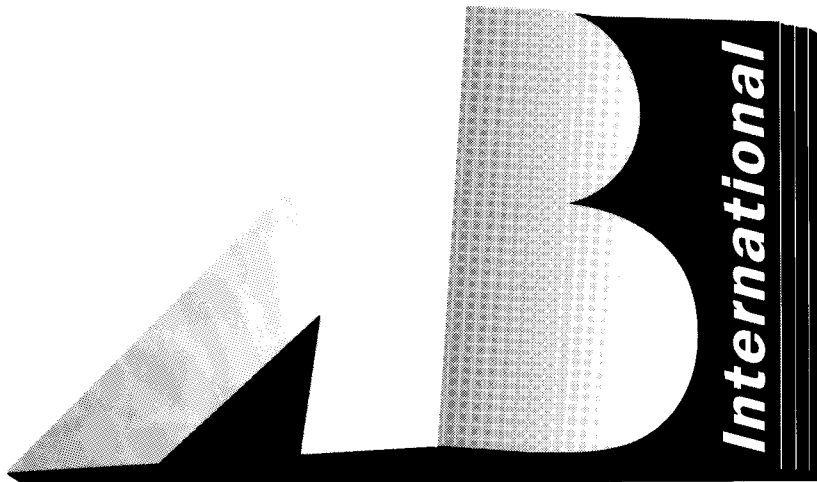


AB INTERNATIONAL

**MODEL 900A / 1100A
MODEL 9220A / 9420A**

SERVICE INFORMATION



AB International Electronics

**1830-6 Vernon Street / P.O. Box 1105
Roseville, Ca 95678 / 916-783-7800**

GENERAL

AB International amplifier products are designed to deliver uncompromised performance in continuous duty commercial and professional audio applications. The following operating instructions cover the installation and operation of the Professional Series amplifiers. New owners are encouraged to read the entire contents prior to placing amplifiers into service.

Professional Series Amplifiers

Circuit Description

To assure absolute long term reliability, the output section of each channel incorporates multiple Motorola Power Transistors, which provide 3 times the amplifiers rated power in watts of dissipation per channel. The output stage is arranged in a fully-complimentary format for class AB/2 operation. The bias current is evenly distributed among all output devices. Bias thermal compensation is accomplished by thermally mating a bipolar semiconductor junction to the heat-producing output device. Triple diffused high power driver transistors are employed along with high speed, high voltage silicon annular devices for the pre-driver and inverter stages. Utilization of these components provides the required separation of F_t break points for absolute stability. Fully complimentary drive and loading is utilized throughout. Only 20 dB of negative feedback is used to reduce forward transfer distortion to minimum levels. VI type energy limiters are incorporated for short circuit protection of the amplifier. Due to the unusually large safe operating area of the output stage, the limiters do not actuate until driving a forty-five degree reactive load of under 2 ohms at full power.

Construction

The amplifiers are designed on an all-modular concept permitting rigorous pre-assembly module testing and maximum service accessibility. Each functional module is fully tested before final assembly. Although components of the highest quality are used throughout, each amplifier is burned in, prior to shipment, at the worst case operating point to eliminate any possibility of component malfunction. All chassis components are precision machined from high quality aluminum and sheet steel stock. The entire package concept is directed toward maximum efficiency of space and structure, accounting for the compact size and light weight.

Professional Series Amplifiers

Thermal Protection

Certain conditions of operation (restricted airflow cooling, sustained high power operation into low impedance loads) can result in a rise in output device case temperature sufficient to affect the amplifiers performance.

Should the heatsink reach 95°C, the output will be automatically disconnected from the load (loudspeaker) and will remain disconnected until the temperature drops below 95°C. The action of removing the load has the effect of eliminating output current. Which, in turn, results in an immediate and rapid drop in temperature. The load will automatically be reconnected when the temperature drops below 95°C.

Fan Assist Cooling

All Professional Series amplifiers are equipped with a two level 24 Vdc fan. The fan speed is determined by the amplifier heatsink temperature. At maximum speed, the fan has a 110 cfm output to assure proper cooling under severe conditions.

Installation

All AB International amplifiers are designed for mounting in a standard 19-inch equipment rack, or one of the many 19-inch rack-type portable cases available. The amplifiers require $5\frac{1}{4}$ inches of vertical panel space, with $11\frac{7}{8}$ inches required behind the panel. Total depth, including handles is $13\frac{5}{16}$ inches. Front panels are machined from solid aluminum stock, with a black textured finish and sturdy rack mount handles.

Placement of the amplifier is not critical for normal operating, provided sufficient air flow is allowed to reach the heatsink array. If the unit is to be placed on a shelf, or a similar unenclosed area, allow four inches of clearance behind the heat-sink to permit vertical air flow through the array. For installation in a cabinet, allow an additional two inches above and one inch below the amplifier to permit air to be drawn around the back. If the amplifier is to be mounted in an equipment rack or cabinet with heat producing equipment, be sure that environmental operating temperatures do not exceed 55°C (131°F). Should overheating occur because of inadequate ventilation, the temperature protection circuitry will automatically protect the amplifier. When a safe operating temperature is restored, the amplifier will return to normal operation.

Because the amplifiers are capable of delivering high power from a relatively small physical package, considerable heat can develop in cabinets containing several instruments. A good rule of thumb to adopt is to provide forced air cooling any enclosure containing four or more instruments.

Power Connections

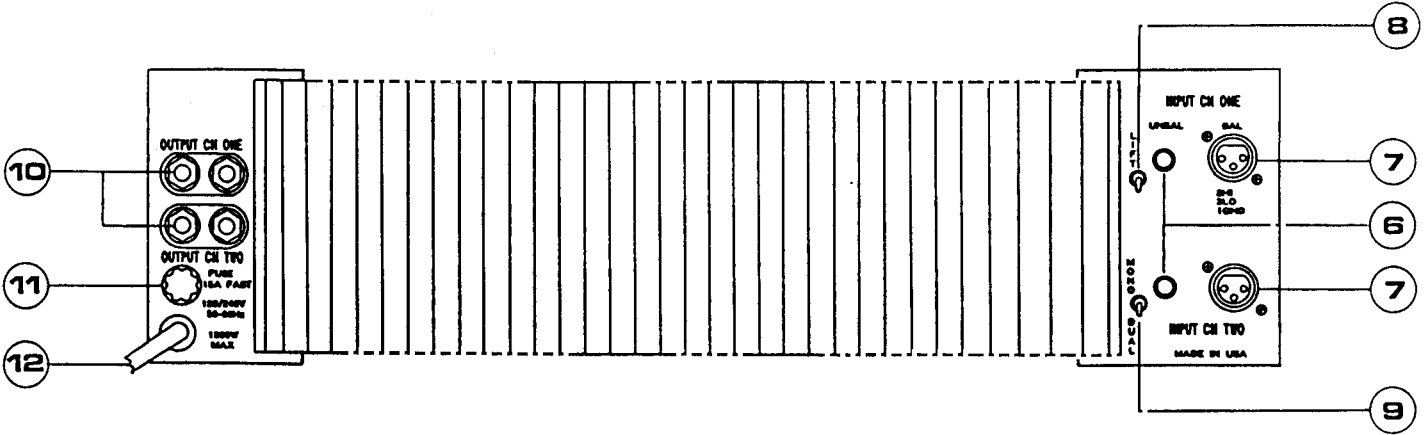
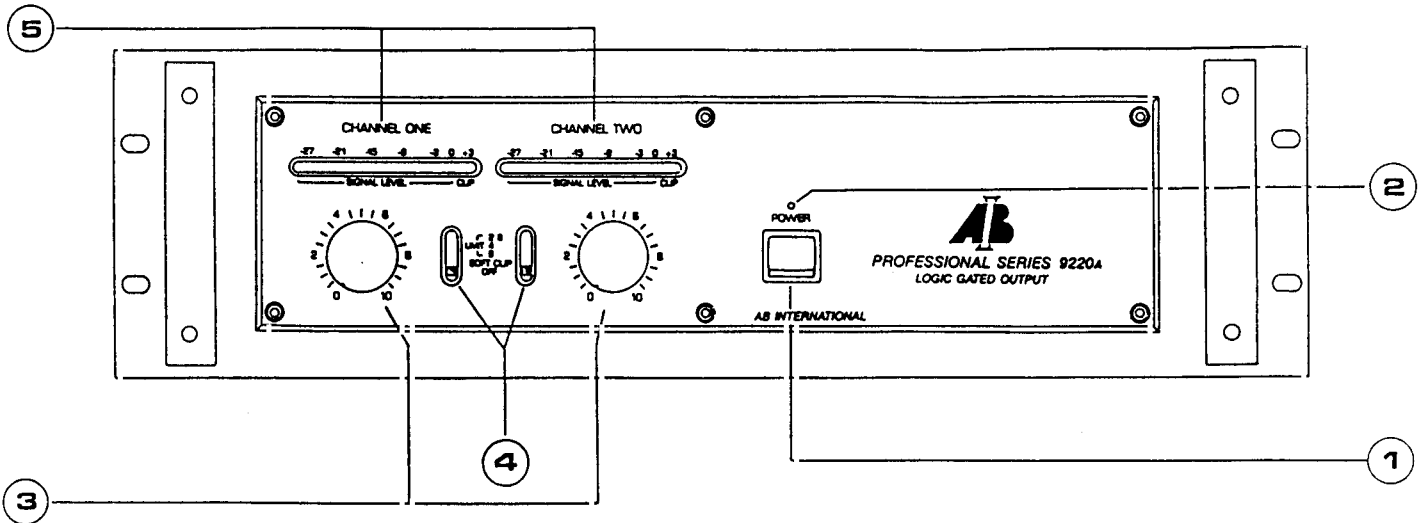
Professional Series power amplifiers are specified for operation from 120/240 Volt 50/60 Hz mains supply.

Equipment for domestic (USA) consumption includes a captive power cord with a three pin polarization plug. **DO NOT REMOVE THE CENTER GROUNDING PIN!**

In new installations and portable sound systems, or any situation in which the mains power is suspect, it is wise to confirm appropriate voltage and line polarity **BEFORE** connecting the instrument to power sources.

Professional Series Amplifiers

Front and Rear Panel Controls



- 1. POWER SWITCH**
To turn the Amplifier ON or OFF, press the upper or lower portion of this switch rocker.
- 2. POWER INDICATING LED**
This LED indicates power is turned ON.

3. LEVEL CONTROLS

Each channel has a separate low-noise 41 click detent rotary level control. Rotate controls clockwise to increase level.

4. "PEAK LIMIT"/"SOFT CLIP" CONTROL

Each channel has a "Peak Limit"/"Soft Clip" switch. Prior to using your amplifier you should first decide which feature best fits your application. If you have need for peak power limiting, select the "LIMIT": "8 ohm", "4 ohm" or "2 ohm" position that corresponds with your speaker load. This will limit the input signal approximately 3dB from rated output and no clip overdrive will occur. Note: 3dB equals half power output. If you select the "SOFT CLIP" position, the amplifier will reach rated output and no hard clipping will occur. The "OFF" position will give no peak limiting or clip protection. If the Red LED regularly illuminates, you should readjust the input level to prevent clipping or select "SOFT CLIP". Most applications will use the "SOFT CLIP" feature since you get both maximum power and protection.

5. SIGNAL STATUS DISPLAY

TWO "11 LED STRIP" output displays are normally off when no signal is present and illuminate progressively as input signal increases. The Green and Yellow LED's represent the amount of signal (in dB) present at the outputs of the amplifier. The Red LED will illuminate when the output level exceeds rated output and the amplifier has gone into "CLIP". If this situation occurs, you should readjust the output level to prevent any speaker damage.

6. UNBALANCED INPUT CONNECTIONS

Unbalanced inputs connect directly to the channel one and channel two quarter inch phone jacks. These inputs take priority over the XLR input jacks.

7. BALANCED INPUT CONNECTIONS

XLR input connectors are provided for the balanced input circuit. Please note that Pin 1: Ground, Pin 2: High, Pin 3: Low.

Professional Series Amplifiers

Front Panel and Rear Panel Controls *(continued)*

8. **GROUND/LIFT SWITCH**

The GROUND/LIFT SWITCH is provided to eliminate ground loops, between this amplifier and a preamplifier, that can occur in certain installations.

9. **DUAL/MONO SELECTOR SWITCH**

Bridged mono operation is easily achieved by the supplied toggle switch. The signal should be applied to channel one input only and the corresponding front panel gain control is then used to set the level.

10. **OUTPUT CONNECTIONS**

Output connections are via five-way binding posts, identified as to polarity with a red and black terminal. We suggest the use of dual banana plugs as a convenient and reliable method of hook-up. They allow rapid removal for polarity reversals. This feature is often necessary in the check out and adjustment of multi-element biamplified and triamplified sound systems. Heavy Class II wire may be used by unscrewing the large plastic portion of the output terminal and inserting the wire into the hole provided. **Note:** It is extremely important when making wire connections that no wire stand or end touches an adjacent terminal!

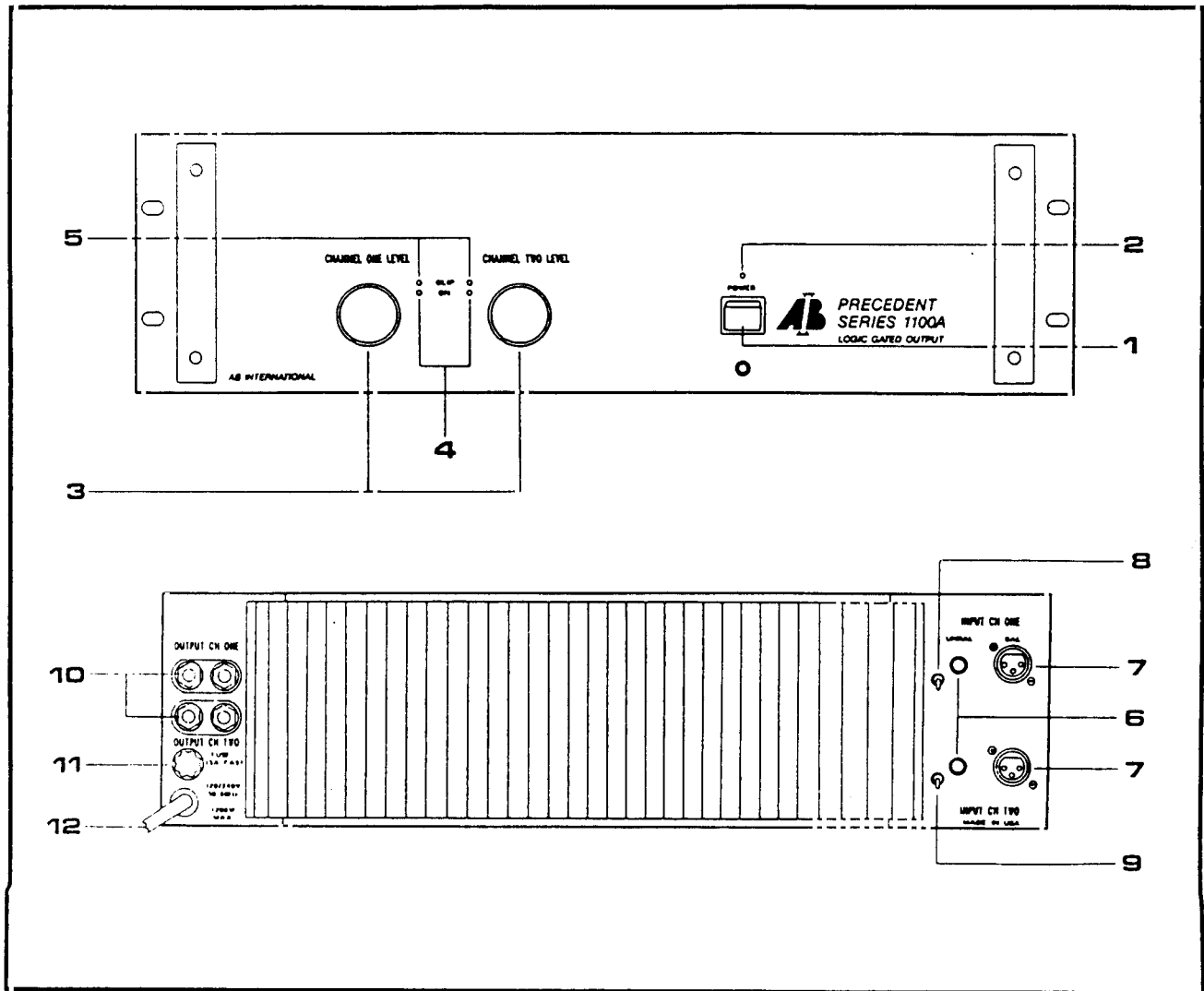
11. **FUSE HOLDER**

The fuse holder contains the Primary AC Fuse. The fuse should only be replaced with one of the same type. If fuses continue to blow out, stop replacing the fuse and refer servicing to qualified personnel.

12. **AC POWER CORD**

Plug the Power Cord into an AC outlet that delivers the proper voltage and current for amplifier operation.

Front Panel and Rear Panel Controls



1. POWER SWITCH

To turn the amplifier ON or OFF, press the upper or lower portion of this rocker switch.

2. POWER INDICATING LED

This LED indicates power is turned ON.

3. LEVEL CONTROLS

Each channel has a separate low-noise 41 click detent rotary level control. Rotate controls clockwise to increase level.

4. SIGNAL STATUS INDICATORS

Two green LED indicators are normally off with no signal present and illuminate when signal is present.

5. CLIP INDICATORS

Two red LED indicators illuminate when the input signal levels exceed 3 dB above clipping. Adjust the level control to minimize clipping.

6. UNBALANCED INPUT CONNECTIONS

Unbalanced inputs connect directly to the channel one and channel two quarter inch phone jacks. These inputs take priority over the XLR input jacks.

7. BALANCED INPUT CONNECTIONS

XLR input connectors are provided for balanced input signals. Please note; Pin 1: Ground, Pin 2: High, Pin 3: Low.

8. GROUND/LIFT SWITCH

To eliminate ground loops between this amplifier and a preamplifier in certain installations, a GROUND/LIFT SWITCH is provided.

9. DUAL/MONO SELECTOR SWITCH

Bridged mono operation is easily achieved by the supplied toggle switch. The input should be applied to channel one only and the corresponding front panel gain control is then used to set level. Refer to Bridged Mono Operation, page 9.

10. **OUTPUT CONNECTIONS**

Output connections are via five-way binding posts, identified as to polarity with a red and a black terminal. We suggest the use of dual banana plugs as a convenient and reliable method of hook-up. They allow rapid removal for polarity reversals. This feature is often necessary in the check out and adjustment of multilevel biamplified and triamplified sound systems. Heavy Class II wire may be used by unscrewing the large plastic portion of the output terminal and inserting the wire into the hole provided. It is **EXTREMELY IMPORTANT**, when making wire connections, that **NO** wire strand or end touches the adjacent terminal, shorting the output.

CAUTION:

Never strap the two red output terminals together (in parallel). Never connect either red output terminal to chassis ground.

11. **FUSE HOLDER**

The Fuse Holder contains the Primary AC Fuse. The fuse should only be replaced with one of the same type. If the fuse continues to blow out, stop replacing the fuse and refer servicing to qualified personnel.

12. **AC POWER CORD**

Plug the Power Cord into an AC outlet that delivers the proper voltage and current for amplifier operation.

CAUTION:

The **9220A** and **9420A** amplifiers are a product of the most advance technology and manufacturing techniques and is fully protected against overheating, input overload and shorted or mismatched loads. As is the case with any precision instrument, some care should be taken in the unit's operation. The following precautions should be noted and adhered to. Damage resulting from their omission is not covered under the terms of the warranty.

DO NOT PARALLEL THE TWO OUTPUTS OF EACH CHANNEL BY CONNECTING THEM TOGETHER OR PARALLEL THEM WITH ANY OTHER AMPLIFIER OUTPUT. NEVER CHANGE A FUSE WITH AC POWER CONNECTED. UNDER NO CIRCUMSTANCES SHOULD THE AMPLIFIER BE OPERATED WITH THE COVER REMOVED. THERE ARE NO USER SERVICEABLE COMPONENTS INSIDE. AVOID POTENTIALLY DANGEROUS SHOCK HAZARDS, KEEP THE COVER CLOSED AT ALL TIMES!

BRIDGED MONO OPERATION

1. Set the DUAL/MONO SWITCH to **MONO**.
2. Connect the input signal to channel one's input jack.
3. Connect the speaker load to the two red terminals of each channel. Confirm the (+) terminal of speaker to channel one and the (-) terminal to channel two.
4. **Do not** use the black terminals of either channel.
5. Assure the speaker impedance is 4 ohms or above.
6. Adjust output using the channel one control. Set channel two level to "0".

CAUTION:

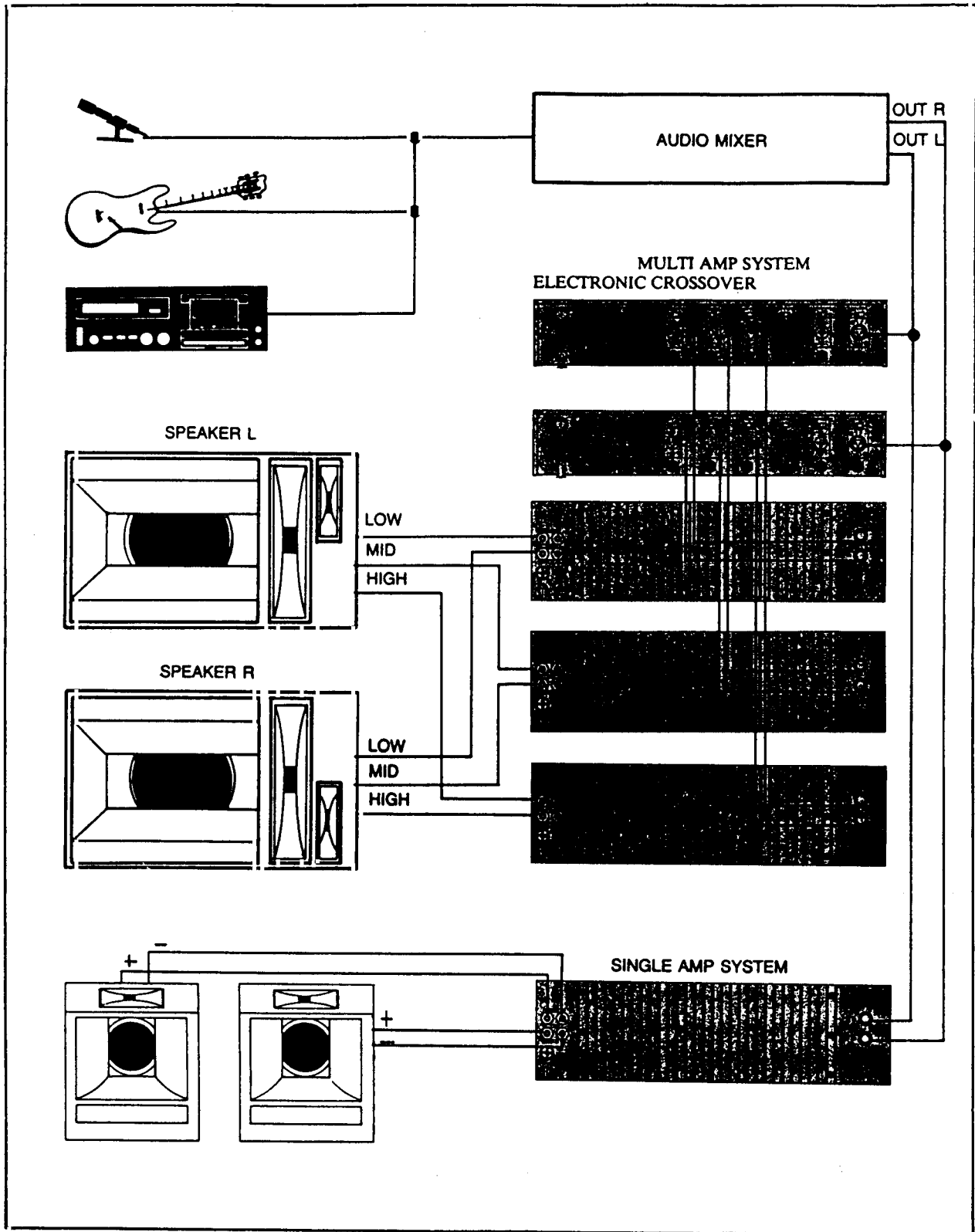
The **900A** and **1100A** amplifiers are a product of the most advanced technology and manufacturing techniques and are fully protected against overheating, input overload and shorted or mismatched loads. As is the case with any precision instrument, some care should be taken in the unit's operation. The following precautions should be noted and adhered to. Damage resulting from their omission is not covered under the terms of the warranty.

DO NOT PARALLEL THE TWO OUTPUTS OF EACH CHANNEL BY CONNECTING THEM TOGETHER OR PARALLEL THEM WITH ANY OTHER AMPLIFIER OUTPUT. NEVER CHANGE A FUSE WITH AC POWER CONNECTED. UNDER NO CIRCUMSTANCES SHOULD THE AMPLIFIER BE OPERATED WITH THE COVER REMOVED. THERE ARE NO USER SERVICEABLE COMPONENTS INSIDE. AVOID POTENTIALLY DANGEROUS SHOCK HAZARDS, KEEP THE COVER CLOSED AT ALL TIMES.

BRIDGED MONO OPERATION

1. Set the DUAL/MONO Switch to **MONO**.
2. Connect the input signal to channel one's input jack.
3. Connect the speaker load to the two red terminals of each channel. Confirm the (+) terminal of the speaker to channel one and the (-) terminal to channel two.
4. **DO NOT** use the black terminals of either channel.
5. Assure the speaker impedance is 4 ohms or above.
6. Adjust output using the CHANNEL ONE control and Set CHANNEL TWO level to "0".

Rear Panel Connections



Professional Series Amplifiers

SPECIFICATIONS

Type:	Two Channel Audio Power Amplifier
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Gain:	31dB (each channel) 9220A 33dB (each channel) 9420A
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Continuous Power:	350 watts per channel at 8 ohms 9220A
Average Power:	590 watts per channel at 4 ohms 9220A
Output:	775 watts per channel at 2 ohms 9220A
(120 VAC Line, 1KHz, single channel driven)	925 watts bridged mono at 8 ohms 9220A 1123 watts bridged mono at 4 ohms 9220A

Continuous Power:	525 watts per channel at 8 ohms 9420A
Average Power:	850 watts per channel at 4 ohms 9420A
Output:	1100 watts per channel at 2 ohms 9420A
(120 VAC Line, 1KHz, single channel driven)	1300 watts bridged mono 8 ohms 9420A 1700 watts bridged mono 4 ohms 9420A

Frequency Response:	Plus/Minus 0.5dB 20Hz to 20KHz
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Distortion:	No more than 0.25% THD or IM, 0.01W to rated power, 20Hz to 20KHz (0.01% Typical)
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Hum and Noise:	104dB below rated output (unweighed 20KHz bandwidth)
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Input Sensitivity:	1.7 VRMS for rated power
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Input Impedance:	15K ohms, nominal
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Transient Intermodulation Distortion:	less than 0.02%
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Crosstalk:	-86dB.
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Damping Factor:	500:1 at 1KHz
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Slew Rate:	Closed loop response greater than 40v per micro second.
Thermal Protection:	Thermal sensor activates channel shut down at 95°C.
D.C. Protection:	D.C. sensor activates channel shut-down if a D.C. condition exists.
Turn-on-Delay:	3 Seconds, solid-state actuated
Heat-Sink and Cooling:	High efficiency, convection cooled with "Venturi" style fan assist providing extra power handling utilizing massive heat-sink extrusions.
Input Connectors:	(2) 1/4 Inch Phone Jacks (unbalanced) (2) XLR (balanced)
Output Connectors:	Dual 5-way Binding Posts
Weight:	34 lbs. (17.7 kg) 9220A 39 lbs. (19.6 kg) 9420A
Controls & Indicators:	<i>(Front Panel)</i> AC Mains Power Switch Power-on LED Indicator, Channel One and Two Level Controls. Each channel contains a selectable variable "Peak Limiter"/ "Soft Clip" feature, Clip LED and an 11 LED "VU" Output Display. <i>(Rear Panel)</i> Dual/Mono switch and Ground Lift Switch.
Power: (Input)	100-130 VAC, 50/60 Hz 90W (idle) 1000 Watts (maximum) 9220A 1500 Watts (maximum) 9420A
Dimensions:	5 ^{1/4} " H (13.3 cm) 19" W (48.3 cm) 11 ^{7/8} " D (30.2 cm) behind panel 13 ^{3/8} " D (34.0 cm) overall

Specifications PRIOR SEPT. 1987

Type:	Two channel audio power amplifier
Gain:	31dB (each channel) 900A 33dB (each channel) 1100A
Continuous Average Power Output:	300 watts per channel at 8 ohms 900A 500 watts per channel at 8 ohms 1100A 500 watts per channel at 4 ohms 900A 750 watts per channel at 4 ohms 1100A
Frequency Response: Distortion:	Plus /Minus 0.5dB 20Hz-20kHz No more than 0.25% THD or IM, 0.01W to rated power, 20Hz to 20kHz (typically 0.01%)
Hum and Noise:	101dB below rated output (unweighted 20kHz bandwidth)
Input Sensitivity: Input Impedance: Input Connectors:	1.6V RMS for rated output 15K ohms, nominal (2) 1/4 -inch phone jacks (unbalanced) (2) XLR (balanced)
Output Connectors: Controls & Indicators:	Dual 5-way binding posts (Front Panel) AC mains power switch, power-on LED indicator, Channel One and Two level controls, Bridge mode switch, Ground lift switch, 120/240V line switch. Channel one and two signal status indicators (green active red clip)
Power:	100-130VAC, 50-60Hz 90W (idle), 1000W (maximum) 900A 1500W (maximum) 1100A
Dimensions:	5-1/4" H (13.3cm) 19" W (48.3cm) 11-7/8" (30.2cm) behind panel 13-3/8" (34cm) overall
Weight:	39 lbs (17.7kg) 43 lbs (19.6kg)

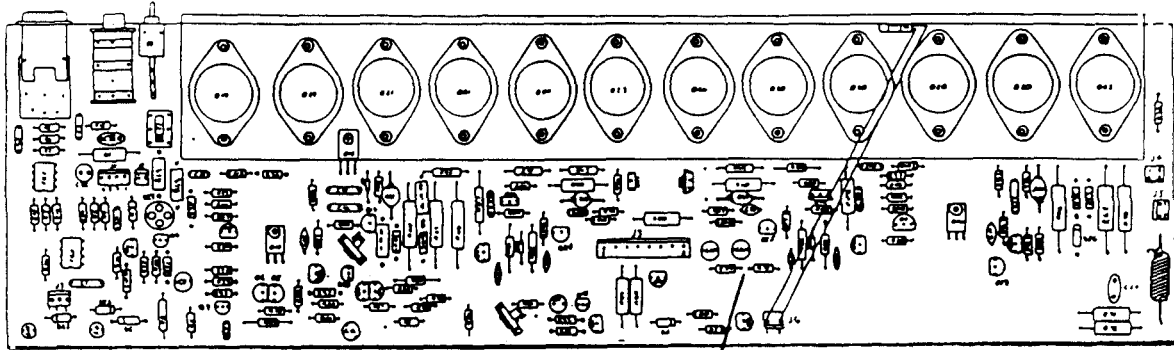
Precedent Series Amplifiers

SPECIFICATIONS

Type:	Two Channel Audio Power Amplifier
Gain:	31 dB (each Channel) 900A 33 dB (each Channel) 1100A
Continuous Power:	350 watts per channel at 8 ohms 900A
Average Power:	590 watts per channel at 4 ohms 900A
Output:	775 watts per channel at 2 ohms 900A
(120 VAC Line, 1KHz, single channel driven)	925 watts bridged mono at 8 ohms 900A 1123 watts bridged mono at 4 ohm 900A
Continuous Power:	525 watts per channel at 8 ohms 1100A
Average Power:	850 watts per channel at 4 ohms 1100A
Output:	1100 watts per channel at 2 ohms 1100A
(120 VAC Line, 1KHz, single channel driven)	1300 watts bridged mono at 8 ohms 1100A 1700 watts bridged mono at 4 ohms 1100A
Frequency Response:	Plus/Minus 0.5 dB 20 Hz to 20 KHz
Distortion:	No more than 0.25% THD or IM, 0.01W to rated power, 20 Hz to 20 KHz (0.01% typical)
Hum and Noise:	104 dB below rated output (unweighed 20 KHz bandwidth)
Input Sensitivity:	1.6 VRMS for rated power
Input Impedance:	15K ohms, nominal
Transient Intermodulation Distortion:	less than 0.02%
Crosstalk	-86 dB
Damping Factor:	500:1 at 1 KHz

Slew Rate:	Closed loop response greater than 40 Volts per micro second
Thermal Protection:	Thermal sensor activates channel shut down at 95° C.
DC Protection:	DC sensor activates channel shut down if a DC condition exists.
Turn-On Delay:	3 Seconds, solid-state actuated.
Heat Sink and Cooling:	High efficiency, convection cooled with "Venturi Style" fan assist providing extra power handling utilizing massive heat sink extrusions.
Input Connectors:	(2) 1/4 Inch Phone Jacks (unbalanced) (2) XLR (balanced)
Output Connectors:	5-way Binding Posts
Weight:	29 lbs. (13.2 kg) 900A 34 lbs. (15.4 kg) 1100A
Controls and Indicators:	<i>(Front Panel)</i> AC Mains Power Switch Power-on LED Indicator, Channel One and Two Level Controls. Channel One and Two Signal Status Indicators (green active / red clip) <i>(Rear Panel)</i> Dual/Mono Switch and Ground Lift Switch.
Power (Input):	100-130 VAC, 50/60 Hz 90 W (idle) 1000 Watts (maximum) 900A 1500 Watts (maximum) 1100A
Dimensions:	5 ¹ / ₄ " (13.3 cm) H, 19" (48.3 cm) W 11 ⁷ / ₈ " (30.2 cm) D, behind panel 13 ³ / ₈ " (34.0 cm) D, over all

DC LATCH TEST PROCEDURE



TEST POINT

Your AB International amplifier is equipped with a D.C. Latch Protection Circuitry. In a case where a D.C. voltage of \pm 3 volts or greater exist at the output of the channel, it will then trigger a relay at the power supply and shut the amplifier off. Failure to test this circuitry, prior to use of the amplifier, may cause damage to a speaker if a failure occurs in the future.

The D.C. Latch Circuitry is made up of two parts:

- 1) Individual channel RC Network and Triac circuitry.
- 2) Power Supply Relay Network.

Note: The power supply relay network serves the function for all the channels in the amplifier.

Test these circuits by following these procedures:

- 1) Take a 10K $\frac{1}{4}$ watt resistor and apply it across two points--
 - A) The junction of R74 and R75 (see schematic) and,
 - B) Any DC voltage point on the Power Supply.
- 2) Note: You are now forcing the triac to trigger by applying D.C. voltage to the base of the triac.
- 2) If step one worked properly your triac should have triggered and now connected the latch line to ground. When the Power supply latch is connected to ground, the relay (K1) will engage and shut the amplifier off by disengaging the gate of the triac (Q1).
- 3) If step one and two worked properly, shut the amplifier off and discharge the main power supply filter caps. This will engage the Triac Q1 on the power supply. The amplifier should now turn on and work properly.

Notes:

- 1) If you are testing Power Supply PCB Revision B - F:
The amplifier will cycle on and off every few seconds when the D.C. Latch circuit has been triggered.
- 2) If you are testing Power Supply PCB Revision G or Higher:
The amplifier will shut off when the D.C. Latch circuit has been triggered. To reset you must shut the amplifier off and discharge the power supply caps through a 100 ohm resistor.

AB INTERNATIONAL COMPONENT DATA

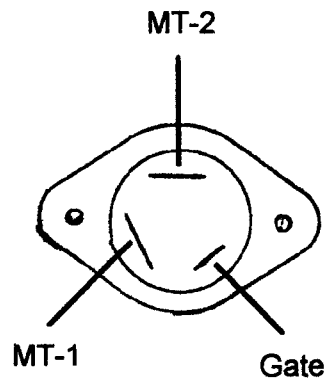
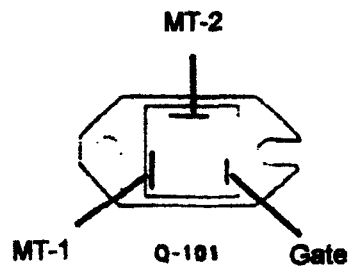
ABI		DIODES		USA
ID. #	ZENIER	VOLTS	W/A	
1N4733	ZENIER	5.1	1w	
1N4735	ZENIER	6.2	1w	
1N4737	ZENIER	7.5	1w	
1N4742	ZENIER	12	1w	
1N4745	ZENIER	16	1w	
1N4749	ZENIER	24	1w	
1N4752	ZENIER	33	1w	
1N4001	SW/DIODE	50	30	UPDATED TO 1N4004
1N914	SW/DIODE	75	75ma	
1N5186	SW/DIODE	200	200	UPDATED TO FR303
FR303	SW/DIODE	200	200	UPDATED TO FR604
1N4004	SW/DIODE	400	30	
FR604	SW/DIODE	400	3A	

ABI		REG. & TRIACS			USA	
ID. #	TYPE	VOLTS	AMPS	POLLARITY	PACKAGE	REPLACEMENT
7808	REG.	8	1.5	POS.	TO-220	
7908	REG.	-8	1.5	NEG.	TO-220	
7812	REG.	12	1.5	POS.	TO-220	
7912	REG.	-12	1.5	NEG.	TO-220	
7815	REG.	15	1.5	POS.	TO-220	
7915	REG.	-15	1.5	NEG.	TO-220	
7818	REG.	18	1.5	POS.	TO-220	
7918	REG.	-18	1.5	NEG.	TO-220	
97A4	TRIAC				TO-92	L201E3
L201E3	TRIAC	200	1		TO-92	Z0102DA
Q4015L5	TRIAC	400	15		TO-220	
Q4025L6	TRIAC	400	25		TO-220	
6027	PUT				TO-92	
Z0102DA	TRIAC				TO-92	

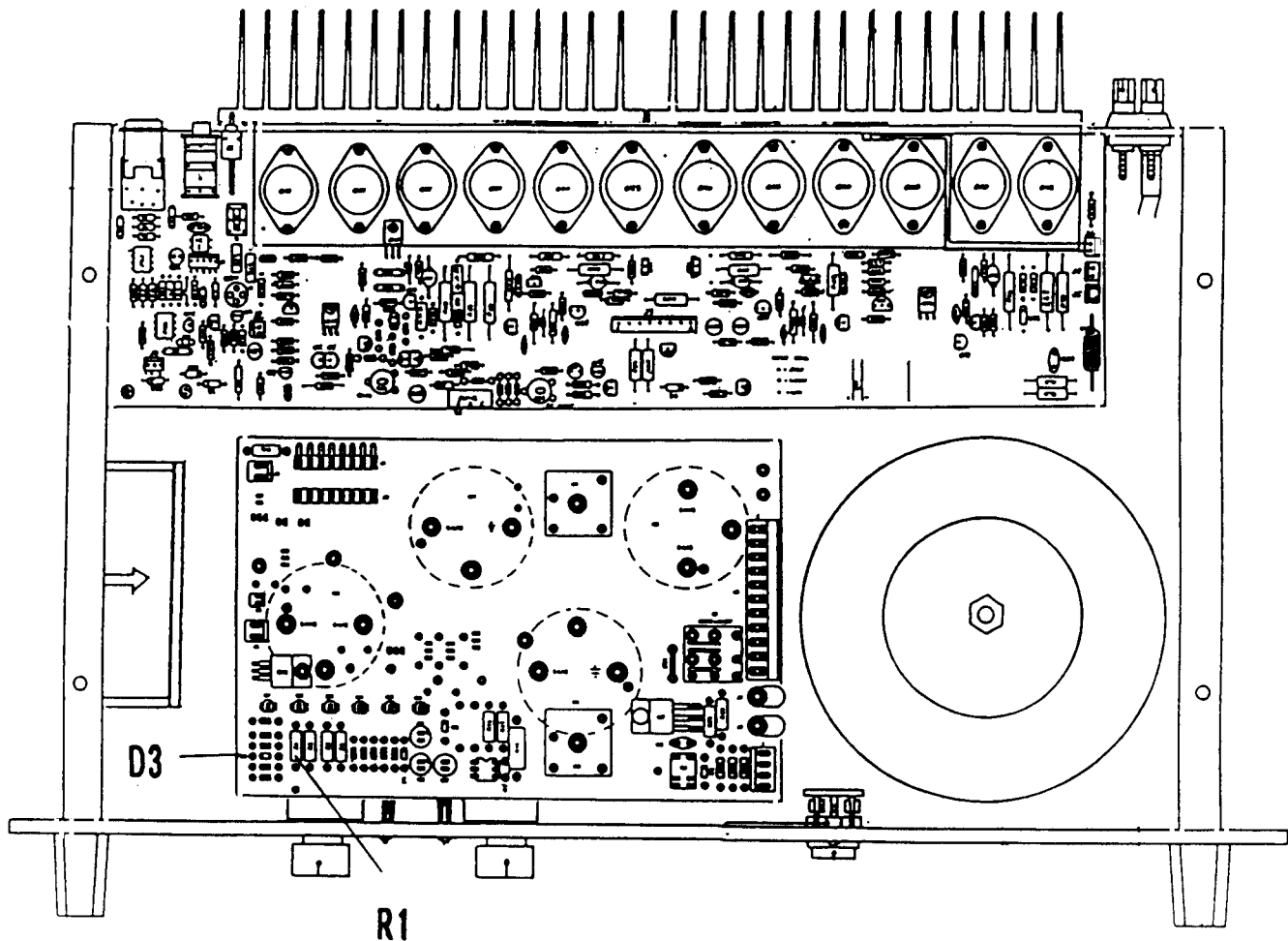
AB INTERNATIONAL COMPONENT DATA

ABI		TRANSISTER UPDATES				USA		
ORIG.	REV. 1	REV. 2	REV. 3	REV. 4	CASE TYPE	POLL.	ICmax	Vceo
MPS8599	A56	2N5401			TO-92	PNP	240ma	150
MPSL01	2N5550	2N5551			TO-92	NPN	600ma	160
MPSL51	2N5400	2N5401			TO-92	PNP	240ma	150
MPS6571	2N4401	2N5551			TO-92	NPN	600ma	160
710	2N4920					PNP		
RCA1C12	2238	MJE15030			TO-220	NPN	8a	120
2N5416					T05	PNP	1a	350
2N3440					T05	NPN	1A	350
MJE340					TO-225	NPN	.5a	300
MJE350					TO-225	PNP	.5a	300
MJH11021					TO-218	PNP	15a	250
TIP122					TO-220	NPN	.5a	100
TIP127					TO-220	PNP	.5a	100
TIP31B					TO-220	NPN	3a	60
TIP32B					TO-220	PNP	3a	60
TIP142					TO-220	NPN	10a	100
TIP147					TO-220	PNP	10a	100
2N3405								
2N4920					TO-225	PNP	1a	80
MJ15011	MJ15022	MJ21194			T03	NPN	10a	250
MJ15012	MJ15023	MJ21193			T03	PNP	10a	250
2SB554	MJ15023				T03	PNP	16a	200
2SD424	MJ15022				T03	NPN	16a	200
1B04	MJ15011	MJ15022	MJ21194		T03	NPN	7a	250
1B05	MJ15011	MJ15022	MJ21194		T03	NPN	7a	250
MJ21194					T03	NPN	16a	250
MJ21193					T03	PNP	16a	250
MJ15023	MJ21193				T03	PNP	16a	250
MJ15022	MJ21194				T03	NPN	16a	250
2SC2837					TO-218	NPN	10a	150
2SA1186					TO-218	PNP	10a	150
MJL21193					TO-3PBL	PNP	16a	250
MJL21194					TO-3PBL	NPN	16a	250
2SA1553					TO-3PBL	PNP	15a	230
2SC4029					TO-3PBL	NPN	15a	230

Triac Diagram



FAN CONVERSION 24V TO 48V MODELS 1100A, 9420A, SUB 1850 POWER SUPPLY REV. H



- STEP 1. REMOVE D3 (ZENER 1N4742) 12V
2. REMOVE R1 (RESISTOR 1.8 ohm 1/2W)
3. REPLACE D3 WITH (ZENER 1N4749) 24V
4. REPLACE R1 WITH (RESISTOR 3.6 ohm 1/2W)

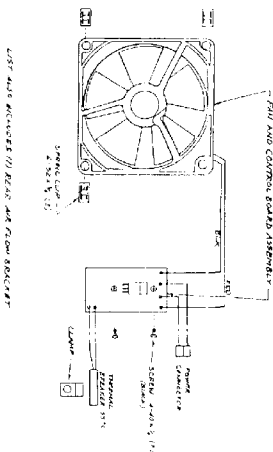
NOTE: THIS CAN BE ACCOMPLISHED BY
SOLDERING FROM THE TOP SIDE OF
THE PCB.

5. REPLACE 24V FAN WITH 48VDC FAN
NOTE: FOLLOW FAN INSTALLATION
INSTRUCTIONS.

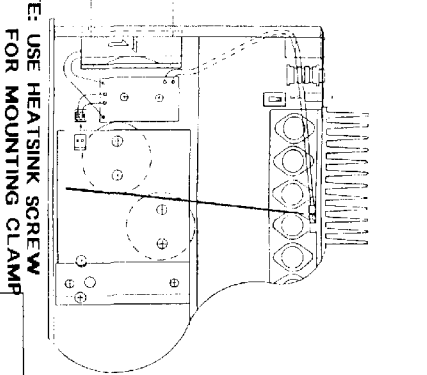
FAN INSTALLATION MODEL 900A/1100A

FOR SERIAL NUMBERS 060090-XX THRU 010092-XX

1 MATERIALS LIST

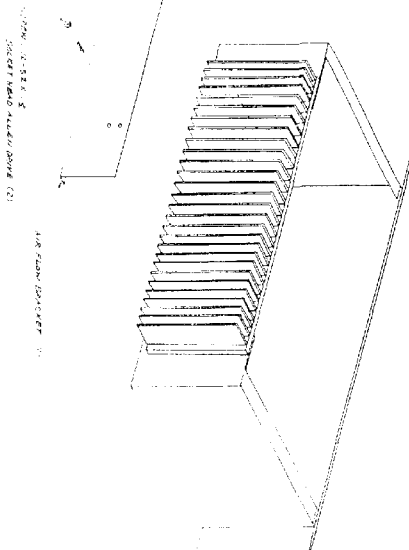


3 THERMAL BREAKER POSITIONING



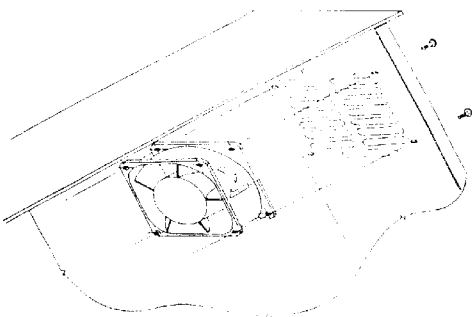
NOTE: USE HEATSINK SCREW FOR MOUNTING CLAMP

5 REAR AIR FLOW BRACKET



2 FAN INSTALLATION

NOTE: 1. FAN MUST BE MOUNTED DURING INSTALLATION
2. FAN MUST BE MOUNTED AND DESIGNED AIR FLOW
DIRECTION MUST BE



4 SECURING CONTROL BOARD

NOTE:
1. MOUNT FAN CONTROL BOARD ASSEMBLY
2. CONNECT POSITIONING CONNECTOR TO
CONTROL SUPPLY MAIN WAVE RESONANCE
CIRCUIT



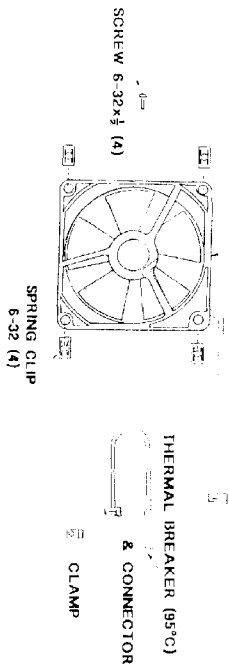
NOTE: POWER SUPPLY REV. G ONLY

ALL INFORMATIONAL ELECTRONICS, INC.
NOTE: FAN (G) IS NOT A COMPONENT
MODEL: FAN 900A/1100A
DATE: 5-1-86
REVISION: 001-001-010

**FAN INSTALLATION MODEL 900A/1100A
FOR SERIAL NUMBERS 0010092-XX THRU PRESENT**

1. MATERIAL LIST

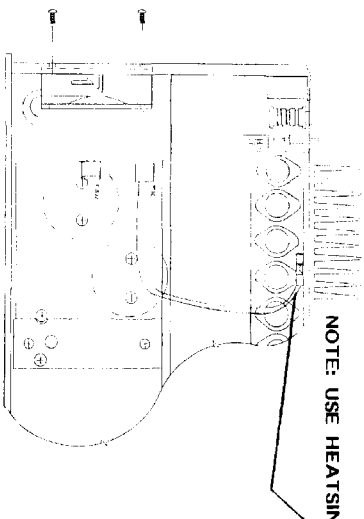
FAN (24V DC FOR 900A & 48V DC FOR 1100A)



LIST ALSO INCLUDES (1) REAR AIRFLOW BRACKET & SCREWS

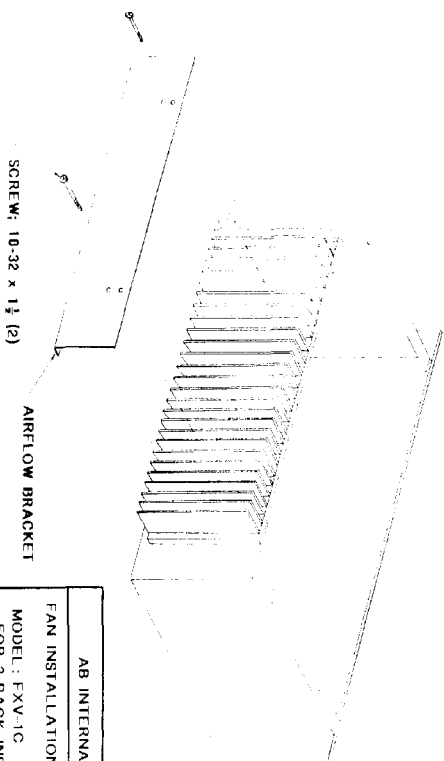
3. THERMAL BREAKER & FAN CONNECTIONS

NOTE: ROUTE BREAKER WIRES AS SHOWN



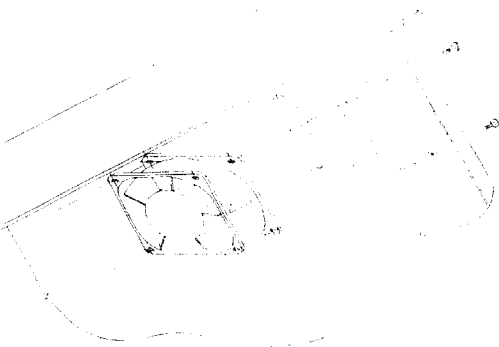
NOTE: USE HEATSINK SCREW FOR MOUNTING CLAMP

4. REAR AIRFLOW BRACKET MOUNTING
ATTACH BRACKET TO HEATSINK



2. FAN INSTALLATION

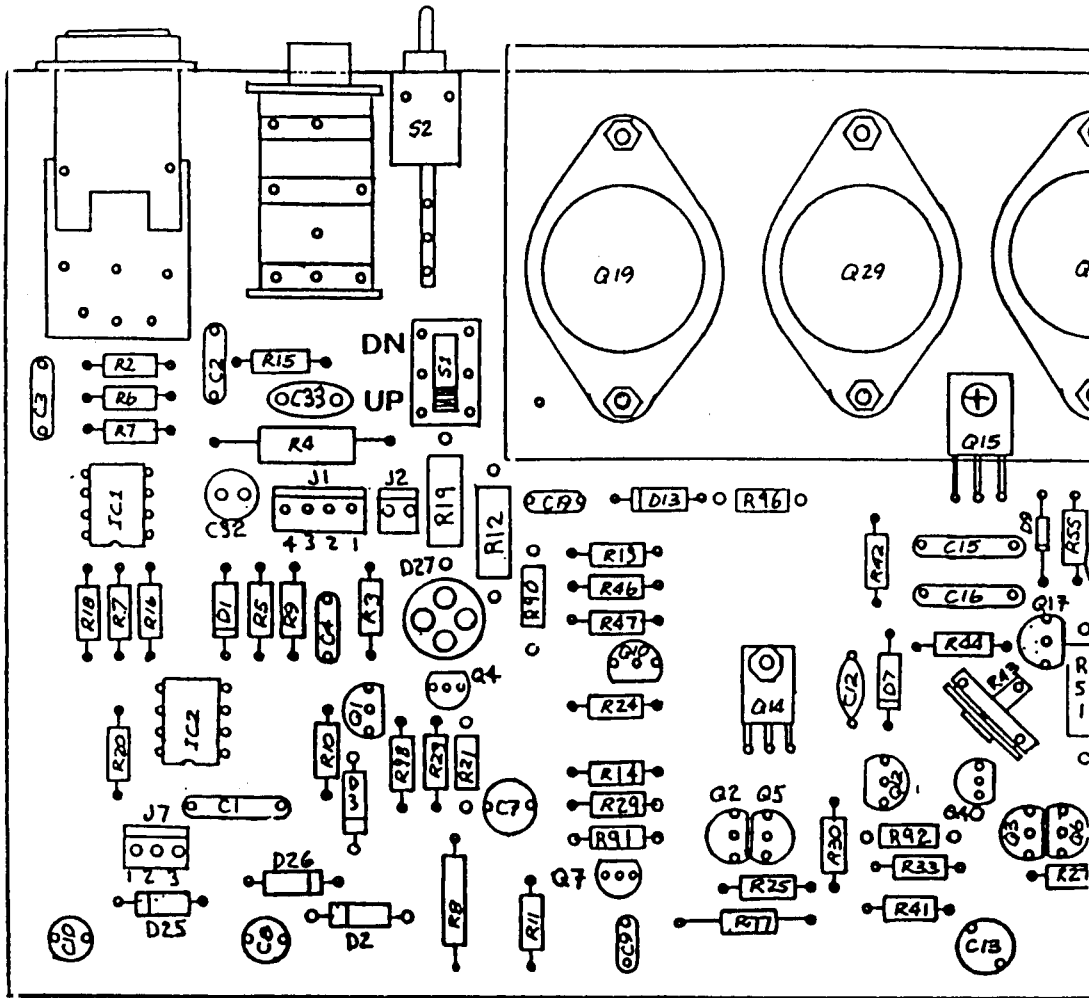
NOTE: 1. AMP MUST BE UNPLUGGED DURING INSTALLATION.
2. OBSERVE AIR FLOW DIRECTION ARROW



AB INTERNATIONAL
FAN INSTALLATION INSTRUCTIONS
MODEL: EXV-1C FOR 3-RACK INST.
DATE: 1-2-92
ASSY NO. 109-560

NOTE: POWER SUPPLY REV. H ONLY (24V DC FOR 900A & 48V DC FOR 1100A)

PCB REPLACEMENT GUIDE LINES



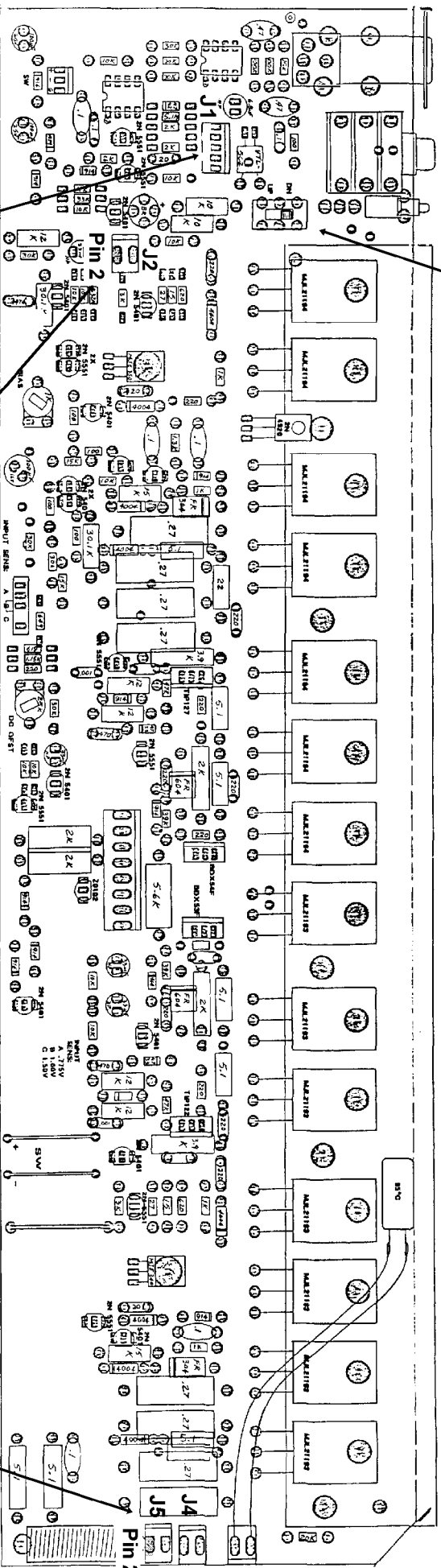
- 1) S1 (Switch One) must be placed in proper position. If you are replacing Channel One, S1 must be in the "UP" position. If you are replacing Channel Two PCB, S1 must be in the "DN" position.
*Note: S1 determines the function of S2; either "Ground/Lift" or "Mono/Dual".
- 2) When connecting the Power Supply Ribbon Cable up to the Power PCB's --
*Note: DO NOT MISS PIN THE CABLE, even for a second. The Power Supply Caps have a charge and may damage the PCB circuitry.
- 3) Apply an even thin coat of white Silicon Thermal Compound to angle. Failure to do so may cause improper heat transfer.

NOTE: EXCLUDE STEP ONE FOR DUAL CHANNEL PCB

900A/1100A Output Pcb Replacement Guide

Toggle switch function depends on which position the output pcb is placed in (top or bottom board, channel 1 or 2 position)
 If the output pcb is in the top or channel 1 placement, it is the "Ground Lift" switch.
 If the output pcb is in the bottom or channel 2 placement, it is the "Bridge/Mono" switch.

Place slide switch S1 in "UP" position when replacement pcb is for channel 1 (Top Board)
 Place slide switch S1 in "DN" position when replacement pcb is for channel 2 (Bottom Board)

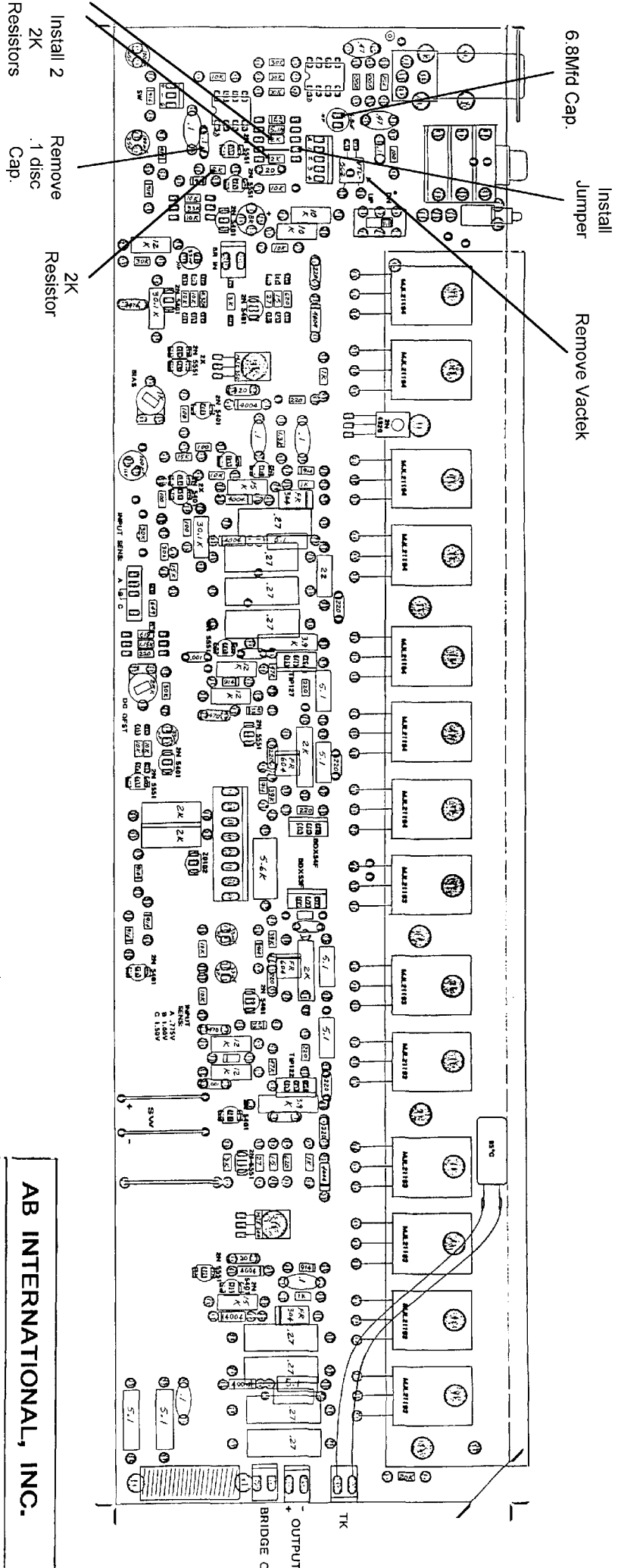


Input sensitivity switch SW-2: Position A=.775V, B=1.0V, C=1.5V. For rev "C-F" place switch in "C" position, for rev "G-J" place switch in same position as old pcb or as in the opposite channel.

Bridge Wire (yellow wire) connects as follow (FAILURE TO CONNECT CORRECTLY WILL RESULT IN DAMAGE):
 If the replacement output pcb is for channel1 (top board) the bridge wire connects to J5 pin 2.
 If the replacement output pcb is for channel 2 (bottom board) the bridge wire connects to J2 In 2.
DOUBLE CHECK CONNECTIONS BEFORE POWERING UNIT UP

Install shielded cable from level control board to J1. If the new output pcb is a revision "J" and the old output pcb is also a rev "G-J" then all connections will be the same. **HOWEVER PLEASE NOTE:** If new output pcb (rev J) is a replacement board for a rev "C-F" the shielded cable from the level control pcb will have a 4 pin connector on it. When installing the connector SKIP pin 1 of J1 on the output pcb and install the 4 pin harness plug onto pins 2-5.

9220A, 9420A Output pcb replacement modification
 "D-G" rev to "J" rev



AB INTERNATIONAL, INC.

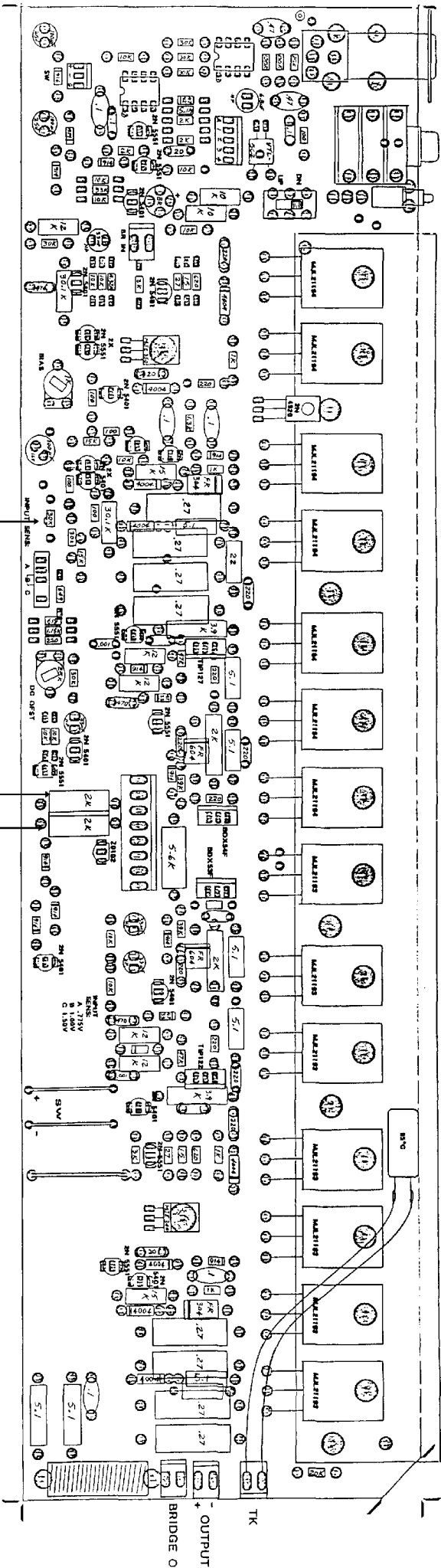
TITLE: PCB ASSEMBLY, CHANNEL BOARD
MODEL: 1100A, 9420A

DATE: 9-7-94

ASSY NO. 502-610 REV. J

9220A, 9420A Output pcb replacement Modification

"J" rev to "J" rev.



Remove
30K Resistor

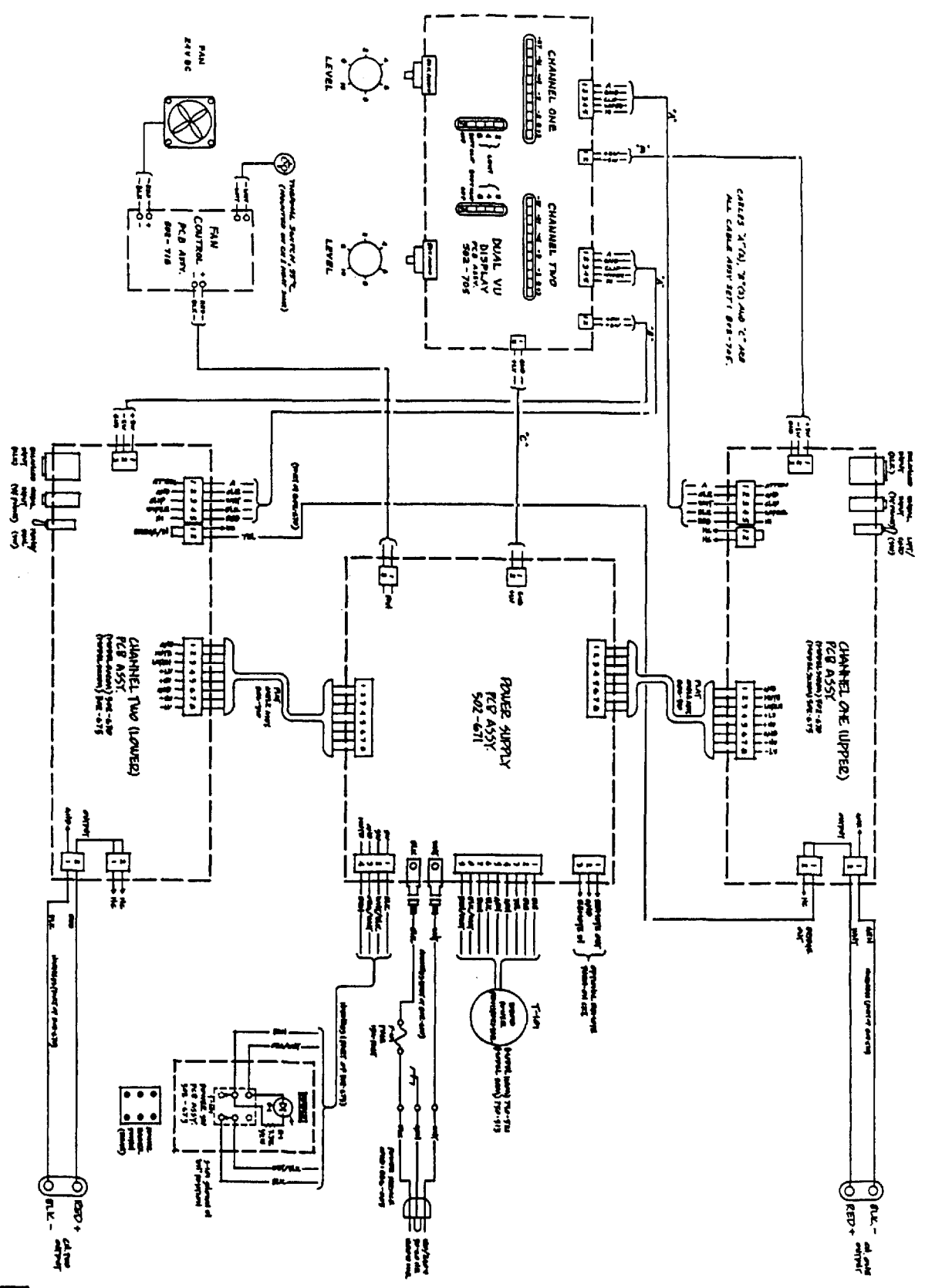
Check value of old resistors to
new resistors, if different
install old resistors in new pcb

AB INTERNATIONAL, INC.

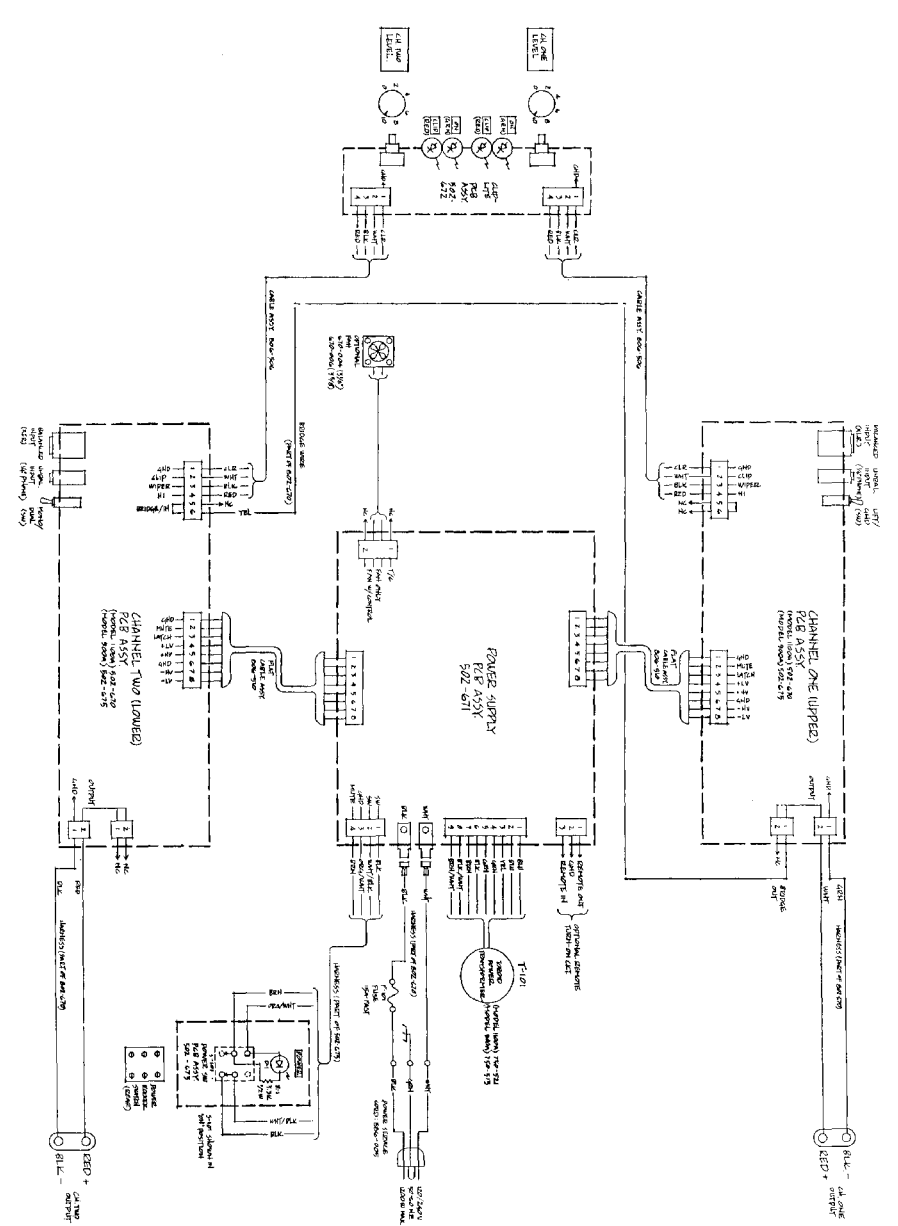
TITLE: PCB ASSEMBLY, CHANNEL BOARD
MODEL: 1100A, 9420A

DATE: 9-7-94

ASSY NO. 502-610 REV. J

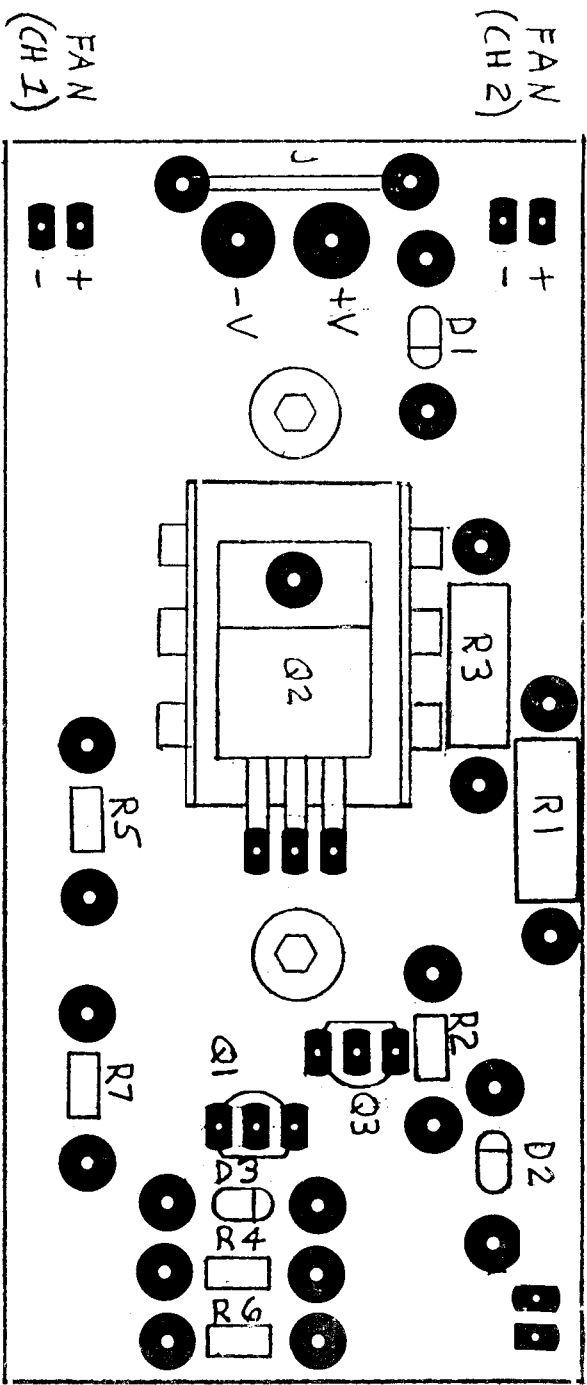


A.B. INTERNATIONAL, INC.
TRIAL MASTER SCHEMATIC
MODEL 500A/REAR
DATE: 8-29-91, K.L.
ASSEMBLY NO. 505-9120
397-6660



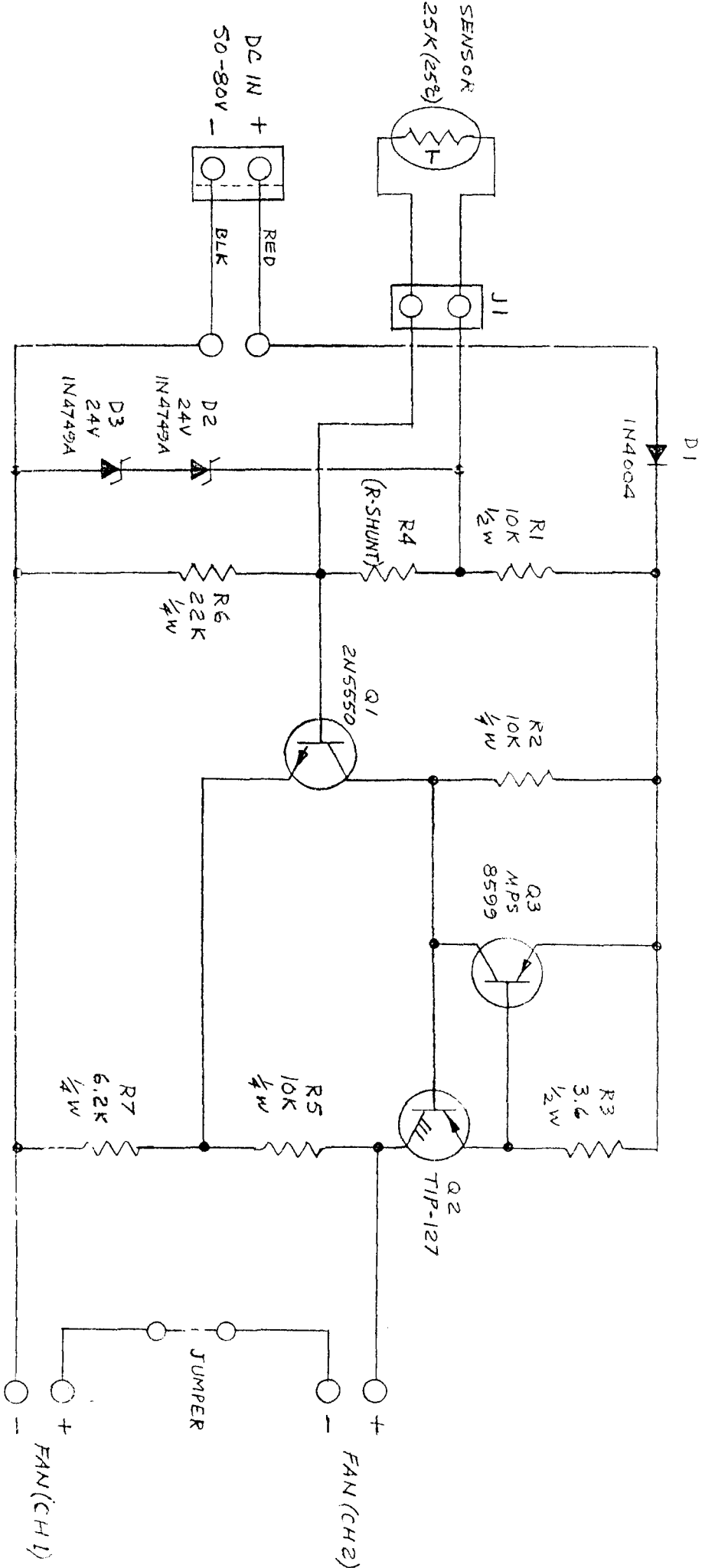
1-20 INTERNATIONAL, INC.
 THIS IS MASTER SCHEMATIC
 MODEL: 8004/1004
 DATE: 8-0-68, R48
 ASSEMBLY NO. 357-420 (M44)
 357-420 (M44)

THERMAL
 SENSOR



NOTE: REV. B ONLY 6-90/12-91

AB INTERNATIONAL INC. ASSEMBLY DIA.: FAN CONTROL MODEL: 1200 C DATE: 4-90 J.K. ASSEMBLY NO. 502-713-B



AB INTERNATIONAL, INC.

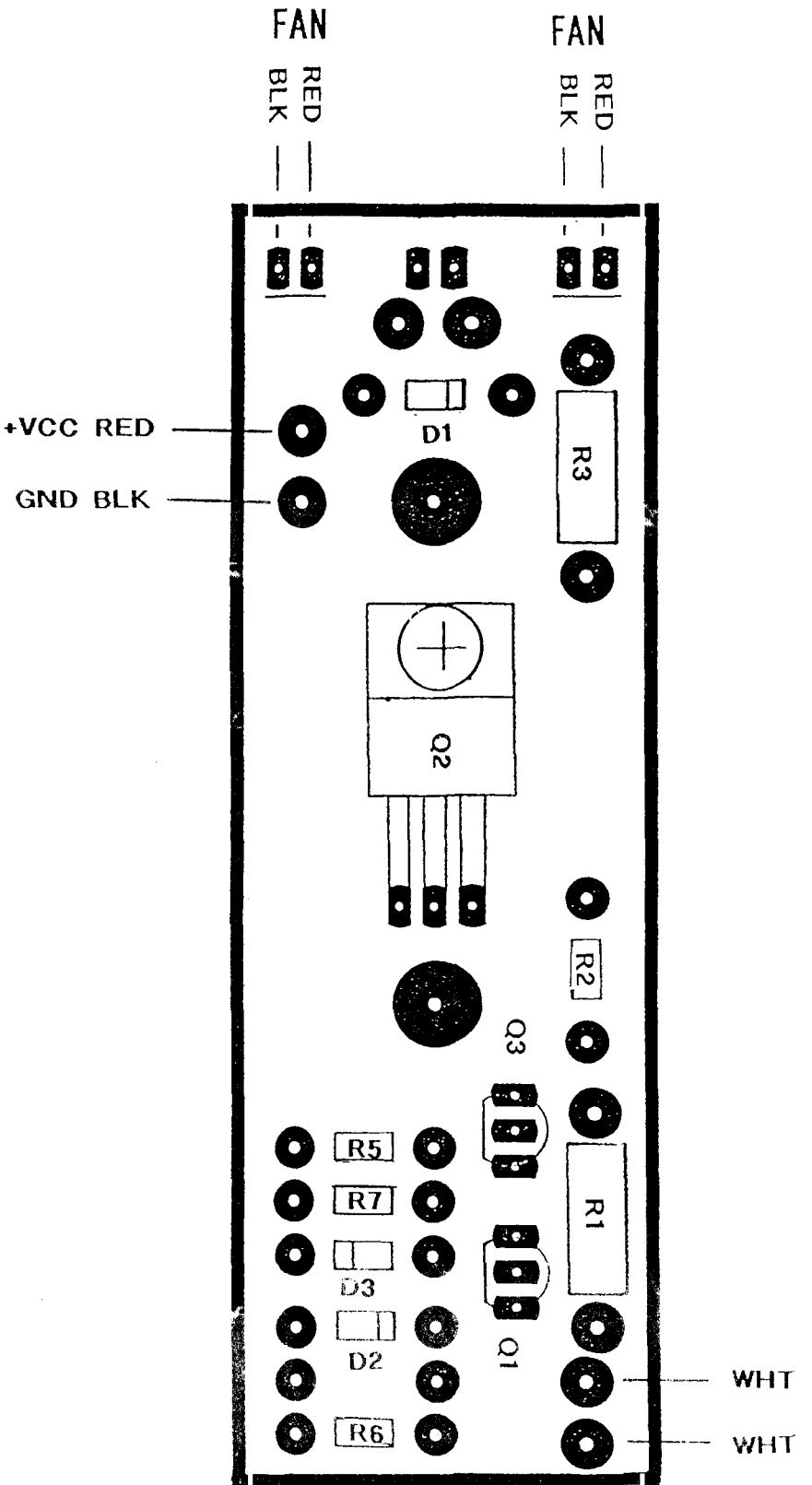
SCHEMATIC: FAN CONTROL C1

MODEL: 1200C

DATE: 4-90 GEO. A

ASSEMBLY NO. 502-713

THERMAL SENSOR



AB INTERNATIONAL, INC.

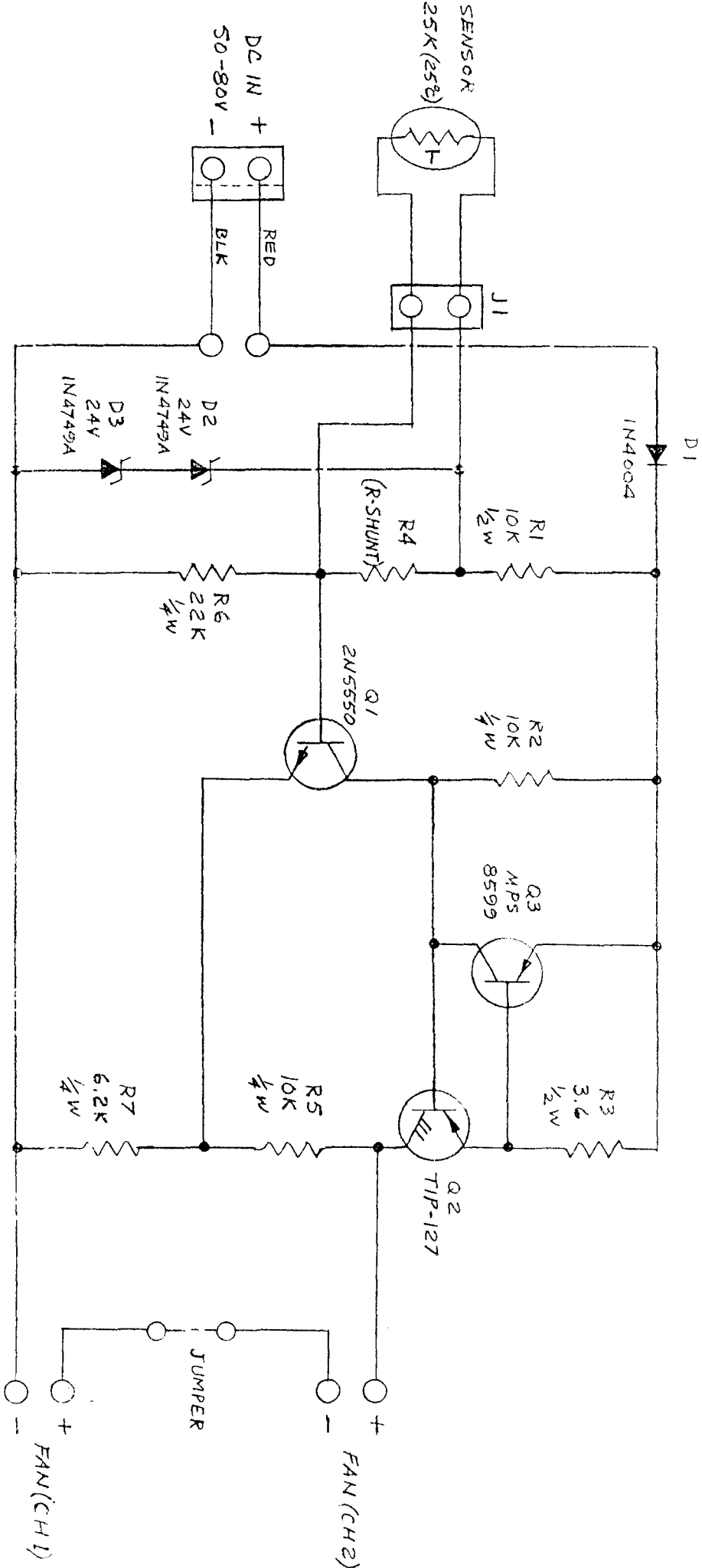
TITLE: FAN CONTROL BOARD

MODEL: 1200C

DATE 11-91

ASSY. NO. 502-713

REV. C



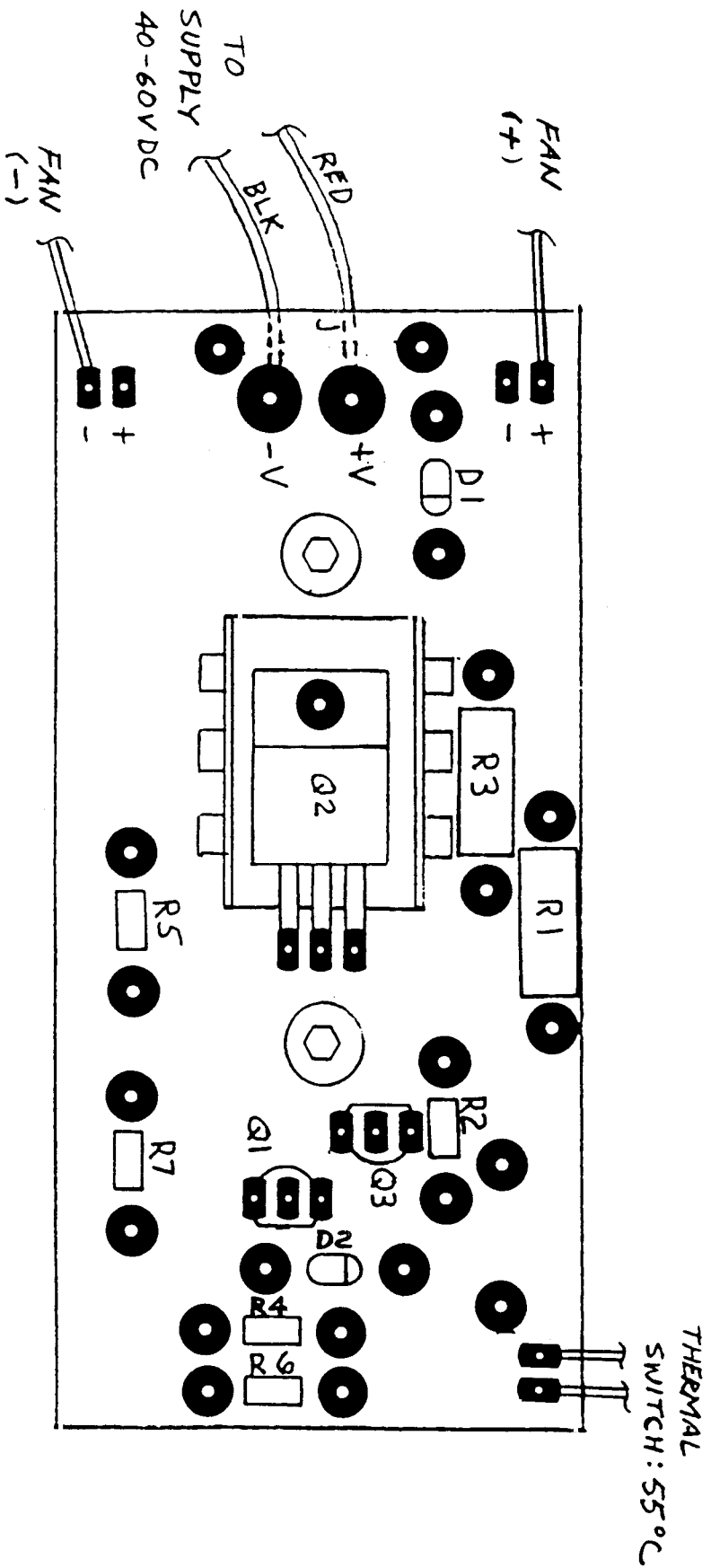
AB INTERNATIONAL, INC.

SCHEMATIC: FAN CONTROL C1

MODEL: 1200C

DATE: 4-90 GEO. A

ASSEMBLY NO. 502-713



NOTE: REV G POWER SUPPLIES ONLY 6-90/12-91

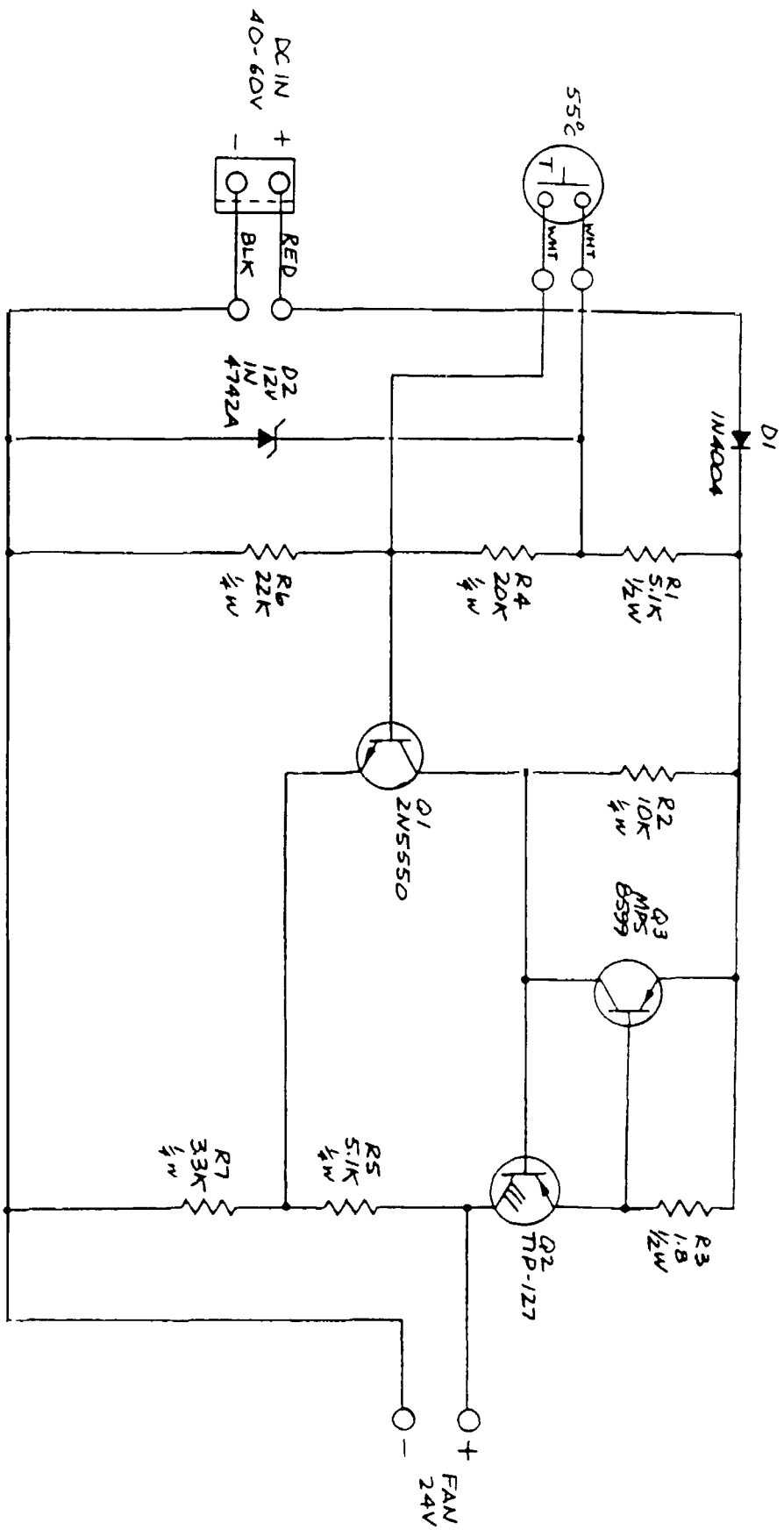
AB INTERNATIONAL, INC.

ASSY: FAN CONTROL BD.

MODEL: 900A/1100A (24V FAN)

DATE: 7-20-90 GEO.A

ASSY NO: 502-716 REV. A

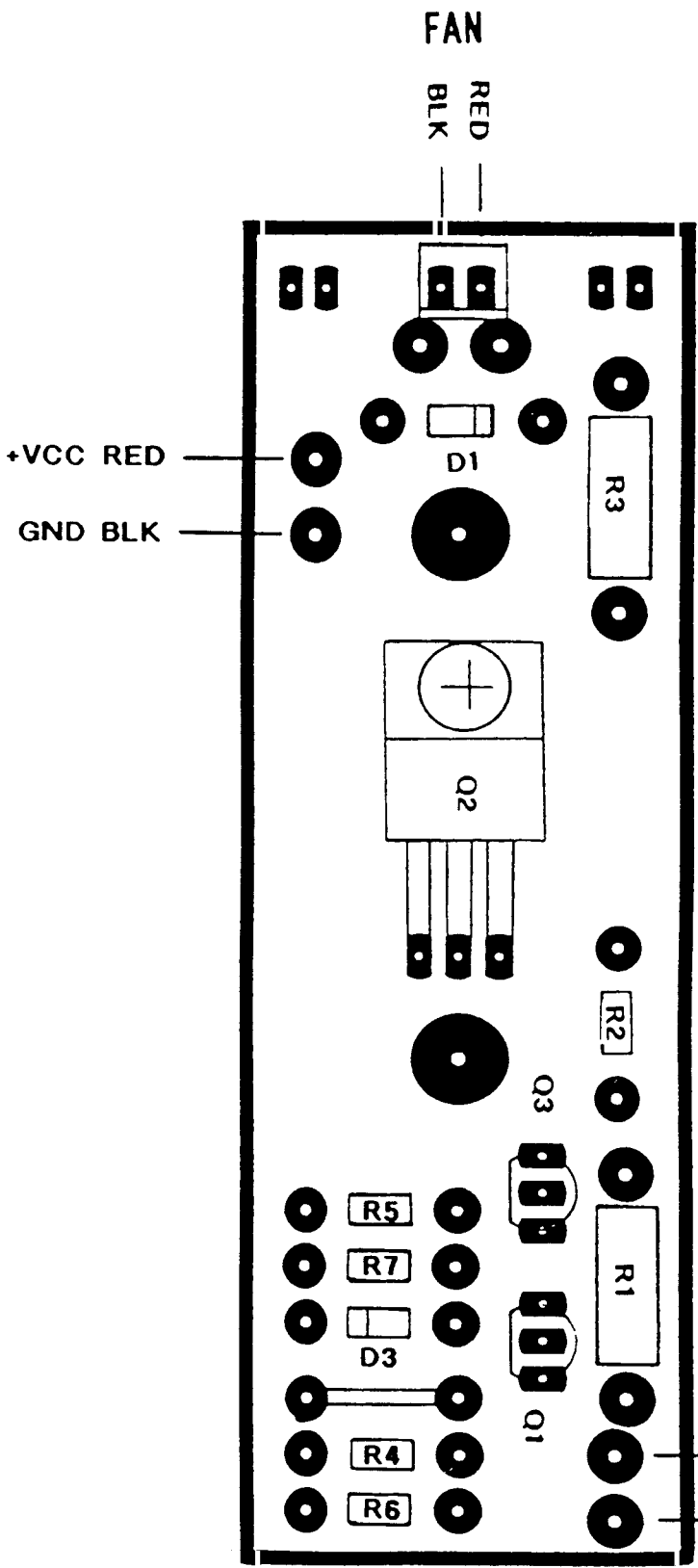


NOTE: REV. POWER SUPPLIES ONLY 6-90/12-91

AB INTERNATIONAL INC
 TITLE: FAN CONTROL CIRCUIT
 (24V FAN)
 MODEL: 900A/1100A
 DATE: 7-17-90 MH.
 ASSEMBLY NO. 502-716 REV. A

THERMAL SWITCH

WHT
WHT



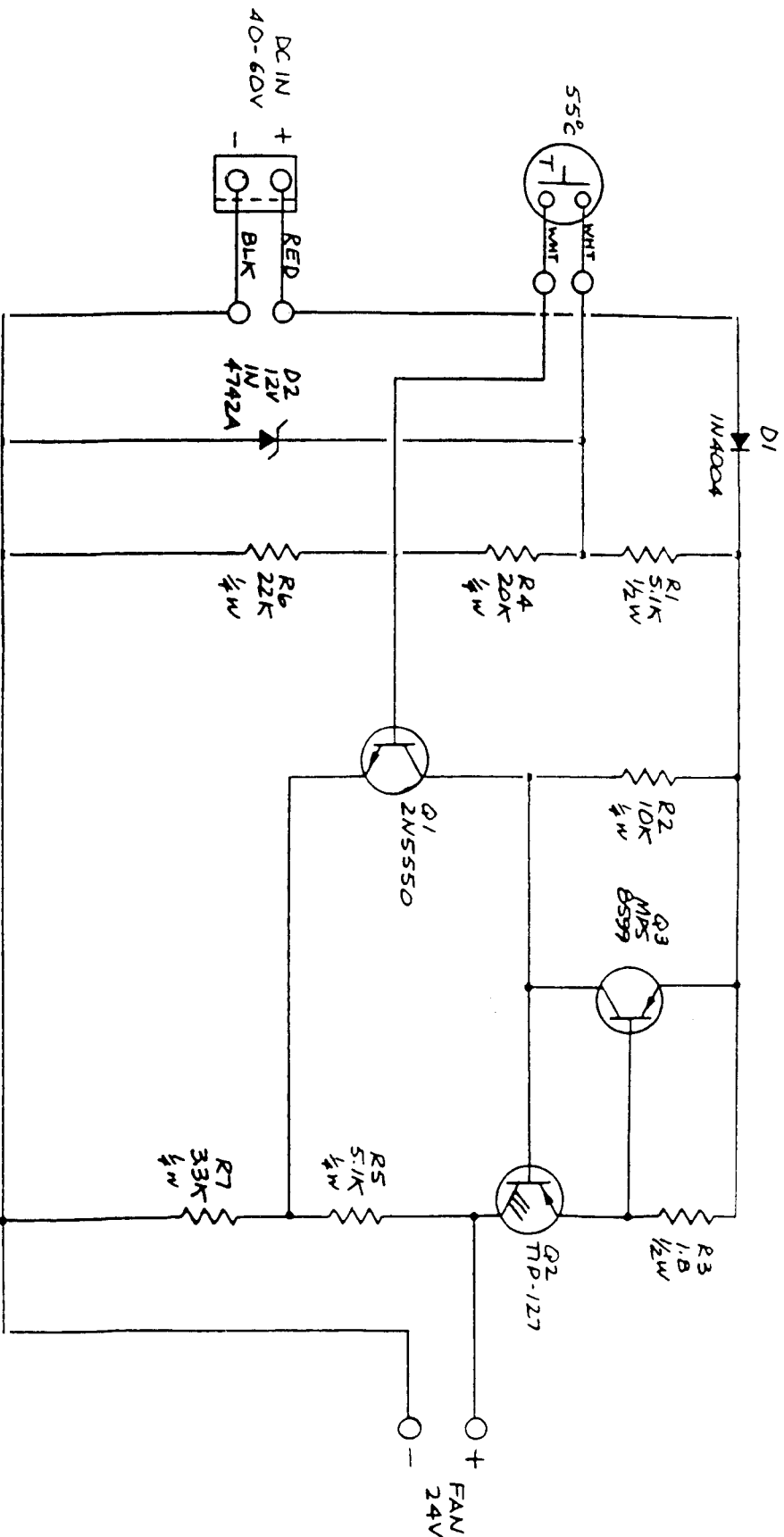
AB INTERNATIONAL, INC.

TITLE: FAN CONTROL PCB

MODEL: FX1B ,TWO-RACK AMPS

DATE 11-91

ASSY. NO. 502-716 REV. C



D2 = 12v zener for 24v fan or
 24v zener for 48v fan

R3 = 1.8 ohm 1/2w for 24v fan or
 3.6 ohm 1/2w for 48 v fan

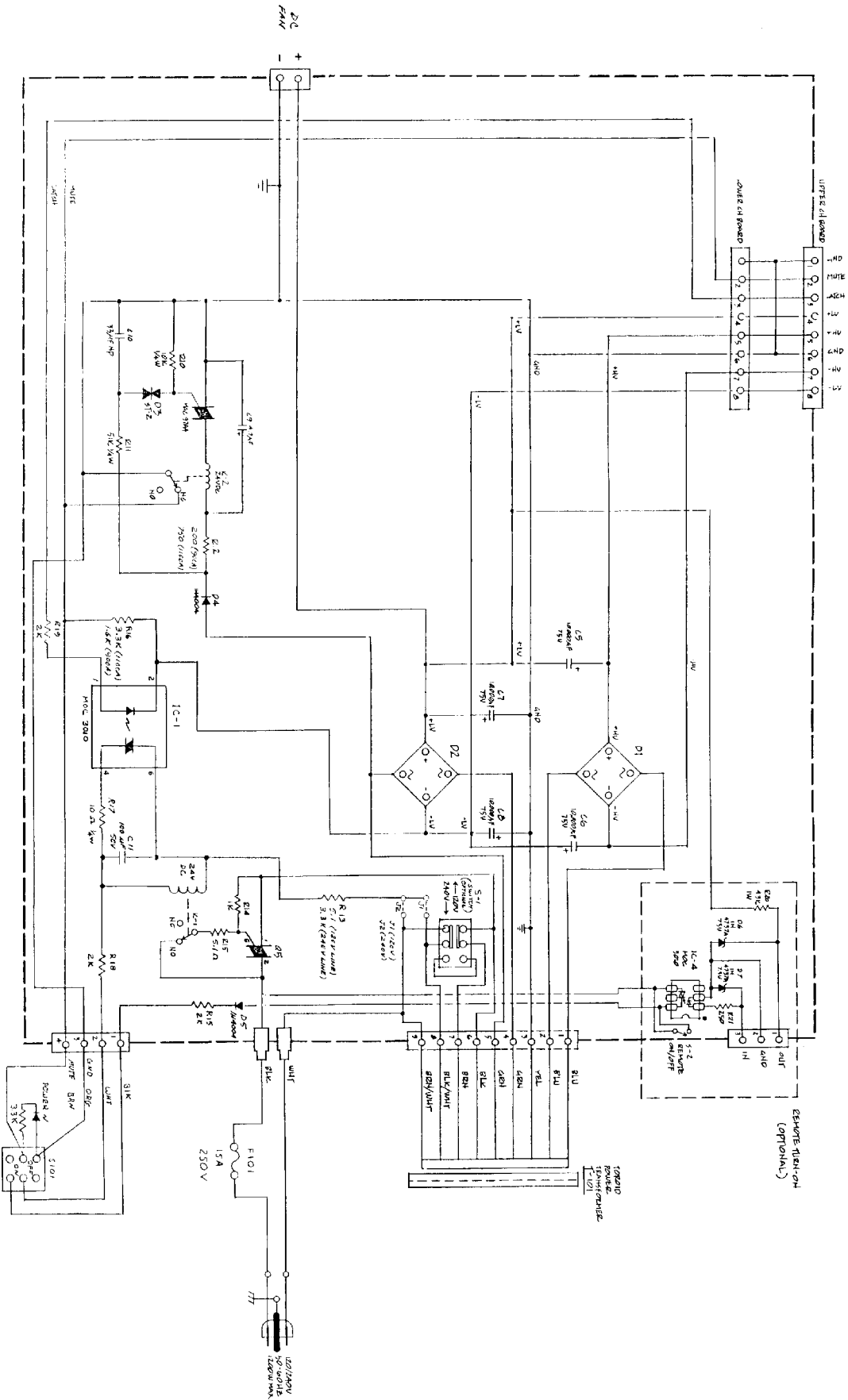
AB INTERNATIONAL, INC.

TITLE: FAN CONTROL CIRCUIT

MODEL: FX1B, TWO-RACK AMPS

DATE 11-91

ASSY. NO. 502-716 REV. C

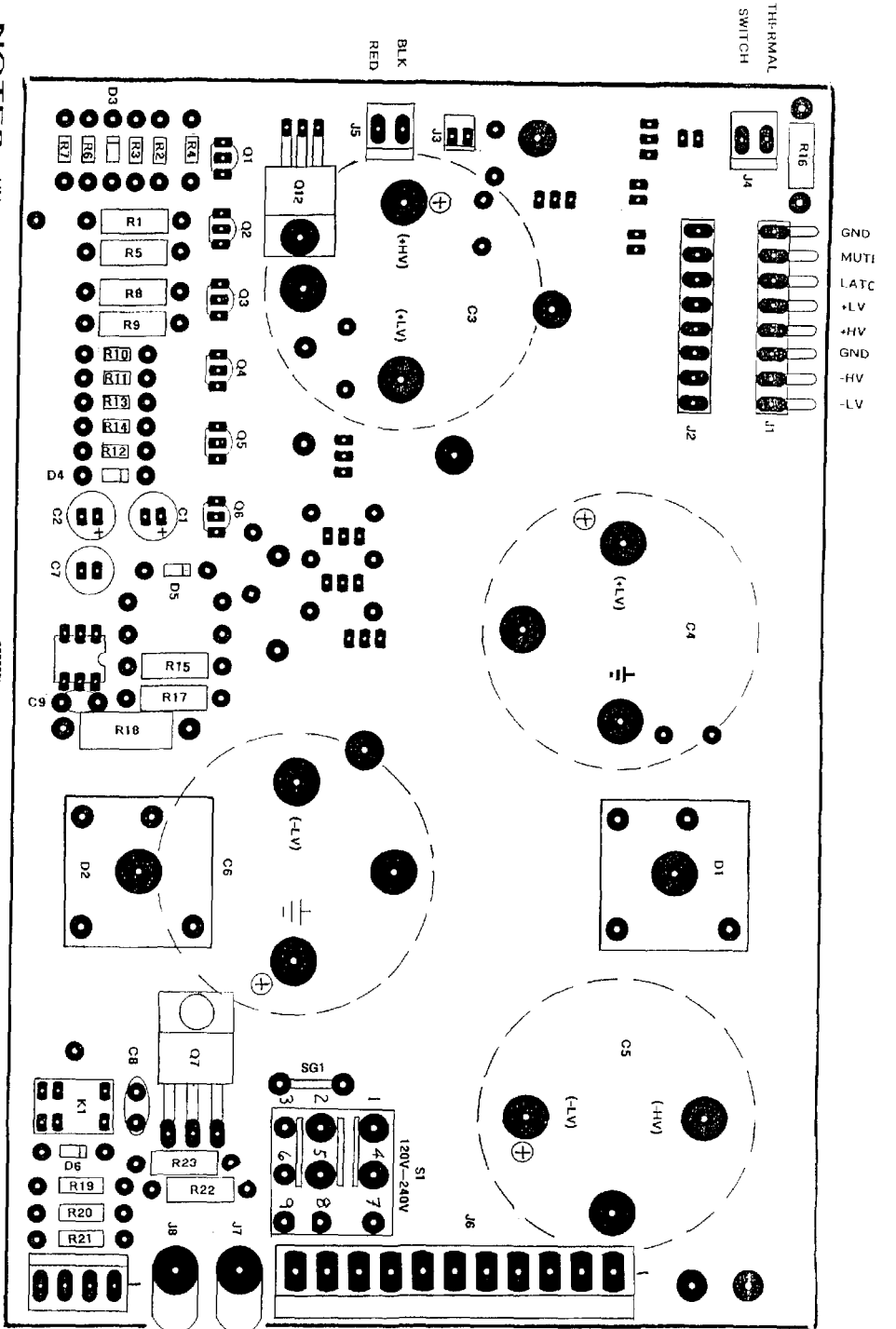


NOTES: UNLESS OTHERWISE SPECIFIED:
 1) ALL CAPACITORS ARE IN OHMS UNLESS STATED OTHERWISE.
 2) ALL CAPACITORS ARE IN MICROFARADS (µF).
 3) ALL CAPACITORS ARE IN MILLIFARADS (mF).
 4) UNLESS SPECIFIED OTHERWISE.

NOTE: 900A = 9220, 1100A = 9420

NOTE: REV G ONLY 6-90/12-91

IBM INTERNATIONAL, INC.
 TITLE: SUPPLYING POWER SUPPLY
 MODEL: 900A / 1100A
 DATE: 6-18-90 560A.
 REVISION: 100-502-681 REV G



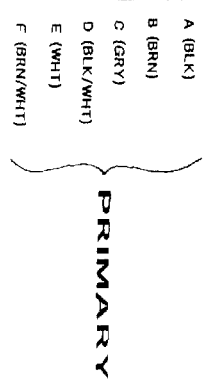
NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, $\frac{1}{2}W$, 5%
2. ALL CAPACITORS ARE IN MICROFARADS (μF)
3. INDICATES CHASSIS GROUND
4. RAIL VOLTAGES ARE AS FOLLOWS:
 +/-HV: 900A 92V; 1100A 108V
 +/-LV: 900A 45V; 1100A 53V

PRIMARY AC	WIRE COLOR						MAINS SELECT
WIRE LETTER (PIN POSITION)	A	B	C	D	E	F	SWITCH POSITION
190-110 VAC	BLACK	BROWN	BLK/WHT	GRAY	BRN/WHT	WHITE	120 POS.
115-130 VAC	BLACK	GRN	GRY	BLK/WHT	WHITE	BRN/WHT	120 POS.
200-215 VAC	BLACK	BEIGN	BLK/WHT	GRAY	BRN/WHT	WHITE	240 POS.
220-230 VAC	BLACK	BDWN	GRY	BLK/WHT	BRN/WHT	WHITE	240 POS.
235-250 VAC	BLACK	BDWN	GRAY	BLK/WHT	WHITE	BRN/WHT	240 POS.

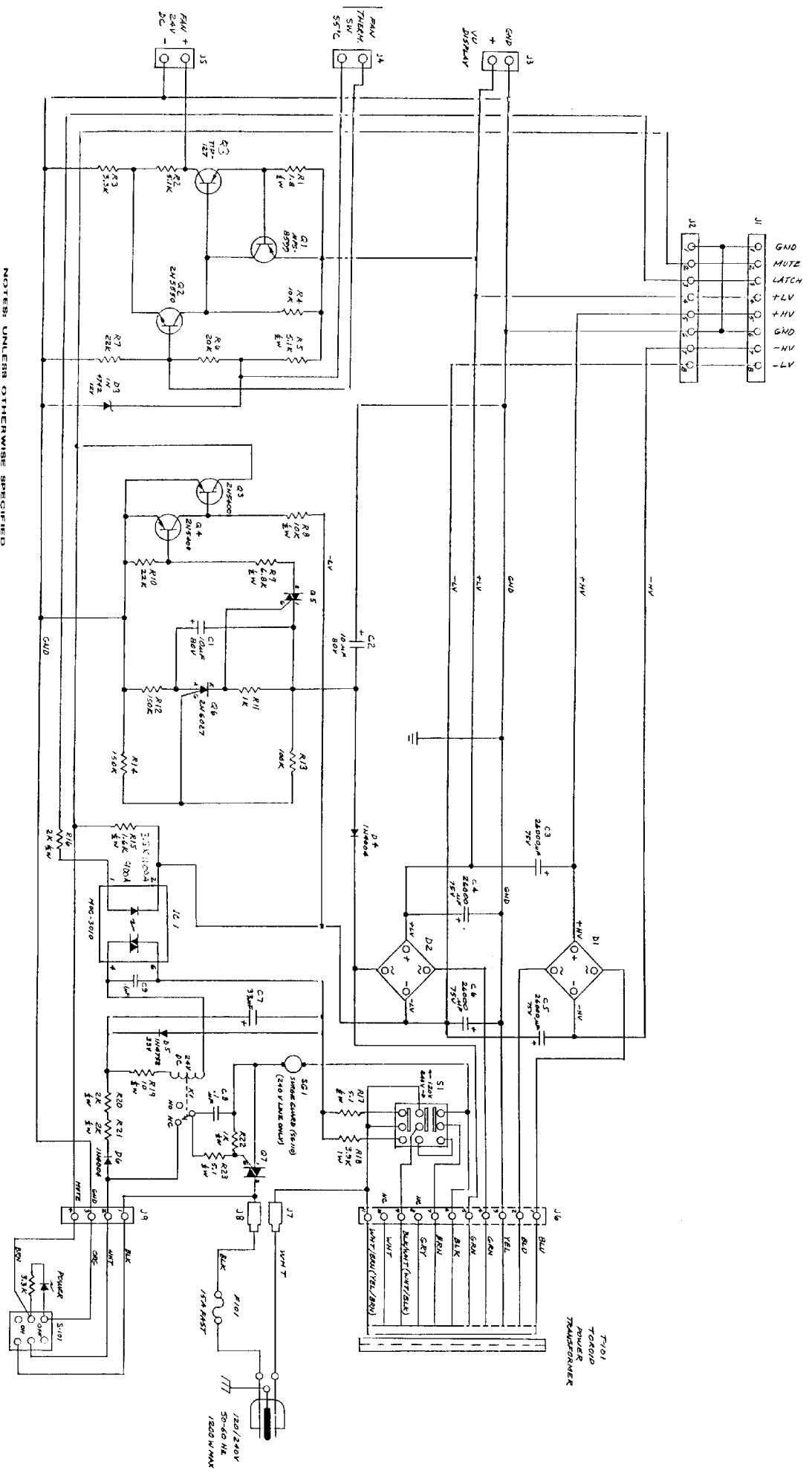
CHANGING AC LINE VOLTAGE WIRING

- STEP 1. SELECT PROPER LINE VOLTAGE
2. LOCATE VOLTAGE ON PRIMARY CHART
 3. CHANGE TRANSFORMER WIRES PER CHART
 4. SELECT PROPER SWITCH POSITION (S1)
- NOTE: IF PCB IS NOT LOADED WITH SWITCH (S1), IF NEEDED MOVE THE THREE ORANGE JUMPERS FROM HOLES (1&4, 2&5, 3&6) TO (4&7, 5&8, 6&9). THIS CAN BE SOLDERED FROM THE TOP SIDE OF THE PCB.
5. CHANGE FUSE 100V-120V = 15A
200V-240V = 10A



AB INTERNATIONAL, INC.

TITLE: POWER SUPPLY BOARD
MODEL: PRECEDENT 900A / 1100A
 NOTE: 900A = 9220, 1100A = 9420
DATE: JAN '92
ASSEMBLY NO. 502-671 REV. H

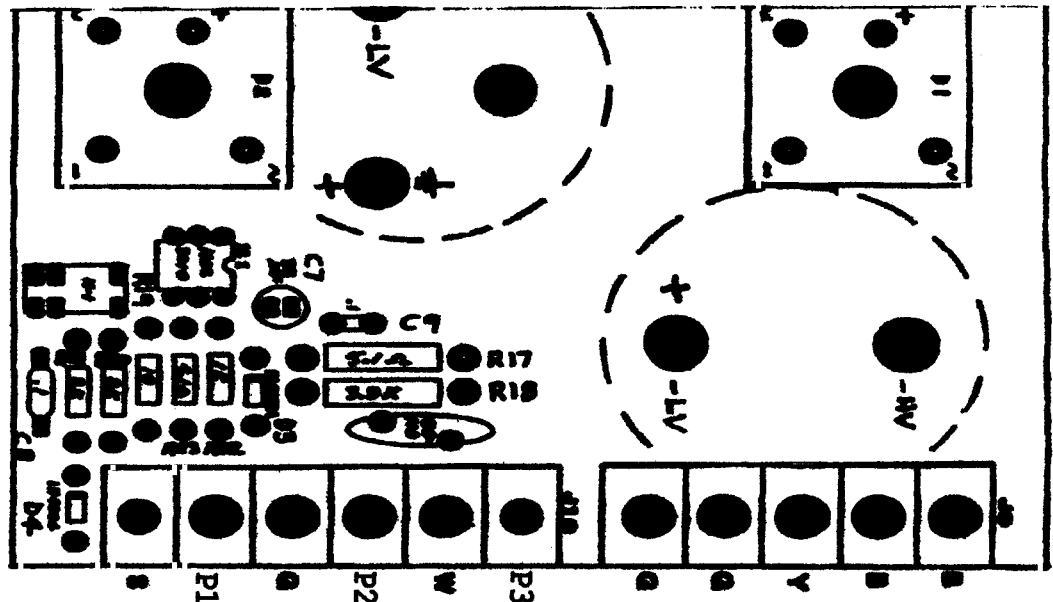


- NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE IN OHMS, Ω OR 5%
 2. ALL CAPACITORS ARE IN MICROFARADS (μF)
 3. M INDICATES MASSIVE GROUND
 4. ± INDICATES SUPPLY TOLERANCE
 5. ± INDICATES SUPPLY TOLERANCE
 6. ± INDICATES SUPPLY TOLERANCE
 7. ± INDICATES SUPPLY TOLERANCE
 8. ± INDICATES SUPPLY TOLERANCE
 9. ± INDICATES SUPPLY TOLERANCE
 10. ± INDICATES SUPPLY TOLERANCE
 11. ± INDICATES SUPPLY TOLERANCE
 12. ± INDICATES SUPPLY TOLERANCE
 13. ± INDICATES SUPPLY TOLERANCE
 14. ± INDICATES SUPPLY TOLERANCE
 15. ± INDICATES SUPPLY TOLERANCE

NOTE: 900A = 9220, 1100A = 9420

AD INTERNATIONAL, INC.
TITLE: SCHEMATIC, POWER SUPPLY
MODEL: 900A / 1100A
DATE: 1-21-92
ASSEMBLY NO. 502-671 REV. H

Line Voltage Conversion Diagram



For transformers with
Primary colors of:

- Brown/White
- Black/White
- White
- Grey
- Brown
- Black

For transformers with
Primary colors of:

- White
- Purple
- Brown
- Orange
- Grey
- Black

Secondary wiring Blue x 2, Yellow, Green x 2 remains unchanged.
Note: Some xfrms had Blue x 2, Yellow, Violet x 2 (Instead of Green)

100VAC Wiring

120VAC

100VAC Wiring

120VAC

- P3 = N/C
- P2 = White
- P1 = Brown
- Black

- P3 = N/C
- P2 = Brown/White
- P1 = Brown
- Black

- P3 = N/C
- P2 = Purple
- Grey
- P1 = Brown
- Black

- P3 = N/C
- P2 = White
- Orange
- P1 = Brown
- Black

220VAC

240VAC

220VAC

240VAC

- P3 = Brown
- Black/White
- P2 = White
- P1 = Black

- P3 = Brown
- Black/White
- P2 = Brown/White
- P1 = Black

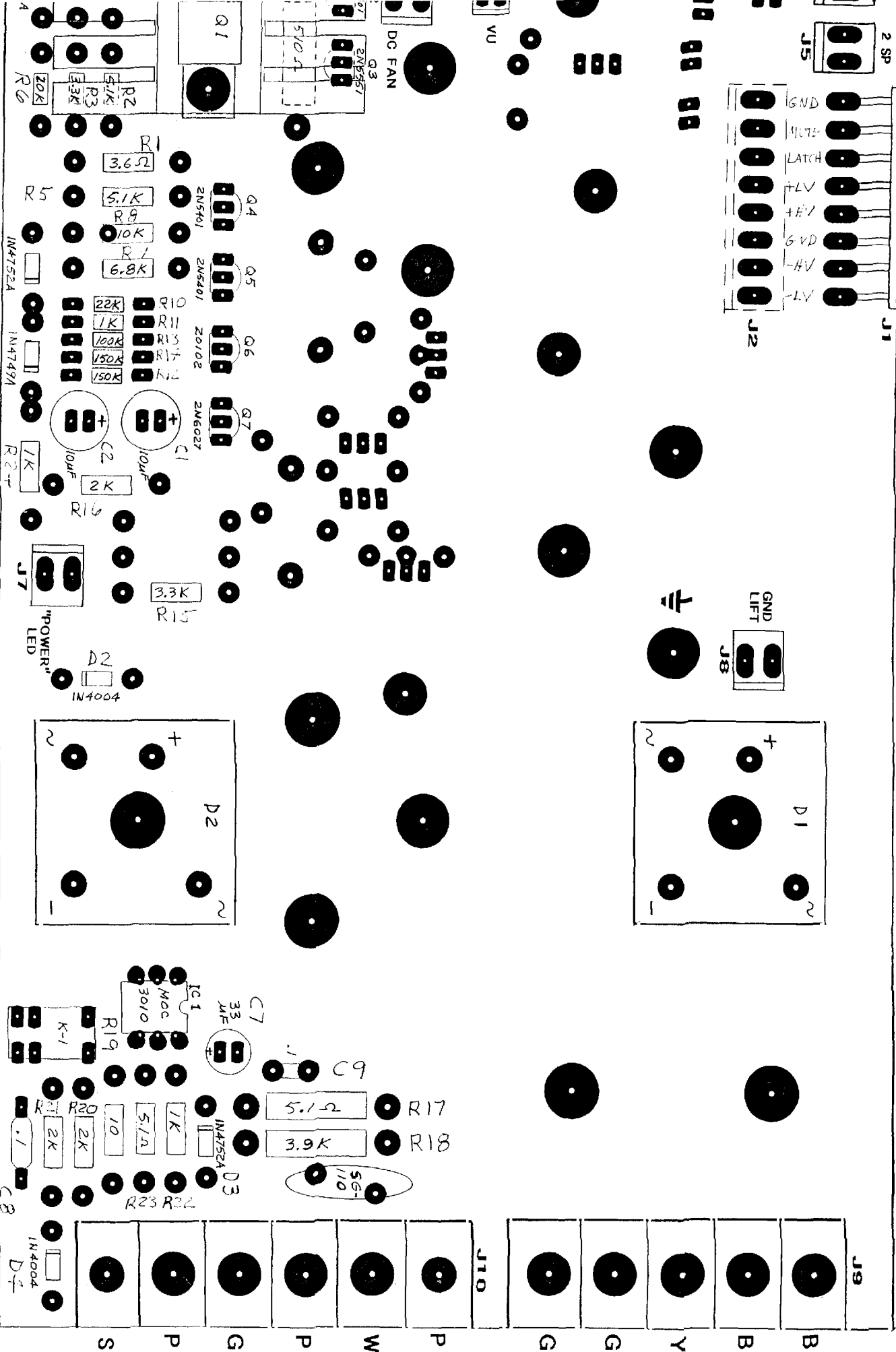
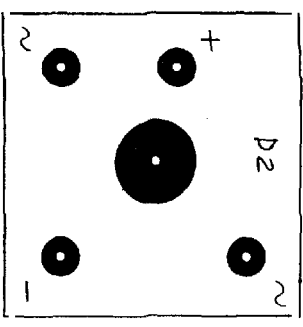
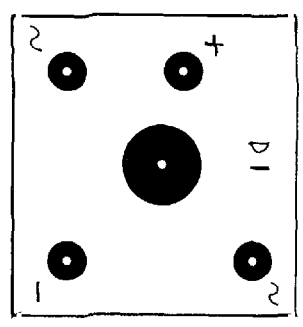
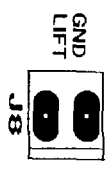
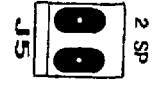
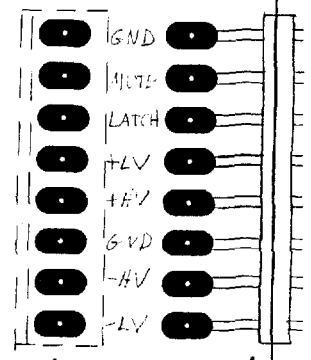
- P3 = Brown
- Orange
- P2 = Purple
- P1 = Black

- P3 = Brown
- Orange
- P2 = White
- P1 = Black

When converting to 220 or 240 VAC remove 5.1
Ohm 1-watt resistor and replace line fuse with a 10 amp fuse.

W. 55°C

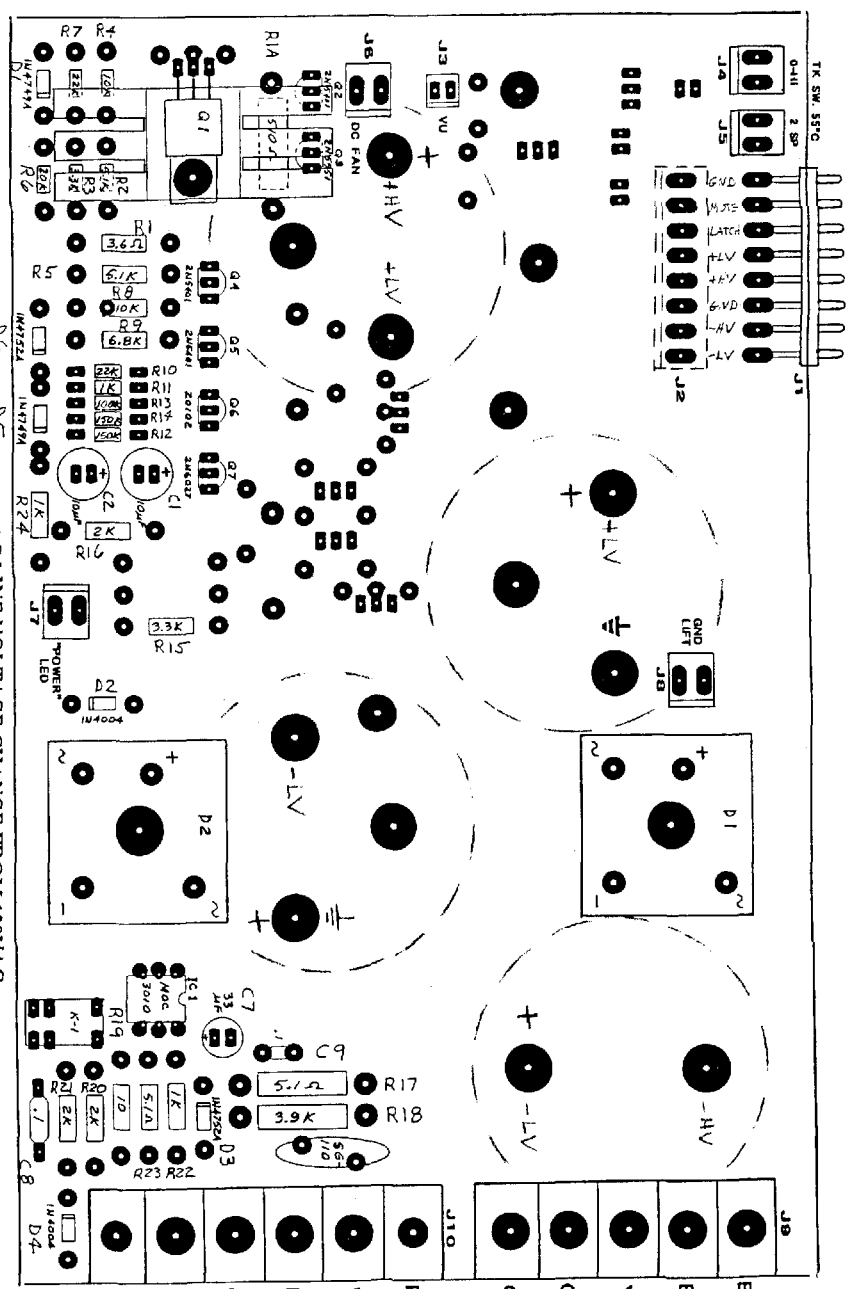
1100A POWER LEVEL



D-5
D-7

S P G P W P G G Y B B

- NOTES UNLESS OTHERWISE SPECIFIED**
- 1. ALL RESISTORS ARE IN OHMS, UNLESS OTHERWISE SPECIFIED.
 - 2. ALL CAPACITORS ARE IN MICROFARADS (UF).
 - 3. R1 SELECT: 1.8 ohm (900A, 9220), 3.6 ohm (1100A, 9420)
 - 4. R1A OMIT FOR 900A, 9220
 - 5. R15 SELECT: 1.6K (900A, 9220), 3.3K (1100A, 9420)
 - 6. R17 OMIT FOR 220V, 240V
 - 7. R2 - 100V TAP WITH TRANSFORMER FOR 900A, 9220
 - 8. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 9. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 10. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 11. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 12. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 13. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 14. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 15. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 16. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 17. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 18. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 19. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420
 - 20. R1 - 100V TAP WITH TRANSFORMER FOR 1100A, 9420

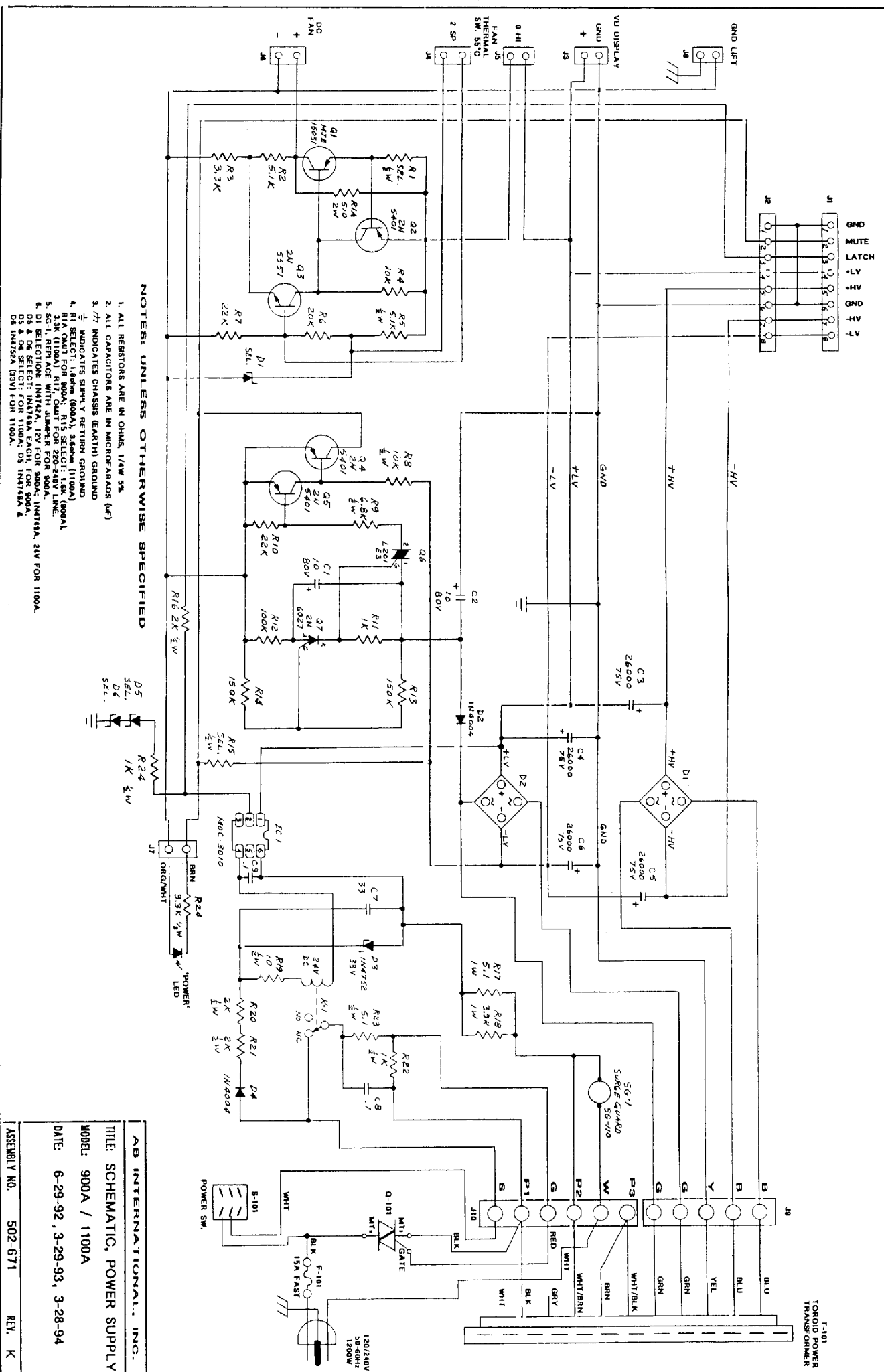


AC LINE VOLTAGE CHANGE FROM 120VAC FOR POWER SUPPLY REVISION "K"

- STEP**
1. REMOVE AMPLETTHER FROM ANY AC POWER SOURCE.
 2. DETERMINE DESIRED AC LINE VOLTAGE AND SELECT PROPER AMPLETTHER SETTING. CHOOSE OF THE FOLLOWING: 100VAC, 180VAC, 220VAC, 240VAC.
 3. FOLLOW WIRING PROCEDURE CLOSELY.
- 100V**
1. LOCATE TERMINAL P1 ON THE POWER SUPPLY AND REMOVE THE BLANK WIRE & BRONZE WIRE FROM P1 AND SECURE THEM.
 2. LOCATE THE GRAY AND WHITE WIRES FROM THE TRANSFORMER AND PLACE THEM ON TERMINAL P2.
- 220V**
1. LOCATE P1 AND P1 ON THE POWER SUPPLY. RELOCATE THE BLANK WIRE ON THE TRANSFORMER FROM P1 TO P2.
 2. LOCATE AND MOVE THE BRN WIRE OF THE TRANSFORMER FROM P1 TO P2.
 3. REMOVE THE BRN WIRE CONNECTED TO P2 AND SECURE.
 4. LOCATE THE WHI WIRE FROM THE TRANSFORMER AND CONNECT IT TO P2.
 5. LOCATE R17 & R18 ON THE POWER SUPPLY AND REMOVE IT BY CUTTING THE LEADS.
 6. CHANGE THE FUSE FROM 15A TO 10A.
- 240V**
1. LOCATE P1 AND P1 ON THE POWER SUPPLY. RELOCATE THE BLANK WIRE ON THE TRANSFORMER FROM P1 TO P2.
 2. LOCATE AND MOVE THE BRN WIRE OF THE TRANSFORMER TO FROM P1 TO P2.
 3. LOCATE R17 & R18 ON THE POWER SUPPLY AND REMOVE IT BY CUTTING THE FUSE.
 4. CHANGE FUSE FROM 15A TO 10A.

<p>TITLE: POWER SUPPLY BOARD</p> <p>MODEL: 900A, 1100A, 9220, 9420</p> <p>ATD AMPS</p>	
<p>DATE: 3-28-94</p>	
<p>PART NO. 502-671</p>	<p>REV. K</p>

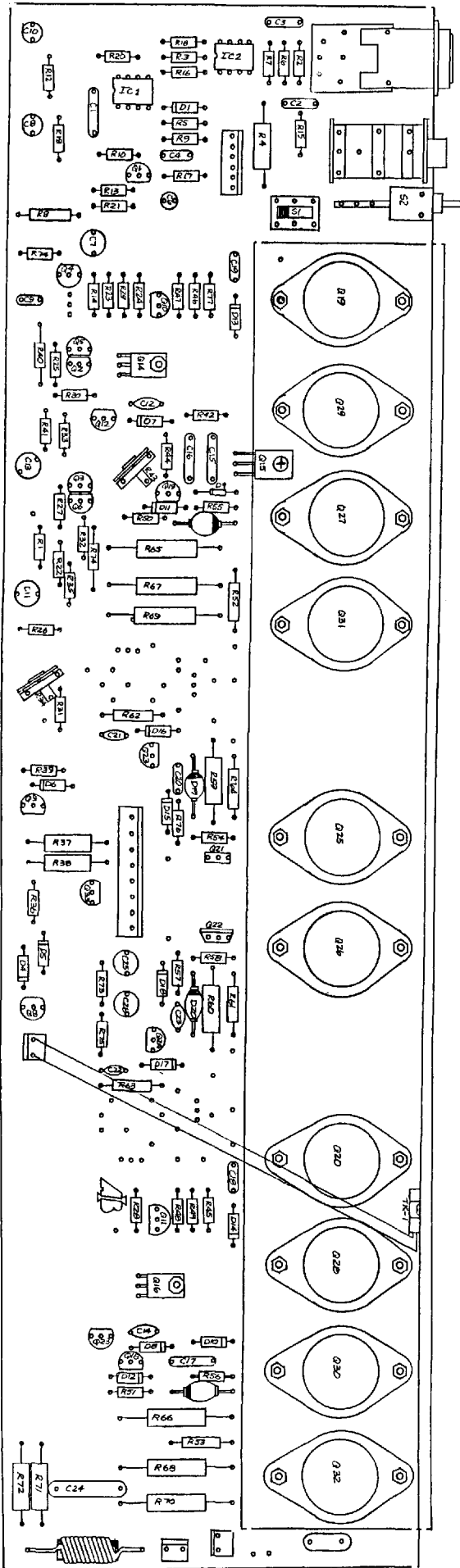
AS International Electronics, Inc.
 1804 Westwood Blvd
 4th Floor
 Van Nuys, CA 91411
 Phone: (818) 784-1884



- NOTES: UNLESS OTHERWISE SPECIFIED**
1. ALL RESISTORS ARE IN OHMS, 1/W 5%
 2. ALL CAPACITORS ARE IN MICROFARADS (UF)
 3. --- INDICATES CHASSIS (EARTH) GROUND
 4. --- INDICATES SUPPLY RETURN GROUND
 5. R1 SELECT: 1800A (900A), 3.600A (1100A)
 6. R1A (ONLY FOR 900A, R1 IS SELECT: 1.8K (900A), 3.6K (1100A))
 7. SC-1, REPLACE WITH JUMPER FOR 900A.
 8. D1 SELECT: INT172A, 12V FOR 900A; INT174A, 24V FOR 1100A.
 9. D5 & D6 SELECT: INT172A EACH, FOR 900A.
 10. D5 & D6 SELECT: FOR 1100A; D5 INT175A & D6 INT175A (33V) FOR 1100A.

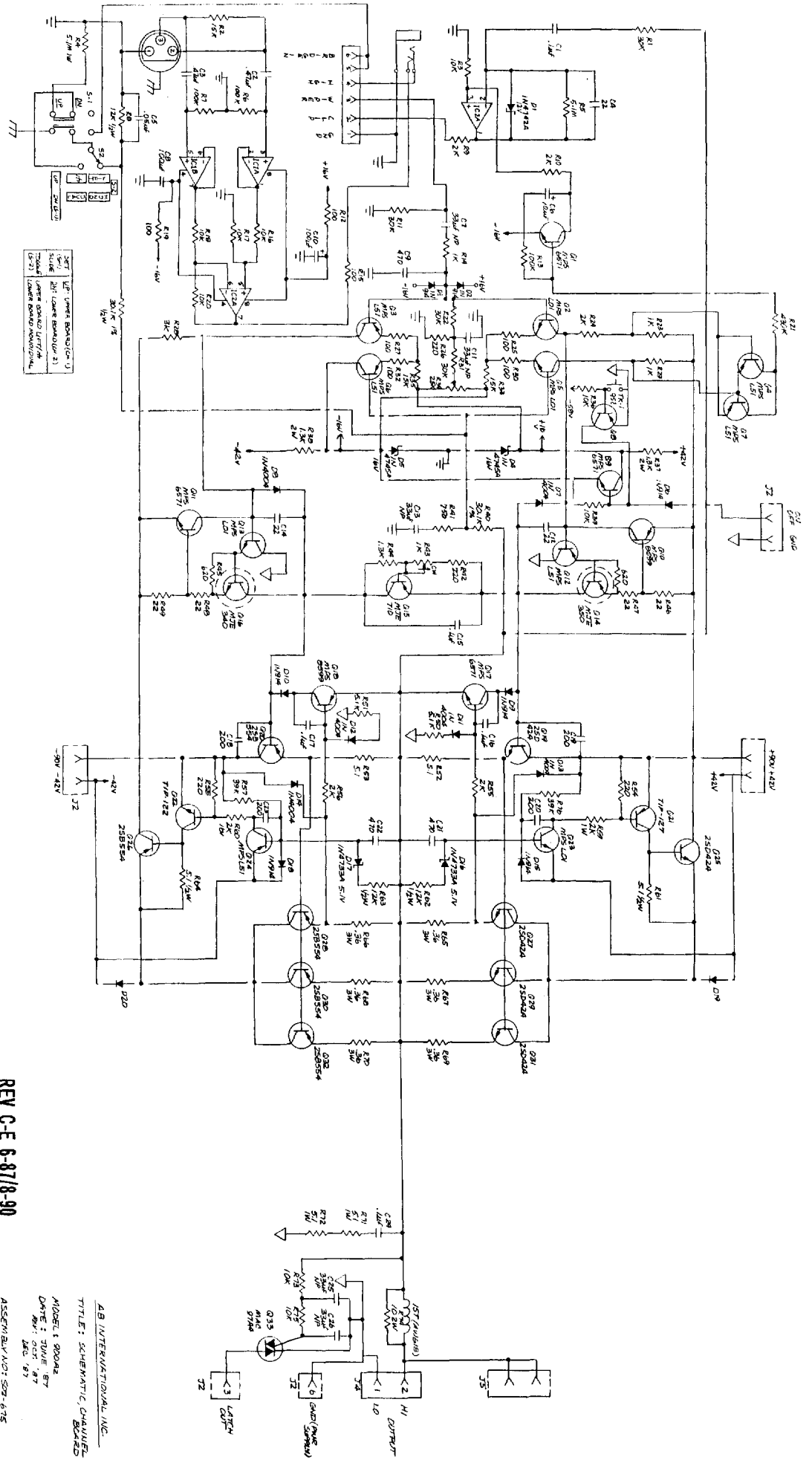
AB INTERNATIONAL, INC.
 TITLE: SCHEMATIC, POWER SUPPLY
 MODEL: 900A / 1100A
 DATE: 6-29-92, 3-29-93, 3-28-94
 ASSEMBLY NO. 502-671 REV. K

T-101
 TOROID POWER
 TRANSFORMER



REV C-E 6-87/8-90

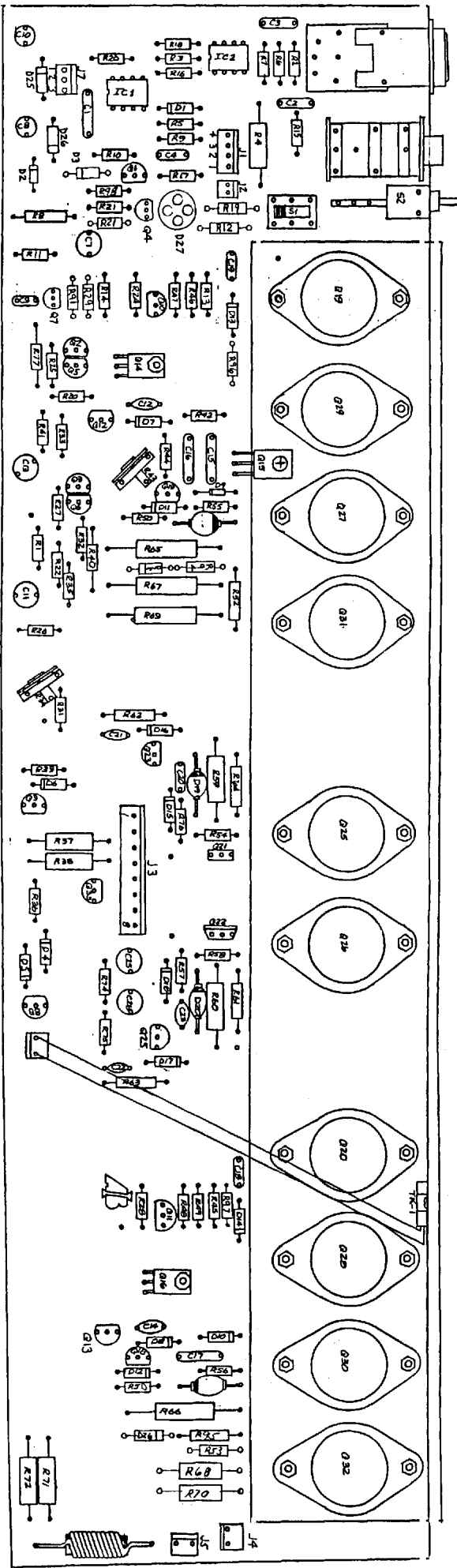
AB INTERNATIONAL, LLC
 ASSEMBLY PCB, 90042
 PN 1 502-475



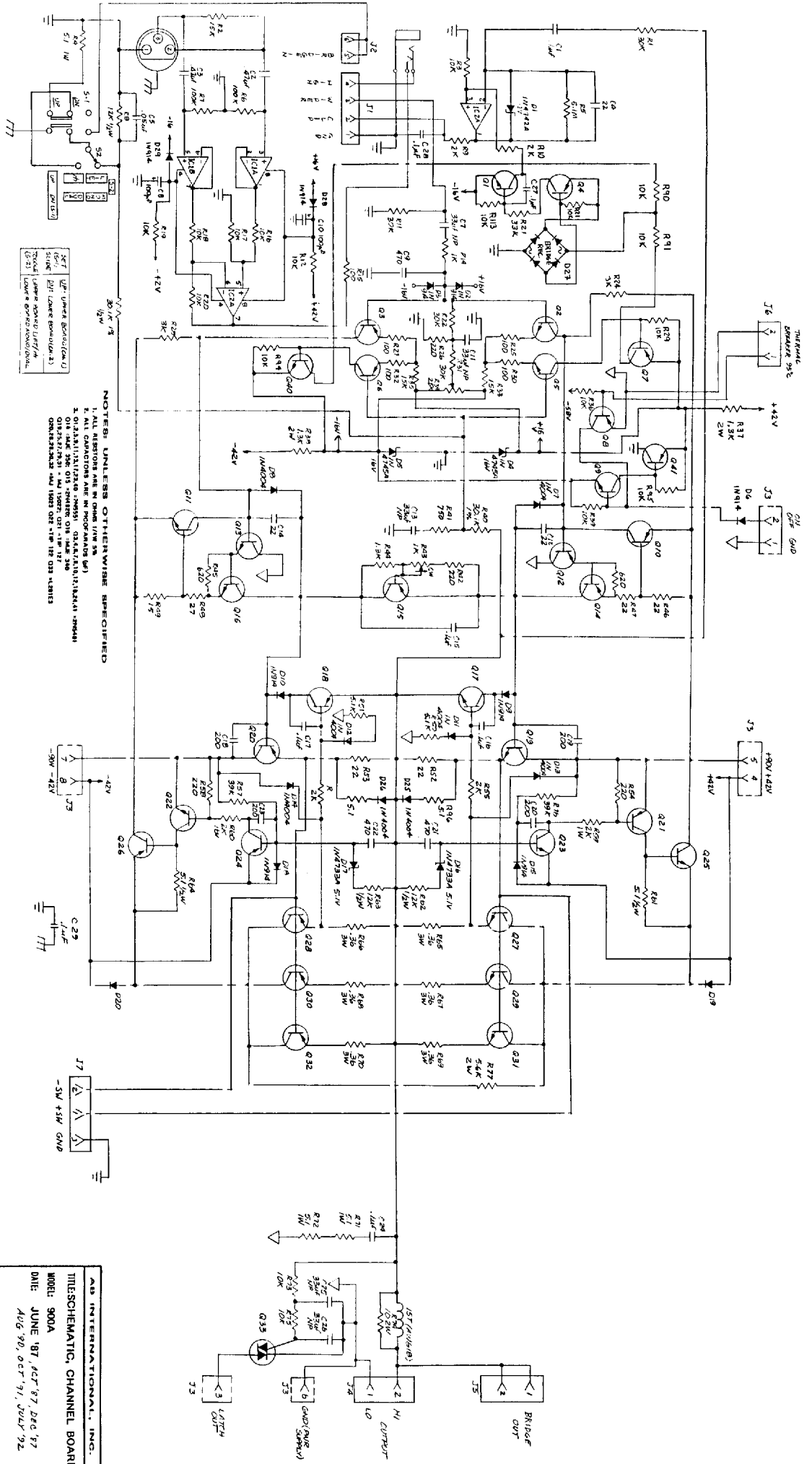
207	UPPER BOARD (IC-1)
208	UPPER BOARD (IC-2)
209	UPPER BOARD (IC-3)
210	UPPER BOARD (IC-4)
211	UPPER BOARD (IC-5)
212	UPPER BOARD (IC-6)
213	UPPER BOARD (IC-7)
214	UPPER BOARD (IC-8)
215	UPPER BOARD (IC-9)
216	UPPER BOARD (IC-10)
217	UPPER BOARD (IC-11)
218	UPPER BOARD (IC-12)
219	UPPER BOARD (IC-13)
220	UPPER BOARD (IC-14)
221	UPPER BOARD (IC-15)
222	UPPER BOARD (IC-16)
223	UPPER BOARD (IC-17)
224	UPPER BOARD (IC-18)
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237	UPPER BOARD (IC-31)
238	UPPER BOARD (IC-32)
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272	UPPER BOARD (IC-66)
273	UPPER BOARD (IC-67)
274	UPPER BOARD (IC-68)
275	UPPER BOARD (IC-69)
276	UPPER BOARD (IC-70)
277	UPPER BOARD (IC-71)
278	UPPER BOARD (IC-72)
279	UPPER BOARD (IC-73)
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288	UPPER BOARD (IC-82)
289	UPPER BOARD (IC-83)
290	UPPER BOARD (IC-84)
291	UPPER BOARD (IC-85)
292	UPPER BOARD (IC-86)
293	UPPER BOARD (IC-87)
294	UPPER BOARD (IC-88)
295	UPPER BOARD (IC-89)
296	UPPER BOARD (IC-90)
297	UPPER BOARD (IC-91)
298	UPPER BOARD (IC-92)
299	UPPER BOARD (IC-93)
300	UPPER BOARD (IC-94)
301	UPPER BOARD (IC-95)
302	UPPER BOARD (IC-96)
303	UPPER BOARD (IC-97)
304	UPPER BOARD (IC-98)
305	UPPER BOARD (IC-99)
306	UPPER BOARD (IC-100)

REV C-E 6-87/8-90

AB INTERNATIONAL INC.
 TITLE: SCHEMATIC, CHASSIS BOARD
 MODEL: 1 900A2
 DATE: JUNE 87
 REV: OCT 87
 ASSEMBLY: NOT 507-675



AB INTERNATIONAL, INC
 ASSEMBLY PCB, 90042
 P/N 502-685 REV F
 AUG 90 JK



Q1	74181	ALU
Q2	74180	MUX
Q3	7400	NAND
Q4	7400	NAND
Q5	7400	NAND
Q6	7400	NAND
Q7	7400	NAND
Q8	7400	NAND
Q9	7400	NAND
Q10	7400	NAND
Q11	7404	INVERTER
Q12	7404	INVERTER
Q13	7404	INVERTER
Q14	7404	INVERTER
Q15	7407	BUFFER
Q16	7407	BUFFER
Q17	7407	BUFFER
Q18	7407	BUFFER
Q19	7414	SCHMITT TRIGGER
Q20	7410	NAND
Q21	555	TIMER
Q22	74123	MONOSTABLE
Q23	74133	MONOSTABLE
Q24	7414	SCHMITT TRIGGER

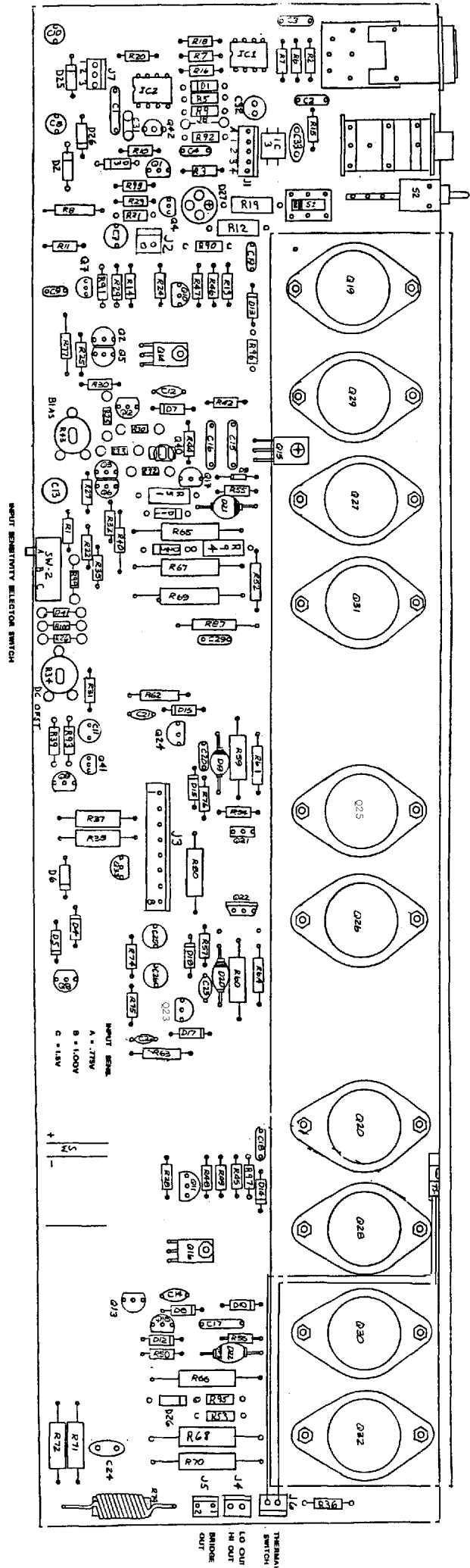
NOTES: UNLESS OTHERWISE SPECIFIED
 1. ALL RESISTORS ARE IN OHMS UNLESS NOTED
 2. ALL CAPACITORS ARE IN PICOFARADS (PF)
 3. DIMENSIONS IN PARENTHESES INDICATE MINIMUM
 4. DIMENSIONS IN SQUARE BRACKETS INDICATE MAXIMUM
 5. DIMENSIONS IN CIRCLES INDICATE TYPICAL
 6. DIMENSIONS IN TRIANGLES INDICATE MINIMUM
 7. DIMENSIONS IN DASHES INDICATE MAXIMUM
 8. DIMENSIONS IN SQUARE ROOTS INDICATE TYPICAL

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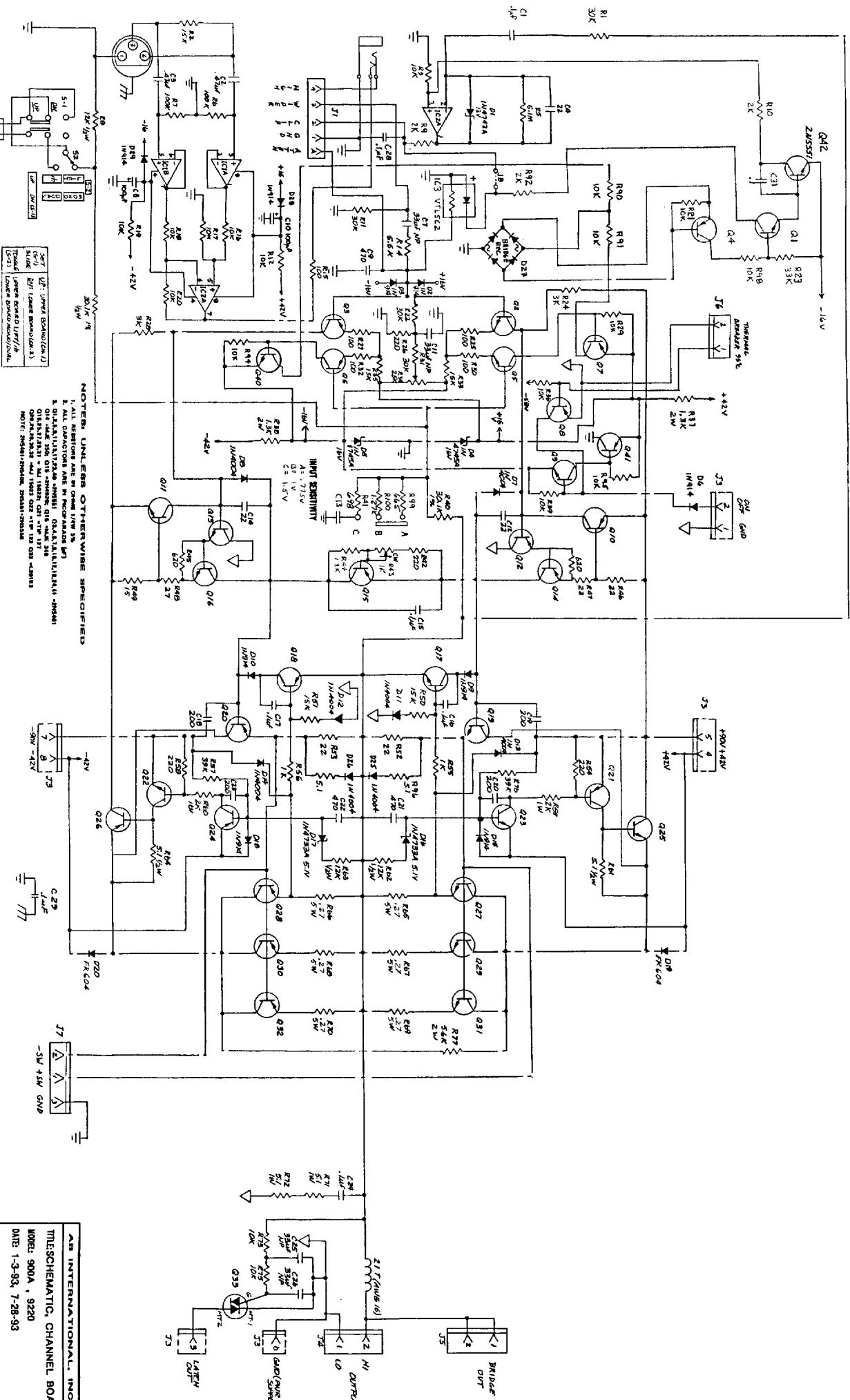
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ASB INTERNATIONAL, INC.
 TITLESCHMATIC CHANNEL BOARD
 WORK: 900A
 DATE: JUNE '87, OCT '87, DEC '87
 AUG '90, OCT '91, JULY '92
 ASSEMBLY NO. 502-675 REL. F



NOTE: SWA TO 9229 CONVERSION, REMOVE IC1 & C11, INSERT J1

AB INTERNATIONAL
TITLE ASSEMBLY 900A, 9220
DATE JAN 1993 JK
302-810 REV. G

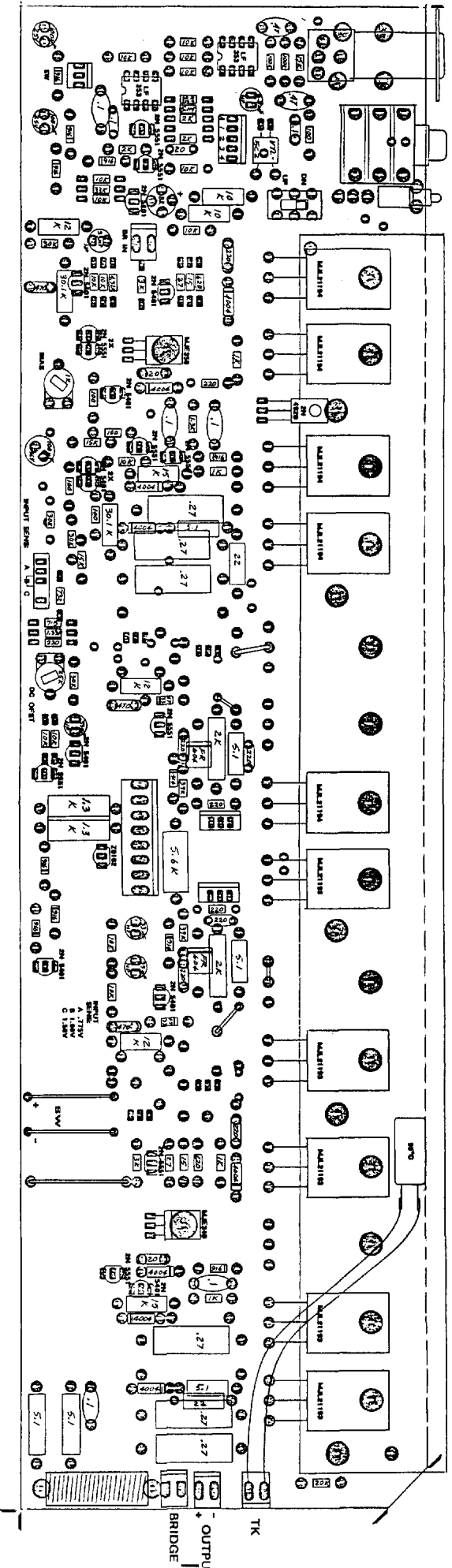


Q1	Q1A	Q1B	Q1C	Q1D	Q1E	Q1F	Q1G	Q1H	Q1I	Q1J	Q1K	Q1L	Q1M	Q1N	Q1O	Q1P	Q1Q	Q1R	Q1S	Q1T	Q1U	Q1V	Q1W	Q1X	Q1Y	Q1Z
2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638	2N3638

NOTE: UNLESS OTHERWISE SPECIFIED
 1. ALL RESISTORS ARE IN OHMS UNLESS NOTED
 2. ALL CAPACITORS ARE IN MICROFARADS UNLESS NOTED
 3. Q1A THROUGH Q1Z ARE 2N3638 UNLESS OTHERWISE NOTED
 4. Q1A THROUGH Q1Z ARE 2N3638 UNLESS OTHERWISE NOTED
 5. Q1A THROUGH Q1Z ARE 2N3638 UNLESS OTHERWISE NOTED

NOTE: 90A TO 92A CONVERSION, REMOVE IC3 & C1, INSERT J1

ASB INTERNATIONAL, INC.
 THIS SCHEMATIC, CHANNEL BOAT
 MODEL 900A, 9220
 DATE 1-5-93, 7-28-93
 ASSEMBLY NO. 502-675 REV. G



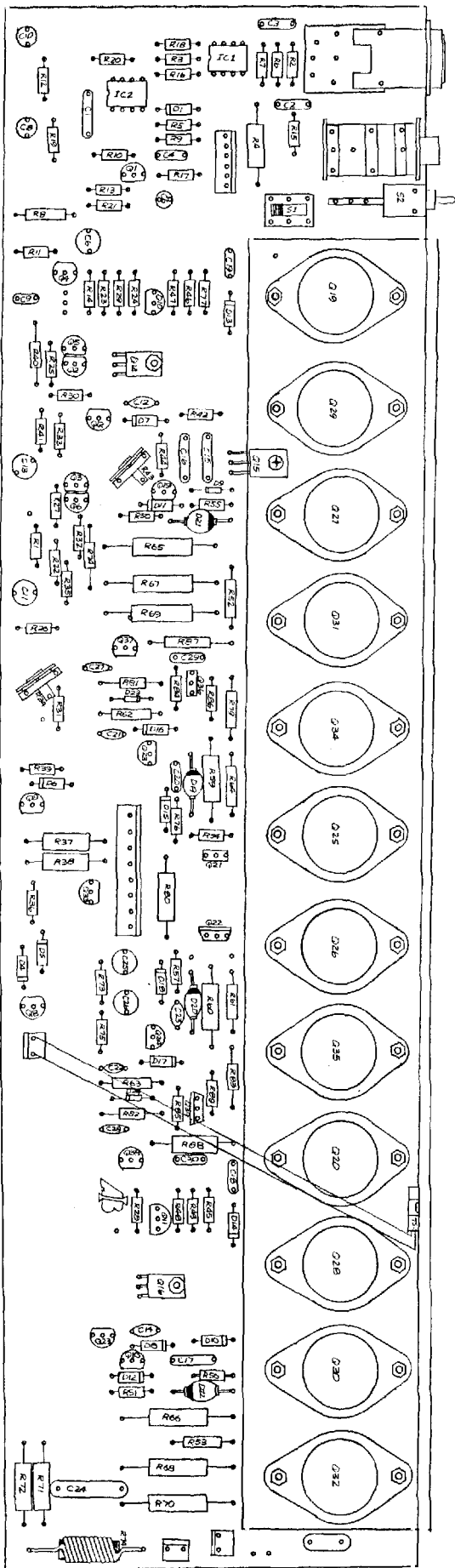
AB INTERNATIONAL, INC.

TITLE: PCB ASSEMBLY, CHANNEL BOARD
MODEL: 900A, 9220A

DATE: 9-7-94

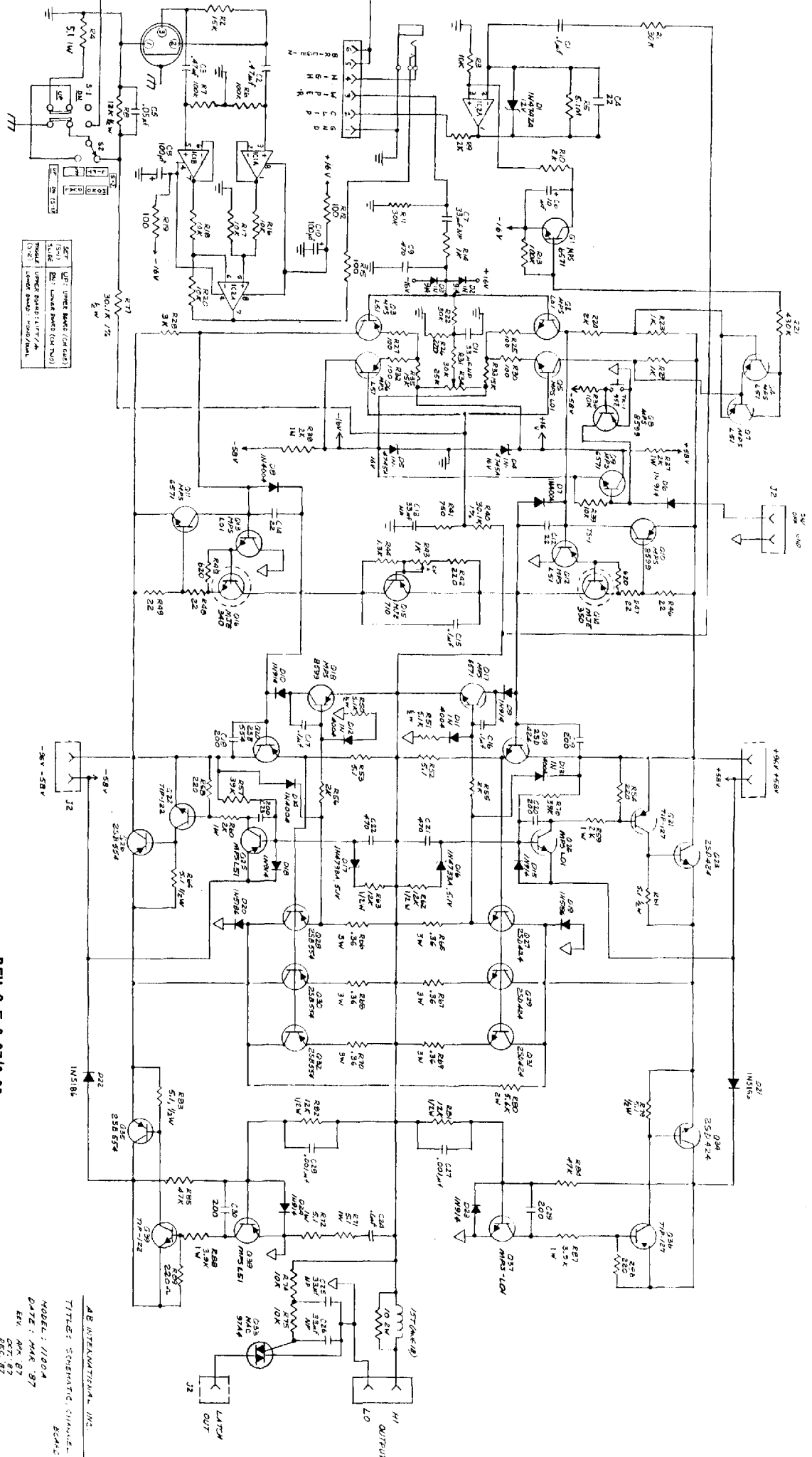
ASSY NO. 502-675

REV. J



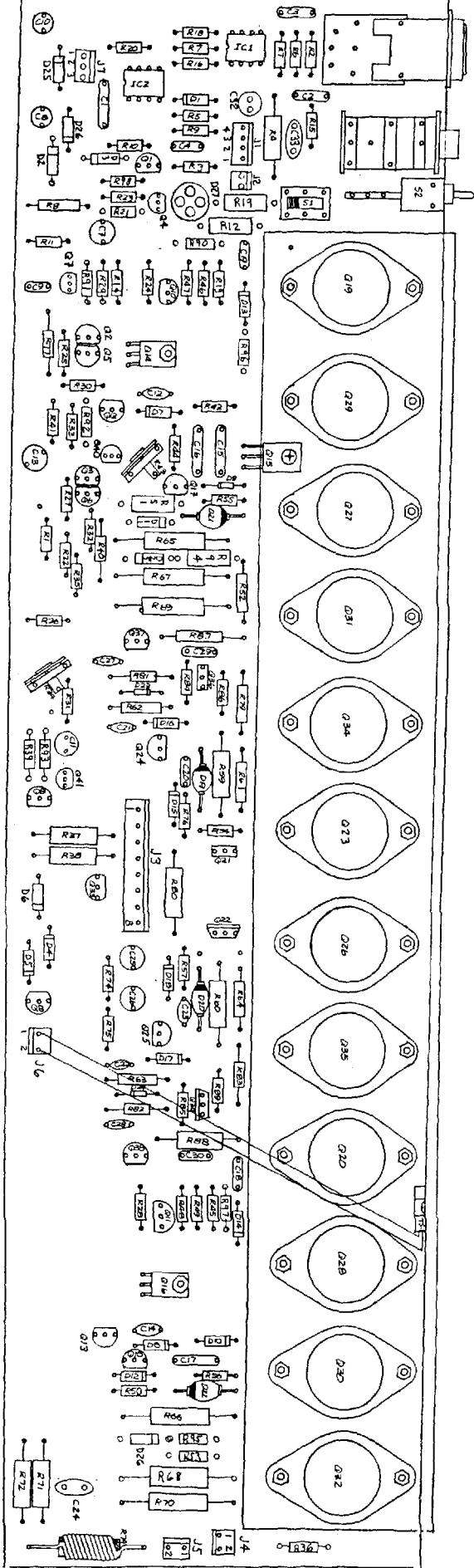
REV C-E 6-87/8-90

AB INTERNATIONAL, INC
 ASSEMBLY PCB, 110C4
 PN: 562-470



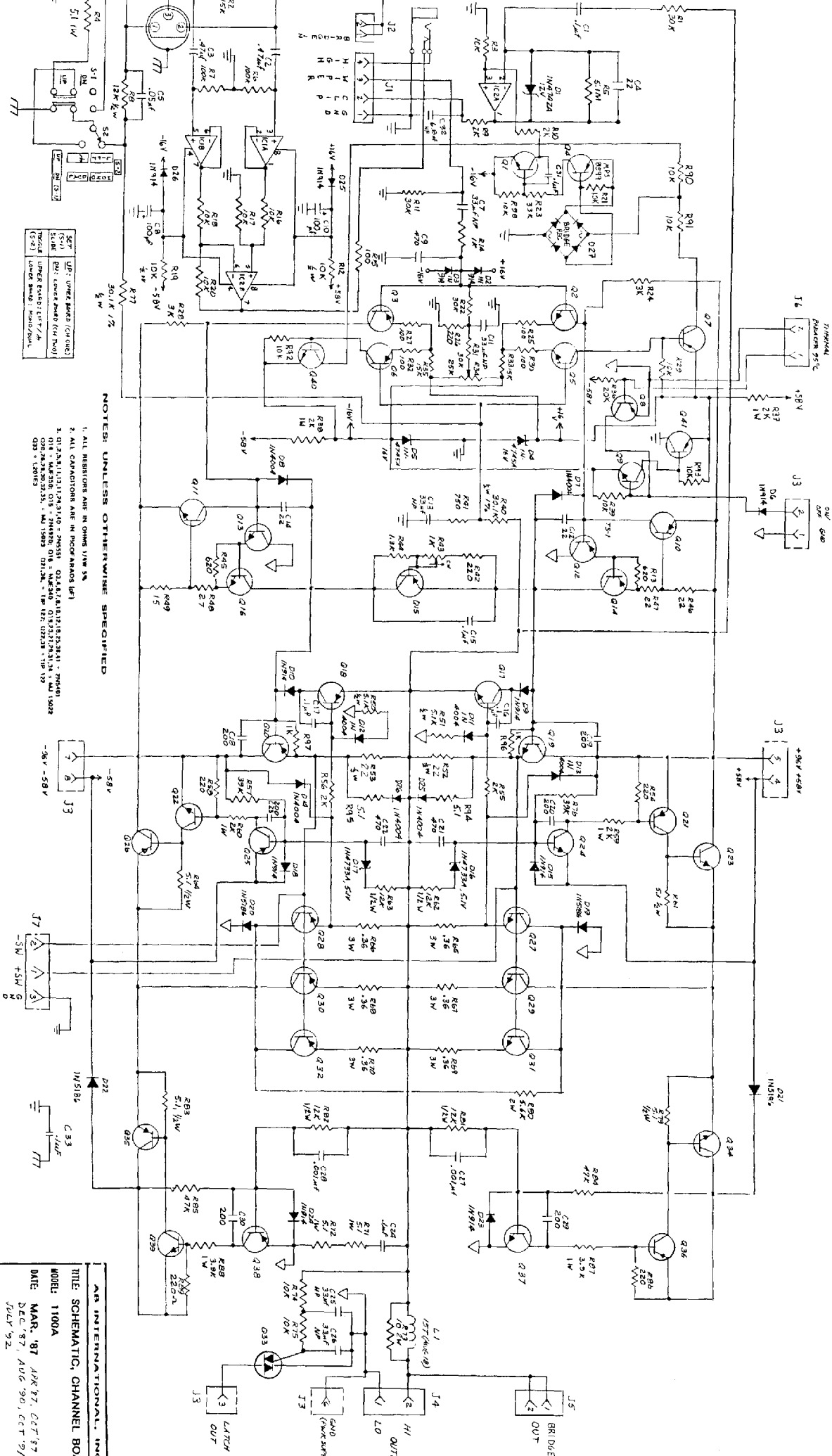
REV C-E 6-87/8-90

AE INTERNATIONAL, INC.
 TITLE: SCHEMATIC CIRCUIT-
 MODEL: 11004
 DATE: MAR 87
 REV: OCT 87
 ASSEMBLY NO: 502-870



NOTE: 900A = 9220, 1100A = 9420

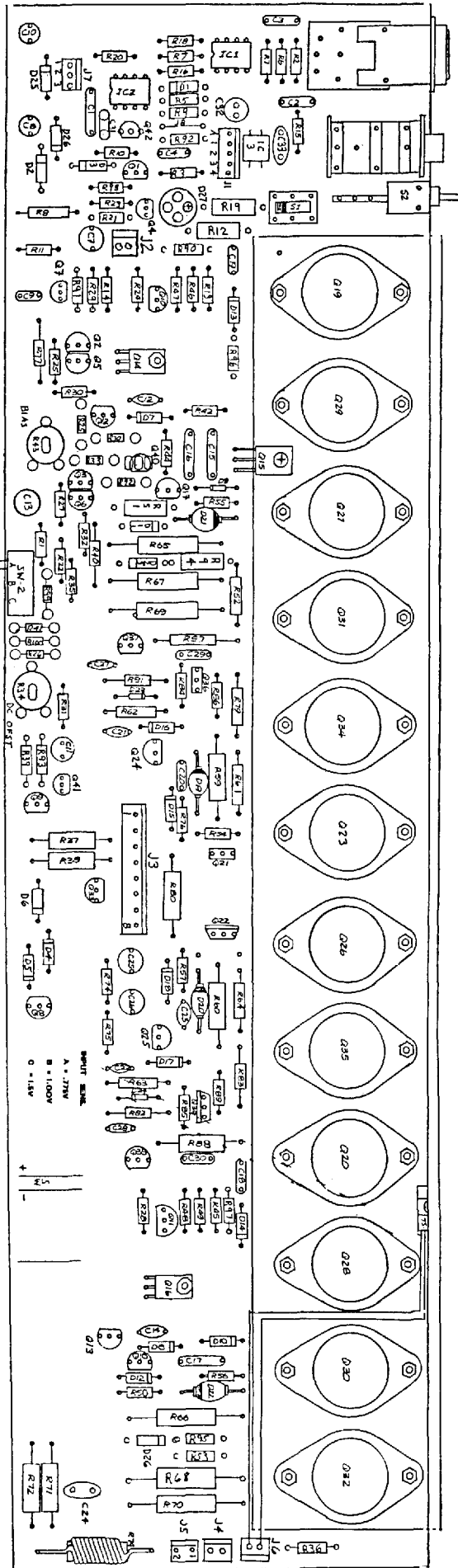
AB INTERNATIONAL, INC.
 ASSEMBLY P.C.B. 1100A
 PW: 502-670 REV. F
 AUG 90 JK



NOTES: UNLESS OTHERWISE SPECIFIED

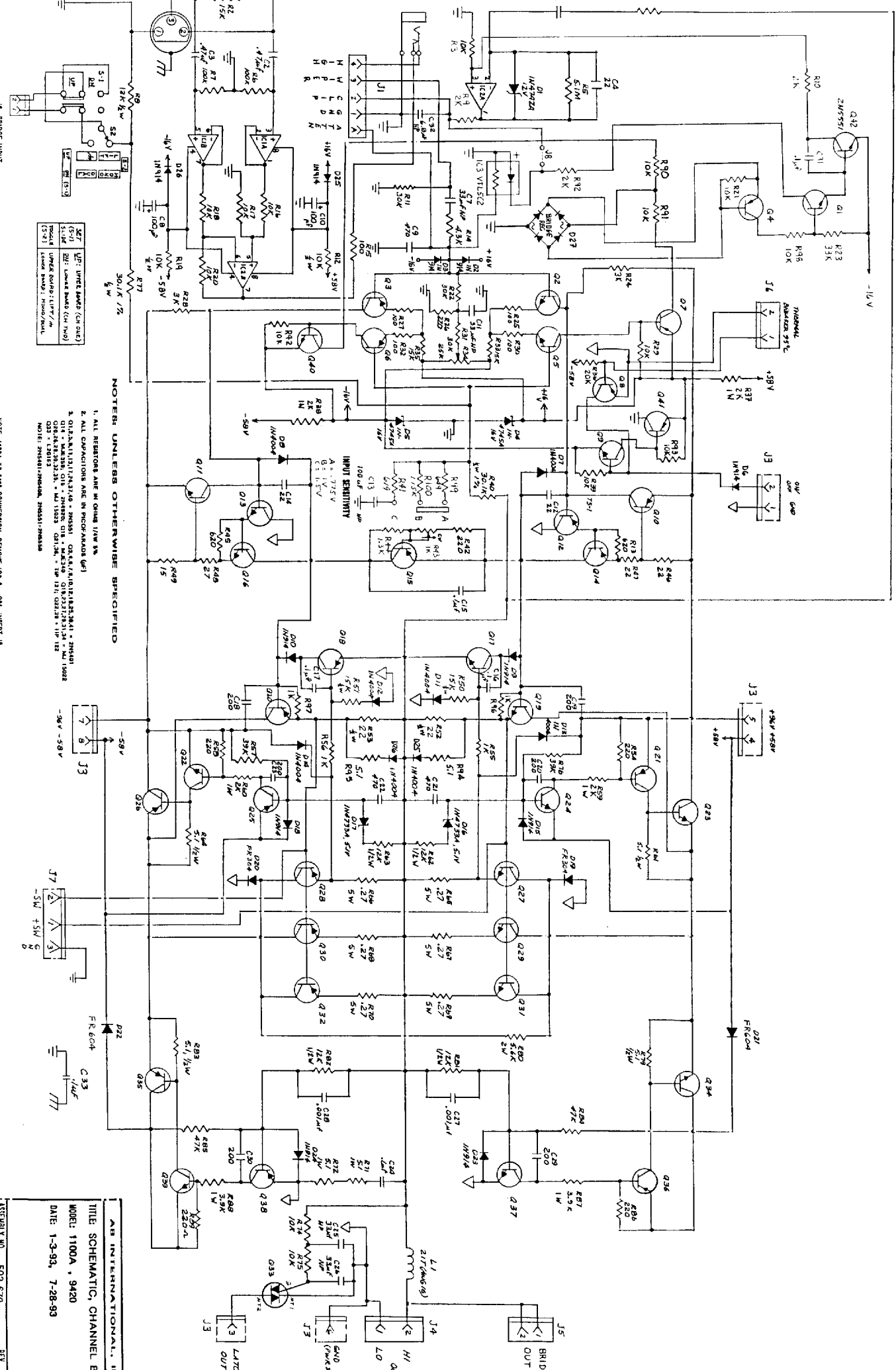
1. ALL RESISTORS ARE IN OHMS UNLESS
2. ALL CAPACITORS ARE IN PICOFARADS (P)
3. Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29, Q30, Q31, Q32, Q33, Q34, Q35, Q36, Q37, Q38
4. D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12
5. C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33
6. J1, J2, J3, J4, J5, J6, J7
7. T1
8. L1

AR INTERNATIONAL, INC
 TITLE: SCHEMATIC, CHANNEL BOX
 MODEL: 1100A
 DATE: MAR. '87 APR 87, OCT 87
 DEC '87, AUG '90, OCT '91
 JULY '92
 ASSEMBLY NO. 502-670 REF F



NOTE: (1)MA TO 9428 CONNECTION, REMOVE (C) & (D), SEE IN

AB INTERNATIONAL INC.
TITLE ASSEMBLY 11MA , 9420
DATE JAN 1953 JK
52-517 REV. 6

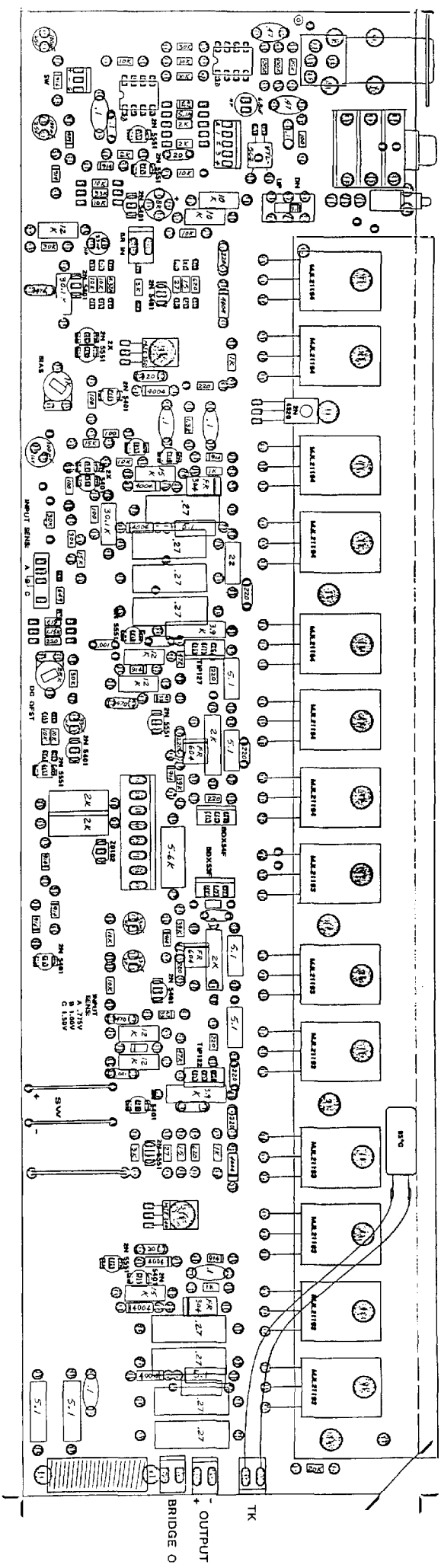


1. BRIDGE INPUT

Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	
2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	
2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550	2N3550

- NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED
 2. ALL CAPACITORS ARE IN MICROFARADS (UF)
 3. Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29, Q30, Q31, Q32, Q33, Q34, Q35
 4. Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29, Q30, Q31, Q32, Q33, Q34, Q35

AB INTERNATIONAL, INC.
 TITLE SCHEMATIC, CHANNEL BO
 MODEL 1100A, 9420
 DATE 1-3-93, 7-28-93
 ASS'Y NO. 502-670
 REV. G

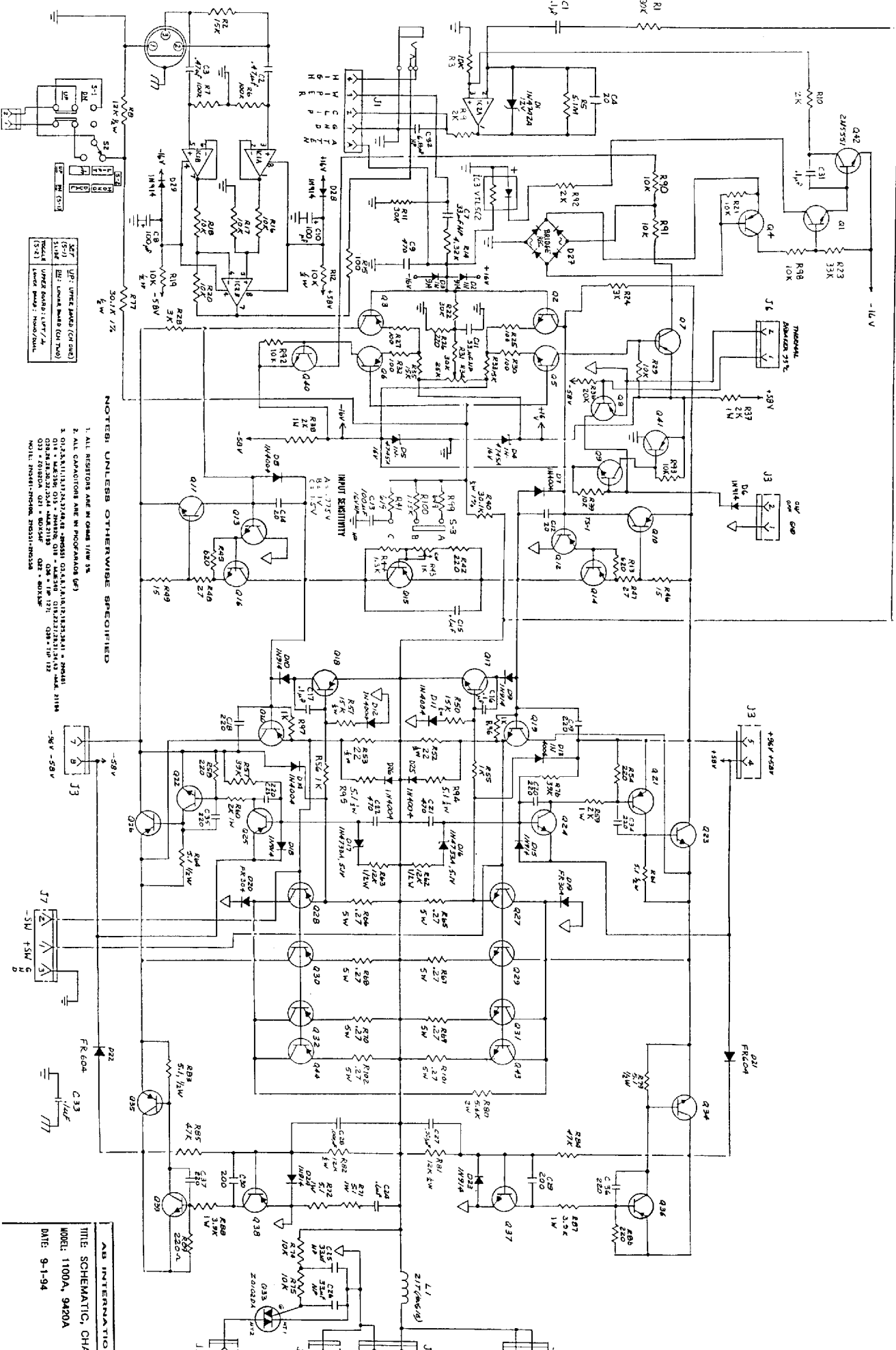


AB INTERNATIONAL, INC.

TITLE: PCB ASSEMBLY, CHANNEL BOARD
MODEL: 1100A, 9420A

DATE: 9-7-94

ASSY NO. 502-610 REV. J



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS UNLESS SPECIFIED
2. ALL CAPACITORS ARE IN PICOFARADS UNLESS SPECIFIED
3. Q1-Q36: 2N3638, 2N3639, 2N3640, 2N3641, 2N3642, 2N3643, 2N3644, 2N3645, 2N3646, 2N3647, 2N3648, 2N3649, 2N3650, 2N3651, 2N3652, 2N3653, 2N3654, 2N3655, 2N3656, 2N3657, 2N3658, 2N3659, 2N3660, 2N3661, 2N3662, 2N3663, 2N3664, 2N3665, 2N3666, 2N3667, 2N3668, 2N3669, 2N3670, 2N3671, 2N3672, 2N3673, 2N3674, 2N3675, 2N3676, 2N3677, 2N3678, 2N3679, 2N3680, 2N3681, 2N3682, 2N3683, 2N3684, 2N3685, 2N3686, 2N3687, 2N3688, 2N3689, 2N3690, 2N3691, 2N3692, 2N3693, 2N3694, 2N3695, 2N3696, 2N3697, 2N3698, 2N3699, 2N3700

AB INTERNATIONAL, INC.
 TITLE SCHEMATIC, CHANNEL BOARD
 MODEL: 1100A, 9420A
 DATE: 9-1-94
 ASSY NO. 502-670
 REV. J