

(51) International Patent Classification:
G10L 21/02 (2013.01)(21) International Application Number:
PCT/US2013/038958(22) International Filing Date:
30 April 2013 (30.04.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/640,681 30 April 2012 (30.04.2012) US(71) Applicant: CREATIVE TECHNOLOGY LTD [SG/SG];
31 International Business Park, #03-01 Creative Resource,
Singapore 609921 (SG).

(72) Inventors; and

(71) Applicants (for US only): YANG, Jun [US/US]; 1144
Little John Way, San Jose, California 95129 (US).
MINETT, Ian [GB/US]; 1180 Muriel Ct., San Jose, Cali-
fornia 95121 (US). RIDDER, Robert [NL/US]; 2339
Muriel Drive, Santa Cruz, California 95062 (US). VER-
ITY, Steven [US/US]; 623 Los Padres Blvd., Santa Clara,
California 95050 (US).(74) Agents: GEAN, Desmond et al.; Creative Labs, Inc., (Leg-
al Department), 1901 McCarthy Boulevard, Milpitas, Cali-
fornia 95035 (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, IS, JP, KE, KG, KM, 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, 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,
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))

(54) Title: A UNIVERSAL RECONFIGURABLE ECHO CANCELLATION SYSTEM

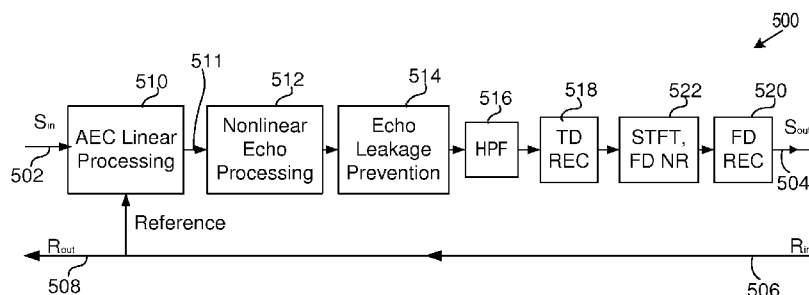


Figure 5

(57) Abstract: A universal reconfigurable system and method are provided for reducing nonlinear echo and residual echo, and for echo leakage prevention in various time-varying and complex environments is proposed in this invention. According to one embodiment, an echo cancellation system includes (1) an adaptive linear filter implemented in either time-domain or frequency-domain; (2) a nonlinear echo suppression; (3) echo leakage prevention; (4) direct current (DC), low frequency residual echo and noise reduction; (5) time-domain nonlinear processor (NLP) to reduce the residual echo; and (6) frequency-domain NLP to further reduce the residual echo. The echo cancellation system is universally applicable to acoustic echo cancellation (AEC) and/or electrical echo cancellation applications. In terms of AEC, this invention is reconfigurable for one or more microphones and/or one or more reference channels. The numbers of microphones and reference channels are user configurable.

