Datasheet for the decision of 17 November 2011

Case Number: T 1415/07 - 3.5.01
Application Number: 98932816.6
Publication Number: 1004085
IPC: G06F17/50
Language of the proceedings: EN

Title of invention:
SYSTEM AND METHOD FOR CONVERTING GRAPHICAL PROGRAMS INTO HARDWARE IMPLEMENTATIONS

Patentee:
National Instruments Corporation

Opponent:
ifm electronic gmbh

Headword:
Converting graphical programs/NATIONAL INSTRUMENTS

Relevant legal provisions:
EPC 1973 Art. 100(c)

Keyword:
Added subject-matter - general operation of front panel taken from cross-referenced document (No - directly and unambiguously derivable for skilled person)

Decisions cited:
T 0006/84, T 0689/90

Catchword:
See points 16 to 19 of the Reasons
Case Number: T1415/07 - 3.5.01

DECISION of the Technical Board of Appeal 3.5.01 of 17 November 2011

Appellant: National Instruments Corporation
(Patent Proprietor)
Building B,
11500 North MoPac Expressway
Austin, Texas 78759-3504 (US)

Representative: Heselberger, Johannes
Bardehle Pagenberg
Prinzregentenplatz 7
81675 München (DE)

Respondent: ifm electronic gmbh
(Opponent)
Teichstrasse 4
45127 Essen (DE)

Representative: Gesthuysen, von Rohr & Eggert
Patentanwälte
Postfach 10 13 54
45013 Essen (DE)


Composition of the Board:
Chairman: S. Wibergh
Members: W. Chandler
P. Schmitz
Summary of Facts and Submissions

I. This appeal is against the decision of the opposition division to revoke European patent No. 1 004 085. The patent relates to converting a graphical program, e.g. representing a measuring instrument, into an implementation that is partially in a software portion and partially in a hardware portion.

II. During the international phase of the prosecution of the underlying PCT application, the applicant (now patent proprietor and appellant) limited the claims to a measurement instrument and added features relating to the front panel in claims 3 to 6. Claim 3 defined that the graphical program included a "front panel" portion, which ran on the computer (i.e. not the hardware part) "to present the front panel portion on a display during the programmable hardware element in the instrument executing to perform the measurement function on the signal". According to the IPER, this feature added matter. After entry into the European phase the appellant made a voluntary amendment combining claims 1 and 3 and the patent was eventually granted with no further amendments to the claims.

III. Opposition was filed against the patent as a whole and based on Article 100(a) and (c) EPC. Most of the opposition concerned the former ground, namely lack of novelty over D1 and inventive step. In section VII on page 26 of the grounds of opposition the opponent (now respondent) argued that various features of the front panel, especially the above-mentioned (simultaneous) operation of the front panel during the measurement function, was not originally disclosed.
IV. The opposition division decided only on the ground under Article 100(c). They found that the simultaneous operation defined in claim 1 of the main request was not derivable from the originally filed application (Article 123(2) EPC). Claim 1 of the auxiliary request, amended by replacing "during" by "and", was considered to extend the protection conferred by the patent (Article 123(3) EPC). In the decision, the division considered the disclosure of the cross-referenced document US-A-4 901 221 (D10 or "Kodosky").

V. In the statement setting out the grounds of appeal, the appellant argued that the simultaneous operation was implicit from the description of the LabVIEW system and D10 in the opening part of the description. The appellant filed the following documents to corroborate the skilled person's understanding of the LabVIEW system:

D14: "IEEE-488 and VXIbus Control, Data Acquisition and Analysis", National Instruments, 1991
D15: "IEEE-488 and VXIbus Control, Data Acquisition and Analysis", National Instruments, 1994

VI. In the communication summarising the issues to be discussed at the oral proceedings, the Board pointed out that it only had to decide the added subject-matter point, but might decide on the other opposition grounds if desired since they had been discussed at length by both parties in the written proceedings. In a reply, the appellant requested that the case be remitted to decide these points.
VII. At the oral proceedings the appellant requested that the decision under appeal be set aside and that the case be remitted to the department of first instance for further prosecution. The respondent requested that the appeal be dismissed.

VIII. Claim 1 of the sole request (the patent as granted) reads as follows:

"A computer-implemented method for configuring an instrument to perform a measurement function, wherein the instrument includes a programmable hardware element, the method comprising:
creating a graphical program, wherein the graphical program implements the measurement function, wherein the graphical program includes a front panel portion and a block diagram portion, wherein the front panel portion operates as a front panel for the instrument;
generating a hardware description based on the block diagram portion of the graphical program, wherein the hardware description describes a hardware implementation of the block diagram portion of the graphical program;
configuring the programmable hardware element in the instrument utilizing the hardware description to produce a configured hardware element, wherein the configured hardware element implements a hardware implementation of the block diagram portion of the graphical program;
compiling the front panel portion into executable code for execution by a processor and storing the executable code in a memory;
the instrument acquiring a signal from an external source after said configuring;
the programmable hardware element in the instrument executing to perform the measurement function on the signal; and
the processor executing the executable code from the memory to present the front panel portion on a display during the programmable hardware element in the instrument executing to perform the measurement function on the signal."

IX. The appellant argued in summary as follows:

The skilled person would have realised that the front panel of the virtual instrument (VI) of the invention worked in the same way as a conventional instrument, i.e. simultaneously with the measurement function ("analogy" argument hereinafter).

D14 to D16 showed that in the well known LabVIEW system the front panel ran at the same time as the instrument ("interactive" argument hereinafter).

The interaction via the global variables, e.g. in Figures 17 to 19, between the CPU interface (and thus the front panel) and the hardware implementation was only possible if both parts were running simultaneously ("global variable" argument hereinafter).

The application stated at page 3, lines 22, 23 that the program created by the graphical program provided the user a (more deterministic) real-time response ("real-time" argument hereinafter).

Since the front panel presented the inputs and outputs while the measurement function was carried out, the application referred at page 4, lines 11, 12 and page 12, lines 9 to 13 to the front panel also as
supervisory control. This enabled the user to interact based on the presented inputs and outputs ("supervisory" argument hereinafter).

X. The respondent argued in summary as follows:

Concerning the "analogy" argument, the reasoning did not exclude the possibility that front panel values were entered and read in a phase prior/post the actual measurement by the hardware. In other words, the application failed to disclose an "unmittelbare Beeinflussung" (direct effect). Such prior entering of data before measurement was the "Regelfall" (general rule).

Concerning the "interactive" argument, even the prior art LabVIEW system did not allow the possibility of controlling the VI while it was running. In any case, the application only presented the LabVIEW system as prior art, but not in combination with the invention.

Concerning the "real-time" argument, the use of the term "real-time" related to the improvement derived from using hardware to perform the measurement and not from any aspect of the front panel.

Concerning the "supervisory" argument, the supervisory control portion was undefined. However, the "supervisory portion" was not identical to the front panel, but was included in it.

Reasons for the Decision

1. The appeal complies with the requirements referred to in Rule 65(1) EPC 1973 and is therefore admissible.
The patent

2. Computer systems can model and/or control various types of equipment. Programs to perform such functions are often written in a conventional computer language such as assembly language or C and consist of lines of code. However, such programs are complex and are difficult for non-programmers, such as technicians, to write or modify.

3. In a graphical programming environment, the program is built up at a higher level in the form of a block diagram. The system automatically generates the program from the diagram. This is easier to use because it hides much of the detail of the program from the user. If the graphical program is used to control an instrument it is referred to as a "virtual instrument" or "VI". In this case, some icons in the block diagram represent input and output operations to and from the instrument and have corresponding objects in a "front panel".

4. However, since a VI is essentially a simulation, it may not have the performance (e.g. speed) of a real instrument. The idea of the invention is to overcome this by converting part of the graphical program, e.g. the part that actually does the measuring, into a hardware implementation, i.e. a circuit. This is done by converting this part into a "hardware description" (e.g. in the known VHDL - Very High Speed Integrated Circuit Hardware Description Language). This is a set of instructions that can be used to program an ASIC, (Application-Specific Integrated Circuit).
Added subject-matter

5. There is no dispute about the basic functionality of the prior art and the invention. The only point at issue in this appeal is whether the last feature of granted claim 1 is derivable from the originally filed (PCT) application. This feature reads:

the processor executing the executable code from the memory to present the front panel portion on a display during the programmable hardware element in the instrument executing to perform the measurement function on the signal.

6. Notwithstanding the obvious grammatical error, it is common ground that this specifies that the display of the front panel and the measurement function in the hardware occur simultaneously.

7. It is common ground that the disputed feature is not explicitly disclosed in the originally filed application. Thus, using the generally accepted standard for judging the support for amendments, the question is whether it is directly and unambiguously derivable taking into account what is implicit to a person skilled in the art.

8. Many of the appellant's arguments aim to show that the feature is derivable by implication from other features, such as the fact that the measurement is "real time", or via the "supervisory portion" or via a "global variable". The Board, however, prefers the arguments that involve passages that mention the "front panel" directly.
9. The "front panel" is first mentioned in the introductory part of the description in connection with virtual instruments (VIs). The passage starting at page 2, line 25 states:

In creating a virtual instrument, a user preferably creates a front panel or user interface panel. The front panel includes various front panel objects, such as controls or indicators that represent the respective input and output that will be used by the graphical program or VI, and may include other icons which represent devices being controlled.

Since this directly follows the summary of the proprietor’s own Kodosky document (D10), the Board considers that the skilled person would have no doubt that such a front panel is a part of the VI of that system. Moreover, as stated by the appellant, D10 discloses part of its invention at column 8, lines 5 to 19 in the following terms:

The virtual instrument 40 includes a front panel 42 which permits interactive use of the virtual instrument 40 by a user. As will be explained more fully below, the front panel permits graphical representation of input and output variables provided to the virtual instrument 40.... The virtual instrument 40 also includes a block diagram 46 which graphically provides a visual representation of a procedure by which a specified value for an input variable displayed in the front panel 42 can produce a corresponding value for an output variable in the front panel 42.
One such VI, described later in the document, is an instrumentation system (Figure 21) for testing a unit 212. The traditional approach is said at column 17, line 9 to involve a computer program that interacts with the test instruments 208 and 210 to measure values in real time. It then goes on to describe a block diagram of the virtual instrument for this example (Figure 22). This has front panel input controls (line 22) and an (output) graph indication (line 57). Finally, it is stated (line 64) that the "instrument is operated from the front panel". In summary, D10 discloses a front panel for interactive control of a virtual measuring instrument that is designed to model an actual instrument performing a real time measurement.

10. Returning to the original application corresponding to description of the present patent, it goes on in the next paragraph (bridging pages 2 and 3) to state:

A user inputs data to a virtual instrument using front panel controls. This input data propagates through the data flow block diagram or graphical program and appears as changes on the output indicators. In an instrumentation application, the front panel can be analogized to the front panel of an instrument.... The user adjusts the controls on the front panel to affect the input and views the output on the respective indicators.

In the Board's view this, especially in the context of D10 discussed above, informs the skilled person that a conventional front panel of a virtual instrument should act like a real instrument, i.e. be usable while the measurement is being performed.
11. If there were still any doubt about this, the subsequent paragraph introduces "LabVIEW" as a well-known graphical programming environment, which in the Board's view also shows this real time capability. Thus, D14 from 1991 (one year after D10) states at page 1-8:

10) Interactive Operation - You can change the inputs to your VI even while it's running by clicking a switch, moving a slide, tweaking [sic] a knob, or typing a value. As data is displayed on the front panel, some indicators include cursors and scroll bars for real-time manipulation of the data.

D15 from 1994 at page 1-8, and D16 from 1996 at page 2-16, paragraph bridging first and second column in both cases disclose the same. Thus in the Board's, and contrary to the respondent's, view there is no serious doubt that it would be implicit to the skilled person that the interactive operation of the front panel had been a fixed feature of LabVIEW from around the date of D10 (1991) up to just before the priority date of the patent (1997).

12. The respondent argues that the application only presents the LabVIEW system as prior art, but not in combination with the invention i.e. with a hardware implementation of (or at least part of) the VI. However, besides the references in the opening part of the description, the embodiment of the invention makes various references to the LabVIEW graphical programming system. The first starting at page 10, line 30 states:

In the preferred embodiment, the graphical programming system is the LabVIEW graphical
programming system available from National Instruments. In this system, the user creates the graphical program in a graphical program panel, referred to as a block diagram window and also creates a user interface in a graphical front panel.

The second starting at page 12, line 29 states:

The user also preferably assembles a user interface, referred to as a front panel, comprising controls and indicators which indicate or represent input/output to/from the graphical program. For more information on creating a graphical program in the LabVIEW graphical programming system, please refer to the LabVIEW system available from National Instruments as well as the above patent applications incorporated by reference.

13. In the Board's judgement, these passages, particularly the latter, leave the skilled person in no doubt that the invention is an extension of the long-standing LabVIEW system and thus has a front panel that is the same as the traditional LabVIEW front panel. In other words, a front panel that operates simultaneously with performing the measurement.

14. The respondent argues that the disclosure does not exclude the possibility of entering of data in a phase before measurement and even that this is the normal situation. Although the Board agrees that this is a theoretical possibility, no evidence was offered that this was envisaged in general or in the present invention. Moreover, in the Board's view, the mere existence of another theoretical possibility is not
enough on its own to defeat the test for "directly and unambiguously derivable", since this would set the standard of proof too high, namely at absolute certainty and would render the determination a mere formality. The determination is subject to the important rider of taking into account matter which is implicit to a person skilled in the art. This matter is explained above, and in the Board's judgement, taking it into account, even considering the possibility offered by the appellant, leads to the conclusion that the feature in question is implicit.

Accordingly, the Board judges that the corresponding amendment to claim 1 is not an extension of subject-matter under Article 100(c) EPC.

The Board has reached its conclusion using the standard of what it judges that a skilled person would understand to be disclosed from the whole context of the application including the introductory part of the description and the referenced documents D10 and D14 to D16. However, the Board is aware that there is a rather restrictive jurisprudence concerning amendments taken from referenced documents which is now considered for completeness.

In T 689/90 (OJ EPO 1993, 616), the Board set out at point 2.2 four conditions to be met:

(a) that protection is or may be sought for features which are only disclosed in the reference document;
(b) that the features which are only disclosed in the reference document contribute to achieving the technical aim of the invention and are thus comprised in the solution of the technical problem underlying the invention which is the subject of the application;
(c) that the features which are only disclosed in the reference document implicitly clearly belong to the description of the invention contained in the application (Article 78(1)(b) EPC) and thus to the content of the application as filed (Article 123(2) EPC); and

(d) that such features are precisely defined and identifiable within the total technical information within the reference document.

18. The decision derived these conditions "having regard partly to what is set out in the headnote to decision T 6/84 [OJ EPO 1985, 238]", but gave no further explanation for this. The conditions in this headnote are:

(i) that the features unequivocally form part of the invention for which protection is sought.

(ii) that all the essential structural features thus disclosed which belong together must be incorporated into the claim.

19. Summing up these criteria, which have been used in various combinations in intervening decisions, and applying them to the present case, the present Board is of the following view:

Condition (a) requires that protection "is or may be sought" for the features, whereas condition (i) requires this to be unequivocal, i.e. unambiguous, which is thus somewhat more strict. Condition (a) also appears to overlap with condition (c) which requires that the features "implicitly clearly belong to the description of the invention". In the present Board's view, what these three conditions are getting at is
that it must be unambiguously derivable to the skilled person which features of the application are to be taken from the referenced document. This is met in the present case since as mentioned above, it is clear that the traditional front panel is intended to form part of the present invention.

Condition (ii) appears to be a statement of the usual requirement that an amendment may not isolate random features from a reservoir of features, whether in the same description or as here from a referenced document. This appears to have been subsumed into condition (d), which effectively requires that the features to be incorporated are equally unambiguously derivable from the referenced document. Again, the Board considers that this is met in the present case because it is clear from the introductory part of the description and LabVIEW in particular that the traditional front panel is interactive. Furthermore, in the Board's view, incorporating the interactive aspect of the front panel is not a case of an inadmissible isolation of one feature from, say, the other features of the front panel because it is apparent that the "interactivity" is self-contained and separate from other aspects of the front panel, and, being a functional feature, there is no question of aspects of structure being isolated.

This leaves condition (b), which requires that the features solve, or contribute to solve "the technical problem underlying the invention which is the subject of the application". This does not appear to have a counterpart in the earlier decision and no further reasons are given for its inclusion in the list. In the present Board's view, this condition seems questionable. Firstly, it is not clear which "technical problem" is meant - the subjective one mentioned in the
application, or the objective one found after considering the prior art cited in the search report. Secondly, in either case it can only relate to "new" features, i.e. features not present in the closest prior art. However, it is not clear why referencing new features should be less objectionable than referencing known ones. For these reasons, the present Board does not require this condition to be met.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance for further prosecution.

The Registrar: The Chairman:

T. Buschek S. Wibergh

Decision electronically authenticated