(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 474 266 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.04.2019 Bulletin 2019/17

(51) Int Cl.:
G09G 5/00 *(2006.01)*

(21) Application number: **17197626.9**

(22) Date of filing: **20.10.2017**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(71) Applicant: **Vestel Elektronik Sanayi ve Ticaret A.S.**
45030 Manisa (TR)

(72) Inventors:
- **EGEMEN, Tufan**
  45030 Manisa (TR)
- **GÜRGEN, Engin**
  45030 Manisa (TR)

(74) Representative: **Ascherl, Andreas et al**
KEHL, ASCHERL, LIEBHOFF & ETTMAYR
Patentanwälte - Partnerschaft
Emil-Riedel-Strasse 18
80538 München (DE)

(54) ADAPTIVE MAINBOARD LVDS OUTPUT SIGNAL ADJUSTMENT FOR DIFFERENT PANELS

(57) Presented is a system for adjusting an output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels. The system comprises at least one mainboard, at least one LVDS structure, a handshaking mechanism, a LVDS data analyzer and at least one panel. The handshaking mechanism is provided in between the panel and the mainboard for selecting LVDS port definition which in turn transfers the panel requirement to the mainboard. The mainboard is connected to the panel via the LVDS structure through a LVDS data analyzer. The LVDS data analyzer is configured to check LVDS output data from the output port according to the panel requirement. The LVDS data analyzer enables or activates or transfers the LVDS output data to the panel, when the panel requirement is matched with the LVDS output data. The system can set the picture of the panel correctly without much time consumption and without a human error.

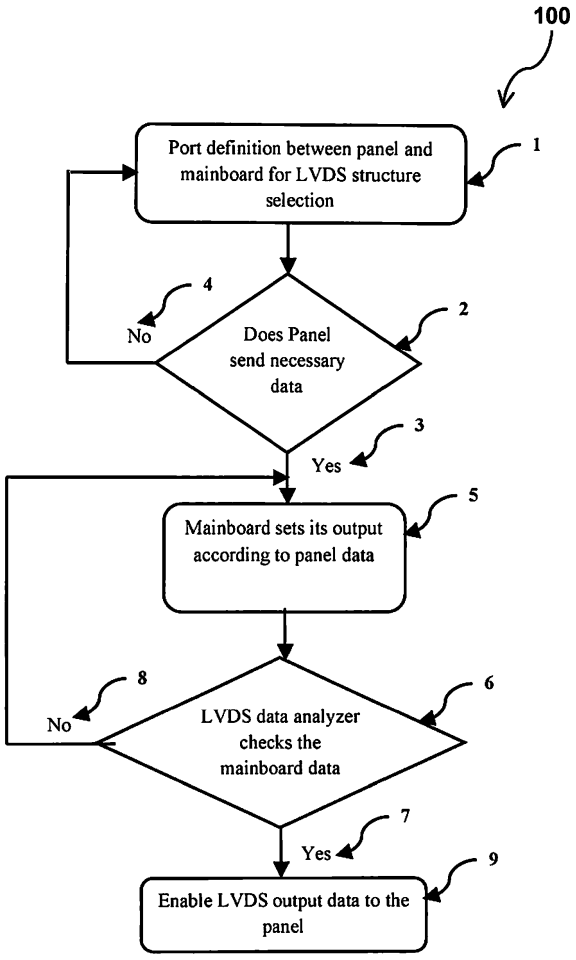

Fig. 1

EP 3 474 266 A1

Description

[0001] This invention refers to a system for adjusting an output signal of an adaptive mainboard LVDS (low voltage differential signaling) for different panels according to claim 1 and a method according to claim 5.

Background of the Invention

[0002] Mainboards of electronic monitoring devices are used for driving many different panel sizes and resolutions. Same mainboard can support different panel by setting different driving option for each panel. If the mainboard is connected to drive a new panel, then many different combination of settings need to be checked manually in order to get a correct picture in a display device or TV (8Bit/10Bit, Jeida/Vesa, Single/Double Clock, Swaped/Not Swapped and so on).

[0003] Hence there are many different driving settings which have to be set for obtaining the corrected picture on the TV of different types that includes but is not limited to 8Bit/10Bit, Jeida/Vesa, Single/Double Clock, Swaped/Not Swapped and so on. So it is quite difficult to try different combinations of settings one by one. This leads to a more time consuming process. Moreover, the picture has to be checked by a person. Hence, detailed errors that occur in the picture may not be noticed by that person and the panel may get driven incorrectly.

[0004] The prior art does not provide an automatic picture correction for different panels using the same mainboard.

Object of the Invention

[0005] It is therefore the object of the present invention to provide a system, in particular a system for adjusting an output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels, and a method that reduces time consumption and eliminates human error while setting the picture manually compared to the known system and methods.

Description of the Invention

[0006] The before mentioned object is solved by a system for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels according to claim 1. The system for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels according to the present invention preferably comprises of at least one mainboard, at least one LVDS structure, a handshaking mechanism, a LVDS data analyzer and at least one panel. The LVDS structure includes a plurality of output port and a plurality of input port. The handshaking mechanism is provided in between the panel and the mainboard for selecting LVDS port definition which in turn transfers the panel requirement to the mainboard. The mainboard is connected to the input port of the LVDS structure and the output port of the LVDS structure connected to the panel through a LVDS data analyzer. The LVDS data analyzer is configured for checking LVDS output data from the output port according to the panel requirement. The LVDS data analyzer enables the LVDS output data to the panel, when the panel requirement is matched with the LVDS output data.

[0007] This solution is beneficial since such a system for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels has the ability to set the picture of the panel correctly without much time consumption and without a human error.

[0008] Further preferred embodiments are subject-matter of dependent claims and/or of the following specification parts.

[0009] According to a preferred embodiment of the present invention the handshaking mechanism is configured to allow the panel to inform data for the input port of the LVDS structure to the mainboard. The LVDS data analyzer can inform the mainboard when the panel requirement is mismatched with the LVDS output data. The LVDS structure can set the output according to a feedback data from the panel and resends the data to the LVDS data analyzer, until the panel requirement is matched with the LVDS output data.

[0010] The before mentioned object is also solved by a method for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels according to claim 5. The method of claim 5 preferably comprises the steps: providing a handshaking mechanism in between the panel and the mainboard for selecting LVDS port definition thereby to transfer the panel requirement to the mainboard, connecting the mainboard to the input port of the LVDS structure, connecting the output port of the LVDS structure to the panel through a LVDS data analyzer, configuring a LVDS data analyzer for checking LVDS output data from the output port according to the panel requirement, and enabling the LVDS output data to the panel when the panel requirement matched with the LVDS output data through the LVDS data analyzer.

[0011] According to a preferred embodiment of the present invention the method for adjusting output signal of an adaptive mainboard LVDS provided for different panels further comprising the steps of, allowing the panel to inform data for the input port of the LVDS structure to the mainboard through the handshake mechanism.

[0012] According to another embodiment of the present invention, the method for adjusting output signal of an adaptive mainboard LVDS provided for different panels further comprising the steps of, allowing the LVDS data analyzer to inform the mainboard when the panel requirement is mismatched with the LVDS output data, allowing the LVDS structure to set the output according to a feedback data from the panel, and resending the

data to the LVDS data analyzer, until matching the panel requirement with the LVDS output data.

[0013] Further benefits, goals and features of the present invention will be described by the following specification of the attached figures, in which components of the invention are exemplarily illustrated. Components of the devices and method according to the inventions, which match at least essentially with respect to their function can be marked with the same reference sign, wherein such components do not have to be marked or described in all figures.

[0014] The invention is just exemplarily described with respect to the attached figures in the following.

Brief Description of the Drawings

[0015]

Fig. 1 illustrates a system for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels, according to the present invention; and

Fig. 2 illustrates a method for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels, according to the present invention.

Detailed Description of the Drawings

[0016] Fig. 1 illustrates a system 100 for adjusting the output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels, according to the present invention. The system for adjusting the output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels according to the present invention preferably comprises of at least one mainboard, at least one LVDS structure, a handshaking mechanism, a LVDS data analyzer and at least one panel. The LVDS structure includes a plurality of output port and a plurality of input port. The handshaking mechanism is provided in between the panel and the mainboard for selecting LVDS port definition which in turn transfer the panel requirement to the mainboard. The mainboard is connected to the input port of the LVDS structure and the output port of the LVDS structure connected to the panel through a LVDS data analyzer. The LVDS data analyzer is configured for checking LVDS output data from the output port according to the panel requirement. The LVDS data analyzer enables the LVDS output data to the panel, when the panel requirement matched with the LVDS output data.

[0017] This solution is beneficial since such a system for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels has the ability to set the picture of the panel correctly without much time consumption and a human interaction.

[0018] The port definition 1 between the panel and the mainboard is set for selecting the input port of the LVDS structure. The mainboard checks whether the panel sends the necessary data 2 for setting the input port of the LVDS structure. If the panel sends the correct data for setting the LVDS structure 3 (that is condition is true) then the mainboard sets its output according to panel data 5. If the panel sends the incorrect data for setting the LVDS structure 4 (that is condition is false) then the mainboard sets its output according to panel data 5. The LVDS data analyzer checks the LVDS data sequence 6. If there is no problem with the data, this analyzer enables the mainboard LVDS output to the panel 7. However, if a problem is detected by the LVDS data analyzer 8, it directly informs the main processor of the board and changes the data sequence to correct data. The mainboard LVDS block sets the output according to this feedback data and resends the data to the analyzer block. This procedure will continue until correct data are available on the output 9. With this structure the LVDS analyzer detect all the errors which cannot be detected by a human eye.

[0019] Fig. 2 illustrates a method 200 for adjusting the output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels according to the invention. The method for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels. The method preferably comprises the steps of: providing a handshaking mechanism in between the panel and the mainboard for selecting LVDS port definition thereby to transfer the panel requirement to the mainboard, connecting the mainboard to the input port of the LVDS structure, connecting the output port of the LVDS structure to the panel through a LVDS data analyzer, configuring a LVDS data analyzer for checking LVDS output data from the output port according to the panel requirement, and enabling the LVDS output data to the panel when the panel requirement matched with the LVDS output data through the LVDS data analyzer.

[0020] According to a preferred embodiment of the present invention the method for adjusting output signal of an adaptive mainboard LVDS provided for different panels further comprises the steps of, allowing the panel to inform data for the input port of the LVDS structure to the mainboard through the handshake mechanism.

[0021] According to another embodiment of the present invention, the method for adjusting output signal of an adaptive mainboard LVDS provided for different panels further comprises the steps of, allowing the LVDS data analyzer to inform the mainboard when the panel requirement is mismatched with the LVDS output data, allowing the LVDS structure to set the output according to a feedback data from the panel, and resending the data to the LVDS data analyzer, until matching the panel requirement with the LVDS output data.

[0022] According to an exemplary embodiment, the

method for adjusting output signal of an adaptive mainboard LVDS provided for different panels further comprises the steps of,
at block 10, a handshaking mechanism is provided between panel and mainboard at the initial state of adjusting the output signal;
at block 11, according to this mechanism, the panel informs the mainboard about its LVDS input structure and on which sequence it should be, wherein this sequence is a feedback from the panel to change the LVDS out signal for the panel;
at block 12, the LVDS data analyser block is added after the mainboard LVDS output, which checks the LVDS data according to panel requirements, wherein this LVDS data analyser checks the LVDS sequence together with all colour data sequence;
at block 13, if there is no problem with the data, this analyser mechanism block enables the mainboard LVDS data to the panel, but if a problem is recognized by this block, it directly informs the main processor of the board and invokes it to change the sequence into to correct data;
at block 14, the mainboard LVDS block sets the output according to this feedback data and resend the data to the analyser block; and
at block 15, this procedure continues until correct data are available on the output. With this structure the LVDS analyser block can recognize all the errors which cannot be catch up by a test person/ human eye.

[0023] Thus, the present invention refers to a system for adjusting an output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels according to the present invention which preferably comprises of at least one mainboard, at least one LVDS structure, a handshaking mechanism, a LVDS data analyzer and at least one panel. The handshaking mechanism is provided in between the panel and the mainboard for selecting LVDS port definition which in turn transfers the panel requirement to the mainboard. The mainboard is connected to the panel via the LVDS structure through a LVDS data analyzer. The LVDS data analyzer is configured for checking LVDS output data from the output port according to the panel requirement. The LVDS data analyzer enables or activates or transfers the LVDS output data to the panel, when the panel requirement is matched with the LVDS output data. The system can set the panel correctly without much time consumption and without a human error.

List of reference numbers

[0024]

1 port definition between panel and mainboard for LVDS structure selection

2 does Panel send necessary data

3 true or yes for Panel send necessary data

4 false or yes for Panel send necessary data

5 Mainboard sets its output according to panel data

6 LVDS data analyzer checks the mainboard data

7 yes or true for LVDS data analyzer checks the correct data

8 no or false for LVDS data analyzer checks the correct data

9 enable LVDS output data to the panel

10 At the initial state, a handshaking mechanism is available between panel and mainboard

11 According to this mechanism, panel informs the mainboard about its LVDS input structure and on which sequence it should be.

12 LVDS data analyzer block is added after the mainboard LVDS output, with checks the LVDS data according to panel

13 If there is no problem with the data, this analyzer mechanism block enables the mainboard LVDS data.

14 But if a problem is recognized by this block, it directly informs the main processor of the board and invokes it to change the sequence into to correct data

15 This procedure will continue until correct data is available on the output

100 system for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels

200 method for adjusting output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels

Claims

1. A system for adjusting an output signal of an adaptive mainboard low voltage differential signaling (LVDS) provided for different panels comprising
at least one mainboard, at least one LVDS structure, and at least one panel,
wherein the LVDS structure includes a plurality of output ports and a plurality of input ports;
characterized in that
a handshaking mechanism (1) is provided in be-

tween the panel and the mainboard for selecting LVDS port definition which in turn transfers the panel requirement to the mainboard;
wherein the mainboard is connected to the input port of the LVDS structure and the output port of the LVDS structure is connected to the panel through a LVDS data analyzer;
wherein the LVDS data analyzer is configured for checking LVDS output data from the output port according to the panel requirement; and
whereby the LVDS data analyzer enables the LVDS output data to the panel, when the panel requirement is matched with the LVDS output data.

2. The system of claim 1, wherein the handshaking mechanism is configured to allow the panel to inform data for the input port of the LVDS structure to the mainboard.

3. The system of claim 1, wherein the LVDS data analyzer informs the mainboard when the panel requirement is mismatched with the LVDS output data.

4. The system of claim 3, wherein the LVDS structure sets the output according to feedback data from the panel and resends the data to the LVDS data analyzer, until the panel requirement is matched with the LVDS output data.

5. A method for adjusting an output signal of an adaptive mainboard LVDS provided for different panels comprising the steps of,
providing a handshaking mechanism in between the panel and the mainboard for selecting LVDS port definition thereby to transfer the panel requirement to the mainboard;
connecting the mainboard to the input port of the LVDS structure;
connecting the output port of the LVDS structure to the panel through a LVDS data analyzer;
configuring a LVDS data analyzer for checking LVDS output data from the output port according to the panel requirement; and
enabling the LVDS output data to the panel when the panel requirement is matched with the LVDS output data through the LVDS data analyzer.

6. The method of claim 5, wherein the method for adjusting the output signal of an adaptive mainboard LVDS provided for different panels further comprising the steps of,
allowing the panel to inform data for the input port of the LVDS structure to the mainboard through the handshake mechanism.

7. The method of claim 5, wherein method for adjusting the output signal of an adaptive mainboard LVDS provided for different panels further comprising the steps of,
allowing the LVDS data analyzer to inform the mainboard when the panel requirement is mismatched with the LVDS output data;
allowing the LVDS structure to set the output according to a feedback data from the panel; and
resending the data to the LVDS data analyzer, until matching the panel requirement with the LVDS output data.

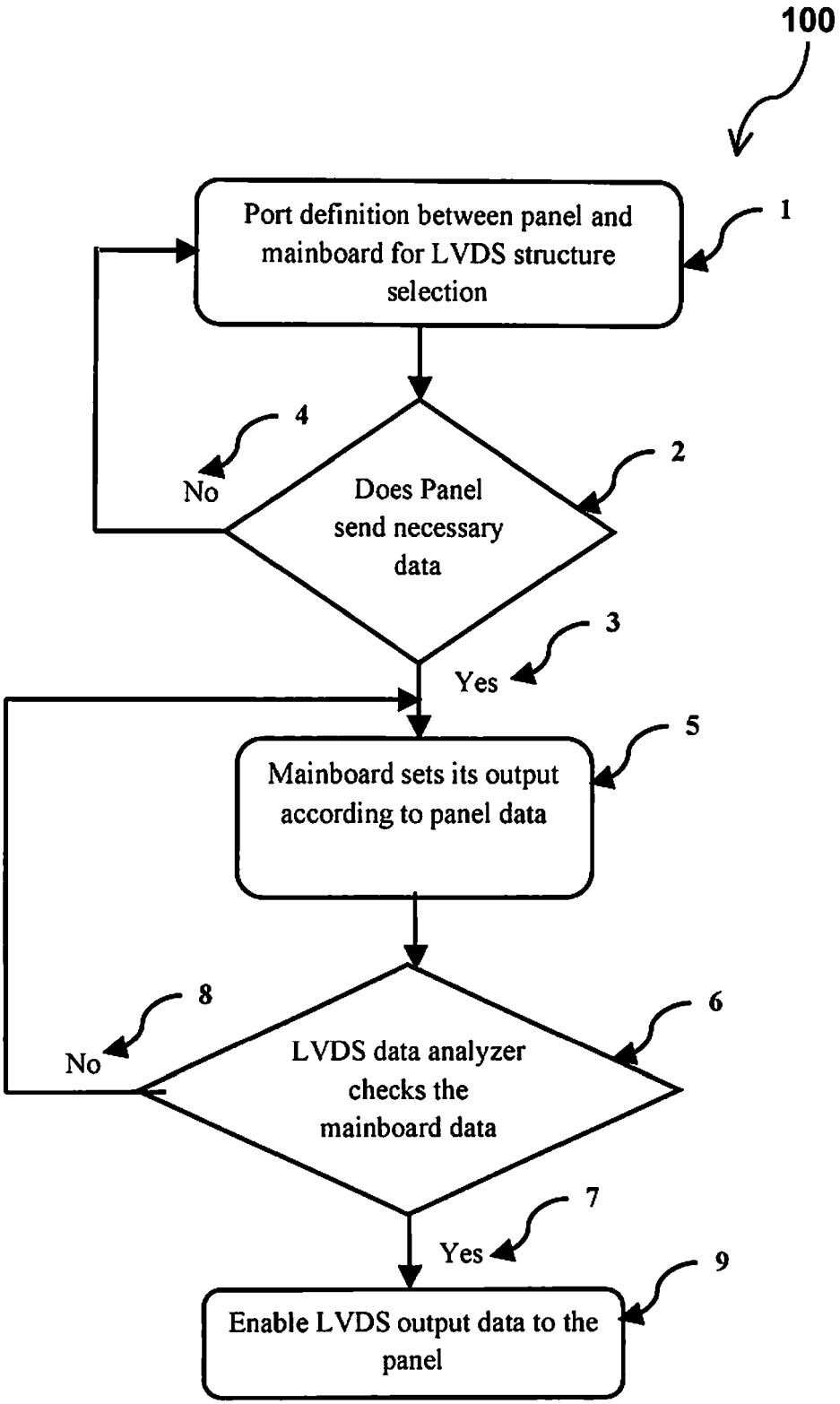
100
Port definition between panel and mainboard for LVDS structure selection
1
Does Panel send necessary data
2
No
4
Yes
3
Mainboard sets its output according to panel data
5
LVDS data analyzer checks the mainboard data
6
No
8
Yes
7
Enable LVDS output data to the panel
9

Fig. 1

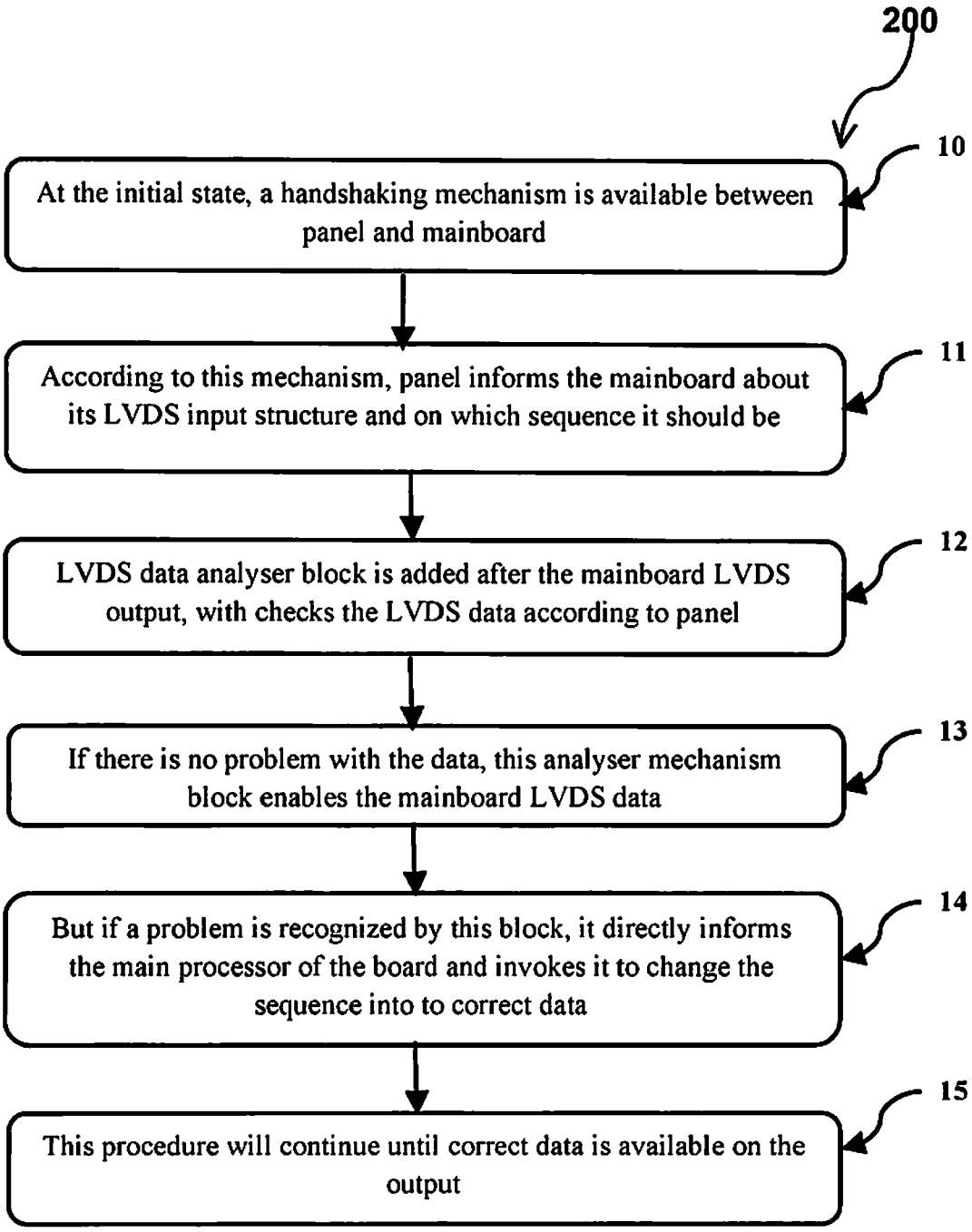
200
10
At the initial state, a handshaking mechanism is available between panel and mainboard
11
According to this mechanism, panel informs the mainboard about its LVDS input structure and on which sequence it should be
12
LVDS data analyser block is added after the mainboard LVDS output, with checks the LVDS data according to panel
13
If there is no problem with the data, this analyser mechanism block enables the mainboard LVDS data
14
But if a problem is recognized by this block, it directly informs the main processor of the board and invokes it to change the sequence into to correct data
15
This procedure will continue until correct data is available on the output

Fig. 2

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 19 7626

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2005/285832 A1 (SHIN SEUNG-GI [KR] ET AL) 29 December 2005 (2005-12-29) * paragraphs [0006], [0042], [0055] - [0056], [0065] - [0067]; figures 3,6,7 *	1-7	INV. G09G5/00
X	US 2006/279519 A1 (WANG YU-SHEN [TW]) 14 December 2006 (2006-12-14) * paragraphs [0017], [0022], [0027] - [0040]; figures 1,4,5 *	1-7	
X	US 2012/257105 A1 (KIMOTO TATSUYA [JP]) 11 October 2012 (2012-10-11) * paragraphs [0004], [0017], [0023], [0037] - [0042], [0045] - [0050]; figures 1,3 * * paragraphs [0057] - [0067] *	1-7	
X	US 2007/057931 A1 (TAKAMORI TOMOTSUGU [JP]) 15 March 2007 (2007-03-15) * abstract; figures 1,2 * * paragraphs [0016] - [0017], [0029], [0033] - [0034] *	1-7	TECHNICAL FIELDS SEARCHED (IPC) G09G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 March 2018	Amian, Dirk

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 19 7626

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

22-03-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005285832 A1	29-12-2005	KR 20050123315 A	29-12-2005
		US 2005285832 A1	29-12-2005
US 2006279519 A1	14-12-2006	TW I260567 B	21-08-2006
		US 2006279519 A1	14-12-2006
US 2012257105 A1	11-10-2012	JP 5911337 B2	27-04-2016
		JP 2012226310 A	15-11-2012
		US 2012257105 A1	11-10-2012
		US 2014009678 A1	09-01-2014
US 2007057931 A1	15-03-2007	JP 2007078980 A	29-03-2007
		US 2007057931 A1	15-03-2007

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82