

**Internal distribution code:**

- (A)  Publication in OJ  
(B)  To Chairmen and Members  
(C)  To Chairmen  
(D)  No distribution

**Datasheet for the decision  
of 23 October 2007**

**Case Number:** T 1087/05 - 3.5.01

**Application Number:** 99951579.4

**Publication Number:** 1145099

**IPC:** G06F 1/16

**Language of the proceedings:** EN

**Title of invention:**

Hand held computer with see-through display

**Applicant:**

HONEYWELL INC.

**Opponent:**

-

**Headword:**

Hand-held computer/HONEYWELL

**Relevant legal provisions:**

-

**Relevant legal provisions (EPC 1973):**

EPC Art. 56

**Keyword:**

"Inventive step - all requests (no)"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 1087/05 - 3.5.01

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.01  
of 23 October 2007

**Appellant:**

HONEYWELL INC.  
Honeywell Plaza  
Minneapolis  
Minnesota 55408 (US)

**Representative:**

Hucker, Charlotte Jane  
Gill Jennings & Every LLP  
Broadgate House  
7 Eldon Street  
London EC2M 7LH (GB)

**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 7 March 2005  
refusing European application No. 99951579.4  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** S. Steinbrener  
**Members:** W. Chandler  
P. Schmitz

## Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division to refuse the application on the grounds that claims 1 to 5 of the main and auxiliary request did not involve an inventive step (Article 56 EPC) over documents DE-A-198 01 519 (D1) and EP-A-0 540 393 (D3).
- II. In the statement setting out the grounds of appeal, the appellant requested that the decision be set aside and that a patent be granted on the basis of claims 1 to 5 of the main, or first auxiliary request, identical to the refused requests, or a second auxiliary request, containing a further minor amendment, all requests filed with the grounds of appeal. The appellant also made an auxiliary request for oral proceedings.
- III. In the communication accompanying the summons to oral proceedings, the Board summarised the issues to be discussed and expressed doubts about the inventive step of the requests. In a response, the appellant withdrew the request for oral proceedings and stated that if oral proceedings were to take place, neither the representative nor the appellant would attend.
- IV. At the oral proceedings, which took place in the appellant's absence, the Board discussed the case and the Chairman announced the decision.
- V. Claim 1 of the main request reads as follows:
- "A hand held computer (10) having a see through display allowing simultaneous viewing of a computer display and an operator's surroundings, comprising:

a housing (15);  
an optical system (50) coupled to the housing, wherein  
the optical system comprises an objective lens (65);  
a computer mounted in the housing;  
a display (80) coupled to the computer and mounted in  
the housing; and  
a viewing assembly (28) connected to the housing,  
wherein the viewing assembly comprises an eye piece  
lens (112) mounted to the housing,  
characterized in that the hand held computer further  
comprises:  
an input device (30) mounted on the housing and coupled  
to the computer, the input device operable to input  
data and to engage a function of a software program  
employed by the computer; and  
an image combination system (92) mounted in the housing  
and coupled to both the optical system and the display,  
wherein the image combination system comprises:  
a beam splitter (95) mounted in the housing and  
interposed between the objective lens and the eye piece  
lens and adjacent to the display to receive projected  
light therefrom; and  
a pentaprism (100) mounted in the housing for receiving  
light directed through the objective lens;  
wherein light transmitted through the objective lens is  
directed through the pentaprism and combined with light  
from the display using the beam splitter, and further  
wherein the combined light is directed through the eye  
piece lens."

In claim 1 of the first auxiliary request, the end of  
the first feature of the characterising portion is  
amended to read "to engage various functions of  
software employed by the computer".

In claim 1 of the second auxiliary request, the optical system of the second feature of claim 1 of the first auxiliary request is amended to be "mounted on the housing".

VI. In the statement of grounds, the appellant argued essentially as follows:

The claimed invention was a fully functioning hand-held computer having a see-through display. Optical images from an external viewing assembly were superimposed with digital images from a computer display. The resultant image allowed the operator to view his surroundings while simultaneously viewing and operating software functions of the computer. In contrast, D1 related purely to portable position determining systems, and not to a fully functioning hand-held computer.

D1 described a pair of binoculars that included global positioning system (GPS) signal receivers and data transmitters. The binoculars were intended to receive satellite GPS signals and to transmit positional information from one binocular to the other binocular. The binoculars would continue to operate the same set of machine instructions and would continuously provide the same set of outputs. The user could only opt to view a selected one of the set outputs of the CPU, i.e. one of the positional descriptions or the time. Thus, D1 did not disclose or suggest the use of an input device which allowed the operator to input data or to engage a function of software executed by the CPU housed in the binocular.

D3 taught a pair of binoculars with two telescopes as shown in Figure 1. Each telescope included an eyepiece (2) and an objective lens (3). The telescope also included a screen (4) for displaying an electronic image. An optical device (8), including a lens (9) and a slide (10) with parallel semi-transparent faces, was positioned at 45° to the optical axis of the objective lens. The slide (10) superimposed the image from screen (4) onto the image seen through the objective lens (3). D3 did not disclose an integral hand-held computer comprising an optical system and a computer in, or mounted to, the same housing. Figure 5b of D3 clearly showed binoculars (32) separate from computer (34). Thus, the skilled man wanting to provide an improved, more versatile, integral hand-held computer would not consider the disclosure in D3 relevant to this goal.

There was no direct and unambiguous teaching in D3 of an image combination system including a beam splitter and a pentaprism. The Examining Division took the view that Figures 1 to 3 of D3 showed the use of two 5-sided prisms, or pentaprisms. However, this was far from clear. However, even if one considered the drawings in D3 to disclose a beam splitter and a pentaprism, the arrangement of these two components was opposite to that required by claim 1 of the Main Request. The claimed arrangement of beam splitter and pentaprism meant that light from the display was not subject to unnecessary processing, with the result that the final image had less distortion than might be experienced with the arrangement shown in D3.

There was no suggestion in D3 to arrange its beam splitter and prisms other than as shown in the drawings, and there was certainly no suggestion that any

particular arrangement might have had an advantage, such as that claimed for the present invention. The Examining Division considered that the arrangement of the pentaprism and the beam splitter was merely a routine design choice for the skilled person. However, the Examining Division did not provide any support for their assertion. Thus, their conclusion that the positioning of a prism (a pentaprism in the case of the claimed invention) before or after the beam splitter would have been considered a routine design choice was based upon hindsight.

Claim 1 of the first auxiliary request required that the input device be operable to input data and to engage various functions of software employed by the computer. This wording emphasised, therefore, that the device of the claimed invention was a fully functioning computer. Claim 1 of this request was inventive over the prior art for the same reasons as claim 1 of the Main Request, with this additional requirement for various functions of software further distancing the claimed invention from the closest prior art, D1.

Claim 1 of the second auxiliary request required that the optical system be mounted on the housing, and thus more clearly emphasised the integral nature of the claimed device. As D3 did not disclose an integral device, this amendment further distanced the claimed invention from that disclosure. Thus, this provided further reason why the skilled man would not have considered the disclosure in D3 when considering the question of inventive step.

## Reasons for the Decision

1. The appeal complies with the requirements referred to in Rule 65(1) EPC and is therefore admissible.
2. As explained by the appellant (see point VI, above), the application is for a hand-held computer having a see-through display. External optical images from a viewing assembly are superimposed with digital images from a computer display. The resultant image allows the operator to view his surroundings while simultaneously viewing and operating software functions of the computer.
3. The examining division found lack of inventive step starting from document D1 and combining it with document D3 and the skilled person's common general knowledge. During the oral proceedings before the Board, which took place in the appellant's absence, however, it turned out that D3 was a better starting point because it related to a computer (albeit not hand-held) having an image combination system closer to the claimed one.

The Board does not consider that this shift in starting point violates the appellant's right to be heard. Firstly, the Board's communication had set out in general terms that inventive step would be discussed in the oral proceedings and documents D1 and D3 were cited. Discussing inventive step implies identifying the closest prior art and therefore this was to be the subject of the oral proceedings. Secondly, D3 had always been a point of discussion during the proceedings, in the decision, the grounds of appeal and



the Board's communication, so that the appellant cannot be taken by surprise if it turned out that it was the best starting point. Finally, by deciding not to attend the oral proceedings, the appellant did not avail himself of the opportunity to comment on this line of argumentation.

4. D3 discloses (Figures 1 and 5) a see through display allowing simultaneous viewing of a computer display and an operator's surroundings, comprising:
  - a housing (1);
  - an optical system coupled to the housing, wherein the optical system comprises an objective lens (3);
  - a computer (34);
  - a display (6) coupled to the computer and mounted in the housing; and
  - a viewing assembly (2) connected to the housing, wherein the viewing assembly comprises an eye piece lens mounted to the housing,
  - an input device (16, 17, 18) mounted on the housing and coupled to the computer, the input device operable to input data and to engage a function of a software program employed by the computer (column 9, lines 14 to 17 and the relevant passages cited by the examining division); and
  - an image combination system (10) mounted in the housing and coupled to both the optical system and the display, wherein the image combination system comprises:
    - a beam splitter (10) mounted in the housing and interposed between the objective lens and the eye piece lens and adjacent to the display to receive projected light therefrom; and
    - wherein light transmitted through the objective lens is combined with light from the display using the beam

- splitter, and further wherein the combined light is directed through the eye piece lens."
5. Claim 1 of the main request differs from D3 in that:
    - a) the computer is a hand-held computer with the computer mounted in the housing;
    - b) the image combination system comprises a pentaprism mounted in the housing for receiving light from the objective lens and directing it to the beam splitter for combination with light from the display.
  6. These features relate to different aspects of the apparatus and have no synergistic effects and can therefore be considered separately.
  7. Feature a) simply has the effect of providing an integrated apparatus. However, the Board considers that it is a notorious goal in the field of computer hardware to provide integrated apparatus where possible if the cost and technology allow this. In particular, in the present application where the user might be a soldier, it would be self-evident to minimise the bulk of the apparatus and avoid external cable connections. Moreover, in the Board's view D3 even suggests this possibility when it states at column 8, lines 29 to 30 that the computer 34 is outside the apparatus "dans le cas de la réalisation", i.e. in that particular implementation, thereby implying that in another implementation it may well be inside the apparatus.
  8. Difference b) is that a pentaprism is mounted in the housing for receiving light directed through the objective lens. The examining division considered this

difference to be a matter of placing the prism in D3 before instead of after the beam splitter. However the Board considers that the prism arrangement in D3 is not a single pentaprism as in the invention, but most likely to be a classic double Porro prism arrangement, commonly found in binoculars. This arrangement erects the image and provides a longer, folded path from both the objective lens and the display to the eyepiece. Furthermore, the claimed pentaprism has a different effect from the prism arrangement in D3, namely to provide an additional 90° deviation for the beam from the objective lens to compensate for the fact that the beam from the display is parallel to that from the objective lens. Nevertheless, since the arrangement of D3 and the claimed one both result in the same overall technical effect, namely superposition of an image from a display in a folded optical path of the correct orientation between an objective and an eyepiece, the Board essentially agrees with the division that the problem solved is to provide an alternative optical arrangement.

9. The appellant argued that, since in the claimed arrangement the beam from the display did not pass through the pentaprism, there was the additional effect that the light from the display was not subjected to unnecessary processing in the prism, so that an image having less distortion could be achieved. However, the Board cannot accept this effect in order to pose the objective technical problem solved by the different optical arrangement. Firstly, this effect is not mentioned anywhere in the application. In fact, the features of the optical arrangement are not the subject of any particular attention in the originally filed

application, in particular in the summary of the invention, reinforcing the observation that they do not provide any surprising effects. Moreover, the appellant's alleged effect does not appear to be plausibly achieved over the whole breadth of the claim since it does not specify the quality of the display or the optical components. In particular, the effect would not appear to occur if the display were of low quality and the optics were of high quality.

10. When evaluating whether the skilled person would consider the claimed alternative obvious, it must be assumed that the skilled person knows the effects of the various optical components available. In particular, a pentaprism deviates light through  $90^\circ$  without inverting the image, and a beam splitter superimposes, with an inversion, one beam from a perpendicular direction onto another light beam.
  
11. The Board considers that the skilled person looking for an alternative arrangement of Figure 1 of D3 would consider a different positioning of the display as a minor constructional change depending on the geometry of the housing used. It is self-evident that when the light beam from the display is to run parallel to the beam from the objective lens two  $90^\circ$  deviations would be required to bring both beams together. Armed with the above knowledge, the skilled person would realise that this could be achieved by using any two devices that provide a  $90^\circ$  deviation, e.g. a beam splitter or pentaprism. Clearly one beam splitter is required to superimpose both images, so that one obvious possibility is to use one beam splitter and a pentaprism. The pentaprism could in principle be placed

in either one of the beams, and the skilled person would make a suitable choice depending on circumstances. Hence, the alternative optical arrangement according to feature b) is also considered to fall within the skilled person's competence.

12. Incidentally, in order that the image has the correct orientation, the optical path from the objective lens must contain an inversion with no change of handedness. In the case of a beam splitter, where the right angle branch provides an inversion and a change of handedness, and a pentaprism, the latter must also provide a change of handedness and thus must be a roof pentaprism as conventionally found in single-lens reflex cameras. Although not stated in the claim or the description, this is apparent from the drawing of the pentaprism 100 in Figure 4 of the application, which has a "roof" section on the left hand side.

13. Accordingly, the subject-matter of claim 1 of the main request lacks an inventive step (Article 56 EPC).

*Auxiliary requests*

14. Claim 1 of the first auxiliary request adds to claim 1 of the main request that the input device engages *various* functions of software. However, the Board agrees with the examining division that D3 discloses such various functions at column 11, lines 6 to 44, so that this feature does not add anything inventive.

15. Claim 1 of the second auxiliary request adds to claim 1 of the first auxiliary request that the optical system is *mounted on* the housing. The Board considers that

with this feature it is not entirely clear from claim 1 which components are in the housing and which are in the optical system, i.e. on the housing. However, assuming that the effect of this feature is to further emphasise the integral nature of the device as advanced by the appellant, the Board judges that this does not add anything inventive. As mentioned above in connection with difference a) of the main request, an integrated system is a well-known and obvious design possibility having no unexpected effect, the choice depending on the application.

16. Accordingly, the subject-matter of claim 1 of the auxiliary requests lacks an inventive step (Article 56 EPC).

17. There being no further requests, it follows that the appeal must be dismissed.

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

T. Buschek

S. Steinbrener