

Veröffentlichung im Amtsblatt	J/Nein
Publication in the Official Journal	Yes/No
Publication au Journal Officiel	Oui/Non



Aktenzeichen / Case Number / N° du recours : T 110/88

Anmeldenummer / Filing No / N° de la demande : 82 110 439.5

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 081 096

Bezeichnung der Erfindung: Image rotate control circuitry

Title of invention:

Titre de l'invention :

Klassifikation / Classification / Classement :

### ENTSCHEIDUNG / DECISION

vom / of / du 10 January 1989

Anmelder / Applicant / Demandeur : IBM

Patentinhaber / Proprietor of the patent /

Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPO / EPC / CBE Art. 56

Schlagwort / Keyword / Mot clé : "Inventive step (no)"

Leitsatz / Headnote / Sommaire

Europäisches  
Patentamt

Beschwerdekammern

European Patent  
Office

Boards of Appeal

Office européen  
des brevets

Chambres de recours



Case Number : T 110/88 - 3.5.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.1  
of 10 January 1989

**Appellant :** International Business Machines Corporation,  
Old Orchard Road,  
Armonk,  
N.Y. 10504 (US)

**Representative :** Vekemans, André, COMPAGNIE IBM  
FRANCE Département de Propriété Industrielle,  
F-06610 La Gaude (FR)

**Decision under appeal :** Decision of Examining Division 065 of the European  
Patent Office dated 5 October 1987 refusing  
European patent application No. 82 110 439.5  
pursuant to Article 97(1) EPC

**Composition of the Board :**

**Chairman :** P.K.J. van den Berg

**Members :** W.P.H. Riewald

F. Benussi

## Summary of Facts and Submissions

- I. European patent application No. 82 110 439.5, claiming priority from a US application of 4 December 1981, was filed on 12 November 1982.

The application was refused by a decision of the Examining Division dated 5 October 1987.

The decision was based on Claims 1 and 2 filed on 18 March 1986; The reason given for the refusal was that the claims were not acceptable due to lack of inventive step having regard to the following prior art documents:

D1: US-A-3 945 019

D2: EP-A-0 012 858.

- II. The Appellant filed a notice of appeal on 24 November 1987 and paid the appeal fee on 2 December 1987. On 12 February 1988 he filed a statement of the grounds of appeal without filing further amendments to the application documents.

The Appellant requests that the decision of the Examining Division be reversed.

- III. The independent Claim 1 reads as follows:

"Rotate control circuitry for a display copier system including display means (100) for repetitively displaying data in a plurality of lines of video dots, with a retrace following each repetition, and a printer (300) having a plurality of elements for printing said data along a horizontal print line, said printer having a number of print elements at least as great as the number of said lines of video dots, characterized in that it comprises:

a read/write buffer (250) for storing a column of said data,

buffer write means (230) for writing a column of said data into said buffer one bit at a time corresponding to a video dot in each horizontal line of said video dots as said data is being displayed,

buffer read means (251) for reading said column of data from said buffer as said display means is retracing, and

means (332, 333) for transferring said column of data read from said buffer to said printer for printing said column of data along said horizontal print line."

IV. The Examining Division argues essentially as follows:

The image rotate control circuitry of the present application is incorporated in a display copier system, such as known from D2, which uses a print head with a plurality of simultaneously activated print elements along a line of print dots.

The principle of image rotation (columns of the CRT display become lines on the printer) is known from D1, which uses a print head which is moved step by step or dot by dot along a print line in accordance with the output of a character generator. Thus, the image rotation is carried out on character data and not on dot data. The adaptation of the rotating circuit of D1 to the dot system of D2 is straightforward. In particular the elimination of a character generator for rotated characters follows directly from the image rotation on a dot basis instead of a character basis. Since both D1 and D2 show comparable loading operations of their buffers, also the synchronous

operation of the printer and the display are only the necessary result of the adaptation of the image rotation to the dot system of D2.

V. The Appellant's arguments can be summarised as follows:

The combination of the teachings of the documents D1 and D2 requires considerable modifications in order to handle the appropriate number of dots instead of the number of characters. The claimed circuitry provides a unique interface attachment and achieves very low cost.

The objections of the Examining Division against the Applicant's arguments are based on "a posteriori" reasoning.

#### Reasons for the Decision

1. The appeal is allowable.
2. The subject-matter of Claim 1 is novel; however, it lacks an inventive step.
  - 2.1 The document D2 discloses a control circuitry for a display copier system including the following features:

A cathode ray tube (Figure 10: CRT99) serves as display means for displaying data. It can be understood from the description that the display means repetitively display in a commonly known manner data in a plurality of lines of video dots with a retrace following each repetition of a complete display (see page 1, second paragraph: "... serial data that the display control circuitry transmits to the cathode ray tube for visual display." and "... dots

in each raster scan line of data." Claim 6: "... during each refresh cycle of said CRT display device").

A printer (Figure 5: print heads 77) has a plurality of print elements (thermal print dots 82) along a complete horizontal print line for printing the displayed data in a plurality of successive lines of print dots (on thermal print paper 78, Figure 6; cf. page 6, second paragraph to page 7, first paragraph).

A "deserializer" (Figure 7: 102) collects in each display repetition cycle (refresh cycle of the CRT) the data for one of the print lines (in the known control circuitry identical with one of the CRT display lines; cf. page 7, last paragraph and page 8, last paragraph).

A (read/write) buffer 103 stores the data of one line to be printed. A random access memory 104 and a data multiplexer 105 serve as means for transferring said print line data read from the buffer 103 to the printer 77/78.

The printing is perfectly in synchronism with the CRT display: one print line of data is printed during each refresh cycle of the CRT as expressly stated on page 7, last paragraph, lines 6 to 8.

- 2.2 The control circuitry of the present Claim 1 differs from this prior art of D2 by the following features:

The buffer write means write in each repetition cycle of the CRT display one dot column (instead of one dot line) of the CRT display into the buffer.

The buffer read means read said dot column of the display during the vertical display retrace as a print line into the means for transferring the print line to the printer.

- 2.3 Starting from the prior art circuitry for a display copier system according to D2, the problem solved by the differing features outlined above can be specified as the incorporation of the so-called image rotation into the system, devised to enable printing the lines of the CRT display data along the length of the paper in the printer if the width of the paper is too small for a complete CRT display line.

Rotation of print data to this effect is well known in the art (cf. the description of the application page 1, the first paragraph under the heading "Background Art" and the document D1 cited in the proceedings).

Therefore, no inventive step can be perceived in recognising the problem.

- 2.4 The image rotate control circuitry disclosed in D1 differs insofar from the claimed circuitry as the processed data are not the video dot signals from a CRT display with horizontal print lines, but binary coded signals representing full characters which are continually and circulatively generated in a refresh memory 15, the video display being effected by means of a character generator (which is not disclosed in detail); cf. column 2, line 42 to column 4, line 21. Columns of these display data in binary coded form are written into a buffer (Figure 4: shift register 69) and read from the buffer to a character generator 75 (with associated circuitry) in Figure 4 which provides for transforming the binary coded data into corresponding dot patterns for the printer.

- 2.5 Notwithstanding these differences, the Board is satisfied that the skilled person will readily perceive from D1 that the following basic steps are carried out for rotating the

data which are repetitively generated by the refresh memory:

- a refresh memory generates repetitively in a serial form and line by line the data to be displayed;
- a column of display data is collected during a repetition (refresh cycle) and stored in a buffer;
- the column of display data is read from the buffer in order to be printed in a print line;
- after completion of a print line, another column of display data is collected from the refresh memory during a further refresh cycle.

2.6 The skilled person confronted with the problem of image rotation for a display copier system known from D2 and with the knowledge of the said generic principles of image rotation will have to perform the following considerations:

- Since the display on the CRT screen as well as the printing on a print paper are based on data in the form of video dots or print dots, respectively arranged in lines, there is no reason at all for the incorporation of those elements of D1 which are required for transforming full character data into corresponding dot patterns. The Board cannot regard this as an "a posteriori" consideration, since it directly follows from the preconditions given by D2 (cf. also page 7, third line from below to page 8, line 3).
- Since the writing of a column of video dot signals into the buffer requires practically the whole time of a video refresh cycle, the reading from the buffer must be

effected subsequently to the refresh cycle. This is a natural requirement of all image rotate methods.

- Since the printing of a complete print line of dots, as disclosed in D2, is effected in a single printing action (i.e. without stepwise movement of a print head, as in D1) the reading of the data for one print line from the buffer can be carried out in a single step. It appears that the skilled man would have no difficulties to realise that the retrace following each refresh cycle is sufficient to carry out the read action. Therefore, the whole time of the following refresh cycle is available for printing the print line according to the data read from the buffer in the same way as already indicated in D2, page 7, last paragraph, lines 6 to 8. Again, also these considerations follow readily from D2, and it cannot be regarded as an "a posteriori" reasoning of the Examining Division when it argues that no inventive step is necessary to replace the more complicated image rotate control means of D1 by less complicated means adapted to the real requirements of an image rotation on a dot basis instead of a full character basis.

- 2.7 Thus, Claim 1 is not allowable because its subject-matter is considered not to involve an inventive step within the meaning of Article 56 EPC.
3. Claim 2 is dependent on Claim 1 and for this reason also not allowable.

**Order**

**For these reasons, it is decided that:**

**The appeal is dismissed.**

**The Registrar:**

**The Chairman:**

**S. Fabiani**

**P.K.J. van den Berg**