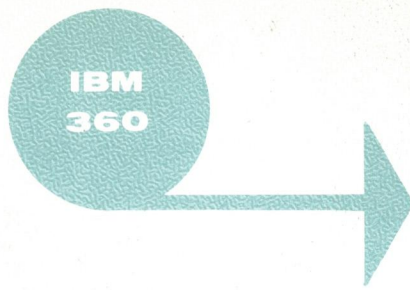IBM-COMPATIBLE
OFF-LINE CONVERTER/
PRINTER SYSTEM

3000
CONVERTER SYSTEM ®

High-speed printout of magnetic tapes in typical IBM System/360 formats independently of the computer...

That's the RC Off-Line Printer System in a nutshell.

What's the advantage?

First of all, better utilization of the CPU memory of your IBM 360. Operating a printer on-line requires 9–12 % of CPU memory capacity. If you find you need three printers – requiring, say, 30 % – then you'll probably need more memory capacity to boot.

Another thing. The use of Spool Mode Administration – with two or three on-line printers – entails considerable difficulty in scheduling the completion of big printing jobs. Which is a real drawback when you have printout deadlines to meet.

The RC Off-Line Printer System has other advantages too. Reduction of operating time throughout your data processing system. The possibility of re-printing computer output stored on magnetic tape. The fact that printer system maintenance never can tie up your computer system.

Then there's the economic advantage, when compared with an investment in on-line printers and a larger CPU memory to handle them. An investment in an RC Off-Line Printer System is an investment in more effective data processing.

RC off-line printer system

RC 3000 Converter Unit
core store: 1,024 8-bit characters ● cycle time: 7 microseconds ● parity checking during reading and writing ● input channel for RC 2000 Paper Tape Reader ● input/output channel for RC 709 Magnetic Tape Station ● output channel for RC 611 Line Printer (or other device)

RC 2000 Paper Tape Reader
reading speed: 2,000 characters/second ● tapes accepted: widths equivalent to 5, 7, 8, and Olivetti 6 track tapes ● core store: 256 8-bit characters ● input channel for alternative device

RC 709 Magnetic Tape Station
tape accepted: 9 track, ½ inch, IBM compatible ● read/write speed: 30 inches/second ● recording density: 800 bits/inch ● transfer rate: 24,000 characters/second ● EBCD or ISO/ASCII codes ● read-after-write check for parity and continuity

RC 3360 Tape Format Adapter

RC 611 Line Printer
printing speed: 1,000 lines/minute ● print characters: six standard character sets available; special character sets designed at extra cost ● number of characters: 64 or 96 ● characters per line: 132 ● paper speed: 15 milliseconds maximum single-line step; 35 inches/second skip feed

The RC Off-Line Printer System – being based on a standard RC 3000 Converter System – can also be used for many other forms of off-line data conversion in addition to printout of magnetic tape:

PAPER TAPE READER	► LINE PRINTER *
PAPER TAPE READER	► MAGNETIC TAPE STATION *
PUNCHED/MARKED CARD READER	► MAGNETIC TAPE STATION
OPTICAL CHARACTER READER	► MAGNETIC TAPE STATION
MAGNETIC TAPE STATION	► PAPER TAPE PUNCH
MAGNETIC TAPE STATION	► PUNCHED CARD PUNCH

* Included in the RC Off-Line Printer System at no extra cost.

The RC 3000 is also available in a 7 track magnetic tape version, and can be equipped with a controller for data transmission to/from other RC 3000 systems via telephone lines. The programming of the RC 3000 is simple and easy to learn; a flexible code conversion catalog can be readily changed to accommodate different forms of conversion, enabling the RC 3000 to go from one job to another in a few seconds.

Just like the RC Off-Line Printer System, the RC 3000 Converter System as a whole is designed to free the computer from time-consuming "paper work" – from the necessity of handling large quantities of input/output data via slow electro-mechanical peripheral devices.
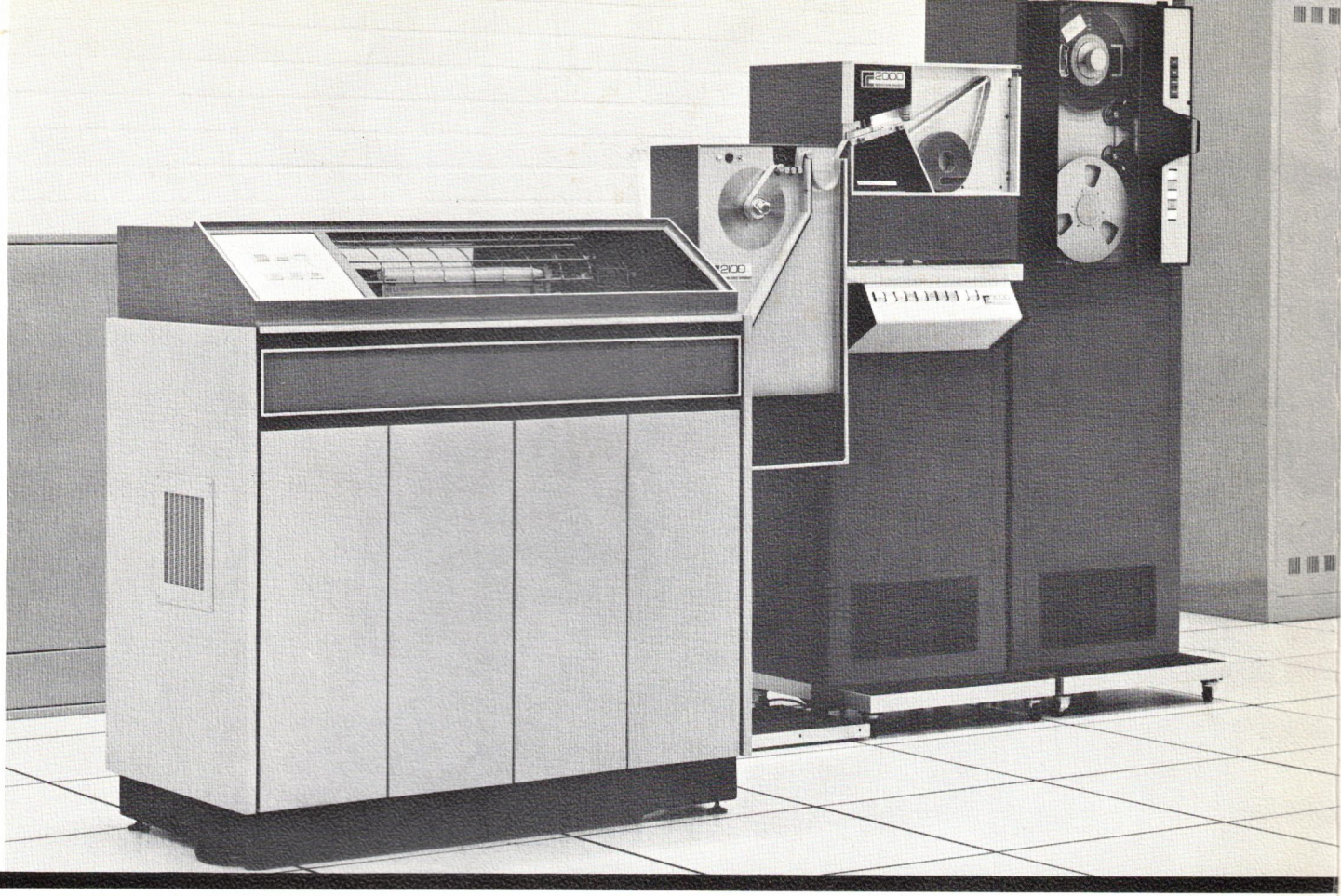
Magnetic tape formats

The RC Off-Line Printer System accepts the following IBM System/360 magnetic tape formats (comp. IBM Form C-28-6628, p. 150 and 151):

Printer Control Character	Record Format	Records per Block	Bytes per Block	Bytes per Record
USAS1 or MACHINE	fixed length	1	max. 133	max. 133
	fixed length	max. 5	max. 665	133
	variable length	1	max. 141	max. 137
	undefined length	1	max. 133	max. 133
NONE	undefined length	max. 6	max. 768	max. 132

Over one hundred RC 3000 Converter Systems are improving data processing efficiency and economy today at computer installations throughout the world. These are just a few users of the RC 3000 Off-Line Converter Printer System:

C & A Brenninkmeyer G.m.b.H.
Bleichstrasse 20, 4 Düsseldorf, Germany.
Department store chain.
Two RC 3000 9-track systems, each with an RC 611/96 printer, serving IBM 1401 and 360 computers.

Tretorn Datacenter AB
Fack, 251 01 Hälsingborg 1, Sweden.
Rubber goods manufacturer.
Two RC 3000 9-track systems with RC 611 printers, connected to an NCR C-420 optical reader, serving an IBM 360/30.

N. V. Philips' Telecommunicatie
P. O. Box 32, Hilversum, Holland.
Telecommunications equipment manufacturer.
An RC 3000 9-track system with an RC 2100 tape winder, RC 400 punch controller, RC 150 tape punch, and RC 611 printer. Serving an IBM 360/40.

Tietotehdas Oy
Pohj. Espl. 25 B, Helsinki, Finland.
Service bureau for banks.
Two RC 3000 9-track systems with RC 2100 tape winders and RC 611 printers; serving three IBM 360/40's.

Explanation

SP n B:	Space n lines before printing.
SK n B:	Skip to channel n before printing.
SP n A:	Space n lines after printing.
SK n A:	Skip to channel n after printing.
SP n I:	Clear printer buffer before spacing n lines.
SK n I:	Clear printer buffer before skipping to channel n.

The correspondance between the printer control characters and the magnetic tape code is tailored to the user's requirements.

RC 611 line printer characteristics

Printing Speed: 1,000 lines/minute. See note below.

Print Characters: Six standard character sets available; special character sets designed at extra cost.

Number of Characters: 64 or 96.

Characters per Line: 132.

Horizontal Spacing: 10 characters/inch.

Line Straightness: Less than 0.010 inches individual character deviation from a straight line drawn parallel to the line of characters.

Vertical Spacing: Six and eight lines/inch.

Hammer Type: Friction-free single moving part, flex-pivoted arranged in horizontal row facing character drum.

Hammer Replacement Time: Less than two minutes.

Character Drum: Photo-etched, chrome-plated sleeve secured to heavy steel mandrel.

Drum Position Sensing: By variable reluctance transducers.

Paper Speed: 15 milliseconds maximum single-line step; 35 inches/second skip feed.

Paper Drive System: Upper and lower pairs of tractors, accurately controlled by servo motor. No paper drive clutch or brake used.

Ribbon: Vertically-fed, self-reversing roll type; 14 inches wide by 15 yards long.

Paper Specifications: Standard, edge-punched (1/2-inch hole centers), fanfold paper up to 19 inches wide. 15-lb bond minimum weight, single copy. Up to six parts 12-lb, with single-shot carbon or tabulating card (0.007 inch thickness) with carbon record sheet.

Horizontal Paper Alignment: Manual controls provided for adjusting paper anywhere within 19-inch feed area. Also vernier control for adjusting ± 1 character while printing.

Vertical Paper Alignment: Vernier for adjusting ± 1 line while printing.

Multi-Copy Adjustments: Manual controls provided for maintaining proper print density for up to 6-part paper.

Paper Loading: Drum housing pivots forward and down permitting fast paper loading and ribbon replacement.

Buffer Storage: Core array; stores one line of characters.

Vertical Format Control: Paper is moved by activating the Paper Advance line, and movement of lines is indicated by the Line Advance signal.

Paper Tape Format Control: Standard 8-track paper tape reader linked to paper motion.

Step Count Format Control: Enables a paper step of between 1 and 7 lines, and can be used independently of or in conjunction with the paper tape format control.

Horizontal Format Control: Normally accomplished utilizing space code.

Power: 220 V AC ± 10 %, 50 Hz, 1.4 KW.

Environment: Temperature 10–38°C; relative humidity 20–80 %.

Size and Weight: Width 119 cm; depth 66 cm; height 122 cm; weight 378 kg.

Colors: Light gray, dark gray, and brushed aluminum.

Note on Printing Speed

The 64-character drum rotates at no less than 1,000 revolutions/minute. The drum is geared for 1,040 revolutions/minute, and the induction slip shall not exceed 3 % or 31 revolutions/minute. The 96-character drum rotates at no less than 667 revolutions/minute. With the 64-character drum, and assuming single-line paper stepping between print operations, the printer prints at not less than 1,000 lines/minute when using any combination of up to 48 physically adjacent characters plus space code. Here, up to 45 milliseconds of each 60 milliseconds rotation time is used for printing. During the remaining 15 milliseconds, the next line to be printed is stored and the paper is advanced while the 16 unused characters are passing the print position.

When printing more than 48 physically adjacent characters, an entire drum revolution may be required to scan all desired characters. Thus, with the 64-character drum, and assuming single-line paper stepping between print operations, the printer prints at not less than 800 lines/minute when using any combination of between 49 and 64 physically adjacent characters plus space code. Here, a maximum of 60 milliseconds is used for printing and an additional 15 milliseconds is required to step the paper.

Alphabetics, numerals, and commonly used punctuation marks are usually situated in adjacent positions on the drum, so that it is highly probably that on most lines of print, the character set that is used is 48 characters or less, and the printer will operate at 1,000 lines/minute. It should be noted that printing is asynchronous, that is, character scanning is initiated as soon as all data are loaded without waiting for any index point.

Printer control characters

After conversion, the control character contained in the record is encoded to serve as printer control characters for vertical paper control and printing instructions.

These printer control characters are the following:

USAS1 CONTROL CHARACTER		MACHINE CONTROL CHARACTER			
SPACE BEFORE PRINT	SKIP BEFORE PRINT	SPACE AFTER PRINT	SKIP AFTER PRINT	CLEAR BEFORE SPACE	CLEAR BEFORE SKIP
SP 0 B	SK 1 B	SP 0 A	SK 1 A	SP 0 I	SK 1 I
SP 1 B	SK 2 B	SP 1 A	SK 2 A	SP 1 I	SK 2 I
SP 2 B	SK 3 B	SP 2 A	SK 3 A	SP 2 I	SK 3 I
SP 3 B	SK 4 B	SP 3 A	SK 4 A	SP 3 I	SK 4 I
	SK 5 B		SK 5 A		SK 5 I
	SK 6 B		SK 6 A		SK 6 I
	SK 7 B		SK 7 A		SK 7 I
	SK 8 B		SK 8 A		SK 8 I

Conversion modes

The RC Off-Line Printer System permits data conversion from magnetic tape to the line printer in three ways:

Mode 1
Using the first character after a block gap and the first character after a filled printer buffer as control characters.

Mode 2
Using the ninth character after a block gap as a control character, after deletion of the first eight characters.
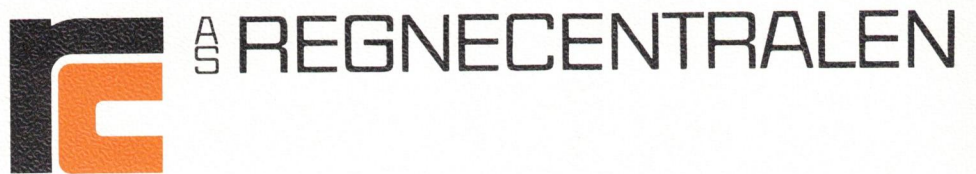
Mode 3
Generating single-line spacing after a block gap and after a filled printer buffer.

The mode of conversion is determined by the last character in the code conversion catalog, which is described fully in the RC 3000 User's Manual, Chapter 3.

ᴬ⁄ˢ REGNECENTRALEN
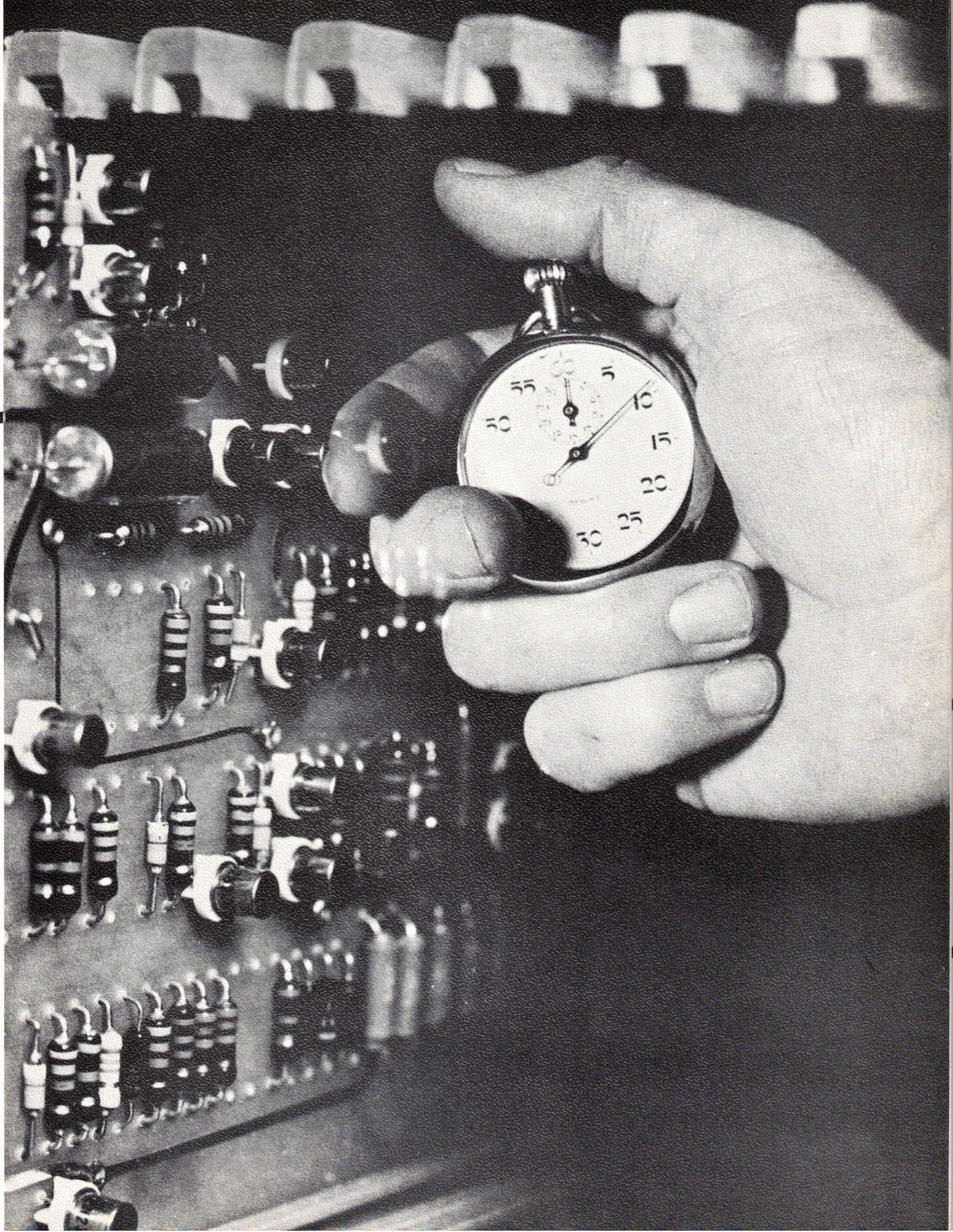
SCANDINAVIAN INFORMATION PROCESSING SYSTEMS

AUSTRIA

BENELUX

DENMARK

FINLAND

GERMANY

NORWAY

SWEDEN