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D E C I S I O N
of 25 April 2001

Case Number: T 1057/96- 3.4.2

Application Number: 90305158.9

Publication Number: 0456923

IPC: G09G 1/16

Language of the proceedings: EN

Title of invention:
Display system

Patentee:
International Business Machines Corporation

Opponent:
NANAO CORPORATION

Headword:
-

Relevant legal provisions:
EPC Art. 56, 123

Keyword:
"Inventive step - no (main request)"
"Added subject-matter - yes (auxiliary request)"
"Inventive step - no, as far as admissible (auxiliary request)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1057/96 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 25 April 2001

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 18 October 1996 revoking European patent No. 0 456 923 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: E. Turrini
Members: M. A. Rayner
B. J. Schachenmann

Summary of Facts and Submissions

I. The appellant (=patent proprietor) has appealed against the decision of the opposition division revoking European patent number 456 923 (application number 90 305 158.9). In the decision, the opposition division made reference inter alia to the following document:

D4: Japanese Utility Model 1-173 787, utilising the English language translation thereof.

The patent in dispute relates to display systems in which control data is communicated between a computer system and a display device. The opposition division considered the subject matter of claim 1 to be novel over the disclosure of document D4 because in this document there was no indication of how a skilled person would access a memory and communication timing parameters in a case where a plurality of these were stored in a display device. The division considered that the skilled person was thus faced with the problem of deciding in which manner the parameters stored in the display device should be transferred to a host computer. The formulation of this problem was not inventive because it was obvious that some communication means must be necessary. A serial data link is a well known type of link which was obvious to the skilled person, who would thus have arrived at the subject matter of claim 1 without an inventive step.

II. The appellant requested setting aside of the decision and maintenance of the patent as amended before the opposition division or in accordance with an auxiliary request filed with the statement setting out the

grounds of appeal. The respondent (=opponent) requested the board to dismiss the appeal of the appellant. Oral proceedings were requested by the appellant and respondent.

III. According to the appellant, the two display systems according to the embodiments disclosed in Figures 1, 2, 3 and Figure 5 of document D4, respectively, cannot store control data in the form of a plurality of control codes comprising timing parameters of the display device. A third display system in the form of a modification of the Figure 5 arrangement describes, in a non-enabling manner, storing parameters of video and sync signals compatible with the display device in a memory contained in the display device. Document D4 does not describe how such a memory might be interrogated, the only reference in document D4 being made in connection with a 3 bit parallel interface. A parallel, not a serial data transfer, solution would thus be obvious as the least amount of modification of the teaching of document D4 would be required, i.e. this was simpler. The invention claimed in the first auxiliary request advantageously provides a command driven interface between the display adapter circuit and the display device, enabling the display adapter circuit, within the confines of the existing serial link circuit, both to obtain identification data from the display device and to effect remote variation of picture height and/or width independently of the video data format of the data producing the picture.

IV. According to the respondent, the reference by the appellant to the third embodiment of document D4 being non-enabling is unsupported, the techniques are commonplace in the prior art. The problem to be solved

by the alleged invention relates to the confines of the pre-existing physical form of the output port, i.e. that there are not very many connecting wires. There can be no more obvious solution to this problem than to use a serial instead of a parallel link because serial links have been commonplace for decades and have the overriding advantage of requiring use of fewer connecting lines.

V. Oral proceedings were appointed, consequent to the auxiliary requests filed.

During the oral proceedings, the appellant reaffirmed his request for maintenance of the patent as amended before the opposition division or in accordance with an auxiliary request filed with the statement setting out the grounds of appeal. The appellant explained that a specialist in the display field is concerned with low cost and high volume, the display of document D4 being also of this type. RS232 serial links as known in the prior art are stand alone links which do not suggest integration, whereas in the invention, the serial link is located in the output port.

According to the auxiliary request height and width are adjusted, i.e. there is a directional transfer which is not disclosed in and cannot be suggested by the teaching of document D4. In column 4, line 19 of the patent specification, in the wording height, width and brightness it is implicit to the skilled person that "and" means "and/or". The appellant confirmed that generally height and width are affected during mode changing, simply because of the effect on scanning of factors such as capacitor charging times and the like.

VI. The respondent maintained his request for dismissal of the appeal and argued during the oral proceedings that the alternative of a serial or parallel link was so well known as not to be inventive. So far as the port was concerned, it was pointed out that a single cable 30 connects the display and personal computer in document D4, so a common output port is used.

There is no support in the disclosure for the wording "at least one of height and width". Moreover, the codes mentioned in line 15 of column 4 of the patent specification are stored in the display and not sent along the serial link. Thus, since the screen geometry is always changed when the mode is changed, the auxiliary request so far as supported in this respect does not differ from the disclosure of document D4.

VII. The independent claims according to the requests of the appellant are worded as follows:

Main Request

1. A display system comprising

a display device (88) for generating a visual output in response to video and sync signals defining the data to be displayed,

a display adapter circuit (92) for generating the video and sync signals in a form specified by control data identifying the display device (88),

an output port (94) for transmitting the video and sync signals from the display adapter circuit (92) to the display device (88) and for transmitting the control data from the display device (88) to the display adapter circuit (92),

a non-volatile memory (9) located in the display

device (88) in which is stored the control data in the form of a plurality of control codes, the control codes comprising timing parameters of the display device, wherein the display system further comprises communication logic (95) for communicating the control codes between the memory and the output port (94) in response to a command signal (21) generated by the display adapter circuit (92), the communication logic comprising

a serial data link (3) for communicating the command signal and the control code between the display device and the output port.

10. A computer system for connection to a display system (88), the computer system comprising:

a display adapter circuit (92) for generating video and sync signals in a form specified by control data identifying the display device to produce a visual output on the display device (88), and

an output port (94) for transmitting the video and sync signals from the display adapter circuit (92) to the display device (88) and for transmitting control data from the display device (88) to the display adaptor circuit (92), wherein the display adapter circuit (92) includes adapter logic means (96) to send serially, via the output port (94), a command signal to the display device (88), and to receive serially from the display device (88), via the output port (94), the control data, in the form of a plurality of control codes, sent from the display device (88) in response to the command signal, the control codes comprising timing parameters of the display device.

Auxiliary Request

1. A display system comprising

a display device (88) for generating a visual output in response to video and sync signals defining the data to be displayed,

a display adapter circuit (92) for generating the video and sync signal in a form specified by control data identifying the display device (88),

an output port (94) for transmitting the video and sync signals from the display adapter circuit (92) to the display device (88) and for transmitting the control data from the display device (88) to the display adapter circuit (92), and

a non-volatile memory (9) located in the display device (88) in which is stored the control data in the form of a plurality of control codes, the control codes comprising timing parameters of the display device; wherein the display system further comprises: communication logic (95) for communicating the control codes between the memory and the output port (94) in response to a command signal (21) generated by the display adapter circuit (92); the communication logic comprising

a serial data link (3) for communicating the command signals and the control codes between the display device (88) and the output port (94), device logic (97) located in the display device for communicating the control code between the memory and the serial data link, and adapter logic (96) located in the display adapter circuit for communicating the control code between the serial data link and the display adapter circuit (92); and,

means (12) for adjusting, in response to parameter control codes communicated from the adapter logic (96) to the device logic (97) along the serial link (3), operating parameters of drive circuitry (13) of the

display device (88) to adjust at least one of height and width of the visual output from the display device.

8. A computer system for connection to a display system (88), the computer system comprising:

a display adapter circuit (92) for generating video and sync signals in a form specified by control data identifying the display device to produce a visual output on the display device (88); and,
an output port (94) for transmitting the video and sync signals from the display adapter circuit (92) to the display device (88) and for transmitting control data from the display device (88) to the display adapter circuit (92); wherein the display adapter circuit (92) includes:

adapter logic means (96) to send serially, via the output port (94) parameter control codes to the display device (88) for controlling operating parameters of drive circuitry (13) of the display device (88) to adjust at least one of height and width of the visual output from the display device, and to send serially, via the output port (94), a command signal to the display device (88), and to receive serially from the display device (88), via the output port (94), the control data, in the form of a plurality of control codes, sent from the display device (88) in response to the command signal, the control codes comprising timing parameters of the display device (88).

VIII. At the end of the oral proceedings, the board gave its decision.

Reasons for the Decision

1. The appeal complies with the provisions mentioned in Rule 65(1) EPC and is therefore admissible.

2. *Main request - Novelty*

2.1 Document D4 discloses a display (10 in the Figures) with means for providing a signal indicative of its functional modes to a computer (20 in the Figures), the computer thus being able to produce a video output in accordance with the mode identified. The display and the computer are connected to each other by means of a cable (30 in the Figures). A mode indicating data signal and a mode switching signal (see DS and MS in Figure 5) are carried on lines 30A in the cable, video and sync signals being carried on lines 30B. Reference numerals 18 and 29 generally illustrate the ports of the display and computer, respectively, lines 18A and 29A being used for mode indicating and switch signals. Similarly, reference numerals 18B and 29B generally illustrate lines in the respective ports of the display or computer, which are used for video and sync signals. The physical form of the cable and its single port connection can be seen in Figure 6.

2.2 In the embodiment shown in Figure 2 of document D4, a three bit parallel interface is shown for connecting 18A of the display to 29A of the computer via lines 30A. Accordingly, eight different data signals (DS) can be transmitted, three of these (001, 010 and 011) are shown by way of example in Figure 3. Each data signal corresponds to a particular - what is described in the document D4 as - "registered information", by which is meant horizontal scanning frequency, vertical scanning frequency, input level and polarity as is disclosed in the last paragraph on page 5 and shown in

Figure 3. The registered information itself is stored in the computer according to the first few lines on page 6. A second embodiment as shown in Figure 5 has an interface which is two way in that not only data signals from the display to the computer but also mode switching signals from the computer to the display are passed, ie lines 30A are shared. In operation, after initialising at power on or at mode switching, a data signal from the display is received by the computer and the registered information and function of the display is identified. Thereafter, only a mode matching the registered information is selected, the computer outputting a mode switching signal (via 29A) for switching to the mode concerned and also outputting video (via 29B).

2.3 The registered information is stored in the memory of the personal computer in the embodiments mentioned in point 2.2, thus a simple identification circuit is used. However, document D4 also contemplates a third embodiment with a memory being provided on the side of the display. In this case, the registered information is stored not in the personal computer but in the display memory (see the paragraph bridging pages 8 and 9), necessitating application of an information signal from the display to the computer or other equipment. Document D4 does not provide an explicit disclosure of the memory in the display being non-volatile, nor does it disclose exactly how a skilled person would have configured the computer and display to enable communication of data stored in the display memory to the computer.

2.4 The submission of the appellant that the disclosure of document D4 in relation to storing the registered

information in a memory is non-enabling does not convince the board since the skilled person was well aware at the filing date of the patent in suit of the construction and addressing of memories and thus able to implement any data storage therein.

2.5 Accordingly the subject matter of the independent claims of the main request differs from the disclosure of document D4 (third embodiment) only by virtue of the explicit reference to non-volatile memory (claim 1) and features relating to the serial data link between the computer and display (claims 1 and 10).

3. *Main request - Inventive step*

3.1 Provision of a non-volatile memory entails data being retained by the memory when power is removed. The problem solved by this feature is thus to prevent the control data in the screen memory being lost on power down or failure. It is obvious to the skilled person reading document D4 that the registered information in the display memory cannot be lost on power down, since otherwise no registered information would subsequently be available for transmission to the computer memory on power up leading to display malfunction. Retention of information on power down is commonplace and its implementation using non-volatile memory well known, so that provision of the same is obvious to the skilled person. Accordingly, the feature "non-volatile" memory cannot contribute to an inventive step of the subject matter of claim 1.

3.2 The problem solved by the novel serial link features of the independent claims can be seen as that of deciding in what way the proposal in document D4 for the

transmission of the registered data between the display memory and the computer is to be implemented in practice. Both a serial and a parallel transmission were very well known to the skilled person for implementation of data transfer as were their respective advantages and disadvantages. In particular, the basic general knowledge of the skilled person is that serial connections, although slower, are advantageous in requiring less wiring. While it is true that the two simpler embodiments of document D4 use a kind of parallel link, the problems (for example less wiring) solved by the choice of a serial link for the more complicated third embodiment do not go beyond the problems well known as being solved by serial links. Accordingly, the board does not see any inventive step being involved in deciding that a serial link was to be used for implementation of the data transfer in the third embodiment of document D4.

3.3 The appellant relied on the argument that use of the existing communication logic in Figure 5 of document D4 was the simpler and thus obvious choice for the skilled person as the structure was already present and a parallel transfer is faster. Furthermore, an RS232 (serial) link is a standalone link and thus its use would not meet the "output port" feature of the claims. A separate serial link is also used in other documents in the prior art. The board observes however that the last paragraph on page 8 of document D4 explains it is in connection with the first two embodiments, where the registered information is stored in the computer, that the function identifying data generating 12 has a simple structure. Moving on to the third (more complicated) embodiment with memory in the display, the line of argument of the appellant seeks to limit the

ambit of the inventive step issue by rejecting any implementation of features for the third embodiment outside of those already disclosed for the simple embodiments. However, since a serial data link is very well known, the board could only have been persuaded by an argument along these lines if document D4 made it clear that a parallel link were essential or if there were an incompatibility between use of a serial link and the disclosure of document D4 which would rule it out of consideration. In view of the distinction between the "simple" embodiments and the third embodiment, the board does not see the parallel link as essential. With respect to incompatibility, it is true that this could be seen with use of a separate serial link as in the prior art, such as an RS232 link, since a stand alone port configuration is thereby defined which is not in accordance with the teaching of document D4 relating to incorporation of the data link into cable 30. However, just for this reason, the skilled person, assuming taking of the first step of deciding to use a serial link in implementation of the third embodiment of document D4, would not then have taken the second step of choosing an incompatible type of serial link, just as for example having decided to use memory in the display, an incompatible (volatile) type of memory would not have been chosen. No such incompatibility exists in the case of implementation of a serial transmission link wired within the cable 30. For such a link, consideration of the problems solved by serial links as explained in section 3.2 above leads to the conclusion that no contribution to inventive step is made in deciding to use a serial link. Accordingly, the argument of the appellant does not convince the board as to inventive step of the subject matter of claims 1 and 10.

3.4 Therefore, the board reached the conclusion that the subject matter of the independent claims of the main request cannot be considered to involve an inventive step within the meaning of Article 56 EPC.

4. *Auxiliary request*

Article 123 EPC (added subject-matter)

4.1 Compared to independent claim 10 of the main request, independent claim 8 of the auxiliary request contains the following further wording

"to send serially, via the output port (94) parameter control codes to the display device (88) for controlling operating parameters of drive circuitry (13) of the display device (88) to adjust *at least one of* height and width of the visual output from the display device".

An amendment corresponding in substance was made in claim 1, where associated device and adapter logic features are also introduced.

4.2 During the oral proceedings part of column 4, especially lines 15 to 25 of the patent specification (=column 4, lines 20 to 31 of the "A" publication) referring to height, width, was identified in relation to support for this further wording. The context is the following:

"The program NVM {non-volatile memory} 11 stores control codes for instructing a display input/output (I/O) circuit 12 to adjust drive signals generated by the drive circuitry 13 in the display device. Examples

of such drive signals directly affect the *height, width* and brightness of the visual output from the display device 88. Each control code is stored in a different address location. By instructing the display I/O circuit 12 with appropriate control codes, the visual output of the display device 88 can be switched between different display modes under the control of a computer program."

This passage thus discloses that height, width and brightness are affected by control codes. The "affecting" takes place within the context of mode switching, there is no disclosure that just one of height or width in isolation is adjusted for other purposes by parameter control codes sent via the serial link. The board does not consider that use of the word "examples" implies any such adjustment of height or width in isolation, it is merely to make specific in the mind of the reader, the nature of the adjustment involved. Therefore, the board reached the conclusion that the respondent is correct in the submission that there is no support in the documents as filed for the wording "at least one of height and width".

4.3 Accordingly, the alternative of just one of height or width contained in the independent claims does not satisfy Article 123(2) EPC. For this reason alone, the auxiliary request is not allowable.

5. *Inventive step*

As far as the arguments of the parties referring to inventive step are concerned, the board would like to add the following considerations.

5.1 The features introduced into the independent claims 1 and 8 of the auxiliary request are concerned with the operation of the display when the modes supported by the display have been notified to the computer. The first complete paragraph in column 4 of the patent gives a description of the process involved. It is naturally not enough that the computer knows what display modes are supported, it must also be able to tell the display what supported mode to use. However, it is the program NVM in the display which stores the control codes for instructing the display I/O circuit to adjust the drive signals in the display device. By instructing with appropriate control codes, the visual output is switched between modes. The control codes themselves are not however sent from the computer via the serial link, since they are already stored in the program NVM. A mode selecting command code is sent from the computer, the monitor specific details are "filled in" by the control codes stored in the NVM. The board is thus convinced by the arguments of the respondent in this respect because it found nothing in the patent disclosure allowing the parameter control codes transmitted to the display from the computer to be interpreted as any more than a mode switching signal. The board is reinforced in this view by column 1, lines 6 to 14 of the patent, which recite that screen geometry (which implicitly includes height and width), is determined by the rates and amplitudes of horizontal and vertical scan signals. From this passage, the board reached the conclusion that when the mode is changed, the height and width of the visual output are affected. The appellant confirmed during the oral proceedings with reference to the effect on scanning of factors such as capacitor charging times and the like that mode switching generally did indeed affect height and width

of visual displays.

5.2 It follows from the above that the mode switching effected in accordance with the teaching of document D4 consequent to mode switching signal MS must also affect the height and width of the visual output. Consequently, this subject matter of the independent claims of the auxiliary request introduces nothing which is not already implicitly present in the teaching of document D4 and cannot therefore contribute to an inventive step. The references to device logic and adapter logic circuits in claim 1 of the auxiliary request amount to no more than a recitation of the hardware routinely present for implementation of the serial link. Since, as explained above, the geometry of the display known from document D4 must also be adjusted consequent to mode switching, means in the display for this purpose are self evidently present.

5.3 The appellant read more into the disclosure of the patent than is present, in particular that remote adjustment of parameters (especially height and or width) of the display independent of mode as disclosed in the patent is claimed in the independent claims of the auxiliary request. However, there is no support in the patent for such an interpretation of the claims, as the parameters concerned are only dealt with in the passage already analysed above. Therefore the board was convinced by the submissions of the respondent and reached the conclusion that the subject matter of the independent claims as far admissible cannot be considered to involve an inventive step within the meaning of Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

P. Martorana E. Turrini