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**Datasheet for the decision  
of 6 April 2006**

**Case Number:** T 0505/02 - 3.5.04

**Application Number:** 93303063.7

**Publication Number:** 0567301

**IPC:** H04N 3/30

**Language of the proceedings:** EN

**Title of invention:**

Display device for displaying a picture of a different aspect ratio

**Patentee:**

VICTOR COMPANY OF JAPAN, LIMITED

**Opponent:**

Interessengemeinschaft für Rundfunkschutzrechte GmbH  
Schutzrechtsverwertung & Co. KG

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 56, 114(2)

**Keyword:**

"Novelty (yes)"

"Inventive step - (yes) after amendment"

"Late submitted material - documents admitted (yes)"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0505/02 - 3.5.04

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.04  
of 6 April 2006

**Appellant I:**  
(Opponent)

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**Decision under appeal:**

Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
15 March 2002 concerning maintenance of  
European patent No. 0567301 in amended form.

**Composition of the Board:**

**Chairman:** F. Edlinger  
**Members:** A. Dumont  
T. Karamanli

## Summary of Facts and Submissions

- I. Appeals were lodged by the Opponent and by the Proprietor against the decision of the opposition division to maintain European patent No. 0 567 301 in amended form according to the Proprietor's second auxiliary request.
- II. The opposition against the patent was based on the grounds of Article 100(a) EPC concerning lack of novelty and lack of inventive step. Reference was made *inter alia* to the following prior art documents in the opposition proceedings:
- D1: EP 0416619 A2  
D5: US 4605952 A.
- III. The following supplementary prior art documents were filed with the statement of grounds of appeal by the Appellant Opponent:
- D6: US 4551754 A  
D7: US 4730215 A.
- IV. Oral proceedings were held on 6 April 2006.
- V. The Appellant Opponent requested that the decision under appeal be set aside and that the patent be revoked.
- VI. The Appellant Proprietor withdrew the previous main request and the auxiliary requests 1 and 2 filed in writing and requested in the oral proceedings that the decision be set aside and that the patent be maintained

in amended form on the basis of claims 1 to 10 filed with letter dated 6 March 2006 (headed "3. Alternative Request") and the description and drawings of the patent as granted (sole request).

VII. The independent claims read as follows:

"1. A display device for displaying a video image of an aspect ratio of horizontal to vertical dimensions of 4:3 onto a display screen having an aspect ratio of horizontal to vertical dimensions of 16:9, said video image being transmitted to said display device without being compressed or expanded, under conditions so that the display screen is filled up with the original image without blank portions on the screen and with substantially all the picture information included in the original image being fully visible on the display screen, said display device characterized by:  
means (1-9, 11-14) for non-linearly expanding the horizontal display scale of said video image on said display screen so that said video image is fully displayed by substantially filling up said display screen with the right and left portions of said video image with respect to a horizontal center portion of said video image expanded in such a manner that the rate of non-linear expansion is gradually increased as the horizontal position with said video image becomes distant from a horizontal center of said video image."

"3. A display device for displaying a video image of an aspect ratio of horizontal to vertical dimensions of 16:9 onto a display screen having an aspect ratio of horizontal to vertical dimensions of 4:3, said video image being transmitted to said display device without

being compressed or expanded and under conditions so that the display screen is filled up with the original image without blank portions on the screen and with substantially all the picture information included in the original image being fully visible on the display screen, said display device characterized by:  
means (41-48) for non-linearly compressing the horizontal display scale of said video image on said display screen so that said video image is fully displayed and fills up said display screen with the right and left portions of said video image with respect to a horizontal center portion of said video image compressed in such a manner that the rate of non-linear compression is gradually increased as the horizontal position within said video image becomes distant from a horizontal center of said video image."

"5. A display device for displaying a visible picture of an aspect ratio of horizontal to vertical dimensions of 16:9 upon a display screen of an aspect ratio of 4:3, said visible picture being transmitted without being compressed and under conditions so that the display screen is filled up with the image signal containing said visible picture without blank portions on the screen, said display device being characterized by:  
means (31-37) for non-linearly expanding the vertical display scale of said visible picture on said display screen so that said visible picture is fully displayed and substantially fills up said display screen, with the upper and lower portions of said visible picture with respect to a vertical center portion of said visible picture expanded in such a manner that a rate of non-linear expansion is gradually increased as a vertical position within said visible picture becomes

distant from a vertical center of said visible picture.  
(Fig. 24) "

The remaining claims are dependent upon at least one of the independent claims reproduced above.

VIII. The reasons given in the decision under appeal for maintaining the patent in accordance with the Proprietor's second auxiliary request may be summarised as follows:

D5 concerned a television system for transmission of (partly) compressed signals of a 5:3 aspect ratio video image. The signals were stored and, after expansion of the compressed parts, a full 5:3 video image was displayed on a 5:3 aspect ratio display device. The 5:3 television receiver of D5 would not be suitable for aspect ratio conversion of a 4:3 image to a 16:9 display without modification. Since the problem underlying the patent (non-linear expansion, distortion of the side portions) was very different from that of D5, a skilled person had no incentive to look into D5 in order to fill up a 16:9 screen. He could perhaps have substituted a 16:9 aspect ratio for a 5:3 aspect ratio, but a skilled person would not have arrived at the subject-matter of claim 1 without taking an inventive step. Concerning claims 3 and 5, the teaching of D5 was even more remote.

D1 disclosed a technique for processing television signals in order to fill up a display screen, whereby side sections were uniformly expanded in the horizontal direction. In this respect, D1 had many similarities with the subject-matter of claim 1. But the input

signal concerned so-called "out of standard image signals such as those in which end portions of the image are missing", and D1 failed to mention the problem of the compatibility of standard aspect ratios and wide-screen aspect ratios. Therefore D1 gave little incentive to a skilled person to arrive at a display device of claim 1 and was very remote from that of claim 3, which used compression rather than expansion to fit the image onto the screen.

Neither of the prior art documents disclosed any non-linear expansion in the vertical direction as specified in claim 5.

IX. The arguments presented by the Appellant Opponent may be summarised as follows:

- D6 and D7 exemplify the same basic idea as D5 with added details (see, for example, D7, column 6, lines 15-23). This shows that the idea disclosed in D5, viz. the change of aspect ratio by non-linear expansion of the peripheral regions of the image, does not accidentally anticipate the claimed subject-matter but instead concerns common practice that can be combined with other prior art, especially D1.
  
- D1 discloses a device for displaying a video image of a first aspect ratio on a display screen having a wider second aspect ratio. The input video signal is geometrically neither compressed nor expanded. D1 limits the deterioration of image quality due to horizontal expansion of the displayed image by uniformly distorting only its less important

peripheral regions. Adapting an aspect ratio by non-linear and gradual expansion of the peripheral regions is mentioned in D5, D6 and D7 as being an improvement over a uniform expansion. Although parts of the distorted images may become visible at the edge portions of the known standard receivers, a person skilled in the art is told that this does not affect the image quality if the more important centre region is left unaffected, in particular if the rate of compression of the edge portions is gradually increased. It would be obvious for a skilled person to apply this teaching to D1, in order to achieve the corresponding improvement in the case of the usual wide aspect ratio of 16:9.

- D5, D6 and D7 deal with television systems in which a video image is geometrically compressed prior to transmission to a receiver. The receiver expands the image for it to appear undistorted on a wide-angle display. In use, the known receiver operates without discriminating between whether an input signal represents a distorted image or not. It is therefore also capable of expanding an undistorted image. Hence the specification of the input signal which is transmitted to the claimed device as not "compressed or expanded" implies no technical limitation on the receiver taken alone and therefore does not render it inventive. Choosing the usual value of 16:9 for the wide-angle aspect ratio is obvious and would lead directly to the claimed display device.



- X. The arguments presented by the Appellant Proprietor may be summarised as follows:
- D6 and D7 do not disclose more than the documents already on file and therefore would over-expand the proceedings without justification, since the facts of the case have remained essentially unchanged. These documents should thus be disregarded in the appeal procedure. D6 and D7 do not qualify as proof of the common practice in the technical field under consideration, since they all originate from the same company and are closely related to D5.
  - D1 deals with the correction of a defective, out-of-standard aspect ratio, whereas D5, D6 and D7 concern the display of undistorted video images on a wide-angle aspect ratio receiver and essentially undistorted video images (the uncompressed centre regions) on the standard receiver. A practitioner would thus not be prompted to associate the documents so as to depart from the uniform expansion disclosed in D1 in favour of a non-uniform and non-linear expansion as disclosed in D5, D6 and D7.
  - D5, D6 and D7 deal with video systems in which a wide-angle image is "squeezed" (geometrically compressed) to fit into a standard transmission channel and "de-squeezed" (geometrically expanded) in the wide-angle receiver in order to display it without distortion. This is totally different from the claimed invention which solves the problem of limiting the distortion which becomes visible when an input signal representing an undistorted image of one standard aspect ratio is converted into a

different second aspect ratio and fully displayed on the display screen of the second aspect ratio. A person skilled in the art would not consider D5, D6 or D7 as closest prior art due to that fundamental difference.

## **Reasons for the Decision**

### 1. *Admissibility of D6 and D7*

It is undisputed that the principles disclosed in D5, D6 and D7, all originating from the same patentee, are closely related. D6 and D7 complement D5 as regards the expansion of the peripheral regions of the image, which is *prima facie* relevant for the assessment of inventive step in the present case. Admitting these documents into the proceedings allows a more comprehensive evaluation of the feature of non-linear expansion present in D5 and recited in the claims under consideration, which have also been amended in this respect, without endangering procedural efficiency or adding undue complexity to the case. The Board therefore decides to admit D6 and D7 into the proceedings.

### 2. *Amendments*

Compared to the corresponding granted claims, the independent claims 1, 3 and 5 now specify the numerical values of 4:3 and 16:9 of the aspect ratios, which are mentioned throughout the description. The rate of non-linear expansion or compression for the peripheral regions in claims 1, 3 and 5 has been further qualified

as being "gradually" increased. These amendments are derivable, for instance, from paragraphs [0021], [0035], [0046] and [0052] and Figures 5, 13, 18 and 22 of the patent specification. The amendments therefore comply with Article 123 (2) and (3) EPC.

3. Claims 1, 3 and 5 essentially correspond to the claims of the patent maintained in the decision under appeal, with the exception that the numerical values of 4:3 and 16:9 of the aspect ratios have been included in present claims 3 and 5 and the term "gradually" has been included in all present claims.

4. *Novelty*

- 4.1 Claims 1, 3 and 5 define display devices with similar means for displaying a video image of one aspect ratio, which is transmitted without being compressed or expanded but is displayed on a screen having a second aspect ratio substantially without loss of information ("screen is filled up", "fully displayed"). In other words, these claims relate to the aspect ratio conversion of received video signals having a standard aspect ratio for display on a screen of a different standard aspect ratio. Claim 1 deals with the horizontal expansion from the 4:3 ratio into the 16:9 ratio, claim 3 with the horizontal compression from the 16:9 ratio into the 4:3 ratio and claim 5 with the vertical expansion from the 16:9 ratio into the 4:3 ratio.

- 4.2 Prior art document D1 relates to a device for displaying a video image with slight distortion, with means for correcting out of standard image signals to

make them fit the standard. It does not mention the reception of a video image of one standard aspect ratio and the display on a screen of a different standard aspect ratio nor does it mention any wide-angle aspect ratio.

- 4.3 The Board is not convinced that the citing of the three closely related patents D5, D6 and D7, filed by a single applicant, proves in the present case that non-linear expansion was common practice, but may be seen as a sign of the importance of the disclosed technique to that particular applicant at a particular time. Therefore these documents are considered as individual pieces of prior art.

Each of D5 to D7 relates to devices for displaying a video image with no intentional distortion and discloses wide-angle aspect ratios of 5:3 (or 2:1), but none of these documents discloses that video signals corresponding to one standard aspect ratio are received and converted for substantially full display in a different standard aspect ratio by gradually changing the rate of expansion/compression with the distance from the centre, as the Board construes the present independent claims, in particular not for a display screen with an aspect ratio having the particular value of 16:9 and 4:3 respectively.

- 4.4 As a result, the subject-matter of all independent claims is new within the meaning of Article 54(1) and (2) EPC.

5. *Inventive step (claim 1)*

5.1 D1 as the closest prior art

5.1.1 D1 (column 1, line 13 to column 2, line 23; column 3, lines 18 to 42; column 4, lines 1 to 12) deals with the problem of correcting "some out of standard image signals" (those which have missing portions as a result of repeated digital processing) to make them fit the (same) standard. Conventionally, this problem was coped with by enlarging the entire image uniformly so as to convert the defective out of standard image signals into acceptable standard image signals. A distortion of the image was thus introduced into the more important central region of the image as well as into less important peripheral regions of the image, resulting in the production of images which are less pleasing to the viewer. D1 improves that conventional technique in that only the peripheral regions of such defective out of standard image signals are horizontally enlarged. The device disclosed in D1 has means (image enlarging circuit 7; Figure 3) for uniformly horizontally expanding the right and left portions (2; Figure 1(A)) of the image so that the video image is fully displayed whilst substantially filling up said display screen. As a result a distortion of the image does not affect the central region, but is limited to less important peripheral regions of the image which normally do not appear on a TV screen or, even if they do appear on the screen, make only a minor contribution to the overall image quality (overscan region). As in the contested patent, the expansion inevitably introduces geometrical distortion of the displayed image.

- 5.1.2 In contrast to the uniform expansion of the edge portions in D1, the claimed display device effects a conversion between the 4:3 and 16:9 standard aspect ratios by gradually increasing the rate of non-linear expansion with the distance from the centre of the image. To achieve this, the regions of non-linear expansion cannot be limited to negligible peripheral regions if the whole of the image has to be fully displayed, but the non-linearity is made less noticeable by gradually increasing the expansion with the distance from the centre (see Figures 5, 13, 18 and 22 of the patent specification).
- 5.1.3 It is known from D6 (for example column 7, lines 25-32) that in the conventional 4:3 receiver, which does not expand parts of the image and where the principal portion of the compressed video image is hidden from view in the overscan region, a vertical line may become noticeable at the transition point at which time-compression begins near the right and left extremes of the display if the transition occurs instantly. The visibility of the line is reduced by changing over between the time-compressed and uncompressed zones in a gradual manner. It should be kept in mind that there is no gradual transition in the displayed image of the wide-angle (5:3) receiver in any of D5, D6 or D7, which does expand the peripheral parts of the video image signal so as to display the original (undistorted) image.
- 5.1.4 In view of this disclosure a person skilled in the art starting from D1 could possibly have found a hint, for instance in D6, to improve the correction of those individual images which are out of standard in D1 by

concealing the transition between non-expanded parts and the expanded peripheral parts. But in so doing he would have corrected defective images to make them fit the standard. In the Board's judgement, such a combination would not have led a person skilled in the art to consider using these techniques for converting aspect ratios for display on a 16:9 or 4:3 screen.

5.2 D5, D6 or D7 as the closest prior art

- 5.2.1 It is undisputed that each of D5 to D7 relates to a video system in which an original undistorted wide-angle image with an aspect ratio of 5:3 (or 2:1) is geometrically squeezed into a conventional (4:3) aspect ratio video image signal for transmission and then expanded in a wide-angle display device having the same aspect ratio as the original image. The viewer is therefore presented with an undistorted image.

Applying the teaching of that prior art to images with an aspect ratio of 16:9 instead of the other standard wide-angle 5:3 aspect ratio would lead to a display device receiving the 4:3 video image and non-linearly expanding it for an undistorted display on a 16:9 screen.

- 5.2.2 In contrast, claim 1 of the opposed patent indicates that the transmitted image is not distorted ("without being compressed or expanded"), which in combination with the gradual non-linear expansion/compression with distance from the centre implies as a consequence that the displayed image is distorted (see, for example, Figure 4(B) of the patent specification).

5.2.3 The Board does not share the Appellant Opponent's view that these features do not contribute to the assessment of inventive step over the prior art. D5 (as well as D7) deals with the expansion of distorted (compressed) video image signals and is silent about the operation of the wide-angle receiver (Figure 9) when fed with a signal reflecting an undistorted image. However D6, which is explicitly referred to in D5, distinguishes between the reception of compressed and uncompressed image signals and foresees a mechanism for disabling the image expansion when an uncompressed image is received (D6, column 6, lines 51-66). The indication about image distortion therefore triggers different processes in the display devices according to the prior art and is not technically meaningless. This is in line with the general aim of all the prior art documents D5, D6 and D7, which is to present the viewer with undistorted images in the case of wide-angle receivers or with images where peripheral parts of the image are not visible in the case of conventional receivers. As a result, in the Board's view, a doubt arises as to whether a person skilled in the art would derive from the silence in D5 or D7 regarding the processing of undistorted images that a receiver in those documents is "unaware" of geometrical distortions and expands any incoming input signal.

The Board does not regard as obvious the modification of receivers known from any of D5, D6 or D7 so as to achieve an aim opposite to their declared aim (display of undistorted images). As a result, a person skilled in the art starting from any one of these documents would not have arrived at the claimed subject-matter without taking an inventive step.



5.3 For these reasons, the subject-matter of claim 1 involves an inventive step within the meaning of Article 56 EPC.

6. *Inventive step (independent claims 3 and 5)*

Documents D1 and D5 to D7 deal exclusively with a horizontal expansion of the image, not with a horizontal compression as in claim 3 or with a vertical expansion as in claim 5. The conclusion reached for claim 1 therefore applies *a fortiori* to claims 3 and 5.

**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 maintain the patent as amended in the following version:

Description:

Columns 1-15 of the patent specification

Claims:

No. 1-10 filed with letter dated 6 March 2006  
("3. Alternative Request")

Drawings:

Sheets 14-26 of the patent specification.

The Registrar

The Chairman

D. Sauter

F. Edlinger