



- (51) International Patent Classification:
H03F 1/02 (2006.01)
- (21) International Application Number:
PCT/US2014/021823
- (22) International Filing Date:
7 March 2014 (07.03.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
13/797,473 12 March 2013 (12.03.2013) US
- (71) Applicant: THX LTD; 1255 Battery Street, Suite 100, San Francisco, CA 94111 (US).
- (72) Inventors: JONES, Owen; 1255 Battery Street, Suite 100, San Francisco, CA 94111 (US). FINCHAM, Lawrence, R.; 1255 Battery Street, Suite 100, San Francisco, CA 94111 (US).
- (74) Agent: VANDERLAAN, Christopher, A.; Irell & Manella LLP, 1800 Avenue of The Stars, Suite 900, Los Angeles, CA 90067 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:
27 November 2014

(54) Title: TRACKING POWER SUPPLY WITH INCREASED BOOST CAPABILITY

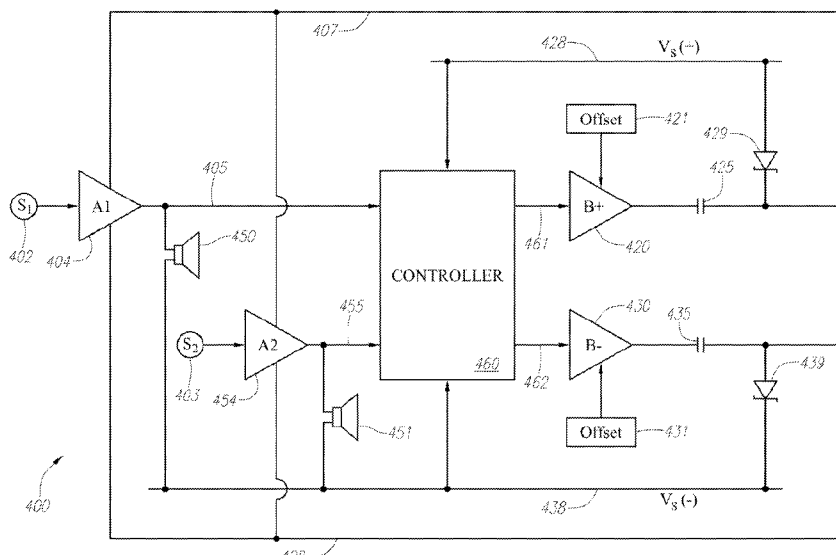


FIG. 4
(PRIOR ART)

(57) Abstract: A tracking power supply for one or more amplifiers includes one or more cascaded sets of power boost circuits to temporarily boost the positive and/or negative power supply rail, respectively. Each power boost circuit may include a gain element and an energy source such as a capacitor or battery, and the power boost circuits are linked to provide a greater degree of voltage boost when needed. An optional control circuit monitors amplifier output signal levels, or separately amplified input signal levels, and provides power boost control signals to the power boost circuits, which temporarily raise or lower the positive and/or negative supply voltages above or below the nominal voltage rails in tandem with the highest and lowest output signals, respectively, from the amplifier(s).

WO 2014/164309 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/021823

A. CLASSIFICATION OF SUBJECT MATTER
INV. H03F1/02
ADD.

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)
H03F

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 8 098 093 B1 (LI YUSHAN [US]) 17 January 2012 (2012-01-17) figures 3, 5, 7 -----	1-8, 10-12, 20-24
X	US 2010/237944 A1 (PIERDOMENICO JOHN [US] ET AL) 23 September 2010 (2010-09-23) figure 13 -----	1-8,10, 20-24
A	US 2011/050349 A1 (STRICKLAND JAMES C [US] ET AL) 3 March 2011 (2011-03-03) figures 1, 8 -----	1

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 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

17 July 2014

Date of mailing of the international search report

30/09/2014

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

Authorized officer

Agerbaek, Thomas

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/021823

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:

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 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.:

1-17, 20-25, 27-34, 38-43

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-17, 20-25, 27-34, 38-43

Tracking power supply for amplifier, comprising a first boost circuit and a second boost circuit, the amplifier being supplied from a supply rail if the amplifier output voltage is below a threshold, else from the first boost circuit, the first boost circuit being supplied from the rail or from the second boost circuit according to a signal indicating the amplifier output voltage.

2. claims: 18, 19

An amplifier system with a tracking power supply comprising a supply rail, an amplifier, a cascaded boost circuit, the cascaded boost circuit boosting the amplifier supply voltage by up to three times (claim 19: five times) when the amplifier output voltage exceeds the supply rail.

3. claims: 26, 35-37, 44

A tracking power supply for an amplifier, comprising a first cascaded boost supply that boosts the positive supply for the amplifier when the supply rail becomes too low for the amplifiers output signal.
a second cascaded boost supply doing the same for the negative supply.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2014/021823

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 8098093	B1	17-01-2012	NONE
US 2010237944	A1	23-09-2010	CN 102047540 A 04-05-2011
			US 2010237944 A1 23-09-2010
			WO 2010108094 A1 23-09-2010
US 2011050349	A1	03-03-2011	US 2011050349 A1 03-03-2011
			WO 2011031379 A2 17-03-2011