BESCHWERDEKAMMERN
DES EUROPÄISCHEN
PATENTAMTS

BOARDS OF APPEAL OF
THE EUROPEAN PATENT
OFFICE

CHAMBRES DE RECOURS
DE L'OFFICE EUROPÉEN
DES BREVETS

Internal distribution code:
(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision
of 7 September 2017

Case Number:	T 2027/12 - 3.4.03
Application Number:	03023441.3
Publication Number:	1414015
IPC:	G09G5/36, H04N7/58, H04N5/04
Language of the proceedings:	EN

Title of invention:
Video bus for a video decoding system

Applicant:
Avago Technologies General IP
(Singapore) Pte. Ltd.

Headword:

Relevant legal provisions:
EPC 1973 Art. 56, 84
EPC Art. 123(2)

Keyword:
Inventive step - (yes)
Amendments - added subject-matter (no) - after amendment

Decisions cited:

Catchword:

Case Number: **T 2027/12 - 3.4.03**

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 7 September 2017

Appellant: Avago Technologies General IP
(Applicant)   (Singapore) Pte. Ltd.
                          1 Yishun Avenue 7
                          Singapore 768923 (SG)

Representative: Jehle, Volker Armin
                          Bosch Jehle Patentanwaltsgesellschaft mbH
                          Flüggenstrasse 13
                          80639 München (DE)

Decision under appeal: **Decision of the Examining Division of the**
                          European Patent Office posted on 3 April 2012
                          refusing European patent application No.
                          03023441.3 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman   G. Eliasson
Members: M. Papastefanou
                  T. Bokor

Summary of Facts and Submissions

I.   The appeal is against the decision of the Examining
        Division refusing the European patent application No.
        03 023 441.3 on the ground that the subject matter of
        both the Main and the Auxiliary requests before it did
        not involve an inventive step within the meaning of
        Article 56 EPC.

II.   The following documents, cited during the first
        instance examination proceedings, are referred to in
        this decision:
        D1:   US 5 602 878 A
        D2:   LIM T S, "Parallel communication with handshake
                between two microcomputers", SOUTHEASTCON '93,
                PROCEEDINGS., IEEE CHARLOTTE, NC, USA, 4-7 April
                1993, NEW YORK, NY, USA, IEEE 4 April 1993
                (XP010146734)

III.   In a communication pursuant to Rule 100(2) EPC, the
        Board indicated that the Main request filed with the
        statement of the grounds of appeal met the requirements
        of Article 52(1) EPC but raised objections under
        Article 123(2) EPC because claims 1 and 6 comprised
        subject matter going beyond the originally filed
        content of the application. In addition, objections
        under Article 84 EPC 1973 in combination with Rule 27
        EPC 1973 were raised because the description was not
        adapted to the claims and comprised ambiguous
        statements ("incorporated by reference") as well an
        incomprehensible term ("analog hysncs").

IV.   In reaction to this communication by the Board, the
        Appellant filed an amended Main request taking into
        account the Board's objections.

V.   The Appellant requests that the decision under appeal
          be set aside and that a patent be granted in the
          following version:

          Claims: 1-10 filed with letter dated 26 July 2017;
          Description:
              Pages 1-24 filed with letter dated 26 July 2017;
          Drawings: Sheets 1/13-13/13 as originally filed.

VI.   Independent claim 1 of the Main request has the
          following wording:

          A method of transmitting data using a bus (612) in a
          network comprising:
              transmitting (710) the data over the bus (612) at a
              first rate, wherein a sender module (610) is
              transmitting said data in response to an incoming
              accept signal (611);
              receiving (712) the data at a processing module
              (630) in the network;
              storing (714) the data in a storage module (632) in
              said processing module (630);
              preventing data overrun of said storage module
              (632) by monitoring a state of said storage module
              and stalling the data flow by shutting off said
              accept signal (611); and
              processing the data stored in said storage module
              (632) at a second rate.

VII.   Independent claim 6 is worded as follows:

          A system for transmitting data in a network from a
          sender module (610) to a processing module (630)
          wherein
          the sender module (610) is adapted and configured for
          transmitting (710) the data over a bus (612) at a first

rate in response to an incoming accept signal (611),
and wherein
the processing module (630) is adapted and configured
for receiving (712) the data and for storing (714) the
data in a storage module (632) in said processing
module (630), and for preventing (716) data overrun of
said storage module by monitoring a state of said
storage module (632) and stalling the data flow by
shutting off said accept signal (611);
and for processing the data stored in said storage
module at a second rate.

Reasons for the Decision

1.   The appeal is admissible.

2.   Claims - Amendments

2.1   The amended claims overcome the objection under Article
        123(2) EPC raised by the Board in its communication
        since the feature objected to ("*transmitting a burst of*
        data") has been removed from the claims.

2.2   The term "plurality of data words" was also removed
        from the independent claims; this amendment is not
        objected to since it finds basis in original claim 7.

2.3   In a further amendment, the term "control information"
        has been removed from the claims. This term is present
        in original claim 7 (*"transmitting data and control*
        information") but the Appellant has indicated as basis
        for its removal Figure 7 and line 9 on page 25 of the
        originally filed application.

2.3.1   The passage on page 25, lines 9-13 of the originally
        filed description reads as follows:

*Fig. 7 illustrates one embodiment of a high level flow diagram for **a method of transmitting data** over a bus or link, generally designated 700, in accordance with one embodiment of the present invention. **More specifically, the pixels or other data and the control information are transmitted** over the bus...."* (emphasis by the Board).

A similar sentence is also to be found on page 25, lines 27-31 with reference to Figures 8A and 8B.

The Board understands the term "data" in the first instance (sentence) to indicate everything that is transmitted over the bus (or link). In the second instance (sentence), it is specified what these transmitted data consist of: pixels or other (image/video) data and control information.

This interpretation is consistent with the rest of the description. In page 22, lines 15-16 it is explained that "...*the bus is adapted to carry or transmit a data structure containing control and video (or data) information...*".

In a similar way, it is explained that "...the field of data is sent as a contiguous array of data on the bus..." (page 27, line 10).

The Board considers, thus, that this amendment finds basis in the originally filed application as indicated by the Appellant.

2.4   The Board is satisfied that the requirements of Article 123(2) EPC are met.

3.   Inventive Step

3.1   The invention

         The invention relates to the transmission of data from
         a sender video module to a receiver video module over a
         bus in a network. The particularity of the method and
         the system of the application is that there are (at
         least) two different clocks (rates) present: one is for
         the transmission of data and the other for the
         processing of the data. The bus that connects the two
         modules provides for a synchronous transmission of
         data, so that the transmitter on the sender video
         module and the receiver on the receiver video module
         are synchronized by the same clock. On the receiver
         module, the received data are stored at a storage
         module at the rate they are received (and transmitted).
         The data are then retrieved from the storage module and
         processed at a different rate, which may be lower than
         the receiving rate (see paragraphs [0081], [0088]). In
         order to prevent data overrun at the storage module, an
         incoming accept signal is used. When the signal is
         asserted (on), data are transmitted from the sender
         video module. When the storage module at the receiver
         module is full, the incoming accept signal is shut off
         and data transmission is stalled.

3.2   State of the art

3.2.1   The prior art documents cited during the first instance
         examination proceedings, in particular D1 and D2,
         address the problem of asynchronous data transmission
         between two modules that operate under different clocks
         (rates).

3.3   The Examining Division considered document D1 as
         closest prior art. This selection was not disputed by

the Appellant and the Board does not see any reason to
put it into question, either.

3.3.1   D1 describes the use of a handshake protocol in the
         data transmission between two modules using different
         clocks (rates). When the sender module, which operates
         at a first rate, is ready to transmit data, it emits a
         signal to the receiver module, which operates at a
         second rate. The data are transmitted and the receiver
         module will emit a reception acknowledgement signal to
         the sender module when data are received successfully.
         Only when such an acknowledgement signal is received at
         the sender module the next data package will be
         prepared for transmission (see Figures 1, 2 and column
         2, line 43 - column 4, line 48).

3.3.2   D2 describes a similar system with parallel,
         asynchronous data transmission using a handshake
         protocol (see section II and Figure 1).

3.4   Main request

3.4.1   Contrary to the arguments of the Appellant in the
         grounds of appeal, the independent claims of the Main
         request do not define the identified particularity of
         the transmission method of the application, i. e. that
         the transmission and reception of the data are
         synchronous but the processing of the received data by
         the processing module is done at a different rate. The
         claims define only that data are transmitted from a
         sender module at a first rate and that they are
         processed by the processing module at a second rate.
         This is valid also for the system and method described
         in D1, since the modules operate at different rates.

3.4.2   What distinguishes the claimed method from the one
        described in D1 is the use of the accept signal: data
        are transmitted from the sender module in response to
        this incoming accept signal and data flow is stalled
        (stopped) when this signal is shut off so that data
        overrun at the storage module is prevented.

3.5   The Examining Division considered that the signal of
        acknowledgement of data reception in D1 corresponded to
        the incoming accept signal of the claims. According to
        the decision, the sender module in D1 would transmit
        data only when the acknowledgement signal coming from
        the received module was asserted, so that this signal
        was also commanding the transmission of data as the
        accept signal in the claim. In addition, the Examining
        Division found that the possible use of buffers, if
        higher data transfer rate was required (column 4, lines
        33-48), would be sufficient to lead the skilled person
        to the obvious conclusion that one of the possible
        reasons the receiver module would not be available for
        receiving data - and thus not emitting/asserting the
        reception acknowledgement signal - would be that the
        buffers were full. Hence, the de-assertion (shutting
        off) of the data reception acknowledgement signal would
        also protect the buffer (that would correspond to the
        storage module of the claims) from data overrun. The
        Examining Division concluded that claim 1 was obvious
        in view of D1.

3.6   The Board cannot follow this argumentation. The
        handshake protocol in an asynchronous data transmission
        between two modules is known in the state of the art
        and it is also described in the first part of D1 (see
        Figure 2) as indicated by the Examining Division. It is
        evident that the data reception acknowledgement signal
        is asserted (emitted) once data are received

successfully by the receiver module. At the moment when
data are transmitted by the sender module this signal
is not asserted since data reception cannot be
acknowledged before data are actually received. Hence,
the transmission of the data is triggered before the
assertion of this signal, i. e. while this signal is
shut off. Moreover, after each reception is
acknowledged by the receiver module, the
acknowledgement signal must be shut off so that the
reception of the next piece of transmitted data can be
acknowledged. Compared to this operation in D1, the
accept signal in the claimed method is generally and
constantly asserted (on) and it is shut off only when
the flow of data is to be stalled. There is no
acknowledgement of data reception at all in the claimed
method and the signal is only used to allow or stop the
flow of data between the two modules. Hence, the Board
concludes that the accept signal in the claimed method
is not equivalent to the data reception acknowledgement
signal in D1. In addition, even if it were to be
accepted that the buffers mentioned in D1 corresponded
to the storage module of the claim, there is no
indication in D1 that the state of the buffer(s) is
monitored in order to prevent data overrun.

3.7   The differentiating features of claim 1 with regard to
        D1 are, therefore, the nature and function of the
        accept signal and the monitoring of the state of the
        storage module. The technical effect provided by these
        features is already stated in the claim: data overrun
        in the storage module is prevented. This improves the
        control of the data flow from the sender module to the
        processing module and the overall data transmission
        between the two modules.

3.8   As already stated above, given the structure and
        operation of the system in D1, the data reception
        acknowledgement signal in D1 cannot be considered to
        correspond to the incoming accept signal of the claims.
        The skilled person starting from D1 and wishing to
        improve the data flow from one module to the other
        would not be incited to modify the operation of the
        described system since any modification of the
        handshake protocol would affect negatively the data
        transmission from one module to the other. This is
        because the data transmission is asynchronous since the
        two modules operate under different clocks (rates). Nor
        would D2 provide any help to the skilled person since
        it also describes handshake protocols for asynchronous
        data transmission between two modules operating under
        different clocks (rates). The conclusion is that the
        method in claim 1 cannot be considered to be obvious to
        the skilled person taking into account the teachings of
        D1 and/or D2.

        The same is also valid for independent claim 6, which
        defines the corresponding system.

3.9   Consequently, the Board concludes that claims 1-10 of
        the Main request involve an inventive step within the
        meaning of Article 56 EPC 1973.

4.   Documents D1 and D2 are mentioned in the description
        (paragraphs [0001] and [0002] respectively), the
        description has been adapted to the claims and the
        objected ambiguous and incomprehensible terms have been
        deleted.

5.   The Board is, hence, satisfied that the application
        meets the requirements of the EPC and EPC 1973.

Order

For these reasons it is decided that:

1.   The appealed decision is set aside.

2.   The case is remitted to the department of first
        instance with the order to grant a patent in the
        following version:

        Claims: 1-10 filed with letter dated 26 July 2017;
        Description:
            Pages 1-24 filed with letter dated 26 July 2017;
        Drawings: Sheets 1/13-13/13 as originally filed.

The Registrar: The Chairman:

S. Sánchez Chiquero   G. Eliasson

Decision electronically authenticated