AMERITRON ALS-500M

500 WATT *NO TUNE*
SOLID STATE MOBILE AMPLIFIER

INSTRUCTION MANUAL

The Ameritron ALS-500M is a 500 watt PEP output solid state linear amplifier using rugged, conservatively rated bipolar RF devices in the power output section. The ALS-500M operates at full power with continuous frequency coverage from 1.5 through 21.6 MHz. This amplifier requires no tuning adjustments. Broad band 5 pole filter provide output harmonic suppression in excess of 60 dB for all frequencies above 8 MHz, and more than 70 dB on all TV channels. Export modifications are available to extend operation to 30 MHz with a copy of a valid amateur license.

The ALS-500M uses two pairs of 2SC2879 transistors operating at 13.8 volts nominal in a push-pull output configuration. High quality RF components combine with load fault sensing, temperature protection, and one switch frequency selection to make this one of the simplest and easiest to operate amplifiers today. The ALS-500M operates on 13.8 Vdc electrical systems and draws a peak current of 80 amperes at full output.

<u>WARNING</u>: THIS AMPLIFIER IS DESIGNED FOR USE IN VEHICLES WITH NEGATIVE GROUND 12 VOLT ELECTRICAL SYSTEMS ONLY. The battery should be maintained between 13.8 and 16.5 volts dc.

PLEASE READ THIS MANUAL BEFORE OPERATING THIS EQUIPMENT !

AMERITRON

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ALS-500M FEATURES

1. Rugged devices.
The ALS-500M uses four rugged linear RF power devices.

2. Fast warm-up time.
The ALS-500M has no vacuum tubes to warm-up.

3. No tune operation.
Tuning adjustments are not necessary. A simple one knob selector switch permits operation on frequencies between 1.5 and 21.6 MHz.

4. Load Fault Protection
The PA load impedance is monitored and the amplifier is bypassed if the bandswitch setting or the external load is incorrect.

5. Current meter.
The ALS-500M has a DC current meter to monitor collector current.

6. Off/On switch.
This switch allows the amplifier to be by-passed for "bare-foot" operation without disconnecting the high current leads.

7. Remote Off/On control.
A separate connection on the power connector allows low current control of the amplifier Off/On function for remote mounting.

8. Remote A and B.
Ports A and B are for connecting the ALS-500RC. The ALS-500RC is a remote control head that allows the amplifier to be located away from the operating station and still have access of the front panel controls.

9. Compact size.
The ALS-500M weighs only 7.5 pounds and measures 3 3/4"H x 9"W x 15 1/2"D .

GENERAL INFORMATION

Load Fault Circuit
The ALS-500M features a load fault trip circuit that bypasses the amplifier if the amplifier frequency switch is set to a lower frequency range than the exciter or if the load reflected power exceeds 70-100 watts. This circuit virtually eliminates the danger of component failures due to operating errors.

The Combiner circuit board near the PA contains the components that sense the reflected power at the input of the low-pass filters used in the output circuit. Selecting a filter that has a cut off frequency below the operating frequency or operating into loads with reflected power levels that exceed 70-100 watts will trip the overload and bypass the amplifier. SCR (Q5) on the Bias board keeps the amplifier "locked out" until the **POWER (ON/OFF)** switch is cycled off and on.

Bias Control Circuits
The Bias board contains the temperature and bias control circuitry. The output transistor temperature is monitored with diodes D1 and D2 on the PA module. The voltage drop across the diodes decreases as the PA transistor temperature rises. The reduction in diode voltage with increasing temperature causes IC 1c/d to reduce the PA base bias current supplied by Q2/3. Diodes D1/2 on the bias board limit the available bias voltage if a failure in the bias circuit occurs.

IC 1a compares the voltage from the Power Amplifier temperature diodes to the reference voltage from the temperature sensitivity control R28. If the temperature becomes too high (voltage too low) IC 1a switches high and Q4 turns the cooling fan on. If the temperature continues to increase IC 1b will eventually pull low and the voltage for the transmit relay and the bias voltage will be removed. The **THERMAL OVERLOAD** LED is illuminated when the output of IC 1b is low. This circuit automatically resets when the temperature drops to a safe operating range.

If the band switch is in the wrong position, the antenna SWR is high, or the amplifier is being driven into non-linear operation a "load fault" will occur. When a load fault occurs gate voltage is applied to SCR Q5. This causes Q5 to latch in a conducting state. Q5 will remain in this condition and the amplifier's relay line will be disabled until the **OFF/ON** switch is cycled off and on. The **LOAD FAULT** LED on the front panel is illuminated whenever SCR Q5 is in conduction and the amplifier is bypassed from a load fault.

Drive Power
The ALS-500M normally requires much less than 100 watts of drive to produce full output power. This drive power varies considerably with the gain of the transistors used in the amplifier and the power supply voltage. As a general rule, exceeding 100 watts of drive for long periods of time may cause component failures. Exceeding 70 watts of peak drive power may cause distortion and increase the bandwidth of the transmitted signal.

Supply Voltage

Low voltage solid state amplifiers are very sensitive to power supply voltage changes. For maximum performance, the voltage should be maintained as high as possible consistent with component life. The devices used in this amplifier have demonstrated excellent life with supply voltages up to 16 volts, and will produce the rated output power at 14 volts dc. The output power will decrease by approximately ***85 watts per volt*** as the supply voltage is lowered from 14 to 12 volts.

SWR Considerations

SWR (Standing Wave Ratio) causes higher voltages and/or currents to appear at the output connector of the amplifier. This problem occurs with all amplifiers regardless of whether tubes or semiconductors are used in the output stage.

The devices used in the ALS-500M have very good overload tolerance. The low pass output network in the ALS-500M not extremely sensitive to load impedance changes. This makes the ALS-500M less sensitive to frequency and SWR changes than many other similar amplifiers. The multiple section output network and push-pull output configuration used in the ALS-500M also offers excellent harmonic suppression.

The only danger presented by a high SWR is that the current and power dissipation in the output devices may exceed safe limits. This can result in heat damage and failure of the amplifying devices. If the SWR exceeds 2:1 the power level should be reduced until the reflected power is 60 watts or less. At approximately 70 watts of reflected power the internal safety circuitry will disable the amplifier.

Periodic Maintenance

The lack of high voltage in this unit eliminates the chance of dirt and dust causing high voltage arcing in this unit. The only deleterious effect of dust and dirt is a reduction in cooling efficiency. The primary maintenance requirement is to monitor the amount of dirt and dust in the amplifier, and remove the dust and dirt before cooling problems begin. Low pressure compressed air can be used to blow the dust out of this amplifier whenever a noticeable accumulation of dust builds up.

A soft bristled brush and a small amount of alcohol can be used to clean stubborn dust from the fan or the other components. Be careful not to get any cleaning compounds on relay contacts or in switches. If it becomes necessary to perform maintenance on any switch or relay contact Ameritron. Ameritron has free technical support for customers that wish to service their own equipment.

Technical Assistance

Ameritron has free technical information bulletins that provide assistance with the most common operational problems. Technical assistance is also available by calling (662) 323-8211 or FAX (662) 323-6551 during our normal business hours (8:00 to 4:30 Central Time on weekdays) for questions that are not properly addressed by the technical bulletins. Ameritron's policy is to provide complete technical support to our customers. Before calling, please have the following information available:

1. The model and serial number the unit.
2. The date of purchase and the dealer.
3. A brief description of the station equipment and antenna system.
4. A complete description of the problem along with all meter readings.

Written assistance is also available. Due to time delays in processing mail, please allow a minimum of three weeks for a written reply. Send questions to: Ameritron**,** 116 Willow Road, Starkville, MS 39759

Export Modifications
A simple modification will allow operation on frequencies above 22 MHz. A parts kit to make this modification is available by sending a written request for an MOD-10M export modification kit along with a copy of your valid amateur license to the Ameritron. There is a charge for this kit. Export models are shipped with this modification installed and have an "X" following the serial number.

INSTALLATION

Location
Do not locate this amplifier in excessively warm locations, near heater vents, or in unventilated areas with ambient temperatures exceeding 120 degrees Fahrenheit. Be sure that air can circulate freely around and through the amplifier cabinet. Do not obstruct the air inlet at the right front side of the amplifier or the outlet air holes on the lower left side of the amplifier.

When not using the ALS-500M remote control head the best location for this amplifier is one that allows the meter to be easily read and the controls accessed during operation. The length of each 13.8 volt high current cable is very important. Every consideration should be given to keeping the high current battery lead lengths as short as practical. ***This includes the ground leads to the battery and the ground lead to the vehicle's chassis.***

The lengths of the remaining low current power and control cables are not critical. The relay control lead can be made from any good quality two wire cable. Low level audio type cables sold for stereo and VCR use are ideal for the relay connection. The RF cables should be kept as short as practical.

Power Requirements
This amplifier requires 11-18 volts positive at low current (less than 4 amperes) for the control and bias circuits. This is a non-critical voltage. The voltage applied to the low current control line will not affect the performance of the amplifier if it is within the specified range. The control line is the small red wire that connects between pin 10 of the power connector and the 5 ampere fuse.

The heavy RED conductors and the black battery return and chassis ground conductors must carry the full peak current of the amplifier. This current can reach 80 amperes on voice peaks or 40 amperes of average current. This large current is split between the two large RED wires leaving pins 3 and 4 of the power connector. The ground connections from pins 11 and 12 must also carry this current. It is extremely important to minimize the voltage drop across these conductors. For maximum performance, all of the high current leads (including the ground leads) must be kept as short as possible.

The following chart gives the approximate peak voltage drop in volts per foot of a single supply wire with 40 amperes of current. Remember the ground wires also carry high current. This chart assumes that the chassis ground of the vehicle has negligible resistance, and that the negative lead to the battery is the same wire gauge as the positive supply leads. The chart on page 5 indicates the maximum length of each individual wire for full performance:

AWG (single conductor)	Voltage Drop at 40 amps	Maximum Length For Full Performance
10 gauge	0.04 V/ft	5 ft.
8 gauge	0.025 V/ft	8 ft.
6 gauge	0.015 V/ft	12 ft.
4 gauge	0.01 V/ft	20 ft.

For best performance the voltage drop at maximum power in the high current power and ground leads should be limited to a 0.2 volt maximum. Refer to the Interconnections section for information on the wiring and fuse requirements of this amplifier.

Fuse Holder Installation

Included in the wire harness bag are 3 fuses and fuse holders. Install these fuse holders *at the battery or electrical system voltage source* after the power harness wires have been routed to their final destinations.

The cartridge type low current fuse holder is for the red low current power lead. Use 3AG type (automotive glass) 5 ampere fast blow fuses for this lead. This holder is usually shipped with the lead connected to both sides of the holder. Cut the lead in the middle and remove 1/2 inch of insulation. Connect the short side of the holder (without a spring) to the lead from the amplifier. If a remote on/off switch other than the ALS-500RC is used it should be installed between this fuse and the amplifer. Connect the long side of the holder to an ignition key switched source or to a positive battery lead. A switched source can usually be obtained from a fuse in the fuse box (radio or accessory) or a convenient wire under the dash. Use wire nuts or solder and tape all connections.

The plug-in fuse holders and 30 ampere fuses are for the red high current power leads. Do not insert any fuses until wiring is complete. These holders have Teflon coated 12 gauge leads. They can be used for any size of power lead because their length is short. Solder **one** lead of each holder to one of the lugs supplied. Install the lugs over the starter solenoid post that connects to the battery or over the bolt that secures the positive battery terminal. Use a separate nut to secure the lugs to avoid disturbing battery connections if possible.

Connect the other lead of each 30 ampere fuse holders to the heavy gauge power leads by stripping, twisting, and then soldering the leads together. Bare wires should be wrapped with several layers of electrical tape. Be sure to dress all amplifier leads so that they are not exposed to sharp edges, high temperatures, or moving parts. After wiring is completed install the fuses.

Auxiliary Battery Installation

If possible, avoid the use of an auxiliary storage battery. Ameritron does not assume any liability and does not recommend the use of an auxiliary battery. The individual installation is left entirely up to the installer. The following suggestions will increase the safety of the installation.

The positive lead that connects the auxiliary battery to the main battery should be fused at both ends with automotive type fuse links rated at 75 to 100 amperes. The positive power cable that connects the

batteries should be number 6 AWG automotive type cable. The negative return can usually be made through the chassis of the vehicle.
The battery should be securely mounted in a *well ventilated* area. The hydrogen gas that forms when the battery is charging can be *explosive* if trapped in a confined area. Remember that hydrogen gas rises, and it can be trapped in the top of any compartment. Vents must exit vertically above the area to be ventilated. Ventilation holes *below* the battery do not remove the hydrogen gas.

The battery mounting must be secure and outside the passenger compartment of the vehicle. A poorly secured battery can be a lethal projectile in a collision. A suitable battery box can be obtained from marine accessory stores. ***WARNING: The installation of a second battery increases the hazard of fire or explosion in an accident!!***

GROUNDING

Unibody Vehicles
The amplifier ground connection should attach to a large fixed body panel of the vehicle. ***Never*** depend on a connection made to the dash board, doors, trunk or hood of a vehicle for grounding. Use the heaviest and shortest connections possible. The best conductors for all ground connections are ***densely*** woven copper braiding or heavy stranded cable that is rated to safely carry 100 amperes. Multiple ground connection points are usually superior to a single ground connection point.

The negative terminal of the battery is almost always directly grounded to the engine block of the vehicle. This prevents the high starter motor currents from flowing through the engine and drive line bearings. To be sure that the high amplifier current does not flow through the driveline of the vehicle, and to minimize the voltage drop in the negative supply lead, the body (chassis) of the vehicle must be securely grounded to the engine.

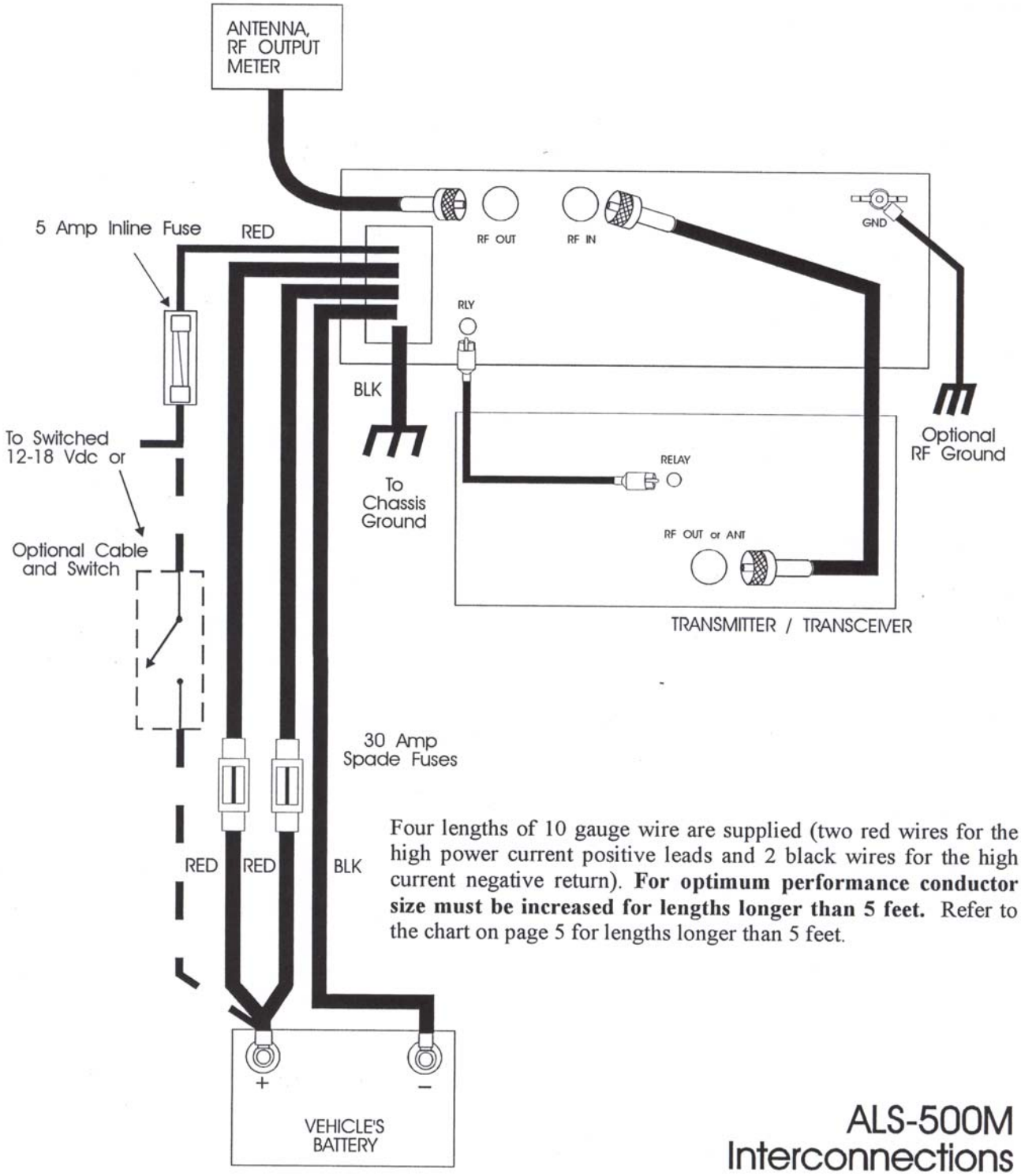
The engine block of the vehicle is almost always poorly grounded to the body of the vehicle. This is usually accomplished by a small gauge wire that connects the negative post of the battery to the chassis of the vehicle. Remember that the manufacturer of the vehicle calculated the size of the grounding conductors to only handle the normal accessory electrical load of the vehicle. Improvements to this ground are mandatory. Improving this ground will also reduce ignition noise and help prevent interference or damage to the sensitive control devices in modern vehicles. This ground can be improved by connecting a heavy ground wire from the chassis or frame to an engine accessory mounting bolt (such as an alternator mounting bracket bolt) or to the same engine bolt that the manufacturer uses for the negative battery cable.

WARNING: Never ground the negative battery post of the battery directly to the vehicle frame.
Never install a ground under any bolt unless you are sure the bolt connects to the engine block. Be sure the bolt does not have a critical mechanical function.

The head gasket of an engine may fail and severely damage the engine if a soft lug or washer is placed under a head bolt. Bolts can NOT be properly torqued against the soft materials used in electrical lugs.

Frame-Type Vehicles
Vehicles with frames often have rubber body mounts that insulate the body from the frame. The vehicle designers do this to minimize noise, vibration and harshness. The bodies of vehicles that use

insulating body mounts must have flexible strapping connected between the body and the frame at all four corners of the body. This includes pick-up truck beds.



Four lengths of 10 gauge wire are supplied (two red wires for the high power current positive leads and 2 black wires for the high current negative return). **For optimum performance conductor size must be increased for lengths longer than 5 feet.** Refer to the chart on page 5 for lengths longer than 5 feet.

ALS-500M Interconnections

INTERCONNECTIONS

1. The negative battery lead must be disconnected from the battery post.

2. The positive battery terminal must be disconnected from the positive battery post.

3. Add a heavy ground strap from the engine block or the battery's negative lead to the chassis of the vehicle.

4. The **long heavy black ground lead** on the amplifier power plug should be connected to battery's negative ground cable terminal. Please note this cable is slightly longer than optimum for the 10 gauge wire supplied.

5. Connect the **short black ground lead** from the amplifier power plug directly to the vehicle's chassis.

6. Both of the **heavy red positive high current leads *must*** be fused *at the battery* with two 30 ampere fuses. Each lead will carry 40 amperes peak (20 amperes average) during normal operation of the amplifier. Two 30 ampere spade type fuses, PN 755-1730, fit into fuse holders supplied with this amplifier. See page 5 for fuse holder installation instructions. Please note this cable is slightly longer than optimum for the 10 gauge wire supplied.

   Note: If using as a fix station with two supplies in parallel, remove the jumper from pins 3 and 4 of the power plug inside of amplifier.

7. The **red low current power lead** must connect to the positive battery supply through a 5 ampere fuse, PN 755-1405. This lead will reset a LOAD FAULT condition if power is momentarily interrupted and restored. This lead can also provide a remote operate - standby function. This can be accomplished by connecting a remote switch in series with this lead. Connecting this lead to a permanent voltage source without a series off-on switch will result in a battery drain of a few milliamperes if the amplifier's **POWER** switch is accidentally left "ON". This lead should be connected to a manually switched electrical system lead for controlling the off-on function, an ignition key switched power source, or through a combination of the two.

8. Connect the RF output (antenna) of the exciter to the **RF IN** (SO-239) of the ALS-500M with a good quality 50 ohm cable capable of handling 100 watts.

9. Connect the vehicle's antenna system to the **RF OUT** (SO-239) connector with 50 ohm coax that will safely carry 600 watts. This is where the RF output meter or antenna connects.

10. Use a shielded audio type cable with standard male phono (RCA) connectors to connect the **RLY** jack of the ALS-500M to the transceiver or transmitter normally open amplifier relay terminal. This connection has 12 volts open circuit and supplies less than 100 mA of current when pulled to ground. There is a back pulse canceling diode in the amplifier for exciter protection. The ALS-500RC's Relay jack has the same function. When using the ALS-500RC use the amplifier's Relay jack ***or*** the remote's Relay jack, whichever makes installation easier.

11. Plug the female multi-pin power connector onto the multi-pin male connector on the rear of the ALS-500M chassis.

12. Reconnect the positive and negative battery leads to the battery.

OPERATION

Follow these instructions in numerical order. Consult the manual for the exciter, if necessary. Be sure all electrical connections is properly wired and the vehicle is running with a fully charged battery. See the Installation instructions for wiring details.

1. Set the ALS-500M front panel **ON-OFF** to **OFF**.

2. Set the amplifier's frequency range switch to the same frequency as the exciter. When using the ALS-500RC, set the amplifier's frequency switch to the Remote position and the remote's frequency range switch to the same frequency as the exciter.

3. With the amplifier still **OFF** transmit into the antenna with the exciter. Measure the SWR with the transceiver's internal SWR indicator or with an external SWR indicator. ***Do not operate this amplifier with an SWR greater than 2:1 or with more than 60 watts of reflected power.*** See the "SWR Considerations" section on page 3.

4. Place the amplifier in the **ON** position with ALS-500RC remote on and amplifier off. The **DC AMPERES** meter should increase slightly and the relay should "click" when the exciter is keyed.

5. Place the exciter in the transmit mode on CW, FM or RTTY. Gradually increase the output power and observe the **DC AMPERES** meter. The current should be around 60 to 80 amperes at full output. An external watt meter should indicate 400 watts or more of carrier power.

Full output levels of 400 watts CW should be obtained with drive levels of under 60 watts. Peak envelope output levels on SSB may reach as high as 600 watts depending on voice and exciter characteristics. The lowest IMD and splatter will be obtained if the amplifier is operated at an output level slightly below the maximum level obtainable.

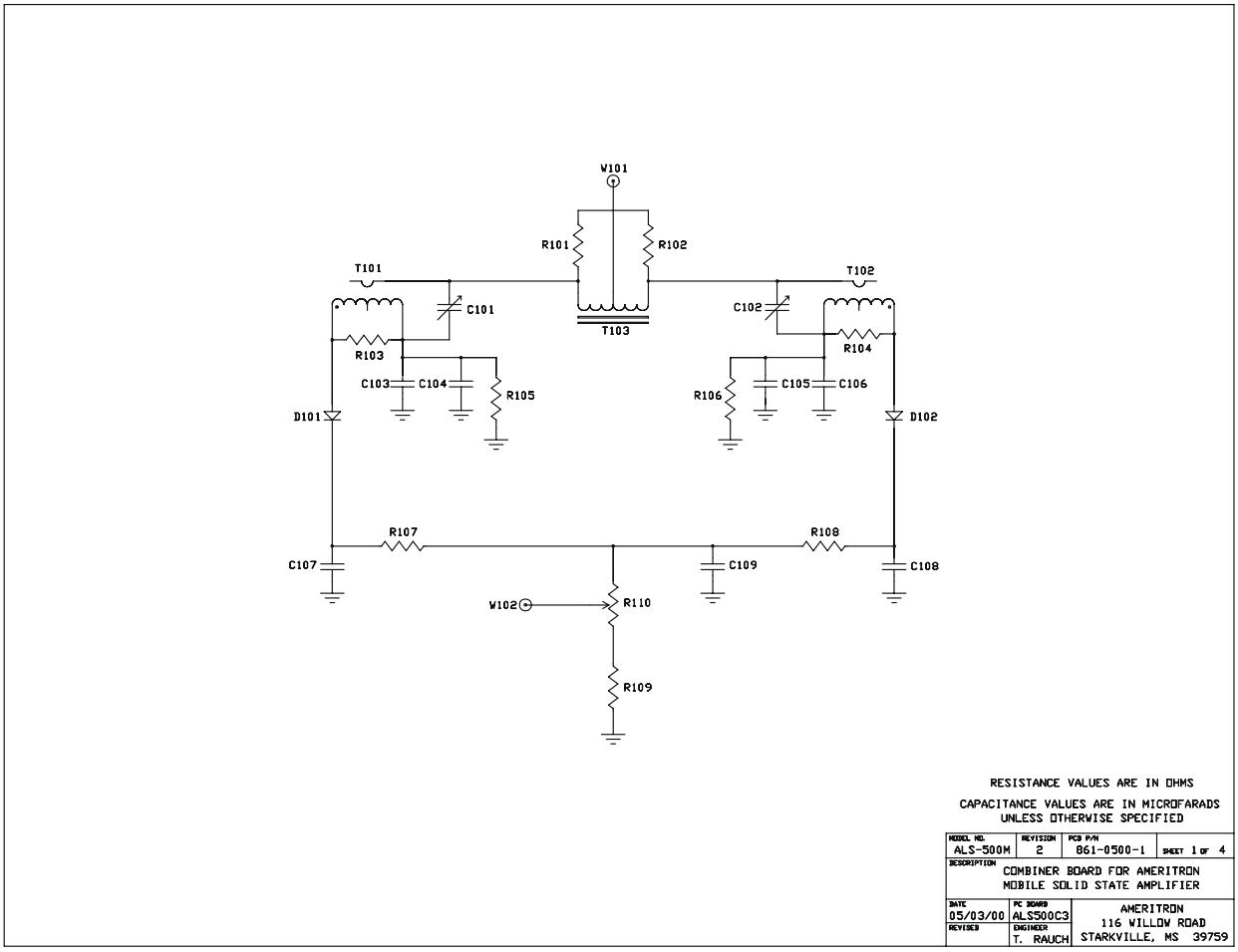
As the temperature rises the fan should start to run. If the temperature rises too far the **THERMAL OVERLOAD LED** will light and the amplifier will not operate. This feature automatically resets when the temperature reaches safe limits.

If the reflected power level is too high, the **FREQUENCY** selector is set to a cutoff frequency below the transmission frequency, one PA section looses power, or the amplifier is overdriven, the **LOAD FAULT LED** will light and the amplifier will not operate. The **OFF-ON** switch must cycled off to reset the **LOAD FAULT** after the problem is corrected.

ALS-500M PARTS LIST

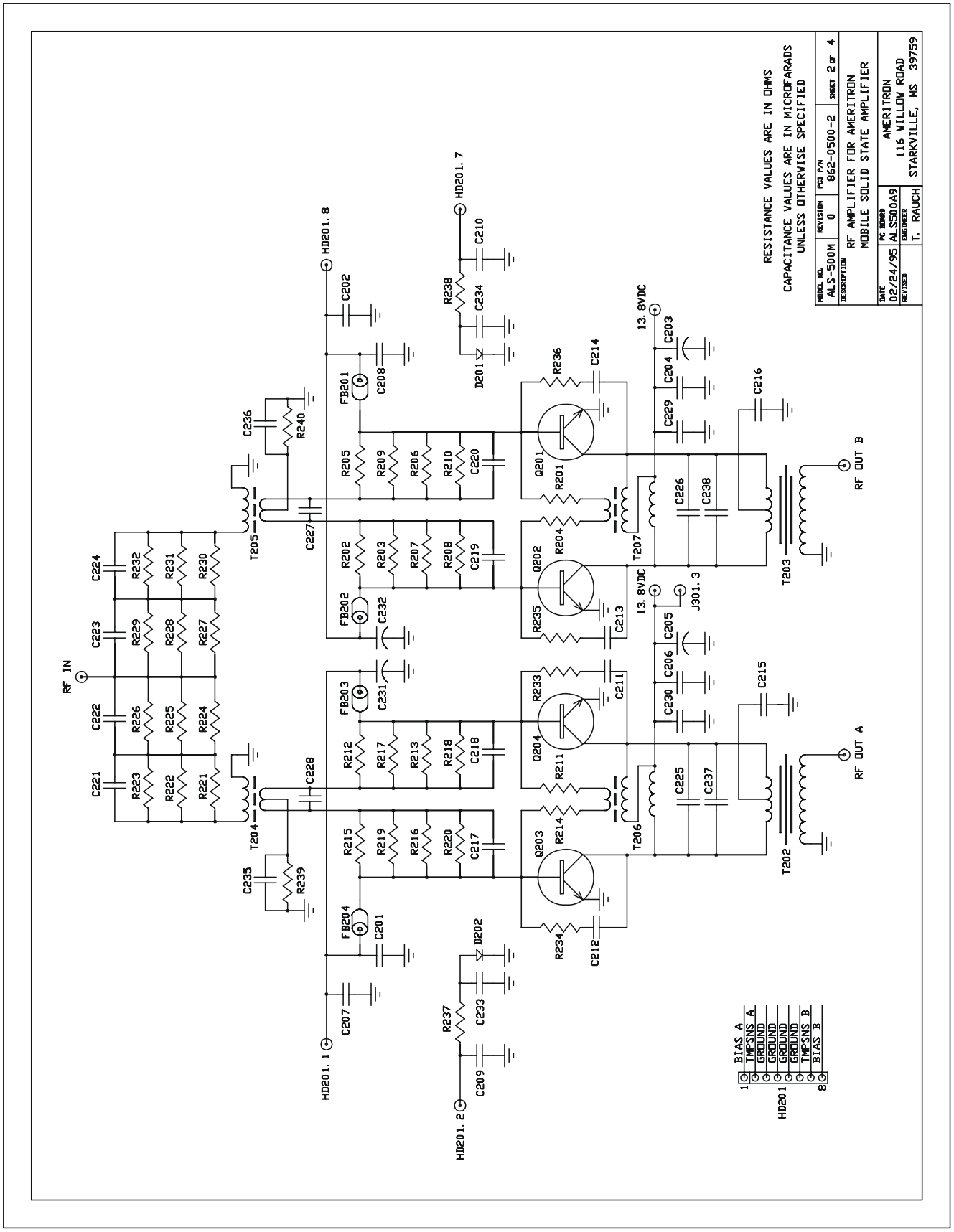
Combiner Board Parts List

Designator	Description	Part Number
C101,102	Capacitor, Trimmer, 500V, 3-12 pF	204-0150
C107,108	Capacitor, Ceramic Disc, 50v, .01 uF	200-0416
C109	Capacitor, Monolithic, 50v, .33 uF	205-2233
C103,106	Not used	
C104,105	Capacitor, DM15, 500 pF	208-5691
D101,102	Diode, 1N34A	300-0346
R101,102	Resistor, 3 watt, 100 ohm	103-2100
R110	Resistor, Trimpot, 2.5k	104-2520
R103,104	Resistor, 1/2 watt, 100 ohm	101-2100
R105,106	Resistor, 1/2 watt, 4.7k ohm	101-3470
R107,108	Resistor, Film, 1/4 watt, 2.2k	100-3220
R109	Resistor, 1/4 watt, 2.7k ohm	100-3270
T101,102	Pickup Transformer	10-14136
T103	Combiner Transformer	11-0500-4
W101,102	Terminal PC Board Posts	720-2670



Power Amplifier Board Parts List

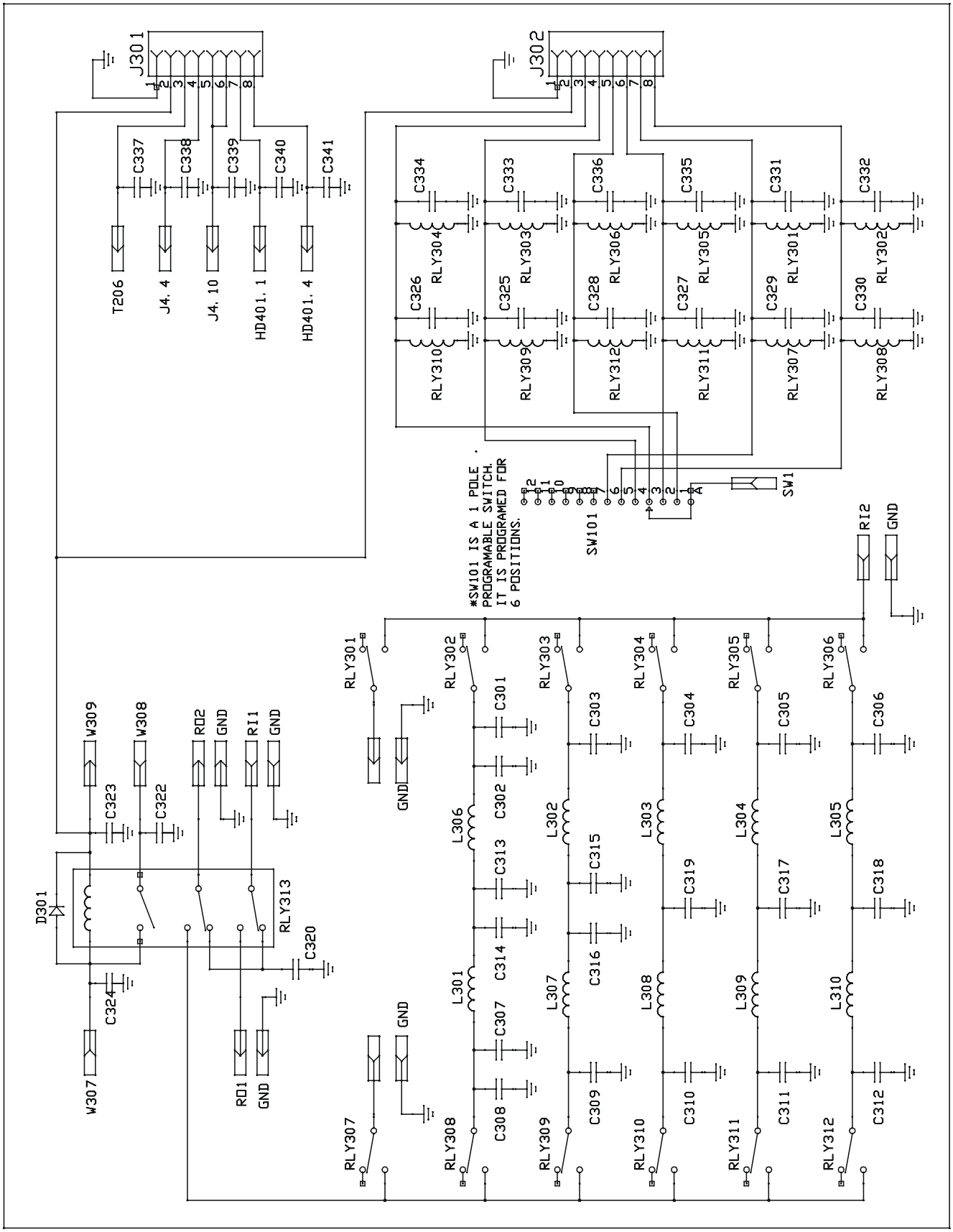
Designator	Description	Part Number
C225,226	Capacitor, DM19, 500v, 360 pF	208-5688-1
C227,228	Capacitor, SM19, 500v, 750 pF	208-5668
C237,238	Capacitor, DM19, 500v, 820 pF	208-5381
C201,208,211,212-216, 229,230,235,236	Capacitor, 50v, .33 uF	205-2233
C202,207,209,210,233,234	Capacitor, Ceramic Disc, .1 uF	200-0754
C203,205	Capacitor, Electrolytic, 25v, 100 uF	203-0564
C204,206	Capacitor, polyester, .15 uF	201-2215
C217-220	Capacitor, Ceramic Disc, 25v, .01 uF	203-0416
C221,224	Capacitor, SM15, 500v, 100 pF	208-5174
C222,223	Capacitor, SM15, 500v, 150 pF	208-5396
C231,232	Capacitor, Electrolytic, 25v, 10 uF	203-0654
D201,202	Diode, 1N4007	300-0266
HD202	8 pin header	612-0108
L201-204	Ferrite Beads	412-1599
PCB	Power Amplifier PC Board	862-0500-2
Q201-204	Transistor, Power, 28C2879	305-2879
R201,204,211,214	Resistor, Metal Oxide, 3 watt, 6.8 ohm	103-0680
R202,203,205-209,210, 212,213,215,216-220	Resistor, 1/2 watt, 10 ohm	101-1100
R221-232	Resistor, Metal Oxide, 3 watt, 100 ohm	103-3100
R233-236	Resistor, Metal Oxide, 3 watt, 33 ohm	103-1330
R237,238	Resistor, 1/4 watt, 10 ohm	100-1100
R239,240	Resistor, 1/2 watt, 18 ohm	101-1180
T201	Not used	
T202,203	Output Transformer	11-0500-1
T204,205	Input Transformer	11-0500-2
T206,207	Feedback Transformer	11-0500-3
W201-202	Terminal PC Board Posts	720-2670


RESISTANCE VALUES ARE IN OHMS
CAPACITANCE VALUES ARE IN MICROFARADS
UNLESS OTHERWISE SPECIFIED
MODEL NO. ALS-500M
REVISION 0
PCB P/N 862-0500-2
SHEET 2 OF 4
DESCRIPTION RF AMPLIFIER FOR AMERITRON MOBILE SOLID STATE AMPLIFIER
DATE 02/24/95
PC BOARD ALS500A9
ENGINEER T. RAUCH
REVISED
AMERITRON
116 WILLOW ROAD
STARKVILLE, MS 39759
RF IN
RF OUT A
RF OUT B
13.8VDC
J301.3
HD201.1
HD201.2
HD201.7
HD201.8
BIAS A
TMPSNS A
GROUND
GROUND
GROUND
GROUND
TMPSNS B
BIAS B
HD201
Q201
Q202
Q203
Q204
D201
D202
T202
T203
T204
T205
T206
T207

Output Filter Board

Designator	Description	Part Number
C301,308	not used	
C302,307	*Capacitor, SM-19, 1000v, 180 pF	252-0180
C303,309	*Capacitor, SM-19, 1000v, 270 pF	252-0270
C304,310	*Capacitor, SM-19, 1000v, 360 pF	252-0360
C305,311,319	*Capacitor, SM-19, 1000v, 680 pF	252-0680
C306,312,317	*Capacitor, SM-19, 1000v, 1500 pF	252-1150
C313,314	*Capacitor, SM-19, 1000v, 160 pF*	252-0160
C315,316	*Capacitor, SM-19, 1000v, 220 pF*	252-0220
C318	*Capacitor, SM-19, 1000v, 2700 pF*	252-1270
C320	Capacitor, Mica, 500 v, 27 pF	250-0027
C321-341	Capacitor, Ceramic Disc, 100 v, .01 uF	200-2100-1
D301	Diode, 1N4007	300-4007
J301,302	Jack, RJ45/641	610-6028
L301,306	Coil, Air Wound, 1/2" ID, 8.5 pass	10-13850
L302,307	Coil, Toroid, 8 pass	10-14168
L303,308	Coil, Toroid, 10 pass	10-14161
L304,309	Coil, Toroid, 14 pass	10-14214
L305,310	Coil, Toroid, 22 pass	10-14222
RLY301-312	Relay, 1PDT, 12Vdc	408-1216
RLY313	Relay, 3PDT 12 Vdc coil	408-6140

* Critical Components


J301
J302
C337
C338
C339
C340
C341
T206
J4. 4
J4. 10
HD401. 1
HD401. 4
C334
C333
C336
C335
C331
C332
C326
C325
C328
C327
C329
C330
RLY304
RLY303
RLY306
RLY305
RLY301
RLY302
RLY310
RLY309
RLY312
RLY311
RLY307
RLY308
*SW101 IS A 1 POLE PROGRAMABLE SWITCH. IT IS PROGRAMED FOR 6 POSITIONS.
SW101
SW1
RI2
GND
W309
W308
RO2
GND
RI1
GND
C323
C322
D301
RLY313
C320
C324
W307
RO1
GND
RLY301
RLY302
RLY303
RLY304
RLY305
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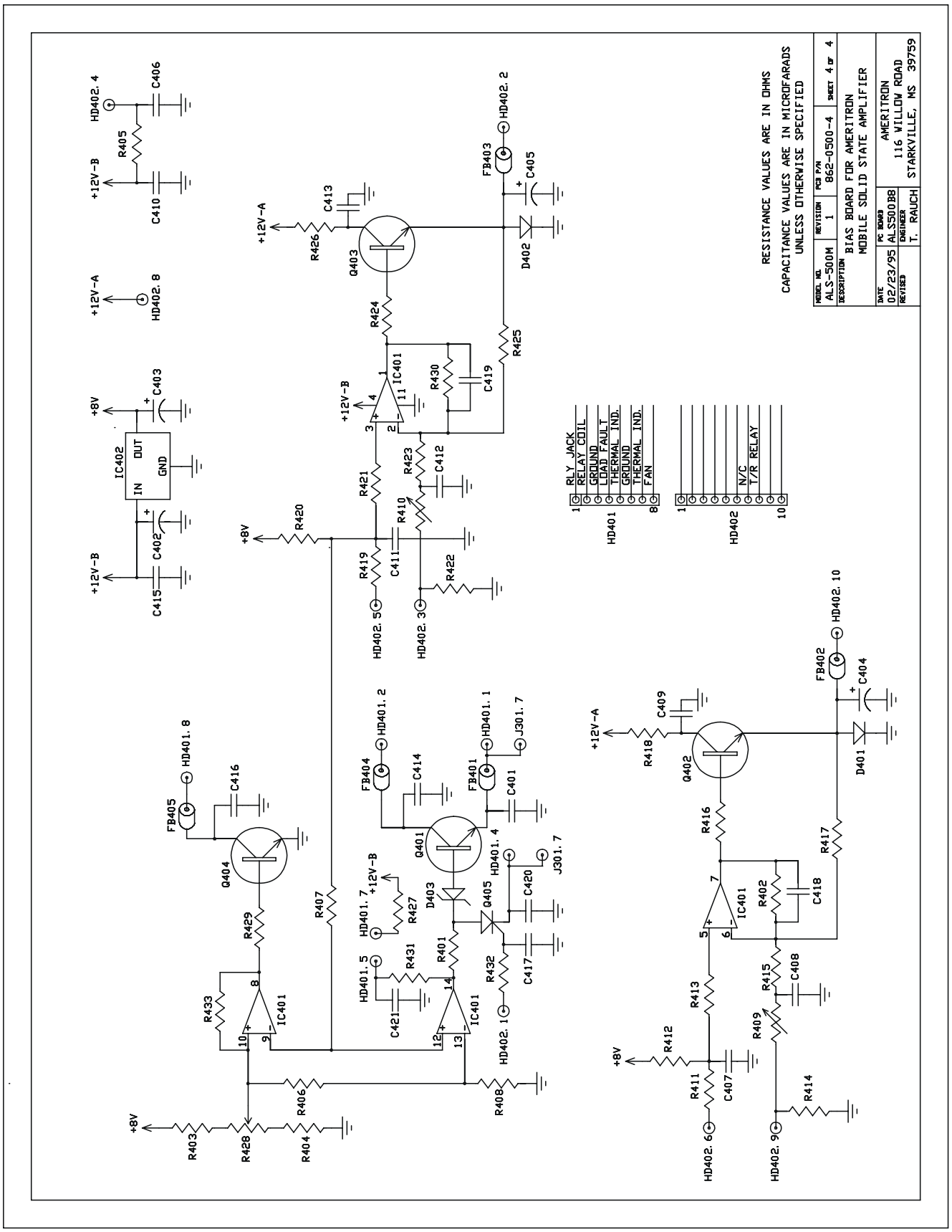
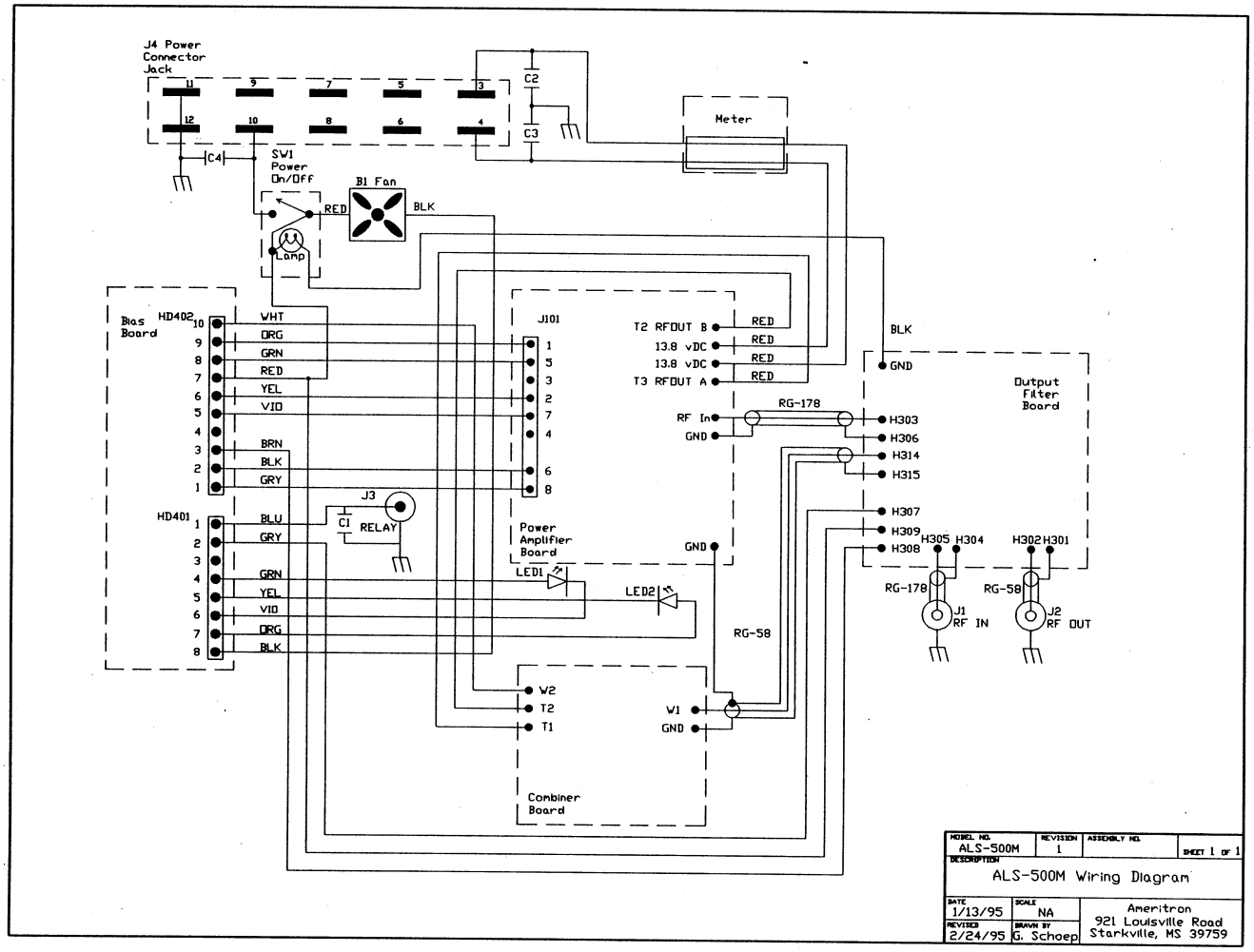
C313
C315
C319
C317
C318
L301
C314
L307
L308
L309
L310
C307
C316
C309
C310
C311
C312
C308
RLY307
RLY308
RLY309
RLY310
RLY311
RLY312

Bias Board Parts List

Designator	Description	Part Number
C401,406-421,	Capacitor, Ceramic Disc, 50v, .1 uF	200-0754
C402-405	Capacitor, Tantalum, 50v, .47 uF	203-0530
D401,402	Diode, 1N4007	300-0266
D403	Diode, Zener, 5.6 v, 1N4734	301-4734
FB401-405	Bead, Ferrite, #43	412-1599
For IC401	Socket, 14 pin	625-0014
IC401	LM324N	311-0324
IC402	Regulator, 78L08AC, 8 V	307-0012
HD401	Header, 8 pin	612-0108
HD402	Header, 10 pin	612-0110
PCB	PC Board	862-0500-1
Q401-404	Transistor, MJF-3055	305-3055
Q405	Transistor, 2N6564 (2N5064)	321-6564
R401,416,417,424,425,429	Resistor, 1/4 watt, 470 ohm	100-2470
R402,430	Resistor, 1/4 watt, 22k	100-4220
R403	Resistor, 1/4 watt, 33k	100-4330
R404,407	Resistor, 1/4 watt, 2.2k	100-3220
R405,411,414,419,422	Resistor, 1/4 watt, 10 Ohm	100-1100
R406	Resistor, 1/4 watt, 10k	100-4100
R408	Resistor, 1/4 watt, 56k	100-4560
R409,410,428	Trim pot, 2.5k	104-2520
R412,420	Resistor, 1/4 watt, 10k	100-4100
R413,415,421,423,431,432	Resistor, 1/4 watt, 1k	100-3100
R418,426	Resistor, 3 watt, 1.5 ohm	103-3400
R427	Resistor, 1/4 watt, 100 ohm	100-2100
R433	Resistor, 1/4 watt, 3.3M	100-6330


RESISTANCE VALUES ARE IN OHMS
CAPACITANCE VALUES ARE IN MICROFARADS
UNLESS OTHERWISE SPECIFIED
MODEL NO. ALS-500M
REVISION 1
PCB P/N 862-0500-4
SHEET 4 OF 4
DESCRIPTION BIAS BOARD FOR AMERITRON MOBILE SOLID STATE AMPLIFIER
DATE 02/23/95
PC BOARD ALS500BB
ENGINEER T. RAUCH
REVISED
AMERITRON
116 WILLOW ROAD
STARKVILLE, MS 39759
RLY JACK
RELAY COIL
GROUND
LOAD FAULT
THERMAL IND.
GROUND
THERMAL IND.
FAN
HD401
N/C
T/R RELAY
HD402
IC401
IC402
Q401
Q402
Q403
Q404
Q405
D401
D402
D403
+12V-A
+12V-B
+8V
GND
IN
OUT

ALS-500M Chassis Components

Designator	Description	Part Number
J1, 2	Jack, SO-239	610-2126
J3	Jack, RCA	600-1225
J4	Jack, Power	610-5012
B1	Fan, 12 volt, muffin, 3"	410-3512
C1,4	Capacitor, Ceramic Disc, 25v, .01 uF	200-0416
C2,3	Capacitor, Ceramic Disc, 25v, .1 uF	200-0754
Meter	100 Amp Induction Meter	400-2500
LED1	MV6753 Red LED	320-0522-1
LED2	MV6753 Yellow LED	320-0300
P1	Plug, Power for J4	610-6012
SW1	Switch, 12 vDC, lighted	507-1357