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D E C I S I O N
of 22 June 2001

Case Number: T 1011/99 - 3.5.1

Application Number: 94116267.9

Publication Number: 0649252

IPC: H04N 5/232

Language of the proceedings: EN

Title of invention:

Video camera using a serial communication between the control and the processing circuits

Applicant:

CANON KABUSHIKI KAISHA

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 52(1), 56

Keyword:

"Inventive step (yes)"

Decisions cited:

-

Catchword:



Case Number: T 1011/99 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 22 June 2001

Appellant: CANON KABUSHIKI KAISHA
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 7 June 1999
refusing European patent application
No. 94 116 267.9 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: S. V. Steinbrener
Members: R. Randes
P. H. Mühlens

Summary of facts and submissions

I. This is an appeal against the decision by the Examining Division to refuse European patent application No. 94 116 267.9 because the subject-matter of claim 1 of both the main request and the subsidiary request was found to lack inventive step in view of the documents:

D1: EP-A-446 647

D2: Patent Abstracts of Japan, vol. 9, no. 54 (P-340) 8 March 1985, & JP-A-59 191 647 (HITACHI SEISAKUSHO K.K.) 30 October 1984

D3: US-A-5 121 218.

According to the Examining Division the teaching of D1 was the starting point for the invention, D2 provided the obvious solution to the problem and D3 was only mentioned to show that the breakdown of communication data into control information and address information was known in the art.

II. Oral proceedings were held on 22 June 2001 before the Board at the end of which the appellant (applicant) requested grant of a patent on the basis of claims 1 to 18 submitted during the oral proceedings and

description: pages 11a, 12 and 22 filed in the oral proceedings; pages 2 to 11, filed with letter dated 18 October 1999; pages 13 to 21 as originally filed

drawings: figures 1 and 2 as originally filed.

Claim 1 reads as follows (the identification of the features of the claim having been added by the Board for the purpose of this decision):

"A video camera comprising:

- (a) processing means (6,7,8) for processing a picked-up image signal output from an image pickup means (1 to 4),
- (b) control means (12) for controlling an image pickup action of said image pickup means (1 to 4) by transferring control data and address data to and receiving communication data from said processing means (6,7,8),
- (c) said control means having a predetermined order of data transmission within one block unit, and
- (d) serial communication means (18,20) disposed between said control means (12) and said processing means (6,7,8) for providing the transfer of said data between said processing means (6,7,8) and said control means (12),
- (e) wherein said processing means (6,7,8), serial communication means (18, 20) and a data order changing means (21,22,24) are integrated on a one-chip integrated circuit (100) for video signal processing of said video camera and said control means (12) is provided externally to said one-chip integrated circuit (100),

- (f) said data order changing means (21 **to 24**) changing the order of data transmission within one block unit to be transmitted by said serial communication means according to an instruction of said control means (12),
- (g) wherein said data order changing means (21,22,24) includes switching means (22) operated by said control means (12) for setting the data transmission order in accordance with the predetermined transmission order of said control means(12)."

The Board notes that feature (f) of claim 1 erroneously refers to reference numerals (21 to 24) instead of (21,22 and 24).

Independent **claim 12** reads as follows (the features having been identified with the same characters as the corresponding features of claim 1):

"A one-chip signal processing integrated circuit for a video camera, comprising:

- (a) processing means (6,7,8) for processing a picked-up image signal, and
- (b,c,d) serial communication means (18,20) for transferring data between said processing means (6,7,8) and an external control means (12) to be connected thereto and having a predetermined order of data transmission within one block unit,
- (e) wherein said processing means (6,7,8),

serial communication means (18,20) and a data order changing means (21,22,24) are integrated on a one-chip integrated circuit (100) for video signal processing of said video camera,

- (f) said data order changing means (21,22,24) changing the order of data transmission within one block unit to be transmitted by said serial communication means according to an instruction of said control means (12),
- (g) wherein said data order changing means (21,22,24) includes switching means (22) operated by said control means (12) for setting the data transmission order in accordance with the predetermined data transmission order of said control means (12)."

III. The appellant argued in the oral proceedings that the teaching of document D2 did not give the solution to the problem as had been suggested by the Examining Division. In fact the skilled person would not even have tried to find a solution to the problem in that document, because it was concerned with registers which apparently were on the same chip as the microcomputer itself. Only after the patent application had been published had it been possible to allege that the registers of D2 functioned in a similar way as those of the invention, although the register shown in D2 did not solve a similar problem and was used in a quite different arrangement than that in the patent application.

IV. At the end of the oral proceedings the Board's decision was announced orally.

Reasons for the decision

1. Claim 1 has been revised in relation to the corresponding independent claim refused by the Examining Division, mainly in that it has been put in the one part form and that the feature, "said control means having a predetermined order of data transmission within one block unit" (feature (c)), and the feature, "said control means (12) is provided externally to said one-chip integrated circuit (100)" (feature (e)) have been added to the claim. Moreover, the text has been revised and the features in the claim have been rearranged to more clearly identify the invention. The independent claim 12, directed to a one-chip IC for a video camera, has been amended in correspondence to the amendments of claim 1. The dependent claims have been adapted to the independent claims. The Board is convinced that all amendments of the claims meet the requirements of Article 123(2) EPC.

It is noted that the subject-matter of dependent claims 9 to 11 and 16 to 18 (concerning the provision of a speed change-over circuit) relates to the part of the original application which was considered by both the search division and the examining division to not form a single general inventive concept with the subject-matter now set out in the independent claims 1 and 12 (order changing circuit). However these dependent claims are allowable if claims 1 and 12 are allowable, since they contain all features of the allowable independent claims and their subject-matter

falls within the respective independent claim.

2. Figure 1 of the present application forms the most relevant prior art. The first features (a) to (d) of claim 1 identify a conventional video camera disclosed in that figure of the present application. Document D1 discloses also such a camera in principle (see Figure 1 and associated text), although it is not stated that data could be divided into control-, address- and communication data. As has been pointed out in the Examining Division's decision, such division of data is however common in the art and is, for example, disclosed in D3 (see for example column 12, lines 23 to 30). The appellant has made clear in the patent application that the data inputting and outputting directions to and from the data shift registers 15 and 17 and the control shift registers 13, 14 and 16 in the prior art arrangement of Figure 1 were always predetermined. Thus in the prior art arrangements the hardware determined, whether communication was to be started from the most significant bit (MSB) or from the least significant bit (LSB). Depending on this predetermined direction of data flow however a suitable general purpose microcomputer with correct structure had to be chosen to be used together with the register, since the cheap prior art microcomputers on the market were also adapted for a certain direction of data flow (cf. feature (c)).

Thus the Board agrees with the appellant that the **problem to be solved** by the remaining features of claim 1 with respect to the closest prior art may be seen in the design of the data communication circuit between the processing means and the control means which circuit should be compatible with a microcomputer

(control means) having a data flow direction starting with the MSB as well as with a microcomputer having the LSB as the starting bit.

The claimed solution is based on a one-chip signal processing integrated circuit adapted to be interfaced to an external microcomputer of any type of data flow.

3. Document D2 discloses a data order changing means 5 that operates in both reading and writing modes. However the arrangement shown in the figure of D2 does not appear to disclose an order changing means that is separated from the microcomputer 1 in the sense of the invention. Instead it appears that the CPU 1 (with appropriate memories) and the order changing means 5 are integrated on the same chip A and allow the connection of external devices of both types of data flow to the same microcomputer. As argued by the appellant, data could apparently be transferred from bus 2 in parallel to the shift register 8 and shifted in series to the output terminal Tx of the chip, or data could be transferred in series from the input terminal Rx of the chip to the shift register 8 and then in parallel to the bus 2. In each case, the order of data flow conforms to the type required by the specific external device addressed. Thus the hardware and software of the CPU is specifically adapted to the function of the data order changing means, the direction of data flow of the former however remaining unchanged. A problem like that of the invention does not arise. Also D2 does not disclose how, or from where, the order changing operation is controlled. As argued by the appellant in the oral proceedings, it could well be that in the arrangement of D2 the order changing command must be initiated from outside the

arrangement shown in the figure.

4. Thus in order to arrive at the invention it appears that the applicant (appellant) first had to identify the design of prior art video cameras, investigate their components and examine the interaction between these components. When doing so, the appellant found that the fabrication of the cameras was unnecessarily complicated and expensive and therefore wished to design a camera that could be made up in a more effective way.

Since prior art cameras had to be specifically adapted to microcomputers with different structures the basic idea of the solution of the invention was apparently that one specific IC chip (feature (e) of claim 1) having processing means (for signal, focusing and light measuring) should be created which would be usable with different types of microprocessors (starting communication either with MSB or LSB). This idea is neither disclosed in D1 nor in D2. D1 does not disclose anything about the organisation of chips in the disclosed arrangement and D2 appears to disclose an I/O device on a chip comprising a microcomputer and an order changing means and does not disclose an exterior microcomputer at all.

In order to make this specific chip compatible with microcomputers with different communication directions the chip was provided with order changing means according to feature (f). Moreover, according to feature (g) this order changing means (having switching means) was designed to be operated by the microcomputer (control means) itself, i.e. the controlling microcomputer of the camera (thus external to the one-

chip IC) was arranged to set the data transmission order on the chip in the way that corresponded to the functioning of the microcomputer itself. Although in principle data order changing means (feature (f)) are disclosed in D2, feature (g) can in no way be derived from D2, since there is no external microcomputer at all in that arrangement and therefore no connection problems in the sense of the invention could arise.

The Board is therefore of the opinion that the invention contributes to a flexible fabrication of video cameras in that the one-chip IC can be used with different types of microcomputers and, since the prior art does not give any hints in the direction of the invention, the Board is of the opinion that the subject-matter of claim 1 would not be obvious to a skilled man. The subject-matter of independent claim 12, which identifies a one-chip IC in correspondence to claim 1, is also not obvious.

5. The Board consequently takes the view that the subject-matter of the independent claims involves an inventive step, Articles 52(1) and 56 EPC. The dependent claims set out particular embodiments of the invention. Thus the dependent claims 9 to 11 and 16 to 18 (cf. reason 1 above) are also allowable.

Furthermore, the description as adapted to the claims now under consideration also meets the requirements of the EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of

claims 1 to 18 as filed in the oral proceedings with the correction of "feature (f)" of claim 1 as set out under II after the quotation of claim 1 in this decision;

description: pages 11a, 12, and 22 as filed in the oral proceedings,
pages 2 to 11 filed with the letter dated 18 October 1999,
pages 13 to 21 as originally filed;

drawings: figures 1 and 2 as originally filed.

The Registrar:

The Chairman:

M. Kiehl

S. V. Steinbrener