

Delivery:

30 days from receipt of order

INSTANT DEVELOPER MODEL 110

\$325.00

F.O.B. New Orleans, Louisiana

Completely dry process flat plane thermal unit instantly develops Kalvar microfilm, aperture cards, and sheet film up to 10 inches by any length.

Dimensions:

22"L x 7"W x 4"H

Weight:

19 pounds

Electrical Characteristics:

115 va., 60 cycle, 5 amps
Equipped with power cord and standard grounding plug.

Delivery:

30 days from receipt of order

KALKARD EXPOSER 200

\$600.00 (\$1,145.00 if ordered with companion, Kalkard Activator 240)

F.O.B., San Carlos, California

Semi automatic exposers for duplicating Instant 80 and other Kalkard aperture cards.

Dimensions: 11"L x 12 1/2"W x 7"H

Weight: 20 pounds

Electrical Characteristics: 115 vac., 60 cycle, 15 amps.
Equipped with power cord and standard grounding plug.

Delivery: 30 days from receipt of order

KALKARD ACTIVATOR 240 \$600.00 (\$1,145.00 if ordered with companion, Kalkard Exposer 200)
F.O.B. San Carlos, California

Develops the image on exposed Instant 80 Kalkard Exposer Card. Contrast control selector permits selection of gamma desired.

Dimensions: 11"L x 12 1/2"W x 7"H

Weight: 30 pounds

Electrical Characteristics: 115 vac., 60 cycle, 10 amps

Delivery: 30 days from receipt of order

KALKARD-AUTO ACTIVATOR 341 \$3,950.00
F.O.B. New Orleans, Louisiana

Converts the 3M 041 from the Diazo ammonia process to the Kalvar system that duplicates up to 2,000 Instant 80 Kalkards an hour. Requires no modification of 041 construction.

Dimensions: Power Supply - 10" x 20" x 17"
Flash Attachment - 12" x 12" x 10"
Control Unit - 6" x 6" x 6"

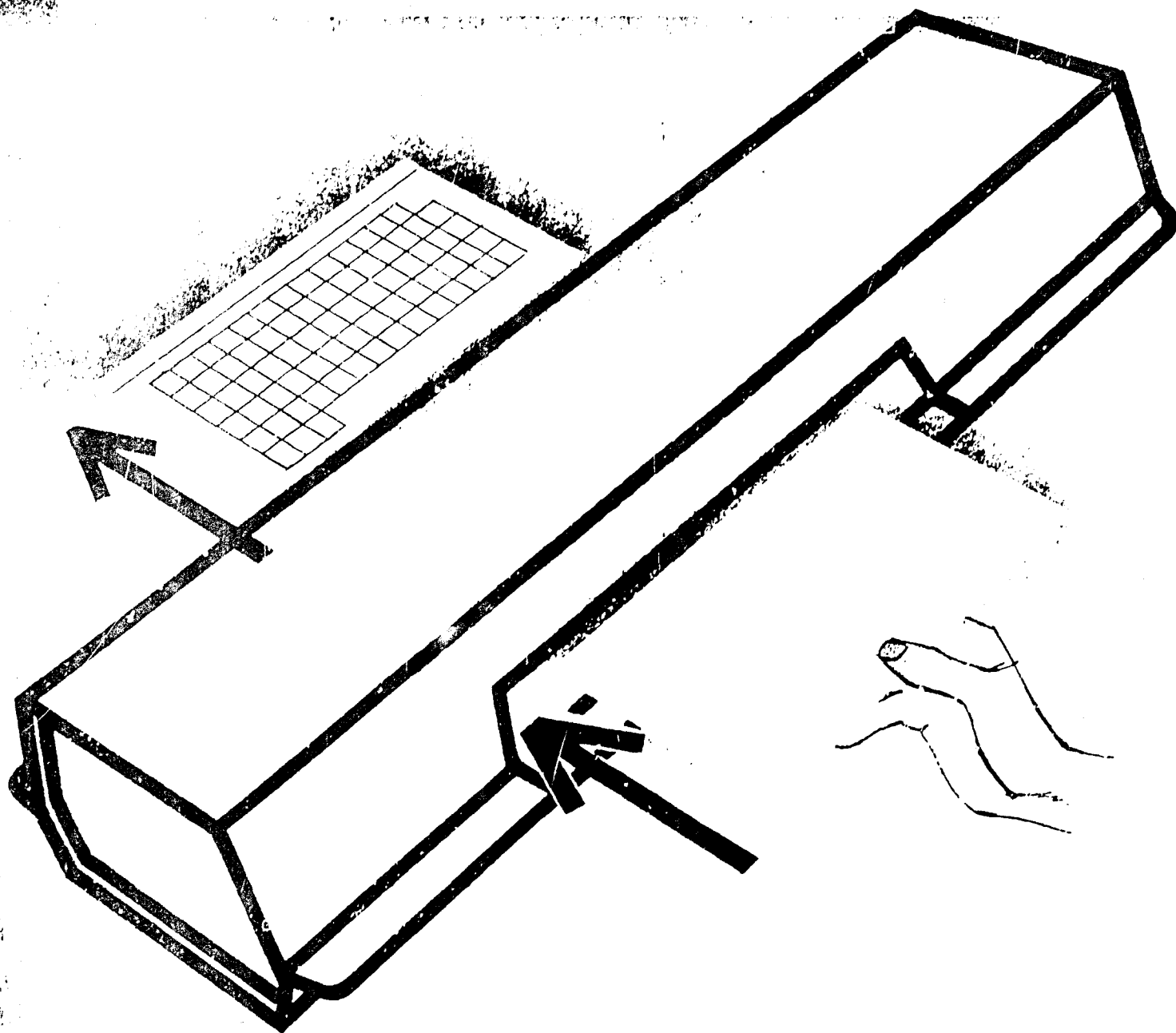
Weight: Power supply - 80 lbs.
Flash Attachment - 20 lbs.
Control Unit - 2 lbs.

Electrical Characteristics: 220 vac., 6 amps.

quick & easy

KALVAFICHE* SYSTEM

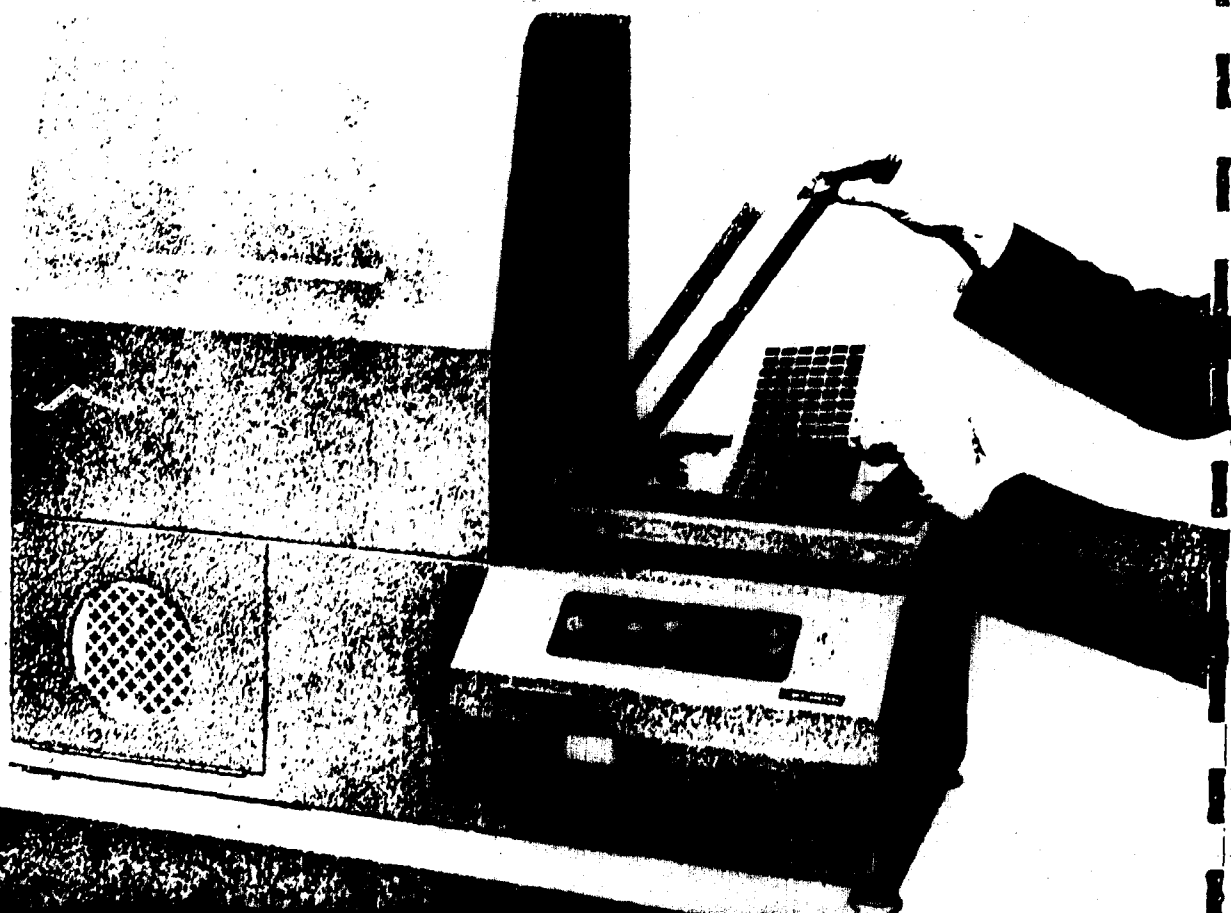
*MICROFICHE USING KALVAR FILM



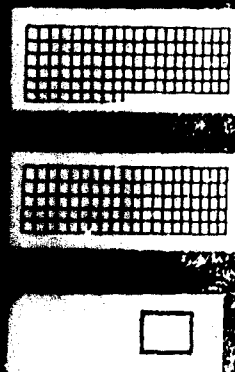
THIS IS YOUR PRINTER

The Kalvafiche System is a fast, amazing method of data handling in an era of "exploding technology." *The film itself is automatic.* It will reproduce your designs, maps, figures, photos, etc., by a dry and instant process. The K-10 Colight Printer (below) creates a latent image in the Kalvar Film by ultraviolet light. The Kalvar In-

stant Developer (right) then develops the image in a few seconds by the simple application of heat. No chemicals, darkroom, vapors or venting. The K-10 Colight Printer (\$895 F. O. B. Minneapolis) gives excellent resolution. It has a 400-Watt G-E Mercury Lamp with 6000 hours life. Air filtering and automatic resetting timer.



Take any type of photographic transparency—aperture card, microfiche, film strip, etc. Place emulsion to emulsion with Kalvar Film. Insert in K-10 Colight vacuum frame . . . in a few seconds the two films . . .



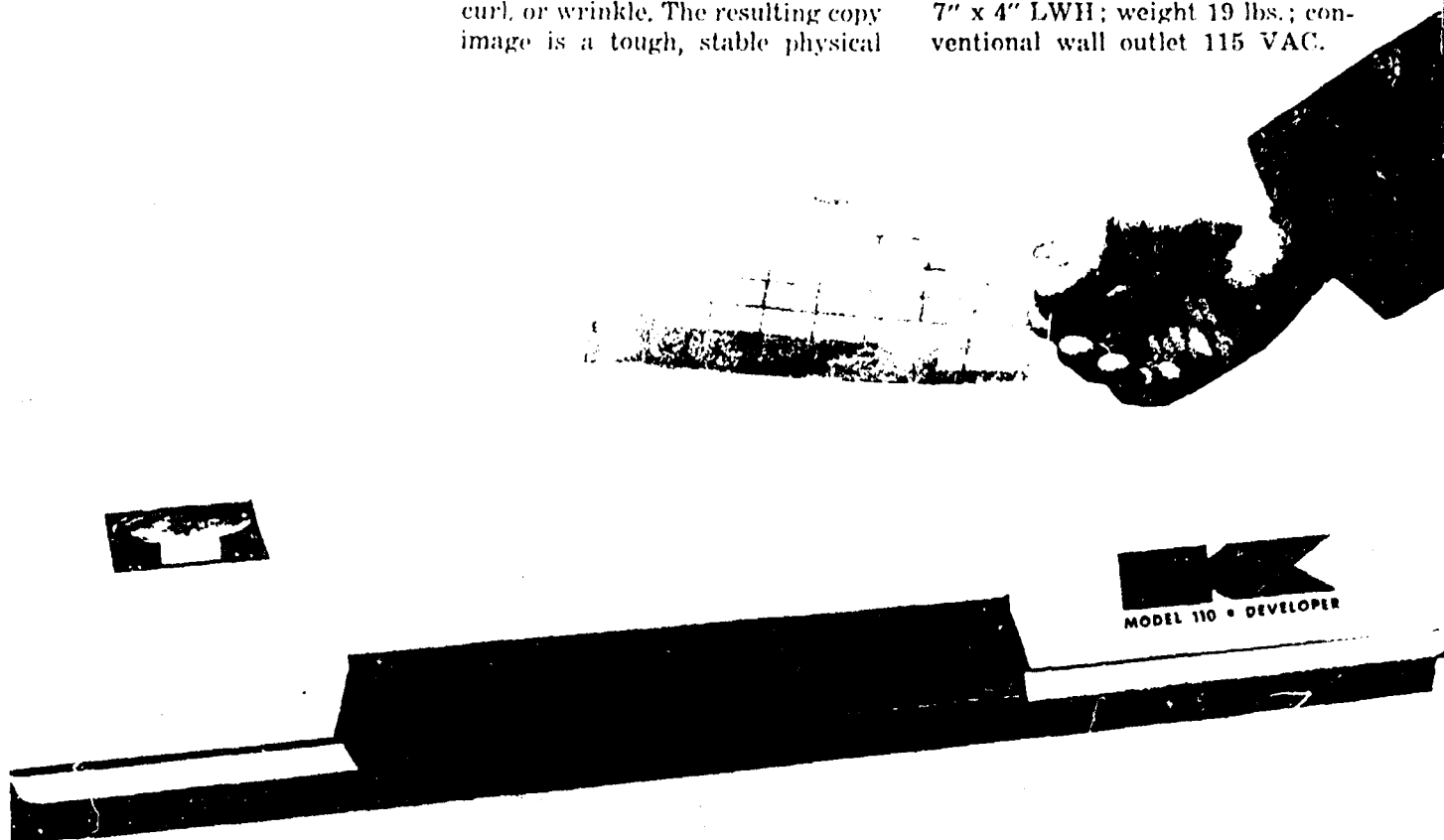
THIS IS THE FAST

K-10 COLIGHT

THIS IS YOUR "DARKROOM"

The Kalvar Instant Developer is an extremely simple unit. It develops Kalvar Film in seconds by passing it through heated belts. It will handle aperture cards, strips, or sheets of film . . . up to 10 inches wide and 60 inches long. The flat, hot belts do the job without warp, curl, or wrinkle. The resulting copy image is a tough, stable physical

structure with excellent photographic qualities. The film is impervious to moisture, grease, fingerprints, mildew (mould) and ionizing radiation. The Developer (Price \$325 F. O. B. Campbell, California) saves you the cost of a darkroom. Specifications: 21" x 7" x 4" LWH; weight 19 lbs.; conventional wall outlet 115 VAC.



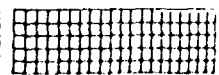
SIMPLE KALVAFICHE SYSTEM

... you now have a latent image on the Kalvafiche. Insert the Kalvafiche into the Instant Developer, which passes it over the heated belts in seconds . . . Out comes the Kalvafiche with a processed image available for immediate use! The ultimate in simplicity, speed, quality and economy.

KALVAR INSTANT DEVELOPER



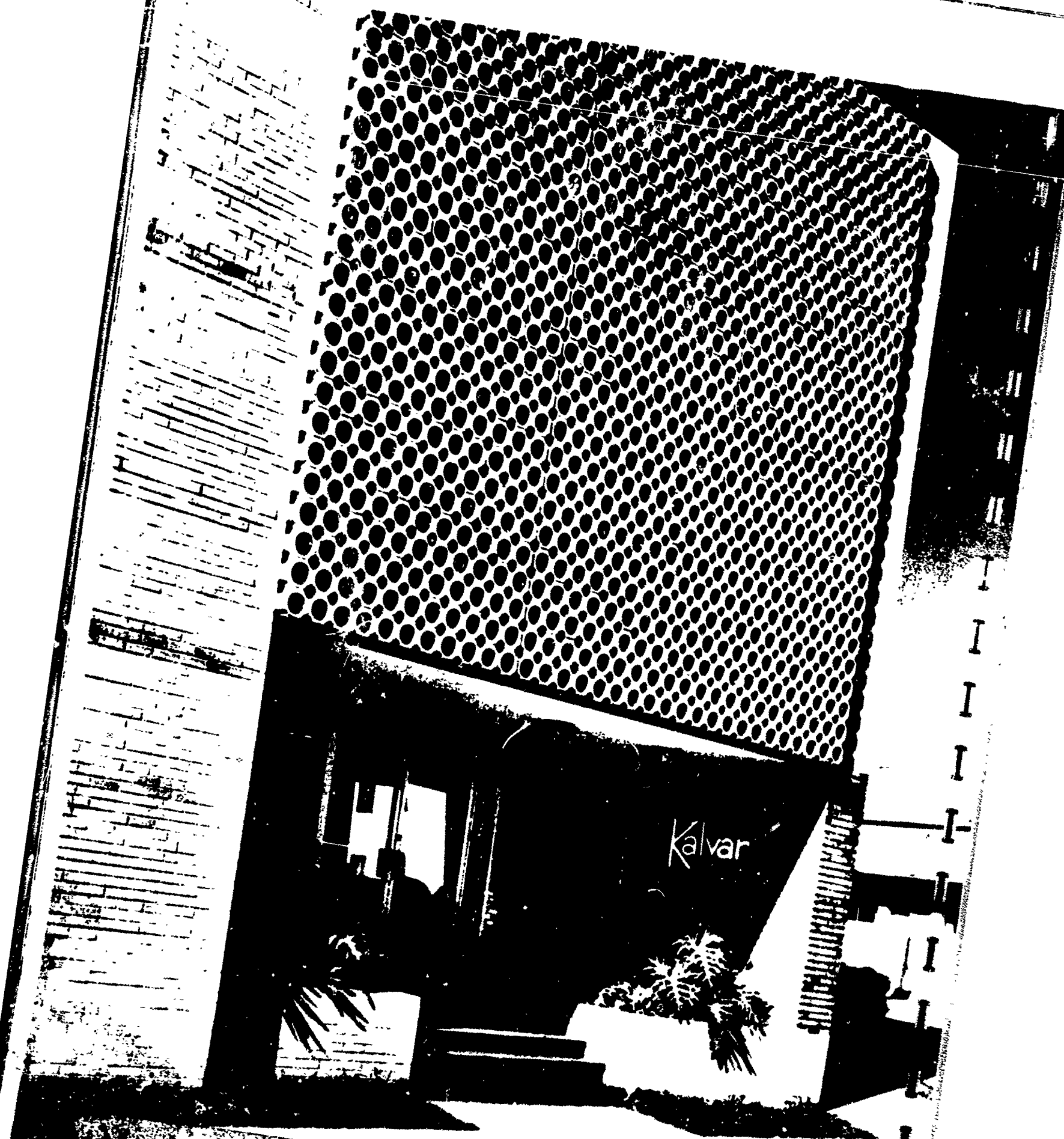
KALVAFICHE



KALVAFICHE



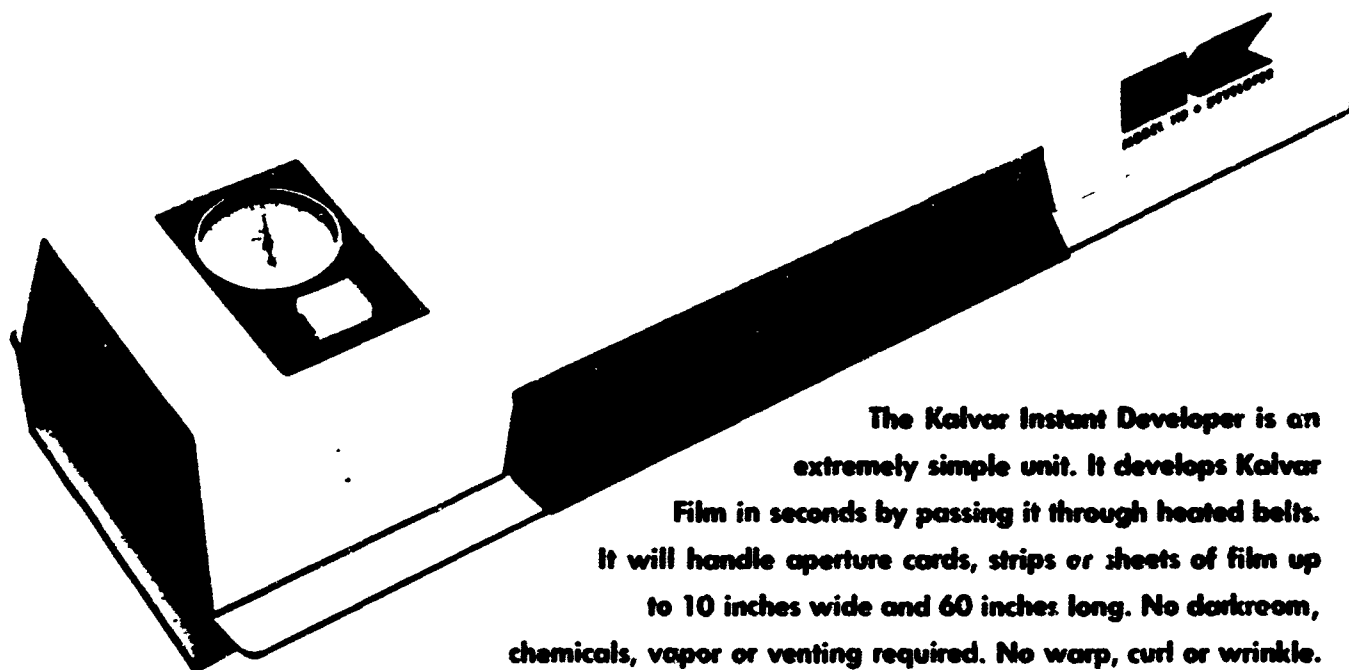
APERTURE CARD



Kalvar Inc. 2000 2nd Street, Berkeley, California 94710

THE NEW KALVAR INSTANT DEVELOPER MODEL 110

...a continuous, flat-plane, belt type developer



The Kalvar Instant Developer is an extremely simple unit. It develops Kalvar Film in seconds by passing it through heated belts. It will handle aperture cards, strips or sheets of film up to 10 inches wide and 60 inches long. No darkroom, chemicals, vapor or venting required. No warp, curl or wrinkle. Produces a highly stable image on tough, tearproof thermoplastic film.

SPECIFICATIONS

Length—21 inches
Width—7 inches
Height—4 inches
Weight—19 lbs.

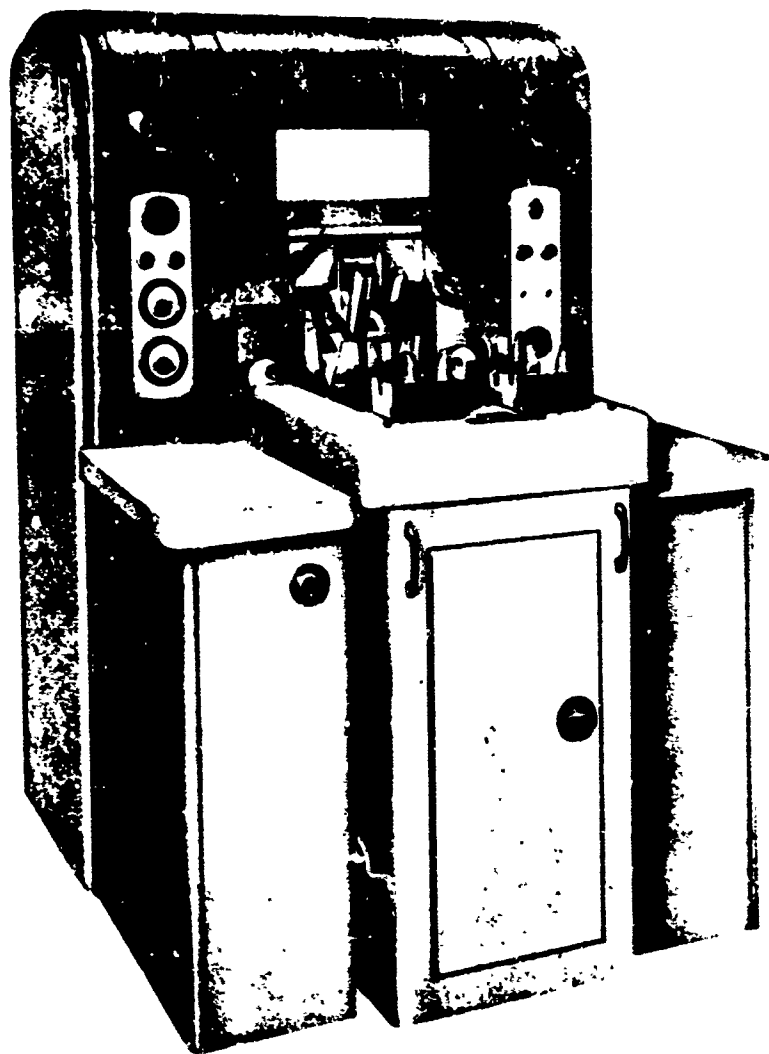
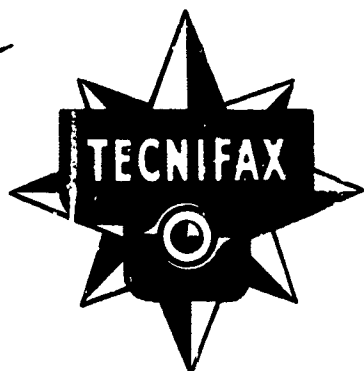
Power—115 VAC, 60 Cycle, 5 AMPS

Developing temperature—235-245°F

Price—\$325 F.O.B. Campbell, California. Delivery 30 days from date of acceptance order



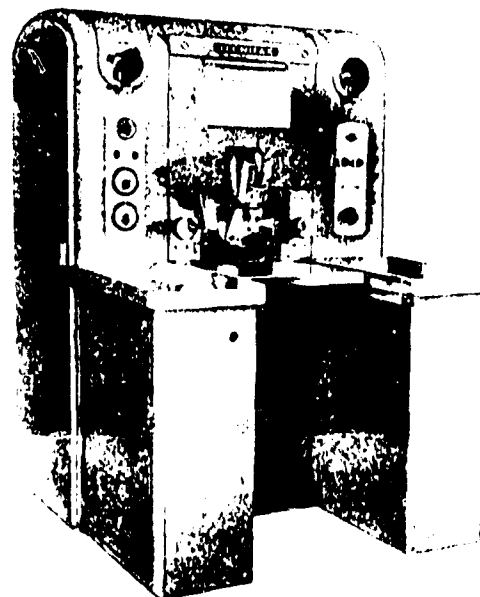
National Sales Office
819 Mitten Road
Burlingame, California 94010



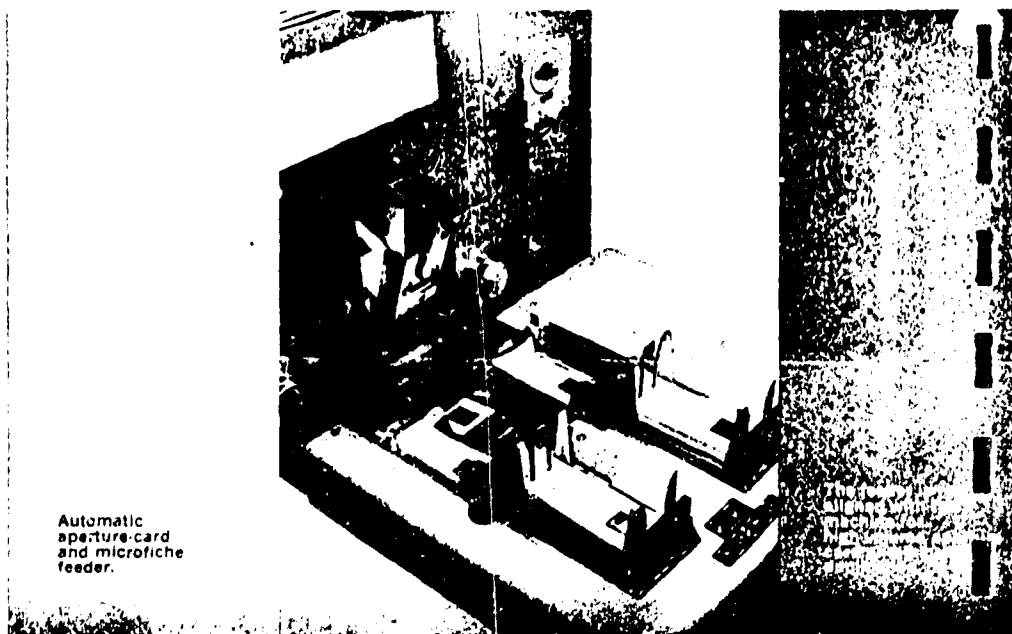
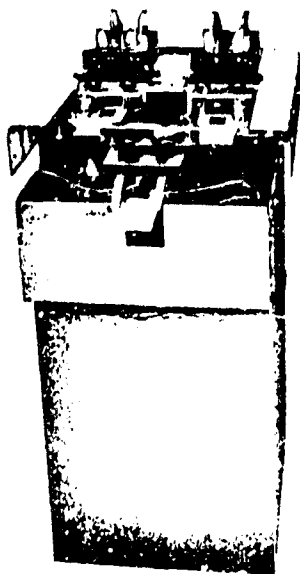
MICROFILM PROCESSER

Hi-R

- Processes microfilm roll-to-roll, card-to-card and microfiche-to-microfiche . . . automatic feed and delivery.
- High-resolution . . . 5.3 to 7.9 range . . . exclusive light-collimator.
- High-volume . . . up to 40 fpm for rolls . . . up to 1200 cards or microfiche per hour.
- Dependable . . . Designed and constructed for heavy-duty, continuous operation.
- Versatile . . . accommodates rolls and sheets up to 11" wide, including 9½" rolls of aerial reconnaissance film.



The basic Hi-R machine processes hand fed sheets up to 11" wide by any length, including aperture-cards and microfiche.



Automatic aperture-card and microfiche feeder.

HIGH SPEED, HIGH RESOLUTION DIAZO MICROFILM PROCESSING

The Tecnifax Hi-R Microfilm Processor is designed for high-volume, high-resolution diazo-duplication of microfilm originals. It meets the most exacting resolution standards of Government and Industry, yielding resolution in the 6.3 to 7.9 range, at an 18 times reduction.

The basic machine will process hand-fed sheets up to 11" wide by any length, including aperture cards and microfiche in any of the commonly-used sizes. Automatic separation and stacking is provided. Optional auxiliary units are available for roll-to-roll duplication and for automatic feeding of aperture cards and microfiche.

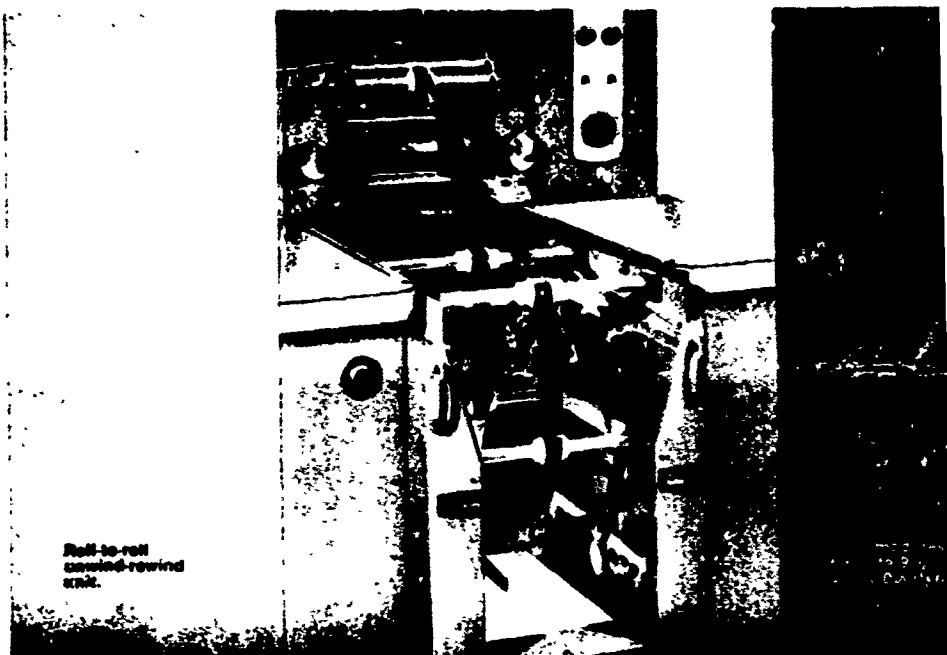
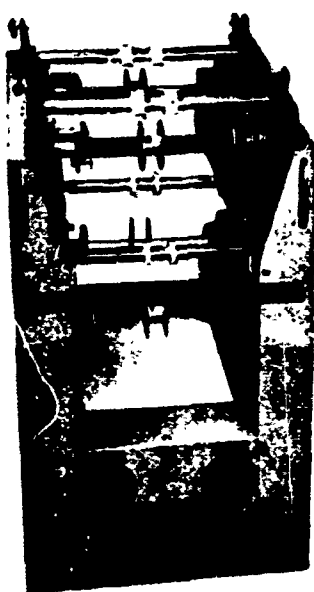
ROLL-TO-ROLL

For roll-to-roll printing, a self-contained, unwind-rewind unit is available. This unit is designed so that it can be easily rolled into position on casters and precisely aligned with the machine. It accommodates rolls in widths from 16mm to 9½", up to 1,000 feet in length.

The original and duplicate are automatically separated and rewound. As the duplicate roll emerges from the developer, it passes in front of an illuminated viewer so the operator can observe the quality of the image and adjust his controls accordingly. Normal processing speeds are in the 10 fpm to 30 fpm range, dependent upon the quality of the originals, the resolution standards, and the type of film used.

CARD-TO-CARD

Another auxiliary unit is available for automatic feeding of master and duplicate aperture cards and microfiche at speeds of up to 1,200 cards per hour. Masters and duplicates are automatically lifted from stacks, superimposed, and fed into the machine. The unit accommodates all commonly-used sizes. It is mounted on casters and is readily and precisely aligned with the machine.



PRICES AND RENTAL

Item	Sales Price	Monthly Rental
Basic Hi-R Diazo-Microfilm Processor	\$16,700.00	\$310.00
Automatic Feeder for aperture card and microfiche	\$ 6,300.00	\$140.00
Roll-to-Roll Printing Unit	\$ 3,250.00	\$ 86.00
Complete Unit	\$26,250.00	\$502.00

These prices are f.o.b. Holyoke, Massachusetts.

The minimum rental period is 6 months. The rental charges include service and replacement parts, except for the mercury-vapor lamp and the electronic tubes which are expendable. All rental prices are f.o.b. Holyoke, Massachusetts.

If the machine is purchased within one year of the starting date of the rental agreement, a portion of the amount paid in rentals will be applied to the purchase price on the following basis: Within 4 months, 90%; within 6 months, 85%; within one year, 80%.



DEVELOPMENT

The Tecnifax patented, elliptical developing tank provides the capacity required to develop any diazo material fully at its printing speed. The developing agent is normally anhydrous ammonia, in conjunction with automatically controlled water vapor, which provides optimum control of development, insuring uniformity and eliminating condensation problems. An optional aqua-ammonia system is available if desired. Frictionless carriage of diazofilms through the developing chamber is achieved by sandwiching them between a belt and the sealing sleeve, both moving at the same speed, thus avoiding scratches.

DIMENSIONS

50" wide, 60" deep, 72" high.

SHIPPING WEIGHTS

Basic machine	2,975 lbs
Card and Microfiche Feeder	450 lbs
Roll-to-Roll Unit	325 lbs.
Total Weight	3,750 lbs.

ELECTRICAL CHARACTERISTICS

220 volts, single phase, 60 cycles, 60 amps
... UL approved.

SERVICE AND MAINTENANCE

The Hi-R is ruggedly constructed for continuous, heavy-duty operation. It is designed for ready access to all parts, simplifying service and maintenance. The entire printing unit can be quickly pulled out on the feed board for cleaning of the cylinder or replacement of the lamp assembly. The top cover is hinged so that it is readily lifted to expose the developing section for cleaning and servicing.

APPLICATIONS

The Hi R Microfilm Processor is designed to meet the requirements of documentation systems based on the use of microfilm in rolls, aperture cards or microfiche, or in combinations of all three types of microfilm. It is also designed to meet the exacting standards required for reproduction of high-acuity, aerial reconnaissance photographs.

TECNIFAX DIAZOFILM

Tecnifax Corporation leads the industry in developing, manufacturing and selling diazofilms. It currently manufactures diazofilms on cellulose-diacetate, cellulose-triacetate, and polyester ("Mylar" and "Cronar") bases. Tecnifax provides diazo microfilm in all the commonly used roll-widths and microfiche sizes, with variable sensitometric characteristics. For additional information on Tecnifax diazo films, please write to Tecnifax outlining your special requirements.

EXPOSURE

The light source of the Hi-R is a high-pressure, mercury-vapor lamp. A high-low switch increases the lamp power to a maximum of 300 watts per inch, or reduces it to a minimum of 200 watts per inch. The potential mechanical speed is 40 feet per minute.

The 8"-diameter, pyrex printing cylinder is specially manufactured to insure freedom from reproducible defects, and is ground and polished to provide intimate contact between the original and the duplicate. The combination of a flawless printing cylinder and a special printer-belt system prevents slippage. The large diameter of the cylinder and a high-capacity cooling system insure low cylinder temperatures for high-resolution printing.

LIGHT COLLIMATION

A specially-designed light-collimator, another Tecnifax exclusive, prevents undercutting and distortion, thereby insuring high-resolution. The standard collimator is designed to yield optimum resolution consistent with printing speed, but special collimators can be designed by Tecnifax to meet individual specifications.



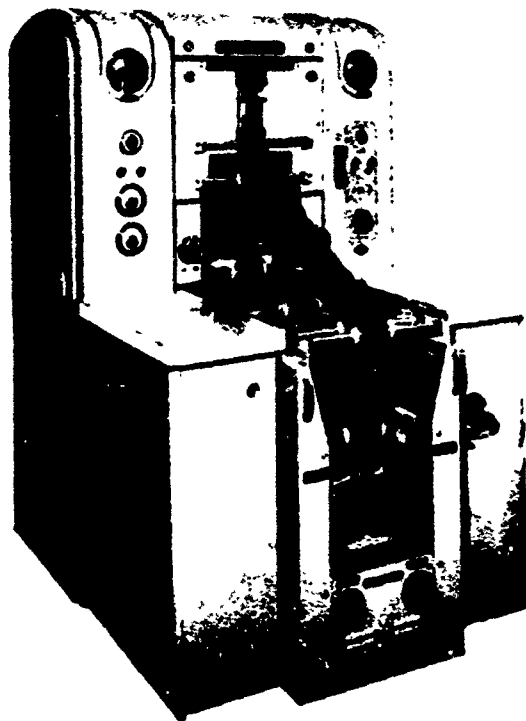
TECNIFAX CORPORATION • HOLYOKE, MASSACHUSETTS

TECNIFAX CANADA, INC. • TORONTO, CANADA

TECNIFAX

Associated with SCOTT PAPER COMPANY

The new HI-R...
One Diazo Microfilm
Duplicator for
Microfiche,
Aperture
Cards and Roll
Film Originals.



HI-R HANDLES THE WIDEST RANGE OF MICROFILM ORIGINALS

The Hi-R will duplicate all sizes and types of microfilm originals, including microfiche, in sheet or roll form from 70mm to 9½" wide, including aerial reconnaissance film.

Other microfilm duplicators handle sheet material or roll material . . . but not both.

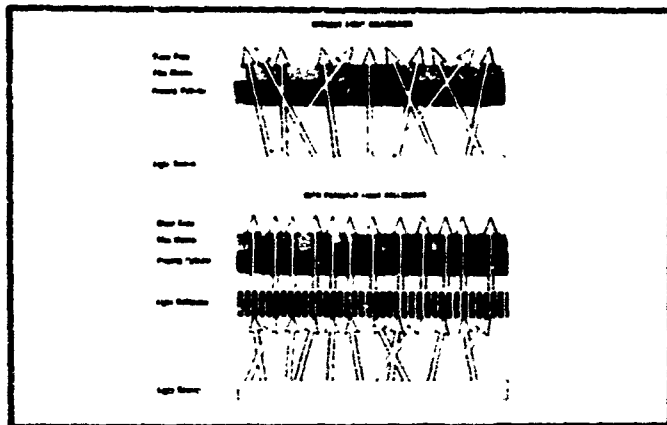
HI-R MEANS HIGH RESOLUTION

Although Diazo microfilms have the capacity to produce high resolution duplicates, much of that capacity is never realized by ordinary microfilm duplicators. The Tecnifax Hi-R combines a light collimator, accurate film tension control, and intimate film contact to achieve proven resolution averaging less than an 8% drop per generation over 7 generations.

HI-R'S EXCLUSIVE HONEYCOMB LIGHT COLLIMATOR

Without light collimation, the ultra-violet light which exposes the copy film strikes the original at haphazard angles, causing undercutting and distortion, resulting in loss of definition.

The Hi-R solves the problem of light collimation with a honeycomb light collimator which produces only parallel, non-perpendicular light rays. Only collimated light rays, at right angle to the film, are allowed to strike the original and duplicate. The result is a clear, sharp, high resolution duplicate.



HI-R'S ACCURATE FILM TENSION CONTROL

The slightest shift between original and copy film during the exposure stage results in loss of definition in the duplicate film. The Hi-R duplicator's unique film tension control prevents slippage by accurately controlling film tension throughout the entire process cycle.



HI-R DIAZO MICROFILM DUPLICATOR

Separate motors, which drive the independent printing and developing belt systems in the Hi-R, are controlled by a dancer roller. Minute differences in the speed of the film in the printing and developing stages are immediately sensed and corrected, thereby assuring precise tension of original and copy film at all times. Thus, roll film in lengths up to 1,000 feet can be processed without difficulty.

HI-R'S VARIABLE PRINTING SPEED CONTROL

Proper exposure time is a must in producing duplicates with maximum legibility. The Hi-R inspection window makes it possible to visually check exposure *while the duplicator is running*... and the operator can immediately adjust printing speed. This assures consistent and high legibility in the diazo duplicates even though the density may vary from master to master.

HI-R REDUCES MICROFILM DUPLICATING COSTS

Although the Hi-R will handle aperture cards, film chips, and microfiche as well as roll films, its cost is less than the cost of some *single-function* machines. Moreover, the Hi-R is available on purchase or lease.

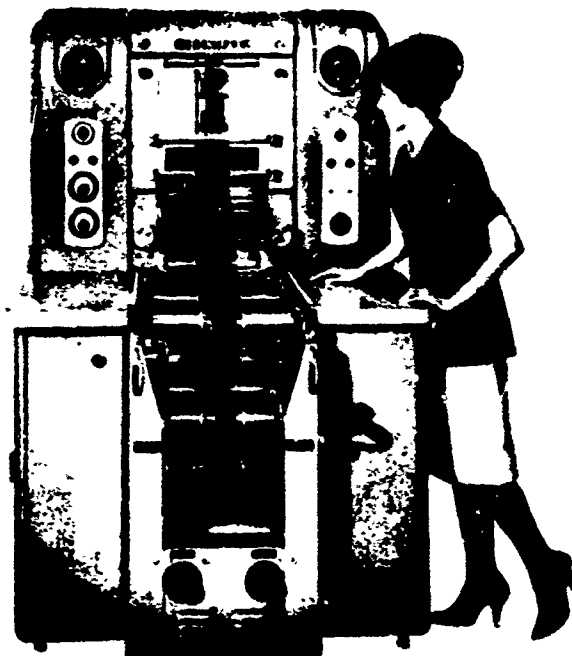
Low Operating and Labor Costs

No special skills are required to operate the Hi-R efficiently. And with its automatic feed mechanisms, the operator can perform other duties while the Hi-R is running.

Low Maintenance Costs . . .

Minimum Maintenance Downtime

The Hi-R is designed and built for heavy-duty continuous production. Access to all working parts is quick and easy. For instance, the entire printing unit—a patented feature—can be quickly pulled out on the feedboard for cleaning of the cylinder or replacement of the lamp assembly. (See photo below.) Easy maintenance accessibility means minimum downtime.



THE HI-R COMPLEMENTS ANY MICROSCOPE

ROLL FILMS

16mm and 35mm (with special adaptors)

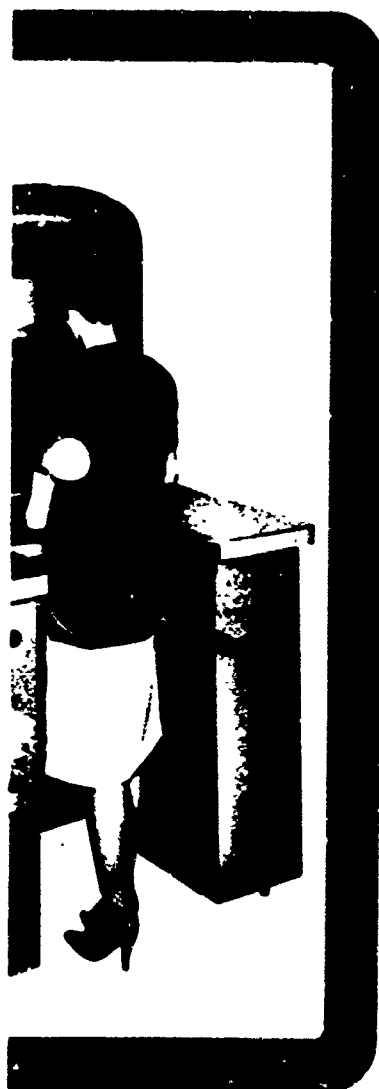
70mm

105mm

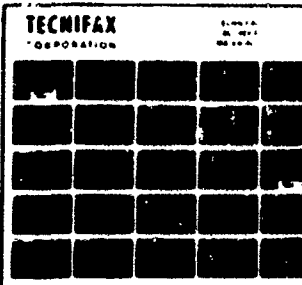
5"

9 1/2"

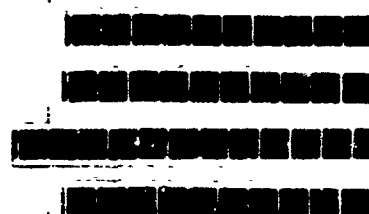




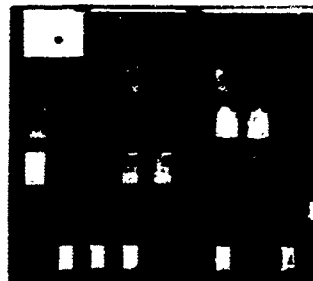
SHEET FILMS



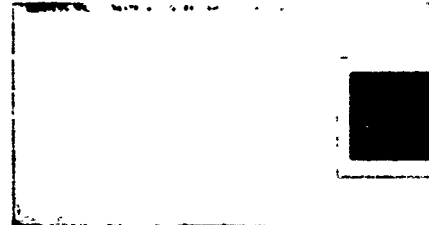
STRIPPED-UP MICROFICHE NEGATIVES



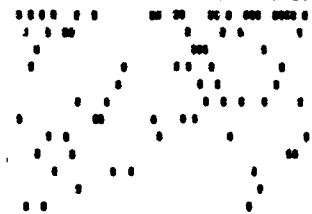
FILM JACKETS



STEP CAMERA NEGATIVES



APERTURE CARDS



APERTURE CARD JACKETS

SHEET FILMS (UP TO 9 1/2" WIDE)

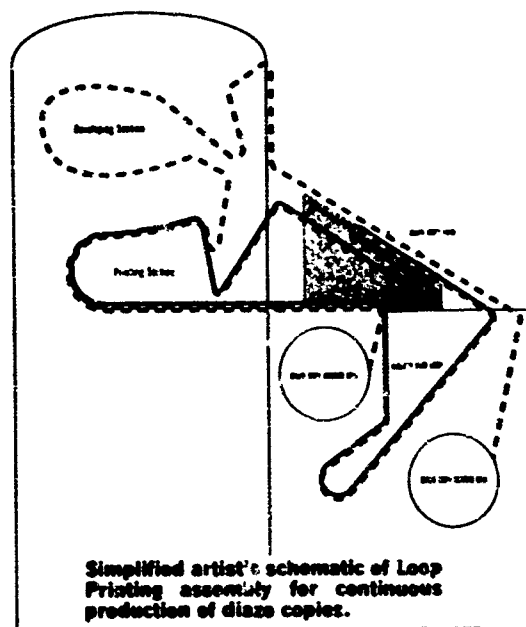
NOW!

ROLL-TO-ROLL MICROFILM DUPLICATES FROM THE SAME-



THE HI-R AUTOMATIC ROLL-TO-ROLL FEEDING UNIT

The automatic roll-to-roll feeding unit allows automatic feeding of roll films in width from 70mm to 9 1/2 inches. Easy-to-get-at supply and take-up shafts adjust to accept any reel of film in lengths up to 1,000 feet. The unit can be quickly and easily rolled into place for automatic feeding and rewinding of roll film originals.

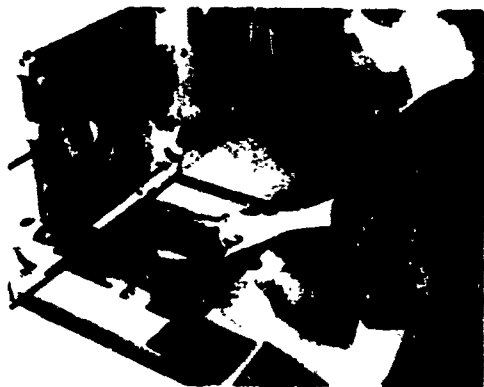


NEW LOOP PRINTING ACCESSORY

A new Hi-R Loop printing process enables the operator to reproduce automatically (and without interruption), up to 30 different four by six-inch step camera microfiche negatives.

The step camera film is made into a loop—12 feet in length—which permits continuous production of diazo copies using the loop printing accessory. This arrangement is very practical for 16mm film used to

MACHINE THAT HANDLES YOUR MICROFICHE REQUIREMENTS



NEW DUAL-FEED ACCESSORY

Production requirements for standard size microfiche are easily met with the unique new dual-feed accessory. By increasing hand-feeding efficiency, this new mechanism allows the operator to make up to 1,200 diazo microfiche copies per hour.

The feed mechanism automatically aligns master and copy film as the operator slides them into the belt carrier system. The feedboard has dual slots for easier and faster operation.

DUPLICATES BETTER THAN THE ORIGINALS!

Because of its fingertip exposure control, the Hi-R can produce duplicate masters that improve upon the quality of the original. In many documentation systems where the master film densities vary, a standard first step is to create on the Hi-R a set of new working masters with uniform density to be used for all future prints. The uniform density of this new working master permits a single speed setting for the entire run, speeding up production considerably.



FAST SET-UP, RAPID PROCESSING, HIGH QUALITY DUPLICATES

After the initial set-up, which takes just a few minutes, the operator is free to do other jobs. The Hi-R duplicates roll films at speeds ranging from 8 to 30 fpm depending on the quality of the original, the resolution standards, and the type of copy film used. Average speed is 14 feet/min. for 1.0 density silver originals duplicated on Hi-R film, with less than 10% resolution loss. Even an inexperienced operator will quickly learn to adjust printing speeds for optimum duplicating from any original after checking the quality of the first print in a series as it passes over the built-in illuminated inspection window.

AERIAL RECONNAISSANCE FILM DUPLICATES

The Hi-R is designed to meet the exacting standards of duplicating high-acuity aerial reconnaissance films through several generations. And, of course, diazo is ideally suited to field conditions since the process requires virtually no water and diazo film cannot be overdeveloped.

SPECIFICATIONS

Dimensions

Basic Machine	Roll to Roll Unit
Width: 50"	22"
Depth: 60"	30"
Height: 72"	38"

Shipping Weights

2,975 lbs.	325 lbs.

ELECTRICAL SERVICE REQUIREMENTS

220 volts single phase 60 cycles per second

DEVELOPING AGENT Any standard developer is used with a temperature controlled water bath. The combination provides optimum contrast and sharpness. The combination assures uniformity and eliminates exposure errors. An optional dual ammonia system is available if desired.

EXHAUST

Exhaust system

TECNIFAX... specialists in visual communications

Since shortly after World War II, Tecnifax has been a leader in the visual communications industry. Tecnifax materials and equipment cover a broad range of markets and products including...

DIAZO SENSITIZED MATERIALS

All types, sizes, colors and weights of sheet and roll materials for high quality diazo intermediates and reproduction copies.

HI-Q DIAZO PROCESSER & ACCESSORIES

High quality, high-output ammonia development diazo processor and accessories for diazo reproduction.

DRAFTING MATERIALS

Films and papers designed to achieve the best balance between good drafting qualities and good reproduction qualities.

DIAZO MICROFILM & HI-R MICROFILM DUPLICATING EQUIPMENT

High quality diazo film in a wide variety of roll, chip and sheet sizes, in many contrast variations. High-resolution equipment for automatic duplicating of diazo microforms.

STATIMATIC® OFFSET PLATEMAKERS & SUPPLIES

An automated offset plate-making system for production of top quality, low cost offset duplicating masters, using a completely dry, direct electrostatic process.

VISUAL COMMUNICATION EQUIPMENT & SUPPLIES

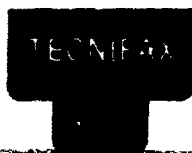
Diazochromes for brilliant color reproduction on clear film. Supplies for preparation of overhead projectuals. Creative services for contract projectuals. Overhead projection equipment.

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7540 Manchester Traffic Way
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A1A Highway and Merritt Avenue
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Minnesota 55431
Tel. 612-886-5476
NEW YORK, NEW YORK 10017
232 East 46th Street—Tel. 212-966-8920

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36 N.W. 42nd Street—Tel. 405-525-6677
PHILADELPHIA, PENNSYLVANIA
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Tel. From Philadelphia 215-975-4816
Tel. From Camden 609-665-1394
PITTSBURGH, PENNSYLVANIA 15237
4580 McKnight Road—Tel. 412-931-5422
ST. LOUIS, MISSOURI 63139
1421 Hampton Avenue—Tel. 314-647-5267
SEATTLE PORTLAND AREA
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Seattle, Washington 98108
Tel. 206-725-5454
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Tel. 415-583-9951
WASHINGTON, D.C. 20011
6200 Kansas Avenue, N.E.—Tel. 202-852-7500
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100 ADVANCE ROAD
Tel. 416-239-7704
MONTREAL, QUEBEC
2067 Charter Street
Dorval, Quebec
Tel. 514-631-4581



TECNIFAX CORPORATION • HOLYOKE, MASSACHUSETTS

195 APPLETON STREET
ZIP CODE: 01042

• TWX: HOLY-188

• TEL: Area Code

413 534-3311

CABLE: TECNIFAX

Data sheets for:

SENSITIZED MATERIALS

(Section C-2)

BELL AND HOWELL COMPANY

**Data sheets on Code 729M not
supplied. Information furnished
by local district sales organiza-
tion.**

GENERAL ANILINE & FILM CORPORATION

**Data sheets not supplied on Unit Gamma Diazo
Film. Information furnished by local district
sales organization.**

RECORDAK MICRO-FILE FILM, TYPES 5455 AND 7455 PHOTOGRAPHIC AND PHYSICAL PROPERTIES

- Medium speed • Panchromatic sensitivity • Extremely fine grain • Extremely high resolution

Uses:

- For making greatly reduced copies of books, newspapers, maps, engineering drawings, etc

Color Sensitivity: Panchromatic

Meter Setting*: 84 (1/2-second exposure, and development as recommended below)

*This is a copying speed for use with exposure meters marked for ASA Speeds or Exposure Indexes; it is based on the formula H/E (meter-candle-seconds) at a density of 1.2 above gross fog.

This number can be used directly with incident-light meters. If a reflected-light reading is made, use a matte white surface of about 90 percent reflectance (such as the back of double-weight, white photographic paper). Divide the meter-setting number by 5 and set the meter calculator to the nearest number on its index scale.

NOTE: This meter-setting number was chosen to indicate a suitable starting time for microfilming applications. It cannot be compared directly to exposure indexes or other meter-setting numbers given for films used in conventional photography.

Filter Factor (tungsten): Increase normal exposure by factor given.

KODAK WRATTEN Filter No. 15 (G)—1.5

Darkroom Handling: Total darkness required. After development is 50 percent completed, a KODAK Safe Filter, WRATTEN Series 3 (dark green), in a suitable light lamp with a 15-watt bulb can be used for a test to see if it is kept at least 4 feet from the film.

Base: Gray triacetate

Nominal Film Thickness (before processing): 0.004 in.

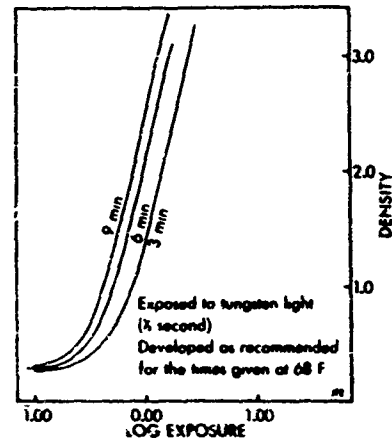
Image-Structure Characteristics (Based on development in RECORDAK MICRO-FILE Developer Replenisher with RECORDAK MICRO-FILE Developer Starting Solution for 6 minutes at 68 F with continuous agitation)

Resolving Power:

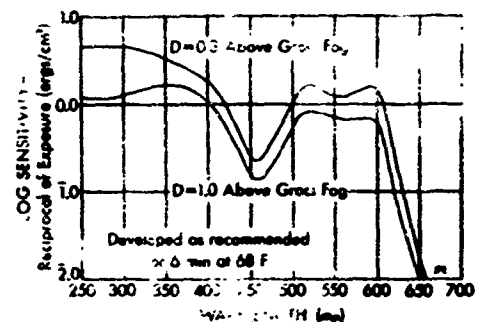
Test-Object Contrast	Value*
1.6:1	160 lines/mm
1,000:1	475 lines/mm

*These values were determined as described in "A Simple Camera Measurement of Photographic Resolving Power" by J. H. Altman, *Graphic Science and Engineering*, Vol. 3, No. 1, pp 17-20 February, 1961.

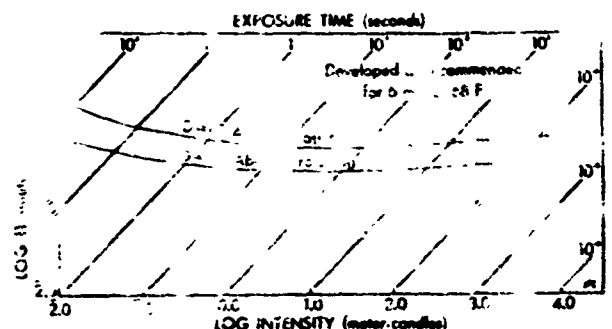
Characteristic Curves



Spectral Sensitivity Curves



Reciprocity Curves



RMS† Granularity: 6.6 (at a net density of 1.0)

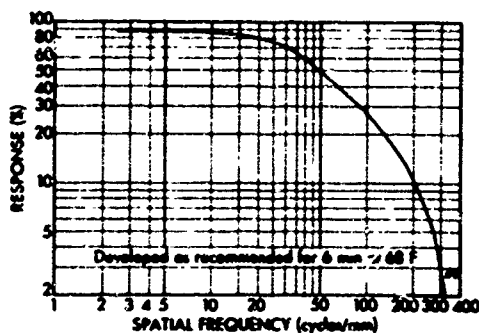
†This value represents 1,000 times the standard deviation in density produced by the granular structure of the material when a uniformly exposed and developed sample is scanned by a densitometer having an optical-system aperture of 12.0 and a circular scanning aperture 48 μ in diameter. The value is proportional to the sensation of graininess which would be perceived if the sample were viewed at a magnification of 12X.

The sensation of graininess will increase or decrease with viewing magnification; e.g., if the viewing magnification is doubled, the value is about doubled.

The graininess of a print is also affected by the printing operation. Granularity is changed roughly in proportion to the contrast of the print material; e.g., if a negative of granularity value 10 is printed onto a material of contrast 2.0, the granularity of the print will be about 20 (see "Wiener-Spectrum Analysis of Photographic Granularity," by E. C. Doerner, *Journal of the Optical Society of America*, Vol. 32, p 689, June, 1942).

If the threshold of the human eye is substantially exceeded in each case, it appears (from our limited data) that a difference of about 6% in the effective value of rms granularity corresponds to a just noticeable difference in the visual impression of graininess.

Modulation Transfer Function Curve



Help in working with this curve can be obtained by writing to PCI Markets Division, Eastman Kodak Company, Rochester, N. Y. 14650. Ask for Modulation Transfer Data for KODAK Films, KODAK Pamphlet No. F49.

LABORATORY PROCESSING

NOTE: Processing with a RECORDAK PROSTAR Film Processor requires specially formulated chemicals (PROSTAR Developer and PROSTAR Fixer).

Develop: RECORDAK MICRO-FILE Developer Replenisher with RECORDAK MICRO-FILE Developer Starting Solution for the times listed below.

Agitate continuously for the first 30 seconds and then for 5 seconds every 30 seconds.

Temperature	Time
65 F	7 min
68 F	6 min
75 F	4 min
85 F	2 min
90 F	1½ min

Rinse: KODAK Indicator Stop Bath or KODAK Stop Bath SB-1a.

15 to 20 seconds at 65 to 90 F.

Use continuous agitation.

Fix: KODAK Rapid Fixer (omit the hardener, Solution B). 2 to 4 minutes at 65 to 90 F.

KODAK Fixing Bath F-5 or KODAK Fixer may also be used if followed by slightly longer wash times.

Agitate continuously for 15 seconds and intermittently thereafter.

Wash: Running water.

10 to 20 minutes at 65 to 90 F.

Time of wash will depend upon residual hypo level desired.

More Rapid Washing: KODAK Hypo Clearing Agent can be used after fixing, to reduce washing time and conserve water. First remove the excess hypo by rinsing the film in water at 65 to 90 F for 30 seconds. Then bathe the film in KODAK Hypo Clearing Agent solution for 30 seconds to 2 minutes with moderate agitation (time will depend upon the temperature used and the type of keeping required). Wash the film for 5 minutes, using a water flow sufficient to give at least one complete change of water in 5 minutes.

NOTE: For best results, keep the temperature of the rinse, fix, and wash close to that of the developer.

Dry: Dry in a dust-free area.

Heated air can be used to shorten drying time.

SIZE DATA AND ORDERING INFORMATION

Sizes Available: Listed below are the sizes and forms in which RECORDAK MICRO-FILE Film, Types 5455 and 7455, are readily available. When ordering any of these films, the RECORDAK product number should be used. Other widths and lengths are available on special order.

Type	Size	Specification (Sp) Number	Film Price Includes Processing Charge	RECORDAK Product Number
7455	16mm x 100 ft	440	No	1240
7455	16mm x 200 ft	641	No	1440
7455	16mm x 1000 ft	648	No	1446
5455	35mm x 100 ft	425	No	1640
5455	35mm x 100 ft, Type A	425	No	1650
5455	35mm x 200 ft	427	No	1660
5455	35mm x 200 ft, Type A	427	No	1661
5455	35mm x 400 ft	756	No	1670
5455	35mm x 400 ft, Type A	756	No	1671
5455	35mm x 1000 ft	756	No	1680
5455	35mm x 1000 ft, Type A	756	No	1681
5455	70mm x 100 ft	472	No	1710
5455	70mm x 100 ft	473	No	1720
5455	70mm x 100 ft	474	No	1730
5455	105mm x 100 ft	832	No	1790

Description of Specification (Sp) Numbers:

All films are edge printed, unless otherwise noted.

425: 35mm, unperforated, wound emulsion in on a Universal Microfilm Spool (S-138—formerly S-6), and has an integral leader and trailer.

427: 35mm, unperforated, wound emulsion in on a Type AA plastic core (1-inch outside diameter), and has no leader or trailer. For Ve-Ja-De, Willson, and similar cameras.

440: 16mm, unperforated, wound emulsion in on a Universal Microfilm Spool, (S-91), and has an integral leader and trailer.

472: 70mm, unperforated, wound emulsion in on a Type X plastic core (2-inch outside diameter), and has no leader or trailer. For Ve-Ja-De and similar cameras.

473: 70mm, unperforated, wound emulsion in on a Type J TENITE core, and has no leader or trailer.

474: 70mm, unperforated, wound emulsion in on a No. 10 Spool (S-94), and has an integral leader and trailer.

641: 16mm, unperforated, wound emulsion in on a KODAK Microfilm Spool (S-85), and has an integral leader and trailer.

648: 16mm, unperforated, wound emulsion in on a Type Z plastic core, and has no leader or trailer.

788: 35mm, unperforated, is wound emulsion in on a Type U TENITE core, and has no leader or trailer.

832: 105mm, unperforated, no edge printing, wound emulsion in on a RECORDAK Spool (S-128), and has a 5-foot integral leader and no trailer.

RECORDAK MICRO-FILE AHU FILM, TYPES 5459 AND 7459 PHOTOGRAPHIC AND PHYSICAL PROPERTIES

- Medium speed • Panchromatic sensitivity • Extremely fine grain • Extremely high resolution • Maximum halation protection. An antihalation undercoat (AHU), which becomes transparent after processing, is used between the emulsion and the clear base
- Hardened emulsion (for high-temperature rapid processing and resistance to abrasion)

Uses:

- For making greatly reduced, high-quality micro-images of engineering drawings, newspapers, books, manuscripts, maps, letters, etc

Color Sensitivity: Panchromatic

Meter Setting*: 64 (1/2-second exposure, and development as recommended below)

*This is a copying speed for use with exposure meters marked for ASA Speeds or Exposure Indexes; it is based on the formula $45/E$ (m/ft-candle-seconds) at a density of 1.2 above gross fog.

This number can be used directly with incident-light meters. If a reflected-light reading is made, use a matte white surface of about 80 percent reflectance (such as the back of double-weight, white photographic paper). Divide the meter-setting number by 5 and set the meter calculator to the nearest number on its index scale.

NOTE: This meter-setting number was chosen to indicate a suitable starting time for microfilming applications. It cannot be compared directly to exposure indexes or other meter-setting numbers given for films used in conventional photography.

Filter Factor (tungsten): Increase normal exposure by factor given.

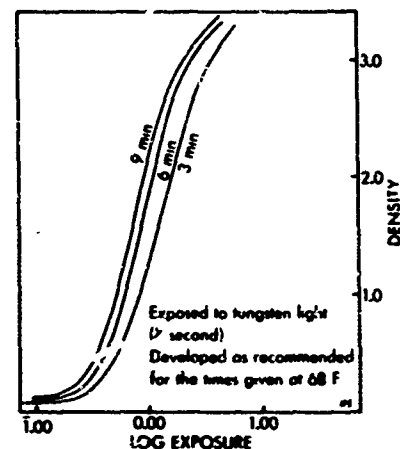
KODAK WRATTEN Filter No. 15 (G)—1.5

Darkroom Handling: Total darkness required. After development is 50 percent completed, a KODAK Safelight Filter, WRATTEN Series 3 (dark green), in a suitable safelight lamp with a 15-watt bulb can be used for a few seconds if it is kept at least 4 feet from the film.

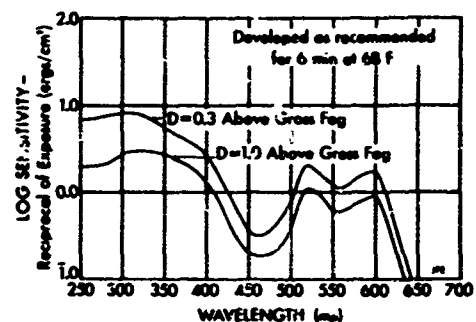
Base: Clear trisacetate

Nominal Film Thickness (before processing): 5.8 mils

Characteristic Curves



Spectral Sensitivity Curves



Reciprocity Curves

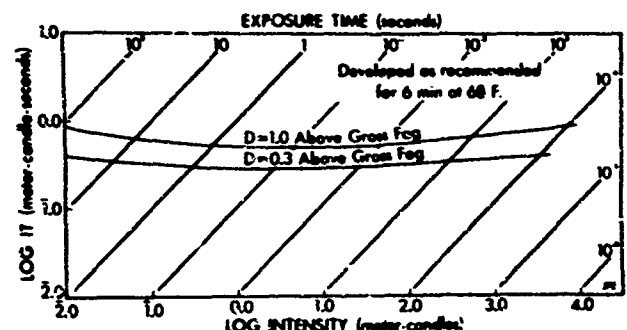


Image-Structure Characteristics (Based on development in RECORDAK MICRO-FILE Developer Replenisher with RECORDAK MICRO-FILE Developer Starting Solution for 6 minutes at 68 F with continuous agitation)

Resolving Power:

Test-Object Contrast	Value*
1.6:1	250 lines/mm
1,000:1	530 lines/mm

*These values were determined as described in "A Simple Camera for the Measurement of Photographic Resolving Power," by J. H. Altman, *Photographic Science and Engineering*, Vol. 5, No. 1, pp 17-20, January-February, 1961.

RMS† Granularity: 8.2 (at a net density of 1.0)

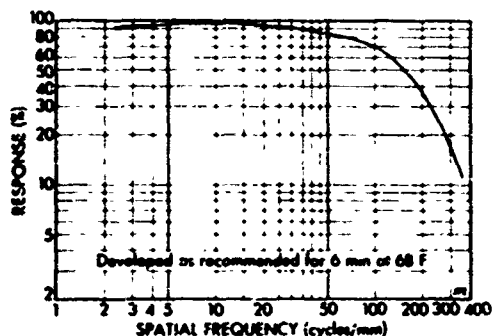
†This value represents 1,000 times the standard deviation in density produced by the granular structure of the material when a uniformly exposed and developed sample is scanned by a densitometer having an optical-system aperture of 12.0 and a circular scanning aperture 48μ in diameter. The value is proportional to the sensation of graininess which would be perceived if the sample were viewed at a magnification of 12X.

The sensation of graininess will increase or decrease with viewing magnification; e.g., if the viewing magnification is doubled, the value is about doubled.

The graininess of a print is also affected by the printing operation. Granularity is changed roughly in proportion to the contrast of the print material; e.g., if a negative of granularity value 10 is printed onto a material of contrast 2.0, the granularity of the print will be about 20 (see "Wiener-Spectrum Analysis of Photographic Granularity," by E. C. Doerner, *Journal of the Optical Society of America*, Vol. 52, p 688, 1962).

If the threshold of the human eye is substantially exceeded in each case, it appears (from our limited data) that a difference of about 8% in the effective value of rms granularity corresponds to a just noticeable difference in the visual impression of graininess.

Modulation Transfer Function Curve



Help in working with this curve can be obtained by writing to PCI Markets Division, Eastman Kodak Company, Rochester, N. Y. 14650. Ask for Modulation Transfer Data for KODAK Films, KODAK Pamphlet No. P49.

LABORATORY PROCESSING

NOTE: Processing in a RECORDAK PROSTAR Film Processor requires specially formulated chemicals (PROSTAR Developer and PROSTAR Fixer).

Develop: RECORDAK MICRO-FILE Developer Replenisher with RECORDAK MICRO-FILE Developer Starting Solution for the times listed below.

Agitate continuously for the first 30 seconds and then for 5 seconds every 30 seconds.

Temperature	Time
65 F	7 min
68 F	6 min
75 F	4 min
85 F	2 min
90 F	1½ min

Rinse: KODAK Indicator Stop Bath or KODAK Stop Bath SB-1a.

15 to 20 seconds at 65 to 90 F.

Use continuous agitation.

Fix: KODAK Rapid Fixer (omit the hardener, Solution B). 2 to 4 minutes at 65 to 90 F.

KODAK Fixing Bath F-5 or KODAK Fixer can also be used if followed by a slightly longer wash time.

Agitate continuously for 15 seconds and intermittently thereafter.

Wash: Running water.

10 to 20 minutes at 65 to 90 F.

Time of wash will depend upon residual hypo level desired.

More Rapid Washing: KODAK Hypo Clearing Agent can be used after fixing, to reduce washing time and conserve water. First remove the excess hypo by rinsing the film in water at 65 to 90 F for 30 seconds. Then bathe the film in KODAK Hypo Clearing Agent solution for 30 seconds to 2 minutes with moderate agitation (time will depend upon the temperature used and the type of keeping required). Wash the film for 5 minutes, using a water flow sufficient to give at least one complete change of water in 5 minutes.

NOTE: For best results, keep the temperature of the rinse, fix, and wash close to that of the developer.

Dry: Dry in a dust-free area.

Heated air can be used to shorten drying time.

SIZE DATA AND ORDERING INFORMATION

Sizes Available: Listed below are the sizes and forms in which RECORDAK MICRO-FILE AHU Film, Types 5450 and 7450, is generally available. When ordering any of these films, the RECORDAK product number should be used. Other widths and lengths, including those marked by an asterisk, are available on special order.

Type	Size	Specifi- cation (Sp) Number	Film Price Includes Processing Charge	RECORDAK Product Number
7450	16mm x 100 ft	440	Yes	1225
7450	16mm x 100 ft	440	No	1233
7450	16mm x 200 ft	640	Yes	1425
7450	16mm x 200 ft	641	No	1433
5450	35mm x 100 ft	425	Yes	1624
5450	35mm x 100 ft	425	No	1633
5450	70mm x 100 ft	472	No	1712*
5450	70mm x 100 ft	473	No	1713*
5450	70mm x 100 ft	474	No	1714*
5450	105mm x 100 ft	832	No	1796

*Special order.

Description of Specification (Sp) Numbers:

All films are edge printed, unless otherwise noted.

425: 35mm, unperforated, bears small edge print, is wound emulsion in on a Universal Microfilm Spool (S-136—formerly S-6), and has an integral leader and trailer.

440: 16mm, unperforated, bears small edge print, is wound emulsion in on a Universal Microfilm Spool (S-91), and has an integral leader and trailer.

472: 70mm, unperforated, is wound emulsion in on a Type X plastic core (2-in. outside diameter), and has no leader or trailer.

473: 70mm, unperforated, is wound emulsion in on a Type J TENITE Core, and has no leader or trailer.

474: 70mm, unperforated, is wound emulsion in on a No. 10 spool (S-84), and has an integral leader and trailer.

640: 16mm, unperforated, bears small edge print, is wound emulsion in on a RECORDAK Spool (S-96), and has an integral leader and trailer.

641: 16mm, unperforated, bears small edge print, is wound emulsion in on a KODAK Microfilm Spool (S-95), and has an integral leader and trailer.

832: 105mm, unperforated, no edge printing, is wound emulsion in on a RECORDAK Spool (S-126), and has a 5-ft integral leader and no trailer.

RECORDAK MICRO-FILE CARD FILM, TYPE 8464 PHOTOGRAPHIC AND PHYSICAL PROPERTIES

- Low speed • Blue sensitivity • Medium contrast • Extremely fine grain • Extremely high resolution • Special thick base gives flatness in microfiche form

Uses:

- For making microfiche positives from negatives on RECORDAK MICRO-FILE Card Film
- For making microfiche negatives from a positive intermediate by contact printing

Color Sensitivity: Blue

Meter Setting*: 10 (1/50-second exposure, and development as recommended below)

*This is a copying speed for use with exposure meters marked for ASA Speeds or Exposure Indexes; it is based on the formula $45/E$ (meter-candle-seconds) at a density of 1.2 above gross fog.

This number can be used directly with incident-light meters. If a reflect-light reading is made, use a matte white surface of about 90 percent reflectance (such as the back of double-weight, white photographic paper). Divide the meter-setting number by 5 and set the meter calculator to the nearest number on its index scale.

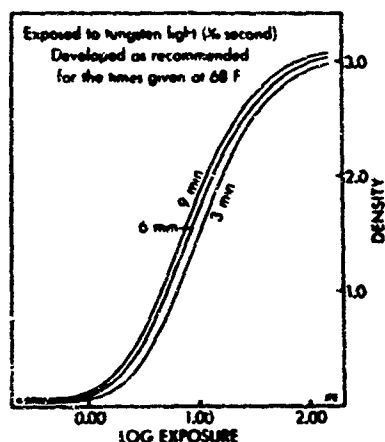
NOTE: This meter-setting number was chosen to indicate a suitable starting time for microfilming applications. It cannot be compared directly to exposure indexes or other meter-setting numbers given for films used in conventional photography.

Darkroom Handling: Use a KODAK Safelight Filter, WRATTEN Series 0A (greenish-yellow), in a suitable safelight lamp with a 15-watt bulb at least 4 feet from the film.

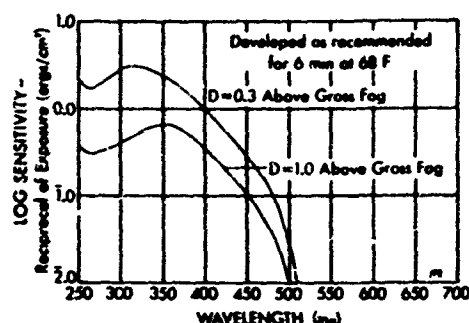
Base: Clear triacetate

Nominal Film Thickness (before processing): 8.2 mils

Characteristic Curves



Spectral Sensitivity Curves



Reciprocity Curves

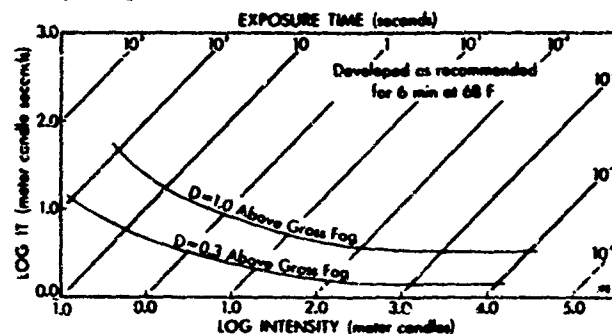


Image-Structure Characteristics (Based on development in RECORDAK MICRO-FILE Developer Replenisher with RECORDAK MICRO-FILE Developer Starting Solution for 6 minutes at 68 F with continuous agitation)

Resolving Power:

Test-Object Contrast	Value*
1.5:1	180 lines/mm
1,000:1	350 lines/mm

RMS† Granularity: 9.5 (at a net density of 1.0)

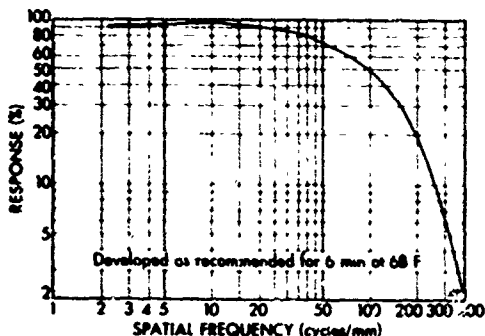
†This value represents 1,000 times the standard deviation in density produced by the granular structure of the material when a uniformly exposed and developed sample is scanned by a densitometer having an optical-system aperture of 12.0 and a circular scanning aperture 48μ in diameter. The value is proportional to the sensation of graininess which would be perceived if the sample were viewed at a magnification of 12^x.

The sensation of graininess will increase or decrease with viewing magnification; e.g., if the viewing magnification is doubled, the value is about doubled.

The graininess of a print is also affected by the printing operation. Granularity is changed roughly in proportion to the contrast of the print material; e.g., if a negative of granularity value 10 is printed onto a material of contrast 2.0 the granularity of the print will be about 20 (see "Wiener-Spectrum Analysis of Photographic Granularity," by E. C. Doerner,

Journal of the Optical Society of America, Vol. 52, p. 666, June, 1962;
If the threshold of the human eye is substantially extended in each case, it appears (from our limited data) that a difference of about 0% in the effective value of rms granularity corresponds to a just noticeable difference in the visual impression of graininess.

Modulation Transfer Function Curve



Help in working with this curve can be obtained by writing to PCI Markets Division, Eastman Kodak Company, Rochester, N. Y. 14650. Ask for Modulation Transfer Data for KODAK Films, KODAK Pamphlet No. P49.

PROCESSING

Develop: RECORDAK MICRO-FILE Developer Replenisher with RECORDAK MICRO-FILE Developer Starting Solution for the times listed below.

Agitate continuously for the first 30 seconds and then for 5 seconds every 30 seconds.

Temperature	Time
65 F	7 min
68 F	6 min
75 F	4 min
85 F	2 min
90 F	1½ min

Rinse: KODAK Indicator Stop Bath or KODAK Stop Bath SB-1a.

15 to 20 seconds at 65 to 90 F.
Use continuous agitation.

Fix: KODAK Rapid Fixer (omit the hardener, Solution B).
2 to 4 minutes at 65 to 90 F.

KODAK Fixing Bath F-5 or KODAK Fixer can also be used if followed by a slightly longer wash time.

Agitate continuously for 15 seconds and intermittently thereafter.

Wash: Running water.

10 to 20 minutes at 65 to 90 F.

Time of wash will depend upon residual hypo level desired.

More Rapid Washing: KODAK Hypo Clearing Agent can be used after fixing, to reduce washing time and conserve water. First remove the excess hypo by rinsing the film in water at 65 to 90 F for 30 seconds. Then bathe the film in KODAK Hypo Clearing Agent solution for 30 seconds to 2 minutes with moderate agitation (time will depend upon the temperature used and the type of keeping required). Wash the film for 5 minutes, using a water flow sufficient to give at least one complete change of water in 5 minutes.

NOTE: For best results, keep the temperature of the rinse, fix, and wash close to that of the developer.

Dry: Dry in a dust-free area.

Heated air can be used to shorten drying time.

SIZE DATA AND ORDERING INFORMATION

Sizes Available: Listed below are the sizes and forms in which RECORDAK MICRO-FILE Card Film, Type 8464, is available. When ordering any of these films, the RECORDAK product number should be used. Other widths and lengths, including product 1821, are available on special order.

Type	Size	Specifi- cation (Sp) Number	Film Price Includes Processing Charge	RECORDAK Product Number
8464	105-mm x 400 ft	913	No	1823
8464	105mm x 675 ft	914	No	1821*

*Special order.

Description of Specification (Sp) Numbers:

913: 105mm, unperforated, is wound emulsion in on a PC 512 paperboard core (3-inch nominal inside diameter), and has no leader or trailer. Film is taped to the core.

914: 105mm, unperforated, is wound emulsion in on a PC 512 paperboard core (3-inch nominal inside diameter), and has no leader or trailer.

For additional information write to:

RECORDAK Co
Business Systems Markets Division
EASTMAN KODAK COMPANY
770 Broadway, New York, N. Y. 10003

RECORDAK MICRO-FILE Card Film,
Type 8464
KODAK Pamphlet No. P180

NEW PAMPHLET 1-66-GLP-DE
PRINTED IN THE UNITED STATES OF AMERICA

Tentative Data Sheet*

RECORDAK Special Direct Duplicating Film, Type SO-156

RECORDAK Special Direct Duplicating Film (Thick Base), Type SO-220

Description: Low speed -- low contrast -- extremely fine grain -- extremely high resolution -- orthochromatic sensitivity

This is a print film that yields a negative duplicate of a camera negative with conventional processing rather than reversal processing.

Uses: This film can be used for release or as an intermediate for making duplicate negatives by contact printing on itself. It can also be used for making positive prints on other print films.

Safelight: Handle and develop this film in the light of a safelight lamp equipped with a 15-watt bulb and a KODAK Safelight Filter, WRATTEN Series 1 (dark red). Keep the safelight at least four feet away from the film.

EXPOSURE

DePue Printer: Replace the 100-watt lamp with a 300-watt lamp. Use a voltage setting of 80-90 volts and a 5/16-inch slit width.

PROCESSING

Develop in RECORDAK MICRO-FILE Developer Replenisher for the following times (in minutes). Agitate continuously for the first 30 seconds and for 5 seconds at 30-second intervals thereafter.

65 F	68 F	75 F	85 F	90 F
$\frac{7\frac{1}{2}}{7\frac{1}{2}}$	$\frac{6}{6}$	$\frac{3}{3}$	$\frac{1\frac{1}{2}}{1\frac{1}{2}}$	$\frac{1}{1}$

Rinse for 15 to 20 seconds at 65 to 90 F with continuous agitation in KODAK Indicator Stop Bath or KODAK Stop Bath SB-1a.

Fix for 1 to 3 minutes (or twice the clearing time) at 65 to 90 F in either KODAK Rapid Fixer (omit hardener Solution B) or in RECORDAK MICRO-FILE Fixer. Agitate continuously for the first few seconds and intermittently thereafter.

*The information in this sheet is tentative, subject to change, and intended only as a guide or starting point to assist you in evaluating the film for your use. If necessary, you can adjust exposure and development to suit your individual needs or preferences.

IMAGE STRUCTURE DATA

These data are based on development in RECORDAK MICRO-FILE Developer Replenisher for 6 minutes at 68 F.

Resolving Power Value

TOC 1000:1

TOC 1.6:1

700 lines/mm

290 lines/mm

These values were determined as described in "A Simple Camera for the Measurement of Photographic Resolving Power," by J. H. Altman, Photographic Science and Engineering, Vol. 5, No. 1, pp 17-20, January-February, 1961.

RMS Granularity Value - 4.0 (gross density of 1.0)

This value represents 1,000 times the standard deviation in density produced by the granular structure of the material when a uniformly exposed and developed sample is scanned by a densitometer having an optical-system aperture of $f/2.0$ and a circular scanning aperture 48μ in diameter. The value is proportional to the sensation of graininess which would be perceived if the sample were viewed at a magnification of $12\times$.

The sensation of graininess will increase or decrease with viewing magnification; e.g., if the viewing magnification is doubled, the value is about doubled.

The graininess of a print is also affected by the printing operation. Granularity is changed roughly in proportion to the contrast of the print material; e.g., if a negative of granularity value 10 is printed onto a material of contrast 2.0, the granularity of the print will be about 20 (see "Wiener-Spectrum Analysis of Photographic Granularity," by E. C. Doerner, Journal of the Optical Society of America, Vol. 52, p 669, June, 1962).

If the threshold of the human eye is substantially exceeded in each case, it appears (from our limited data) that a difference of about 6% in the effective value of rms granularity corresponds to a just noticeable difference in the visual impression of graininess.

SIZE DATA AND ORDERING INFORMATION

SO-15f is supplied on cine thickness support in 16mm, 35mm, and 70mm width rolls.

SO-220 is supplied on 8-mil thick base for microfiche use.

Recordak Co
Business Systems Markets Division
Eastman Kodak Company
770 Broadway, New York, N.Y. 10003

5-66 (Tentative)

L-KO-E

Printed in the United States of America

Microreproduction Reports

POST 200SA75 SEPIA MICROFILM FOR MAKING DUPLICATE MASTERS



**PRODUCT
INFORMATION**

Diazo Blackline Microfilms are sensitized with a balanced compound of blue, red and yellow dyes which with the proper couplers produce a visual black. It has been found that the blue dye component contributes nothing but visual effect and that the blocking of actinic light rays necessary for regeneration is carried out by the red and yellow components.

In other words, the blue component, although necessary for purely reader use, in effect diminishes a film's regeneration capabilities. POST has therefore developed 200SA75 Sepia Master Microfilm, sensitized with dyes selected solely for their reprinting characteristics without regard for image color. Although the reddish-sepia result is readable, the purpose of the film is as an intermediate master for use for printing succeeding generations on such films as POST 200VA75 Blackline, (in preference to printing directly from the silver original).

Among the advantages are a gamma slightly higher than unity for improving distribution copies without excessive contrast build-up; less critical exposures due to better actinic-light blocking than silver originals; lower minimum densities than silver emulsions, resulting in higher printing speeds; and greater scratch resistance because the dye-stained image is homogenous with the safety-film base, rather than surface-coated as are silver/gelatin emulsions.

Microreproduction Reports

POST 200GA75 DUPLICATE MICROFILM



**PRODUCT
INFORMATION**

200GA75 Blackline Diazo Microfilm is a general-purpose microfilm on an .0075" acetate base, conforming to government specifications. It should be used where some recipients of distribution microfiche may wish to prepare additional film duplicates in addition to the more usual reader or reader-printer use.

By slightly increasing exposure speed and increasing maximum without increasing minimum densities, much of the regeneration capability of a Sepia Master Film is achieved. There is no sacrifice of quality from any user aspect.

In effect, the trade-off has been this: Density, gamma and actinic-light blockers have been increased at the expense of only a small loss in production rates.

Microreproduction Reports

POST 200VA75 DUPLICATE MICROFILM



**PRODUCT
INFORMATION**

The inherent advantages of diazo duplicate microfilms have been detailed at length in the literature, and characteristics such as comparative lack of grain and extreme scratch resistance are typical of the imbibed image of all diazo films. However, the thousands of available diazo dye/coupler combinations give the researcher great flexibility in designing for specific applications.

POST 200VA75 has been developed primarily for the printing of distribution microfiche; it is called an "edition" microfilm. It is a blackline film with exceptional printing characteristics as well as user advantages. It has been formulated to cope with a basic problem of microfiche, the fact that a group of originals of various types and qualities must be reprinted onto one fiche at a single exposure.

With very high printing speed and wide latitude, 200VA75 will reproduce a wide range of original densities without exposure speed adjustments. This combination of high production rate and low rejection rate greatly decreases microfiche edition costs. Low minimum density provides ample contrast for good reader viewing, and the sensitizer contains a special blue-light blocker which is evident when good printbacks are made by any reader-printer system now on the market.

FREDERICK POST COMPANY

BOX 903 • CHICAGO, ILLINOIS 60601 • TEL. 312-461-1131



Current Products
Special Products

June 30, 1966

PENDING POST R & D ACTIVITIES

FOR REVIEW BY INFORMATION DYNAMICS CORPORATION

We itemize below information about developmental activities at Frederick Post Company in prospect for future users of microforms. The projects are of a proprietary nature, and so we ask that the information be reported to your government clients accordingly.

Heat Diazo Film - Attached is an internal report from our Assistant Director of Research, Al Furch, whose group has devoted over 7 years to R & D in heat process development of diazo. In 1965, their work culminated in the successful commercial introduction of POST Heat Diazo Paper, using a heat cylinder to develop the diazo exposed image (in place of ammonia fumes or liquid developer solutions). In the past three years, a concurrent program to develop a Heat Diazo Film has been in operation. The attached report and samples exhibit results to date.

The following observations about the impediments to commercial introduction of this product are made from the viewpoint of practical field solutions.

- 1) Coating pattern problem must be solved in our Laboratories and in Manufacturing before this can be brought to market.
- 2) Extended time in development is not a serious shortcoming in roll film duping where the needed development chamber cycle could be readily accommodated. Our roll to roll printer in R & D can adjust for this requirement. In fiche to fiche printing (such as the NB table-top printer described in the POST Current Products kit), such development dwell time may be a problem to some users.
- 3) Fuming in development hopefully can be reduced, but a suction device to exhaust should overcome this (there are no unpleasant odors, as are associated with the ammonia process).
- 4) Printing speed is important, but because of the contemplated mechanical speed in the POST roll to roll printer, it is expected that the slower speed to obtain density equivalent to that of ammonia duping films could be over 30' per minute. In

diazo for better prints

June 30, 1966

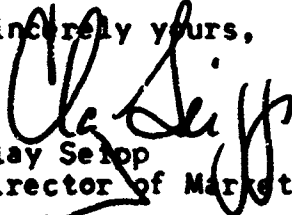
satellite printers, such productivity should be entirely acceptable.

Reader Printer - POST is currently investigating the feasibility of a new electrostatic enlarger using a liquid toner with the ability to offer direct or reversal image reproduction selectively via two separate toner sections. This could provide a positive blowback from a negative film or from a positive film. This project is still speculative and no finished breadboard unit has as yet been put into work.

Low Cost Readers - POST is working in conjunction with Taylor Merchant Corporation to develop two additional readers for the intermittent user. Each of these units offer promising volume opportunities and should be on the market in 1967:

- a) A medium sized screen (9" x 13") desk top reader with 18X magnification to accommodate two 4 x 6 fiche simultaneously. Might retail at about \$75.
- b) A pocket viewer, battery lighted with rigid focus, in both 12X and 16X, to retail at about \$8.75.

Sincerely yours,


Clay Seipp
Director of Marketing

CS:ao

INTER AND INTRA-OFFICE CORRESPONDENCE



To: Clay Seipp

Date: June 28, 1966

From: Al Furch

SUBJECT: Heat Process Diazo Microfilm

Base

The film currently being used is polyester. It is the only commercially available transparent base having the proper optical characteristics (clarity, smoothness freedom from striations) and which can also withstand the temperatures necessary for development of the product.

Mechanism

The same as used in the paper product. A new chemical device in diazotypy.

Characteristics Needed

- a) Coating - Thermoplastic resin which resists development temperature and does not fume during this cycle.
- b) Fidelity - No or negligible lateral image flow during development.
- c) Shelf-Life - Should be of the same order as regular diazo microfilm at good storage temperatures.
- d) Density - As related to speed, approaching that of diazo microfilm.
- e) Coating Pattern - Sufficiently smooth to not interfere with blow-back requirements.
- f) Actinic Opacity - Related to density and printing speed. To be satisfactory for making at least one regeneration and for blow-back.

INTER AND INTRA-OFFICE CORRESPONDENCE



To:

Date:

From:

-2-

Characteristics Attained

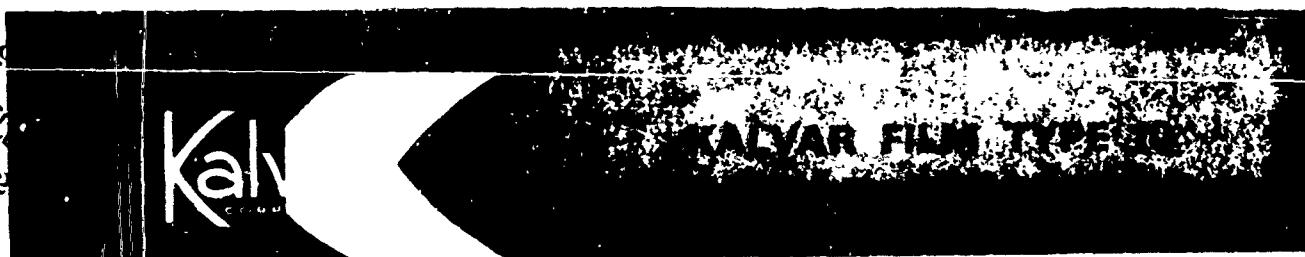
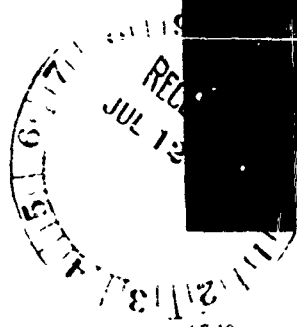
The product in its present state does have good fidelity and excellent legibility in a reader. The stability of the finished print is as good as regular diazo microfilm. The shelf-life is good, if kept at temperatures in the vicinity of 75° F. Density and actinic opacity are acceptable but at the sacrifice of printing speed as compared to standard microfilms.

Shortcomings

- 1) Coating pattern of the lacquer film needs improvement. Currently has a very fine longitudinal ridged appearance.
- 2) Development rate at the temperatures necessary (below film base distortion point) is slow. Longish dwell time required.
- 3) Fuming of the product occurs during development.
- 4) Density for printing speed is relatively low. In order to equal the density of 200VA, printing speed has to be reduced to about one-third that of 200VA.

AF/tr

cc: Walter Hollmann
Ted Foss
Dan Drotning



DESCRIPTION AND APPLICATION DATA

KALVAR FILM TYPE 10 is a general purpose heat developing projection viewing print film of medium contrast specifically designed as a microimage print film. It has sufficient resolution, gray scale and latitude for copying fine lines, yet enough density range to produce good contrast images.

GENERAL

KALVAR FILMS are the product of a basically different system of photography which does not require chemical processing. In use the films are exposed by ultraviolet light to form the latent photographic image, and heated to permanently develop the image. Ultraviolet sensitivity and heat development eliminate the darkroom and provide a clean, fast, simple photographic medium easily adaptable in systems applications. Multistep chemical processing, washing and vapor venting are totally eliminated.

The system is unique in that the opaque area of the heat developed image is composed of light scattering centers rather than light absorbing grains or dyes as in conventional films.

HANDLING

KALVAR FILMS do not require darkroom or safelight handling. They can be handled safely in normal office illumination prior to image exposure, but this unique operational freedom should not be over-extended. *Be sure to keep all unused Kalvar film in its ultraviolet protective wrapping.*

EXPOSURE

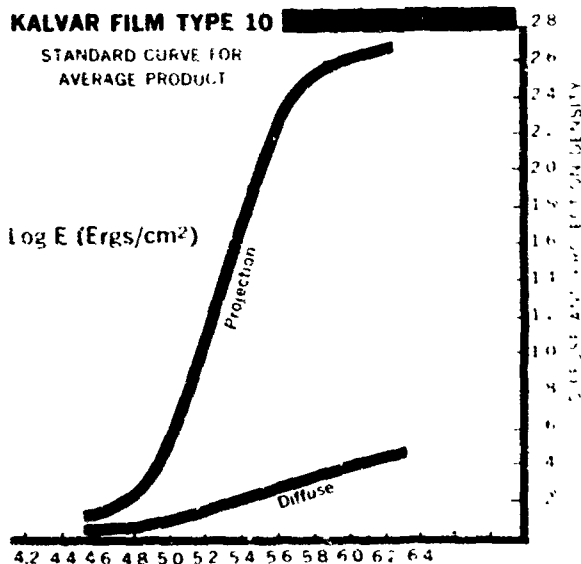
The energy required to expose Kalvar Film Type 10 is 0.2 watt second/cm². For practical purposes, exposure systems should be engineered to preclude the need for exposure time beyond 3 minutes. During exposure it is important to limit Kalvar film to a temperature of no more than 110° F at the film stage.

Listed below are a few of the many commercially available lamps which are effective in the exposure of Kalvar Films. These lamps have an actinic efficiency of:

MERCURY VAPOR (15%)	WATTAGE
General Electric H85A3/UV	85
Osram HBO-200	200
Hanovia 612C1	400
Osram HBO-500	500
General Electric AH6 (water cooled)	1000

Incandescent (2%): Tungsten type projection lamps from 300 watts up as used in slide projectors

Fluorescent (8%): Any commercial fluorescent lamp employing a phosphor type BL



SUPPORTS. Available on dimensionally stable polyester bases of different gauges

102—2 mil polyester base

103—3 mil polyester base

104—4 mil polyester base

(Suitable for stuff-feed high speed viewers)

105—5 mil polyester base

(Available in sheet film only)

Relative Speed—10

(Type 10 is used as a base for speed comparisons)

Gamma	Definition
Diffuse Density—0.30	Resolution—200 l/mm
Proj. Density—2.00	Spectral Sensitivity 3400 Å to 4400 Å
Log Exposure Scale—1.30	peak at 3850 Å



KALVAR CORPORATION, 909 South Broad Street, New Orleans, Louisiana 70125

KALVAR FILM TYPE 10 A medium contrast projection viewing print film

DEVELOPING

All that is necessary for the development of Kalvar Film is heat. Any method of heating the film to the proper development temperature will produce a permanent, high quality image. For optimum results Kalvar films should be developed at a temperature of 210 °F for a dwell time of approximately 1 second.

STORAGE

KALVAR raw film should be stored and transported in normal ambient temperatures and humidity. The film should not be subjected to temperatures above 110 °F for any significant length of time prior to exposure.

IMAGE STABILITY

The properly exposed, developed and fixed Kalvar image is one of the most stable of all photographic images. It is unaffected by water, light, and most solvents under normal ambient storage conditions. Oils and greases, including fingerprints, are easily removable. The normal microfilm image is stable to ambient temperatures up to 150 °F. However, the stability of the image is dependent upon the development parameters. Kalvar images can be produced to withstand more than 300 °F.



KALVAR CORPORATION, 909 South Broad Street, New Orleans, Louisiana 70125



SG 20

DESCRIPTION AND APPLICATION DATA

KALVAR FILM TYPE 20 is a medium contrast, wide latitude heat developable projection viewing print film designed for copying microfilm of widely varying densities such as are encountered in catalogue and newspaper microphotography. It is also an excellent film for reproducing continuous tone copy.

GENERAL

KALVAR FILMS are the product of a basically different system of photography which does not require chemical processing. In use the films are exposed by ultraviolet light to form the latent photographic image, and heated to permanently develop the image. Ultraviolet sensitivity and heat development eliminate the darkroom and provide a clean, fast, simple photographic medium easily adaptable in systems applications. Multistep chemical processing, washing and vapor venting are totally eliminated.

The system is unique in that the opaque area of the heat developed image is composed of light scattering centers rather than light absorbing grains or dyes as in conventional films.

HANDLING

KALVAR FILMS do not require darkroom or safelight handling. They can be handled safely in normal office illumination prior to image exposure, but this unique operational freedom should not be over-extended. *Be sure to keep all unused Kalvar film in its ultraviolet protective wrapping.*

EXPOSURE

The energy required to expose Kalvar Film Type 20 is 0.25 watt second/cm². For practical purposes, exposure system should be engineered to preclude the need for exposure times beyond 3 minutes. During exposure it is important to limit Kalvar film to a temperature of no more than 110 F at the film stage.

Listed below are a few of the many commercially available lamps which are effective in the exposure of Kalvar Films. These lamps have an actinic efficiency of:

MERCURY VAPOR (15%)

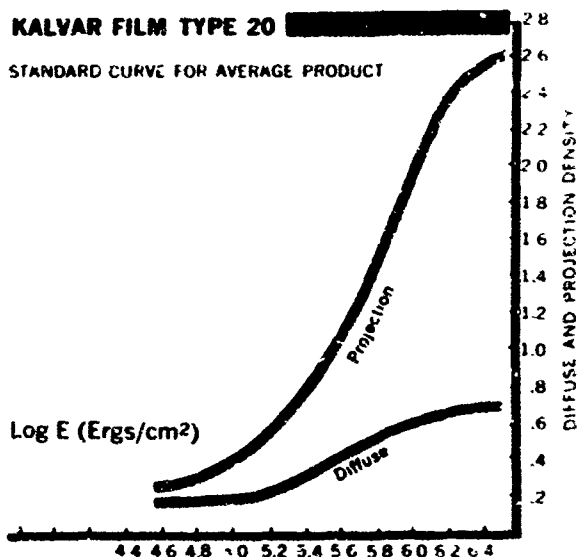
General Electric H85A3/UV	85
Osram HBO-200	200
Hanovia 612C1	400
Osram HBO-500	500
General Electric AH6 (water cooled)	1000

Incandescent (2%): Tungsten type projection lamps from 300 watts up as used in slide projectors

Fluorescent (8%): Any commercial fluorescent lamp employing a phosphor type BL

KALVAR FILM TYPE 20

STANDARD CURVE FOR AVERAGE PRODUCT



SUPPORTS: Available on dimensionally stable polyester base of different gauge

202—2 mil polyester base

203—3 mil polyester base

204—4 mil polyester base

(Suitable for stuff-feed high speed viewers)

205—5 mil polyester base

(available in sheet film only)

Relative Speed—0.80

(Code 10 is used as a base for speed comparisons)

Gamma

Proj. Density—2.60

Definition

Resolution—161 L/mm

Special Sensitivity

3400 Å to 4400 Å

Log Exposure Scale—1.40 peak at 3850 Å



KALVAR CORPORATION, 909 South Broad Street, New Orleans, Louisiana 70110

KALVAR FILM TYPE 20 A 16mm film with a 1260 foot length

DEVELOPING

All that is necessary for the development of Kalvar Film is heat. Any method of heating the film to the proper development temperature will produce a permanent, high quality image. For optimum results Kalvar films should be developed at a temperature of 210 F for a dwell time of approximately 1 second.

STORAGE

KALVAR raw film should be stored and transported in normal ambient temperatures and humidity. The film should not be subjected to temperatures above 110 F for any significant length of time prior to exposure.

IMAGE STABILITY

The properly exposed, developed and fixed Kalvar image is one of the most stable of all photographic images. It is unaffected by water, light, and most solvents under normal ambient storage conditions. Oils and greases, including fingerprints, are easily removable. The normal microfilm image is stable to ambient temperatures up to 150 F. However, the stability of the image is dependent upon the development parameters. Kalvar images can be produced to withstand more than 300 F.



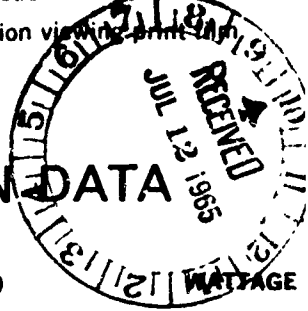
KALVAR CORPORATION, 909 South Third Street, New Orleans, Louisiana 70112

Printed in USA



KALVAR FILM TYPE 30

A high contrast projection viewing print film



50 30

DESCRIPTION AND APPLICATION DATA

KALVAR FILM TYPE 30 is a high contrast heat developable projection viewing print film designed for copying from Kalvar Type 10 microfilm when third generation work is desired. Type 30 is also an excellent film for copying low density silver positive microfilm, or for increasing contrast when printing from flat line copy microfilm.

GENERAL

KALVAR FILMS are the product of a basically different system of photography which does not require chemical processing. In use the films are exposed by ultraviolet light to form the latent photographic image, and heated to permanently develop the image. Ultraviolet sensitivity and heat development eliminate the darkroom and provide a clean, fast, simple photographic medium easily adaptable in systems applications. Multistep chemical processing, washing and vapor venting are totally eliminated.

The system is unique in that the opaque area of the heat developed image is composed of light scattering centers rather than light absorbing grains or dyes as in conventional films.

HANDLING

KALVAR FILMS do not require darkroom or safelight handling. They can be handled safely in normal office illumination prior to image exposure, but this unique operational freedom should not be over-extended. *Be sure to keep all unused Kalvar film in its ultraviolet protective wrapping.*

EXPOSURE

The energy required to expose Kalvar Film Type 30 is .25 watt second/cm². For practical purposes, exposure systems should be engineered to preclude the need for exposure times beyond 3 minutes. During exposure it is important to limit Kalvar film to a temperature of no more than 110 F at the film stage. Listed below are a few of the many commercially available lamps which are effective in the exposure of Kalvar Films. These lamps have an actinic efficiency of:

MERCURY VAPOR (15%)

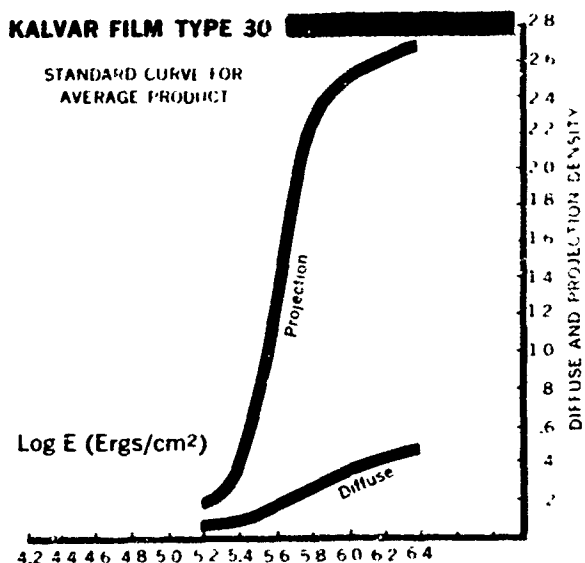
	WATTAGE
General Electric H85A3/UV	85
Osram HBO-200	200
Hanovia 612C1	400
Osram HBO-500	500
General Electric AH6 (water cooled)	1000

Incandescent (2%): Tungsten type projection lamps from 300 watts up as used in slide projectors

Fluorescent (8%): Any commercial fluorescent lamp employing a phosphor type BL

KALVAR FILM TYPE 30

STANDARD CURVE FOR
AVERAGE PRODUCT



SUPPORTS: Available on dimensionally stable polyester bases of different gauges

- 302—2 mil polyester base
- 303—3 mil polyester base
- 304—4 mil polyester base
(Suitable for stuff-feed high speed viewers)
- 305—5 mil polyester base
(Available in sheet film only)

Relative Speed—0.55

(Type 10 is used as a base for speed comparisons)

Gamma: Definition: Resolution—0.25 L/mm

Diffuse Density—0.45

Proj. Density—4.80 Spectral Sensitivity
3400 Å to 4400 Å

Log Exposure Scale—0.95 peak at 3850 Å



KALVAR CORPORATION, 909 South Broad Street, New Orleans, Louisiana 70125

KALVAR FILM TYPE 30 A high contrast projection viewing print film

DEVELOPING

All that is necessary for the development of Kalvar Film is heat. Any method of heating the film to the proper development temperature will produce a permanent, high quality image. For optimum results Kalvar films should be developed at a temperature of 240°F for a dwell time of approximately 1 second.

STORAGE

KALVAR raw film should be stored and transported in normal ambient temperatures and humidity. The film should not be subjected to temperatures above 110°F for any significant length of time prior to exposure.

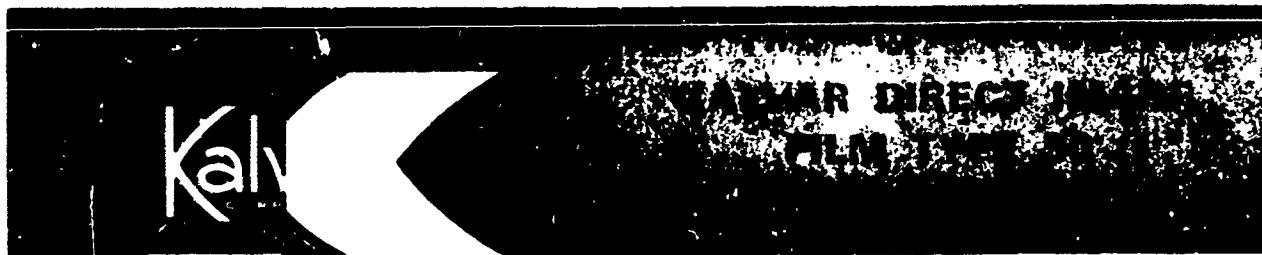
IMAGE STABILITY

The properly exposed, developed and fixed Kalvar image is one of the most stable of all photographic images. It is unaffected by water, light, and most solvents under normal ambient storage conditions. Oils and greases, including fingerprints, are easily removable. The normal microfilm image is stable to ambient temperatures up to 150°F. However, the stability of the image is dependent upon the development parameters. Kalvar images can be produced to withstand more than 300°F.



KALVAR CORPORATION, 909 South Broad Street, New Orleans, Louisiana 70125

Printed in U.S.A.



50 50

DESCRIPTION AND APPLICATION DATA

KALVAR FILM TYPE 50 is a medium contrast heat developing print film which does not change photographic sign from film generation to film generation. It has sufficient resolution, gray scale and latitude for copying fine lines, yet enough density range to produce good contrast images.

GENERAL

Kalvar Films are the product of a basically different system of photography which does not require chemical processing. The system is unique in that the opaque area of the heat developed image is composed of light scattering centers rather than light absorbing grains or dyes as in conventional films.

Note: Kalvar Direct Image Film Type 50 requires special handling. Please see reverse side for directions.

HANDLING

KALVAR FILMS do not require darkroom or safelight handling. They can be handled safely in normal office illumination prior to image exposure, but this unique operational freedom should not be over-extended. *Be sure to keep all unused Kalvar film in its ultraviolet protective wrapping.*

EXPOSURE

The energy required to expose Kalvar Type 50 is 0.10 watt seconds cm^2 . Listed below are a few of the many commercially available lamps which are effective in the exposure of Kalvar Films. The lamps have an actinic efficiency of:

MERCURY VAPOR (15%)

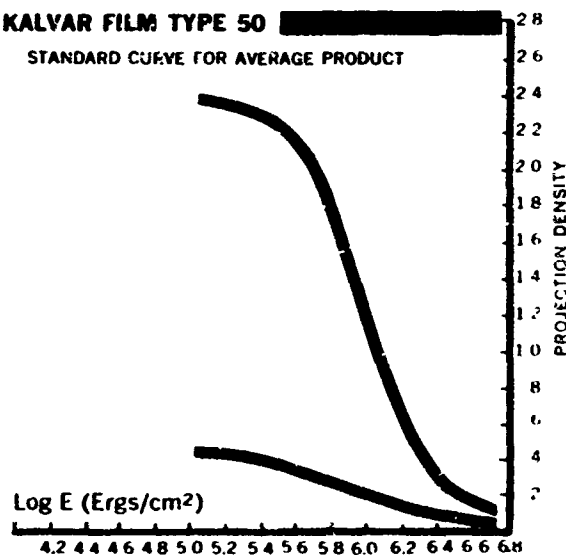
General Electric H85A3/UV	85
Osram HBO-200	200
Hanovia 612C1	400
Osram HBO-500	500
General Electric AH6 (water cooled)	1000

Incandescent (2%): Tungsten type projection lamps from 300 watts up as used in slide projectors

Fluorescent (8%): Any commercial fluorescent lamp employing a phosphor type BL

KALVAR FILM TYPE 50

STANDARD CURVE FOR AVERAGE PRODUCT



SUPPORTS: Available on dimensionally stable polyester base of different gauge

- 502—2 mil polyester base
- 503—3 mil polyester base
- 504—4 mil polyester base
(Suitable for stuff-feed high speed viewers)
- 505—5 mil polyester base
(available in sheet film only)

Relative Speed—0.50

(Code 10 is used as a base for speed comparisons)

Gamma
Diffuse Density—0.40
Proj. Density—3.10

Definition
Resolution—144 L/mm

Special Sensitivity
3400 Å to 4400 Å

Log Exposure Scale—1.15 peak at 3850 Å



KALVAR CORPORATION, 909 South Broad Street, New Orleans, Louisiana 70125

KALVAR DIRECT IMAGE FILM TYPE 50 A medium contrast projection viewing print film

DEVELOPING

First exposure

This exposure must be rather heavy in order to completely expose all the photochemical compound in the areas which are intended to remain clear. If this area is not completely burned out on the first exposure, the second exposure and development will cause a slight fog density in the intended clear area.

De-gassing

First heat treatment

Not more than about 170 F for some 15 seconds. If the temperature of this degassing stage is raised to the softening point of the emulsion there is a tendency to have bubble formation in the areas which would ordinarily degas and remain clear. Degassing at normal room temperature requires about 15 minutes.

Second exposure

This one gives an overall exposure to the film causing the generation of gas in previously unexposed areas. This exposure need not be any greater than the original exposure used in forming the latent image. However, time and temperature here are important. As you are exposing this residual image area, the gas is leaking out—so it must be kept relatively cool to decelerate this diffusion.

Development

Final heat treatment must be sufficient to soften the plastic and allow bubble growth. A temperature of 260 F for about one second is required. This development must be given immediately after the overall exposure step in order to prevent unnecessary loss of gas needed to form the bubbles.

STORAGE

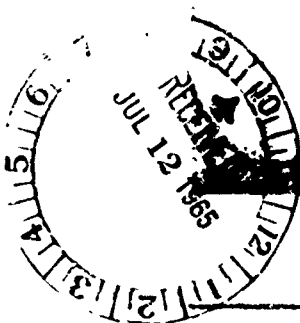
KALVAR raw film should be stored and transported in normal ambient temperatures and humidity. The film should not be subjected to temperatures above 110 F for any significant length of time prior to exposure.

IMAGE STABILITY

The properly exposed, developed and fixed Kalvar image is one of the most stable of all photographic images. It is unaffected by water, light, and most solvents under normal ambient storage conditions. Oils and greases, including fingerprints, are easily removable. The normal microfilm image is stable to ambient temperatures up to 150 F. However, the stability of the image is dependent upon the development parameters. Kalvar images can be produced to withstand more than 300 F.



KALVAR CORPORATION, 909 South Broad Street, New Orleans, Louisiana 70125



KALVAR FILM TYPE 80

A direct image variable contrast print film

DESCRIPTION AND APPLICATION DATA

KALVAR FILM TYPE 80 is a general purpose direct image variable contrast print film requiring light alone for both exposure and development. Although exposure is the same as in other Kalvar films, Type 80 development is accomplished by light instead of by the application of heat as in these other films. The light source used for Type 80 development is an ultraviolet gas discharge lamp. By varying the amount of discharge, the operator can control the contrast in the finished print, as is shown by the curves on this sheet.

GENERAL

Kalvar films in general are the product of a basically different system of photography which does not require chemical processing. The films are exposed by ultraviolet light to form the latent photographic image and are heated to permanently develop the image. In the case of Type 80, however, the latent image area is cleared by the initial exposure, and a second rapid flash by the gas discharge lamp develops or *activates* the residual or previously undeveloped photo-sensitive areas to form a density.

HANDLING

KALVAR FILMS do not require darkroom or safelight handling. They can be handled safely in normal office illumination prior to image exposure, but this unique operational freedom should not be over-extended. *Be sure to keep all unused Kalvar film in its ultraviolet protective wrapping.* Unexposed Kalvar film should not be handled in sunlight, which is a source of ultraviolet light.

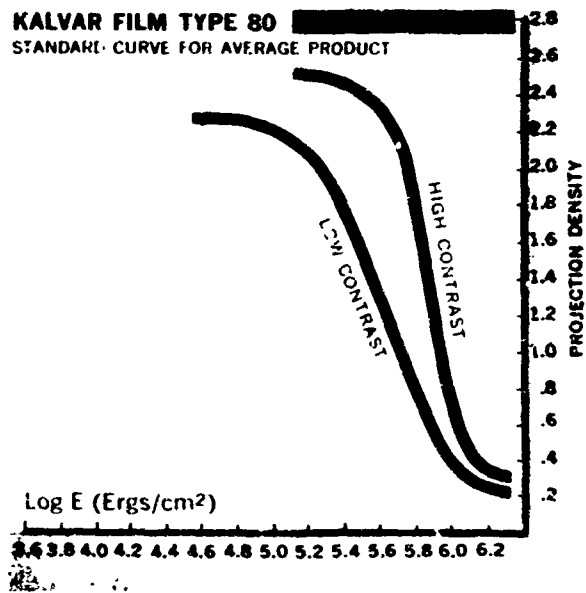
EXPOSURE

The energy required to expose Kalvar Film Type 80 is 0.20 watt seconds/cm². Listed here-with are some of the commercially available lamps which are effective in the exposure of Kalvar films:

MERCURY VAPOR (15%)	WATTAGE
General Electric H85A3/UV	85
Osram HBO-200	200
Hanovia 612C1	400
Osram HBO-500	500
General Electric AH6 (water cooled)	1000

Incandescent (2%): Tungsten type projection lamps from 300 watts up as used in slide projectors

Fluorescent (8%): Any commercial fluorescent lamp employing a phosphor type BL



SUPPORTS: Available on dimensionally stable polyester base of 2 or 3 mil thickness.
Relative speed—0.85
(Type 10 is used as a base for speed comparisons)

Gamma (Projection density):
High—5.0
Low—2.5
Log Exposure Scale:
At high gamma—0.80
At low gamma—1.25
Definition:
Resolution—250 L/mm
Spectral Sensitivity:
3400 Å to 4400 Å,
peak at 3850 Å



KALVAR CORPORATION, 909 South Broad Street, New Orleans, Louisiana 70125

KALVAR FILM TYPE 80 A direct image variable contrast print film

DEVELOPING

All that is necessary for the development of Kalvar Film Type 80 is an energy source such as a 200 watt second Xenon flash lamp or similar commercially available lamp. No heat source is required.

STORAGE

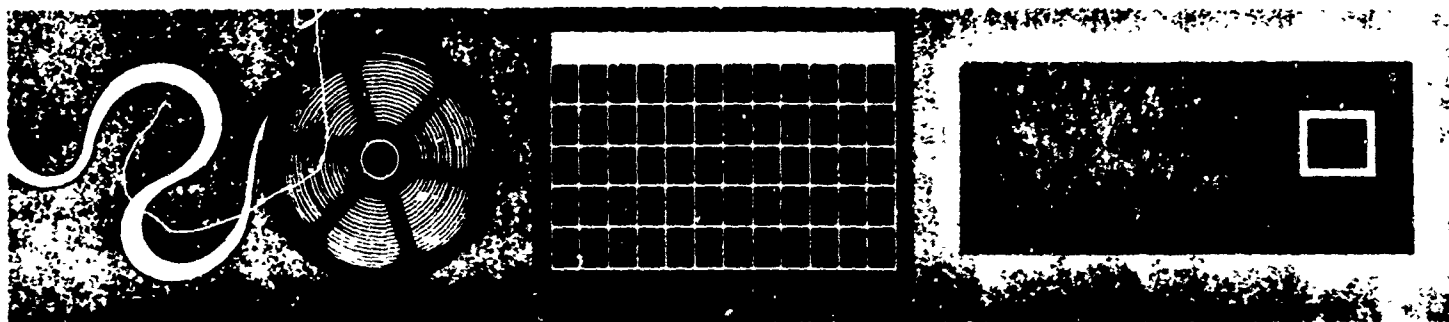
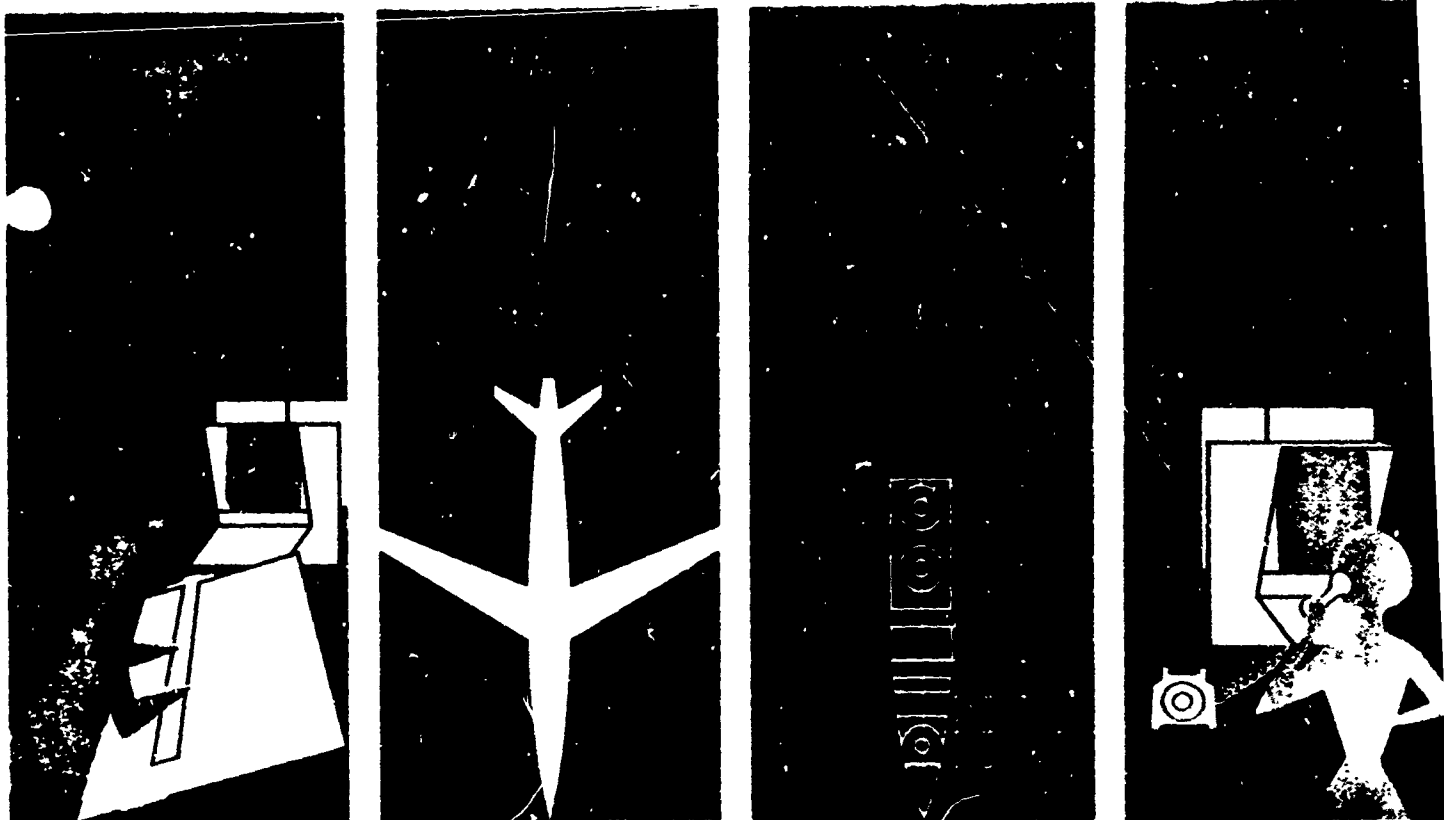
KALVAR raw film can be stored and transported in normal ambient temperatures and humidity. The film should not be subjected to temperatures above 110 F before exposure.

IMAGE STABILITY

The properly activated Kalvar Type 80 image is one of the most stable of all photographic images. It is unaffected by water, light, and most solvents under normal ambient storage conditions. Oils and greases, including fingerprints, are easily removable. This image is stable to temperatures up to 210 F. Kalvar images can be produced to withstand more than 300 F.



KALVAR CORPORATION, 909 South Broad Street, New Orleans, Louisiana 70125



**Tecnifax Microforms
for diazo microduplication**

**the modern way to meet your
information handling needs**

TECNIFAX

Today's technology demands imaginative answers to the information explosion

The rapid technological advances of the mid-twentieth century are placing severe stresses on traditional methods of recording, filing, retrieving, duplicating and disseminating information. These methods are proving to be too slow, inaccurate, and expensive to meet the heavy demands of today's rapidly-expanding technology.

For instance, thousands of private businesses are under government contract annually for prime research work on the frontiers of science. Without fast, accurate, and timely information dissemination systems, millions of dollars and thousands of manhours can be wasted in duplicated efforts by contractors.

Many government agencies must have complete and up-to-date information at their fingertips on millions of citizens, and large investments and properties. Electric utilities, providing power for as many as 2,000,000 homes, must have complete, up-to-date information to answer specific customer questions at the ring of a phone.

Huge, four-engine jet airliners rely on the smooth functioning of over one million parts to keep operating safely and on schedule.

Computers have always been capable of analyzing and computing data at fantastic speeds... now, the information they generate must be readily available for immediate distribution to many locations simultaneously. Traditional methods of recording, storing, duplicating, and distributing the vast amount of information required to keep America's commercial, industrial, and government concerns functioning smoothly are no longer adequate... at any cost.

New, diazo microfilm is performing a vital role in all these applications, and many more. And, it is doing it faster, more accurately and at lower cost than ever before possible.

Tecnifax, long the leader in diazofilm research and technology, is playing an important role in filling these rapidly-growing needs. Tecnifax' wide variety of diazofilm systems is uniquely suited to the wide range of application requirements... from film emulsions and bases designed for simple duplication of high-contrast engineering line drawings to complex diazo emulsions required for duplicating subtle tonal gradations in aerial intelligence photographs.

For all these needs, from the simplest to the most complex, Tecnifax has the answer. It has a specific duplicating system — including equipment and film — for a wide range of applications, including basic film preservation, technical report distribution programs, and multiple copy dissemination of CRT display information.

Tecnifax diazotype reproduction systems cost little to install and they more than pay for themselves in increased efficiency and production volume. Furthermore, capital expenditure programs do not have to be initiated. A simple, convenient leasing arrangement is available to get a time-and-money-saving Tecnifax diazo micro duplicating system installed. Your Tecnifax sales representative has the full details.

Why is Tecnifax the best answer for today's needs?

Because Tecnifax diazo microfilm duplication is a simple, fast, one-step process. You get a positive diazo copy film from a positive original... a negative diazo copy film from a negative original. Since no intermediate step is required, there is no additional resolution loss, and you get a usable second-generation copy. You save time and expense because expensive, throw-away intermediate copies are eliminated. Furthermore, high resolution second-generation diazo copies can be used as masters to make additional copies.

Tecnifax diazo microfilm is handled and developed in a dry, daylight environment. You need no water, no darkroom, no expensive chemicals. Employees can work and be supervised in a clean, well-lighted atmosphere. Tecnifax microduplication requires no special training for personnel. Just pair the

original film with unexposed diazofilm in normal room light and feed both into the machine. The film is exposed in ultraviolet light... then sealed in ammonia vapor... all automatically inside the microduplicator. Complete copies are immediately available for inspection.

High resolution for maximum legibility

The diazo image is formed of minute particles of organic dyes, less than 1/300 the size of the particle in the finest grain silver halide emulsions. That's why increased resolution of Tecnifax diazo microduplicating films increases film legibility and makes possible high-quality hard copy. Also, since the diazo component is dissolved in the film base, they are less susceptible to scratching and fingerprinting. And, because they readily transmit infrared radiation, Tecnifax microduplicates do not buckle and warp in readers.

Tecnifax Diazofilms for every microduplication requirement

Tecnifax offers over 15 standard diazo microduplicating films for data reproduction. Some produce high contrast duplicates... others produce low contrast duplicates. Some are specially developed for high-speed printing... some for continuous-tone reproduction. Some produce a strong black image... others a sepia image. Clear or tinted bases of red, green, blue, or yellow for color coding are available in rolls, microfiche, or for use in aperture cards... to meet the needs of any miniaturized graphic-information system.

At Tecnifax, we maintain high quality and uniformity by stringent quality control procedures and close attention to details during every manufacturing step. Tecnifax has one of the most extensive research and development programs in the industry. Through continuous emphasis on quality and product improvement, Tecnifax maintains its leadership and ability to produce products to meet the demanding requirements of advanced graphic information systems.

Tecnifax Diazofilms for microfilm duplication

Catalog No.	Form	Sizes	Characteristics	Applications
LOW-CONTRAST FILMS				
D5-100 (K-tone)	Roll	16mm 35mm 70mm	Continuous tone; 5-mil acetate base	General purpose
D5-101	Roll Sheet	70mm Various sizes	Continuous tone; 5-mil acetate base	For use where tonal quality is important, excellent for aerial film duplication
T3-100	Roll	35mm	Continuous tone; 3-mil acetate base	For aperture-card applications
P2-100	Roll	16mm 35mm	2-mil polyester base	For cartridge and aperture-card applications
P3-100	Roll	16mm 35mm	3-mil polyester base	For cartridge and aperture-card applications
MEDIUM-CONTRAST FILMS				
D5-200 (K-line)	Roll	16mm 35mm 70mm	Excellent density range; 5-mil acetate base	General purpose
D5-201 (Unitone)	Roll	16mm	Fast printing speed; 5-mil acetate base	For use where fast print speed must be combined with good image formation
D5-202R	Roll	16mm 35mm	Moderate printing speed; 5-mil acetate base	For use where close contact of master and duplicate film is essential
T8-202	Sheet	Various sizes	Moderate printing speed; 7.5-mil acetate base	For microfiche applications
T8-202R	Roll Sheet	105mm Various sizes	Moderate printing speed; 7.5-mil acetate base	Specially developed for use on Tecnifax Hi-R Duplicator
T8R202R	Roll Sheet	105mm	7.5-mil acetate base - red	For microfiche applications where color coding is advantageous
T8G202R	Roll Sheet	105mm	7.5-mil acetate base - green	For microfiche applications where color coding is advantageous
T8B202R	Roll Sheet	105mm	7.5-mil acetate base - blue	For microfiche applications where color coding is advantageous
T8Y202R	Roll Sheet	105mm	7.5-mil acetate base - yellow	For microfiche applications where color coding is advantageous
HIGH-CONTRAST FILMS				
D5-400 (K-max)	Roll	16mm 35mm	Very high contrast; 5-mil acetate base; sepia image	For special applications
P3-400	Roll	16mm 35mm	Very high contrast; 3-mil polyester base; sepia image	For special applications

Tecnifax Microduplicating Equipment for any volume of work

Whether you need a high-speed duplicator for a constant high volume or a compact unit for low-cost duplication at low or medium volume, Tecnifax can supply a fully automatic processor designed and manufactured to meet the requirement. Send for full details on these four models:

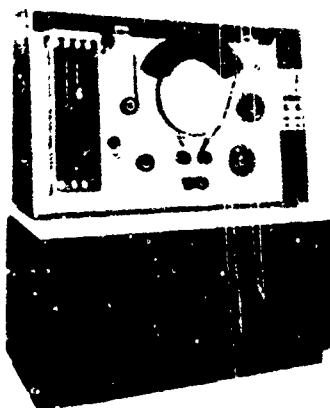
***Model 601 Diaz Card Microduplicator™**

The Model 601 is a flow-type printer-processor that permits high-volume, high-resolution diazo duplication of microfiche and all other nonrigid cut films. Operation is fully automatic. The operator just puts the master and the film into the machine. He gets a clear, sharp duplicate within seconds. Model 601 picks off the master and returns it to the operator when the exposure cycle is complete. The built-in film-handling system will not scratch or damage silver originals.



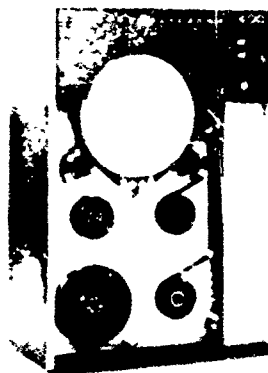
***Model 303 Diaz Roll Microduplicator™**

The high-speed Model 303 duplicates 1000-foot rolls of microfilm, 16mm or 35mm, at rates up to 50 feet/minute exposing, developing and rewinding the film in one continuous cycle. It was specifically designed for high-volume requirements where high resolution capability must be combined with operation at consistent high speed.



***Model 400 Diaz Roll Microduplicator™**

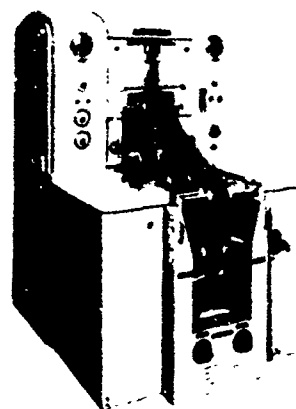
For low or medium volume, the desktop Model 400 offers economical, high-resolution duplication. It handles 100- to 1000-foot rolls of either 16 or 35mm film. A 100-foot roll can be duplicated every six minutes. A 1000-foot roll can be completed in one hour. Exposure, development, and rewinding are fully automatic... the operator has only to start the cycle.



Hi-R Diazoprocessor

High-production general-purpose microduplicator for reproduction of roll film widths from 70mm to 9½ inches and sheet film in a wide variety of sizes.

The Hi-R's rugged design and exclusive light collimating systems are uniquely suited for volume reproduction of roll or sheet films with a minimum resolution loss. A new loop printing accessory permits automatic reproduction of up to 39 different four-by-six inch originals for multiple distribution of microfiche copies. Other accessories are available for roll- or sheet-film reproduction.



For full information on Tecnifax Microduplicating Films and Equipment, Call Your Nearest Tecnifax Representative or Write Tecnifax Corporation, Holyoke, Massachusetts 01040.

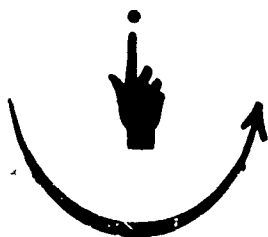
*Designed and manufactured by CBS Laboratories, a Division of Columbia Broadcasting System, Inc.

TECNIFAX

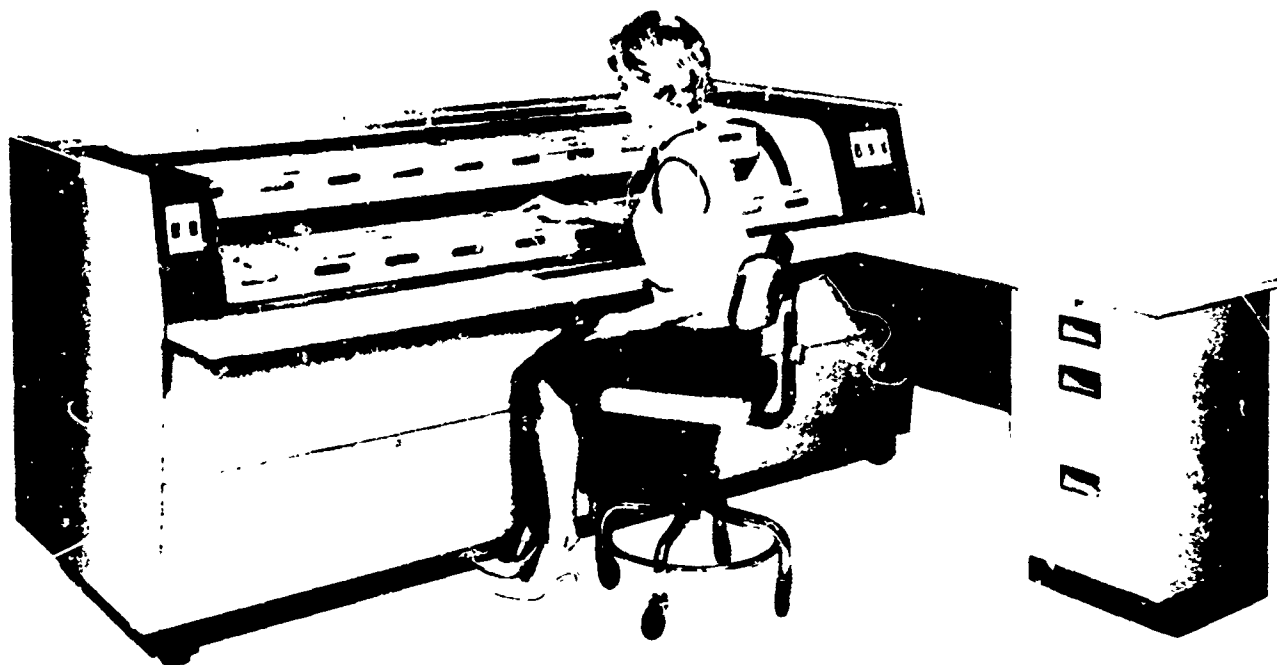
Data Sheets for:

MATERIALS HANDLING

(Section C-3)



6600 SERIES MECHANIZED UNITS



DISCOUNTS

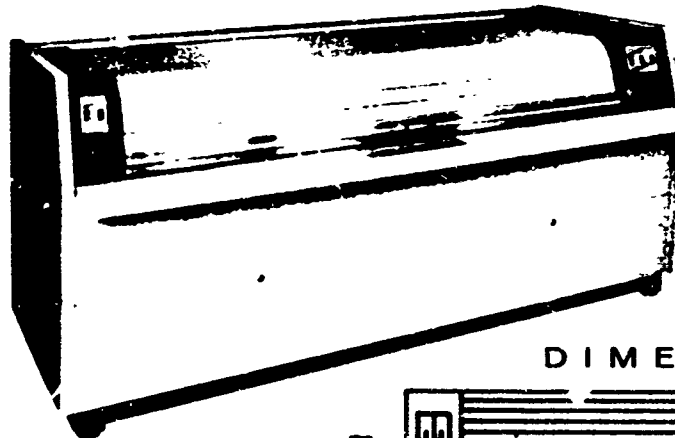
1 to 3 units	5%
4 to 6 units	7½%
7 to 9 units	10%
10 or over	12½%

GENERAL SPECIFICATIONS

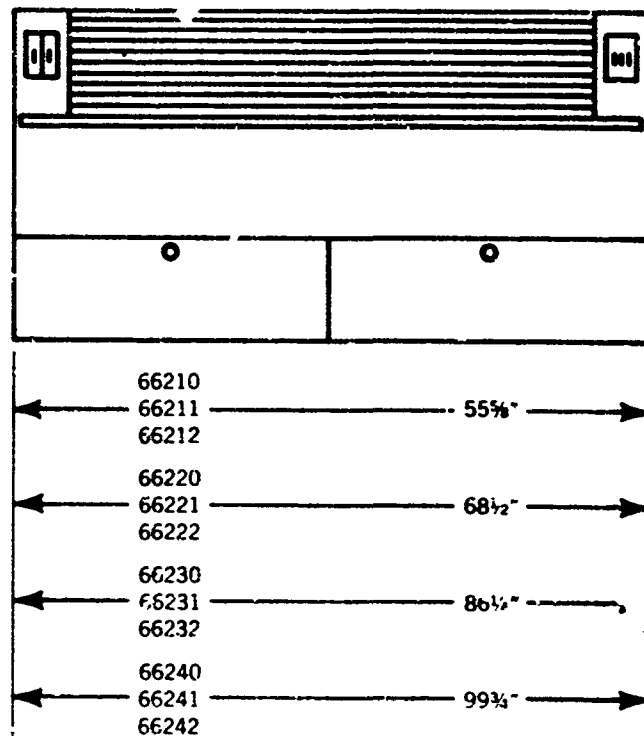
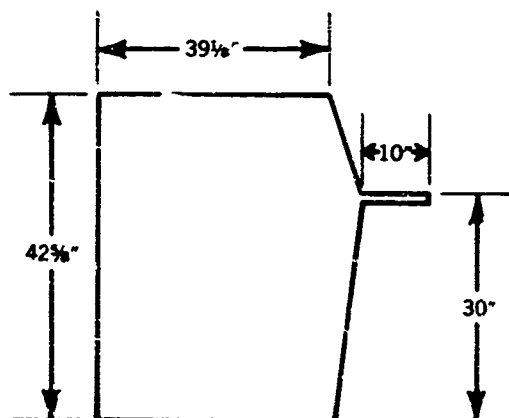
POWER SUPPLY:	110 Volt 60 Cycle, A.C.
MOTOR:	½ H.P., D.C. Motor. Standard Right Hand Drive only. Unit services from front of file.
OPERATING CONTROLS:	Automatic Push Button Selector standard all models.
MANUAL CONTROL OR SUPERVISORY SWITCH:	For stand up reference, a control switch is located on front of pedestals on both ends of file.
EMERGENCY OPERATION:	Hand crank for emergency operation during power failure.
SAFETY FEATURES:	Safety Cushion full width of opening and Photo Electric Eye assures instant halt of file. Safety Cushion is activated by slight pressure and Photo Electric Eye is activated when electrical beam is broken.
HOOD OR COVER:	Anodized Extruded Aluminum. Panels mounted on nylon bearings and track guided for ease of operation.
COUNTER:	Full width stationary counter available as standard. See Page 4 for choice of counter designs.
CONVENIENCE COMPARTMENT:	Standard all models. Located on top of right pedestal.
FINISH:	Exterior: — Dusty Green, Blue Azure, Pheasant Tan, Empire Gray, Platinum, Fawn Gray Interior: — Platinum
LEVELIZERS:	All models equipped with four heavy-duty "Dome Levelizers" for accurate leveling, easier moving, better weight distribution and positive support of the file.

6600 SERIES MECHANIZED FILES

Card Size	Model No.	Pin Arr.	Inside Tray Depth	Filing Inches	Rows of Cards Per Unit	Trays per Pan	Assortment	Tray No.	Selling Price Including Trays			Approx. Shipping Weight
									Eastern Zone	Central Zone	Western Zone	
5 x 3	66212	12	13	936	72	3	2-Compt.	60605	\$2520	\$2583	\$2646	1200
	66222	12	13	1248	96	4	2-Compt.	60605	3260	3341	3423	1330
	66232	12	13	1872	144	6	2-Compt.	60605	3705	3798	3890	1480
	66242	12	13	2184	168	7	2-Compt.	60605	4035	4136	4237	1592
5 x 4	66211	9	13	585	45	5	Single	60601	2315	2373	2431	1085
	66221	9	13	819	63	7	Single	60601	3015	3090	3166	1215
	66231	9	13	1170	90	10	Single	60601	3270	3352	3434	1340
	66241	9	13	1494	108	12	Single	60601	3510	3598	3686	1435
TAB H	66212	12	13	624	48	4	Single	60602	2345	2404	2462	1200
	66222	12	13	936	72	6	Single	60602	3090	3167	3245	1330
	66232	12	13	1248	96	8	Single	60602	3545	3634	3722	1480
	66242	12	13	1560	120	10	Single	60602	3620	3711	3801	1592
8 x 5	66210	8	13	416	32	4	Single	60610	2340	2399	2457	1047
	66220	8	13	520	40	5	Single	60610	2935	3008	3082	1177
	66230	8	13	728	56	7	Single	60610	3395	3480	3565	1293
	66240	8	13	936	72	9	Single	60610	3575	3664	3754	1381

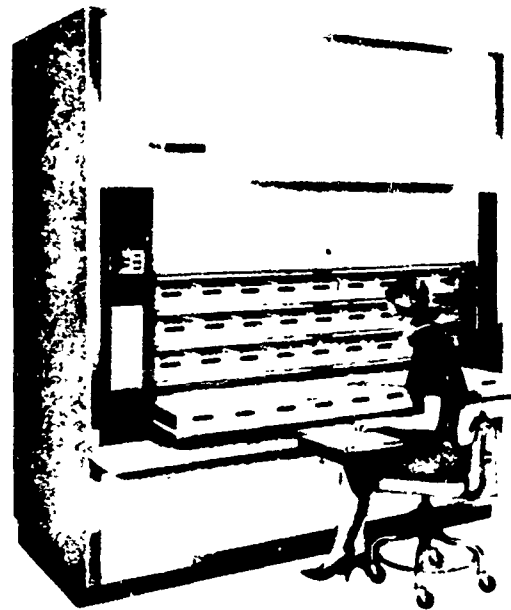


DIMENSIONS





FULL ACCESSIBILITY . . All cards — from front to back of each drawer — are easily accessible to operator. View of card guiding and indexing is direct and unobscured. Note also the generously-scaled panoramic index positioned directly before the operator. Indexing system is related to push-button by simplified code to minimize effort and expedite record selection.



DISCOUNTS		
1 - 2 Units		2 1/2%
3 Units		3%
4 - 5 Units		5%
6 Units		6%
7 Units		7 1/2%
8 Units		8%
9 Units		9%
10 Units up		12 1/2%

CARD POWER FILES

PRICING AND DIMENSIONS

Card Size	Model No.	P21 Width Clear	OVERALL DIMENSIONS			No. of Shelves	Rows of Cards Per Shelf	Filing Inches	PRICES			Est.* Shipping Weight
			High	Wide	Deep				EZ	CZ	WZ	
70" MODELS (70 1/2" CLEAR SHELF WIDTH)												
5 x 3	10971-2453	70 1/2"	95 1/2"	90 1/2"	45 1/2"	24	13	4641	\$6025	\$6175	\$6326	4880
	10972-2853	70 1/2"	107 1/2"	90 1/2"	45 1/2"	28	13	5415	6495	6657	6820	5470
	10973-3253	70 1/2"	119 1/2"	90 1/2"	45 1/2"	32	13	6188	7050	7226	7403	6240
6 x 4	10971-2454	70 1/2"	95 1/2"	90 1/2"	45 1/2"	24	11	3927	5890	6037	6185	4880
	10972-2864	70 1/2"	107 1/2"	90 1/2"	45 1/2"	28	11	4582	6415	6575	6736	5470
	10973-3264	70 1/2"	119 1/2"	90 1/2"	45 1/2"	32	11	5236	6810	6980	7150	6240
TAB	10971-2473	70 1/2"	95 1/2"	90 1/2"	45 1/2"	24	9	3213	5620	5761	5901	4880
	10972-2873	70 1/2"	107 1/2"	90 1/2"	45 1/2"	28	9	3749	6185	6340	6494	5470
	10973-3273	70 1/2"	119 1/2"	90 1/2"	45 1/2"	32	9	4284	6555	6719	6883	6240
8 x 5	10968-2085	70 1/2"	95 1/2"	90 1/2"	45 1/2"	20	8	2380	5115	5243	5371	4070
	10969-2485	70 1/2"	110 1/2"	90 1/2"	45 1/2"	24	8	2856	5710	5853	5995	4900
	10970-2685	70 1/2"	119 1/2"	90 1/2"	45 1/2"	26	8	3094	5815	5960	6106	5285
80" MODELS (78 1/2" CLEAR SHELF WIDTH)												
5 x 3	62401	78 1/2"	95 1/2"	98 1/2"	45 1/2"	24	15	5355	\$6630	\$6800	\$6951	5180
	62402	78 1/2"	107 1/2"	98 1/2"	45 1/2"	28	15	6248	7085	7247	7410	5770
	62403	78 1/2"	119 1/2"	98 1/2"	45 1/2"	32	15	7140	7465	7641	7818	6540
6 x 4	62401	78 1/2"	95 1/2"	98 1/2"	45 1/2"	24	12	4248	6370	6517	6665	5180
	62402	78 1/2"	107 1/2"	98 1/2"	45 1/2"	28	12	4998	6635	6795	6956	5770
	62403	78 1/2"	119 1/2"	98 1/2"	45 1/2"	32	12	5712	6900	7070	7240	6540
TAB	62401	78 1/2"	95 1/2"	98 1/2"	45 1/2"	24	10	3570	6170	6311	6451	4880
	62402	78 1/2"	107 1/2"	98 1/2"	45 1/2"	28	10	4165	6465	6620	6774	5770
	62403	78 1/2"	119 1/2"	98 1/2"	45 1/2"	32	10	4760	6800	6964	7128	6240
8 x 5	62404	78 1/2"	95 1/2"	98 1/2"	45 1/2"	20	9	2676	5600	5728	5856	4370
	62405	78 1/2"	110 1/2"	98 1/2"	45 1/2"	24	9	3213	6010	6153	6295	5200
	62406	78 1/2"	119 1/2"	98 1/2"	45 1/2"	26	9	3481	6370	6515	6661	5595

PRICES INCLUDE: KEY LOCKING COVER AND STATIONARY COUNTER 12" DEEP FULL WIDTH OF UNIT, 27" HEIGHT.

ACCESSORIES AND OPTIONAL EXTRAS | 1. GROUP 1 M2 COMBINATION LOCK ON DOOR \$ 50.00
 | 2. ROLLING WORK SURFACE 65.00
 | 3. AUTOMATIC SHELF EJECTOR SYSTEM (factory installation) (not subject to discount) 500.00

NOTE: Price deductions for the omission of back and side panels in multiple installations are shown on page 15

* Estimated Shipping Weights are without Trays.

CARD POWER FILE

FULL SUSPENSION ROLL-UP SHELF

GENERAL SPECIFICATIONS

1. SHIPMENT

Units are delivered by shipment as disassembled units to be assembled from parts and sub-assemblies at the customer's site.

All prices include required assembly on the job site, freight, local delivery or any handling costs, including rigging if necessary.

2. POWER SUPPLY

All units operate on standard 110-120 volt A.C. power and use 1/2 horsepower D.C. gear motors for soft start and stop and positive braking. Units require 100 amperes to start and 5 amperes to run with balanced load.

3. SERVICING

Oil and mechanical and electrical components is available through the front of the unit only. Thus, units may be positioned end-to-end and back-to-back.

4. STANDARD FEATURES

All units include a front access panel and an emergency hand crank operation.

5. SAFETY SYSTEM

All units are equipped with a safety system which includes tri-tonic electric eyes at the top and bottom of the operator access opening. In addition, safety guard panels are located at the bottom of the opening. An electric interlock is provided on each side of the opening. Each door must be fully in the unit and the finger latch must latch positively into position before the unit can be operated. Just finger pressure against the latch is all that is required to release for withdrawal.

6. CYCLE SPEED

The conveyor system with balanced load is designed to move two shelves. Units never go through the entire cycle because of the Priority Pilot control which sends the desired shelf to the operator via the closer direction.

7. SHELF EXPOSURE

Form Sizes: TAB, 5' x 3' 6" x 4' Expose 4-shelf opening.

Form Size: 8' x 5' Expose 3-shelf opening.

8. MEDIA HEIGHT

Maximum media height in trays is 5 1/8" on 8 x 5 and 4 1/2" on 5 x 3, 6 x 4, and Tab Models. All trays are standard, stock design Super Elevator Trays 14 7/8" net file depth.

9. SHELVES

All shelves are roller ball suspended. Manual units require minimum effort for full extension to reference position.

10. OPERATING CONTROLS

All units are equipped with push button controls to control the positioning of each individual shelf. These controls are located recessed and centered into the counter surface.

11. SUPERVISORY CONTROL

All units are equipped with a supervisor's control located on the left front face of the machine. This control allows for the memory storage of the shelf position, the use of the supervisor's control, and the automatic return to the previous shelf position.

12. FINISH

All units are available in Empire Gray, Pheasant Tan, Blue Azure, Dusty Green, Fawn Gray or Platinum exterior. All unit interiors are finished in Platinum.

13. COUNTERS

Unit price includes stationary counter 27" height, full width of unit, 12" depth from front of file. Counter surface is standard Formica No. 879 beige to match cover and interior.

14. COVERS

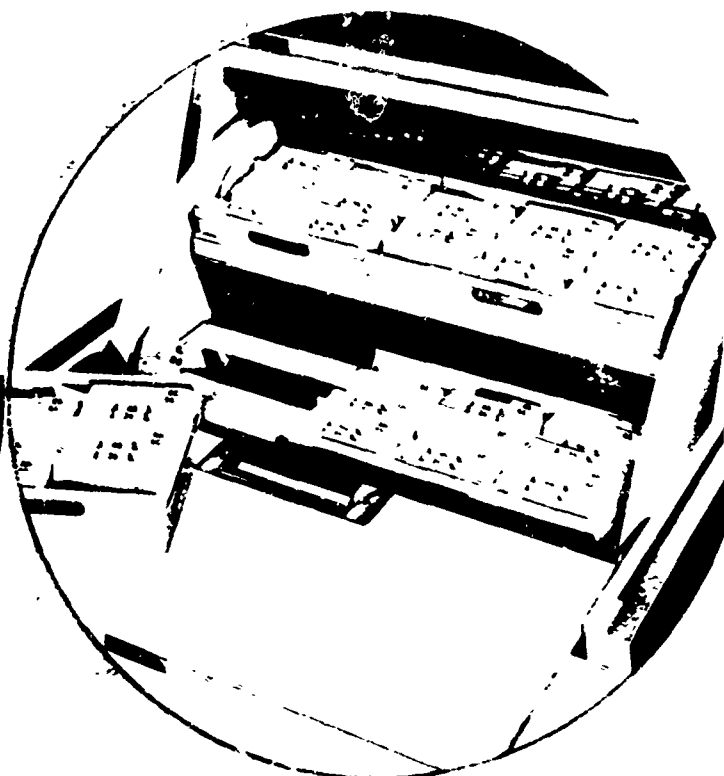
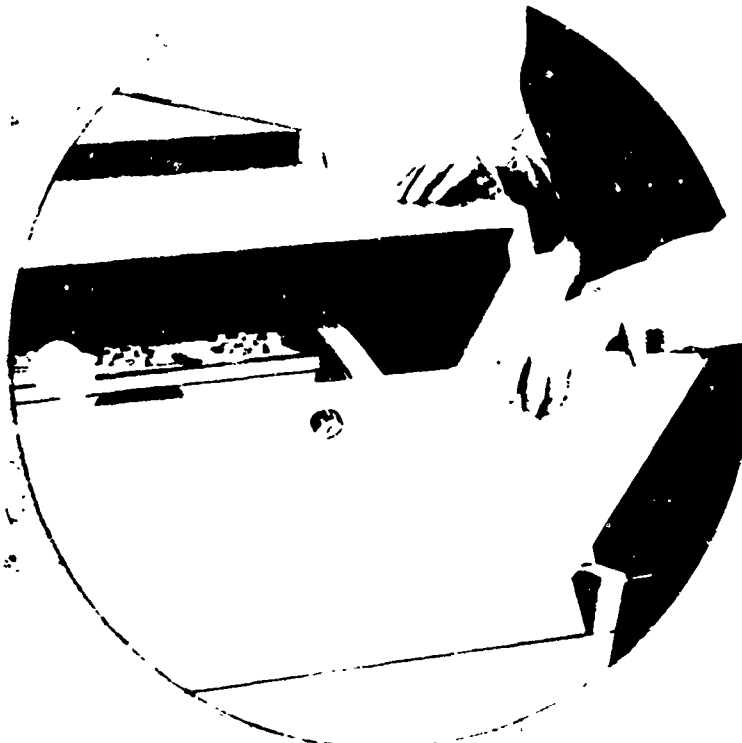
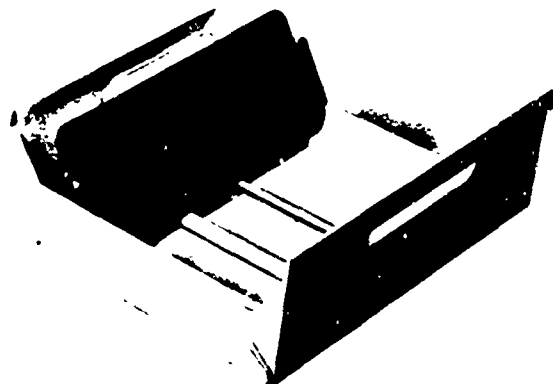
Finished in Platinum to match interior. Standard with key lock, optionally available with combination lock.

15. AUTOMATIC SHELF EJECTOR SYSTEM

Automatically brings the shelf out to working position. Shelf is returned to unit when next selector button is pushed.

Because no belts or clamps are needed to contain records, the whole top of each record row is completely visible and can be used for guiding. Makes filing and finding faster. Permits use of Self-indexing Guides for standard size records or tab cards.

Trays can be lifted out of file, and replaced, without releasing locks or other gadgets. Nor is there any need to shift records in and out of special desk trays . . . thus division of work and other peak period activities are facilitated. File operates normally even when trays are removed. Slope tray ends form a natural 30° working "V". All tab trays are furnished with 90° ends.

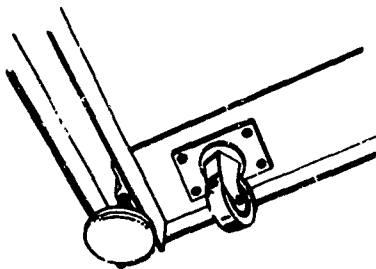


Operator works directly in front of file . . . no need to turn and twist for posting and reference. Work motions are reduced to a minimum. All records are delivered to the operator at the ideal desk level working position. Swept-back design allows ample knee and leg room.

Full width, desk-height posting shelf provides ample work room. Folds back when not in use, covered with glare-free vitc.

Unit features a large-size index holder for quick, convenient tray identification and record finding.





BOTH SWIVEL CASTERS AND DOME LEVELIZERS

Quiet-riding swivel casters provide easy movement from one location to another.

Levelizer Domes provide firm support for files on uneven or carpeted floors. Screw stem adjusts to 1½". Two-inch diameter nylon base cannot stain floor or carpet.

POWER SUPPLY: 110-115 v. 60 cy. A.C.

MOTOR: 95 v. D.C. Motor

¼ H.P. 10860, 10861, 10862 and 10863

¼ H.P. 10864, and 10865

CASTERS AND DOME LEVELIZERS: Standard all Files

FINISH:

Exterior -- Sides, Back and Top:

Dusty Green

Empire Gray

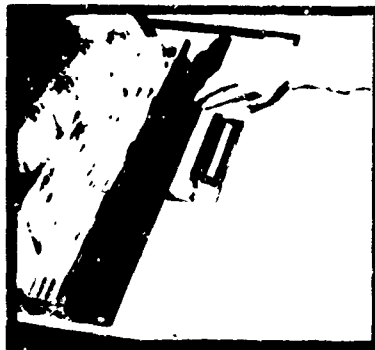
Pheasant Tan

Blue Azure

Platinum

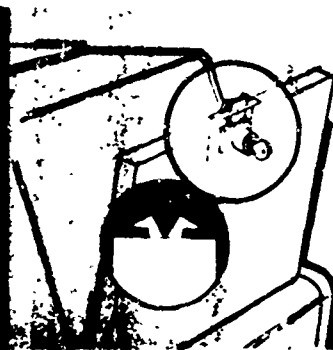
Exterior -- Front and Telescoping Hood: Platinum Std.

Interior -- Platinum, Standard all Files



SAFETY CUSHION

Flexible, ultra-sensitive safety cushion at rear of work surface stops file instantly when touched and keeps it stopped until activated by reset-stop button.



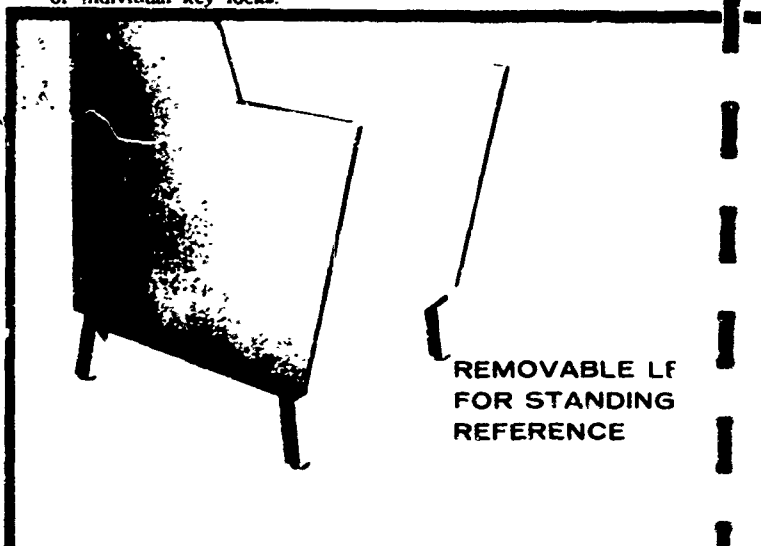
KEY LOCK

Unique, double-pronged lock prevents unauthorized access to records. . . door keeps records free from dust. Standard with paracentric key. Multiple unit installations can have identical or individual key locks.

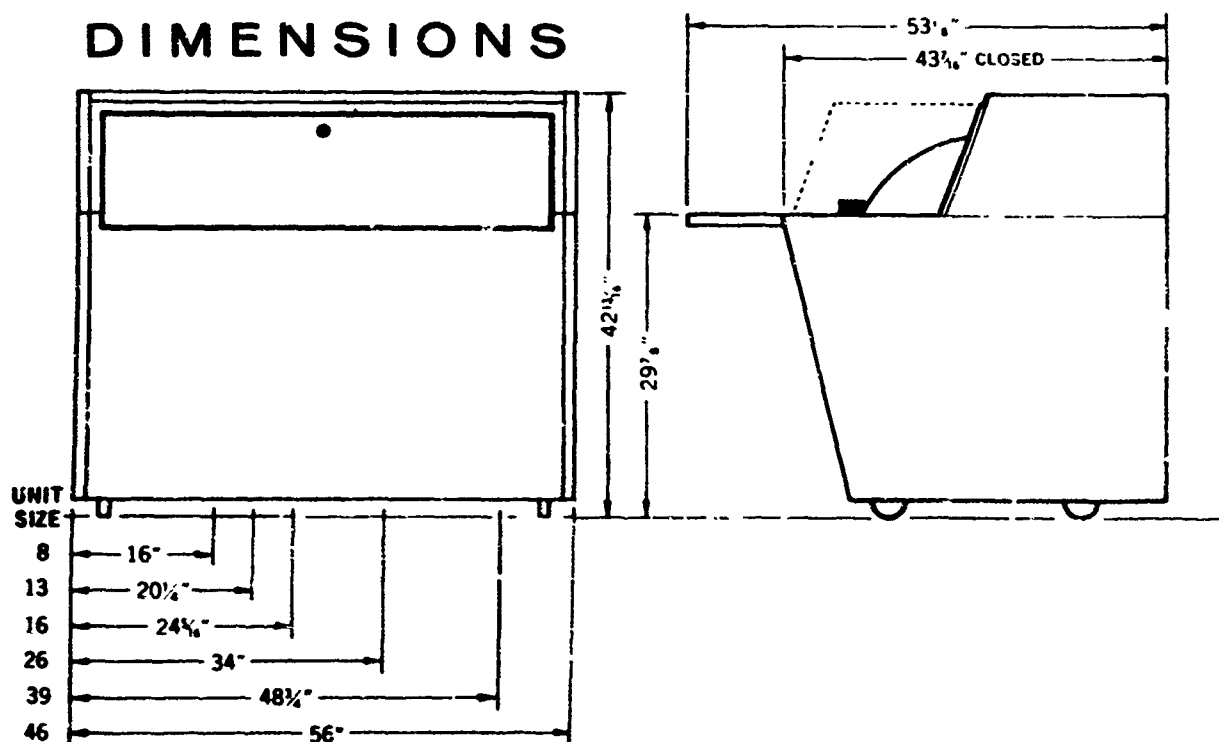


HOOD

Hood slides forward, on steel rollers and track, to protect records when not in use. Slide out of the way into housing when file is in use.



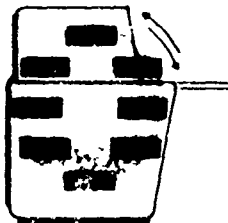
DIMENSIONS



ONLY

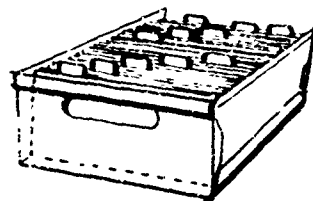
**ROTARY FILES
OFFER
ALL THESE
BENEFITS**

**RECORDS ARE
ALWAYS UPRIGHT**

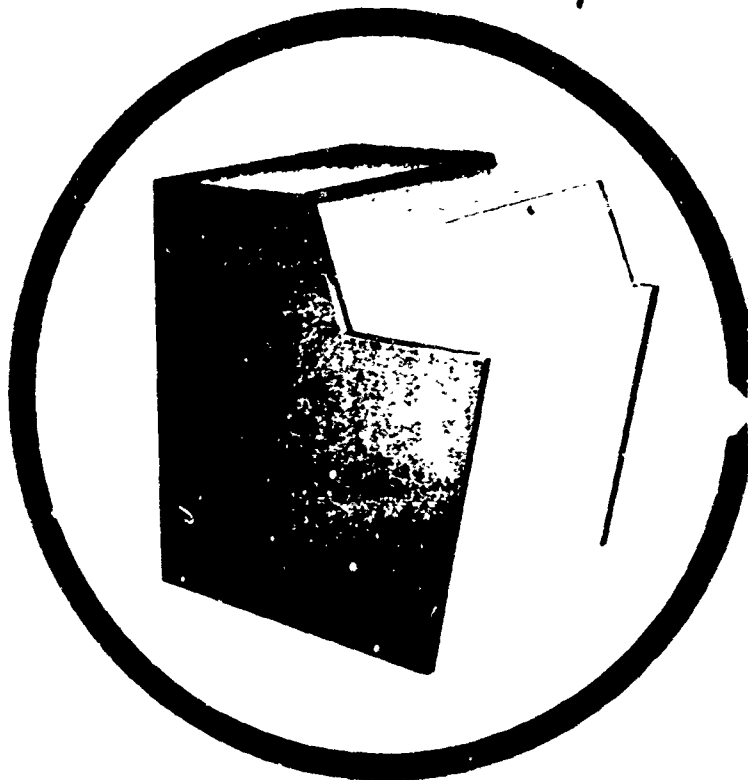


Thanks to "over-level" tray positioning, records in the Diebold Rotary File are always upright. Records can't fall out, yet there are no belts or special clamps to fray or wear records. Partially filled trays are no problem... records will not drop out when file is operated

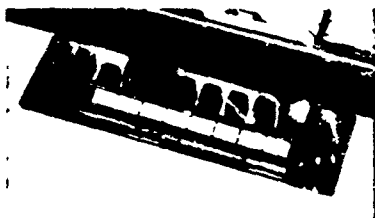
**USE YOUR
PRESENT RECORDS.
NO TRANSCRIPTION
NEEDED**



You can use your present records in a Diebold Rotary File without costly transcription. No punching or special preparation needed... just transfer records from your present files. Diebold Rotary File will accommodate a wide range of record sizes and weights... from tissue-thin sales slips to Addressograph plates

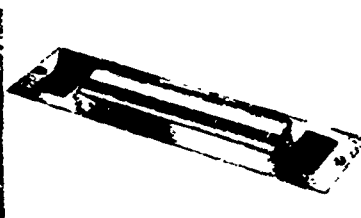


PUSH BUTTON CONTROL



This control system provides a push button for each of the eight record pans. Pressing the proper button brings the desired records directly to working level by fastest possible route... no waiting for machine to go through cycle. Available in either a fixed position or portable console on unit size 26 or larger.

TOUCH BAR CONTROL



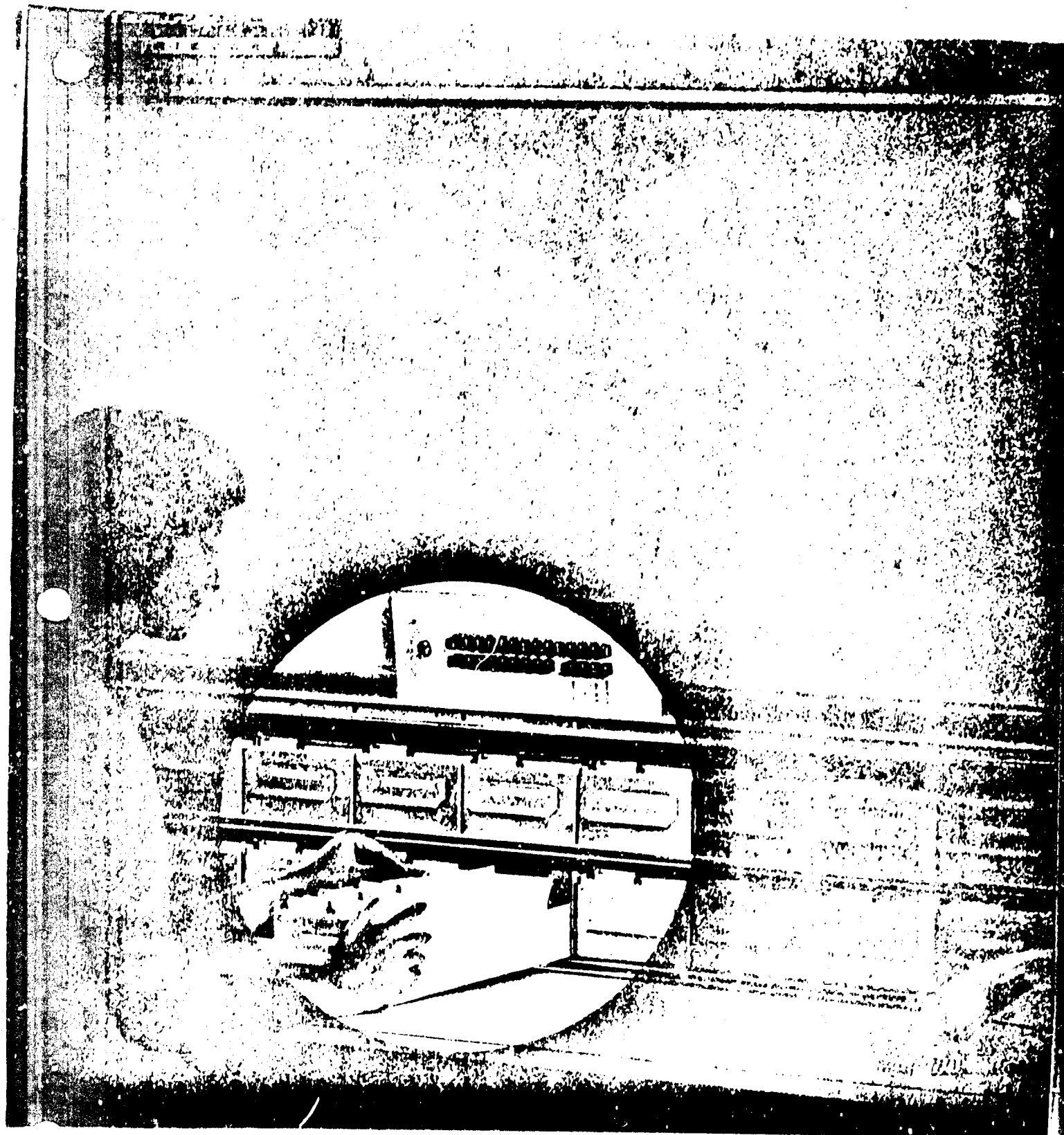
Touch-Bar control rotates records in either direction. Operator maintains pressure on bar until desired records reach shelf level. Tray Positioner, available as an optional extra, automatically brings trays to correct working level when Touch Bar is released

FOOT CONTROL



Slight pressure on foot pedal activates record rotation. As with Touch Bar, release of pressure on pedal stops rotation of records. Foot Control can be located at most convenient position. Automatic Tray Positioner is available as an optional extra

**WIDES
CONTROL
OPERATING
CONROLS**



LEKTRIEVER II

TRADE MARK

STORE 500,000 RECORDS IN LEKTRIEVER II AND RETRIEVE ANY ONE IN SECONDS

After working hours spare time costs you nothing. Between 9 a.m. and 5 p.m. spare time loses dollars.

You can, occasionally, spare a few minutes waiting for a vital record. A few minutes and several dollars. Occasionally.

When every single record encroaches on your schedule, every day, month after month, a new system is urgently needed. You can ill afford to spare another costly moment with the old.

Today's phenomenal growth in mar-

keting, planning and financing has accelerated the steady flow of essential records. These records guide, regulate and report significant business actions. They're indispensable to your decisions. They must be available, promptly, when they're needed.

LEKTRIEVER II, another new Remington Records Retrieval unit, answers this need. LEKTRIEVER II automates the filing and finding of all kinds of card records. Push-button control enables you to retrieve any desired record in an average of 7 seconds.

LEKTRIEVER II houses over 500,000 5" x 3" records within an area of 25½

square feet. It will also house 400,000 tab cards or 300,000 8" x 5" cards. Of any conventional size card you require.

A comfortable, convenient work station, LEKTRIEVER II brings new ease and dignity to filing and finding. Wearisome bending, stretching, standing and stooping are eliminated. Personnel turnover is sharply reduced, and overall efficiency soars to a new high.

And you get the record you need, the moment you need it.

The result? You can serve all your customers with the speed, precision and simplicity essential to efficient profitable operations.



FIVE ADVANTAGES OVER YOUR PRESENT CARD RECORD SYSTEM

SPEED — LEKTRIEVER II with its unique push button control brings the desired card trays, automatically, to the reference level in seconds. The tray carrier always reaches the operator by the shortest route. When more than one person seeks a card record, an auxiliary "bypass" allows interruption of a search sequence for special reference in other areas of the unit. When completed the unit automatically returns to the LEKTRIEVER II position previously in use.

EFFICIENCY — LEKTRIEVER II provides a complete, comfortable and convenient work station that upgrades employee morale and increases filing and retrieving production. A mere push of a button brings the required records within easy reach, and posting is accelerated and simplified. The search area is available in either standing or seated desk-type work positions for handy withdrawal of trays.

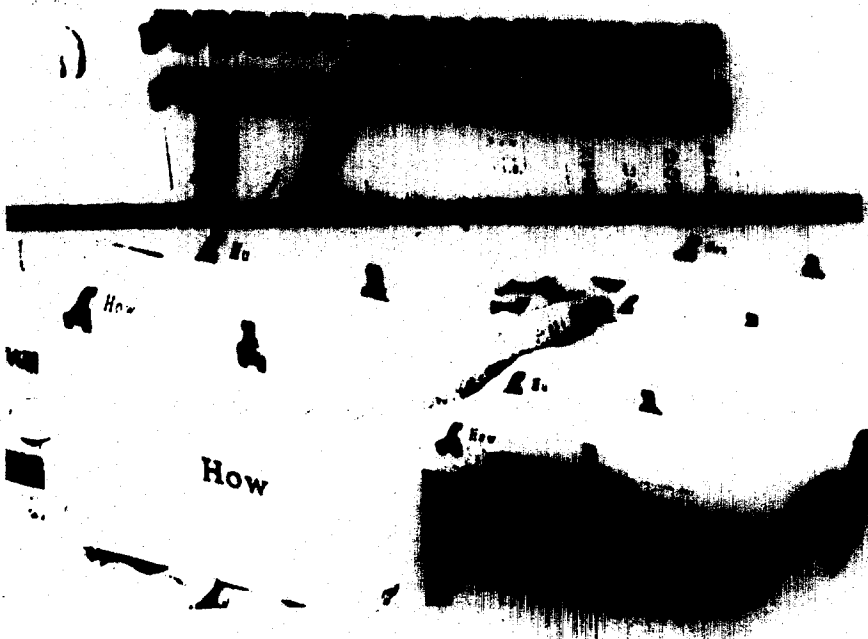
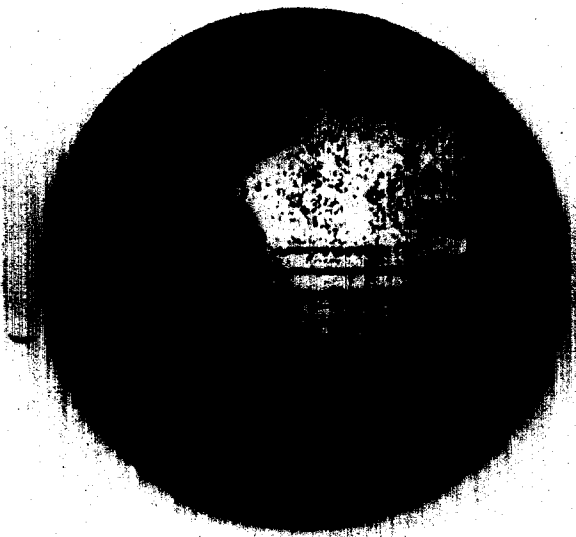
FLEXIBILITY — LEKTRIEVER II utilizes unused ceiling and air space and achieves maximum capacity in a compact area. Units come in several heights to meet specific card record needs. A broad, practical work surface permits multiple access. Any operator can reach the farthest card tray without constant shifting.

COMPATIBILITY — LEKTRIEVER II is free from wearing vibration and disturbing noise. The unit operates with quiet ease and efficiency at all times—starting, stopping, retrieving and reversing. For maximum personnel safety the Dual Beam Electronic Safety Eye, standard on all models, instantly stops machine operation when the operator's hand or any other material enters the area of moving trays.

ECONOMY — LEKTRIEVER II justifies immediate savings in the following areas:

1. **SPACE** — LEKTRIEVER II files over 500,000 card records in 26½ square feet of floor area.
2. **TIME** — LEKTRIEVER II files and finds records 25% faster than other mechanized files.
3. **PERSONNEL** — LEKTRIEVER II modernizes the file room. Personnel turnover is reduced, job training is minimized.
4. **MAINTENANCE** — LEKTRIEVER II is a quality, trouble free unit requiring minimum service and maintenance.
5. **INSTALLATION** — LEKTRIEVER II is assembled on the site. Walls, windows and doors remain in place. No outside boom rigging is required.

1
2
3
4
5



LEKTRIEVER II



Card Size	Catalog No.	Filing Inches Per Unit	OVERALL UNIT SIZE			No. of Carriers	Trays Per Carrier	Inches Filing Per Tray
			Height	Width	Depth			
5 x 3	912-5324	4230	93 1/2"	91 1/4"	42"	24	12	14 1/4"
	912-5328	4935	107 1/2"	91 1/4"	42"	28	12	14 1/4"
	912-5332	5640	119 1/2"	91 1/4"	42"	32	12	14 1/4"
TAB	912-7324	2820	95 1/2"	91 1/4"	42"	24	8	14 1/4"
	912-7328	3290	107 1/2"	91 1/4"	42"	28	8	14 1/4"
	912-7332	3760	119 1/2"	91 1/4"	42"	32	8	14 1/4"
6 x 4	912-6424	3525	95 1/2"	91 1/4"	42"	24	10	14 1/4"
	912-6428	4112	107 1/2"	91 1/4"	42"	28	10	14 1/4"
	912-6432	4700	119 1/2"	91 1/4"	42"	32	10	14 1/4"
8 x 5	912-8520	2200	95 1/2"	91 1/4"	42"	20	8	13 1/4"
	912-8524	2642	107 1/2"	91 1/4"	42"	24	8	13 1/4"
	912-8527	2970	119 1/2"	91 1/4"	42"	27	8	13 1/4"
MIB	912-2324	9517	95 1/2"	91 1/4"	42"	24	9-3Compt.	*14 1/4"
	912-2328	11103	107 1/2"	91 1/4"	42"	28	9-3Compt.	*14 1/4"
	912-2332	12690	119 1/2"	91 1/4"	42"	32	9-3Compt.	*14 1/4"

NOTE: 4 1/2" is the maximum overall record height including guide tabs which can be housed in MIB, 5 x 3, Tab and 6 x 4 units. 5 1/2" is the maximum overall record height.

including guide tabs which can be housed in 8 x 5 units.

*Capacity in filing inches per compartment.

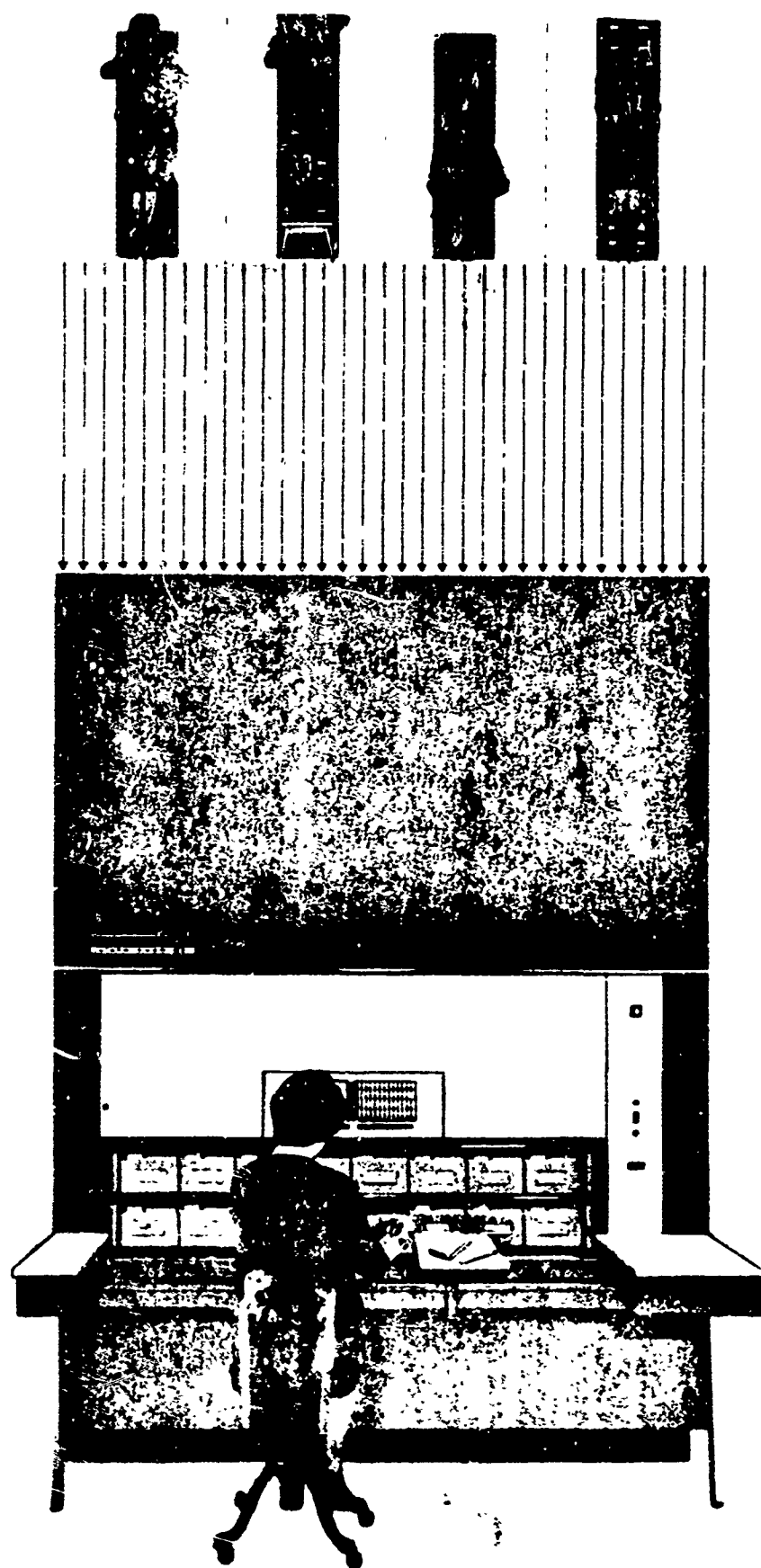
LEKTRIEVER II performs fast, simple and reliable service in a broad range of fields and applications. Among these are included:

- **BANKS**—Trust and Estate Records, Bulk Checks, Customer Information Files, Trust Files.
- **GOVERNMENT**—Police Records, Motor Vehicle Records, Cross Indexes, Personnel Records, Census Records, Vendors Records, Tax Return Records, Probate Records, Vital Statistics Records.
- **INSURANCE**—Claims Records, Medical History Records, Policy Indexes, Drivers Safety Records, Cross Indexes.
- **HOSPITALS AND CLINICS**—Patients tory Index, Equipment Records, Purch Records.
- **MANUFACTURERS**—Engineering Record Engineering Drawings (on microfilm), Accounts Receivable, Sales Records, Employee History Records, Credit Indexes.
- **PROFESSIONS**—Specification Files, Client History Files, Plan Files, Drawings (on microfilm).
- **PUBLIC UTILITIES**—Location Records, Installation Records, Engineering Drawing Customers Service Records, Meter History Records.
- **SCHOOLS**—Student History Record—Alumni Records.
- **TELEPHONE AND TELEGRAPH**—Specification Files, Engineering Records, Personnel Records, Equipment Location Records—Customer Records.



Remington Records Retrieval

REMINGTON OFFICE SYSTEMS DIVISION SPERRY RAND CORPORATION



ELEKTRIEVER III

TRADE MARK

When it comes to retrieving vital records LEKTRIEVER III does everything except make you wait.

As a business executive you must make every second count. Since your time is valuable and decisions can't wait, vital records must be available, promptly.

Today, records have multiplied rapidly with the phenomenal growth in marketing, finance and planning. A cascade of paper work accompanies the average annual 3% expansion of clerical staffs.

You must also make every dollar count in improving efficiency and increasing productive output. At the same time, you require vital records. Everyday they affect your judgment. They guide, regulate and report significant actions. They serve, literally, as indispensable tickets to business success.

Loss or misplacement of a contract, production order, invoice, credit report or any summary of necessary information may delay, even jeopardize, transactions involving substantial capital investments.

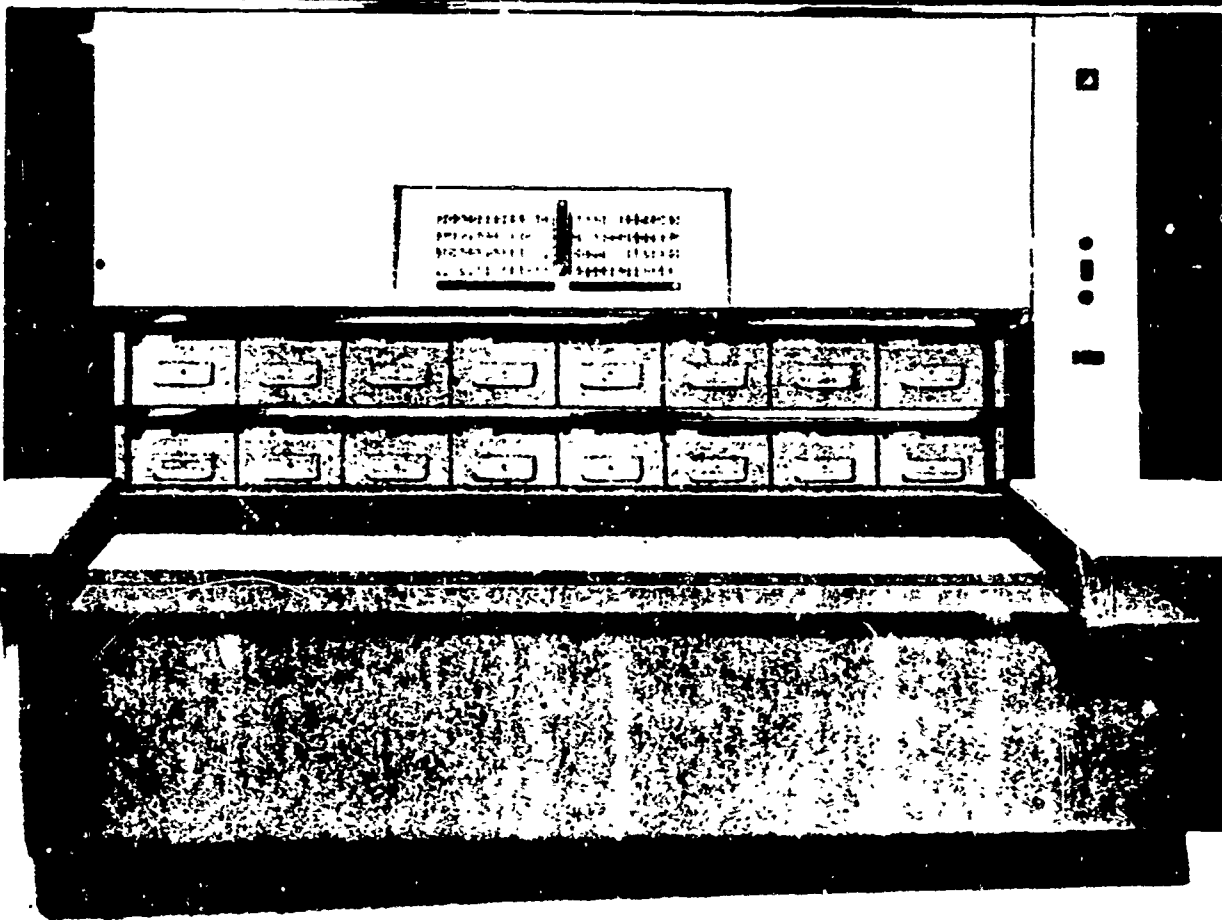
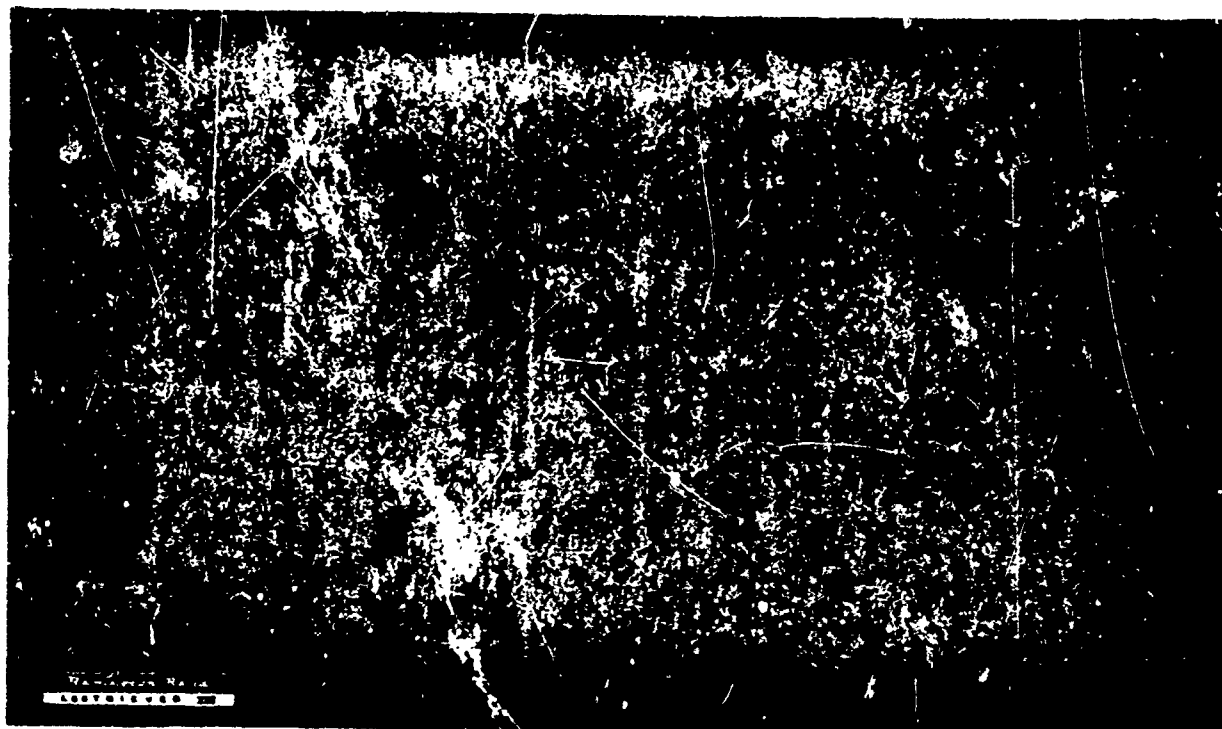
To solve problems of today's inexhaustible stream of records REMINGTON OFFICE SYSTEMS has applied the latest principles of automation.

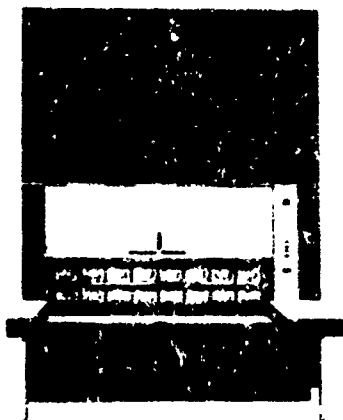
In recent years REMINGTON has achieved outstanding success in the development of LEKTRIEVER I—for the automation of letter- and legal-size media. LEKTRIEVER II has met the task of efficiently automating the filing and retrieval of all kinds of reference cards.

Now, for maximum speed and minimum effort, REMINGTON introduces the new, completely automated Records Retrieval System that responds, instantly, to push-button commands.

Whether they're legal-size or letter-size documents or reference cards of varied sizes, LEKTRIEVER III keeps your records precisely in order and promptly available. You, the busy executive, can get the record you want when you want it, out of the vast number on hand.

LEKTRIEVER III not only assures accuracy and establishes simplified control, but it achieves solid, big savings in space and in effortless operation. And you don't have to wait for anything.



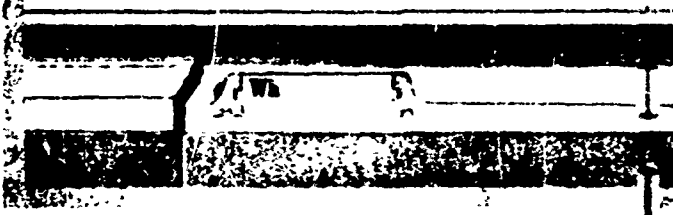


LEKTRIEVER III speeds, simplifies records retrieval, saves money!

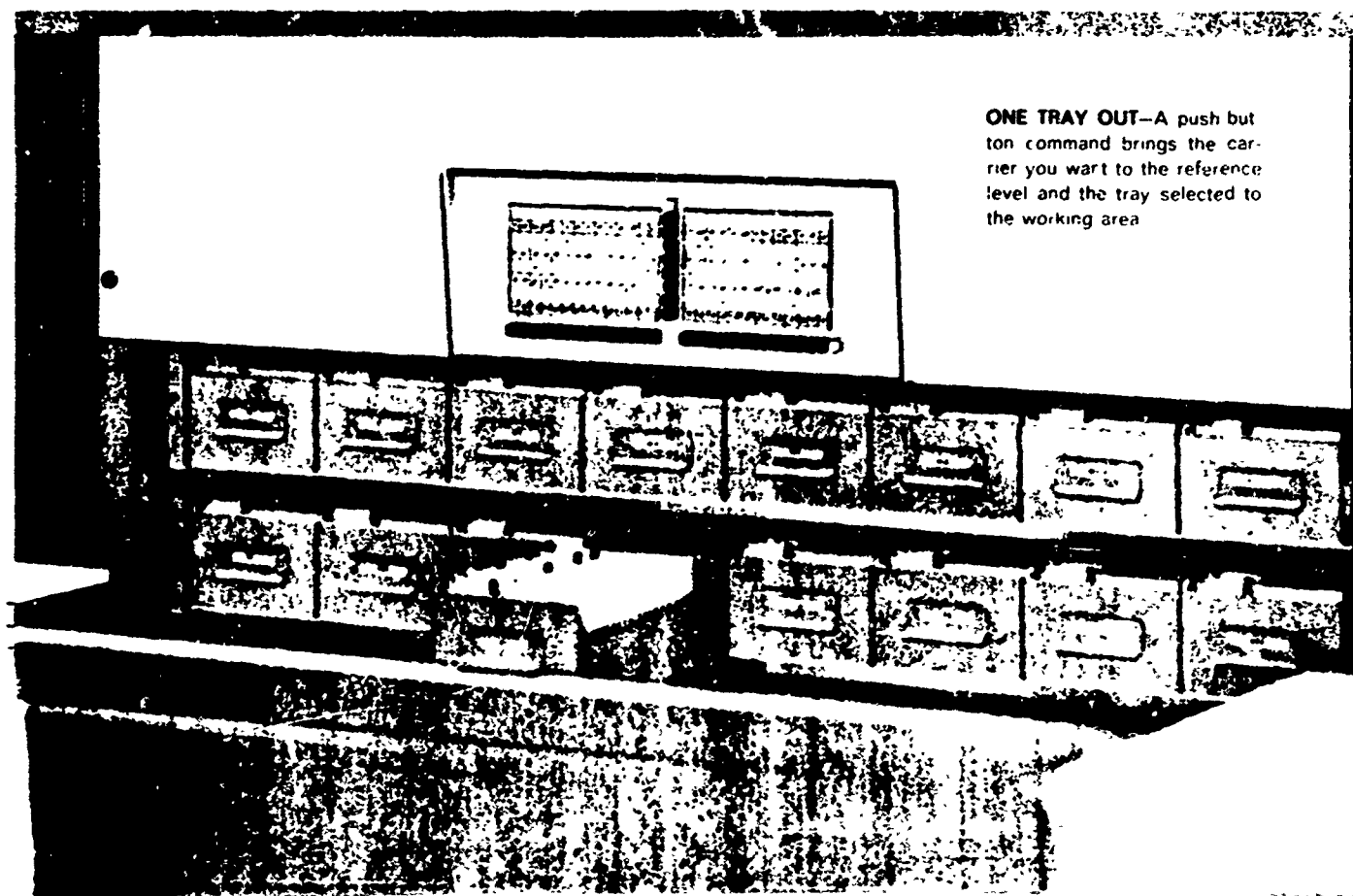
LEKTRIEVER III eliminates all the motions that eat into profits by providing the fastest, simplest retrieval of hard copy records.

Ease and efficiency have replaced all the bending, kneeling, stretching, standing and stooping that once made filing and retrieval such a fatiguing, costly, time consuming function.

A	Man	Pat	Lee	Co	De	Fl	For	Gl	Har	Lee	Ne	
Ad	Bar	Br	Car	Con	Der	Ed	Fr	Gr	Har	Lee	Ne	
Al	Bar	Br	Car	Con	Der	Ed	Fr	Gr	Har	Lee	Ne	
Am	Bar	Br	Ch	Con	Der	Ed	Fr	Gr	Har	Lee	Ne	
An	Bar	Br	Ch	Con	Der	Ed	Fr	Gr	Har	Lee	Ne	
Ar	Bar	Br	Ch	Con	Der	Ed	Fr	Gr	Har	Lee	Ne	
As	Bar	Br	Ch	Con	Der	Ed	Fr	Gr	Har	Lee	Ne	
B	Bar	Br	Ch	Con	Der	Ed	Fr	Gr	Har	Lee	Ne	



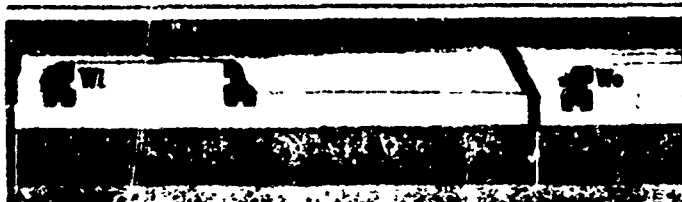
THE PUSH-BUTTON SELECTOR PANEL—the complete, easy-to-read, color-coded index to every carrier and every tray. For your selection, you merely push the proper buttons and the tray or trays are delivered and placed directly over your lap. This is the best possible reference position.



ONE TRAY OUT—A push button command brings the carrier you want to the reference level and the tray selected to the working area.

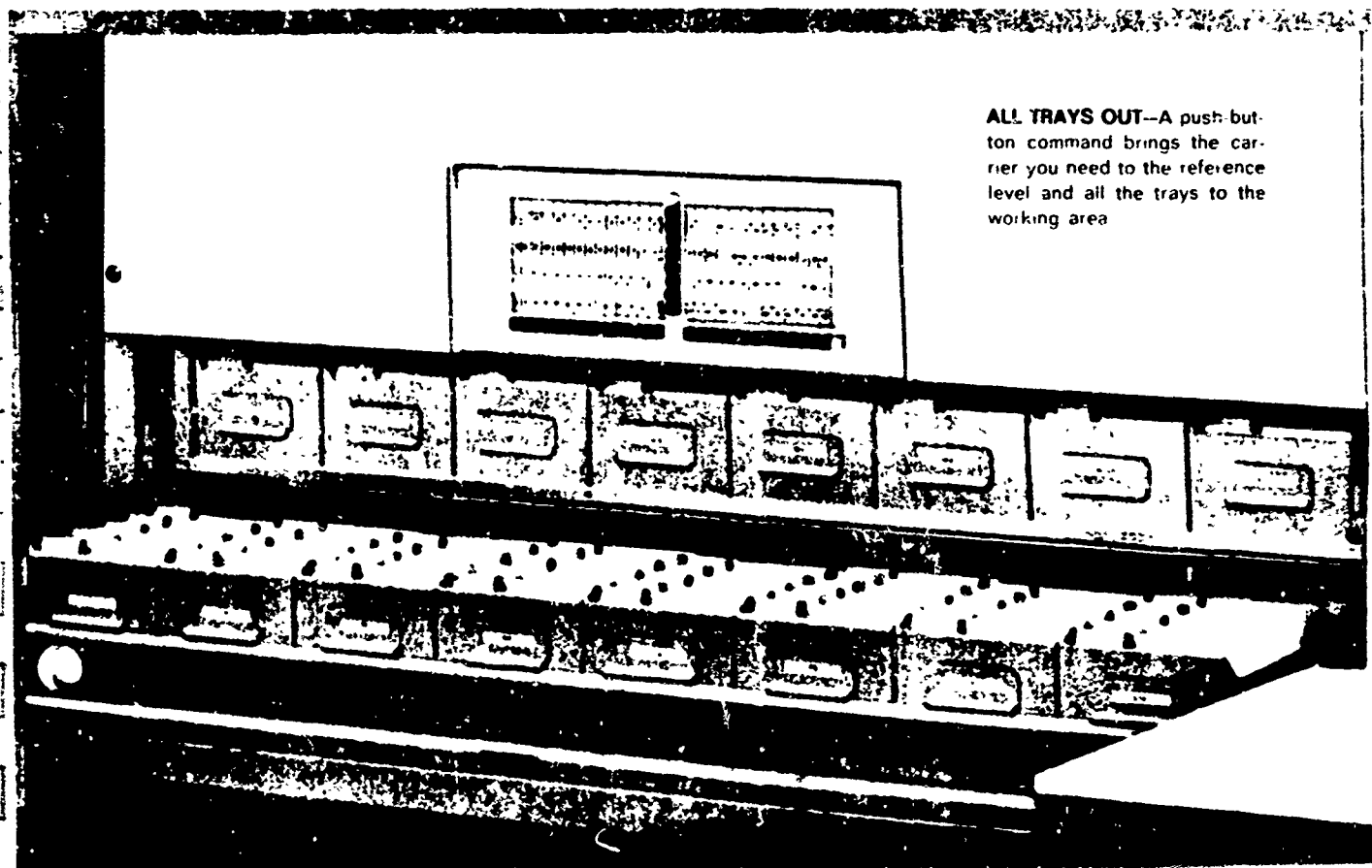
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Ad	Al	Ar	As	At	Ba	Be	Bi	Bo	Br	Bu	Ca	Co	Cu	Da	De	Di	Do	Dr	Ed	El	En	Es	Et	Eu	Ex	Fa	Fe	Fi	Fl	Fr	Ge	Go	Gr	Gu	Ha	He	Hi	Hu	Id	Ia	Il	In	Io	Is	It	Ja	Je	Ji	Jo	Ju	Ke	Ko	Ku	La	Le	Li	Lo	Lu	Ma	Me	Mi	Mo	Mu	Na	Ne	Ni	No	Nu	Pa	Pe	Pi	Pl	Pr	Ra	Re	Ri	Ro	Ru	Sa	Se	Si	So	St	Su	Ta	Te	Th	Ti	To	Tr	Tu	Va	Ve	Vi	Vu	We	Wo	Wu	Xa	Xo	Xu	Ya	Ye	Yi	Yo	Yu	Za	Ze	Zi	Zo	Zu



Consider a few of the unique, unparalleled advantages LEKTRIEVER III affords:

1. **For complete, instant control**—the handy Push Button Selector Panel with a large color-coded label on each button, assures quick, easy reference to the entire index of trays and carriers.
2. **For retrieving or filing a specific record**—a push button command speeds the desired carrier to the reference level and delivers the needed tray to the work area... in 8 seconds!
3. **For rapid general filing or retrieval**—a push-button command speeds the desired carrier to the reference level and delivers **all** trays to the work area... in 8 seconds!
4. **For fast, uninterrupted operations**—a push-button command returns the tray or trays to the carrier and the next selection moves into place... in 9½ seconds!
5. **For regaining needed, costly space**—utilization of vertical space provides a voluminous, yet compact storage-capacity to handle from one-half million 5" x 3" cards to 24-million letter-size records on microfilm. Space savings range from 40% to 60% over the area taken up by former methods.



ALL TRAYS OUT—A push-button command brings the carrier you need to the reference level and all the trays to the working area.

LEKTRIEVER III frees you from costly delays.

LEKTRIEVER III saves you time. As a busy executive you know that this is your most precious asset.

You can request and receive any document you need—the instant decisions must be made because it's housed in LEKTRIEVER III and retrieved by LEKTRIEVER II. A fast, simple and consistently reliable system, LEKTRIEVER III enables you to concentrate on major decisions without the bother of when and where a pertinent record is going to be found.

LEKTRIEVER III upgrades your records retrieval.

Every progressive business firm experiences the sudden mushrooming of records. Today, filing and retrieval frequently become protracted struggles with phalanxes of files. This means hours of bending, stretching, stooping, kneeling and standing. And finding a record, the moment it's needed, is virtually impossible.

With LEKTRIEVER III filing and retrieval attain the dignity essential to vital business functions. Employee morale rises to new heights of job satisfaction. Turnover drops, sharply. Efficiency increases. And experienced personnel are no longer required to give regular assignments to train new filing clerks.

Simplified operations, comfortable work stations and added stature now transform Records Retrieval into an attractive, pleasant task.

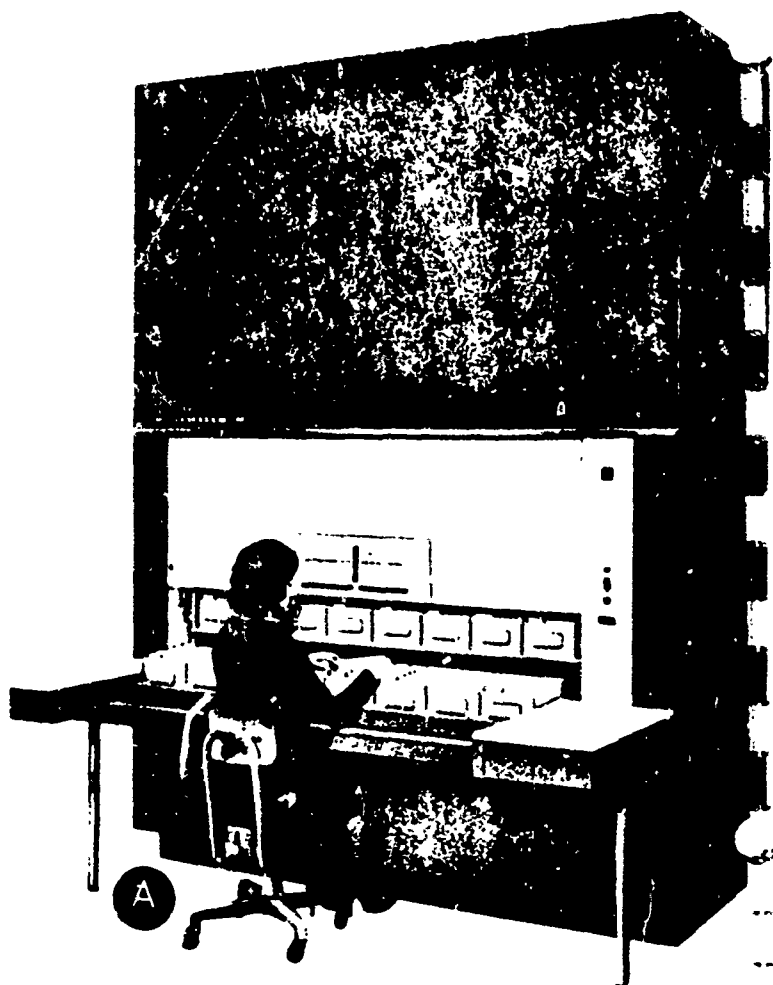
LEKTRIEVER III, as you can readily observe, constitutes a complete work station, where comfort and convenience complement automation. The result?—An overall gain in efficiency.

Since these units can be placed along the wall or back-to-back, supervisory personnel can easily view and control operations at all times.

For all the answers to Records Retrieval needs see your Remington Office Systems Specialist.

REMINGTON OFFICE SYSTEMS has been successfully meeting and solving problems of storing and finding records since 1876. REMINGTON has an outstanding history in the pioneering and developing of new Records Retrieval techniques. From the first conventional file cabinets to modern electro-mechanical equipment, REMINGTON's record and leadership remain pre-eminent.

Whatever records systems your office now uses, call your REMINGTON Systems Specialist. Carefully selected and thoroughly trained, he is the man whose experience and expertise can assist you in analyzing your present records system. If there is room for improvement, he will show you where. If not, he'll let you know at once. Try him. Call today. He's at your nearest REMINGTON office. You will be under no obligation.



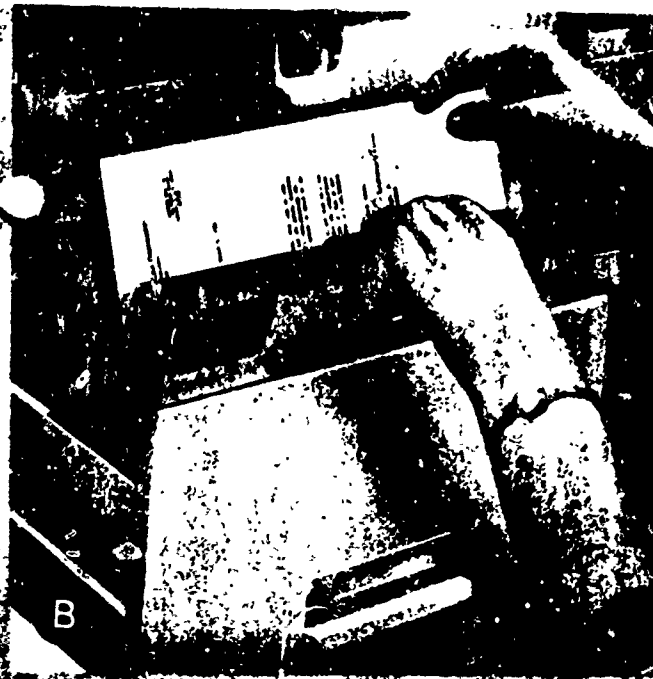
LEKTRIEVER III provides many features to insure smooth, efficient and convenient operation. Among these are:

A A compact tower of quality construction and graceful design, LEKTRIEVER III lends a note of eclat and beauty to any office surroundings. Finish is Surf Green and Antique White.

B Drop-Filing for letter-size and legal-size records. When the desired tray arrives at the work area, the operator merely drops a new file in the proper place or lifts one out. Attention is concentrated on the primary object—records!

C The Posting Board, the light handy accessory that moves the entire width of the posting area. It can be securely clamped at any desired place. The ample Formica top facilitates making entries and withdrawals.

D Personal Effects Compartment conveniently located affords enough room to hold both the operator's handbag and a few records.



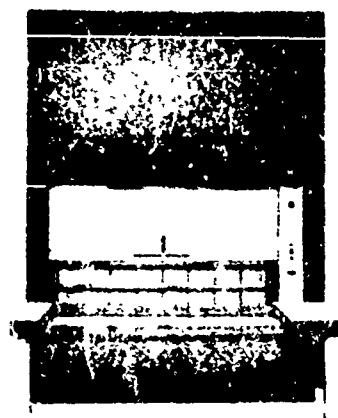
LEKTRIEVER III stores and retrieves records wherever instant access means profit:

LEKTRIEVER III has been designed to serve you, whatever your business. It is the Retrieval System that will furnish instant access to Accounting Summaries, Operation Studies, Technical Reports, Indexes or any class of records that must be immediately available.

Here are several fields where LEKTRIEVER III renders dependable, speedy and trouble-free services:

- **BANKS**—Bulk Checks, Customer's Information File, Trust Files, Mortgage Loan Folders, Trust and Estate Records, Credit Correspondence
- **GOVERNMENT**—Police Records, Motor Vehicle Records, Cross Indexes, Procurement Records, Personnel Records, Census Records, Vendors Records, Tax Return Records, Probate Records, Uniform Commercial Code Records, Oil and Gas Leases, Vital Statistics Records
- **HOSPITALS AND CLINICS**—Patients History File, Patients History Index, Correspondence, Equipment Records, Purchase Records
- **INSURANCE**—General Correspondence, Claims Records, Policy Folders, Daily, Applications Files, Contracts, Case Files, Medical History Records, Policy Indexes, Drivers Safety Records, Cross Indexes
- **MANUFACTURERS**—Engineering Records, Engineering Drawings, Invoices, Accounts Receivable, Production Orders, Purchase Orders, Sales Records, Open Orders, Factory Orders, Employee's History Records, Quotations, Credit Indexes, General Correspondence, Bills of Lading and Freight Bills
- **PROFESSIONS**—Case Files, Specification Files, Client History Files, Plan Files, Drawings
- **PUBLIC UTILITIES**—Location Records, Installation Records, Engineering Drawings, Contracts, Customer Service Records, Meter History Records, Work Orders, General Correspondence
- **SCHOOLS**—Student History Records, Alumni Records, Central Files
- **TELEPHONE & TELEGRAPH**—Specification Files, Engineering Records, Personnel Records, Equipment Location Records, Customers' Records
- **TRANSPORTATION COMPANIES**—Freight Bills, Bills of Lading, Claims Files, Tariffs, Classification Files, Interline Records, Route and Rate Records
- **WHOLESALE & RETAILERS**—Paid Invoices, Shipping and Receiving Reports, Purchase Orders, General Correspondence, Bills of Lading, Freight Bills

RETRIEVER III



Card Size	Catalog Numbers	Unit Filing Capacity Inches	Overall Unit Size			Carriers Per Unit	Trays Per Carrier
			WIDTH	HEIGHT	DEPTH		
UNITS FOR CARD SIZE L							
5 x 3	9125-5324-3	4230	91 1/4"	95 1/2"	70 3/4"	24	4-3 Compt
	9125-5328-3	4935	91 1/4"	107 1/2"	70 3/4"	28	4-3 Compt
	9125-5332-3	5640	91 1/4"	119 1/2"	70 3/4"	32	4-3 Compt
6 x 4	9125-6424-2	3525	91 1/4"	95 1/2"	70 3/4"	24	5-2 Compt
	9125-6428-2	4112	91 1/4"	107 1/2"	70 3/4"	28	5-2 Compt
	9125-6432-2	4700	91 1/4"	119 1/2"	70 3/4"	32	5-2 Compt
8 x 5	9125-8520	2200	91 1/4"	95 1/2"	70 3/4"	24	8
	9125-8524	2640	91 1/4"	107 1/2"	70 3/4"	24	8
	9125-8527	2973	91 1/4"	119 1/2"	70 3/4"	27	8
7 1/2 x 3 1/4	9125-7324	2820	91 1/4"	95 1/2"	70 3/4"	24	8
	9125-7328	3290	91 1/4"	107 1/2"	70 3/4"	28	8
	9125-7332	3760	91 1/4"	119 1/2"	70 3/4"	32	8
2 1/4 x 3	9125-2324	9517	91 1/4"	95 1/2"	70 3/4"	24	4-6 Compt + 1-3 Compt
	9125-2328	11103	91 1/4"	107 1/2"	70 3/4"	28	4-6 Compt + 1-3 Compt
	9125-2332	12690	91 1/4"	119 1/2"	70 3/4"	32	4-6 Compt + 1-3 Compt
UNITS FOR LETTER AND LEGAL SIZES							
Letter (11" x 8 1/2")	9125-1212	862	91 1/4"	95 1/2"	70 3/4"	12	5
	9125-1214	1008	91 1/4"	107 1/2"	70 3/4"	14	5
	9125-1216	1150	91 1/4"	119 1/2"	70 3/4"	16	5
Legal (14 1/2" x 9 1/2")	9125-1512	690	91 1/4"	95 1/2"	70 3/4"	12	4
	9125-1514	805	91 1/4"	107 1/2"	70 3/4"	14	4
	9125-1516	920	91 1/4"	119 1/2"	70 3/4"	16	4
ACCESSORIES FOR ABOVE UNITS ONLY							
9125APB	Mobile Adjustable Posting Board—Can be furnished where required						

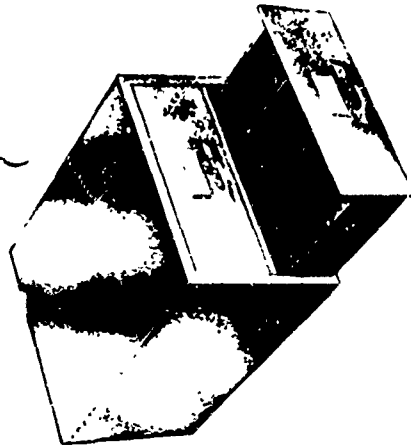
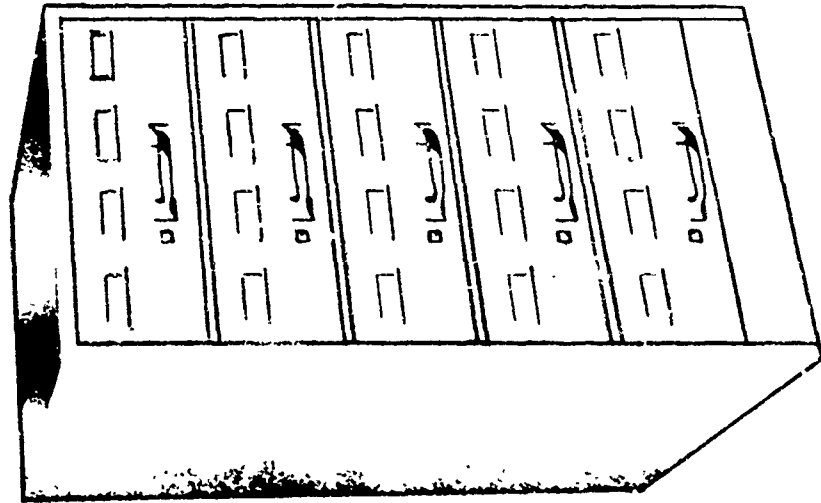
Overall Depth for all units 70 3/4" which includes Tray, Extractor projection. NOTE: Maximum overall record height including guide tab 5 1/4" on 3 x 5 Units, 4 1/4" on all other card sizes and 10" on Letter and Legal Sizes.

ELECTRIC CURRENT SPECIFICATIONS: Furnished standard for operation on 115V-60 Cycle AC. Contact Factory before quoting on equipment for operation on any other current. The correct voltage and cycle available at customer's premises must be shown on all orders.



Remington Records Retrieval
OFFICE SYSTEMS DIVISION SPERRY RAND CORPORATION

for roll microfilm



ATLANTIC microfilm

All Cabinets are fabricated
trically welded throughout
of service.

for ROLL MICROFILM
Capacity of each file drawer is 100 rolls of 16 mm film
or 68 rolls of 35 mm film. Each of the drawers is parti-
tioned to accommodate 4 rows of film.

No.	No. of drawers	Lock	DIMENSIONS		
			W	H	D
15	5	No	19	40	26 ¹ / ₂
15L	5	Yes	19	40	26 ¹ / ₂
17	7	No	29	50	26 ¹ / ₂
17L	7	Yes	19	50	26 ¹ / ₂

If locks are wished - specify "L" after item number

The best grade "A" features in low cost filing...FULL SPEED SUSPENSION (

low cost "starter" file for 4"x 4" microfilm boxes

Stack them to suit your present requirements or add a unit whenever your needs expand — a special interlocking device holds them securely in place. The drawers operate smoothly on nylon glides.
No. 115 Microfilm File: Width 14 13/16", height 12 7/8", depth 24", ship. wt. 28 lbs.

for MICRO-FOLIO®
(microfiche) and MICRO-JACKETS

file cabinets

of heavy best grade furniture steel elec-
to secure durability and strength for years

FOR 4" x 6"

or 105 mm & 148 mm SIZES

No. 2636 — Six double drawers.
Capacity up to 11,000 microfiche
masters or 8,000 micro-jackets.
Dimensions: 15" W x 40" H x
26 1/2" D

No. 2644 — Eight double draw-
ers. Capacity up to 15,000 micro-
fiche masters or 11,000 micro-
jackets.
Dimensions: 15" W x 52" H x
26 1/2" D

FOR 3 x 5" SIZES

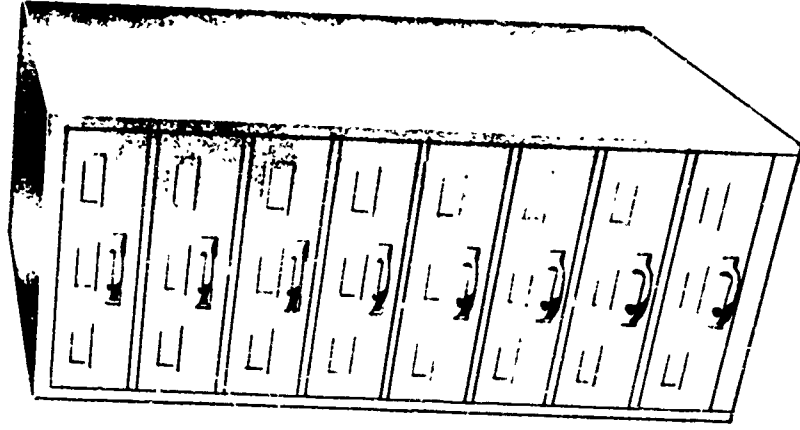
No. 2648 — Holds up to 25,000
microfiche masters or 18,000
micro-jackets.
Dimensions: 18" W x 52" H x
26 1/2" D

FOR 5" x 8" SIZES

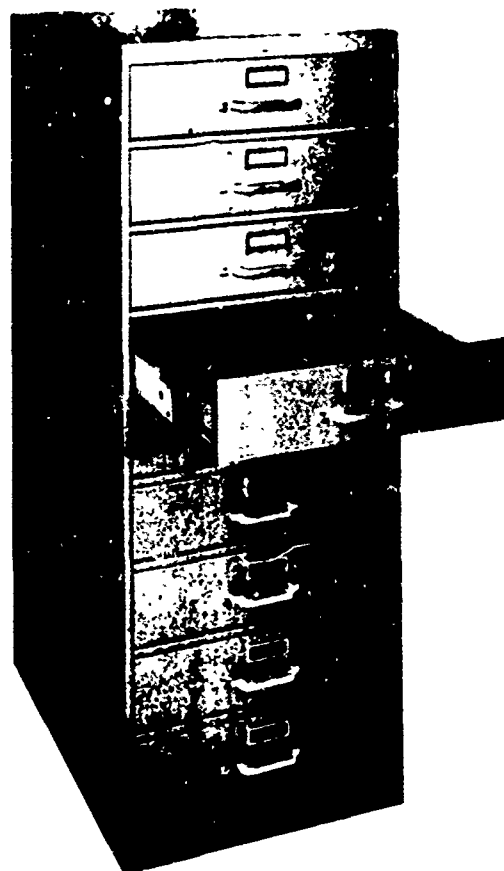
No. 2658 CH — Five double
drawers. Capacity up to 10,000
microfiche masters or 75,000
micro-jackets.
Dimensions: 19 1/4" W x 40" H
x 26 1/2" D

No. 2658 — Seven double draw-
ers. Capacity up to 13,000 micro-
fiche masters or, 10,000 micro-
jackets.
Dimensions: 19 1/4" W x 52" H x
26 1/2" D

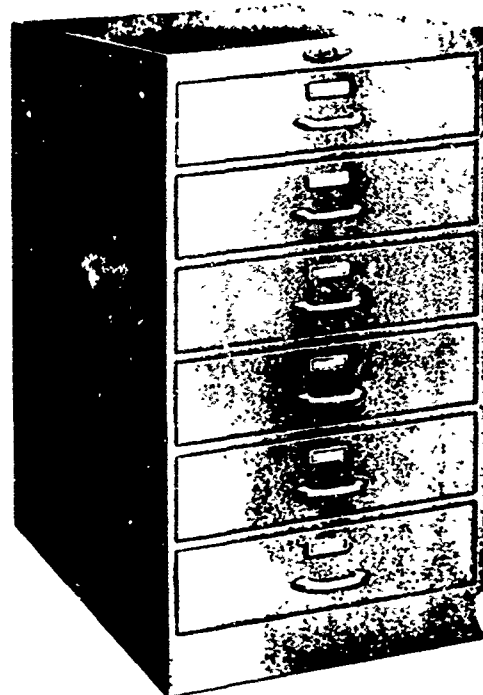
ber. Gray will be supplied unless otherwise specified.



10 BEARINGS TO EACH DRAWER) ... heavier • faster • better construction!!



NINE-DRAWER ROLL FILM CABINET



SIX-DRAWER ROLL FILM CABINET

**MICROFILM
CABINETS**
Made to the same
Specifications
as Top-Grade
Correspondence
Files

MICROFILM CABINETS

Built for today's microfilm, jacket and aperture card needs, these modern file cabinets have the same rugged construction features as top grade correspondence files.

There are two sizes of *Roll* Microfilm File Cabinets, nine drawer and six drawer. The nine drawer cabinet offers more storage capacity in less floor space. The six drawer cabinet is a convenient standing-working height—an ideal place to put the microfilm reader.

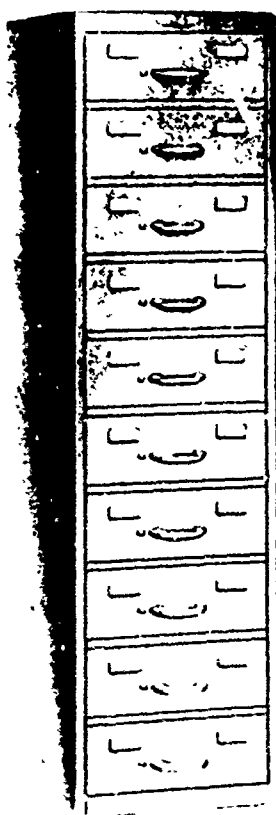
Each drawer is partitioned to accommodate four rows of 100 ft. film reels. Each drawer holds 100 16mm or 68 35mm reels. The drawers can be adapted to tab card sizes by simply removing the center partitions.

There are three sizes of microfilm *Jacket* cabinets. These three sizes accommodate either 3" x 5", 4" x 6" or 5" x 8" microfilm Jackets.

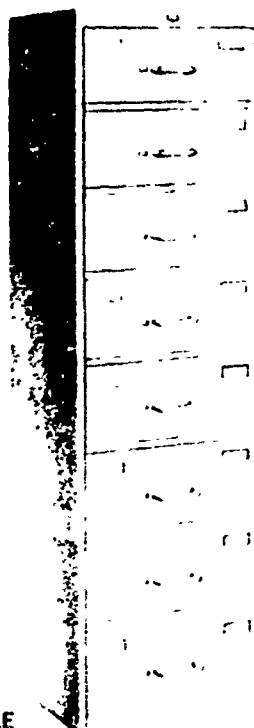
The 5" x 8" Jacket Cabinet can be used for storing Autoload® Cartridges. Each drawer can hold two cartridge storage trays.

All cabinets can be equipped with locks if desired.

Micro-Data Division



TEN DRAWER
3x5 JACKET FILE
CABINET



EIGHT DRAWER
4x6 JACKET
FILE CABINET

SEVEN DRAWER
5x8 JACKET
FILE CABINET



Bell & Howell MICROFILM CABINETS SPECIFICATIONS

Product Code	Description	Outside Dimensions			Inside Dimensions Drawer or Compartment			Approx. Shp'g. Weight
		Wide	High	Deep	Wide	High	Deep	Lbs.
19101	Six Drawer Roll Microfilm Cabinet - Four compartments in each drawer.	20"	34 $\frac{1}{2}$ "	28"	1 $\frac{1}{2}$ "	4 $\frac{1}{8}$ "	26 $\frac{1}{4}$ "	238
19102	Same as above with Lock	20"	34 $\frac{1}{2}$ "	28"	4 $\frac{1}{2}$ "	4 $\frac{1}{8}$ "	26 $\frac{1}{4}$ "	240
19103	Nine drawer Roll Microfilm Cabinet - Four compartments in each drawer.	20"	50 $\frac{1}{2}$ "	28"	4 $\frac{1}{2}$ "	4 $\frac{1}{8}$ "	26 $\frac{1}{4}$ "	320
19104	Same as Above with Lock	20"	50 $\frac{1}{2}$ "	28"	4 $\frac{1}{2}$ "	4 $\frac{1}{8}$ "	26 $\frac{1}{4}$ "	322
19105	10 Drawer 3"x5" Microfilm Jacket Cabinet - Two compartments in each drawer.	12 $\frac{3}{4}$ "	50 $\frac{1}{2}$ "	28"	5 $\frac{1}{8}$ "	3 $\frac{1}{4}$ "	26 $\frac{1}{4}$ "	295
19106	Same as Above with Lock	12 $\frac{3}{4}$ "	50 $\frac{1}{2}$ "	28"	5 $\frac{1}{8}$ "	3 $\frac{1}{4}$ "	26 $\frac{1}{4}$ "	297
19107	8 Drawer 4"x6" Microfilm Jacket Cabinet - Two compartments in each drawer.	14 $\frac{3}{4}$ "	50 $\frac{1}{2}$ "	28"	6 $\frac{1}{8}$ "	5"	26 $\frac{1}{4}$ "	250
19108	Same as Above with Lock	14 $\frac{3}{4}$ "	50 $\frac{1}{2}$ "	28"	6 $\frac{1}{8}$ "	5"	26 $\frac{1}{4}$ "	252
19109	Seven Drawer 5"x8" Microfilm Jacket Cabinet - Two compartments in each drawer.	18 $\frac{3}{4}$ "	50 $\frac{1}{2}$ "	28"	8 $\frac{1}{8}$ "	5 $\frac{1}{8}$ "	26 $\frac{1}{4}$ "	250
19110	Same as Above with Lock	18 $\frac{3}{4}$ "	50 $\frac{1}{2}$ "	28"	8 $\frac{1}{8}$ "	5 $\frac{1}{8}$ "	26 $\frac{1}{4}$ "	252

Bell & Howell
Microfilm Division

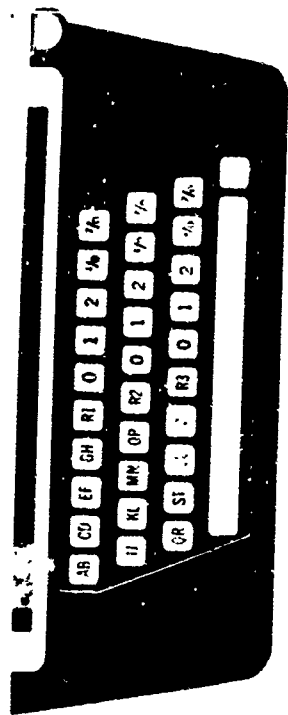
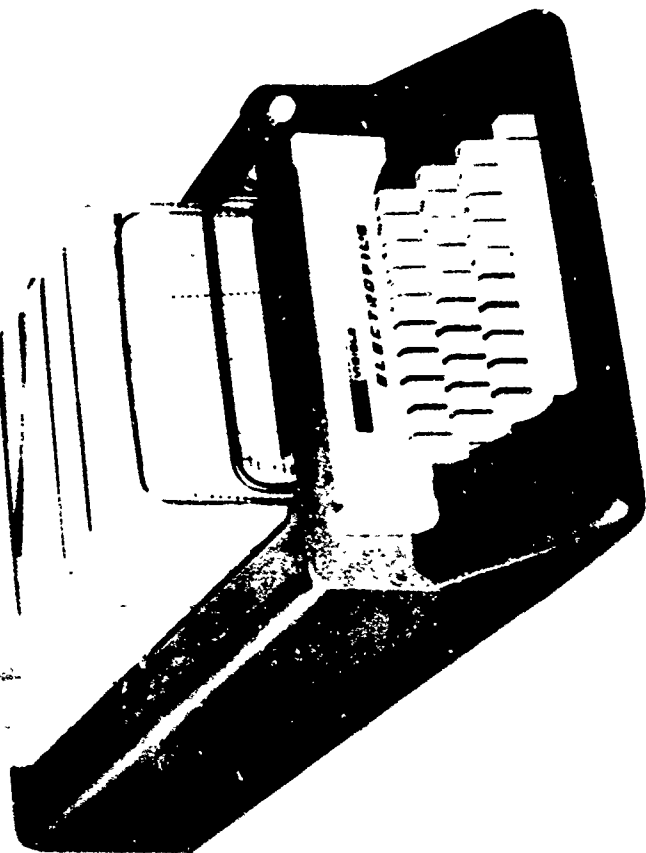
6800 McCORMICK ROAD • CHICAGO, ILLINOIS 60645

In Canada: Bell & Howell Micro-Data products are distributed by Ditto of Canada, Ltd., 45 Jutland Road, Toronto 18, Ontario

ACME VISIBLE

ELECTROFILE[®]

**RANDOM ACCESS PUSH-BUTTON
AUTOMATIC CARD SYSTEM**

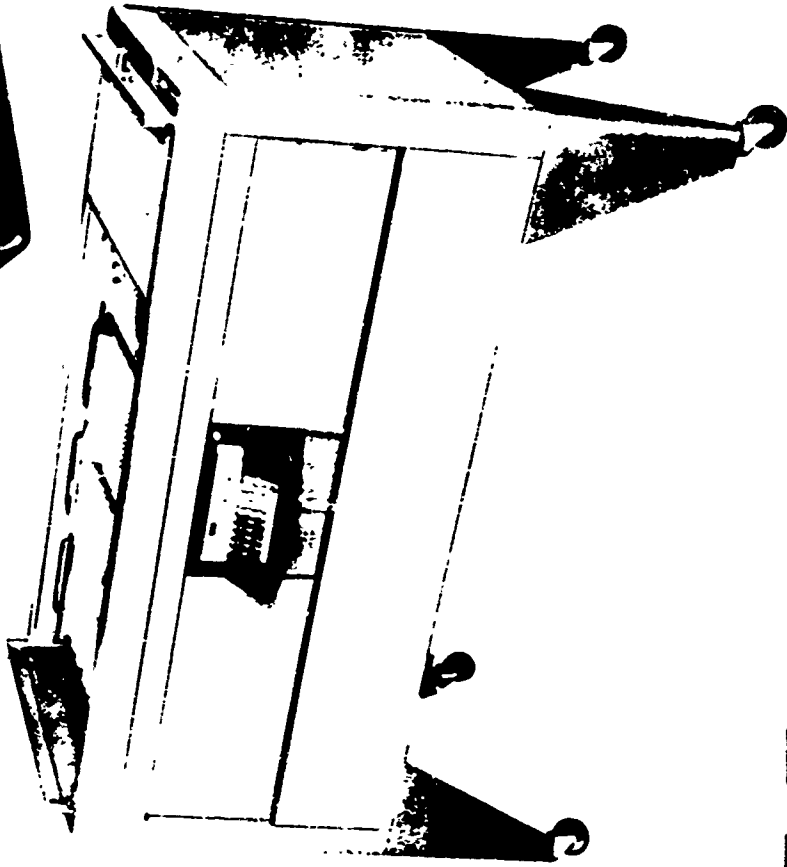
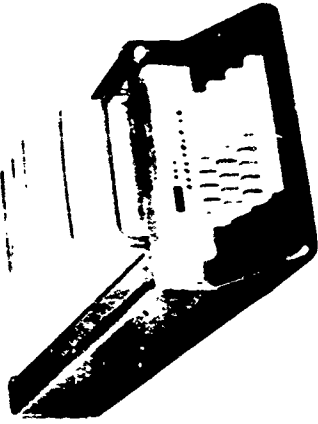


Fingertip automatic selection of any card or group of cards

ACME VISIBLE

ELECTROFILE®

**AVAILABLE IN SINGLE
OR MULTIPLE UNITS.**
Regardless of the size of your
business or the number of
record cards you use in your
filing system, Electrofile can
be adapted to suit your spe-
cific needs.

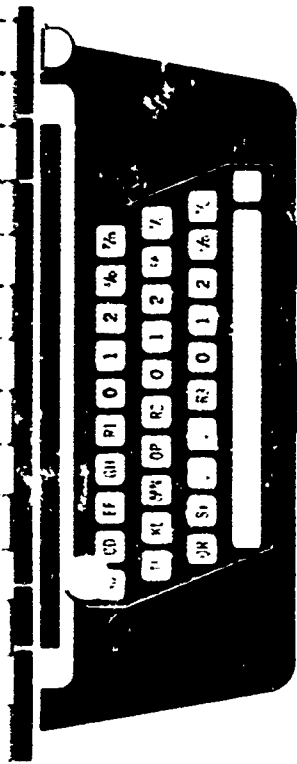


Electrofile is a self-contained System which mechanizes your Vital Record Cards through the medium of electricity . . . Coding, Verifying and Selecting any Individual Card or Group of Cards in mere seconds . . . regardless of their sequence.

Electrofile is an Electro-Magnetic Filing System, so flexible that it can be readily adapted to fit card filing systems of almost any size or type. It requires no complicated forms—no expensive procedures . . . can be operated without special skills by your present employees. Even your present cards may be used by Electrofile through special adaptor strips.

Filing procedures are speeded up and filing costs lowered with Electrofile. It provides—*automatically*—fingertip control of all types of active records, whether sorted or unsorted, eliminating all sorting expenses. To enable both small and large operations to enjoy its many advantages, Electrofile may be had with single or multiple trays to accommodate thousands of active account cards.

**Compact
Economical
Automation**



Random Access - Random Filing



INDIVIDUAL CARD SELECTION. No more laborious searching for the card you want. At the touch of the selector keys, the ELECTROFILE automatically brings you the right card - regardless of its location in the tray. Valuable time is saved and, where classifiers are involved, delays are avoided, enhancing good will.

ELIMINATION OF CROSS-REFERENCE. The ability to code each card by different categories enables you to combine vital data on one card. Duplicate records are not usually required for cross-reference. This advantage of keeping group information in one file contributes substantially to savings in time and space.



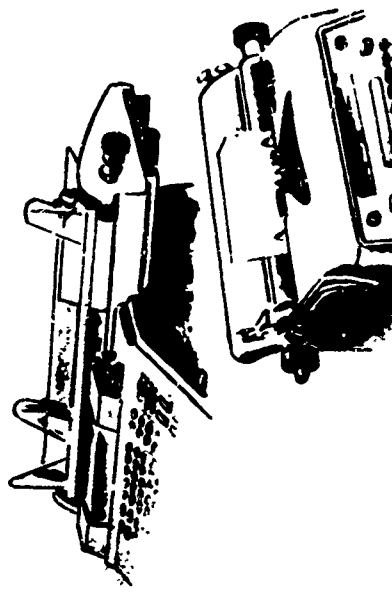
GROUP CARD SELECTION. When a group of cards in a given category is needed, the entire lot is located as quickly as a single card. Hours of time wasted in digging out needed information are eliminated, freeing personnel for other duties.

RANDOM FILING. Because ELECTROFILE selector can immediately spot the card you want regardless of its location in the tray, refiling by sequence is not necessary. Cards can be put back into the tray at random, thereby saving the time and effort normally required to seek out their proper place.



MULTIPLE CLASSIFICATIONS SELECTION. With ELECTROFILE, this card can be identified by name, by number, by date, by product, by territory or any way required. In addition to such identification, it can be coded as belonging to other major categories - an exclusive advantage that eliminates the need for cross-reference files.

CARDS ARE FLEXIBLE. ELECTROFILE cards are used like regular cards, but have strips of thin metal teeth along the bottom edge. They can be processed through typewriters, posting machines, etc., just as quickly and easily as ordinary cards.



HOW **ELECTROFILE** OPERATES

*You'll Get These Advantages
with the new...*

A single coded card provides a complete record

A single file card may contain the complete record of any individual, company or account—can be coded to any desired category or special classification—can be identified by name, number, date, product, territory or in any way required. This master control eliminates cross-reference files—provides instantaneous selection of any wanted card or group of cards through any identification. An added advantage is that any Electrofile card may be processed through typewriters, posting machines, etc.

This notched metal code is the key to instant card selection

Electrofile's amazing speed and accuracy comes from the special, patented metal teeth which form the bottom edge of each card. Using the Electrofile Keyboard, these teeth are keyed to practically any desired kind of card selection. Depressing any desired key causes any

single card or group of cards bearing this specific code to pop up instantly from the file. These special metal edges may be attached to the cards you're now using. Electrofile's fingertip control actuates the electro-magnetic machine by simply pushing the required key.

ELECTROFILE

- Greater office efficiency
- Close control of all your vital card records
- Push-button machine convenience
- Improved employee morale
- Greatly reduced work load
- Substantial time savings
- Lowered operating costs

*Gives Fingertip Control
of Records in...*

- Accounts Receivable
- Follow-up Files
- Subscription Files
- Cost Analysis
- Inventory Control
- Accounts Payable
- Production Control
- Installment Collections
- Personnel Records
- Association Files
- Statistical Records
- Degree-Day Control of Fuel Oil Deliveries

*It will pay you to investigate the many savings
ELECTROFILE can bring to your business.
Call your ACME representative today.*

ACME **VISIBLE**

RECORDS, INC.

CROZET, VIRGINIA

Office and Representative in principal cities



10000 DDD • CINCINNATI

Telephone 242-4220 Area Code 513

THE ACCESS SYSTEM

System Concept: The ACCESS system makes possible the rapid selection of randomly stored, unitized records. It is simple, inexpensive, extremely fast, and provides multiple cross access. It can be operated by anyone. It can be used at individual work stations, at a central facility, or as part of an integrated system.

System Configuration: There are three elements: (1) modular selectors for the storage and retrieval of randomly stored cards, (2) coders for coding ACCESS cards, and (3) remote consoles that control both selectors and coders.

Search Mode: The search mode is entirely parallel: all codes in all cards in all selectors are searched simultaneously.

Response Time: Card selection takes place in less than 1 second, regardless of the size of the document collection. Files of 100,000 records are searched as rapidly as files of 5,000 records.

Modularity: Selectors are programmed and controlled by a remote console. The console can call for a single selector, a group of selectors, or all the selectors to which it is connected. Thus, collections of any size can be controlled from a single point and searched instantaneously. As the collection grows, additional selectors can be connected.

Size: The ACCESS selector is a modular unit approximately 16 inches wide, 11 inches deep, and 10 inches or more high (depending upon card size). Selectors can be placed side by side and stacked two, three, four and five high.

Card Capacity: Selectors utilize special, 14-inch-wide card trays. Tray capacity is 1350 or more cards, depending upon card thickness. Trays can be rapidly removed and replaced (cards do not leave the trays during the selection process). A single selector can thus service a record collection of any size. However, most applications will benefit from the use of multiple selectors operating in parallel for the high-activity portions of files; less active records can be stored in ACCESS trays and housed in special immediate-access shelf units.

Card Formats: Selectors are available for card formats within the range of tabulating cards (3-1/4 x 7-3/8) to 12 x 9. Cards may be of paper or plastic, transparent or opaque, with or without windows or pockets, and of a variety of thicknesses. Cards can be typed on, written on, and used in standard bookkeeping, posting, copying, and duplicating equipment. Different size cards cannot, however, be intermixed in a single selector or selector tray.

Card Coding: ACCESS cards are coded by a high speed unit that is programmed and controlled by the console. Special interface equipment is available for the automatic translation of Hollerith and other common data processing codes into ACCESS codes. Low cost, manual coders are also available for low-volume applications.

Code Verification: Coded ACCESS cards are verified by being placed in a selector and called for by reentering the desired code through the console.

Coding Capacity: 65 coding sites are available along a single edge of ACCESS cards. Two edges can be coded (for a maximum of 130 coding sites) if necessary. The 65 sites can be organized into fields of varying sizes according to the requirements of particular applications. A 5-site field, for example, provides any one of 10 codes. An 8-site field has a capacity of any one of 70 codes. Thirteen numeric characters can be encoded along one edge. Under such circumstances the coding capacity becomes 10,000,000,000,000 codes. Alpha characters can also be encoded. Super-imposed coding is feasible.

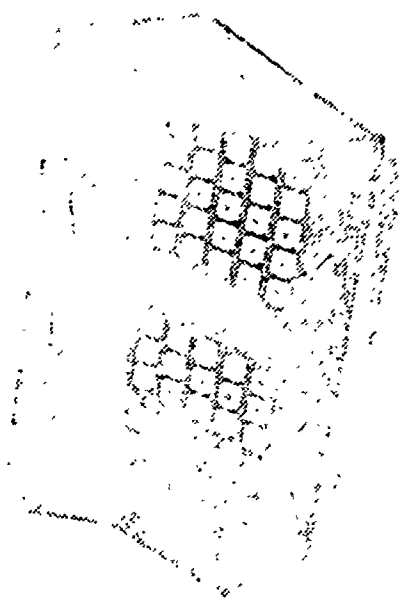
Coding Logic: The ACCESS system can be programmed according to the requirements of essentially any application. In addition to conventional alphabetic and numeric codes, quite sophisticated logic is possible. Examples are: equal-to-or-greater-than, equal-to-or-less-than, plus-or-minus-a-predetermined value, logical sums, and-or, and-not, etc.

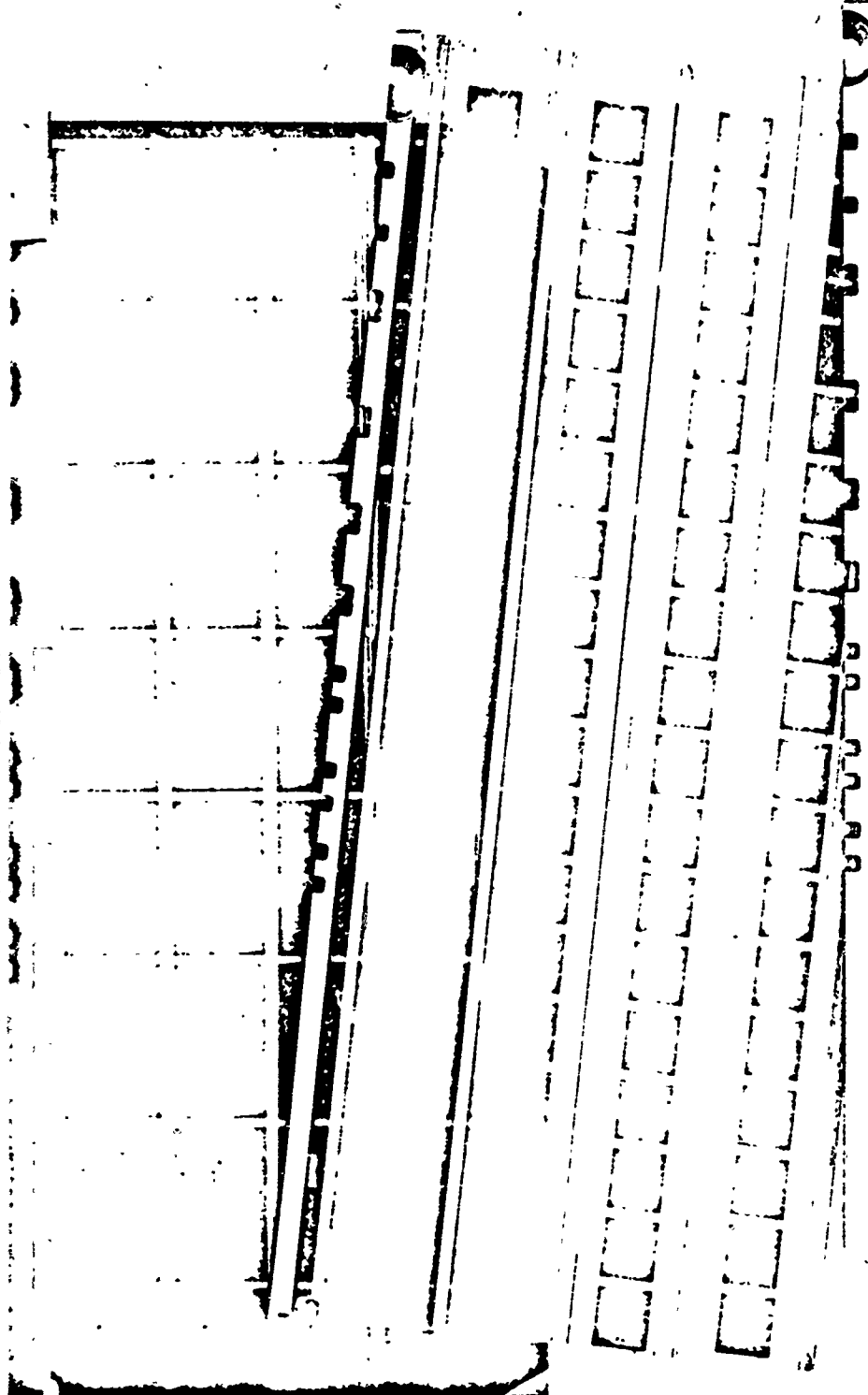
Custom Consoles: In addition to the standard, general-purpose ACCESS console, consoles with custom keyboards are available. Custom consoles have 75 keys, which can be used to call for any or all of as many as 65 separate facts, conditions, or characteristics. The keys can be individually labeled, thus serving as an index to the document file. The advantage of a custom console is that it frees the user from having to remember codes.

System Compatibility: The ACCESS system is fully compatible with existing equipment for handling tabulating cards, aperture cards, 8-channel edge-perforated cards, magnetically striped ledger cards, microfilm jackets, microfiches, etc. ACCESS units can be used either alone or as components of an overall system in conjunction with other data processing equipment, including computers.

Special Requirements: ACCESS equipment operates on standard electrical circuits. No special temperature regulation or humidity control is necessary. Noise levels are within normal office ranges; sound conditioning is unnecessary. Styling and colors harmonize with contemporary office decor.

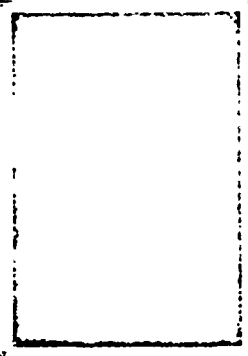
Availability: ACCESS selectors, coders, and consoles will be in limited production by late 1965.





THIS IS THE NEW
RECORDAK
MICRO-FILE APERTURE CARD, TYPE MIL-DS

- Produced on your own premises
- Eliminates problems of deliveries, inventory and shelf life
- Adhesive will not loosen, separate, buckle or bleed
- Office styled equipment can be operated anywhere — by anyone
- And the cost is low



RECORDAK Corporation (Subsidiary of Eastman Kodak Company)
770 Broadway, New York, N.Y. 100

FAIRCHILD HILLER
REPUBLIC AVIATION DIVISION
FARMINGDALE, LONG ISLAND, NEW YORK

REPUBLIC MICRO-VUE

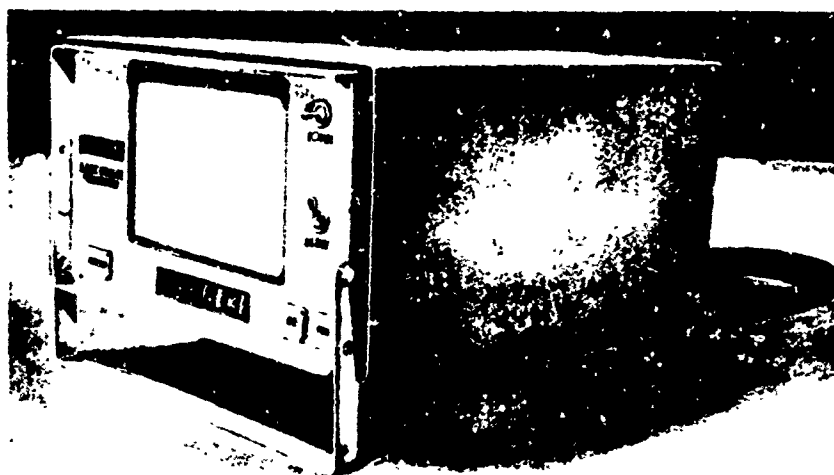
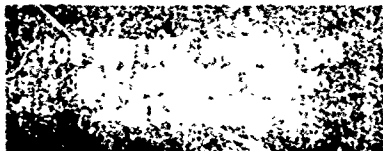
A Portable High-Density Information System

Republic Aviation Division's **MICRO-VUE SYSTEM** (developed under independent research monies) includes a portable opto-electro-mechanical device for immediate retrieval of massive amounts of textual graphical data stored by a unique microphotographic process

The system, against which patents are pending, allows frame to frame (within 1 10th second) addressing of up to 10,000 pages of optimally formatted information stored at linear reductions of 260:1 on a four-inch film chip.

Typically, in maintenance of advanced aircraft or shipboard systems, use of **MICRO-VUE** would allow scanning of a 99-page fold-out of wiring, logic flow diagrams, or wave-form patterns; because of its digital logic circuitry controller cueing of remote locations to any number of devices is possible. This capability has immediate possibilities for missile launch and space operations as well as automated factory programs.

Aside from its obvious advantage in storage of large amounts of archival and technical information, the system was designed by Republic Maintainability Engineers to enable automatic collection of data with respect to use of the stored information. Thus, accurate maintenance and reliability data can be acquired and



the device used for programmed instruction and psychological testing.

Current activities include testing the system in an improved priced illustrated repair parts updating program for a retail chain, research library oriented applications analyses for a non-profit organization and utilization of **MICRO-VUE** for Department of Defense weapons system support evaluation programs

MICRO-CHIP CAPACITY

9801 frames (.026" x .026")
99 rows x 99 columns

MICRO-CHIP DIMENSIONS

4" x 4" (3.2" x 3.2" nominal
useable data storage area)

6.5" x 6.5" (enlarged
images magnified 240 x)

12" x 9" x 17"

WEIGHT

20 lbs nominal (± 2 lbs
rech. bat.)

POWER

110 120 VAC or 26 VDC 75 W

FAIRCHILD HILLER
REPUBLIC AVIATION DIVISION
FARMINGDALE, LONG ISLAND, NEW YORK

REPUBLIC MICRO-VUE

A Portable High-Density Information System

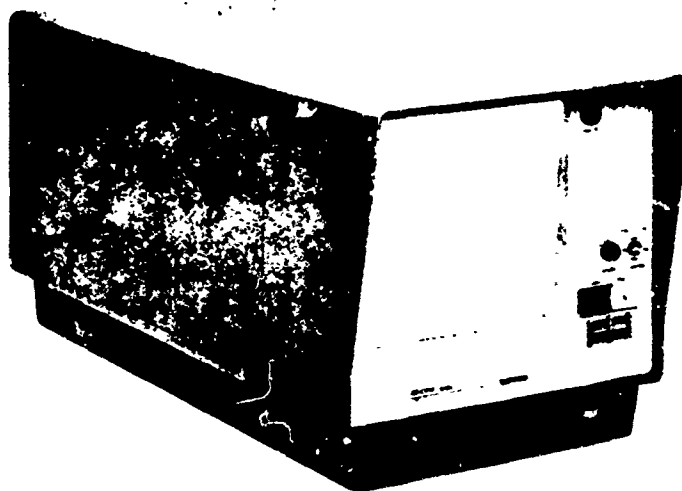
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FOR FURTHER INFORMATION
CONTACT AREA CODE:
516-531-3829



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MICRO-CHIP DIMENSIONS

4" x 5" (3.3" x 4.3" useable
data storage area)

MICRO-CHIP CAPACITY

5852 frames (.041" x .053")
77 rows x 76 columns (oriented
to typical illustrated parts listing format)

12" x 15" (enlarged
images magnified 260 x)

20" x 20" x 25"

WEIGHT

40 lbs

POWER

110/120 VAC: 600 W

*20 chip (nominal) autoloader
available as an accessory



WESTWOOD DIVISION

HOUSTON FEARLESS CORPORATION

11801 WEST OLYMPIC BOULEVARD ■ LOS ANGELES, CALIFORNIA 90064
TELEX 06-7 4291 TWX 213-490-3919 ■ BRADSHAW 2-4331

RANDOM ACCESS

MICROFILM READERS

CARD II, TYPE I



JUST FOUR SECONDS NEEDED TO FIND AND DISPLAY ANY PAGE

The all new Houston Fearless CARD (Compact Automatic Retrieval-Display)* system is a desk-top, self-contained microfilm file-reader. Pushbutton retrieval provides access to any microfilmed page contained in the FilmCARD Reader, greatly reducing the time and cost for record lookup. On command, the desired record is automatically located (regardless of its position in the file) and displayed on the screen - in no more than four seconds and in as little time as one second. New selection input automatically returns the displayed record to the file, where it is immediately available for reselection.

CAPACITY

Approximately 750 filmcard records can be available for selection in the FilmCARD Reader at any one time, providing a maximum capacity of more than 70,000 pages of information. Any storage requirement in excess of 70,000 pages is accommodated external to the reader, and can be quickly interchanged with the internal file.

*Patent Pending

PUSHBUTTON RANDOM ACCESS SYSTEM STORES 70,000 MICROFILMED PAGES

APPLICATIONS

This advanced Houston Fearless FilmCARD Reader may be utilized in many business, professional, and industrial fields, including:

Communications - Engineering - Finance
and Insurance

Manufacturing - Medicine - Merchandising -
Statistics

Travel and Transportation - Utilities

for typical applications such as:

Account and Signature Verification - Case
Histories

Catalogs - Chemical and Pharmaceutical
Directories

Credit and Billing Information - Inventory Lists

Customer Subscriber Lists - Telephone
Order Desks

Parts Lists - Specifications - Telephone
Switchboards

Rate Tables - Transportation Schedules

UPDATING

The FilmCARD Reader is designed to allow records to be organized for each type of subject matter so that information can be purged and updated in a logical manner. Information may be stored chronologically (for example, on a monthly basis), or material may be grouped into alphabetical or numerical divisions; or arrangement may be by subject classifications or by any logical and convenient method.

Since the file system always returns a record to the same spot where it was previously located, information can be updated by simply replacing filmcard groups (or even individual filmcards, if desired). In the FilmCARD Reader, file integrity is always maintained, and the front-loading feature provides for error-free updating by unskilled personnel.

NO INSTALLATION NEEDED

The FilmCARD Reader which weighs approximately 30 pounds, is made operational by locating it on a desk or suitable work table and plugging its power cord into a standard 115-volt 60-cycle ac receptacle.

OPERATION

The FilmCARD Reader is operated entirely from the control panel at the front. The panel contains an OFF-ON switch, a category keyboard, an alphabetic (section) keyboard, a page keyboard, and a VIEW push switch. Selection is made by pressing four keys - easier than dialing a telephone. The desired page is presented on the screen within four seconds. After an initial selection, access to a different page is less than one second.

The operator never touches a record when using, loading, or unloading the FilmCARD Reader.

SEARCH AND DISPLAY

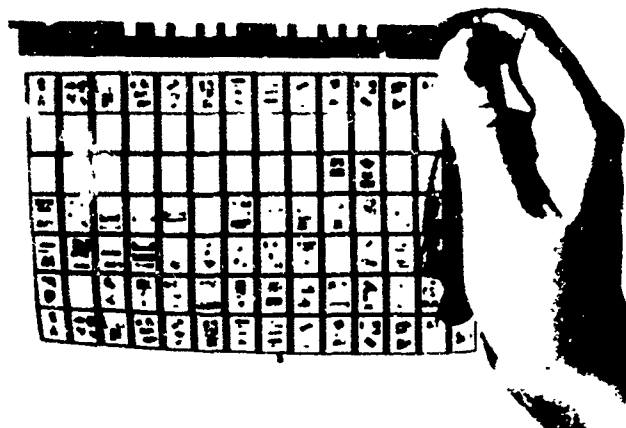
When FilmCARD control keys are pressed, a selection cycle is initiated that locates the desired microfilmed page and projects it at an enlargement of 24 times on the screen. The filmcard is located by a binary-coded clip mounted along one edge. Once it is found, the filmcard is automatically withdrawn from the file into a projection gate. A long-life quartz-iodine lamp, combined with a high quality optical system, images the selected microfilmed page onto the rear-projection screen.

FILE CONVERSION

Existing manual microfiche files can be easily converted for automated retrieval in the FilmCARD Reader. Conversion is simple; a binary-coded strip is attached along one edge of each filmcard.

HOW THE FilmCARD Reader WORKS FOR YOU

The basic storage medium is the 105 by 148.75mm (approximately 4- by 6-inches) microfiche (filmcard). As shown in the illustration, up to 98 pages of information are compactly grouped on one filmcard. Up to 750 filmcards can be in the FilmCARD Reader at any one time, and any page of information may be selected from the large file and displayed on the screen. Ten category pushbuttons, each corresponding to a "book" of information, select the classification topic. A second set of keys selects the "section" of the "book." The "section" index is automatically displayed on the screen so that the actual "page" of information may be selected. The "page" is retrieved immediately and automatically by pushing two buttons on the keyboard - the numbers taken from the index display. The entire selection cycle will not exceed four seconds for an operator that has minimal training. This time includes automatic put-away of the previously displayed page.



GENERAL SPECIFICATIONS

Storage Capacity	Up to 70,000 pages (internal)
Access Time	4 seconds maximum
Magnification	24 times
Power	115-volt, 60-cycle ac
Filmcard Size	105 x 148.75mm (approx. 4 x 6 inches)
Screen Size (approx.)	9 x 12 inches
Overall Size (approx.)	19" high x 18" wide x 21" deep

CUSTOM MODELS

In addition to its standard FilmCARD Reader, Houston Fearless can furnish custom models to meet specific applications. Easily incorporated special features include a printer for hard copy output; application oriented keyboards; increased internal storage capacity to 100,000 pages; COSATI, DOD, and NMA formats, and other record sizes with either vertical or horizontal frames; random-access computer peripheral equipment; dual screen models; display models; look-ahead; replaceable storage files; and activity oriented file systems. Houston Fearless systems engineers and specialists will help you to select the particular features needed for your application.

For additional information, please contact:

Alfred S. Tauber
Manager, Product Planning
Westwood Division



HOUSTON FEARLESS CORPORATION

11801 West Olympic Blvd. ■ Los Angeles, Calif. 90064
TELEX 06-7 4291 TWX 213-490-3919 ■ BRadshaw 2-4331

LITHO IN U.S.A.

A.M.'s, Thursday
May 19, 1966

International Business Machines Corporation
Data Processing Division
112 East Post Road
White Plains, New York 10601
Bert Reisman, Manager of Information
R. J. Siegel
914 White Plains 9-1900

THE IBM 1350 PHOTO IMAGE RETRIEVAL SYSTEM

WHITE PLAINS, N.Y., May 19 The IBM 1350 photo image retrieval system announced today provides automatic control over large files of microfilm images.

All operations -- filing, retrieving, picture-copying -- are performed under electronic instructions which are an integral part of the system. The IBM 1350 system will not require programming by a user. However, programming will be required for IBM's System/360 when this computer and the IBM 1350 are linked.

Filing and Retrieving

Before an image is filed in the IBM 1350 photo image retrieval system, it is assigned a specific address within the system -- an operation which can be performed manually or with a computer.

The image -- contained in an aperture card which also has identifying information (the address and part number, for example) punched in it -- is entered in the system's photo image converter. The image on the aperture card is photographically reproduced on a small rectangle of film called a "chip," and stored within the system. The punched information is magnetically recorded on a stripe of magnetic oxide on the chip.

When a particular image is requested, its address within the system is determined from an index and entered into the system in one of several ways. A request card can be inserted in the image converter, a standard punched card can be inserted in an attached card reader, the data can be entered by using the system's printer-keyboard or it can be entered directly through a linked computer.

An off-line computer (one that is not attached to the photo image retrieval system) can look up the addresses of specific images -- or a group of images relating to a particular part (rear axles, for example) -- and automatically produce punched cards to be fed into the IBM photo image retrieval system. A computer connected to the system will eliminate the step of having to feed these cards into the system.

When a particular drawing is requested, it is moved pneumatically from its location within the system's file to the image-converter, copied and then returned. The copy is in the form of a completely processed, punched and interpreted aperture card.

The system has the ability to answer 1,000 random requests an hour.

STORAGE MEDIA

The photo image chip, or film, is the basic unit of storage in the system. It is a 70 by 35 millimeter piece of polyester film coated on one side with a diazo emulsion. There is a horizontal stripe of magnetic oxide on the other side. The chip image is created by contact with the microfilm in an aperture card. To make a copy from a chip, the full chip image area (containing one or more images) is contact-printed on a blank aperture card. The areas of aperture image and chip image are equal. The magnetic oxide stripe on the chip can accommodate 100 eight-bit characters of data -- usually system address, part number and other information.

The aperture card, a standard-sized punched card, is the input and output medium for the system. The master aperture card contains the silver halide film image of the document as well as punched data to identify the image. In its output form, the aperture card holds the diazo film image copied from the chip. The card also can be punched and printed with data read from the chip's magnetic strip. The output aperture card can be used for image viewing or for the production of hard copy.

The photo image cell, with a capacity of 32 chips, is the plastic container in which the chips are stored and transported within the system. Except for a few seconds -- when the chip is being prepared from its master aperture card or its image is being reproduced on an output aperture card -- the chip never leaves the cell. The cell is approximately 3 inches high, 1.5 inches wide and 1 inch deep, and contains slots which keep each chip separate from the others in the cell, minimizing wear.

Cells are stored in individual compartments within movable trays. The 450 compartments within a tray are divided into 15 identical sections, each containing a 3.10 matrix of cells. In the center of each section is a row of three empty compartments. When aligned vertically, the empty central rows form smooth-walled tubes through which cells stationed below can be pneumatically moved. Switching devices above the trays can connect any of these transport channels to a common pneumatic tube serving the entire file.

To select any cell in the file, the appropriate tray automatically is moved forward or back to one of five positions until the desired cell row is aligned with the transport channel. The appropriate overhead switching device is then moved right or left to one of three positions. A vacuum is applied to the appropriate channel so that the cell is lifted from its compartment and moved through the pneumatic system to the image converter at an average speed of approximately 25 feet per second.

-more-

THE IBM 1351 and IBM 1352 CELL FILES

The IBM 1351 cell file and control unit and the IBM 1352 file provide the IBM photo image retrieval system with the facility to automatically store and retrieve photo image cells. The IBM 1351 holds one module of 2,250 cells (72,000 chips), the pneumatic air supply and the electronic control unit. The 1351 controls the system and also handles digital data transmitted from and to an attached computer.

Increased capacity is available through the use of the IBM 1352, the two module cell file. Up to six additional modules (three 1352s) can be installed in one system, providing a total capacity of 15,750 photo image cells containing 504,000 chips.

Loading and unloading cells from the cell file is accomplished at the cell entry station. The station consists of five removable sections of the bottom tray in the 1351 cell file, each containing 30 photo image cells. This capability of changing up to 150 cells at one time provides a means for quickly bringing large groups of cells from the shelf to on-line storage. The cell entry station is a standard feature of the 1351 cell file and is available as an optional feature on the 1352 cell file.

The IBM 1355 photo image converter provides the input and output functions of transferring images to and from the system, and digital data to and from punched cards.

Output consists of image transfer from chip to aperture card, which can be punched and interpreted in the same operation.

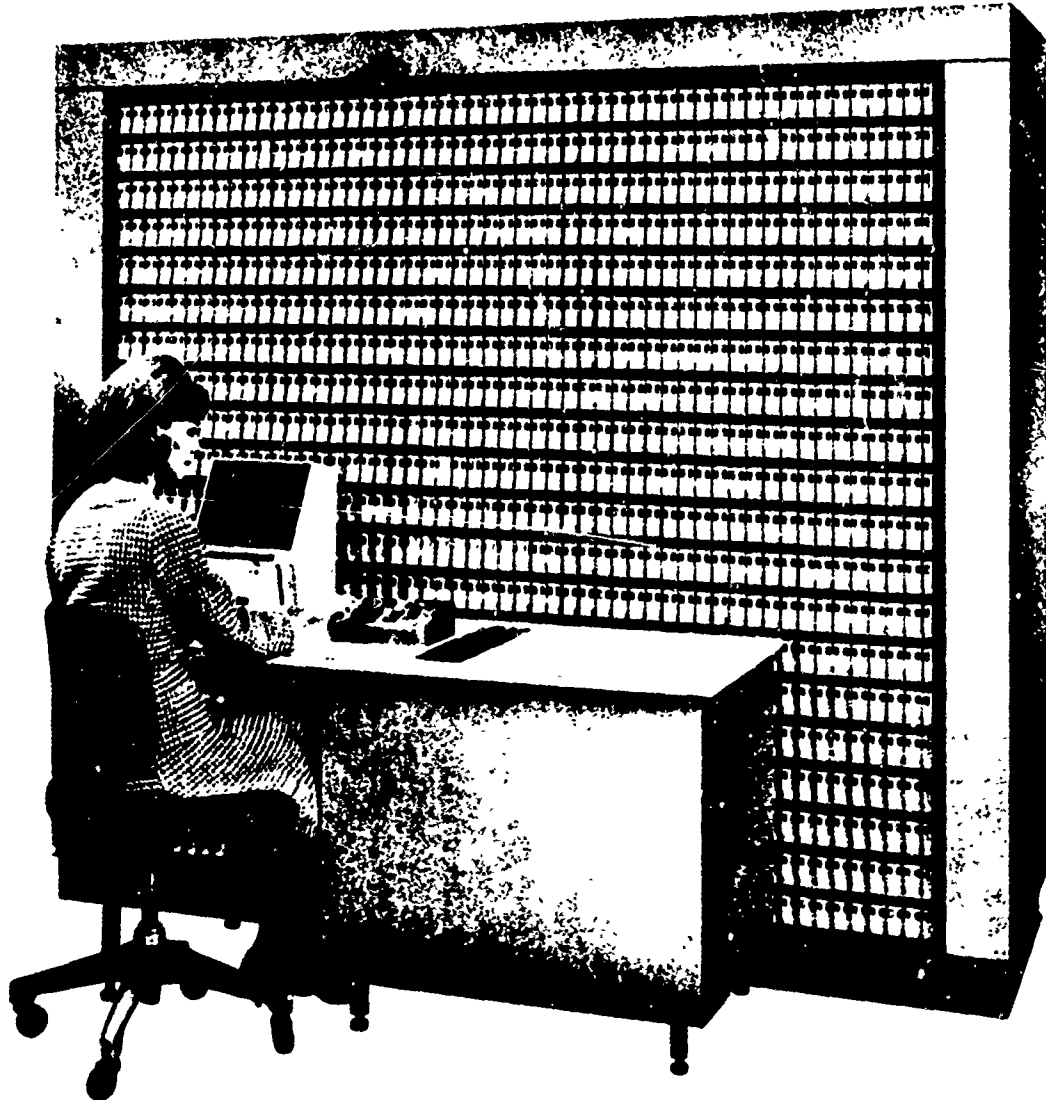
In copying pictures for storage, the IBM 1355 reads master aperture cards, transfers the images to a photo-image chip, and records the digital data on the magnetic stripe of the chip.

The printer-keyboard permits two-way communication between the photo image retrieval system and an operator, and permits the operator to initiate requests directly from the keyboard.

#

MOSLER SELECTRIEVER

**Key to efficient, low-cost availability
of essential information**



The true value of an information retrieval system is measured by the speed, ease, economy and flexibility with which it furnishes information on demand. With the Mosler Selectriever, document retrieval becomes a completely automated operation—including compact storage of data captured in unitized microfilm and other present or future types of unit records. It offers automatic recovery and distribution of needed information in "real-time."

Its capability accomplishes the most sophisticated document retrieval tasks, yet its cost is low enough to justify it solely for routine, unsophisticated uses. Mosler Selectriever is practical even for the organization of modest size.

Engineered to provide random access to any

one of 200,000 unit documents—tabulating cards, aperture cards, or microfiche—the Selectriever on command will select and furnish or display any one of its unit documents in less than 10 seconds. Among its output options are rear screen projector, hard copy, duplicate aperture card or roll film, and distribution (at various magnifications) to remote locations via closed circuit television. These distribution options are expandable as the state-of-the-art advances.

The Selectriever speeds and eases information retrieval, distribution, and refiling. Fully automated document handling sends efficiency way up, errors way down. Result—reduced clerical personnel and cost, increased effectiveness and output from operating personnel.



Selectriever accommodates full range of documents

Any document which can be microfilmed, or reduced to or confined to the familiar 3¼" x 7½" card is suitable input—including engineering drawings, signature cards, legal documents, photographs, maps, technical documents, specifications, business charts, and many more.

How Selectriever retrieves information

Selectriever input—3¼" x 7½" tabulating cards, aperture cards, or microfiche—is coded with 35 round holes along the bottom edge. Specific holes are notched out to identify the card for automated handling. Punching and notching can be combined with the same operation that brings the cartridge which will store the card in the Selectriever. The cartridge, made of Lexan*, has a capacity of 100 unit documents, and is housed in one of two parallel "honeycombed" walls, each holding 1,000 cartridges.

A lightweight cartridge retrieval mechanism operates between the two honeycombed walls. It moves at high speed to retrieve cartridges in response to commands entering the system via keyboard, punched paper tape, or computer interface.

The retrieved cartridge is automatically forwarded to a card-select unit (there can be several on one Selectriever) where the round holes in the cartridge and the card contents are engaged by the code mechanism. This

device positively restrains all but the selected card.

The contents of the cartridges are then "scanned" over a stream of controlled-velocity air which first separates the adjacent cards from the selected card. This card is lifted, encased in a protective sheath of air, and either presented to the operator or run up into a platen in an optical path for automatic copying, projection, or image transmission—depending on the output chosen.

This entire sequence, from command to read-out, averages only 6½ seconds. On further command, the card is automatically returned to its cartridge, and the cartridge to its assigned storage location, in just over 3 seconds.

Open-loop outputs—make stored cards available

- Bulk access—contents of entire cartridge presented for removal, replacement, or infiling.
- Open access—multiple simultaneous retrieval of identically-coded cards from one cartridge with one command.
- Direct access—hands one unique card to the operator.

Closed-loop outputs—make information available while holding the cards secure within the system, maintaining file integrity

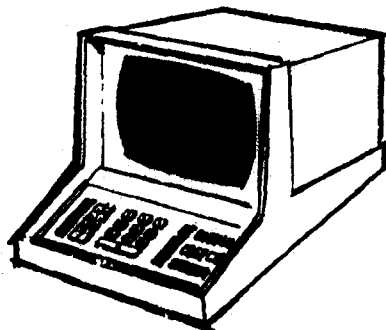
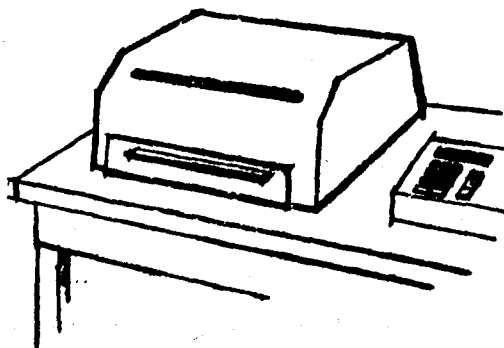
- Card-to-card duplication
- Card-to-roll film duplication
- Reader/Printer
- Fixed magnification television
- Variable magnification television
- Front screen projector

*Reg. T.M. General Electric Co.

AUTOMATED CARD PREPARATION, AUTOMATED PRINTING, AUTOMATED IMAGE DISTRIBUTION With these Selectrilever sub-systems-

CONTROL CONSOLE AND NOTCHER

In addition to the control-order keys, the control console provides for entry of numeric document identifications through a ten-key keyboard, plus an additional ten keys for entry of alphabets, or special identifiers such as product class, type of account, division, etc. Input identifications are processed through a program panel permitting complete flexibility of digit utilization. Latching, self-indicating switches show output method selected while a full complement of condition lights shows the operation-by-operation status of the entire system. The console also carries a selector switch which assigns the keyboard commands to retrieval, to card-notching, or to both functions simultaneously. In this latter setting, as the on-line notcher (which is cable-connected to the console) punches and notches the input document, the proper cartridge is brought to the selector, and any like-coded card automatically ejected, completely automating the file-update operation.

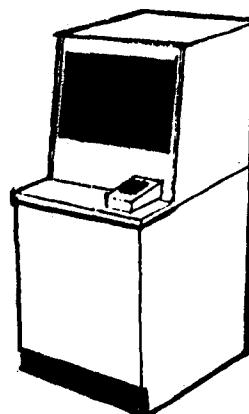
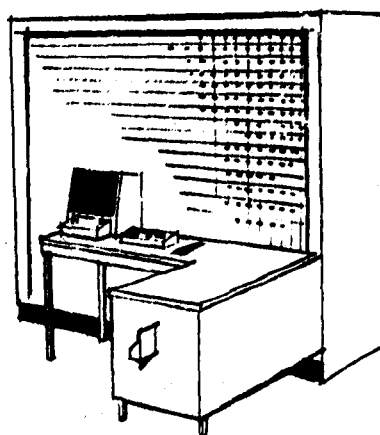


REMOTE INQUIRY STATION

The remote keyboard gives the user, wherever his location, full control over all appropriate Selectrilever functions, plus whatever television camera manipulation is called for by the application. The forwarding of the inquiry also automatically establishes the path for the return of the video signal bearing the requested information. Priority assignment and automatic timed image withdrawal can be furnished if desired.

CARD-TO-CARD AND CARD-TO-ROLL FILM DUPLICATORS

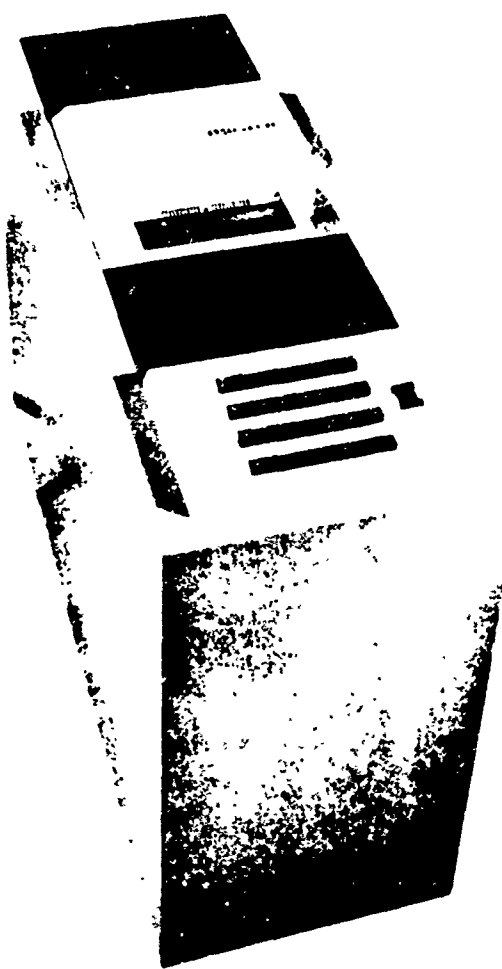
Retrieved aperture cards or microfiche are kept captive within the system, and automatically transported to the copying station. There, information they carry is contact-copied onto the diazo or thermal aperture cards or roll film which are automatically fed into the system from magazines. Once copied, one file document may be returned to file, and another retrieved during the development cycle, providing fully-overlapped output. The input identification number is automatically printed onto the aperture card as it leaves the system.



READER/PRINTER

Provides for inspection, at the Selectrilever, of any image in the system, and for optional generation of an enlarged silver print if desired. Both these functions are accomplished without ever allowing the filed document to escape from the system. Upon release, the filed document is automatically returned to the proper cartridge, and the cartridge to its assigned storage position.

Mosler OPEN ACCESS ROTRIEVER



Mosler Document Retrieval Equipment:

For the rapid retrieval of aperture cards,
card documents, or microfiche.

OPEN ACCESS ROTRIEVER

For the rapid retrieval and infiling of aperture cards, card documents or microfiche.

FEATURES:

- Cards brought within easy reach of operator.
- Card lifted on a cushion of air to prevent marring and scratching of microimage.
- Random refiling within 100-card pocket.
- Raises desired card 1/2-inch above the other cards in the pocket.
- Uses commercially available cards by notching only.
- Special safety door will prevent harm to operator's fingers or damage to cards.
- Stylish design blends with any office decor.
- Capacity of 5,000 aperture cards, card documents, or microfiche with up to 250,000 images.
- Retrieval of any desired card in 4 to 7 seconds, and infiling in 2 seconds.
- Provides capability of locking unit to secure file contents.

USER BENEFITS:

- Reduces possibility of misfiling and lost cards.
- Makes cards available at point-of-use.
- Ease of update and purge of records.
- Reduces refiling time by 50% or more.
- Easy to transfer in existing card records without having to use special sensitizing.
- Compatible with existing office and microfilm filing systems.
- Eliminates much valuable managerial and professional time lost waiting for documents.
- Reduces personnel turnover by alleviating tedium of the filing function.

SPECIFICATIONS:

Approximate overall dimensions: 32" high, 40" long, 15" wide.

Power requirements: 110 volts, 60 cycle A.C., 1.2 KVA maximum.

Retrieval time: 4 to 7 seconds.

Random infiling: within 100-cards.

Input: EDP size (3 1/4" x 7 3/8"); equipment available for other card sizes at extra cost.

Capacity: 5,000 card documents containing single or multi-images.

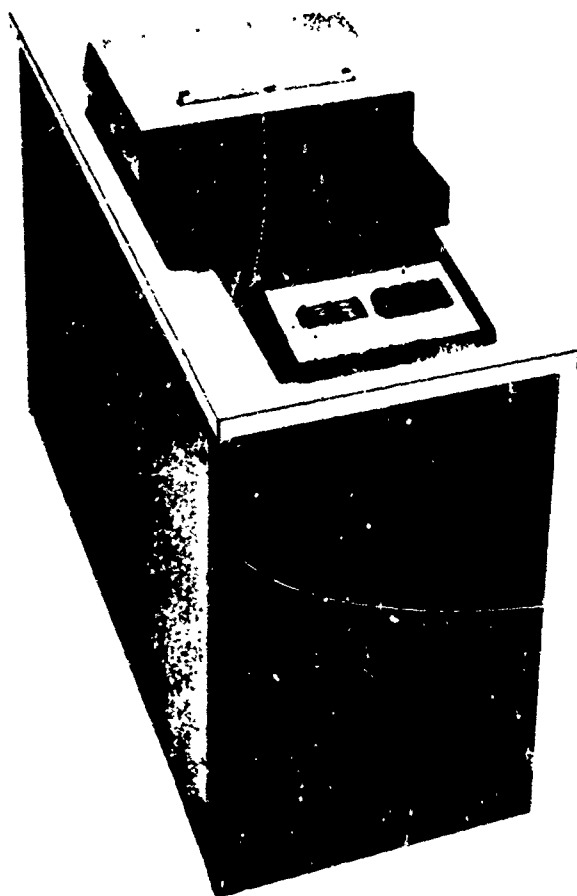
Weight: 400 pounds.

Address inquiries:

Business Planning Department, The MOSLER Safe Company, Grand Boulevard, Hamilton, Ohio — 45012

U.S. Patent Numbers 196,917, 3,059,984, 3,119,394, other patents pending.

Mosler Manual Access ROTRIEVER



Mosler Document Retrieval Equipment:

For the rapid retrieval of aperture cards,
card documents, or microfiche.

MANUAL ACCESS ROTRIEVER

For the rapid retrieval and infiling of aperture cards, card documents or microfiche.

FEATURES:

- Cards brought within easy reach of operator.
- Desired card raised into a special holder for ease of manual access.
- Card lifted on a cushion of air to prevent marring and scratching of microimage.
- Stylish design blends with any office decor.
- Cards refilled mechanically at the touch of a finger.
- Counterbalanced door opens for ease of bulk loading.
- Verification window automatically gives file location.
- Capacity of 5,000 aperture cards, card documents; or of more than 250,000 images if microfiche are utilized.
- Retrieval of any desired card in 5 to 8 seconds, and infiling in 2 seconds.
- Simple 10-digit keyboard provides ease of manipulation.

USER BENEFITS:

- Reduces possibility of misfiling and lost cards.
- Makes cards available at point-of-use.
- Ease of update and purge of records.
- Reduces refiling time by 50%, or more.
- Easy to transfer in existing card records without having to use special sensitizing.
- Compatible with existing office and microfilm filing systems.
- Eliminates much valuable managerial and professional time lost waiting for documents.

SPECIFICATIONS:

Approximate overall dimensions: 34" high, 42" long, 16½" wide.

Power requirements: 110 volts, 60 cycle A.C., 1.2 KVA maximum.

Retrieval time: 5 to 8 seconds.

Random infiling: within 2 seconds mechanically.

Input: EDP size (3¼" x 7¾"); equipment available for other card sizes at extra cost.

Capacity: 5,000 card documents.

Weight: 450 pounds.

Address inquiries:

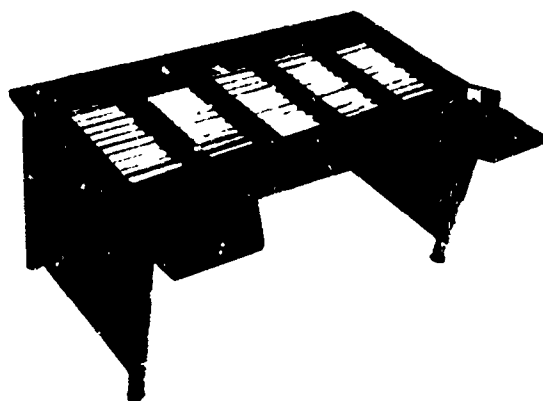
Business Planning Department, The MOSLER Safe Company, Grand Boulevard, Hamilton, Ohio — 45012

U.S. Patent Numbers 196,917, 3,059,984, 3,119,394, other patents pending.



Randomatic

Instant Retrieval Systems



SERIES 7500

Desk Console

Planned for modular expandability, each Desk Console is available with as few as two file trays up to a maximum of five file trays, all trays recessed flush with the desk top. Multiple Console units can be interconnected with all file trays in a system controlled from a single keyboard.

RANDOMATIC 7500 is a completely random file system that is expandable to any desired card capacity. The cable-connected keyboard punch is portable to permit flexible systems operation. Desk tops are available with or without wing extensions.

The KEYBOARD PUNCH consists of a simple ten-button indexing keyboard for card selection and coding as well as a punch for notching cards in binary form along the bottom edge. File select keys are provided to permit single or multiple access to the file trays. Straight numeric or alpha-numeric keytops are available. A reset key permits the removal of indexing errors prior to card selection. As an option, the KEYBOARD PUNCH can be furnished as a completely separate unit for off-line card punching.

Each FILE tray is divided into ten automatically adjustable sections. A complete Desk Console, having five file trays, would contain fifty sections. A section can contain a single card or a full deck. Each section consists of a fixed and a movable divider. The movable dividers automatically adjust to the number of cards in each section and properly maintain card selectivity control. When the Console is turned off, all movable dividers in all file trays automatically compress the cards, which prevents warpage and minimizes moisture absorption.

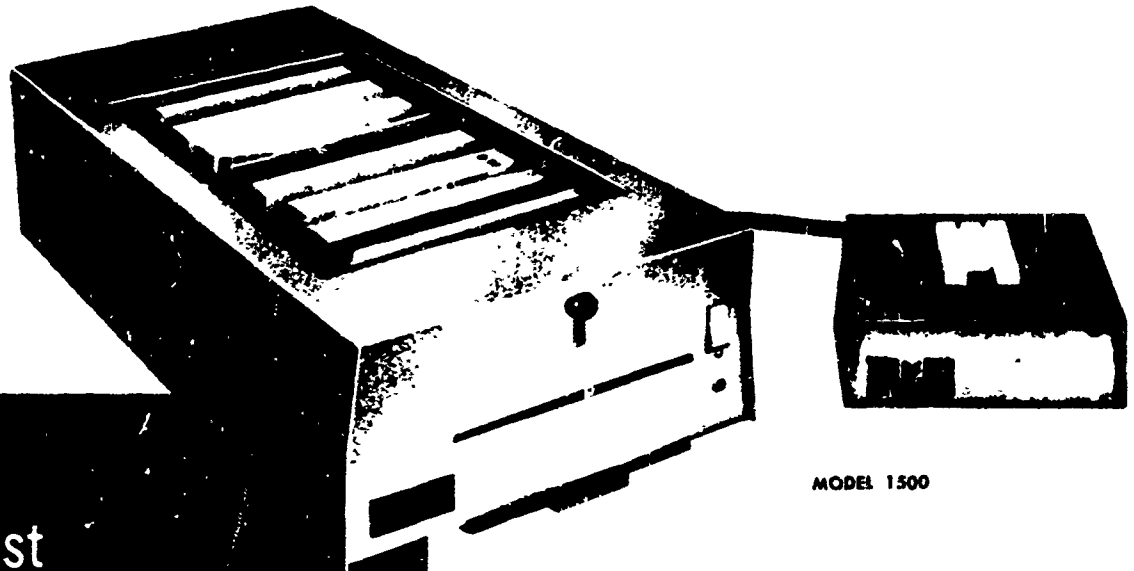
SERIES 7500 is available in modular units starting with two installed file trays. Up to three additional file trays can be later added with a simple "plug-in" installation. Additional Console units also can be later cable-connected. File covers, fitting flush with the desk top, conveniently cover any file tray location not being used.

SPECIFICATIONS

Selection Technique:	Nonmagnetic principle using resonant vibration.
Card Materials:	Paper, film, plastic — no special attachments required. Standard tabulating 3 1/4"x7 3/8" or standard 5"x8" cards of uniform dimensions. Cards taller than 5' can be designed for special applications. Preferred thickness: 7 mils or greater.
File Capacity:	Average 1200 cards per file tray or 6,000 cards per complete Desk Console, depending upon card thickness — maximum 7500.
Desk Console Size:	63 3/4" wide, 34" deep, 30" high.
Keyboard Punch Size:	11 1/2" wide, 10 3/8" deep, 4 1/4" high.
Electrical Requirement:	Standard 110 volt AC 60 cycles.



Randomatic



MODEL 1500

- Fast automatic retrieval of random filed cards
- Select single cards or groups of cards electrically

RANDOMATIC DATA SYSTEMS, INC.

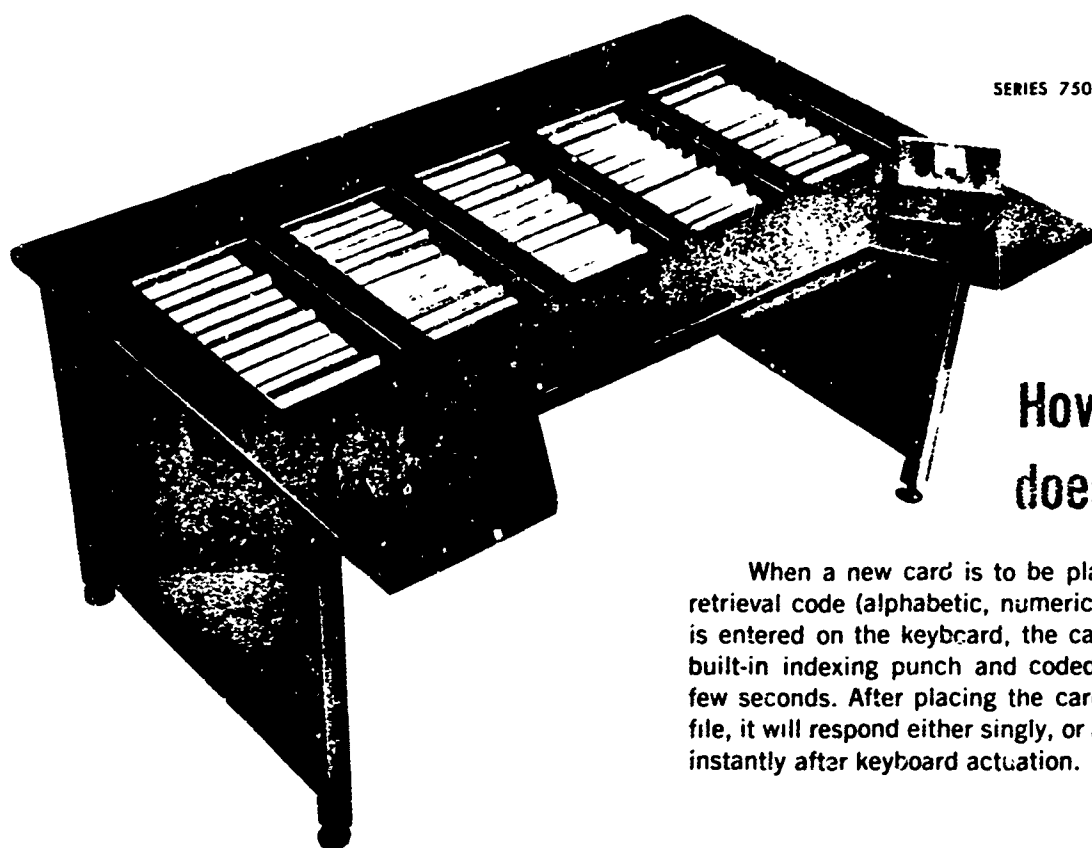
MANUAL CARD FILING

V

FILING MANUALLY in sequence order means that . . .

1. Every card must have its exact spot
2. Card search can be slow and costly
3. Cards must be refiled accurately — if not . . .
4. Misfiling can cause work delays
5. Cards can edge-fray from repeated fingering
6. Cross-referencing may require a second file
7. Group filing may require separate sequences

MANUAL FILING IS SLOW...INEFFICIENT.. ANTIQUATED...



SERIES 7500 DESK CONSOLE

How
does it work?

When a new card is to be placed in the file, its retrieval code (alphabetic, numeric, or a combination) is entered on the keyboard, the card is placed in the built-in indexing punch and coded. This takes but a few seconds. After placing the card at random in the file, it will respond either singly, or as part of its group, instantly after keyboard actuation.

Special Randomatic Advantages

Extren
us —
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f je
ar le
qu ed

S. RANDOMATIC CARD FILING

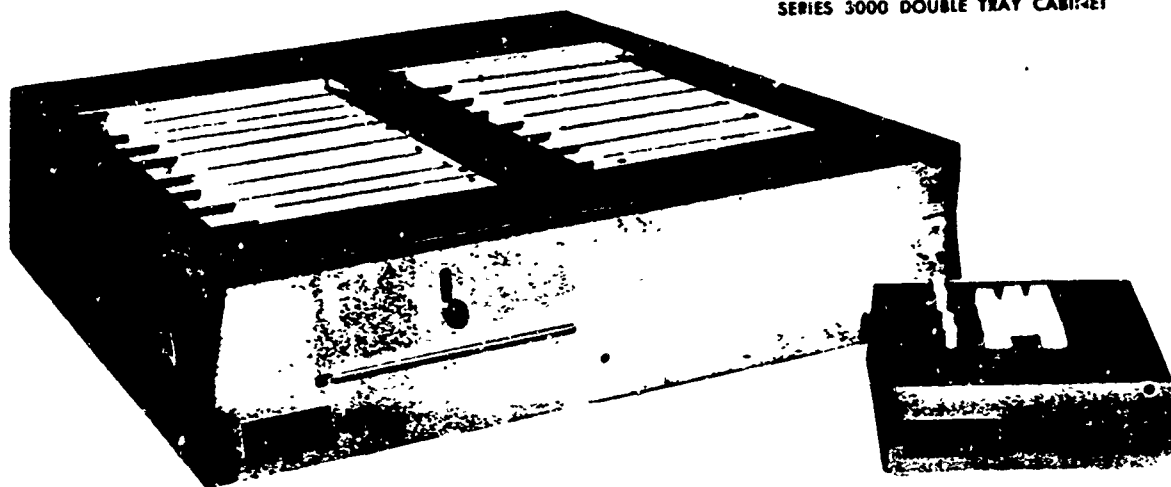
RANDOMATIC FILING has these tremendous advantages . . .

1. Cards can be ANYWHERE in the file
2. Cards, selected on the keyboard, pop up instantly
3. Cards are refiled at random — a handful as quickly as one
4. Misfiling is impossible
5. Records stay neat, clean
6. Second files or lists can be eliminated
7. A single card or a group — random filed — can be retrieved instantly

RANDOMATIC FILING MODERNIZES CARD FILING

for TIME-MONEY-ENERGY savings

SERIES 3000 DOUBLE TRAY CABINET



ly simple — easy to
10-key adding ma-
pe — separate from
lon — connected by
gth plug-in cord re-

No attachments or strips
needed — cards themselves
are notched on the bottom —
can be paper, plastic, or film
— provides card economy.

Unique electrically-con-
trolled "action" dividers keep
cards lightly compressed and
therefore straight, clean,
moisture-resistant.

One stationary keyboard can
activate multiple file tray
units—a single file tray holds
up to 1500 cards. A Desk
Console with five trays holds
up to 7500 cards. Any num-
ber of file trays can be inter-
connected together and oper-
ated simultaneously.

RANDOMATIC applications are almost too numerous to mention.

Here are a few:

- Microfilm Aperture Cards
- Microfiche Cards
- Tabulating Card Systems
- Addressing Card Files
- Personnel Records
- Applicant Qualification Systems
- Medical Records
- Hospital Nomenclature
- School Records
- Library Circulation Control
- Real Estate Multiple Listings
- Title and Abstract Records
- Reservation Systems
- Statistical Analysis
- Cross-reference Systems
- Interconnections to other machines
- Installment Loan Systems
- Collection Card Systems
- Credit Records
- Inventory Systems
- Purchase Records
- Stock Location Control
- Production Control
- Order Fulfillment Records
- Preventative Maintenance Systems
- Rate and Price Card Records
- Tool and Equipment Control
- Truck and Car Dispatching
- Unit Location Control
- Fuel Oil Degree Day Systems
- Service Records
- Sales and Prospect Records

- **RANDOMATIC coding is simple and flexible to meet a variety of card retrieval needs. Group selection permits raising all cards for a common target date, branch plant, geographical area, item type, vendor, or any characteristic or combination of characteristics. And yet, individual cards can be raised, too.**
- **RANDOMATIC is a versatile filing tool. A study of your particular requirements will gladly be made by a RANDOMATIC systems expert at no cost or obligation.**
- **RANDOMATIC is available by lease, rental or purchase.**

Randomatic
Instant Retrieval Systems

RANDOMATIC DATA SYSTEMS, INC.

(609) 895-34

Data Sheets for:

MICROFICHE READERS

(Section C -4, 1)

Model MJR-85A PORTABLE MICROFILM READER

- big 10" x 10" clear-view screen, specially formulated for non glare rear projection
- choice of magnifications for engineering drawings, newspapers, standard or legal-size documents
- high quality optics, with adjustable condensers for even illumination with all of the five interchangeable lenses
- co-ordinated control -- carrier is teamed with vertical adjustment knob for precise positioning of the projected image
- rugged construction -- to withstand the rigors of traveling and use anywhere in the office or in the field.

Truly versatile, the Atlantic Portable Microfilm Reader accepts microfilm of all formats; in microfiche, micro-jackets or aperture cards, even in 16mm and 35mm rolls, with optional roll film carrier accessory. Through a meticulously-designed optical projection system, it provides a crisp and undistorted image on the special rear projection screen. And, it's a big image, fully 100 square inches . . . and it's bright, so the Reader can be used with ease in a fully-lighted room!

When not in use, the Reader folds away, tucks away anywhere, carries everywhere, is instantly ready to set up and use. An important contribution to any microfilm system!

SPECIFICATIONS:

Screen Size: 10" x 10"

Magnification ratios:

For aperture cards: 7x and 15x

For microfiche and roll film projection, 11x, 17x and 22x

Controls: ON, OFF; knob control vertical adjustment, manual horizontal adjustment, focus; plus vertical elevation for sit-down viewing

Cooling System: Optical heat filter plus forced draft blower

Dimensions:

open: 22" h. x 13" w. x 17" d.

closed: 9" h. x 13" w. x 17" d.

Weight: 19 pounds

Power Requirements: 110-120v, AC, 50-60 cycle

Power Consumption: 150 watts

Folds away for portability . . . sets up in an instant . . . anywhere!

Carrier accepts microfiche, micro-jackets and aperture cards. Holds them flat between heavy layers of piano-parallel optical glass.

Fine focusing control assures clear, clean, sharp image projection.



MJR 85A PORTABLE MICROFILM READER



Microfilm products developed by

atlantic microfilm corp.

Spring Valley, N.Y.

ATLANTIC F66 READER

the first and only desk-top microfiche reader priced under \$100!

- Bottom loading — single knob controls all fiche movements
- Compact size—for uncluttered desk-top operation
- Non-glare, 8½x11" rear projection viewing screen

The totally new Atlantic F66 Reader breaks the price barrier . . . as the first microfiche reader at less than \$100! Yet, the F66 has features you'll not find in many high-priced readers.

The versatile F66 accepts all COSATI-standard microfiche, and micro-jackets up to 4x6; optional carriers are available for other formats, as is a roll film attachment for 16mm and 35mm microfilm rolls. The choice of 19x or 24x magnifications accommodates all standard microfiche.

Light intensity can be adjusted to your preference,

and the high quality optical system provides even illumination over the entire viewing area. For easy maintenance and bulb replacement, the entire optical system is accessible by raising the hinged door. Still another feature is the Alpha-Numeric image finder that tells you instantly the exact fiche row and location of the image being viewed.

SPECIFICATIONS:

Screen size: 8½x11"

Magnification ratios: 24x (supplied); 19x (optional)

Controls: On/Off light intensity switch, single knob for fingertip focusing adjustment, single knob for vertical and horizontal adjustment.

Dimensions: 20" h x 10" w x 16" d

(Requires less than 1 sq. ft. desk space)

Weight: 12 lbs.

Power requirements: 110-120v, AC, 50-60 cycle

ATLANTIC F66 READER

- accepts all COSATI-Standard microfiche; accessories available for other formats
- instant image location
- interchangeable lenses
- one-knob control



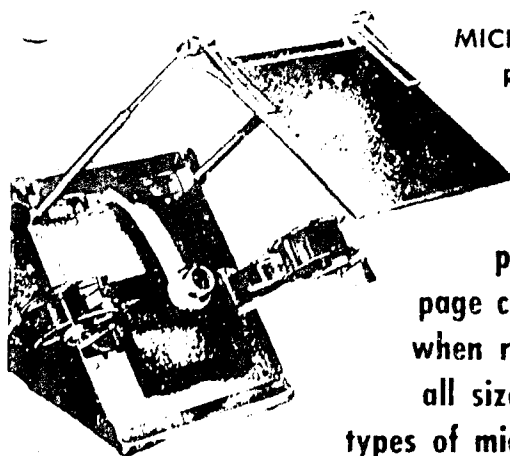
another milestone in microfilming from

atlantic microfilm corp.

Spring Valley, N.Y.

THE *Dagmar Super*

MICROFILM
READER



printed-
page comfort
when reading
all sizes and
types of microfilm



■ Only the Dagmar Super Microfilm Reader is so advanced in design as to provide in one unit a means of reading comfortably all microfilm forms.

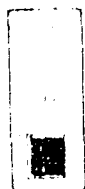
THE *Dagmar Super* MICROFILM READER



35mm
Rollfilm



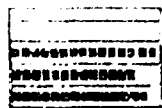
16mm
Rollfilm



Aperture
Cards



Microfiches
Microfilmsheets



Strip film, mounted
or in jackets

- A portable microfilm reader years ahead in its functional design and precision performance yet priced within every budget.
- Operates silently.
- Image is read at a comfortable, normal reading position in moderately lighted rooms.

COMFORTABLE READING IN LIGHTED ROOMS

No more eye strain from peering into darkened hoods or from the glare of glass screens. Bright, sharp images are projected into natural reading position on table-top. Any non-glazed white or off-white paper serves as a viewing screen.

BRILLIANT IMAGES — SPECIAL LAMP SYSTEM

The projector designer's ideal of the high intensity point source of light is achieved in the Dagmar Super by converting the current down to low voltage for use with a rugged filament six volt lamp which gives maximum brightness, and longest filament life.

SHARP IMAGES — PRECISION LENS SYSTEM —

FINGER TIP FOCUSING — Highest quality ground condenser and projection lenses assure razor sharp images. Parabolic mirror behind lamp affords maximum use of light available. Surface silvered plate glass mirror provides distortion-free projection to table-top. Lens is finger tip focused by turning lens tube.

SUPERB WORKMANSHIP — GREY CRYSTAL

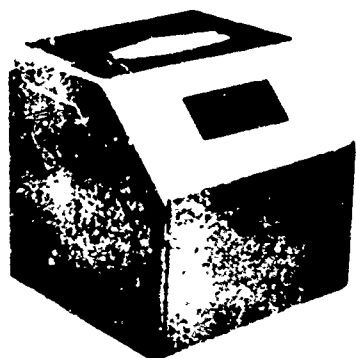
FINISH — The craftsmanship in the Dagmar Super combines functional utility and beauty. Only the best in materials and design assure long trouble-free service. In operating position or in its carry case it is modern in line and appearance. It is the successor to Dagmar I which has been in use around the world for many years.

GEARED UP ROLLFILM ADVANCE

One turn of the handle gives several turns of the film reels to save time in scanning 16mm and 35mm rollfilm. This feature is especially helpful to readers of newspaper and journal files.

CONVENIENT PORTABILITY — COMPACT,

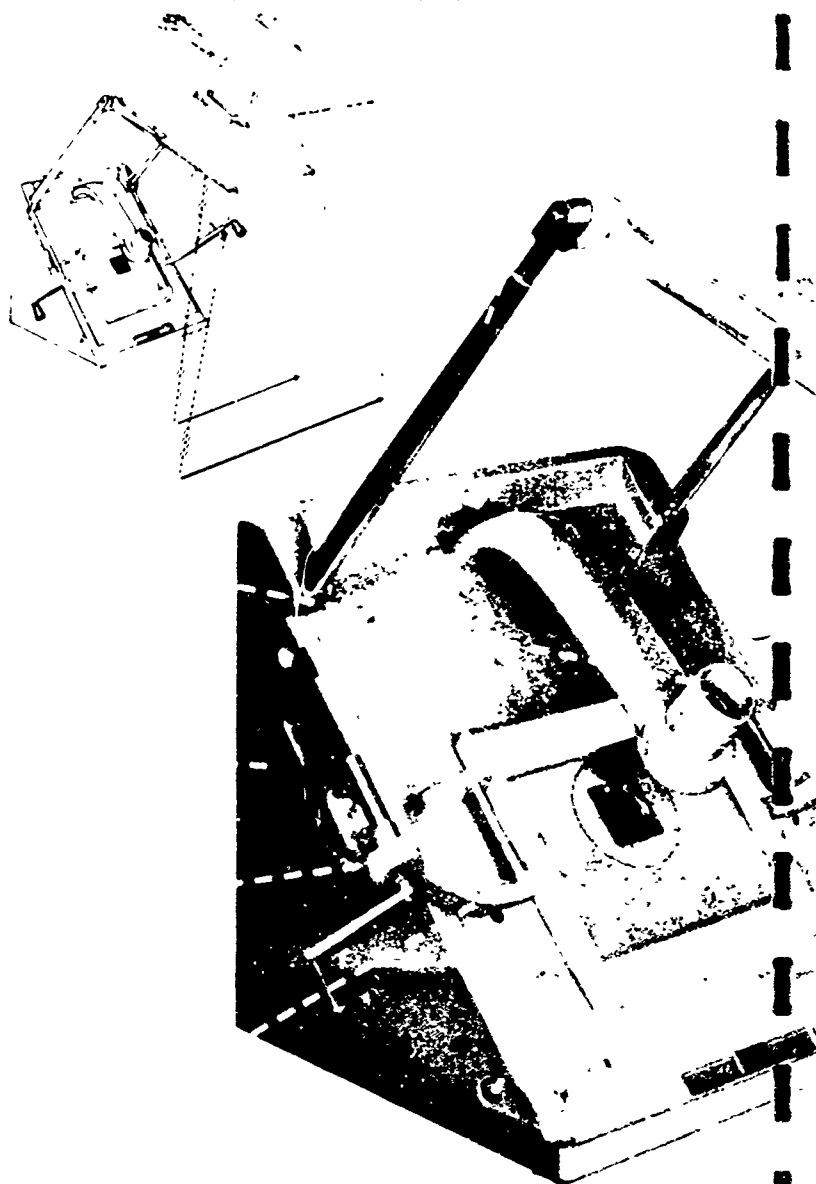
LIGHTWEIGHT — In its rugged carry-case the Dagmar Super measures only 9 inches on each edge and weighs 16 pounds. It is the perfect reader for space saving in a microfilm reading room and for the student or researcher who wishes to carry a reader to office, to home or on a traveling research assignment.

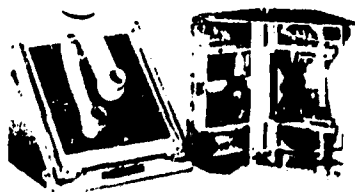


TWO SECOND CHANGE FROM ROLLFILM TO SHEETFILM AND APERTURE CARDS — Reel arms snap in or out of secure sockets in seconds. Reel arms accommodate 35mm or 16mm rollfilm. Teller spools prevent scratching of rollfilm as it is guided into cover glass. With arms removed the surface is obstruction free for projection of all types of sheet film types: microfiches, microfilmsheets, aperture cards and film jackets.

ZOOM MIRROR GIVES WIDE RANGE OF IMAGE SIZES

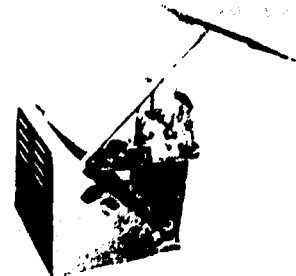
— By moving mirror on its telescopic axis magnification can be varied through a wide range without the trouble and expense of extra lenses. Only the Dagmar Super offers this outstanding convenience.





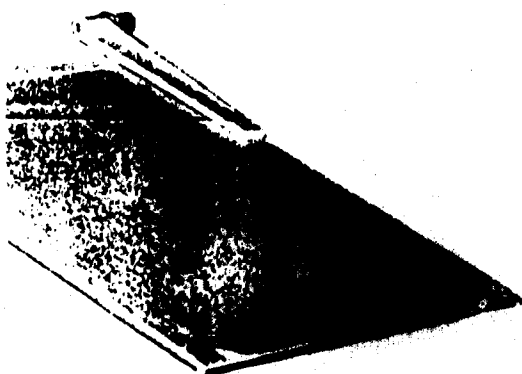
BUILT-IN MIRROR AND SUPPORT ARMS

Mirror and telescopic supports slide into storage position under the lens. Reel arms snap into holders inside cover. Line cord and filmsheet holder rest in special clips inside cover. Nothing need be carried outside the carry case.



EASY LAMP REPLACEMENT— SPARE LAMP HOLDER INSIDE

No experienced mechanic is needed to replace the lamp. Removal of two screws permits lifting of hinged front panel. Spare lamp rests in carry clip. Simple base makes easy installation in seconds.



EASY RE-ENLARGEMENT PRINT MAKING

Standard papers can be used for making photostatic type copies in minutes in partially lighted rooms. Faster photographic papers can make copies in seconds in dark rooms. Zoom mirror allows fingertip control of size of re-enlargement.

LONG LIFE LAMP—SAFETY FUSED LINE CORD

The high intensity, rugged filament lamp can withstand jarring of case even when burning. A new type cord plug has small cartridge type fuses to protect the Dagmar Super at all times.

SILENT, COOL OPERATION

Even a room full of Dagmar Supers would afford reading room comfort. The skillfully designed lighting system and housing requires no noisy fan for cooling. Cooling takes place through convection ribs which leave no hot spots uncomfortable to touch and which provide absolute safety for film materials.

SCANNING LEVER

Movement of the scanning lever allows viewing of every section of microfilm documents which extend to the edge of 35mm rollfilm.

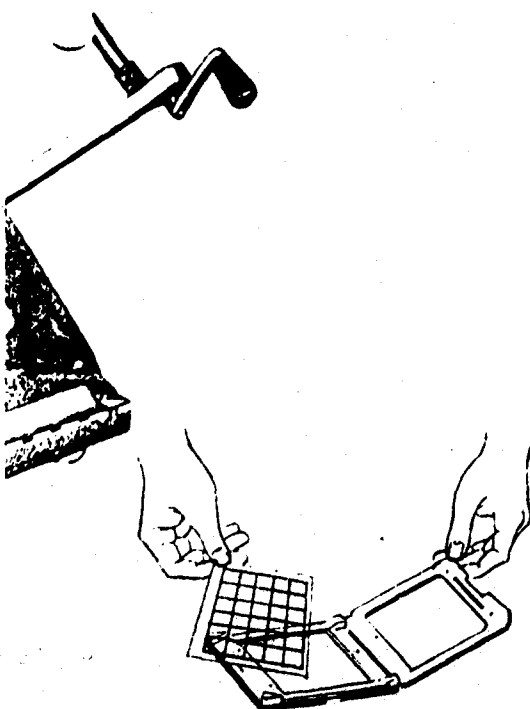
LOWEST COST—MOST FEATURES

Enlarges 12 to 20 times and is especially suitable for Rollfilm, Aperture Cards, Microfiches, Mounted Strip Film, and Film Jackets. Scanning lever allows viewing of every section of full width 35mm film. Each Dagmar Super Microfilm Reader is supplied with carry case cover, lens, zoom mirror, reel arms, magnetic microfiche holder, spare lamp, 16mm take-up reel and 35mm take-up reel.

MODEL A DAGMAR SUPER.....\$159.95 each

The Model 35 Dagmar Super which enlarges 10 to 15 times is designed especially for projecting micro-images of documents, filmed in lower reduction ratios, which must be viewed in their entirety, such as blueprints or music manuscripts.

MODEL 35 DAGMAR SUPER.....\$179.95 each



MAGNETIC MICROFICHE, FILMSHEET AND APERTURE CARD HOLDER

The specially designed filmsheet holder has built in magnets which hold it any place on the projection surface and allow easy movement from frame to frame. It also serves as the cover glass for rollfilm use. The hinged cover is held closed by magnets to provide distortion free images throughout the field. Glass panels are encased in high impact plastic.

All Dagmar Super Microfilm Readers, made in Holland by expert craftsmen who have made microfilm equipment for years, operate on standard 50 to 60 cycle alternating current. A built-in voltage switch allows operation on American and foreign voltages (110, 125, 140, 220, 240).

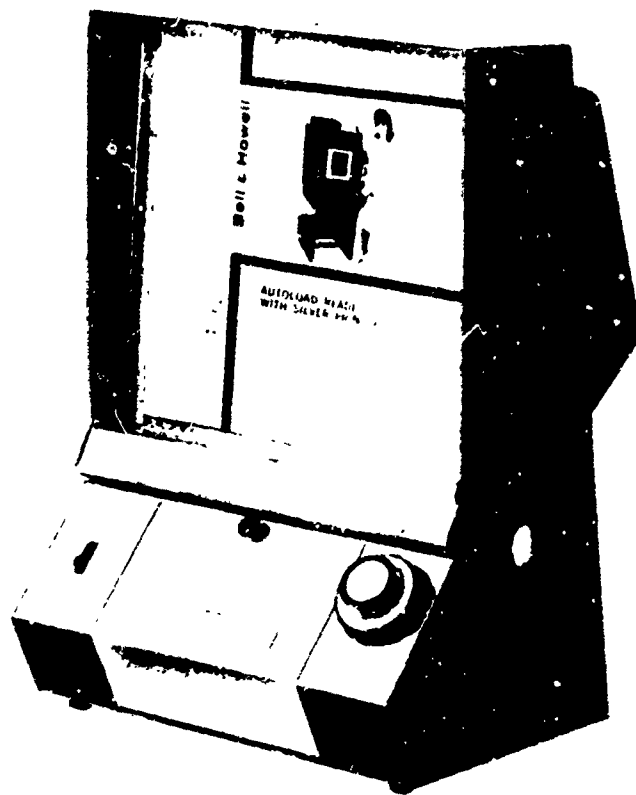
EASY-TO-OPERATE
QUALITY MICROFICHE
READER

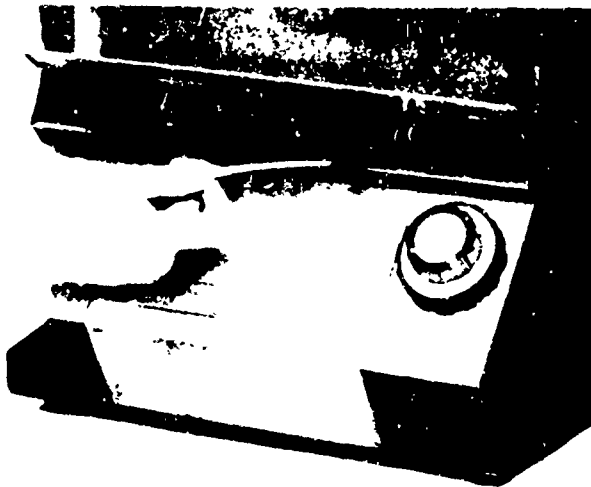
HEADLINER MICROFICHE READER

Microfiche users have long felt there is a need for a quality Microfiche Reader that is reasonably priced yet simple to operate. The new Bell & Howell Headliner Microfiche Reader fulfills this need. It combines the simplest controls available on any Microfiche Reader with the quality for which Bell & Howell is so well known throughout the world.

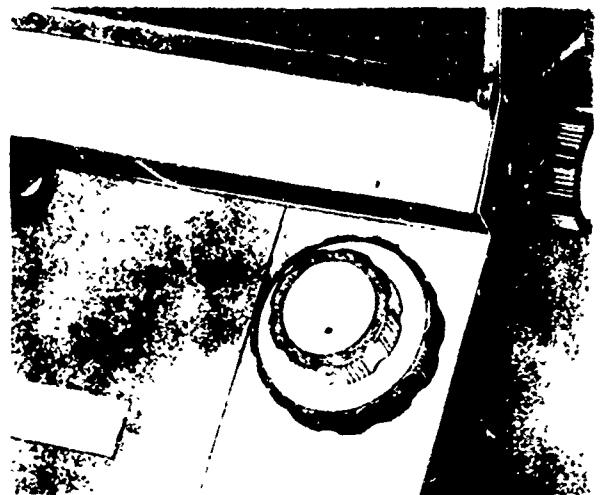
The large screen available on this Reader combined with unusually bright illumination and quality optics produces sharp images that make the reading of anything easier and faster than ever before. The Headliner includes a direct-dial control dial for fast location of the desired image and full 360° image rotation with a single control. It is unusually sturdy in construction so that it can take years of constant use. The Headliner will accept standard 4" x 6" Microfiche or Jackets.

This outstanding Microfiche Reader offers excellent reading of both positive and negative fiche. Glass flats separate automatically for easy insertion and close automatically when the fiche is moved into the viewing position. If you have been waiting to buy a Microfiche Reader that meets *all* your requirements—or if you are thinking of purchasing additional Microfiche Readers the Headliner is the answer to your needs.





Insertion of Microfiche is simple. Fiche is inserted by handling the title strip only.



Dual dial control provides the capacity to locate the desired image quickly and accurately.

BELL & HOWELL MICROFICHE READER

Specifications

TYPE OF FILM: The Headliner will accept standard 4" x 6" Microfiche (105mm x 148mm) either positive or negative. It will also take 4" x 6" acetate jackets.

LOADING: Two glass flats open automatically when dial is turned to loading position. They close automatically as fiche is moved into viewing position. Fiche is handled by title strip at all times. Flats are easily removable for cleaning.

TRANSPORT: Dual-dial finger tip control permits operator to move fiche either horizontally or vertically. Dials can be calibrated for any standard fiche format providing fast location of desired image.

MAGNIFICATION: 24X.

SCREEN: The reader screen is translucent, blue tinted, 14" x 14" square, available in smooth or non-glare finish. It is shielded by a hood projecting 3" from the top of the screen.

IMAGE ROTATION: Any image may be rotated a full 360 with a control at the side of the reader.

CONSTRUCTION: The headliner is a sturdy, heavy duty unit. Frame construction is of sheet steel.

COLOR: Metallic Blue.

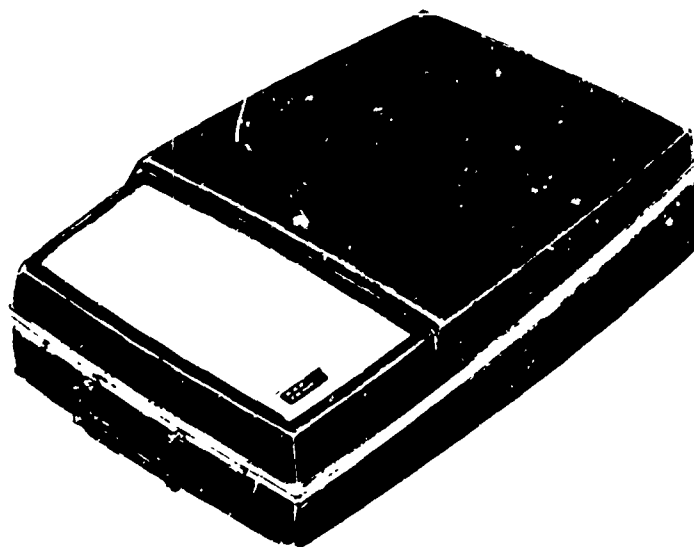
DIMENSIONS: 24" high, 19" deep, 16" wide.

WEIGHT: 38 pounds.

POWER REQUIREMENTS: 115 volts, 60 cycle, AC.

6300 McCORMICK ROAD • CHICAGO, ILLINOIS 60645

In Canada Bell & Howell Micro Data products are distributed by Ditto of Canada, Ltd.



Quality . . . Low Cost . . . Portable
Bell & Howell
Mascot Portable Microfiche Reader

Users of microfiche require two things in a reader: 1. A quality reader that provides sharp images, and 2. A screen for easy viewing.

Recognizing this need, Bell & Howell has introduced a new portable microfiche reader that includes the fine quality optics for which Bell & Howell is famous and is light enough in weight to be completely portable. It is called the Mascot. In addition to quality and portability, the Mascot Reader is among the lowest cost fiche readers available today.

Compactness does not always mean a unit will be simple to operate. However, in the case of the Mascot, *anyone* can learn to use this unit in a matter of seconds. It is so modern in appearance that the average person would consider it a piece of luggage (and the fact that it weighs only 15 pounds makes it lighter than most pieces of packed luggage). The Mascot can be carried any place, it can be used in your office, home, auto, or anywhere convenient to you. This unit can be set up or closed easier than a portable typewriter.

In use the Microfiche Reader has an exceptionally large (11" x 11") screen which provides outstanding readability. This unit is versatile—it can handle microfiche or jackets up to 6" x 6". It is a remarkably durable unit and includes a long-life lamp.

The Mascot Microfiche Reader opens up brand new areas for the use of microfiche. For example, with a wall projector attachment, the Mascot can be used to project important data, on microfiche, for use in conferences or groups. In addition, this attachment is particularly appropriate for use in schools where the need to project information to groups is frequent.

THE MASCOT PERMITS YOU TO BRING THE READER TO THE WORK. Most important, it eliminates the problem of using inferior equipment because of budgetary problems. The Mascot is the finest fiche reader, in its class, available today. It is made to the same quality standards required of all Bell & Howell equipment.

Micro-Data Division

MASCOT PORTABLE MICROFICHE READER

SPECIFICATIONS

FILM:	Will accept standard 4" x 6" microfiche (positive or negative) and 4" x 5" jackets. 6" x 5" flats permit rotating of fiche.
LOADING:	Two glass flats automatically open and close for fiche insertion and removal. The flats are easily removable for cleaning.
IMAGE SCANNING:	Movable film holder allows quick reference to documents over a visible grid plate. Image finder provides pinpoint location of any page. Grid plate formats are interchangeable.
MAGNIFICATION:	21 X
SCREEN:	Large 11" x 11" screen; translucent, blue tinted and removable. Glare shield eliminates outside light and reflections.
PORTABILITY:	Durable lightweight case with carrying handle. Flats lock in place when transporting. Microfiche storage case included.
DIMENSIONS:	7" high, 13" wide, 20" deep.
WEIGHT:	15 Lbs.
POWER REQUIREMENTS:	117 volt, 50/60 cycle, AC—12 volt D.C.
LAMP LIFE:	Minimum 500 hours.
OPTIONAL FEATURES:	Automobile Cigarette Lighter Plug in. Auxiliary power pack. Wall projection attachment for conferences and meetings.

Bell & Howell
Micro Data Division

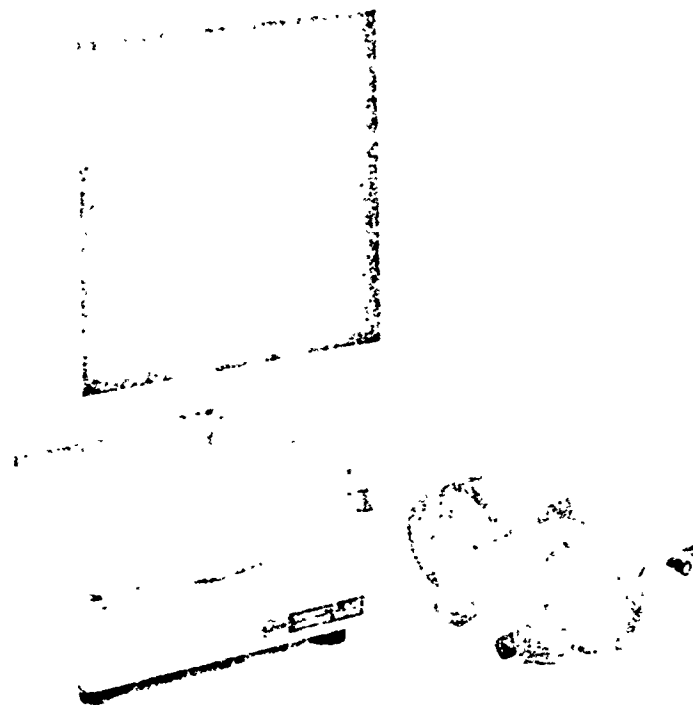
6800 McCORMICK ROAD • CHICAGO, ILLINOIS 60645

In Canada Bell & Howell Micro-Data products are distributed by Ditto of Canada, Ltd., 45 Jutland Road, Toronto 18, Ontario

Canon Documat Universal Reader 300

The Canon Universal Reader has a bright screen and an excellent lens for easy viewing of contrasted microfilm images.

By changing of various attachments and lenses, you can read all types of microfilm such as 16mm and 35mm roll film, microfiche, and film mounted in aperture cards.

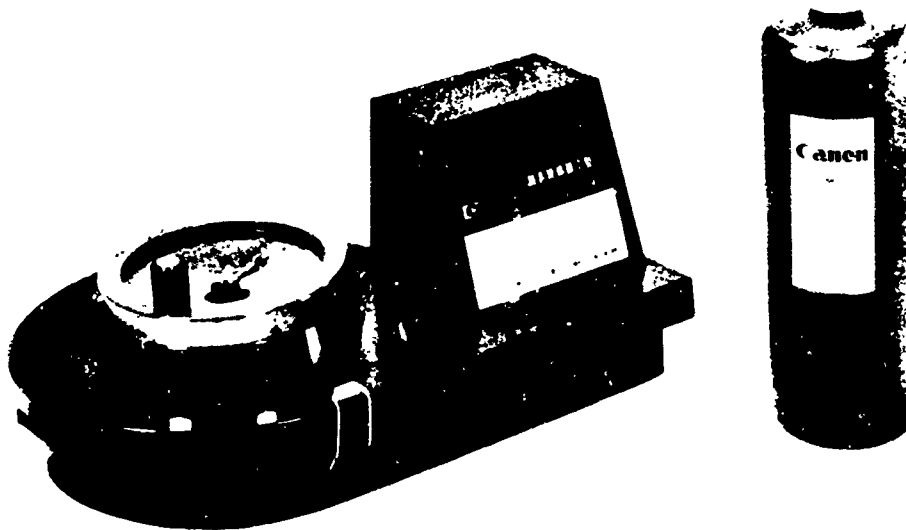


Canon Documat Universal Reader 300

Film	16mm and 35mm roll film, aperture cards and microfiche (aperture 5" x 3")
Lens (magnification)	22mm (32X), 35mm (21X), 45mm (15X), 50mm (13X), 60mm (10X)
Screen size	12" x 12"
Light source	115V, 60 C/S, 110 VA
Dimensions and weight	12" x 16" x 27", 54 lbs.

Canon Monomicrol Developing Tank

This unit is a daylight loading small-size developer for 16mm microfilm only. Anyone can operate this developing unit using the mono-bath Canon Monomicrol CM-3P.



Canon Monomicrol Developing Tank

Developable film length Up to 25 feet (25 R. 50 ft in use)

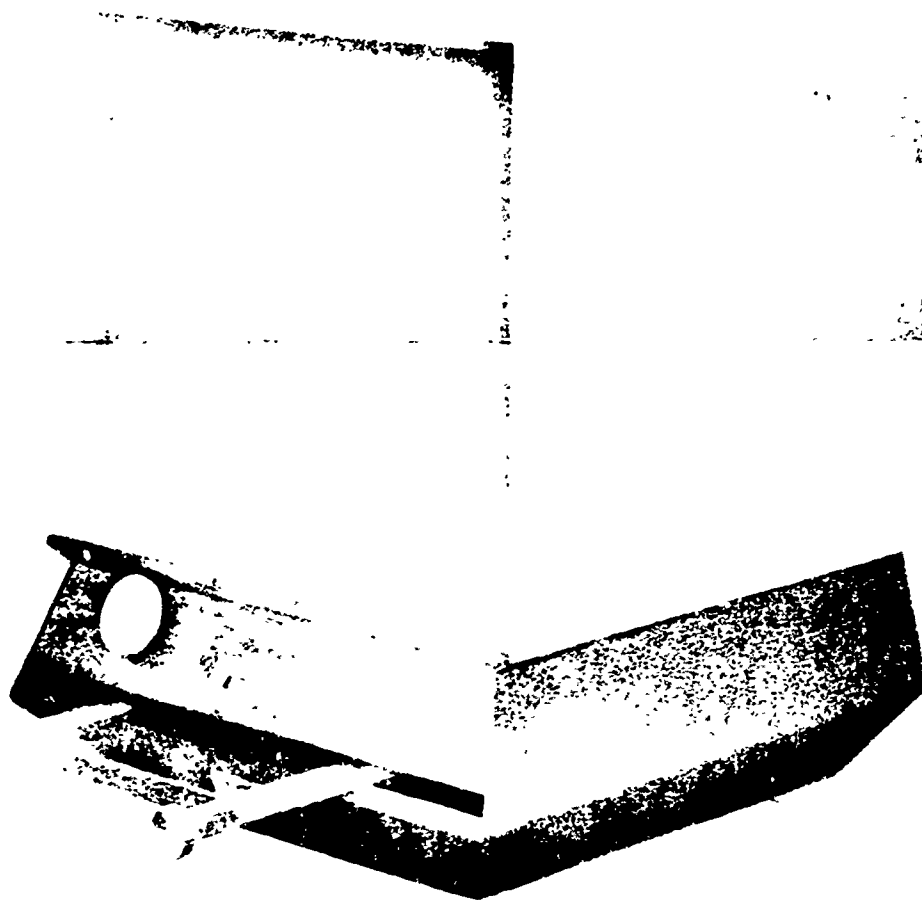
Dimensions and weight 15" x 11" x 7", 5 lbs.

Developing solution Monomicrol CM-3P (100 cc container,
Diluted to 1-3 when used)

* The CM-2P powder for automatic processor is ready for use.

DRS MICRO-READER

MODEL 1114



AN INCOMPARABLE MICROFICHE READER!

The DRS 1114 Micro-Reader represents the latest in microfiche reader design, incorporating the features so necessary for modern microfiche and EDP print-out.

A brilliant, needle-sharp 11" x 14" image is projected at 23 X on the eye-comfort, TV-blue screen by a unique variable illumination optical system, a true engineering masterpiece. The precision 'fiche holder glides smoothly from image to image and is position controlled by a single knob, opening automatically when fully extended.

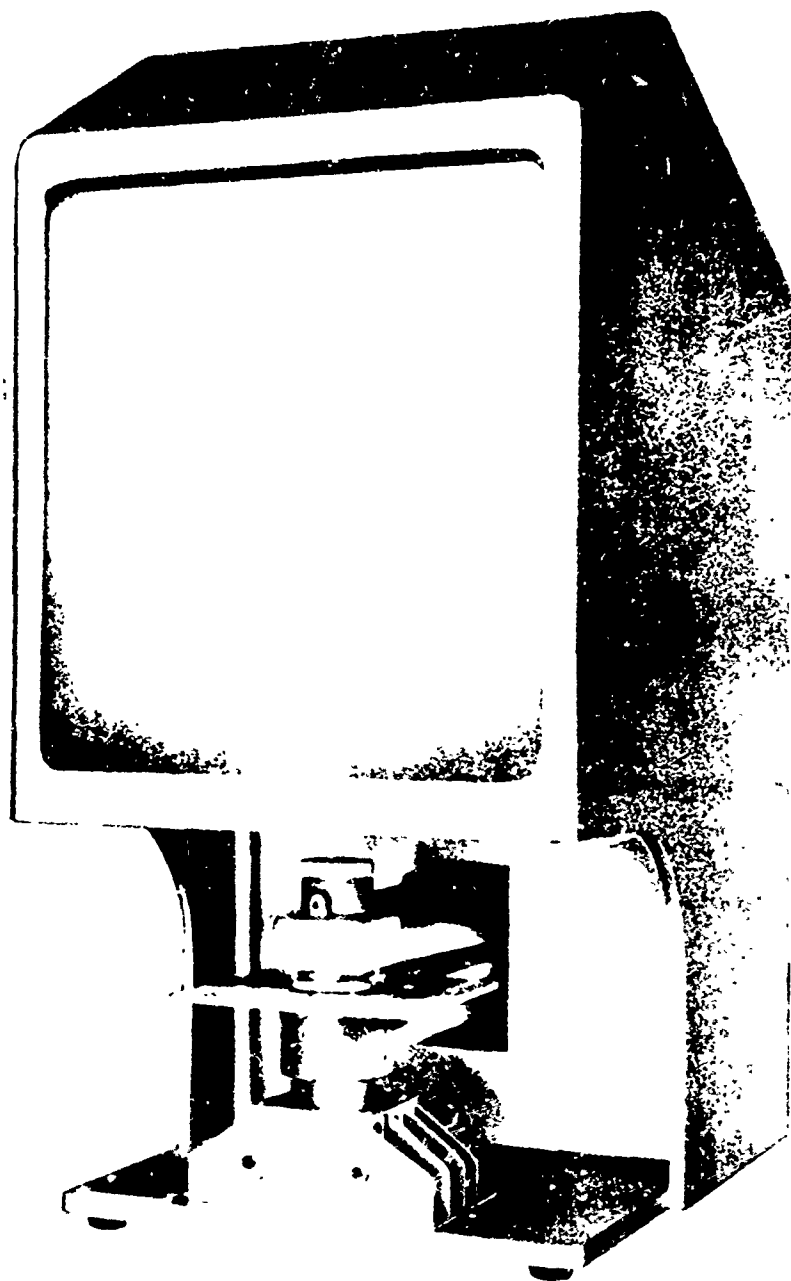
The DRS 1114 occupies just 9"x12" of desk space, with overall dimensions of 14" width, 15" depth, and 17 1/2" height. Ruggedly built and attractively finished in beige and cocoa with walnut trim, the DRS 1114 represents a truly complimentary unit for any office.

Supplied for use on standard 115 VAC.

DRS

DATA REPRODUCTION SYSTEMS • 100 EAST BEACH AVE. INGLEWOOD, CALIFORNIA 90301

DIETZGEN 16mm and 35mm Filmcard Reader for viewing Microfilm mounted in EAM, Jackets and Aperture Cards



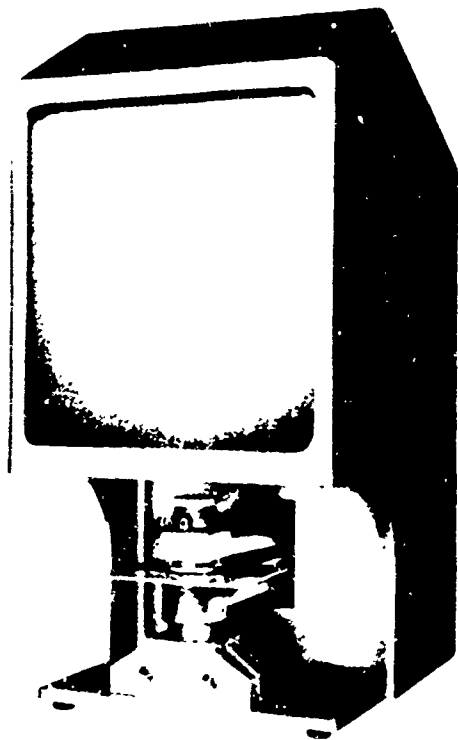
GRISCOMBE Model Series KE

17X magnification — Catalog No. 4312-17
24X magnification — Catalog No. 4312-24
30X magnification — Catalog No. 4312-30
43X magnification — Catalog No. 4312-43

DIETZGEN

puts the accent on quality

DIETZGEN 16mm and 35mm Filmcard Reader for viewing Microfilm mounted in EAM, Jackets and Aperture Cards



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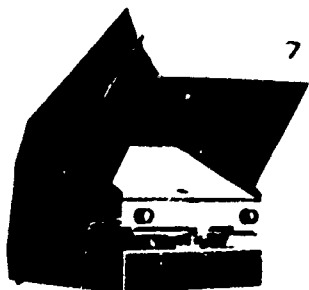
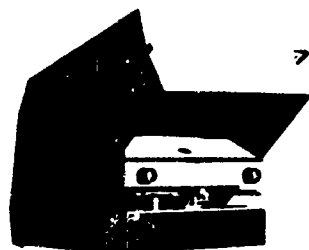
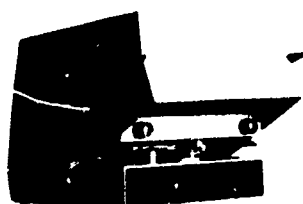
DIETZGEN

SPECIFICATIONS:

1. **Screen:** 12 x 12 inches. Special translucent screen of newly developed plastic crystals transmits the light brilliantly, sharply and without the sparkling effects found in ordinary ground glass screens.
2. **Film Card Size:** Any size up to 6 1/2 inches by unlimited length. It is unnecessary to move the lamp house or make any adjustment to accommodate large size film cards.
3. **Lenses:** Of excellent quality, produce flat, undistorted images. Four interchangeable lenses are available to permit a wide range of magnification: 17X, 24X, 30X and 43X.
4. **Lamp:** An inexpensive low voltage high intensity lamp to give even and brilliant illumination over entire screen. It is easily replaced with no adjustments required.
5. **Image Constantly in Focus:** During film movement and scanning — a most desirable feature.
6. **Power:** 100-200 volts a.c. 50-60 cycles, 100 watts.



Available soon . . . from Documentation Incorporated



10

FOR MICROFICHE AND ROLL FILM



Features:

- Opaque reading surface
- 90° swivel microfiche holder
- Reads all NMA Standard fiche including 5" x 8"
- Accommodates acetate jackets
- Fan cooling
- Instant open/instant close
- Portable/Lightweight/Compact/Rugged
- Vinyl-laminated aluminum case
- Long-life, shock-resistant light source
- Brilliant full-surface illumination
- Ultra-sharp magnification
- 15mm Roll-film attachment available as accessory \$30
- Low cost: *F.O.B. Bethesda, Maryland*



The Doc Inc 1010 READER incorporates more attributes in one package than any other reader—at a price every budget can afford.

Designed by one of the world's largest producers of microfilm to satisfy multiple office needs in the fast growing field of microfilm documentation.

With its quick opening, self-contained case, the lightweight portable 1010 READER can be easily used in an office . . . a laboratory . . . a library . . . at home.

The opaque reading surface, angled at 25°, assures comfortable sharp image viewing with no eye strain.

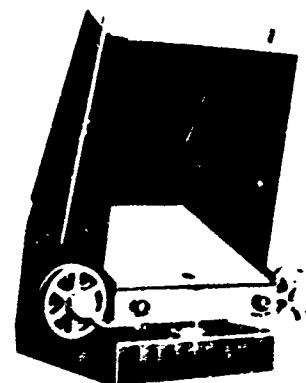
The 1010 READER accepts all NMA Standard microfilm including the 5" x 8" format as well as strip film in acetate jackets.

The 1010 READER features a swivel film holder to permit rotating the image without removing the film.

A fan cooling system maintains an even low temperature to protect the film from heat damage.

DOC INC engineers have designed the 1010 READER to accommodate the NMA Standard 18:1 reduction ratio for microfilm.

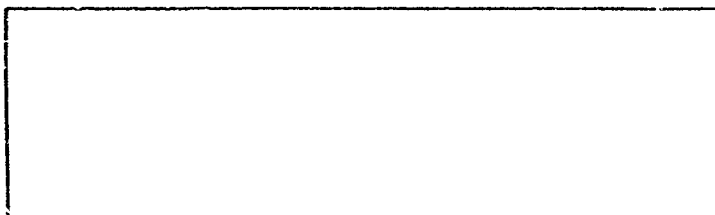
The 1010 READER is a handsome piece of office equipment finished in a blue vinyl-laminated aluminum case. When closed, it can be stowed under an airplane seat. When in use, it occupies no more desk space than a sheet of paper.



SPECIFICATIONS:

Film Format:	Any microfilm, up to and including 5" x 8" size and 16mm roll film with special attachment
Screen Size:	10" high and 10" wide
Reading Surface:	Opaque
Magnification Ratio:	18:1 standard; 19.7:1 also available
Case Size:	20" high x 11" wide x 13" deep—in use 14" high x 11" wide x 9½" deep—closed
Weight:	14¼ pounds
Light Source:	100 watt, 20v lamp, transformer powered and blower cooled
Power Requirements:	115vAC, 60 cps, 1.5 amps with integral cord storage on case bottom

Please address all inquiries and orders to:





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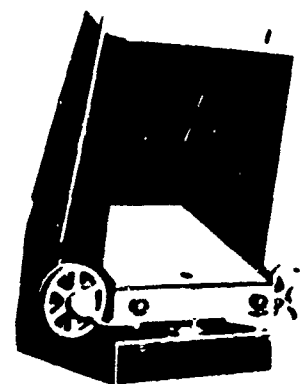
The 1010 READER accepts all NMA Standard microfiche including the 5" x 8" format as well as strip film in acetate packet.

The 1010 READER features a swivel fiche holder to permit rotating the image without removing the fiche.

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DOCUMENTATION INCORPORATED

4833 Rugby Avenue, Bethesda, Maryland 20014
(301) 656-9500



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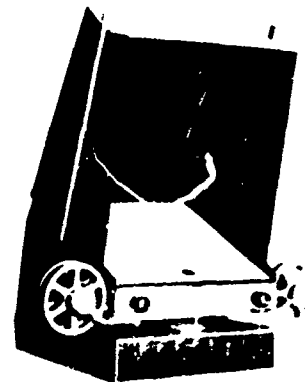
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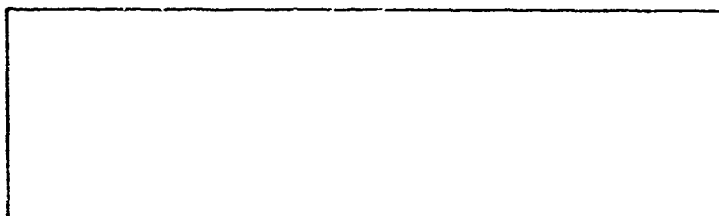
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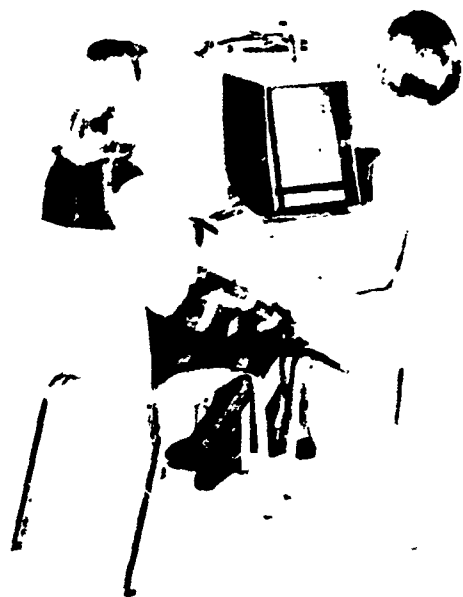


A top quality Microfilm Reader for only \$125.

This reader not only matches the features of expensive models, but it has a few new features of its own.

- IT'S SMALL - 1' deep x 1' wide and 2' high.
- IT'S LIGHT - weighs only 22 pounds.
- IT'S COOL - operates at 140° without a fan.
- IT'S BRIGHT - 9" x 13" gray screen with non-glare coating. Variable lamp intensity control.
- IT'S VERSATILE - it accepts both 35mm and 16mm roll film, fiche, jacketed and aperture-card-mounted film.

27A5 READER	\$110.00
99A286 Roll Film Adapter	\$45.00
99A287 Microfiche Holder	\$15.00



DUKANE CORPORATION
Special Products Division
St. Charles, Illinois, U.S.A. 60174



TOTAL

NEW

microfiche viewer-scanner

No. 52 2034

The Micro-Master Microfiche Viewer-Scanner has been designed to provide a top quality, low cost, compact unit for viewing microfiche sheets. The film is magnified 15 times on a 10½" x 12" screen. The unit is compact and requires only one square foot of desk-top space.

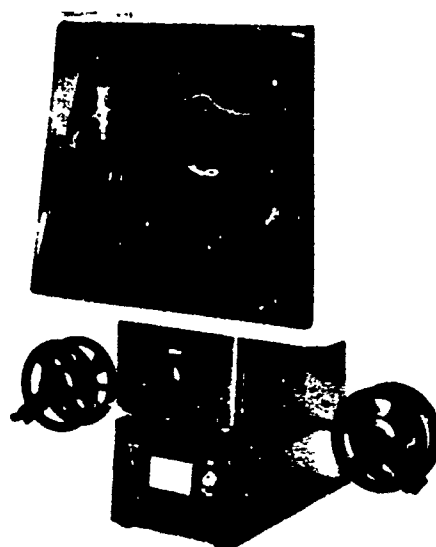
A single scan knob controls both horizontal and vertical scanning operations. A focus knob permits quick, fine focusing for a sharp, clear image. Specifications for overall dimensions and lamp are identical to the 52 2008 model.



(For left side mounted aperture cards)

This unit is similar to the 52 2008 but allows use with aperture cards having the microfilm mounted on the left side of the card. The unit also accommodates both vertically and horizontally oriented images. All other specifications are the same as the 52 2008 unit.

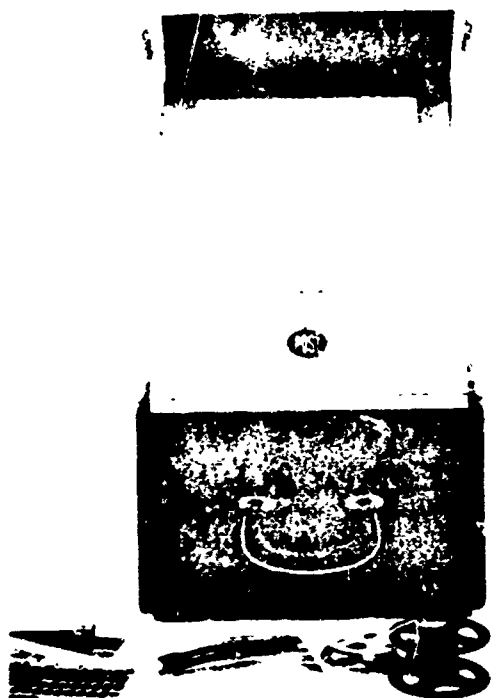
This adapter attachment is used with 52 2030 Viewer-Scanner where both roll microfilm and aperture cards are used. The adapter will handle 100 foot rolls of both perforated and non-perforated 16 and 35mm film. Unique design of the adapter allows for scanning of each image. Glass flats on the unit are easily removed for cleaning.



KEUFFEL & ESSER CO.

**Twin-Turret
Microfilm
Reader**
Cat. No. 620-00

for Microfiche, Micro-Jackets, Aperture Cards, Sheet Film
Accommodates all flat film sizes up to 5 x 8 in.
(Roll-Film Accessory Attachment Available)



**INSTANT SELECTION OF
MAGNIFICATION**

plus Mechanical Film Scanning

plus Portability

plus Brilliant Image

Designed for universal use with all "flat" microfilm forms. The film is placed in the special 8 x 5 in. mechanical slide carrier. Lateral adjustment is easily accomplished by fingertip movement of the carrier; vertical adjustment by turning the large knob on the front of the unit.

The dual magnification feature allows you to see the entire film frame reproduced on the screen. Selected areas may then be magnified to twice original size, in a fraction of a second, by rotating to the other lens.

FEATURES

SCREEN

10 x 10 inches. New "lens-screen" produces brilliant image, no sparkling effects.

MAGNIFICATION

11x and 22x standard. 8x and 15x also available.

PROJECTION LENSES

High quality, flat undistorted images, easily focused by small control knob located on the front of the reader.

FILM CARRIER

Film is held flat by heavy optical glass flats, assuring uniform focus in all areas.

OPTICAL SYSTEM

150 watt projection lamp, excellent condenser system to insure brilliant even illumination; heat filter and blower unit to protect film and jackets. Lamp, condensers and heat filter easily removed for cleaning or replacement. Condenser system adjustable from front of reader.

SIZE

Closed: 9 inches high, 13 inches wide, 17 inches deep.
Open: 22 inches high, 13 inches wide, 17 inches deep.

WEIGHT

19 pounds.

POWER

100-120 volts, 50-60 cycles, 150 watts.



FREDERICK POST COMPANY

ATLANTA • CHICAGO 90 • CLEVELAND • DETROIT • ENGLEWOOD, N. J.
HOUSTON • LOS ANGELES • MILWAUKEE • PITTSBURGH • SAN FRANCISCO
SEATTLE • WASHINGTON, D. C. • DEALERS IN ALL PRINCIPAL CITIES

RECORDAK Microstrip Reader • Model PG



© Recordak 1965

RECORDAK MICROSTRIP SYSTEM...

A Whole New Microform Concept — For Fast Information Retrieval

The Recordak Microstrip System is designed for fast reference to active, frequently amended files (directories, inventory lists, credit records, account identification, etc.). In seconds, an operator seated at a Microstrip Reference Station can answer any information request from extensive individually indexed files on microfilm, compacted in Microstrip Holders. As many as 1200 Microstrip Holders, containing up to 1,742,000 lines of information, can be housed in Microstrip Access Files within arms' reach of the operator.

The Microstrip Holder is a rigid plastic sleeve containing strips of 16mm microfilm images up to 12" long. Its color-coded end tab, indexed by subject content, identifies image groups. Individual images within the Microstrip Holder are also indexed by precise "tell-tale" symbols. After the selected Microstrip Holder is positioned in the slot of the Recordak Microstrip Reader, the index selector is moved up to the "tell-tale" index for the requested data which is instantly displayed on the reader screen.

Ideally suited for quick look-ups, the Recordak Microstrip System makes possible fast response to information requests at telephone order desks, credit inquiry stations, and speedy retrieval of such standard data as rate tables, transportation schedules, signature files, and other frequently changing and frequently referenced files. Microstrip components are high in quality, low in cost so that multiple Microstrip Stations for extensive file reference requirements in the busiest organizations can be justified within modest budgets.

FEATURES

MAGNIFICATION Choice of 17.5x or 22.5x

IMAGE ROTATION 360°

SCREEN 14" x 14", tinted green

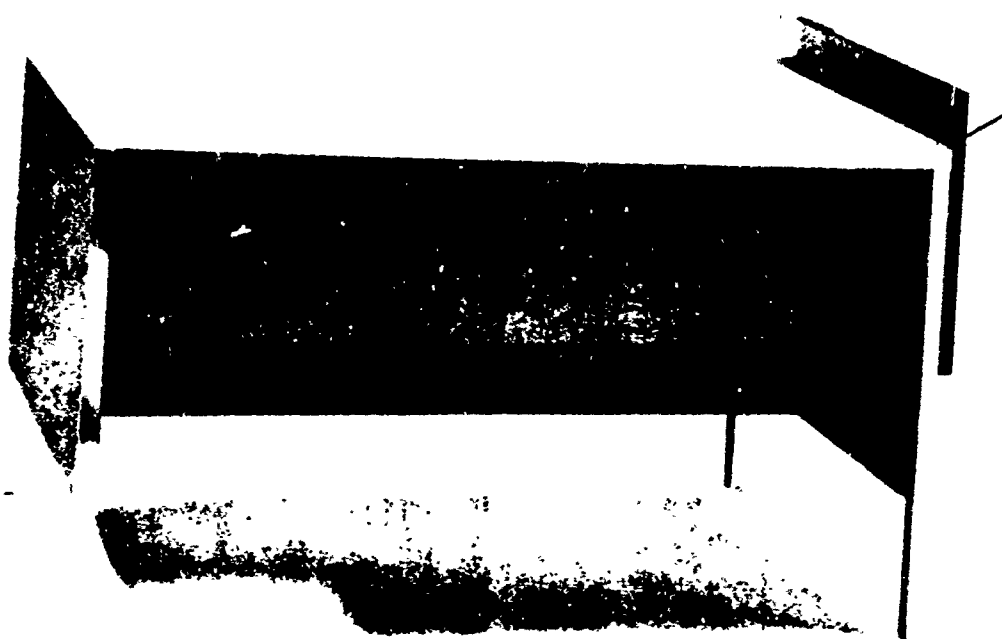
SIZE 20 5/8" high, 21 3/4" wide, 28" deep.

WEIGHT 82 pounds

POWER 117V, 50-60 Cycle AC, 2.9 Amps

RECORDAK CORPORATION 770 BROADWAY NEW YORK, N.Y. 10003 SUBSIDIARY OF EASTMAN KODAK COMPANY

RECORDAK Microstrip Reference Station



An indispensable addition to your Microstrip System

The Recordak Microstrip Reference Station is designed to provide a central work area for use in the Recordak Microstrip System. Constructed of durable steel with a stain-resistant Texolite top, the tubular steel legs of the reference station provide firm support for the Recordak Microstrip Reader or Reader-Printer -- and for up to twelve Microstrip access files. A handy 16" x 30" slide-out shelf, which may be located permanently on the left or right side of the stand, provides additional writing and working space. Beneath the top of the stand is a twelve inch deep storage area for supplies. The reference station features a handsome beige and brown finish and chrome brushed legs; color-coordinated with the finish of the Microstrip Reader.

© Recordak 1965

FEATURES

SIZE 27" high 47 1/8" wide 20 3/4" deep

COLOR Beige and brown

CONSTRUCTION Steel with Texolite top and tubular steel legs

RECORDAK CORPORATION 770 BROADWAY NEW YORK N.Y. 10003 SUBSIDIARY OF EASTMAN KODAK COMPANY

A-1933 10M665(MM)VL

Recordak and Microstrip are registered trademarks of the Eastman Kodak Company

Product No. 3405 Printed in U.S.A.

Images Appear from Microfilm Wand

Data can be quickly retrieved and easily revised

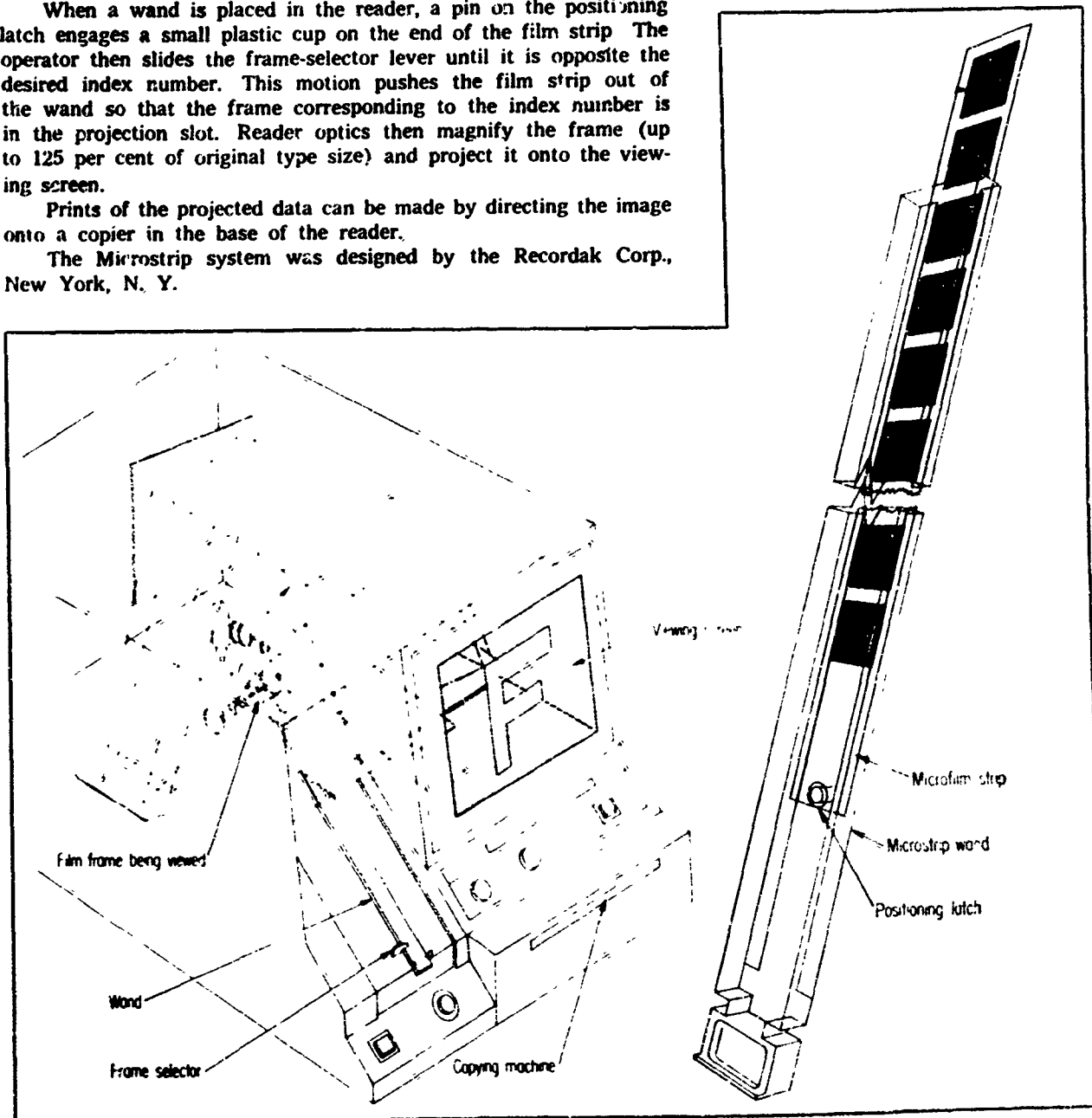
Rigid plastic wands carrying foot-long microfilm strips provide easily accessible data storage units in new Microstrip viewing system. Combining a reader, copy printer, and storage racks, the system is designed for situations where data must be frequently updated and access time is critical, such as an inventory-control center or telephone-inquiry service. About five seconds are required to find the proper wand, insert it into machine, and project the desired frame. An entire 16-mm strip can be easily replaced, or individual frames can be deleted from, or added to an existing strip.

After receiving an inquiry, an operator finds the wand containing the required data by checking the color-coded tab on the end of each wand for a key word or number. For example, if each strip contained 21 consecutively numbered frames, the key number might be the first number of the series.

When a wand is placed in the reader, a pin on the positioning latch engages a small plastic cup on the end of the film strip. The operator then slides the frame-selector lever until it is opposite the desired index number. This motion pushes the film strip out of the wand so that the frame corresponding to the index number is in the projection slot. Reader optics then magnify the frame (up to 125 per cent of original type size) and project it onto the viewing screen.

Prints of the projected data can be made by directing the image onto a copier in the base of the reader.

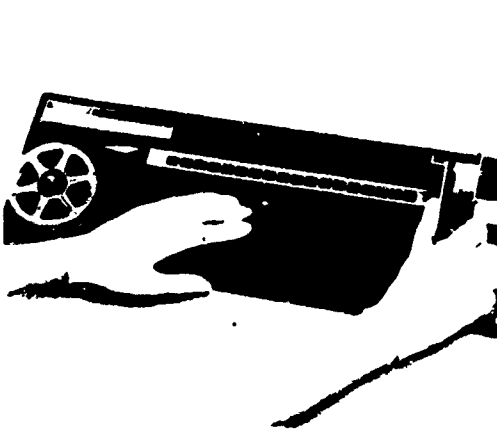
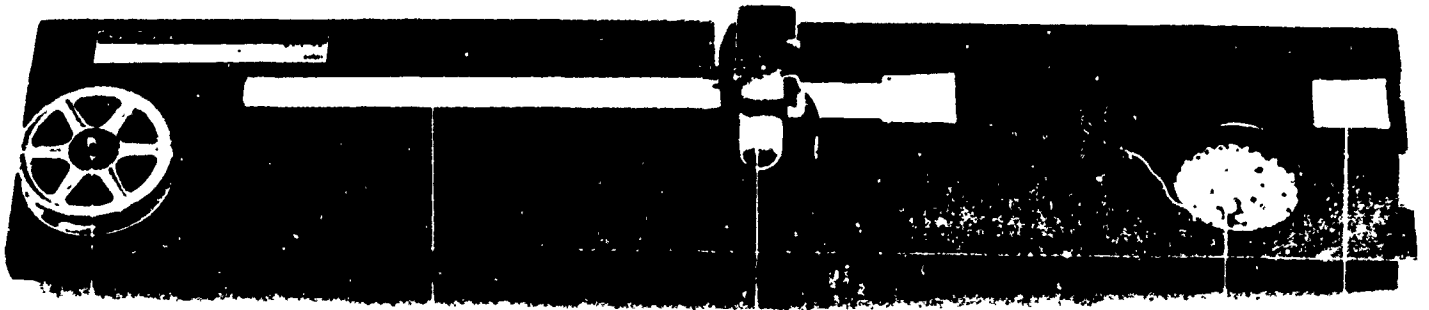
The Microstrip system was designed by the Recordak Corp., New York, N. Y.



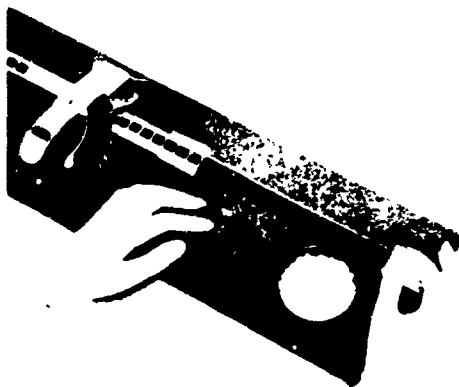
Reprinted from MACHINE DESIGN, December 22, 1965 by

RECORDAK Co./BUSINESS SYSTEMS MARKETING DIVISION EASTMAN KODAK COMPANY 100 Broadway New York, N. Y. 10038

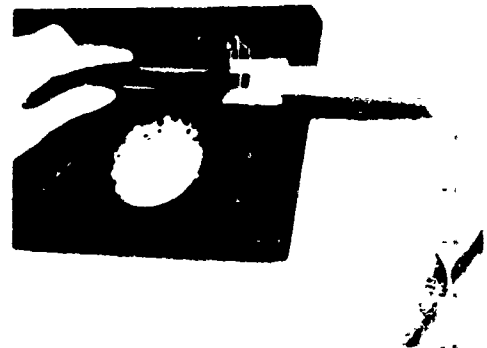
RECORDAK Microstrip Filler



1. Manual cutter and punch cuts microfilm to correct length and punches an accurately positioned hole for the Microstrip eyelet



2. Filler's support fixture protects edges of punched hole as eyelet is inserted



3. Tip of Microstrip Holder fits into niche at the end of support fixture for quick and easy insertion of microfilm

© Recordak 1961

For fast, efficient loading

The Recordak Microstrip Filler enables an operator to prepare filmstrips and load them in Recordak Microstrip Holders quickly and efficiently. The filler includes a sturdy metal spindle (A) for holding the reel of film, a film guide (B) to keep film in place, a combination film punch and cutter (C) and a storage-well (D) for the plastic eyelets (The eyelets engage with the image selector control of the Microstrip Reader). A special support fixture (E) protects the edges of the punched hole while an eyelet is snapped into place. Loading speed, with properly prepared film, averages from six to ten Microstrip Holders per minute.

FEATURES

SIZE 12" x 6" wide 6" deep 4" high

OPERATING PARTS Film punch and cutter

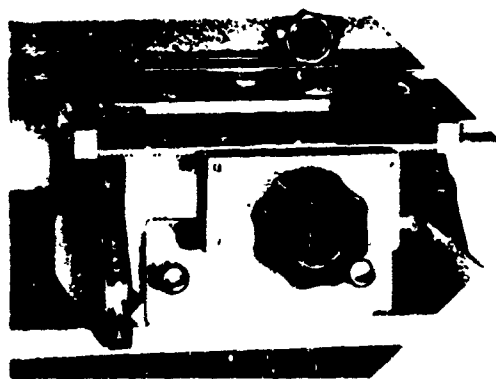
OPERATION Manual

RECORDAK CORPORATION / 770 BROADWAY / NEW YORK / N.Y. 10003

RECORDAK FILMCARD READER • Model PFC-46-1

The *Recordak Filmcard Reader*, Model PFC-46-1 is a low cost, high quality unit designed to provide sharp and clear viewing of microfilm images of Recordak Micro-File Filmcards (microfiche) or microfilm images in film jackets measuring up to 4" x 6" in size.

This simple-to-operate reader has many outstanding features including: code scales for fast identification and retrieval of desired Filmcard images; glass flats that open and close automatically for easy positioning or removal of materials to be viewed. The non-glare screen is tinted to minimize operator fatigue during extended viewing periods . . . is illuminated as the Filmcard is moved into scanning position . . . darkened when the carriage is returned to loading position. Fast image retrieval is facilitated by reference to alphabetical and numerical scales which instantly identify the row in which the desired image occurs and the location of the image within the row. Image selection is accomplished by fingertip control of a single knob positioned at the front of the film carriage.



Recordak Micro-File Filmcards or transparent film jackets are secured in constant focus between glass flats. To simplify placement or removal of Filmcards and jackets, the glass flats separate automatically when the film carriage is moved forward to the loading position.

The reader is compact, lightweight, and sturdily constructed for years of efficient, trouble-free operation.



FEATURES

MAGNIFICATIONS . . . 20X 23X and 26.5X.

The 20X and the 23X PFC-46-1 was specifically designed for viewing jackets and Federal Government format microfiche reduced at 18 to 20:1 reductions.

READER SCREEN . . . 10½" wide by 13½" high - translucent daylight type, green tinted for viewing comfort.

FILM . . . accommodates Recordak Micro-File Filmcards (microfiche) or 16 or 35mm film in transparent jackets. Maximum size of Filmcards or jackets acceptable on the film carriage is 4½" by 6". Maximum view-scanning area of the film carriage is 4" by 6" (103mm x 148mm).

IMAGE RETRIEVAL . . . location of specific images on a Filmcard is implemented by reference to a vertical, alpha scale and a horizontal, numerical scale below the screen on the front of the film carriage housing.

CONTROLS . . . a "fine" focus adjusting knob is located at the lower front center of the screen. A vertical scanning lever and a horizontal scanning knob is located at the front of the film carriage.

GLASS FLATS . . . open automatically when the film carriage is moved forward for loading, close automatically when the film carriage is returned to viewing position.

PROJECTION LAMP . . . 6 volt, prefocus filament. On/off action controlled by the position of the film carriage.

DIMENSIONS . . . 27" high, 13½" wide, 18½" deep.

WEIGHT . . . 48 pounds.

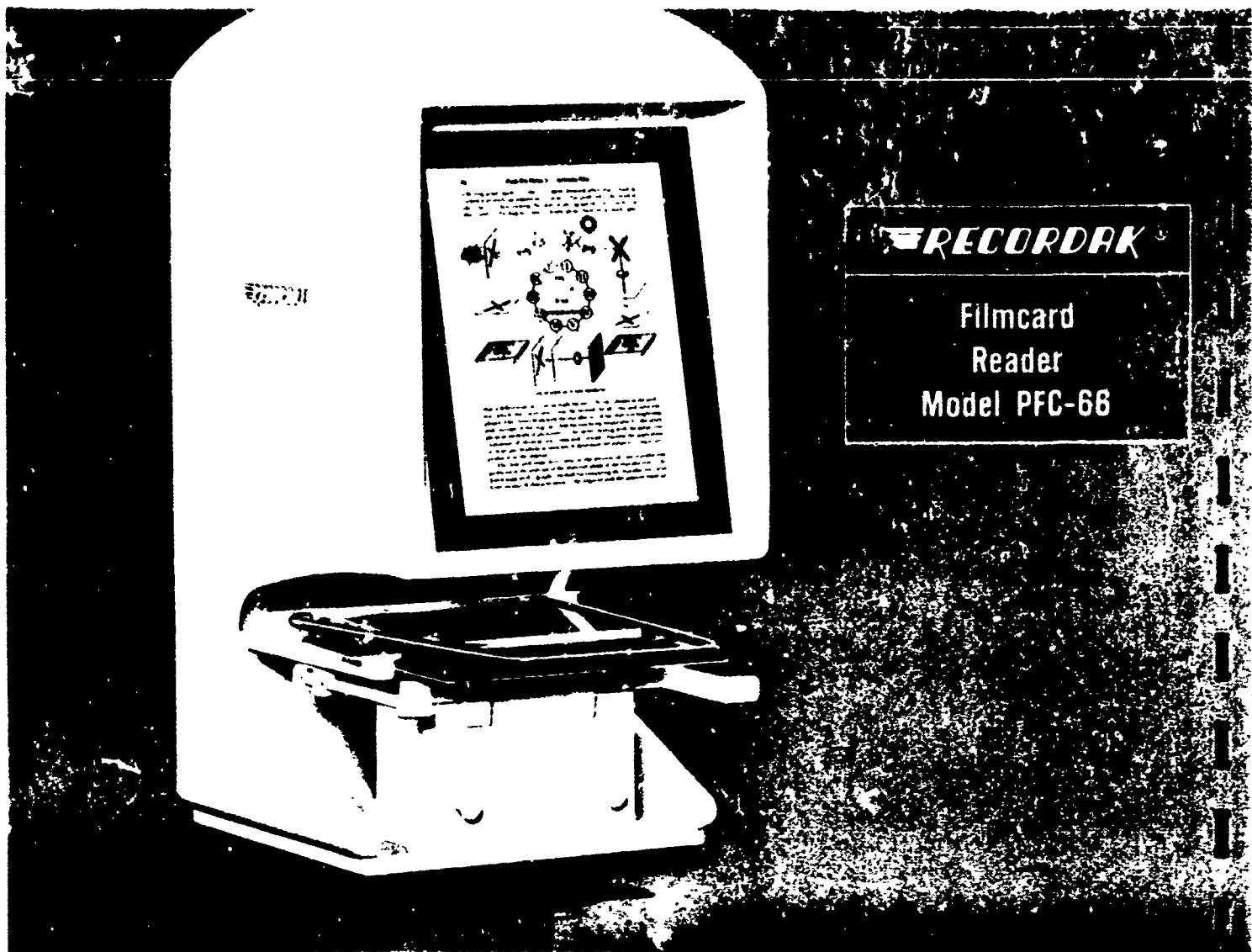
ELECTRICAL REQUIREMENTS . . . 115 volts, 50/60 cycles, .5 amperes, A.C. only, 60 watt

© Recordak 1964

RECORDAK Co / BUSINESS SYSTEMS MARKETS DIVISION / EASTMAN KODAK COMPANY

A-19028 5M166/MM-WL)

770 Broadway New York N Y 10003
Product Nos. 7556, 7557, 7558 Printed in U.S.A.



RECORDAK

**Filmcard
Reader
Model PFC-66**

Low-cost, Semi-portable, Precision-engineered

The Recordak Filmcard Reader, Model PFC-66 is housed in a sturdy shell-steel cabinet, yet is so light in weight (only 31 pounds) that it can be readily carried by its convenient hide-away handle. Because it occupies no more space than an ordinary typewriter, it fits compactly on a desk, a counter-top — or wherever it is needed.

Highly practical, yet modestly priced, the PFC-66 Reader is designed to meet the most exacting performance standards. Glass flats hold the filmcard (measuring 3" x 5", 4" x 6", 6" x 4" or 6" x 6") or film jacket (measuring 3" x 5" or 4" x 6") securely in place to assure sharp projection of any individual image on the green-tinted reader screen. All standard microfiche formats, including those meeting National Microfilm Association requirements, are accommodated by the PFC-66 Reader. A unique "velvet-touch" scanning system, which provides fingertip scanning control, permits the operator to move the film effortlessly in any direction.

Quality construction, portability, low price, ease of operation — all combine to make the Recordak PFC-66 Filmcard Reader ideally suited for reference to microfiche and/or microfilm in libraries, business and government offices, industrial plants — and even research work at home.

FEATURES

SCREEN 8" wide x 10" high tinted green

LAMP 6 volt prefocus filament. One spare lamp provided with each reader.

POWER 115 V., 50/60 cycle, 0.5 amp., A.C. only

FILM CARD (MICROFICHE) AND FILM JACKET SIZE up to 5" x 6"

FOCUSING By lever with positive stops. Focus remains constant during scanning operations.

SCANNING Handle permits easy and free movement of the carriage in any direction.

FIXED MAGNIFICATION Choice of 17x or 22x

SIZE 21½" high, 10½" wide, 15" deep (base 10½" by 11½")

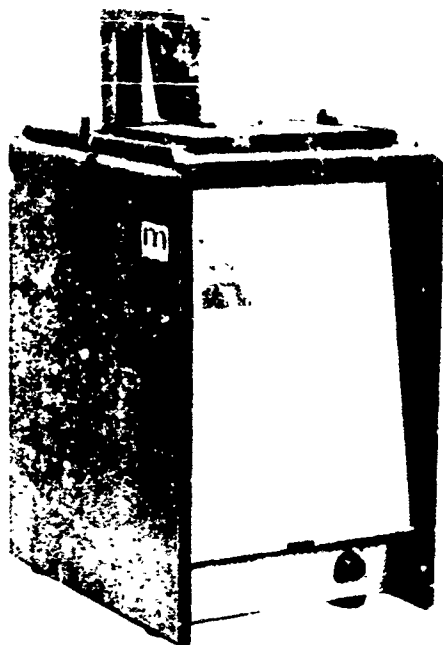
WEIGHT 31 pounds.

© Recordak 1965

RECORDAK CORPORATION 770 BROADWAY NEW YORK, N.Y. 10003 SUBSIDIARY OF EASTMAN KODAK COMPANY

A 1979A 10th 8/83 (MM/WE)

Product numbers: 17x 7562 22x 7563 Price list on P.F.A.



NEW! THE MICROCARD FR-5 MICROFICHE READER

COMPACT, LIGHTWEIGHT

SIMPLE TO OPERATE

NO-FUSS FOCUSING

MAINTENANCE FREE

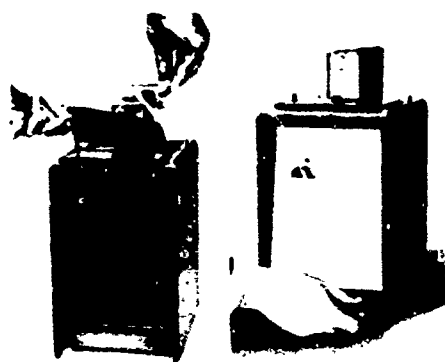
**CONFORMS TO ALL NMA
AND GOV'T STANDARDS**

PRICED AT JUST \$125

*The economical desk-top reader
designed for your personal use and convenience*

The Microcard* Corporation has created an entirely new reader, incorporating a wide range of "big reader" features and maintaining the Microcard standard of manufacturing perfection, yet priced attractively low. The new FR-5 Microfiche Reader is not a "stripped down" model of a larger reader. Far from it! The FR-5 stands alone, completely new in concept and design.

The FR-5 features image sharpness unheard of in a low-cost reader. The brilliance of the light-green tinted screen makes it twice as vivid as a TV screen. As an added feature, dual magnification is standard on the FR-5; 16½x gives you the true clarity of image so necessary for comfortable viewing; 22x brings out minute detail in small illustrations and schematics.



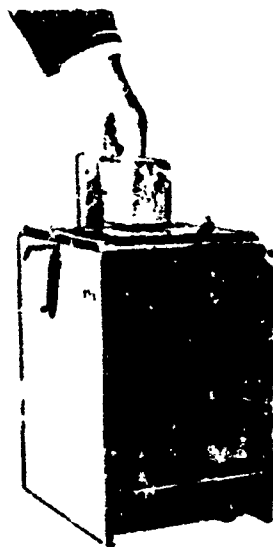
As simple as dialing your telephone

No complicated controls or touchy adjustments ... maximum ease of operation is built-in the new FR-5. Just insert the fiche in the precision holding and transporting mechanism, flip the switch, adjust focus and scan.

**Pioneer and Leader
in the Microform Field**

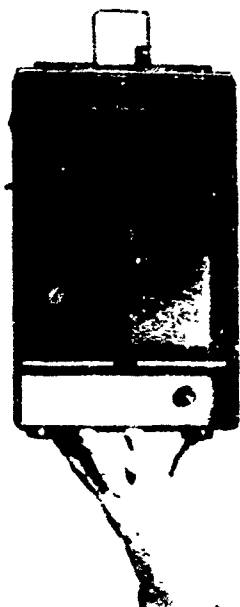


**MICROCARD
CORPORATION**



*Easily portable for maximum
convenience and practicality*

The FR-5 can go where you go . . . from room to room, desk to desk . . . wherever it is most convenient for you. Use any 120V outlet. (A 220V model is available at \$20 extra). Existing room light poses no problem . . . the special tinted screen and precision 3-element wide angle lens produce clear, crisp images under any lighting conditions.



*A triumph in design . . . lightweight and
compact, yet no sacrifice in quality*

The FR-5 Microfiche Reader takes less desk-top space than this sheet of paper . . . just 12" high, 7½" wide, 10½" deep. Weighing less than 12 pounds, the all steel and cast aluminum cabinet guarantees rigidity and long-lasting durability. Screen is 7½" wide by 9¼" high. Designed to conform to all NMA standards, the FR-5 handles all sizes of microfiche including 4"x6", either horizontally or vertically. This feature enables you to view all pages in an upright position, regardless of their position on the fiche.



*Maintenance? Just occasional
replacement of the light bulb*

It's actually that simple. No tools are required . . . just slip off the cover to change the bulb . . . absolutely no other maintenance is needed. (Bulb life approximately 100 hours).

*The Microcard® FR-5 Microfiche Reader, complete, is
available F.O.B. West Salem, Wisconsin, at just \$125.00.*

m
microcard

**MICROCARD
CORPORATION**

366 SOUTH OAK STREET, WEST SALEM, WISCONSIN



MICROFICHE READER

SPECIFICATIONS

Model No. 576-95

Overall Dimensions, 13" x 15" x 19";

Screen Size, 12" x 10.5";

15x Magnification;

6-Volt Long Life Type Lamp;

List Price \$198.50

The DuKane Reader, Model No. 576-95, has been designed to provide industry and government with a top-quality, low-cost, compact unit for the reading of 35mm Microfiche through the 5 x 8 inch size. This Reader offers high image quality and excellent illumination under normal office lighting conditions.

The DuKane Microfiche Reader is a compact unit, specifically designed for desk-top use...



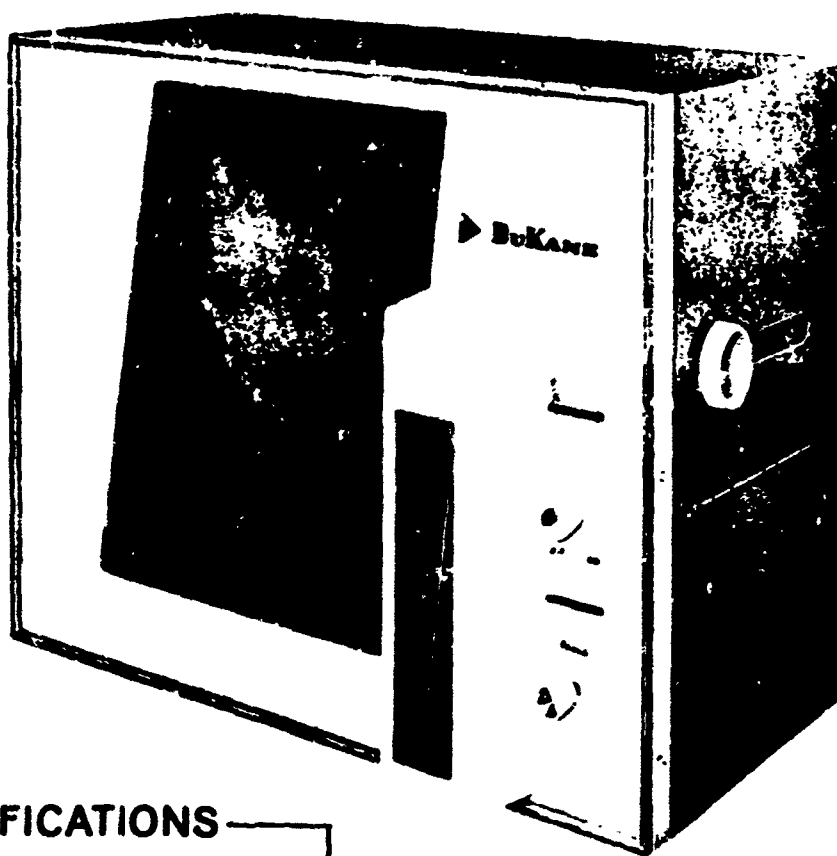
requires only one square foot of space. The compact design was achieved through the development of a unique scanning device. A single scan knob controls both horizontal and vertical scanning operations. A focus knob permits quick, efficient focusing for a sharp, clear image. This precision engineered Reader combines quality construction, simple fool-proof operation with low cost to offer top value for every dollar invested.

DUKANE CORPORATION

St. Charles, Illinois

The DuKane 576-75 VIEWER

...the ultimate reader for unitized film.



SPECIFICATIONS

Model 576-75
Overall Dimensions 21"x17"x17"
Screen Size 11"x14"
24X Magnification

To satisfy the demand for a precision engineered reader combining quality construction, attractive appearance, modern styling with simple, fool-proof operation, DuKane has introduced the 576-75 Viewer. It features 24 times magnification and a 11" x 14" screen, which enables the user to view enlargements of most original material. Sharpness of focus and outstanding resolution are the results of the superior optics used in the 576-75.

Other features include front film loading, spring loaded glass flats to prevent film buckling. A single scan knob is used for both horizontal and vertical scanning.

The location and viewing angle of the non-glare gray screen reduce eye fatigue. Attractive modern design and appearance of the DuKane 576-75 Viewer complement any office, library or hospital decor.

DUKANE CORPORATION

St. Charles, Illinois

Form No. 8310-A-65

Data Sheets for:

MICROFICHE READER/PRINTERS

(Section 4-C. 2)

ATLANTIC READER-PRINTER -- Model B-1

for viewing and printing
from any microfilm format

- clear, easy-to-read images on the 12x12" non-glare viewing screen
- perfect, full-size copies by the photostabilization process
- low price
- simple, trouble-free operation

Here's a versatile Reader-Printer that brings a new concept in economy and convenience to microfilm operations. Accepting any format — microfiche, micro-jackets, aperture cards, 16mm and 35mm roll film — the Atlantic B-1 can be used both as a reader and a printer simultaneously. Since copies are not processed automatically when the unit is used, the B-1 can also be used just as a reader. Ideal for users requiring only occasional prints.

Reading — even for hours — is easy on the green-tinted, non-glare rear projection viewing screen. The 12x12" screen is also mounted at a convenient angle for sit-down viewing.

Letter-perfect photostabilization copies can be made quickly, effortlessly on a demand basis. After ex-

posure in the Reader-Printer, copy paper is automatically processed through Activator and Stabilizer solutions in the separate processor.

There's a complete range of high-resolution interchangeable lenses available: 6.5x, 9.4x, 14.0x and 18.7x.

Other Atlantic B-1 features include: • safety film advance • durable construction • modern styling • choice of copy print papers • accessory adapter for 16mm and 35mm microfilm rolls, and many others.

SPECIFICATIONS:

Screen Size: 12x12"

Magnification Ratios: 6.5x, 9.4x, 14.0x, 18.7x

Controls: On/Off; Vertical/Horizontal adjustment; Light intensity exposure dial

Cooling System: Optical heat filter plus forced draft blower

Dimensions: 15½" w x 17" d x 29½" h

Weight: 45 lbs.

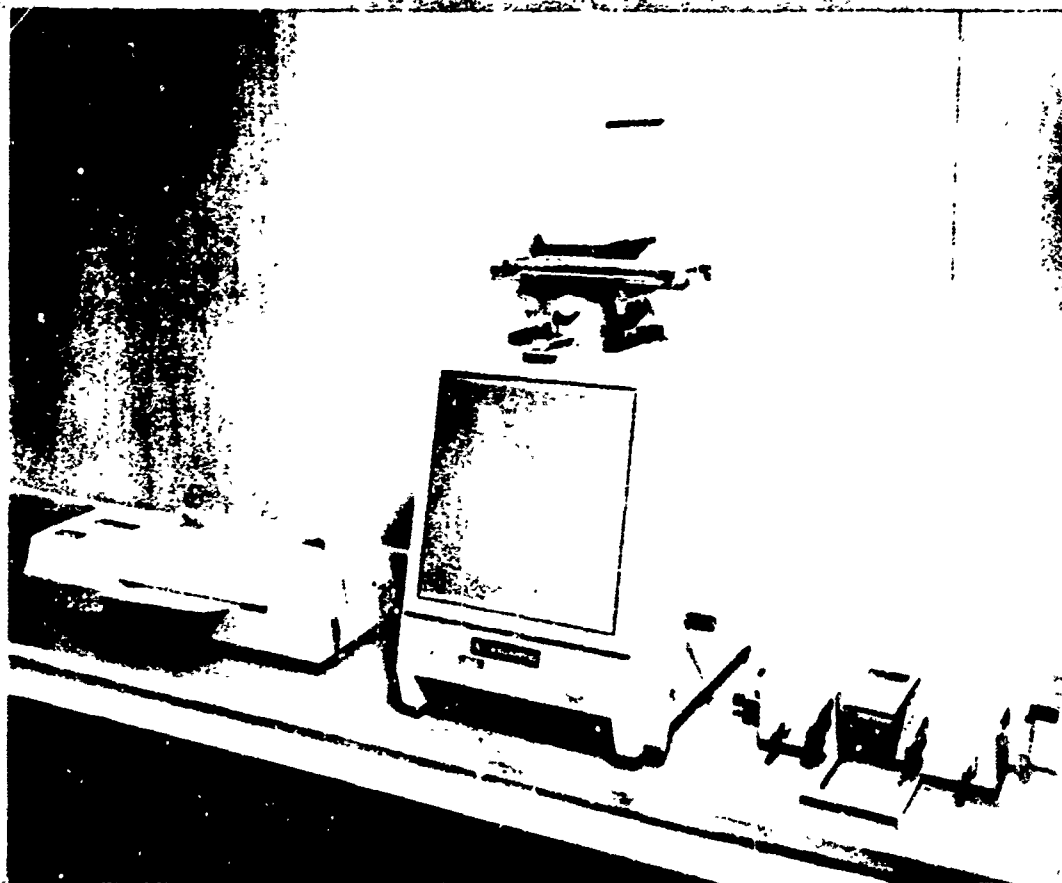
Power Requirements: 110-120v, AC, 50-60 cycle

Power Consumption: 150 watts

Max. Copy Print Size: 8½x11½"

ATLANTIC Reader-Printer — Model B-1

- for viewing and printing simultaneously
- interchangeable lenses
- accepts all microfilm formats



Distributed By
atlantic microfilm corp.
Spring Valley, N Y

The
DOCUMAT[®]

18 x 24

READER-PRINTER

True Photographic Reproduction Fidelity

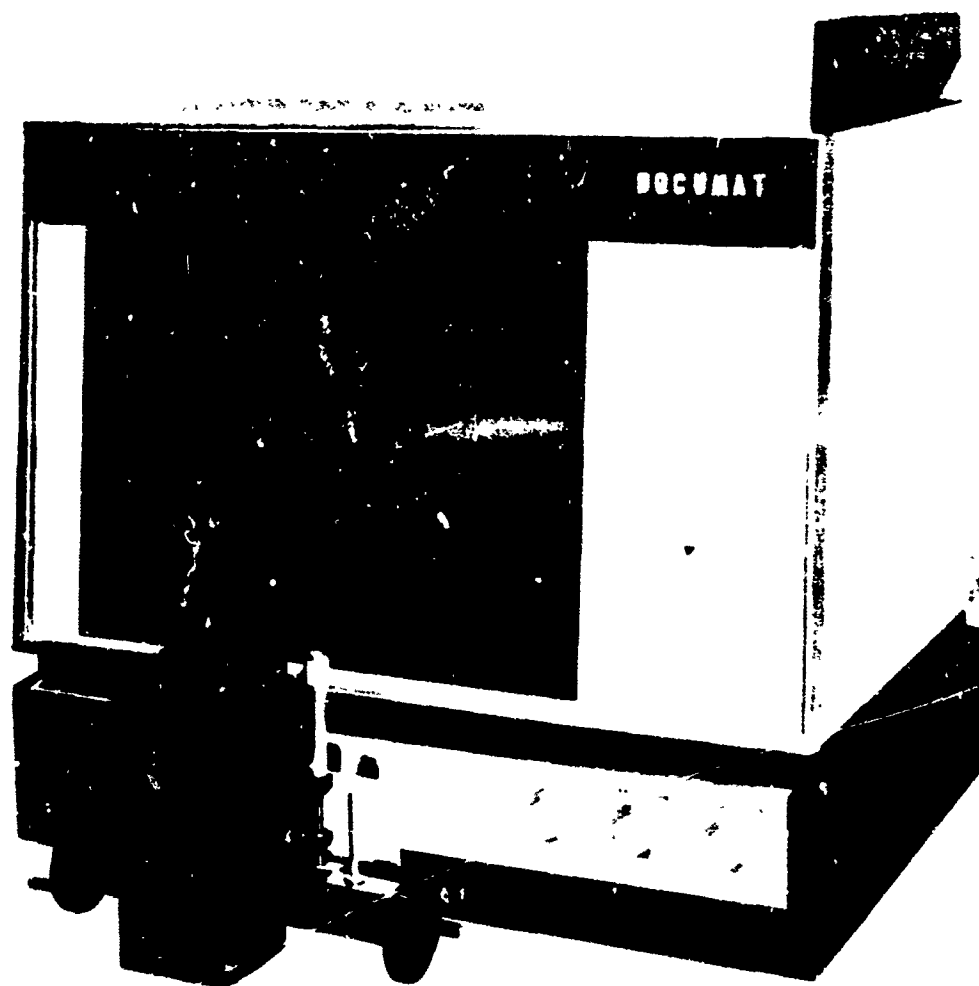
The new Documat 18 x 24 Reader-Printer is an automatic table top machine which accepts 16, 35, or 70 mm roll film, aperture cards, film jackets or film sheets. Prints of the screen image emerge in 1/2 minute and are dry in seconds.

Documat print fidelity matches your best originals. Uses only the time-proven silver photographic process. Reader screen shows extraordinary sharp image even under bright light conditions. Highest quality resolution and reproduction.

Variable knife cut-off feature enables this Documat machine to deliver any length of print desired by operator from 8 1/2" to 21" . . . clean cut . . . with no torn edges. A single roll of paper provides 175 prints each 21" long by 18" wide . . . or proportionately more prints of shorter length. This feature eliminates any waste paper. There is no waste cut-off margin.

Translucent paper is available to provide for multiple reproduction requirements.

★ A similar, but unique, highly specialized 18 x 24 microfilm Reader-Printer was developed for the U. S. Navy by Documat, Inc.



DOCUMAT gives you sharper, cleaner prints; the finest microfilm reproduction possible!

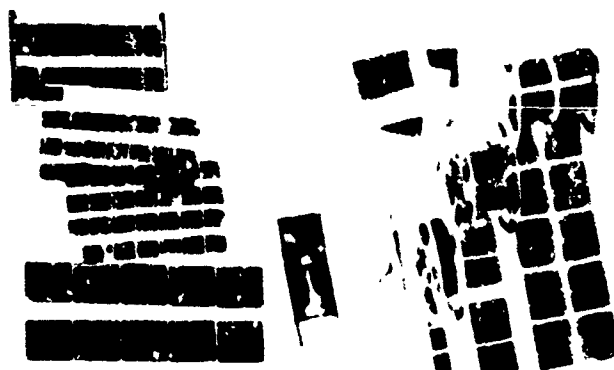
Just press a button, and the Documat 18x24 Reader-Printer produces a durable, sharp, black and white print. The Documat 18x24 Reader-Printer (actually two machines in one) is unexcelled as either a reader or a printer. Scanning is especially easy.

You see your film on a brightly illuminated 17x23 screen that takes the guesswork out of printing. No waste time. Even while scanning your film for the next print ready-to-use copy is emerging.

The Documat 18x24 Reader-Printer makes good copies from microfilm others can't print. Black and white tones are permanently sealed in. Won't fade, crack or peel; either hard opaques or clear transluents for reproducible prints.

UNSURPASSED DOCUMAT ADVANTAGES

- Silver sensitized Documat paper prints continuous tones, halftones, even positive or negative film. Paper remains bright and permanently white. Will not fade, peel or crack.
- Rich blacks and whites of sharp, clear image are permanently transposed and sealed into the print.
- Copies everything seen on the viewing screen and delivers a same size print in 35 seconds, neatly framed and with evenly trimmed edges.
- No torn edges. No waste paper. Variable knife cut-off feature provides any length of copy sheet from 8 1/2 inches, with no waste cut off margin.
- Simple to operate. Engineering personnel, draftsmen, clerical help, quickly and readily get good copies the first time... simply by pressing a button. No chance of an operator printing the wrong frame.
- High volume output capacity. Seconds fast.
- No daily maintenance. Rugged, finely machined Documat construction. Parts easily removed for inspection or cleaning. Only routine checking required.



18x24 Reader-Printer accepts 16, 35, 70mm roll film, aperture cards, film jackets or film sheets.

OPERATIONAL SPECIFICATIONS

Film Sizes Accepted

16mm, 35mm, 70mm rolls, aperture cards, film jackets or film sheets.

Operating Controls

An on/off switch, print switch, focus knob, exposure control dial and paper length knob.

Projector Controls

Cranks to traverse roll film, a vertical film positioning knob, a platen film clamp knob, a mask knob.

Operation

Completely automatic after print button is pushed. Total time for exposure and processing is 35 seconds. Next subject can be selected on the screen during the processing.

Magnification and Viewing Screen

Magnification is 14x on a 17"x23" Polacoat® viewing screen.

Adjustable Reader Head

Reader Head can be rotated 90° to obtain an upright image.

Focusing

Accomplished by turning a knob control.

Vertical Scanning

A film positioning knob moves the film holding mechanism for vertical scanning.

Film Transport

Film passes between glass flats and guide rollers. Smooth cranking operation for rapid scanning. Verner movement possible with dry handles. Dual clutch control permits movement in either direction with either hand. Film guides move aside when viewing aperture cards.

Film Jackets, Aperture Cards, Film Sheets

Two glass flats. Roll film from any edge. Image centered manually.

Print Size

Image size of 17"x23" is printed on 18"x24" print with a uniform white border. Any length of print can be selected from 8 1/2" to 24", width always being 18". No jagged edges or tears possible because of variable knife cut off feature.

Print Paper

Silver sensitized paper remains permanently white. Will not fade, peel or crack. The paper is supplied in an 18"x350 ft roll which gives 175 prints of 24" length or proportionately more of shorter length. The roll is loaded into machine in room high. Copies are automatically trimmed clean. Translucent paper also available.

Processing

A fixator and stabilizer solutions supplied each in an 8 qt. plastic container. No chemicals to mix or handle. Solutions last for hundreds of prints. Prints are dry within a few seconds after emission from the machine.

Lens and Light Source

The lens is 65 mm. f8. A 300 watt pin point projector lamp gives 15 foot candles of illumination at the screen surface (not less than 100 ft. in brightness at center).

Cooling

An efficient cooling fan protects the film and machine.

Size and Weight

Width - 35 1/4" Depth without projector - 25 1/2"
Height - 34 1/2" Weight - 200 lbs. Depth with projector - 35 1/2"
Shipping Weight - 275 lbs.

Manufactured by:

DOCUMAT INC.

84 Fourth Ave., Waltham, Mass. 02154

DESIGNERS AND MANUFACTURERS OF
MICROFILM AND PHOTOCOPY EQUIPMENT

DISTRIBUTED BY

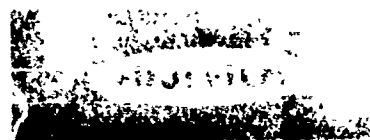
FUJI MICROFILMING SYSTEM

Low Cost Reader Printer
for microfiche, up to 8 × 5".

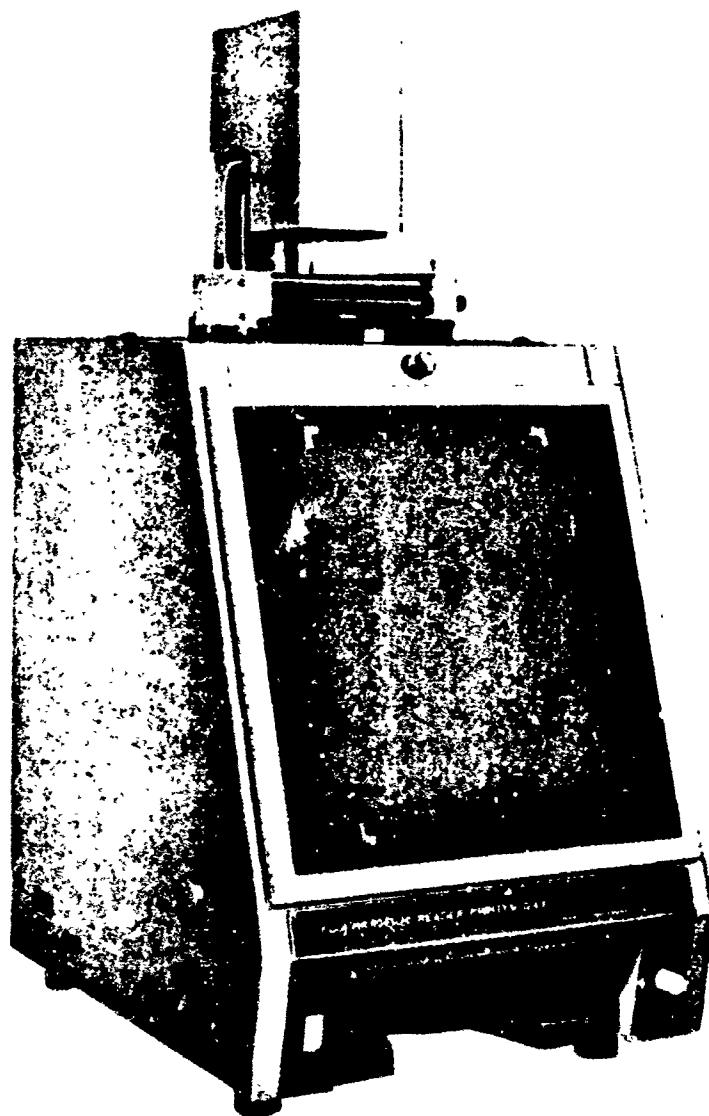
Comfortable Reading
on special green glass screen.

Use Any Type of Silver Halide Paper
as well as diffusion transfer reversal paper for positive to positive reproduction.

Aperture Size: 16.1 × 16.1 mm max. (projection), 11.4 × 16.1 mm max. (printing)



FUJI MICROFILM READER PRINTER Q4F



UNIQUE FEATURES OF FUJI MICROFILM READER PRINTER Q4F

Extremely Sharp and Clear Images

The high resolution Fujinon-M lens, non diffusive condenser lenses and the point filament bulb assure sharp and clear images on the screen or on paper.

High Intensity Illumination

Four large condenser lenses including one meniscus lens and a spherical reflector mirror gather the maximum quantity of light beams and project them through the lens.

Easy-to-Read Green Glass Screen

The Fuji green glass screen features, fine grain glass for high resolution, high diffusion for uniform illumination, high translucency for clarity and no glare. It protects the user from eye strain.

Film Protection

Heat-absorbing glass protects the film from damage by thermic rays.

Easy-to-Position Image Frame

The desired frame on the fiche can be easily selected and projected by manipulating the fiche drive knob and scanning device.

Wide Utility

Accepts all ISX and NMA standard microfiche up to 5x8" (including 3x5", 4x6", and 3x7") as well as film strips.

SPECIFICATIONS

Film	Up to 5x8" sheet film (microfiche), film strip.
Screen size	294x294 mm (11 1/2 x 11 1/2")
Magnification ratio	17.5X
Maximum size of printing sheet	210x297 mm (8 1/2 x 11 3/4")
Max. print size	200x283 mm (7 7/8 x 11 1/4")
Aperture size	16.1x16.1mm for projection. 11.4x16.1 mm for printing.
Image rotation	+180 -90°, revolving projection head.
Scanning	±53 mm.
Light source	24 V, 120 W point filament bulb.
Power required	150 W
Exposure control	Electronic timer, and repeat button
Dimensions & Weight	75 H x 39 W x 41 L cm (29 1/2 x 15 x 17 1/2"). Approx. 20 Kgs. (44 lbs.)

Remarks: A transformer up to 240 V can be built in if desired.

FUJI FILM

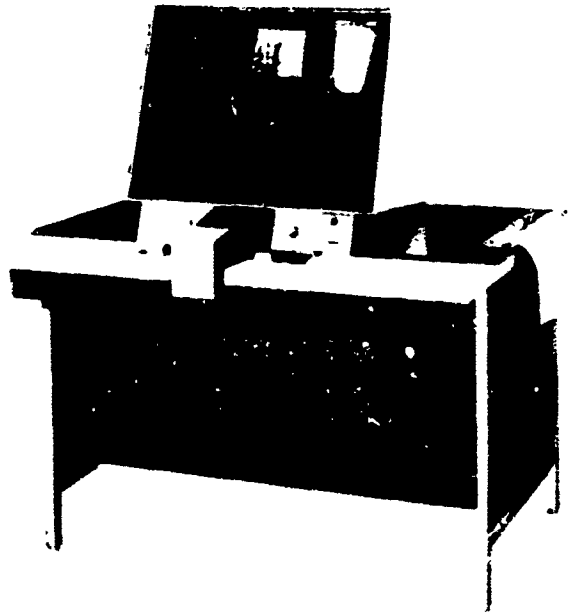
FUJI PHOTO FILM CO., LTD.

No. 3, 2-chome, Ginza-Nishi, Chuo-ku, Tokyo, Japan

FUJI PHOTO FILM U.S.A. INC.

18-24 READER-PRINTER, MODEL F

UNIVERSAL INPUT/OUTPUT *for* *Microfilm Users*



OUTSTANDING MICROFICHE CAPABILITY has now been added to the Award-Winning advantages of the Itek 18-24 Reader-Printer. The "silver-sharp" quality, versatility and convenience of this remarkable Itek unit are thus available to users of microfilm in any form—sheets, rolls, jackets or aperture cards.

THE SUPERIOR DESIGN of the new Microfiche Film Carrier reflects the same engineering skill employed throughout the Itek 18-24 Reader-Printer. For example, the glass flats are automatically opened, as soon as the operator touches either the horizontal-vertical positioning controls or the roll-film spindles. When the desired frame is located, the operator simply lifts his hands from the controls to close the flats, thus placing the film in precisely the correct position for viewing or printing.

THE MICROFICHE CARRIER accepts any standard sheet or jacket up to 5 x 8, and any portion of the sheet or jacket can quickly be brought into focal position without touching the film or jacket.

THE MASKING AND VARIABLE TRIMMING features of the Itek 18-24 Reader-Printer are especially useful to microfiche users, since any vertical section of the enlarged image, from 8" to 24" wide, may be framed and printed. Various widths of paper may be employed. The unit therefore has the ability to print and trim only the desired image, thus conserving both time and materials.

UNIVERSAL OUTPUT in the form of opaque prints, translucent intermediates, or offset plates rounds out the ALL-AROUND CAPABILITY of this unique reader-printer.

See complete specifications on reverse of this sheet.



Itek Business Products, ROCHESTER, N.Y.

SPECIFICATIONS

Projection Lens: Highest-quality special 6-element lens

Light Source: Fan cooled, 300 W, 125 V lamp

Unitized-Film Carrier: Accepts microfiche, jackets or aperture cards. Film may be moved 8" horizontally and $4\frac{3}{4}$ " vertically by turning two positioning knobs. Glass flats open, through solenoid action, when the knobs are pressed, thus eliminating scratching of film.

Facilities for Roll Film: Spindles and transport rollers are provided as standard equipment. No interchange of glass flats is required when shifting between unitized and roll film. The angle of the film plane is precisely maintained from spool to spool, as well as in the projection area, in order to eliminate buckling. Transport rollers are of nylon. Both spindles are equipped with slip clutches, permitting easy film advance in either direction. During projection, the closed flats provide uniform optical positioning. The flats automatically open, due to solenoid action, when the spindles are turned.

Focus Wheel: Permits quick refocus to compensate for minor variations in emulsion position, created by thickness of jacket or reversal of film for production of reverse-reading intermediates.

Exposure and Illumination Control: Fixed exposure timing. Illumination intensity may be varied to compensate for variation in film density by means of rheostat control on instrument panel. Thus the range of reproducible film is broadened and reproduction quality is improved.

Print Length Selector: Length of print is infinitely variable from 8" to 24", the length being set by twisting a control dial. (Width of print is determined by width of roll of paper employed.)

Mask: When prints less than 24" in length are produced, a mask plate screens off unwanted area on both viewing screen and sensitized material. The mask may be set at any position by moving a finger-tip lever on control panel. The viewed image and the projected print are identical in content, calibration at bottom margin of screen showing size of image to be printed.

Viewing Screen: Rear-projection type, with 18" x 24" viewing area. Screen is inclined to permit comfortable viewing from either seated or standing position.

Severing Mechanism: Automatic. Neatly separates print from roll at pre-selected length.

Processing Unit: Fed from disposable containers. No handling of solutions is ever required. Raising hinged reservoir automatically fills processing unit; lowering reservoir returns developer to containers for evaporation-proof storage when Reader-Printer is not in use.

Paper Feed: Automatic. Paper is loaded on desk-high spindle. Access for loading is easily attained by lifting section of table-top.

Code No. 52320

OPERATIONAL DATA AND PHYSICAL CHARACTERISTICS

Size of Viewed Image and Print: Variable from $17\frac{1}{8}$ " x 24" to 8" x $8\frac{1}{2}$ ".

Magnification: 14.7X. (Variations in magnification available on special order.)

Printing Time: Approximately 30 seconds. During 25 seconds of this time, the viewing screen may be employed for selecting next image.

Type of Paper: Special Negative-Positive Reader-Printer Paper. This is available either in document weight or as translucent stock. May be used to make Project-A-Lith offset plates, when used with Itek Project-A-Lith Processor.

Type of Print Produced: Stabilized high-contrast photocopy. Image may be right-reading or reverse-reading, as desired.

Electrical Requirements: 115 V. 60 cycle, AC only. 5 Amps.

Electrical Cord: 8-ft., 3-wire.

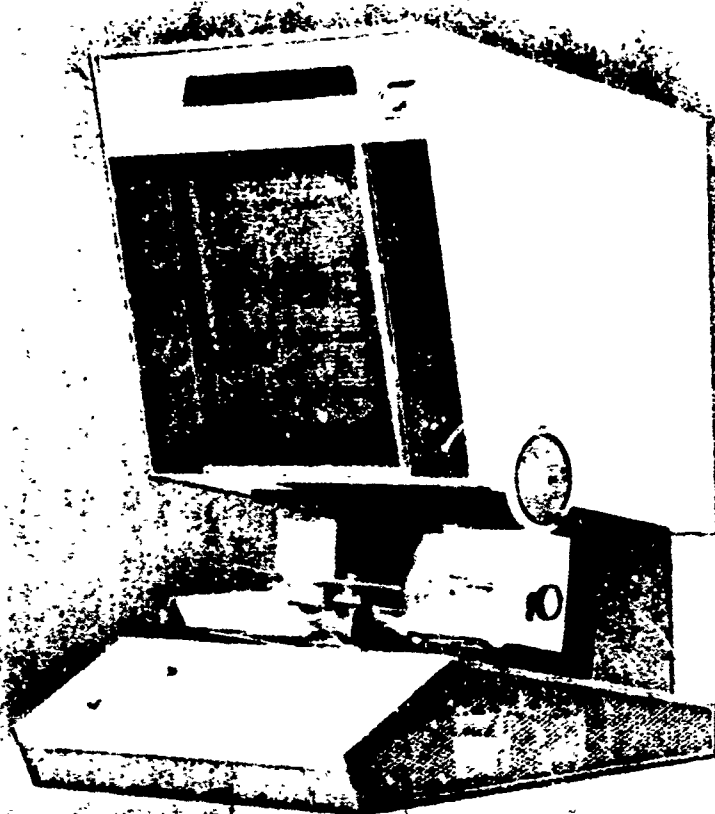
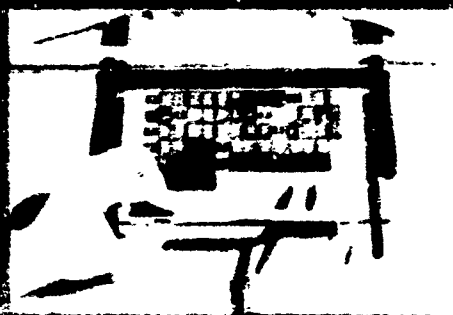
Size: 46" wide x 36" deep x $51\frac{1}{2}$ " high.

Weight, Net: 350 lb. (approximately).

Weight, Gross: 520 lb. (approximately).

Ⓢ Trademark

- Reader-Printer for sheet film
- Instant reference viewing of individual frames on a large screen
- Easy operation
- Produces sharp, dry, 8 1/2" x 12 1/2" copies in only 6 seconds



3M FILMAC 400

MICROFICHE READER-PRINTER

The new 3M "Filmac 400" Microfiche Reader-Printer takes multi-image sheet film in sizes as large as 5 by 8 inches. It provides instant reference viewing of individual frames on a large screen. And the "400" delivers sharp, dry, 8 1/2" x 12 1/2" copies of any image in only 6 seconds.

A double-action film holder

with protective glass allows fast, precise positioning of selected film under the viewing lens. You can easily move from image to image without ever touching the film.

This modern 3M Reader-Printer completely eliminates time-consuming transcriptions of microfiche records. Touch a button and it delivers an exact, error-free copy

of the microfilm image you need

Dimensions: Base: 17" wide by 21 1/2" deep; 26 1/2" high. **Electrical Requirements:** 110 volts, AC current, 60 cycles, 10 amperes. **Light Source:** 200 watt, 20 volt quartz iodine with reflector. Lamp position adjustable along optical centerline.

3M
COMPANY
MICROFILM PRODUCTS
ST. PAUL, MINN. 55119

RECORDAK Microstrip Printer Accessory • Model AEG



© Recordak 1965

The Recordak Microstrip Printer Accessory, Model AEG, adds fast, high quality print-out capability to the Recordak Microstrip Reader. The Microstrip Reader, as the central unit of the Recordak Microstrip Information Retrieval System, makes possible fast reference to active, frequently amended files (directories, inventory lists, credit records, account verification, etc.). The Printer Accessory combines with the reader so that the combination has the appearance of one integral, efficient unit. The print cycle is push-button activated. Prints are delivered squeegee-dry at operator hand level.

Photographic prints in several sizes can be provided by the Printer Accessory (4" x 10", 5 1/2" x 10" or 8 1/2" x 10"). Print time is approximately twenty-eight seconds the first cycle and eighteen seconds for each successive print. Search may be resumed approximately ten seconds after the print button is pressed. The Microstrip Printer Accessory can be installed easily at any time your Recordak Microstrip System requires hard copies.

FEATURES

SIZE OF READER-PRINTER: 23 1/2" high, 21 1/4" wide 30" deep.

TOTAL WEIGHT OF READER-PRINTER: 132 1/2 pounds

COLOR: beige and tan

SENSITIZED PAPER: Recordak 550 Paper (available in widths of 4", 5 1/2" and 8 1/2", and in .50 lengths)

PROCESSING SOLUTION: Recordak Monobath 50

PRINT CYCLE: Prints automatically exposed, cut, processed and delivered squeegee-dry

PRINT ACCESS TIME: Approximately 28 seconds. Image search may be resumed approximately 10 seconds after print button is pressed. Successive prints may be made at the rate of one every 18 seconds.

OPERATOR CONTROLS: Print button, print exposure control knob

Data Sheets for:

HARD-COPY PRINTERS

(Section 4-C. 3)



Automatic Microfiche Enlarger- Printer Model EL-4

The Microcard EL-4 Automatic Enlarger-Printer produces enlarged hard copy from microfiche or unitized master negatives at a rate of 5,000 document pages per 8-hour shift. Each page is printed near original size on an 8 1/2" x 11" sheet of heat-developing dry silver paper which has the sharpness and gradation of a silver print, but requires no odorous chemicals or toners.

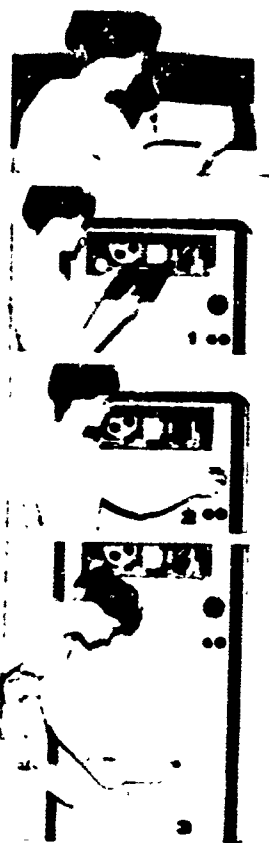
Once the operator inserts the fiche and presses the start button, all operations are completely automatic. The EL-4 functions cleanly, quietly and efficiently. In areas such as depository libraries which use high volume technical documentation, the EL-4 provides eye legible reference to current technical literature and reports in seconds. Since the library retains a complete master negative file, hard copies need not be returned, a distinct advantage for both researcher and library.



Microcard[®] Automatic Microfiche Enlarger-Printer Model EL-4

Features and Specifications

1. Accepts all microfiche prepared in conformity with Federal Microfiche Standards
2. Enlarges and dry processes one page every five seconds; text reproduced approximately original size. Provides excellent quality half-tone prints.
3. Machine is easily loaded with dry silver paper rolls (available through your local 3M Co. supplier), 800 ft. in length; separate 8 1/2" x 11" pages are cut and delivered in sequence automatically, ready for stapling.
4. Very economical . . . paper costs under 3¢ per sheet in small quantities, even less in larger quantities. Easy to replace lamp.
5. No pages to turn or meters to watch . . . operator needn't be in constant attendance. Simply load fiche, push button, and the EL-4 completes the job automatically.
6. Operates on 120V 60 cycle AC; requires only 2' x 3' of floor space. Attractive gray-green finish accented with dark green trim blends with any decor.
7. The EL-4 is available on a lease basis or you may purchase it outright. Enjoy unlimited use; no "meter charge" or "per copy" charge.



Extremely Simple to Operate

It doesn't take a trained technician to operate the EL-4 and no complicated instructions are necessary. Just insert roll of heat-developing dry silver paper (one large roll produces over 800 8 1/2" x 11" pages); then follow these simple steps: (1) Insert fiche in holder and drop into enlarger carriage. (2) Adjust exposure control (once exposure has been set, this adjustment is no longer necessary), and press start button; machine automatically steps from frame to frame, stops at last page and returns to start position. (3) Completely developed dry copy is ready in just 5 seconds.



**MICROCARD[®]
CORPORATION**
365 SOUTH OAK STREET, WEST SALEM, WISCONSIN



MODEL EL-4 AUTOMATIC MICROFICHE ENLARGER-PRINTER

Microcard's EL-4 Automatic Enlarger-Printer produces enlarged hard copy from microfiche or unitized master negatives at a rate up to 5,000 document pages per 8-hour shift. Each page is printed near original size on an 8½" x 11" sheet of heat-developing dry-silver paper which has the sharpness and gradation of a silver print, but requires no odorous chemicals or toners.

Once the operator inserts the fiche and presses the start button, all operations are completely automatic. The EL-4 functions cleanly, quietly and efficiently. In areas such as depository libraries which use high volume technical documentation, the EL-4 provides eye-legible reference to current technical literature and reports in seconds. Since a complete master negative file is retained, hard copies need not be returned.

MODEL EL-4 FEATURES & SPECIFICATIONS

1. Designed for Federal Microfiche Standards.
2. Enlarges and dry processes one page every five seconds, 5000 pages per 8-hour shift; text reproduced approximately original size. Provides excellent quality halftone prints.
3. Machine is easily loaded with dry-silver paper rolls (available through local 3M Company supplier in 8" or 8½" width x 400' to 800' length). Pages are cut and delivered in sequence automatically, ready for stapling and immediate delivery.
4. Very economical to operate; paper costs only 2½¢ per sheet, less in large quantities. Lamps are inexpensive and easy to replace.
5. No pages to turn or meters to watch; operator needn't be in constant attendance. Simply load fiche, dial program-stop, push button, and the EL-4 completes the job automatically.
6. Operates on 120V, 60 cycle AC, 1300W; requires very little floor space. The attractive gray-green finish, accented with dark green trim, blends perfectly with any decor.
7. Enjoy unlimited use; no "meter-charge" or "per-copy" charge. The EL-4 replaces as many as six standard reader-printers.
8. Dimensions: 62" high, 30" wide, 25" deep; 470 lbs. (uncrated).

GOVERNMENT PURCHASE PRICE: \$17,100 f.o.b. West Salem, Wisconsin (See General Conditions)

GENERAL CONDITIONS

INSTALLATION: At no added cost to the customer, Microcard will provide necessary installation information and, for a period of two days, will furnish an installation engineer to assist and train customer's personnel at customer's site in the U.S.A.

INSTRUCTION: Before delivery of equipment, customer may send a man to Microcard at West Salem, Wisconsin for a week's maintenance and operation training at no additional charge to the customer.

DELIVERY: Allow 30-45 days after receipt of order.

SHIPMENT: Special handling suggested.

TERMS: Net 30 days.

Further inquiries should be sent to:

Director, Contract Sales
Microcard Corporation
365 South Oak St.
West Salem, Wis. 54669

SEND ORDERS TO:



**MICROCARD®
CORPORATION**

365 SOUTH OAK STREET, WEST SALEM, WISCONSIN

DOC INC "MICROSYSTEM PAGE PRINTER"

SPECIFICATIONS

TYPE OF FILM READ: Microfiche, 3" x 5" - 5" x 3"; aperture cards.

READING SCREEN SIZE: 8.5" x 11.625" (21cm x 30cm)

PRINTOUT SIZE: Two up:-8.25" x 5.75" each

IMAGES PER ROLL: Two up: 1,000

PRINTOUT PAPER: Photocopy, matte, glossy, transluscents

EXPOSURE TIME: 3-5 seconds average; 1-60 seconds

DRYING TIME: 10-14 seconds

MACHINE SIZE & WEIGHT: 2' x 3' x 5'; 375 pounds

OBJECTIVE LENS: 12X supplied (See optional equipment)

FOCUSING: Threaded ring on objective lens

LIGHT INTENSITY: Potentiometer control for screen reading and exposure time.

OPERATIONAL PROCEDURE: Synchronized automatic 5 step:

- (1) exposure
- (2) paper advance
- (3) cutting
- (4) activator and stabilization
- (5) delivered print

ACTIVATOR-STABILIZATION: Integrated, pump fed, self-contained 2 bath. Fluid contained in refillable 5 quart containers. When "8511" is OFF, both pans are automatically drained with fluids returning to containers, thus protecting against contamination, reducing machine dirt and encrustations while prolonging fluid life. Cleaning of equipment is reduced to a minimum.

DRIFR: Automatic

CUTTER: Automatic

POWER: "8511"--115/230v AC, 3/1½ amps; DRYER-115/230v AC, 14/7 amps.

DELIVERY: 90 days ARD.

INSTALLATION: On site by Doc Inc technical representatives including training of user personnel for maintenance.

SERVICE: Unitized construction; replacement parts at scheduled rates from Doc Inc or Doc Inc Service Representatives.

WARRANTY: 60 days, workmanship and material, not including transportation for servicing.

DOCUMENTATION NEWS INCORPORATED RELEASE

4833 RUGBY AVENUE
BETHESDA 14, MARYLAND
301 • 656-9500

FOR FURTHER INFORMATION
CONTACT DOCUMENTATION INCORPORATED

RELEASE DATE May 17, 1966

ANNOUNCING. . . THE DOC INC 'MICROSYSTEM PAGE PRINTER'

Bethesda, Maryland, May 17, 1966--Continuing its policy of providing microform users with practical hardware--Doc Inc now offers its 'MICROSYSTEM PAGE PRINTER' as the third member in its family of microform viewers.

Complementing its two portable units, the "1010" Reader and the "Mark V" Reader-Printer, this new unit now makes available an office-type high production page printer for hard copy printouts.

Designed and manufactured for Doc Inc, the 'MICROSYSTEM PAGE PRINTER' offers the fastest and least expensive method of providing 21cm x 30cm (approximately 8 1/2" x 11 5/8") printouts from literally all types of film on a variety of hard copy paper finishes as well as vellums.

Shown at the 1966 NMA Convention in Washington for the first time, the Printer is available on 90-day delivery. Warranted by Doc Inc, it is installed by Doc Inc technical representatives and serviced by local Doc Inc service representatives throughout the United States.

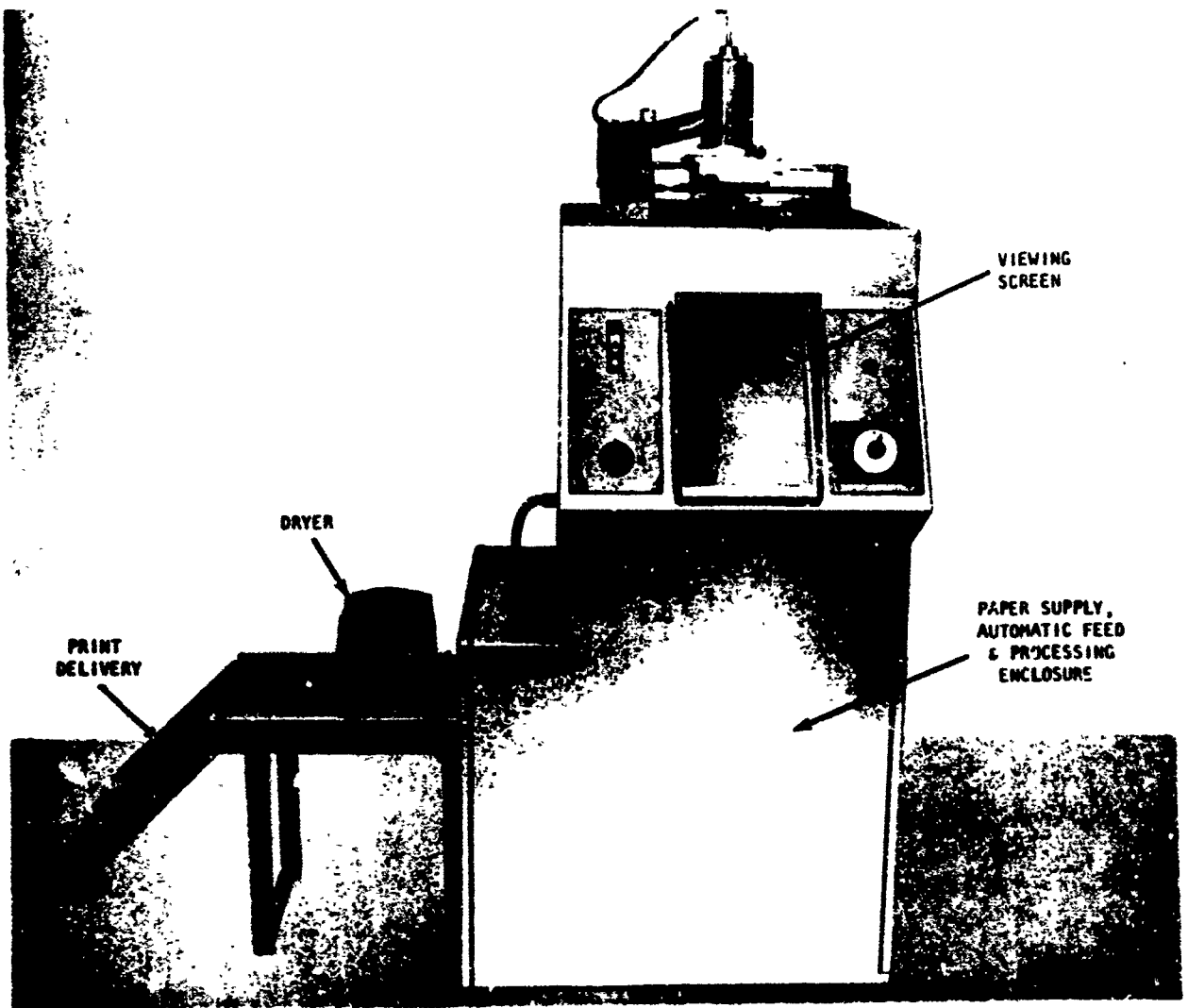
Supplies, both paper and fluids, are available through Doc Inc representatives and other local firms, and are stocked for immediate delivery.

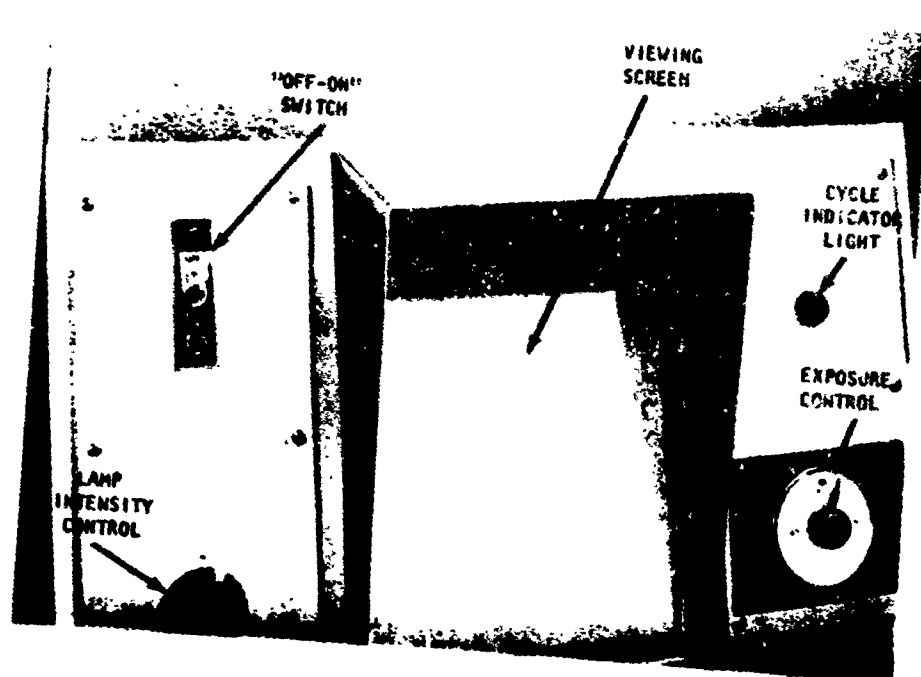
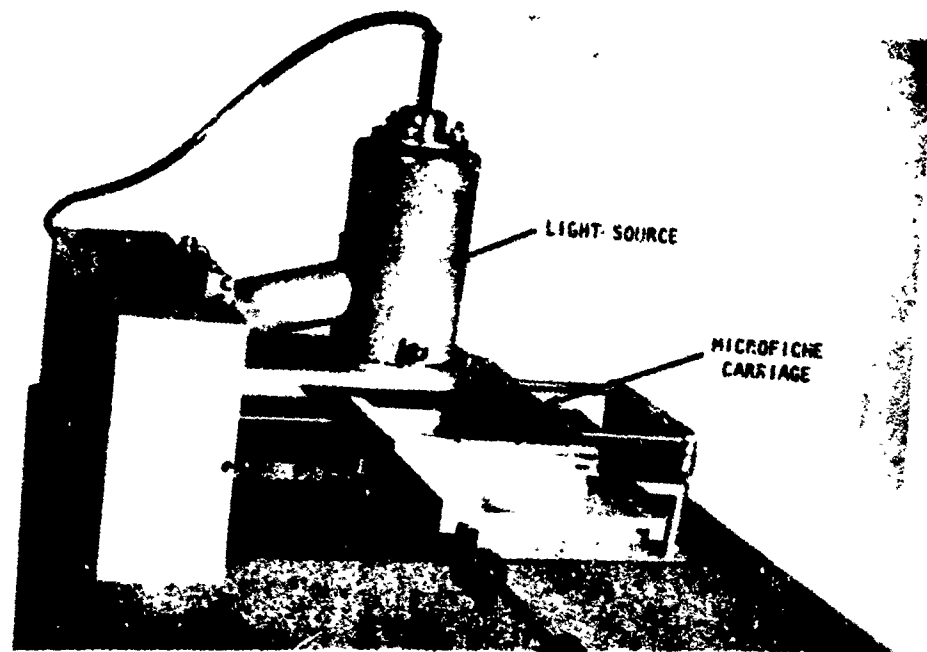
For further information about the DOC INC 'MICROSYSTEM PAGE PRINTER'--please call, wire or write:

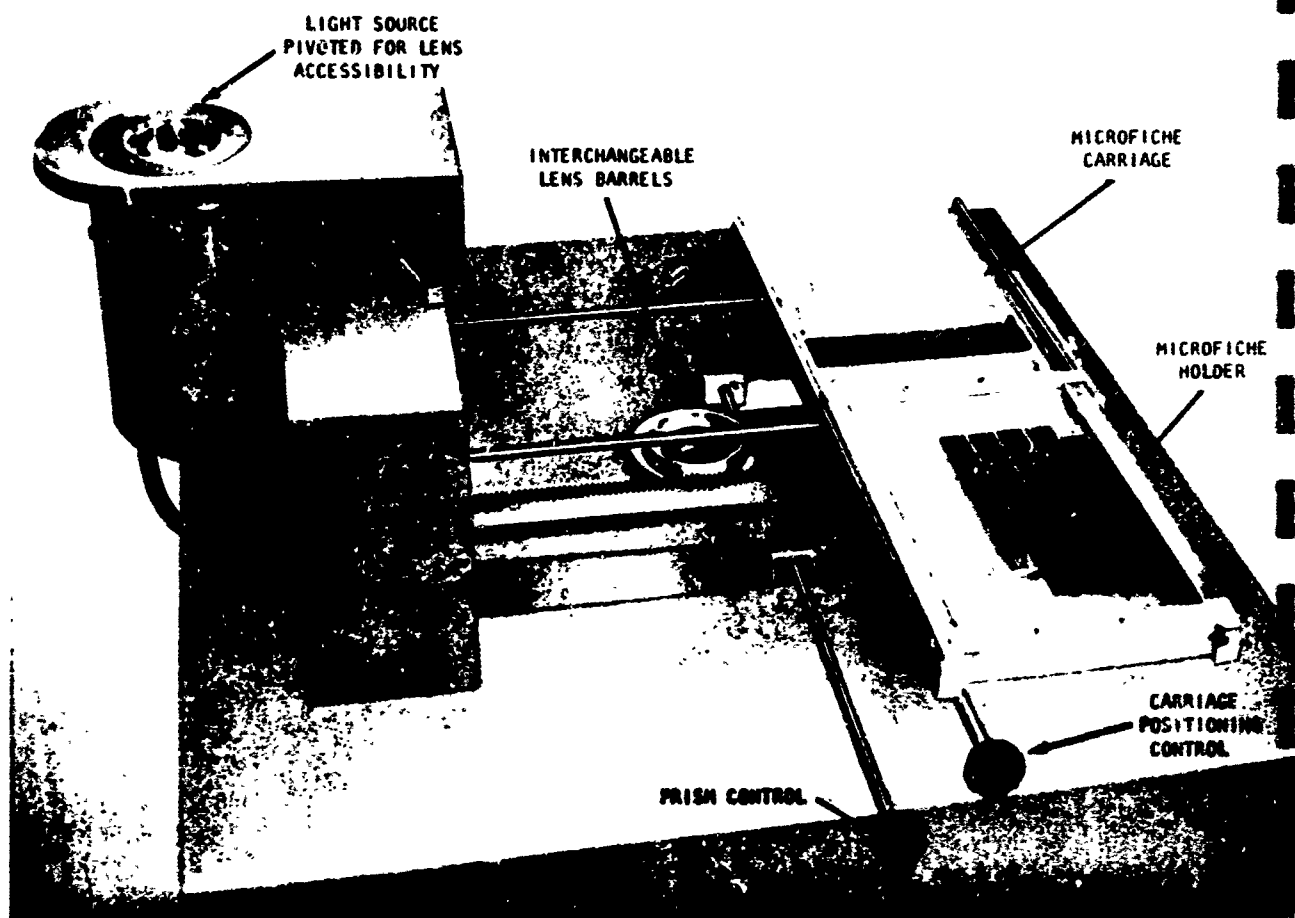
Sales Department
DOCUMENTATION INCORPORATED
4833 Rugby Avenue
Bethesda, Maryland 20014
Telephone: 301-656-9500
Telex: 089-499

OPTIONAL EQUIPMENT

1. 16mm Reel Film Adapter
2. 35mm Reel Film Adapter
3. Prism for image rotation
4. Objective lenses: 6X, 23X, 45X

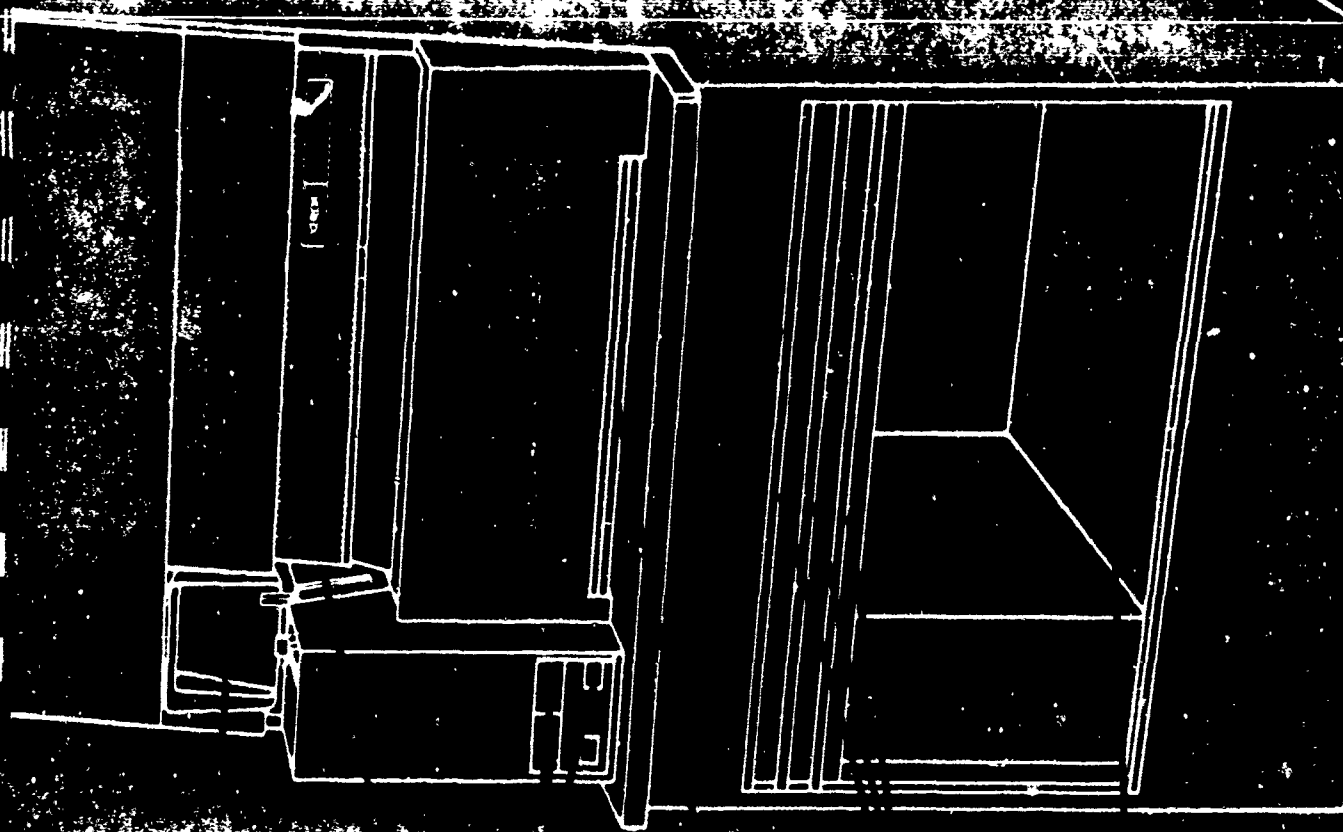






Xerox 1824[®] Printer

Prints on ordinary paper
from all forms of masters



For identification and recording of documents, recorded in various frames of the master, jacketed microfilm

Microfilm apertures are inserted and held in place during exposure

Controls of one button for starting machine, push button for activating copying cycle and various signals for completion to begin new copying cycle

Location of a sheet of ordinary paper, vellum, or a plain offset master starts automatic printing and processing cycle

For storage of cut sheets of ordinary paper in various sizes from 8 1/2" x 11" to 11" x 17" sheets are fed directly from supply drawer into paper feed slot

Finished print emerges from automatic printing and processing cycle directly into return hopper, print is ready for immediate use

Xerox 1824° Printer



The 1824 Printer (Universal Input) is designed not only to meet the need for engineering prints from microfilm, but to produce top quality prints from all types of microfilmed records.

Whether you use microfilm in aperture cards, roll or jacketed microfilm, the 1824 Printer supplies crisp, clear prints up to 18" x 24" on ordinary paper, vellum or offset master material.

Operation is automatic. Prints emerge ready for immediate use. They are dry, permanent and may be written on easily with pen or pencil. Quality is excellent—sharp, black on white.



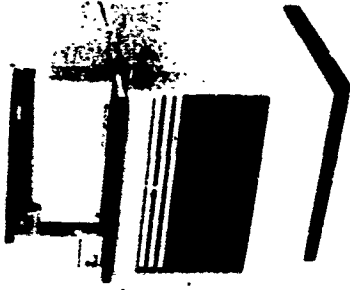
Specifications

Prints from 16 or 35mm roll microfilm, microfilm in acetate jackets up to 5" x 8" in size, and microfilm in aperture cards. Enlargements are made at a ratio of 14.5:1. Automatic exposure, developing, transfer and delivery in 21 to 30 seconds, depending on size. Front end delivery. Copies onto ordinary paper, vellum or offset master material. Unit handles paper sizes 8 1/2" x 11" to 18" x 24". Paper supply drawer's incorporated in cabinet.

Height—65" Width—32" Depth—32"

Weight—Approximately 600 lbs.

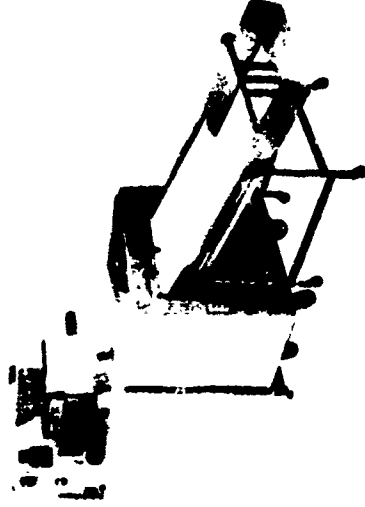
Power—Main: 120-240 or 200 Volts, 50/60 Hz. Phase 1



1824 Printer—Aperture Card Input delivers engineering prints from microfilm mounted in an aperture card. In every other respect, this machine offers the same benefits as the Universal Input model—at a lower cost. Exposure, development and print delivery is entirely automatic. This printer enables more and more companies and government agencies to realize the benefits of a unitized microfilm system.

Specifications

Specifications for the 1824 Printer—Aperture Card Input are the same as those for the Universal Input model except input is limited to 35mm microfilm mounted in aperture cards with military "D" aperture. 12:1 magnification ratio is also available on special order.



Copyflo 24C2 Continuous Printer A fully automatic, high speed machine for the production of engineering prints from roll or card-mounted microfilm. Uses ordinary paper, vellum or offset master material. High quality copies up to 24" in width are produced at the rate of 20 linear feet per minute. Essential to unitized microfilm systems where a large volume of prints are required.

For more information, contact Xerox Corporation, Rochester, New York 14603