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**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**

D E C I S I O N
of the Technical Board of Appeal 3.5.01
of 17 November 2011

Appellant:
(Patent Proprietor)

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Decision under appeal: **Decision of the Opposition Division of the**
European Patent Office posted 5 July 2007
revoking European patent No. 1004085 pursuant to
Article 102(1) EPC 1973.

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
        D16: "Instrumentation Reference and Catalogue",
              National Instruments, 1996.

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, tweeking [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.

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

16.   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.

17.   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