

(57) Abstract: A feedforward type amplifier having a signal cancellation loop includes a cancellation node, a gain controller (C1) and a phase controller (C2). Each controller provides a discrete tap steering signal that it modulates with a discrete tracer signal that takes on a preselected sequence of values. The sequence is chosen so that the tracer signal is mutually orthogonal to each other tracer signal over a preselected period. A gain and phase adjuster (GPA1) connected to the outputs of the controllers provides a controlled gain change and phase shift in the signal cancellation loop. A detector (D1), the input of which is connected to the cancellation node and the output of which is connected to the controllers outputs a measure of the envelope of the signal at the cancellation node. After the preselected period new values for the tap steering signals are obtained by multiplying the detector output by the respective tracer signal, each over the respective preselected period, summing each resulting series of values, and changing the tap steering signals to be modulated and presented to the gain and phase adjuster in accordance with the values of the respective sums.



(88) Date of publication of the international search report:
3 April 2003

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

International application No.

PCT/US02/25557

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H03F 3/66

US CL : 330/52

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)

U.S. : 330/52, 149, 151

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,386,198 A (RIPSTRAND et al) 31 January 1995 (31.01.1995), figure 8; column 9, lines 22-30.	1, 2, 3, 11, 12 ----- 6, 14
Y --- A	US 5,576,659 A (KENINGTON et al) 19 November 1996 (19.11.96), figure 1; column 8, lines 35-47.	6, 14 ----- 4, 5, 9, 10, 13
X	US 5,796,304 A (Gentzler) 18 August 1998 (18.08.98), fig. 4.	7,8 ----- 15-42

☐ Further documents are listed in the continuation of Box C.

☐ See patent family 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 application or patent 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

"&" document member of the same patent family

Date of the actual completion of the international search

19 September 2002 (19.09.2002)

Date of mailing of the international search report

14 FEB 2003

Name and mailing address of the ISA/US

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

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

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim 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. ☒ Claim Nos.: 9-12,17-21,26-28
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:

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.

INTERNATIONAL SEARCH REPORT

PCT/US02/25557

Continuation of B. FIELDS SEARCHED Item 3:

USPTO APS WEST

search terms: feedforward or (feed forward), tracer or pilot, orthogonal