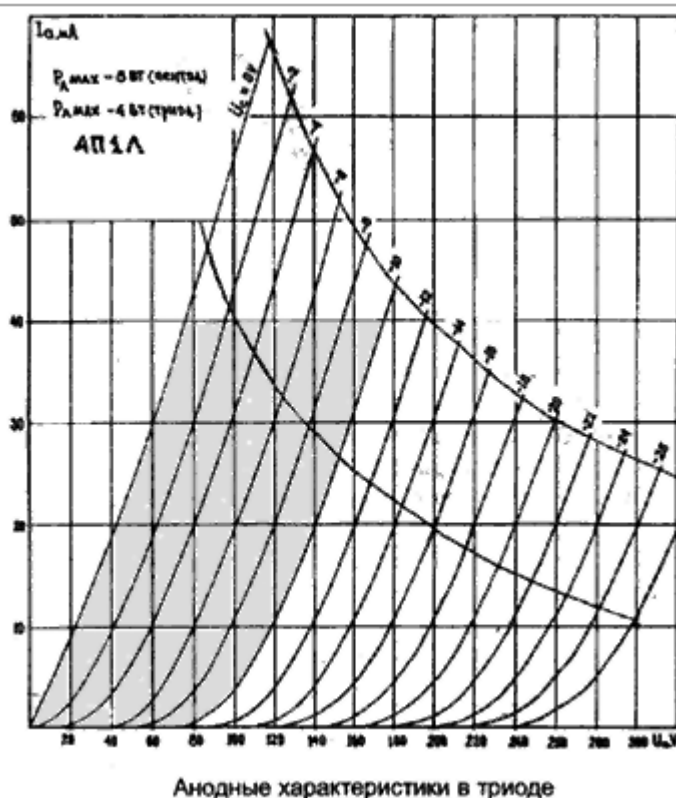




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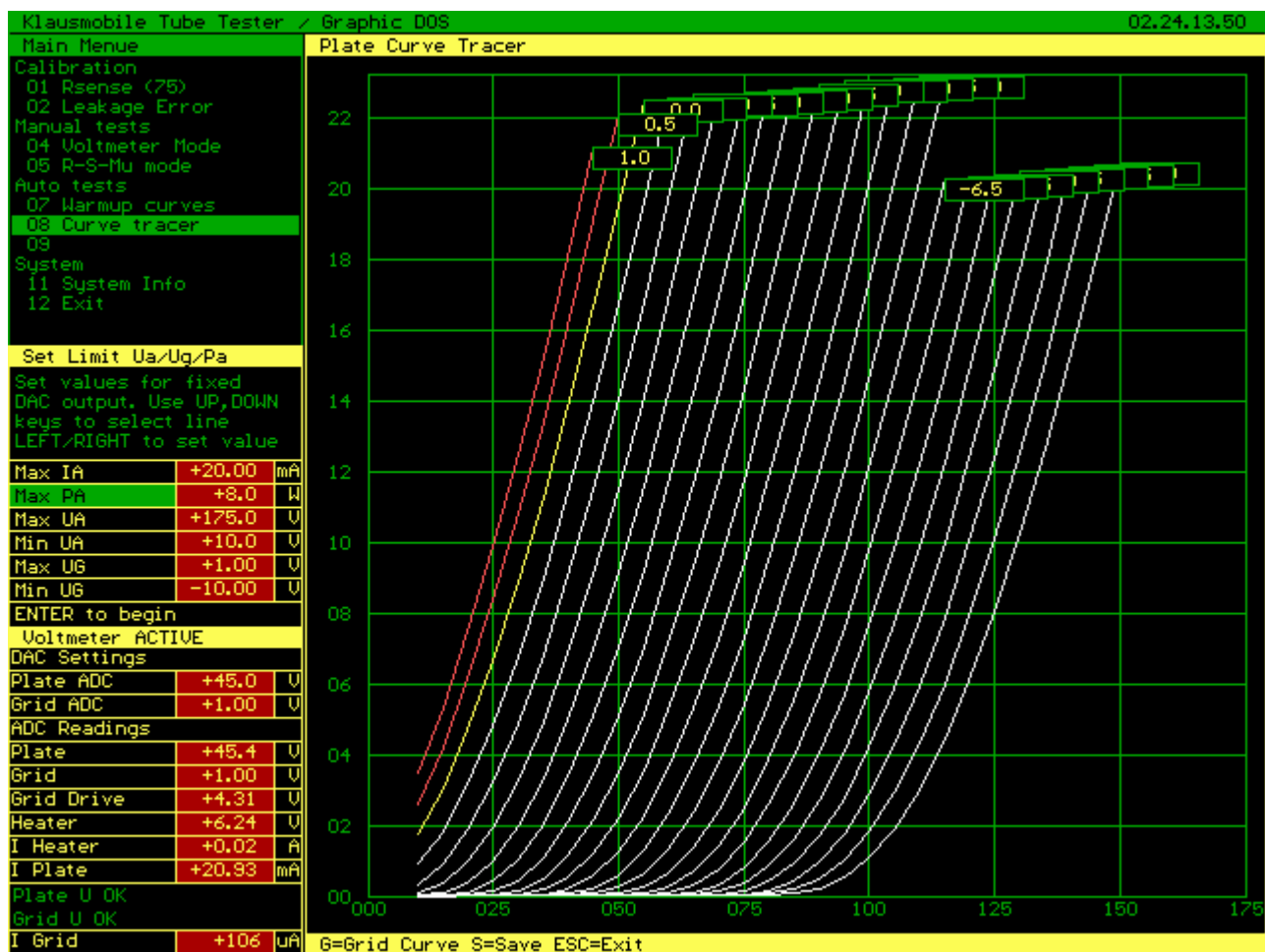
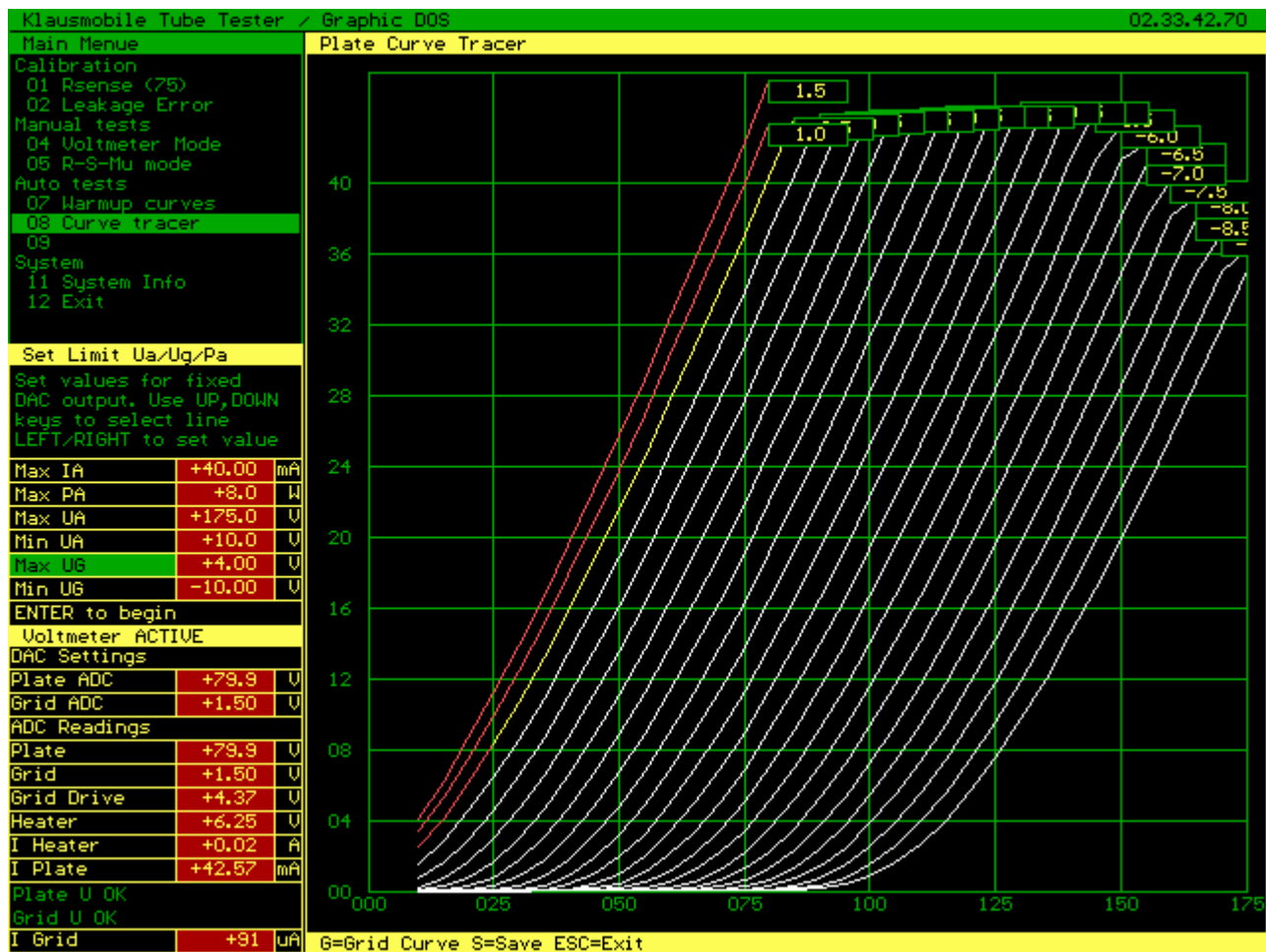
The Last DHT

Or the first DHT that went through Klaustester torture bench. Actually, it is a DH Pentode, but thanks to the late Aleks Belkanov it is labelled 'the last DHT' - it is a locktal tube from the fifties. Here is a triode-connected chart from Belkanov's webzine (shaded area is the tester's range limited by -10V grid source)



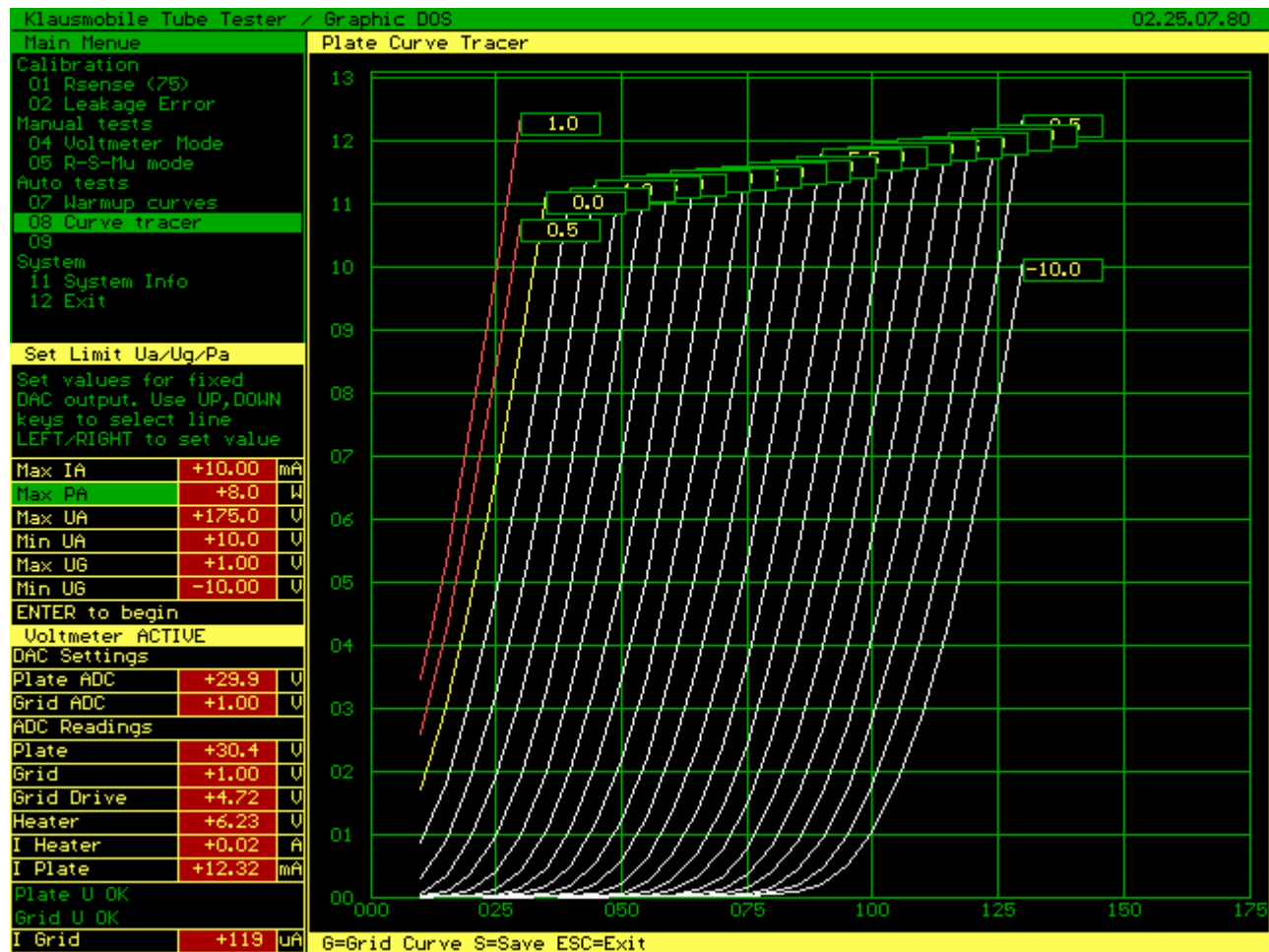
My tester is not fit for direct heating and pentodes, so I powered the tube from a separate battery with a series resistor. Battery negative applied to cathode center tap (pin 8), battery positive to cathode extremes (pin 1, 7). That is, the average cathode potential is 1V above ground (in case of true AC heating it will be exactly at ground). For pentode mode, I attached a separate 80V regulated PS (didn't have a higher voltage) to cathode center pin. Both add-ons don't induce any ground loops.

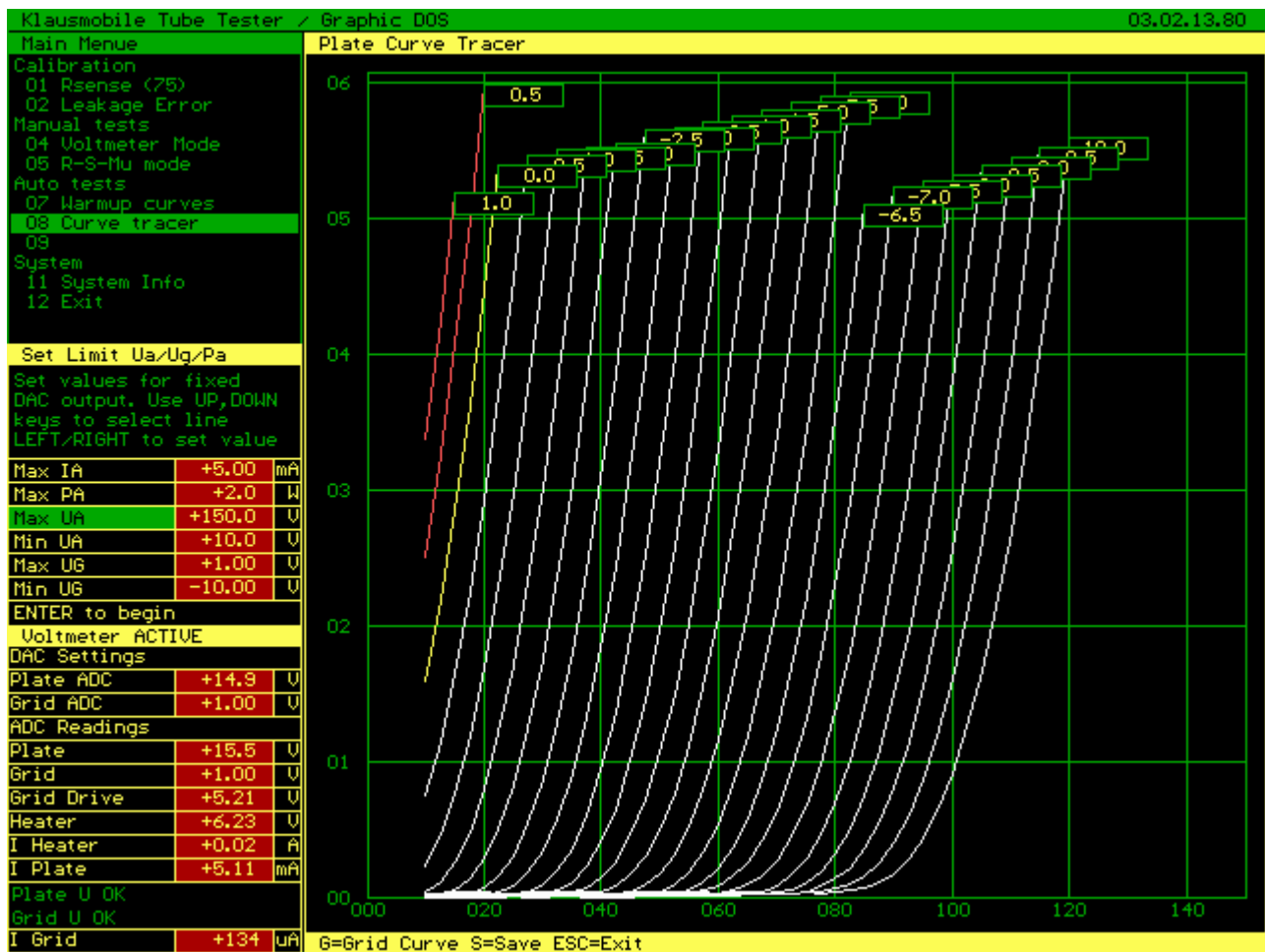
Test sample was quite close to specs.



S/Mu/Rp for Ia=40.0mA and variable Ua/Ug						
Ug,V	Ua,V	Ia,mA	Ga	Gm	Mu	Rp,k
-7.5	157.6	39.21	0.7	15.9	24.3	1.52
-7.0	153.2	39.75	0.7	9.1	13.7	1.49
-6.5	149.0	40.30	0.7	8.6	12.1	1.40
-6.0	144.7	40.62	0.7	8.2	11.7	1.43
-5.5	139.7	40.71	0.7	8.5	11.8	1.38
-5.0	134.8	40.59	0.7	8.2	11.6	1.41
-4.5	130.2	40.76	0.7	7.9	11.3	1.43
-4.0	124.6	40.46	0.7	8.3	11.6	1.38
-3.5	119.7	40.65	0.8	9.2	12.1	1.31
-3.0	114.8	40.42	0.7	8.1	11.1	1.38
-2.5	109.8	40.39	0.7	8.1	11.1	1.37
-2.0	104.9	40.29	0.7	7.8	10.9	1.40
-1.5	99.9	40.33	0.7	8.1	11.1	1.35
-1.0	95.0	40.25	0.7	7.4	10.4	1.40
-0.5	90.1	40.19	0.7	7.4	10.3	1.39
0.0	85.0	40.01	0.7	7.2	10.2	1.42
0.5	80.1	40.07	0.7	7.2	9.8	1.35
1.0	75.1	39.29	0.7	5.4	7.5	1.39
1.5	72.5	39.76	0.7	4.7	6.6	1.41
S/Mu/Rp for Ia=30.0mA and variable Ua/Ug						
Ug,V	Ua,V	Ia,mA	Ga	Gm	Mu	Rp,k
-9.5	162.0	30.07	0.8	10.1	13.5	1.33
-9.0	157.1	29.84	0.7	9.5	13.2	1.38
-8.5	152.1	29.73	0.7	8.7	12.3	1.42
-8.0	147.2	29.62	0.7	8.4	12.2	1.44
-7.5	142.2	29.54	0.7	8.2	11.9	1.44
-7.0	137.2	29.49	0.7	8.1	11.9	1.47
-6.5	132.4	29.43	0.7	7.7	11.4	1.48
-6.0	128.4	30.08	0.7	7.8	11.6	1.49
-5.5	123.5	30.05	0.7	7.7	11.6	1.50
-5.0	118.6	30.00	0.7	7.3	11.0	1.49
-4.5	113.6	29.93	0.7	7.2	11.0	1.52
-4.0	108.6	29.90	0.6	7.0	10.9	1.54
-3.5	104.9	30.59	0.7	7.0	10.8	1.53
-3.0	99.9	30.59	0.7	7.3	10.9	1.50
-2.5	95.0	30.55	0.7	7.1	10.9	1.52
-2.0	90.0	30.49	0.7	6.7	10.2	1.53
-1.5	84.9	30.33	0.7	6.6	10.1	1.53
-1.0	80.0	30.39	0.7	6.9	10.3	1.50
-0.5	75.0	30.31	0.7	6.7	10.3	1.52
0.0	70.1	30.25	0.7	6.3	9.6	1.53
0.5	65.2	30.08	0.6	5.9	9.1	1.54
1.0	61.4	30.05	0.6	4.4	6.8	1.54
1.5	57.7	29.69	0.7	3.6	5.5	1.51
S/Mu/Rp for Ia=20.0mA and variable Ua/Ug						
Ug,V	Ua,V	Ia,mA	Ga	Gm	Mu	Rp,k
-9.5	145.9	20.09	0.6	7.6	12.3	1.61
-9.0	140.9	19.95	0.6	7.3	12.0	1.65
-8.5	136.0	19.88	0.6	7.0	11.8	1.69
-8.0	131.0	19.78	0.6	6.8	11.7	1.72
-7.5	127.2	20.39	0.6	6.8	11.5	1.68
-7.0	122.2	20.35	0.6	6.7	11.4	1.69
-6.5	117.4	20.31	0.6	6.4	11.0	1.70
-6.0	112.3	20.27	0.6	6.3	10.9	1.71
-5.5	107.3	20.24	0.6	6.2	10.7	1.72
-5.0	102.4	20.19	0.6	6.2	10.7	1.72
-4.5	97.5	20.15	0.6	5.9	10.3	1.75
-4.0	92.5	20.12	0.6	6.1	10.7	1.75
-3.5	87.5	20.07	0.6	5.7	10.0	1.75
-3.0	82.4	19.94	0.6	5.6	10.0	1.77
-2.5	77.5	19.94	0.6	5.7	10.2	1.78
-2.0	72.6	19.89	0.6	5.3	9.5	1.78
-1.5	67.6	19.84	0.6	5.3	9.5	1.79
-1.0	62.7	19.80	0.6	5.2	9.3	1.78
-0.5	57.7	19.78	0.6	5.3	9.4	1.78
0.0	52.7	19.71	0.6	5.2	9.3	1.79
0.5	49.0	20.15	0.6	4.4	7.7	1.76
1.0	45.3	20.08	0.6	3.5	6.1	1.73
1.5	42.7	20.26	0.6	2.5	4.3	1.73

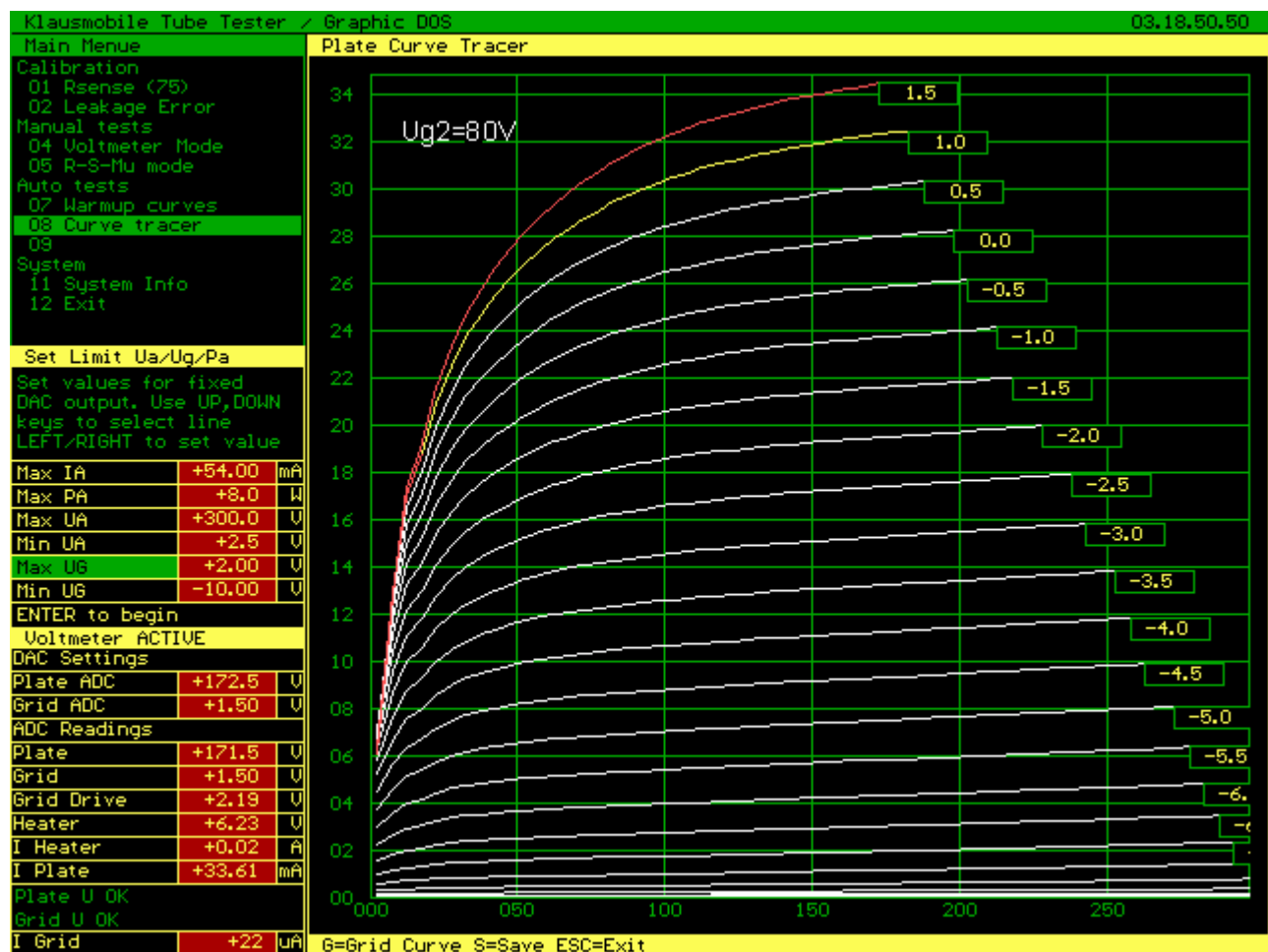
What is unusual is very nice low-power performance. Curves are nice, although my experience is not as rosy: i tried it with 60..80V on plate, battery bias, and the low-current versions (3..6mA) were thin-sounding. Increasing I_a to 15mA ($V_g = -3V$) added 'body', I suspect the tube likes generous currents. See my Projects: Baby of Camel page for schematics



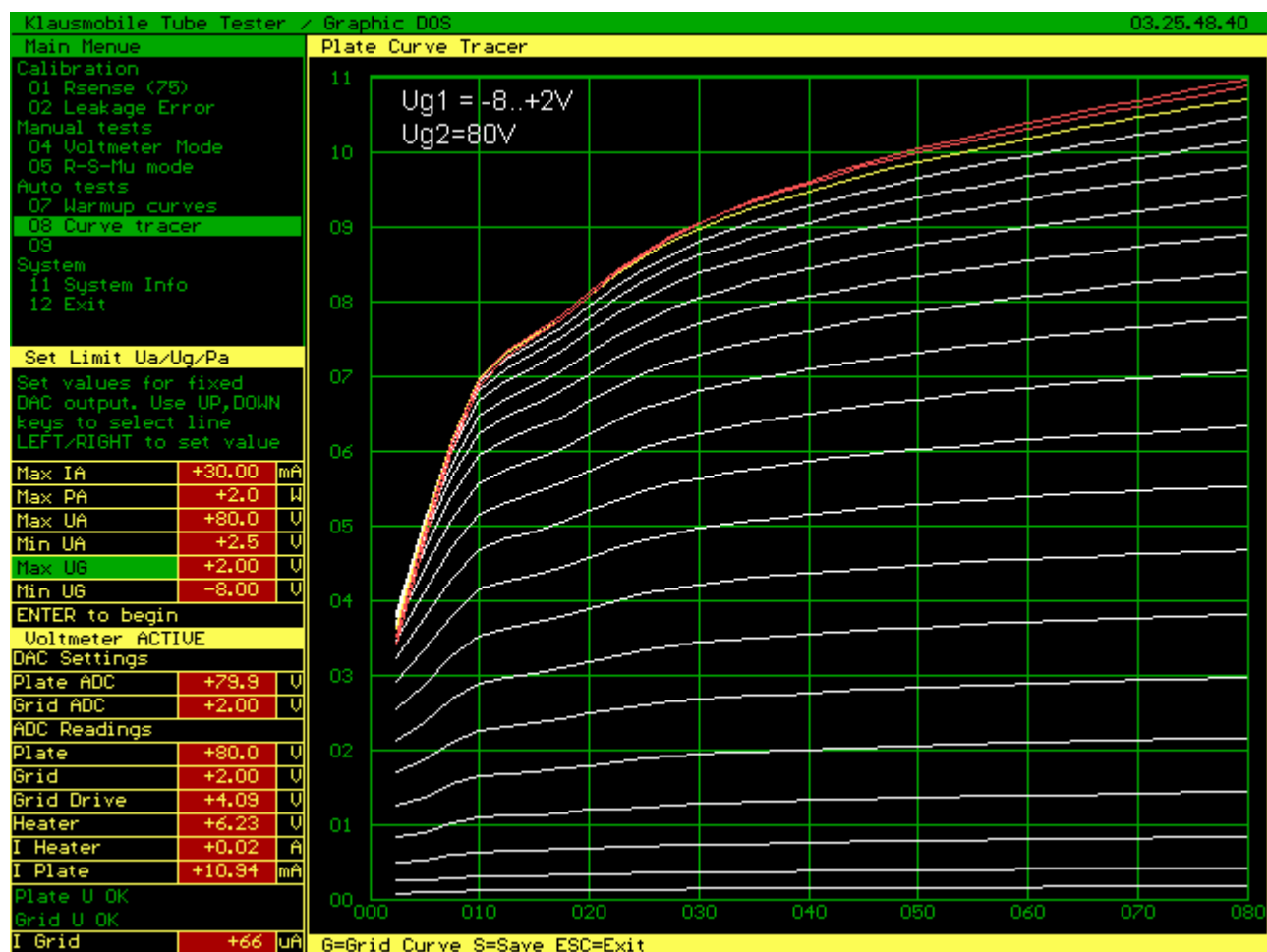


S/Mu/Rp for Ia=10.0mA and variable Ua/Ug						
Ug,V	Ua,V	Ia,mA	Ga	Gm	Mu	Rp,k
-9.5	126.0	9.94	0.4	4.9	11.1	2.25
-9.0	121.1	9.84	0.4	4.8	10.9	2.27
-8.5	116.7	10.04	0.4	4.7	10.8	2.27
-8.0	111.8	9.97	0.4	4.7	10.7	2.29
-7.5	107.4	10.19	0.4	4.8	10.8	2.27
-7.0	102.5	10.13	0.4	4.5	10.0	2.25
-6.5	97.5	10.10	0.4	4.7	10.8	2.28
-6.0	92.5	10.04	0.4	4.4	10.0	2.26
-5.5	87.5	10.01	0.4	4.4	10.1	2.27
-5.0	82.4	9.90	0.4	4.4	10.1	2.27
-4.5	77.5	9.86	0.4	4.4	10.0	2.27
-4.0	72.5	9.84	0.4	4.4	9.9	2.25
-3.5	68.2	10.07	0.4	4.2	9.5	2.24
-3.0	63.2	10.02	0.4	4.2	9.4	2.24
-2.5	58.3	10.01	0.4	4.2	9.5	2.25
-2.0	53.3	9.96	0.4	4.2	9.3	2.22
-1.5	49.0	10.19	0.4	3.9	8.7	2.22
-1.0	44.0	10.16	0.5	3.9	8.7	2.21
-0.5	39.1	10.12	0.4	4.0	8.8	2.22
0.0	34.1	10.07	0.5	3.9	8.6	2.19
0.5	29.8	10.03	0.5	2.9	6.2	2.16
1.0	26.7	10.12	0.5	2.1	4.4	2.09
1.5	24.2	10.16	0.5	1.4	2.8	2.03
S/Mu/Rp for Ia= 5.0mA and variable Ua/Ug						
Ug,V	Ua,V	Ia,mA	Ga	Gm	Mu	Rp,k
-9.5	113.7	5.05	0.3	3.4	11.0	3.20
-9.0	108.7	4.97	0.3	3.3	10.8	3.20
-8.5	104.1	5.00	0.3	3.2	10.2	3.20
-8.0	99.4	5.04	0.3	3.2	10.1	3.10
-7.5	94.3	4.94	0.3	3.2	10.2	3.20
-7.0	89.7	4.97	0.3	3.2	10.1	3.10
-6.5	84.9	5.03	0.3	3.2	10.0	3.10
-6.0	80.0	4.97	0.3	3.2	10.0	3.10
-5.5	75.0	4.94	0.3	3.2	10.0	3.00
-5.0	70.6	5.09	0.3	3.1	9.4	3.00
-4.5	65.7	5.03	0.3	3.1	9.3	3.00
-4.0	60.7	4.99	0.3	3.1	9.4	3.00
-3.5	55.8	4.94	0.3	3.1	9.4	3.00
-3.0	51.1	5.00	0.3	3.1	9.3	3.00
-2.5	46.5	5.07	0.3	3.0	8.8	2.98
-2.0	41.5	5.04	0.3	2.9	8.8	2.96
-1.5	36.6	5.00	0.3	3.0	8.8	2.96
-1.0	31.6	4.97	0.3	3.0	8.8	2.95
-0.5	26.7	4.92	0.3	2.8	8.1	2.94
0.0	22.3	5.06	0.3	2.7	7.9	2.89
0.5	17.9	4.91	0.3	2.0	5.6	2.85
1.0	15.4	5.09	0.4	1.5	4.1	2.73
1.5 Failed to set Ua for this Ug						

Pentode mode measurements for 80V at G2, 0V at G3



Note the obvious kinked pattern at low voltage (Vp stepped by 2.5V)



At low V_p and positive V_g voltage gain, indeed, becomes negative (red curves on the chart above drop below the white curves).

S/Mu/Rp for Ia=20.0mA and variable Ua/Ug						
Ug,V	Ua,V	Ia,mA	Ga	Gm	Mu	Rp,k
-1.5	120.2	20.06	0.1	4.9	82.7	16.90
-1.0	60.5	20.17	0.1	4.2	43.3	10.30
-0.5	40.4	20.20	0.2	3.7	24.0	6.40
0.0	30.5	20.20	0.3	3.1	12.4	3.90
0.5	25.5	20.23	0.4	2.5	6.8	2.77
1.0	21.7	19.88	0.4	1.4	3.1	2.31
1.5	20.5	19.99	0.4	0.6	1.3	2.22
S/Mu/Rp for Ia=10.0mA and variable Ua/Ug						
Ug,V	Ua,V	Ia,mA	Ga	Gm	Mu	Rp,k
-4.0	120.2	9.97	0.1	4.6	58.6	12.60
-3.5	30.4	9.85	0.1	3.7	28.7	7.70
-3.0	20.5	10.17	0.2	3.2	17.2	5.30
-2.5	10.6	9.91	0.5	2.3	4.7	2.04
-2.0	8.7	10.01	0.8	1.4	1.7	1.27
-1.5	7.4	9.90	1.2	0.5	0.5	0.86
-1.0	6.8	9.98	1.4	-0.1	-0.1	0.70
-0.5	6.5	10.06	1.6	-0.8	-0.5	0.62
0.0	6.2	9.92	1.8	-1.1	-0.6	0.56
0.5	6.2	9.96	1.9	-2.3	-1.2	0.53
1.0	6.2	9.87	1.9	-2.8	-1.5	0.52
1.5	6.5	10.15	1.8	-3.1	-1.7	0.55

Legend: White curves: $I_g < 5\mu A$ Yellow: $5 < I_g < 20\mu A$ Red: $20 < I_g < 300\mu A$.
Measurements terminate at $I_g > 300\mu A$

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