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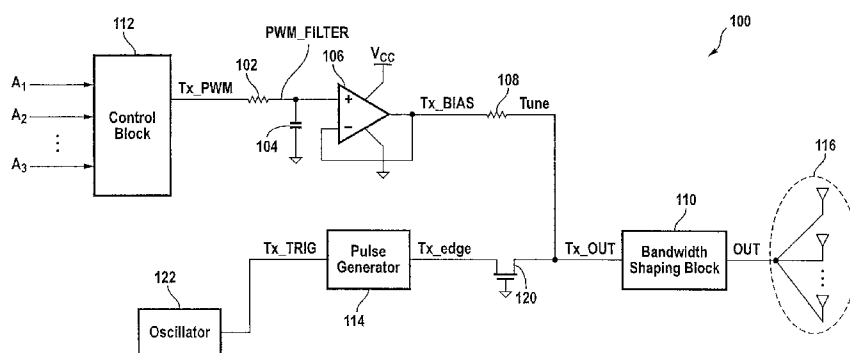
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(54) Title: MODULATION OF AN RF TRANSMIT SIGNAL



(57) Abstract: Techniques for reducing interference among transceivers are disclosed. A transistor generates a radio frequency transmit signal in response to a generated pulse. The pulse is generated when transitions are detected in a clock signal. The clock signal is produced by an oscillator block which includes a ceramic resonator configured as a clock source. When interference is detected, the pulse applied to the transistor is varied. The frequency of the transmit signal is optionally modulated by varying the temperature of a resonator element. To vary this temperature, the current flowing through one or more resistive elements positioned in proximity of the resonator element is varied according to a control signal. As the level of this current flow varies, the amount of heat emitted by the resistive elements varies, thereby changing the temperature of the resonator element which has a relatively high temperature sensitivity.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/66104

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H03C 3/00 (2008.01)

USPC - 332/117

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)

USPC - 332/117

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 332/106, 108, 109, 112, 117, 118, 119, 120, 126 -- text search, see search terms below

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

PubWEST(PGPB,USPT,USOC,EPAB,JPAB); DialogPRO(Engineering); Google Scholar

Search Terms Used: modulat, RF, radio, frequency, oscillat, bias, dynamic, vary, modif, adjust, interfer, avoid, detect, mitigat, pulse, amplitude, width, digital, DAC, signal, bit, register, processor, multi, microcontroller, pulse amplitude

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,731,201 A (FRISBIE) 01 May 1973 (01.05.1973), especially Figs 2A-2C, 4, 6; col 1, ln 15-20; col 3, ln 33, 62, 64-65; col 5, ln 31-39, 65-67.	1-18
Y	US 4,635,296 A (DINSMORE) 06 January 1987 (06.01.1987), especially Fig 1; col 1, ln 31-36; col 2, ln 17-20, 54-55; col 3, ln 23-24, 33-39, 43-59; col 4, ln 39-60.	1-18
Y	US 4,896,372 A (WEAVER) 23 January 1990 (23.01.1990), especially col 1, ln 12-16.	2, 12
Y	US 2004/0213351 A1 (SHATTIL) 28 October 2004 (28.10.2004), especially Fig 46D; para [0021], [0381], [0565].	3, 13
Y	US 6,404,357 B1 (TAUNTON) 11 June 2002 (11.06.2002), especially Fig 1; col 3, ln 38-42, 44-45; col 4, ln 13-15; col 6, ln 35-39.	4, 8-10, 14, 17, 18
Y	US 5,917,346 A (GORD) 29 June 1999 (29.06.1999), especially Fig 9; col 3, ln 2-22; col 10, ln 53-55.	6-10



Further documents are listed in the continuation of Box C.



* 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 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

"&" document member of the same patent family

Date of the actual completion of the international search

15 March 2008 (15.03.2008)

Date of mailing of the international search report

08 APR 2008

Name and mailing address of the ISA/US

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/66104

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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 No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

Group 1: Claims 1-18; Group 2: Claims 19-32; Group 3: Claims 33-55.

The inventions listed in Groups 1-3 above lack unity of invention as defined by PCT Rule 13.1 because under Rule 13.2 they lack the same or corresponding special technical feature.

Groups 2 and 3 do not require the special feature of varying a bias signal in response to the modulation of the generated signal, as required by Group 1.

Groups 1 and 3 do not require the special technical feature of varying current flow through one or more resistive elements in response to the modulation of a control signal to vary the temperature generated by the one or more resistors, as required by Group 2.

Groups 1 and 2 do not require the special technical feature of a ceramic resonator configured as a clock source, as required by Group 3.

None of the technical features identified above are common to the other groups, nor do they correspond to a special technical feature that would otherwise provide unity between the groups. Groups 1-3 therefore lack unity of invention.

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 additional fees, this Authority did not invite payment of additional fees.

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.:
1-18

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.