

Title (en)  
Digital loudspeaker

Title (de)  
Digitaler Lautsprecher

Title (fr)  
Haut-parleur numérique

Publication  
**EP 1206160 A1 20020515 (EN)**

Application  
**EP 00309950 A 20001109**

Priority  
EP 00309950 A 20001109

Abstract (en)  
A digital loudspeaker responsive to a binary digital audio signal received at an input (26). The digital loudspeaker is manufactured as an integrated module comprising an array of acoustic output transducers each with a diaphragm (20) including a conductive layer arranged facing a further conductive layer across a gap. The conductive layers of each transducer form a parallel plate capacitor so that a drive signal applied across the capacitor induces electrostatic force between the capacitor plates, thereby driving the diaphragm (20). The non-linear response of the diaphragms (20) is compensated for by pulse shaping circuits (22) which are arranged adjacent the associated diaphragms (20). The pulse shaping circuits (22) each receive a unary digital drive signal from an encoder circuit (24) via tracks (28). The encoder circuit (24) serves to convert the binary digital audio signal received at the input (26) into a large number of unary digital drive signals, one for each of the output transducers. Using standard silicon processing technology, the entire integrated loudspeaker module, including transducers and drive circuitry, can be integrated onto a single silicon wafer, or two wafers arranged facing each other. In this way, arrays of a thousand transducers or more can be manufactured in a single integrated module of modest total area. <IMAGE>

IPC 1-7  
**H04R 1/00**; **H04R 19/00**

IPC 8 full level  
**H04R 1/00** (2006.01); **H04R 19/00** (2006.01); **H04R 1/40** (2006.01)

CPC (source: EP)  
**H04R 1/005** (2013.01); **H04R 19/005** (2013.01); **H04R 1/403** (2013.01)

Citation (search report)  
• [E] EP 1063866 A1 20001227 - TEXAS INSTRUMENTS INC [US], et al  
• [XAY] US 4515997 A 19850507 - STINGER JR WALTER E [US]  
• [Y] EP 0561566 A2 19930922 - MONOLITHIC SENSORS INC [US]  
• [AD] WO 9631086 A1 19961003 - HOOLEY ANTHONY [GB]  
• [A] DE 4343807 A1 19950629 - GUENTHER NUBERT ELEKTRONIC GMB [DE]  
• [A] US 5517570 A 19960514 - TAYLOR STEPHEN F [US]

Cited by  
EP2352306A1; EP2663091A1; FR2990320A1; CN103493511A; CN106878891A; EP2464142A3; AU2004250746B2; KR100719816B1; US7684578B2; US10520601B2; US9880533B2; WO2004114725A1; WO2012070042A1; US9584941B2; US10237670B2; US9425708B2; US9986343B2; US9445170B2; US9497526B2; US9282385B2; US10007244B2; US10503136B2; US10642240B2

Designated contracting state (EPC)  
AT

DOCDB simple family (publication)  
**EP 1206160 A1 20020515**

DOCDB simple family (application)  
**EP 00309950 A 20001109**