



OWNER'S MANUAL

GTA Grand Touring Amplifier

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- IMPORTANT -

PLEASE READ THIS PAGE BEFORE OPERATING

YOUR

BGW POWER AMPLIFIER

Your new BGW amplifier is designed to provide years of trouble free performance. Observing these few precautions will insure proper operation:

Read all Instructions before connecting any AC power to your power amplifier.

Retain this Manual for future reference.

Heed all warnings on the top or rear of the power amplifier.

The amplifier should not be used near water - for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.

The amplifier should be situated so that its location or position does not interfere with its proper ventilation. For example, it should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

The amplifier should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances that produce heat.

The amplifier should be connected to a power supply only of the type described in the operating instructions or as marked on the rear panel.

Precautions should be taken so that the grounding means of the amplifier is not defeated.

The power supply cord should be routed so that it is not likely to be walked on or pinched by items placed upon or against it, paying particular attention to cord at the plug, convenience receptacles, and the point where they exit from the amplifier.

Care should be taken so that objects do not fall into, and liquids are not spilled into the amplifier through openings.

The amplifier should be serviced by qualified service personnel when:

The power supply cord or the plug has been damaged; or objects have fallen into, or liquid has been spilled into the amplifier; or has been exposed to rain; or does not appear to operate normally or exhibits a marked change in performance; or has been dropped, or the enclosure has been damaged.

All connections should be made to the power amplifier with the power OFF.

Speaker fuses should be used to afford maximum speaker protection.

Never connect the output of one channel to that of another.

Connect the power cord to the proper voltage mains as indicated on the rear of the amplifier. Conversion to another voltage requires internal rewiring.

Do not remove the amplifier's cover. Amplifiers may not be covered under warranty if they are tampered with. There are NO adjustments within. Potentially lethal voltages exist within the amplifier. Refer all service work to an authorized BGW service station.

UNPACKING AND SET-UP

Your BGW Power Amplifier is shipped in an advanced packing container.

SAVE THE CONTAINER AND ALL PACKING MATERIAL!

The container should be saved in the event the unit is moved or shipped at some future date. Replacement containers are available from BGW Systems.

Inspect the unit for damage in transit immediately upon receipt. If damage is found, notify the transportation company immediately. Only the consignee may institute a claim with the carrier for shipping damage. BGW will cooperate fully in such an event. Be sure to save the container as evidence of damage for the shipper to inspect.

The amplifier's mounting position must be chosen carefully, so that the air flow to the front and rear of the unit is not restricted. Inadequate ventilation may cause failure of the amplifier. For rack mounting, the four rubber feet on the bottom of the unit may be removed and no hardware will be loosened inside the unit.

Do not, however, use the front panel as the sole support for the amplifier. Side rails or rack shelves should be employed.

DO NOT PLUG THE AMPLIFIER IN YET!

All connections should be made before power is applied.

EQUIPMENT INSTALLATION

RACK MOUNTING HINTS

Use care when mounting equipment in a rack enclosure. Place the heaviest units near the bottom of the rack. Equipment cannot always be supported by Front Panels alone. This is especially true of amplifiers whose depth is more than twice their height. Uniform support can be insured by installing bottom or side rails.

When racks are to be transported or used in a mobile installation, some means of securing the rear of the equipment is required. This will restrict movement of the equipment in any direction in the rack enclosure. Likewise, equipment weighing more than 50 lbs require rear support to prevent distorting or breaking the Front Panel. BGW Power Amplifiers are fitted with Rear Panel Support provisions for this purpose. Please refer to the CHASSIS DIMENSIONS AND REAR SUPPORT DETAIL drawing in this manual. Angle brackets attached to the sides or bottom of the rack enclosure, and fitted to mate up with the mounting holes on the Rear Panel is one suggestion.

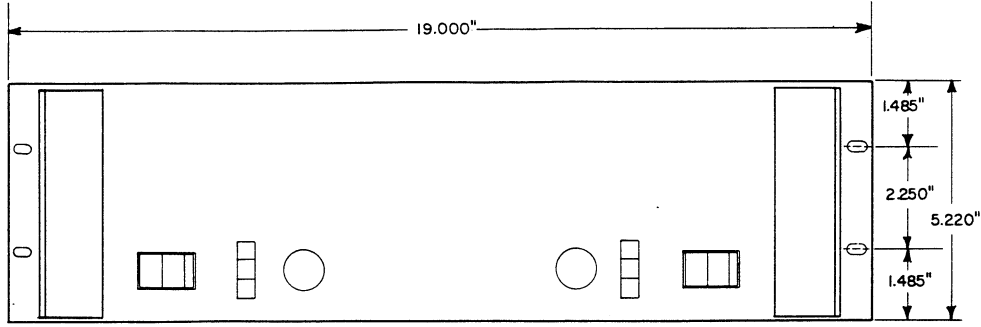
NOTE: DO NOT ALLOW MORE THAN 1/2" OF SCREW SHANK INSIDE CHASSIS. Select a screw length of about 1/4" greater than the bracket/washer thickness.

To protect the Front Panel finish from deep scratches occurring around the rack mount slotted holes, use NYLON Finishing Washers between the mounting screws and the Front Panel. #10-32 hardened machine screws are recommended, and is the size required for the rear support provisions. (Avoid "packaged" hardware found in consumer discount lumber/hardware stores, as most of it is too soft and can shear off easily. Hex-key style hardware, in general, has the proper hardness ratings).

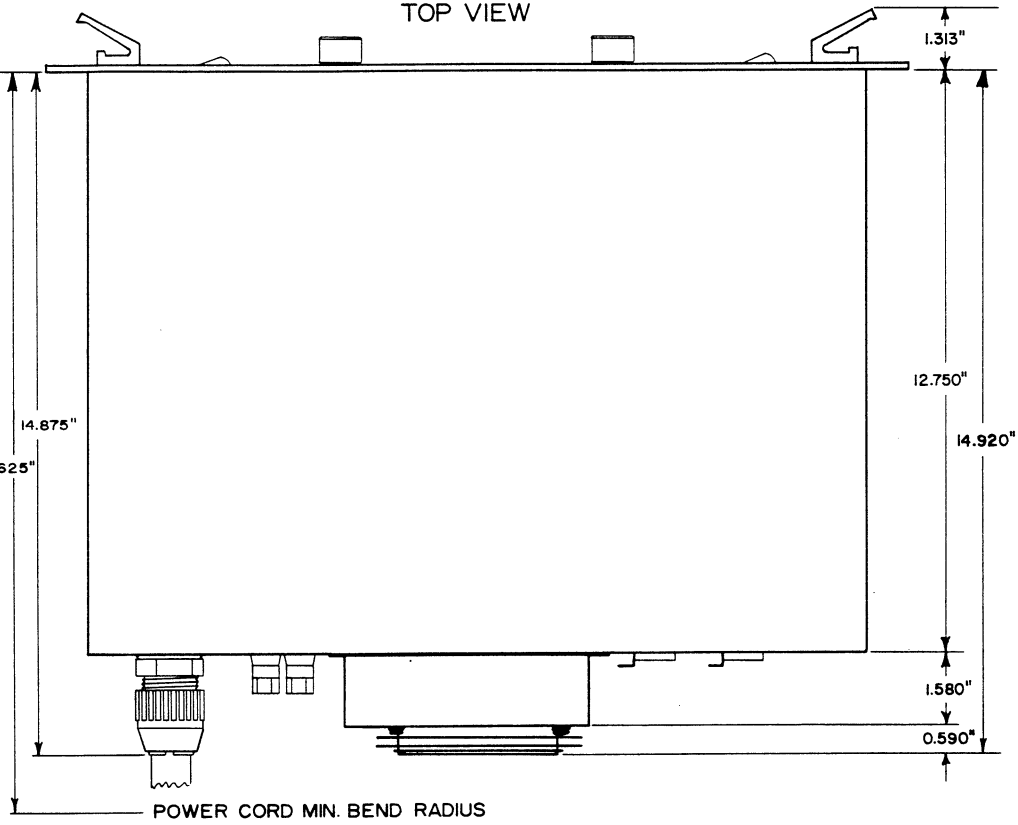
Unless the rack enclosure is small, and/or light enough in weight to lay down on its' back, allowing the amplifier(s) to be easily positioned and "bolted in" by yourself, LET SOMEONE ASSIST YOU! While lighter weight equipment can be installed by one person into vertical rack enclosures (by performing a "circus balancing act" sometimes), attempting the same with 50 lbs-PLUS amplifiers can lead to VERY PAINFUL PERSONAL INJURY or DAMAGE to the equipment (OR BOTH)! Again, LET SOMEONE ASSIST YOU ! Very little intelligence is involved in one person on each side of a 50 to 80 lb amplifier and, together, slipping it into position and start the mounting hardware threading into the proper rack rail holes ("Does your side line up? Mine neither. Let's slide it up one position."), and share the tool to tighten the mounting hardware. Within moments, the amplifier is in place.

The better quality (and more expensive) rack mount enclosures provide (or have provisions for) front-to-back, right angle steel

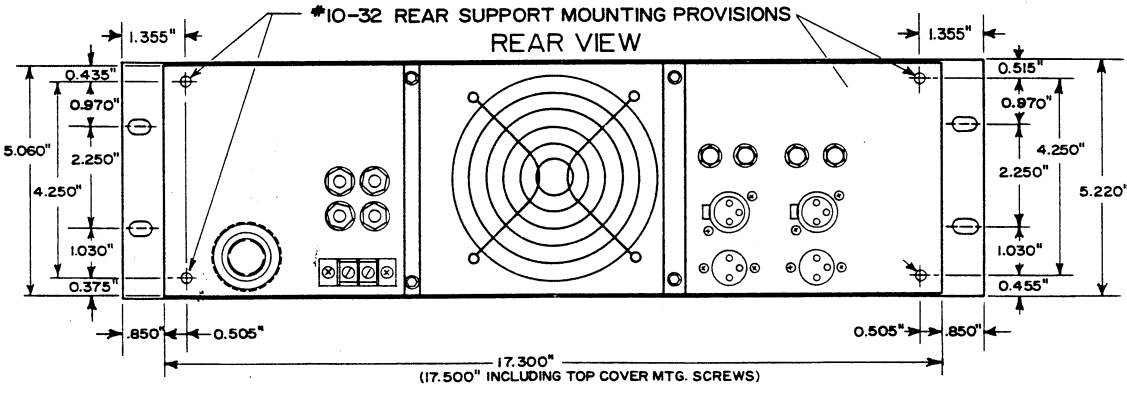
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FRONT VIEW



TOP VIEW



REAR VIEW

BGM SYSTEMS 13130 SOUTH YUKON AVE. HAWTHORNE, CA 90250 (213) 973-8090		BGM SYSTEMS	
TITLE GTA CHASSIS DIMENSIONS AND REAR SUPPORT DETAIL		SIZE C	REV 4
SINGLE 4-WIRE POWER CORD		DRAWN <i>S.W. Selberg</i>	DATE 11-11-88
CHECKED <i>S.W. Selberg</i>		PROJECT ENGR. <i>S.W. Selberg</i>	DATE 11-6-86
UNLESS OTHERWISE SPECIFIED DIMENSIONING AND TOLERANCING PER USASI Y14.5. DIMENSIONS ARE IN INCHES AND APPLY AFTER PLATING. TOLERANCE ON DECIMALS: XX = + .03 XXX = + .010 TOLERANCE ON ANGLES = ± 0° 30' BREAK SHARP EDGES .010 MAX. SURFACE ROUGHNESS 125 ✓			

DO NOT SCALE DRAWING

NOTES: UNLESS OTHERWISE SPECIFIED.

support brackets, in addition to identical, aligned rack-mount rails at the rear of the enclosure. (At least, they are supposed to be aligned with the front rack rails). If the bottom support brackets are used, a blank rack panel will be required between the bottom of most BGW products and the top of the next unit, as the chassis bottom is very close to being flush with the bottom of the front panel.

A most clever arrangement we have seen for the rear support made use of #10-32 threaded, tapered guide pins bolted into the Rear Support Provision holes, and mating bushings installed into aligned right angle brackets attached to the enclosure side walls. Front panels were secured with (quality) standard hardware. This made installation and removal of the amplifiers easy, once the input, output and power cord connections were detached.

KEEPING IT COOL

A power amplifier draws energy from a primary electrical service, usually a 120 Volt service, to drive loudspeaker systems with an audio signal. Typically, only half of the energy can be delivered to the loudspeakers; the remaining energy is converted into heat, and must be dissipated (ventilated) into the air.

Air circulating past heat-producing components absorbs the heat and carries it away. To accomplish this, low and medium power amplifiers rely on natural convection currents, while most high power amplifiers use fans. If the air flow is obstructed, the resulting rise in heat may cause an amplifier to stop working or fail.

Circulating air currents must not be cut off when installing power amplifiers in Racks or small cases. Power amplifiers using convection cooling require spacing between each other to permit air flow between them. Power amplifiers using forced-air cooling, on the other hand, can usually be stacked close to each other and may not need any blank panel spacing between them.

To improve natural convection currents within a rack, a 'chimney' can be created by closing the back of the rack and venting the rack at the bottom to let in fresh cool air, and at the top to exhaust hot air. Vents should be large rectangular slots approximately 19" wide by 4" high.

The Rack cabinet will require some type of blower if a large air-flow is required. It is best to exhaust air from the top of the rack rather than to blow it in from the bottom. There will be less dust and dirt in the rack this way, if the bottom vent is sufficiently large. It is advisable to provide dust filters at both the air inlet and exhaust outlets of the rack. Likewise, periodic maintenance is required to clean the filters. If no filters are used, then similar maintenance should be performed on the amplifiers to prevent heat buildup or failure from conductive elements that may be in the dust.

The GTA Power Amplifier is fan cooled with a single speed 107 CFM unit, and is configured to pull cool air in thru the side vents (across the heatsinks), and exhaust the hot air out the back.

INSTALLATION NOTES

ELECTRICAL POWER REQUIREMENTS

Refer to DRWG #9512-8760, Sheets 2, 3, and 4. Also POWER CONSUMPTION CHART (GRAPH #1), LOUDSPEAKER IMPEDANCE CHART (GRAPH #2).

The standard GTA Power Amp is now equipped with a 4-WIRE, 30 AMP Power Cord, and is shipped with a mating Power Receptacle. (Previous GTA's were built with two power cords). As this new cord only fits one style receptacle, some discussion is warranted for the change.

UNTIL NOTED OTHERWISE, 120 VOLT AC POWER MAINS AND PRIMARY WIRING IS IMPLIED.

Using the GTA in high-power installations (for example, 2 OHM Subwoofer Bins per Channel) can pull well in excess of 20 AMPS from the AC Mains (120 V). As most Mains Branch Circuits use 20 AMP circuit breakers with the 15 AMP duplex outlets (NEMA 5-15R type), and the wiring suitable for 20 AMPS, a single GTA in this use can trip the breaker occasionally. Two GTA's powered off the same Branch Circuit will continuously trip the breaker in this use. Remember, music energy normally consumes less power (from the AC Mains) than continuous sine wave, but can become equal at times. Also, AC Mains power consumption is directly controlled by the Amplifier Load Impedance (See GRAPH #1). Loudspeaker (system) impedance looks nothing like pure resistance to the Amplifier, and may be higher or lower than the 'nominal' impedance specified (See GRAPH #2). Thus, two GTA's driving 8 OHM speaker systems per Channel may be perfectly fine on a 20 AMP Branch Circuit, while two GTA's driving 4 OHM or 2 OHM speakers may trip the breaker.

With the previous 2-Power Cord version of the GTA, it was easy to install, and likewise easy to exceed the Branch Circuit Current ratings of the wiring and circuit breaker. It also prevented obtaining Approval and Listing with any of the Electrical Safety Organizations (UL, CSA, L.A. Building & Safety, etc.) by using two Power Cords. Providing the single, 30 AMP, 4-WIRE Power Cord both satisfies the Safety Organizations's requirements, and offers the widest choice of Power Mains connections to the installer. It does require some effort for the installation, understanding of the power requirements, and of the AC Mains Power Distribution System to which it is connected.

POWER MAINS RECEPTACLE WIRING

EXAMPLE 1.

Referring to DRWG #9512-8760, Sheet 3, consider a simple playback system, with all Equipment powered from a single 3-WIRE 120 Volt outlet (FIG. 6 or 4). A single GTA is used, with each Channel driving a pair of 8 OHM Full Range Speakers in parallel, rated for

FIG. 1

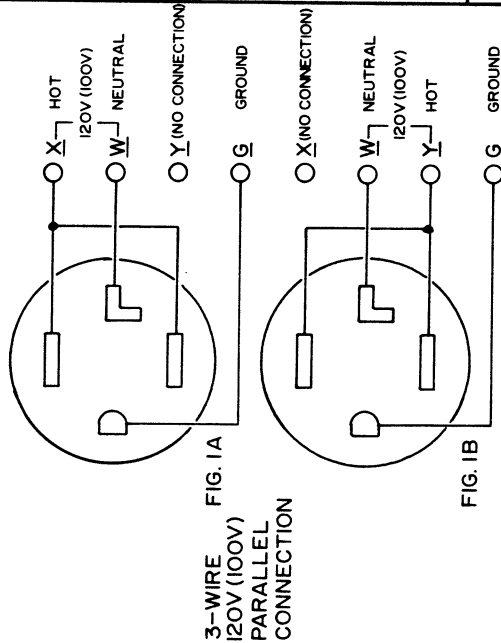


FIG. 1A
3-WIRE 120V (100V) PARALLEL CONNECTION

FIG. 1B

FIG. 2

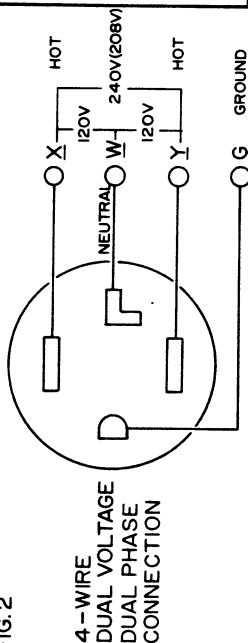


FIG. 2
4-WIRE DUAL VOLTAGE DUAL PHASE CONNECTION

FIG. 3

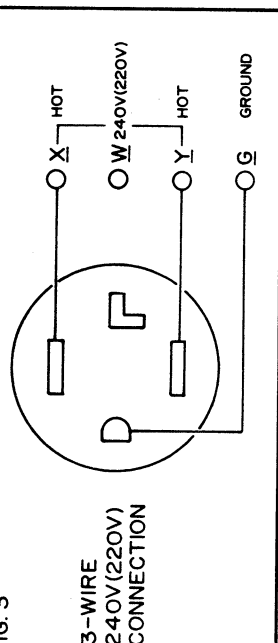


FIG. 3
3-WIRE 240V (220V) CONNECTION

FIG. 4

TYPICAL DOMESTIC UTILITY VOLTAGE DISTRIBUTION -WYE-CONECTED 3-PHASE 120V/208V SYSTEM- (MOST COMMON INDUSTRIAL/CONCERT HALL POWER SYSTEM)

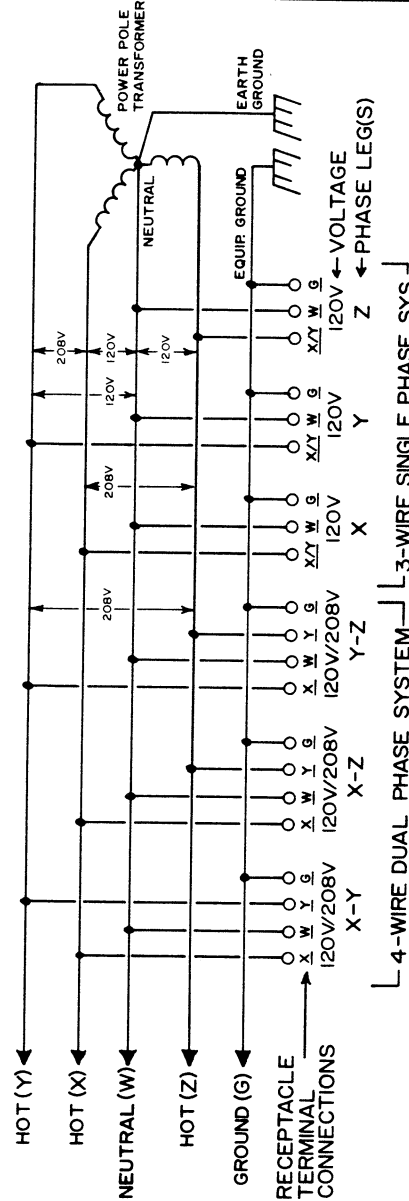


FIG. 4
L 4-WIRE DUAL PHASE SYSTEM L 3-WIRE SINGLE PHASE SYS.

FIG. 5

TYPICAL U.K./EUROPEAN UTILITY VOLTAGE DISTRIBUTION -WYE-CONECTED 3-PHASE 220/380V TO 250/432V SYSTEM-

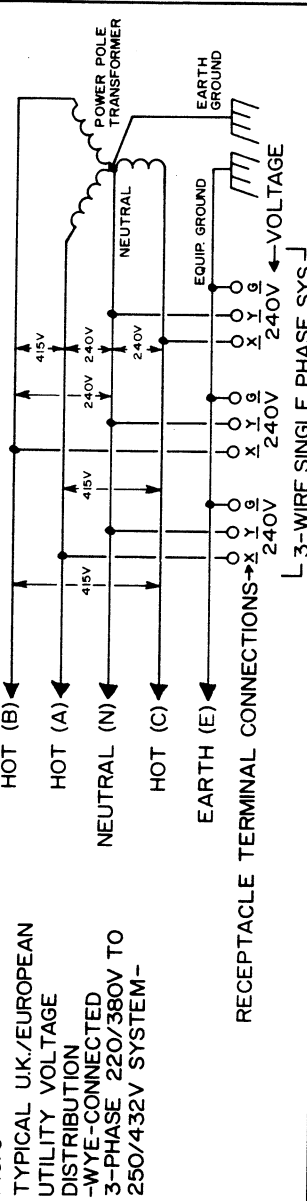


FIG. 5
L 3-WIRE SINGLE PHASE SYS.

FIG. 6

TYPICAL DOMESTIC UTILITY VOLTAGE DISTRIBUTION -SINGLE PHASE 240V/ DUAL 120V/240V SYSTEM (MOST COMMON RESIDENTIAL/SMALL BUSINESS POWER)-

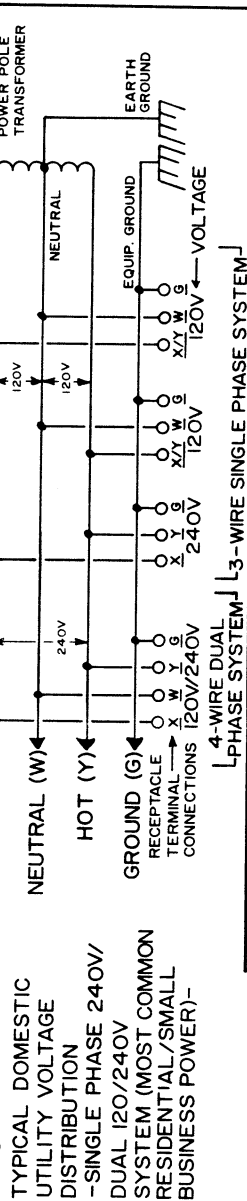


FIG. 6
L 4-WIRE DUAL PHASE SYSTEM L 3-WIRE SINGLE PHASE SYSTEM

UNLESS OTHERWISE SPECIFIED DIMENSIONING AND TOLERANCING PER USASI Y14.5. DIMENSIONS ARE IN INCHES AND APPLY AFTER PLATING. TOLERANCE ON DECIMALS: XX = ± .03, XXX = ± .010. TOLERANCE ON ANGLES = ± 0° 30'. BREAK SHARP EDGES .010 MAX. SURFACE ROUGHNESS 125.

REVISIONS		DESCRIPTION		DATE	APPROVED
LTR					

DRAWN S.W. Selbeck		CHECK		11-10-88	
PROJECT ENG S.W. Selbeck				11-6-86	

BGW SYSTEMS 14400 S. HAYWARD BLVD. HAYWARD, CALIF. 94545 (213) 973-8030		TITLE MODEL GTA POWER MAINS RECEPTACLE WIRING	
SIZE C	DRAWING NUMBER 9512-8760	SCALE <i>N.A.</i>	SHEET 3 OF 4

3. REFER TO THE WIRING TABLES, ARTICLE 310 OF THE NATIONAL ELECTRIC CODE HANDBOOK (OR EQUIV.).
 2. SELECT THE PROPER WIRING CONNECTIONS (FIG. 1-3) THAT BOTH MATCH THE GTA PRIMARY CONNECTIONS (SHEET 2, FIG. 1-4) AND THE VOLTAGE DISTRIBUTION SYSTEM (THIS SHEET, FIG. 4-6).
 1. FOR AC POWER MAINS WIRING OF RECEPTACLE(S), REFER TO DRWG. 9512-8760, SHEET 2 AND TEXT "INSTALLATION NOTES: ELECTRICAL POWER REQUIREMENTS". QUALIFIED ELECTRICIAN REQUIRED.

NOTES: UNLESS OTHERWISE SPECIFIED.

DO NOT SCALE DRAWING

200 WATTS each, let's say. The signal source consists of a CD player, a Cassette Recorder, a Preamp and an Equalizer. The appropriate RECEPTACLE WIRING would be either FIG. 1A or 1B; and referring to the tables mentioned in NOTE 3, 12AWG or larger is required for the hookup. AS A QUALIFIED ELECTRICIAN IS INSTALLING THE RECEPTACLE, it is assumed the electrical hardware used to both mount the Receptacle and connect it to the other standard 120V duplex outlets is per National Electrical Code Requirements.

Let's further assume maximum power consumption for the signal source equipment is 400 WATTS. Referring to the POWER CONSUMPTION CHART (GRAPH #1), it can be seen that this system can safely operate on a single 20 AMP Branch Circuit without exceeding the Current rating.

EXAMPLE 2.

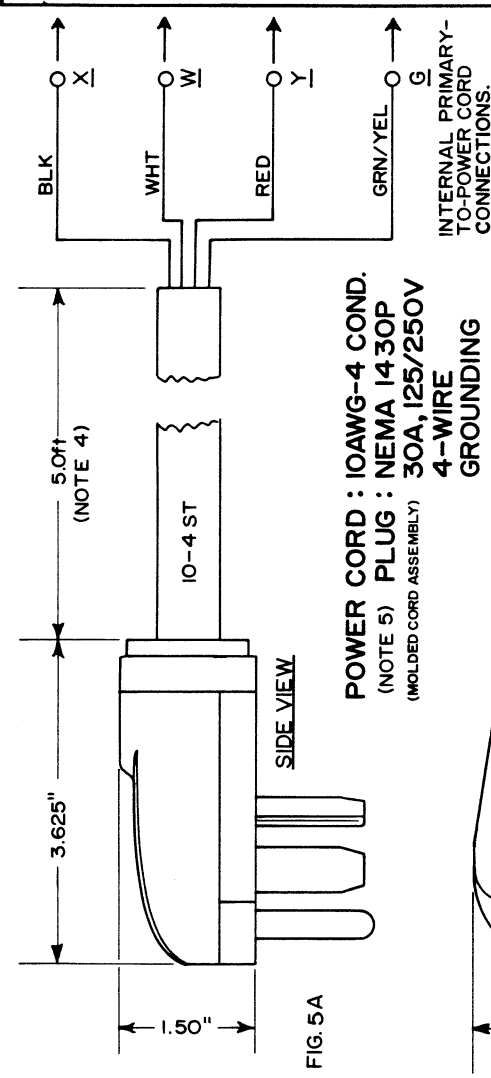
Consider now a larger system which uses 8 GTA's, 4 per Rack, along with 8 GTB's, 4 per Rack in a 3-WAY Stereo PA System. The GTA's are operating in DUAL MONO, looped together (Inputs), and each Channel is driving 4 OHM Low Frequency Bins. (The GTB's are distributed to handle the MIDS and HIGHS, but we won't address the Rack Power wiring for those here). Each side of the stage uses one Rack each of the GTA's and GTB's, plus the Monitor system. The MAINS VOLTAGE DISTRIBUTION SYSTEM used is that of FIG.4 (DRWG #9512-8010F Sheet 3), and Stage Left and Stage Right are on separate LEGS of the 3-PHASE SYSTEM (3-WIRE 120 Volt/LEG).

The Low Freq. Bins are each rated for 600 WATTS. Referring to the POWER CONSUMPTION CHART (GRAPH #1), it can be seen that allowing for 20 AMPS per GTA would be a good choice, particularly if individual Branch Circuit breakers are provided in the Amp Rack along with a Master Circuit breaker. Again, the appropriate RECEPTACLE WIRING to use would be either FIG. 1A or 1B. And, assuming the Branch Circuit breakers are used, 12AWG or larger wiring would be acceptable. However, if only a Master Circuit breaker is provided, the wiring must now be suitable for at least 80 AMPS (3AWG or larger). A QUALIFIED ELECTRICIAN PERFORMING THE ELECTRICAL WIRING INSTALLATION is assumed, and the appropriate wiring hardware and methods used meet the National Electrical Code (or equiv.).

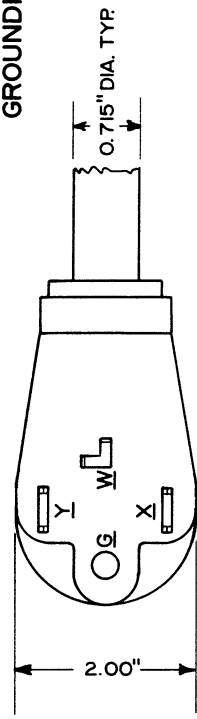
EXAMPLE 3.

Using the example above, suppose the MAINS VOLTAGE DISTRIBUTION SYSTEM used is that of FIG. 6. Here is a good application for 4-WIRE DUAL PHASE connections. The appropriate RECEPTACLE WIRING to use is FIG. 2. In this case, a pair of 2-GANG 20 AMP Branch Circuit breakers would replace the 4 single 20 AMP breakers, with 2 GTA's per Branch. 12 AWG or larger would be acceptable for wiring each pair of Receptacles. In the case of only a Master Circuit breaker, the wiring need only be that required for 40 AMPS, which is 8AWG or larger. This is due to the twin 120 Volt circuits used to power the amplifiers. Since the phase relationship of these circuits is 180 Degrees, the NEUTRAL line remains the same wire gauge, as the current from the X LEG is opposite that of the

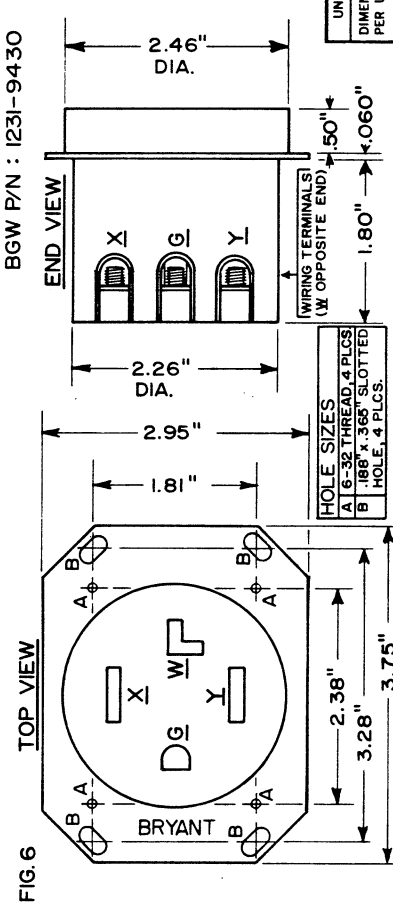
REVISIONS	DESCRIPTION	DATE	APPROVED



POWER CORD : IOAWG-4 COND.
 (NOTE 5) **PLUG : NEMA 1430P**
 (MOLDED CORD ASSEMBLY) **30A, 125/250V**
4-WIRE
GROUNDING

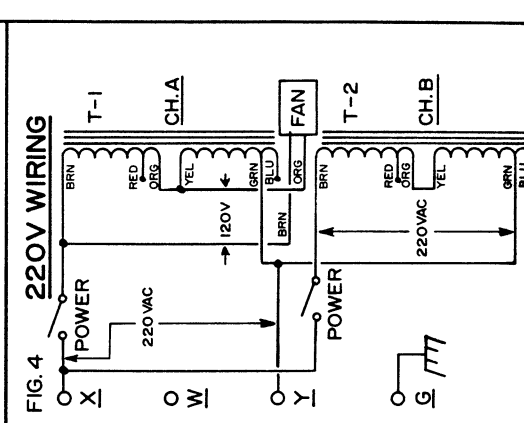
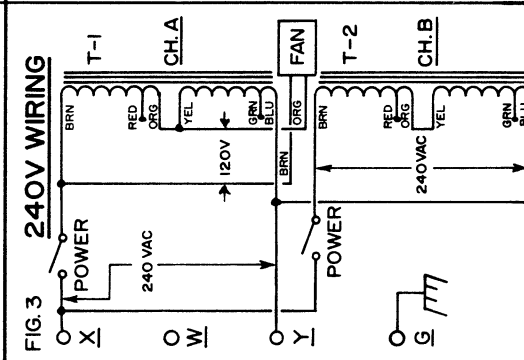
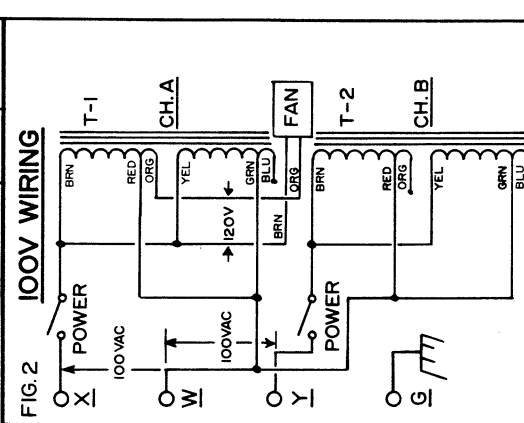
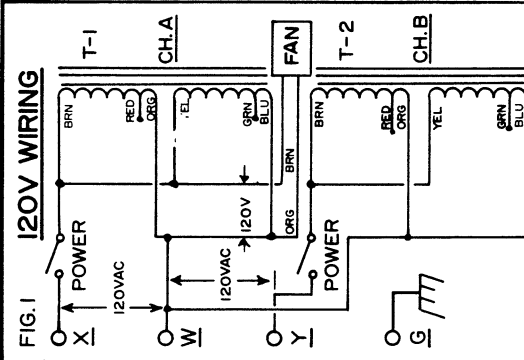


BGW-PROVIDED MATING POWER RECEPTACLE : NEMA 1430R (NOTES 1, 2)
 BGW P/N : 1231-9430



- UNLESS OTHERWISE SPECIFIED DIMENSIONING AND TOLERANCING PER USAS1 Y14.5. DIMENSIONS ARE IN INCHES AND APPLY AFTER PLATING. TOLERANCE ON DECIMALS: .XX = ± .03 .XXX = ± .010. TOLERANCE ON ANGLES = ± 0° 30'. BREAK SHARP EDGES 0.10 MAX. SURFACE ROUGHNESS 125/✓
1. ALL PRIMARY WIRING COMPONENTS/HARDWARE USED CARRY UL/CSA LISTINGS.
 2. SINGLE, 4-WIRE PWR. CORD REQ'D TO OBTAIN RECOGNIZED ELECTRICAL SAFETY ORGANIZATIONS LISTINGS.
 3. CONSULT FACTORY REGARDING SHORTENING OF POWER CORD W/O REPLACING MOLDED PLUG END.
 4. TWIST-LOCK (NEMA 1430P/R) AND NON-LOCKING STRAIGHT-BLADE (NEMA 1430P/R) ARE ELECTRICALLY EQUIV.
 5. SEVERAL MFGS OF MATING RECEPTACLE EXIST. ALL REQUIRE QUAD-SIZE BOX W/ MIN. DEPTH OF 2.125". SEE ADDITIONAL DRWG'S INCLUDED IF ALTERNATIVE RECEPTACLE IS PROVIDED.
 6. FOR AC POWER MAINS WIRING OF RECEPTACLE(S), REFER TO DRWG. 9512-8760 SHEET 3 AND TEXT "INSTALLATION NOTES" ELECTRICAL POWER REQUIREMENTS. QUALIFIED ELECTRICIAN REQUIRED.

NOTES: UNLESS OTHERWISE SPECIFIED.



		BGW SYSTEMS 13130 SOUTH YUKON AVE. DENVER, CO 80250 (303) 753-8090	
TITLE	MODEL GTA POWER CORD AND PRIMARY WIRING	DATE	11-6-86
DRAWN	S. W. Selberg	CHECK	S. W. Selberg
PROJECT ENGR.	S. W. Selberg	DRAWING NUMBER	9512 - 8760
SIZE	C	SCALE:RELATIVE:AE:1	SHEET 2 OF 4

Y LEG. Again, A QUALIFIED ELECTRICIAN PERFORMING THE ELECTRICAL WIRING INSTALLATION is assumed, and the appropriate wiring hardware and methods used meet the National Electrical Code (or equiv.).

NOTE : IN THE FOLLOWING EXAMPLES, 220-240 VOLT AC MAINS AND PRIMARY WIRING WIRING IS IMPLIED.

EXAMPLE 4.

Using the system described in EXAMPLE 2, suppose the MAINS VOLTAGE DISTRIBUTION SYSTEM used is that of FIG. 6. Power lines feeding the Amp Rack is 4-WIRE DUAL PHASE, to provide 120 Volt lines as required. Since the GTA's used here are wired for 240 Volts internally, the appropriate RECEPTACLE WIRING to use is FIG. 3, as the NEUTRAL wire of the GTA power cord is not used. FIG. 2, of course, will also suffice, though the NEUTRAL remains unused. Referring to the graph of CONTINUOUS OUTPUT POWER vs. FREQ. in the Product Spec Sheet, it will be seen that 240 Volt operation offers somewhat greater output power (60 Hz AC MAINS). Wire size requirements are the same as that described in EXAMPLE 3. A QUALIFIED ELECTRICIAN PERFORMING THE ELECTRICAL WIRING INSTALLATION is assumed, and the appropriate wiring hardware and methods used meet the National Electrical Code (or equiv.).

EXAMPLE 5.

Again, the system described in EXAMPLE 2 will be used. The MAINS VOLTAGE DISTRIBUTION SYSTEM used is FIG. 5. Amplifier primary wiring is for 240 Volts internally. The only RECEPTACLE WIRING to use is FIG. 3. Under no circumstances should FIG. 2 be used, as 415 Volts appears across any two Voltage Legs, and would then appear between the X and Y wiring terminals of the Receptacle. In countries where the AC MAINS VOLTAGE is well regulated at 220 Volts, the GTA primary wiring may be changed to accomodate this (see DRWG #9512-8010F Sheet 2, FIG. 4). Normally, the primary wiring used is for 240 Volts (FIG. 3), as 220 Volt MAINS may go above 250 Volts, where regulation is not as good. Wiring the primaries for 220 Volts in this case could lead to overstressing some components in the Amplifier.

Wire size requirements are again similar to that described in EXAMPLE 3. A QUALIFIED ELECTRICIAN PERFORMING THE ELECTRICAL WIRING INSTALLATION is assumed, and the appropriate wiring hardware and methods used meet the Electrical Code of your country.

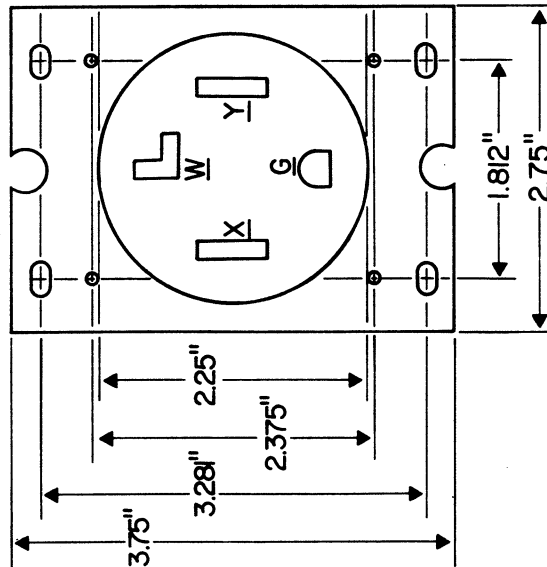
APPENDIX

DRWG #9512-8760 SHEET 2 (of 4): FACTORY-WIRED AC-MAINS CORD/PRIMARY CONNECTIONS.

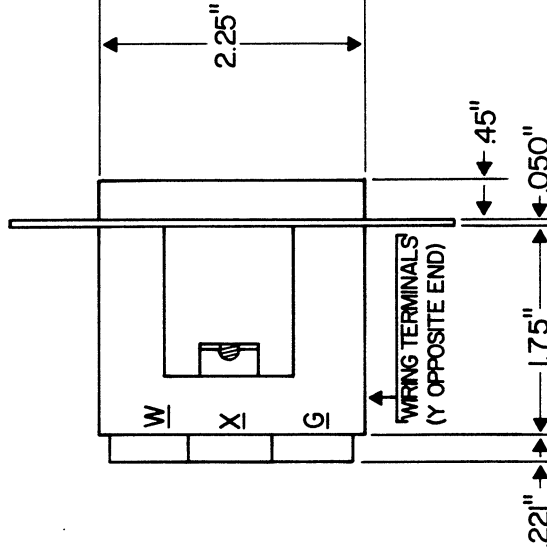
This Drawing gives both mechanical dimensions of the Power Cord, Plug, mating Receptacle(s), and the Power Supply Transformers Primary Wiring connections to the Power Cord. The cooling fan wiring is also shown to illustrate how it is powered.

REVISIONS		DATE	APPROVED
LTR	DESCRIPTION		

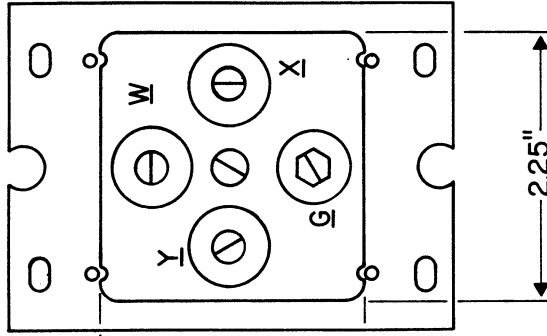
FRONT VIEW



SIDE VIEW



REAR VIEW



HOLE SIZES
A 6-32 THREAD, 4 PLCS
B .188 X .300 SLOTTED HOLE, 4 PLCS

MANUFACTURE: PASS & SEYMOUR

3. THIS RECEPTACLE CARRIES UL/CSA LISTINGS.
2. SEVERAL MFG'S OF MATING RECEPTACLE EXIST. ALL REQUIRE QUAD-SIZE BOX W/MIN. DEPTH OF 2.125". THE PASS & SEYMOUR RECEPTACLE IS AN ALTERNATIVE RECEPTACLE.
1. FOR AC POWER MAINS WIRING OF RECEPTACLES, REFER TO DRWG. SHEET 3 AND TEXT "INSTALLATION NOTES: ELECTRICAL POWER REQUIREMENT: QUALIFIED ELECTRICIAN REQUIRED."

NOTES: UNLESS OTHERWISE SPECIFIED.

UNLESS OTHERWISE SPECIFIED
 DIMENSIONING AND TOLERANCING PER ANSI Y14.5.
 DIMENSIONS ARE IN INCHES AND APPLY AFTER PLATING.
 TOLERANCE ON DECIMALS:
 .XX = ± .03 .XXX = ± .010.
 TOLERANCE ON ANGLES = ± 0° 30'
 BREAK SHARP EDGES .010 MAX.
 SURFACE ROUGHNESS 125/

		BGW SYSTEMS 13130 SOUTH YUKON AVE. HAWTHORNE, CA 90250 (213) 973-6090	
DRAWN	11/10/97	TITLE	
CHECK	11/16/97	GTA MATING POWER RECEPTACLE	
PROJECT ENGR	11/16/97	SIZE	DRAWING NUMBER
		B	1231-9430
		SCALE	SHEET / OF /
			1 /

Connection designation letters X, W, Y, and G are those given for the NEMA 14-30 3-POLE/4-WIRE GROUNDING connectors (as labeled in UL817, FIG. 161.26).

DRWG #9512-8760 SHEET 3 (of 4): USER-WIRED AC-MAINS RECEPTACLE/PRIMARY CONNECTIONS.

This Drawing is segmented into two specific domains: FIG. 1-3 prescribe the appropriate wiring of the 4-WIRE POWER MAINS RECEPTACLE; FIG. 4-6 Schematically illustrates the 'LOW VOLTAGE' SECONDARY windings connections of 'typical' PUBLIC UTILITY VOLTAGE DISTRIBUTION SYSTEMS, as provided around the world. PLEASE NOTE: Voltage figures shown on the Secondary legs depict IDEAL LOAD BALANCE. (Isn't IDEAL a nice concept?) The INTENT of FIG. 4-6 is to provide an overview of BASIC UTILITY POWER SYSTEMS at a glance.

DRWG #9512-8760 SHEET 4 (of 4): GTA CHASSIS DIMENSIONS AND REAR SUPPORT DETAIL.

This Drawing provides all critical dimensions to aid in the installation of the Amplifier. The REAR VIEW is so dimensioned to locate the Rear Support Mounting centers from either the bottom of the chassis or from the mounting centers of the Rack-Mount Front Panel.

POWER CONSUMPTION CHART

Two graphs are provided here. Graph 1A shows power curves for 16, 8, 4, 2, and 1 OHM loads for one Channel driven only. Each curve is really an 'envelope' showing maximum power consumption under continuous sine wave, and folds back to a 10% DUTY CYCLE output power (resulting in higher Transient power). Graph 1B shows power curves for 16, 8, 4, and 2 OHM loads for Bridged-Mono operation in the same fashion. It may also be used for total power consumption in Stereo or Dual Mono by adding up the total output power.

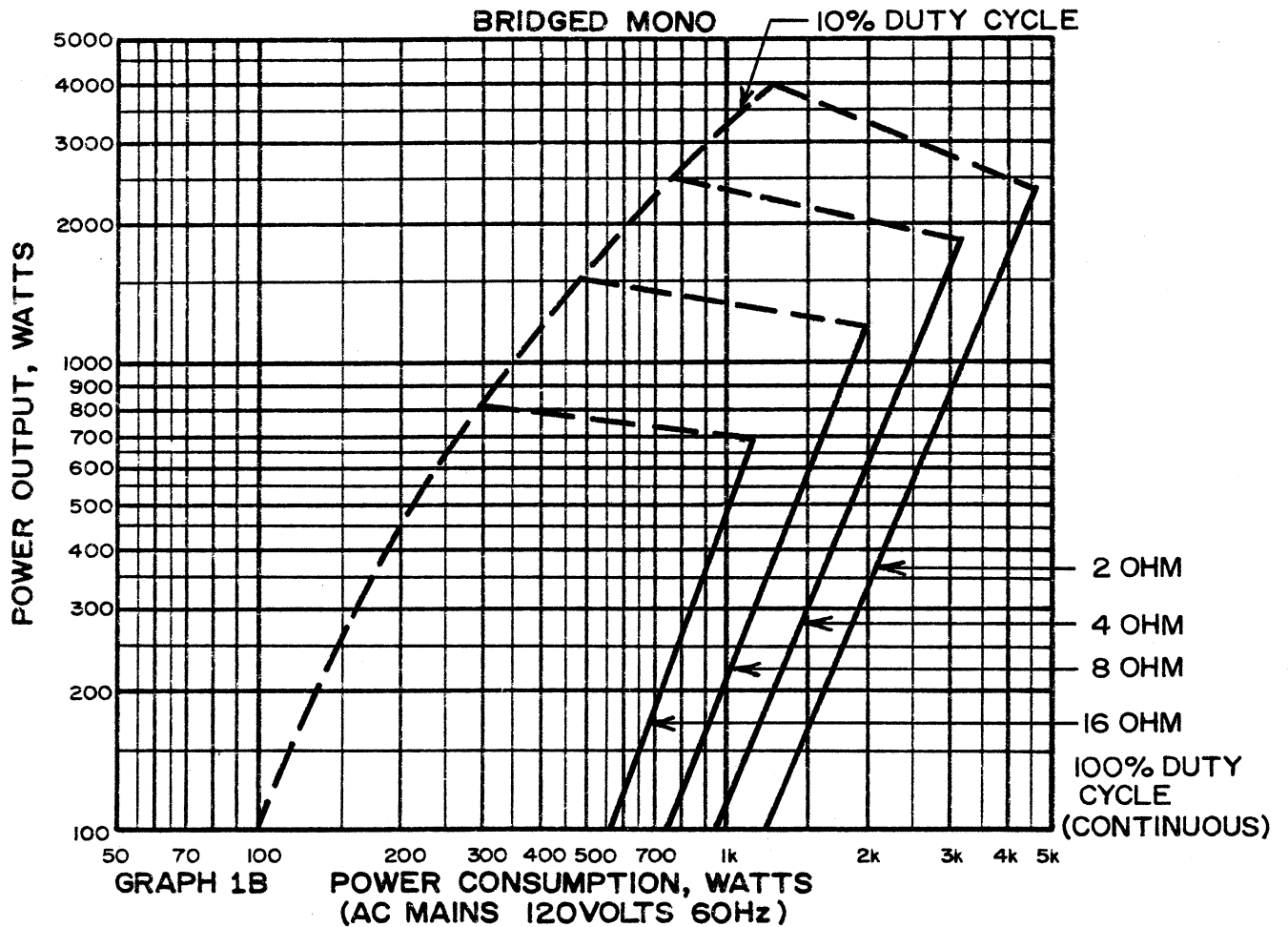
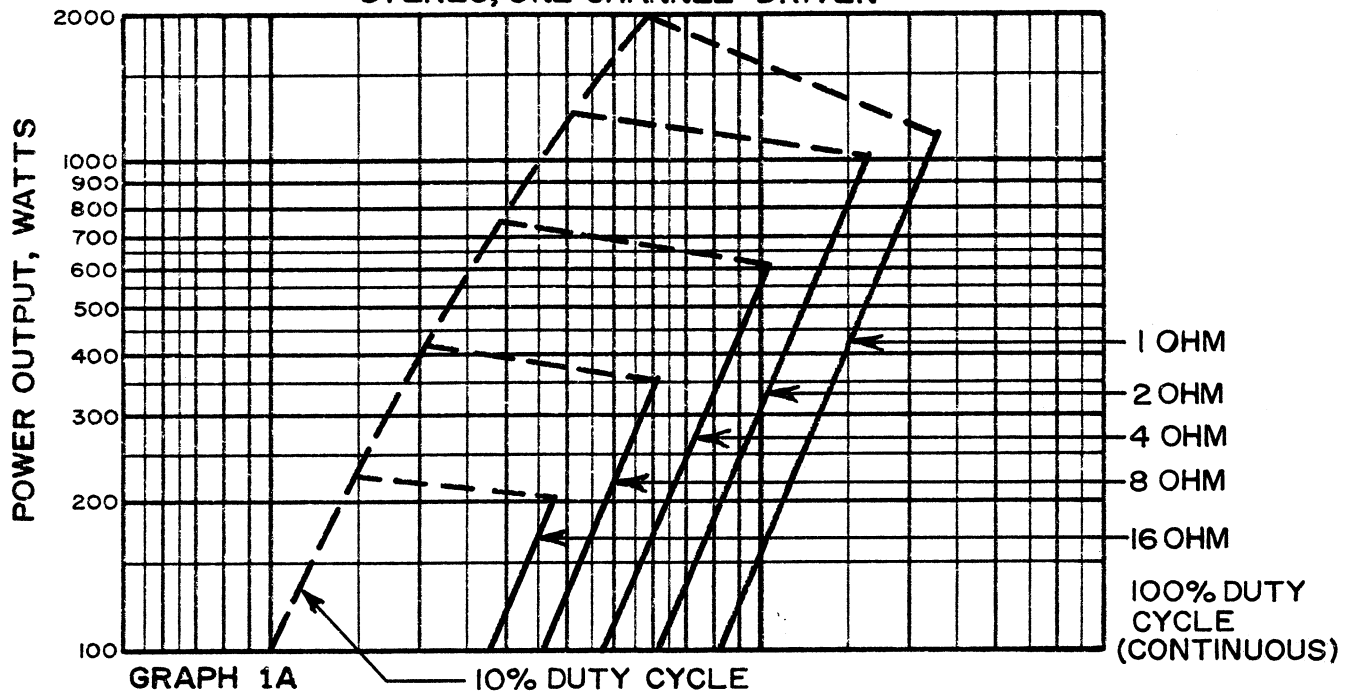
In-rush current figures for single and dual Channels are provided for both 120 Volt/60 Hz and 240 Volt/60 Hz as well.

LOUDSPEAKER IMPEDANCE CHART

Two graphs are provided here. Graph 2A shows the Impedance vs. Frequency curves of a typical 18" Dia. 4 OHM woofer in both Free Air and Mounted in a 7 cu. ft. ported enclosure (Thiele-Small Alignment #4 type). Graph 2B shows the resultant Phase vs. Frequency curves corresponding to Graph 2A.

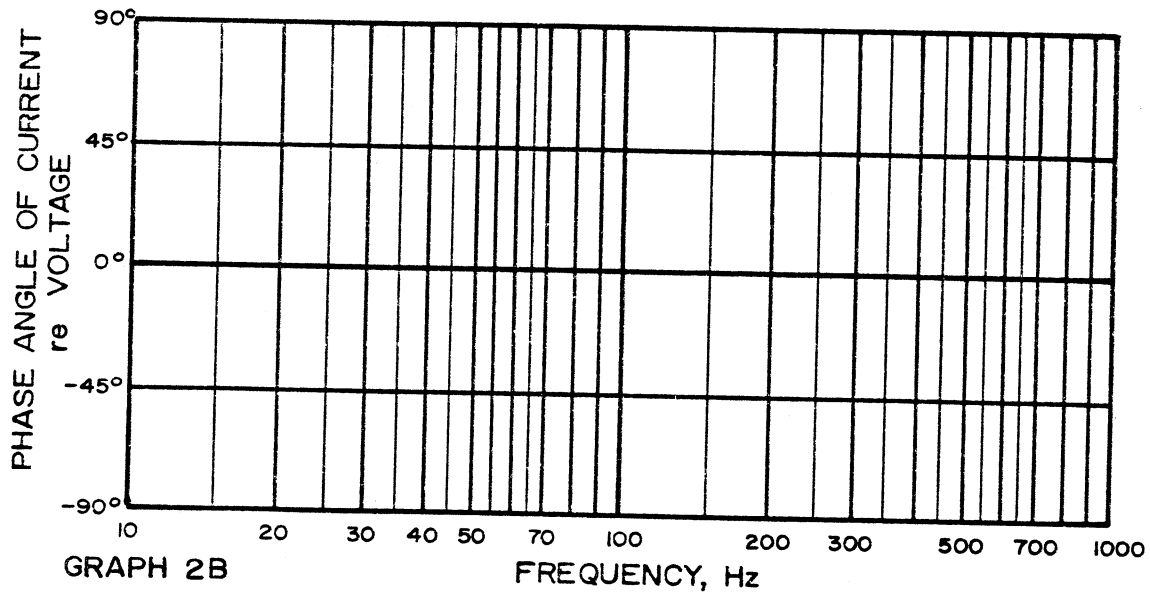
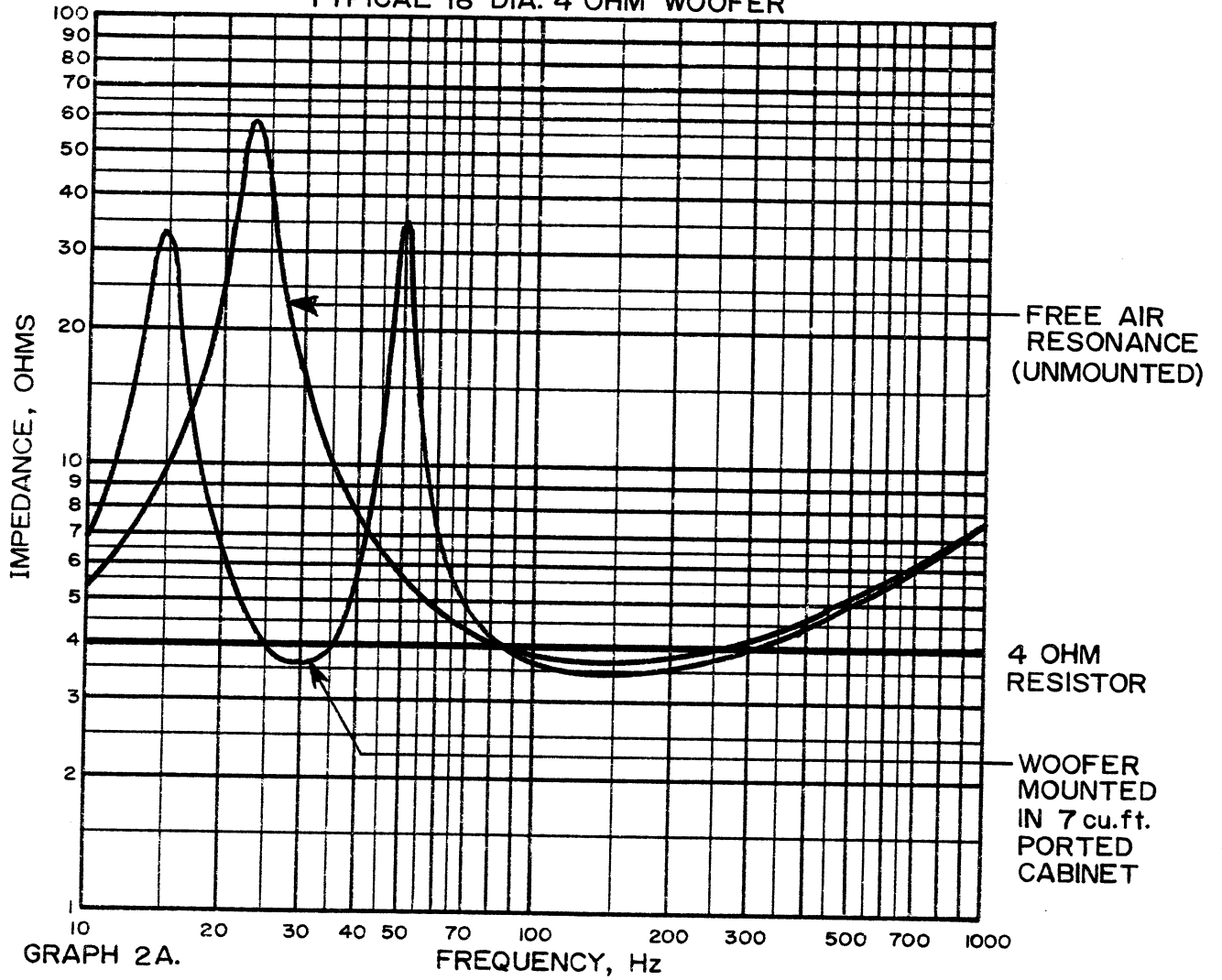
POWER CONSUMPTION CHART

STEREO, ONE CHANNEL DRIVEN



LOUDSPEAKER IMPEDANCE CHART

TYPICAL 18" DIA. 4 OHM WOOFER

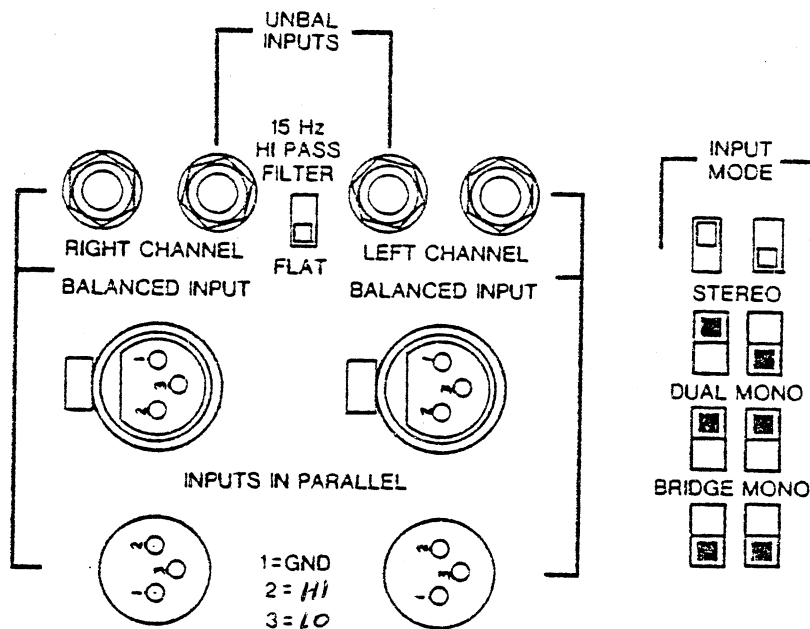


INPUT CONNECTIONS

To provide the greatest flexibility in the installation of this amplifier, two types of input modules are available: Active Balanced (Standard product), or Transformer Balanced (Option 06). From the back panel, connections are the same. Both Female and Male XLR connectors are provided along with a 1/4" tip-ring-sleeve phone jack for Balanced input connections. All three connectors are in parallel to aid in driving a rack full of amplifiers from the same signal source. With short Male/Female XLR cables, inputs can loop-thru to one another. Input impedance is 15 kohms between pins 2 and 3. Signal polarity is pin 2 PLUS, pin 3 MINUS. (If opposite polarity is desired, refer to the notes on the Schematic drawing 9008-0762 or 9008-0761 in this manual).

In addition to the looping Balanced input connectors, an unbalanced 1/4" phone jack is provided. This input bypasses the Balanced input stage (Active or Transformer versions), and allows direct connection to the Power Amplifier stage thru the Input Mode switches and the level control. (See System Block Diagram 9512-0760).

To further increase the flexibility, Input Mode Switches provide



discrete Stereo, Dual Mono and Bridge-Mono configurations. Switch settings are shown above. The Stereo mode needs no instructions. In the Dual Mono position, the Left channel input circuit drives both Power Amp modules, and disconnects the Right channel inputs. (On the Transformer Input version, Left and Right channel inputs are placed in parallel to prevent improper loading of the XFMR Secondary. Be sure the Input Mode Switches are not in this position if discrete Stereo is desired, as this will short the

signal source outputs together). Both level controls remain independent. This saves an additional patch cord when parallel input connections are required.

For Bridge-Mono operation, the Left channel input is used, and only the Left channel level control is operational. Output connections and instructions are covered elsewhere. (See Table of Contents)

On the standard Active Balanced Input version, a 15 Hz, 12 dB/Oct. High Pass Filter is provided to limit subsonic energy output if present in the signal content. The switch controls both channels together, and is located between the two unbalanced phone jacks. This feature is not available on the Transformer Input version (Option 06).

TRANSFORMER-COUPLED SOURCE TERMINATIONS

When interfacing with equipment having an output transformer, proper loading must be provided to prevent non-linearities. To accomplish the task of selecting the proper resistance value to add across the input line, you must determine two things first:

1. Total Input Impedance of the amplifier(s) : Z_{total} ;
2. Source Impedance driving the amplifier(s) : R_s ;

STEP 1. $Z_{total} = \text{Input } Z \text{ of Amps} / \text{Number of Amps}$

STEP 2. Check documentation of Signal Source for Output Impedance.

STEP 3. $K \text{ (Impedance Factor)} = (Z_{total} - R_s) / R_s$

STEP 4. Termination Resistor Req'd = $(1+1/K)(R_s)$

EXAMPLE :

Input Impedance of Amplifiers = 15,000 ohms

Number of Amplifiers = 4

$R_s = 600$ ohms

STEP 1. $15,000/4 = 3,750$ ohms

STEP 2. R_s given as 600 ohms

STEP 3. $(3,750-600)/600 = 5.25$

STEP 4. $(1+1/5.25)(600) = (1.19)(600) = 714.29$ ohms

Closest value is 715 ohms 1% metal film resistor.

Assuming that the XLR input connectors are being used, this termination resistor may be installed in a Shielded Phone Plug, connected between Tip and Sleeve, and plugged into the Balanced 1/4" phone jack input above the XLRs.

preventing this from occurring. If your speaker system does not contain a fuse or a circuit breaker (or other means), a fuse should be placed in series with each speaker and the wire going to the Red terminal on the rear of the Amplifier.

Maximum protection can be obtained with fast-acting fuses. Use the value recommended by the manufacturer. If no value is specified, use the chart provided in the following pages to select the correct value (MFRM-03530A).

To use the chart, take a straightedge, such as a ruler, and line up the Speaker's Minimum Impedance with its' Peak Music Power rating. The proper fuse value can then be read from the center column. Choose a fuse that is closest to, and below, the value indicated.

WIRE SIZE AND DAMPING FACTOR

The high damping factor of BGW Amplifiers results in a very tight, clean bass response. Excessively long, and/or small diameter (AWG) speaker lines can lower the damping factor and distort the lower frequencies. A damping factor of at least 50 should be maintained to insure good audio quality. (Damping Factor of this Amplifier may be found in the Specification Sheet at the front of the manual).

The relationship between wire length and wire gauge, and damping factor can be calculated using the chart (MFRM-03510A) found next to the other chart mentioned above. Proceed as follows:

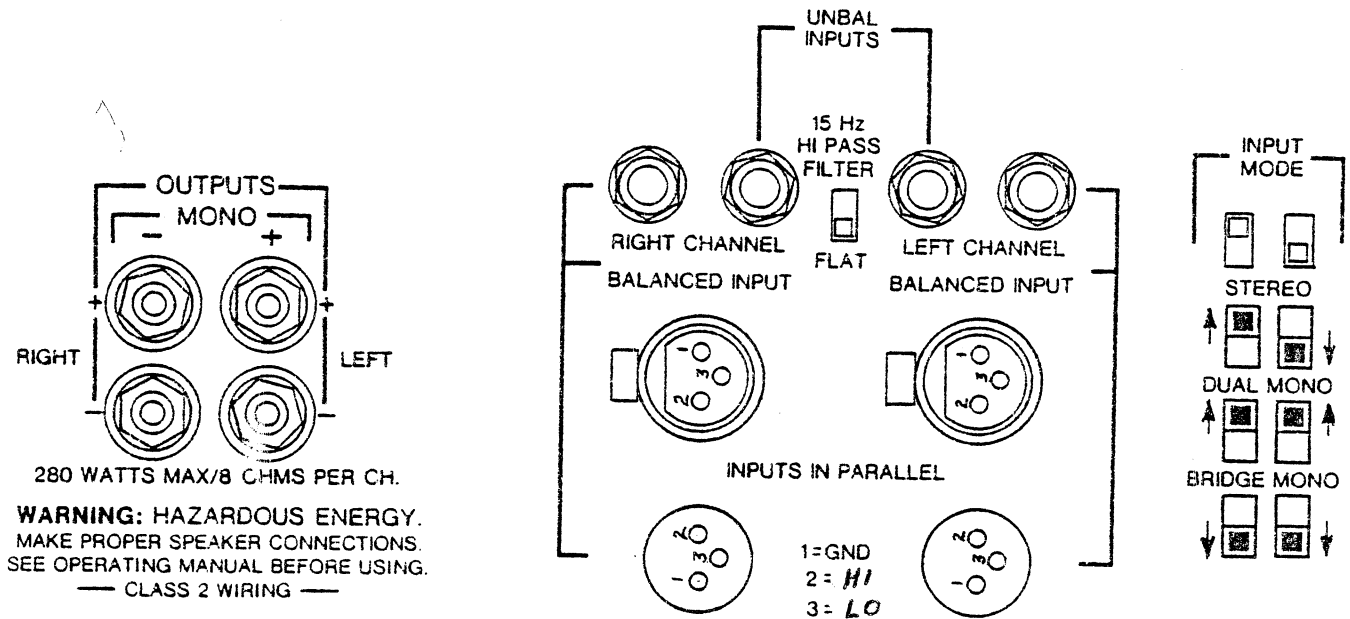
1. Using a straightedge, line up the gauge of the speaker wire with its' length. Mark off the resulting source resistance where this line crosses the center column.
2. Line up the source resistance, determined in step #1, with the manufacturers' impedance of the speaker system. The damping factor can now be read.

NOTE: The impedance of a cone-type speaker can be approximated by measuring the resistance across the speaker terminals, with the amplifier disconnected. Multiplying this result by 1.33 gives you the approximate minimum impedance. This method should NEVER be used on HORN COMPRESSION DRIVERS!

STEREO OUTPUT CONNECTIONS

Two sets of five-way binding posts, on the rear panel, serve as output connectors; one Red and one Black for each channel. The Red one is the same polarity as the input signal. As is obvious, the Left Speaker Cable connects to the Left output, and the Right Speaker Cable connects to the Right output.

The binding posts are GOLD plated, and may best be used by using one of the many high-quality, heavy (wire) gauge speaker cables that have GOLD plated terminals at each end. To insure tight fitting connections, the binding posts allow a 1/2" NUT DRIVER to be used to tighten down the connections. Alternately, bare or tinned ends may be inserted into the holes provided, as seen when the binding post is unscrewed, or spade lugs fitted onto the ends. (GOLD plating is not mandatory). For ease, standard Dual Banana plugs may be attached to the cable for quick disconnect.



NOTE: Minimum Load Impedance is 2 OHMS.

Make certain that the speakers are properly phased to each other. Connect the Black or Minus (-) terminal on the Speaker to the appropriate Black binding post on the Amplifier. Connect the Red or Plus (+) terminal to the Red binding post. Set the Input Mode Switches to the Stereo position as shown above.

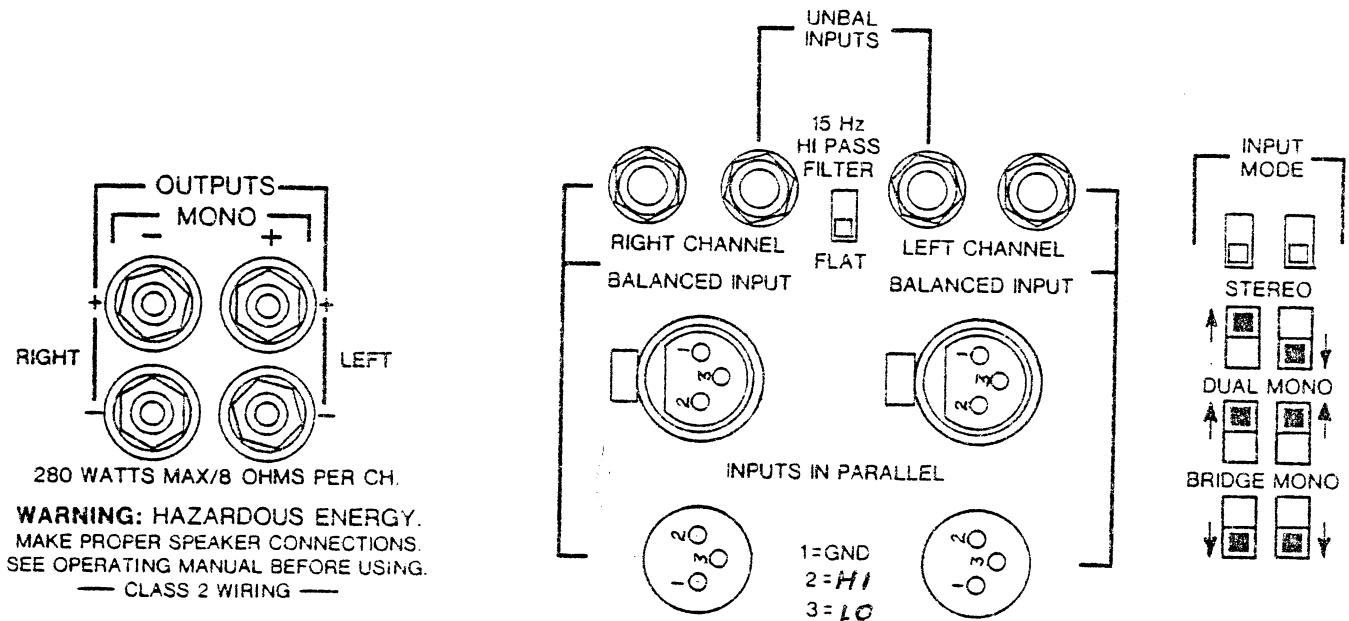
SPEAKER PROTECTION

All speakers can be damaged by having too much power applied to them. Fuse protection is an effective and inexpensive way of

MONO OPERATION

The output power of the amplifier can be increased by operating in the Bridged-Mono Output configuration. The correct procedure for this mode of operation is as follows:

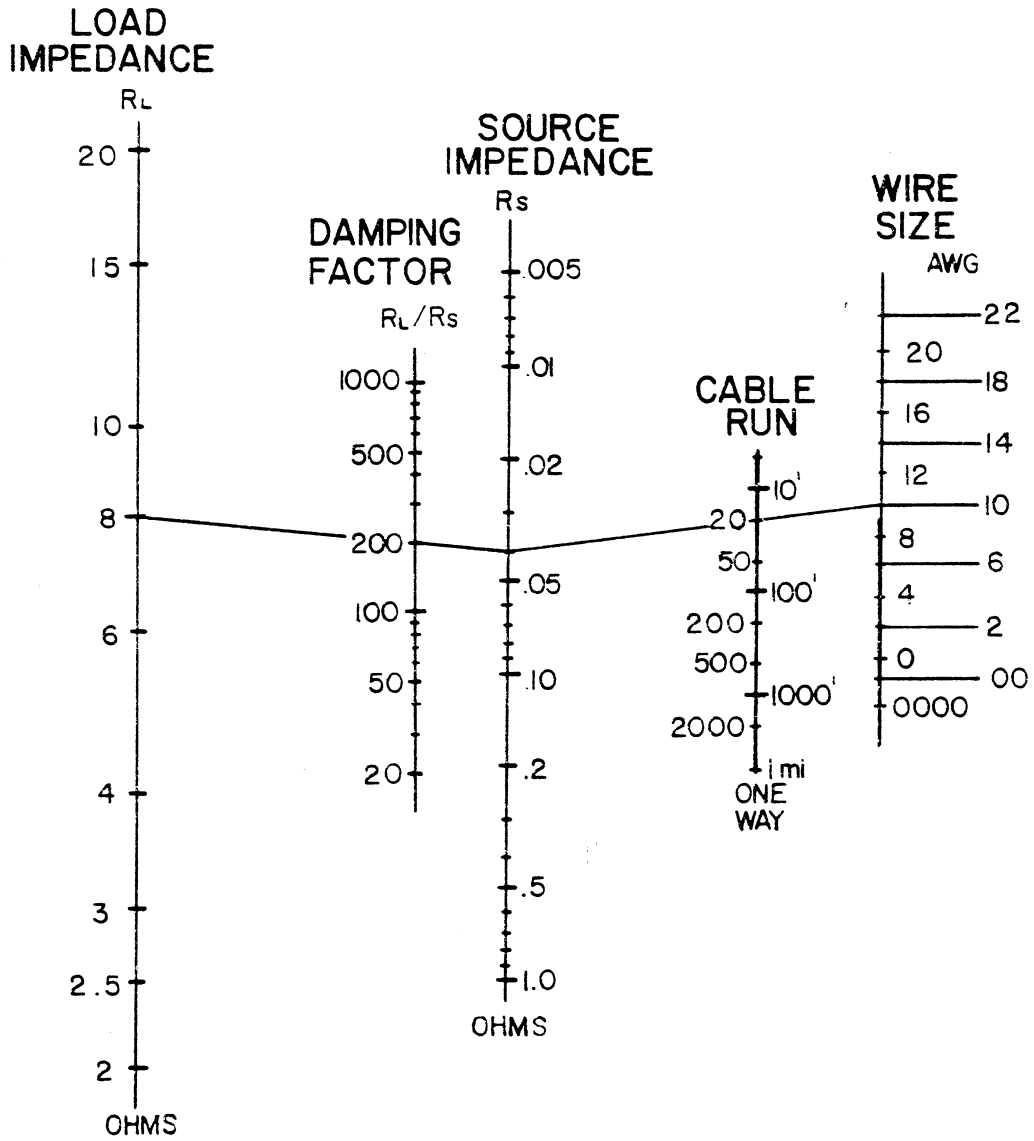
1. Set the the Input Mode Switches to Bridge Mono position as shown below.
2. Use the Left channel input connections only. DO NOT use the Right channel input, as it is now disconnected.
3. Connect the Speaker Cable leads across the two Red binding posts. DO NOT make any simultaneous load connections to the Black binding posts (GROUND). The Left channel output is PLUS, the Right channel output is MINUS, as shown in the diagram below. Fuses, when necessary, should be placed in series with one lead.



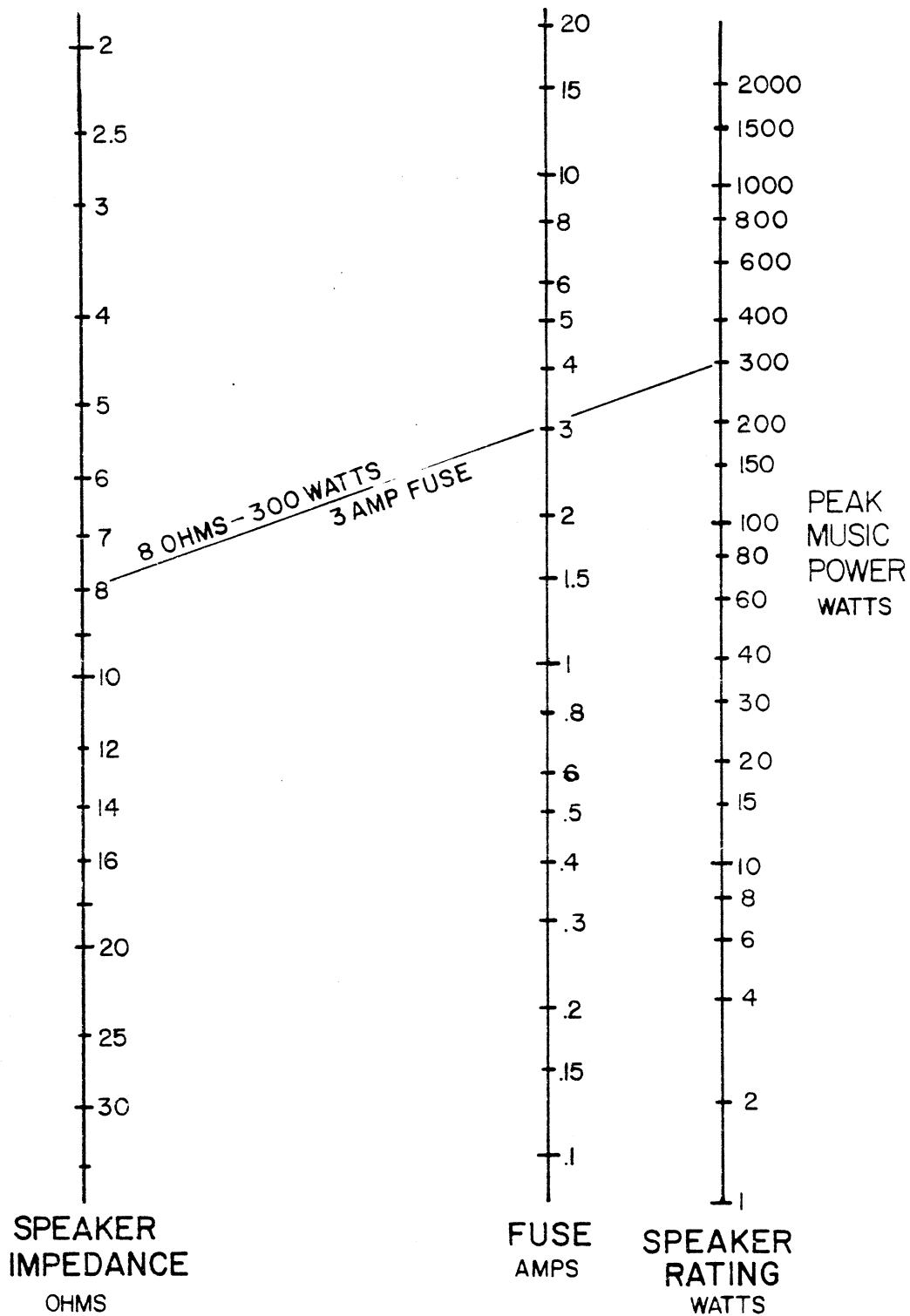
NOTE: Minimum Load Impedance for Bridged-MONO is 4 OHMS.

CIRCUIT DESCRIPTION

In the Bridged-Mono mode, the output of the Left channel is attenuated and fed into the inverting input of the Right channel, making the Right channel a Unity Gain Voltage Follower. The two channels work opposite each other; when one goes positive, the other goes negative, thus doubling the output voltage swing. Each Amplifier channel is effectively driving half the load, and this is why the minimum load impedance is double that for Stereo. The single output is connected between the two Red binding posts.



DAMPING FACTOR & WIRE SIZE NOMOGRAPH (see text)



FUSE SELECTOR NOMOGRAPH FOR LOUDSPEAKER PROTECTION

MFRM-03530A

OPERATION

PRECAUTIONS

1. Speaker destruction is often due to improper equipment operation. This often occurs when someone without the proper appreciation for the components of a high power, high quality music system, has the opportunity to change records or adjust levels. The best protection here is caution. Keep the equipment out of reach of untrained adults and children. Make sure the speaker is properly protected with fuses (Output Connections Section).
2. Never parallel the two amplifier outputs together.
3. If the amplifier continuously blows fuses, something is wrong - do not increase fuse size.
4. Do not connect an input ground lead to an output ground lead; to do so may cause a ground loop and oscillations.
5. Do not operate the amplifier from power mains which exceed the indicated mains voltage by more than 10%.
6. Never connect the output of the amplifier to another power source such as a battery or power main.
7. Do not expose the amplifier to corrosive chemicals such as lye, soft drinks, salt water, etc. Also, never immerse the amplifier in any liquid.
8. Do not remove the amplifier's cover during operations.
9. The amplifier is not intended for high frequency-high power use and should not be used for high power at above 20 kHz.
10. Neither the amplifier nor any of its leads should be exposed to areas likely to be struck by lightning.

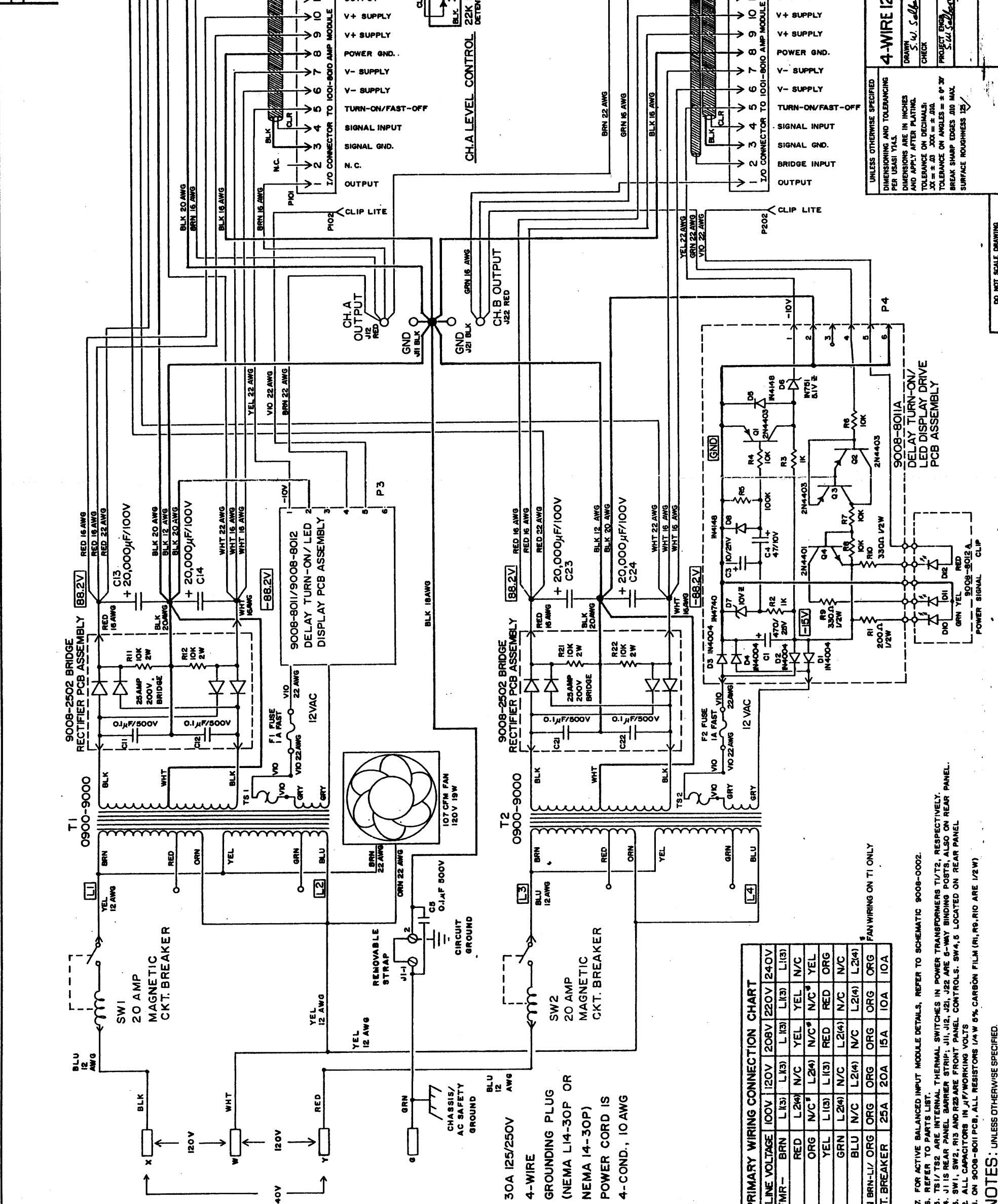
PROCEDURES

After all connections have been made to the power amplifier, turn the gain controls fully counter-clockwise. Turn on the preamplifier, then turn on the power amplifier. The LED over the circuit breaker or marked IDLE should light. If it does not, check to see that the amplifier is plugged in to a live power outlet.

With the preamplifier gain controls fully off, advance the left and right power amplifier gain controls about half way clock-wise (slit in knob facing upwards). There should be no audible hum; if a hum is heard, check the connections between the power amplifier and preamplifier. Now advance the preamplifier gain controls until the desired maximum volume is achieved. Should the preamplifier gain control be in excess of the $3/4$ setting, decrease it to half volume and increase the gain controls of the power amplifier to the desired level.

Often, turn-on transients originate in the pre-amp or tuner. This is especially true of tube-type units. If this situation arises, turn the amplifier on after the other units have had adequate time to stabilize.

LTR	DESCRIPTION	DATE	APPROVED
B	ADD SW3 MAIN/STANBY SWITCH	7-2-87	SWS
C	REPLACE 9008-8012 MODULE w/9008-8010; MAKE TURN-ON CRT NEAR TIME RESISTOR ADJ. POINT; WIRING CHANGED FOR 7-WIRE 125/250V A/C	12-4-87	SWS
D		2-24-88	



PRIMARY WIRING CONNECTION CHART

AC LINE VOLTAGE	100V	120V	208V	220V	240V
XFMR--	BRN L(1)	L(1)	L(1)	L(1)	L(1)
	RED L(2)	N/C	YEL L(2)	YEL N/C	N/C
	ORG N/C	L(2)	N/C	N/C	YEL
	YEL L(1)	L(1)	RED L(2)	RED ORG	ORG
	GRN L(2)	N/C	L(2)	N/C	N/C
	BLU N/C	L(2)	N/C	L(2)	L(2)
FAN BRN-L/1	ORG ORG	ORG ORG	ORG ORG	ORG ORG	ORG ORG
CKT. BREAKER	25A	20A	15A	10A	10A

NOTES: UNLESS OTHERWISE SPECIFIED:

- FOR ACTIVE BALANCED INPUT MODULE DETAILS, REFER TO SCHEMATIC 9008-0002.
- REFER TO PARTS LIST.
- TS1/TS2 ARE INTERNAL THERMAL SWITCHES IN POWER TRANSFORMERS T1/T2, RESPECTIVELY.
- J1 IS REAR PANEL BARRIER STRIP; J11, J12, J21, J22 ARE 5-WAY BINDING POSTS, ALSO ON REAR PANEL.
- ALL CAPACITORS IN μ F/WORKING VOLTS
- ON 9008-8011 PCB, ALL RESISTORS 1/4 W 5% CARBON FILM (R1, R9, R10 ARE 1/2 W)

4-WIRE 125/250

BU SYSTEMS
 1930 SOUTH YUKON AVE.
 HAWTHORNE, CA 90250
 (213) 973-8090

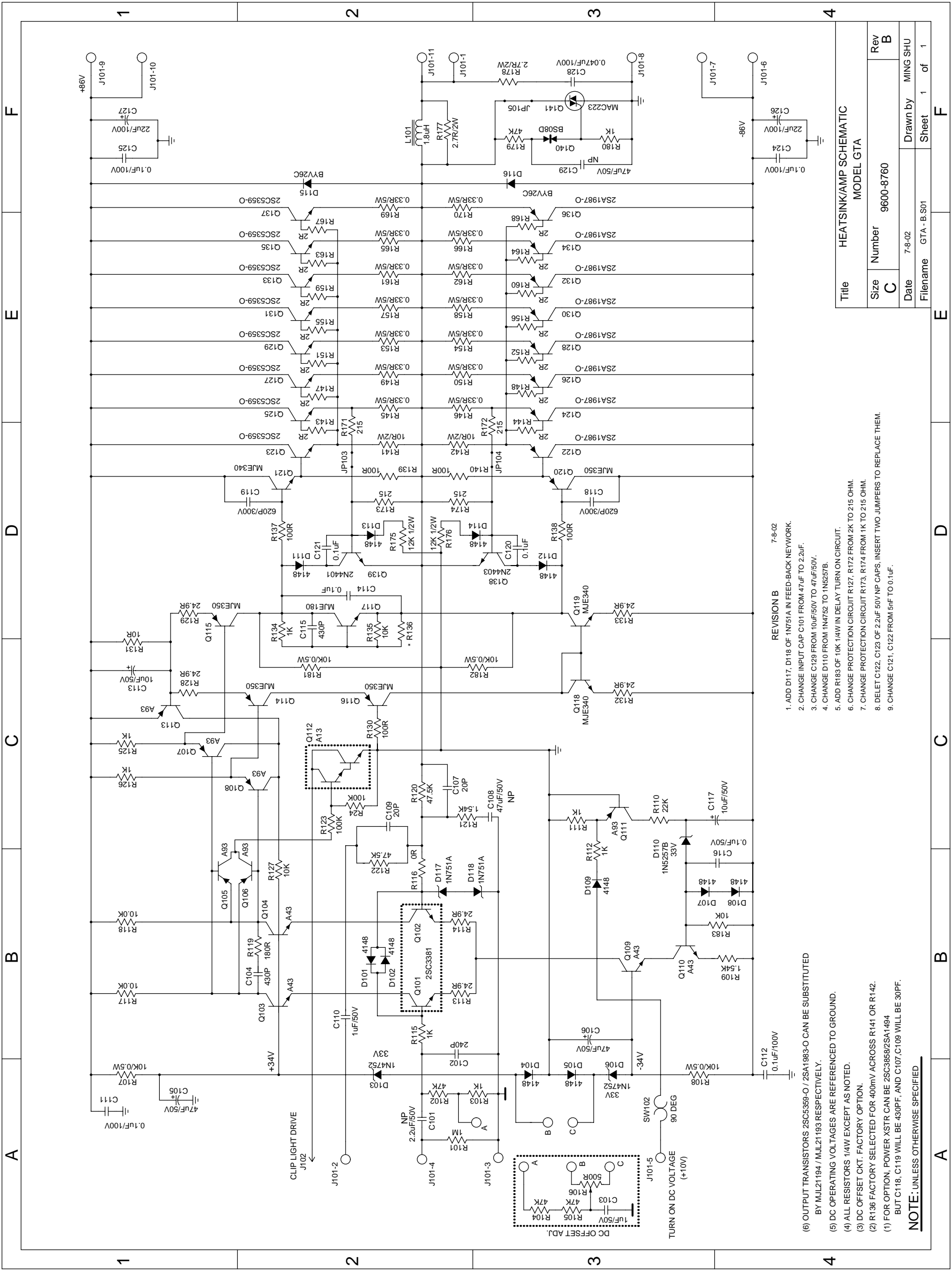
CHASSIS WIRING SCHEMATIC
MODEL GTA POWER AMP

DATE: 9-7-87
 DRAWN: S.W. Sully
 CHECK: S.W. Sully
 PROJECT ENG: S.W. Sully
 PROJECT NO: 11-6-86

UNLESS OTHERWISE SPECIFIED DIMENSIONING AND TOLERANCING PER USASI Y14.5
 DIMENSIONS ARE IN INCHES AND APPLY AFTER PLATING.
 TOLERANCE ON DECIMALS: .XX = ± .01
 TOLERANCE ON ANGLES: ± 0° 30'
 BREAK SHARP EDGES 0.01 MAX.
 SURFACE ROUGHNESS 12/

SCALE: D
 DRAWING NUMBER: 9512-8010
 SHEET: 1 OF 1

DO NOT SCALE DRAWING



REVISION B 7-8-02

1. ADD D117, D118 OF 1N751A IN FEED-BACK NETWORK.
2. CHANGE INPUT CAP C101 FROM 47uF TO 2.2uF.
3. CHANGE C129 FROM 10uF/50V TO 47uF/50V.
4. CHANGE D110 FROM 1N4752 TO 1N5257B.
5. ADD R183 OF 10K 1/4W IN DELAY TURN ON CIRCUIT.
6. CHANGE PROTECTION CIRCUIT R173, R174 FROM 2K TO 215 OHM.
7. CHANGE PROTECTION CIRCUIT R173, R174 FROM 1K TO 215 OHM.
8. DELET C122, C123 OF 2.2uF 50V NP CAPS, INSERT TWO JUMPERS TO REPLACE THEM.
9. CHANGE C121, C122 FROM 5nF TO 0.1uF.

(6) OUTPUT TRANSISTORS 2SC5359-O / 2SA1983-O CAN BE SUBSTITUTED BY MJL21194 / MJL21193 RESPECTIVELY.

(5) DC OPERATING VOLTAGES ARE REFERENCED TO GROUND.

(4) ALL RESISTORS 1/4W EXCEPT AS NOTED.

(3) DC OFFSET CKT. FACTORY OPTION.

(2) R136 FACTORY SELECTED FOR 400mV ACROSS R141 OR R142.

(1) FOR OPTION, POWER XSTR CAN BE 2SC3852/2SA1494 BUT C118, C119 WILL BE 430PF, AND C107, C109 WILL BE 30PF.

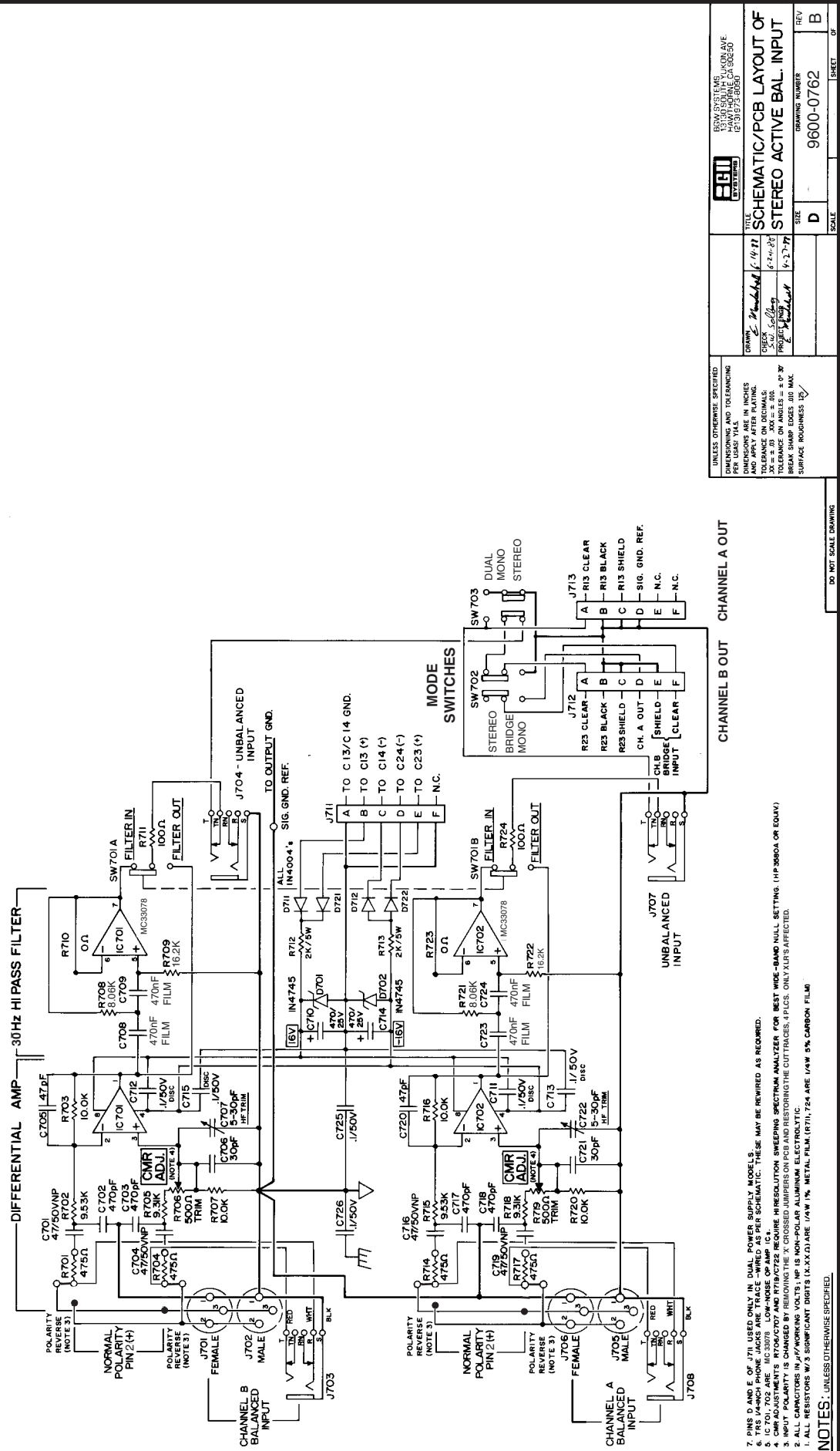
NOTE: UNLESS OTHERWISE SPECIFIED

Title		HEATSINK/AMP SCHEMATIC	
Model		MODEL GTA	
Size	Number	9600-8760	Rev
C	B		B
Date	7-8-02	Drawn by	MING SHU
Filename	GTA - B.501	Sheet	1 of 1

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REV	DESCRIPTION	DATE	APPROVED
A	REVISE J703 & J708 SO THE REMAINS HOT WITH PIN 2 HOT ON THE ALU'S	12-15-89	RP

REV	DESCRIPTION	DATE	APPROVED
-----	-------------	------	----------



UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED
DIMENSIONS AND TOLERANCING ARE IN INCHES	UNLESS OTHERWISE SPECIFIED
AND APPLY AFTER PLATING.	UNLESS OTHERWISE SPECIFIED
TOLERANCE ON DIMALS:	UNLESS OTHERWISE SPECIFIED
±0.010	UNLESS OTHERWISE SPECIFIED
±0.005	UNLESS OTHERWISE SPECIFIED
±0.002	UNLESS OTHERWISE SPECIFIED
BREAK SHARP EDGES JID MAX.	UNLESS OTHERWISE SPECIFIED
SURFACE ROUGHNESS 10	UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

CHANNEL A OUT

CHANNEL B OUT

MODE SWITCHES

SW702
STEREO BRIDGE MONO

SW703
DUAL MONO STEREO

J712
A - R13 CLEAR
B - R13 BLACK
C - R13 SHIELD
D - SIG. GND. REF.
E - N.C.
F - N.C.

J713
A - R13 CLEAR
B - R13 BLACK
C - R13 SHIELD
D - SIG. GND. REF.
E - N.C.
F - N.C.

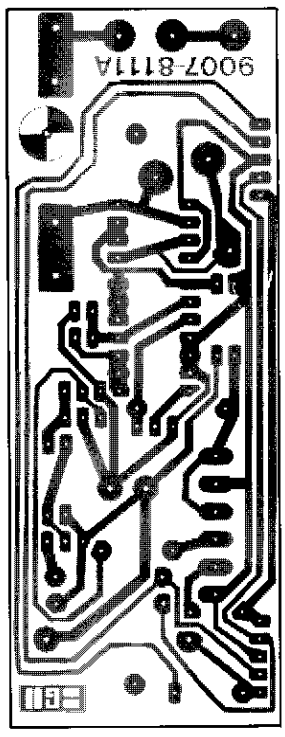
UNLESS OTHERWISE SPECIFIED

- PINS 8 AND 9 OF J711 USERS ONLY IN DUAL POWER BATTERY MODE.
- THIS (A) AND (B) PHONE JACKS ARE TRACE WIRE AS PER SCHEMATIC. THESE MAY BE REMOVED AS REQUIRED.
- IC 701, 702 ARE MC 33078. LOW-NOISE OP AMP IC.
- COMPONENTS R706/C707 AND R718/C722 REQUIRE HIGH RESOLUTION SWEEPING SPECTRUM ANALYZER FOR BEST WIDE-BAND NULL SETTING. (HP 3080A OR EQUIV.)
- RESISTORS R701, R702, R703, R704, R705, R706, R707, R708, R709, R710, R711, R712, R713, R714, R715, R716, R717, R718, R719, R720, R721, R722, R723, R724, R725 ARE 1/4W 5% CARBON FILM.
- ALL CAPACITORS W/3 SIGNIFICANT DIGITS (X.XX) ARE 1/4W 1% METAL FILM (R711, R724 ARE 1/4W 5% CARBON FILM).

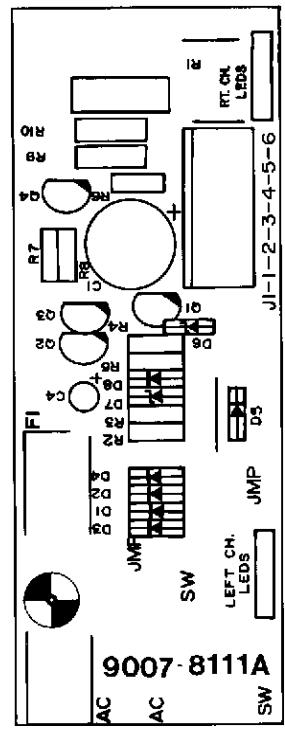
NOTES: UNLESS OTHERWISE SPECIFIED.

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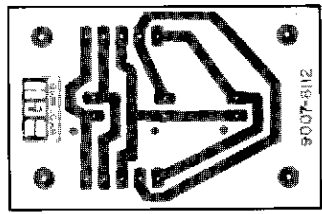
REVISIONS	DATE	APPROVED
DESCRIPTION		
LTR		



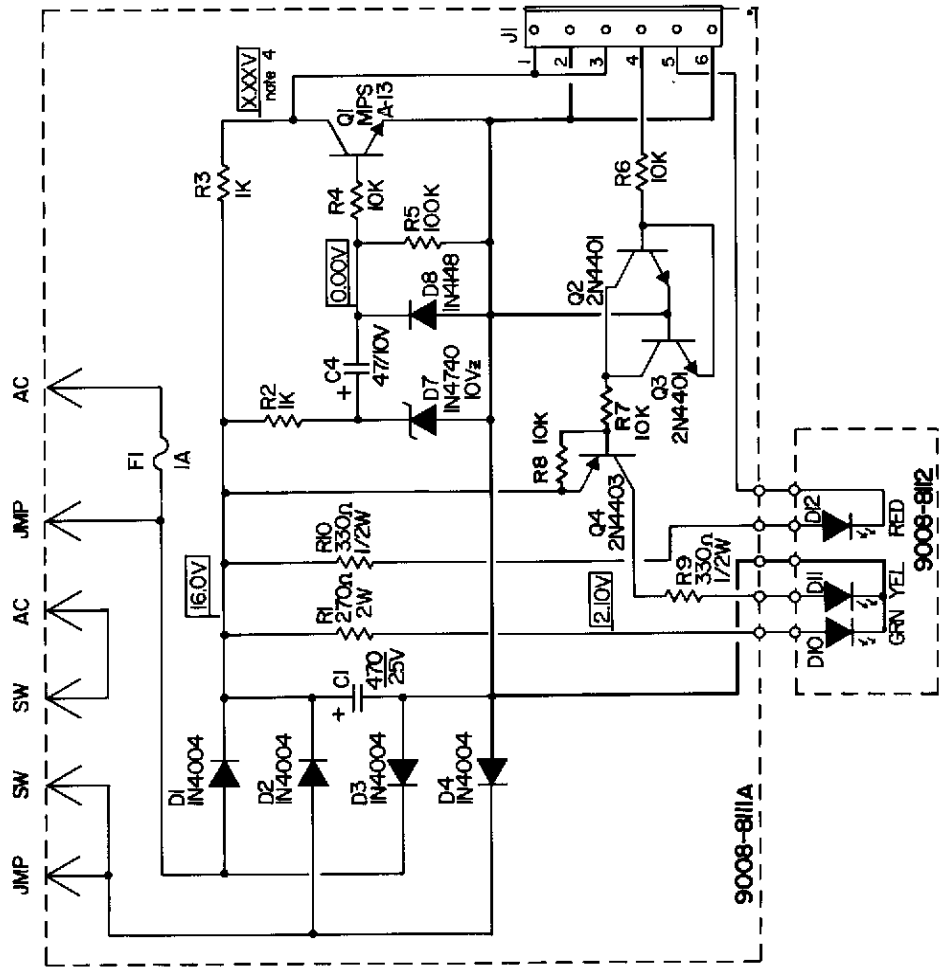
BOTTOM VIEW 9008-8111A



TOP VIEW 9008-8111A



BOTTOM VIEW 9008-8112



UNLESS OTHERWISE SPECIFIED DIMENSIONING AND TOLERANCING PER USASI Y14.5. DIMENSIONS ARE IN INCHES AND APPLY AFTER PLATING. TOLERANCE ON DECIMALS: XX = ± .05 XXX = ± .010. TOLERANCE ON ANGLES = ± 0° 30' BREAK SHARP EDGES 300 MAX. SURFACE ROUGHNESS 125		DRAWN: <i>J. Johnson</i>		DATE: 11-10-88		TITLE: SCHEMATIC - DELAY TURN ON/ LED DISPLAY DRIVE	
CHECKED: <i>E. P. ...</i>		DATE: 12-1-88		PROJECT ENG: 11-6-86		REV: A	
PROJECT ENG: <i>S. W. ...</i>		SCALE: C		DRAWING NUMBER: 9600-8111		SHEET: OF	

UNLESS OTHERWISE SPECIFIED
DIMENSIONING AND TOLERANCING
PER USASI Y14.5.
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AND APPLY AFTER PLATING.
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XX = ± .05 XXX = ± .010.
TOLERANCE ON ANGLES = ± 0° 30'
BREAK SHARP EDGES 300 MAX.
SURFACE ROUGHNESS 125

DO NOT SCALE DRAWING

NOTES: UNLESS OTHERWISE NOTED.
5. DOT DENOTES CATHODE ON 9008-8112.
FOR MODELS GTA/GTB, VOLTAGE IS 10.0V NOMINAL.
4. FOR MODEL 8500T, VOLTAGE IS 6.40V NOMINAL.
3. MODEL 8500T DOES NOT USE THE 9008-8112 (led) PCB.
2. ALL CAPACITORS IN 1/4W WORKING VOLTAGE.
1. ALL RESISTORS ARE 1/4W UNLESS OTHERWISE NOTED.

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