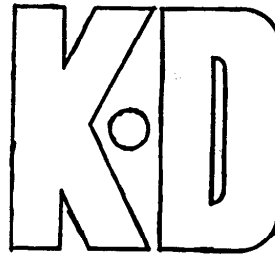


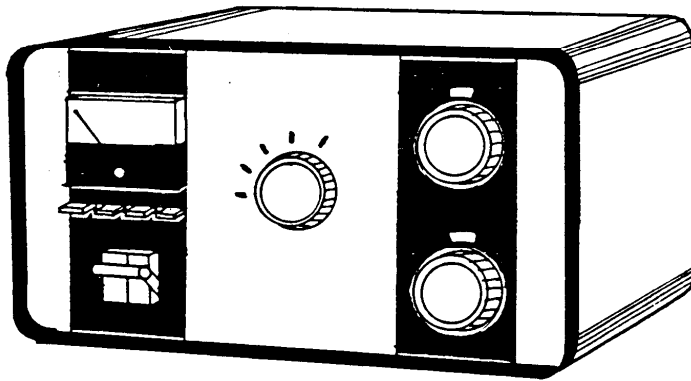
HENRY 2KD STANDARD/3KD CLASSIC
OPERATING AND MAINTENANCE MANUAL

HENRY RADIO

OPERATING AND MAINTENANCE MANUAL



SERIES
LINEAR
AMPLIFIERS



✓ 230VAC

3KD CLASSIC

2KD STANDARD

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

This unit has been type tested and found to comply with the limits for a Class A computing device in accordance with the specifications for Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation.

MANUFACTURER'S INSTRUCTIONS AND USER'S RESPONSABILITY TO PREVENT RADIO FREQUENCY INTERFERENCE

MANUFACTURER'S INSTRUCTIONS

The user must observe the following precautions in installing and operating this device

1. Operate the equipment in strict accordance with the manufacturer's instructions for the model.
2. Ensure that the unit is plugged into a properly grounded wall outlet and that the power cord supplied with the unit is used and not modified.
3. Ensure that the unit is always operated with the factory installed cover set on the unit.
4. Make no modifications to the equipment which would affect its meeting the specified limits of the Rules.
5. Properly maintain the equipment in a satisfactory state of repair.
6. Use a shielded and properly grounded I/O cable to ensure compliance of this unit to the specified limits of the Rules.

USER'S RESPONSABILITY

The user has the ultimate responsibility to correct problems arising from harmful radio-frequency emission from equipment under his control. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures. All of these responsibilities and any others not mentioned are exclusively at the expense of the user.

1. Change in orientation of the receiving device antenna.
2. Change in orientation of the equipment.
3. Change in location of the equipment.
4. Change in equipment power source.

If these attempts are unsuccessful, install one or all of the following devices.

1. Line isolation transformers.
2. Line filters.
3. Electromagnetic shielding.

If necessary, the user should consult the dealer, or an experienced radio/ television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission to be helpful: "How to Identify and Resolve Radio - TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004 - 000 - 00345 - 5.

Note: The operator of a computing device may be required to stop operating his device upon finding that the device is causing harmful interference and it is in the public interest to stop operation until the interference problem has been corrected.

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HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 1: SPECIFICATIONS

TYPE	RF Linear Power Amplifier
EMISSION	SSB, AM, FM, CW, RTTY, OR PULSE
OUTPUT POWER	1200 Watts PEP, 750 Watts CW (2KD) 1500 Watts PEP, 750 Watts CW (3KD)
TUBE COMPLIMENT	Eimac 3-500Z (2KD) Eimac 3CX1200D7 (3KD)
DRIVE POWER	60 to 120 Watts Nominal
PLATE VOLTAGE	3800 - 4000VDC Nominal (2KD) 3800 - 4000VDC Nominal (3KD)
DUTY CYCLE	Continuous Duty At Rated Output (Commercial and Industrial)-750 Watts
DIMENSIONS	8.75 " H, 15.00 " W, 16.50" D
SHIPPING WEIGHT	75 Pounds (1 Box)
COOLING	Forced Air Cooling
POWER REQUIREMENTS	2 Wire, Single Phase, 60Hz 115VAC, 30 Amps; 230VAC, 15 Amps
FREQUENCY COVERAGE.....	3.5 - 25MHz Domestic Models 3.5 - 30MHz Export Models
OUTPUT IMPEDANCE.....	50 Ohms Unbalanced with SWR not to exceed 2.0:1
INPUT IMPEDANCE	50 Ohms Unbalanced with SWR not to exceed 2.0:1

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 1: SPECIFICATIONS (continued)

NOISE LEVEL >40dB Below Single Tone Carrier at
1000 Watts.

HARMONICS AND SPURIOUS OUTPUTS..... Second Harmonic -50dBc, Third
Order Distortion >35dB Down at Full
Output.

NOTE: All amplifiers can be set up for 50Hz operation, 200VAC operation, or two wire
220VAC operation (Europe), but this is considered a special option by Henry Radio and must
be specified when ordering your amplifier. (It will be necessary to install special transformers in
your unit to meet these requirements.)

NOTE: Frequency coverage above 25MHz is available on export models only because of FCC
regulations.

NOTE: Specifications subject to change without notice.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 2: FEATURES

- ALC CIRCUIT All models have an adjustable ALC feedback circuit to prevent overdrive from a high powered transceiver.
- METERING One panel meter monitors Plate Voltage, Plate Current, Grid Current and relative Out put Power.
- CONTROLS..... Band switch, Load control, Tune control, Meter switch, and Circuit breaker ON/OFF switch.
- REAR PANEL CONNECTORS RF input (BNC type connector), RF Output (UHF type connector), ALC feedback (RCA type connector), Relay control (RCA type connector).
- RELAY KEYING A built in 12VDC supply (2KD) or a 26VDC supply (3KD) activates the antenna relay when the relay control jack is shorted to ground.
- PROTECTIVE DEVICES Two high voltage shorting switches, primary AC fuse, primary circuit breaker, and cathode fuse.
- POWER SUPPLY Conservatively rated components guarantee superb dynamic regulation in the high voltage supply and reliable, trouble free performance. An oil filled capacitor is used in the high voltage supply. Diode rectifiers in the high voltage supply are rated at 15kV PIV, 1.2Amps.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 2: FEATURES (continued)

- BAREFOOT OPERATION** The 2KD Standard and 3KD Classic allow the amateur to operate "barefoot" by turning the amplifier off. When configured in this manner the amplifier is bypassed, directly connecting your transceiver to the antenna.
- ANTENNA RELAYS.....** The 2KD Standard uses Guardian relays for both input and output T/R switching. The 3KD Classic uses a Guardian input relay and a Jennings vacuum output relay, the combination being sufficiently fast acting for semi-break-in CW operation.
- CABINETS** The all aluminum alloy cabinets provide double shielding in the RF section for minimizing cabinet leakage and radiation.
- TANK CIRCUIT** The Pi - L plate circuit has a silver plated rotary tank coil to insure the cleanest, most efficient output.

Henry Radio amplifiers are backed by a 25 year history of providing the finest RF equipment available to the Amateur Service.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 3: INTRODUCTION

The 2KD Standard and 3KD Classic are a family of high quality, desk top model, single stage linear RF amplifiers designed around rugged and economical Eimac triodes. Both models employ the same grounded grid circuit topology to insure simplicity of design and conservatively rated components ensure years of reliable operation. The amplifiers are completely self contained and use the highest quality RF, DC and AC components available today. All that is necessary for operation is a transceiver with at least 50 watts output, a source of either 115VAC or 230VAC power, and a 50 ohm antenna system.

The 2KD Standard uses a single Eimac 3-500Z tube offering about 14 dB of power gain (the output power is about 20 times the input power) making it easy to drive to full output with the popular low power, solid state transceivers. It will deliver 1000 watts PEP and 750 watts CW into a 50 ohm load. This model uses a moderate duty power supply for operation in the United States. FCC regulations require that the units supplied in the United States cannot be operated above 25MHz.

The 3KD Classic uses a single Eimac 3CX1200D7 tube offering 14 dB of power gain which will deliver 1500 watts PEP in SSB service and 750 watts in CW mode. It is also available in the United States for operation up to 25MHz.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 3: INTRODUCTION (continued)

The 2KD Standard X and the 3KD Classic X are for industrial, scientific, medical, commercial and export users only. They cover the 3.5 through 30 MHz frequency range.

Both models are designed around the same basic RF deck which employs a unique rotary tank inductor not found in any other line of production amplifiers. All of these models can be used for AM, FM, SSB, CW, RTTY or Pulse. Frequency coverage is instantaneously any 200kHz segment between 3.5 and 30MHz and can be tuned to any frequency between 3.5 and 30 MHz (subject to FCC restrictions in the United States between 28 - 30MHz).

The 2KD Standard requires tube installation because of the fragility of the glass envelope 3500Z tube from mechanical shock that it may encounter during shipping. For this reason, the tube is packed in a separate box. The 3KD Classic does not require tube installation because the rugged, ceramic/metal 3CX1200D tube is much more resistant to mechanical shock that it could encounter during shipping, therefore the tube is shipped installed in its socket.

CAUTION!!!! PLEASE READ THIS INSTRUCTION MANUAL CAREFULLY BEFORE OPERATING YOUR NEW EQUIPMENT!!!! POWER AMPLIFIERS CAN BE DAMAGED BY OPERATION OUT OF RESONANCE!!!!

**HENRY 2KD STANDARD/3KD CLASSIC
OPERATING AND MAINTENANCE MANUAL**

SECTION 3: INTRODUCTION (continued)

CAUTION!!!! THERE ARE DANGEROUSLY HIGH VOLTAGES PRESENT INSIDE THE AMPLIFIER WHEN IT IS PLUGGED IN AND TURNED ON!!!! NEVER REMOVE THE COVERS WHEN THE AMPLIFIER IS PLUGGED IN AND TURNED ON!!!!

CAUTION!!!! ALWAYS EXERCISE EXTREME CAUTION WHEN SERVICING ANY AMPLIFIER!!!! HENRY RADIO RECOMMENDS THAT ANY SERVICING BE PERFORMED BY RETURNING YOUR UNIT TO THE FACTORY!!!!

CAUTION!!!! THE VOLTAGES FROM THE HIGH VOLTAGE POWER SUPPLY CAN BE LETHAL!!!! ALWAYS UNPLUG THE AMPLIFIER AND TURN OFF THE CIRCUIT BREAKER BEFORE WORKING INSIDE THE POWER SUPPLY OR RF DECK!!!!

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 4: INSTALLATION

SECTION 4.1: UNPACKING

.. When you first receive your amplifier, you must carefully inspect both the box and the amplifier for shipping damage. If you see any shipping damage, save the box and packing material, and notify the transportation company immediately. In any case, it is a good idea to save the box and packing material because they are quite expensive to replace, and are quite useful in protecting the amplifier should you ever decide to ship or move it to another location.

Remove the amplifier from its box and packing material. Your unit is packed in a single box and is ready to operate with the exception of the power plug. A power plug that mates with the power socket at the operating location must be properly installed as described in SECTION 4.3 before the unit can be operated.

The following accessories should be included with your amplifier:

- 1 Instruction Manual
- 1 UHF type Coax Connector
- 2 Shielded Control Cables
- 1 Warranty Card
- Drive Cable (RG58/U)
- 1 Set of Fuses

SECTION 4.2: OPERATING LOCATION

The amplifier may be located wherever desired provided there is adequate air flow from the bottom of the unit up through the top of the amplifier. Do not restrict the air flow of the amplifier, and never place it too close to

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 4: INSTALLATION (continued)

a wall that might restrict the airflow into the back of the unit. You will require a location that has an appropriate 115VAC or 230VAC power source. A location which avoids environmental extremes of temperature, humidity, and dust will keep your amplifier looking and running like new for many years of reliable operation.

SECTION 4.3: CABLING..... All of the following cables must be connected before operation of the amplifier:

POWER CABLE - The amplifier is equipped with a three wire AC power cable that is factory wired to accept 230VAC, 2 wire, 60Hz, single phase power unless special instructions were given at the time you ordered your amplifier. A factory modification is required for 50Hz operation, 200VAC operation, or 2 wire European operation. 115VAC operation is available on all units by rewiring the jumper board on the back of the amplifier (see SECTION 4.4).

The three wires in the power cable (the green wire (GROUND) is not counted in the standard definition of power wiring, hence the 2 wire designation earlier. 2 wire European operation does not have a ground wire.) are black, white and green. The green wire is chassis ground and the neutral on all 230VAC single phase plugs. The black and white wires connect to the hot 230VAC circuits. A power plug is not provided because there are so many different types of 230VAC outlets. This also holds true for 115VAC operation. We suggest that you consult with your

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 4: INSTALLATION (continued)

local electrician about proper installation of your plug.

CAUTION!!!! THE AMPLIFIER WILL BE DAMAGED IF THE GREEN WIRE IS CONNECTED TO THE 230VAC TERMINAL!!!! MAKE SURE THAT THE GREEN WIRE IS CONNECTED TO THE NEUTRAL TERMINAL (GREEN SCREW)!!!!

ANTENNA COAX - Use only RG-8/U coax (or better), to connect the amplifier to an antenna or dummy load. A PL-259 type connector (UHF type) is included in the accessory kit. Prepare the cable as shown in Figure 1 below. The PL-259 connector mates with the coax jack marked OUTPUT on the rear panel of the amplifier's chassis (SO-239 type receptical).

CAUTION!!!! NEVER OPERATE THE AMPLIFIER UNLESS IT IS CONNECTED TO A MATCHING ANTENNA OR DUMMY LOAD!!!! THE LOAD MUST BE CAPABLE OF HANDLING THE FULL OUTPUT POWER OF THE AMPLIFIER!!!!

You will damage the equipment if you operate into a load with an SWR $>2.0:1$, (a reflected power greater than 10% of the incident or forward power). Measure the antenna's SWR with an SWR or power meter using only the transceiver's output before operating the amplifier. With the amplifier in the off position, the transceiver will be directly connected to your load (antenna or dummy load) so that you can perform this test.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 4: INSTALLATION (continued)

DRIVE CABLE - The RG-58/U drive cable supplied in the accessory kit connects the INPUT connector on the rear panel of the amplifier to the output connector on your transceiver. The amplifier side of the cable is terminated in a BNC type connector. The transceiver end of the cable is terminated in a PL-259 (UHF type) connector. An adapter may be required if your transceiver does not have the matching SO-239 type jack.

ALC (Automatic Level Control) - Plug the gray ALC cable into the ALCOUT phono jack (RCA type) on the rear panel of the amplifier and into the ALC feedback connection on the transceiver. If the transceiver does not have provisions for feedback of the ALC voltage from the amplifier, no connection is necessary.

RELAY CABLE - The gray relay cable must be plugged into the phono jack (RCA type) marked RELAY on the back panel of the amplifier. This cable conducts the keying signal from the transceiver to switch the amplifier to the transmit condition and must be connected to the socket or connector marked ANTENNA RELAY, ACC1 (or some equivalent designation) on the transceiver. The transceiver needs to supply only a shorting relay contact (grounded during transmit) to key the amplifier. Most of the new transceivers on the market (1990) use DIN plugs, while older transceivers use RCA jacks. It may be necessary if you have one of the newer transceivers to do some soldering work to connect the relay control cable to your transceiver.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 4: INSTALLATION (continued)

FIGURE 1



coupling ring



plug sub-assembly



plug adapter

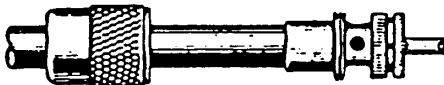
plugs 83-1SP, 83-822



Cut end of cable even. Remove vinyl jacket $1\frac{1}{4}"$, except 83-1SP plug remove vinyl jacket $1\frac{1}{4}"$.



Bare $\frac{1}{4}"$ of center conductor. Trim braided shield. Slide coupling ring on cable. Tin exposed center conductor and braid.



Screw the plug sub-assembly on cable. Solder assembly to braid through solder holes, making a good bond between braid and shell. Solder conductor to contact. Do not use excessive heat.



For final assembly, screw coupling ring on plug sub-assembly.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 4: INSTALLATION (continued)

CAUTION!!!! NEVER APPLY ANY VOLTAGE TO THE RELAY JACK OF THE AMPLIFIER!!!!

Your amplifier has a built in power supply which provides the necessary voltage.

Most modern transmitters and transceivers have provisions for a relay control connection. If the connection is not obvious to you, examine the operating manual for the exciter to find an available unused relay contact that is normally closed during transmit.

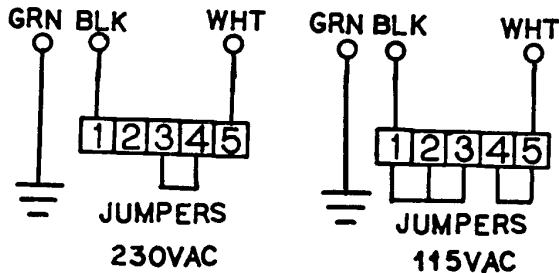
Some modern transceivers use diode switching rather than relay switching. This may cause a problem with the voltage drop across the diode preventing sufficient voltage drop across the relay coil to activate the relay in the Henry amplifier. The 2KD Standard uses a 12VDC relay control voltage, while the 3KD Classic uses a 26VDC relay control voltage. If your transceiver will not key the amplifier, you should check the resistance across the contact you are using. If there is too much resistance, contact the transceiver's manufacturer about possible solutions to this problem.

SECTION 4.4: TRANSFORMER TAPS .

HIGH VOLTAGE/FILAMENT TRANSFORMER - The 2KD Standard and 3KD Classic amplifiers are both supplied with an ECA-1403A. The transformer is factory wired for 115VAC/230VAC operation, the voltage being selectable by the proper jumpering of a terminal block accessible from the back panel of the

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 4: INSTALLATION (continued)



amplifier. The proper jumper board connections for 115VAC and 230VAC operation are listed below:

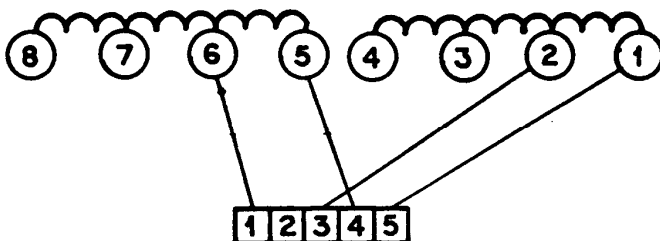
ECA-1403A

115VAC Jumper 1, 2, and 3
Jumper 4 and 5
230VAC Jumper 3 and 4

The high voltage/filament transformer is located on the left side of the amplifier.

Because both the high voltage and filament secondaries are on the same transformer core, it is not possible to adjust the two secondary voltages independently of each other. Since it is more critical to the correct operation of the tube to have the filament voltage be within specified limits than to have the plate voltage correct, it is recommended that you retap the transformer for the correct filament voltage.

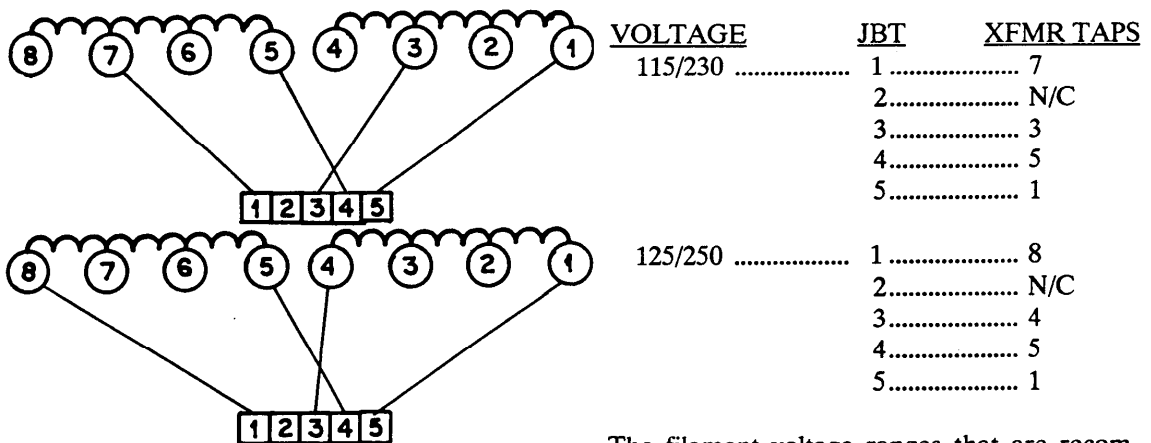
The ECA - 1403A can be retapped for the following input voltages: 110VAC/220VAC, 115VAC/230VAC (factory standard), and 125VAC/250VAC. The wiring of the jumper board terminals (JBT) to the transformer (Xfmr) primary taps are listed below:



<u>VOLTAGE</u>	<u>JBT</u>	<u>XFMR TAPS</u>
110/220 ...	1	6
	2	N/C
	3	2
	4	5
	5	

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 4: INSTALLATION (continued)



The filament voltage ranges that are recommended by the manufacturer for optimum performance and long life operation are the following:

<u>TUBE TYPE</u>	<u>FILAMENT VOLTAGE</u>
3-500Z	4.75 - 5.25VAC
3CX1200D7	5.98 - 6.62VAC

If the filament voltage is low, retap the transformer for 110/230VAC. If the filament voltage is high, retap the transformer for 125/250VAC.

RELAY SUPPLY TRANSFORMER - The relay power supply transformers do not have variable taps at their inputs, and experience has shown that even under worst case conditions, there is still sufficient voltage to activate the relays. Therefore, retapping is not necessary.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 5: OPERATING CONTROLS

SECTION 5.1: FRONT PANEL CONTROLS.... **ON/OFF POWER SWITCH** - This switch is used to turn the AC power to the amplifier on and off. When the amplifier is turned off, the output of your transceiver is directly connected to your antenna or dummy load.

MULTIMETER AND RELAY CONTROL SWITCHES - These four push buttons are located immediately below the multimeter. There are four different functions. These are grid current (IG), plate current (IP), relative output power (RF), and high voltage (HV). The respective full scale readings are:

IG		0 - 100mA
IP		0 - 1000mA
RF		0 - 1
HV		0 - 10kVDC

DIAL LIGHTS - The dial lights come on to indicate when the amplifier is turned on.

LOAD CONTROL - This control matches the amplifier's output network to the antenna or other load. Refer to the calibration chart for the appropriate initial settings for the frequency of operation that you have chosen. A dial setting of zero (0) corresponds to a minimum loading, and a dial setting of one hundred (100) corresponds to maximum loading. This minimum and maximum loading corresponds to when the loading capacitor's plates are unmeshed and fully meshed respectively.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 5: OPERATING CONTROLS

TUNE CONTROL - The TUNE control is a 20 turn vernier dial connected to the rotary inductor tank coil. Refer to the calibration chart at the back of the manual for the appropriate settings for the frequency of operation that you have selected.

BAND SWITCH - The BAND switch selects the correct tuned input circuit and the appropriate capacitances on the output circuit for the frequency of operation. Listed below are guidelines for the BAND switch position relative to operating frequency.

CAUTION!!!! NEVER MOVE THE BAND SWITCH WHEN THE AMPLIFIER IS KEYED!!!! YOU WILL DESTROY MANY OF THE COMPONENTS IN THE AMPLIFIER AND IT WILL CAUSE YOU TO HAVE AN EXPENSIVE REPAIR BILL!!!!

BAND SWITCH POSITION

OPERATING FREQUENCY (Approximately)

80	3.5 - 5.0MHz
40	5.0 - 10.0MHz
20	10.0 - 17.0MHz
15	17.0 - 24.0MHz
10	24.0 - 30.0MHz

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 5: OPERATING CONTROLS (continued)

SECTION 5.2: REAR PANEL CONTROLS.....ALC ADJUSTMENT - This potentiometer controls the sensitivity of the amplifier's ALC feedback circuit. See SECTION 6.3 for instructions on how to adjust the ALC feedback.

GRID METER ADJUST - This potentiometer is set at the factory to calibrate the multimeter when the multimeter select switch is in the IG (grid current) position.

PLATE METER ADJUST - This potentiometer is set at the factory to calibrate the multimeter when the multimeter select switch is in the IP (plate current) position.

INPUT TUNING COILS - These slug tuned coils can be tuned with a plastic hex key (tuning wand) through the holes in the rear panel. They are factory set to cover a 500kHz band segment centered on the respective amateur band designated on the BAND switch (80 meters, 40 meters, 20 meters, 15 meters or 10 meters). While the output tuning controls have sufficient range to cover a band segment several MHz wide, the input circuit is fixed tuned. If you wish to operate the equipment outside of the traditional amateur bands, either for MARS operation or for the new WARC bands, it will be necessary to retune the input circuit which that new frequency falls within according to the table in SECTION 5.1. If you will be working exclusively on frequencies outside of the traditional amateur bands, inform us here at Henry Radio of this at the time you order your amplifier, and we will set your amplifier up at the factory to operate on the

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 5: OPERATING CONTROLS (continued)

frequencies that you specified at the time you ordered your amplifier.

SECTION 5.3: REAR PANEL JACKS ALCJACK - This socket accepts an RCA phono plug (an ALC cable is supplied in the accessory kit) to connect the feedback voltage from the amplifier to the transceiver. No connection is necessary if your transceiver has no provisions for ALC feedback.

RELAY CONTROL JACK - The RCA jack marked RELAY CONTROL connects the amplifier to your transceiver to key the amplifier when your transceiver is transmitting. An inter-connect cable is supplied in the accessory kit for this purpose. When the socket is shorted to ground, the amplifier's antenna relay closes. If the amplifier is turned off, the relay cannot be keyed.

CAUTION!!!! NEVER APPLY ANY VOLTAGE TO THE RELAY CONTROL SOCKET!!!! THERE IS A BUILT IN POWER SUPPLY THAT PROVIDES THE PROPER VOLTAGE TO ACTUATE THE RELAY!!!! YOU ONLY NEED TO PROVIDE A SHORTING CONTACT TO ACTIVATE THE T/R RELAY!!!!

RF INPUT JACK - This BNC type connector accepts the drive cable from your transceiver. The input impedance of the amplifier is nominally 50 ohms unbalanced. The drive cable is supplied in the accessory kit for this purpose. It is an RG-58/U type cable with a BNC plug on one end and a PL-259 plug on the other end.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 5: OPERATING CONTROLS (continued)

RF OUTPUT JACK - This SO-239 connector, (UHF type) transfers power from the amplifier to the output coax and ultimately to your antenna or dummy load. The output impedance of the amplifier is nominally 50 ohms unbalanced. The load VSWR cannot exceed 2.0:1. This means that the reflected power cannot exceed 10% of the forward or incident power. Use only RG-8/U coaxial cable or a better or equal grade coax which is rated for power level and frequency equal to or greater than the full rated output and maximum frequency for which the amplifier is rated (750 watts at 30 MHz).

GROUND LUG - This lug is provided to earth ground the amplifier's chassis. It is wise to connect the ground lug to a good earth ground because this will minimize any risk of electrical shock as well as minimize cabinet radiation.

AUXILLARY FUSE - This 3AG type, 3amp fuse protects the blower and the relay power supply. When replacing this fuse be sure to replace it with a fuse of the same current rating.

CATHODE FUSE - This 8AG type, 1.5amp fuse protects the tube from excessive plate current. It will blow if there is a plate current overload condition. When replacing this fuse, be sure to replace it with a fuse of the same current rating.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 5: OPERATING CONTROLS (continued)

POWER CORD - The power cord must be connected to an AC power source capable of supplying the necessary voltage and current required by the amplifier (see Page 1). No AC power plug is provided because of the more than a dozen AC plug types available. Consult your local electrician as to the proper plug for your operating location.

GRID TEST POINT - This RCA type connector is normally shorted to ground. It is used at the factory to monitor the grid current externally for calibration purposes. An external 0 - 100mA meter may be plugged into this jack to monitor the grid current externally and independently of the built in multimeter. A shorting plug is shipped installed in the grid test point jack. It should be left installed for normal operation of the amplifier.

JUMPER BOARD TERMINAL BLOCK - This terminal block can be accessed from the rear panel of the amplifier. It is used for setting up the amplifier to run on either 115VAC or 230VAC. For more information on how to set up the jumpers for the power line voltage at your location, see SECTION 4.4.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 5: OPERATING CONTROLS (continued)

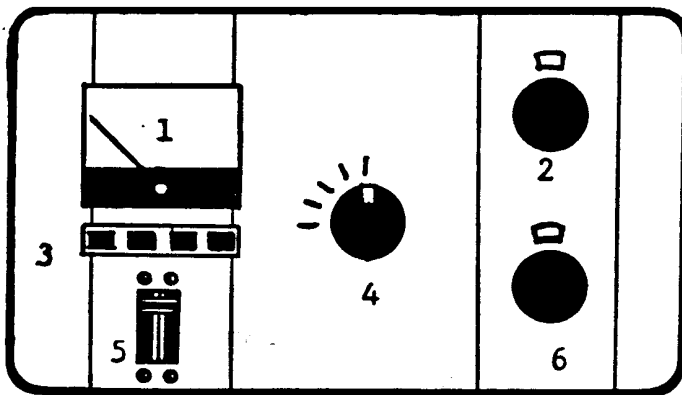
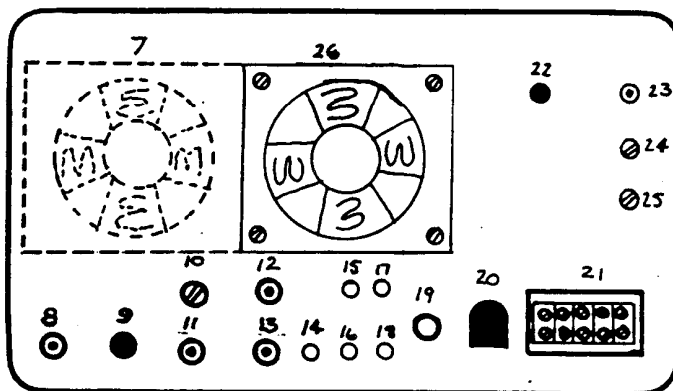


FIGURE 2



- | | | | |
|----|------------------------------|----|---------------------------------|
| 1 | Multimeter | 14 | 10 Meter Input Coil Adjust |
| 2 | Output Tune Control | 15 | 20 Meter Input Coil Adjust |
| 3 | Function Switch | 16 | 15 Meter Input Coil Adjust |
| 4 | Band Switch | 17 | 75-80 Meter Input Coil Adjust |
| 5 | Main Circuit Breaker | 18 | 40 Meter Input Coil Adjust |
| 6 | Output Load Control | 19 | Ground Lug Screw |
| 7 | Axial Cooling Fan (3KD only) | 20 | AC Power Cord |
| 8 | RF Output Jack | 21 | AC Jumper Board Terminal Block |
| 9 | 3AG Fuse for Auxillaries | 22 | 8AG Cathode Fuse |
| 10 | ALC Adjust Control | 23 | Grid Test Point |
| 11 | ALC Out Jack | 24 | Grid Meter Adjust |
| 12 | RF Input Jack | 25 | Plate Meter Adjust |
| 13 | Relay Control Jack | 26 | Axial Cooling Fan (2KD and 3KD) |

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 6: OPERATION

SECTION 6.1: PRELIMINARY SETTINGS

Set the BAND switch to the desired band based on the table in SECTION 5.1. With the amplifier turned off, tune your transceiver to the desired operating frequency, and then turn your transceiver's drive to zero (0). Set the TUNE and LOAD controls to the calibration settings recommended in the calibration table at the back of this manual. With the amplifier off, the exciter is directly connected to your antenna or dummy load.

Turn the amplifier on with the main circuit breaker which is located on the front of the cabinet. The dial lights and the blower should come on when you turn on the main breaker. Both the 3-500Z and the 3CX1200D7 require no warmup period, so you may use the amplifier within a few seconds of turning it on. With the 3-500Z, you should see the filament glowing. With the 3CX1200D7, the cooling air exhaust will feel warm, though because of the ceramic/metal tube construction, you cannot see the filament glowing directly as in the 3-500Z. Key your transceiver to switch the amplifier into transmit mode **BUT DO NOT APPLY POWER YET!!!!** Check that the operating parameters are approximately as follows:

<u>Model</u>	<u>Grid Current</u>	<u>Plate Current</u>	<u>High Voltage</u>
2KD Standard	0mA	100mA	3800VDC
3KD Classic	0mA	120mA	3800VDC

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SECTION 6: OPERATION (continued)

If the values of the high voltage and the resting current (no drive plate current) are significantly different from those listed in the table ($\pm 5\%$), then there may be a problem with the amplifier, or the taps on the high voltage transformer may need to be changed (though the filament voltage is much more critical than the plate (high) voltage.)

SECTION 6.2: SSB OPERATION...

Make sure that the output of the transceiver is turned to zero. Set the BAND switch to the appropriate position for the operating frequency you have chosen. Switch the transceiver to SSB mode.

STEP 1 - Preset the TUNE and LOAD controls of the amplifier using the calibration settings in the calibration table at the back of this manual. Press the function switch marked IP so that the multimeter reads plate current.

STEP 2 - Gradually increase the drive from your transceiver until the amplifier draws about 200mA of plate current. Press the function switch marked RF. If you have used the factory calibration settings, you should see some output power. Adjust the TUNE and LOAD controls alternately for maximum RF power.

STEP 3 - If you prefer to tune up with the grid and plate current meters, use the following procedure. Press the function switch marked IP so that the multimeter is reading plate current. Dip the plate current with the TUNE control.

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SECTION 6 OPERATION (continued)

The dip in the plate current indicates that the tube is operating in a resonant condition.

STEP 4 - Press the function switch marked IG so that the multimeter reads grid current. Adjust the LOAD control to dip the grid current.

STEP 5 - switch the multimeter back to plate current (IP). Adjust the TUNE control to dip the plate current again. Repeat steps 3 and 4 until the dips in the grid and plate current coincide.

STEP 6 - Increase the drive from your transmitter and repeat steps 3, 4, and 5 until you have achieved the following operating conditions:

<u>Model</u>	<u>Grid Current</u>	<u>Plate Current</u>
2KD Standard	140mA	400mA
3KD Classic	300mA	800mA

CAUTION!!!! DO NOT DRIVE THE AMPLIFIER FOR MORE THAN 10 SECONDS WHEN IT IS NOT TUNED TO RESONANCE!!!! 10 SECONDS TUNE AND 10 SECONDS OFF IS A GOOD OPERATING HABIT WHEN TUNING UP!!!!

STEP 7 - When the amplifier has been tuned to resonance and loaded up properly, write down the dial settings so that you can return to that frequency again without retuning. As long as the tube is in good condition and your load stays constant, the dial readings should stay constant.

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SECTION 6: OPERATION (continued)

STEP 8 - Switch your transceiver to SSB operation and key the microphone and speak into it to drive the amplifier. The meter readings for voice peaks will be approximately 1/2 of the meter readings that you got during tune up. Because of the inertia in the meter movement, the output readings will not follow your speech patterns. If you want to follow your speech patterns, you will have to get a monitor scope, which is a modified oscilloscope that reads a sample of the output power of the amplifier.

The ALC circuit is designed to prevent the overdrive and resulting distortion from a high powered transceiver. If your transceiver cannot put out more than 120 watts, the ALC connection is probably not necessary.

The amplifier is shipped with the ALC ADJUST control, which is located on the back panel of the amplifier, in the fully counterclockwise (off) position. If the ALC circuit is used, the adjustment must be made only once, unless a new transceiver is used.

With the ALC ADJUST control fully counterclockwise, tune the amplifier for SSB operation. Drive the amplifier to about 400mA of plate current. Rotate the ALC ADJUST control clockwise until the grid current begins to decrease. Once the ALC adjustment is made, use the locknut on the control shaft to lock it in place. If your transceiver cannot drive the amplifier over 400mA of plate current, there is no need to adjust the ALC control.

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SECTION 6: OPERATION (continued)

Follow the same tuning procedure as given in the SECTION 6.2 for CW operation. The meter readings will be about 60% of the SSB readings. When you have verified the TUNE and LOAD dial settings for each band and are more comfortable with your amplifier, the entire tune up procedure can be performed very quickly by presetting the controls to their previous positions. As long as the load is constant, the settings should be the same. The following table gives the nominal values for CW operation.

<u>Model</u>	<u>Grid Current</u>	<u>Plate Current</u>
2KD Standard	125mA	... 300mA
3KD Classic ...	180mA	... 450mA

Please keep the following precautions in mind when you operate your amplifier to insure its safe and reliable operation for years to come.

Voltages inside the amplifier can be **LETHAL!!!!** **NEVER** try to disable the protection or interlock circuits designed into the amplifier. **NEVER** operate your amplifier with any of the panels removed.

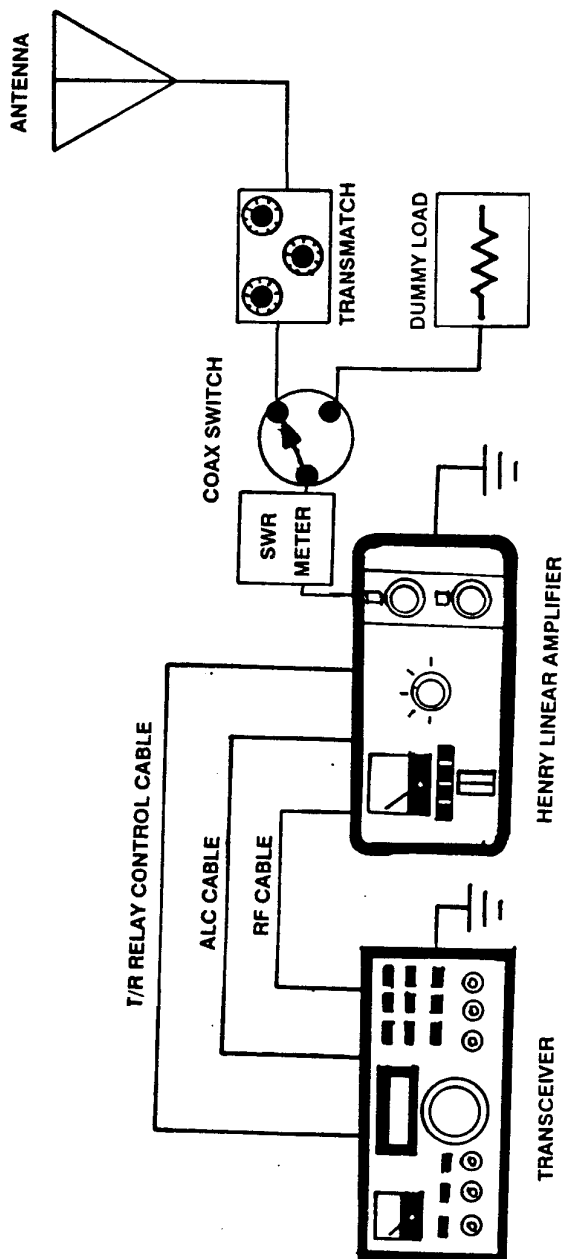
ALWAYS tune the amplifier to resonance at the operating frequency and load it into your antenna or dummy load before transmitting.

NEVER 'hot' switch or switch the BAND switch when the amplifier is keyed. If you do it is

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 6: OPERATION (continued)

FIGURE 3



RECOMMENDED OPERATING CONFIGURATION

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 6: OPERATION (continued)

guaranteed that you will have a very expensive repair bill. Not only does 'hot' switching burn and melt the contacts on the BAND switch, it also melts, cracks and otherwise destroys any capacitors, chokes or tuning inductors in the output circuit. Even the tube can be destroyed. The only other way we have found to wreak an equivalent amount of destruction in an amplifier is through a direct lightning strike.

Be patient; it only takes a few seconds when changing bands to turn the amplifier off, change bands with the BAND switch, pretune for the new frequency with the settings in the calibration table at the back of this manual, turn on the amplifier again, and reresonate and load it for the new frequency.

NEVER operate the amplifier into a load with an SWR greater than 2.0:1.

The components in the amplifier are specifically rated for the service and operating parameters which are listed in SECTION 1. Excessive drive, which in turn causes excessive output will shorten the life of the tube and other components.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 7: MAINTENANCE PROCEDURES

NOTE: Any time you have a problem with your amplifier, be certain to check that it is plugged in and that the fuses are good before you continue troubleshooting. **NEVER** use a higher value fuse than the one specified on the amplifier. If you do, you could cause extensive damage to the unit.

SECTION 7.1: INPUT MISMATCH.....All Henry amplifiers have tuned input networks for each band covered so that there is better than a 2.0:1 SWR between the amplifier and your transceiver. If for some reason you find that there is more than 10 watts of reflected power between your transceiver's output and the input of the amplifier when the amplifier is in transmit mode on one band only, then you will have to retune the input coil for that band where the problem exists. The input coils are adjusted through holes on the rear panel of the chassis and are marked with their corresponding band switch positions.

To tune the input, you must insert an SWR meter or RF power meter that can be configured to read reflected power between your transceiver's output and the amplifier's input. Key your transceiver at the desired operating frequency, and then adjust the input coil for minimum reflected power or minimum SWR in the drive cable.

If the SWR problem appears on every band, you must assume that the input antenna relay is out of its socket, either totally or partially. Also, a short in the coax cable between the input

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 7: MAINTENANCE PROCEDURES (continued)

connector and the RF chassis can cause the same problem.

SECTION 7.2: RELAY PROBLEMS If you see reduced receiver sensitivity in your transceiver when the amplifier is being used, or when the amplifier is turned off and you are operating through the amplifier 'barefoot', you should check the input antenna relay and then the output antenna relay to see if they may have vibrated out of their sockets, or if they may have a bad contact. The output relay on the 3KD Classic will not have this problem because it is a Jennings vacuum relay and is socketless. After you have ruled out either of these possibilities, you must check the input and output coax cables for shorts or intermittent contact.

RESTING CURRENT WHEN AMPLIFIER IS NOT KEYED - If the relay is keyed you will see normal resting current, therefore you must suspect that the relay cable, the transceiver's relay, or one of the amplifier's relays is malfunctioning. Isolate the problem by disconnecting the relay cable. If the problem persists, the cause is in the amplifier. If the problem disappears, then the cause is in the cable or the transceiver. A problem in the amplifier would normally be caused by a short in the relay power supply, or a defective relay.

THE AMPLIFIER WILL NOT KEY - Suspect the relay cable first, then check the transceiver's relay circuit. Henry amplifier's key with either 12VDC (2KD) or 26VDC (3KD). Some modern transceivers use diode switching to perform the

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 7: MAINTENANCE PROCEDURES (continued)

transmit/receive (T/R) function and the forward voltage drop is often high enough that there is not enough current flow to activate the antenna relays in the amplifier. For this reason, a more sensitive relay may be necessary, or a modification to your transceiver may be needed.

Another cause could be that the relay power supply has failed. Check the voltage at the center pin of the relay jack. It should be between 10 and 15VDC (2KD) or between 20 and 30VDC (3KD). If there is no voltage at all, first check the 3AG fuse, then the parts and components of the relay supply, and finally the relays themselves.

SECTION 7.3 TUBE PROBLEMS ...

..... EXCESSIVE PLATE CURRENT - This problem often indicates a bad tube, and the only cure is to replace the tube. The problem can be a partial failure, showing a high resting current, or a total failure, causing the circuit breaker to trip. The failure mode that is most common is a plate to grid short, which usually causes the cathode fuse to blow.

Excessive resting current can also be caused by a failure of the cathode bias circuit. To check whether the bias diode D201 needs replaced, you will need either an old VOM that has both a 9 volt and a 1.5 volt battery or a DVM, a spare 9 volt battery and some clip leads. Before explaining how to test it, I will describe the diode. We have received a great number of phone calls and letters concerning how to test this diode so some explanation is obviously needed. The diode is

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 7: MAINTENANCE PROCEDURES (continued)

NOT a zener diode. It is actually about 15 to 20 pn junction diodes connected in series in a single package, and it is connected in the bias circuit with its polarity opposite of the way you would normally connect a zener diode in the same circuit. Its voltage drop at current levels above 100mA is between 9 and 11 volts. The new DVM's do not apply sufficient voltage to the diode (9 volts) like the old VOM's do in the 10k ohm range, and even in the diode test position available on some of them, cannot cause the diode to conduct under forward bias. This is why you need to use a 9 volt transistor battery to bias the diode into conduction and use the DVM to measure the current. If you find the diode D201 or the resistor in parallel with it, R202, defective, replace them and that should cure the problem of excessive resting current that is not due to a shorted tube.

GRID/FILAMENT SHORT - A failure of this nature can cause the amplifier to show a high plate current even when it is not keyed. Another indication of this problem is a negative grid current reading on the multimeter when you have selected IG on the function switch. The tube must be replaced to solve this problem.

PLATE SHORT - A failure of this nature can cause the amplifier to show high plate current even when it is not keyed. Other high voltage shorts in other parts of the output circuit can also show this symptom, so you must isolate the cause. If the shorted condition causes excessive plate current to flow, the cathode fuse will blow.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 7: MAINTENANCE PROCEDURES (continued)

LOW OUTPUT - Both the 3-500Z and the 3CX1200D7 can offer many years of reliable service if they are operated within their specified ratings. If you operate the amplifier out of resonance, the tubes will eventually go soft, making it impossible to drive the amplifier to its full output.

SECTION 7.4: HIGH VOLTAGE PROBLEMS **CAUTION!!!! THE HIGH VOLTAGE IN THE AMPLIFIER CAN BE LETHAL!!!! ALWAYS DISCONNECT THE AMPLIFIER FROM THE AC POWER SOURCE AND TURN OFF THE POWER AT THE MAIN CIRCUIT BREAKER BEFORE YOU WORK ON THE EQUIPMENT!!!!**

NO PLATE CURRENT WITH EXCESSIVE GRID CURRENT - This is a sure indication of a break in the high voltage line between the power supply and the tube. You **MUST** unplug the amplifier from the AC line before using an ohmmeter to find the break.

HIGH VOLTAGE SHORT - A high voltage short will usually result in the tripping of the circuit breaker. There will often be arc traces indicating the location of the short. Isolate the high voltage short by disconnecting the high voltage lead between the RF deck and the power supply. If when you turn the unit on again with the RF deck disconnected and the short disappears, then the short is in the RF deck or B-return. If the short persists, then the short is in the power supply.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 7: MAINTENANCE PROCEDURES (continued)

If the short is in the RF deck or B- return, remove the top cover from the cabinet, and then the top cover from the RF deck. Look for any visible signs of a short, like burned components discolorations on the chassis walls or floor. Then use an ohmmeter to trace the circuit from the high voltage connector to the blocking capacitors, including the tube. Often, a high voltage short will only show up when a high voltage is applied. To locate such a short, it may be necessary to unsolder leads to remove the components from the circuit one by one until the short disappears. Start with the DC blocking capacitors C202 and C203, then the tube, and finally the RF bypass capacitor, C201. Also check that the shorting switch S203 is disabled or disconnected. With the RF deck cover in place, this switch should be open.

If the problem is in the power supply, you will have to follow the same strategy outlined above. Look for visible signs of a short, such as burned or discolored components or chassis surfaces. Next use an ohmmeter to try and locate the short. Finally, begin removing components one by one until the short disappears. In the case of the power supply being considered here, you would begin with the shorting switch S204, then the filter capacitor, next the bleeder resistors, and finally the diode bridge and the high voltage transformer.

Keep in mind that a high voltage short will very likely blow the cathode fuse, which will need to be replaced.

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 7: MAINTENANCE PROCEDURES (continued)

NO HIGH VOLTAGE METER READING -

The most likely cause is a blown cathode fuse in the RF chassis. After that, the other most likely causes are a failure or value change of the high voltage divider resistor in the power supply, or a failure in the meter circuit.

SECTION 7.5: BLOWER PROBLEMS..... These Henry amplifiers use either a single axial fan (2KD) or two axial fans (3KD). While these fans have an excellent reputation for long life and reliability in the computer industry, and our own testing indicates that they will work well as a cooling fan for tube type amplifiers, we do not have any long term experience with this type of blower, having used the squirrel cage type exclusively for the last 30 years. We decided to try these axial type fans out because of the complaints concerning the noise levels generated by the squirrel cage blowers we normally use. While the axial type fans had a reputation of not being able to sustain their flow rates at high back pressures, we have not found any problems with flow rate in these two amplifiers, the seal temperatures being maintained well below the maximum allowed by the manufacturer. We would appreciate any feedback that you can give us about the long term durability and quietness of these fans in this tube amplifier application.

If the blower is not operating, check the 3AG fuse on the back panel of the amplifier. If the fuse is blown, the dial lights will not come on either.

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SECTION 7: MAINTENANCE PROCEDURES (continued)

SECTION 7.6: OUTPUT PROBLEMS **LOW OUTPUT** - The first thing to check if you are getting low output from the amplifier is to make sure you are getting sufficient drive from your transceiver. When the amplifier is working properly, you will get an amplification factor between 20 and 25 times the input power (13 to 15dB of gain). Some transceivers have a power drop off on the higher frequency bands, therefore the amplifier will show a correspondingly reduced output. Since the amplifier is exceptionally linear, its output varies directly with its input.

The next thing to check is the input and output cabling. An intermittent or shorted drive cable can cause a low or total lack of input to the amplifier. This will usually show up by operating your transceiver through the amplifier with the amplifier turned off (barefoot operation) and measuring the power into and out of the amplifier with a power meter. Low drive can also show up as low grid current during transmit. Also check the output cables. Shorted coax is not uncommon and a poor job of installing the coax connectors can cause severe output problems.

Other problems that can reduce output are low plate voltage, low AC line voltage, and a bad tube.

The amplifier is normally factory wired 115/230VAC 2 wire, 60Hz operation unless you specified it otherwise at the time you ordered your amplifier. If your line voltage is different go to SECTION 4.4 to retap the transformer.

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SECTION 7: MAINTENANCE PROCEDURES (continued)

HIGH VOLTAGE IS LOW - This is most likely caused by the fact that your line voltage is not 115/230VAC. If the high voltage is about half the value listed in SECTION 1, then the jumper board needs to be rewired for 115VAC. If the high voltage is low by only a few hundred volts, the transformer needs to be retapped. The jumper board and tapping information for the ECA - 1403A can be found in SECTION 4.4. This transformer incorporates both the high voltage and filament secondary windings on the same core. Because it is far more important for the filament to be running at the right voltage, check that the filament voltage is in spec. Usually if the high voltage is reading low, the filament voltage will also be low. If your line voltage is less than 230VAC or higher than 250VAC, you will have to replace the transformer. Contact the factory for further information.

HIGH VOLTAGE IS HIGH - If the high voltage is reading about twice as high as the values listed in SECTION 1, you will have to rewire the jumper board for 230VAC. Normally you could not see such a voltage on the meter because other circuits would have blown from overvoltage. If you had the amplifier connected to 230VAC but had the jumper board wired for 115VAC, then you would have blown the transformer as well as the blower(s) and relay transformer. If the high voltage is high by a few hundred volts, then you will have to retap the transformer, with the proviso that you check the filament voltage first. If the high voltage is high, then the filament voltage will also be high. Again, the

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 7: MAINTENANCE PROCEDURES(continued)

filament voltage is more important than the high voltage for proper tube operation, so if the filament voltage is high, you will have to retap the transformer. The transformer is designed so that the high voltage and filament voltage will both be within specification simultaneously with the proper line voltage, but if for some reason you cannot achieve exactly the right filament and high voltage at the same time, then opt for the right filament voltage.

SECTION 7.8: OTHER PROBLEMS.

AMPLIFIER WILL NOT TURN ON - The most likely cause of this problem is that the circuit breaker has failed. Check the continuity of the circuit breaker with an ohmmeter. Another cause is the improper installation of the power plug on the power cable. If the high voltage comes on, but the dial lights, blower(s) and relay supply do not, the 3AG fuse has blown.

ALC CIRCUIT SHORTED - A defect in the ALC circuit will prevent the tube from being driven to full output. Disconnect the ALC cable and turn the ALC control fully counter clockwise to see if the short is in the ALC cable or in the amplifier's ALC circuit. Use an ohmmeter to trace the ALC circuit to find the defective component.

FILAMENT VOLTAGE FAILURE - With a glass envelope tube, you can visually check that the filament is functioning properly, but with a ceramic/metal tube, it is not so easy. If the filament is lit, the air flow from the exhaust port on the top of the amplifier should feel warm as

HENRY 2KD STANDARD/3KD CLASSIC OPERATING AND MAINTENANCE MANUAL

SECTION 7: MAINTENANCE PROCEDURES(continued)

the filament dissipates about 150 watts. Another check is if the amplifier draws any resting current when it is keyed without any drive. If it doesn't, then the filament is not lit. If it does, then it is lit. The filament power passes through a terminal block into the RF deck, so if you suspect that you are not getting any filament power, check that these wires are firmly attached. After that, check the filament choke on the bottom of the RF deck, or a bad contact on the tube socket. Finally, check the continuity of the filament itself with an ohmmeter to see if the filament may have burned out (very rare for the 3CX1200 series tubes).

If you have questions concerning the service of your amplifier, you should call or write to the Service Department at the factory at Henry Radio. If it becomes necessary for you to return your amplifier to the factory for repair, you should pack the equipment in the proper packing material and shipping container (if you saved the original shipping container and packing, that would be ideal), and include a short letter describing the problem. Insure the package for the replacement cost of the merchandise, and ship the amplifier to our Amplifier Service Department. Ceramic/metal power tubes can be shipped in their sockets in the RF deck, glass envelope tubes should be unplugged and packed separately. The phone number and shipping address for Henry Radio are: 213-820-1234

2050 South Bundy Drive
Los Angeles, CA 90025

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SECTION 8: DISASSEMBLING YOUR AMPLIFIER

The description of this procedure uses screw numbers which are shown in Figure 4. Refer to that drawing as necessary.

CAUTION: Unplug the amplifier from the AC line before starting this procedure.

REMOVE THE TOP PANEL - Remove screws 4, 5, 11, 12, and pull the top perforated, painted panel off of the amplifier.

REMOVE THE BACK PANEL - Remove screws 10, 13, 14, and 15 and pull the the back panel away from the power supply section.

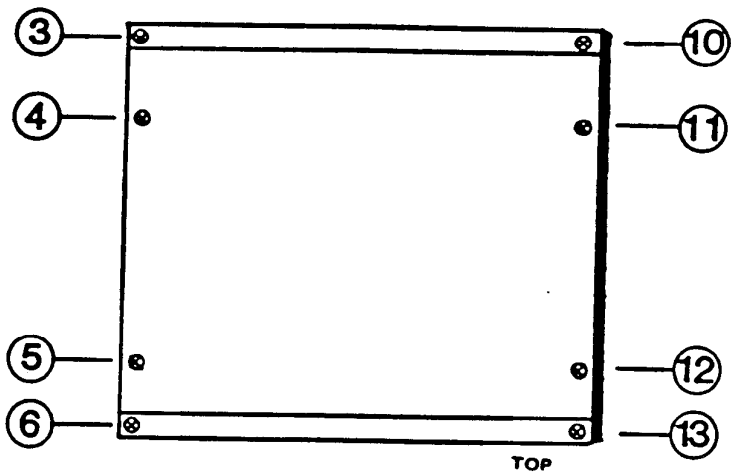
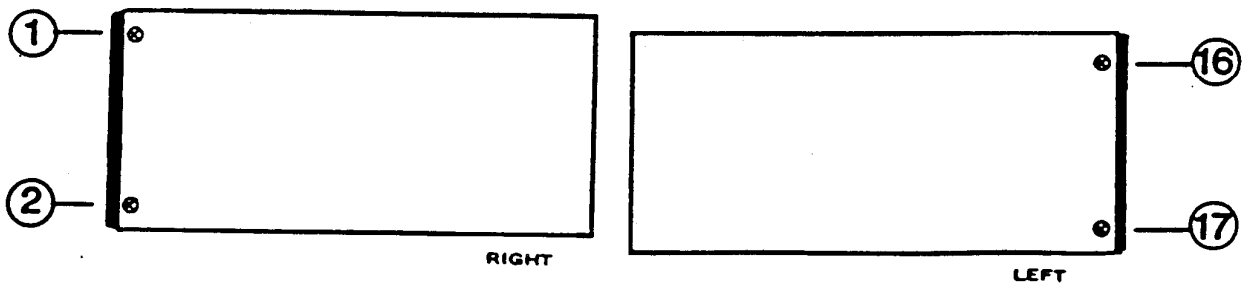
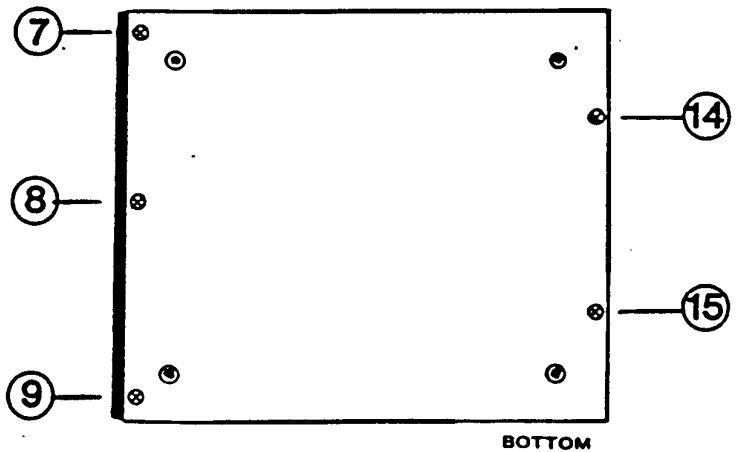
REMOVE CABLES - Dissconnect the all of the cables between the RF deck/power supply sections and the front panel.

REMOVE THE RF DECK - First remove the **BAND**, **TUNE**, and **LOAD** knobs from their respective shafts. The RF deck should now slide out the back of the wraparound. Most service can now be accomplished without any further disassembly. The front panel can now be reached from both sides, the RF deck from the top and bottom, and the power supply from the front, back, left side and top.

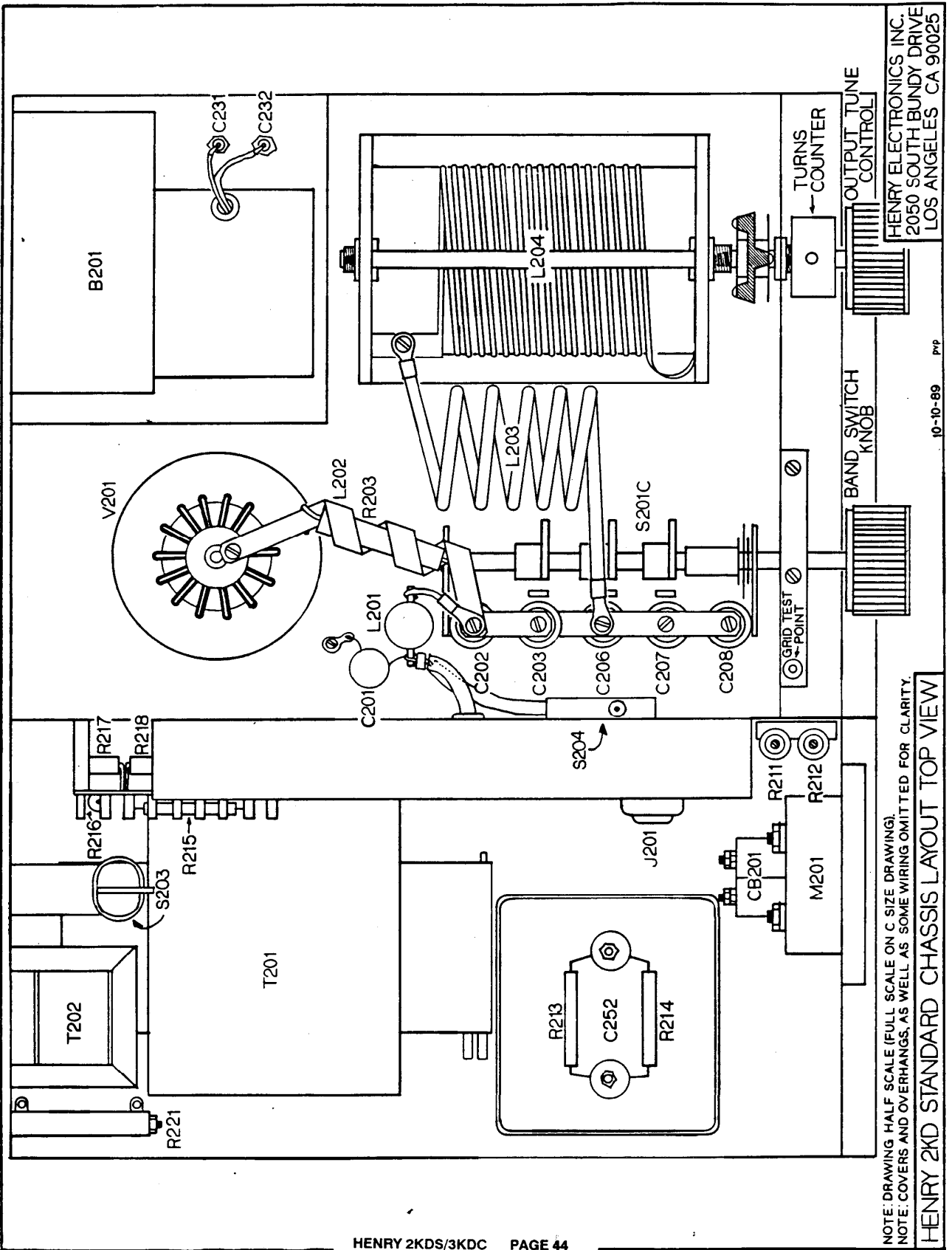
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SECTION 8: DISASSEMBLING YOUR AMPLIFIER (continued)

FIGURE 4

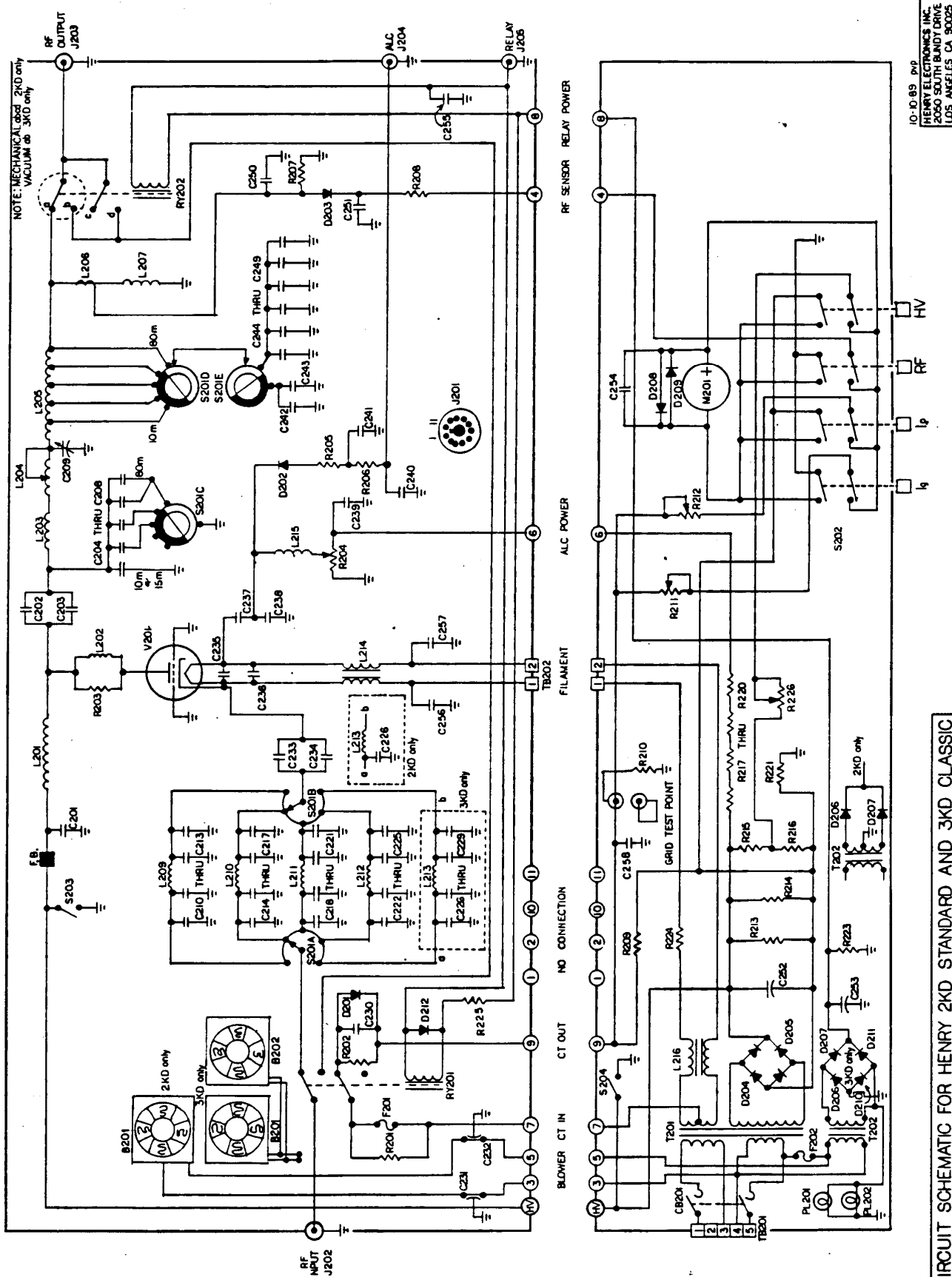


LAYOUT DRAWINGS, SCHEMATICS AND TUBE DATA SHEETS



HENRY ELECTRONICS INC.
 2050 SOUTH BUNNY DRIVE
 LOS ANGELES CA 90025

10-10-89 P/P



10-10-89 DVP
HENRY ELECTRONICS INC.
2050 SOUTH BUNDY DRIVE
LOS ANGELES CA 90025

SECTION 10: PARTS LISTS

PARTS LISTS FOR HENRY 2KD STANDARD AND 3KD CLASSIC

C201	Ceramic Disc, 0.0047uF, 6kVDC	Sprague 8220KD
C202,C203	Ceramic Transmitting, 1000pF, 5kVDC	ITT Jennings 700002
		HEC HH58-8833
C204, C205	Ceramic Transmitting, 25pF, 7.5kVDC	ITT Jennings 700024
		HEC HT50-8837
C206	Ceramic Transmitting, 75pF, 7.5kVDC	ITT Jennings 700018
		HEC HT50-8211
		HEC HT50-8221
		HEC HT50-8228
		HEC HT50-8513
		HEC HT50-8513
		HEC HT50-8519
C207, C208	Ceramic Transmitting, 100pF, 7.5kVDC	ITT Jennings 700066
		HEC HT50-8729
		HEC HT50-8740
		HEC HT50-8819
		HEC HT50-8836
C209	Air Variable, 500pF, 2kVDC.....	Henry 154-10J
C210	Mica, 560pF, 500VDC, (2KD)	Arco DM15-561J
	Mica, 200pF, 500VDC, (3KD).....	Arco DM15-201J
C211	Mica, 560pF, 500VDC, (2KD)	Arco DM15-561J
	Mica, 10pF, 500VDC, (3KD)	Arco DM15-100J
C212	Mica, 430pF, 500VDC, (2KD)	Arco DM15-431J
	Mica, 300pF, 500VDC, (3KD)	Arco DM15-301J

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SECTION 10: PARTS LISTS (continued)

CAPACITORS (continued)

C213	Mica, 470pF, 500VDC, (2KD).....	Arco DM15-471J
	Mica, 68pF, 500VDC, (3KD)	Arco DM15-680J
C214	Mica, 250pF, 500VDC, (2KD).....	Arco DM15-251J
	Mica, 200pF, 500VDC, (3KD)	Arco DM15-221J
C215	Mica, 250pF, 500VDC, (2KD).....	Arco DM15-251J
	Mica, 82pF, 500VDC, (3KD)	Arco DM15-820J
C216	Mica, 200pF, 500VDC, (2KD).....	Arco DM15-201J
	Mica, 220pF, 500VDC, (3KD)	Arco DM15-221J
C217	Mica, 200pF, 500VDC, (2KD).....	Arco DM15-201J
	Mica, 68pF, 500VDC, (3KD)	Arco DM15-680J
C218	Mica, 220pF, 500VDC, (2KD).....	Arco DM15-221J
	Mica, 220pF, 500VDC, (3KD)	Arco DM15-221J
C219	Mica, 220pF, 500VDC, (2KD).....	Arco DM15-221J
	N/A, (3KD)	
C220	Mica, 120pF, 500VDC, (2KD).....	Arco DM15-121J
	Mica, 100pF, 500VDC, (3KD)	Arco DM15-101J
C221	Mica, 120pF, 500VDC, (2KD).....	Arco DM15-121J
	Mica, 75pF, 500VDC, (3KD)	Arco DM15-750J
C222	Mica, 91pF, 500VDC, (2KD).....	Arco DM15-910J
	Mica, 120pF, 500VDC, (3KD)	Arco DM15-121J
C223	N/A, (2KD)	
	N/A (3KD)	
C224	Mica, 91pF, 500VDC, (2KD).....	Arco DM15-910J
	Mica, 75pF, 500VDC, (3KD)	Arco DM15-750J
C225	N/A, (2KD)	
	N/A, (3KD)	
C226	Mica, 50pF, 500VDC, (2KD).....	Arco DM15-500J
	Mica, 100pF, 500VDC, (3KD)	Arco DM15-101J
C227	N/A, (2KD)	
	N/A, (3KD)	
C228	N/A, (2KD)	
	N/A, (3KD)	
C229	N/A, (2KD)	
	Mica, 51pF, 500VDC, (3KD)	Arco DM15-510J
C230	Ceramic Disc, 0.01uF, 600VDC	Centralab DD6-103

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SECTION 10: PARTS LISTS (continued)

CAPACITORS (continued)

C231, C232	Feedthrough, 2000pF, 600VDC ..	Erie 2000M Tusonix 202M
C233-C236	... Ceramic Disc, 0.01uF, 600VDC.....	Centralab DD6-103
C237, C238	... Mica, 47pF 500VDC	Arco DM15-470J
C239-C241	... Ceramic Disc, 0.01uF, 600VDC.....	Centralab DD6-103
C242-C249	... Ceramic Transmitting, 100pF, 7.5kVDC	ITT Jennings 700066 HEC HT50-8729 HEC HT50-8740 HEC HT50-8819 HEC HT50-8836
C250	Mica, 220pF, 500VDC	Arco DM15-221J
C251	Ceramic Disc, 0.02uF, 150vdc	Centralab DDM-203
C252	Oil Filled, 25uF, 4kVDC	Aerovox BD402EW02
C253	Electroltic, 470uF, 50VDC	Arco ME-470-50 CDE WBR-470-50
C254-C258	Ceramic Disc, 0.01uF, 600VDC	Centralab DD6-103

DIODES

D201.....	... Regulator, Non-zener type, 10VDC, 2A	PTI 12105408
D202.....	... Rectifier, 200PIV, 1.0A	1N458
D203.....	... Rectifier, 1000PIV, 1.0A.....	1N4007
D204, D205 ..	... Rectifier, 15kV PIV, 1.2A.....	CSdC 45XV246
D206, D207 ..	... Rectifier, 200PIV, 1.0A	1N4004
D208, D209 ..	... Rectifier, 1000PIV, 1.0A.....	1N4007
D210, D211 ..	... Rectifier, 200PIV, 1.0A	1N4004
D212.....	... Freewheeling Diode, 1000PIV, 1.0A	1N4007

INDUCTORS

L201	 Plate Choke, 25uH, 2A	Henry 2KD STD-L201
L202	 Plate Parasitic Suppressor Choke	Henry 2KD STD-L202
L203	 10 Meter RF Coil	Henry 2KD STD-L203
L204	 Rotary Inductor, 13uH, 6A	Henry 2KD STD-L204
L205	 L Section Coil	Henry 2KD STD-L205

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SECTION 10: PARTS LISTS(continued)

INDUCTORS(continued)

L206	RF Power Sensor Pickup Coil	Henry 2KD STD-L206
L207	RF Choke, 2.5mH, 250mA	Miller 4555
L208	N/A	
L209	Input Coil, 3.5MHz Band, (80 Meters)	Henry 2KD STD-L209
L210	Input Coil, 7.0MHz Band, (40 Meters)	Henry 2KD STD-L210
L211	Input Coil, 14.0MHz Band, (20 Meters)	Henry 2KD STD-L211
L212	Input Coil, 21.0MHz Band, (15 Meters)	Henry 2KD STD-L212
L213	Input Coil, 28.0MHz Band, (10 Meters)	Henry 2KD STD-L213
L214	Filament Choke	Henry 2KD STD-L214
L215	RF Choke, 2.5mH, 250mA	Miller 6302
L216	Filament Surge Suppressor Choke, (3KD) ..	Henry 3KD CLC-L216

RESISTORS

R201	Carbon, 10k Ohms, 2 Watts, 10%	Resistor
R202	Carbon, 220 Ohms, 2 Watts, 10%	Resistor
R203	Precision, 50 Ohms, 10 Watts, 1%	Resistor
R204	Potentiometer, 100k Ohms, 5 Watts, 5%	Resistor
R205	Carbon, 1k Ohms, 1 Watt, 10%	Resistor
R206	Carbon, 68k Ohms, 1 Watt, 10%	Resistor
R207	Carbon, 1.8k Ohms, 1/2 Watt, 10%	Resistor
R208	Carbon, 100 Ohms, 1/2 Watt, 10%	Resistor
R209	Wirewound, 50 Ohms, 10 Watts, 5%	Resistor
R210	Wirewound, 1 Ohm, 10 Watts, 5%	Resistor
R211	Potentiometer, 10k Ohms, 5 Watts, 5%	Resistor
R212	Potentiometer, 1000 Ohms, 5 Watts, 5%	Resistor
R213, R214	Precision, 5M Ohms, 7.5 Watts, 1%	Resistor
R215	Precision, 4M Ohms, 7.5 Watts, 1%	Resistor
R216	Carbon, 10k Ohms, 2 Watts, 10%	Resistor
R217, R220	Carbon, 1.2M Ohms, 2 Watts, 10%	Resistor
R221	Wirewound, 200 Ohms, 20 Watts, 5%	Resistor
R223	Carbon, 150 Ohms, 2 Watts, 10%	Resistor
R224	Precision, 0.1 Ohms, 50 Watts, 1%	Resistor
R225	Carbon, 120 Ohms, 2 Watts, 10%, (3KD)	Resistor
R226	Potentiometer, 10k Ohms, 2 Watts, 5%	Resistor

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SECTION 10: PARTS LISTS(continued)

TRANSFORMERS

T201	Combined HV and Filament Supply Transformer	ECA 1403A
T202	Relay Supply Transformer, (2KD)	ECA 1161
	Relay Supply Transformer, (3KD)	ECA 1199

MISCELANEOUS

CB201	 Circuit Breaker, 250VAC, 30A	P&B W92X11-2-30
F201 ..	 Fuse, 8AG type, 1.5A, 250VAC.....	Littelfuse 361-001.5
	Fuseholder, 8AG type	Littelfuse 348-875
F202	 Fuse, 3AG type, 3A, 250VAC	Littelfuse 312-3
	Fuseholder, 3AG type	Littelfuse 342-004
J201	 Harness Connector, 11 pin Socket	Amphenol S-3308
	Harness Connector, 11 pin Plug	Amphenol P-3308
J202	 RF Input Connector, BNC type.....	Amphenol UG209
J203	 RF Output Connector, UHF type	Amphenol SO-239
J204, J205	 ALC Jack, Relay Jack, RCA type	Switchcraft 3501FP
M201	 Multimeter, 0 - 1mADC Movement	Beede 913104
PL201, PL202	 Dial Lights	Sylvania 1829
RY201	 Relay, Air type, 12VDC DPDT, (2KD and 3KD)	Guardian 1365PC
RY202	 Relay, Air type, 12VDC DPDT, (2KD)	Guardian 1365PC
	Relay, Vacuum type, 26VDC, SPDT, (3KD)	ITT Jennings RJ2B
	Relay Socket	Guardian 1365PC
S201A, S201B	 Band Switch, Input Section	Centralab 2504
S201C, S201D	 Band Switch, Output Section	Henry 2KD STD-S201
S202	 N/A.....	
S203	 High Voltage Shorting Switch	Henry 2KD STD-S203
S204	 High Voltage Shorting Switch	Henry 2KD STD-S204

TUBE

V201	Glass Envelope Power Grid Tube, (2KD	Eimac 3-500Z
	Ceramic/Metal Power Grid Tube, 3KD)	Eimac 3CX1200D7
	Tube Socket	Doleatto 4105
	Chimney	Henry
	Plate Cap/Heat sink for 3-500Z ..	Henry

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SECTION 1 TUNE AND LOAD SETTINGS

The following table contains the factory calibrated dial settings and related meter readings for your amplifier. These settings are for tuning up into a 50 Ohm non reactive dummy load. If you are tuning up into an antenna, or the line voltage at your operating location is different from 115/230VAC, then the settings will vary.

MODEL: 3KD Classic SERIAL NUMBER: _____

SECTION 11.1: FACTORY CALIBRATION DATA, CW OPERATION

FREQUENCY	TUNE	LOAD	GRID mA	PLATE mA	OUTPUT WATTS
28.5	17.0	70			
21.3	15.1	68			
14.2	13.1	52			
7.2	08.9	29			
3.8	03.7	40			

SECTION 11.2: FACTORY CALIBRATION DATA, SSB OPERATION

FREQUENCY	TUNE	LOAD	GRID mA	PLATE mA	OUTPUT WATTS

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SECTION 12: WARRANTY

SECTION 12.1: LIMITED WARRANTY - Henry Radio warrants each new Henry amplifier to be free from defective materials and workmanship and agrees to remedy such defects or to furnish a new part in exchange for any part or unit which under normal installation, use and service, discloses such defects, provided that the defective part or unit is returned intact by the original owner to us for examination, with all transportation costs prepaid to our factory, within 90 days from the date of sale to the original purchaser, and provided that such examination, in our judgement, shows that it is thus defective. Should a malfunction be suspected, write in detail to our service department for suggestions concerning the operation, repair or return of your unit if it should prove necessary.

EXCLUSION: Henry Radio does not warranty vacuum tubes used in our equipment. Eimac tubes are warranted by Eimac on a pro-rated one year basis. All other tubes are not warranted.

EXCLUSION: Warranty claims will only be honored when accompanied by proof of purchase which shows the purchase date.

EXCLUSION: The warranty does not extend to any of our radio products that have been subjected to misuse, neglect, accident, incorrect wiring not of our own, improper installation, or use in violation of the instructions furnished by us. It does not extend to units which have been repaired or altered outside of the the factory without our written permission, where the serial number has been changed, defaced or removed, or the unit was used with accessories not manufactured by us or recommended by us in writing.

The above warranty does not include incidental or consequential damages and the distributor disclaims any liability for any such damage. All implied warranties, if any, are limited in duration to the above stated 90 day warranty period. Some states do not allow the exclusion or limitation of incidental or consequential damages or on how long the implied warranty lasts, so the above limitations may not apply to you.

Henry Radio reserves the right to make improvements to its products which it may deem desirable without obligation to install such improvements in its previously sold products.