Measure Step Size caused by the Screen Bypassing Network

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This paper covers measurements made to determine the frequency response step size caused by the screen bypass circuit in a voltage amplifier pentode.

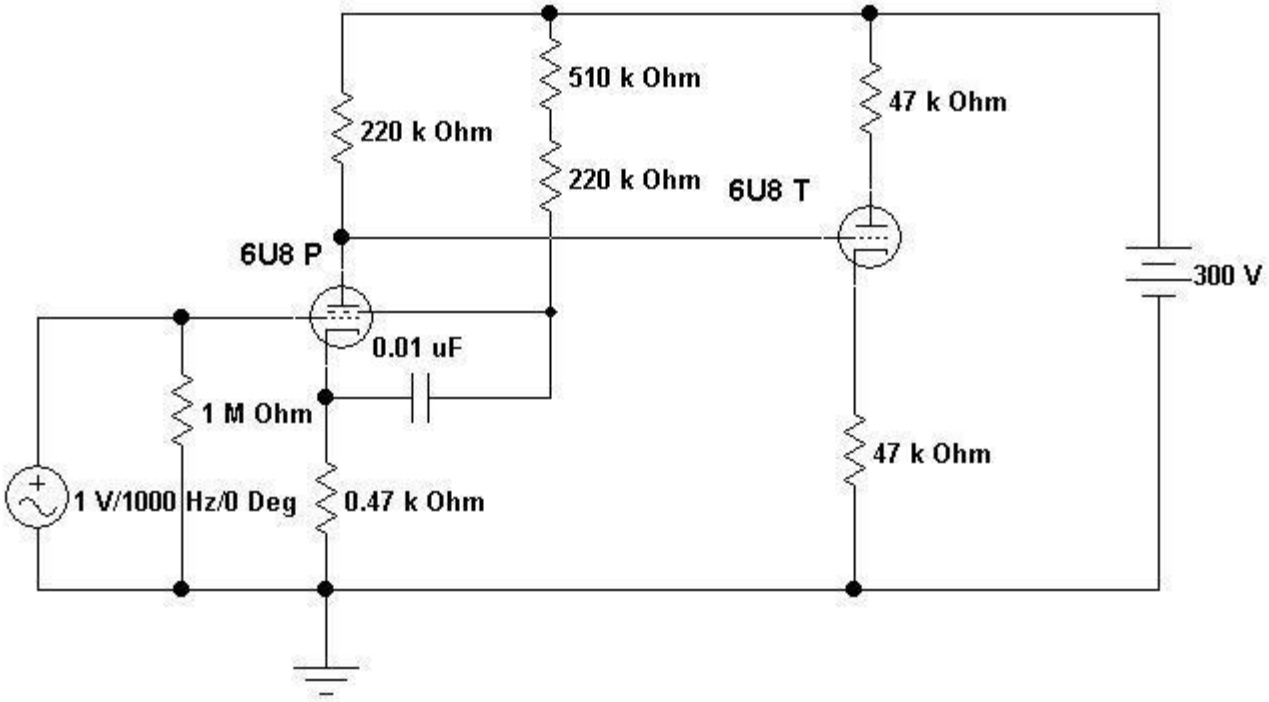
Two similar circuits were used in this trial. Neither is optimized. In one circuit the screen grid is supplied DC in the ordinary way from the plate supply. In the alternative circuit a screen DC connexion thru a suitable resistance back from the following cathode of a DC coupled split load phase inverter is used. Each has certain advantages & problems. Refer to the schematics.

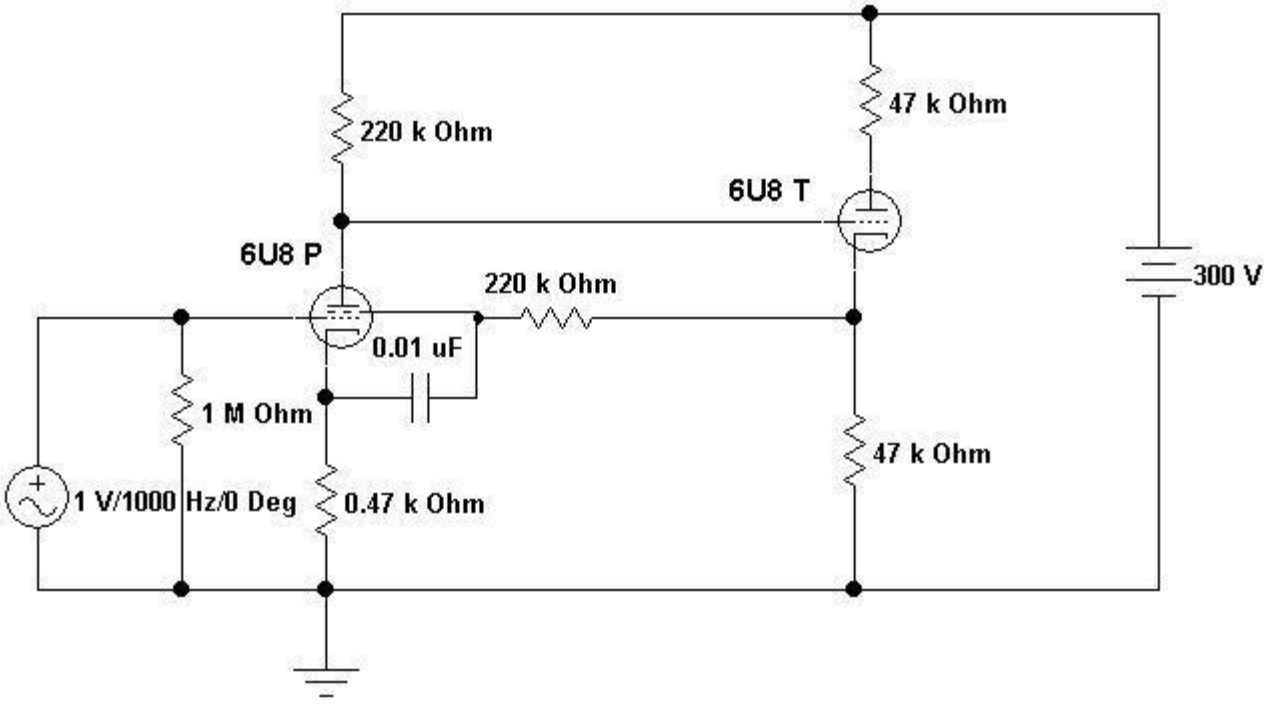
The signal generator is direct connected to grid one of the 6U8 pentode section. There is no capacitor in order that there be no other RC time constant in circuit that might cause errors during the tests. Notice the screen bypass capacitor is rather low capacity. The test equipment would take a very long time while operating at low frequency in order to acquire the data. Shifting the frequency by using a smaller RC time constant eliminates that problem. The resulting step remains the same size.

The Pico Technology Scope/ Spec A has a max input of +/- 20 volts. With the X10 Differential Probe that becomes +/- 200 volts. So the gain measurements are all taken off the cathode of the triode section of the 6U8. If taken off the plate connexion of the 6U8 pentode the probe would need to be set to X100 which would result in less measurement resolution. The experimenter needs to know as much about what his equipment will not do as what it will.

For the ordinary circuit-	in	out	Gain	Gain db
Bypass cap connected	100 mV	12.54 V	125	42
Bypass cap disconnected	100	3.59	35.9	31
		Step is ~ 11 db		
Bypass cap disconnected	182 mV	6.14 V	33.7	30.6
Bypass cap connected	182	18.8	102.2	40.2
		Step is ~ 10 db	almost clipping	
For the CF to G2 circuit-	**in**	**out**	**Gain**	**Gain db**
Bypass cap disconnected	99 mV	2.11 V	21.2	26.5
Bypass cap connected	103	7.89	76.6	37.7
		Step is ~ 11 db	overloaded	
Bypass cap connected	50 mV	4.87 V	97.4	39.8
Bypass cap disconnected	48	1.04	21.7	26.7
		Step is ~ 13.1 db	almost clipping	

Terman reports phase shift for screen steps in this range have maximums of 25-40 degrees.


510 k Ohm
47 k Ohm
220 k Ohm
220 k Ohm
6U8 T
6U8 P
300 V
0.01 uF
1 M Ohm
47 k Ohm
1 V/1000 Hz/0 Deg
0.47 k Ohm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