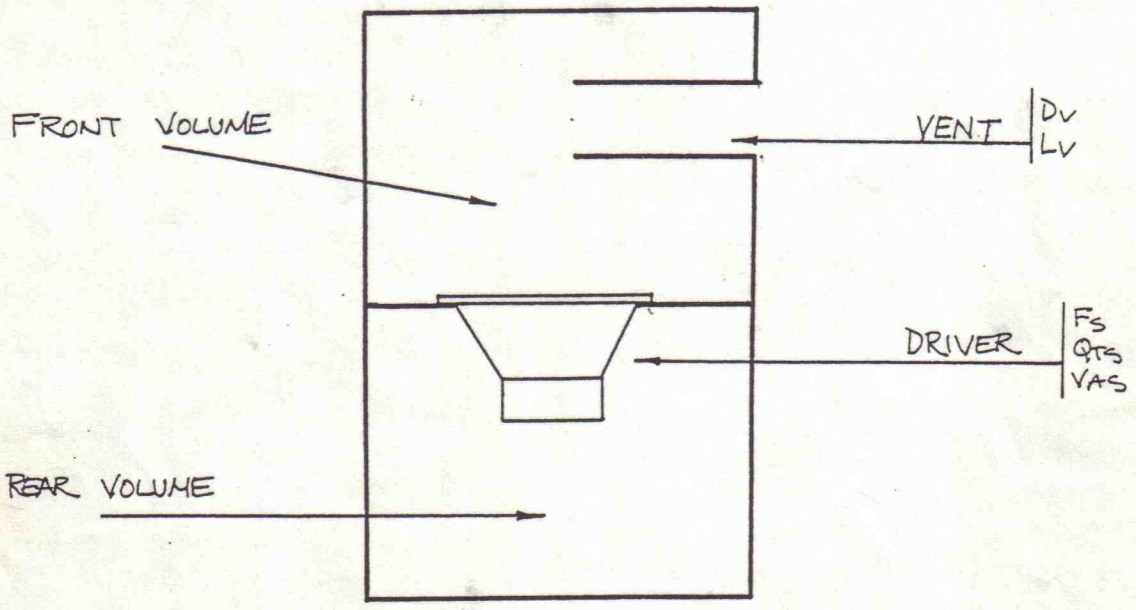
G&S DESIGNS
A GORDON ELECTRONICS COMPANY
26227 Research Rd., Hayward, CA 94545
Office (415) 783-4440 FAX (415) 783-8444

AREA of circle = πr^2

FOURTH ORDER BAND-PASS ENCLOSURE

TYPICAL LAYOUT :



FRONT CAVITY - GOVERNS TRANSIENT RESPONSE (S VALUE).

REAR CAVITY - SETS FREQUENCY RESPONSE AND SYSTEM EFFICIENCY.

VENT - ALL ACOUSTIC OUTPUT IS THROUGH VENT OPENING. VENT TUNES FRONT CAVITY TO THE RESONANT FREQ. OF DRIVER/REAR CAVITY COMBO.

DRIVER - NEEDED PARAMETERS ARE Fs, Qts, Vas. DRIVERS WITH A Fs/Qts RATIO BETWEEN 40 & 100 WORK BEST (DRIVERS THAT NORMALLY WORK IN SEALED BOXES.).

FOURTH ORDER BAND PASS CALCULATIONS

liters =
28.32

FRONT CAVITY VOLUME = $(2 \cdot \underline{S} \cdot Q_{TS})^2 \cdot V_{AS}$

REAR CAVITY VOLUME = $V_{AS} / (\underline{A} / Q_{TS})^2 - 1$

VENT TUNING FREQUENCY = $\underline{A} \cdot (F_S / Q_{TS})$

DIRECTIONS: FIRST CALCULATE THE DRIVER F_S/Q_{TS} RATIO TO SEE IF IT FALLS WITHIN THE SPECIFIED RANGE. GOING TO THE ALIGNMENT CHART SELECT AN 'S' VALUE, THEN COMPUTE FRONT CAVITY VOLUME. NEXT, LOOK UNDER COLUMN 'D' TO FIND AN ACCEPTABLE GAIN/LOSS FIGURE, THEN READING TO THE LEFT, FIND NUMBER UNDER COLUMN 'A' AND COMPUTE REAR CAVITY VOLUME. TO FIND VENT TUNING FREQUENCY MULTIPLY NUMBER FROM COLUMN 'A' BY THE DRIVER F_S/Q_{TS} RATIO. COMPUTE VENT LENGTH USING STANDARD PORTED BOX VENT CALCULATIONS. TO FIND LOW FREQUENCY LIMIT MULTIPLY VALUE FROM COLUMN 'B' BY DRIVER F_S/Q_{TS} RATIO. LIKEWISE, TO FIND THE HIGH FREQUENCY LIMIT MULTIPLY VALUE FROM COLUMN 'C' BY DRIVER F_S/Q_{TS} RATIO.

RIPPLE →

ALIGNMENTS ACCORDING TO S & A VALUES

RIPPLE = 1.5 dB

S=.4

A	B	C	D
0.7887	0.3073	2.0245	-8.0
0.8117	0.3230	2.0402	-7.5
0.8354	0.3394	2.0566	-7.0
0.8598	0.3565	2.0737	-6.5
0.8849	0.3744	2.0916	-6.0
0.9108	0.3931	2.1103	-5.5
0.9374	0.4126	2.1298	-5.0
0.9647	0.4329	2.1501	-4.5
0.9929	0.4541	2.1713	-4.0
1.0219	0.4761	2.1933	-3.5
1.0517	0.4991	2.2163	-3.0
1.0825	0.5230	2.2402	-2.5
1.1141	0.5479	2.2651	-2.0
1.1466	0.5738	2.2910	-1.5
1.1801	0.6008	2.3180	-1.0
1.2145	0.6288	2.3460	-0.5
1.2500	0.6579	2.3751	-0.0
1.2865	0.6881	2.4053	0.5
1.3241	0.7195	2.4367	1.0
1.3627	0.7521	2.4693	1.5
1.4025	0.7859	2.5031	2.0
1.4435	0.8209	2.5382	2.5
1.4856	0.8573	2.5745	3.0
1.5290	0.8950	2.6122	3.5
1.5737	0.9340	2.6513	4.0
1.6196	0.9745	2.6917	4.5
1.6669	1.0164	2.7336	5.0
1.7156	1.0598	2.7770	5.5
1.7657	1.1047	2.8220	6.0
1.8172	1.1513	2.8685	6.5
1.8703	1.1994	2.9166	7.0
1.9249	1.2491	2.9663	7.5
1.9811	1.3006	3.0178	8.0

R = 1.27 dB

S=.5

A	B	C	D
0.6310	0.2600	1.5312	-8.0
0.6494	0.2731	1.5442	-7.5
0.6683	0.2867	1.5579	-7.0
0.6879	0.3010	1.5721	-6.5
0.7079	0.3158	1.5870	-6.0
0.7286	0.3313	1.6024	-5.5
0.7499	0.3474	1.6186	-5.0
0.7718	0.3642	1.6354	-4.5
0.7943	0.3817	1.6528	-4.0
0.8175	0.3999	1.6711	-3.5
0.8414	0.4189	1.6900	-3.0
0.8660	0.4386	1.7097	-2.5
0.8913	0.4591	1.7302	-2.0
0.9173	0.4804	1.7515	-1.5
0.9441	0.5025	1.7736	-1.0
0.9716	0.5255	1.7966	-0.5
1.0000	0.5493	1.8204	0.0
1.0292	0.5741	1.8452	0.5
1.0593.	0.5997	1.8709	1.0
1.0902	0.6264	1.8975	1.5
1.1220	0.6540	1.9251	2.0
1.1548	0.6826	1.9537	2.5
1.1885	0.7122	1.9833	3.0
1.2232	0.7429	2.0141	3.5
1.2589	0.7747	2.0458	4.0
1.2957	0.8076	2.0788	4.5
1.3335	0.8417	2.1128	5.0
1.3725	0.8769	2.1481	5.5
1.4125	0.9134	2.1845	6.0
1.4538	0.9511	2.2222	6.5
1.4962	0.9901	2.2612	7.0
1.5399	1.0304	2.3015	7.5
1.5849	1.0720	2.3431	8.0

R = .35 dB

S=.6

A	B	C	D
0.5258	0.2326	1.1886	-8.0
0.5412	0.2440	1.2000	-7.5
0.5570	0.2560	1.2119	-7.0
0.5732	0.2684	1.2244	-6.5
0.5900	0.2813	1.2373	-6.0
0.6072	0.2948	1.2508	-5.5
0.6249	0.3088	1.2648	-5.0
0.6432	0.3233	1.2793	-4.5
0.6619	0.3385	1.2945	-4.0
0.6813	0.3542	1.3102	-3.5
0.7012	0.3706	1.3266	-3.0
0.7216	0.3876	1.3436	-2.5
0.7427	0.4052	1.3612	-2.0
0.7644	0.4235	1.3795	-1.5
0.7867	0.4425	1.3986	-1.0
0.8097	0.4623	1.4182	-0.5
0.8333	0.4827	1.4387	0.0
0.8577	0.5039	1.4599	0.5
0.8827	0.5258	1.4818	1.0
0.9085	0.5486	1.5046	1.5
0.9350	0.5721	1.5281	2.0
0.9623	0.5965	1.5525	2.5
0.9904	0.6217	1.5778	3.0
1.0193	0.6478	1.6039	3.5
1.0491	0.6749	1.6309	4.0
1.0797	0.7028	1.6588	4.5
1.1113	0.7317	1.6877	5.0
1.1437	0.7616	1.7176	5.5
1.1771	0.7925	1.7485	6.0
1.2115	0.8244	1.7804	6.5
1.2469	0.8573	1.8134	7.0
1.2833	0.8914	1.8474	7.5
1.3207	0.9266	1.8826	8.0

R = 0.0 dB

S=.7

A	B	C	D
0.4507	0.2167	0.9373	-8.0
0.4638	0.2270	0.9476	-7.5
0.4774	0.2378	0.9584	-7.0
0.4913	0.2490	0.9696	-6.5
0.5057	0.2606	0.9812	-6.0
0.5204	0.2727	0.9933	-5.5
0.5356	0.2852	1.0058	-5.0
0.5513	0.2983	1.0188	-4.5
0.5674	0.3118	1.0324	-4.0
0.5839	0.3259	1.0464	-3.5
0.6010	0.3404	1.0610	-3.0
0.6185	0.3555	1.0761	-2.5
0.6366	0.3712	1.0918	-2.0
0.6552	0.3874	1.1080	-1.5
0.6743	0.4043	1.1248	-1.0
0.6940	0.4217	1.1423	-0.5
0.7143.	0.4397	1.1603	0.0
0.7351	0.4584	1.1790	0.5
0.7566	0.4777	1.1983	1.0
0.7787	0.4977	1.2183	1.5
0.8014	0.5184	1.2390	2.0
0.8248	0.5398	1.2604	2.5
0.8489	0.5619	1.2825	3.0
0.8737	0.5848	1.3054	3.5
0.8992	0.6084	1.3290	4.0
0.9255	0.6329	1.3534	4.5
0.9525	0.6581	1.3787	5.0
0.9803	0.6841	1.4047	5.5
1.0090	0.7111	1.4317	6.0
1.0384	0.7389	1.4595	6.5
1.0687	0.7675	1.4881	7.0
1.0999	0.7972	1.5177	7.5
1.1321	0.8277	1.5483	8.0