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# RC 4000 PERIPHERAL DEVICES

# RC 2000 PAPER TAPE READER
# REFERENCE MANUAL

ABSTRACT

This report describes the logical structure of the RC 2000 paper tape reader when used in connection with the RC 4000 computer.

CONTENTS



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## MAIN CHARACTERISTICS

The paper tape reader is connected to the low-speed data channel by means of a buffer register of 24 bits.

The reader is supplied with an internal buffer with a capacity of 256 characters of 8 bits each. The internal buffer is automatically filled by means of a serve-controlled motor with a maximum speed of 2000 characters/second. The reader produces an interrupt signal when one of the two following conditions are fulfilled:

1: The number of characters in the internal buffer exceeds 64.

2: The end of the paper tape has been reached and there is less than 65 characters in the internal buffer.

Characters may now be transferred from the internal buffer through the buffer register to a working register by means of read and sense commands.

When the internal buffer is less then half-full the motor is started again.

## PAPER TAPE SPECIFICATIONS

The paper tape reader accepts paper tape of the following types:

8 tracks (one inch tape)
7 tracks (seven-eights inch tape)
6 tracks (square holes)
5 tracks (eleven-sixteenths inch tape)

In the internal representation of a character the tracks are identified by the track identifiers b8 through b1 each having the weight as shown:

| track identifier | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 |
|---|---|---|---|---|---|---|---|---|
| weight | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

A bit value of one corresponds to a punched hole in the corresponding track.

## COMMANDS

The paper tape reader accepts sense and read commands, the latter with three modifications.

In the input/output instruction specifying the sense command the value of the modifier field i.e. bits 18 - 21 in the effective address is irrelevant.

The use of write commands, control commands and other modifications of the read command than specified have no effect at all i.e. the device is then considered disconnected.

## READ COMMANDS

The following read commands are available:

| | |
|---|---|
| 2 | read odd |
| 6 | read even |
| 10 | read general |

The integers denote the values of bits 18 - 23 in the effective address of the input/output instruction.

A read command initiates the transfer of one character from the internal buffer to the buffer register. During this, the reader is busy for approximately 20 microseconds.

The read odd and read even commands transfer a 7-bit character:

0 b7 b6 b5 b4 b3 b2 b1

and sets a status bit if the parity of bits b8 - b1 is even and odd, respectively.

The read general command transfers an 8-bit character:

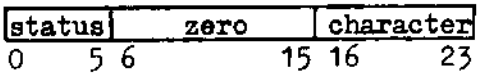
b8 b7 b6 b5 b4 b3 b2 b1

and sets a status bit if the parity of bits b8 - b1 is even.

Blank tape (0 holes) is skipped automatically in read operations.

SENSE COMMAND

When the reader is available a status word can be transferred from the buffer register to a working register by means of a sense command. The rightmost 8 bits of the status word contain the last character received in the buffer register, whereas the leftmost 6 bits are status bits:




The status bits have the following meaning:

0 end of buffer
1 parity
2 (not used = 0)
3 (not used = 0)
4 (not used = 0)
5 end of tape

End of buffer: If the internal buffer is empty and paper tape is still present the reader always generates a character equal to zero and the status bit end-of-buffer.

Parity: The meaning of the parity indication has already been explained under READ COMMANDS.

End of tape: If the internal buffer is empty and no paper tape is present in the reader a character equal to zero and the status bit end-of-tape are always generated.

## OPERATOR PUSH-BUTTONS

The paper tape reader is supplied with four push-buttons called reset, read, skip and up.

Reset: The reset button immediately causes the internal buffer to be cleared. If paper tape is present the buffer will now be refilled with 100 - 200 characters.

Read: The read button does not change the previous contents of the internal buffer. It merely causes the motor to start if both paper tape is present and the buffer is less than half-full.

Skip: The skip button causes the motor to skip characters on the paper tape without changing the contents of the internal buffer.

Up: The up button opens the pressure lid. The motor now remains stopped until the pressure lid is closed and the reset or the read button is pressed.