

INTERIM MANUAL
SIGMA XR-3000D LINEAR AMPLIFIER

SPECIFICATIONS

Frequency Coverage:	Ham bands 160 through 10 meters plus MARS.
Plate Input:	2000 watts PEP on SSB. 1000 watts DC on CW and RTTY.
Drive Requirements:	100 Watts PEP on SSB. 75 watts on CW and RTTY.
Input Impedance:	50 ohms.
Output Impedance:	PI-network adjusts for 50-100 ohms. (Antenna SWR should not exceed 2:1).
Plate Voltage:	2700 volts (use caution).
Tube Complement:	A pair of EIMAC 3-500Z's.
Power Requirements:	AC Input of 117 v AC @ 30 amps 50/60 Hz. or 230 v AC @ 15 amps 50/60 Hz.
Cooling:	Forced air with quiet fan.
Meters:	One for plate current exclusively. One for grid current, HV and power out. Both meters illuminated.

OPERATION

CAUTION:

Because of the high voltage in the SIGMA XR-3000D, extreme care should be used if the amplifier is to be operated with the covers removed.

- | | |
|------------------|--|
| 1. Power | AC ON/OFF switch. |
| 2. HI-Low | This switch is used normally in the <u>*High*</u> position for 2kw SSB. It should be switched to <u>*Low*</u> for initial tuning up after a band or frequency change and for CW-RTTY. |
| 3. Stby/Send | This switch is used to control the amplifier. In the <u>*Stby*</u> position the exciter can be tuned & loaded into the antenna. The send position allows the amplifier to operate either PTT or VOX (connect pins 6 & 7 on remote to the amplifier control on your exciter). |
| 4. Band | Selects the appropriate circuit components to resonate the amplifier on the amateur band selected (160 through 10 meters). |
| 5. Load | Adjusts the output impedance of the Sigma XR-3000D to match the antenna load impedance (SWR should be under 2:1). |
| 6. Plate | Tunes the tank circuit for maximum output. |
| 7. Meter | Indicates plate current. |
| 8. Meter | Multimeter, Indicates grid current, plate voltage and relative power output. |
| 9. Sensitivity | Adjusts power output meter reading for on scale reading. |
| 10. Meter Switch | Selects display for multimeter (8). |

TUNING

Initial Adjustments:

Connect the antenna (or dummy load), remote and RF input connections from the exciter.

With the amplifier AC power *Off*, tune and load the exciter on the band and frequency chosen.

Control Positions:

Power	Off
Power Switch	Tune
Band	Same as exciter
Plate	Center of band
Load	Fully CCW
H-L Switch	Low
Stby/Send	Stby

Adjustment Method:

- (1.) Turn the power switch to on. Check that the fan is operational.
- (2.) Flick Stby/Send switch to send, the plate current should read approximately 100MA and the plate voltage approximately 2.3KV.
- (3.) Apply RF power from the exciter (usually operated in the tune mode) increasing it until the plate current is approximately 0.4 amp. Tune the plate control for a peak in RF out indication. H-L switch to High alternately adjust the load and plate controls while increasing the exciter power output in small steps until the amplifier is tuned and loaded for maximum RF out. The plate meter will be approximately 0.5 amps (this corresponds to 1000 watts DC input). For SSB approximately 0.8 amps for 2000 watts PEP.

When using SSB, the amplifier grid current should be approximately 200-250 MA.

NOTE: While transmitting with the XR-3000D over extended periods of time, the final amplifier plates may show a bright red color. This is normal and does not detract from the life of the tubes. If the plates display a very bright orange or yellow color the XR-3000D should be checked immediately to determine that it is not being overdriven and that it is tuned up properly. The XR-3000D should not be turned off immediately after long periods of transmitting, but should be left on standby for several minutes with zero plate Amperes to allow the final amplifier tubes to cool down.

The current and voltage figures given in this section are approximations. Actual readings will vary at each installation with such factors as line voltage, exciter drive, and load impedance.

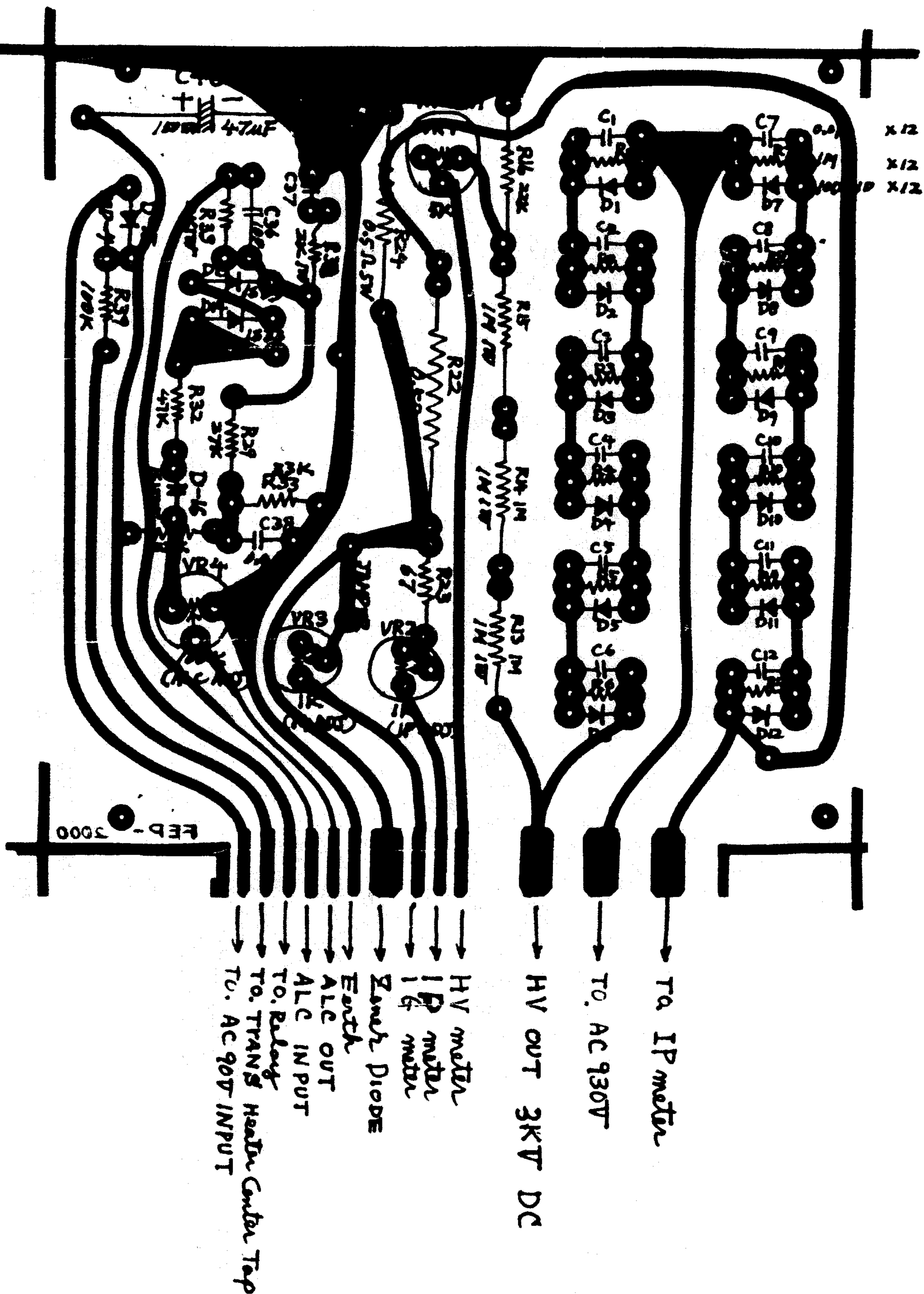
THEORY OF OPERATION

The Sigma XR-3000D is a 160 through 10 meter Linear amplifier using two grounded grid triodes. Refer to the schematic. Transformer T1 is the plate transformer, the output of which is rectified and applied to the plate of the tubes. Transformer T2 provides the filament power and the bias voltage to turn off the tubes in *Stby*. Exciter ALC is generated by diodes D13 & D14. The ALC level can be adjusted by VR4 to a level suitable for the exciter.

The Sigma XR-3000D is supplied factory wired for 230 AC. Should you wish to change it to 117 VAC refer to the following diagrams.

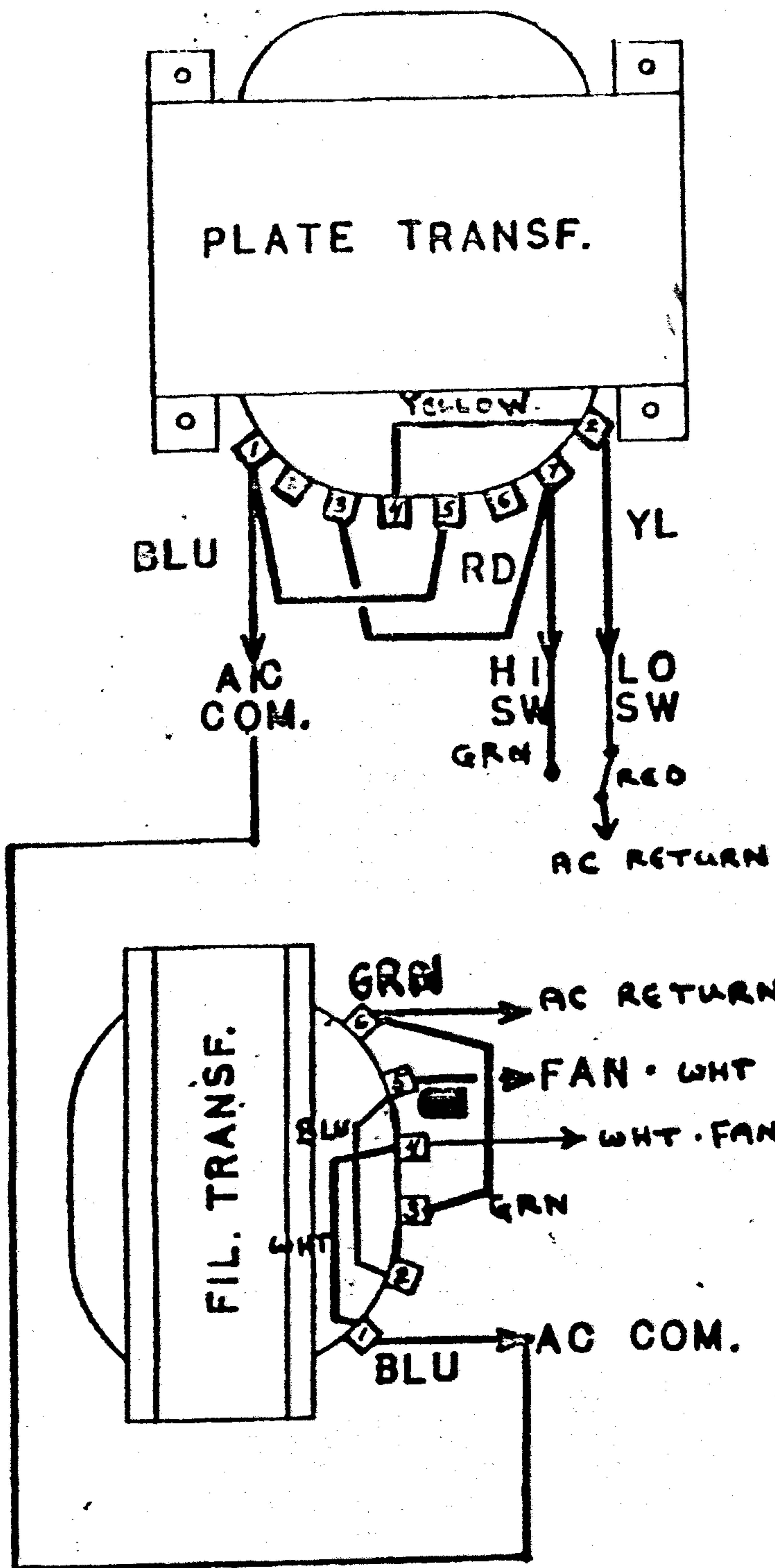
NOTE: Carefully check after rewiring the transformers (both plate & filament must be changed as well as fan wiring).

XR-30000 PRINTED CIRCUIT BOARD

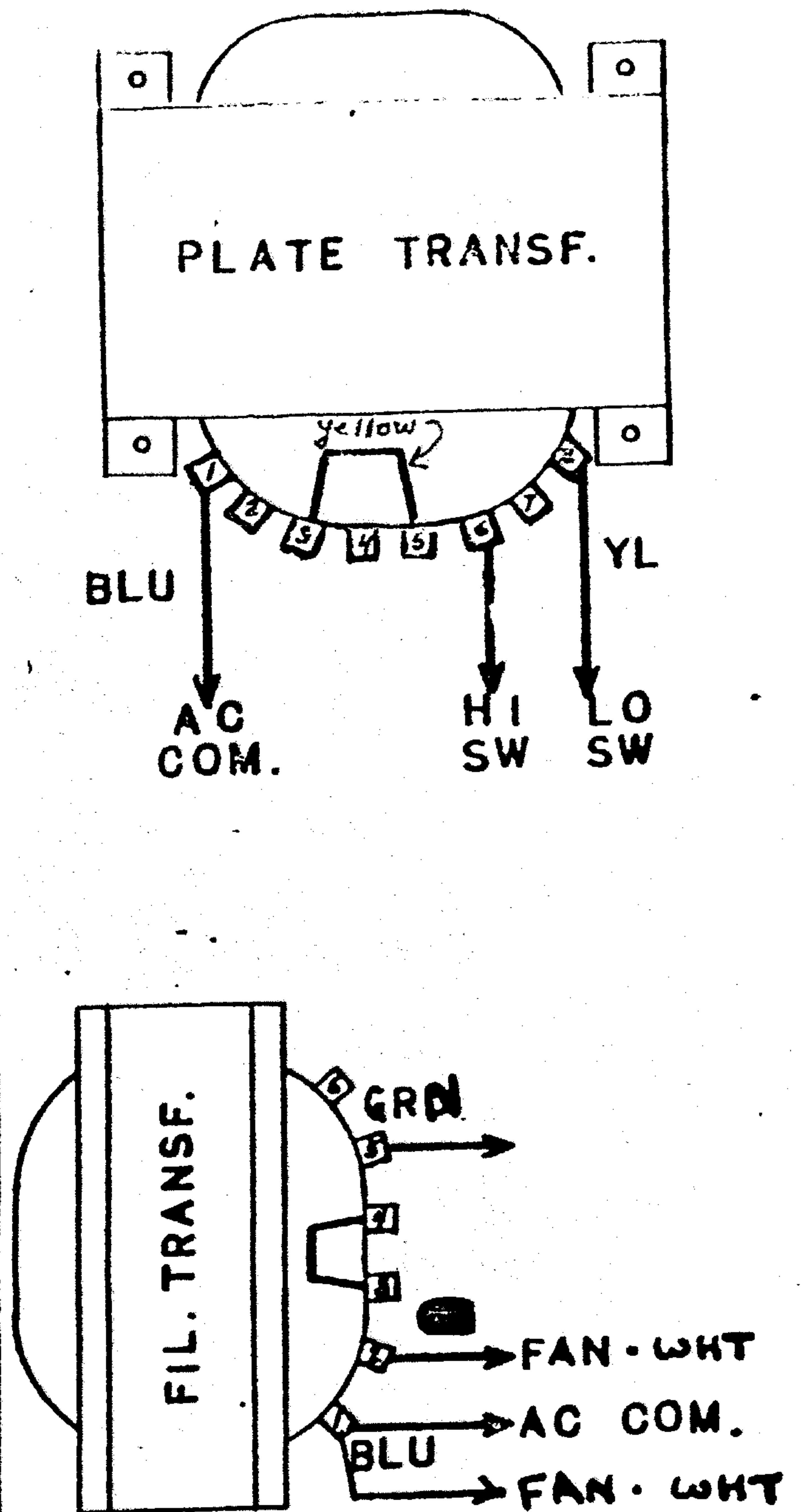


SIGMA XR-3000D

117V WIRING (FACTORY)

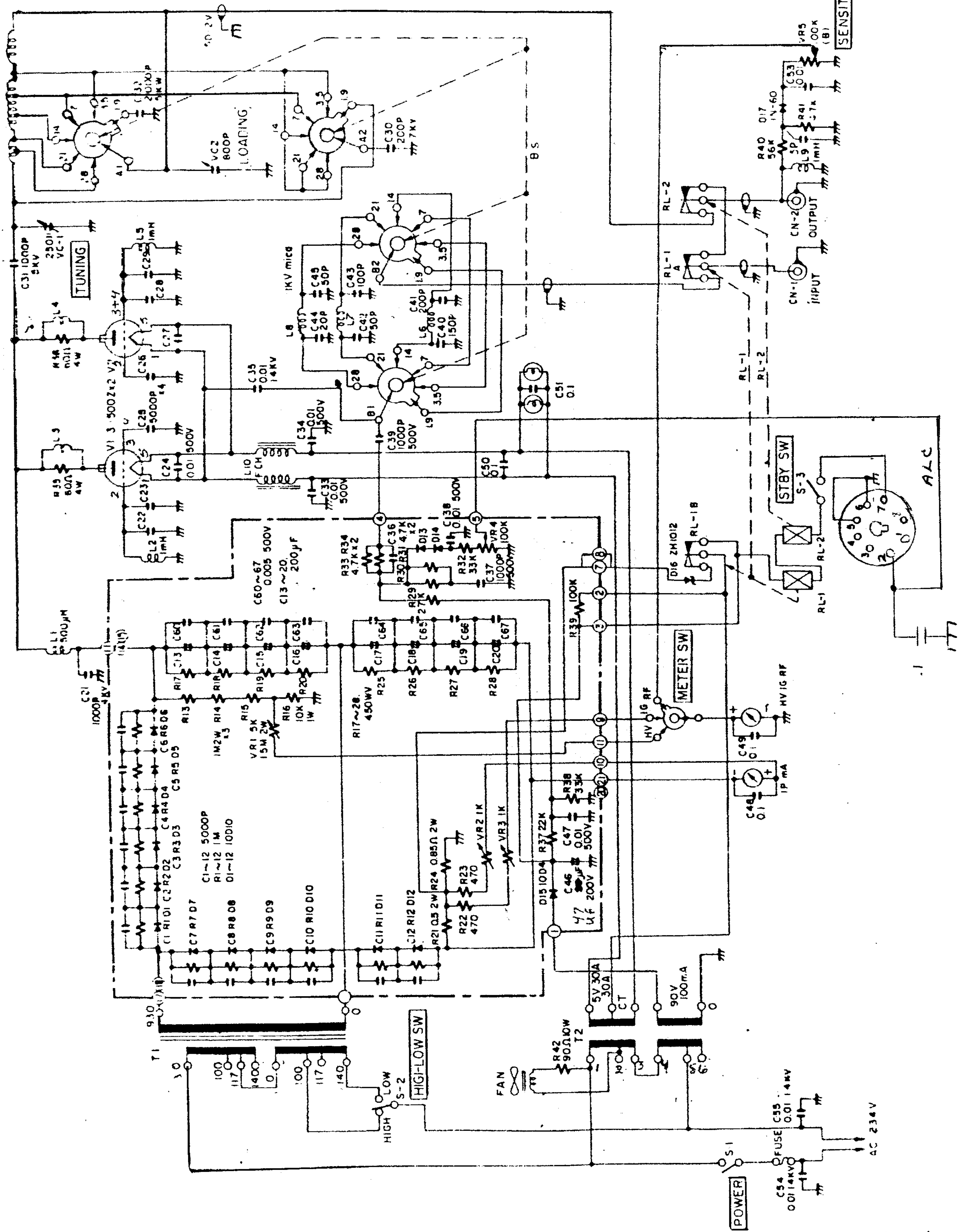


220V WIRING



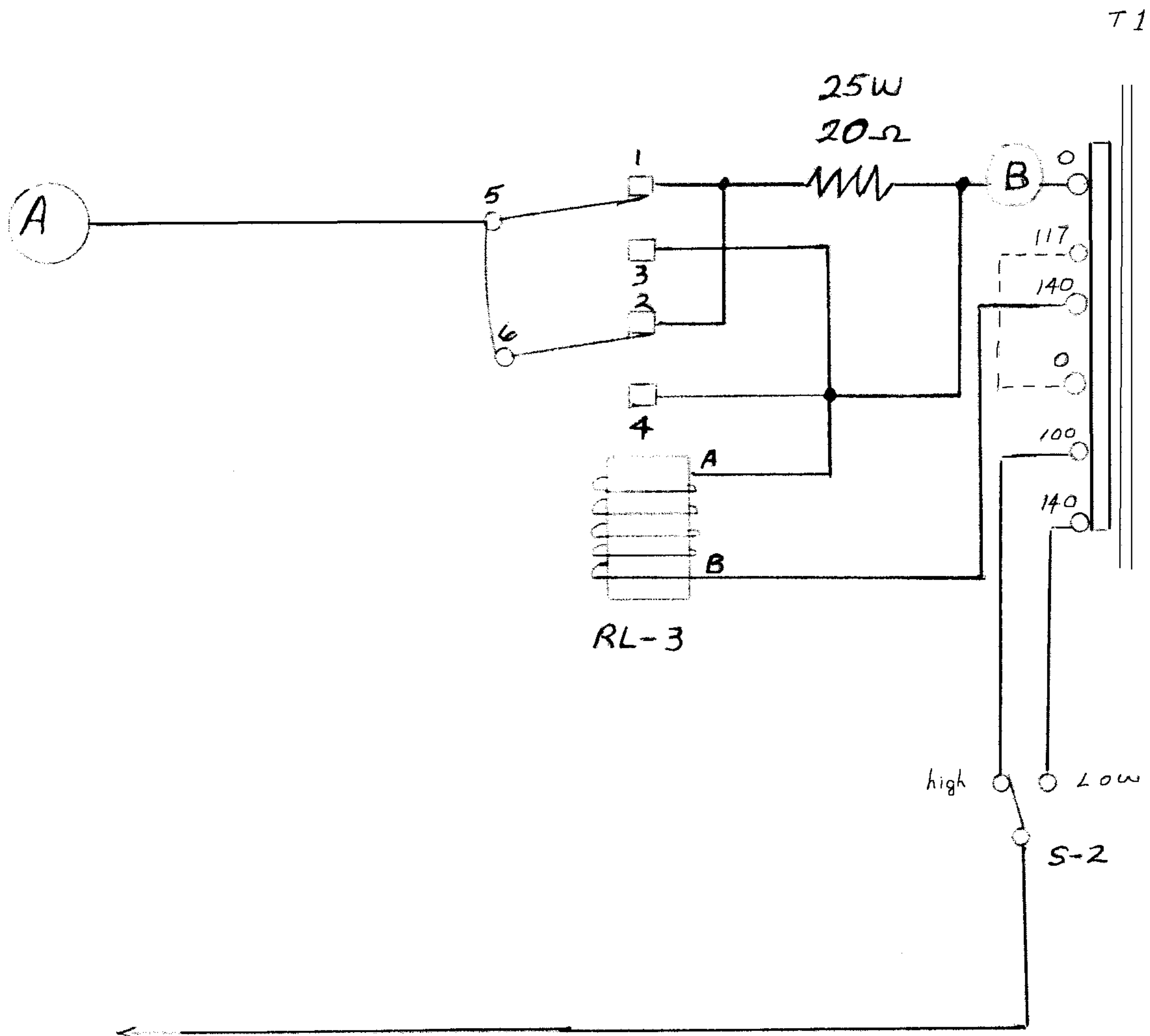
REVISED WIRING DIAGRAM

SIGMA XR-3000 D LINEAR AMPLIFIER



6/2002

XR-3000D START-UP CURRENT-LIMITING



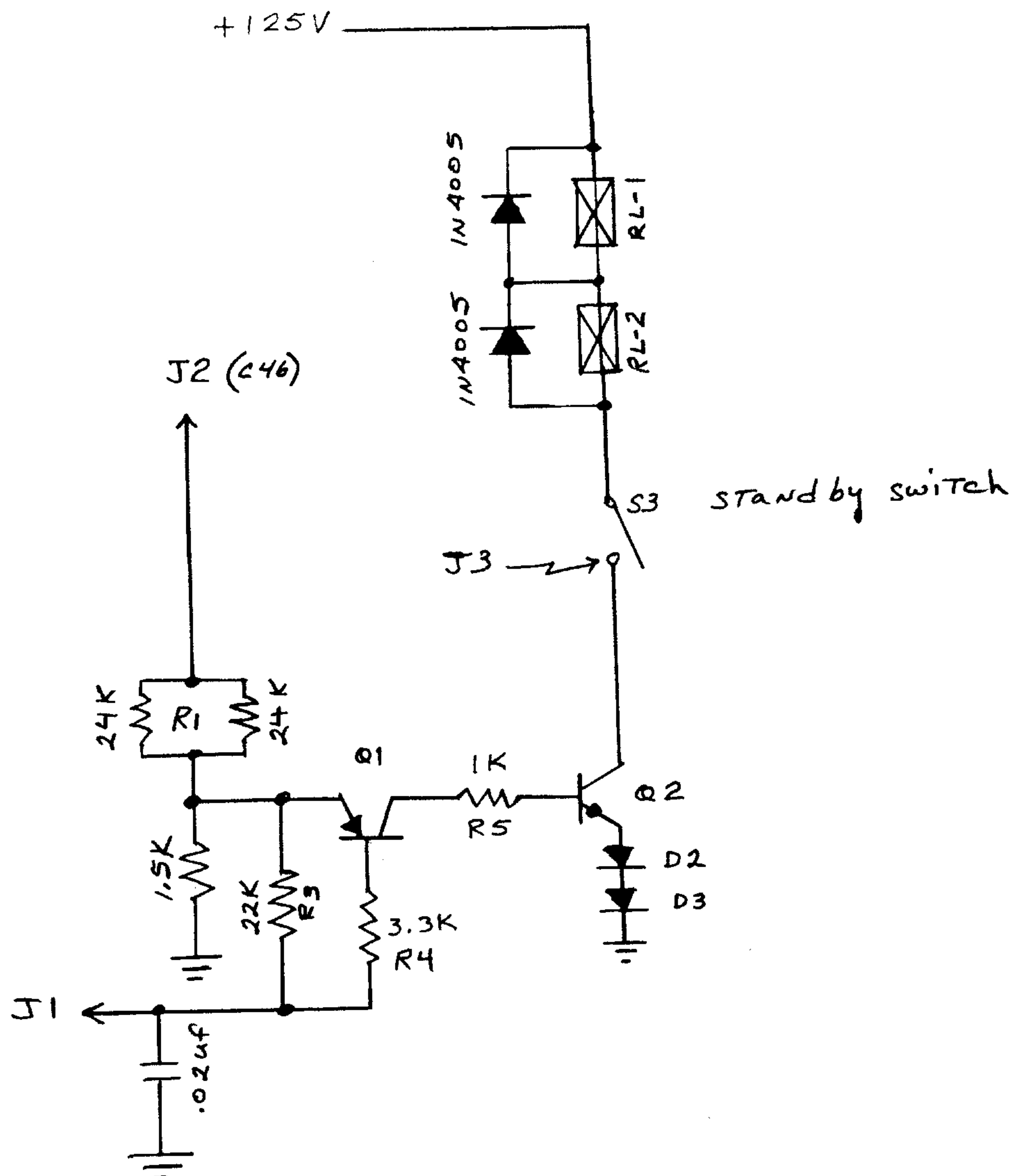
RL-3, OMRON 120VAC @ 15AMPS

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NEW

SIGMA XR-3000D KEYING CIRCUIT

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$R_1 = 2\text{EA}, 24\text{K}\Omega$ 1 watt

ALL other resistors = $1/2$ watt

$D_2 = 1\text{N}4001$

$D_3 = 1\text{N}4001$

$Q_1 = 2\text{N}4403$ or $2\text{N}3906$

$Q_2 = \text{NTE } 287$ or $\text{MPSA}42$

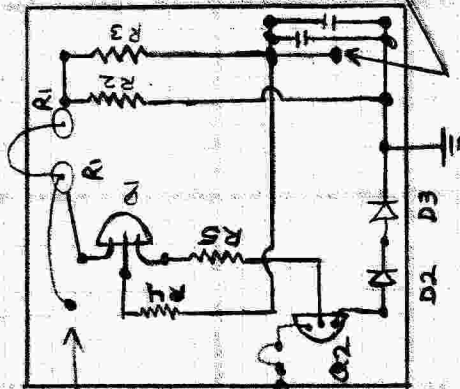
NOTE: you must use a heat sink on Q_2

NOTE: J1 now only
OF +125VDC

HAS +14VDC ON IT instead

6/2002

w9ehu - XR-3000 Rly mod.



in view looking
down on ckt board



$R_1 = 24K\Omega$	1w	in parallel
$R_2 = 1.5K$	$\frac{1}{2}w$	
$R_3 = 22K$	$\frac{1}{2}w$	
$R_4 = 3.3K$	$\frac{1}{2}w$	
$Q_1 = 2N4403$		
$Q_2 = NTE 287$		-(to 220 package)
$R_5 = 1K$	$\frac{1}{2}w$	
$D_1 = 1N4005$		
$D_2 = 1N4003$		
$D_3 = 1N4003$		

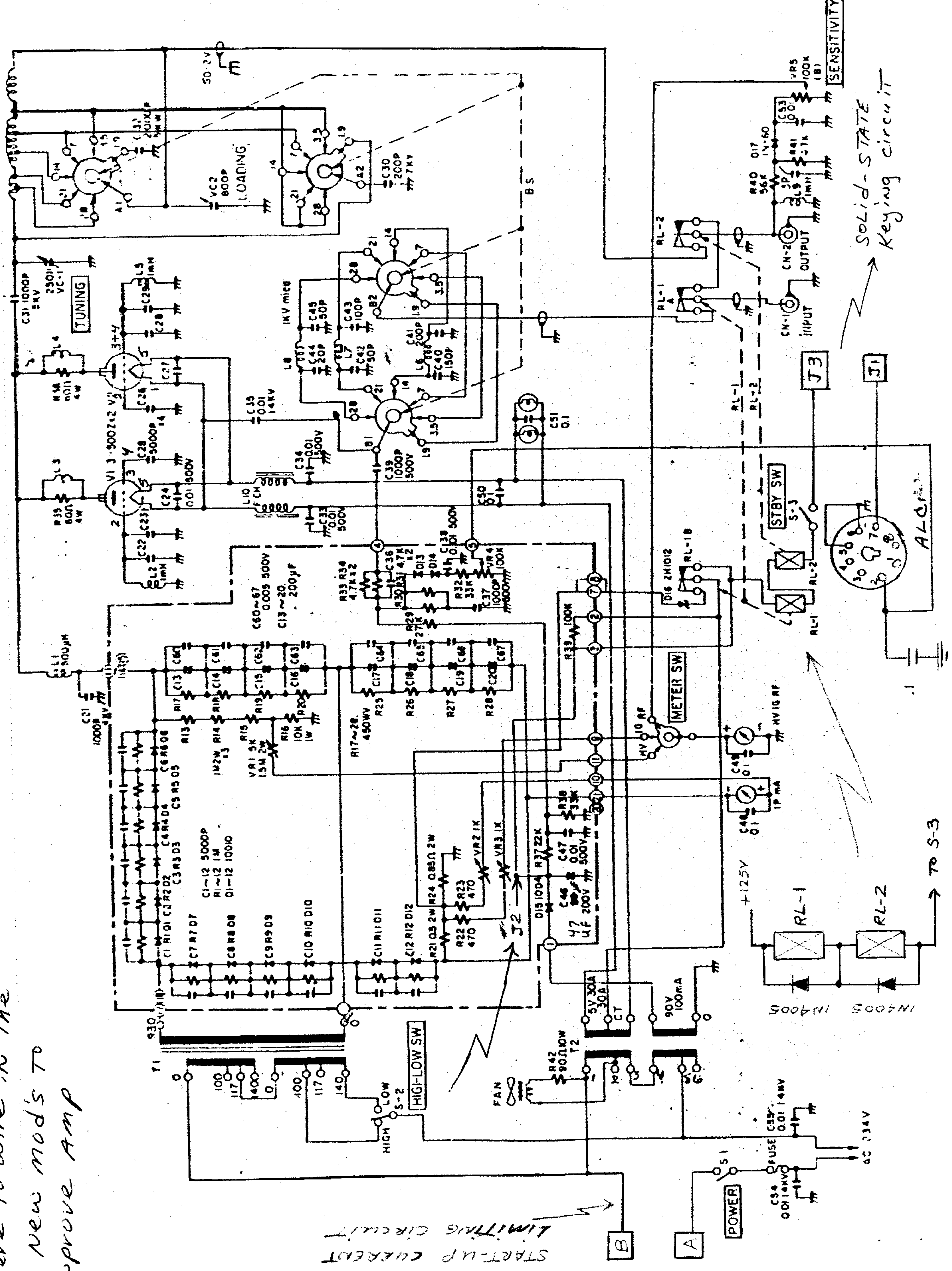
$$C1 = .02 \text{ mf}$$

J1 = HEAT RLY JACK TO SEC RIG
J2 = GOES TO AMP + 120VDC AT RLY
J3 = GOES TO OPERATE / STANDBY SWITCH

Q2 must have heat sink

SIGMA XR-3000 D LINEAR AMPLIFIER

Mod circuit showing
where to wire in the
2 new mod's to
improve AMP



START-UP CURRENT
LIMITING CIRCUIT

SOLID-STATE
Keying circuit

TO S-3