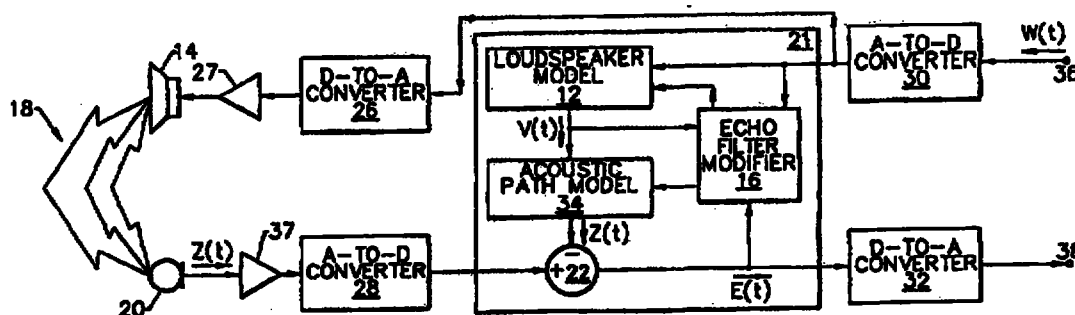


**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H04M 9/08		A1	(11) International Publication Number: WO 96/26592
			(43) International Publication Date: 29 August 1996 (29.08.96)
(21) International Application Number: PCT/US96/02073		(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 20 February 1996 (20.02.96)			
(30) Priority Data: 08/393,711 24 February 1995 (24.02.95) US			
(60) Parent Application or Grant (63) Related by Continuation US 08/393,711 (CON) Filed on 24 February 1995 (24.02.95)			
(71) Applicant (for all designated States except US): ERICSSON INC. [US/US]; 1 Triangle Drive, P.O. Box 13969, Research Triangle Park, NC 27709 (US)		Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.	
(72) Inventors; and			
(75) Inventors/Applicants (for US only): DENT, Paul, Wilkinson [GB/US]; 637 Eagle Point Road, Pittsboro, NC 27312 (US). SOLVE, Torbjörn, W. [SE/US]; 106 W. Dutton Court, Cary, NC 27513 (US).			
(74) Agents: BIGEL, Mitchell, S. et al.; Bell, Seltzer, Park & Gibson, P.O. Drawer 34009, Charlotte, NC 28234 (US).			

(54) Title: APPARATUS AND METHOD FOR CANCELING ACOUSTIC ECHOES INCLUDING NON-LINEAR DISTORTIONS IN LOUDSPEAKER TELEPHONES



(57) Abstract

An echo canceling loudspeaker telephone includes a loudspeaker which produces a sound pressure wave in response to an input signal which is applied to an audio input thereof. This sound pressure wave includes a desired linear component which is a linear function of the input signal, and an undesired non-linear component which is a non-linear function of the input signal, and the sound pressure wave is transmitted along an acoustic path. A microphone is positioned in the acoustic path and converts the sound pressure wave into an output signal. An echo filter is responsive to the input signal and generates an estimated echo signal. This echo filter includes a loudspeaker model which generates an estimate of the sound pressure wave including an estimate of the linear component and an estimate of the non-linear component. This echo filter also includes an acoustic path model which generates an estimate of the acoustic path from the loudspeaker to the microphone. In addition, a subtractor subtracts the estimated echo signal from the output signal thereby reducing an echo portion of said sound signal.