Resistance Coupled Amplifier Charts for commonly audio voltage amplifying tubes.

These charts are useful for designing voltage amplifying circuits using the tubes listed and they give a reasonably accurate estimate of voltage gain and maximum AC voltage output you can expect (given normal manufacturing tolerances). Because these charts were developed with standard issue US made tubes of the 1950's , you may find that tubes of other origins and later manufacture behave somewhat differently. However if a new tube is sold with a given tube number, its performance has to be reasonably close enough facsimile of the original issue tube number in order to operate properly in the circuits that it is intended to be used in.

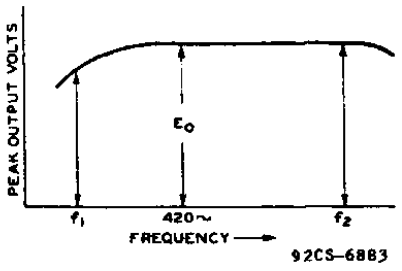
Usually (see the RCA preamble pages for details), the values of the cathode and screen bypass and stage-coupling capacitors shown on these pages are selected for a fairly high (100 Hz) low frequency roll-off (the idea was to minimize 60 Hz hum in the audio output and multiple-stage “motorboating”). You may wish to make these built-in low frquency “poles” to roll off at a higher (eg: for amatuer radio work) or lower (eg: high fidelity use) frequency. In some cases (especially high gain pentodes and multiple high-gain stages), operating tubes with DC voltage on the filaments and with a well filtered and well decoupled high voltage DC supply may be necessary to avoid hum & motorboating if the low-frequency rolloff point chosen is very low.

RESISTANCE-COUPLED AMPLIFIERS

Symbols used in the following text and charts are explained at the end of the text.

GENERAL CIRCUIT CONSIDERATIONS

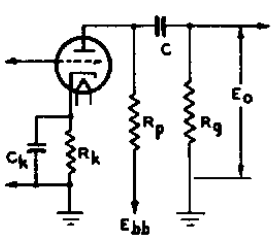
In the discussions which follow, the frequency (f_2) is that value at which the high-frequency response begins to fall off. The frequency (f_1) is that value at which the low-frequency response drops below a satisfactory value, as discussed below. Decoupling filters are not necessary for two stages or less.



92CS-6883

A variation of 10 per cent in values of resistors and capacitors has only slight effect on performance. One-half-watt resistors are usually suitable for R_{g2}, R_g, R_p, and R_k resistors. Capacitors C and C_{g2} should have a working voltage equal to or greater than E_{bb}. Capacitor C_k may have a low working voltage in the order of 10 to 25 volts. Peak input Voltage is equal to the Peak Output Voltage divided by the Voltage Gain.

Triode (Heater-Cathode Type) Amplifier



92CS-6886

Diagram No. 1

Capacitors C and C_k have been chosen to give an output voltage equal to 0.8 E_o for a frequency (f_1) of 100 cycles. For any other values of (f_1), multiply values of C and C_k by $100/f_1$. In the case of capacitor C_k, the values shown in the charts are for an amplifier with dc heater excitation; when ac is used, depending on the character of the associated circuit, the gain, and the value of f_1, it may be necessary to increase the value of C_k to minimize hum disturbances. It may be desirable to operate the heater at a positive voltage of from 15 to 40 volts with respect to the cathode. The voltage output at f_1, of "n" like stage equals $(0.8)^n E_o$ where E_o is the peak output voltage of the final stage. For an amplifier of typical construction, the value of f_2 is well above the audio-frequency range for any value of R_p.

Pentode (Filament-Type) Amplifier

Capacitors C and C_{g2} have been chosen to give an output voltage equal to $0.8E_o$ for a frequency (f_1) of 100 cycles. For any other value of f_1, multiply values of C and C_{g2} by $100/f_1$. The voltage output at f_1 for "n" like stages equals $(0.8)^n E_o$

RESISTANCE-COUPLED AMPLIFIERS

(continued from preceding page)

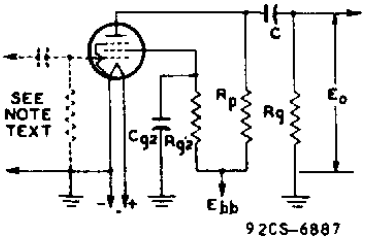


Diagram No.2

where E_o is the peak output voltage of the final stage. For an amplifier of typical construction, and for R_p values of 0.1, 0.25, and 0.5 megohm, approximate values of f_2 are 20000, 10000, and 5000 cps, respectively.

Note: The values of input coupling capacitor in microfarads and of grid resistor in megohms should be such that their product lies between 0.02 and 0.1. Values commonly used are 0.005 μf and 10 megohms.

Pentode (Heater-Cathode Type) Amplifier

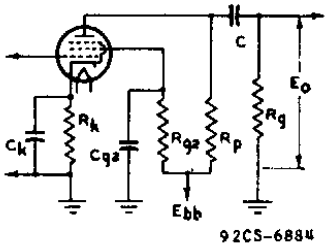


Diagram No.3

Capacitors C, C_k, and C_{g2} have been chosen to give an output voltage equal to 0.7 E_o for a frequency (f_1) of 100 cycles. For any other value of f_1, multiply values of C, C_k, and C_{g2} by $100/f_1$. In the case of capacitor C_k, the values shown in the charts are for an amplifier with dc heater excitation; when ac is used, depending on the character of the associated circuits, the voltage gain, and the value of f_1, it may be necessary to increase the value of C_k to minimize hum disturbances. It may be desirable to operate the heater at a positive voltage of from 15 to 40 volts with respect to the cathode. The voltage output at f_1 for "n" like stages equals $(0.7)^n E_o$ where E_o is the peak output voltage of the final stage. For an amplifier of typical construction, and for R_p values of 0.1, 0.25, and 0.5 megohm, approximate values of f_2 are 20000, 10000, and 5000 cps, respectively.

Phase Inverters

Information given for triode amplifiers, in general, applies to this case. Capacitors C have been chosen to give an output voltage equal to 0.9 E_o for a frequency (f_1) of 100 cycles. For any other value of f_1, multiply values of C by $100/f_1$. The signal input is applied to the grid of triode unit A. The grid of triode unit B obtains its signal from a tap (P) on the grid resistor (R_g) in the output circuit of unit A. The tap is chosen so as to make the voltage output of unit B equal to that of unit A. Its location is determined by the voltage gain values given in the charts. For

RESISTANCE-COUPLED AMPLIFIERS

(continued from preceding page)

example, if V.G. is 20 (from the charts), P is chosen so as to supply 1/20 of the voltage across R_g to the grid of unit B. For phase-inverter service, the cathode resistor may be left unbypassed unless a bypass capacitor is necessary to minimize hum; omission of the bypass capacitor assists in balancing the output stages. The value of R_k is specified on the basis that both units are operating simultaneously at the same values of plate load and plate voltage.

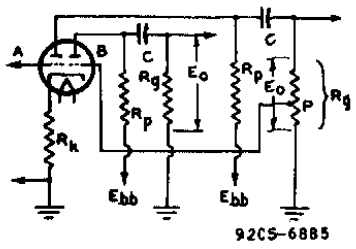


Diagram No.4

SYMBOLS USED IN RESISTANCE-COUPLED AMPLIFIER CHARTS

C = Blocking Capacitor (μf).

C_k = Cathode Bypass Capacitor (μf).

C_{g2} = Screen Bypass Capacitor (μf).

E_{bb} = Plate-Supply Voltage (volts). Voltage at plate equals plate-supply voltage minus drop in R_p and R_k. See Note 1, below.

R_k = Cathode Resistor (ohms).

R_{g2} = Screen Resistor (megohms).

R_g = Grid Resistor (megohms). for following stage.

R_p = Plate Resistor (megohms).

V.G. = Voltage Gain. At 5 volts (RMS) output, unless otherwise specified.

E_o = Peak Output Voltage (volts). This voltage is obtained across R_g (for following stage) at any frequency within the flat region of the output vs frequency curve, and is for the condition where the signal level is adequate to swing the resistance-coupled amplifier tube to the point where its grid starts to draw current.

Note 1: For other supply voltages differing by as much as 50 per cent from those listed, the values of resistors, capacitors, and voltage gain are approximately correct. The value of voltage output, however, for any of these other supply voltages, equals the listed voltage output multiplied by the new plate-supply voltage divided by the plate-supply voltage corresponding to the listed voltage output.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

6 — See Circuit Diagram 4

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	–	1900*	–	–	0.025	13	16
		0.25	–	2250*	–	–	0.01	19	19
		0.5	–	2500*	–	–	0.006	20	20
	0.25	0.25	–	4050*	–	–	0.01	16	20
		0.5	–	4950*	–	–	0.006	20	22
		1.0	–	5400*	–	–	0.003	24	23
	0.5	0.5	–	7000*	–	–	0.006	18	22
		1.0	–	8500*	–	–	0.003	23	23
		2.0	–	9650*	–	–	0.0015	26	23
180	0.1	0.1	–	1300*	–	–	0.03	35	19
		0.25	–	1700*	–	–	0.015	46	21
		0.5	–	1950*	–	–	0.007	50	22
	0.25	0.25	–	2950*	–	–	0.015	40	23
		0.5	–	3800*	–	–	0.007	50	24
		1.0	–	4300*	–	–	0.0035	57	24
	0.5	0.5	–	5250*	–	–	0.007	44	24
		1.0	–	6600*	–	–	0.0035	54	25
		2.0	–	7650*	–	–	0.002	61	25
300	0.1	0.1	–	1150*	–	–	0.03	60	20
		0.25	–	1500*	–	–	0.015	83	22
		0.5	–	1750*	–	–	0.007	86	23
	0.25	0.25	–	2650*	–	–	0.015	75	23
		0.5	–	3400*	–	–	0.0055	87	24
		1.0	–	4000*	–	–	0.003	100	24
	0.5	0.5	–	4850*	–	–	0.0055	76	23
		1.0	–	6100*	–	–	0.003	94	24
		2.0	–	7150*	–	–	0.0015	104	24

*Values shown are for phase-inverter service.

6N7,6N7-GT,6A6,53

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

7

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	–	4200	–	2.5	0.025	5.4	22►
		0.22	–	4600	–	2.2	0.014	7.5	27►
		0.47	–	4800	–	2.0	0.0065	9.1	30►
	0.22	0.22	–	7000	–	1.5	0.013	7.3	30►
		0.47	–	7800	–	1.3	0.007	10	34■
		1.0	–	8100	–	1.1	0.0035	12	37★
	0.47	0.47	–	12000	–	0.83	0.006	10	36■
		1.0	–	14000	–	0.7	0.0035	14	39★
		2.2	–	15000	–	0.6	0.002	16	41★
180	0.1	0.1	–	1900	–	3.6	0.027	19	30★
		0.22	–	2200	–	3.1	0.014	25	35
		0.47	–	2500	–	2.8	0.0065	32	37
	0.22	0.22	–	3400	–	2.2	0.014	24	38
		0.47	–	4100	–	1.7	0.0065	34	42
		1.0	–	4600	–	1.5	0.0035	38	44
	0.47	0.47	–	6600	–	1.1	0.0065	29	44
		1.0	–	8100	–	0.9	0.0035	38	46
		2.2	–	9100	–	0.8	0.002	43	47
300	0.1	0.1	–	1500	–	4.4	0.027	40	34
		0.22	–	1800	–	3.6	0.014	54	38
		0.47	–	2100	–	3.0	0.0065	63	41
	0.22	0.22	–	2600	–	2.5	0.013	51	42
		0.47	–	3200	–	1.9	0.0065	65	46
		0.1	–	3700	–	1.6	0.0035	77	48
	0.47	0.47	–	5200	–	1.2	0.006	61	48
		1.0	–	6300	–	1.0	0.0035	74	50
		2.2	–	7200	–	0.9	0.002	85	51

► At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output

6AQ6,6AQ7,6AT6,6Q7,6Q7-GT/G,
6SL7-GT (one section), 6SZ7, 6T8,12AT6
12Q7,12Q7-GT/G, 12SL7-GT, 19T8

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

10 — See Circuit Diagram 1

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.047	0.047	–	1600	–	3.2	0.061	9	10■
		0.1	–	1800	–	2.5	0.033	11	11★
		0.22	–	2000	–	2.0	0.015	14	11
	0.1	0.1	–	3000	–	1.6	0.032	10	11★
		0.22	–	3800	–	1.1	0.015	15	11
		0.47	–	4500	–	1.0	0.007	18	11
	0.22	0.22	–	6800	–	0.7	0.015	14	11
		0.47	–	9500	–	0.5	0.0065	20	11
		1.0	–	11500	–	0.43	0.0035	24	11
180	0.047	0.047	–	920	–	3.9	0.062	20	11
		0.1	–	1200	–	2.9	0.037	26	12
		0.22	–	1400	–	2.5	0.016	29	12
	0.1	0.1	–	2000	–	1.9	0.032	24	12
		0.22	–	2800	–	1.4	0.016	33	12
		0.47	–	3600	–	1.1	0.007	40	12
	0.22	0.22	–	5300	–	0.8	0.015	31	12
		0.47	–	8300	–	0.56	0.007	44	12
		1.0	–	10000	–	0.48	0.0035	54	12
300	0.047	0.047	–	870	–	4.1	0.065	38	12
		0.1	–	1200	–	3.0	0.034	52	12
		0.22	–	1500	–	2.4	0.016	68	12
	0.1	0.1	–	1900	–	1.9	0.032	44	12
		0.22	–	3000	–	1.3	0.016	68	12
		0.47	–	4000	–	1.1	0.007	80	12
	0.22	0.22	–	5300	–	0.9	0.015	57	12
		0.47	–	8800	–	0.52	0.007	82	12
		1.0	–	11000	–	0.46	0.0035	92	12

■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output.

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

11

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.05	0.05	–	2800	–	2.0	0.05	14	9
		0.1	–	3400	–	1.62	0.025	17	9
		0.25	–	3800	–	1.3	0.01	20	10
	0.1	0.1	–	4800	–	1.12	0.025	16	10
		0.25	–	6400	–	0.84	0.01	22	11
		0.5	–	7500	–	0.66	0.005	23	12
	0.25	0.25	–	11400	–	0.52	0.01	18	12
		0.5	–	14500	–	0.4	0.006	23	12
		1.0	–	17300	–	0.33	0.004	26	13
180	0.05	0.05	–	2200	–	2.2	0.055	34	10
		0.1	–	2700	–	2.1	0.03	45	11
		0.25	–	3100	–	1.85	0.015	54	11
	0.1	0.1	–	3900	–	1.7	0.035	41	12
		0.25	–	5300	–	1.25	0.015	54	12
		0.5	–	6200	–	1.2	0.008	55	13
	0.25	0.25	–	9500	–	0.74	0.015	44	13
		0.5	–	12300	–	0.55	0.008	52	13
		1.0	–	14700	–	0.47	0.004	59	13
300	0.05	0.05	–	2100	–	3.16	0.075	57	11
		0.1	–	2600	–	2.3	0.04	70	11
		0.25	–	3100	–	2.2	0.015	83	12
	0.1	0.1	–	3800	–	1.7	0.035	65	12
		0.25	–	5300	–	1.3	0.015	84	13
		0.5	–	6000	–	1.17	0.008	88	13
	0.25	0.25	–	9600	–	0.9	0.015	73	13
		0.5	–	12300	–	0.59	0.008	85	14
		1.0	–	14000	–	0.37	0.003	97	14

6C5,6C5-GT, (wired as triode)
6C6,6J7, 6W7,12J7, 57

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

13

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.05	0.05	–	1650	–	2.80	0.06	11	11
		0.1	–	2070	–	2.66	0.029	14	12
		0.25	–	2380	–	1.95	0.012	17	13
	0.1	0.1	–	3470	–	1.85	0.035	12	13
		0.25	–	3940	–	1.29	0.012	17	13
		0.5	–	4420	–	1.0	0.007	19	13
	0.25	0.25	–	7860	–	0.73	0.0135	14	13
		0.5	–	9760	–	0.55	0.007	18	13
		1.0	–	10690	–	0.47	0.004	20	13
180	0.05	0.05	–	1190	–	3.27	0.06	24	13
		0.1	–	1490	–	2.86	0.032	30	13
		0.25	–	1740	–	2.06	0.0115	36	13
	0.1	0.1	–	2330	–	2.19	0.038	26	14
		0.25	–	2830	–	1.35	0.012	34	14
		0.5	–	3230	–	1.15	0.006	38	14
	0.25	0.25	–	5560	–	0.81	0.013	28	14
		0.5	–	7000	–	0.62	0.007	36	14
		1.0	–	8110	–	0.5	0.004	40	14
300	0.05	0.05	–	1020	–	3.56	0.06	41	13
		0.1	–	1270	–	2.96	0.034	51	14
		0.25	–	1500	–	2.15	0.012	60	14
	0.1	0.1	–	1900	–	2.31	0.035	43	14
		0.25	–	2440	–	1.42	0.0125	56	14
		0.5	–	2700	–	1.2	0.0065	64	14
	0.25	0.25	–	4590	–	0.87	0.013	46	14
		0.5	–	5770	–	0.64	0.0075	57	14
		1.0	–	6950	–	0.54	0.004	64	14

6F8-G,6SN7-GT,6J5,12SN7-GT
6CG7,6FQ7,8CG7,7N7,7A4,12FQ7

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

14 — See Circuit Diagram 3

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	0.37	1200	0.05	5.2	0.02	17	41
		0.25	0.44	1100	0.05	5.3	0.01	22	55
		0.5	0.44	1300	0.05	4.8	0.006	33	66
	0.25	0.25	1.1	2400	0.03	3.7	0.008	23	70
		0.5	1.18	2600	0.03	3.2	0.005	32	85
		1.0	1.4	3600	0.025	2.5	0.003	33	92
	0.5	0.5	2.18	4700	0.02	2.3	0.005	28	93
		1.0	2.6	5500	0.05	2.0	0.0025	29	120
		2.0	2.7	5500	0.02	2.0	0.0015	27	140
180	0.1	0.1	0.44	1000	0.05	6.5	0.02	42	51
		0.25	0.5	750	0.05	6.7	0.01	52	69
		0.5	0.5	800	0.05	6.7	0.006	59	83
	0.25	0.25	1.1	1200	0.04	5.2	0.008	41	93
		0.5	1.18	1600	0.04	4.3	0.005	60	118
		1.0	1.4	2000	0.04	3.8	0.0035	60	140
	0.5	0.5	2.45	2600	0.03	3.2	0.005	45	135
		1.0	2.9	3100	0.025	2.5	0.0025	56	165
		2.0	2.7	3500	0.02	2.8	0.0015	60	165
300	0.1	0.1	0.44	500	0.07	8.5	0.02	55	61
		0.25	0.5	450	0.07	8.3	0.01	81	82
		0.5	0.53	600	0.06	8.0	0.006	96	94
	0.25	0.25	1.18	1100	0.04	5.5	0.008	81	104
		0.5	1.18	1200	0.04	5.4	0.005	104	140
		1.0	1.45	1300	0.05	5.8	0.005	110	185
	0.5	0.5	2.45	1700	0.04	4.2	0.005	75	161
		1.0	2.9	2200	0.04	4.1	0.003	97	200
		2.0	2.95	2300	0.04	4.0	0.0025	100	230

6C6,6J7,6W7,12J7,57

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

20 — See Circuit Diagram 3

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	0.29	820	0.09	8.8	0.02	18	41
		0.25	0.29	880	0.085	7.4	0.016	23	68
		0.5	0.31	1000	0.075	6.6	0.007	28	70
	0.25	0.25	0.69	1680	0.06	5.0	0.012	16	75
		0.5	0.92	1700	0.045	4.5	0.005	18	93
		1.0	0.82	1800	0.04	4.0	0.003	22	104
	0.5	0.5	1.5	3600	0.045	2.4	0.003	18	91
		1.0	1.7	3800	0.03	2.4	0.002	22	119
		2.0	1.9	4050	0.028	2.35	0.0015	24	139
180	0.1	0.1	0.29	760	0.10	9.1	0.019	49	55
		0.25	0.31	800	0.09	8.0	0.015	60	82
		0.5	0.37	860	0.09	7.8	0.007	62	91
	0.25	0.25	0.83	1050	0.06	6.8	0.001	38	109
		0.5	0.94	1060	0.06	6.6	0.004	47	131
		1.0	0.94	1100	0.07	6.1	0.003	54	161
	0.5	0.5	1.85	2000	0.05	4.0	0.003	37	151
		1.0	2.2	2180	0.04	3.8	0.002	44	192
		2.0	2.4	2410	0.035	3.6	0.0015	54	208
300	0.1	0.1	0.35	500	0.10	11.6	0.019	72	67
		0.25	0.37	530	0.09	10.9	0.016	96	98
		0.5	0.47	590	0.09	9.9	0.007	101	104
	0.25	0.25	0.89	850	0.07	8.5	0.011	79	139
		0.5	1.10	860	0.06	7.4	0.004	88	167
		1.0	1.18	910	0.06	6.9	0.003	98	185
	0.5	0.5	2.0	1300	0.06	6.0	0.004	64	200
		1.0	2.2	1410	0.05	5.8	0.002	79	238
		2.0	2.5	1530	0.04	5.2	0.0015	89	263

6SJ7,12SJ7

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1

25

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	–	4400	–	2.7	0.023	5	29●
		0.22	–	4700	–	2.4	0.013	6	35●
		0.47	–	4800	–	2.3	0.007	8	41●
	0.22	0.22	–	7000	–	1.6	0.001	6	39●
		0.47	–	7400	–	1.4	0.006	9	45■
		1.0	–	7600	–	1.3	0.003	11	48★
	0.47	0.47	–	12000	–	0.9	0.006	9	48■
		1.0	–	13000	–	0.8	0.003	11	52★
		2.2	–	14000	–	0.7	0.002	13	55★
180	0.1	0.1	–	1800	–	4.0	0.025	18	40
		0.22	–	2000	–	3.5	0.013	25	47
		0.47	–	2200	–	3.1	0.006	32	52
	0.22	0.22	–	3000	–	2.4	0.012	24	53
		0.47	–	3500	–	2.1	0.006	34	59
		1.0	–	3900	–	1.8	0.003	39	63
	0.47	0.47	–	5800	–	1.3	0.006	30	62
		1.0	–	6700	–	1.1	0.003	39	66
		2.2	–	7400	–	1.0	0.002	45	68
300	0.1	0.1	–	1300	–	4.6	0.027	43	45
		0.22	–	1500	–	4.0	0.013	57	52
		0.47	–	1700	–	3.6	0.006	66	57
	0.22	0.22	–	2200	–	3.0	0.013	54	59
		0.47	–	2800	–	2.3	0.006	69	65
		1.0	–	3100	–	2.1	0.003	79	68
	0.47	0.47	–	4300	–	1.6	0.006	62	69
		1.0	–	5200	–	1.3	0.003	77	73
		2.2	–	5900	–	1.1	0.002	92	75

● At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output

6AV6,12AV6,12AX7
6AX7,20EZ7

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

26 — See Circuit Diagram 3

E_{bb}	R_p	R_g	R_{g1}	R_k	C_{g1}	C_k	C	E_o	V.G.*
90	0.1	0.1	0.35	1700	0.044	4.6	0.020	13	29
		0.22			0.046	4.5	0.012	17	39
		0.47			0.047	4.4	0.006	20	47
	0.22	0.22	0.80	3000	0.034	3.2	0.010	15	43
		0.47			0.035	3.1	0.005	21	59
		1.0			0.036	3.0	0.003	24	67
	0.47	0.47	1.9	7000	0.021	1.8	0.005	21	59
		1.0			0.022	1.7	0.003	25	75
		2.2			0.023	1.7	0.002	28	87
180	0.1	0.1	0.35	700	0.060	7.4	0.020	24	39
		0.22			0.062	7.3	0.012	28	56
		0.47			0.064	7.2	0.006	33	65
	0.22	0.22	0.80	1200	0.045	5.5	0.010	24	65
		0.47			0.046	5.3	0.005	31	87
		1.0			0.048	5.2	0.003	34	101
	0.47	0.47	1.9	2500	0.033	3.5	0.005	27	98
		1.0			0.034	3.4	0.003	32	122
		2.2			0.035	3.3	0.002	37	140
300	0.1	0.1	0.35	300	0.075	10.8	0.020	25	51
		0.22			0.077	10.6	0.012	32	68
		0.47			0.080	10.5	0.006	35	83
	0.22	0.22	0.80	600	0.056	7.9	0.010	28	81
		0.47			0.057	7.5	0.005	37	109
		1.0			0.058	7.4	0.003	41	123
	0.47	0.47	1.3	1200	0.044	5.3	0.005	35	125
		1.0			0.046	5.2	0.003	42	152
		2.2			0.047	5.1	0.002	48	174

* At an output voltage of 1 volt RMS and Grid No. 1 bias of 1 volt.

5879 (as pentode)

RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 3

Cont'd **26**

E_{bb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
180	0.1	0.1	0.19	1300	0.08	6.0	0.021	48	33
		0.22	0.20	1400	0.08	5.85	0.013	59	46
		0.47	0.22	1500	0.07	5.45	0.007	68	57
	0.22	0.22	0.44	2000	0.09	4.85	0.011	48	41
		0.47	0.53	2300	0.07	4.45	0.006	62	62
		1.0	0.55	2400	0.065	4.25	0.004	68	72
	0.47	0.47	1.0	3500	0.07	3.5	0.005	51	54
		1.0	1.1	3700	0.07	3.5	0.003	59	66
		2.2	1.2	4000	0.07	3.3	0.002	66	81
300	0.1	0.1	0.18	1000	0.1	7.0	0.022	85	38
		0.22	0.2	1100	0.1	6.8	0.013	110	53
		0.47	0.23	1200	0.075	6.4	0.007	124	66
	0.22	0.22	0.47	1400	0.1	5.75	0.012	88	44
		0.47	0.52	1600	0.1	5.45	0.006	113	64
		1.0	0.58	1700	0.075	5.0	0.004	124	86
	0.47	0.47	1.1	2300	0.1	4.6	0.006	90	58
		1.0	1.2	2500	0.1	4.3	0.004	110	76
		2.2	1.3	2800	0.1	4.2	0.002	121	99

"Chart for Maximum Voltage Output" for type 5879 demonstrates how to set up pentodes for maximum output instead of maximum gain. Other pentodes (6J7, 6SJ7,EF86,etc.) will perform similarly.

See Circuit Diagram 1

28

E_{bb}	R_p	R_g	R_k	C_k°	C°	E_o	V.G.*
90	0.1	0.24	1800	—	—	13	24
	0.24	0.51	3700	—	—	14	26
	0.51	1.0	7800	—	—	16	27
180	0.1	0.24	1300	—	—	31	27
	0.24	0.51	2800	—	—	33	29
	0.51	1.0	5700	—	—	33	30
300	0.1	0.24	1200	—	—	58	28
	0.24	0.51	2300	—	—	30	30
	0.51	1.0	4800	—	—	56	31

* At 2 volts (RMS) output.

° Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

12AY7/6072

RESISTANCE COUPLED AMPLIFIER TABLES

Table A

	Ebb = 100 Volts							Ebb = 250 Volts						
Rb	0.1		0.27			0.47		0.1		0.27			0.47	
Rcf	0.27	0.47	0.27	0.47	1.0	0.47	1.0	0.27	0.47	0.27	0.47	1.0	0.47	1.0
Rk	1500	1800	3900	3900	4700	5600	6800	680	680	1800	1800	2200	3300	3900
Ib	0.54	0.51	0.23	0.23	0.22	0.150	0.141	1.62	1.62	0.69	0.69	0.65	0.41	0.40
E_{c_1}	−0.81	−0.92	−0.90	−0.90	−1.04	−0.840	−0.960	−1.10	−1.10	−1.24	−1.24	−1.43	−1.35	−1.56
Eb	45.2	48.1	37.1	37.1	39.6	28.7	32.7	86.9	86.9	62.3	62.3	75.6	55.7	59.9
Esig	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Eout	3.0	3.0	2.8	3.0	3.1	2.95	3.0	3.90	4.10	3.55	3.70	3.65	3.50	3.60
Gain	30.0	30.0	28.0	30.0	31.0	29.5	30.0	39.0	41.0	35.5	37.0	36.5	35.0	36.0
% Dist.	1.9	1.7	1.9	1.7	1.4	1.8	1.4	.54	1.0	1.0	.92	.79	.89	.75
Esig(1)	0.54	0.29	0.30	0.29	0.38	0.22	0.34	0.61	0.49	0.54	0.56	0.71	0.64	0.77
Eout	6.6	8.7	8.4	8.4	11.5	6.5	10.0	23.0	19.7	19.0	20.6	25.5	22.1	27.0
Gain	30.0	30.0	28.0	28.9	30.3	29.5	29.4	37.0	40.2	35.2	36.8	35.9	34.5	35.1
% Dist.	3.9	4.7	5.0	4.5	4.9	3.6	4.1	4.4	4.2	4.7	4.2	4.6	4.8	4.6

12AT7,6AQ8,6AB4,12AZ7
12DT8,6201,7690

Table Q

	Ebb = 100 Volts							Ebb = 250 Volts						
Rb	0.1		0.27			0.47		0.1		0.27			0.47	
Rcf	0.27	0.47	0.27	0.47	1.0	0.47	1.0	0.27	0.47	0.27	0.47	1.0	0.47	1.0
Rk	2200	2700	5600	5600	6800	10000	12000	1000	1200	2700	3300	3900	5600	6800
Ib	0.61	0.56	0.250	0.250	0.235	0.150	0.140	1.79	1.72	0.70	0.68	0.65	0.41	0.39
Ec_1	-1.3	-1.5	-1.4	-1.4	-1.6	-1.5	-1.7	-1.8	-2.1	-1.9	-2.2	-2.5	-2.3	-2.7
Eb	38	43	31	31	35	28	33	69	76	59	64	72	55	63
Esig	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Eout	2.05	1.96	1.83	2.00	1.95	1.90	1.93	2.42	2.40	2.20	2.24	2.22	2.12	2.12
Gain	20.5	19.6	18.3	20.0	19.5	19.0	19.3	24.2	24.0	22.0	22.4	22.2	21.2	21.2
% Dist.	1.0	0.9	1.0	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5
Esig(1)	0.42	0.51	0.54	0.55	0.71	0.62	0.76	0.93	1.13	1.01	1.26	1.48	1.28	1.52
Eout	8.5	11.7	9.9	10.7	13.5	11.5	14.3	22.5	27.0	22.2	28.0	32.5	26.5	31.5
Gain	20.2	19.2	18.3	19.5	19.0	18.6	18.8	24.2	23.9	21.8	22.2	22.0	20.7	20.7
% Dist.	3.9	5.0	4.9	4.1	4.4	4.8	4.5	4.7	4.8	4.7	4.7	4.6	4.9	4.5

12AV7,5965,5965A
7062/E180CC

Table W

	Ebb = 300 VOLTS							Ebb = 400 VOLTS						
Rb	.022		.047		.10			.022		.047		.10		
Rcf	0.1	0.27	0.1	0.27	0.1	0.27	0.47	0.1	0.27	0.1	0.27	0.1	0.27	0.47
Rk	820	820	1500	1800	2700	3900	4700	820	820	1500	1800	2700	3900	4700
Ib	7.22	7.22	3.8	3.54	1.94	1.74	1.63	9.75	9.75	5.09	4.8	2.64	2.34	2.2
Ect	-5.92	-5.92	-5.7	-6.38	-5.24	-6.88	-7.66	-8.0	-8.0	-7.64	-8.64	-7.13	-9.3	10.34
Eb	135.3	135.3	115.7	127.0	100.8	119.1	129.3	177.5	177.5	155.9	165.7	128.9	156.9	169.7
Esig	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Eout	13.5	13.8	13.4	13.6	13.0	13.0	13.0	13.5	13.8	13.5	13.7	13.3	13.4	13.3
Gain	13.5	13.8	13.4	13.6	13.0	13.0	13.0	13.5	13.8	13.5	13.7	13.3	13.4	13.3
% Dist.	1.1	0.9	1.1	0.8	1.2	0.8	0.8	0.8	0.8	0.8	0.7	0.9	0.7	0.7
Esig	4.19	4.19	4.03	4.51	3.7	4.86	5.42	5.66	5.66	5.4	6.12	5.04	6.44	7.31
Eout	56.5	58.0	54.0	61.5	48.0	63.0	69.8	76.2	78.2	73.0	83.8	66.5	85.5	97.5
Gain	13.5	13.8	13.4	13.6	13.0	13.0	12.9	13.5	13.8	13.5	13.7	13.2	13.3	13.3
% Dist.	4.8	4.4	4.6	4.4	4.8	4.6	4.8	4.9	4.4	4.8	4.5	5.0	4.7	5.0

5687 (7119/E182CC similar)