Appendix B

Electroacoustic Glossary of Symbols

a	Radius (m), Equivalent piston radius of diaphragm (m)
B	Magnetic flux density (T), Parameter in QB3 vented-box alignments, Parameter in cardiod microphone pattern, Mass loading factor, Parameter in low-pass to band-pass frequency transformation
$B2$	$2nd$-order Butterworth infinite-baffle and closed-box alignment
$B4$	$4th$-order Butterworth vented-box alingment
c	Velocity of sound (345 m/s, 1131 feet/s)
C_A	Acoustic compliance (m^5/N)
C_{AB}	Acoustic compliance of volume V_{AB} (m^5/N)
C_{AP}	Acoustic compliance of passive radiator suspension (m^5/N)
C_{AS}	Acoustic compliance of diaphragm suspension (m^5/N)
C_{AT}	Total acoustic compliance of diaphragm suspension and enclosure (m^5/N)
C_{A1}	Acoustic compliance in circuit for piston air load impedance (m^5/N)
C_E	Electrical capacitance (F)
C_M	Mechanical compliance (m/N)
C_{MS}	Mechanical compliance of diaphragm suspension (m/N)
$C2$	$2nd$-order Chebyshev alignment
$C4$	$4th$-order Chebyshev vented-box alignment
D_{KE}	Kinetic energy density (J/m^3)
D_{PE}	Potential energy density (J/m^3)
e, E	Electrical voltage (V)
f	Force (N), Frequency (Hz)
f_B, ω_B	Helmholtz resonance frequency of vented box (Hz, rad/s)
f_C, ω_C	Closed-box system resonance frequency (Hz, rad/s)
f_ℓ, ω_ℓ	Lower -3 dB cutoff frequency (Hz, rad/s)
f_S, ω_S	Resonance frequency of driver in infinite baffle (Hz, rad/s)
f_u, ω_u	Upper -3 dB cutoff frequency (Hz, rad/s)
f_{u1}, ω_{u1}	Upper -3 dB cutoff frequency in pressure response of driver (Hz, rad/s)
f_{u2}, ω_{u2}	Upper -3 dB cutoff frequency in power response of driver (Hz, rad/s)
$G(s)$	Infinite-baffle low-frequency pressure transfer function
$G_{BP4}(s)$	Forth-order bandpass system low-frequency pressure transfer function
$G_C(s)$	Closed-box low-frequency pressure transfer function
$G_V(s)$	Vented-box low-frequency pressure transfer function
h	Vented-box system Helmholtz tuning ratio (f_B/f_S)
I	Acoustic intensity (W/m^2)
k	Wavenumber (m^{-1}), Parameter in C4 vented-box alignments, Mutual coupling coefficient

k_{pad}	L-pad voltage division ratio
ℓ	Length (m), Effective length of voice-coil wire that cuts air-gap flux (m)
ℓ_f	Flanged end correction (m)
ℓ_{uf}	Unflanged end correction (m)
L_P, L_V	Port or vent length (m)
L_e	Constant in equation for impedance of lossy voice-coil inductance
L_E	Electrical inductance (H)
m, M	Constants in equation for cross-sectional area of acoustic horn
M_A	Acoustic mass (kg/m^4)
M_{A1}	Acoustic mass in circuit for piston air load impedance (kg/m^4)
M_{AB}	Acoustic mass of air in box (kg/m^4)
M_{AC}	Acoustic mass of diaphragm and air load for driver on a box (kg/m^4)
M_{AD}	Acoustic mass of diaphragm (kg/m^4)
M_{AS}	Acoustic mass of diaphragm and air load for driver on infinite baffle (kg/m^4)
M_M	Mechanical mass (kg)
M_{MC}	Mechanical mass of diaphragm and air load for driver on a box (kg)
M_{MD}	Mechanical mass of diaphragm (kg)
M_{MS}	Mechanical mass of diaphragm and air load for driver on infinite baffle (kg)
n	Constant in equation impedance of lossy voice-coil inductance
p	Acoustic pressure (Pa)
p_D	Acoustic pressure difference (Pa)
p_{ref}	Reference pressure for SPL (2×10^{-5} Pa)
p_{sens}^{1V}	On-axis pressure sensitivity for $e_g = 1$ V and $r = 1$ m (Pa)
P	Total pressure (Pa), Power (W), Phons
P_A	Acoustic power (W)
P_{AR}	Acoustic power radiated (W)
P_E	Electrical power (W)
P_0	Static air pressure (1.013×10^5 Pa)
q	f_ℓ/f_S for vented-box system
Q	Quality factor
Q_{EC}	Closed-box system electrical quality factor
Q_{ES}	Infinite-baffle system electrical quality factor
Q_L	Vented-box enclosure quality factor
Q_{MC}	Closed-box system mecahnical quality factor
Q_{MS}	Infinite-baffle system mechanical quality factor
Q_{TC}	Closed-box system total quality factor
Q_{TS}	Infinite-baffle system total quality factor
$QB3$	Quasi-Butterworth $3rd$-order vented-box alignment
R_A	Acoustic resistance (N·s/m^5)
R_{AB}	Acoustic resistance that models closed-box losses (N·s/m^5)
R_{AC}	$R_{AS} + R_{AB}$ (N·s/m^5) for closed-box system
R_{AE}	Acoustic resistance that models electrical losses (N·s/m^5)
R_{AL}	Acoustic resistance that models air leak (N·s/m^5)
R_{AS}	Acoustic resistance that models suspension losses (N·s/m^5)
R_{AT}	$R_{AE} + R_{AS}$ (N·s/m^5) for infinite-baffle system
R_{ATC}	$R_{AE} + R_{AC}$ (N·s/m^5) for closed-box system
R_{A1}, R_{A2}	Acoustic resistors in circuit for piston air load impedance (N·s/m^5)
R_E	Electrical resistance (Ω)
R_{ES}	Increase in voice-coil impedance at $\omega = \omega_S$ for infinite-baffle system (Ω)
R_M	Mechanical resistance (N·s/m)
R_{MS}	Mechanical resistance of diaphragm suspension (N·s/m)
S	Area (m^2), Sones

S_D	Area of diaphragm (m^2)
S_B	Inside area of box wall (m^2)
S_M	Mouth area of acoustic horn
S_T	Throat area of acoustic horn
SPL	Sound pressure level (dB)
SPL_{sens}^{1V}	On-axis SPL sensitivity for $e_g = 1$ V and $r = 1$ m (dB)
SPL_{sens}^{1W}	On-axis SPL sensitivity for $P_E = 1$ W and $r = 1$ m (dB)
S_D	Piston area of diaphragm (m^2)
S_P, S_V	Port or vent area (m^2)
$T_{u1}(s)$	Transfer function which models high frequency pressure response of driver
$T_{u2}(s)$	Transfer function which models high frequency power response of driver
u	Mechanical velocity, Particle velocity (m/s)
u_D	Mechanical velocity of diaphragm (m/s)
U	Volume velocity (m^3/s)
U_D	Volume velocity emitted by diaphragm (m^3/s)
U_L	Volume velocity emitted by air leak (m^3/s)
U_P, U_V	Volume velocity emitted by port or vent (m^3/s)
V	Volume (m^3)
V_{AS}	Volume compliance of driver suspension (m^3)
V_{AB}	Effective volume of air in box including filling effect (m^3)
V_{AT}	Net volume compliance of driver and enclosure (m^3)
V_B	Volume of air in unfilled enclosure (m^3)
W_{KE}	Kinetic energy (J)
W_{PE}	Potential energy (J)
x	Mechanical displacement (m), Distance (m)
x_D	Mechanical displacement of diaphragm (m)
$x_{\max}$	Maximum diaphragm displacement (m)
Y_E	Electrical admittance (Ω^{-1})
Y_M	Mechanical admittance (mech. Ω^{-1})
Y_A	Acoustic admittance (acoust. Ω^{-1})
Z_e	Impedance of lossy voice-coil inductance (Ω)
Z_E	Electrical impedance (Ω)
Z_M	Mechanical impedance (mech. Ω)
Z_s	Specific acoustic impedance (mks rayls)
Z_{VC}	Voice-coil impedance (Ω)
α	Compliance ratio C_{AS}/C_{AB} or V_{AS}/V_{AB}
δ	Passive radiator compliance ratio C_{AP}/C_{AB}
ϵ	dB ripple factor for Chebyshev alignments
η	Efficiency
η_0	Midband reference efficiency of driver
γ	Ratio of specific heat at constant pressure to specific heat at constant volume, Propagation constant for wave in acoustic horn
λ	Wavelength (m)
ρ_0	Density of air (1.18 kg/m^3)
τ	Time constant (s^{-1}), Crystal coupling coefficient (N/C)
ξ	Particle displacement (m)