Title: DC-TO-DC CONVERTER PROVIDING STABLE OPERATION

Abstract: The present invention is directed to a system and method which utilizes a fixed base current to control the output voltage instead of a variable base current. In one embodiment, instead of modulating the base current, the converter uses output current to determine the voltage produced at the output. By sinking current out of the DC-to-DC converter, a high output impedance is achieved which, in turn, allows a fairly low modulating current to offer a large change in output voltage. This circuit eliminates at least one of the feedback loops found in existing designs, further increasing stability. As a result of the circuit design, there is achieved a DC-to-DC converter which allows the user to easily define the frequency at which the circuit operates and which is tolerant of component variations.
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H02M3/07 H02M3/137 H03L7/093

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H03L H02M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, PAJ, EPO-Internal, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US 6 114 920 A (MOON UN-KJ ET AL) 5 September 2000 (2000-09-05) column 1, line 31 -column 2, line 13 figure 1</td>
<td>1-10</td>
</tr>
<tr>
<td>A</td>
<td>US 6 140 880 A (MARLETT MARK J ET AL) 31 October 2000 (2000-10-31) column 1, line 28 - line 43 figure 1</td>
<td>1-10</td>
</tr>
<tr>
<td>A</td>
<td>US 5 317 202 A (WAIZMAN ALEXANDER) 31 May 1994 (1994-05-31) column 2, line 23 - line 37 figure 3</td>
<td>1-10</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents:
* "A" document defining the general state of the art which is not considered to be of particular relevance
* "E" earlier document but published on or after the international filing date
* "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
* "O" document referring to an oral disclosure, use, exhibition or other means
* "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"S" document member of the same patent family

Date of actual completion of the international search: 14 January 2004

Date of mailing of the international search report: 26. 01. 04

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk
Tel: (+31-70) 340-2040, Tx: 31 651 epo nl, Fax: (+31-70) 340-3016

Authorized officer
Roeder, A

Form PCT/IB/510 (second sheet) (July 1992)
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&quot;TSA5523M 1.4 GHz I2C-bus controlled multimedia synthesizer&quot; PHILIPS INTEGRATED CIRCUITS DATA SHEET, 'Online! 17 December 1996 (1996-12-17), pages 1-20, XP002248837 Retrieved from the Internet: <a href="">URL:unknown</a> cited in the application abstract</td>
<td>1-10</td>
</tr>
<tr>
<td>X</td>
<td>US 6 320 458 B1 (GANDOLFI GABRIELE ET AL) 20 November 2001 (2001-11-20) abstract column 1, line 57 - line 67 column 2, line 19 - line 57 figures 1,2</td>
<td>11, 16-18, 23,24</td>
</tr>
</tbody>
</table>
INTERNATIONAL SEARCH REPORT

Box I  Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. □ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. □ Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. □ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II  Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☑ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. □ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. □ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

□ The additional search fees were accompanied by the applicant's protest.

☑ No protest accompanied the payment of additional search fees.
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-10

   DC/DC converter whose output voltage ranges from low level to high level and varies proportionally to an input control signal and has the high level when the input control signal is absent.

2. Claims: 11-24

   amplifier composed of a first portion and a second portion; the first portion is constructed on a 5 volt chip and the second portion is constructed off said 5 volt chip.
<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 6114920 A</td>
<td>05-09-2000</td>
<td>US 5942949 A</td>
<td>24-08-1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 11195983 A</td>
<td>21-07-1999</td>
</tr>
<tr>
<td>US 6140880 A</td>
<td>31-10-2000</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>JP 08097867 A</td>
<td>12-04-1996</td>
<td>NONE</td>
<td></td>
</tr>
</tbody>
</table>