ENGINEERING SKETCH PAD

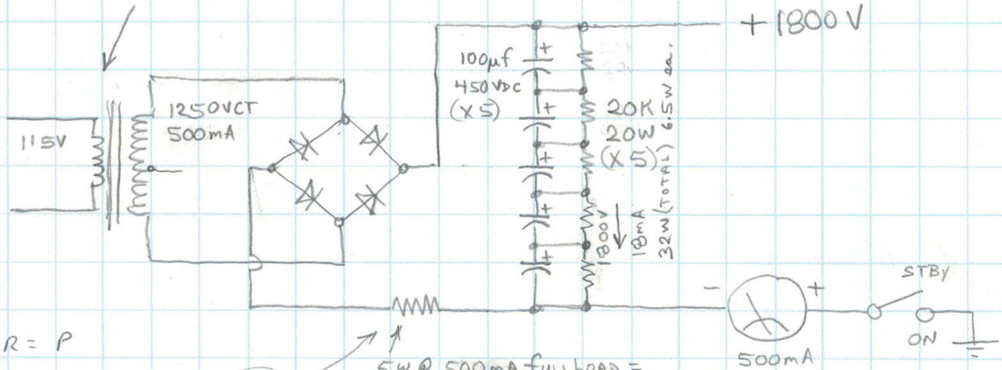
BY:	DATE:	SUBJECT:	SHEET NO.: of
CHECKED BY:	DATE:		JOB NO.:

RCA XFMR (FILAMENT)

PLATE SUPPLY

W/O 5V WINDING, 123 V IN = DC 1890 V OUT

W/5V WINDING 123V IN = DC 1800V (NO LOAD)



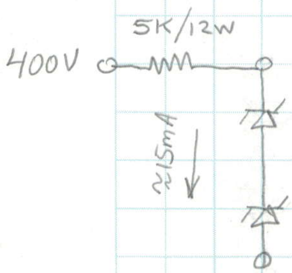
$I^2R = P$

$\frac{.5^2 R}{.5^2} = \frac{5}{.5^2} = \frac{5}{.25} = 20\Omega$, $P = 5W$ < 10 VOLT DROP>

5w @ 500mA FULL LOAD =

if 50Ω, P(W) @ 500mA = $.5^2 \times 50 = 12.5W$ < 25 VOLT DROP>

* TURN-ON CURRENT PULSE = 6 mS @ 175 VOLTS ACROSS 50 Ω = 3.5 Amps



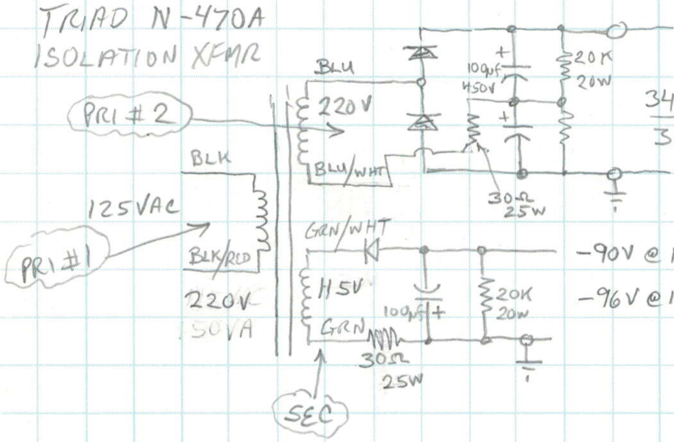
$P = I^2R = E \times I = \frac{E^2}{R} \Big/ 50w = \frac{100^2}{R} = \frac{100^2}{50} = 200\Omega \Big/ 10w = \frac{100^2}{10w} = R = 1000\Omega$

$50w = \frac{200^2}{R}$ $R = \frac{200^2}{50} = 800\Omega \Big/ 10w = \frac{200^2}{R}$, $R = \frac{200^2}{10} = 4K\Omega$

50mA MAX = $4K\Omega \times .05^2 = 10W$

TRIAD N-470A
ISOLATION XFMR

SCREEN SUPPLY & NEG. BIAS



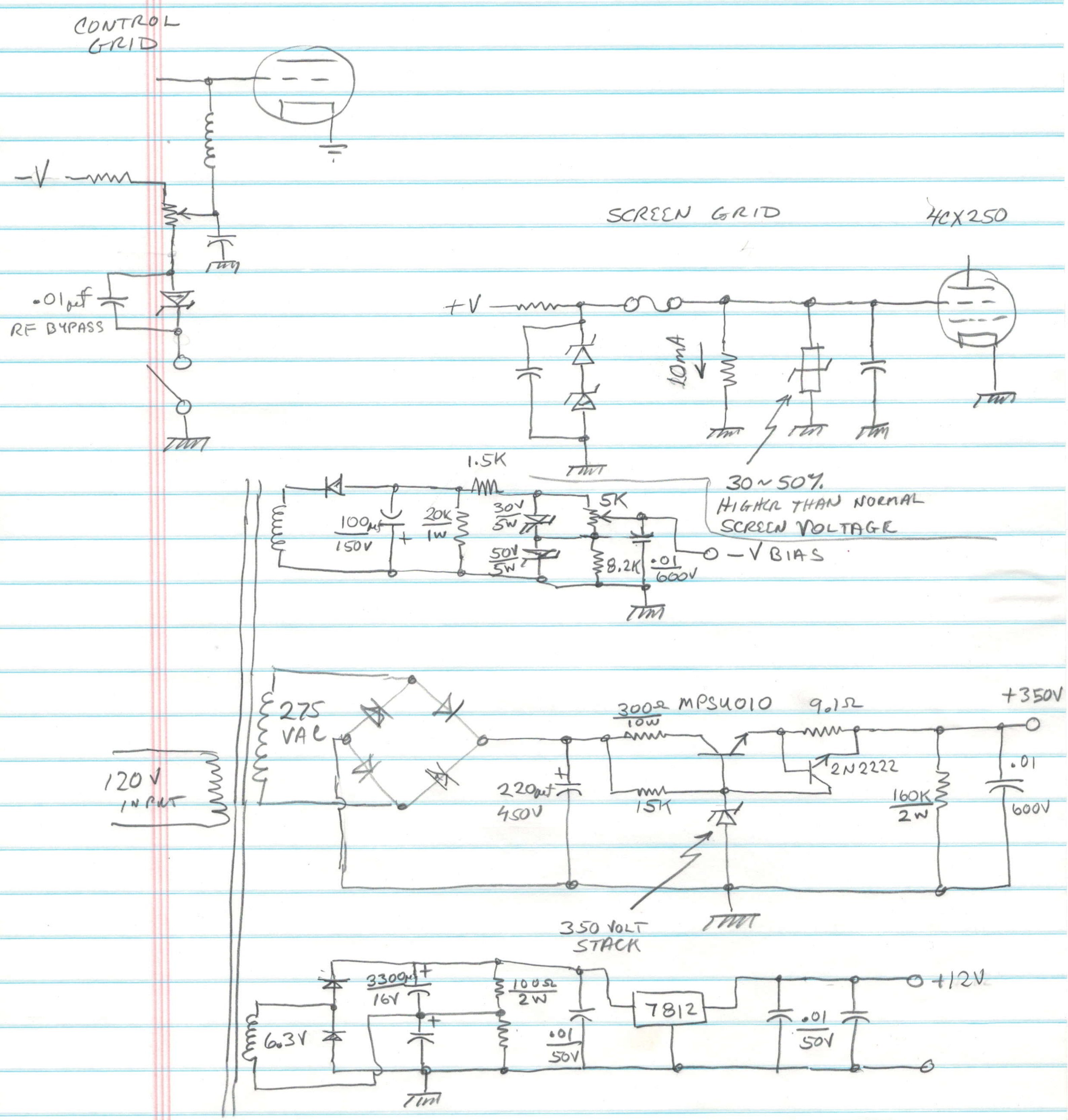
340VDC @ 125VAC INPUT

310VDC @ 115VAC INPUT

-90V @ 115VAC INPUT

-96V @ 125VAC INPUT

4CX250 GRID SUPPLYS



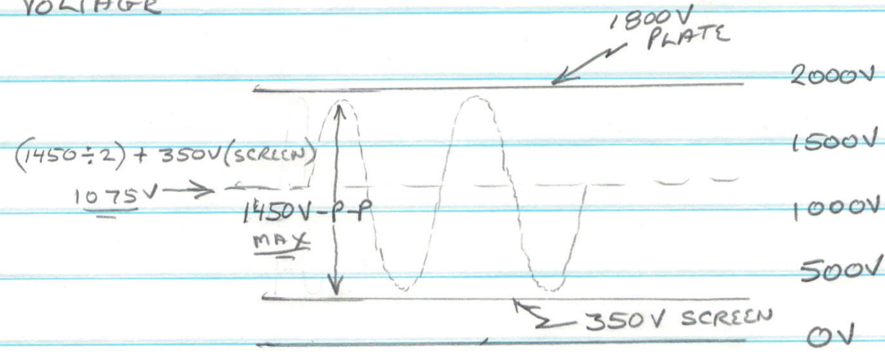
POWER AMPLIFIER FUNDAMENTALS

— $i_p = g_m \times e_g$ —

WHERE: i_p = PLATE CURRENT

g_m = TRANSCONDUCTANCE (mu) $\Delta i_p / \Delta e_g$

e_g = GRID RF VOLTAGE



—DETERMINE PLATE LOAD RESISTANCE—

OPTIMUM TUBE LOAD RESISTANCE =

$$R_L = \frac{V_P}{K \times I_P}$$ WHERE;

R_L = THE APPROPRIATE LOAD RESISTANCE, IN OHMS

V_P = DC PLATE POTENTIAL, IN VOLTS

I_P = DC PLATE CURRENT, IN AMPS

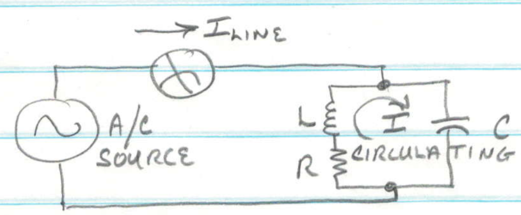
K = <A CONSTANT THAT APPROXIMATES THE RMS CURRENT FOR EACH CLASS of OPERATION>:

CLASS A, $K \approx 1.3$

CLASS AB, $K \approx 1.5 \sim 1.7$

CLASS B, $K \approx 1.57 \sim 1.8$

CLASS C, $K \approx 2$



$Q = \frac{X}{R}$

—TANK CIRCUIT Q—

SINCE BOTH CIRCULATING CURRENT AND Q ARE PROPORTIONAL TO $1/R$, CIRCULATING CURRENT IS THEREFORE PROPORTIONAL TO Q. THE TANK CIRCULATING CURRENT THEREFORE EQUALS LINE CURRENT TIMES Q:

EX: IF LINE CURRENT = 100 mA & Q = 10; I CIRCULATING = 1 AMP!

— TANK Q CONT. —

WHEN THERE IS NO LOAD CONNECTED TO THE TANK, THE ONLY RESISTANCES CONTRIBUTING TO R ARE THE LOSSES IN THE TANK CIRCUIT. THE "UNLOADED Q" (Q_u) IN THAT CASE IS:

$$Q_u = \frac{X}{R_{LOSS}}$$

WHERE: X = REACTANCE of EITHER INDUCTOR or CAPACITOR
R_{LOSS} = EFFECTIVE SERIES LOSS RESISTANCE IN THE CIRCUIT.

* A LOAD CONNECTED TO A TANK CIRCUIT HAS EXACTLY THE SAME EFFECT ON TANK OPERATION AS CIRCUIT LOSSES. (BOTH CONSUME ENERGY) CIRCUIT LOSSES BECOME HEAT RATHER THAN USEFUL OUTPUT.

WHEN ENERGY IS COUPLED OUT of THE TANK TO A LOAD, THE LOADED Q (Q_L) IS.

$$Q_L = \frac{X}{R_{LOSS} + R_{LOAD}}$$

WHERE R_{LOAD} IS THE LOAD RESISTANCE. R_{LOSS} SHOULD BE AS SMALL AS PRACTICAL TO YIELD THE HIGHEST VALUE of UNLOADED Q.

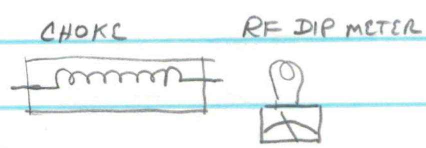
$$\text{TANK EFFICIENCY} = \frac{R_{LOAD}}{R_{LOAD} + R_{LOSS}} \times 100 = \%$$

ALSO ALGEBRAICLY:

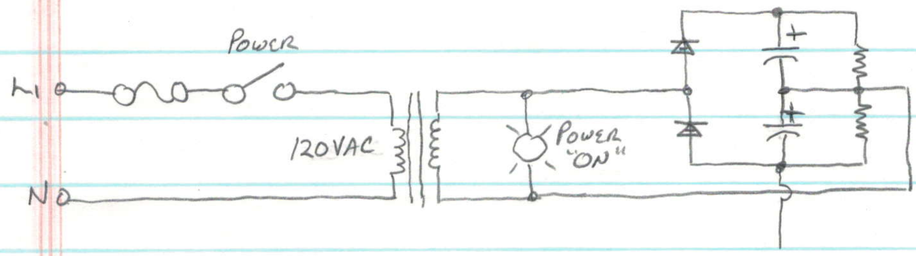
$$\left(1 - \frac{Q_L}{Q_u}\right) \times 100$$

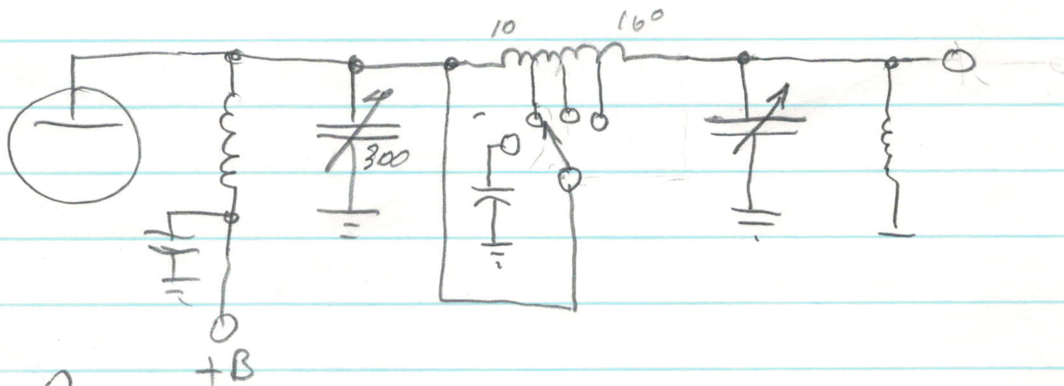
WHERE Q_L = TANK CIRCUIT LOADED Q
Q_u = UNLOADED Q of THE TANK CIRCUIT.

— RF CHOKES —



USE A DIP METER TO CHECK for UNWANTED RESONNANT RISE NEAR ANY DESIRED OPERATING FREQUENCYS





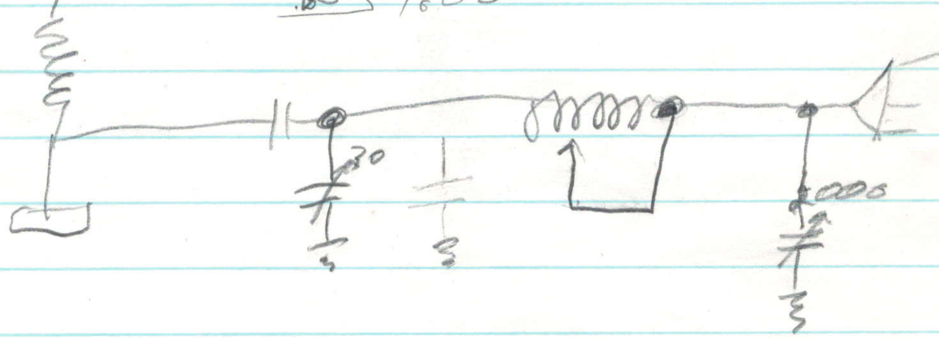
—PAUL—
W7KBE

3885
7:00–9:00 AM

7282
3:30–4:30

$R = \frac{E}{I} \quad \frac{1800}{.5} - \quad \frac{1800}{.2}$

$.2 \overline{)\,3000\,} \quad 1600$



212-00L

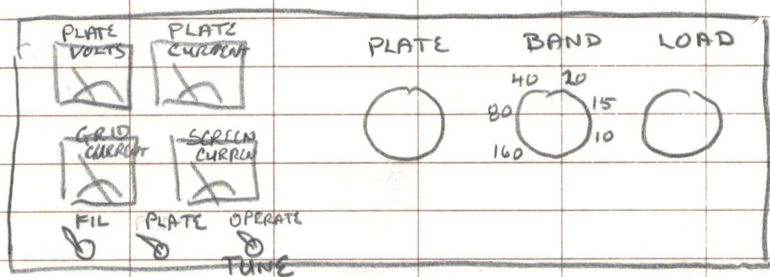


PLATE VOLTS
PLATE CURRENT
GRID CURRENT
SCREEN CURRENT
FIL
PLATE
OPERATE
TUNE
PLATE
BAND
40
20
80
15
10
160
LOAD