

ECMA

EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

STANDARD ECMA - 51

IMPLEMENTATION OF THE NUMERIC OCR-A FONT WITH 9x9 MATRIX PRINTERS

January 1977

Free copies of this document are available from ECMA,
European Computer Manufacturers Association,
114 Rue du Rhône — 1204 Geneva (Switzerland)

ECMA

EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

STANDARD ECMA - 51

IMPLEMENTATION OF THE NUMERIC
OCR-A FONT WITH 9x9 MATRIX PRINTERS

January 1977

BRIEF HISTORY

In June 1971 the General Assembly of ECMA decided to start work on standardization of character sets for matrix printers. This task was entrusted to TC4.

Matrix printing is a technique that is increasingly being used because of certain advantages in many applications in the computer field. Therefore, ECMA felt it necessary to investigate the possibility of generating machine-readable characters by this technique. The main goal of the work was to define characters which could be printed with commonly used matrix printers and could be read by humans and machines. Two projects were undertaken by this Committee: one for the implementation of ECMA-8 (Numeric OCR-A Font) on a 9x9 grid and one for a new alpha-numeric character set for 7x9 matrix printers. The latter is the subject of Standard ECMA-42, dated December 1973. The former was the subject of a white cover document, also published in December 1973, which dealt with the implementation of the OCR-A characters according to Standard ECMA-8. The strokes of the characters defined by this implementation correspond to the nominal character dimensions and are in almost all points within the Character Outline Limits as defined in Standard ECMA-15. The digitalization inherent to matrix printing required a choice between alternative solutions for a few stroke ends. The only exception to this is the dot at the end of the bottom stroke of digit FIVE, which has been deliberately suppressed, as actual reading tests achieved much better results with the final design than with an interim design containing this dot.

The present Standard ECMA-51 has been derived from this document. Reading tests performed have shown that matrix printed characters according to the proposed implementation are read without any difficulties by readers not specially tuned to their particular structure. As a result of these tests the shape of digit THREE has been improved by shifting the middle stroke by one step to the right and some considerations on print quality have been introduced. These are the only differences between this Standard and the previous publication of December 1973.

Adopted as Standard ECMA-51 by the General Assembly of Dec. 16, 1976.

1. SCOPE

This document defines the implementation of Standard ECMA-8 for the nominal character dimensions of the numeric OCR-A font with 9x9 matrix printers. The characters generated are machine readable characters of OCR-A shape.

This document does not define paper characteristics or character positioning. These matters will be the subject of other standards or publications.

2. CHARACTER SET

The character set is that defined in ECMA-8, except for LONG VERTICAL BAR, i.e. :

10 digits : **0123456789**

3 special symbols, HOOK, FORK, CHAIR :

JYH

3. SIZE

This document deals with Size I only.

4. PRINTED IMAGE DEFINITION

The printed image of each character is defined by a number of dots placed on a grid.

4.1 Grid Definition

The grid used for positioning the dots relative to each other has the following dimensions:

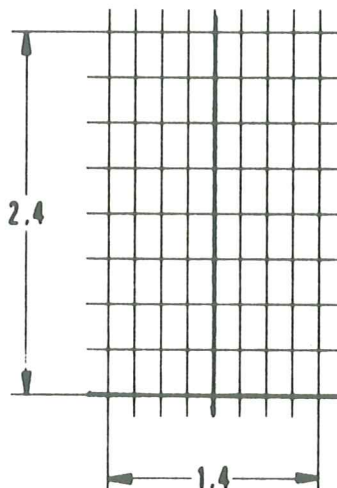
height: 2,400 mm

width : 1,400 mm

It consists of 9 vertical lines and 9 horizontal lines, the intersections of which define the nominal dot centre positions.

The distance between the horizontal lines (vertical step) is 0,300 mm.

The distance between the vertical lines (horizontal step) is 0,175 mm.



Scale : 20 : 1

The thicker lines of the grid indicate the vertical centreline and the horizontal reference line of each character.

NOTE: This grid has been chosen to give the best fit with the character shapes defined in ECMA-8 in respect to machine readability and at the same time to allow for high speed printing.

4.2 Dot Definition

The dots are dark areas centred on the intersections of the grid. They are circles of 0,4 mm diameter nominal or polygons of equivalent area.

5. PRINT QUALITY CONSIDERATIONS

The print quality for OCR characters is defined by Standard ECMA-15. Due to the printing concept of matrix printed characters, the following considerations apply.

i) Tolerance Range (ECMA-15: 4.2)

It is expected that in general matrix printed characters will be in Range Y.

ii) COL Gauges (ECMA-15: 4.4)

Matrix printed characters shall be checked with the normal COL gauges for Range Y.

iii) Edge Irregularities (ECMA-15: 4.5.9)

An edge irregularity is allowable if it is entirely contained in a circle of 0,3 mm in diameter and if the distance to the next edge irregularity measured on either COL is at least 0,3 mm.

6. CHARACTER SHAPE DEFINITION

The characters are defined by the enclosed drawings in which they are shown at scale appr. 20 : 1.

