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Datasheet for the decision
of 12 October 2023

Case Number:	T 0030/21 - 3.5.07
Application Number:	11862283.6
Publication Number:	2695079
IPC:	G06F17/30, G05B19/05
Language of the proceedings:	EN

Title of invention:
Methods and apparatus for a file system on a programmable
logic controller

Applicant:
Siemens Aktiengesellschaft

Headword:
File system on a programmable logic controller/SIEMENS AG

Relevant legal provisions:
EPC Art. 56
RPBA 2020 Art. 13(2)

Keyword:
Inventive step - all requests (no)
Amendment after summons - exceptional circumstances (yes)

Decisions cited:

G 0001/19, T 2351/17

Case Number: **T 0030/21 - 3.5.07**

D E C I S I O N
of Technical Board of Appeal 3.5.07
of 12 October 2023

Appellant:	Siemens Aktiengesellschaft
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Representative:	Siemens Patent Attorneys
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Decision under appeal:	Decision of the Examining Division of the European Patent Office posted on 25 August 2020 refusing European patent application No. 11862283.6 pursuant to Article 97(2) EPC

Composition of the Board:

Chair	J. Geschwind
Members:	M. Jaedicke
	C. Barel-Faucheux

Summary of Facts and Submissions

I.   The appellant (applicant) appealed against the
       examining division's decision refusing European patent
       application No. 11862283.6. That application was filed
       as international application PCT/US2011/030907
       (published as WO 2012/134491 A1) with a filing date of
       1 April 2011.

II.   The documents cited in the contested decision included:
       D1   US 2006/0190106 A1, published on 24 August 2006
       D3   WO 02/31608 A2, published on 18 April 2002

III.   The examining division decided among other things that
       the subject-matter of the independent claims of the
       main request and of each of the first to third
       auxiliary requests lacked an inventive step when
       starting from document D1. For the second and third
       auxiliary requests the examining division combined
       documents D1 and D3.

IV.   In its statement of grounds of appeal, the appellant
       requested that the contested decision be set aside and
       that a patent be granted on the basis of the main
       request or one of the first to third auxiliary
       requests, all requests as considered in the contested
       decision and resubmitted with the grounds of appeal.

V.   In a communication under Article 15(1) RPBA 2020 the
       board expressed among other things its provisional
       opinion that the subject-matter of claim 1 of all
       requests lacked inventive step. Moreover, claim 1 of
       the main request appeared to infringe Articles 84 and

123(2) EPC, and claim 1 of the third auxiliary request appeared to infringe Article 123(2) EPC.

VI.   By letter of 12 September 2023, the appellant submitted a main request and a first auxiliary request. The appellant indicated that if the main request were to be admitted, it would replace all previous requests.

VII.   Oral proceedings were held as scheduled and the appellant was heard on relevant issues. At the end of the oral proceedings, the Chair announced the board's decision.

VIII.   The appellant's final requests were that the decision under appeal be set aside and that a patent be granted on the basis of the main request or the first auxiliary request, both requests filed by letter of 12 September 2023.

IX.   Claim 1 of the main request reads as follows (itemisation of the features has been added by the board):
         [a] "A programmable logic controller comprising:
         [b]   a controller module;
         [c]   a persistent file system module coupled to the controller module and adapted to persistently store archive data files, wherein a data archive file is in a user application format in a comma separate value (CSV) MIME type format, ASCII text, HTML or XML format;
         [d]   a memory module that stores binary data coupled to the controller module;
         [e]   a web server module coupled to the file system module and adapted to output a web page listing archive files stored in the persistent file system module; and

[f]   a user program module that triggers a transfer
       operation including converting and writing binary
       data to the persistent file system module and
       stores instructions adapted to be executed by the
       controller module, the instructions including:

[g]   creating an archive file in a user application
       format in the file system module;

[h]   converting binary data stored in the memory
       module to the user application format of the
       archive file when a trigger condition for
       triggering the converting has been satisfied,

[i]   the trigger condition being a user defined
       condition that is used to start the transfer
       steps,

[j]   wherein the receiving and storing of binary data
       in the memory module continues while converting
       previously received and stored binary data; and

[k]   storing the converted binary data as an entry in
       the archive file in the persistent file system
       module and

[l]   receiving a request for a listing of archive
       files from a browser application and

[m]   presenting a webpage listing the archive files in
       response to the request for a listing of the
       archive files."

X.   Claim 1 of the first auxiliary request differs from the
       main request in that it adds the following text at the
       end of claim 1:
       "on a host computer accessing an IP address and
       specific data archive web page stored within the file
       system module"

XI.   The appellant's arguments relevant to the present
       decision are discussed in detail below.

Reasons for the Decision

1.   The application relates to a file system for manipulating and accessing data on programmable logic controllers (PLCs), also known as industrial controllers. Raw binary data in a PLC may originate as electrical signals and/or process data from the application controlled by the PLC, and access to these data may require a proprietary external application. The invention proposes a web browser-accessible file system for accessing the data in a PLC (see description as published, page 1).

Admissibility of the requests under Article 13(2) RPBA 2020

2.   Under Article 13(2) RPBA 2020 any amendment to a party's appeal case made after notification of a summons to oral proceedings shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.

3.   The sets of claims according to the main request and the first auxiliary request were a response to objections under Articles 123(2) and 84 EPC raised for the first time in the board's preliminary opinion (see points V. and VI. above). The amendments made in the main request and the first auxiliary request address these fresh objections.

    As this was the appellant's first opportunity to address these fresh objections, the board considers that there are exceptional circumstances (see decision T 2351/17, point 2 of the reasons and the further decisions cited in the Case Law of the Boards of Appeal of the EPO, 10th edition 2022, V.A.4.5.5 a)) which

justify admitting the newly filed requests into the
appeal proceedings under Article 13(2) RPBA 2020.
Consequently, the board admits the main request and the
first auxiliary request into the appeal proceedings.

Main request

4.   *Inventive step*

4.1   The examining division considered that document D1 was
        a suitable starting point for assessing inventive step.

4.1.1   The appellant argued that document D1 was not a
        suitable starting point for assessing inventive step as
        it did not have the same purpose and effect as the
        invention and did not mention a similar technical
        problem (statement of grounds of appeal, page 3, first
        and second paragraphs).

4.1.2   The board is not convinced by this argument as document
        D1 relates to storing measured data from devices
        controlled by a PLC in files which are accessed via a
        web server. Consequently, document D1 relates to an
        overall problem that is very similar to the problem
        addressed by the application at issue (see point 1.
        above). Consequently, the board agrees with the
        examining division that document D1 is a suitable
        starting point for assessing inventive step.

4.2   The appellant argued that the examining division had
        misinterpreted document D1 and erroneously combined
        different embodiments for its novelty analysis (see
        statement of grounds of appeal, page 3, last paragraph
        to page 4, second paragraph). Figure 7 of D1 disclosed
        a different PLC from that disclosed in Figures 1 to 6
        of D1. Consequently, the disclosure of Figure 7 could

not be combined with the disclosure of the other
figures for a novelty analysis.

4.2.1   The board agrees with the examining division's view
         that Figure 7 of document D1 illustrates another use of
         the industrial controller illustrated in Figures 1 and
         2, for example. Figure 7 discloses how a remote client
         can access the files stored in the PLC disclosed in
         Figures 1 and 2. Neither Figure 7 nor the related
         paragraphs [0034] and [0035] of the description
         disclose anything that indicates an alternative
         embodiment from the industrial controllers disclosed in
         Figures 1 and 2, for example. Consequently, the board
         is not convinced by the appellant's argument.

4.3   The appellant agreed that document D1 disclosed
         features a, b and d of claim 1 (see point IX. above for
         the itemisation of the claim features). However,
         features c, e and g to m of claim 1 were not disclosed.
         Document D1 did not disclose a persistent file system
         as the files (data) were stored in RAM memory (see
         paragraphs [0027] and [0028]: "the file system services
         46 reside and execute on a random access memory (RAM)
         residing on the industrial controller 40").

         According to the appellant, document D1 did not
         disclose any conversion of data into a user application
         format or a user-defined trigger condition for starting
         the data transfer steps. Rather, it disclosed in
         paragraph [0035] periodically downloading measured and
         trend data to a data warehouse, which did not
         correspond to the user-defined trigger condition
         according to feature i. Feature j of claim 1 specified
         that there was continuous receiving and storing of
         binary data during the data conversion. Consequently,

the periodic transfer of data disclosed in document D1
and the trigger in claim 1 were completely different.

Moreover, paragraph [0035] of document D1 disclosed
storing data outside the file system, which did not
correspond to feature k. D1 also failed to disclose a
request for a web page listing archive files and
presenting such a web page as specified in features l
and m. Rather, it disclosed in paragraph [0034] that a
client application communicated over the internet with
the file system to select a ladder program for
execution on the PLC.

4.3.1   Regarding the obviousness of the distinguishing
        features identified by the appellant, the appellant
        argued that the user-defined trigger condition started
        the data transfer and data conversion. Data conversion
        was a "further" technical effect. Moreover, regarding
        features i, l and m, the appellant argued that the
        important feature was that the web page provided the
        capability to access files managed by the file system
        module in view of the conversion step at feature h and
        the creation of the archive file format at feature g of
        claim 1. The presentation of the web page therefore was
        technical pursuant to the case law, since the web page
        itself was displayed not for its cognitive content but
        as an access point for manipulating archive files that
        were not displayable in a user application.

4.3.2   According to the appellant, the distinguishing features
        c, e and g to m of claim 1 together achieved the
        technical effect of allowing a PLC to be interrogated
        by means of a web page user interface in order to see
        archive data files "relating to the running of the
        PLC". The conversion allowed "data to be seen in the
        native language of a user application on a web page".

Consequently, the user application was able to carry
out the interrogation. This represented an improvement
on existing technologies, in which there was no ability
to interrogate the PLC using a user application and a
proprietary application was required to retrieve data
(see point 1. above).

The objective technical problem was how to interrogate
a PLC without resorting to proprietary applications.
The solution was inventive since D1 was concerned not
with interrogating the PLC but with RAM capacity
issues. There were no non-technical user requirements
with regard to the request for and subsequent
presentation of a web page listing archive files.
Document D1 did not provide a file listing in a format
readable by a web browser. Consequently, the subject-
matter of claim 1 involved an inventive step.

4.4   In accordance with the problem-solution approach, the
        board first determines which features of claim 1 are
        disclosed by document D1.

4.4.1   Document D1 (Figure 7, reference signs 132 and 134)
        discloses a PLC with a controller module. D1 also
        discloses a memory module storing binary data (such as
        logged data) in RAM memory (see Figure 1, reference
        signs 20 and 34; paragraph [0027]). Consequently,
        document D1 discloses features a, b and d of claim 1.

4.4.2   Document D1 (paragraph [0022]) discloses that the file
        system provides an interface to non-volatile storage
        devices such as hard drives or flash cards. The
        appellant cited paragraph [0028] of D1, which discloses
        that the "file system services [...] reside and execute
        on a" RAM memory. The board construes this passage as
        disclosing that the software for managing the file

system executes in RAM memory. This interpretation of
paragraph [0028] is entirely consistent with the
disclosure in paragraph [0027], which discloses storing
new temperature data that represent continuous
measurements in a file to avoid the RAM memory capacity
being reached. If the files were stored solely in RAM
memory (as alleged by the appellant), then storing the
data in a file could not solve any RAM memory capacity
problem. Paragraph [0027] also discloses storing the
file "in a separate memory device from the memory on
which the application program executes", e.g. a non-
volatile memory device residing on the PLC as disclosed
in D1, paragraphs [0010] and [0022]. In view of the
above, the board is convinced that document D1
discloses a persistent file system as specified in the
first part of feature c of claim 1.

The second part of feature c specifies that an archive
file is in a user application format. The board agrees
with the appellant that D1 does not disclose files
stored in a user application format.

4.4.3   In the board's view, document D1 discloses a web server
         (Figure 7, reference sign 146) coupled to the file
         system on the PLC (Figure 7, reference sign 138), i.e.
         the first part of feature e of claim 1. Moreover, the
         board considers that document D1 (paragraph [0027],
         "application program", and Figure 1, reference signs
         20, 24 and 26) discloses a user program module that
         writes binary data to a persistent file and stores
         instructions adapted to be executed by the controller
         module (see feature f of claim 1). Finally, paragraph
         [0027] of document D1 discloses storing binary data in
         a persistent file (see feature k).

4.4.4   In view of the above, the board concludes that the
        subject-matter of claim 1 differs from the disclosure
        of document D1 on account of the following
        distinguishing features:
        DF1   A data archive file is in a user application
              format in a comma separate value (CSV) MIME type
              format, ASCII text, HTML or XML format (see
              feature c).
        DF2   The user program module comprises instructions to
              create an archive file in a user application
              format in the file system module and to store the
              binary data in the converted format as an entry
              in an archive file (see features g and k).
        DF3   The user program module comprises instructions to
              convert binary data stored in the memory to the
              user application format of the archive file when
              a trigger condition for triggering the conversion
              has been satisfied (see features f and h).
        DF4   The trigger condition is a user-defined condition
              that is used to start the transfer steps (see
              feature i).
        DF5   The receiving and storing of binary data in the
              memory module continues during the conversion of
              previously received and stored binary data (see
              feature j).
        DF6   The web server module is adapted to output a web
              page listing archive files stored in the
              persistent file system module (see the second
              part of feature e).
        DF7   The user program module comprises instructions to
              receive a request for a listing of archive files
              from a browser application and to present a web
              page listing the archive files in response to the
              request for a listing of the archive files (see
              features l and m).

4.5   In the following, the board applies the problem-
        solution approach separately to the following two
        groups of distinguishing features – DF1 to DF5, and DF6
        to DF7 – since these two groups of features do not
        interact to achieve a synergistic effect.

4.6   In the board's view, the distinguishing features DF1 to
        DF5 provide a data file in one of the standard user
        application formats specified in feature c of claim 1
        (e.g. HTML or XML format; see also the description of
        the application at issue, page 6, second paragraph).
        Storing data in files in these standard user
        application formats enables access to data in the files
        by means of user applications that are able to read
        these standard file formats. However, claim 1 does not
        specify any access to data in an archive file, and so
        there can be at most only a potential for a technical
        effect of data access by means of standard user
        applications. The board has doubts that this potential
        effect constitutes a "further" technical effect as per
        decision G 1/19, points 94 to 96. Even if it were
        accepted, for the appellant's benefit, that the effect
        of enabling access by means of user applications that
        are able to read certain standard file formats
        constituted a "further" technical effect, it was
        straightforward to use conversion to a standard user
        application format when solving the problem of enabling
        access to stored data by commonplace user applications.

        Moreover, since D1 (paragraph [0027]) discloses that
        temperature measurement data are received continuously
        and the PLC consequently needs to be able to deal
        itself with incoming measurement data on a continuous
        basis (e.g. to avoid memory issues), and the skilled
        person understands that measurement data are received
        in a proprietary format (see also point 1. above), it

was a straightforward option to use some kind of
trigger condition to start the data conversion.

Regarding the distinguishing feature DF4, the board
considers that the trigger condition being "user
defined" does not achieve any technical effect. In this
context the board notes that claim 1 specifies neither
the "user" nor the condition in any detail. As
discussed at the oral proceedings before the board, the
description of the current application discloses on
page 7, first paragraph, that "any practicable trigger
condition may be used to initiate the transfer",
including the memory having been filled. Since document
D1 (paragraph [0027]) already discloses writing
measurement data to a file to avoid RAM capacity
issues, the distinguishing feature DF4 was in any case
obvious when starting from document D1 since the
skilled person could and would use a condition to start
the transfer and conversion of data to avoid a memory
capacity problem, for example. The appellant's argument
that paragraph [0035] of D1 disclosed periodically
downloading data into a data warehouse is not relevant
since claim 1 does not relate to downloading data into
a data warehouse.

The distinguishing feature DF5 essentially specifies
that the storing of received measurement data in the
memory module and the transfer and conversion of data
stored previously in the memory module to a file are
performed concurrently. As the examining division
correctly observed, document D1 (paragraph [0027])
discloses continuous temperature measurements, so
measurement data continuously arrive in the memory
module. Since the process of receiving data is
continuous, concurrently transferring and converting

the incoming data to a file was a straightforward
implementation option.

Consequently, the distinguishing features DF1 to DF5
cannot provide a basis for acknowledging an inventive
step.

4.6.1   The distinguishing features DF6 and DF7 enable web
        access to a listing of files being stored on the PLC in
        a user application format.

        Regarding features l and m, the examining division
        essentially argued in point 12.4 of its decision that
        the possibility of requesting a listing of archive
        files and the subsequent presentation of this listing
        on a web page to the requesting user was a non-
        technical user requirement, and the board agrees.

        The board notes that the fact that the archive files
        store data in a certain format does not play any role
        for the presentation of the listing on a web page since
        the web page is merely used to present a <u>listing</u> of the
        files, i.e the data stored in the files is not
        presented. Moreover, claim 1 does not specify any
        interaction with this listing such as a selection and
        downloading of a selected archive file. Consequently,
        the appellant's arguments relating to (1) alleged
        advantages of the archive file format in the context of
        features l and m or (2) any technical effect achieved
        by interacting with the listing are not supported by
        the wording of claim 1. Consequently, the board
        concludes that features l and m use the web access to
        the file system on the PLC (see D1, Figure 7 and
        paragraph [0034]) in a straightforward manner to
        implement the non-technical user requirement of
        presenting a listing of the archive files on the PLC on

the client. Consequently, the distinguishing features
DF6 and DF7 are obvious.

4.7   In view of the above, claim 1 of the main request lacks
        an inventive step (Article 56 EPC) over document D1.

First auxiliary request

5.   Claim 1 of the first auxiliary request adds the
        following feature at the end of claim 1 of the main
        request:
        "on a host computer accessing an IP address and
        specific data archive web page stored within the file
        system module"

6.   *Inventive step*

6.1   The feature added by the first auxiliary request was
        already present in the former second auxiliary request
        that was considered in the decision under appeal.
        Regarding this feature, the examining division
        considered that document D1 (Figure 7 and paragraph
        [0034]) disclosed a web browser running on a host and
        accessing the PLC via a web service. This web service
        access implied using an IP address and accessing a web
        page with contents according to user requirements. D1
        did not disclose how the web service was implemented or
        where the web page was stored, but document D3 (Figures
        1 and 2; page 7, line 21 to page 8, line 15) disclosed
        storing web pages on the PLC. Consequently, the
        examining division considered the feature added by the
        former second auxiliary request to be obvious.

6.2   The appellant argued that paragraph [0034] of document
        D1 disclosed that the client application was connected
        to the internet via a web service and a web browser, so

that the client application was able to select a ladder
program for execution by the PLC. However, document D1
did not mention any web page storage or access.
Moreover, combining documents D1 and D3 would at best
result in a web page stored in the file system
accessible by the web service to allow the client
application to select ladder logic files and access the
logged measured and trend data, which would need to be
displayed on the same web page with associated display
instructions. The claimed invention did not require any
such instructions since it used a user application
format. Consequently, the subject-matter of claim 1 was
inventive.

6.3   The board agrees with the examining division's
        arguments. The first auxiliary request essentially adds
        that a specific web page is accessed by a browser in
        the usual manner. In this regard, the board also
        considers that storing web pages in the file system
        (and thus on the PLC disclosed in D1) for access by a
        web server was well known at the filing date. A
        specific "data archive" web page being accessed was
        within the skilled person's routine development skills
        at the filing date. In particular, the skilled person
        was aware that requesting a web page typically meant
        accessing a specific web page via an address (URL).
        Consequently, it was straightforward to access a
        specific data archive web page when a request for
        listing archive data files was required.

        Moreover, claim 1 specifies that the data stored in an
        archive file is in a user application format. This does
        not imply that the web page listing of the archive
        files also uses a user application format. However,
        since, according to feature c of claim 1, HTML is a
        user application format and since web pages in HTML

format, were notorious at the filing date, it was in any case obvious for the skilled person to provide a web page listing the archive files in HTML format.

In view of the above, the appellant's arguments are not convincing and the subject-matter of claim 1 of the first auxiliary request lacks inventive step (Article 56 EPC) over document D1 in view of document D3.

7.   Since none of the appellant's requests can form the basis for the grant of a patent, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

S. Lichtenvort   J. Geschwind

Decision electronically authenticated