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D E C I S I O N
of 28 July 1994

Case Number: T 0331/93 - 3.5.2

Application Number: 83301016.8

Publication Number: 0091188

IPC: G11B 15/46

Language of the proceedings: EN

Title of invention:
Microprocessor controlled multiple servo system for a recording and/or reproducing apparatus

Patentee:
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Opponent:
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Interessengemeinschaft für Rundfunkschutzrechte E.V.
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Nokia Graetz GmbH

Headword:

Relevant legal norms:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:

Catchword:

Europäisches Patentamt | European Patent Office | Office européen des brevets

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Case Number: T 0331/93 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 28 July 1994

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Decision under appeal: **Decision of the Opposition Division of the European Patent Office dated 25 January 1993 rejecting the opposition filed against European patent No. 0 091 188 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: A. G. Hagenbucher
Members: M. R. J. Villemin
W. M. Schar

Summary of Facts and Submissions

I. The Appellant (formerly Opponent II) is one of four Opponents who opposed European patent No. 0 091 188. He now contests the decision of the Opposition Division rejecting the opposition.

II. The patent in suit has been granted with two independent Claims 1 and 13, worded as follows:

"1. Apparatus for controlling a magnetic tape recording and reproducing machine which is capable of operating in a multiplicity of operating modes in response to mode function and control means, the machine having a take-up and a supply reel, a selectively engageable capstan and a rotatable transducing head, said apparatus comprising servo means (32) for controlling the operation of take-up and supply reels (60, 62), servo means (34) for controlling the operation of the capstan (76), servo means (36) for controlling the rotation of the transducing head and a microprocessor (30) characterised in that the microprocessor controls each of said servo means during the operating modes, said microprocessor periodically under the control of timing signals produced in accordance with the rotation of the transducing head interrogating and receiving input signals indicative of a state of each of said reel servo means, said capstan servo means and said transducing head servo means, as well as input signals from said mode and function control means and providing output signals for generally simultaneously controlling each of said servo means responsive to said input signals."

"13. A multiple servo system for an apparatus having a head which is rotated relative to a magnetic tape that is moved past the head to record and reproduce video

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information on the tape in discrete tracks, comprising a transducing head for recording and/or reproducing video information on a magnetic tape, a head scanner servo system (36) for rotating said transducing head during recording and/or reproducing of video information on the tape, said head scanner servo system including means for producing output pulses indicative of the rotational position and velocity of said head, a servo system (34) for controlling the longitudinal velocity of magnetic tape being transported past said head, said servo system including means for producing a signal indicative of the longitudinal tape velocity, and a microprocessor (30), characterised in that the microprocessor (30) forms a component part of each of said servo systems, said microprocessor receiving said scanner servo system output pulses as timing signals and, in response thereto, determining the rotational position and velocity of said head and producing a control signal to regulate the position and velocity of said head, said microprocessor also being responsive to said timing signals to sample said signal from said longitudinal velocity controlling system and to produce an additional control signal to regulate longitudinal tape velocity."

The wording of Claim 1 in EP-B-091 188 distinguishes from that of the granted version by the word "received" in column 51, line 3, instead of "receiving".

Claims 2 to 12 are dependent on Claim 1 and Claims 14 to 16 are dependent on Claim 13.

III. In the Statement of Grounds, the Appellant argued that the subject-matter of Claims 1 and 13 did not involve an inventive step, having regard to the prior art disclosed in the following documents:

- US-A-4 249 220 (which will be referred to as D1);

- Video-Handbuch, Ru van Wezel, Franzis-Verlag, 1979, pages 273 and 274 (D2);

- GRUNDIG TECHNISCHE INFORMATIONEN, No. 6, 1980, pages 281-292 (which will be referred to as 031);

- DE-A-3 007 874 (012);

- IBM Technical Disclosure Bulletin, Vol. 20, No.2, July 1977, pages 512 and 513 (023);

- Audio Engineering Society preprint No. 1834 (E-5), O. J. Bonello, "A new tape transport system with digital control", 70th AES Convention, 30 October to 2 November 1981, New York (014).

The non-prepublished document

- Arbeitsbuch Mikrocomputer, H.Feichtinger, Franzis-Verlag, 1985, pages 25-28 (D3),

has been cited as evidence for prior use of microprocessors of high efficiency.

IV. Oral proceedings were held on 6 July 1994. Opponents I (N.V. Philips' Gloeilampenfabrieken) and IV (NOKIA GRAETZ GmbH) did not attend these oral proceedings.

In the oral proceedings the Respondent (Proprietor of the patent) submitted two auxiliary requests.

V. The Appellant argued that the control functions recited in Claim 1 were provided in all high quality video tape recorders. He submitted that it was common practice that various operations in a video recorder were automatically controlled. It was also usual to use a signal produced by the scanner servo as a phase or

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timing reference for the tape speed servo, as disclosed in D1 and D2. Video tape recorders with servo systems including a microprocessor were disclosed in documents 031, 012, 023 and 014. In view of the rapid increase in microprocessor performance achieved in the 1970's, as is clear from D3, it was obvious to assign more duties to the microprocessor.

In the oral proceedings the Appellant essentially relied on documents 031 and 023 to show that the subject-matter of Claims 1 and 13 lacked an inventive step. He referred particularly to pages 286-289, especially sections 9.1 and 9.2 on page 288 of document 031 mentioning the use in a video recorder of a microprocessor for performing phase control in the tape servo means and voltage regulation in the actuator servo loops. He referred also to Figure 9 of document 031 showing the microprocessor SM 590 with input terminal 6 connected to pin 3 ("Lagengeberimpuls Kopfrad") which he argued was receiving timing signals produced in accordance with the rotation of the rotating head.

He alleged that document 023 described a magnetic tape recorder having a rotatable transducing head. Servo circuits were controlled by a microprocessor receiving timing signals which could be produced in accordance with the rotation of the head. The Appellant argued that the microprocessor controlled the head rotation servo as well as the tape transport system and it could obviously be used for the control of other circuits.

VI. The Respondent agreed that due to the development of microprocessors it was obvious to require them to perform more and more tasks. This did not mean, however, that all features of Claims 1 and 13 were known or rendered obvious by the prior art cited by the Appellant. The Respondent objected that the Appellant

had not clearly specified which features of the claims were allegedly anticipated or rendered obvious by which prior document and referred to his previous submissions dated 27 July 1992.

He pointed out that terminal 6 of the microprocessor mentioned in document 031 was merely identified as an interrupt input and there was no explanation in document 031 of what function was performed in consequence of the reception of a pulse at this input. He argued that the system described in document 023 comprised only one stepping motor and could not possibly correspond to a video recorder. There was no reference in this known system to the microprocessor interrogating and receiving input signals indicative of a state of each of reel servo means, capstan servo means and transducing servo means as claimed. The Respondent emphasized in the oral proceedings that a microprocessor designed for performing a known task was not automatically and obviously considered suitable for carrying out other functions not hinted at in the prior art.

Regarding the generating of timing signals mentioned in Claims 1 and 13, the Respondent referred to Figure 17 of the opposed patent showing microprocessor 30 receiving 4 MHz clock signals on pin 39 as well as IRQ signals on pin 4 indicated in Claim 13 as the output pulses from the head scanner servo.

VII. The Appellant requested that the decision of the Opposition Division be set aside and that the patent in suit be revoked in its entirety.

The Respondent requested that the appeal be dismissed and the patent be maintained as granted or on the basis of the auxiliary requests filed during the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

2. The novelty of the subject-matter of Claims 1 and 13 of the patent in suit has not been contested. The Board agrees that the claimed subject-matter is novel.

3. *Inventive step*

3.1 The invention according to granted Claim 1 concerns an apparatus for controlling a magnetic tape recording and reproducing machine. It has a rotatable transducing head and is able to operate in a multiplicity of operating modes in response to mode function and control means. It is therefore specifically suitable for video recording and reproducing.

According to the preamble of Claim 1, this apparatus comprises:

- a take-up reel and a supply reel,
- a selectively engageable capstan,
- a rotatable transducing head (scanner),
- respective servo means for controlling the operation of the take-up and supply reels, the capstan and the rotation of the transducing head; and
- a microprocessor.

As found by the Opposition Division these features are known from the document "IEEE Transaction on Consumer Electronics", No. 4, Volume CE-25, August 1979; M. Ozawa et al. "NEW PORTABLE VIDEO CASSETTE RECORDER", pages 440-445 (which will be referred to as 011).

The essential features mentioned in the characterising part of Claim 1 can be summarized as follows:

The microprocessor,

a) under the control of timing signals produced in accordance with the rotation of the head, periodically receives and interrogates first input signals indicative of the state of each of the afore-mentioned servo means,

b) also receives and interrogates second input signals from the mode and function control means,

c) provides output signals for generally simultaneously controlling each of the servo means in response to said first and second input signals.

3.2 Granted Claim 13 concerns a multiple servo system in a video recorder apparatus as indicated in its preamble. The characterising part of this claim recites essential features which can be summarized as follows:

The microprocessor forms a component part of each of the servo systems and receives the scanner servo system output pulses as timing signals and, in response thereto,

d) determines the rotational position and the velocity of the head and produces a control signal to regulate the position and velocity of the head,

e) samples the signal from the longitudinal velocity controlling system and produces an additional control signal to regulate the longitudinal tape velocity.

3.3 Documents D1 and D2 describe phase comparison systems. They do not disclose, or remotely suggest, the features respectively listed in the characterising parts of Claims 1 and 13.

3.4 In view of D3 it is not contested that efficient microprocessors have been used before the priority date of the patent in suit. However, this patent is not restricted to the mere use of a microprocessor in a magnetic tape recorder.

3.5 Figures 5-7 of document 012 show a regulation system in a magnetic tape video apparatus. This system is intended to achieve a particular amplitude/frequency characteristic of a servo loop ("Regelschleife"). It includes a regulation unit 11 (see Figure 5) comprising a memory 14 which receives synchronisation pulses from tachometric generator 72 coupled to rotatable head 50.

This document does not suggest the simultaneous control of reel, capstan and scanner servos. There is also no suggestion that a microprocessor could interrogate and receive signals indicative of the state of the servo means.

Document 014 discloses only the use of a microprocessor whose primary function consists in ensuring a constant tension on the tape in an audio tape recorder. The microprocessor counts the revolutions of a tape position sensor wheel (see Figure 4). No suggestion of any of the features of the characterising parts of Claims 1 and 13 is made.

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Documents 012 and 014 are thus not relevant to the subject-matter of Claims 1 and 13.

3.6 In the oral proceedings held before the Board, the Appellant alleged that documents 031 and 023 were particularly relevant to the claimed subject-matter.

3.6.1 Document 031 concerns a magnetic tape video recorder (see particularly Figures 9 and 10) including a microprocessor SM 590. The microprocessor generates

- a control voltage signal for the tape servo phase control (see Figure 9, output SM 23 of DTF module) and

- control voltage signals for the head actuators (see Figure 9, outputs SM 24 and 25 of DTF module and page 288, section "zu 9.2").

Input pin 6 of the microprocessor is connected to input terminal 3 which is supplied with a head wheel position signal ("Lagengeberimpuls Kopfrad"). The Appellant took the view that this indicated that the microprocessor was controlled by timing signals produced in accordance with the rotation of the head. The Respondent replied that pin 6 was identified on page 286, table of Figure 10, as an interrupt input ("Unterbrechungseingang") and there was no disclosure in 031 of what function is performed in consequence of a pulse at this input.

In this context it is appropriate to refer to document "GRUNDIG TECHNISCHE INFORMATIONEN", No. 3, 1981, pages 105-116, referred to as 021 in the proceedings before the Opposition Division. This document deals with a VTR of a similar type (VIDEO 2x4 super) as that of the VTR disclosed in 031 (2x4 PLUS). From document 021 (pages 105 and 106, section 1, and pages 108 and 109,

top portion, left-hand corner of the electronic circuit) it appears that the head wheel signal pulse ("Lagengeber-Impuls") is used as current value ("Istwert") to be compared with a reference value ("Sollwert") in the phase comparator MC 14 046 (input terminals 14 and 3 of the comparator) in order to develop head servo control signals.

Even if a sequence of "Lagengeber-Impuls" is considered as timing signals generated in accordance with the rotation of the head, it cannot be derived from document 031 that the microprocessor, under the control of such signals, periodically receives and interrogates first input signals indicative of the state of all the servo means indicated in Claim 1 (see feature a) mentioned in section 3.1 above). In any case, the capstan servo is controlled by the programmable divider MC 14 526 (see lower part of Figure 9) and not by the microprocessor.

The Board concludes that document 031 discloses none of the features a) to e) indicated in sections 3.1 and 3.2 above.

3.6.2 Document 023 describes a microcomputer controlled magnetic recording machine. This known machine comprises servo circuits for driving a motor M which actuates a controlled device. This device can be a rotary head portion. Motor M is coupled to a tachometric generator T which supplies signals to the microcomputer.

The Board agrees with the Appellant that the microcomputer disclosed in document 023 is under control of timing signals produced in accordance with the rotation of the transducing head. However, for the following reasons, the Board cannot share the

Appellant's views that the teaching of document 023 renders the subject-matter of Claims 1 and 13 obvious.

Document 023 is relevant as far as controlling by the microprocessor of servo circuits and various functions such as servo step and track alignment function, beginning of read and write function and starting step function are mentioned (cf. page 513, 2nd, 3rd and 5th paragraphs). The microcomputer initiates functions in accordance with the status of the control device recorder as well as the control signals received (cf. page 513, 4th paragraph). It evaluates the position of the magnetic record member or tape, the speed of the rotor and the relationship of the motor with respect to the tape (cf. page 513, 5th paragraph).

Document 023, however, does not disclose a multiplicity of operating modes in response to mode function and control means, which is specific for video recording and reproducing. Hence, it does not hint at generally simultaneously controlling each of reel servo means, capstan servo means and transducing head servo means responsive to input signals from mode and function control means. Document 023 is even silent with respect to reel servo means and it appears that the control signals mentioned on page 513, 4th paragraph are only those of the controlling device, i.e. the rotary head (cf. page 513, paragraphs 1 and 2).

A multiplicity of servo means is not expressis verbis mentioned in document 023. Even if one admitted that several servo means for controlling the speed of motor M and track alignment function or the two servo functions shown in the lower figure of page 512, were implicitly used, it is not derivable from document 023 that the state of each of the servo means should be periodically evaluated by the microprocessor. Moreover, the vagueness

and speculative character of document 023 alleged by the Respondent is also underlined by the fact that although the figure of this document shows a motor (M) with a tachometer feedback, the document refers to a stepping motor which usually does not require feedback signals.

4. In the Board's opinion, the documents D1, D2, 031, 012, 023, 014, individually or in combination, do not disclose or even remotely suggest the technical features underlying the present invention as defined by the wording of Claims 1 and 13, even considering the prior use of efficient microprocessors. Therefore, these features lie beyond the realm of simple "workshop improvements" and cannot be regarded as obvious to a person skilled in the art.

5. Because of that, the prior art mentioned above does not prejudice the maintenance of the patent as granted.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl A. G. Hagenbucher