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HAWTHORNE, CALIFORNIA 90250
TELEX NO. 66-4494

OWNER'S MANUAL
MODELS 250D & 250E
STEREO POWER AMPLIFIER

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*Model 250E Only

- 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 that 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.

DESCRIPTION

The BGW 250D and 250E are professional stereo power amplifiers, identical except for their front panel indicator lights. Clipping indicators are used on the 250D, while the 250E uses dual solid-state V.U. meters. (See Section #01520).

An on/off circuit-breaker switch, gain controls, and the indicator lights are located on the front panel; all other external features are mounted on the rear.

Three-pin XLR type plugs can be used for balanced and unbalanced input line connections. A jumper plug must be inserted into the transformer socket when unbalanced lines are used, and a transformer is required for balanced lines. Standard 1/4" phone jacks are provided for unbalanced line use only, and can be used directly. (See all input connection sections).

The five-way binding posts used for output connections accept banana plugs, spade lugs, or tinned wire. Circuit ground can be separated from chassis ground by removing the connecting link on the rear panel barrier strip. A recessed switch converts the amp into a bridged mono mode.

Features include an error-sensing op-amp input stage, to stabilize performance; a heat sink mounted bias circuit, to provide precise temperature compensation; and a full complementary output stage, featuring six 150 watt transistors in each channel (1800 watt total dissipation capability). Extensive circuitry is used to protect the amplifiers and whatever is connected to them. (See section #01520).

Mechanical features include: a 16 gauge welded steel chassis, teflonTM insulated wiring, two massive aluminum heat sinks, and modular construction.

All active audio circuit components are contained in two modules, one for each channel. These modules consist of a glass epoxy circuit board mechanically coupled to a large aluminum heat sink. Vertical fin arrangement and grill work on all radiating sides allows natural convection currents to flow upward and away from the amplifier. Removal of the modules for modification or service is easily accomplished by removing four support screws and the plug-in electrical connectors.

INDICATOR AND PROTECTION CIRCUITS

INDICATOR CIRCUITS

The 250D features a pair of red LED's, one for each channel, in clipping indicator circuits that are activated when the amplifier output voltage tries to exceed the available power supply voltage. Distortion rises significantly because there is not enough energy to accurately reproduce the signal. As this condition can occur at a rate too fast for the eye to follow, the LED's remain lit for 1/4 second once clipping is sensed. A third red LED is employed as a "power on" indicator.

Each of the two solid-state V.U. meters on the 250E features eleven LED's arranged in an arc. The first LED position (left) is a "power on" indicator. The remaining nine LED's are calibrated in decibels below rated power, with the far right LED indicating 0 dB and the balance ranging downward to -33dB. A switch on the rear panel calibrates the meter for four or eight ohm loads. This display, accurate to ± 1 dB, has a response many times faster than the best conventional D'Arsonval meters, and is also more precise. The last LED is the same indicator used in the 250D circuit. The meter is protected by a high impact LexanTM window that resists scratching and color degradation.

PROTECTION CIRCUITS

In your unit, both the primary mains (A.C. line) overload protection and the on/off switch have been combined into a rocker-actuated, magnetic circuit breaker, whose operation, unlike fuses, is predictable and independent of temperature. Returning the switch to the on position resets the system.

Speaker protection is provided by relay circuitry that disconnects the load whenever a short-circuit or harmful D.C. current is present across the output terminals. Transients created when removing extremely large signals from the load are suppressed by magnetic-field arc-interruptors mounted on the relay case.

The relay circuit includes a time delay that allows the amplifier to stabilize before the speakers are connected. It also connects the speakers the instant the circuit breaker is shut off, eliminating annoying pops and clicks.

Protection is further provided by thermal-sensing switches mounted directly on each heat sink. Should the temperature in either output circuit rise beyond a safe level, a switch will shut off the amplifier and disconnect the speakers.

SPECIFICATIONS: MODELS 250D & 250E
OUTPUT POWER AND TOTAL HARMONIC DISTORTION

8 OHM OUTPUT POWER

100 watts minimum sine wave continuous average power output per channel with both channels driving 8-ohm loads over a power band from 20 Hz to 20 kHz. The maximum Total Harmonic Distortion at any power level from 250-milliwatts to 100 watts shall be no more than 0.1%.

1 kHz Power: 105 watts into 8-ohms per channel, both channels operating,
0.1% Total Harmonic Distortion.

4 OHM OUTPUT POWER

126 watts minimum sine wave continuous average power output per channel with both channels driving 4-ohm loads over a power band from 20 Hz to 20 kHz. The maximum Total Harmonic Distortion at any power level from 250-milliwatts to 126 watts shall be no more than 0.15%.

1 kHz Power: 150 watts into 4-ohms per channel, both channels operating,
0.15% Total Harmonic Distortion.

BRIDGED MODE OUTPUT POWER

251 watts minimum sine wave continuous average power output monaural driving an 8-ohm load over a power band from 20 Hz to 20 kHz. The maximum Total Harmonic Distortion at any power level from 250-milliwatts to 251 watts shall be no more than 0.15%.

1 kHz Power: 290 watts into 8-ohms, 0.15% Total Harmonic Distortion.

All Specifications and features are subject to change without notice.

SPECIFICATIONS

Intermodulation Distortion:	Less than 0.03% from 250 milliwatts to rated output (60 Hz & kHz, 4:1)
Small Signal Frequency Response:	+0, -3dB, 1Hz to 100kHz +0,-0.25dB, 20Hz to 20kHz
Hum and Noise Level:	Better than 106dB below rated output into 8-ohms (unweighted, 20Hz to 20kHz)
Input Sensitivity:	1.4 volts for maximum output. Voltage gain 26dB (20 times)
Input Impedance:	Greater than 15k ohms
Damping Factor:	Greater than 230 to 1 referenced to 8-ohms @ 1kHz
Output Impedance:	Designed for any load impedance equal to or greater than 4 ohms
Power Requirements:	Internal Jumper selects either 100, 120, 200, 220, or 240 volts; 50-60 Hz.
Semiconductor Complement	<u>250D</u> 2 Op Amp IC's (equivalent to 44 transistors each), 31 transistors, 6 zener diodes, 18 diodes and 3 LED's. <u>250E</u> 3 Op Amps IC, 51 Transistors, 6 zener diodes, 26 diodes and 20 LED's.
Dimensions:	5 1/4 inch by 19-inch standard rack front panel by 11 3/4 inches deep (13.34 cm x 48.26 cm x 29.85 cm)
Weight:	30 lbs., net; 36 lbs shipping 11.2 Kg. net, 13.2 Kg. shipping

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.

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 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 sides of the unit is not restricted. Inadequate ventilation may cause the protective heat sensors to shut the unit off. 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 PLUG THE AMPLIFIER IN YET!

All connections should be made before power is applied.

RAC: MOUNTING HINTS

KEEPING IT COOL

A power amplifier draws energy from a primary electrical service, usually a 120 VAC outlet, to drive loudspeaker systems with an audio signal. Typically, only half of the energy can be delivered to the loudspeakers; 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 impeded, 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. Power amplifiers using convection cooling require spacing between amplifiers to permit air flow between them. Power amplifiers using forced-air cooling, on the other hand, can usually be stacked closer to each other and may not need any blank panel spacing between amplifiers.

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 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.

INSTALLING THE UNITS

Use care when mounting equipment in a rack. Place the heaviest units near the bottom of the rack and fill in all unused rack spaces with blank panels. 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.

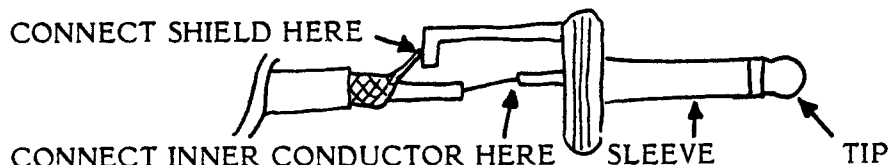
When racks are to be transported or used in a mobile installation, some means of securing the rear of the equipment are required. Angle brackets either attached to the bottom, side rails or rear panel are practical approaches.

STEREO INPUT CONNECTIONS

Three-pin XLR and 1/4 in. phone jacks are provided on the rear of the amplifier for input connections. Balanced or unbalanced lines may be used; however if input cables are longer than 8 feet, balanced lines may be necessary to maintain the signal-to-noise ratio and high frequency response.

1/4 INCH PHONE JACKS

The 1/4" phone jacks are for unbalanced lines only (single conductor, shielded) and may be used directly. Simply connect the shield to the outer sleeve of the plug and the inner conductor to the tip, or buy ready-made cables. See diagram below.



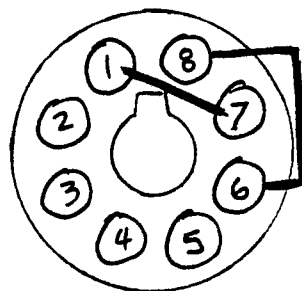
3-PIN XLR CONNECTORS

The 3-pin XLR connectors may be used with balanced (2-conductor, shielded) or unbalanced lines. They are connected to the amplifier's inputs by using the 8-pin transformer socket; they cannot be used directly.

Unbalanced Lines

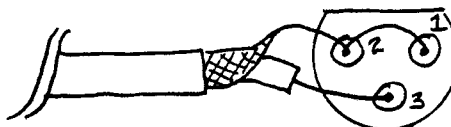
To use the 3-pin XLR connectors with unbalanced lines, a jumper plug (BGW P/N 1350-0108) must be inserted into each transformer socket. The jumper plug connects pin #1 to pin #7, and pin #6 to pin #8 as shown.

JUMPER PLUG
MUST BE USED
WITH
UNBALANCED
LINES

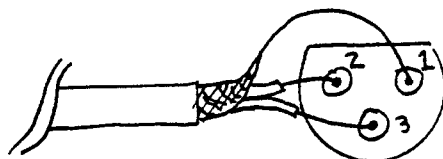


With the jumper plug in place, the 3-pin XLR connector has pin #2 connected to ground, and pin #3 to the input of the amplifier. Note: Rear of plug shown.

When using single conductor shielded cable for unbalanced lines, connect the inner conductor to pin #3 and the shield to pins #1 & #2.



When using 2-conductor shielded cable for unbalanced lines, connect the high level signal wire to pin #3, the low level signal wire to pin #2, and the shield to pin #1.



Note: Shield not connected to anything at signal source.

To achieve a true balanced input, it is necessary to use one transformer for each input. These should be plugged into the octal sockets provided. Depending on the specific application, one of several different transformers may be selected.

Forms are included in this manual to help guide you in your use and selection of transformers. Use the index below to find the appropriate form to match your needs.

CONNECTING ONE SOURCE TO ONE AMPLIFIER

Using Balanced Lines: Refer to form #03031

Using Unbalanced Lines: Refer to form #03041

CONNECTING ONE SOURCE TO TWO OR MORE AMPLIFIERS OR DEVICES

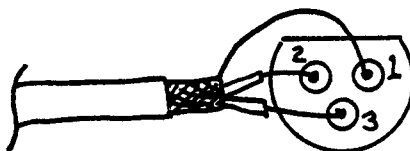
Using Balanced Lines: Refer to form #03011

Using Unbalanced Lines: Refer to form #03021

NOTE: Each amplifier input will be referred to as the "Load" in the above mentioned forms. Only one channel will be shown.

Two conductor shielded cable should be used in a balanced line system. Connect input cables as shown below.

Pin #1 Shield (Ground)
Pin #2 Signal (Minus)
Pin #3 Signal (Plus)

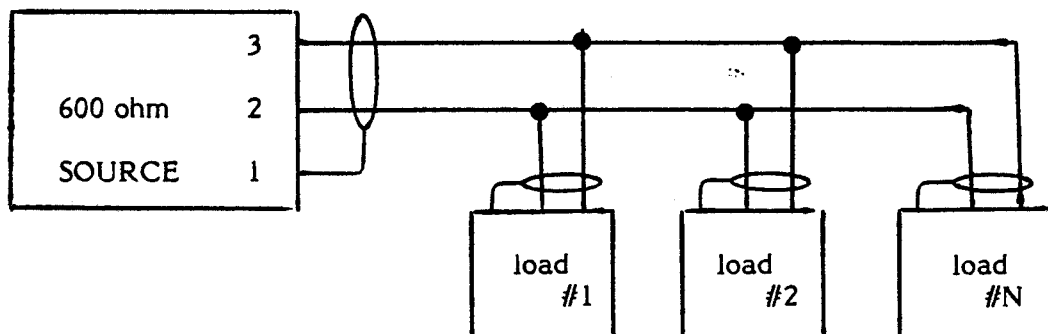


FOR MONO (BRIDGED) OPERATION

To operate the unit as a mono amplifier, use the left channel input only. DO NOT use the right channel input. Remember to place the stereo/mono switch in the mono position.

BRIDGING BALANCED LINE INPUTS

Used only when two or more devices are driven from the same input line.



MAXIMUM NUMBER OF AMPLIFIER 25ea

Input transformers for above

- A. Use 1:1 transformer 600 ohms to 600 ohms
- B. Nth load must have a terminating resistor added to the secondary of the Input transformer.

One alternative configuration is

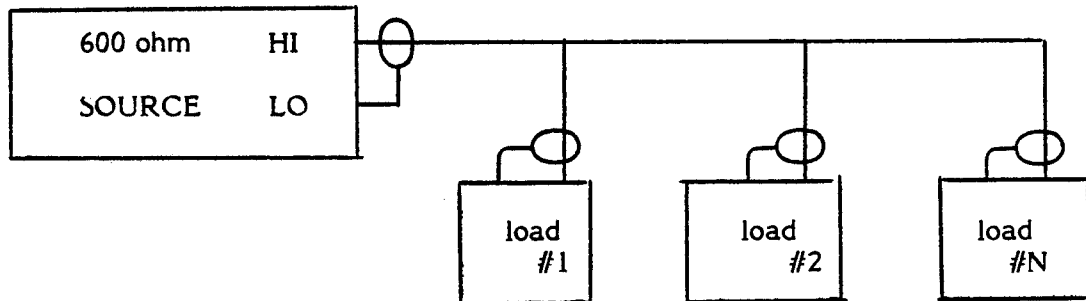
- C. 1:1 transformer 15K ohms to 15K ohms
- D. Nth load must have a terminating resistor added to the primary of the input transformer.

To find this resistance value see sheet TERMINATING RESISTANCE CHART, MFRM 03051.

NOTE: Terminating resistance is required when source is a transformer. Sources other than a transformer may not need a termination.

BRIDGING UNBALANCED LINE INPUTS

Used only when two or more devices are driven from the same Input line.



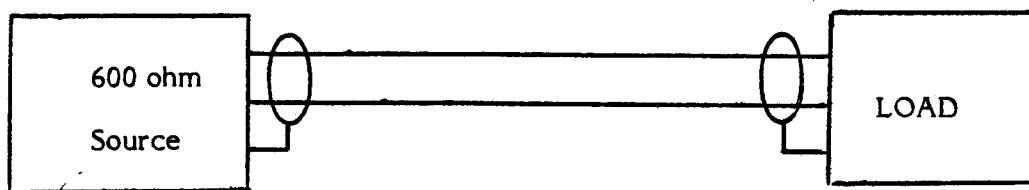
The Nth load should have a terminating resistor added to its octal plug between pin 1 and pin 6.

To find this resistor value see sheet "TERMINATING RESISTANCE CHART", MFRM 03051.

NOTE: Terminating resistance is required when source is a transformer. Sources other than a transformer may not need a termination.

BALANCED LINE INPUT:

Used only when one amplifier is driven from one source.



Input transformer for above

A. Use 1:5 transformer 600 ohms to 15K ohms

NOTE: No 600 ohm TERMINATION IS REQUIRED

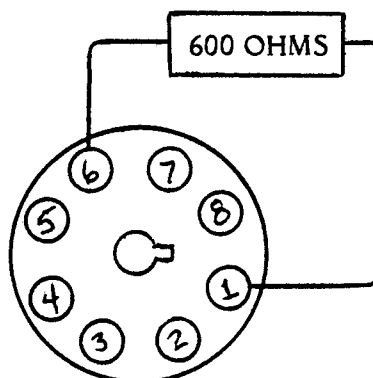
B. Alternate transformer

Use 1:1 transformer 600 ohms to 600 ohms

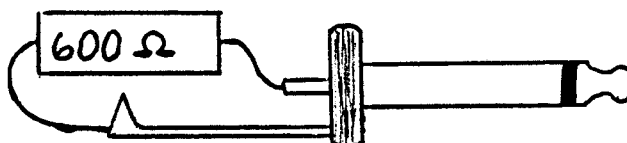
NOTE: 600 ohms termination is required on the secondary of the transformer

NOTE: Terminating resistance is required when source is a transformer: sources other than a transformer may not need a termination.

600 ohm termination, when required, can be accomplished by soldering the resistor across pins 1 and 6 of the transformer as shown below

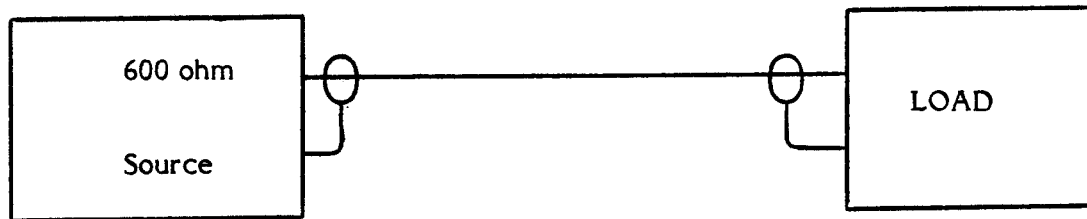


or by installing the resistor in a 1/4" phone plug and inserting it into the unused unbalanced input jack.



UNBALANCED LINE INPUT

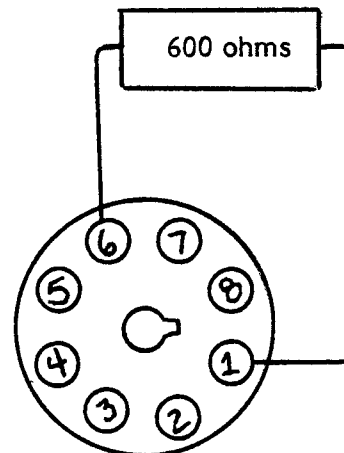
Used only when one amplifier is driven from one source



A 600 ohm terminating resistor must be added to its octal plug.

Between pin 1 and pin 6

NOTE: Terminating resistance is required when source is a transformer. Sources other than a transformer may not need a termination.



TERMINATING RESISTANCE CHART

How to find terminating resistance for balanced or unbalanced 600 ohm lines, driving more than one amplifier.

STEP A $\frac{\text{*Input Impedance of Amplifiers}}{\text{Number of Amplifiers}} = \text{Total Load Impedance of Amplifiers}$

STEP B $\frac{\text{Total Impedance of Amplifiers} - 600}{600} = K \text{ (Impedance Factor)}$

STEP C $\left(\frac{1}{K} + 1\right) \times 600 \text{ ohms} = \text{Load Resistor Required}$

EXAMPLE:

Input Impedance of Amplifiers = 15,000 ohms

Number of Amplifiers = 4

A $\frac{15,000}{4} = 3750 \text{ ohms}$

B $\frac{3750 - 600}{600} = 5.25$

C $\frac{1}{5.25} + 1 \times 600 = 1.19 \times 600 = 714.29 \text{ ohms}$

Closest value is 715 ohms 1% metal film resistor.

* Note all amplifiers must have the same input impedance. If not, use formula below:

$$\frac{1}{\frac{1}{Z_1} + \frac{1}{Z_2} + \frac{1}{Z_3} + \frac{1}{Z_n}} = \text{Total Load Impedance}$$

EXAMPLE:

Four (4) Amplifiers with input impedance of 15k, 30k, 30k and 7.5k

$$\frac{1}{\frac{1}{15k} + \frac{1}{30k} + \frac{1}{30k} + \frac{1}{7.5k}} = 3750 \text{ ohms}$$

TERMINATING RESISTANCE CHART

How to find terminating resistance for balanced or unbalanced 600 ohm lines, driving more than one amplifier.

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* Note all amplifiers must have the same input impedance. If not, use formula below:

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EXAMPLE:

Four (4) Amplifiers with input impedance of 15k, 30k, 30k and 7.5k

$$\frac{1}{\frac{1}{15k} + \frac{1}{30k} + \frac{1}{30k} + \frac{1}{7.5k}} = 3750 \text{ ohms}$$

STEREO OUTPUT CONNECTIONS

Two sets of five-way binding posts, on the rear panel, serve as output connectors, with one black and one red binding post for each channel. Left channel leads go to the binding posts marked LEFT; right channel, to those marked RIGHT.

Output leads are best connected, to the amplifier, with standard banana plugs; however, the five-way action of the binding posts permits the use of tinned wires or spade lugs.

Make certain that the speakers are properly phased. Connect the black or minus (-) terminal on the speaker cabinet to the appropriate black binding post on the amplifier. Connect the red or plus (+) terminal to the red binding post. Check to see that the stereo-mono switch on the rear of the amplifier is in the stereo position.

SPEAKER PROTECTION

All speakers can be damaged by having too much power applied to them. Fuse protection is an effective and inexpensive way of preventing this from occurring. If your speaker system does not contain a fuse or a circuit breaker, 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 to select the correct value (MFRM-03530).

To use the chart, take a straightedge, such as a ruler, and line up the speaker's 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

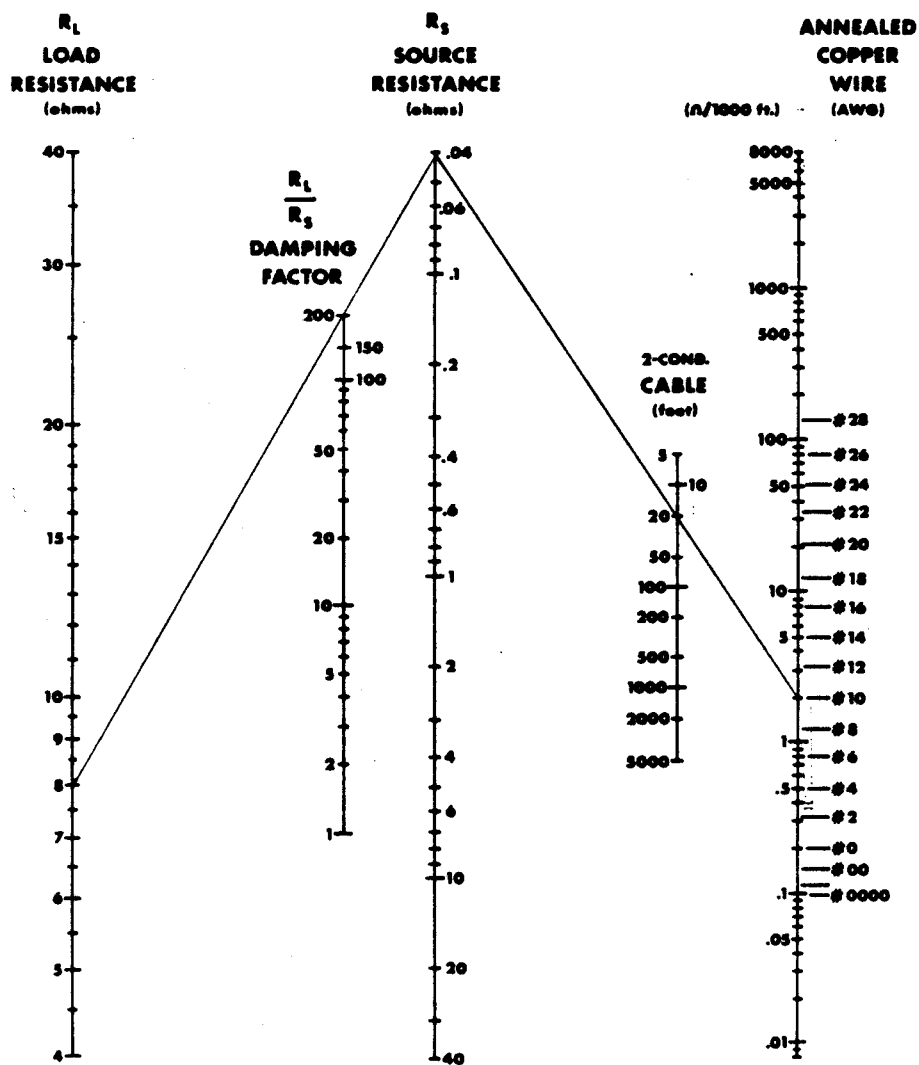
The high damping factor of BGW amplifiers results in a very clean bass response. Excessively long, and small diameter speaker wires can lower the damping factor and distort the lower frequencies. A damping factor of at least 50 should be maintained to insure good audio quality.

The relationship between wire length and diameter, and damping factor can be calculated using the chart (MFRM-03510) on the following page. Proceed as follows:

1. Using a straight-edge, 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 manufacturer's impedance* of the speaker system. The damping factor can now be read.

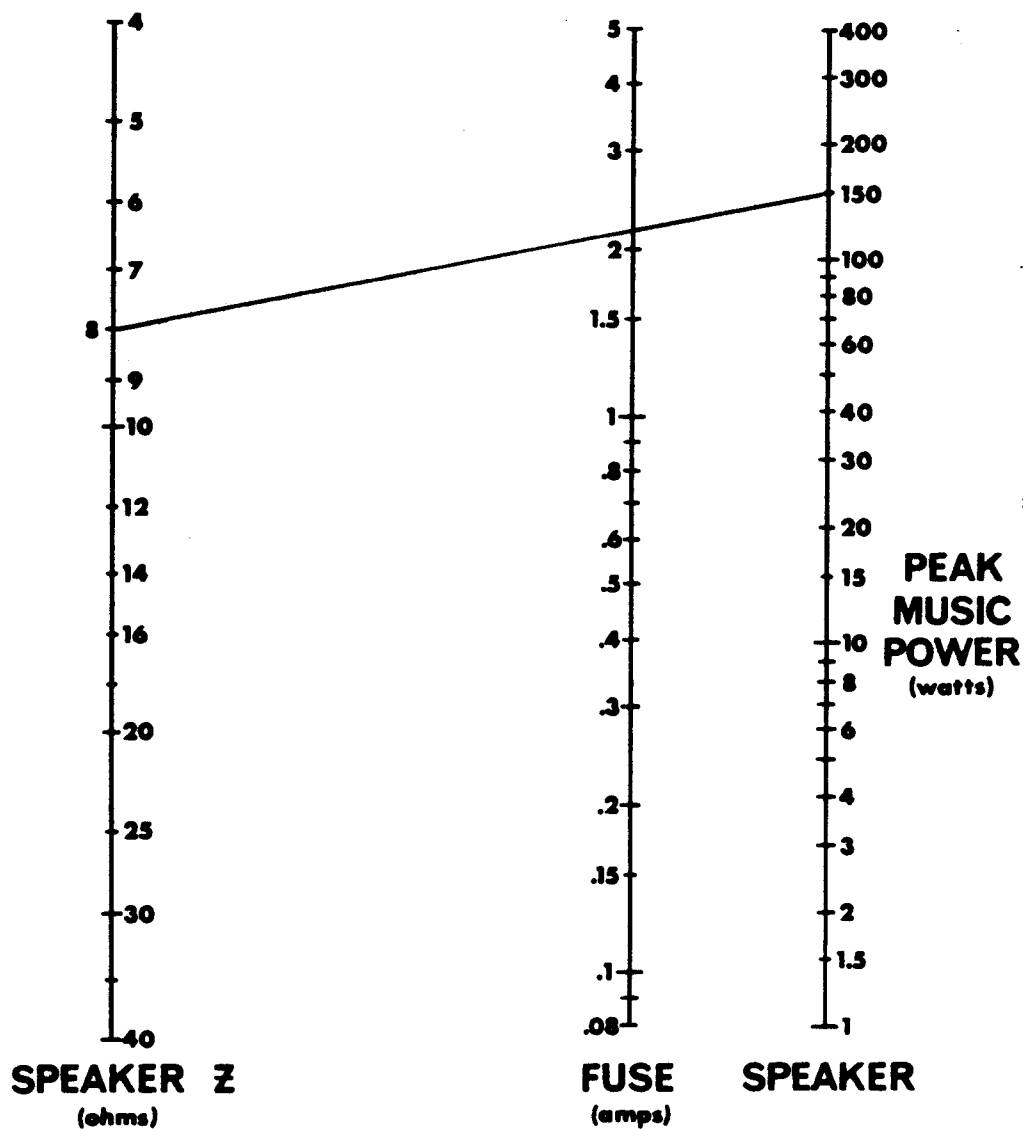
*The impedance of a speaker system can be approximated by measuring the resistance across the speaker terminals, with the amplifier disconnected. Multiplying this result by 1.33, gives you the approximate impedance.

Note: This method cannot be used with electrostatic speakers.



EXAMPLE: $R_L = 8\Omega$, $R_S = .04\Omega$ OR D.F. = 200
 CABLE LENGTH OF 20 FT. ANSWER: #10 WIRE

SOURCE RESISTANCE AND DAMPING FACTOR VS. LENGTH AND SIZE OF OUTPUT LEADS



EXAMPLE: $Z = 8\Omega$, PEAK POWER = 150W. ANSWER: FUSE = 2 AMPS

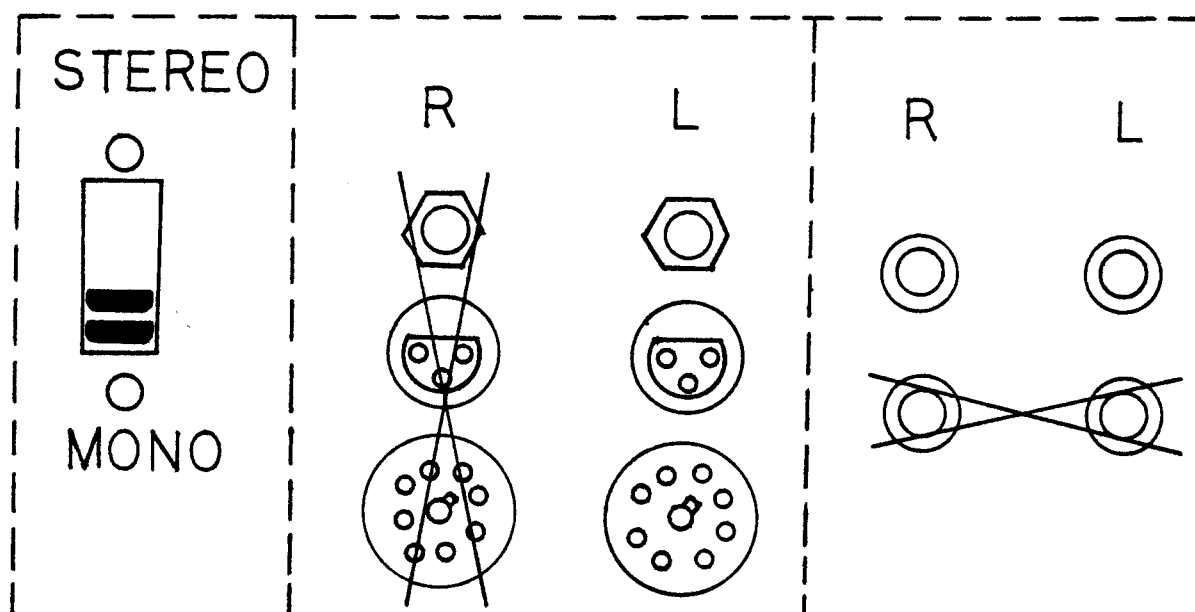
FUSE SELECTOR NOMOGRAPH FOR LOUDSPEAKER PROTECTION

MFRM-03530

MONO OPERATION

The output power of the amplifier can be increased by operating it in the mono (bridged) mode. The correct procedure for mono operation is as follows:

1. Set Stereo/mono switch to mono position.
2. Use left channel input only. DO NOT use the right channel input.
3. Connect the output across the two red binding posts. DO NOT use the black binding posts. DO NOT reference the load (speaker) to ground. Designate the left channel red binding post (+) and the right channel red binding post minus (-). Fuses, when necessary, should be placed in series with one red binding post.



NOTE: Minimum load impedance for mono operation should be 8 ohms.

CIRCUIT DESCRIPTION

In the mono mode, the output of the left channel is fed into the inverting input of the right channel. The two channels work opposite each other; when one goes positive, the other goes negative, thus doubling the output voltage swing. The single output is referenced between the two red binding posts.

POWER MAINS CONNECTIONS

The unit should be plugged in only when it has been established that it is wired for the correct power mains voltage and after all other connections have been made.

The mains (AC line) voltage is indicated on the serial number label on the rear of the unit. Products supplied for use in the United States and Canada are factory wired for 120 volts. Only the indicated mains voltage should be used. If the mains voltage must be changed, see POWER MAINS VOLTAGE CONVERSION.

A molded, parallel blade, U-ground plug is supplied. This connector is standard in the United States and Canada. For use elsewhere, the plug must be replaced with the correct connector. The color-code of the cord is as follows:

HI (switched Leg) - Brown (or Black)

LO (neutral Leg) - Blue (or White)

EARTH (chassis ground) - Green with Yellow tracer (or Green)

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 the 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. When driving any load with an impedance of less than 4 ohms, the load should be isolated from the amplifier with a series capacitor in order to avoid both damage to the load, and wasting of output power.
4. If the amplifier continuously shuts off, something is wrong - refer to Warranty and Service Station.
5. Do not connect an input ground lead to an output ground lead; to do so may cause a ground loop and oscillations.
6. Do not operate the amplifier from power mains which exceed the indicated mains voltage by more the 10%.
7. Never connect the output of the amplifier to another power source such as a battery or power main.
8. Do not expose the amplifier to corrosive chemicals such as lye, soft drinks, salt water, etc. Also, never immerse the amplifier in any liquid.
9. Do not remove the amplifier's cover.
10. The amplifier is designed for full power operation over the 20-20kHz audio band. High power operation above 20kHz should be avoided.
11. Neither the amplifier, nor any of its leads, should be exposed to areas likely to be struck by lightning.

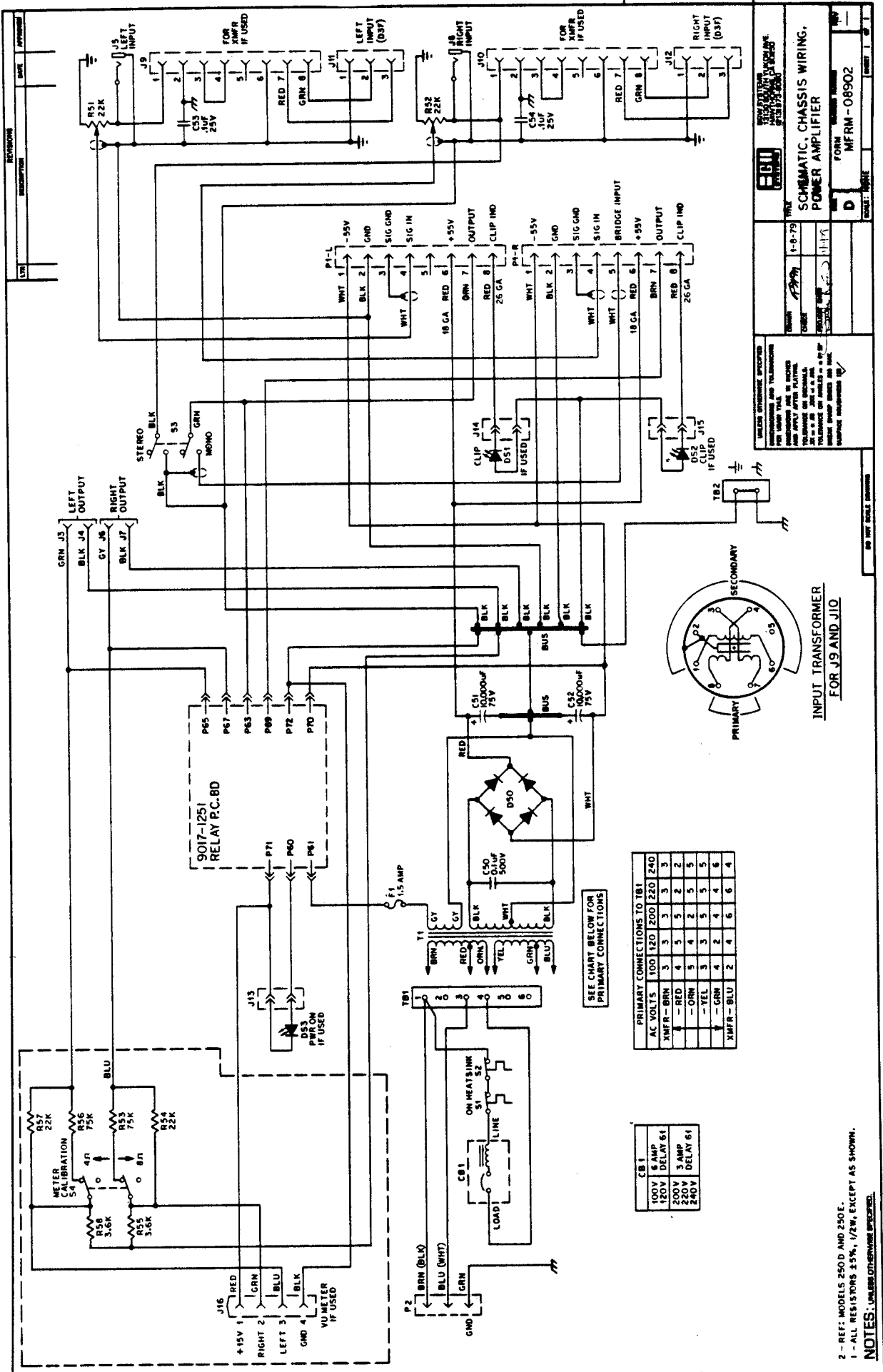
PROCEDURES

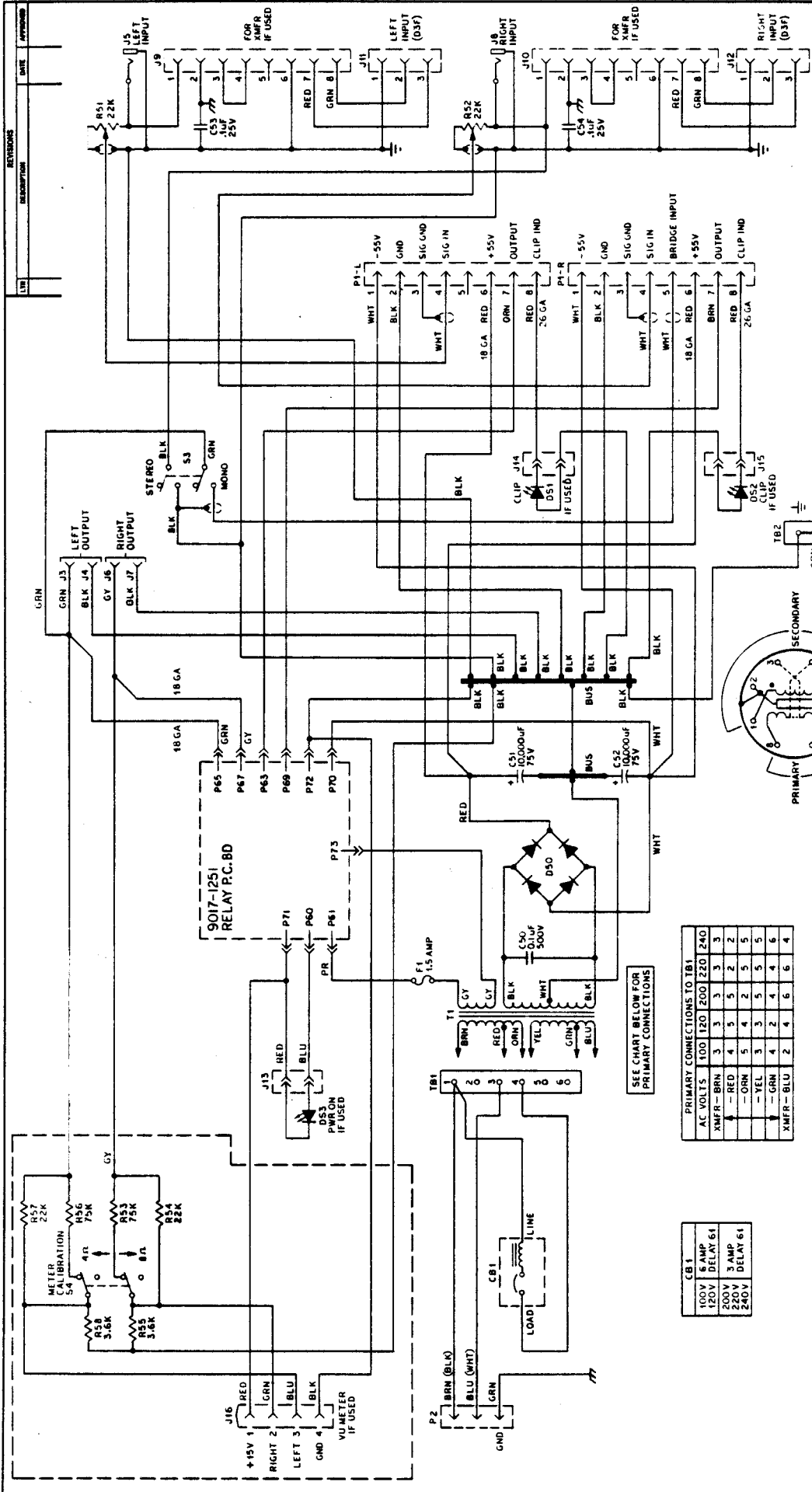
After all connections have been made to the power amplifier, turn the gain controls fully counter-clockwise. Turn on the preamplifier, then turn on the power amplifier. The red idle or power should light. If it does not, check to see that the amplifier is plugged into a live power outlet.

With the preamplifier gain controls fully off, advance the left and right power amplifier gain controls about half way clockwise (slot in knob facing upwards toward meters). There should be no audible hum; if 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.

The amplifier incorporates a time delay network and a relay, which connects the speaker only after the amplifier has stabilized, thus eliminating transients.

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.





REVISIONS

REV	DATE	DESCRIPTION	APPROVED
1			

UNLESS OTHERWISE SPECIFIED:
RESISTORS AND CAPACITORS
PER MIL-STD-883C

SCII MATIC CHASSIS WIRING,
POWER AMPLIFIER

FORM MFRM-08903

SCALE: NONE

SHEET 1 OF 1

PRIMARY CONNECTIONS TO T81

AC VOLTS	100	120	200	220	240
XMFR - BRN	3	3	3	3	3
XMFR - RED	4	5	5	2	2
XMFR - GRN	5	4	2	5	5
XMFR - YEL	3	3	5	4	6
XMFR - GRN	4	2	4	5	6
XMFR - BLU	2	4	6	6	4

CB1

VOLTS	100V	120V	200V	220V	240V
5 AMP					
6 AMP					
DELAY 61					

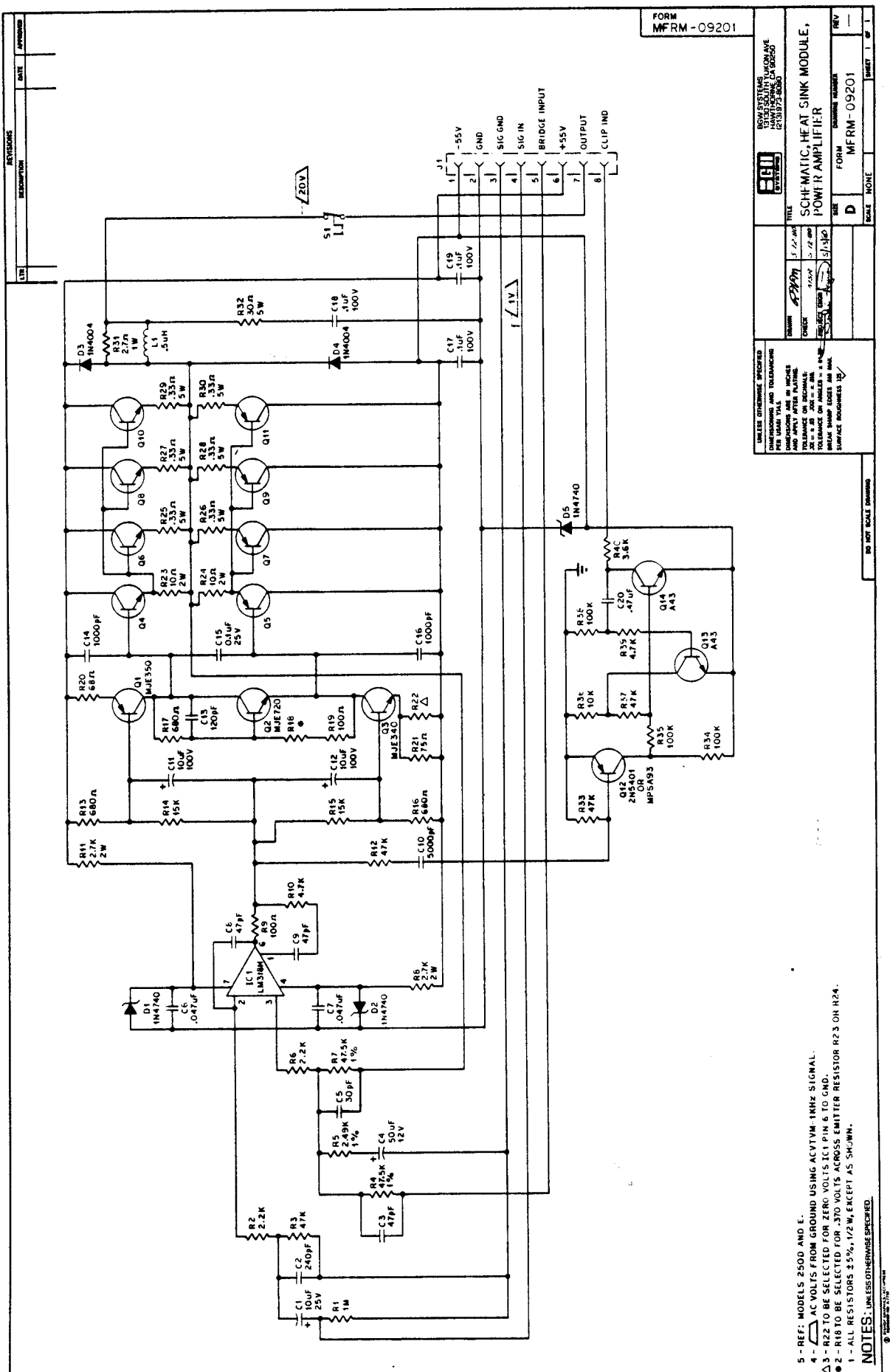
INPUT TRANSFORMER
FOR J9 AND J10

2 - REF: MODELS 250 D AND 250 E.
1 - ALL RESISTORS ±5%, 1/2W, EXCEPT AS SHOWN.
NOTES: UNLESS OTHERWISE SPECIFIED

ENG NO	DESCRIPTION	PART NO
***	CHASSIS AND WIRING	***
***	CAPACITORS	***
C50	.1UF 500V DISC	0199-0100
C51	10.000UF 75V	0543-0010
C52	10.000UF 75V	0543-0010
C53	.1UF 25V DISC	0129-0100
C54	.1UF 25V DISC	0129-0100
***	CIRCUIT BREAKERS & FUSES	***
CB1	AC PWR ROCKER SW, W CIRCUIT BREAKER GA FUSE 3AG 1.5A	0650-1602 0600-1500
***	DIODES	***
D50	BRIDGE RECTIFIER KBH2502	1886-2502
***	JACKS, SOCKETS, AND PLUGS	***
J3	5 WAY BANANA PLUG BINDING POST, RED	1231-1008
J4	5 WAY BANANA PLUG BINDING POST, BLACK	1231-1009
J5	1/4 INCH PHONE JACK INSUL OPEN CIRCUIT	9999-0111
J6	5 WAY BANANA PLUG BINDING POST, RED	1231-1008
J7	5 WAY BANANA PLUG BINDING POST, BLACK	1231-1009
J8	1/4 INCH PHONE JACK INSUL OPEN CIRCUIT	9999-0111
J9	SOCKET 8 PIN	1202-0008
J10	SOCKET 8 PIN	1202-0008
J11	JACK, INPUT 3 PIN XLR D3F	9999-0130
J12	JACK, INPUT 3 PIN XLR D3F	9999-0130
J13	SOCKET 2 WIRE FOR LEDS, BRN	1200-2021
J14	SOCKET 2 WIRE FOR LEDS, BRN	1200-2021
J15	SOCKET 2 WIRE FOR LEDS, BRN	1200-2021
J16	4 CIRCUIT MOLEX CONN MALE F03091042	1231-1042
P1L	PLUG, 8 PIN	1350-0008
P1R	PLUG, 8 PIN	1350-0008
***	RESISTORS	***
R51	POTENTIOMETER 22K OHMS 1/2W LONG	7006-1014
R52	POTENTIOMETER 22K OHMS 1/2W LONG	7006-1014
R53	75K OHMS 1/2W 5% DEPOSITED CARBON	5005
R54	22K OHMS 1/2W 5% DEPOSITED CARBON	5005
R55	3.6K OHMS 1/2W 5% DEPOSITED CARBON	5005
R56	75K OHMS 1/2W 5% DEPOSITED CARBON	5005
R57	22K OHMS 5% DEPOSITED CARBON	5005
R58	3.6K OHMS 1/2W 5% DEPOSITED CARBON	5005

ENG NO	DESCRIPTION	PART NO
*** SWITCHES ***		
S1	THERMAL SWITCH OOR 185 24500344-2	0630-3442
S2	THERMAL SWITCH OOR 185 24500344-2	0630-3442
S3	SWITCH, SLIDE, RECESS ARM STEREO/MONO	0620-6206
*** TRANSFORMERS ***		
T1	TRANSFORMER 325VA NO TAPS REV F	0900-1260
*** PACKING MATERIAL ***		
	DUST SEAL FOAM STRIP FOR VU METER	9999-0003
	LABEL LA DEPT BUILD & SAFETY	9700-1753
	BAG POLY 10X6X.004 MIL	9899-0004
	NAMEPLATE SERIAL #	9899-1000
	CARTON 19 3/4X14 5/8X5 1/4 PLAIN	9850-1250
	CARTON 23X17 7/8X8 7/8 PRINTED	9851-1250
	RAIL BLOCK 5X14 1X2X1 3/8	9852-1250
	CORNER BLOCK 1 1/2 FOAM	9854-0150
	TAPE 3 KRAFT PRINTER FRAGILE	9860-0001
	TAPE 3 EGGSHELL WH	9860-0002
	BAG POLY 20X30X.004 MIL	9899-2030
*** ELECTRICAL HARDWARE ***		
	POWER CABLE ASSY 16/3 BLACK	8709-1163
	FUSE HOLDER	9999-4406
TB1	VARRIER STRIP, 6 LUG 912-6	0720-9126
TB2	BARRIER STRIP, 2 LUG 3014-02	0720-3014
	#10 CRIMP LUG, RING TERM 12-10 WIRE	1313-3457
	#10 CRIMP LUG, RING TERM 16-14 WIRE	1313-4123
	LUG, SLIP ON TERM, FEMALE W CLAMP	1322-6125
	CONNECTOR ASSY 4 PIN MOLEX F03091042 WHT	1231-1042
	TERMINAL PIN, FEMALE MOLEX 02081102	1231-1102
	LUG, SLIP ON INSUL TERM, FEMALE BLUE	1321-5305
	PIN TERM, CRIMP 18-22 WIRE FEMALE	1231-1105
	LUG, SLIP ON TERM, FEMALE 16-14 WIRE	1322-9700
	LUG, SOLDER #6 STUD	1331-1416
*** MECHANICAL HARDWARE ***		
	COVER 250E	9005-1260
	GUARD, INPUT TRANSFORMER	9009-1251
	PANEL SPACER 1/4ID X 1/20D	8607-0125

ENG NO	DESCRIPTION	PART NO
	KNOB .88 DIA NOTCHED, BL	0700-1273
	INSULATED STANDOFF	0720-0001
	CLAMP, FILTER CAP AAP001	1235-0001
	RUBBER FEET 2085S	9999-2085
	TIE WRAPS 5 1/2 IN WRNS 1/2	9999-0550
***	NUTS, BOLTS, AND WASHERS	***
	4-40X3/8 FLAT HD MACHINE SCREW PHIL CAD	2315-2375
	#4 ITL WASHER	8122-0000
	6-32X5/16 PAN HD MACH SCREW PHIL BL	2111-3312
	6-32X3/8 FLAT HD MACH SCREW PHIL BL	2311-3375
	6X3/8 PAN HD SHEET METAL SCREW PHIL BL	3111-3312
	#6 ITL WASHER	8132-0000
	6-32X1/4 HEX NUT	8530-0250
	8-32X1/2 PAN HD MACHINE SCREW PHIL BL	2111-4500
	8-32X3/4 PAN HD MACHINE SCREW PHIL BL	2111-4750
	8-32X1/4 SOCKET SET SCREW CUP PT	2731-4250
	8X1/2 PAN HD SHEET METAL SCREW PHIL CAD	3115-4500
	#8 FLAT WASHER	8141-0000
	#8 INTERNAL TOOTH WASHER	8142-0000
	10-32X1/2 PAN HD MACHINE SCREW PHIL BL	2111-5500
	10-32X3/8 PAN HD MACH SCREW SLOT CAD	2125-5375
	10-32X3/8 ALLEN SOC CAP MACH SCREW BL	2431-5375
	#10 FLAT WASHER	8151-0000
	#10 INTERNAL TOOTH WASHER	8152-0000
	#10 SPLIT WASHER	8154-0000
	1/4-20 HEX NUT, LOCKING	8565-0437
	1/4-20X5/8 FLAT HD HEX SOCKET CAP BL	2331-5375
	3/8 ITL SMALL PATTERN WASHER	8172-0001



FORM MFRM-09201

REVISIONS		DATE	APPROVED
1	20V		
2	1V		

DATE	10/1/73	BY	W. J. B. (WJTB)
DESIGNED BY	W. J. B. (WJTB)	CHECKED BY	W. J. B. (WJTB)
TESTED BY	W. J. B. (WJTB)	APPROVED BY	W. J. B. (WJTB)
DATE	10/1/73	BY	W. J. B. (WJTB)

FORM	MFRM-09201
REV	1

DATE	10/1/73	BY	W. J. B. (WJTB)
DESIGNED BY	W. J. B. (WJTB)	CHECKED BY	W. J. B. (WJTB)
TESTED BY	W. J. B. (WJTB)	APPROVED BY	W. J. B. (WJTB)
DATE	10/1/73	BY	W. J. B. (WJTB)

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TESTED BY	W. J. B. (WJTB)	APPROVED BY	W. J. B. (WJTB)
DATE	10/1/73	BY	W. J. B. (WJTB)

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
TOLERANCES ARE AS SHOWN
TOLERANCE ON DECIMALS
XX = .01 XX = .001 XX = .0001
TOLERANCE ON ANGLES
XX = 1/2 XX = 1/4 XX = 1/8
SURFACE FINISHES AS SHOWN

5 - REF: MODELS 2500 AND E.
4 - AC VOLTS FROM GROUND USING ACVTVM: 1KHz SIGNAL.
3 - R22 TO BE SELECTED FOR ZERO VOLTS IC1 PIN 6 TO GND.
2 - R18 TO BE SELECTED FOR .370 VOLTS ACROSS EMITTER RESISTOR R23 ON R24.
1 - ALL RESISTORS ±5%, 1/2 W, EXCEPT AS SHOWN.

NOTES: UNLESS OTHERWISE SPECIFIED.

BGW SYSTEMS, INC.

08500-1

ENG NO	DESCRIPTION	PART NO
*** HEAT SINK MODULE 250D/E ***		
*** CAPACITORS ***		
C1	10UF 25V TANTALUM	0226-0010
C2	240PF 500V MICA	0090-0240
C3	47PF 1KV DISC NCO	0100-0047
C4	50UF 12V TE1133	0456-0050
C5	30PF 100V MICA	0060-0030
C6	.047UF 25V DISC	0129-0047
C7	.047UF 25V DISC	0129-0047
C8	47PF 1KV DISC NCO	0100-0047
C9	47PF 1KV DISC NCO	0100-0047
C10	5000PF 1KV DISC	0100-0005
C11	10UF 100V TE1407	0486-0010
C12	10UF 100V TE1407	0486-0010
C13	120PF 500V MICA	0090-0120
C14	1000PF 1KV DISC	0100-1000
C15	.1UF 25V DISC	0129-0100
C16	1000PF 1KV DISC	0100-1000
C17	.1UF 100V MYLAR	0369-0100
C18	.1UF 100V MYLAR	0369-0100
C19	.1UF 100V MYLAR	0369-0100
C20	.47UF 100V MYLAR 10%	0369-0471
*** DIODES ***		
D1	1N4740A 10V ZENER DIODE SI	1900-4740
D2	1N4740A 10V ZENER DIODE SI	1900-4740
D3	1N4004 DIODE RECTIFIER SI	1900-4004
D4	1N4004 DIODE RECTIFIER SI	1900-4004
*** INTEGRATED CIRCUITS ***		
IC1	LM318H OP AMP	1885-0318
*** INDUCTORS ***		
L1	.5UH INDUCTOR	9999-2405
*** TRANSISTORS ***		
Q1	MJE350 PNP TRANSISTOR SI	1853-0350
Q2	MJE720 NPN BIAS TRANSISTOR SI	1854-0720
Q3	MJE340 NPN TRANSISTOR SI	1854-0340
Q4	2N3583 NPN DRIVER TRANSISTOR SI	1854-3583
Q5	2N6468 PNP DRIVER TRANSISTOR SI	1853-6468
Q6	MJ15015 NPN POWER TRANSISTOR SI	1854-5015
Q7	MJ15016 PNP POWER TRANSISTOR SI	1853-5016
Q8	MJ15015 NPN POWER TRANSISTOR SE	1854-5015
Q9	MJ15016 PNP POWER TRANSISTOR SI	1853-5016
Q10	MJ15015 NPN POWER TRANSISTOR SI	1854-5015

ENG NO	DESCRIPTION	PART NO
Q11	MJ15016 PNP POWER TRANSISTOR SI	1853-5016
Q12	2N5401 PNP TRANSISTOR SWITCH SI T092	1853-5401
Q13	MPS A-43 NPN TRANSISTOR SE T092	1854-0043
Q14	MPS A-43 NPN TRANSISTOR SI T092	1854-0043
*** RESISTORS ***		
R1	1 MEG OHMS 1/2W DEPOSITED CARBON 5%	5005-1006
R2	1K OHMS 1/2W DEPOSITED CARBON 5%	5005-1003
R3	47K OHMS 1/2W DEPOSITED CARBON 5%	5005-4703
R4	47.5K OHMS 1% RN60D	5001-4752
R5	2.49K OHMS 1% RN60D	5001-2491
R6	1K OHMS 1/2W DEPOSITED CARBON 5%	5005-1003
R7	47.5 OHMS 1% RN60D	5001-4752
R8	2.7K OHMS 2W CARBON COMP 10%	6020-2702
R9	100 OHMS 1/2W DEPOSITED CARBON 5%	5005-1002
R10	4.7K OHMS 1/2W DEPOSITED CARBON 5%	5005-4702
R11	2.7K OHMS 2W CARBON COMP 10%	6020-2702
R12	47K OHMS 1/2W DEPOSITED CARBON 5%	5005-4703
R13	680 OHMS 1/2W DEPOSITED CARBON 5%	5005-6801
R14	15K OHMS 1/2W DEPOSITED CARBON 5%	5005-1503
R15	15K OHMS 1/2W DEPOSITED CARBON 5%	5005-1503
R16	680 OHMS 1/2W DEPOSITED CARBON 5%	5005-6801
R17	680 OHMS 1/2W DEPOSITED CARBON 5%	5005-6801
R18	FACTORY SELECTED RESISTOR	
R19	100 OHMS 1/2W DEPOSITED CARBON 5%	5005-1002
R20	68 OHMS 1/2W DEPOSITED CARBON 5%	5005-6800
R21	75 OHMS 1/2W DEPOSITED CARBON 5%	5005-7500
R22	FACTORY SELECTED RESISTOR	
R23	10 OHMS 2W WIRE WOUND 5% BWH	4025-1001
R24	10 OHMS 2W WIRE WOUND 5% BWH	4025-1001
R25	.33 OHMS 5W 10% ROCKWOOD	4050-0330
R26	.33 OHMS 5W 10% ROCKWOOD	4050-0330
R27	.33 OHMS 5W 10% ROCKWOOD	4050-0330
R28	.33 OHMS 5W 10% ROCKWOOD	4050-0330
R29	.33 OHMS 5W 10% ROCKWOOD	4050-0330
R30	.33 OHMS 5W 10% ROCKWOOD	4050-0330
R31	2.7 OHMS 2W 5% BWH	4025-2070
R32	30 OHMS 5W 10% ROCKWOOD	4050-3001
R33	47K OHMS 1/2W DEPOSITED CARBON 5%	5005-4703
R34	100K OHMS 1/2W DEPOSITED CARBON 5%	5005-1005
R35	100K OHMS 1/2W DEPOSITED CARBON 5%	5005-1005
R36	10K OHMS 1/2W DEPOSITED CARBON 5%	5005-1004
R37	47K OHMS 1/2W DEPOSITED CARBON 5%	5005-4703
R38	100K OHMS 1/2W DEPOSITED CARBON 5%	5005-1005
R39	4.7K OHMS 1/2W DEPOSITED CARBON 5%	5005-4702
R40	3.6K OHMS 1/2W DEPOSITED CARBON 5%	5005-3602

*** MISCELLANEOUS HARDWARE

HEAT SINK POWER AMP

1000-0250

BGW SYSTEMS, INC.

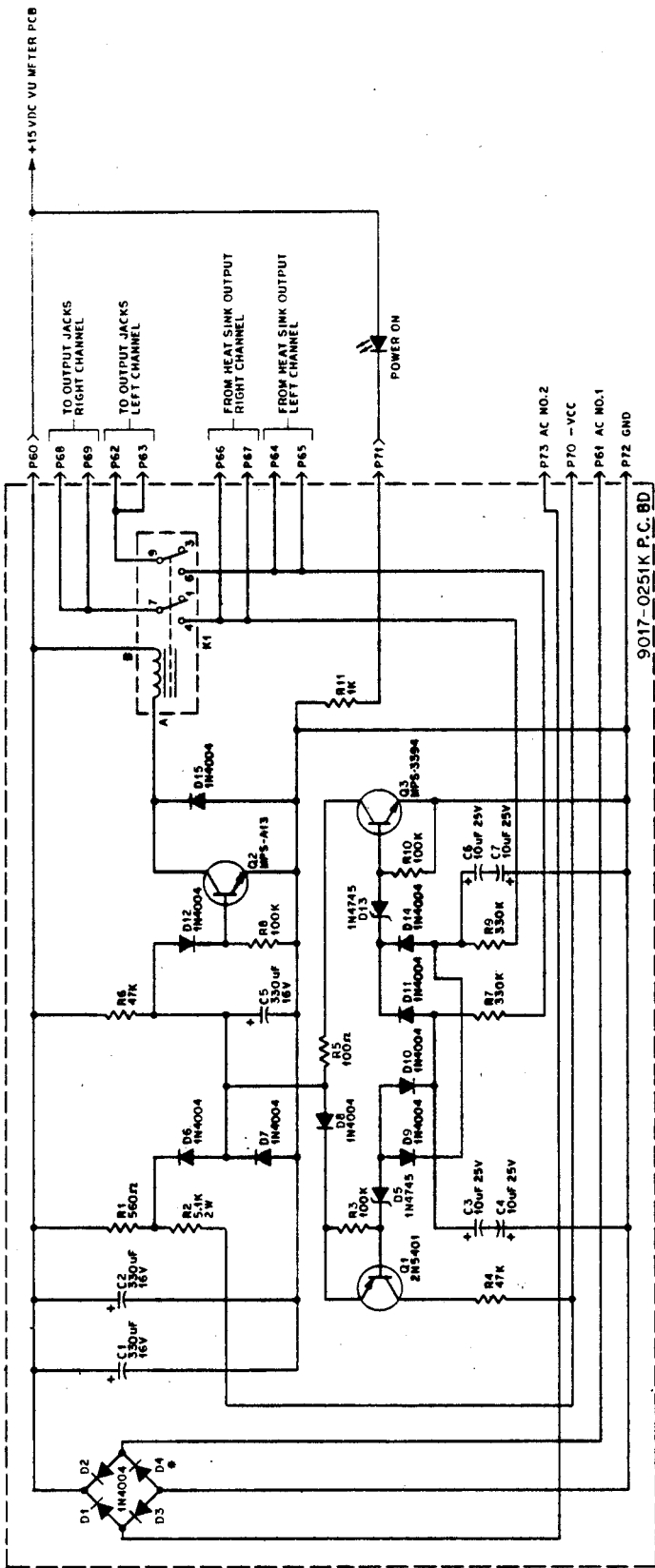
08500-3

ENG NO	DESCRIPTION	PART NO
	PRINT CIRCUIT BD DRIVER/POWER STAGE	9007-0270
	INSULATOR MICA .125 DIA MJE340	0723-0005
	INSULATOR MICA T066	0723-0031
	INSULATOR MICA T03	0723-0321
	INSULATOR SHOULDER TANSISITOR	0723-3347
	4-40X3/8 PAN HD MACH SCREW PHIL CADMIUM	2115-2375
	6-32X5/8 ROUND HD MACH SCREW SLOT	2225-3625
	#6 ITL WASHER	8132-0000
	6-32X1/4 HEX NUT	8530-0250

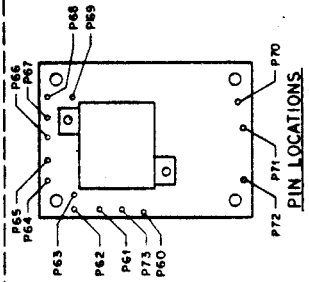
EXTENSIONS	DATE	APPROVAL

FORM
MFRM-08304

		RSC SYSTEMS 1500 EAST 15TH AVENUE HAWTHORNE, CA 90240 (213) 773-8000	
TITLE SCHEMATIC, RELAY BOARD, POWER AMPLIFIER		DRAWING NUMBER MFRM-08304	
CHECK 	DATE 1-1-80	SIZE D	SHEET 1 OF 1



9017-0251K P.C. 8D



* 2 - WHEN REPLACING ASSEMBLIES NUMBERED
 9017-0251J OR EARLIER REMOVE D4.
 1 - ALL RESISTORS ±5%, 1/2W, EXCEPT AS SHOWN.
 NOTES: UNLESS OTHERWISE SPECIFIED.

ENG NO	DESCRIPTION	PART NO
*** PARTS LIST RELAY PCB 9017-0251K ***		08340
SCHEMATIC RELAY BOARD MFRM-08304		
*** CAPACITORS ***		
C1	330 UF 16 V RADIAL ELECTROLYTIC	0466-0330
C2	330 UF 16 V RADIAL ELECTROLYTIC	0466-0330
C3	10 UF 25 V TANTALUM	0226-0010
C4	10 UF 25 V TANTALUM	0226-0010
C5	330 UF 10 V RADIAL ELECTROLYTIC	0446-0330
C6	10 UF 25 V TANTALUM	0226-0010
C7	10 UF 25 V TANTALUM	0226-0010
*** DIODES AND ZENERS ***		
D1	1N4004 1A 400V	1900-4004
D2	1N4004 1A 400V	1900-4004
D3	1N4004 1A 400V	1900-4004
D4	1N4004 1A 400V	1900-4004
D5	1N4745 16 VOLT ZENER	1900-4745
D6	1N4004 1A 400V	1900-4004
D7	1N4004 1A 400V	1900-4004
D8	1N4004 1A 400V	1900-4004
D9	1N4004 1A 400V	1900-4004
D10	1N4004 1A 400V	1900-4004
D11	1N4004 1A 400V	1900-4004
D12	1N4004 1A 400V	1900-4004
D13	1N4745 16 VOLT ZENER	1900-4745
D14	1N4004 1A 400V	1900-4004
D15	1N4004 1A 400V	1900-4004
K1	RELAY WITH MAGNETICS 12V DPDT	0800-1001
*** TRANSISTORS ***		
Q1	PNP SI PLASTIC T092 2N5401	1853-5401
Q2	NPN SI DARLINGTON PLASITIC T092 MPSA13	1854-0013
Q3	NPN SI PLASTIC T092 MPS3394	1854-3394
*** RESISTORS ***		
R1	560 5% 1/2W DEPOSITED CARBON	5005-5601
R2	5.1K 10% 2W CARBON COMP	6025-5102
R3	100K 5% 1/2W DEPOSITED CARBON	5005-1005
R4	47K 5% 1/2W DEPOSITED CARBON	5005-4703
R5	100 5% 1/2W DEPOSITED CARBON	5005-1002

BGW SYSTEMS, INC.

08340-2

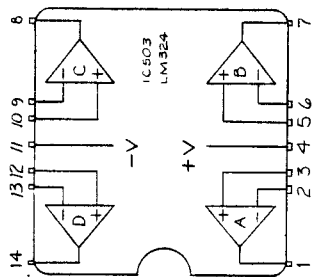
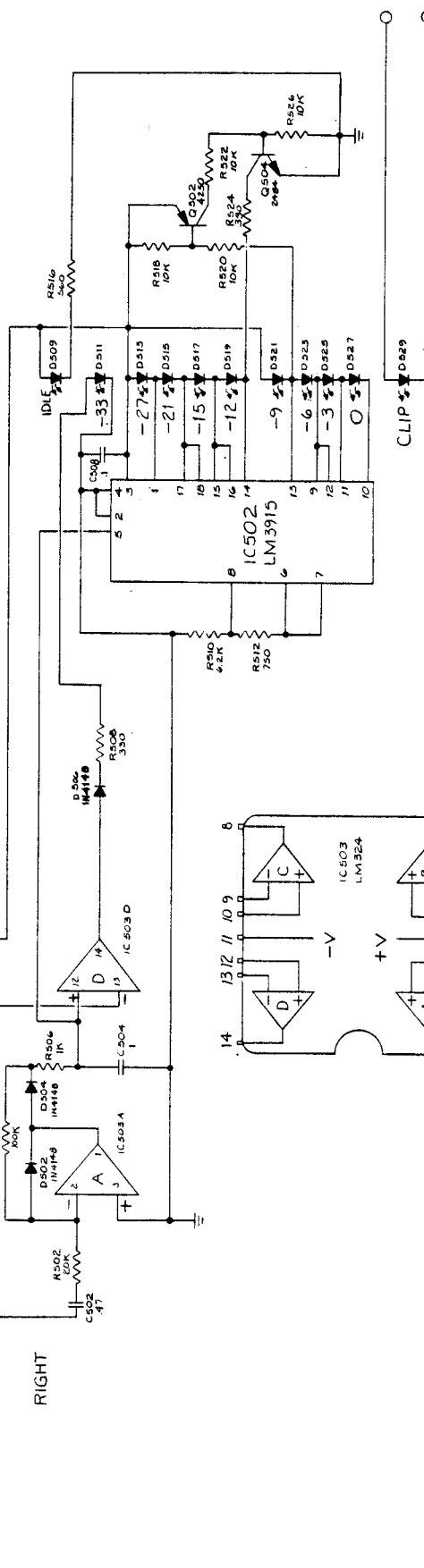
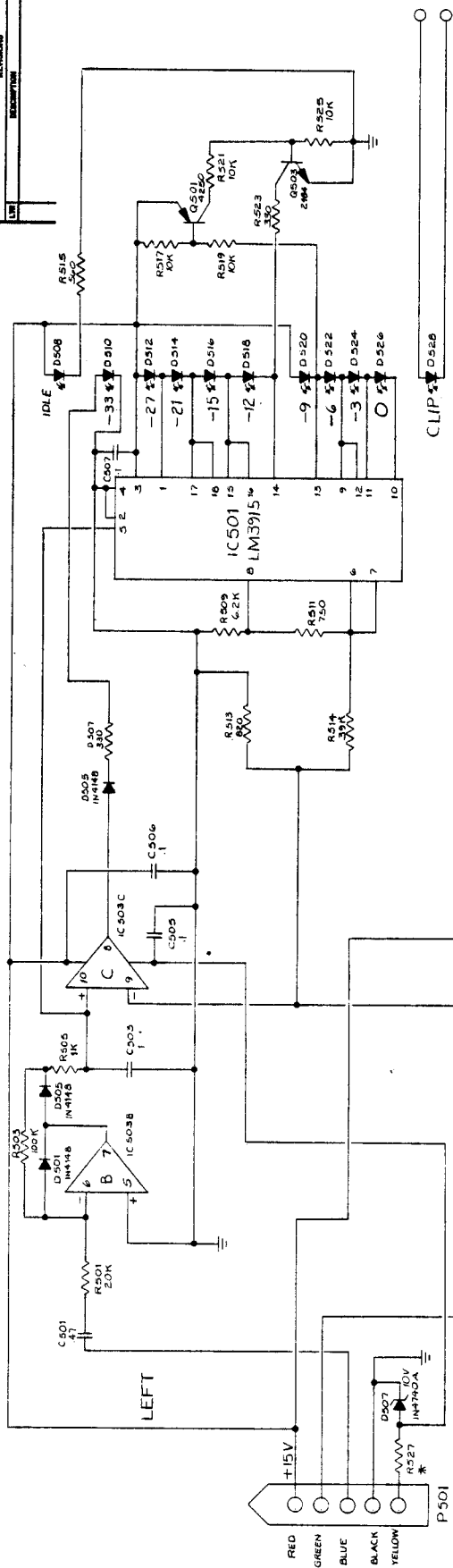
ENG NO	DESCRIPTION	PART NO
R6	47K 5% 1/2W DEPOSITED CARBON	5005-4703
R7	33K 5% 1/2W DEPOSITED CARBON	5005-3303
R8	100K 5% 1/2W DEPOSITED CARBON	5005-1005
R9	33K 5% 1/2W DEPOSITED CARBON	5005-3303
R10	100K 5% 1/2W DEPOSITED CARBON	5005-1005
R11	1K 5% 1/2W DEPOSITED CARBON	5005-1003

*** MISC PARTS RELAY BOARD

	RELAY BOARD COMPLETE WITH PARTS	9017-1251
1	PRINTED CIRCUIT BOARD 9017-0251K	9017-0251
1	RELAY SOCKET	1204-1000
1	RELAY HOLD DOWN WIRE	9999-9002
2	6-32X3/8 PH PAM MS	2315-3375
2	#6 ITLW	8132-0000
2	6-32X1/4 HEX NUTS	8530-0250
4	6-32X1/4 STANDOFFS	0772-1437
14	MOLEX PINS ON PCB	1349-9312

**

*



3. P.C. BOARD #9007-0413 B.
2. R527: 3.9K 2ω 250E, 5.1K 2ω 750B.
1. REFER TO PART LIST; MFRM- 07501.

ENG NO	DESCRIPTION	PART NO
*****	PARTS LIST VU METER LED BOARD *****	07501

SCHEMATIC VU METER LED BOARD

MFRM-07104

CAPACITORS

C501	.47UF 100V METAL MYLAR CAPACITOR	0363-8000
C502	.47UF 100V METAL MYLAR CAPACITOR	0363-8000
C503	1UF 25V TANTALUM CAPACITOR	0226-0001
C504	1UF 25V TANTALUM CAPACITOR	0226-0001
C505	.1UF 25V CERAMIC DISC CAPACITOR	0129-0100
C506	.1UF 25V CERAMIC DISC CAPACITOR	0129-0100
C507	.1UF 25V CERAMIC DISC CAPACITOR	0129-0100
C508	.1UF 25V CERAMIC DISC CAPACITOR	0129-0100

DIODES

D501-	1N4148/1N914 DIODE	1900-4148
D506		
D507	1N4740A 10V ZENER	1900-4740
D508-	LED GREEN	1990-4950
D517		
D518-	LED YELLOW	1990-4550
D525		
D525-	LED RED	1990-4650
D529		

INTEGRATED CIRCUITS

IC501	LM3915 LED VU METER DRIVER	1885-3915
IC502	LM3915 LED VU METER DRIVER	1885-3915
IC503	LM324 QUAD OP AMP	1885-0324

PLUG

P501	MOLEX CONNECTOR 03-09-2052	1231-2052
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TRANSISTORS

Q501	PN4250 SILICON TRANSISTOR PNP	1853-4250
Q502	PN4250 SILICON TRANSISTOR PNP	1853-4250
Q503	PN2484 SILICON TRANSISTOR NPN	1854-2484
Q504	PN2484 SILICON TRANSISTOR NPN	1854-2484

RESISTORS

R501	20K 1/2W CARBON COMP RESISTOR	5005-2004
R502	20K 1/2W CARBON COMP RESISTOR	5005-2004
R503	100K 1/2W CARBON COMP RESISTOR	5005-1005
R504	100K 1/2W CARBON COMP RESISTOR	5005-1005

ENG NO	DESCRIPTION	PART NO
R505	1K 1/2W CARBON COMP RESISTOR	5005-1003
R506	1K 1/2W CARBON COMP RESISTOR	5005-1003
R507	330R 1/2W CARBON COMP RESISTOR	5005-3301
R508	330R 1/2W CARBON COMP RESISTOR	5005-3301
R509	6.2K 1/2W CARBON COMP RESISTOR	5005-6202
R510	6.2K 1/2W CARBON COMP RESISTOR	5005-6202
R511	750R 1/2W CARBON COMP RESISTOR	5005-7501
R512	750R 1/2W CARBON COMP RESISTOR	5005-7501
R513	820R 1/2W CARBON COMP RESISTOR	5005-8201
R514	39K 1/2W CARBON COMP RESISTOR	5005-3903
R515	560R 1/2W CARBON COMP RESISTOR	5005-5601
R516	560R 1/2W CARBON COMP RESISTOR	5005-5601
R517-	10K 1/2W CARBON COMP RESISTOR	5005-1004
R522		
R523	330R 1/2W CARBON COMP RESISTOR	5005-3301
R524	330R 1/2W CARBON COMP RESISTOR	5005-3301
R525	10K 1/2W CARBON COMP RESISTOR	5005-1004
R526	10K 1/2W CARBON COMP RESISTOR	5005-1004
R527	MODEL 250E**3.9K 2W WIRE WOUND RESISTOR	6020-3902
	MODEL 750B**5.1K 2W WIRE WOUND RESISTOR	6025-5102

MISCELLANEOUS

MOLEX PINS 02-09-2137	1349-2137
AWG 22 SOLID TINNED BUSS	8022-0500
AWG 22 19 STR PVC BLACK	8222-1100
AWG 22 19 STR PVC RED	8222-1120
AWG 22 19 STR PVC GREEN	8222-1150
AWG 22 19 STR PVC BLUE	8222-1160
AWG 22 19 STR PVC WHITE	8222-1190
ROUND SPACER 1/4 DIA 3/8 LONG	8606-0375
PC BOARD 22-LAMP VU METER	9007-0413

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BBW SYSTEMS, INC.

09410

ENG NO	DESCRIPTION	PART NO
***	UNIQUE PARTS MODEL 2500	***
	CHASSIS MODEL 2500	9002-1270
	FRONT PANEL 2500	9000-1253
	LED INDICATOR LITES 2500	1990-5053
	SPECIAL WASHER FOR MOUNTING LEDS	8135-0001
*****	*****	

POWER MAINS VOLTAGE CONVERSION

CAUTION: These servicing instructions are for use by qualified personnel only. To avoid electric shock do not perform any servicing other than that contained in the Operating Instructions, unless you are qualified to do so. Refer all servicing to qualified service personnel.

Voltage conversion should be done by a BGW Authorized Service Station only.

Terminal Strip Connections

The terminal strip (AC Barrier Strip) is located on the inside back wall of the chassis. To gain access, remove the screws holding the top cover. The chart below indicates the proper transformer connections for each voltage.

 PRIMARY CONNECTIONS TO AC BARRIER STRIP

AC VOLTS	100	120	200	220	240
XMFR - BRN	3	3	3	3	3
XMFR - RED	4	5	5	2	2
XMFR - ORN	5	4	2	5	5
XMFR - YEL	3	3	5	5	5
XMFR - GRN	4	2	4	4	6
XMFR - BLU	2	4	6	6	4

NOTE: Numbers shown are terminals on AC Barrier strip and are read from top to bottom as shown.

POWER MAINS VOLTAGE CONVERSION

POWER TRANSFORMERS MARKED 0900-0252B AND 0900-0411B

FOR ALL MODELS EXCEPT MODEL 600's AND 600SP's

CAUTION: These servicing instructions are for use by qualified personnel only. To avoid electric shock do not perform any servicing other than that contained in the Operating Instructions, unless you are qualified to do so. Refer all servicing to qualified service personnel.

Voltage conversion should be done by a BGW Authorized Service Station only.

Terminal Strip Connections

The terminal strip (TB1) is located on the inside back wall of the chassis. To gain access, remove the eight screws holding the top cover. The chart below indicates the proper transformer connections for each voltage.

PRIMARY CONNECTIONS TO TB1

AC VOLTS	100	120	200	220	240
XMFR - BRN	1	1	1	1	1
XMFR - BRN/WHT	3	3	3	3	3
XMFR - RED	4	5	5	2	2
XMFR - ORN	5	4	2	5	5
XMFR - YEL	3	3	5	5	5
XMFR - GRN	4	2	4	4	6
XMFR - BLU	2	4	6	6	4

NOTE: Numbers shown are terminals on TB1 and are read from top to bottom as shown.

THREE YEAR LIMITED WARRANTY

BGW SYSTEMS, INC., (BGW), 13130 South Yukon Avenue, Hawthorne, California, 90250, warrants to the original owner all parts, except front panels, knobs, cases and cabinets, of every new BGW product to be free from defects in materials or workmanship, as hereinafter provided, for three (3) years from the original date of purchase.

BGW will at its option, repair or replace any equipment covered by this warranty which becomes defective, malfunctions or otherwise fails to conform with this warranty under normal use and service during the term of this warranty, at no charge for parts or labor.

In order to obtain warranty service, the equipment, together with the original or a machine reproduction of the Bill of Sale or other dates, proof-of-purchase document describing the equipment, must be delivered to an Authorized BGW Service Center in the continental United States, or to BGW at the above address, at the owners expense. Any evidence of alteration, erasing or forgery of proof-of-purchase documents will be cause to void the warranty. Collect shipments to BGW will be refused unless previously authorized. The names and addresses of Authorized BGW Service Stations are listed in your owner's manual or may be obtained by writing to BGW Warranty Department at the above address.

This warranty does not cover defects, malfunctions or failures resulting from shipping or transit accidents, abuse, misuse, operation contrary to furnished instructions, operation on incorrect power supplies, operation with faulty associated equipment, modification, alteration, improper servicing, tampering or normal wear and tear. Equipment on which the serial number has been defaced or removed shall not be eligible for warranty service. Should any equipment submitted for warranty service be found ineligible therefore, an estimate of repair cost will be furnished and the repair will be accomplished if requested by the owner upon receipt of payment or acceptable arrangements for payment.

ANY IMPLIED WARRANTIES INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL BE LIMITED IN DURATION TO THE PERIOD OF TIME SET FORTH ABOVE. BGW SHALL NOT BE RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. SOME STATES DO NOT ALLOW LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSION MAY NOT APPLY TO YOU. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. This is the only expressed warranty applicable to BGW products. BGW neither assumes nor authorizes anyone to assume for it any other expressed warranty.

Completion and return of the owner registration card enclosed with the equipment is requested, but is not a condition for obtaining warranty service.

BGW reserves the right to make changes or improvements in design or manufacturing without incurring any obligation to change or improve products manufactured prior thereto.