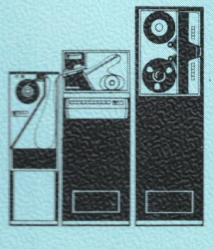
MULTIDIRECTIONAL OFF-LINE DATA CONVERSION AND TRANSMISSION SYSTEM

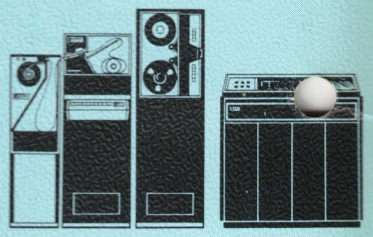
3000

CONVERTER SYSTEM®

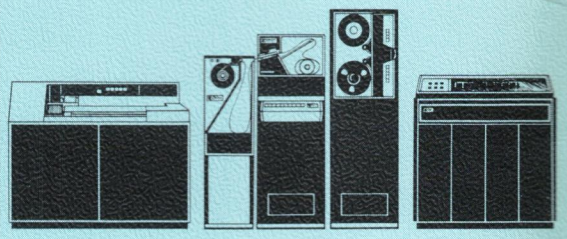
PAPER TAPE ▸ MAGNETIC TAPE



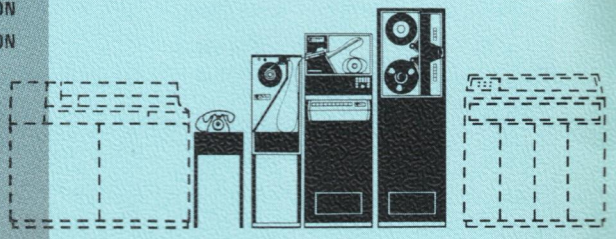
PAPER TAPE ▸ MAGNETIC TAPE
PAPER TAPE ▸ LINE PRINTER
MAGNETIC TAPE ▸ LINE PRINTER



PAPER TAPE ▸ MAGNETIC TAPE
PAPER TAPE ▸ LINE PRINTER
MAGNETIC TAPE ▸ LINE PRINTER
PUNCHED CARDS ▸ MAGNETIC TAPE
PUNCHED CARDS ▸ LINE PRINTER



PAPER TAPE ▸ MAGNETIC TAPE
PAPER TAPE ▸ DATA TRANSMISSION
MAGNETIC TAPE ▸ DATA TRANSMISSION
DATA TRANSMISSION ▸ MAGNETIC TAPE



RC 3000 CONVERTER SYSTEM

The RC 3000 is designed to free computers from time-consuming paper work - from the necessity of handling large quantities of input/output data via slow electro-mechanical peripheral devices.

The RC 3000 operates such devices itself, independently of the computer, and can convert all input and output data to and from magnetic tape off-line. In this way, the RC 3000 makes it possible to use high-speed magnetic tape exclusively for computer input/output. This minimizes the time required for non-productive operations, and obviates all need to increase computer core store capacity when many peripheral devices must be accommodated.

The RC 3000 also enables more efficient peripheral operations. Input/output devices no longer have to wait until the computer can serve them, and off-line printing, for example, is a decided advantage in scheduling the completion of large printout jobs. As a data carrier, magnetic tape has other advantages besides speed. It is easily shipped and stored. Magnetic tape can be sent to a central computer for processing, while original documents are kept at the source. Computer output stored on magnetic tape can be reprinted at any time. Finally, the fact that the RC 3000 is an off-line system means that peripheral device maintenance can never hold up computer operations.

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CONVERTER SYSTEM

RC 3000 CONVERTER SYSTEM

The basic RC 3000 consists of the RC 2000 Paper Tape Reader, the RC 3000 Converter Unit, and either the 7-track RC 707 or 9-track RC 709 Magnetic Tape Station. A number of input and output devices can be connected to the Converter Unit, providing a wide range of off-line data conversion possibilities. For example:

Paper Tape Reader	➧	Magnetic Tape Station
Paper Tape Reader	➧	Paper Tape Punch
Paper Tape Reader	➧	Line Printer
Punched/Marked Card Reader	➧	Magnetic Tape Station
Punched/Marked Card Reader	➧	Paper Tape Punch
Punched/Marked Card Reader	➧	Line Printer
Optical Character Reader	➧	Magnetic Tape Station
Magnetic Tape Station	➧	Magnetic Tape Station *
Magnetic Tape Station	➧	Paper Tape Punch
Magnetic Tape Station	➧	Punched Card Punch
Magnetic Tape Station	➧	Line Printer
Magnetic Tape Station	➧	Incremental Plotter

* The RC 3000 can also be equipped with a controller for off-line data transmission between magnetic tape stations and other input/output devices.

The RC 3000 is programmed for a specific conversion task by writing a Catalog based on the input and output codes involved.
The RC 3000 can readily accomodate different conversion tasks, as the Catalog is simply read into the Converter Unit prior to each conversion run.

RC 3000 CONVERTER UNIT

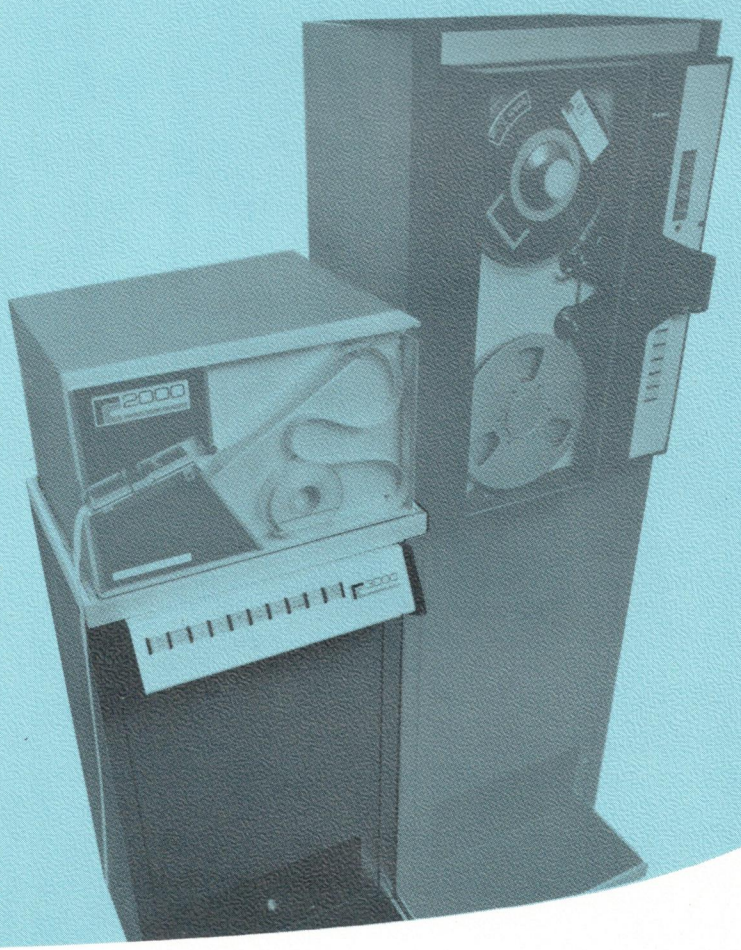
The RC 3000 Converter Unit contains a core store, control unit, and power supply. The core store, the capacity of which is 1,024 8-bit characters, has two functions: Catalog and Block Accumulator.

Catalog

First, the core store holds the Catalog, read in prior to the conversion run from an 8-track paper tape, the so-called Catalog Tape, and containing the following:

- Transformation Characters, including the special functions Deletion, End of Block, End of Block with Stop, Lower Table Shift, and Upper Table Shift
- Start Address Mark, indicating block length (maximum 992 characters, dependent on the input code)
- Mode Character, indicating conversion mode (for example, paper tape to magnetic tape with even parity).

The Catalog is further described under "RC 3000 Programming."



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RC 3000
CONVERTER
UNIT

Block Accumulator

The second function of the core store is to collect converted characters in a special area, from which they are transferred in blocks, from time to time during the conversion run, to the output device selected. (The handling of data in the RC 3000 is based on the transfer and conversion of single characters or blocks of characters). This area of the store is called the Block Accumulator.

The size of the Block Accumulator can be varied from task to task by means of the Start Address Mark, and during a task by means of the End of Block function.

Permanent Programs

The control unit has an input channel for the buffer store of the RC 2000 Paper Tape Reader, input/output channel for a magnetic tape station, and output channel for a line printer or other device. The flow of data is governed by five built in programs:

- **P1, read catalog tape.** Reads the Catalog into the core store.
- **P2, read data from RC 2000.** Reads, converts, and stores characters from the RC 2000 buffer store in the Block Accumulator.
- **P3, read data from magnetic tape.** Reads, converts, and stores characters from magnetic tape in the Block Accumulator.
- **P4, write data to magnetic tape.** Writes characters from the Block Accumulator to magnetic tape.
- **P5, write data to line printer.** Writes characters from the Block Accumulator to a line printer or other device.

P1 is activated only once, prior to the conversion run. During the run, the RC 3000 is alternately controlled by an input program (P2 or P3) and an output program (P4 or P5).

The input program reads, converts, and stores characters in the Block Accumulator. When the Block Accumulator is full, the output program assumes control and writes the accumulated characters to the device selected. When the Block Accumulator is empty, the input program takes over again.

CHARACTERISTICS

Core Store
capacity: 1024 8-bit characters
cycle time: 7 μs

Power
50 Hz, 220 V
max. power: 330 kcal/h
max. line current: 2.2 A

Cooling Air
280 m³/h from ambient
temperature: 18-25° C
relative humidity: 40-70 %

Size and Weight

width:	58.9 cm
depth:	62.0 cm
height:	140.9 cm
weight:	121.0 kg

RC 2000 PAPER TAPE READER

The RC 2000 reads 5 meters of tape a second, equivalent to 2,000 characters/second for standard round-hole formats, or 1,650 characters/second for the Olivetti rectangular-hole format. Tapes can be up to 300 meters long, equivalent to about 120,000 characters.

The RC 2000 employs a servo input buffer system based on a solid-state cyclic core store which can hold 256 characters of up to 8 bits. The core store is used as a buffer between the reader and the processing device; this permits the tape to be driven by a simple servo motor, thus eliminating abrupt starts and stops.

Characters are read continuously into the buffer store, from which they are transferred one by one to the processing device. As characters are transferred, the speed of the tape drive motor is regulated so as to seek an input character rate that equilibrates the output rate with a buffer store content of approximately 128 characters, limited to a maximum speed of 2,000 characters/second.

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RC 2000 PAPER TAPE READER

The RC 2000 accepts four standard widths equivalent to: one inch (8 tracks maximum), seven-eighths inch (7 tracks maximum), Olivetti (6 tracks), and eleven-sixteenths inch (5 tracks). Tapes can be punched in any suitable opaque material up to 0.3 mm thick – three times normal – which permits the reading of spliced tapes.

The RC 2000 is controlled by the built-in RC 3000 program P2. As the servo input buffer system can accept input from other sources, the RC 2000 has an input channel for an alternative device such as a punched card reader. The RC 2000 reader itself is used for input of paper tape data and, prior to each conversion run, the Catalog. By means of another channel, the RC 2000 can be connected directly to an output device, for instance, a line printer.

Option RC 2100

The RC 2100 Automatic Tape Winder winds tapes as fast as they are read the RC 2000, using a servo system in which the presence of tape activates the take-up hub motor.

CHARACTERISTICS

Reading Speed
max. 2000 cps

Character Format
max. 8 bits

Tape Formats
one inch (max. 8 tracks):
25.4 mm
seven-eighths inch (max. 7 tracks):
22.2 mm
Olivetti (6 tracks):
20.5 mm
eleven-sixteenths inch (5 tracks):
17.5 mm

Hole Spacing
max. 2.54 mm center to center

Tape Media
any suitable opaque material

Tape Thickness
max. 0.3 mm

Tape Length
max. 300 m, equivalent to approx. 120,000 characters

Core Store
256 8-bit characters

Power
50 Hz, 220 V
max. power: 120 kcal/h
max. line current: 0.8 A

Cooling Air
120 m^3/h
temperature: 15-30° C
relative humidity: 40-70 %

Size and Weight – RC 2000

width:	52.0 cm
depth:	46.3 cm
height:	32.6 cm
weight:	36.0 kg

Size and Weight – RC 2100

width:	40.0 cm
depth:	26.0 cm
height:	76.3 cm
weight:	38.5 kg

RC 707 AND RC 709 MAGNETIC TAPE STATIONS

The RC 707 and RC 709 Magnetic Tape Stations employ 7 and 9 track, 1/2 inch, internationally compatible tapes. The RC 707 records at densities of 200/556, and 556/800 bits/inch, the RC 709 at 800 bits/inch. The read/write speed is 30 inches/second at 800 bits/inch, the maximum transfer rate 24,000 characters/second.

A block can contain from 1 to 960 characters in the RC 707, and from 1 to 768 characters in the RC 709. A longitudinal redundancy check (LRC) character provides even longitudinal parity in each block. The RC 709 also utilizes a cyclic redundancy check (CRC) character at the end of each block as defined in "Data Interchange on Magnetic Tape, 9 Tracks/800 BPI" (ECMA/TC166/37). The RC 709 includes a write tape mark function; this is optional in the RC 707.

The tape transport employs a single servo-driven capstan, vacuum tape-buffer chambers, servo-controlled reel motors, and built-in tape cleaners. The tape is held in contact with the capstan by a low, uniform tension derived from the vacuum chambers (also during rewinding to ensure proper packing). A dual-stack read/write head provides true read-after-write checking.

The tape can be moved to upspace or backspace a file or block, or to rewind or unload tape. The tape station provides status bits indicating parity error, end-of-tape sensed, beginning-of-tape sensed, write-enable ring sensed, and so forth. The tape station has a local/remote switch. In local mode the operator can load and unload tape, or perform maintenance. In remote mode the tape station is controlled by the built-in RC 3000 programs P3 and P4.

CHARACTERISTICS

Tape Types
7/9 track, 1/2 inch, internationally compatible

Tape Transport
equivalent to Ampex TM7

Recording Mode
NRZ 1 (non-return to zero)

Recording Densities
RC 707: 200/556, and 556/800
RC 709: 800 bpi

Tape Length
2450 feet (800 m)

Tape Capacities
RC 707: 22.8 million characters at 800 bpi
16.0 million characters at 556 bpi
5.6 million characters at 200 bpi
RC 709: 23.4 million characters

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RC 707
AND
RC 709

Block Lengths
RC 707: 1 to 960 characters
RC 709: 1 to 768 characters

Interblock Gap
3/4 inch

Access Time
9 ms from start to block begin

Read/Write Speeds
RC 707: 30 ips at 800 bpi
36 ips at 556 and 200 bpi
RC 709: 30 ips

Transfer Rate
max. 24,000 cps

Rewind Speed
approx. 180 ips (less than 3 minutes for 800 m)

Power
50 Hz, 220 V
max. power: 730 kcal/h
max. line current: 4.1 A

Cooling Air
300 m³/h from ambient
temperature: 16-32° C
relative humidity: 40-70 %

Size and Weight

width:	57.2 cm
depth:	57.0 cm
height:	179.9 cm
weight:	166.0 kg

RC 611 LINE PRINTER AND RC 3360 MAGNETIC TAPE FORMAT ADAPTER

The RC 611 Line Printer employs a drum with 132 print positions. Two drum sizes are available: one with 64 characters, which rotates at no less than 1,000 revolutions/minute, and one with 96 characters, which rotates at no less than 667 revolutions/minute. The RC 611 prints at maximum speed when using any combination of up to 48 physically adjacent characters plus space code.

The maximum paper feed speed is 35 inches/second, corresponding to 5 milliseconds/line after the third line. Paper feed can be controlled by an 8-track format tape and/or by counting lines.

Six standard character sets are available. Special sets can be designed at additional cost.

The printer has a local/remote switch. In local mode the operator can insert and adjust forms and the like. In remote mode the printer is controlled by the built-in RC 3000 program P5.

The RC 611 is connected to the Converter Unit by means of a format adapter, such as the RC 3360 described below. The printer buffers one line of 7-bit characters before executing the printing or control operation specified.

The RC 3360 permits printout of magnetic tapes in typical IBM System/360 formats using the RC 611. The formats accepted are as follows (comp. IBM Form C-28-6628, p. 150 and 151):

Printer Control Character	Record Format	Records per Block	Bytes per Block	Bytes per Record	Mode
USAS1 or MACHINE	fixed length	1	max. 133	max. 133	1
	fixed length	max. 5	max. 665	133	
	undefined length	1	max. 133	max. 133	
	variable length	1	max. 141	max. 137	2
NONE	undefined length	max. 6	max. 768	max. 132	3

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

Data can be printed from magnetic tape in three different ways, as determined by the Mode Character in the Catalog:

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.

CHARACTERISTICS

Printing Speed
max. 1000 lpm

Print Positions
132

Drum Sizes
64 and 96 characters

Print Density
horizontal: 10 characters/inch
vertical: 6 lines/inch

Paper Feed Speed
max. 35 ips

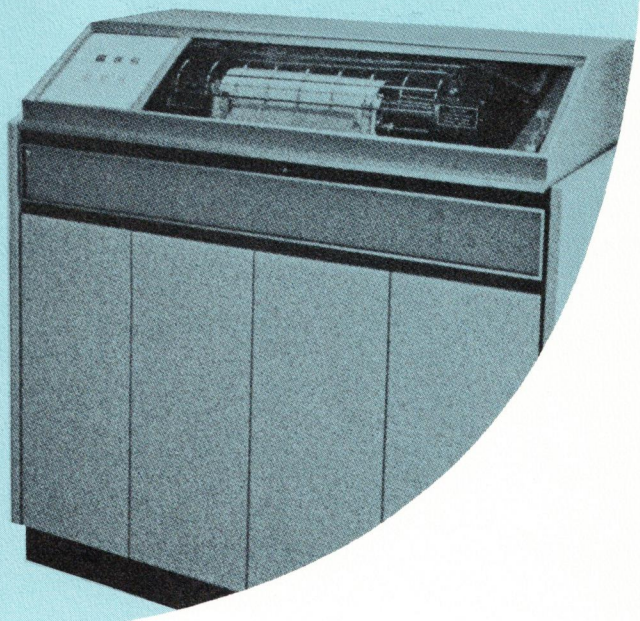
Standard Character Sets
96 characters, OCR-B font, size 1
64 characters, OCR-B font, size 1
2×48 characters, Cobol modified
2×48 characters, Cobol modified
64 characters, IBM PL/1 modified
96 characters, special

Power
50 Hz, 220 V, 1.5 Kw

Cooling Air
temperature: 16-30° C
relative humidity: 30-70 %

Size and Weight

width:	114.0 cm
depth:	76.0 cm
height:	122.0 cm
weight:	400.0 kg



RC 3000® CONVERTER SYSTEM

RC 3100 DATA TRANSMISSION CONTROLLER

The RC 3100 extends the RC 3000 Converter System to include off-line data transmission between magnetic tape stations and other input/output devices, without restricting off-line conversion in connection with local data processing.

The RC 3100 comprises three units: the RC 3101 Transmitter, RC 3102 Receiver, and RC 3103 Transmitter/Receiver. The first two units can be extended after delivery to include RC 3103 capability. All units interface directly to standard modems complying with CCITT Recommendation V. 24.

The RC 3100, designed for leased as well as dialed telephone connections, operates on a two-way alternate basis with the following channel combinations:

Data Channel	Supervisory Channel
600/1200 bauds	75 bauds
1200/2400 bauds	75 bauds
2400 bauds	75 bauds
1200/2400 bauds	1200/2400 bauds
2400 bauds	2400 bauds
4800 bauds	4800 bauds

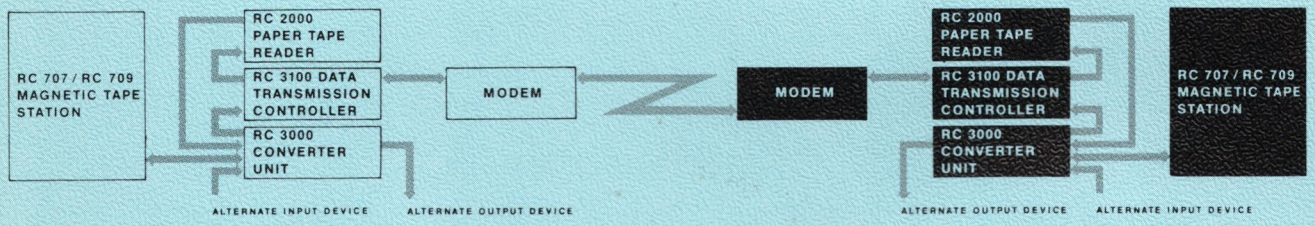
At 1200 bauds, the actual transmission speed from, say, magnetic tape with a block length of about 650 10-bit characters is approximately 110 characters/second. During transmission a parity check is generated for each character and a longitudinal redundancy check for each block.

Transmission Procedure

The RC 3100 converts characters of 8 bits in parallel from the input device to characters of 10 bits in series for transmission according to a start/stop principle. Thus characters converted from 8-track paper tape will contain: a start bit, seven data bits, a parity bit, and a stop bit.

The 10-bit characters are transmitted in blocks, the length of which is determined by the Catalog at the transmitter end. Fixed as well as variable block lengths can be used. Three characters are added to each block for transmission: STX (start of text), ETX (end of text), and LRC (longitudinal redundancy check). STX and ETX are used at both the transmitter and receiver end to indicate the start and end of each block.

At the end of each block, a waiting period ensues to provide response time for the receiver. The duration of this period is normally 35 milliseconds, roughly equivalent to the time required to transmit 4 characters at 1200 bauds.
If the block has been correctly received, a response is received on the 75 baud channel at the transmitter end before the elapse of the waiting period. This causes the next block to be transmitted.
If the block has been erroneously received, there is no response. When the waiting period has elapsed without a response, the block is retransmitted, as the receiver does not transfer erroneously received blocks to the output device. Retransmission will be attempted up to three times, after which the RC 3100 automatically stops and an alarm condition is indicated.



RC 3000® CONVERTER SYSTEM

RC 3200 PAPER TAPE TRANSMITTER

The RC 3200 permits transmission of paper tape data to an RC 3000 Converter System equipped with the RC 3100 Data Transmission Controller without restricting off-line conversion in conjunction with local data processing. A single RC 3000 can receive data from several RC 3200 transmitters, though not simultaneously.

The RC 3200 reader can accommodate 5, 7, and 8 track standard tapes and 6 track Olivetti tapes at the turn of a single selector knob. The RC 3200 transmitter interfaces directly to standard modems complying with CCITT Recommendation V. 24.

The RC 3200, designed for leased as well as dialed telephone connections, operates on a two-way alternate basis with the following channel combinations:

Data Channel	Supervisory Channel
600/1200 bauds	75 bauds
1200/2400 bauds	75 bauds
2400 bauds	75 bauds
1200/2400 bauds	1200/2400 bauds
2400 bauds	2400 bauds
4800 bauds	4800 bauds

Transmission Procedure

The RC 3200 converts paper tape characters of up to 8 bits in parallel to characters of 10 bits in series for transmission according to a start/stop principle. Thus the converted character consists of: a start bit, seven data bits, a parity bit, and a stop bit.

The 10-bit characters are transmitted in blocks, the normal length of which is 128 characters. The last block transmitted can contain from 1 to 128 characters. Three characters are added to each block for transmission: STX (start of text), ETX (end of text), and LRC (longitudinal redundancy check). STX and ETX are used at both the transmitting and receiving ends to indicate the start and end of each block.

At the end of each block, a waiting period ensues to provide response time for the receiver. The duration of this period is normally 35 milliseconds, roughly equivalent to the time required to transmit 4 characters at 1200 bauds.

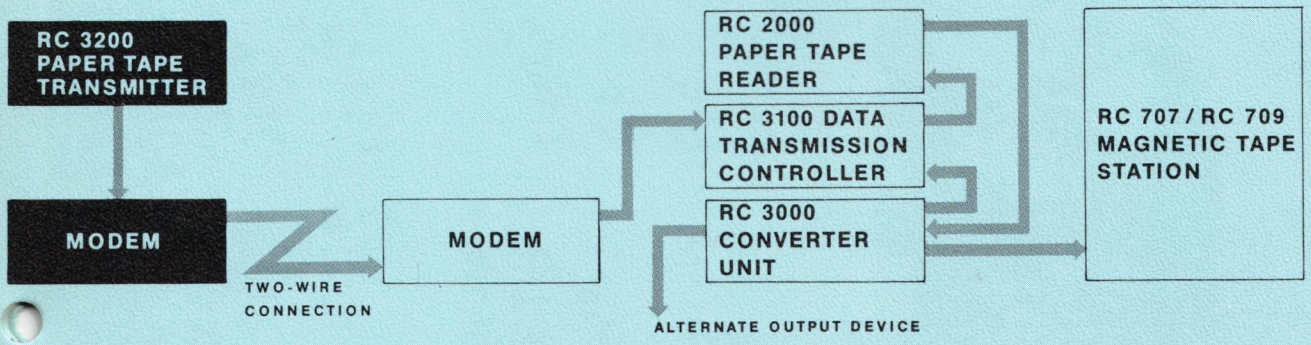
If the block has been correctly received, a response is received on the supervisory channel at the transmitting end before the elapse of the waiting period. This causes the next block to be transmitted.
If the block has been erroneously received, there is no response. When the waiting period has elapsed without a response, the block is retransmitted, as the RC 3100 controller will not transfer erroneously received blocks to the RC 3000 output device.
Retransmission will be attempted up to three times, after which the RC 3200 automatically indicates an alarm condition by means of visible and audible signals. Transmission can be restarted after an alarm condition without loss of data.

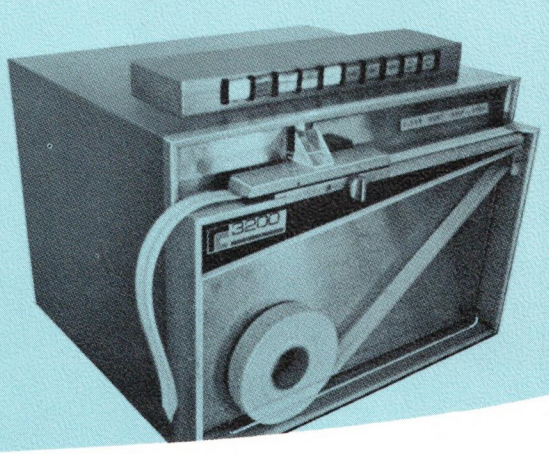
Programming

The RC 3200 is programmed prior to transmission of a data tape by means of an 8 track tape with five characters containing the following:

1st Character: selection of parity track, parity mode, and feed hole reading.
2nd Character: substitute for STX character.
3rd Character: substitute for ETX character.
4th Character: substitute for EOT (end of transmission) character.
5th Character: substitute for parity error.

The substitutes are selected by the user. When combinations corresponding to the STX, ETX, or EOT characters are read from the data tape, the RC 3200 transmits the respective substitutes found as the second, third, or fourth characters of the program tape; similarly, the transmitter replaces an erroneous character with the substitute found as the fifth character of the program tape, if a parity error is detected.





RC 3000® CONVERTER SYSTEM

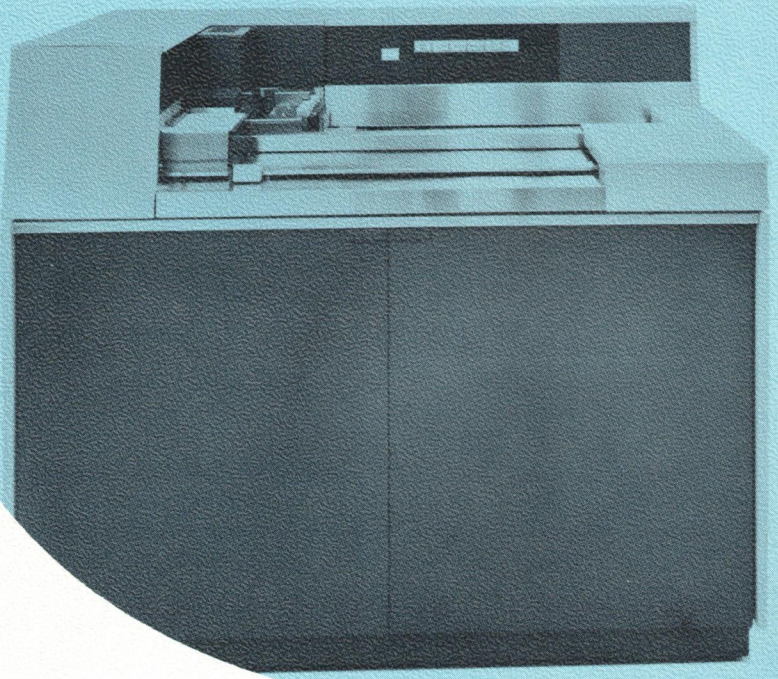
RC 1200 PUNCHED CARD READER

The RC 1200 reads 1,200 80-column or 1,600 51-column punched cards a minute. Cards are read photo-electrically, column by column. Data can be transferred in binary or coded mode. In binary mode each column is divided into two consecutive 6-bit characters. In coded mode each column is converted into one 8-bit character. Despite certain restrictions, RC 1200 coding permits the reading of the most commonly used Hollerith codes.

Each column is read twice, so that any discrepancies in the two readings can be detected. Prior to the reading of each card, all of the data channels are tested for their response to light and dark conditions; thus any malfunction in the photo diodes or amplifier circuits can be detected at once. Other error detecting features include failure to feed a card and margin checks for timing.

An asynchronous pneumatic picker enables the RC 1200 to handle cards that have been damaged or exposed to high humidity. Cards are transported by vibrating feed and stacker trays. The feed and receiving trays can each hold 4,000 cards, the secondary receiving tray 240 cards. The original orientation of the deck is retained after reading. Without reducing the reading speed, a delay after each card gives time to decide into which receiving tray the card is to be directed.

The RC 1200 is connected to the Converter Unit via the RC 2000 buffer store, and controlled by the built-in RC 3000 program P2.



CHARACTERISTICS

Reading Speeds
80-column cards: 1200 cpm
51-column cards: 1600 cpm

Capacity

feed tray:	4000 cards
receiving tray:	4000 cards
secondary tray:	240 cards

Power
50 Hz, 3×380 V
max. power: 2200 kcal/h
max. line current: 10 A

Cooling Air
850 m^3/h from ambient
temperature: 17-25° C
relative humidity: 35-60 %

Size and Weight

width:	144.7 cm
depth:	83.0 cm
height:	117.6 cm
weight:	478.0 kg

RC 1500 PUNCHED/MARKED CARD READER

The RC 1500 reads 1,500 80-column punched cards and/or 40-column marked cards a minute, each mark column corresponding to two punch columns; or, converted quickly, 2,000 51-column punched cards a minute. Cards are read photoelectrically, column by column. Data can be transferred in binary or coded mode. In binary mode each column is divided into two consecutive 6-bit characters. In coded mode each column is converted into one 8-bit character. Despite certain restrictions, RC 1500 coding permits the reading of the most commonly used Hollerith codes.

The movement of the card through the transport and all reading and timing circuits are checked on each card cycle to detect possible errors.

Cards are picked asynchronously from the feed tray by an impact and friction mechanism. The feed tray can hold 3,000 cards, each of the two receiving trays 2,000 cards, the original orientation of the deck being retained in the latter. Cards can be loaded and unloaded during operation. Without reducing the reading speed, a delay after each card gives time to decide into which receiving tray the card is to be directed.

The RC 1500 is connected to the Converter Unit via the RC 2000 buffer store, and controlled by the built-in RC 3000 program P2.

CHARACTERISTICS

Reading Speeds
80-column punched cards: 1500 cpm
40-column marked cards: 1500 cpm
51-column punched cards: 2000 cpm

Capacity

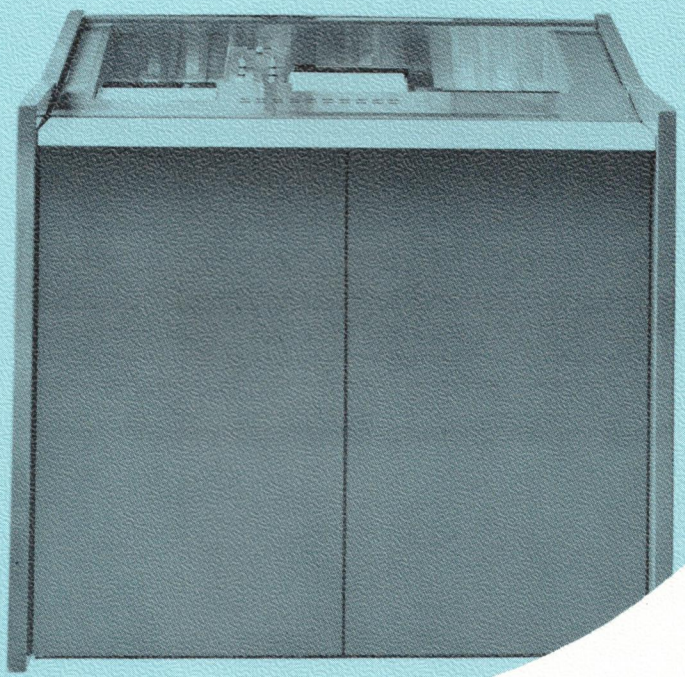
feed tray:	3000 cards
receiving tray:	2000 cards
secondary tray:	2000 cards

Power
50 Hz, 220 V

Cooling Air
temperature: 15-30° C
relative humidity: 20-65 %

Size and Weight

width:	97.8 cm
depth:	82.2 cm
height:	101.6 cm
weight:	182.0 kg



RC 3000® CONVERTER SYSTEM

RC 150 PAPER TAPE PUNCH AND RC 400 PUNCH CONTROLLER

The RC 150 punches characters of up to 8 bits at a speed of 150 characters/second. The tape (1 inch, 7/8 inch, or 11/16 inch) is advanced in 1/10 inch increments, equivalent to the distance between the centers of two holes, and supplied from a 1,000 foot roll, sufficient for about 120,000 characters.

The RC 150 is connected to the Converter Unit by means of the RC 400 Punch Controller, and controlled by the built-in RC 3000 program P5. The RC 400 receives characters of 8 bits in parallel and control signals from the Converter Unit. Each time a character and control signal are received, one character is punched. The RC 400 does not perform checking, as each character received contains a parity bit.

The first character starts the punch motor, and within 0.8 second the RC 150 is ready to operate. When the last character has been received, the motor continues running for about 6 seconds to avoid unnecessary restarting after short program interruptions.

Option RC 401

The RC 401 Shift Character Generator is available as an option for conversion of 8-track tapes to 5-track telex tapes.

CHARACTERISTICS

Punching Speed
max. 150 cps

Character Format
max. 8 bits

Tape Formats
8-track: 1 inch (25.4 mm)
7-track: 7/8 inch (22.2 mm)
6-track: 7/8 inch (22.2 mm)
5-track: 11/16 inch (17.5 mm)

Hole Spacing
1/10 inch (2.54 mm) center to center

Tape Media
any opaque material

Tape Thickness
3/1000 inch (0.08 mm)

Tape Length
1000 feet (300 m), sufficient for approx. 120,000 characters

Power
50 Hz, 220 V
max. line current: 1.0 A

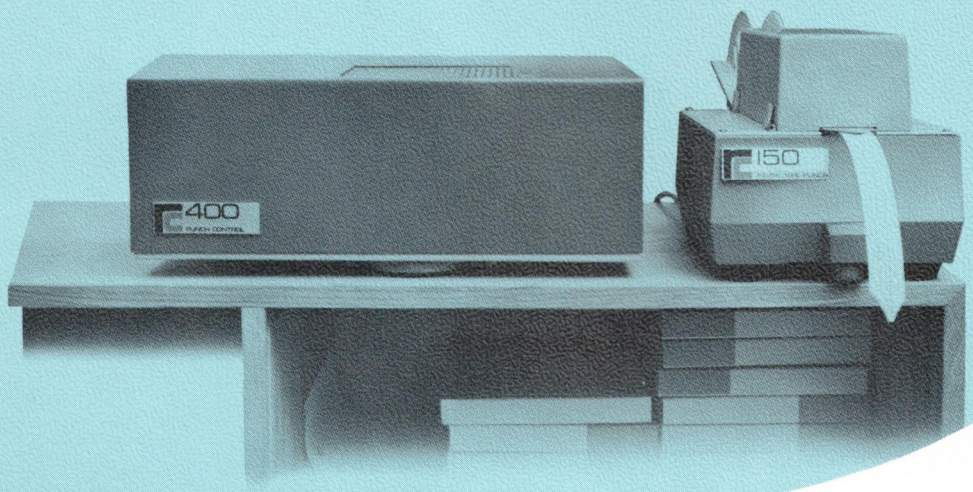
Cooling Air
temperature: 16-30° C
relative humidity: 40-70 %

Size and Weight – RC 150

width:	20.5 cm
depth:	52.0 cm
height:	22.0 cm
weight:	13.5 kg

Size and Weight – RC 400

width:	43.0 cm
depth:	37.0 cm
height:	17.0 cm
weight:	14.0 kg



RC 3000®
CONVERTER SYSTEM

RC 3000 PROGRAMMING

The RC 3000 is programmed for a specific conversion task by writing a Catalog Table based on descriptions of the input and output codes involved.

First, the characters from the input code are listed according to value. Opposite each Input Value, the corresponding Symbol is written.

INPUT TABLE									
SIGNIFICANCE								INPUT VALUE	SYMBOL
128	64	32	16	8	4	2	1		
.	.	.	.	.	.	.	.	0	
.	.	.	.	.	.	.	1	1	
.	.	.	.	.	.	1	.	2	

EXAMPLE

The Input Table for EBCDIC contains Input Values from 0 to 255, and the letter A is written opposite 193 because its bit pattern is 1 1 1

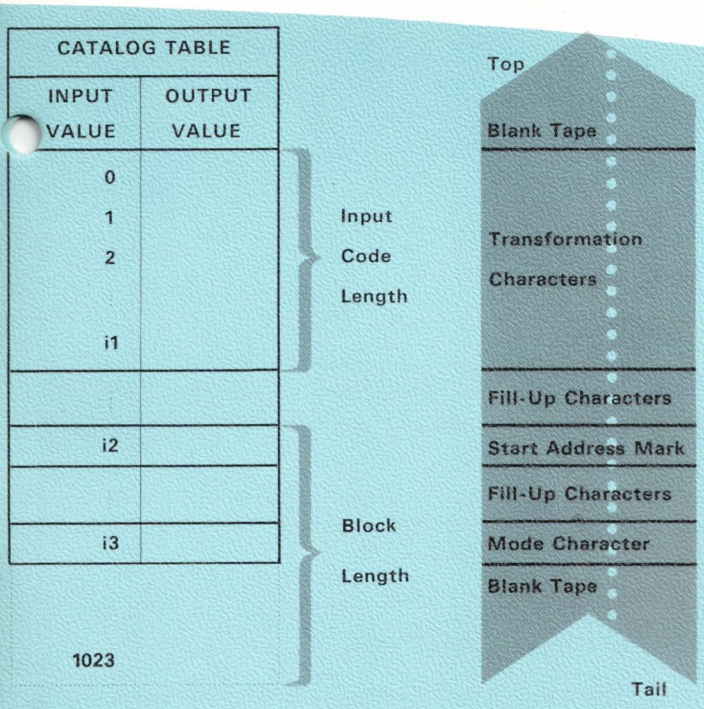
Next, the characters from the output code are listed according to kind, that is, the letters from A to Z, the digits from 0 to 9, Space, and so forth. Opposite each Symbol, the corresponding Output Value is written.

OUTPUT TABLE									
SYMBOL	OUTPUT VALUE	SIGNIFICANCE							
		64	32	16	P	8	4	2	1
A									
B									
C									

EXAMPLE

In the Output Table for the PL/1 character set, the Output Value 47 is written opposite the letter A when this graphic is placed on drum position . 1 . . 1 1 1 1

Now, the Catalog Table can be written. We examine each Symbol from the Input Table, determine the corresponding Output Value via the Output Table, and write the Output Value in the Catalog Table opposite the corresponding Input Value.



EXAMPLE
In the Catalog Table for conversion from EBCDIC to the PL/1 character set, the Output Value 47 is written opposite the Input Value 193.

Of course, the input code may contain symbols not appearing in the output code. We must then decide whether to replace such a character with another character or with a special function.

- If the character can be skipped, we use the special function Deletion.
- If the character controls variable block length, then End of Block is employed; this causes output of the accumulated characters.
- If the character is a task terminator, End of Block with Stop can be used; this causes the RC 3000 to stop.
- If the character is a shift character, then Lower Table Shift or Upper Table Shift can be substituted.

When the last Transformation Character has been written (opposite i1), we complete the Catalog Table with:

- Start Address Mark (opposite i2), which indicates the size of the Block Accumulator.
- Mode Character (opposite i3), which indicates the data carriers and formats involved.
- Fill-Up Characters to ensure that the length of the Catalog is a multiple of 32 characters (which is checked by the RC 3000 during P1).

EXAMPLE
In conversion from magnetic tape to line printer with a block length of 665 characters, the Start Address Mark is written opposite the Input Value 359 (that is, 1024 minus 665), and the Mode Character is written opposite the Input Value 383.

Finally, the Catalog is punched on 8-track paper tape. This can be done with an ordinary 8-track key-punch such as a Flexowriter, with the RC Mechanical Punch, or with a computer.

Example of Catalog Construction

Input Code: EBCDIC, 9-track magnetic tape, block length 665 characters.
Output Code: RC 611 Line Printer, PL/1 character set (No. 213437).

The first symbol in the Input Table, NUL, has no equivalent in the Output Table. We transform it to the special function Deletion, and write the Output Value 127 in the Catalog Table opposite the Input Value 0.

...

The next symbol is TM, which we transform to End of Block with Stop. We write the Output Value 123 in the Catalog Table opposite the Input Value 19.

...

The next symbol, SP, appears in the Output Table. We write the corresponding Output Value, 0, in the Catalog Table opposite the Input Value 64.

...

INPUT TABLE

SIGNIFICANCE								INPUT VALUE	SYMBOL
128	64	32	16	8	4	2	1		
.	.	.	.	.	.	.	.	0	NUL
.	.	.	1	.	.	1	1	19	TM
.	1	.	.	.	.	.	.	64	SP
1	1	.	.	.	.	.	1	193	A
1	1	.	.	.	.	1	.	194	B
1	1	.	.	.	.	1	1	195	C
1	1	1	1	1	1	1	1	255	ERR

MODE SELECTION	OUTPUT VALUE
Mag. Tape to Printer, Mode 1	50

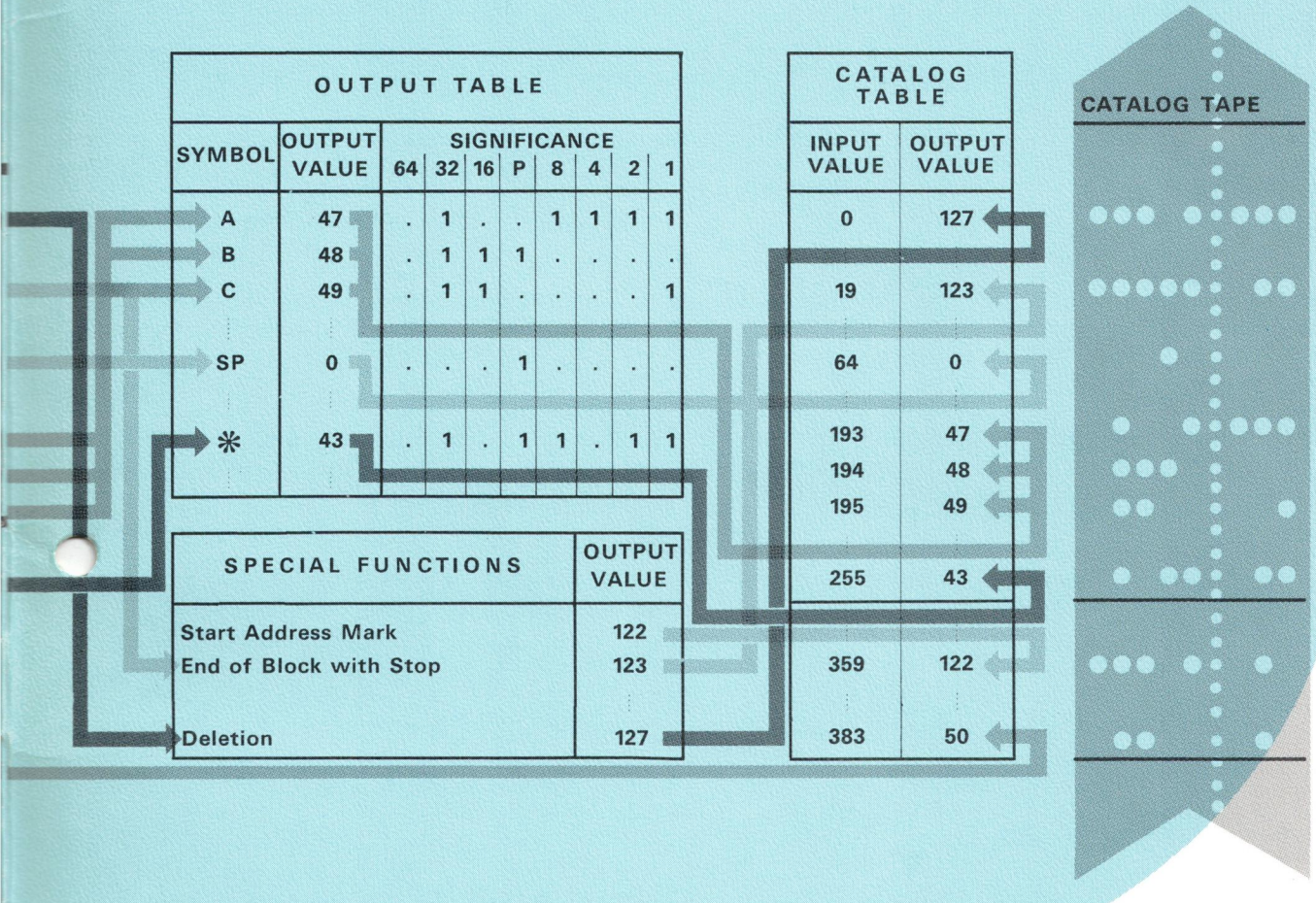
A, B, and C also appear in the Output Table, and we write the corresponding Output Values, 47, 48, and 49, in the Catalog Table opposite the Input Values 193, 194, and 195.

...

The last symbol in the Input Table, ERR, corresponds to an error condition. We transform it to an asterisk, and write the corresponding Output Value, 43, in the Catalog Table opposite the Input Value 255.

The block length of 665 characters corresponds to a start address of 1024 - 665 = 359. Opposite this Input Value in the Catalog Table, we write the Output Value of the Start Address Mark, 122.

Finally, opposite the Input Value 383, which corresponds to the nearest higher multiple of 32, we write the Output Value of the selected Mode Character, 50.



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HEADQUARTERS: FALKONER ALLÉ 1 · DK-2000 COPENHAGEN F · DENMARK
PHONE: (01) 10 53 66 · TELEX: 6282 RCHQ DK · CABLES: REGNECENTRALEN

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BENELUX
DENMARK
GERMANY
NORWAY
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Printed in Denmark by
R. Roussell Bogtryk + Offset

RCSL 82-Q 0004 (MAR/70)