

Price: \$5.00

D125 POWER AMPLIFIER  
MANUAL AND SCHEMATIC

4-12-88

**audio research corporation**

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MINNEAPOLIS, MINNESOTA 55430

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## PREFACE

Please take time to carefully read and understand the following instructions before you install or attempt to operate your D125 hybrid power amplifier. Familiarizing yourself with pertinent facts about your amplifier and its correct operating procedures will help assure you of maximum musical satisfaction and reliable operation. The effort you invest now will be well rewarded as time goes by.

## INTRODUCTION

In late 1986, Audio Research Corporation introduced its first hybrid amplifier, the M300. Combining a vacuum tube output stage with FET low-level stages, the M300 quickly established a new benchmark for dynamic realism and resolution of fine detail in music reproduction. Now, the D125 offers this technology in a stereo unit.

Like the M300, the D125 employs a transformer-coupled, vacuum tube output stage using 6550 tubes. Similarly, the low-level stages are entirely FET based, yielding lower noise and distortion and avoiding the problematic tendencies of small-signal tubes (hum, microphonics, drift, etc.).

The D125 incorporates much of the design of the M300. However, it incorporates certain user features not found in the M300 which make it even more convenient to use (and service).

## FEATURES

Power Rating. The D125 provides approximately 115 watts per channel into 4-8-16 ohm loads. Subjectively, however, many listeners will perceive the D125 as sounding much more powerful. This sense of ease and dynamic power is due in part to a massive, tightly regulated power supply and large custom power transformer, making the D125 suitable for use with speakers having complex (and difficult) impedance characteristics, including some electrostatic designs. Suitability of use with extremely low-efficiency, current-hungry designs (such as the early Apogeos) will still require careful evaluation.

Output Stage. The D125 employs four (4) 6550-type power output tubes in each channel. Each group is matched at the factory. (See instructions regarding tube replacement for further information.)

Output Stage Operating Point (Bias) Control. DC balance of the output tubes is automatically monitored and controlled by a special servo circuit. The operating point for the output tubes is set via a front panel rotary control and LED indicator (one set for each channel) on the front panel. These controls can also be used to put the tubes in a "standby" mode by turning the control fully counter-clockwise.

"Tube Saver" Circuit. The D125 employs a "Tube Saver" circuit similar to the M300 to extend vacuum tube life as well as protecting the amplifier from a variety of abnormal operating conditions which otherwise could damage tubes and other components -- conditions including a preamp malfunction, speaker short, etc. See Paragraph 7 under OPERATING PROCEDURE on Page 8 for further information.

"Low Current" Monitor. An LED indicator for each of the eight (8) output tubes is located on the main circuit board. For a normally functioning tube, these indicators will not light. However, when a tube's current is approximately 20% low, the LED will light, indicating that the tube should be replaced (either because of normal aging or because of failure). This allows the owner to monitor tube condition and replace tubes only as needed.

Cooling. The D125 has two internal fans providing forced air cooling for the output tubes. These fans are single-speed, high-quality units designed for quiet, reliable operation. A small amount of air turbulence noise is normal.

New Transformer Design. The D125 incorporates output transformers designed and built exclusively for this amplifier. Oversized cores and Audio Research® proprietary design result in extended frequency response (at both ends of the spectrum) and greater resolution of musical detail.

Automatic Muting at Shutdown. The D125 outputs are automatically muted when power is interrupted or turned off.

The D125 represents a significant improvement over our previous amplifier designs, and its superior performance will be most apparent when used with associated equipment of commensurate quality. In this regard, the finest quality front-end sources and loudspeaker systems can be used with the D125.

#### CONSTRUCTION AND TESTING

Like every Audio Research product, your D125 power amplifier has been designed and carefully handcrafted in the U.S.A., using precision mechanical parts, electronic components and assembly procedures similar to those used in the manufacture of military electronics, aircraft electronics and scientific instruments. To assure performance standards, each D125 is visually inspected at several assembly points, test run, electronically tested and sonically evaluated prior to shipment.

This time-consuming "perfectionist" approach to the design and manufacture of audio equipment is intended to provide you with the best in musical satisfaction and lasting value.

#### PACKAGING

Save all the packaging. Your Audio Research amplifier is a precision electronic instrument and should be properly cartoned any time shipment is made. Because of its weight, it is highly probable that the unit will be damaged during shipment if repackaged in cartoning other than that designed for the unit. It is also important, again because of the unit's weight, to pack each tube individually in its own carton.

You may not have occasion to return the unit to the factory for service, but if that should prove necessary, or other occasion to ship it occurs, the original packaging may save your investment from unnecessary damage, delay and expense.

REMEMBER: Remove all vacuum tubes from their sockets and package them in the individual cartons to avoid damage in shipment. Mark each tube with its "V" number so that proper relocation can occur at re-installation.



## UNPACKING

The D125 is packed within two cartons (inner and outer) which have polyfoam panels in between. Because of the weight of the unit and because it is a precision electronic instrument, it is necessary to take reasonable care in its unpacking and preparation for use.

It is best to have a large, open work area. Set the carton upright in the center of the work area and with a knife or razor blade carefully slit the taped edges of the outer carton's top flaps. Fold the flaps to the sides and while holding the inner carton in place, roll the unit upside down. You can now lift the outer carton off and set it and the foam filler panels aside. Now slit the inner carton's bottom flaps taped edges. Again, fold the flaps over and while holding the unit in, roll it over as before. You can now lift the inner carton off to find your D125 sitting upright, undamaged and uncartoned. Carefully remove the plastic wrap. Now, while you remember how, reassemble the carton system for future use. Reverse this procedure for repacking.

## ACCESSORIES

1 - Phillips screwdriver (for cover removal)

Spare Fuses:

- 2 - 3/16 Amp AGC 250V normal-blow with 100V, 120V and 220/240V units (screen)
- 2 - 6 1/4 Amp MDS 125V slo-blow with 120V units (power)
- (2 - 8 Amp MDX 125V slo-blow with 100V units [power])
- (2 - 4 Amp MDA 250V slo-blow with 220/240V units [power])

## WARNINGS

1. To prevent fire or shock hazard, do not expose your D125 to rain or moisture.
2. This unit contains voltages which can cause serious injury or death. Do not operate with covers removed. Refer servicing to your authorized Audio Research dealer or other qualified personnel.
3. The 16-gauge, 3-conductor power cord on your D125 is equipped with a standard three-prong grounding plug. If used normally, it will provide a safe earth ground connection of the chassis. Refer to the section on Grounding Instructions for detailed information.
4. For continued protection against fire hazard, replace fuses only with the same type and rating of fuses as specified at individual fuse holders.

## PREPARATION FOR USE

Your D125 amplifier is shipped with all of the vacuum tubes removed, packaged and wrapped so that they will not be broken or internally damaged in shipment. It is necessary to install these before using your amplifier.

Your D125 utilizes a total of eight (8) vacuum tubes. All are type 6550 power output tubes.

These tubes are packed separately in individual cartons located under the protective cage. It is important to carefully install these vacuum tubes in their proper locations, observing the "V" markings of each tube and their corresponding sockets. A tube location chart is included on Page 14. Proceed as follows:

1. Using the Phillips screwdriver provided, remove the top cage, momentarily setting it and the screws aside.
2. Remove the 8 tubes individually from their cartons and insert them in their proper sockets.
3. Re-install the protective cage.
4. Save the Phillips screwdriver and the vacuum tube cartons for possible future use. Storing these items within the D125 packaging carton is a good way to assure finding them again.

#### FRONT PANEL CONTROLS

The front panel has:

- |                    |   |
|--------------------|---|
| 1 Switch:          | Power Line On-Off   |
| 2 Fuse Holders:    | 1 - Power Line<br>1 - Screen  |
| 4 Indicators:      | 1 - Power "ON" (Green)<br>1 - Tube Current Adjustment - Right (Green)<br>1 - Tube Current Adjustment - Left (Green)<br>1 - Screen Power (Green) |
| 2 Rotary Controls: | 1 - Tube Current Adjustment - Right Channel<br>1 - Tube Current Adjustment - Left Channel   |

#### USE OF CONTROLS

Power-On Switch. Initiates/terminates AC line power to the amplifier. Function indicated by green LED at right of toggle switch.

Power Line LED Indicator. The line indicator should be illuminated whenever the amplifier is connected to a power source, the line fuse is intact and the Power Switch is set to "On."

Screen Current LED Indicator. Located next to the Screen Fuse Holder, the Screen Current Indicator will be illuminated whenever the amplifier power is "On" and the screen fuse is intact. If the Indicator should fail to illuminate or go out, replace the screen fuse (see Fuse Replacement under SERVICING). If the Indicator repeatedly fails to light, contact your authorized Audio Research dealer for possible service. (Also note that if the amplifier is driven into extreme clipping, the Screen Current Indicator may momentarily dim. Reduce playback level at the pre-amplifier to avoid possible damage to loudspeakers.)

Tube Current Adjustment Controls. Two such controls, each with a corresponding green LED indicator, are provided -- one for the right channel, one for the left. These controls allow you to adjust, within a pre-set range, the current of each bank of four (4) output tubes -- the advantage being that you will be able to continuously optimize the sonic performance of the tubes as they "age" over their normal lifespan (approximately 2000 hours in normal use).

Rotating these controls in a clockwise (i.e., right-hand) direction increases the current level; counter-clockwise rotation decreases the current level. For optimum performance within the operating parameters of each tube bank, the controls should be rotated -- after about ten (10) minutes of warmup time, with no signal being passed -- until each corresponding LED has reached the approximate center of its "on" region. To the left of this position, current levels will be too low to yield best performance; to the right, the tubes will run at higher current and their life expectancy will be reduced proportionally. Note that the center position may differ between the two controls. This is because the bias-monitoring circuitry of the D125 is sensing the optimum current parameters for each bank of output tubes, and every group of tubes will vary slightly as to their performance characteristics.

To use these controls and put the amplifier in a "standby" mode (i.e., for low current draw when the amplifier is "on" but not in use), simply rotate the controls counter-clockwise. When you are ready to play music, simply adjust the controls to the approximate center of their illuminated region once again.

Tube Current LED Indicators. Normally, the Tube Current Indicators ("TCI") should light within five (5) minutes after the amplifier has been turned on. If an Indicator fails to light within the allotted time, rotate its corresponding adjustment control to the center of the illuminated "on" region. (If the Indicator repeatedly requires readjustment or fails to light at all, turn the Control fully counter-clockwise and contact your authorized Audio Research dealer to arrange for possible service.)

When the amplifier is passing a musical signal, these front panel Current Indicators will remain on during low-level operation. At medium levels, they will flicker. At full power or "clipping," the Indicators will blink out momentarily then re-illuminate when the playback level drops. When no music signal is present, the Indicators should remain lit in their pre-set "On" position.

## INSTALLATION

To insure normal component life and safe operation this unit must be operated only in a horizontal (upright) position. Adequate air flow and proper cooling thereby can occur only if there is no restriction below, behind and above the unit.

The five (5) special non-marring elastomer feet provide adequate spacing only from a smooth, hard surface. Never operate the unit while it is sitting on a surface such as a rug or carpet.

If the unit is to be operated in an enclosure such as an equipment rack, make certain that adequate air flow above and below the unit is provided. the "ambient" operating temperature should never exceed 120°F or 49°C. Audio Research Corporation Rack Mount Ventilators (RMV3) should be used above and below each unit. Improper installation will cause premature tube and other component failure and will affect your Warranty, as well as the service life of the unit.

It is normal for a vacuum tube power amplifier to run quite "warm," and if used for prolonged periods, "hot" to the touch. All components within are, however, operated at safe, conservative levels and will not be improperly affected thereby, providing the requirements outlined above are adhered to.

Please contact your authorized Audio Research dealer or Audio Research Customer Service Department if you have any questions about, or problems installing or using your D125.

### CONNECTION INSTRUCTIONS

The rear panel has:

2 Input Connectors: Right and Left Channels

2 Output Terminal Strips: Right and Left Channels

1 Mute-Operate Switch (both channels)

Power Cord with 3-Prong Grounding Plug

IMPORTANT: Use the best available speaker wires and interconnects. Audio Research cannot emphasize this enough. As better components and systems are developed it becomes increasingly important to avoid the limitations of inferior system interconnections. For best results we recommend Audio Research High Definition® speaker cables and interconnects.

Audio Research uses circuitry called "partial cathode coupling" in all of its vacuum tube and hybrid power amplifier designs. This requires the 4 ohm taps of the D125's outputs to be grounded (internally). This is of no consequence when using most loudspeakers. Simply connect the "negative" speaker lead to "0" and the "positive" speaker lead to 4, 8 or 16 ohms, as required.

Some loudspeakers, however, including the Polk SDAs, Infinity RS-1 Series, IRS Beta Series and possibly some electrostatic designs have "common ground" systems, either by hookup between the speakers or in a special crossover device. Most headphone adaptor boxes also have a common ground. In these instances it is important to connect the "negative" speaker leads (or headphone common leads) to the "4" ohm taps rather than the "0" ohm taps to avoid shorting the amplifier or causing monaural performance to occur. Use either "0" ohms or "16" ohms for the "positive" speaker leads. (The "0" ohm tap will provide an inverted signal. Contact your authorized Audio Research dealer or Audio Research Customer Service Department for help with these special cases.)

It is important sonically that your entire system be connected so that the audio signal arriving at the speakers has correct, or "absolute" polarity (i.e., non-inverted). Connect the black or "-" speaker terminal to the wire that connects to the "0" terminal on the D125. Connect the red or "+" speaker terminal to the wire that connects to the "4," "8" or "16" terminal on the D125. Use the best available speaker cables and tighten the screw terminals securely with a large screwdriver to ensure best sonic results.

Matching. It is important to match as closely as possible the impedance of the amplifier and speakers for optimum transfer of power to the speaker with minimum distortion. In the case of speaker systems with significant variations in impedance throughout the frequency spectrum, such as most electrostatic types, determine the best impedance match by listening for the best overall sonic results.

Connect the D125 input to the preamplifier or electronic crossover, using only the highest grade of audio interconnect cables. To avoid sonic degradation use the shortest practical length of cables.

AC Power Connections. It is essential that the D125 amplifier be connected to a wall AC power receptacle, or a similar heavy-duty source. It must not be connected to convenience receptacles on preamplifiers, etc., or the full sonic capabilities of both the D125 and the preamplifier will be compromised. Furthermore, the proper control of start-up surges will not occur unless the power switch on the front of the D125 is actually used for on/off control.

For the very best performance with 100 or 120 volt circuits, the D125 should be connected to its own AC power circuit branch, protected by a 20 amp breaker. The preamplifier and other audio equipment should be connected to a different power circuit and breaker. Avoid the use of extension cords. If they must be used on a temporary basis, use 14 gauge or heavier cords.

The D125 utilizes a compatible grounding system that generally does not require a "ground lifter" adapter plug on the AC power cord to minimize hum. The power cord on your D125 has a standard three-prong grounding plug to provide maximum safety when it is connected to a grounded wall receptacle. If there is any question regarding the safety of grounding procedures, be certain to seek competent help with the installation.

If an electronic crossover or other AC powered equipment is used with the D125, it may be necessary to use "ground lifter" adapters on the power plugs on such equipment to minimize system hum. Generally, the lowest hum is achieved when the only direct connection between audio common "ground" and true earth ground occurs in the preamplifier, through its grounded power cord. Other equipment in the system should have some form of isolation to prevent ground loops and associated hum.

Always place the power on-off switch on the front of the D125 in the OFF position before connecting the power line cord to AC power.

#### OPERATING PROCEDURE

1. Make sure you have read and complied with the INSTALLATION and CONNECTIONS instructions prior to attempting operation.
2. Make sure your D125 power amplifier is properly connected to a 20 ampere power (10 amp/220/240V) receptacle via the attached power cord (see CONNECTIONS).
3. Your preamplifier should be "On" and set to "Mute" or at minimum gain.
4. Turn the POWER switch from "Off" to "Power." The green "Power" LED indicator should begin glowing immediately. Also, the green "Screen" fuse LED should also light, indicating proper operation of the high-voltage circuits. Note: If the "Power" or "Screen" indicators LEDs fail to light, turn the "Power" switch to "off" and check the appropriate fuses for possible failure. Extra fuses for both powerline and screen circuits are packed with your D125. (Be sure the unit is connected to the power line.)



5. The Tube Current Indicator LEDs will normally not illuminate until the amplifier has fully stabilized and the preset current levels have been reached -- normally, the indicators will begin to come on after about two to four (2-4) minutes of warmup time. About ten (10) minutes or more of stabilization time is required for the Current Indicators to indicate in the center of the operating region of the previously set levels. Note that any retrimming of the Current Controls should be done only after the amplifier has fully warmed up and stabilized, to insure maximum sonic performance.

6. Your D125 may function safely within 30 seconds of turn-on, but to achieve acceptable levels of sonic performance, fifteen (15) minutes or so of warmup time is recommended. The amplifier will continue to improve over the first hour or more of operation, as full thermal equilibrium occurs.

7. "Tube Saver" Circuit Operation. In the event of a vacuum-tube defect, excessive subsonic input to the amplifier, a short at the speaker output or other overload, your D125 has a sophisticated protection circuit designed to prevent damage to the amplifier. This protection circuit responds "instantaneously" to the event onset. If the problem is sustained for approximately 10 milliseconds or more, the screen fuse will "blow," and its associated LED will go out. In this event, you should turn the amplifier off, replace the screen fuse with one of the extras provided (see ADJUSTMENT PROCEDURE -- Fuse Replacement), then turn the amplifier on. At this point it would also be advisable to check the eight LED indicators on the main circuit board (they can be seen by looking down through the top of the cover at the rear of the amplifier), to determine whether or not all the tubes are still operating normally. If an LED remains lighted after 5 to 10 minutes, it is an indication that the tube at that location has been seriously weakened and should be replaced (see ADJUSTMENT PROCEDURE -- Tube Replacement).

8. Make sure the "Mute-Operate" Switch on the rear panel is placed in the "Operate" position.

#### ADJUSTMENT PROCEDURE

These adjustments are factory set and should not require readjustment except in the event of a circuit malfunction or component replacement. These are not user adjustments and are not usually required when changing tubes.

Adjustment should be attempted only by a qualified technician with 4.5 digit digital voltmeter with .01mV DC resolution (200mV range). (A 3.5 digit DVM may be used on a temporary basis, but servo calibration will be less accurate.)

WARNING. These adjustments involve measurements of circuits that are at 420 Volts DC above chassis potential, with large energy storage. Use extreme care to avoid shock hazard and to avoid damage to the D125 or to your meter due to careless use of test leads. All meter test lead connections must be isolated from chassis or earth ground. Start with the meter on its highest range before making connections, and then select the 200mV DC range.

A. TUBE CURRENT INDICATOR (TCI) CALIBRATION. (See Chart on Page 15 for location of RV4 L, R; RV5 L, R)

1. Remove top and bottom covers.
2. Allow 10-20 minutes warmup to stabilize tube current.
3. Connect DVM between TP2 and TP5 (see Tube Chart on Page 14 for location).
4. Adjust left channel front current control for 62mVDC meter indication.
5. Adjust RV4L so that front current LED just lights.
6. Readjust left channel front current control for 68mVDC meter indication.
7. Adjust RV5L so that front current LED just lights.
8. Repeat for right channel measuring between TP4 and TP5, and adjusting RV4R and RV5R. If LEDs do not light, try adjusting RV4 CCW and RV5 fully CW and try again.

B. SERVO BALANCE CALIBRATION.

1. Install bottom cover so that unit is resting upright on its rubber feet, on a hard surface for normal ventilation. Leave top cover off.
2. Set front current controls in the middle of their operating range.
3. Allow 20-30 minutes undisturbed warmup to fully stabilize tube current and servo circuit temperatures. This is very important for accurate calibration.
4. Connect DVM between TP1 and TP2.
5. Adjust 15 turn trimmer through hole in the left side of the chassis just behind the front panel. Use a small screwdriver with a 0.1" side blade. An insulated screwdriver is not necessary. Adjust for less than 0.1mVDC indication. Response is very slow, and it may take 20-30 seconds for the reading to stabilize after adjustment. Some fluctuation is normal, so use the average reading.
6. Repeat for the right channel using TP3 and TP4, and the right side trimmer.

NOTE: There is some interaction between TCI and servo calibrations, so if the unit was badly misadjusted, recheck the entire procedure to insure proper results.

SERVICING

Because of its careful design and exacting standards of manufacture, your D125 amplifier should normally require only reasonable service to maintain its high level of performance. Some authorized Audio Research dealers provide service. Contact Audio Research Customer Service Department for any needed help.

CAUTION: The D125 amplifier contains sufficient levels of voltage and current internally to cause fatal shock. Do not tamper with components or parts inside the unit. Even with the power turned off, a charge remains in the energy storage capacitors for a significant period of time. Refer any needed service to your authorized Audio Research dealer or other qualified technician.

Fuse Replacement. If either the "Power" or "Screen" LEDs are extinguished during normal operation, the amplifier should be turned off before replacement of either fuse is attempted. After setting the Power Switch to "off," unscrew the fuseholder cap, remove and discard the blown fuse and replace it with one of the same ratings. Replace the fuseholder cap and secure. Never employ fuses with values other than those specified for your D125.

Once the fuse has been replaced, turn the amplifier on. Normal operation should resume. If the same fuse repeatedly blows, service by a qualified technician is indicated.

Low-Current Monitors ("LCM"). Eight (8) low current (LED) indicators, one for each output tube, are provided. These are located on the main circuit board, visible at the rear of the amplifier through the perforated top cover. When the amplifier is powered "On," warmed up and not passing a music signal, these Indicators will normally not be lit. If an Indicator is "on" under these conditions, its corresponding output tube has low current and should be replaced (see Tube Replacement under SERVICING). When music is played through the amplifier, these lights will normally blink "on" and "off."

Tube Replacement. The eight (8) power output tubes installed in your D125 are high-quality type 6550 vacuum tubes, individually tested and matched by Audio Research. In general (i.e., with non-abusive use), these tubes should provide approximately 2000 hours of service before replacement is required (this is somewhat dependent upon speaker efficiency, playback levels normally reached and choice of program material; and is definitely dependent upon proper installation and cooling).

If replacing an individual 6550 tube, simply give the 6-digit number on the label (on the base of the tube) to your dealer, technician or Audio Research Customer Service Department. They can then supply or order an appropriate replacement for you.

If replacing one or both quad banks of tubes, ordering them through Audio Research will assure uniform performance characteristics for each bank. While the tubes in each bank need not be exactly matched, doing so will insure the best possible performance.

To replace a tube, first unplug the amplifier from the wall receptacle. Then, using the Phillips-head screwdriver provided, unscrew the top cover fasteners, carefully remove the top cover and set it aside.

Carefully remove the defective tube and discard it. Take the new tube and, looking at its base, orient the tube correctly to its socket, making sure the center keying pin correctly fits the notched center pin socket. The tube should provide some resistance as it is pushed into place. The "fit" should be firm, though not absolutely rigid. Replace the topcover, tighten the fasteners, and connect the amplifier to the wall receptacle. The amplifier may now be turned on and allowed to warm up and stabilize before resetting the Tube Current Control for the channel.

Any questions regarding the operation, maintenance or servicing of your D125 amplifier may be referred to your authorized Audio Research dealer or to the Customer Service Department of Audio Research: Telephone number 612/566-7570.



## CLEANING

To maintain the visual appearance of your D125 amplifier, occasionally wipe the front panel and top cover surfaces with a soft, damp (not wet) cloth to remove dust. A mild, non-alkaline soap solution may be used to remove fingerprints or similar smudges. Cleaners containing abrasives should not be used as they will damage the "brushed" grain of the front panel finish.

## 3-YEAR LIMITED WARRANTY TERMS AND CONDITIONS

1. LIMITED WARRANTY. Audio Research warrants the product designated herein to be free of manufacturing defects in material and workmanship, subject to the conditions hereinafter set forth, for a period of three (3) years from the date of purchase by the original purchaser or no later than five (5) years from the date of shipment to the authorized Audio Research dealer, whichever comes first, excepting vacuum tubes which are warranted for 90 days only (See 6).
2. CONDITIONS. This Warranty is subject to the following conditions and limitations. The Warranty is void and inapplicable if the product has been used or handled other than in accordance with the instructions in the owner's manual, abused or misused, damaged by accident or neglect or in being transported, or the defect is due to the product being repaired or tampered with by anyone other than Audio Research or an authorized Audio Research repair center. The product must be packed and returned to Audio Research or an authorized Audio Research repair center by the customer at his or her sole expense. Audio Research will pay return freight of its choice. A RETURNED PRODUCT MUST BE ACCOMPANIED BY A WRITTEN DESCRIPTION OF THE DEFECT AND A PHOTOCOPY OF THE ORIGINAL PURCHASE RECEIPT. This receipt must clearly list model and serial number, the date of purchase, the name and address of the purchaser and authorized dealer and the price paid by the purchaser. Audio Research reserves the right to modify the design of any product without obligation to purchasers of previously manufactured products and to change the prices or specifications of any product without notice or obligation to any person.
3. REMEDY. In the event the above product fails to meet the above Warranty and the above conditions have been met, the purchaser's sole remedy under this Limited Warranty shall be to return the product to Audio Research or an authorized Audio Research repair center where the defect will be rectified without charge for parts or labor, except vacuum tubes (See 6).
4. LIMITED TO ORIGINAL PURCHASER. This Warranty is for the sole benefit of the original purchaser of the covered product and shall not be transferred to a subsequent purchaser of the product.
5. DURATION OF WARRANTY. This Warranty expires on the third anniversary of the date of purchase or no later than the fifth anniversary of the date of shipment to the authorized Audio Research dealer, whichever comes first.
6. VACUUM TUBES. Vacuum tubes are warranted for the original 90-day period only.

7. DEMONSTRATION EQUIPMENT. Equipment used by an authorized dealer for demonstration purposes is warranted to be free of manufacturing defects in materials and workmanship for a period of three (3) years from the date of shipment to the dealer. Vacuum tubes are warranted for 90 days. Demo equipment needing warranty service must be packed and returned to Audio Research by the dealer at his sole expense. Audio Research will pay return freight of its choice. A returned product must be accompanied by a written description of the defect on an AUDIO RESEARCH RETURNED GOODS AUTHORIZATION form. Dealer-owned demonstration equipment sold at retail within three (3) years of date of shipment to the dealer is warranted to the first retail customer to be free of manufacturing defects in materials and workmanship for the duration of the 3-Year Limited Warranty remaining (as measured from the date of shipment of the equipment to the dealer). Vacuum tubes are not warranted for any period under these conditions of sale. In the event warranty service is needed under these conditions, the owner of the equipment must provide a copy of his purchase receipt, fulfilling the requirements described under "2. Conditions" above. The product must be packed and returned to Audio Research or an authorized Audio Research repair center by the customer at his or her sole expense. Audio Research will pay return freight of its choice.

8. MISCELLANEOUS. ANY IMPLIED WARRANTIES RELATING TO THE ABOVE PRODUCT SHALL BE LIMITED TO THE DURATION OF THIS WARRANTY. THE WARRANTY DOES NOT EXTEND TO ANY INCIDENTAL OR CONSEQUENTIAL COSTS OR DAMAGES TO THE PURCHASER. Some states do not allow limitations on how long an implied warranty lasts or an exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

9. WARRANTOR. Inquiries regarding the above Limited Warranty may be sent to the following address:

Audio Research Corporation  
6801 Shingle Creek Parkway  
Minneapolis, MN 55430

#### WARRANTY OUTSIDE THE USA

Audio Research has formal distribution in many of the countries of the free world. In each country the Audio Research Importer has contractually accepted the responsibility for product warranty. Warranty should normally be obtained from the importing dealer or distributor from whom you obtain your product.

In the unlikely event of service need beyond the capability of the Importer, Audio Research does, of course, back up the warranty. Such product would need to be returned to Audio Research, together with a photostatic copy of the bill of sale.

D125 PRELIMINARY SPECIFICATIONS (AC line set @120V 60Hz for these specifications)

Power Output:

110 watts per channel minimum continuous (both channels operating) at 16 ohms from 20Hz to 20kHz with less than .4% total harmonic distortion (typically below .005% at 1 watt)

Approximate actual power available per channel

at "clipping" (both channels operating, 1kHz): 115 watts

(Note that actual power output is dependent upon both line voltage and "condition" i.e., if power line has high distortion, maximum power will be affected adversely, although from a listening standpoint this is not very critical.)

Power Bandwidth:

(-3dB Points) 10Hz to 80kHz

Input Sensitivity:

0.7V RMS for rated outputs

Input Impedance:

100K ohms, nominal

Output Regulation:

Approximately 0.4dB, 16 ohm load to open circuit  
(Damping factor approximately 20)

Negative Feedback:

21dB

Slew Rate:

20 volts/microsecond

Rise Time:

3 microseconds

Hum & Noise

90dB below rated output -- less than 2mV RMS -- (Broad-bandwidth unweighted, inputs muted)

Power Supply Energy Storage:

Approximately 280 joules

Power Requirements:

105-125VAC 60Hz (210-250VAC 50Hz) 1000 watts maximum  
400 watts at "idle"

Dimensions:

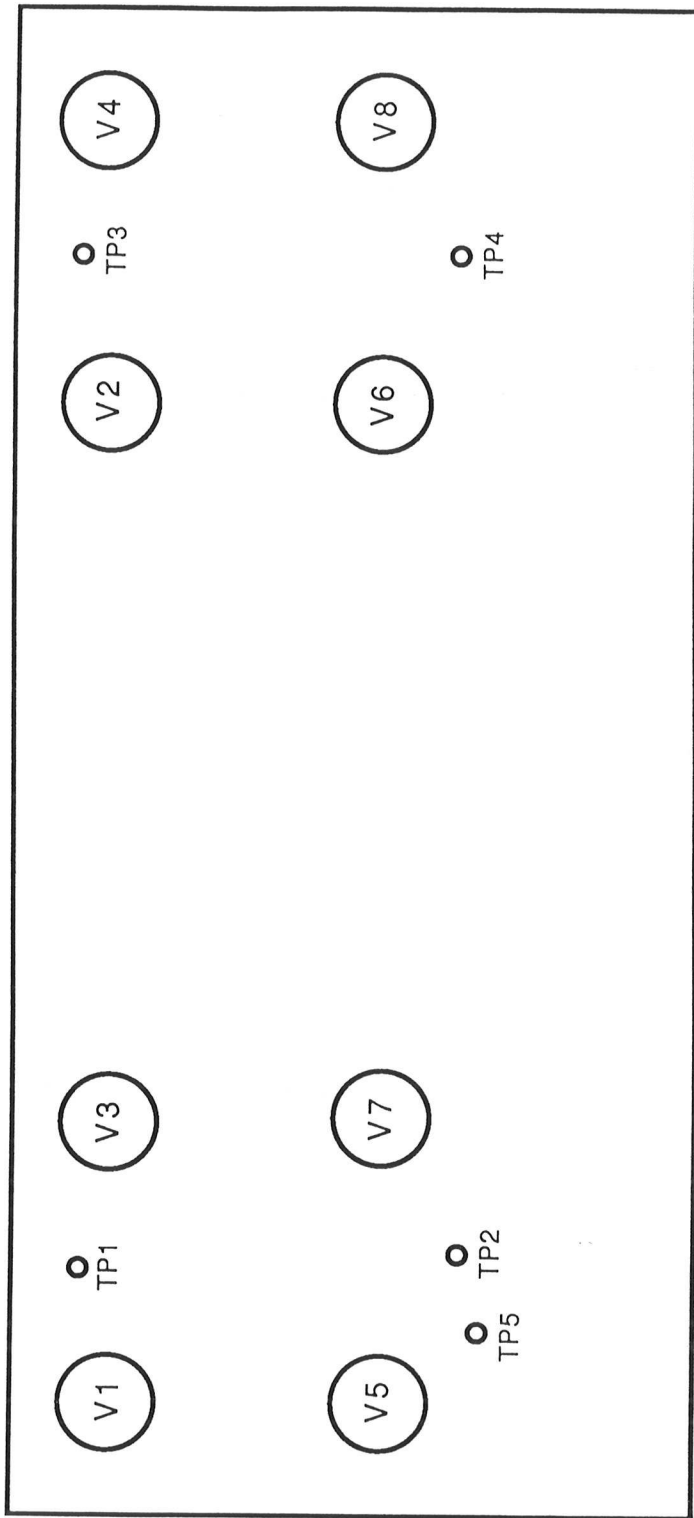
19" (48 cm) W (standard rack panel x 8 3/4" (22.2 cm) H x 16.5" (42 cm) D (front panel back). Handles extend 1 5/8" (4.1 cm) forward of the front panel.

Weight:

84 lbs. (38 kg) Net; 95 lbs. (45.5 kg) Shipping

Tubes Required:

4 - Matched Pair 6550 (low gas) Power Output



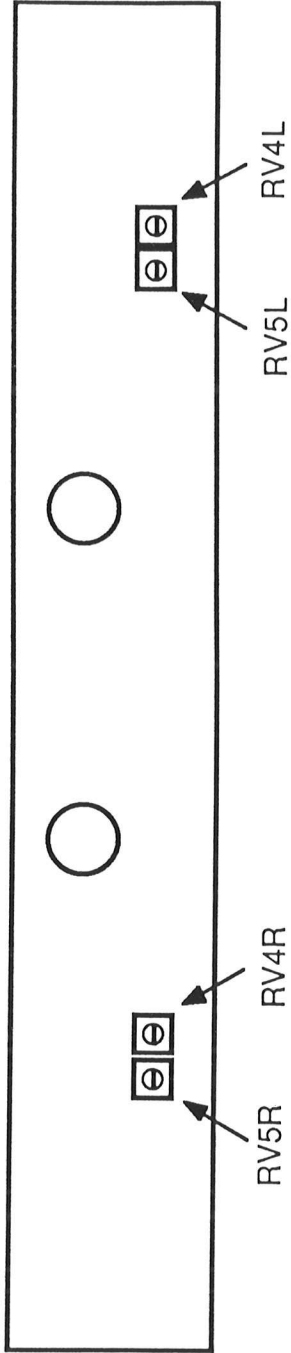
D125 TUBE AND TEST POINT LOCATION CHART

MAIN PWB VIEWED FROM THE FRONT OF THE AMPLIFIER

ALL TUBES TYPE 6550 (LOW GAS CONTENT TUBES ARE STRONGLY RECOMMENDED AND ARE AVAILABLE FROM AUDIO RESEARCH CORPORATION)

(BEST SONIC RESULTS AND LONGEST TUBE LIFE WILL OCCUR WHEN V1, V3, V5, V7 AND V2, V4, V6, V8 ARE REASONABLY CLOSELY MATCHED)

TOP EDGE



FRONT PANEL CONTROL BOARD

VIEWED FROM THE REAR OF THE AMPLIFIER

DO NOT CHANGE THESE ADJUSTMENT SETTINGS UNLESS YOU HAVE READ AND UNDERSTAND THE INSTRUCTIONS REGARDING THEM FROM THE MANUAL AND HAVE THE NECESSARY TECHNICAL SKILLS AND TEST EQUIPMENT TO PROPERLY ACCOMPLISH READJUSTMENT.

D125 TUBE CURRENT INDICATOR CALIBRATION ADJUSTMENTS LOCATION

MODEL D 125  
STEREO POWER AMPLIFIER  
SCHEMATIC & PARTS LIST

10-13-89

**audio research corporation**

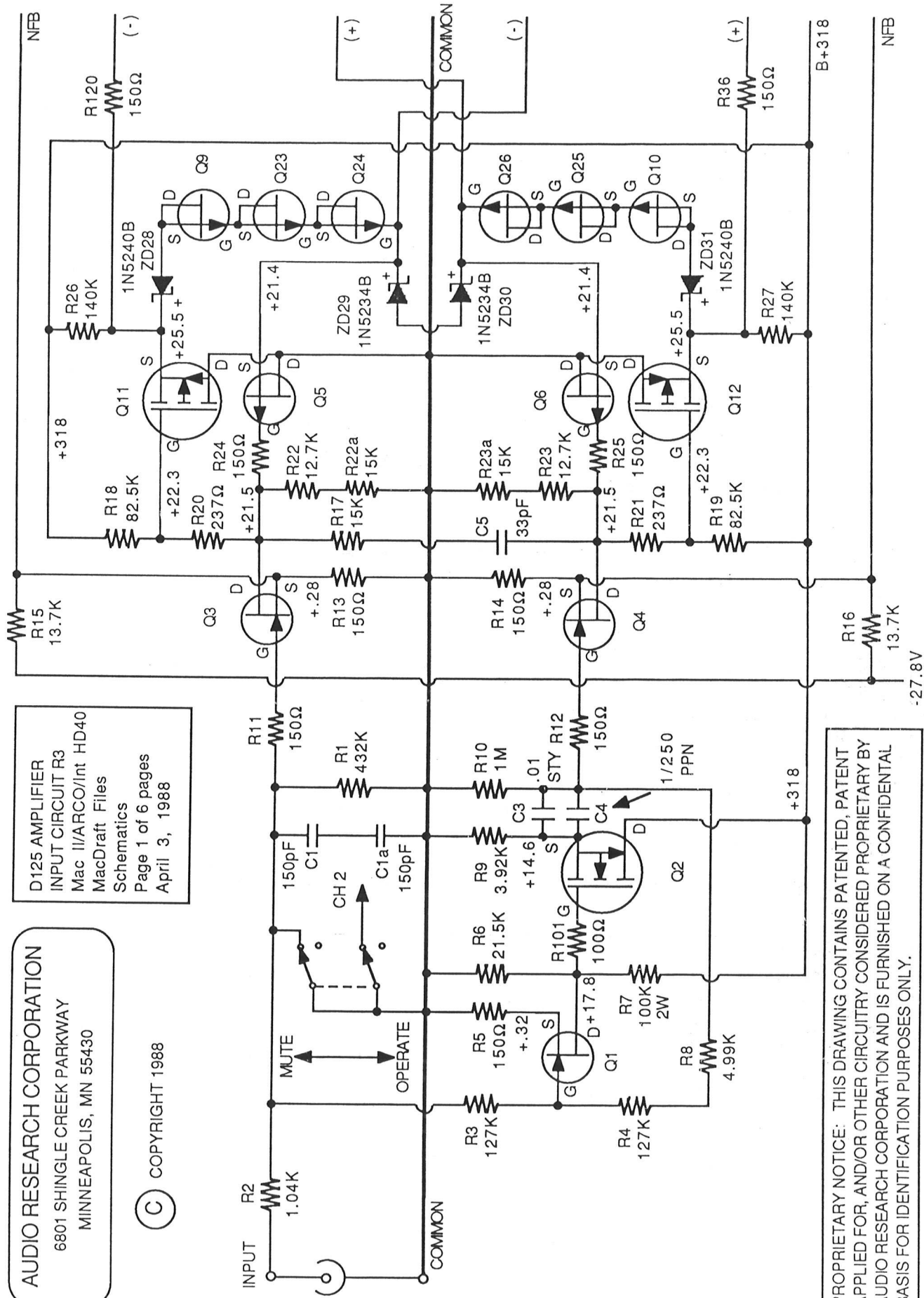
6801 SHINGLE CREEK PARKWAY  
MINNEAPOLIS, MINNESOTA 55430

**AUDIO RESEARCH CORPORATION**

6801 SHINGLE CREEK PARKWAY  
MINNEAPOLIS, MN 55430

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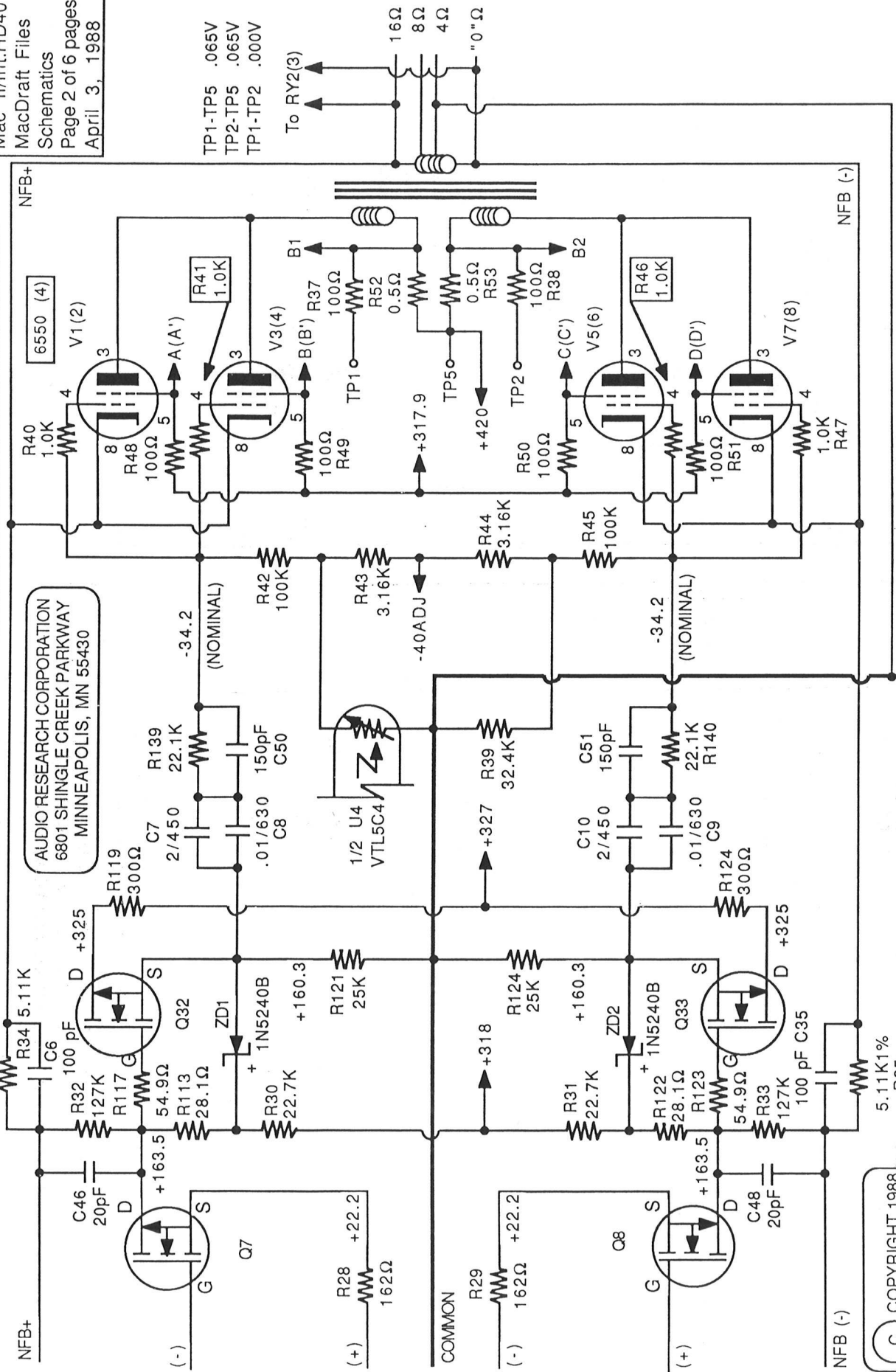
D125 AMPLIFIER  
INPUT CIRCUIT R3  
Mac II/ARCO/Int HD40  
MacDraft Files  
Schematics  
Page 1 of 6 pages  
April 3, 1988



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D125 AMPLIFIER DRIVER/OUTPUT  
 Mac II/Int.HD40  
 MacDraft Files  
 Schematics  
 Page 2 of 6 pages  
 April 3, 1988



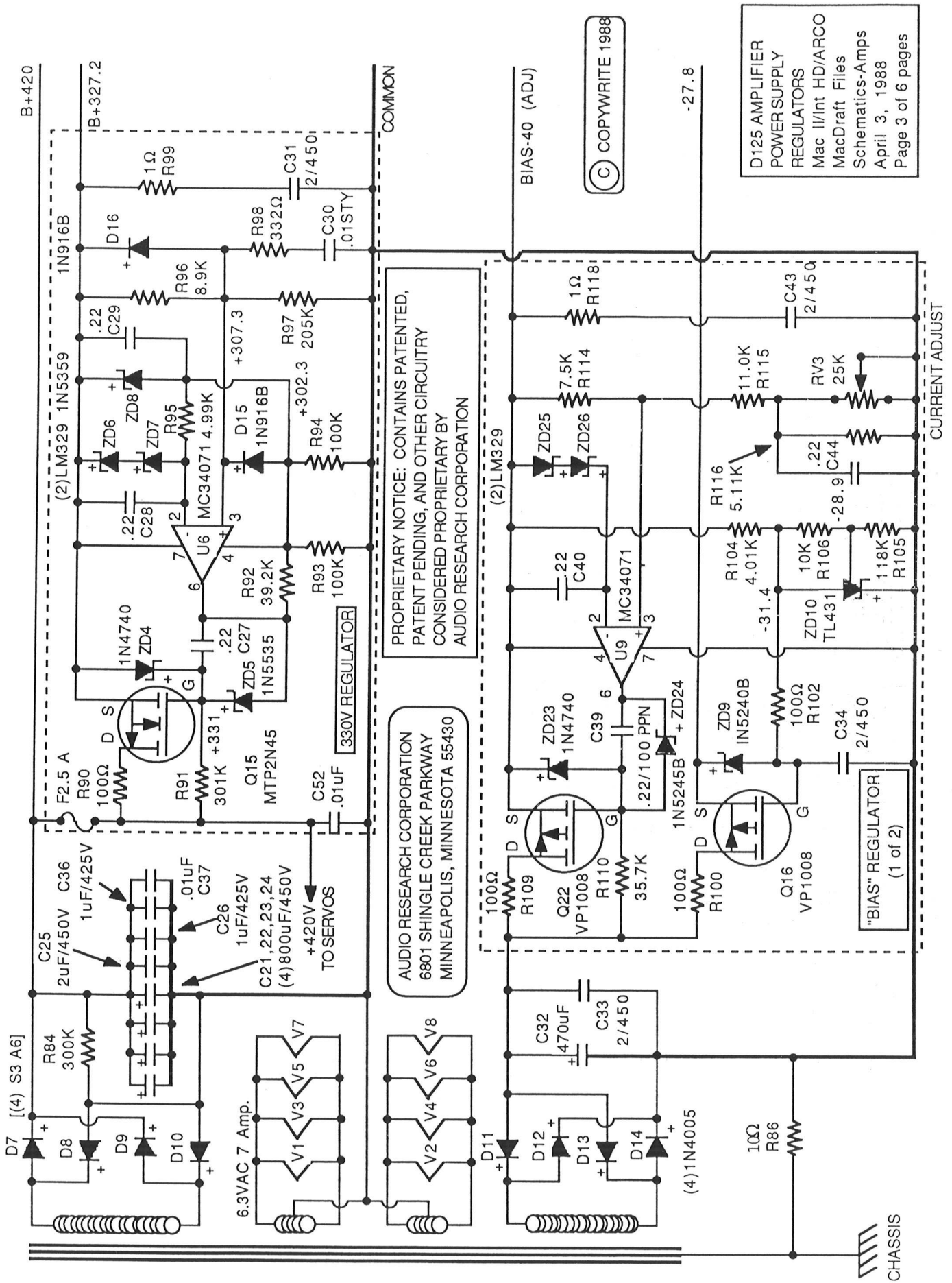
NOTE: 4Ω TAPS ARE GROUNDED. AVOID COMMON GROUND USE AND TESTIN

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TP1-TP5 .065V  
 TP2-TP5 .065V  
 TP1-TP2 .000V

To RY2(3)  
 16Ω  
 8Ω  
 4Ω  
 "0"Ω





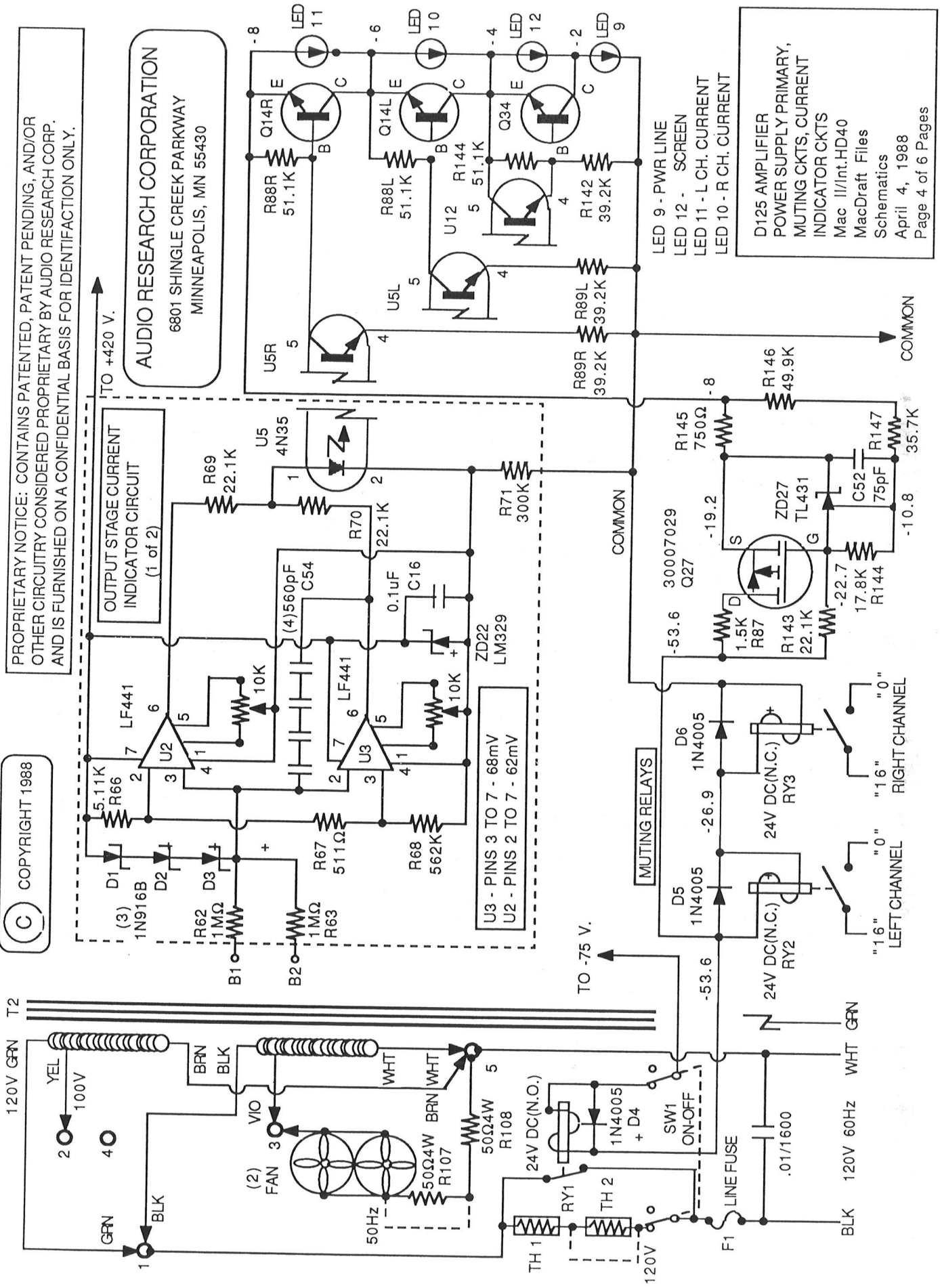
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D125 AMPLIFIER  
POWER SUPPLY  
REGULATORS  
Mac II/Int HD/ARCO  
MacDraft Files  
Schematics-Amps  
April 3, 1988  
Page 3 of 6 pages

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MINNEAPOLIS, MN 55430



D125 AMPLIFIER  
POWER SUPPLY PRIMARY,  
MUTING CKTS, CURRENT  
INDICATOR CKTS  
Mac II/Int.HD40  
MacDraft Files  
Schematics  
April 4, 1988  
Page 4 of 6 Pages

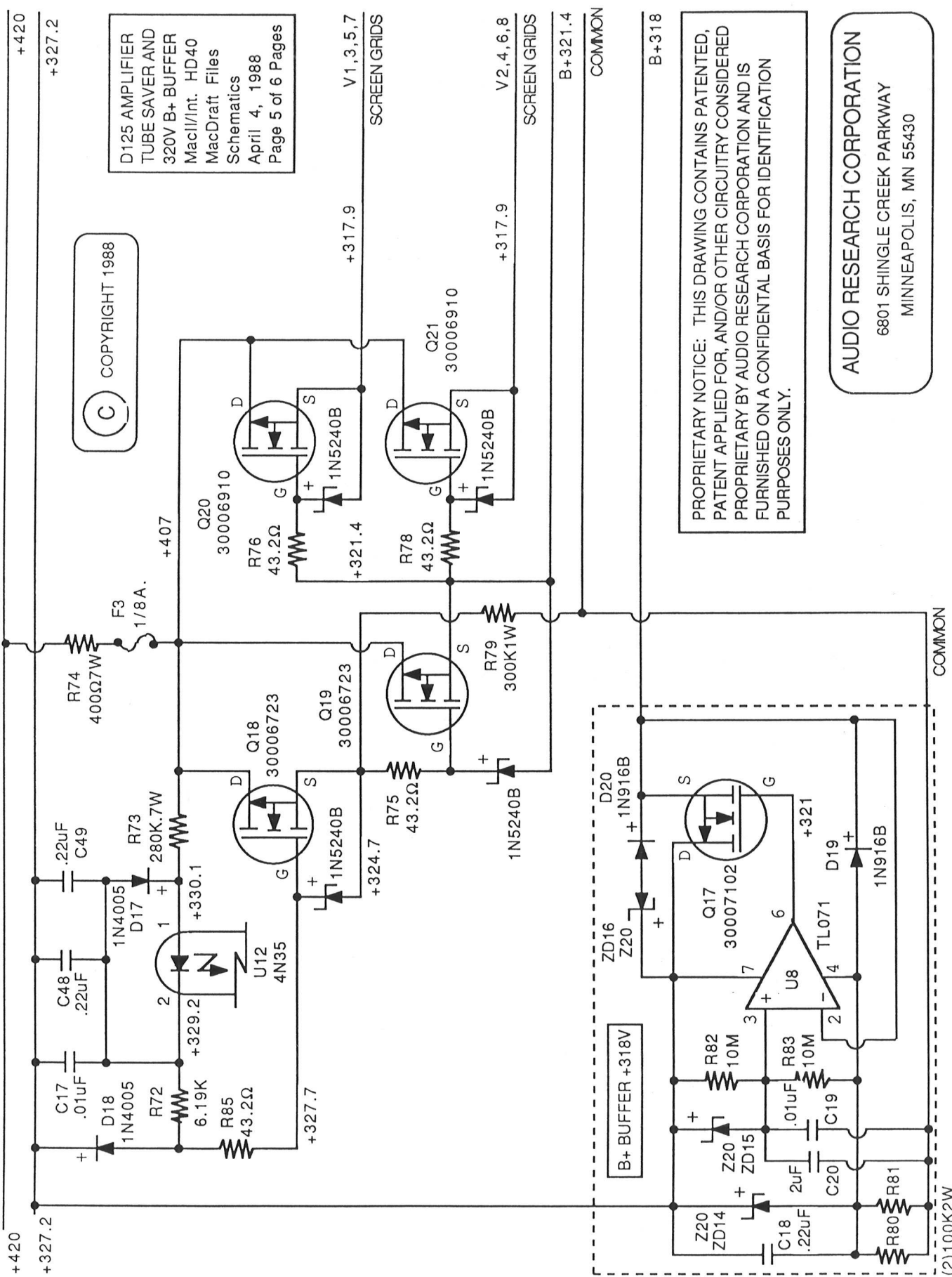
OUTPUT STAGE CURRENT  
INDICATOR CIRCUIT  
(1 of 2)

U3 - PINS 3 TO 7 - 68mV  
U2 - PINS 2 TO 7 - 62mV

MUTING RELAYS

"16" "0"  
LEFT CHANNEL  
"16" "0"  
RIGHT CHANNEL

LED 9 - PWR LINE  
LED 12 - SCREEN  
LED 11 - L CH. CURRENT  
LED 10 - R CH. CURRENT



D125 AMPLIFIER  
TUBE SAVER AND  
320V B+ BUFFER  
Mac//Int. HD40  
MacDraft Files  
Schematics  
April 4, 1988  
Page 5 of 6 Pages

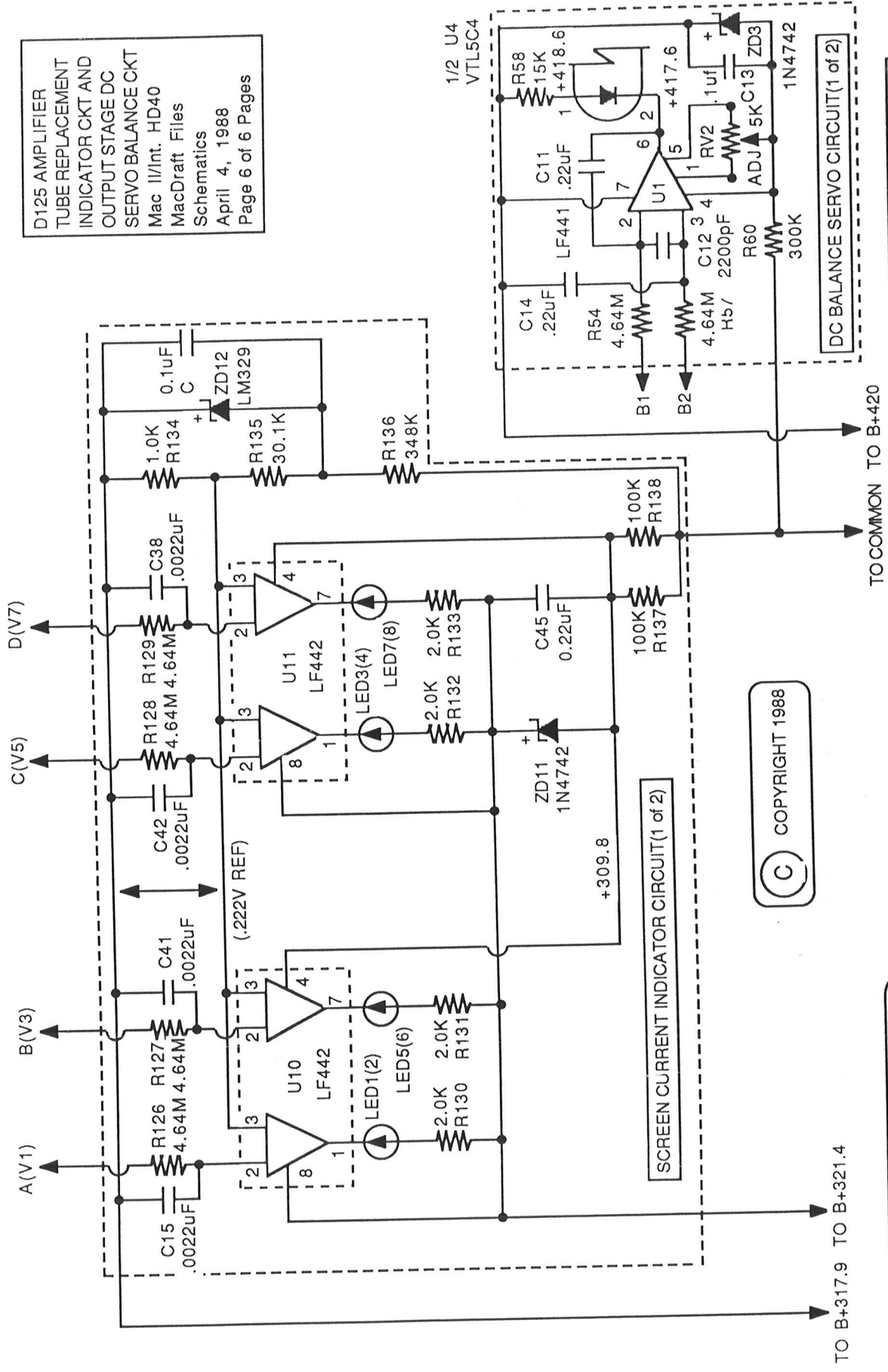
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6801 SHINGLE CREEK PARKWAY  
MINNEAPOLIS, MN 55430

(2) 100K2W

D125 AMPLIFIER  
 TUBE REPLACEMENT  
 OUTPUT STAGE DC  
 SERVO BALANCE CKT  
 Mac II/Int. HD40  
 MacDraft Files  
 Schematics  
 April 4, 1988  
 Page 6 of 6 Pages



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## PARTS LIST

As of OCT 13 89

PRODUCT: D125

NOTES:

Schematic Symbol	Quantity	ARC Part #	Description
CAPACITORS			
C 1,1A,50,51,55,55A	10	53150202	CAP. 150 PF 2 1/2% 630V PPN
C 2,3,16	6	53100505	CAP. .1 UF 10% 63V MPCN
C 3,8,9,17,19,30,37,52	11	53100406	CAP. .01 UF+/-10% 630V
C 4	2	53100606	CAP. 1.0 UF +/-10% 250V
C 5	2	53330200	CAP. 330 PF 2.5% 160V
C 6,35	4	53100202	CAP. 100 PF+/-2 1/2% 630 V PPN
C 7,10,20,25,31,34	8	53200602	CAP. 2 UF +/-10% 450V
C 11,14,18,27,28,29,39,40,44,53,57	18	53220507	CAP. .22 UF 10% 160V
C 12	2	53220306	CAP. 2200 PF 10% 100VDC
C 15,38,41,42,56	10	53100408	CAP. .01 UF 10% 63V PPN
C 21,22,23,24	4	50800801	CAP. 800 UF 450V GRAY
C 26,36	2	53100608	CAP. 1.0 UF 1-20% 425V TYPE V
C 32	1	50470802	CAP. 470 UF 100V "LYTIC"
C 33,43	3	53200603	CAP. 2 UF +/-10% 250V
C 45	1	53220506	CAP. .22 UF 100V
C 46,46A,47,47A	8	53100101	CAP. 10 PF +/-1 PF 630V PPN
C 48,49	2	53220509	CAP. .22 UF+/-10% 400 V
C 54,54A,54B,54C	8	53560201	CAP. 560 PF+/-2.5% 630V
C 58	1	51220602	CAP. 2.2 UF 20% 35V
DIODES			
D 1,2,3,15,16,19,20,21	11	30500910	FAIRCHILD IN916B
D 4,5,6,11,12,13,14,17,18	9	30500400	IN4005 GENERAL INSTRUMENT
D 7,8,9,10	4	30503310	EDAL #M4G5
FUSES			
F 1(120V)	1	34501000	FUSE, 6-1/4 MDX
F 2	1	34500202	FUSE, AGC 1/2
F 3	1	34500010	FUSE, 3/16A AGC
CONNECTORS			
J 1R	1	23201501	GOLD PHONO JK.,W/RD.BND.SP11
J 1L	1	23201502	GOLD PHONO JK.,W/WH.BD.SP11
PANEL INDICATOR			
LE 1-8	12	34300102	L.E.D.COLLAR & RETAINING RING
TRANSISTORS			
Q 1	2	30006503	FET, WHITE ORANGE
Q 2,18,19	4	30006724	FET, ORANGE RED YELLOW
Q 3,4	4	30006528	FET, WHITE RED GRAY
Q 5,6	4	30006402	FET, BLUE RED
Q 7,8	4	30007502	FET, ORANGE WHITE RED
Q 9,10,23,24,25,26	12	30005901	FET, RED BROWN
Q 11,12	4	30007006	FET, GRAY BLUE
Q 14	3	30007300	TRANS. MPSA18 MOTOROLA

## PARTS LIST

As of OCT 13 89

PRODUCT: D125

NOTES:

Schematic Symbol	Quantity	ARC Part #	Description
TRANSISTORS			
Q 15,32,33	5	30006811	FET, YELLOW
Q 16,22,27	4	30007029	FET, GRAY WHITE
Q 17	1	30007102	FET, YELLOW RED
Q 20,21	2	30006910	FET, BROWN
Q 31,34	2	30003100	TRANSIST.,2N5088,2N5209,2N5210
Q 35	1	30006527	FET, WHITE RED VIOLET
RESISTORS			
R 1	2	42432503	RES. 432K 1% MK-3 50PPM
R 2	2	42100314	RES. 1K 1% MK-5 50PPM
R 3,4	4	42127503	RES. 127K 1% MK-3 50PPM
R 5,11,12,13,14,24,25,36,120	20	42150203	RES. 150 OHM 1% MK-3 50PPM
R 6	2	42215403	RES. 21.5K 1% MK-3 50PPM
R 7,80,81,93,94,137,138	8	42100505	RES. 100K 1% MK-8 50PPM
R 8,95	3	42499303	RES. 4.99K 1% MK-3 50PPM
R 9	2	42392303	RES. 3.92K 1% MK-3 50PPM
R 10,62,63,142,151	8	42100603	RES. 1 MEG 1% MK-3 50PPM
R 15,15A,16,16A	8	42274403	RES. 27.4K 1% MK-3 50PPM
R 17,22A,23A,56	8	42150403	RES. 15K 1% MK-3 50PPM
R 18,19	4	42825405	RES. 82.5K 1% MK-8 50PPM
R 20,21,145	9	42750203	RES. 750 OHM 1% MK-3 50PPM
R 22,23	4	42127403	RES. 12.7K 1% MK-3 50PPM
R 26,26A,27,27A,73,97	10	42280513	RES. 280K1% MK-4 50PPM
R 28,29	4	42162203	RES. 162 OHM 1% MK-3 50PPM
R 30,30A,30B,31,31A,31B	12	42681405	RES. 68.1K 1% MK-8 50PPM
R 32,33	4	42127505	RES. 127K 1% MK-8 50PPM
R 34,35	4	42511313	RES. 5.11K 1% MK-4 50PPM
R 37,38,55,67,100,101,101A,102,109	13	42100203	RES. 100 OHM 1% MK-3 50PPM
R 39	2	42324403	RES. 32.4K 1% MK-3 50PPM
R 40,41,46,47,66,134	12	42100303	RES. 1K 1% MK-3 50PPM
R 42,45	4	42100503	RES. 100K+/-1% MK-3 50PPM
R 43,44	4	42316303	RES. 3.16K 1% MK-3 50PPM
R 48,49,50,51	8	43100205	RES. 100 OHM 2W 2% WW
R 52,53	4	43050004	RES. 0.5 OHM+/-2% 3W W.W.
R 54,57,126,127,128,129	12	42464603	RES. 4.64 MEG. 1% MK-3 50PPM
R 60,71,79,84	6	42300514	RES. 300K 1% MK-5 50PPM
R 68	2	42110503	RES. 110K 1% MK3 50PPM
R 69,70,139,140,143	9	42221403	RES. 22.1K 1% MK-3 50PPM
R 72	1	42619314	RES. 6.19K 1% MK-5 50PPM
R 74	1	43400201	RES. 400 OHM 7W 5%W.W.
R 75,76,78,85	4	42432103	RES. 43.2 OHM 1% MK-3 50PPM
R 82,83	2	42100703	RES. 10 MEG 1% MK-3 50PPM
R 86,103	2	42100103	RES. 10 OHM 1% MK-3 50PPM
R 87	1	42511203	RES. 511 OHM 1% MK-3 50PPM
R 89,92	3	42392403	RES. 39.2K 1% MK-3 50PPM
R 90	1	46100201	RES. POWER OX.100 OHM 5% 3W
R 91	1	42301503	RES. 301K 1% MK-3 50PPM
R 96,96A,144	3	42178403	RES. 17.8K 1% MK-3 50PPM
R 97A	1	42750503	RES. 750K 1% MK-3 50PPM
R 98	1	42332203	RES. 332 OHM 1% MK-3 50PPM

## PARTS LIST

As of OCT 13 89

PRODUCT: D125

NOTES:

Schematic Symbol	Quantity	ARC Part #	Description
RESISTORS			
R 99,118	3	43100002	RES. 1 OHM 2W 5% W.W.
R 104	2	42402303	RES. 4.02K 1% MK-3 50PPM
R 105	1	42118503	RES. 118K 1% MK-3 50PPM
R 106,112,141,148	5	42100403	RES. 10K+/-1% MK-3 50PPM
R 107	1	43500100	RES. 50 OHM +/-5% 4 1/2W
R 110,147	3	42357403	RES. 35.7K 1% MK-3 50PPM
R 111	1	42150514	RES. 150K 1% MK-5 1W 50PPM
R 113,122,150	5	42182203	RES. 182 OHM 1% MK-3 50PPM
R 113,122	4	42332103	RES. 33.2 OHM 1% MK-3 50PPM
R 114	2	42750303	RES. 7.5K 1% MK-3 50PPM
R 115	2	42110403	RES. 11K 1% MK-3 50PPM
R 116	2	42511303	RES. 5.11K 1% MK-3 50PPM
R 117,123	4	42549103	RES. 54.9 OHM 1% MK-3 50PPM
R 119,124	4	43300202	RES. 300 OHM 5% 2W W.W.
R 121,121A&B,125B	12	42750405	RES. 75K 1% MK-8 50PPM
R 130,131,132,133	8	42200303	RES. 2K MK-3 1% 50PPM
R 135	2	42301403	RES. 30.1K 1% MK3 50PPM
R 136	2	42348513	RES. 348K 1% MK-4 50PPM
R 146	1	42499403	RES. 49.9K 1% MK-3 50PPM
R 149	1	42182303	RES. 1.82K 1% MK-3 50PPM
CONTROLS			
RV 2	2	45500301	TRIM POT, 5K 10% 15 TURN
RV 3	2	45250402	25K 10% P.C. MNT.POT.
RV 4,5	4	45100424	10K TRIM POT
RELAYS			
RY 1	1	64101200	RELAY, 24V T90 POWER ON
RY 2,3	2	64101300	RELAY, 24V 10A PC MNT.
SWITCHES			
SW 1	1	24101300	TOGGLE SWITCH, MONO AMP.
SW 3	1	24101400	SHORT BAR GOLD TOGGLE SWITCH
TRANSFORMERS			
T 1	2	60007830	XFR. D125 OUTPUT REV.E
T 2	1	60007901	XFR. D125 POWER REV.E
THERMISTORS			
TH 1	1	47000300	THERMISTOR 30 OHM +/-20% CL60
INTEGRATED CIRCUITS			
U 1	2	31002401	LF 441 CN TESTED-ACCEPT
U 2,3	4	31002411	LF 441CN TESTED-ACCEPT
U 4	2	34400122	PHOTO COUPLER TESTED

## PARTS LIST

As of OCT 13 89

PRODUCT: D125

NOTES:

Schematic Symbol	Quantity	ARC Part #	Description
-----			
INTEGRATED CIRCUITS			
U 5	2	34400401	4N35 PHOTO COUPLER TESTED
U 6,9	3	31002200	MC34071P MOTOROLA
U 8	1	31001900	TL071CP
U 10,11	4	31002500	LF442CN OP. AMP.
U 12	1	34400402	4N35 PHOTO COUPLER TESTED
U 13	1	34400500	COUPLER MOTOROLA MOC3011
VACUUM TUBES			
V 1-8	8	32000501	VAC.TUBE, 6550 [TESTED ]
ZENER DIODES			
ZD 1,2,9,18,19,20,21,23,28,31	15	30504400	IN5240B
ZD 3,11	3	30502700	IN4742-A
ZD 4	1	30500300	IN4740A
ZD 5	1	30504200	IN5535A
ZD 6,7,12,22,25,26	10	31000705	LM329DZ GREEN
ZD 8	1	30503500	IN5359 B
ZD 10,27	2	31002610	UA431AWC FAIRCHILD ONLY
ZD 14,15,16	3	30503700	DIODE, Z20 10%
ZD 24	2	30501800	IN5245B
ZD 29,30	4	30502100	1N5234B