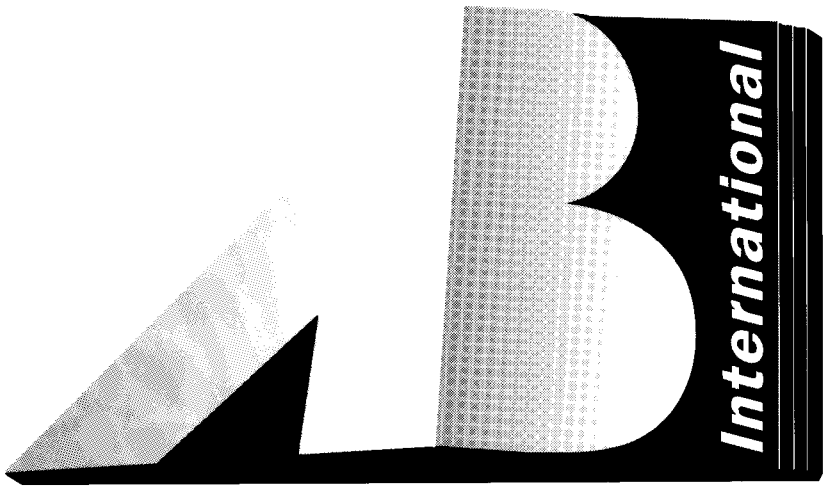
AB INTERNATIONAL

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 predriver 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 preassembly 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 $5^{1/4}$ inches of vertical panel space, with $11^{7/8}$ inches required behind the panel. Total depth, including handles is $13^{5/16}$ 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

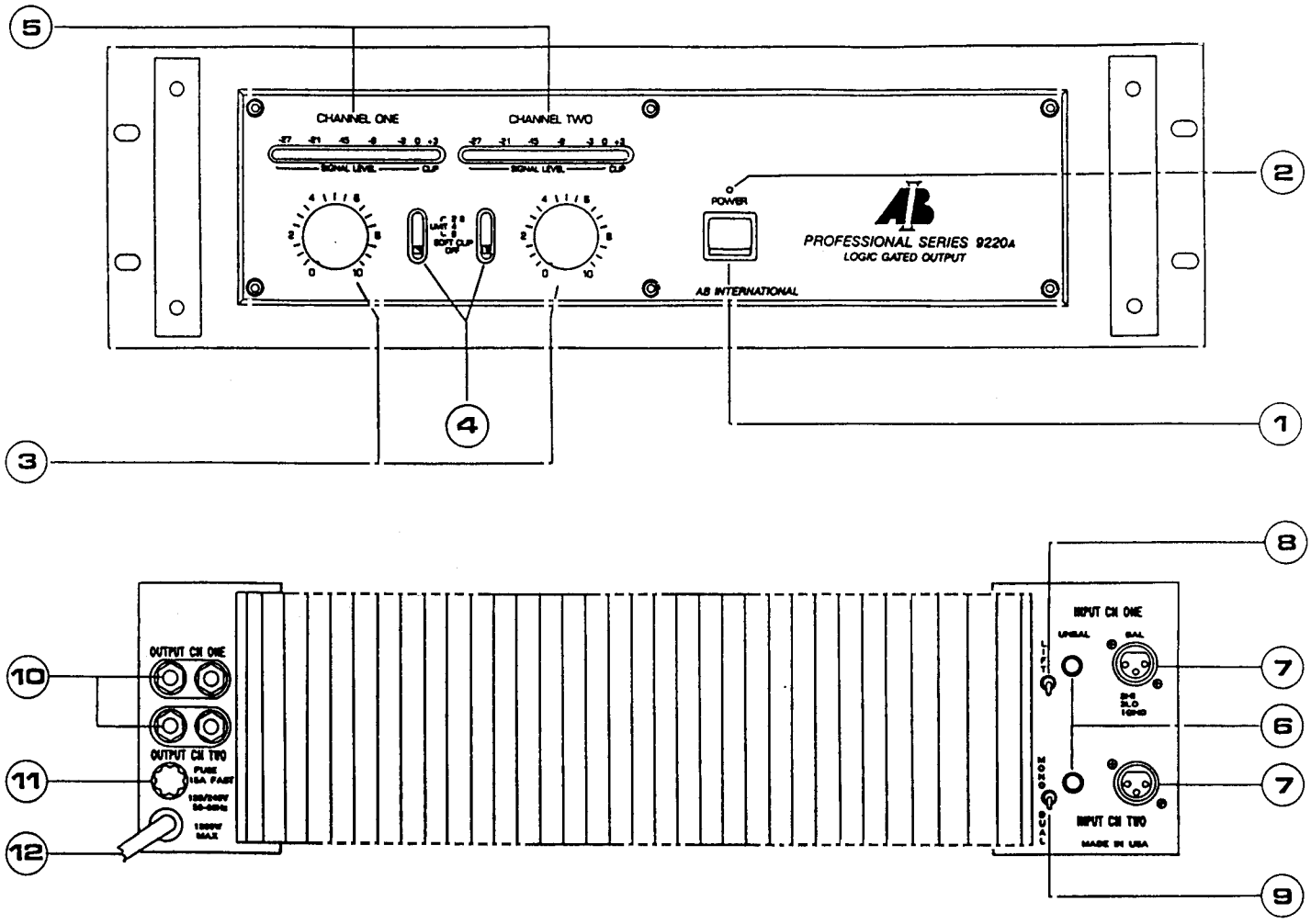
Professional Series power amplifiers are specified for operation from 120/240 Volt 50/60 Hz mains supply.

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.

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!

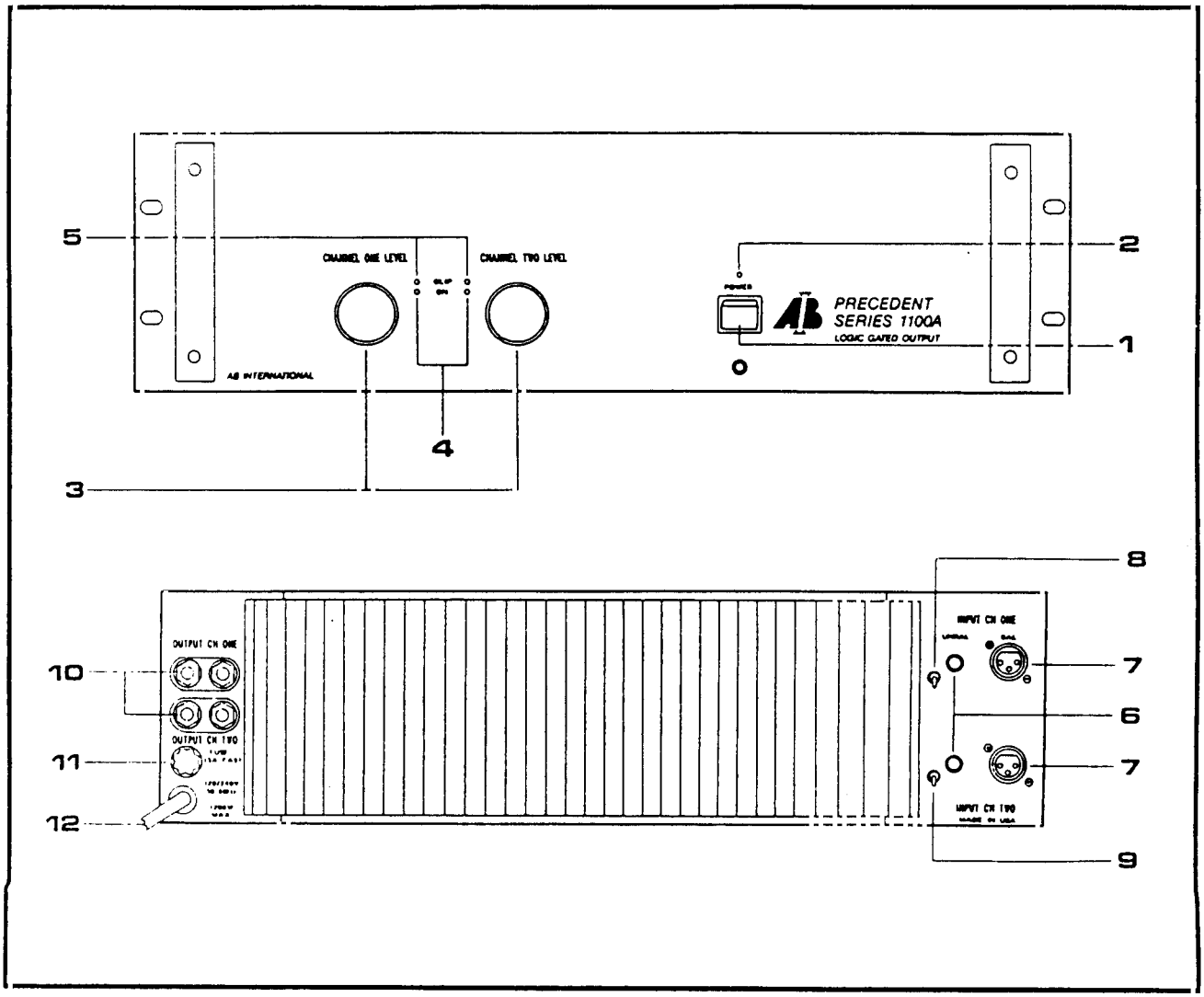
11. FUSE HOLDER

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.

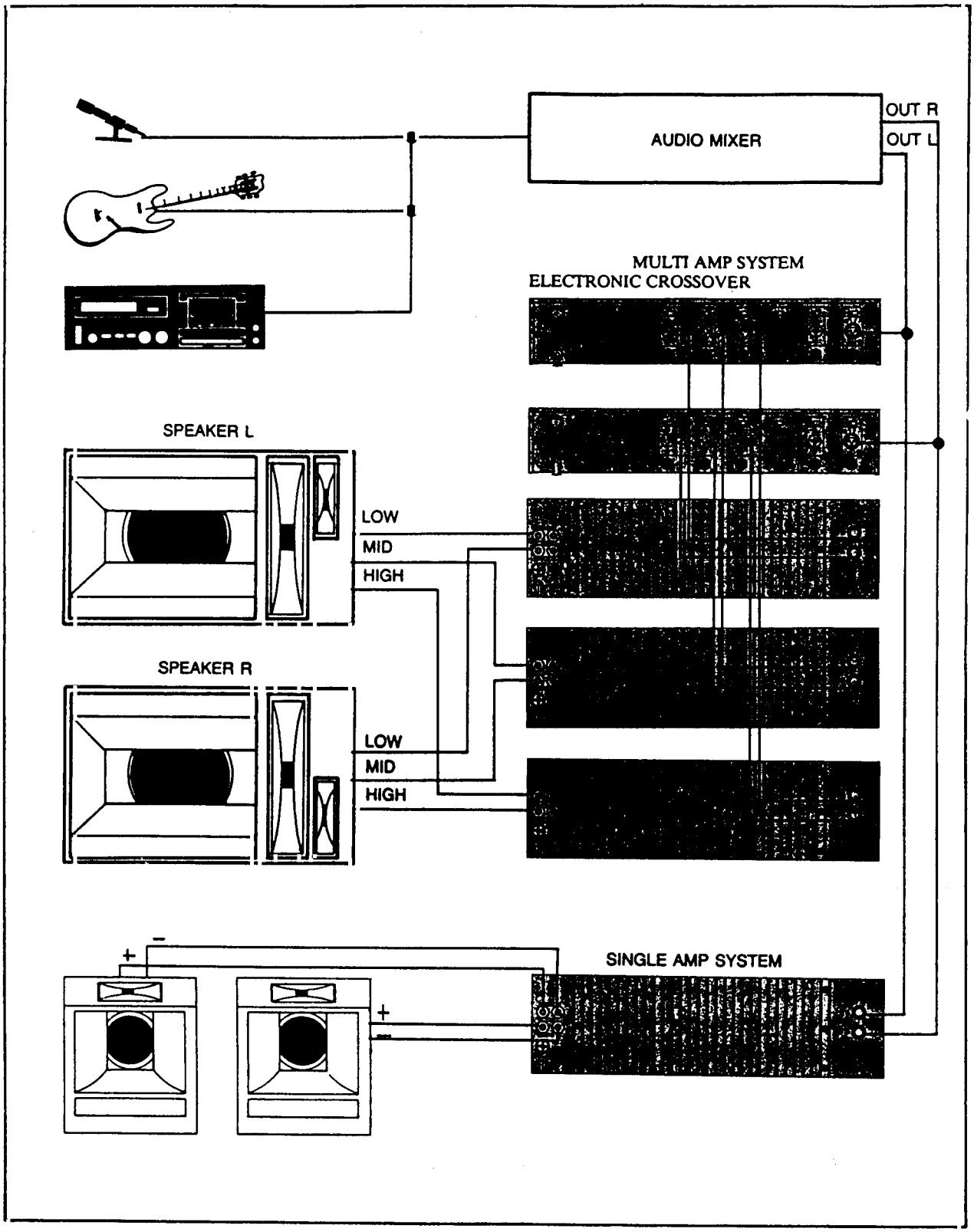
3. Connect the speaker load to the two red terminals of each channel. Confirm the (+) terminal of the speaker to channel one and the (-) terminal to channel two.

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
Gain:	31dB (each channel) **9220A** 33dB (each channel) **9420A**
Continuous Power: **Average Power:** **Output:** **(120 VAC Line, 1KHz,** **single channel driven)**	350 watts per channel at 8 ohms **9220A** 590 watts per channel at 4 ohms **9220A** 775 watts per channel at 2 ohms **9220A** 925 watts bridged mono at 8 ohms **9220A** 1123 watts bridged mono at 4 ohms **9220A**
Continuous Power: **Average Power:** **Output:** **(120 VAC Line, 1KHz,** **single channel driven)**	525 watts per channel at 8 ohms **9420A** 850 watts per channel at 4 ohms **9420A** 1100 watts per channel at 2 ohms **9420A** 1300 watts bridged mono 8 ohms **9420A** 1700 watts bridged mono 4 ohms **9420A**
Frequency **Response:**	Plus/Minus 0.5dB 20Hz to 20KHz
Distortion:	No more than 0.25% THD or IM, 0.01W to rated power, 20Hz to 20KHz (0.01% Typical)
Hum and Noise:	104dB below rated output (unweighed 20KHz bandwidth)
Input Sensitivity:	1.7 VRMS for rated power
Input Impedance:	15K ohms, nominal
Transient Intermodulation **Distortion:**	less than 0.02%
Crosstalk:	-86dB.
Damping Factor:	500:1 at 1KHz

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:	*(Front Panel)* 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. *(Rear Panel)* 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:	Plus /Minus 0.5dB 20Hz-20kHz
Distortion:	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:	1.6V RMS for rated output
Input Impedance:	15K ohms, nominal
Input Connectors:	(2) 1/4 -inch phone jacks (unbalanced) (2) XLR (balanced)
Output Connectors:	Dual 5-way binding posts
Controls & Indicators:	(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)

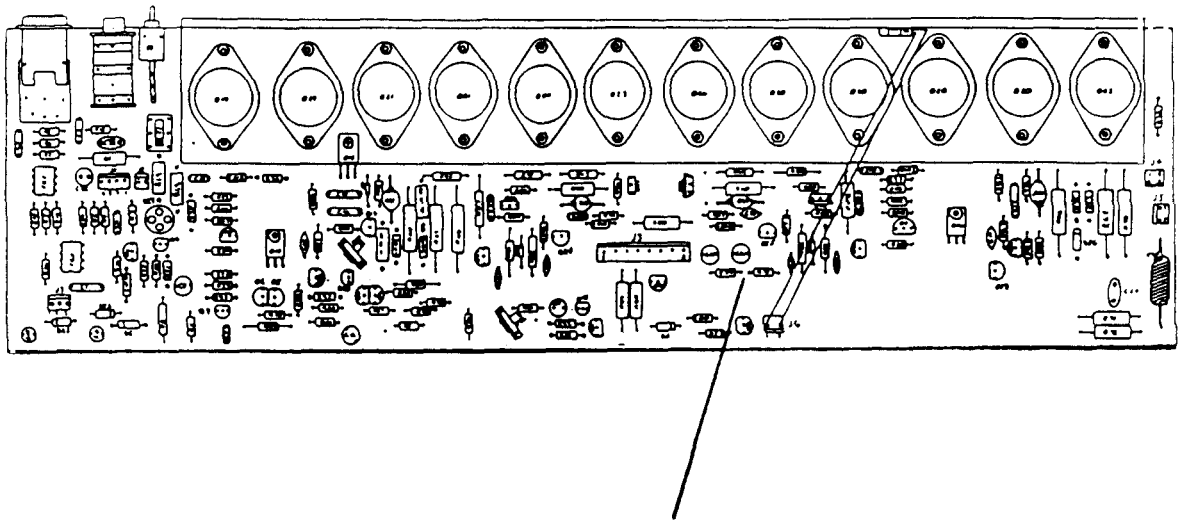
SPECIFICATIONS

Type:	Two Channel Audio Power Amplifier
Gain:	31 dB (each Channel) **900A** 33 dB (each Channel) **1100A**
Continuous Power: **Average Power:** **Output:** **(120 VAC Line, 1KHz,** **single channel driven)**	350 watts per channel at 8 ohms **900A** 590 watts per channel at 4 ohms **900A** 775 watts per channel at 2 ohms **900A** 925 watts bridged mono at 8 ohms **900A** 1123 watts bridged mono at 4 ohm **900A**
Continuous Power: **Average Power:** **Output:** **(120 VAC Line, 1KHz,** **single channel driven)**	525 watts per channel at 8 ohms **1100A** 850 watts per channel at 4 ohms **1100A** 1100 watts per channel at 2 ohms **1100A** 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:	*(Front Panel)* 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) *(Rear Panel)* 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



Your AB International amplifier is equipped with a D.C. Latch Protection Circuitry. In a case where a D.C. voltage of ± 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 occures 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 ¼ 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.

   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

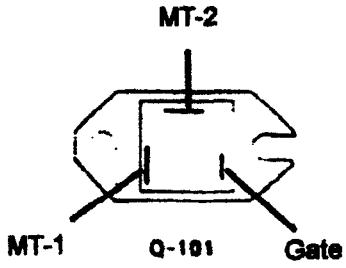
ABI			DIODES	USA
ID. #	ZENIER	VOLTS	W/A	
1N4733	ZENIER	5.1	1w	
1N4735	ZENIER	6.2	1w	
1N4737	ZENIER	7.5	1w	
1N4742	ZENIER	12	1w	
1N4745	ZENIER	16	1w	
1N4749	ZENIER	24	1w	
1N4752	ZENIER	33	1w	
1N4001	SW/DIODE	50	30	UPDATED TO 1N4004
1N914	SW/DIODE	75	75ma	
1N5186	SW/DIODE	200	200	UPDATED TO FR303
FR303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

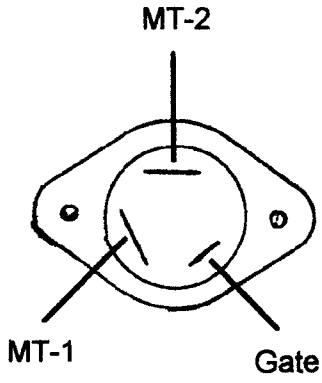
ABI		REG. & TRIACS			USA		
ID. #	TYPE	VOLTS	AMPS	POLLARITY	PACKAGE	REPLACEMENT	
7808	REG.	8	1.5	POS.	TO-220		
7908	REG.	-8	1.5	NEG.	TO-220		
7812	REG.	12	1.5	POS.	TO-220		
7912	REG.	-12	1.5	NEG.	TO-220		
7815	REG.	15	1.5	POS.	TO-220		
7915	REG.	-15	1.5	NEG.	TO-220		
7818	REG.	18	1.5	POS.	TO-220		
7918	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

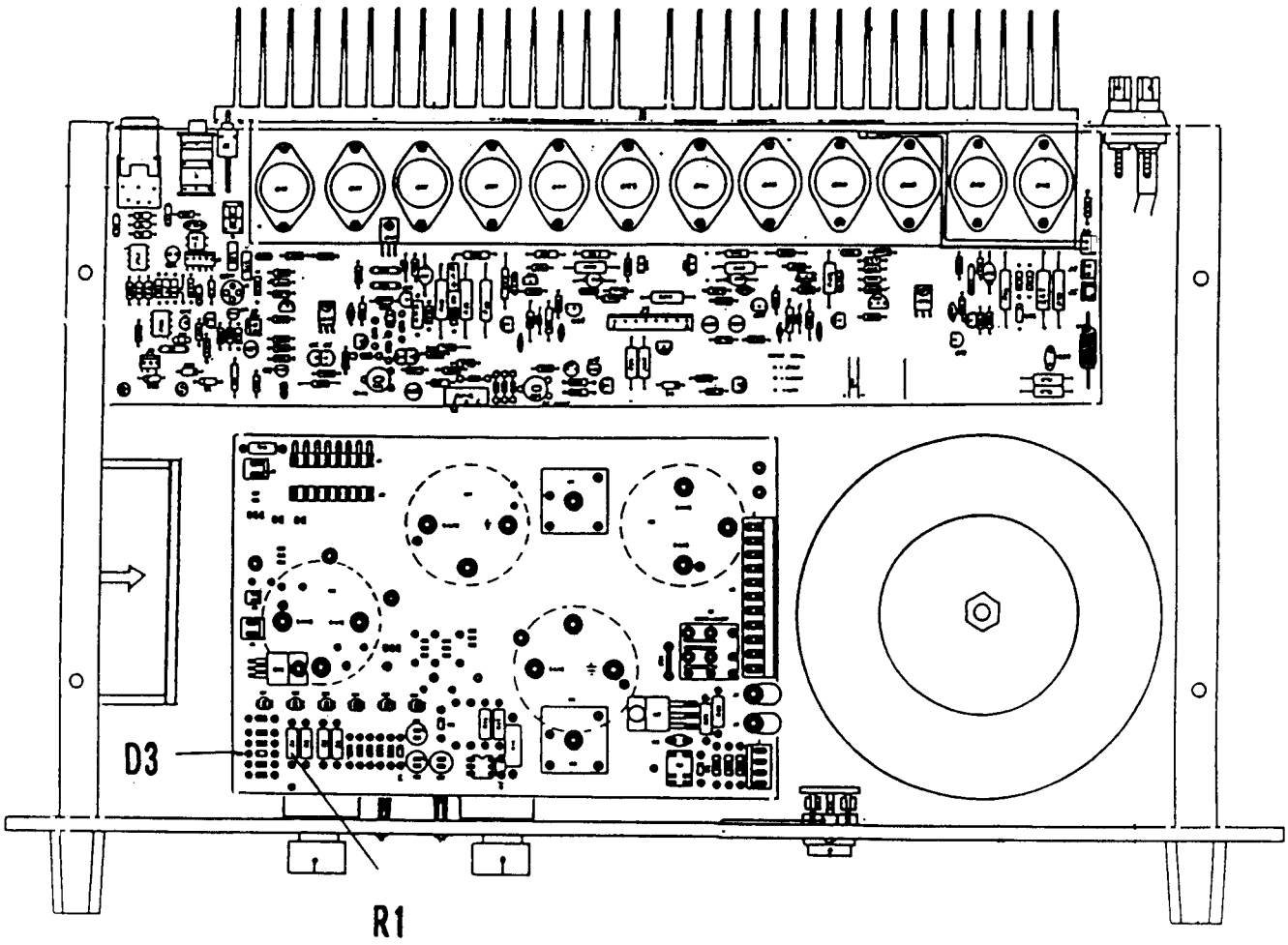
ABI		TRANSISTER UPDATES			USA			
ORIG.	REV.1	REV.2	REV.3	REV. 4	CASE TYPE	POLL.	ICmax	Vceo
MPS8599	A56	2N5401			TO-92	PNP	240ma	150
MPSL01	2N5550	2N5551			TO-92	NPN	600ma	160
MPSL51	2N5400	2N5401			TO-92	PNP	240ma	150
MPS6571	2N4401	2N5551			TO-92	NPN	600ma	160
710	2N4920					PNP		
RCA1C12	2238	MJE15030			TO-220	NPN	8a	120
2N5416					TO5	PNP	1a	350
2N3440					TO5	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			TO3	NPN	10a	250
MJ15012	MJ15023	MJ21193			TO3	PNP	10a	250
2SB554	MJ15023				TO3	PNP	16a	200
2SD424	MJ15022				TO3	NPN	16a	200
1B04	MJ15011	MJ15022	MJ21194		TO3	NPN	7a	250
1B05	MJ15011	MJ15022	MJ21194		TO3	NPN	7a	250
MJ21194					TO3	NPN	16a	250
MJ21193					TO3	PNP	16a	250
MJ15023	MJ21193				TO3	PNP	16a	250
MJ15022	MJ21194				TO3	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.

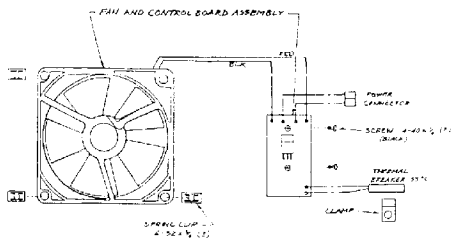
5. REPLACE 24V FAN WITH 48VDC FAN

NOTE: FOLLOW FAN INSTALLATION INSTRUCTIONS.

FAN INSTALLATION MODEL 900A/1100A

FOR SERIAL NUMBERS 060090-XX THRU 010092-XX

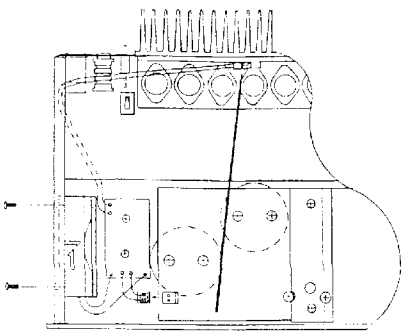
1 MATERIALS LIST:



LIST ALSO INCLUDES (1) REAR AIR FLOW BRACKET

3 THERMAL BREAKER POSITIONING:

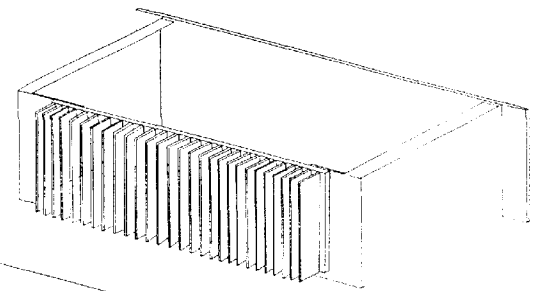
NOTE: WIRES MUST BE PLACED AS SHOWN.

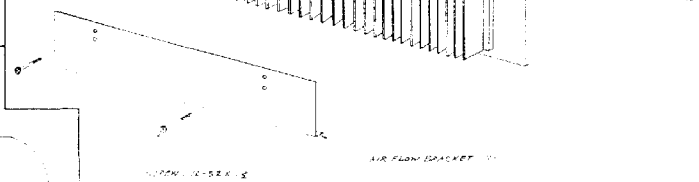


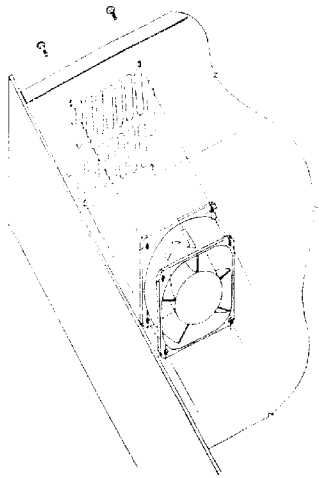
NOTE: USE HEATSINK SCREW FOR MOUNTING CLAMP

5 REAR AIR FLOW BRACKET

MOUNT BRACKET AS SHOWN







2 FAN INSTALLATION:

NOTE:
1. AMP MUST BE UNPLUGED DURING INSTALLATION
2. PLACE FAN IN CHASSIS AND OBSERVE AIR FLOW DIRECTION ARROW.

4 SECURING CONTROL BOARD

NOTE:
1. MOUNT FAN CONTROL BOARD ASSEMBLY
2. CONNECT 2 POSITION CONNECTOR TO POWER SUPPLY BOARD.

CAUTION ! SUPPLY MAY HAVE RESIDUE CHARGE

AB INTERNATIONAL ELECTRONICS, INC.

TITLE: FAN (DC) INSTALLATION INSTRUCTIONS
MODEL: FKV-1B, FOR 900A/1100A AFTER S.N. 060090

DATE: 7-4-90

ASSEMBLY NO: 108-550

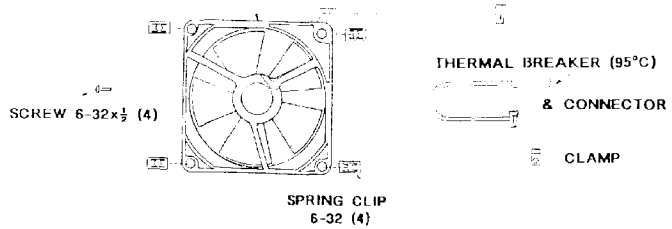
NOTE: POWER SUPPLY REV. G ONLY

FAN INSTALLATION MODEL 900A/1100A

FOR SERIAL NUMBERS 0010092-XX THRU PRESENT

1. MATERIAL LIST

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

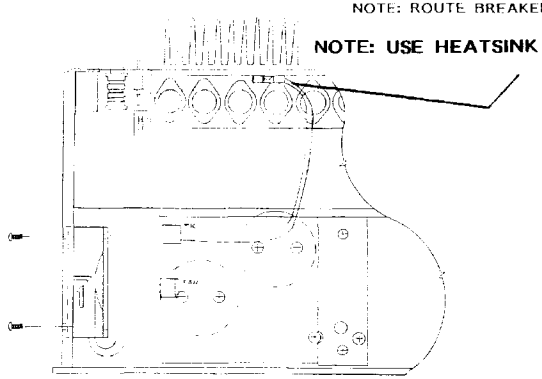


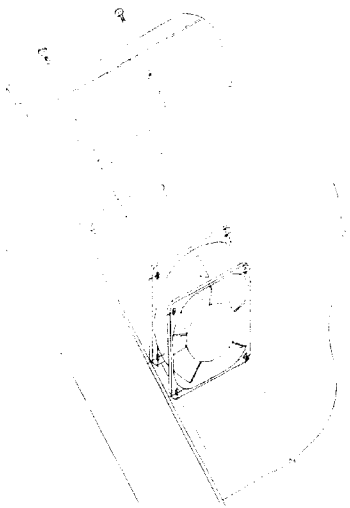
LIST ALSO INCLUDES (1)REAR AIRFLOW BRACKET & SCREWS

3. THERMAL BREAKER & FAN CONNECTIONS

NOTE: ROUTE BREAKER WIRES AS SHOWN

NOTE: USE HEATSINK SCREW FOR MOUNTING CLAMP



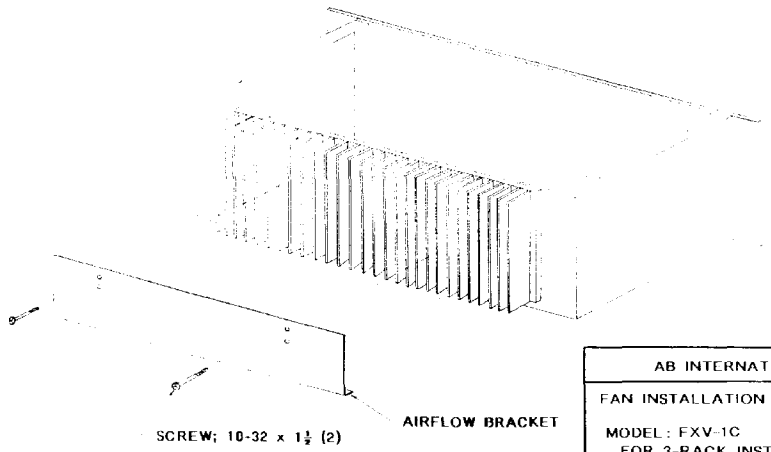


2. FAN INSTALLATION

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

4. REAR AIRFLOW BRACKET MOUNTING

ATTACH BRACKET TO HEATSINK

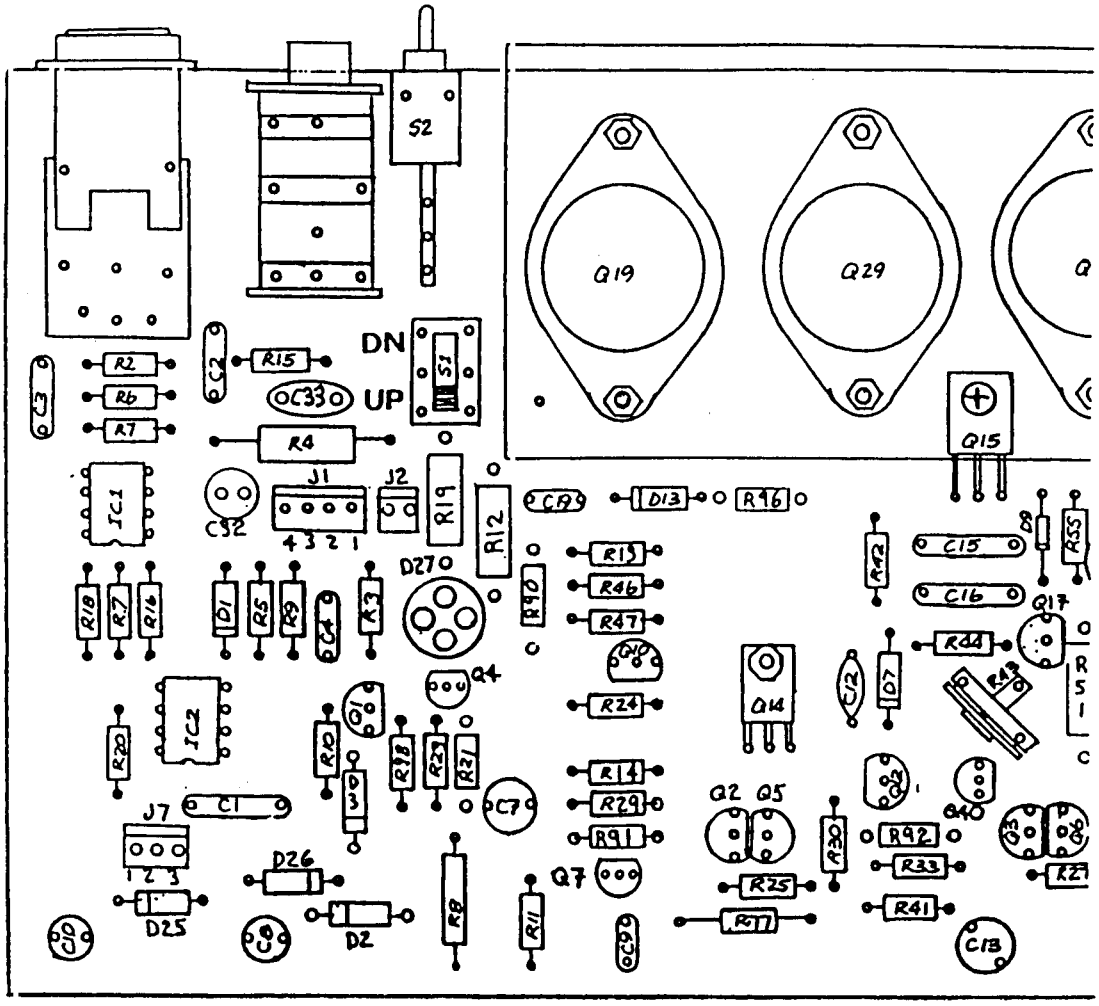


AB INTERNATIONAL
FAN INSTALLATION INSTRUCTIONS
MODEL : FXV-1C FOR 3-RACK INST.
DATE: 1-2-92
ASSY NO. 109-560

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: <u>DO NOT MISS PIN THE CABLE</u>, even for a second. The Power Supply Caps have a charge and may damage the PCB circuitry.

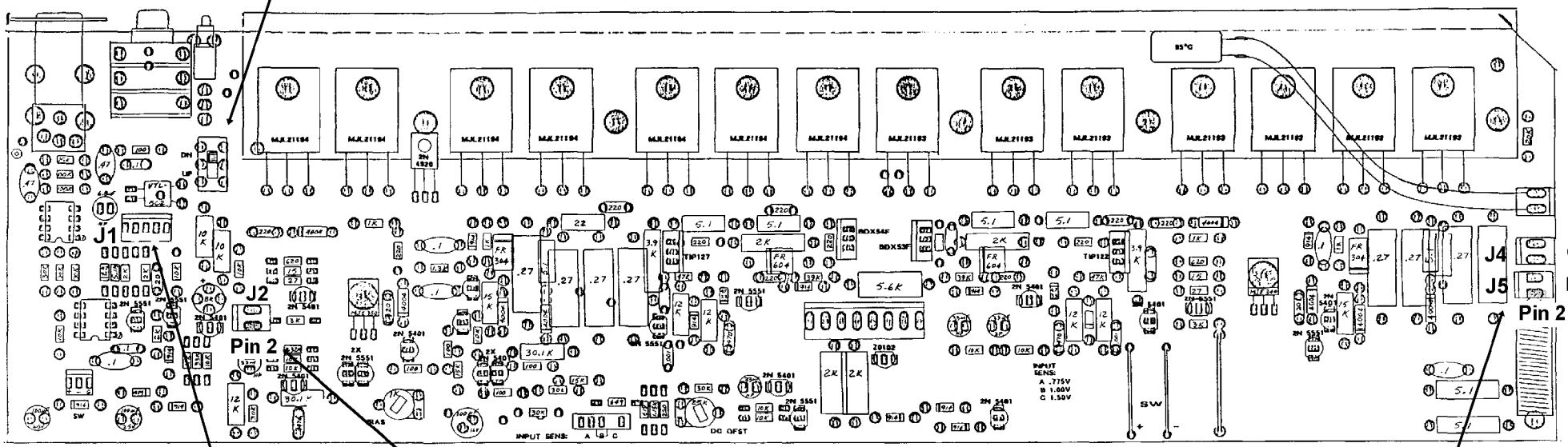
3) Apply an even thin coat of white Silicon Thermal Compound to angle. Failure to do so may cause improper heat transfer.

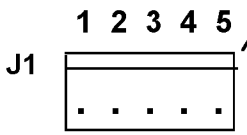
NOTE: EXCLUDE STEP ONE FOR DUAL CHANNEL PCB

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)





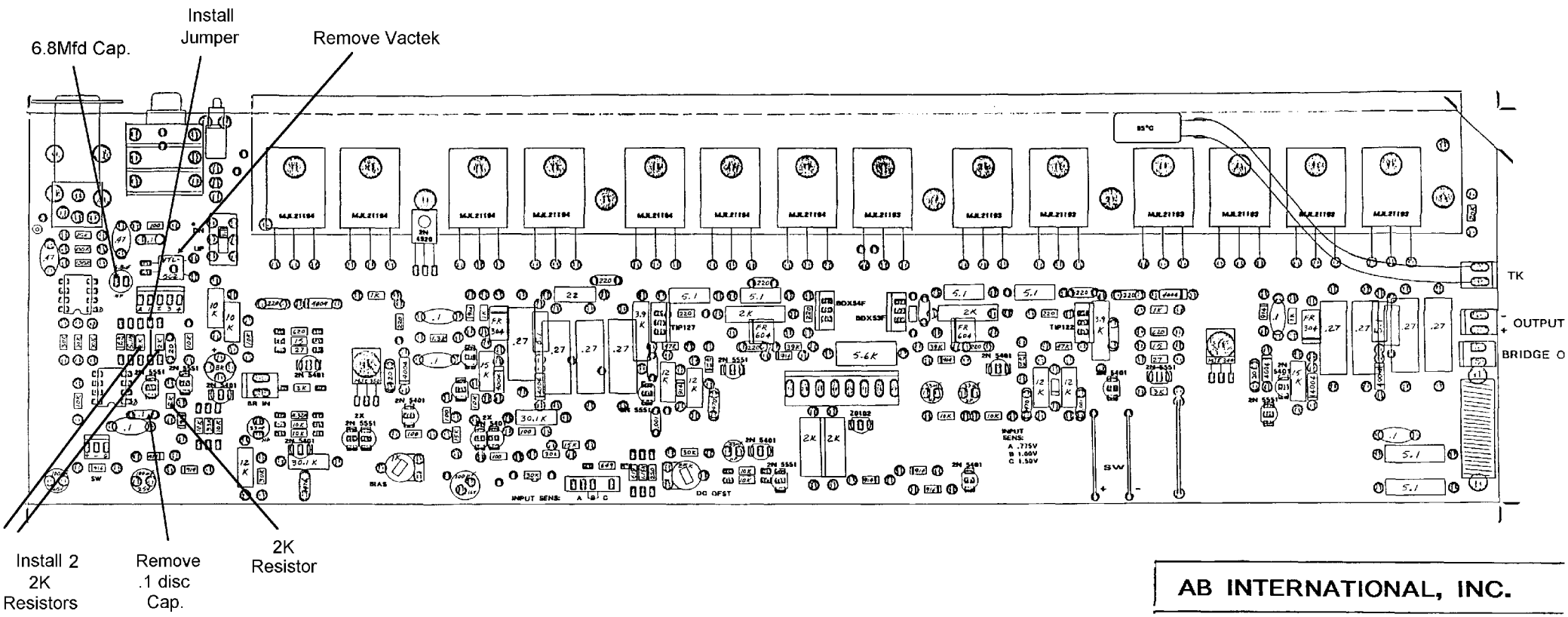
Input sensitivity switch SW-2: Position A=.775v, B=1.0v, C=1.5v. For rev "C-F" place switch in "C" position, for rev "G-J" place switch in same position as old pcb or as in the opposite channel.

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 channe 2 (bottom board) the bridge wire connects to J2 In 2.
DOUBLE CHECK CONNECTIONS BEFORE POWERING UNIT UP.....

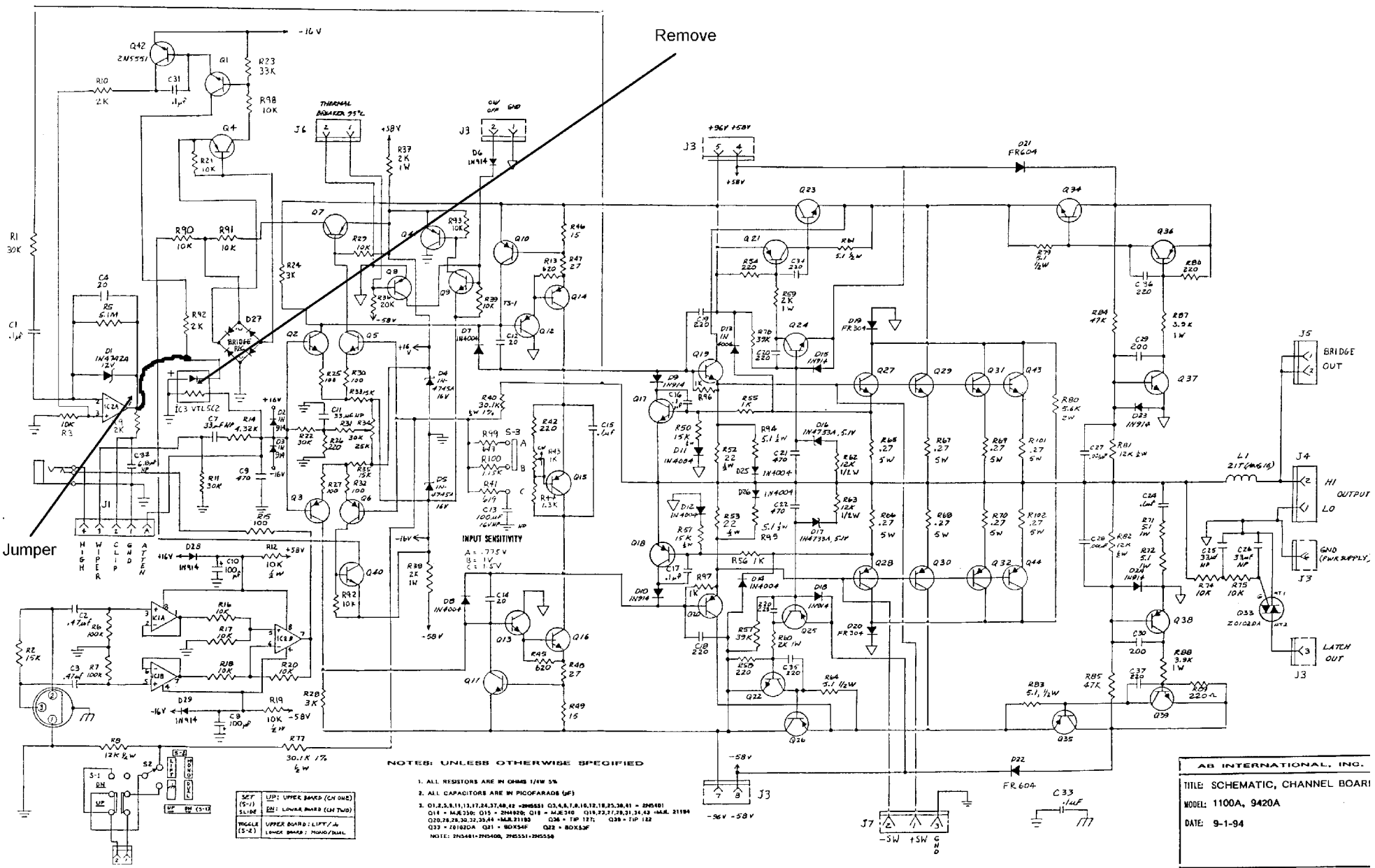
Install shielded cable from level control board to J1. If the new output pcb is a revision "J" and the old output pcb is also a rev "G-J" then all connections will be the same. HOWEVER PLEASE NOTE: If new output pcb (rev J) is a replacement board for a rev "C-F" the shielded cable from the level control 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

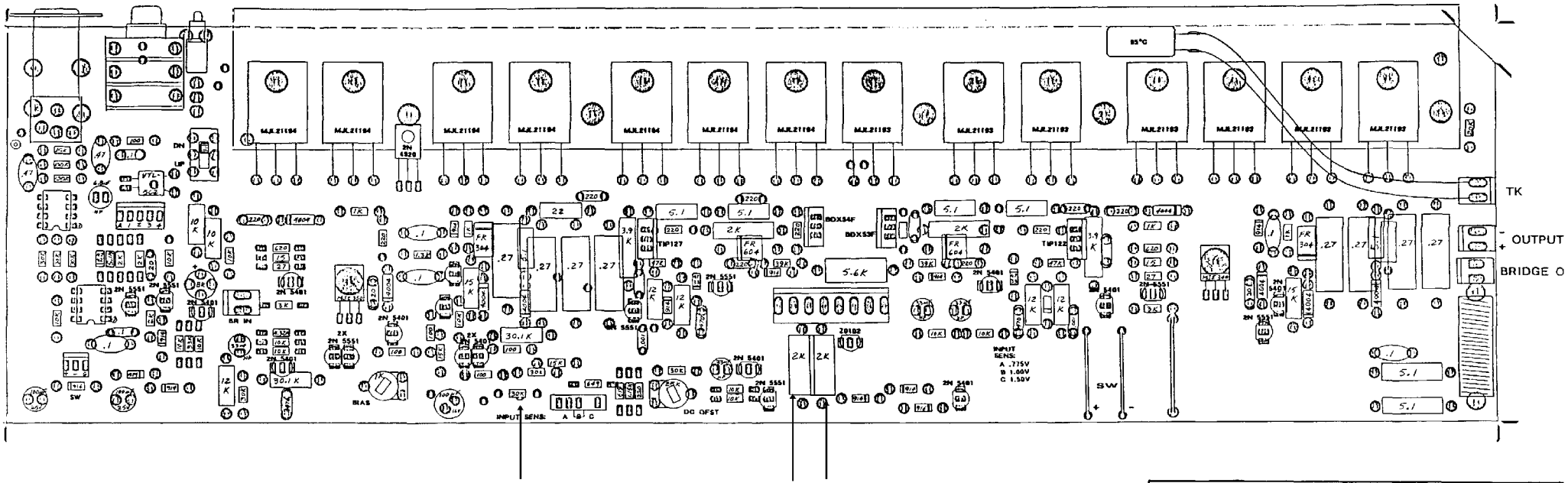


AB INTERNATIONAL, INC.	
TITLE: PCB ASSEMBLY, CHANNEL BOARD MODEL: 1100A, 9420A	
DATE: 9-7-94	
ASSY NO.. 502-670	REV. J


Remove
Jumper
NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE IN OHMS 1/4W 5%
2. ALL CAPACITORS ARE IN PICOFARADS (pF)
AB INTERNATIONAL, INC.
TITLE: SCHEMATIC, CHANNEL BOARD
MODEL: 1100A, 9420A
DATE: 9-1-94
ASSEMBLY NO. 502-670
REV. J

9220A, 9420A Output pcb replacement Modification

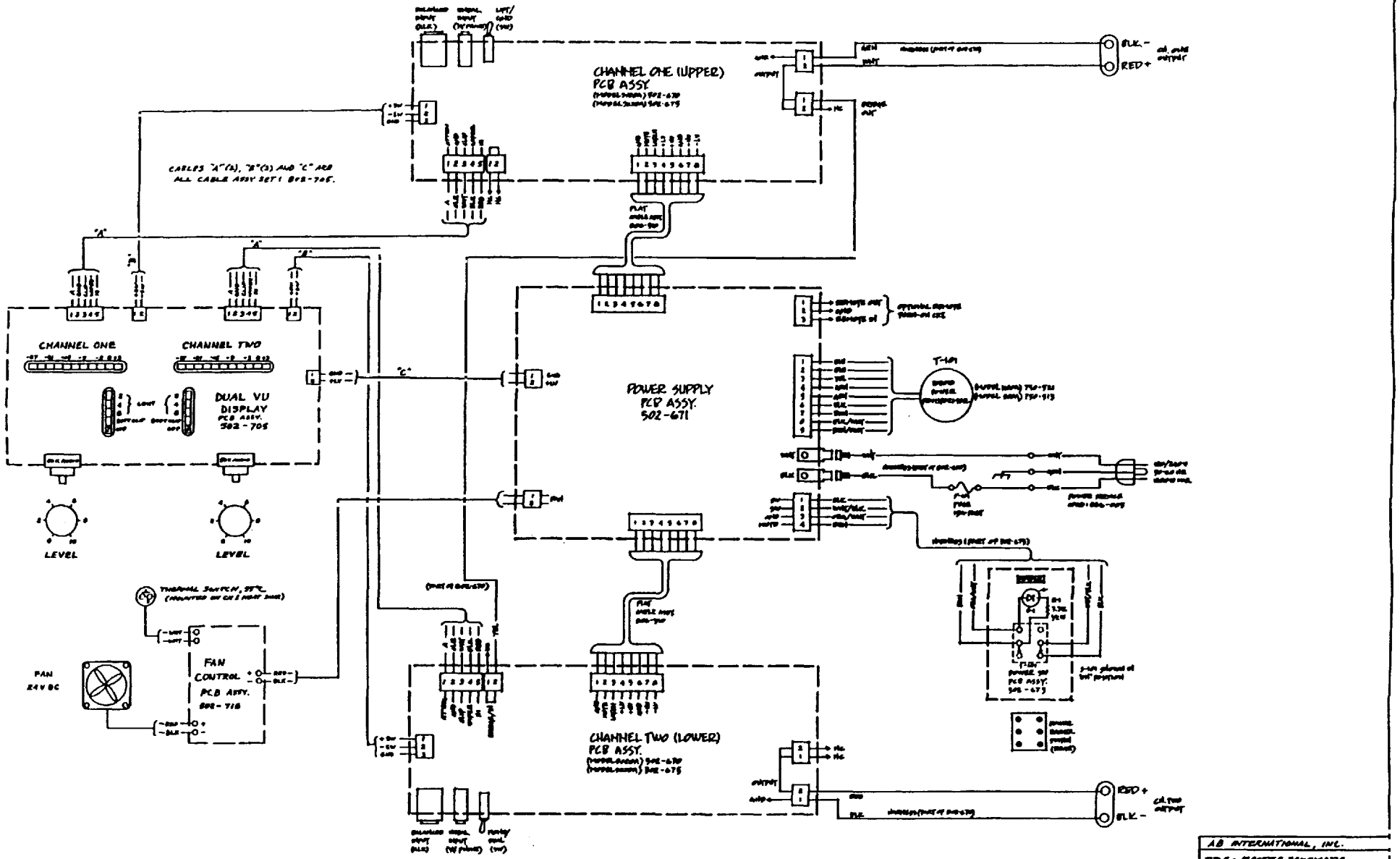
"J" rev to "J" rev.



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.. 502-670	REV. J



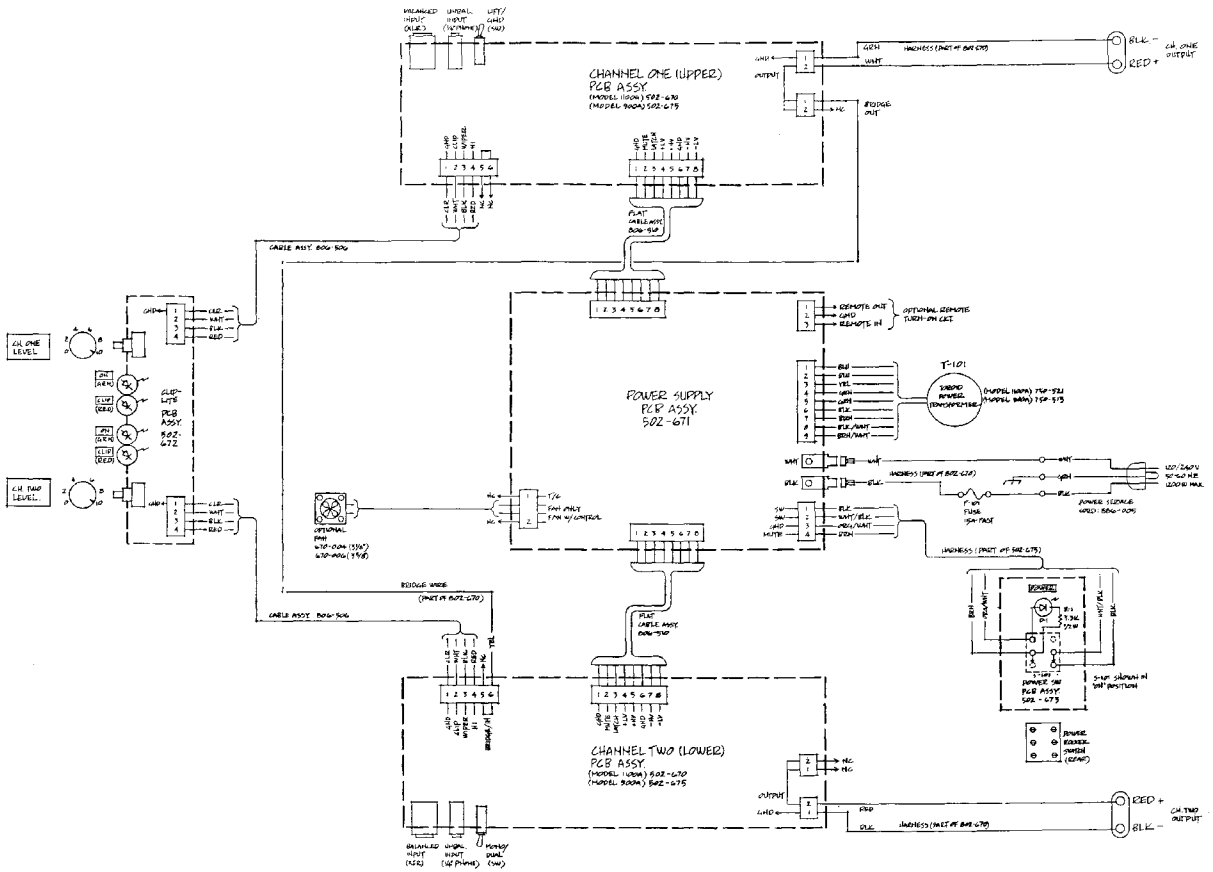
AB INTERNATIONAL, INC.

TITLE: MASTER SCHEMATIC

MODEL: 9400A/9630A

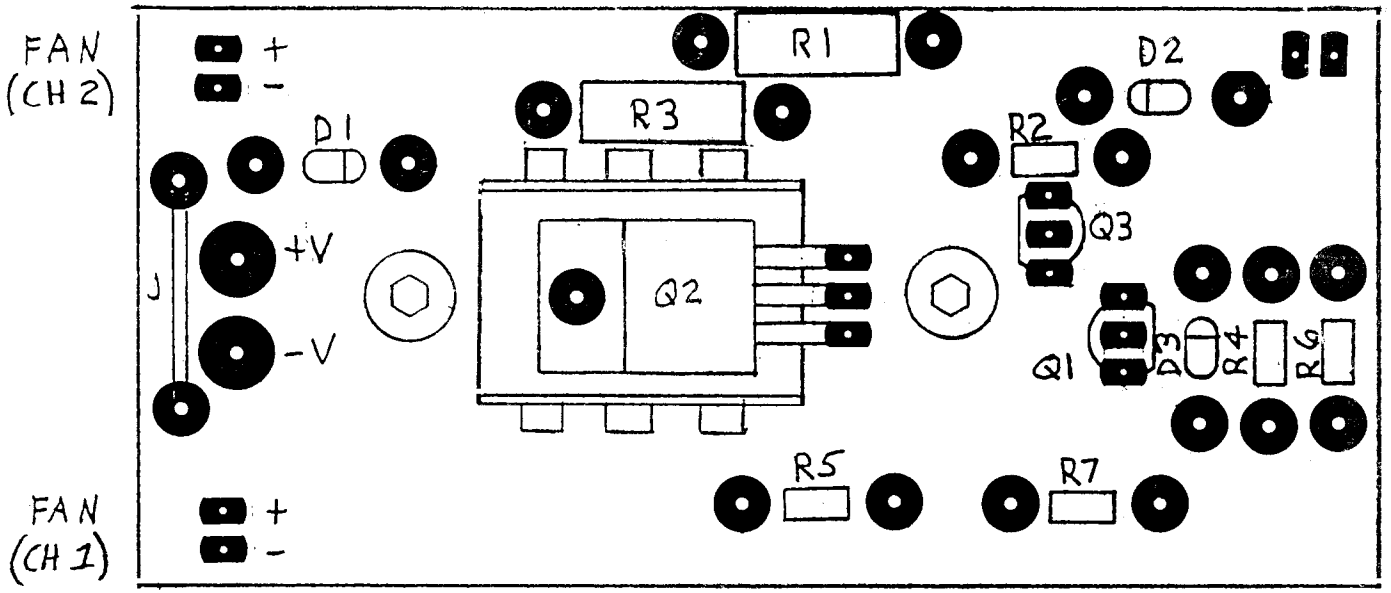
DATE: 8-29-91, R.A

ASSEMBLY NO. 355-9330
355-9440



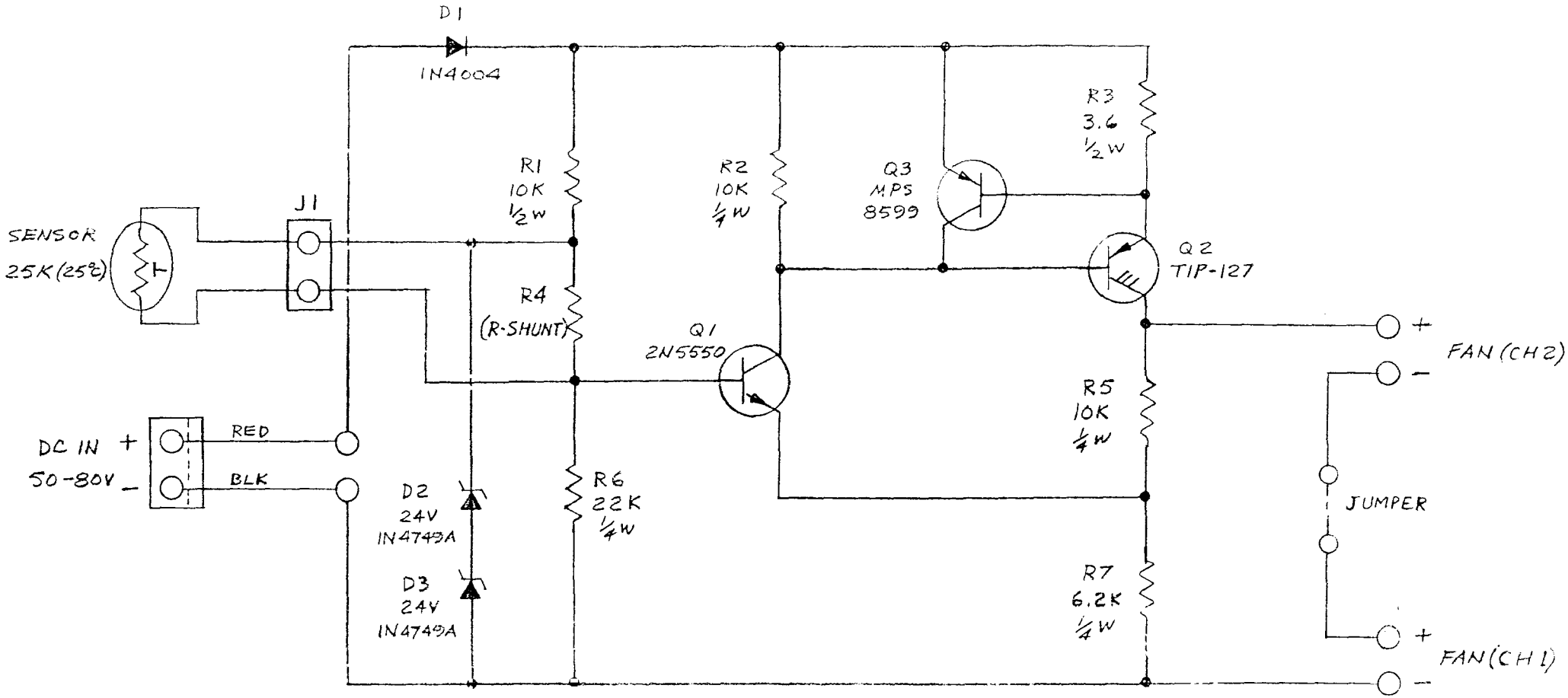
A.R. INTERNATIONAL, INC.	
TITLE: MASTER SCHEMATIC	
MODEL: 900A/1100A	
DATE: 8-10-88, R.A.	
ASSEMBLY NO. 355-670 (1100A)	
355-675 (900A-2)	

THERMAL
SENSOR

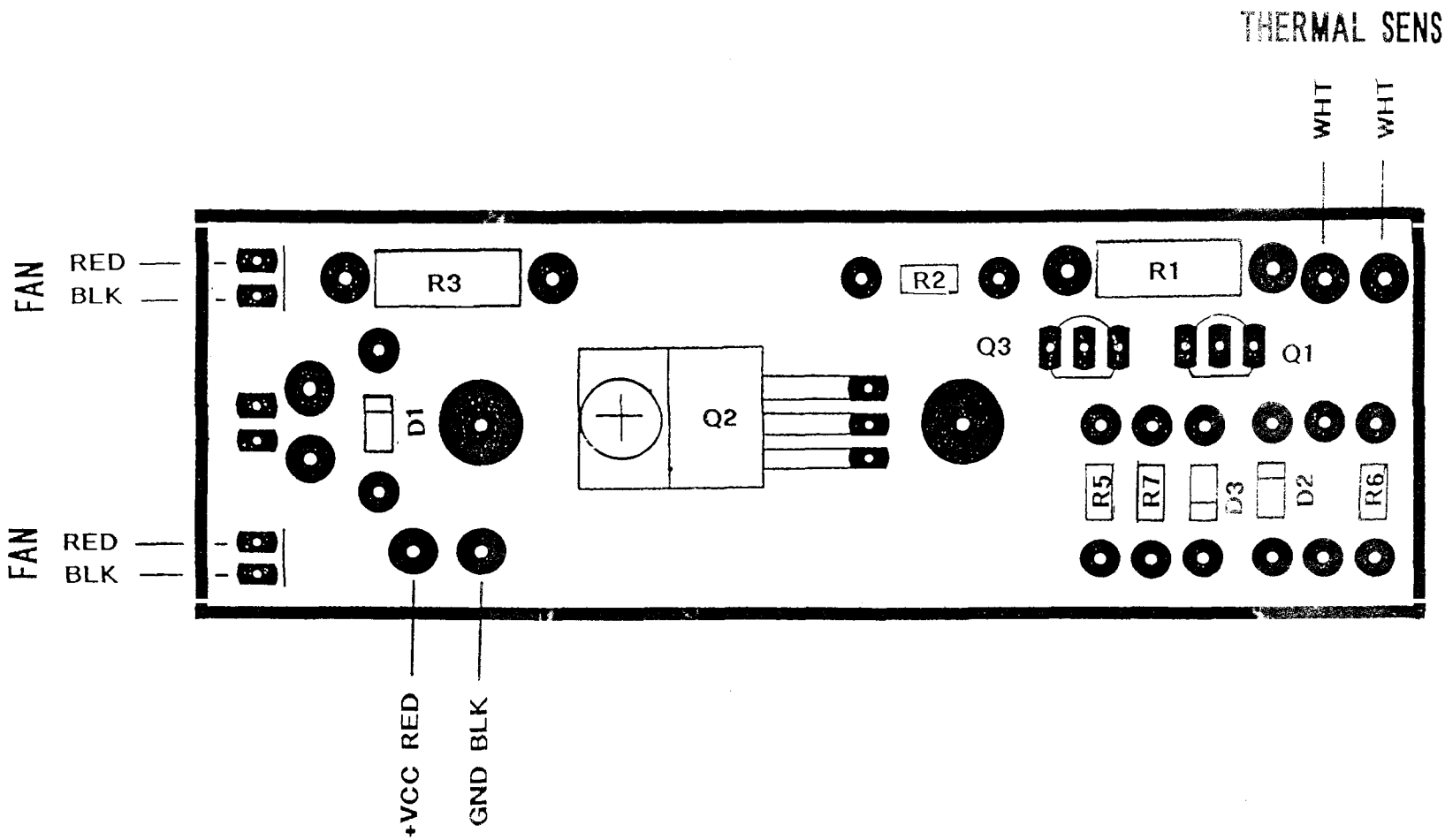


NOTE: REV. B ONLY 6-90/12-91

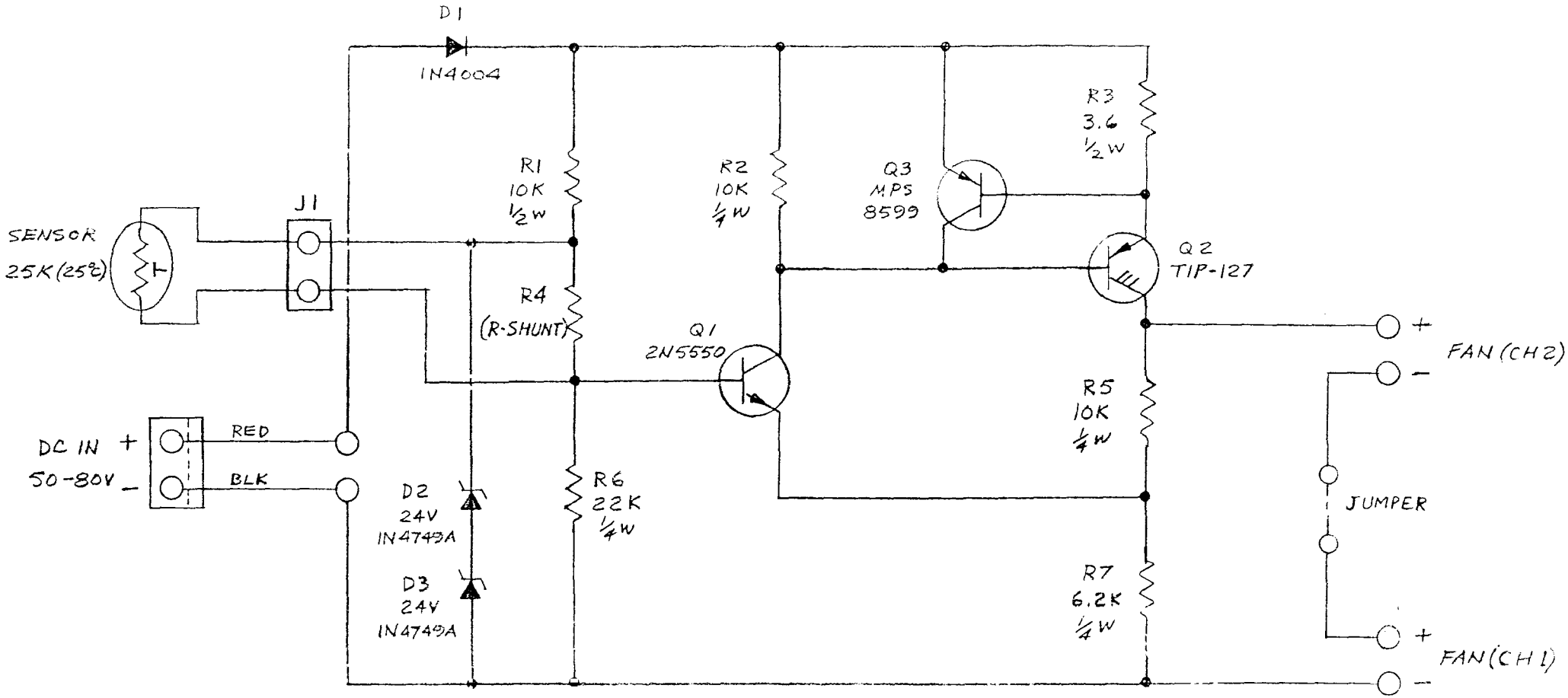
AB INTERNATIONAL INC.
ASSEMBLY DIA.: FAN CONTROL MODEL: 1200C DATE: 4-90 J.K.
ASSEMBLY NO. 502-713-B



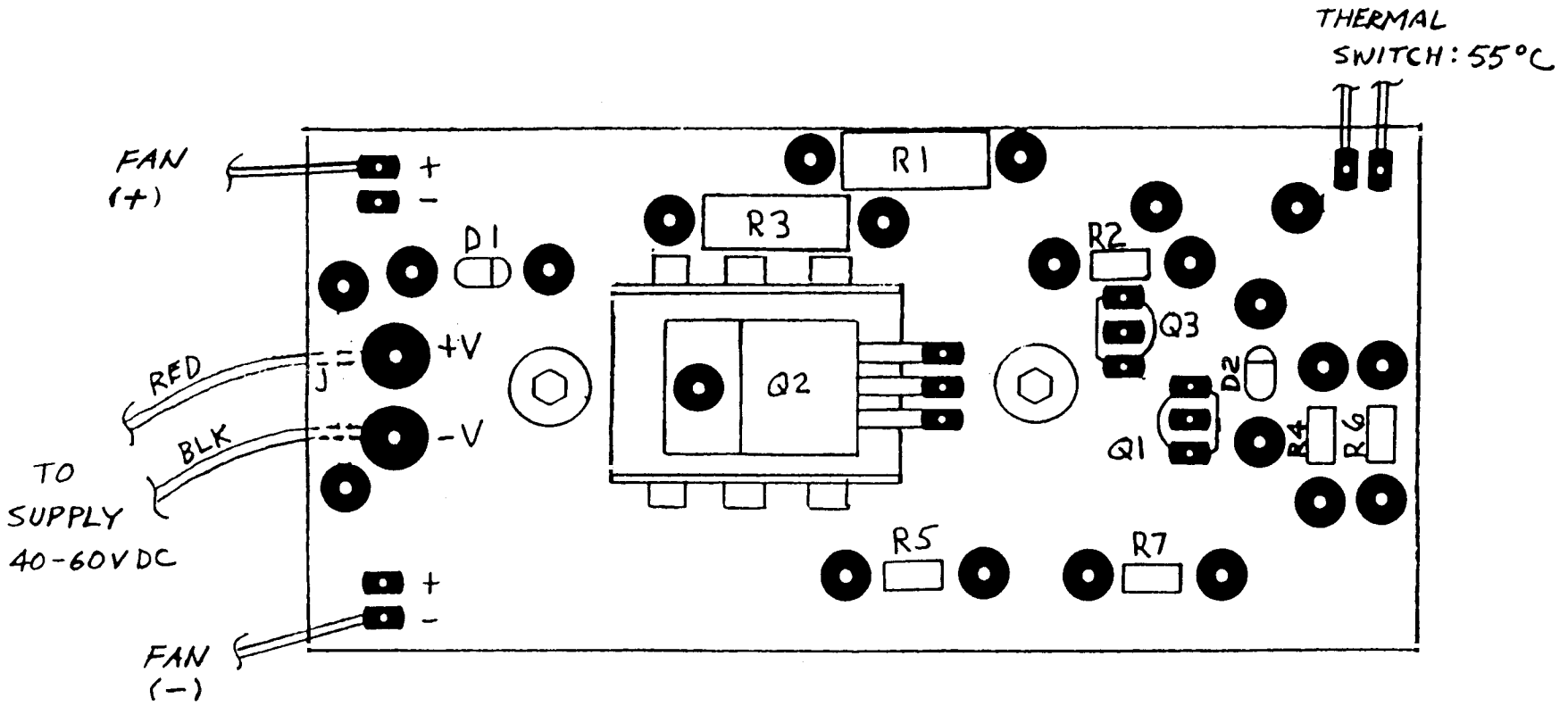
AB INTERNATIONAL, INC.	
SCHEMATIC: FAN CONTROL CI	
MODEL:	1200C
DATE:	4-90 GEO. A
ASSEMBLY NO.	502-713



AB INTERNATIONAL, INC.		
TITLE:	FAN CONTROL BOARD	
MODEL:	1200C	
DATE	11-91	
ASSY. NO.	502-713	REV. C

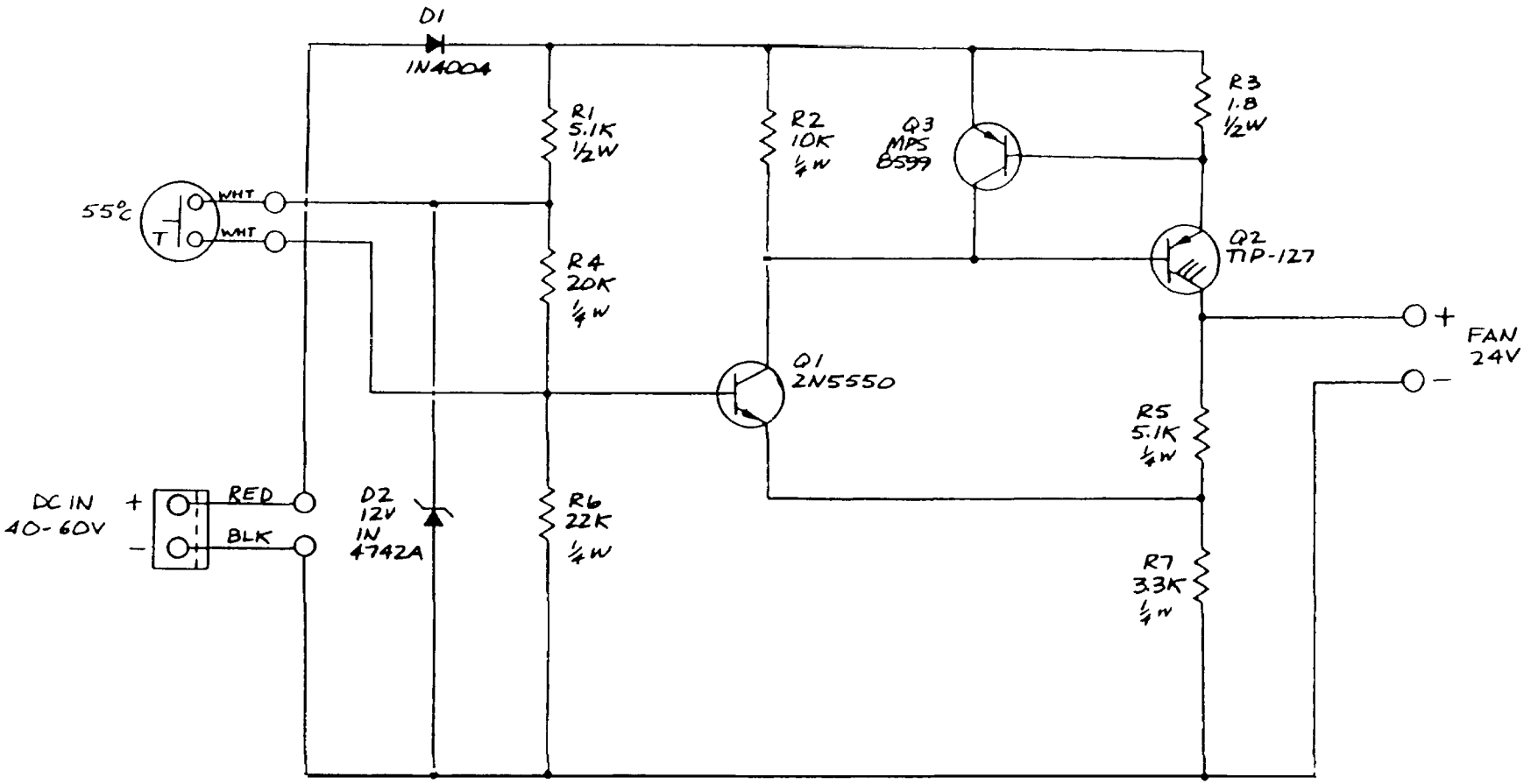


AB INTERNATIONAL, INC.	
SCHEMATIC: FAN CONTROL CI	
MODEL:	1200C
DATE:	4-90 GEO. A
ASSEMBLY NO.	502-713



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 G POWER SUPPLIES ONLY 6-90/12-91



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

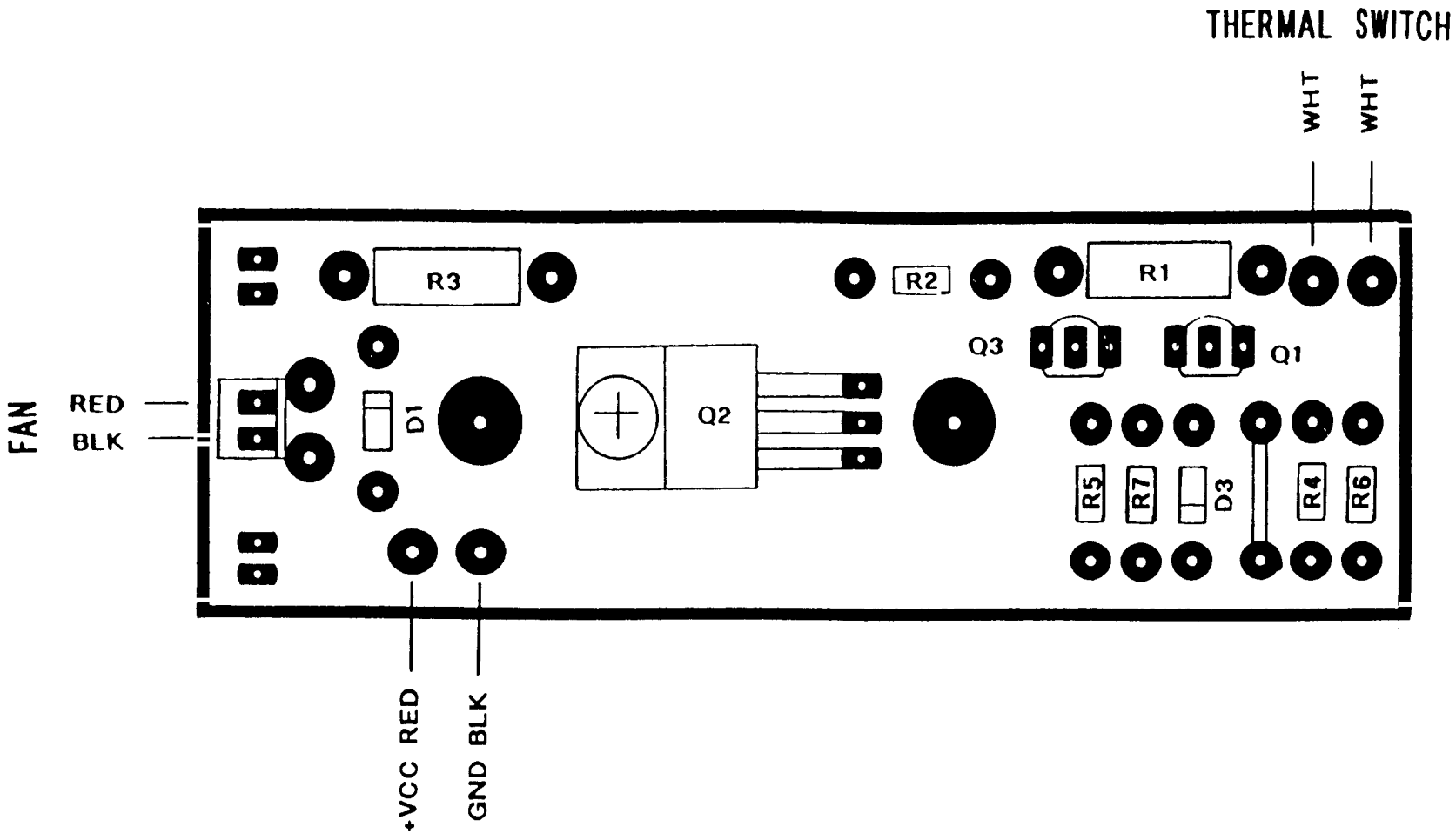
AB INTERNATIONAL INC

TITLE: FAN CONTROL CIRCUIT (24V FAN)

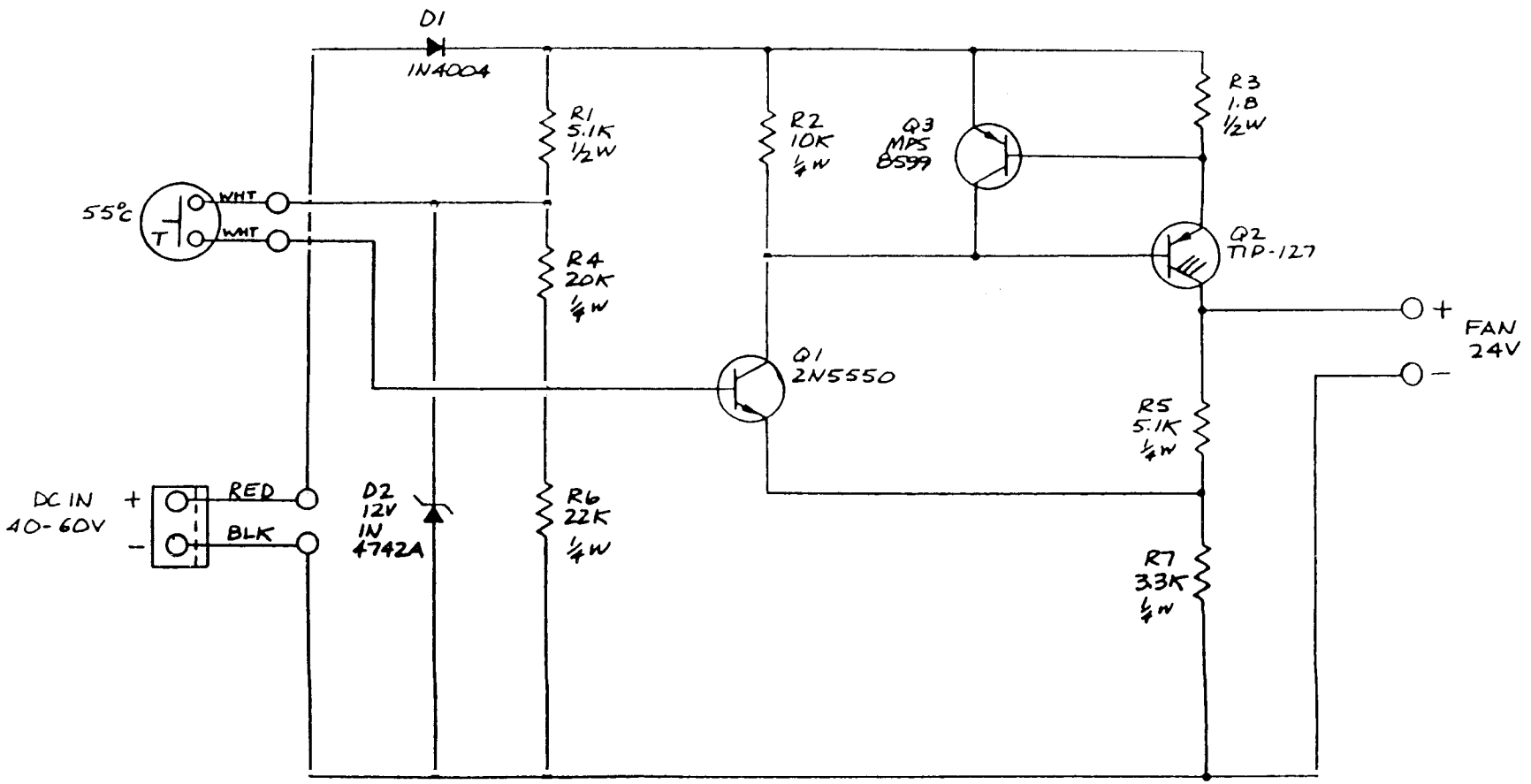
MODEL: 900A/1100A

DATE: 7-17-90 MH.

ASSEMBLY NO. 502-716 REV. A



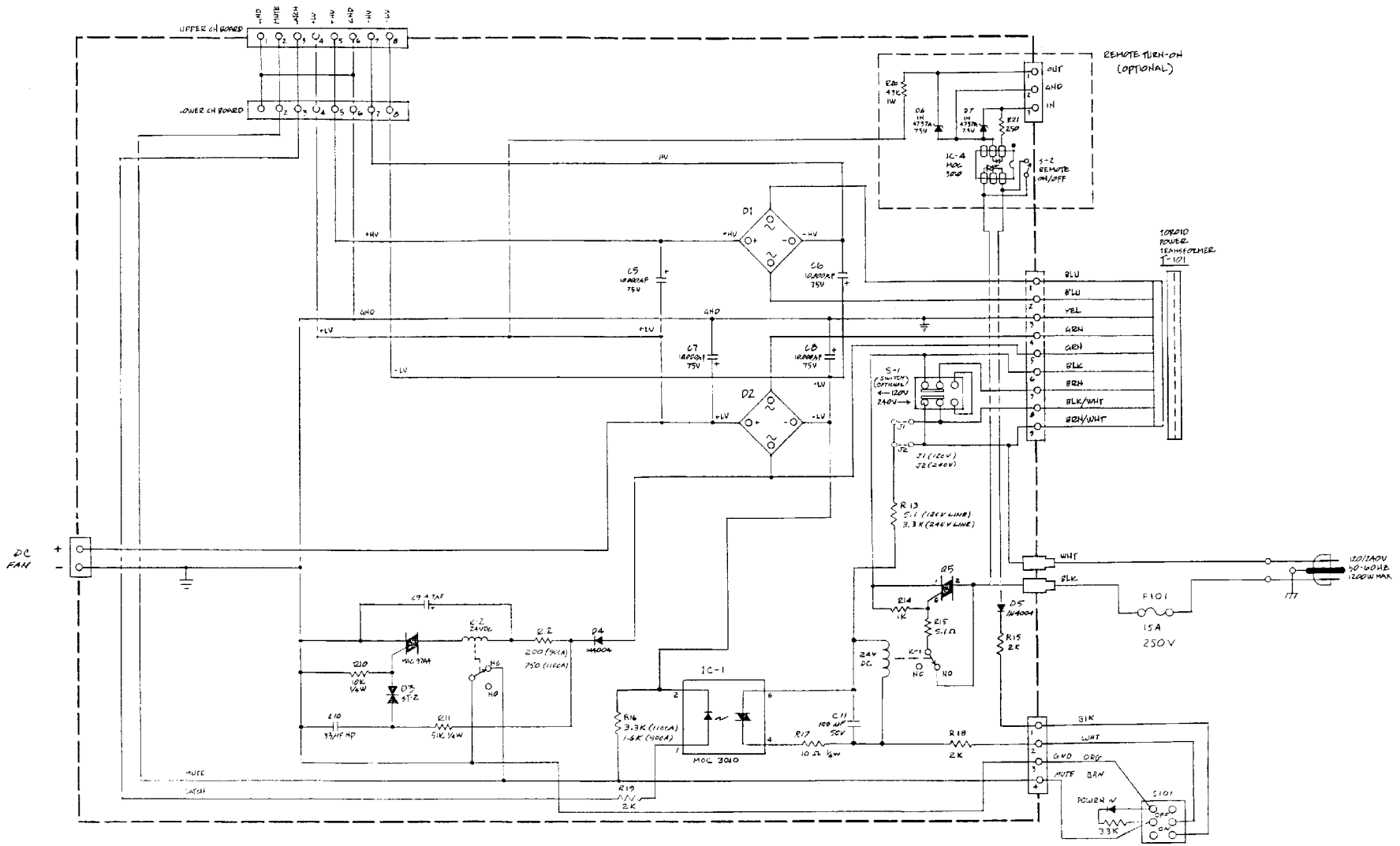
AB INTERNATIONAL, INC.	
TITLE: FAN CONTROL PCB	
MODEL: FX1B ,TWO-RACK AMPS	
DATE 11-91	
ASSY. NO. 502-716	REV. C



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 RESISTORS ARE IN OHMS, 1/2W, 5%
2) ALL CAPACITORS ARE IN MICROFARADS, (MF)
3) ⏚ INDICATES CHASSIS GROUND
   ⏚ INDICATES SUPPLY RETURN GROUND

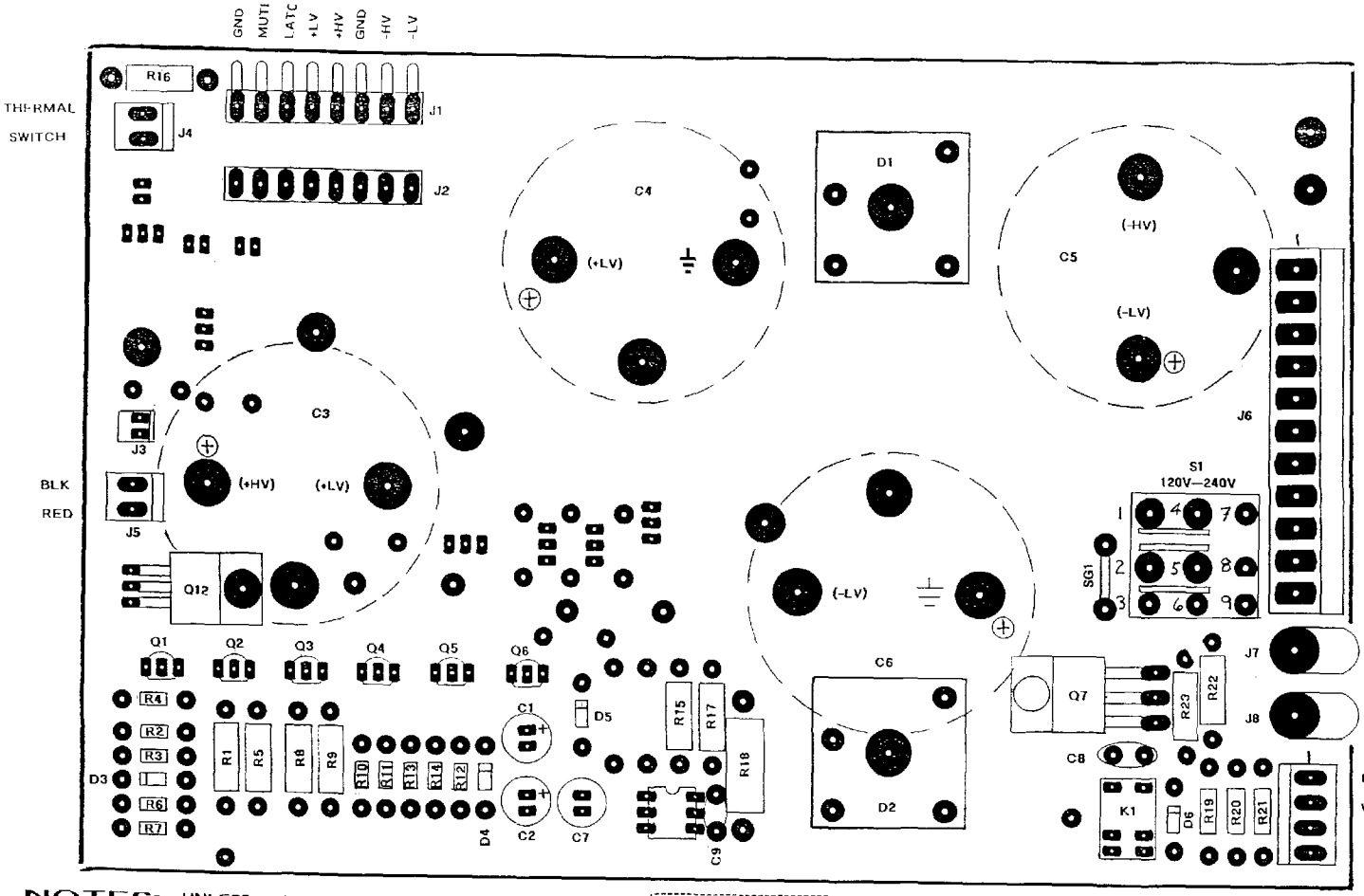
NOTE: 900A = 9220, 1100A = 9420

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

AB INTERNATIONAL, INC

TITLE: SCHEMATIC POWER SUPPLY
MODEL: 900A / 1100A
DATE: 6-14-90 REV. A.

ASSEMBLY NO: 502-641 REV G



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

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, ¼W, 5%
2. ALL CAPACITORS ARE IN MICROFARADS [uF]
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
100-110 VAC	BLACK	BROWN	BLK/WHT	GRAY	BRN/WHT	WHITE	120 POS.
115-130 VAC	BLACK	BROWN	GRAY	BLK/WHT	WHITE	BRN/WHT	120 POS.
200-215 VAC	BLACK	BROWN	BLK/WHT	GRAY	BRN/WHT	WHITE	240 POS.
220-230 VAC	BLACK	BROWN	GRAY	BLK/WHT	BRN/WHT	WHITE	240 POS.
235-250 VAC	BLACK	BROWN	GRAY	BLK/WHT	WHITE	BRN/WHT	240 POS.

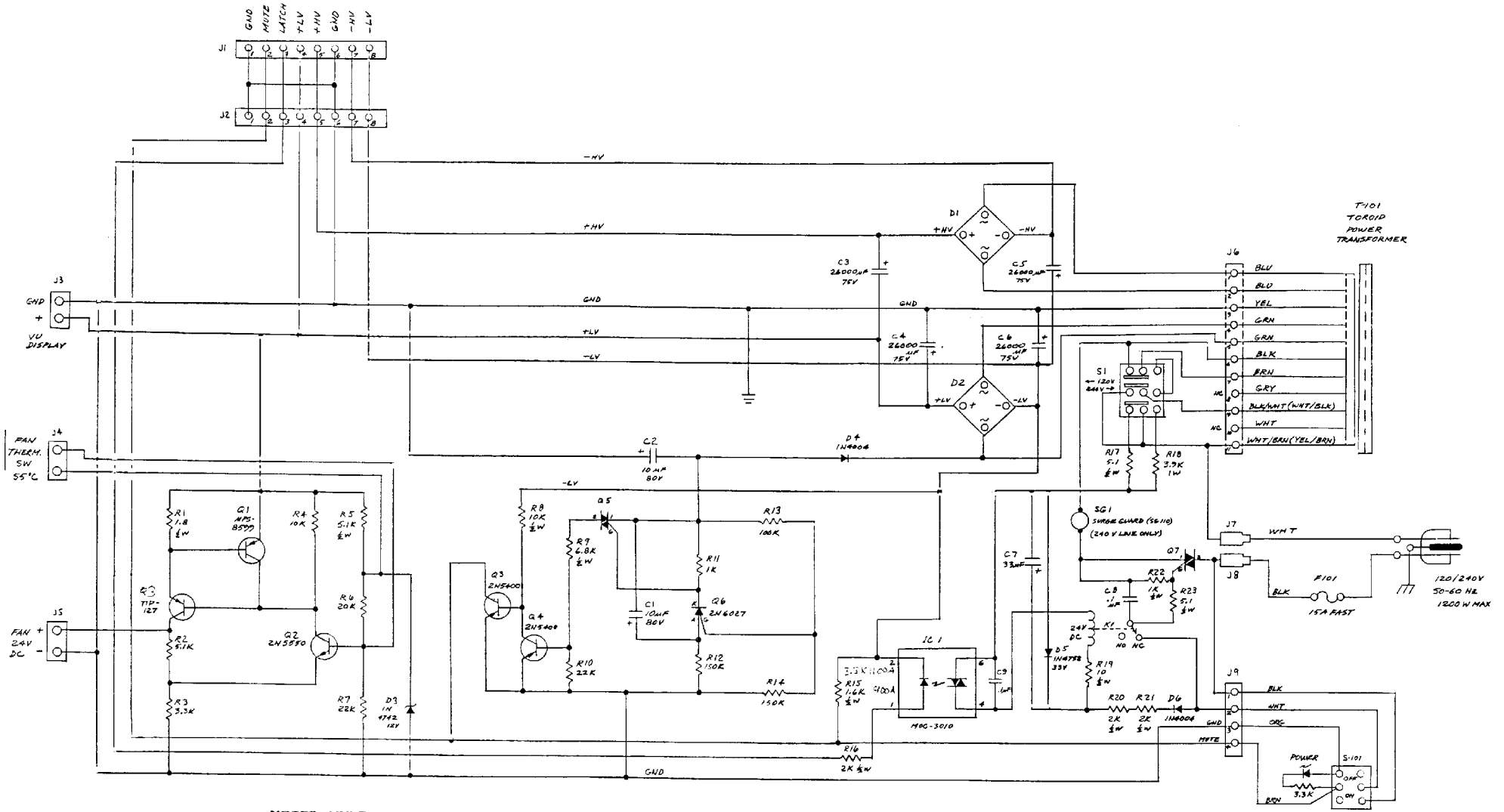
AB INTERNATIONAL, INC.

TITLE: POWER SUPPLY BOARD
MODEL: PRECEDENT 900A / 1100A

NOTE: 900A = 9220, 1100A = 9420

DATE: JAN '92

ASSEMBLY NO. 502-671 REV. H



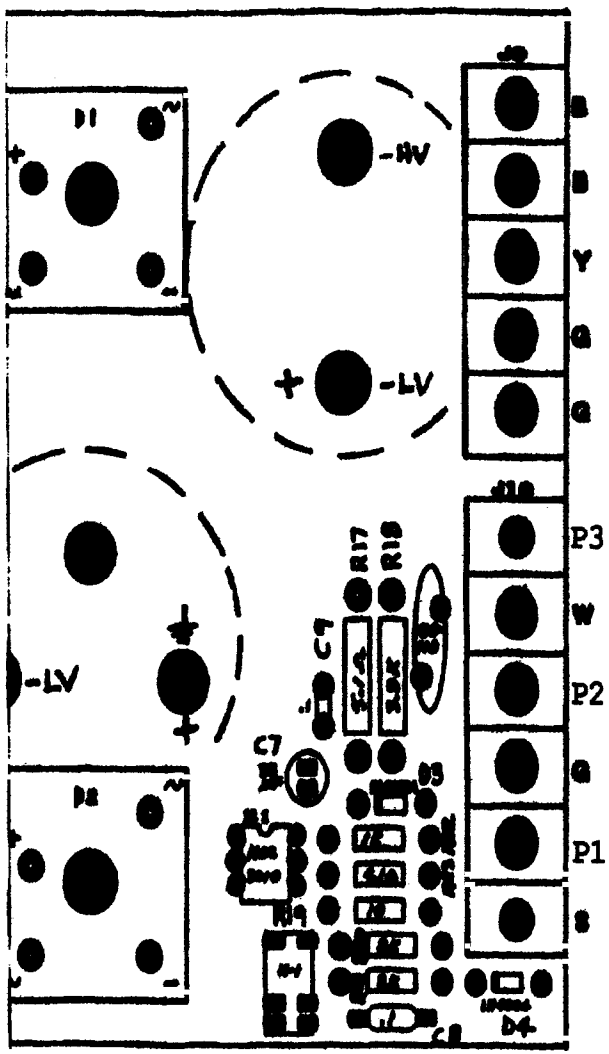
NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, ¼W 5%
2. ALL CAPACITORS ARE IN MICROFARADS (uF)
3. ⏚ INDICATES CHASSIS GROUND
   ⏚ INDICATES SUPPLY RETURN GROUND
4. RAIL VOLTAGES ARE AS FOLLOW:
   ± HV: ±92 V (900A) ; ±108V (1100A)
   ± LV: ±45V (900A) ; ± 53V (1100A)

NOTE: 900A = 9220, 1100A = 9420

AB 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:

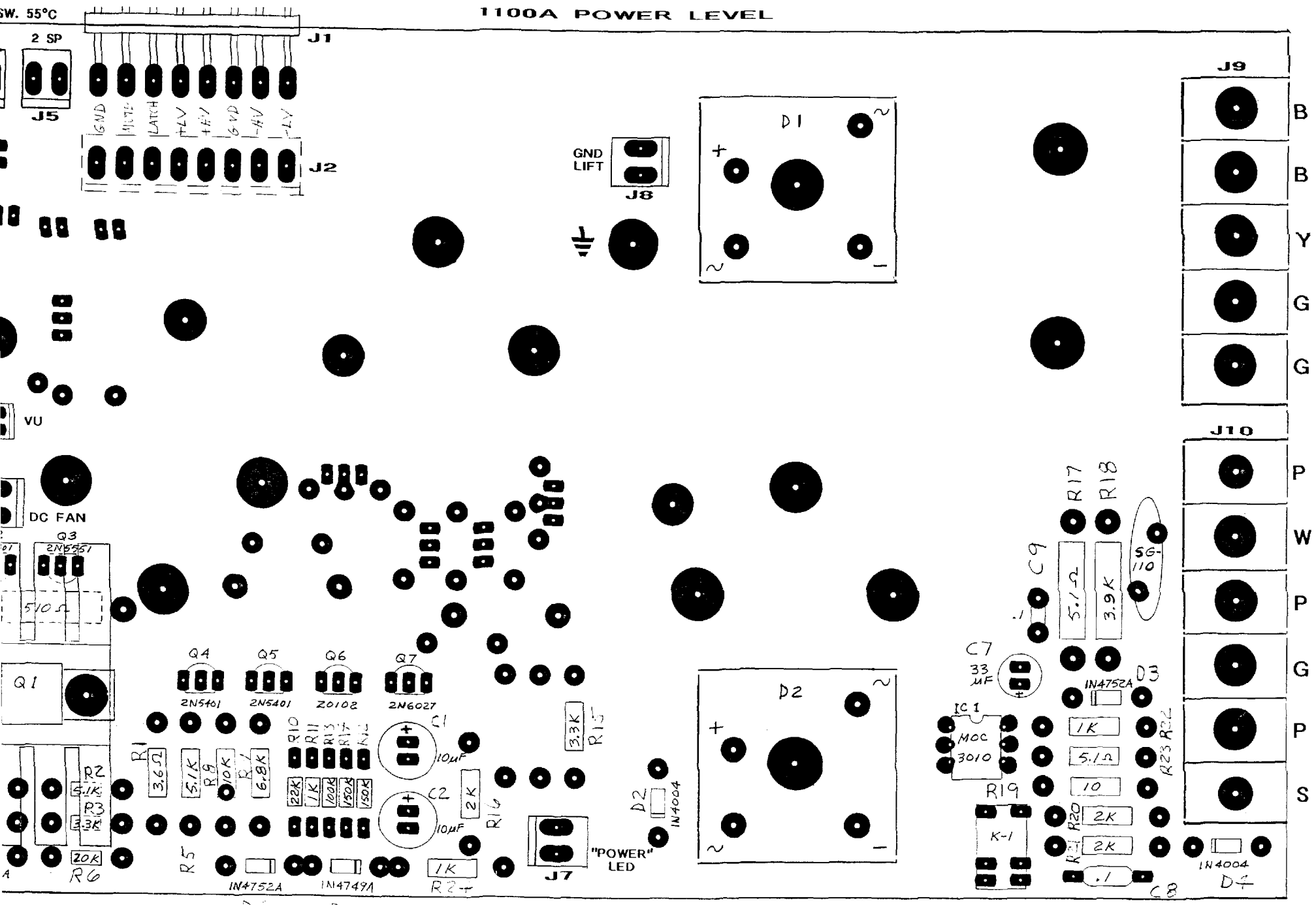
White	Orange
Purple	Grey
Brown	Black

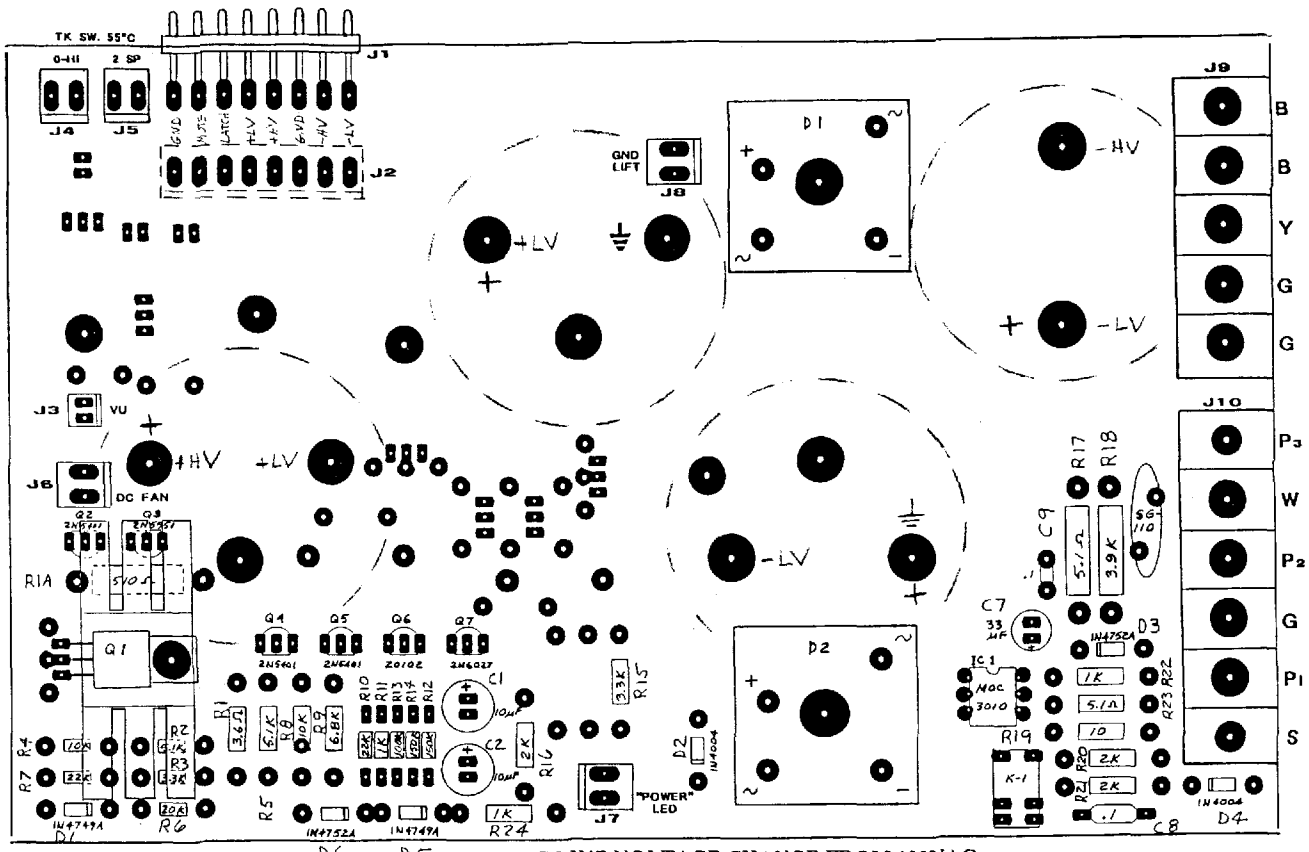
Secondary wiring Blue x 2, Yellow, Green x 2 remains unchanged.
Note: Some xfmrs had Blue x 2, Yellow, Violet x 2 (Instead of Green)

100VAC Wiring	120VAC
P3 = N/C	P3 = N/C
P2 = White	P2 = Brown/White
P1 = Brown Black	P1 = Brown Black
220VAC	**240VAC**
P3 = Brown Black/White	P3 = Brown Black/White
P2 = White	P2 = Brown/White
P1 = Black	P1 = Black

100VAC Wiring	120VAC
P3 = N/C	P3 = N/C
P2 = Purple Grey	P2 = White Orange
P1 = Brown Black	P1 = Brown Black
220VAC	**240VAC**
P3 = Brown Orange	P3 = Brown Orange
P2 = Purple	P2 = White
P1 = Black	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.


1100A POWER LEVEL
SW. 55°C
2 SP
J5
J1
J2
GND
MUTE
LATCH
+LV
+HV
-VD
-HV
-LV
GND LIFT
J8
D1
J9
B
B
Y
G
G
VU
DC FAN
Q3
2N5551
J10
P
W
P
G
P
S
Q1
Q4
Q5
Q6
Q7
2N5401
2N5401
Z0102
2N6027
R1
3.6Ω
R2
5.1K
R3
3.3K
R4
6.8K
R5
20K
R6
10K
R9
R10
22K
R11
1K
R13
100K
R15
150K
R16
150K
C1
10μF
C2
10μF
2K
R14
3.3K
R15
D2
IN4004
D2
J7
"POWER" LED
IN4752A
D6
IN4749A
D5
1K
R24
R17
5.1Ω
R18
3.9K
SG-110
C9
.1
C7
33 μF
IC 1
MOC 3010
R19
K-1
IN4752A
D3
1K
5.1Ω
10
R23
R22
2K
R20
2K
R21
.1
C8
IN4004
D4



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

STEP
1. REMOVE AMPLIFIER FROM ANY AC POWER SOURCE.
2. DETERMINE DESIRED AC LINE VOLTAGE AND SELECT PROPER AMPLIFIER SETTING. CHOOSE OF THE FOLLOWING, 100VAC, 120VAC, 220VAC, 240VAC.
3. FOLLOW WIRING PROCEDURE CLOSELY.

100V
1. LOCATE TERMINAL P2 ON THE POWER SUPPLY AND REMOVE THE BLK/WHT & BRN/WHT WIRES FROM P2 AND SECURE THEM.
2. LOCATE THE GRAY AND WHITE WIRES FROM THE TRANSFORMER AND PLACE THEM ON TERMINAL P2.

220V
1. LOCATE P2 AND P3 ON THE POWER SUPPLY. RELOCATE THE BLK/WHT WIRE OF THE TRANSFORMER FROM P2 TO P3.
2. LOCATE AND MOVE THE BRN WIRE OF THE TRANSFORMER FROM P1 TO P2.
3. REMOVE THE BRN/WHT WIRE CONNECTED TO P2 AND SECURE.
4. LOCATE THE WHT WIRE FROM THE TRANSFORMER AND CONNECT IT TO P2.
5. LOCATE R17 (5.1 OHM 1W) ON THE POWER SUPPLY AND REMOVE IT BY CUTTING THE LEADS.
6. CHANGE THE FUSE FROM 15A TO 10A

240V
1. LOCATE P2 AND P3 ON THE POWER SUPPLY. RELOCATE THE BLK/WHT WIRE OF THE TRANSFORMER FROM P2 TO P3.
2. LOCATE AND MOVE THE BRN WIRE OF THE TRANSFORMER TO FROM P1 TO P2.
3. LOCATE R17 (5.1 OHM 1W) ON THE POWER SUPPLY AND REMOVE IT BY CUTTING THE LEADS.
4. CHANGE FUSE FROM 15A TO 10A.

NOTES UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHM'S, 1/4W 5%
2. ALL CAPACITORS ARE IN MICROFARADS (uf)
3. R1 SELECT: 3.8 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. SG-1 REPLACE WITH JUMPER FOR 900A,9220
8. D1 SELECTION: 1N4742 (12V) FOR 900A & 9220
   1N4749 (24V) FOR 1100A & 9420
9. D5 & D6 SELECT: 1N4749A EACH, 900A & 9220, FOR 1100A & 9420 D5 = 1N4749A & D6 = 1N4752A
10. RAIL VOLTAGES ARE AS FOLLOWS:
    +/- HV 900A/9220 92VDC; 1100A/9420 108VDC
    +/- LV 900A/9220 45VDC; 1100A/9420 53VDC

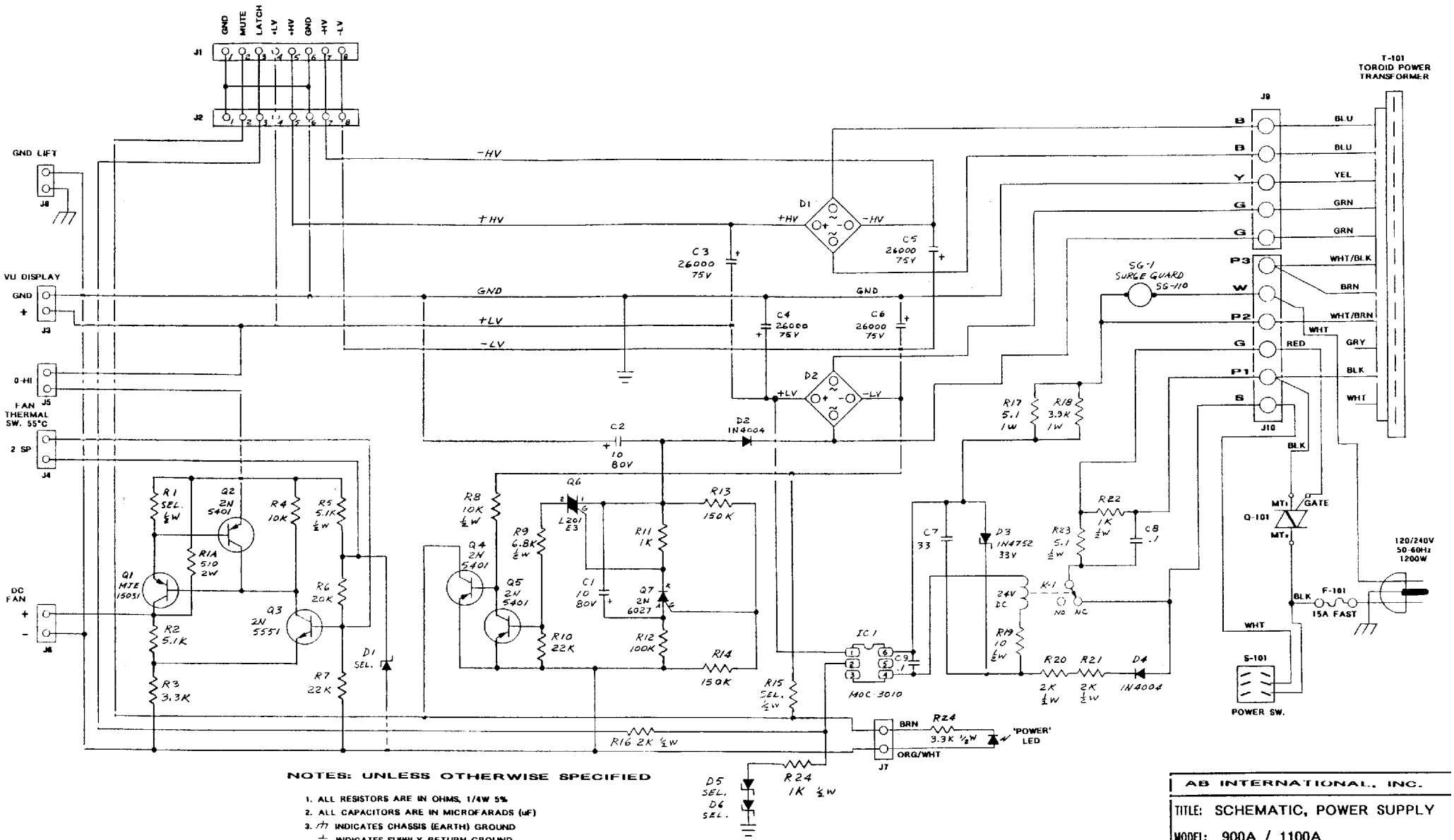
AB International Electronics, Inc.
1830-B Vernon Street
Roseville, CA 95678
(916) 783-7800 FAX (916) 784-1858
Telex 295803 ABIT

TITLE: POWER SUPPLY BOARD

MODEL: 900A,1100A,9220,9420
ATD AMPS

DATE: 3-28-94

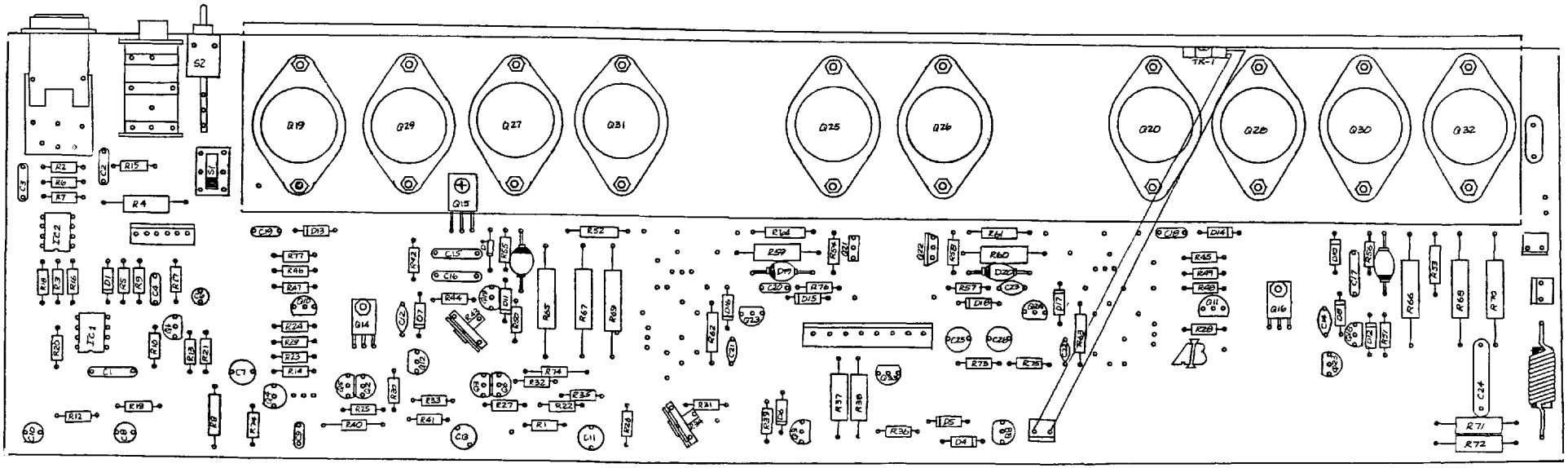
PART NO. 502-671 | REV. K



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, 1/4W 5%
2. ALL CAPACITORS ARE IN MICROFARADS (uF)
3. ⏚ INDICATES CHASSIS (EARTH) GROUND
   ⏚ INDICATES SUPPLY RETURN GROUND
4. R1 SELECT: 1.8ohm (900A), 3.6ohm (1100A)
   R1A OMIT FOR 900A; R15 SELECT: 1.5K (900A), 3.3K (1100A) R17, OMIT FOR 220-240V LINE.
5. SG-1, REPLACE WITH JUMPER FOR 900A.
6. D1 SELECTION: 1N4742A, 12V FOR 900A; 1N4749A, 24V FOR 1100A.
   D5 & D6 SELECT: 1N4749A EACH, FOR 900A.
   D5 & D6 SELECT: FOR 1100A; D5 1N4749A & D6 1N4752A (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

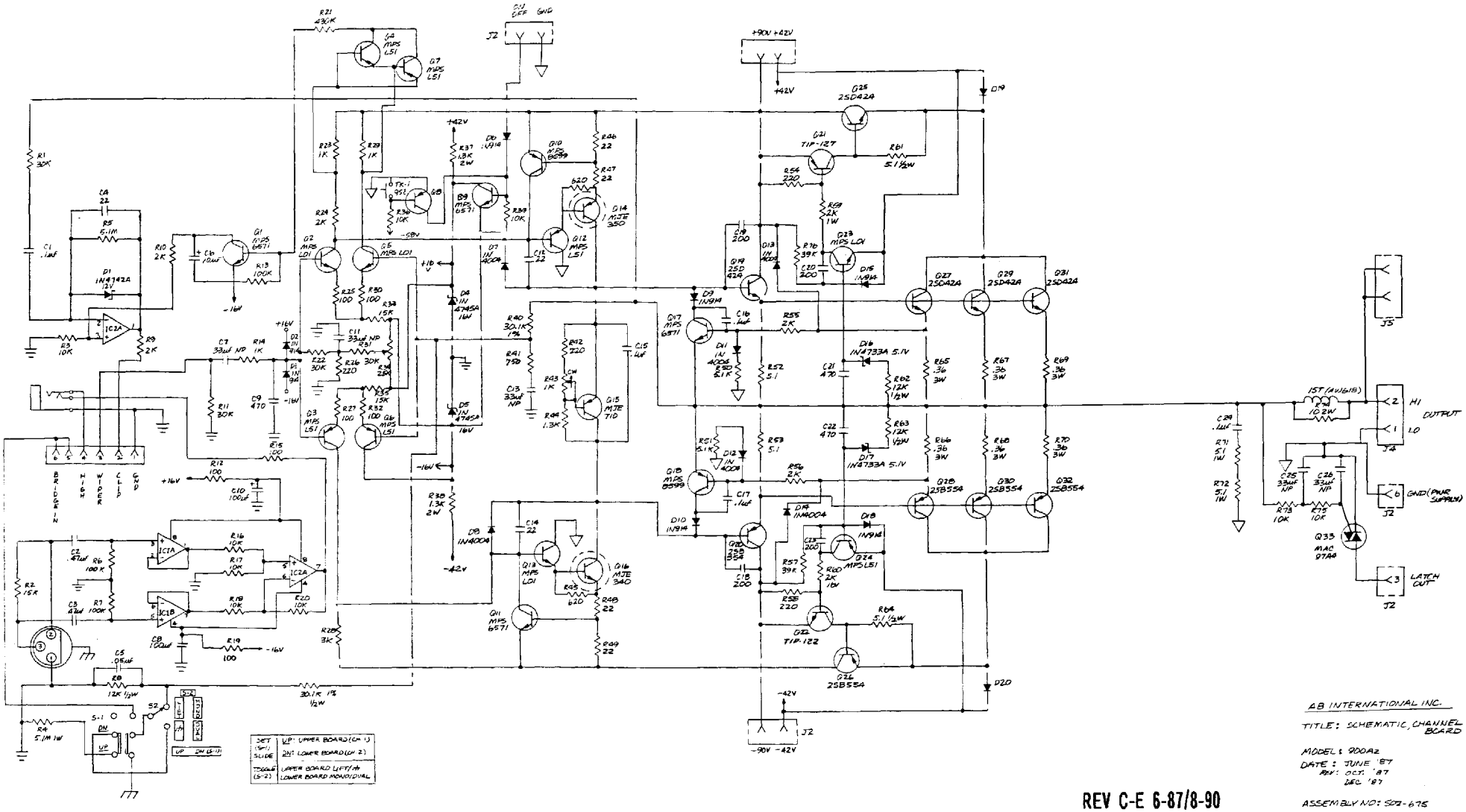


AB INTERNATIONAL, INC

ASSEMBLY PCB, 900AE

PN: 502-675

REV C-E 6-87/8-90



REV C-E 6-87/8-90

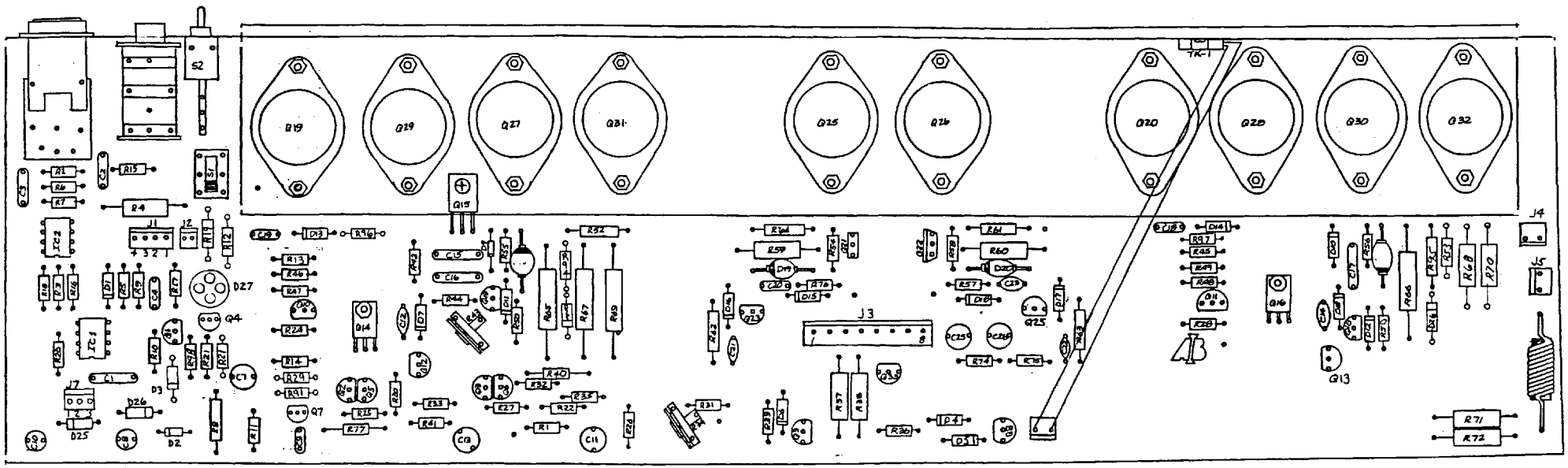
AB INTERNATIONAL INC.

TITLE: SCHEMATIC, CHANNEL BOARD

MODEL: 900A2

DATE: JUNE '87
REV: OCT. '87
DEC '87

ASSEMBLY NO: 501-675

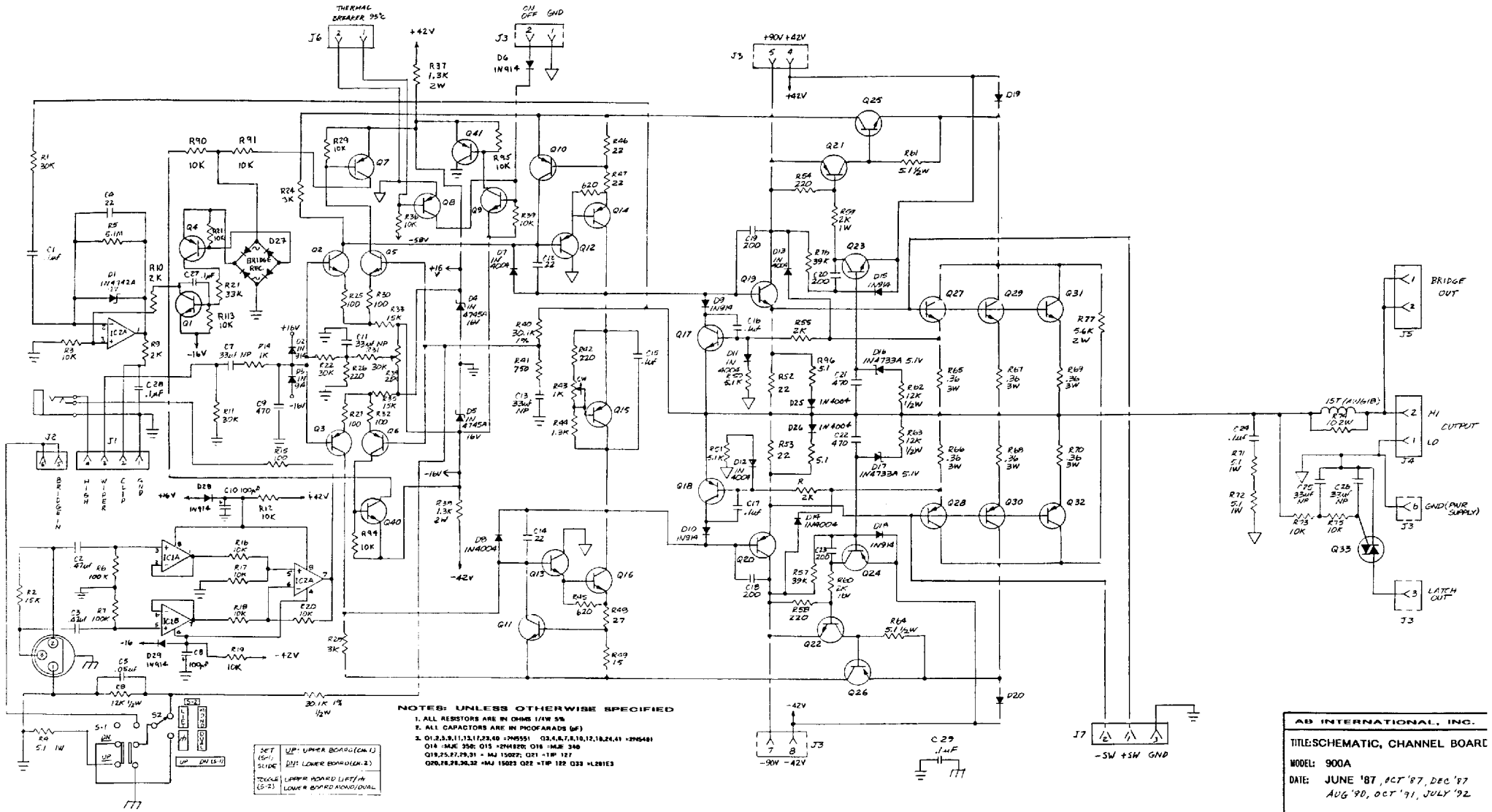


AB INTERNATIONAL, INC

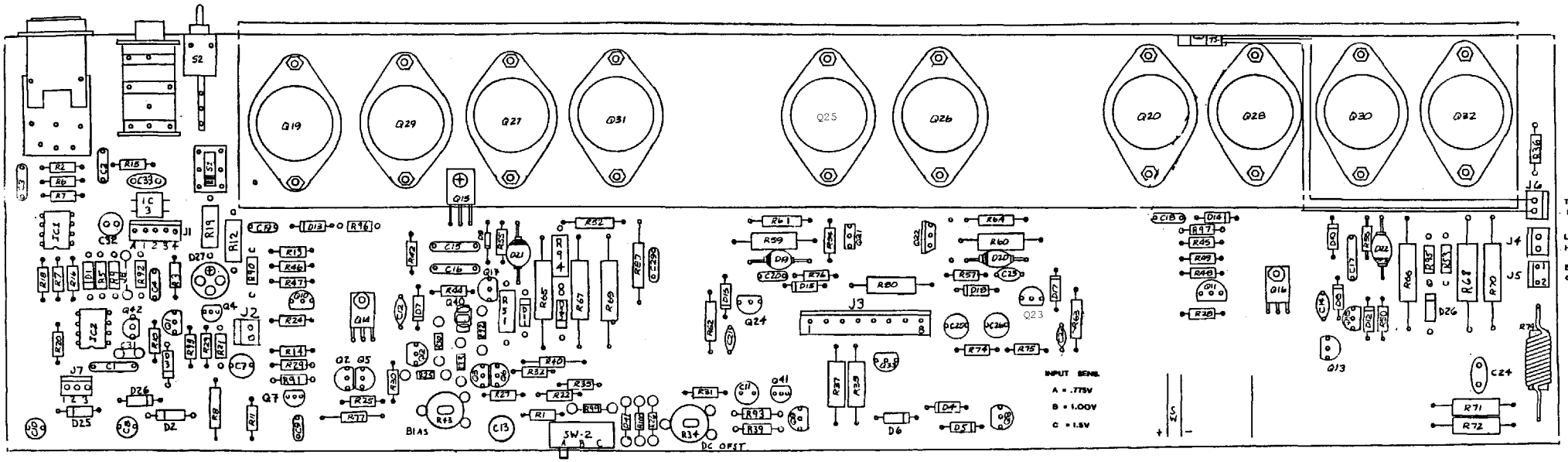
ASSEMBLY PCB, 900AZ

PN: 502-675 REV F

AUG 90 JK



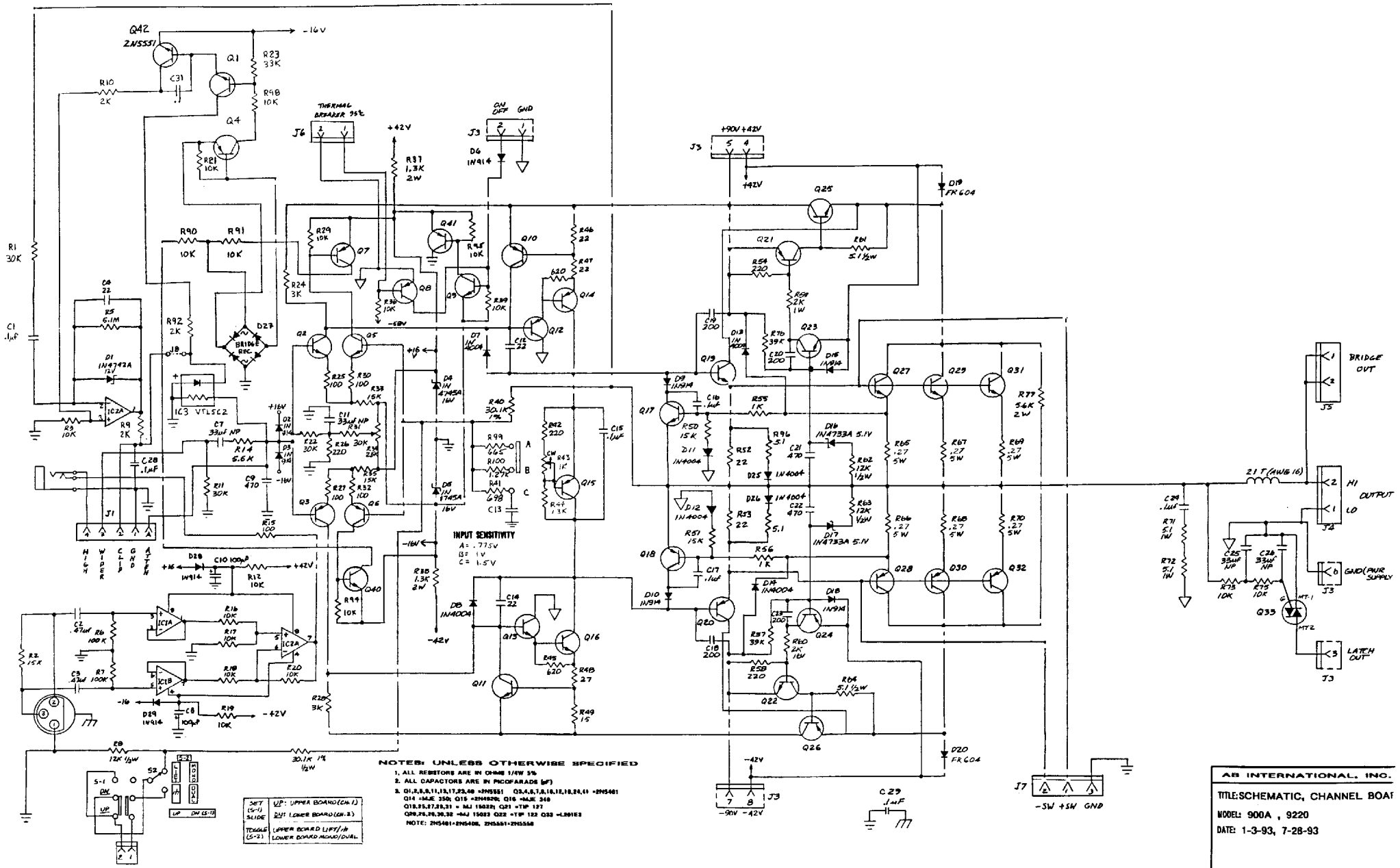
AD INTERNATIONAL, INC.	
TITLE:	SCHEMATIC, CHANNEL BOARD
MODEL:	900A
DATE:	JUNE '87, OCT '87, DEC '87, AUG '90, OCT '91, JULY '92
ASSEMBLY NO.	502-675
REV.	F

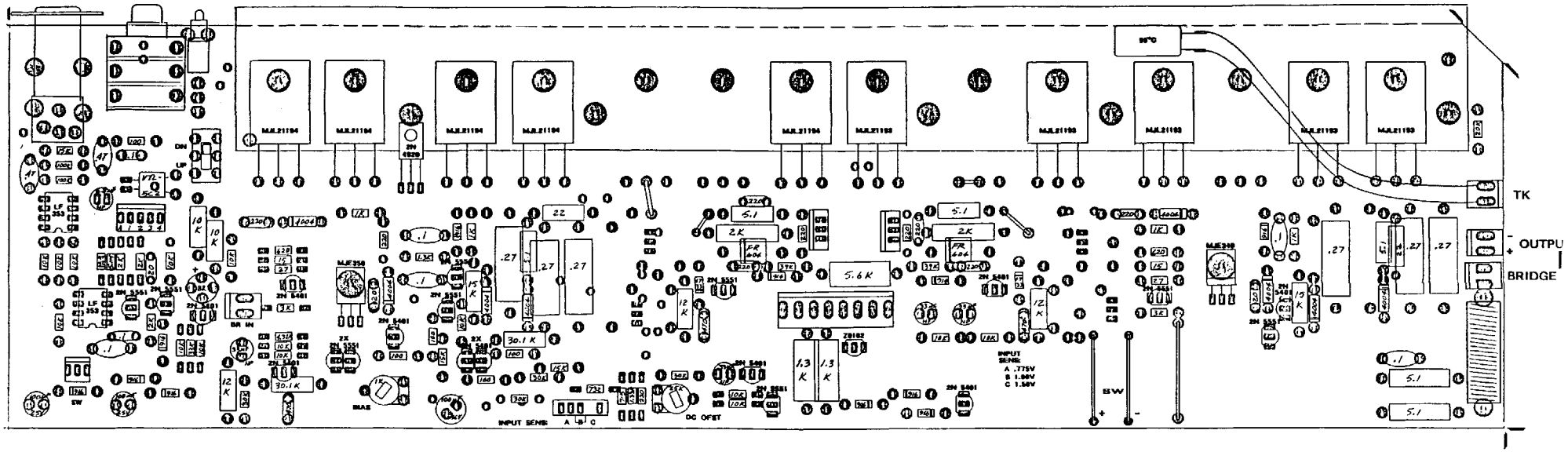


INPUT SENSITIVITY SELECTOR SWITCH

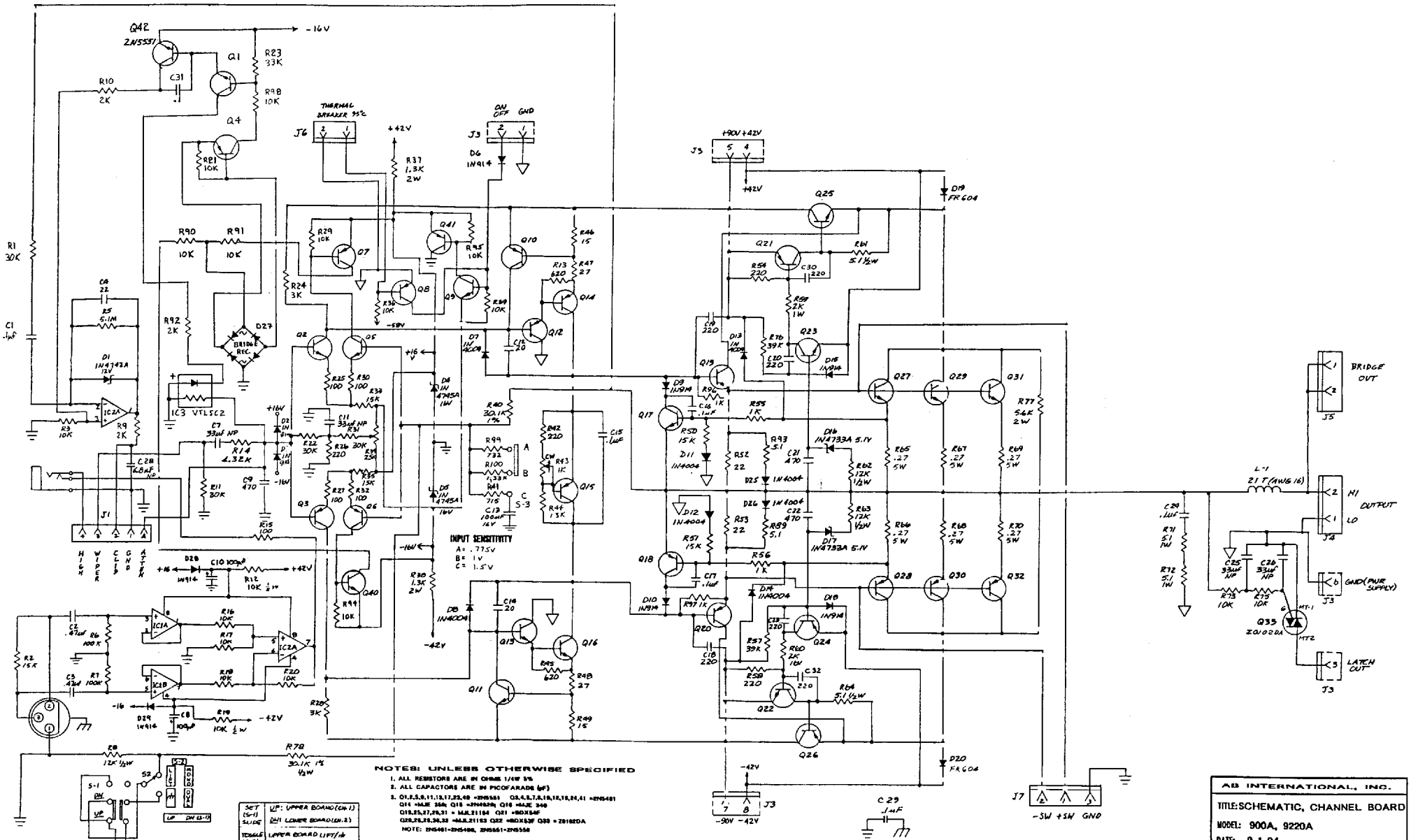
NOTE: 900A TO 9228 CONVERSION, REMOVE IC3 & C31, INSERT J8

AB INTERNATIONAL
TITLE: ASSEMBLY 900A , 9220
DATE: JAN 1993 JK
502-670 REV. G


Q42 2N5551
-16V
Q1
R23 33K
R10 2K
C31
R98 10K
Q4
R21 10K
THERMAL BREAKER 95C
J6
+42V
R37 1.3K 2W
ON OFF GND
J3
D6 IN914
+90V +42V
J3
+42V
D19 FR604
Q25
R90 10K
R91 10K
R29 10K
Q7
Q41
R95 10K
Q10
R46 22
R47 22
620
Q14
R24 3K
R30 10K
Q8
Q9
R39 10K
-68V
Q12
D7 IN4004
C12 .22
Q2
Q5
+16V
R35 100
R50 100
R33 15K
D4 IN 4745A 16V
R40 30.1K 1%
R99 665
R100 1.27K
R41 698
C13
A
B
C
R42 220
C15 .1μF
R43 1K
R44 1.3K
Q15
Q3
Q6
R27 100
R32 100
R34 15K
R36 220
R31 30K
R22 30K
C11 33μF NP
C7 33μF NP
R14 5.6K
D2 IN 914
D3 IN 914
C9 470
-16V
R11 30K
R15 100
J1
HIGH WIDEK CLIP GND ATTN
INPUT SENSITIVITY
A = .775V
B = 1V
C = 1.5V
D8 IN 4745A 16V
-16V
R38 1.3K 2W
-42V
Q40
R94 10K
D28 IN914
C10 100μF
+16
+42V
R12 10K
D5 IN4004
C16 22
Q13
Q16
R45 620
R48 27
Q11
R49 15
R28 3K
Q17
D9 IN914
C16 .1μF
R55 1K
R50 15K
D11 IN4004
R52 22
R51 5.1
D25 IN4004
R96 .51
C21 470
D16 IN4733A 5.1V
R62 12K 1/2W
Q27
Q29
Q31
R77 56K 2W
R65 .27 5W
R67 .27 5W
R69 .27 5W
D12 IN4004
R53 22
R57 15K
D24 IN4004
C22 470
R63 12K 1/2W
D17 IN4733A 5.1V
Q18
R56 1K
C17 .1μF
R66 .27 5W
R68 .27 5W
R70 .27 5W
Q28
Q30
Q32
D10 IN914
D14 IN4004
D18 IN914
Q20
C18 200
C19 200
R58 220
R57 39K
R60 2K 16V
Q24
Q22
R64 5.1 1/2W
Q26
D20 FR604
-42V
J3
7 8
-90V -42V
C29 .1μF
J7
-5V +5V GND
C20 200
D13 IN 4004
R76 39K
C20 200
D15 IN914
Q23
Q19
R54 220
R59 2K 1W
Q21
R61 5.1 1/2W
21 T (AWG 16)
C24 .1μF
R71 5.1 1W
R72 5.1 1W
J5
BRIDGE OUT
J4
HI OUTPUT
LO
J3
GND(FOR SUPPLY)
C25 33μF NP
C26 33μF NP
R73 10K
R74 10K
Q35
MT1
MT2
G
J3
LATCH OUT
R1 30K
C1 .1μF
R90 10K
R91 10K
R92 2K
R24 3K
D22 BRIDGE REC.
J8
D1 IN4742A 12V
IC3 VTL5C2
C4 22
R5 6.1M
IC2A
R3 10K
R9 2K
C28 .1μF
R8 15K
C2 .47μF
R6 100K
C3 .47μF
R7 100K
IC1A
IC2A
IC1B
R16 10K
R17 10K
R18 10K
R20 10K
-16
D29 IN914
C8 100μF
R19 10K
-42V
R26 3K
R8 12K 1/2W
30.1K 1% 1/2W
S-1
S-2
DN
UP
S2
LOW HIGH
LOW HIGH
UP DN (S-1)
SET (S-1) SLIDE
UP: UPPER BOARD (CH.1)
DN: LOWER BOARD (CH.2)
TOGGLE (S-2)
UPPER BOARD UP/1/lo
LOWER BOARD MONO/DUAL
J2 BRIDGE INPUT
NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE IN OHMS 1/4W 5%
2. ALL CAPACITORS ARE IN PICOFARADS (pF)
3. Q1,2,5,8,11,13,17,23,60 =2N5551 Q3,4,6,7,9,10,12,18,24,(1 =2N5401
Q14 =MJE 350; Q15 =2N4920; Q16 =MJE 340
Q19,25,27,28,31 = MJ 15023; Q21 =TIP 127
Q20,26,29,30,32 =MJ 15022 Q22 =TIP 122 Q33 =L201E3
NOTE: 2N5401=2N5400, 2N5551=2N5550
NOTE: 900A TO 9220 CONVERSION, REMOVE IC3 & C31, INSERT J8
AB INTERNATIONAL, INC.
TITLE:SCHEMATIC, CHANNEL BOAF
MODEL: 900A , 9220
DATE: 1-3-93, 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

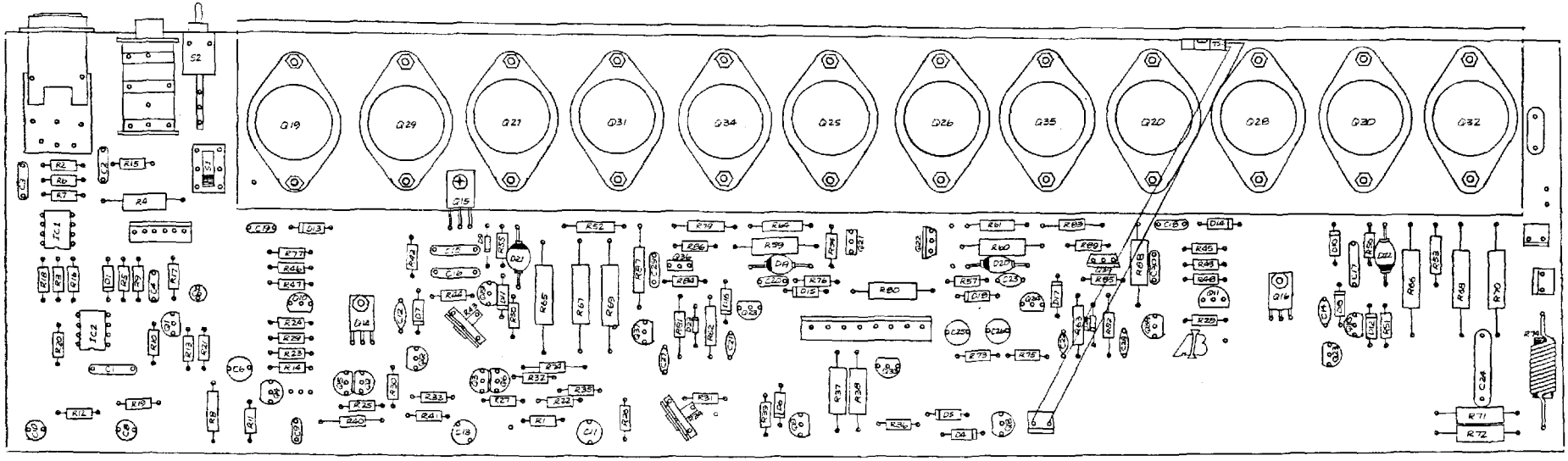


NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS 1/4W 5%
2. ALL CAPACITORS ARE IN MICROFARADS (μF)
3. Q1,2,5,6,11,13,17,23,40 = 2N5551 Q3,4,8,7,9,10,12,15,24,41 = 2N5401
   Q14 = MJE 350; Q15 = 2N4029; Q16 = MJE 340
   Q18,25,27,29,31 = MJL21194 Q21 = MDX54F
   Q28,26,28,30,32 = MJL21193 Q22 = MDX53F Q35 = 2N1020A
   NOTE: 2N5401=2N5400, 2N5551=2N5550

SET (S-1) SLIDE	UP: UPPER BOARD (CH 1) DN: LOWER BOARD (CH 2)
TOGGLE (S-2)	LIFT/tilt UPPER BOARD MOVE/DUAL

AB INTERNATIONAL, INC.		
TITLE: SCHEMATIC, CHANNEL BOARD		
MODEL: 900A, 9220A		
DATE: 9-1-94		
ASSEMBLY NO.	502-675	REV. J

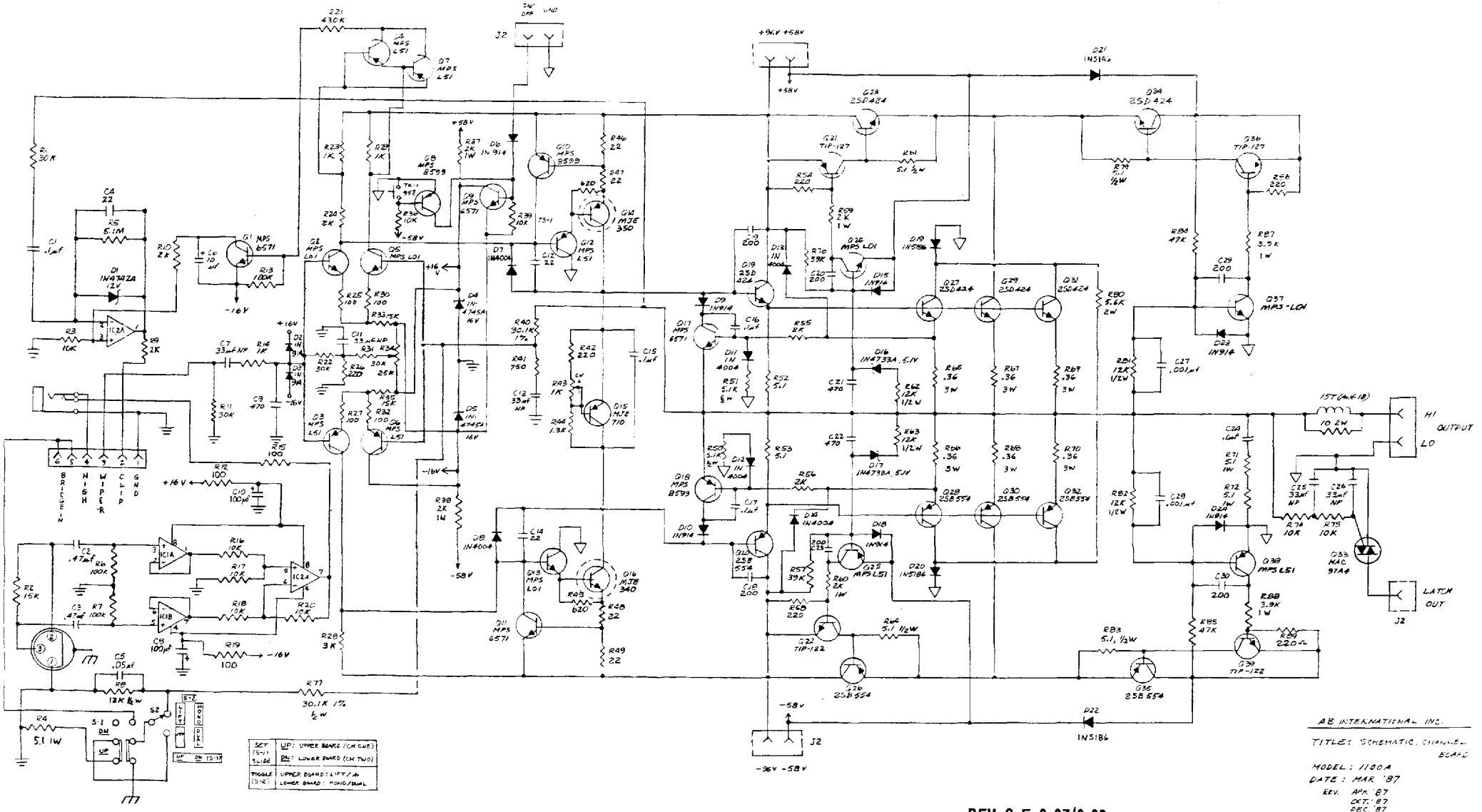


AB INTERNATIONAL, INC.

ASSEMBLY PCB, 110CA

PN: 502-670

REV C-E 6-87/8-90



REV C-E 6-87/8-90

AB INTERNATIONAL INC.

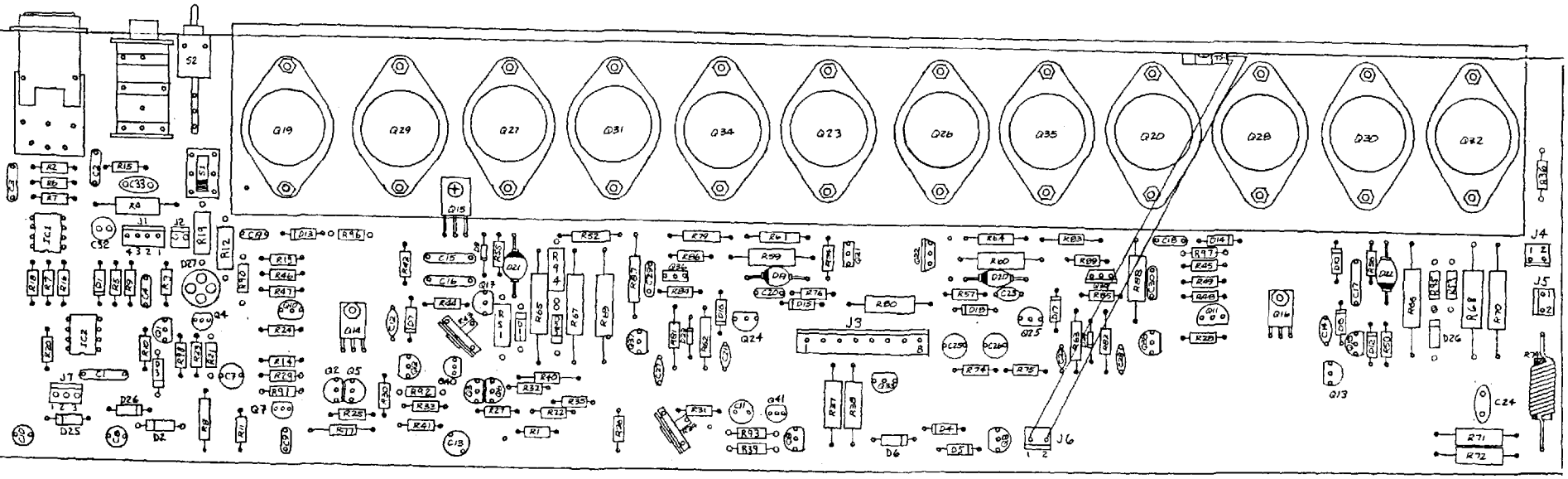
TITLE: SCHEMATIC, CHANNEL BOARD

MODEL: 1100A

DATE: MAR '87

REV. APR '87
OCT. '87
DEC. '87

ASSEMBLY NO: 502-670



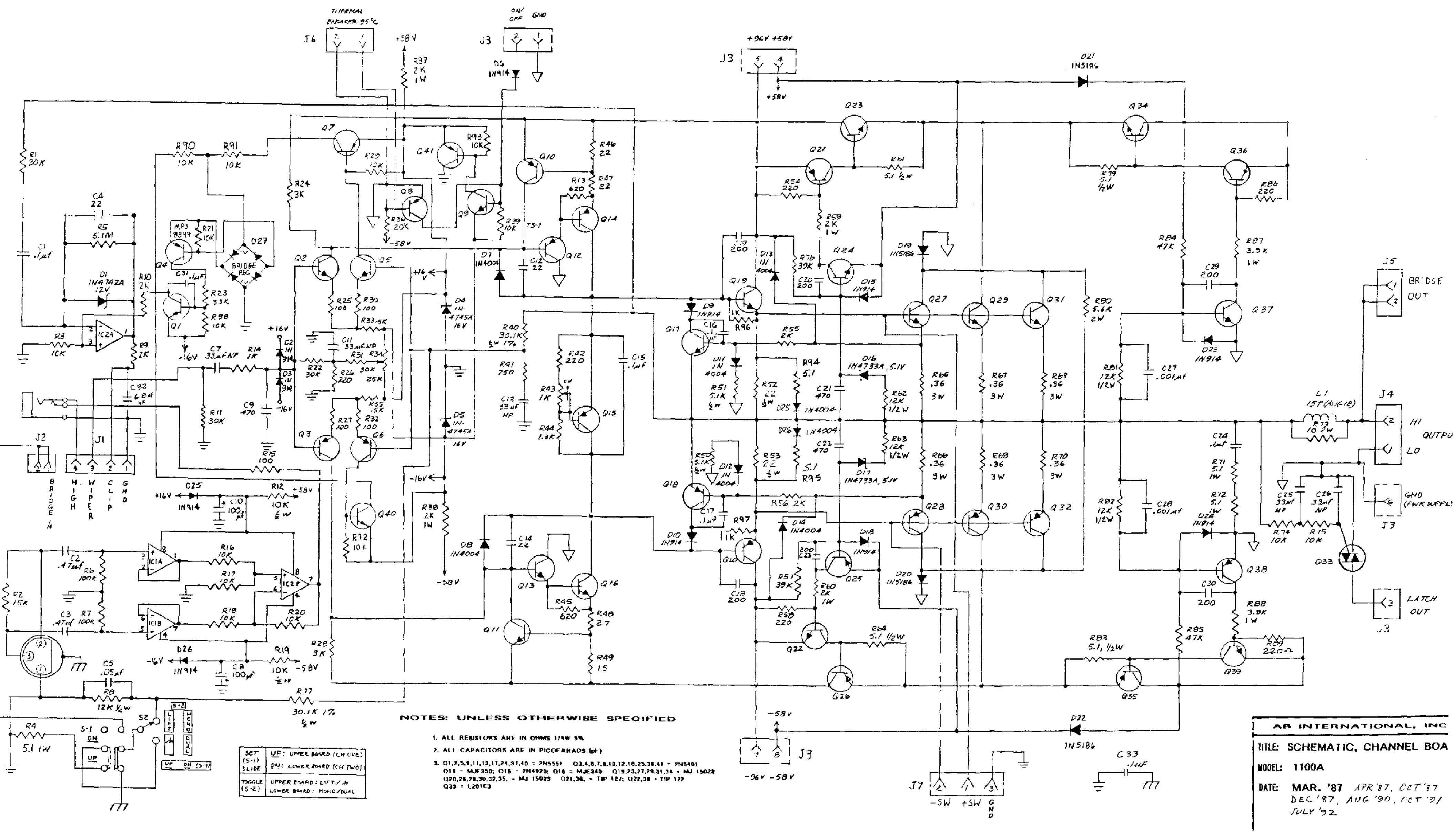
AB INTERNATIONAL, INC

ASSEMBLY PCB, 1100A

PN: 502-670 REV. F

AUG 90 JK

NOTE: 900A = 9220, 1100A = 9420



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS 1/4W 5%
2. ALL CAPACITORS ARE IN PICOFARADS (pF)
3. Q1,2,5,9,11,13,17,24,37,40 = 2N5551 Q3,4,6,7,8,10,12,18,25,38,41 = 2N5401
Q14 = MJF350; Q15 = 2N4920; Q16 = MJE340 Q19,23,27,29,31,34 = MJ 15022
Q20,26,28,30,32,35, = MJ 15023 Q21,36, = TIP 127; Q22,39 = TIP 122
Q33 = L201E3

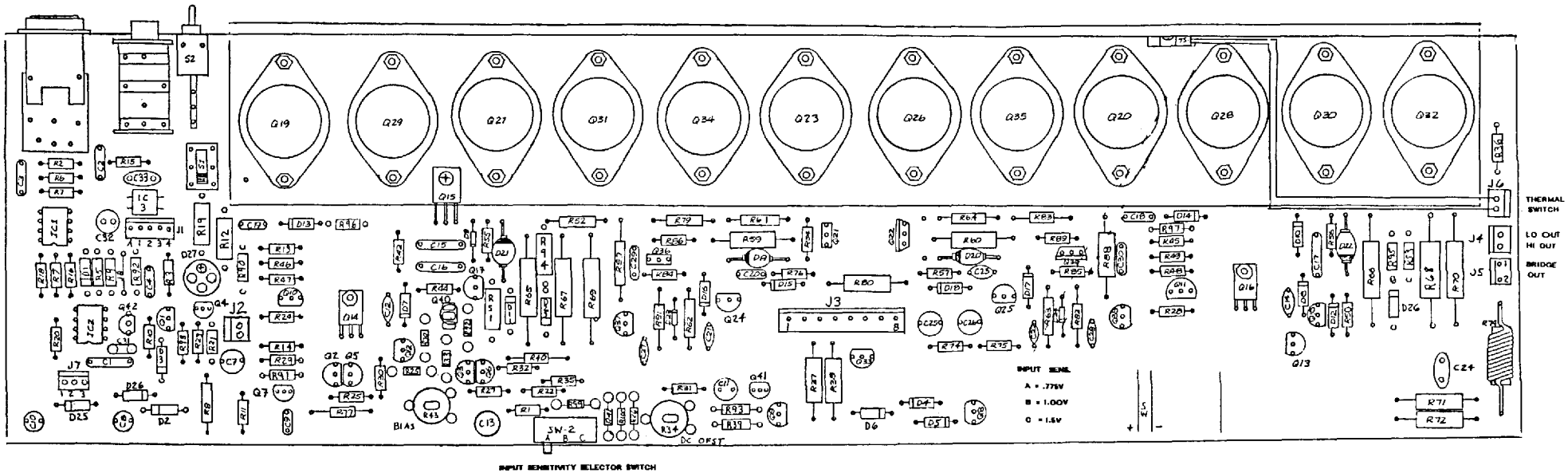
AB INTERNATIONAL, INC

TITLE: SCHEMATIC, CHANNEL BOA

MODEL: 1100A

DATE: MAR. '87 APR '87, OCT '87 DEC '87, AUG '90, OCT '91 JULY '92

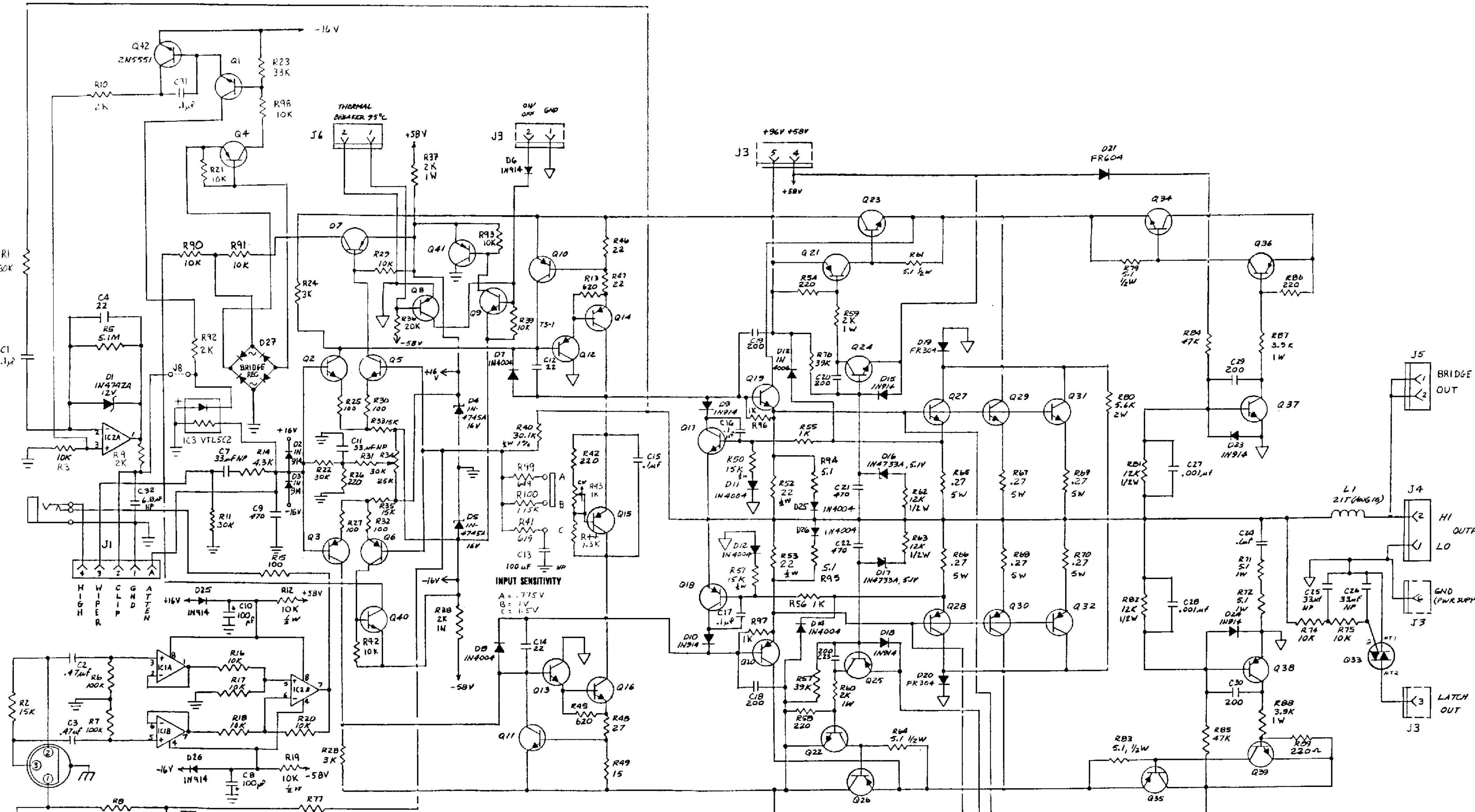
ASSEMBLY NO. 502-670 REV. F



INPUT SENSITIVITY SELECTOR SWITCH

NOTE: 1190A TO 9420 CONVERSION, REMOVE IC3 & C31, INSERT J8

AB INTERNATIONAL INC.
TITLE: ASSEMBLY 1190A , 9420
DATE: JAN 1993 JK
502-670 REV. G



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS 1/4W 5%
2. ALL CAPACITORS ARE IN PICOFARADS (pF)
3. Q1,2,5,8,11,13,17,24,37,40 = 2N5551 Q3,4,6,7,9,10,12,16,25,36,41 = 2N5401
   Q14 = MJE350; Q15 = 2N4920; Q18 = MJE340 Q19,23,27,29,31,34 = MJ 15022
   Q20,26,28,30,32,35, = MJ 15023 Q21,36, = TIP 127; Q22,39 = TIP 122
   Q33 = L201E3

NOTE: 2N5401=2N5400, 2N5551=2N5550

NOTE: 1100A TO 9420 CONVERSION, REMOVE IC3 & C31, INSERT J8

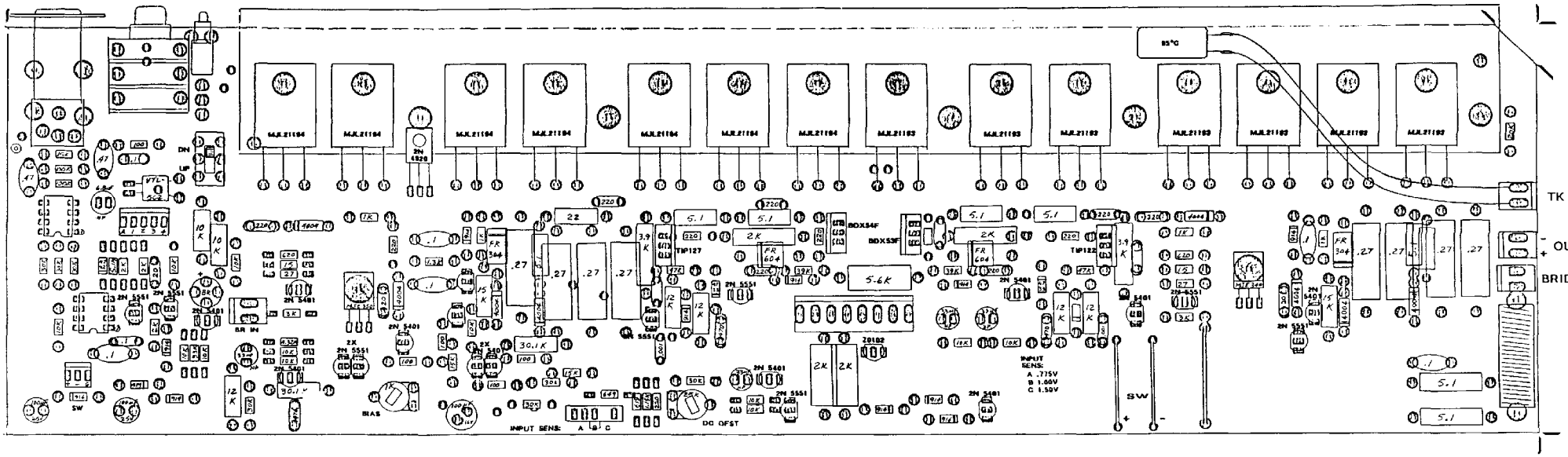
AB INTERNATIONAL, INC

TITLE: SCHEMATIC, CHANNEL BOA

MODEL: 1100A , 9420

DATE: 1-3-93, 7-28-93

ASSEMBLY NO. 502-670 REV. G

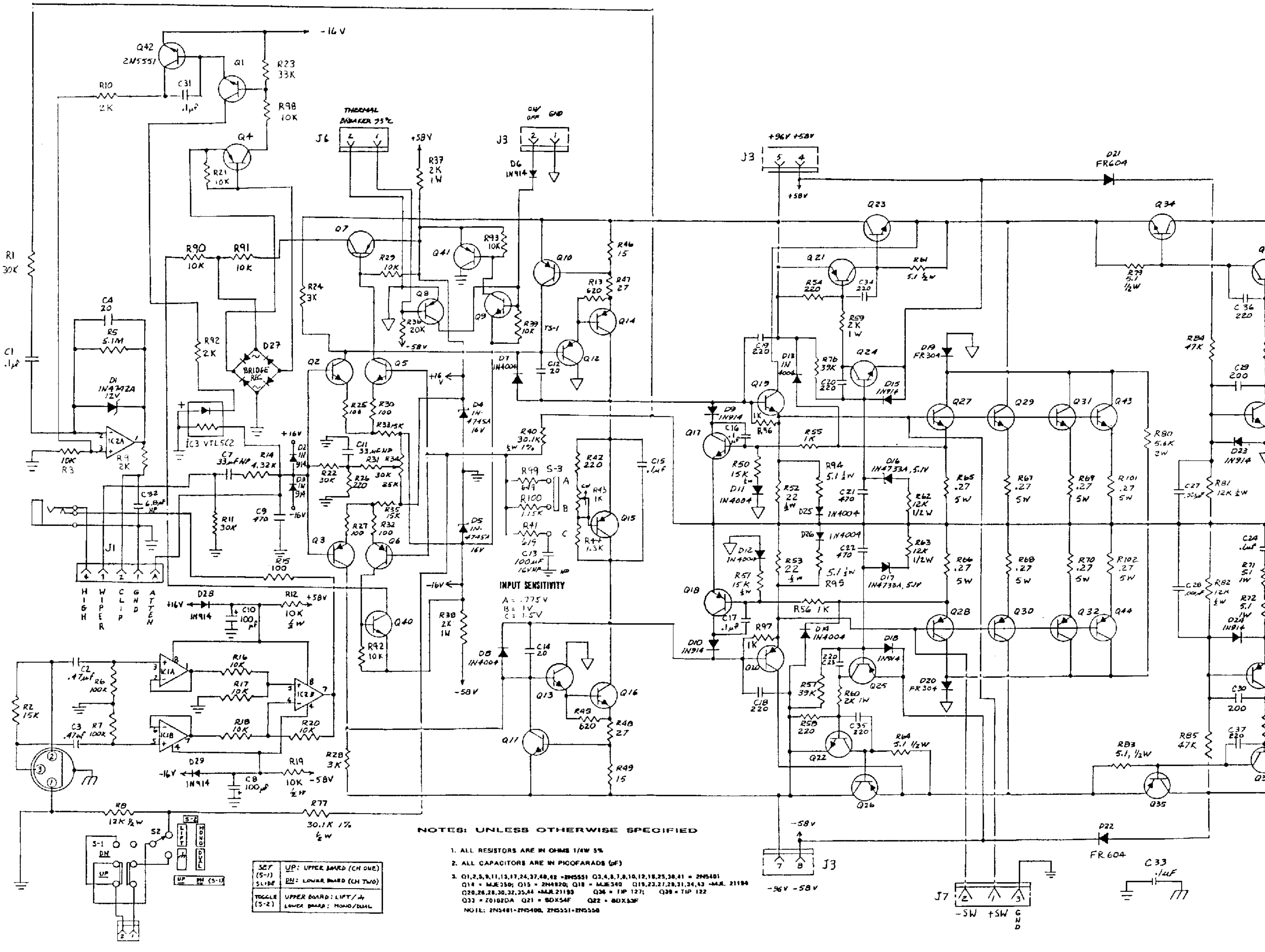


AB INTERNATIONAL, INC.

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

DATE: 9-7-94

ASSY NO.: 502-670 **REV.** J



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS 1/4W 5%
2. ALL CAPACITORS ARE IN PICOFARADS (pF)
3. Q1,2,5,9,11,13,17,24,37,40,42 = 2N5551 Q3,4,6,7,8,10,12,16,25,38,41 = 2N5401
Q14 = MJE350; Q15 = 2N4920; Q18 = MJE340 Q19,23,27,29,31,34,43 = MJL 21194
Q20,26,28,30,32,35,44 = MJL 21193 Q36 = TIP 127; Q39 = TIP 122
Q33 = Z0102DA Q21 = BDX54F Q22 = BDX53F
NOTE: 2N5401-2N5400, 2N5551-2N5550

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