13130 SOUTH YUKON AVENUE
PHONE (213) 973-8090

HAWTHORNE, CALIFORNIA 90250
TELEX NO. 66-4494

OWNER'S MANUAL
MODEL 85
BROADCAST POWER AMPLIFIER

TABLE OF CONTENTS

- 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.

DESCRIPTION

The BGW Model 85 is one of the most advanced solid state, full complementary, bridgeable, stereo power amplifiers available.

Features of the Model 85 include Magnetic Circuit Breaker/Power Switch, Input Level Controls, Headphone Jack, and Power Indicator, ¼" input connectors, separate circuit and chassis grounds, and small size.

The Front Panel includes two Input Level Controls, Power Switch, Headphone Jack, and Green LED Power Indicator.

The Rear Panel includes AC Input Cord, two ¼ Phone Jack Input Connectors, Mono/Stereo Switch to convert amplifier to a fully bridged Mono amplifier and a 6 point screw terminal strip for the output of each amplifier and ground circuits.

Both the circuit and chassis grounds are connected to separate barrier strip terminals on the rear of the amplifier. They are connected together by a removeable link. By removing the link, the circuit grounds of all active units (amplifiers, preamplifiers, mixers, etc.) can be tied to earth ground at a common point. This aids in eliminating ground loops.

The size of the Model 85 is convenient for a wide variety of applications. However, please note the following precautions:

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

2) Do not stack Model 85 amplifiers. A minimum of 1 3/4 inches above each amplifier should be provided for free air circulation.

The output voltage follower stage of your amplifier uses the most advanced type of transistors available. These large geometry, 150 watt complementary power devices have large safe operating areas and extended power bandwidth. Electrostatic and other highly reactive speaker systems present no difficulties for the Model 85.

All of the semiconductors in the output area are in intimate contact with the heat sink. The bias stage is mounted on the same heat sink as the output transistors and provide temperature compensated bias current to the output stage.

The input stage utilizes NPN matched low noise transistors connected as a differential pair. This stage drives two common emitter voltage stages in Push Pull. The output of the voltage amplifier stage is loaded by a current mirror stage, bias stage and the complementry Darlington output stage.

The Model 85 is wired for use at 120 VAC only

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.

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OPTIONS FOR THE MODEL 85

The Model 85 may be ordered with the following options:

85-01	Dual Channel Active Balanced Inputs (with 70 dB CMRR)
85-06	Dual Channel Transformer Balanced Inputs
85-20	XLR Unbalanced Inputs

THE BGW 85

BROADCAST POWER AMPLIFIER

Exacting design standards and unique features establish the BGW amplifier as the industry leader in power amplifier technology. Features such as all steel chassis and covers, metal-case output transistors, totally modular construction and large alumimum heat-sink have set the industry standard in audio power amplifiers.

Delivering at least 35 watts per channel into 8 ohm loads and using the latest in full complementary circuitry techniques, the Model 85 offers reliability and performance unparalleled in the industry.

SPECIFICATIONS: BGW MODEL 85

OUTPUT POWER

35 watts minimum sine wave continuous average power output per channel with both channels driving 8-ohm loads over a power band from 20Hz to 20kHz. The maximum Total Harmonic Distortion at any power level from 250-milliwatts to 25 watts shall be no more than .05% from 20Hz to 5kHz then rising linearly to a maximum of .10% at 20kHz.

45 watts minimum sine wave continuous average power output per channel with both channels driving 4-ohm loads over a power band from 20Hz to 20kHz. The maximum Total Harmonic Distortion at any power level from 250-milliwatts to 45 watts shall be no more than .10% from 20Hz to 5kHz then rising linearly to a maximum of .20% at 20kHz.

90 watts minimum sine wave continuous average power output monaural driving an 8-ohm load over a power band from 20Hz to 20kHz. The maximum Total Harmonic Distortion at any power level from 250-milliwatts to 90 watts shall be no more than .10% from 20Hz to 5kHz then rising linearly to a maximum of .20% at 20kHz.

*All specifications and features are subject to change without notice.

SPECIFICATIONS

Intermodulation Distortion:	Less than 0.04% from 250 milliwatts to rated power.
Small Signal Frequency Response:	+0, -3dB, 1Hz to 100kHz, +0, -0.25dB, 20Hz, to 20kHz.
Hum and Noise Level:	Better than 105dB below rated 8 ohm output (unweighted, 20Hz to 20kHz).
Input Sensitivity:	0.84 volts for rated 8 ohm power output. Voltage gain 26dB (20 times).
Input Impedance:	15k ohms.
Damping Factor:	Greater than 300 to 1 at 8 ohms below 1kHz.
Output Impedance:	Designed for any load impedance equal to or greater than 4 ohms.
Slew Rate:	18 V/u S
Rise Time:	2.4 u S.
Power Requirements:	120 volts A.C., 50-60 Hz at 2.5 amps
Semiconductor Complement:	2 Ultra-low noise matched differential pairs, 18 transistors, 12 diodes, 1 LED.
Dimensions:	1 3/4" by 19" standard rack front panel. Depth behind fron panel 11½". (4.45cm x 48.26cm x 29.21cm)
Weight:	14 Lbs. Net, 18 Lbs. shipping. 6.36 Kg. Net, 8.18 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 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 around 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.

The size of the amplifier is convenient for a wide variety of applications. However, please note the following precautions:

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

2.) Do not stack amplifiers. A minimum of 1 3/4" above each amplifier should be provided for free air circulation.

DO NOT PLUG THE AMPLIFIER IN YET!

All connections should be made before power is applied.

RACK 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.

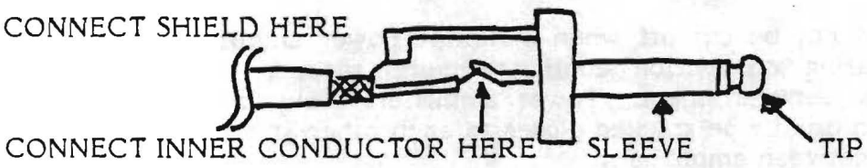
When racks are to be transported or used in a mobile installation, some means of securing the rear of the equipment are required. Angle brackets either attached to the bottom, side rails or rear panel are practical approaches.

STEREO INPUT CONNECTIONS

1/4 inch phone jacks are provided on the rear of the amplifier for input connections.

1/4 INCH PHONE JACKS

The 1/4" phone jacks are for unbalanced lines only (single conductor, shielded). 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.



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.

STEREO OUTPUT CONNECTIONS

A six (6) station screw barrier block on the rear panel, serves as output connectors, with one plus (+) and one minus (-) for each channel. Left Channel leads go to barrier stations marked LEFT; right channel, to those marked RIGHT.

Output leads are best connected to the amplifier with the use of tinned wires.

Make certain that the speakers are properly phased. Connect the black or minus (-) terminal on the speaker cabinet to the appropriate minus (-) barrier on the amplifier. Connect the red or plus (+) terminal to the plus (+) barrier. 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.

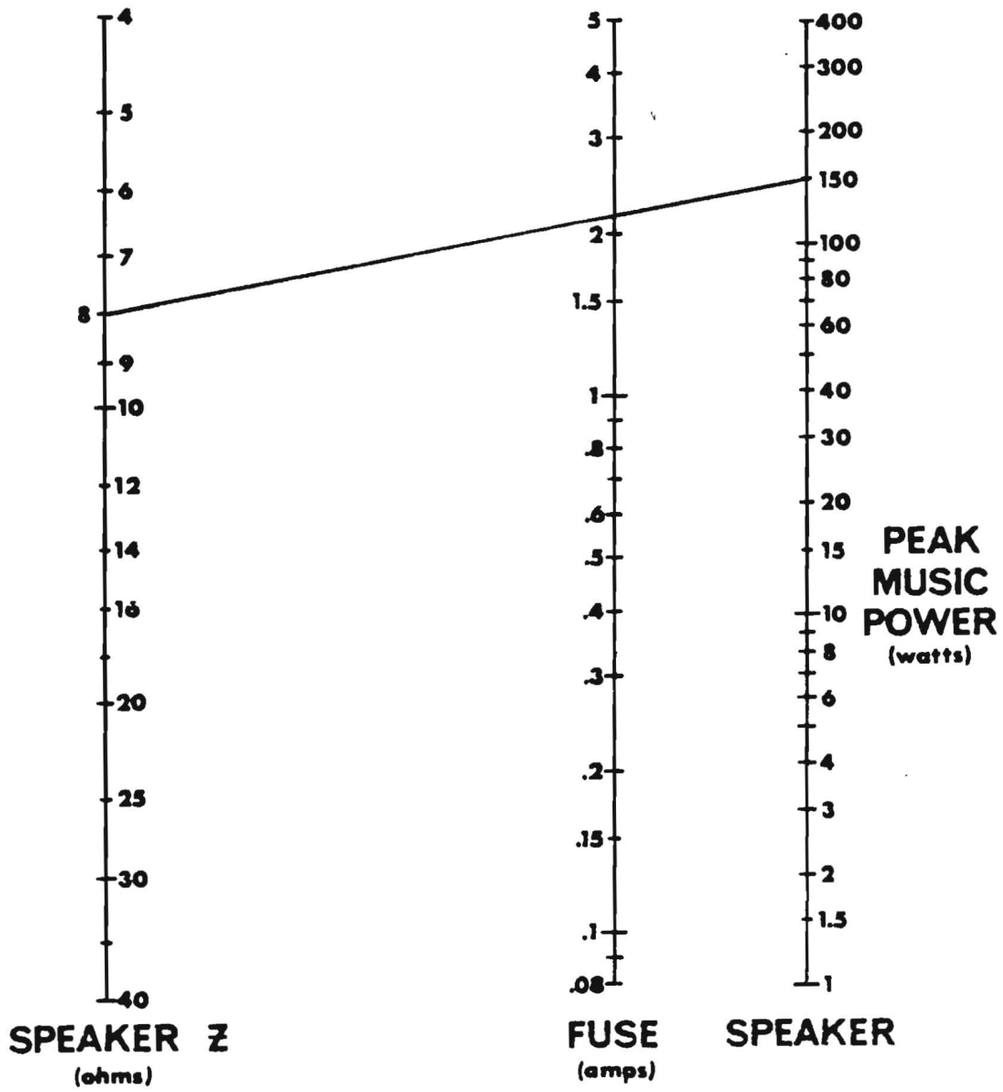
The relationship between wire length and diameter, and damping factor can be calculated using the chart (MFRM 03510) on the following page. Proceed as follows:

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.

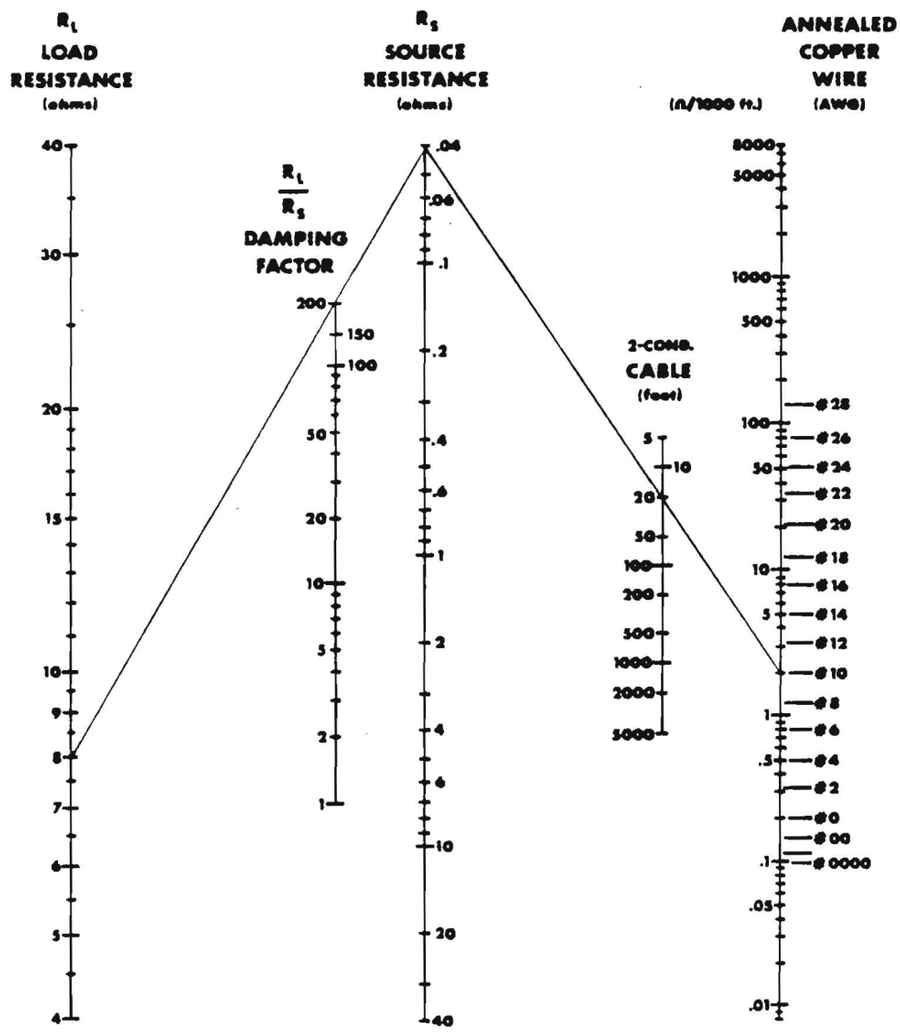
Note: This method cannot be used with electrostatic speakers.



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

FUSE SELECTOR NOMOGRAPH FOR LOUDSPEAKER PROTECTION

MFRM-03530



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

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

STEREO HEADPHONE CONNECTIONS

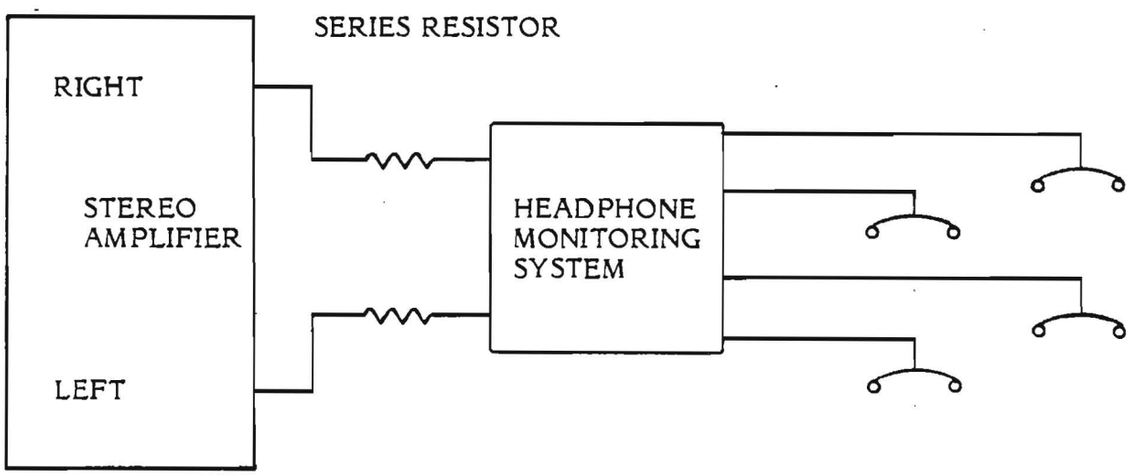
The Model 85 provides a stereo headphone jack for your use. It is wired in the standard configuration (left-tip, right-ring, common-sleeve). There is a 270 ohm resistor in series with each channel to protect the headphones. This will provide about 60 mW per channel for 16 ohm headphones.

OTHER METHODS

Some headphone monitoring systems connect the headphones directly to the output terminals of an amplifier. Plugging in headphones in such a system, when using a stereo amplifier, will short circuit the outputs of the two channels together. This often results in blown fuses in amplifiers without current limiting. Also, contacts on jacks and plugs may burn or lose their spring action, causing intermittent connections.

Solution

Resistors of at least 4 ohms, placed in series with each channel of the amplifier and the headphone or headphone system, will prevent a short circuit at the amplifier. The resistors should be able to handle the full rated power of the amplifier for several seconds, although certain applications allow the use of a lower wattage resistor.



If several headphone jacks are connected as shown above, when someone inserts or removes the headphone from any jack, all other headphones will have temporary loss of signal. This can be eliminated by installing resistors at every headphone jack.

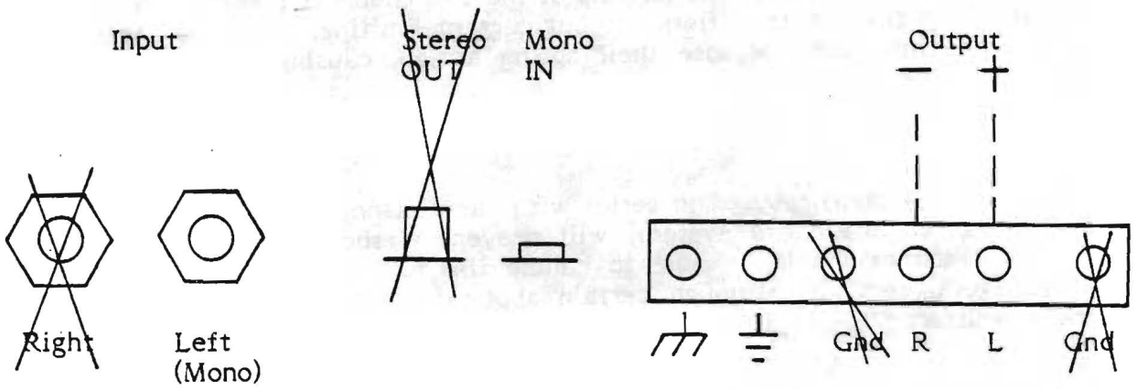
MONO OPERATION

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 (IN) position.

2. Use left channel input only. DO NOT use the right channel input.

3. Connect the output across the two Plus (+) Terminals. DO NOT use the Minus (-) Terminals. DO NOT reference the load (speaker) to ground. Designate the left channel as Plus (+) and the right channel as minus (-). Fuses, when necessary, should be placed in series with one of the Plus (+) Terminals.



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 adjacent terminals as shown.

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 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 preamplifer gain controls fully off, advance the left and right power amplifier gain controls about half way clock-wise (slit in knob facing upwards). There ahould 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.

MODEL 85 CIRCUIT DESCRIPTION

POWER SUPPLY

The AC mains are connected directly to the primary of the toroidal power transformer, T501 with the On/Off switch-circuit breaker, S501 in series with the "HOT" lead. The secondaries of T501 are connected to a full wave bridge rectifier D301 through D304 to capacitor input filter C302 and C303, to give the plus and minus power supplies. C301 across the bridge rectifier suppresses any high frequency noise that might be coupled through the transformer or generated by the bridge rectifier.

AMPLIFIER

The input signal from J101 is applied to left input level control, VR101. The output of VR101 is applied to the input of Q101 through the coupling network, C101, C102, C103, R101, and R102. This network provides a high input impedance to the amplifier and filters out DC and radio frequency interference.

Q101 is a low noise matched dual transistor connected as a differential input stage. The output of Q101 is Push Pull. This signal drives Q102 and Q104. Q102 and Q104 are common emitter voltage gain stages. The output of Q104 (positive phase) drives the driver stages Q108 and Q107.

Q105 is a Vbe multiplier stage to provide bias voltage for the output stage to keep idle bias current at a constant level as the temperature changes.

Q103 and Q106 form a current mirror stage that acts as load for Q102 and Q104. The current mirror stage uses base emitter diode only of Q103 to match base emitter diode of Q106. As more collector current is pulled from the collector of Q106, (Q104 is turning on harder) an equal and opposite amount of current is removed from Q103. Hence, the current of Q103 plus the current of Q106 is constant level of current.

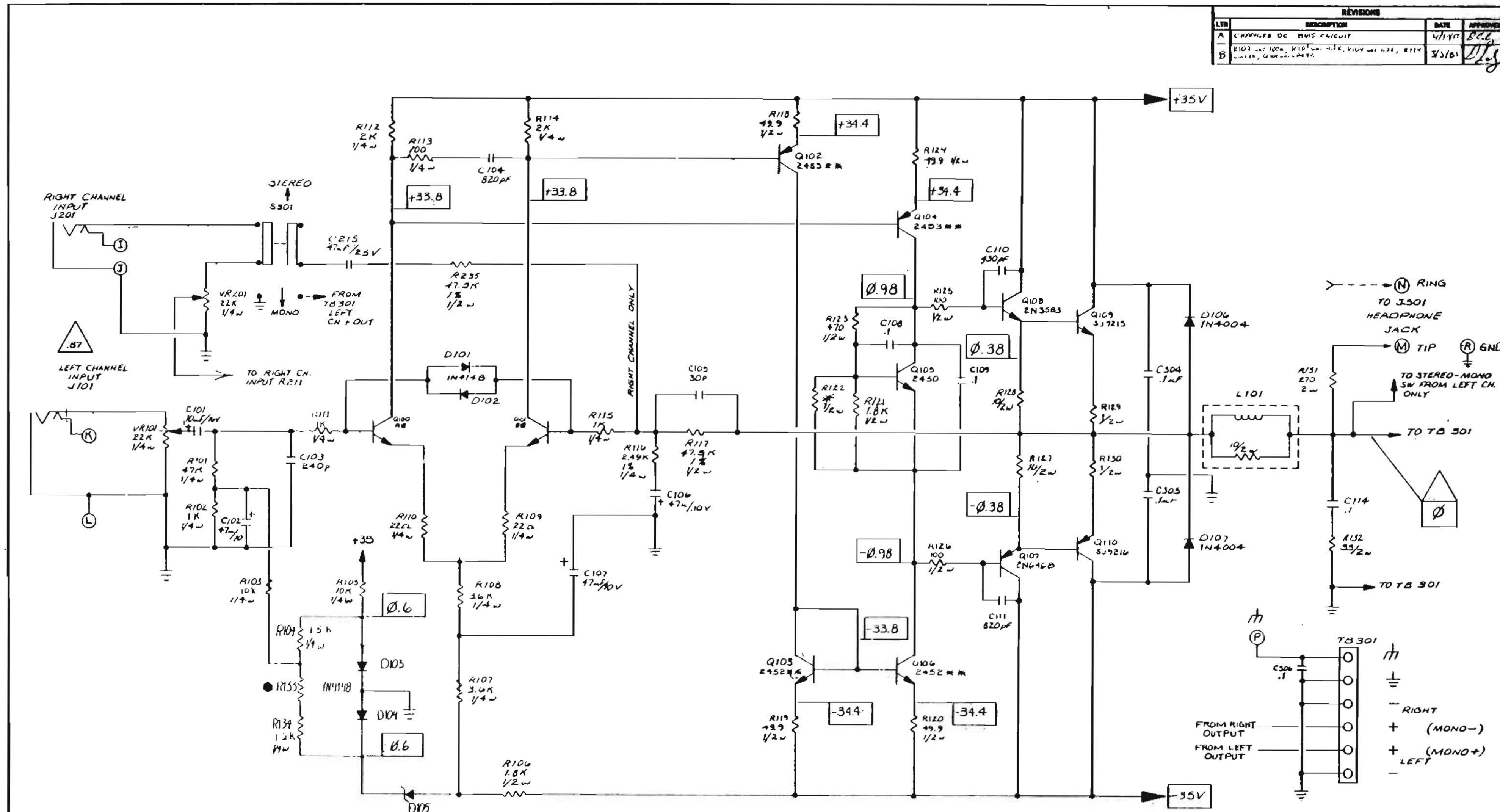
Q108 and Q107 are connected common collector to provide the current gain necessary to drive the output transistors Q109 and Q110. The output appears across flyback clipping diodes D103, and D104, then passes through compensation networks L101 and C112/R124 to appear at the output terminals.

To maintain overall amplifier stability, linearity, and low distortion, negative feedback is used throughout the amplifier. Voltage divider R116/R117 applies the correct amount of feedback to the non-inverting input of Q101. Except for the input, the amplifier uses direct coupling throughout. The right channel works in the same way; parts are numbered the same, except in the 200 series.

BRIDGED MODE

When the mono/stereo switch S301 is set to mono, it converts the right channel amplifier to a unity gain inverting power amplifier.

S301 Mono/stereo switch grounds the normal input to the right channel and connects the output of the left channel amplifier to drive the right channel summing point R230.



7. ● FACTORY PRESELECTED COMPONENT, SET FOR ...

6. △ = AC VOLTS FROM GROUND, 1KHz SIGNAL, USING A DVM.

5. ☐ = DC VOLTS FROM GROUND, NO SIGNAL, USING A DVM.

4. 2452** AND 2453** TRANSISTORS ARE MATCHED PAIRS.

3. S301 SHOWN IN STEREO POSITION.

2. # FACTORY PRESELECTED COMPONENT SET FOR 400 mV ACROSS R128 OR R127.

1. REFER TO PARTS LIST MFRM-15790.

NOTES: UNLESS OTHERWISE SPECIFIED

LAST COMP		
D107	R235	VR201
R134	VR101	
Q110	C306	S301
C114	TB301	
C215	J101	
L101	J201	

DO NOT SCALE DRAWING

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 ✓

DRAWN GRIFFIN, C	11-26-84
CHECK	
PROJECT ENGR.	2/26/84

1001-00-...

BGW SYSTEMS
13130 SOUTH YUKON AVE.
HAWTHORNE, CA 90250
(213) 973-8090

TITLE: SCHEMATIC, BROADCAST POWER AMPLIFIER, MODEL 85

SIZE: D | DRAWING NUMBER: MFRM-15720 | REV: B

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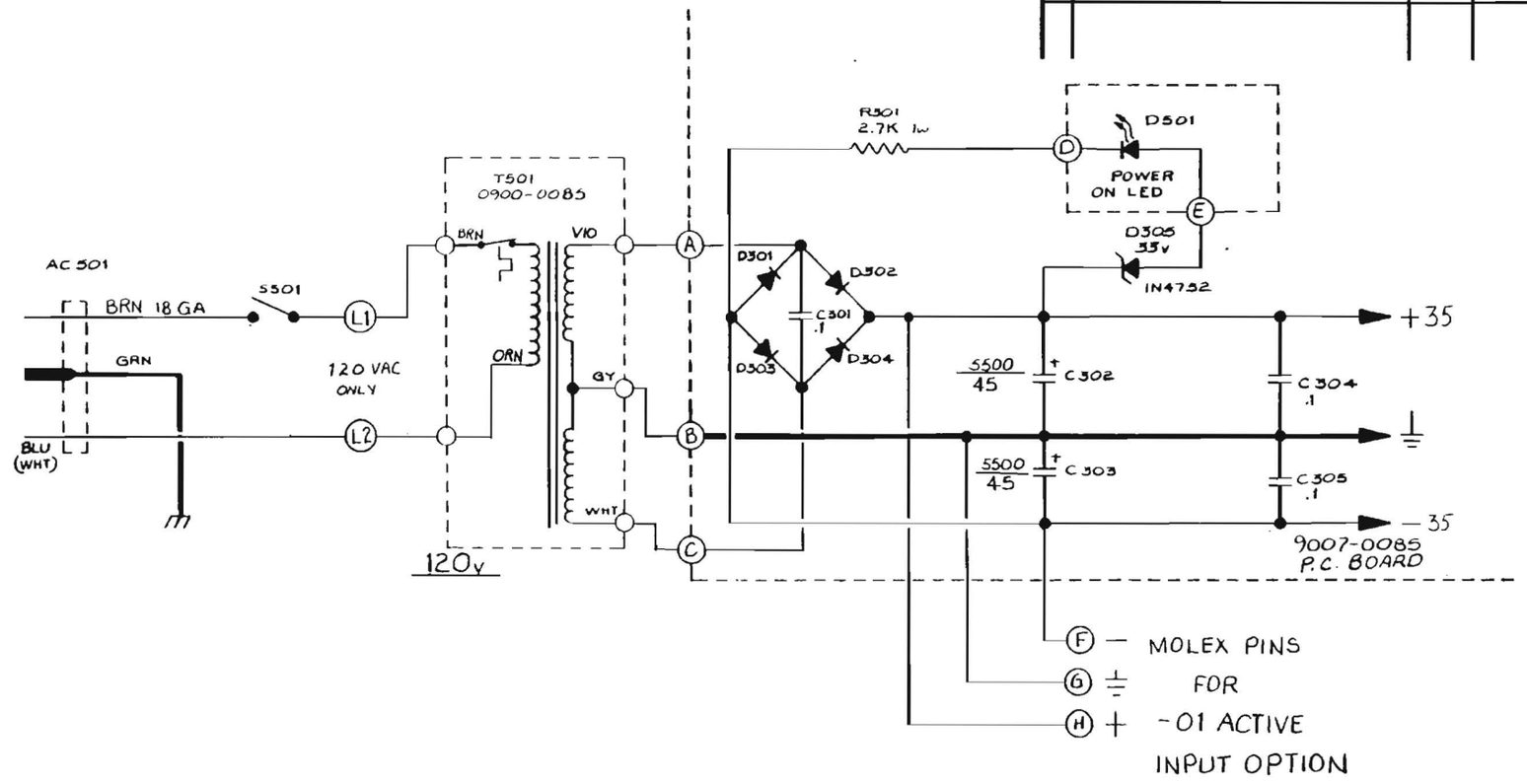

2-⏚ CHASSIS GROUND, ⏚ CIRCUIT GROUND.
1-REFER TO PART LIST MFRM-15790.

NOTES: UNLESS OTHERWISE SPECIFIED.

DO NOT SCALE DRAWING

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DIMENSIONING AND TOLERANCING PER USASI Y14.5.
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DRAWN	GRIFFIN, C.	11-26-84
CHECK		
PROJECT ENGR	D. Deal	2/26/84

BGW SYSTEMS
13130 SOUTH YUKON AVE.
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TITLE SCHEMATIC
POWER SUPPLY
MODEL 85

SIZE	DRAWING NUMBER	REV
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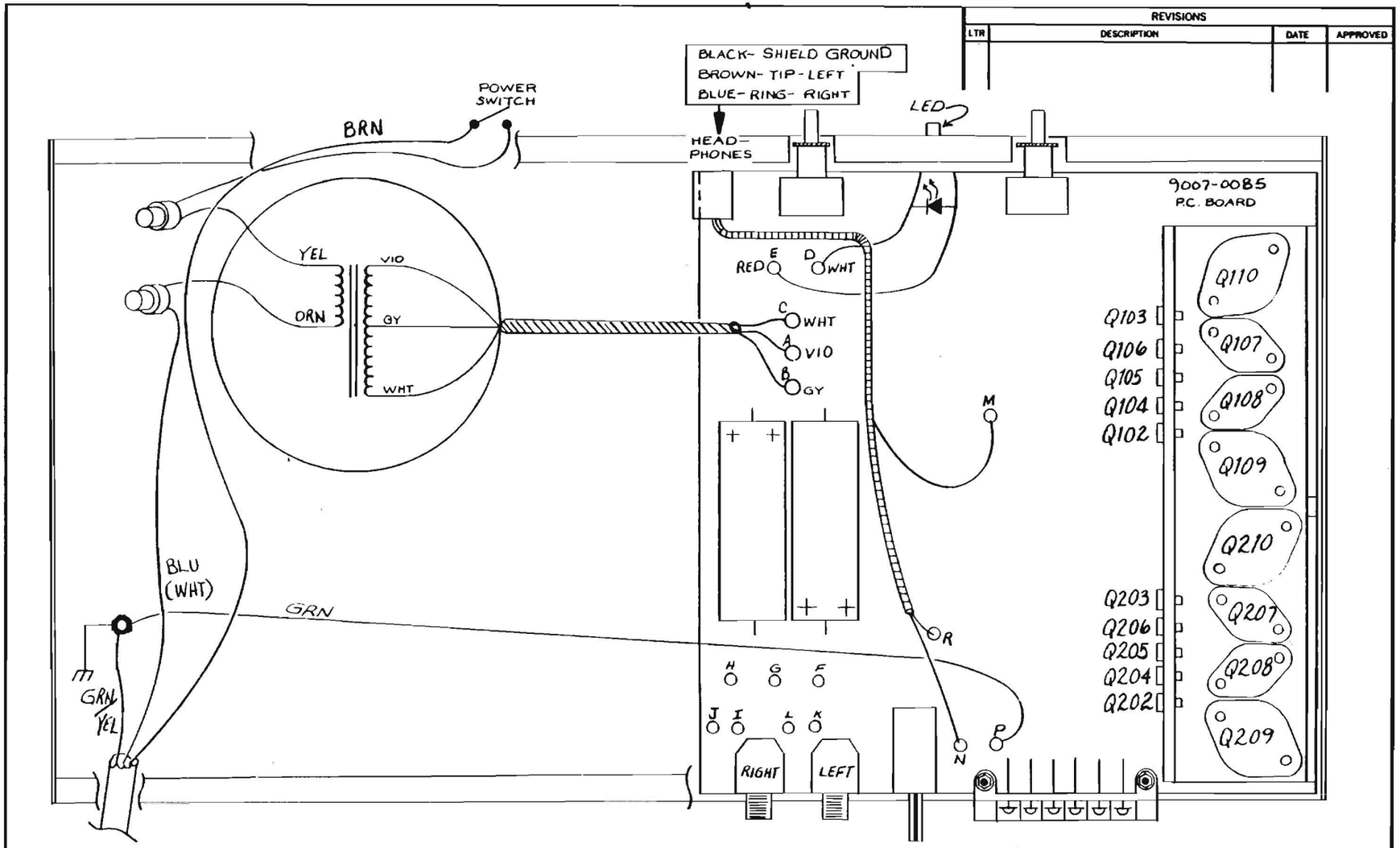
SCALE NONE SHEET 1 OF 1



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

2. REFER TO SCHEMATIC MFRM-15730.
1. REFER TO PARTS LIST MFRM-15790.

NOTES: UNLESS OTHERWISE SPECIFIED.

DO NOT SCALE DRAWING

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TOLERANCE ON ANGLES = ± 0° 30'
BREAK SHARP EDGES .010 MAX.
SURFACE ROUGHNESS 125

DRAWN	GRIFFIN, CE JR	1-2-85
CHECK	R JOHNSON	1-3-85
PROJECT. ENGR	D Lash	1/4/85

BGW SYSTEMS
13130 SOUTH YUKON AVE.
HAWTHORNE, CA 90250
(213) 973-8090

TITLE: STANDARD INTERCONNECT
-MODEL 85

SIZE	DRAWING NUMBER	REV
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SCALE N.T.S | SHEET 1 OF 1

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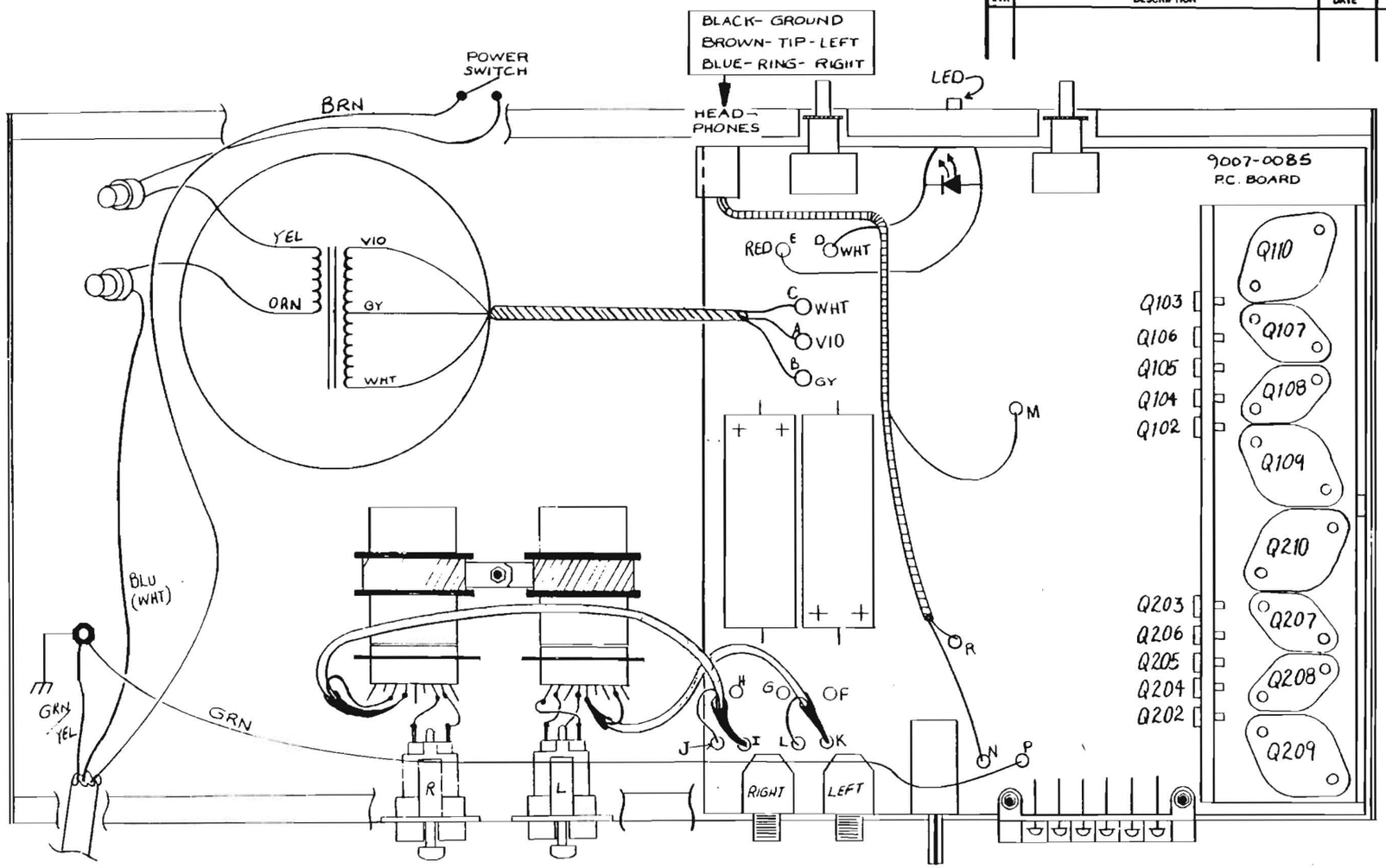

REFER TO MFRM-12575 FOR INPUT TRANSFORMERS WIRING

1. REFER TO PARTS LIST MFRM-15790.

NOTES: UNLESS OTHERWISE SPECIFIED.

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SURFACE ROUGHNESS 125

DRAWN	GRIFFIN, CE JR	1-2-85
CHECK	R. Johnson	1-3-85
PROJECT ENGR		1/4/85

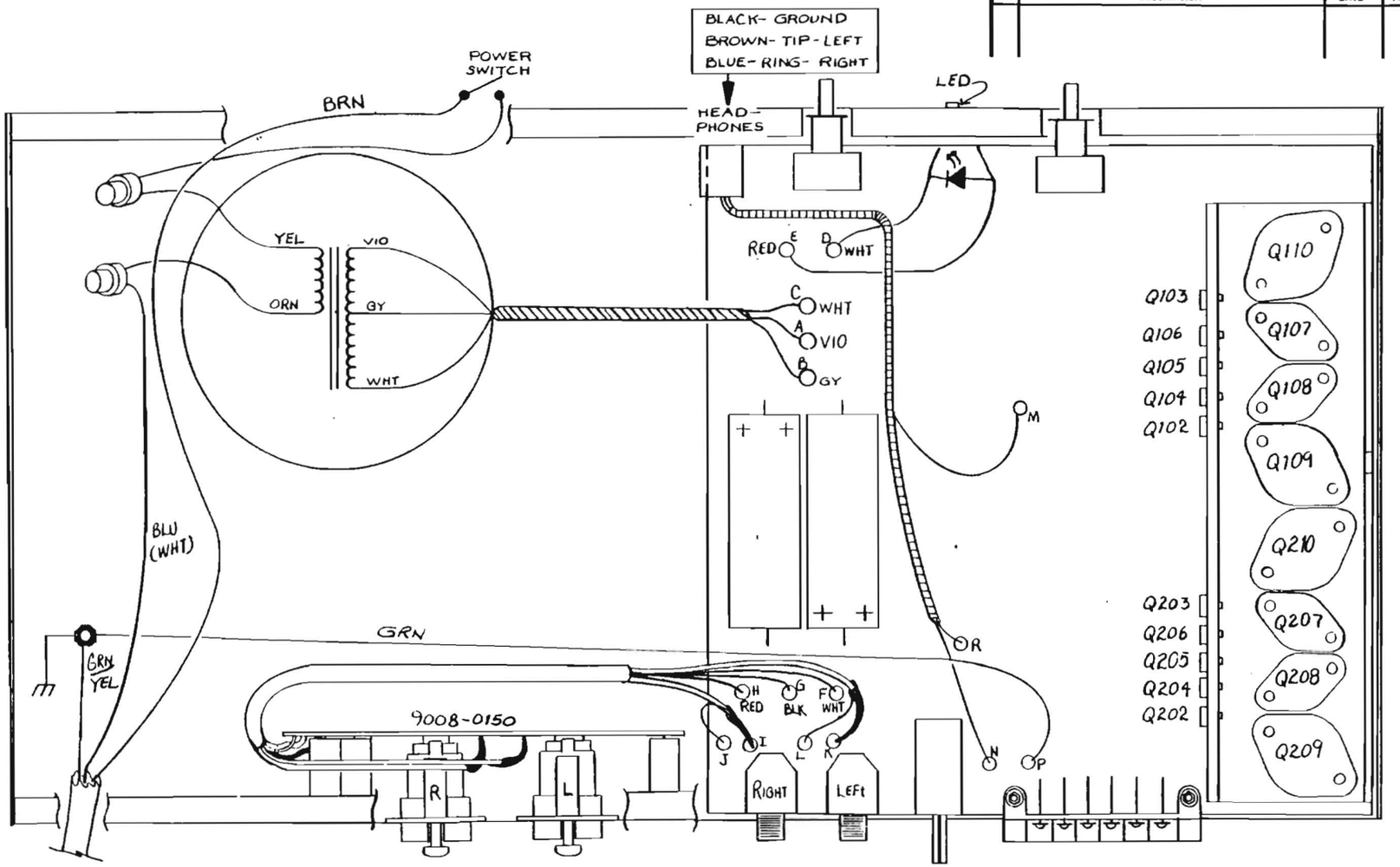
BGW SYSTEMS
13130 SOUTH YUKON AVE.
HAWTHORNE, CA 90250
(213) 973-8090

TITLE: OPTION 06/07 TRANSFORMER INPUT MODEL 85

SIZE	DRAWING NUMBER	REV
C	MFRM-15741	~

SCALE N.T.S | SHEET 1 OF 1

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



3 REFER TO INPUT MODULE SCHEMATIC MFRM-12340.
2 REFER TO AMP SCHEMATIC MFRM-15730.
1. REFER TO PARTS LIST MFRM-15790.

NOTES: UNLESS OTHERWISE SPECIFIED.

DO NOT SCALE DRAWING

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

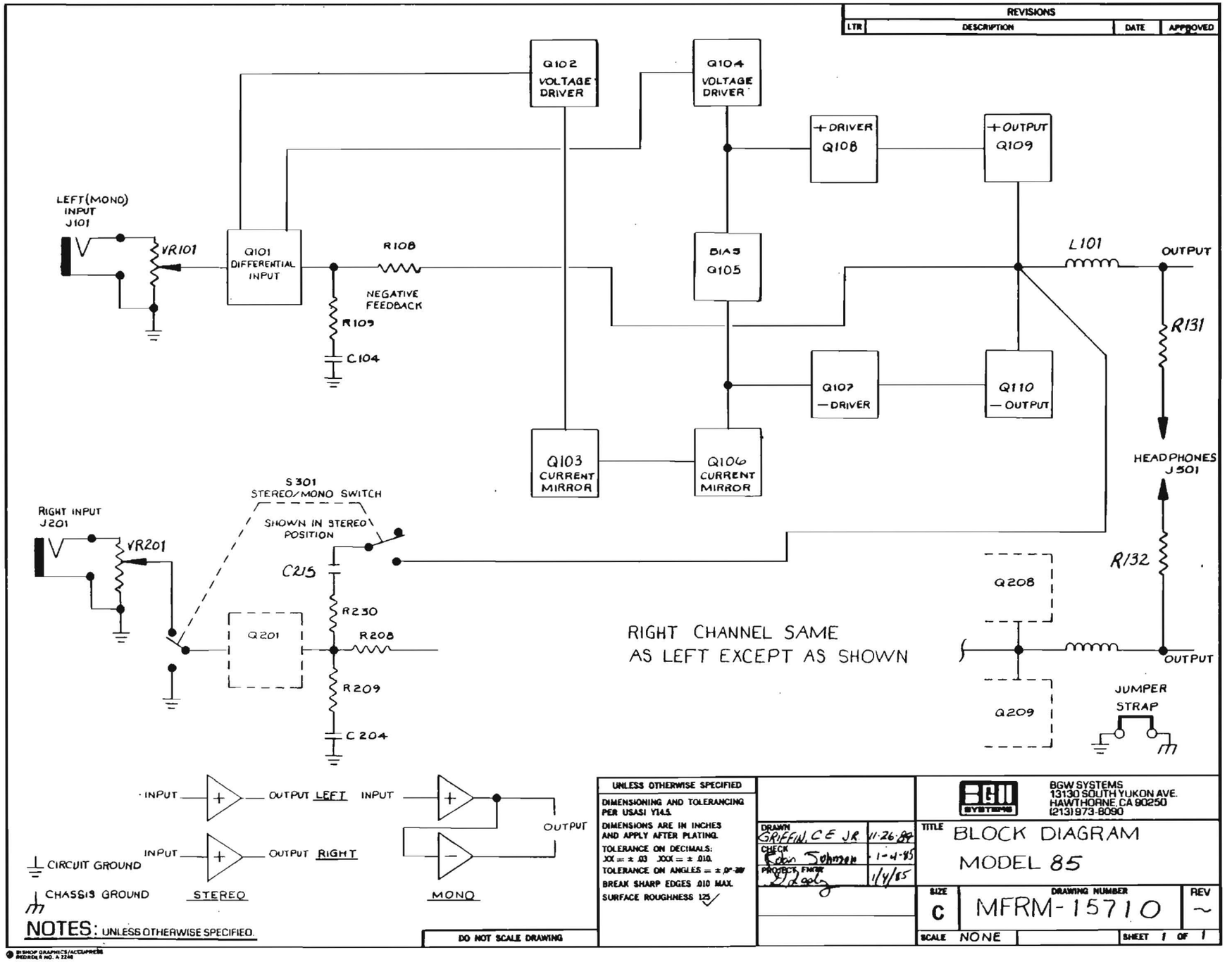
DRAWN	GRIFFIN, CE JR	1-2-85
CHECK	R Johnson	1-3-85
PROJECT ENGR		1/4/85

BGW SYSTEMS
13130 SOUTH YUKON AVE.
HAWTHORNE, CA 90250
(213) 973-8090

TITLE: OPTION 01, ACTIVE INPUT MODEL 85

SIZE	DRAWING NUMBER	REV
C	MFRM-15742	~

SCALE N.T.S | SHEET 1 OF 1


REVISIONS
LTR
DESCRIPTION
DATE
APPROVED
Q102
VOLTAGE
DRIVER
Q104
VOLTAGE
DRIVER
+DRIVER
Q108
+OUTPUT
Q109
LEFT(MONO)
INPUT
J101
VR101
Q101
DIFFERENTIAL
INPUT
R108
NEGATIVE
FEEDBACK
R109
C104
BIAS
Q105
L101
OUTPUT
R131
Q107
—DRIVER
Q110
—OUTPUT
Q103
CURRENT
MIRROR
Q106
CURRENT
MIRROR
HEADPHONES
J501
S301
STEREO/MONO SWITCH
SHOWN IN STEREO
POSITION
RIGHT INPUT
J201
VR201
C215
R230
R208
R209
C204
Q201
R132
Q208
Q209
OUTPUT
JUMPER
STRAP
RIGHT CHANNEL SAME
AS LEFT EXCEPT AS SHOWN
INPUT
OUTPUT LEFT
INPUT
OUTPUT
INPUT
OUTPUT RIGHT
CIRCUIT GROUND
CHASSIS GROUND
STEREO
MONO
NOTES: UNLESS OTHERWISE SPECIFIED.
DO NOT SCALE DRAWING
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
DRAWN GRIFFIN, C E JR. 11-26-84
CHECK Ron Johnson 1-4-85
PROJECT ENGR 1/4/85
BGW SYSTEMS
13130 SOUTH YUKON AVE.
HAWTHORNE, CA 90250
(213) 973-8090
TITLE BLOCK DIAGRAM
MODEL 85
SIZE C
DRAWING NUMBER MFRM-15710
REV ~
SCALE NONE
SHEET 1 OF 1

ITEM NUMBER	DESCRIPTION	DESIGNATOR
M NL85	MANUAL MODEL 85 & 85-01	
0060-0030	CAP 30 PF 100V MICA	C105,205
0060-0430	CAP 430PF 100V MICA	C110,210
0060-0820	CAP 820PF 100V MICA	C104,111,204,211
0090-0240	CAP 240PF 500V MICA	C103,203
0129-0100	CAP .1UF 25V DISC	C108,107,208,209,306
0199-0100	CAP .1UF 500V DISC	C301
0369-0100	CAP .1UF 100V MYLAR	C304,305,114,214
0456-0047	47UF 10V RADIAL ELEC CAP	C102,107,106,202,206 C207,215
0476-0010	CAP 10UF 50V TE1304	C101,201
0533-0006	CAP 5500UF 45V RADIAL	C302,303
0651-0400	4A CIRCUIT BREAKER BAT	S501
0660-0680	SWITCH STEREO-MONO	S301
0700-1114	KNOB,STANDARD,PUSH ON	
0720-1001	TERMINAL STRIP W/RT ANGLE BRKT	T8301
0721-0001	BARRIER PAPER INPUT JACKS	
0721-1175	FISH PAPER, MODEL 75	
0723-0077	MICA INSULATOR DISC .5 IN.	
0723-3448	SHOULDER INSULATOR LONG SHANK	
0723-5603	MICA INSULATOR T03	
0723-5666	MICA INSULATOR T066	
0900-0085	XFMR PWR MOD85	T501
0901-0005	TOROID HOLD DOWN DISC 3.5IN	
0901-0007	TOROID HOLD DOWN PAD 3.5IN	
1101-0085	HEAT SINK ASSY MODEL 85	
1200-2021	SOCKET MOLEX 22-01-2021	
1205-0005	STEREO PH JACK INSU 3/8 LONG	J501
1205-0006	INPUT JACK RT ANGLE PC MNT	J101,201
1231-1101	MOLEX CHAIN LUG,02-08-1101	
1231-2218	CLOSED END SPLICE 22-18GA	
1235-5004	STRAIN RELIEF SR5N-4 18-3SVT	
1321-5305	1/4 IN X .032 BLUE INS FASTON	
1349-0114	PIN MOLEX 08-50-0114	
1349-9312	PIN MOLEX R93-12A	
1853-2453	PNP SI MED PWR PLASTIC TO-126	Q102,104,202,204
1853-6468	2N6468 TRANSISTOR PNP 67571 EQ	Q107,207
1853-9216	SJ9216 PNP T03 POWER TRANS	Q110,210
1854-0074	DUAL NPN LOW NOISE UPA74	Q101,201
1854-2450	SJE 2450 NPN SI MED PWR TO-126	Q105,205
1854-2452	NPN SI MED PWR PLASTIC TO-126	Q103,106,203,206
1854-3583	2N3583 TRANSISTOR NPN 67570 EQ	Q108,208
1854-9215	SJ9215 NPN T03 POWER TRANS	Q109,209
1900-0501	MR501 DIODE 3A 100V	D301,302,303,304
1900-4004	1N4004 DIODE 1A 400V	D106,107,206,207
1900-4148	1N4148/1N914 DIODE	D103,104,203,204
1900-4745	DIODE,IN4745A 15V	D105,205
1900-4752	1N4752 33V ZENER DIODE	D305
1990-5000	LED GREEN RECTANGULAR	D501
2111-5500	10-32X1/2 PH MS PHIL BLK	
2115-2500	4-40X1/2 PH MS PHIL CAD	
2115-3625	6-32X5/8 PH MS PHIL CAD	

ITEM NUMBER	DESCRIPTION	DESIGNATOR
2331-5375	10-32X3/8 FH MS ALLEN BLK	
3111-3312	6X3/8 PH SMS PHIL BLK	
4020-2701	WIRE WOUND RES 270R 2W 10% BWH	R131,231
4020-3300	33 OHMS 2WATTS WW RESISTOR	R132,232
4025-1001	WIRE WOUND RES 10R 2W 5% BWH	R127,128,227,228
4025-1009	RES .1R 2W 5% WIRE WOUND BWH	R127,130,229,230
5001-2491	RES 2.49KR RN60D 1%	R116,216
5001-4752	RES 47.5KR RN60D 1%	R117,217
5005-0000	ZERO OHM RESISTOR	JUMPERS
5005-1002	RES 100R 1/2W 5%	R125,126,225,226
5005-1004	RES 10 KR 1/2W 5%	R105,205
5005-1802	RES 1.8KR 1/2W 5%	R106,121,206,221
5011-4990	49.9R RN55 1%	R118,119,120,124 R218,219,220,224
5065-1002	RES,100R,1/4W,5%	R102,113,202,213
5065-1003	RES 1KR 1/4W 5%	R111,115,211,215
5065-2003	RES,2KR,1/4W,5%	R112,114,212,214
5065-2200	RES 22R 1/4W 5%	R109,110,209,210
5065-3602	RES,3.6KR,1/4W,5%	R107,108,207,208
5065-4702	RES 4.7KR 1/4W 5%	R103,203
5065-4703	RES 47KR 1/4W 5%	R101,201
6010-2702	RES 2.7KR 1W 10%	T301
7006-2018	22K PC MOUNT DETENTED POT	VR101,201
7100-1005	100K TRIM POT LINEAR TAPER	R104,204
8100-0003	WASHER LEVEL CONTROL 8MM	
8130-0000	COMPRESSION WASHER FOR CASE 77	
8135-0001	1/8 ID 1/2 OD FIBER WASHER	
8141-0000	#8 FLAT WASHER	
8155-0000	FLAT FIBER WASHER 3/8X.195	
8180-0001	ITL WASHER FOR METRIC POTS	
8191-0000	WASHER FLAT 3/8 DIA NICKEL	
8220-0190	AWG 20,SOLID,WHITE,PVC	
8222-1100	AWG 22 19 STR PVC BLACK	
8222-1110	AWG 22,19 STR,PVC,BROWN	
8222-1120	AWG 22 19 STR PVC RED	
8222-1150	AWG 22 19 STR PVC GREEN	
8222-1160	AWG 22 19 STR PVC BLUE	
8222-1180	AWG 22,19 STR,GREY,PVC	
8500-1010	8MM HEX NUT,10MM OD,.75 THREAD	
8533-0250	6-32X1/4 HEX KEP NUT	
8543-0312	8-32X5/16 HEX KEP NUT	
8607-0125	PANEL SPACER 1/4ID X 1/20D X .	
8699-0001	POP RIVET 1/8 IN. AA8 ROUND HD	
8708-0883	AC PWR USA 18/3 SVT 8 FEET	AC501
9000-0085	FRONT PANEL 85	
9002-0085	CHASSIS MODEL 85	
9005-0085	TOP COVER MODEL 85	
9006-0085	COVER PLATE,XLR MODEL 85	
9007-0085	PC BOARD MODEL 85	
9851-1140	CTN 23X17-7/8X5-3/8 WHT PRNTD	
9999-0550	TIE WRAP 5 1/2" WRN 5 1/2	
9999-5003	FEET RUBBER ADH 3M	

BGW SYSTEMS

13130 YUKON AVENUE P.O. BOX 5042 HAWTHORNE, CALIFORNIA 90251-5042
TELEPHONE: (213) 973-8090 FAX: (213) 676-6713 TELEX NO.: 66-4494

LIMITED 90 DAY WARRANTY

BGW SYSTEMS, INC., (BGW), 13130 Yukon Avenue, Hawthorne, California, 90250, warrants to the original owner all parts, except front panels, knobs, cases and cabinets, of every new product to be free from defects in materials or workmanship, as hereinafter provided, for 90 days 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 dated, proof-of-purchase document describing the equipment, must be delivered to BGW Systems at the above address at the owner's expense. Collect shipments to BGW will be refused unless previously authorized. Any evidence of alteration, erasing or forgery of proof-of-purchase documents will be cause to void the warranty.

This warranty does not cover defects, malfunctions or failure 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 arrangement of 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 THE LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. 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 the return of the owner registration card enclosed with the equipment is not a condition for obtaining warranty service under the above conditions, but will, upon receipt, automatically extend the warranty period to a full one (1) year under the extended warranty options explained on the EXTENDED WARRANTY OPTIONS POLICY STATEMENT.

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.

BGW OPTIONAL EXTENDED WARRANTY

All BGW Systems products are covered by a **LIMITED 90 DAY WARRANTY** as detailed in the warranty policy statement enclosed in the equipment manual. We are, however, pleased to offer the following optional **EXTENDED WARRANTY OPTIONS** as outlined below.

OPTION A.

Upon receipt of the completed Warranty Registration Card, the terms and conditions of the basic warranty will be extended to a period of one (1) year from the date of purchase by the original owner at NO additional charge.

OPTION B.

The terms of the basic warranty may be extended to a full THREE (3) years by returning the Warranty Registration Card along with a nominal payment of $25.00 per unit purchased, prior to the expiration of the basic 90 day warranty period.

OPTION C.

The terms of the basic warranty may be extended to a full SIX (6) years by returning the Warranty Registration Card along with a nominal payment of $125.00 per unit purchased, prior to the expiration of the basic 90 day warranty period.

BGW SYSTEMS
WARRANTY REGISTRATION CARD

Company Name:_____

Address: _____

City:_____ State:_____ Zip:_____

Primary Contact:_____ Title:_____

Secondary Contact:_____ Title:_____

Telephone: (____)_____ Fax: (____)_____

Primary Business:_____

Equipment Model #:_____ Serial #:_____

Date Purchased:_____ Purchased From:_____

Application Information:

In which of the following applications are these amplifiers being used?

Touring Sound Reinforcement _____
Studio Monitors _____
Club Installation _____
Rental _____
Other Fixed Installation _____

What other brands of Power Amplifiers do you use? _____

_____

Why did you select BGW for this application? _____

_____

_____

How many Power Amplifiers do you purchase in an average year? _____

1 to 5 _____, 5 to 10 _____, 10 or more _____

What is the primary factor in determining which Power Amplifiers you purchase?

Price _____
Sonic Performance _____
Ease of Service _____
Warranty _____
Long Term Reliability _____
Physical Size _____
Weight _____
Other Features _____
- i.e., input attenuators, input connectors circuit breakers, speaker protection.

PLEASE EXTEND MY WARRANTY TO ONE (1) FULL YEAR. _____

I HAVE ENCLOSED $25.00. PLEASE EXTEND MY WARRANTY TO THREE (3) FULL YEARS. _____

I HAVE ENCLOSED $125.00. PLEASE EXTEND MY WARRANTY TO SIX (6) FULL YEARS. _____

BGW SYSTEMS - FINAL TEST MODEL 85-06

DATE: 10-15-1992
TECHNICIAN: BEN
LINE VOLTAGE: 120 V
SERIAL NUMBER: 92A2854

STEREO POWER OUTPUT - 8 OHMS

CHANNEL A: 42 W

CHANNEL B; 41 W

STEREO POWER OUTPUT - 4 OHMS

CHANNEL A: 62 W

CHANNEL B: 61 W

BRIDGED MONO POWER OUTPUT AT 8 OHMS = 125 W

UNBALANCED INPUT NOISE LEVEL

CHANNEL A: 104 uV

CHANNEL B: 49 uV

BALANCED INPUT NOISE LEVEL

CHANNEL A: 106 uV

CHANNEL B: 125 uV

HIGH FREQUENCY -3dB POINT

CHANNEL A: 20 kHz
CHANNEL B: 20 kHz

QUIESCENT POWER: 20 W

BGW SYSTEMS
WARRANTY REGISTRATION CARD

Name:_____ Title:_____
Company Name:_____
Address:_____
City:_____ State:_____ Zip:_____
Secondary Contact:_____ Title:_____
Telephone: (____) _____ Fax: (____) _____
Primary Business:_____
Equipment Model #:_____ Serial #:_____
Date Purchased:_____ Purchased from:_____

How are are these amplifiers being used?

Touring Sound Reinforcement	_____
Studio Monitors	_____
Club Installation	_____
Rental	_____
Other Fixed Installation	_____

What other brands of Power Amplifiers do you use? _____

Why did you select BGW for this application? _____
_____

How many Power Amplifiers do you purchase in an average year?
1 to 5 _____ 5 to 10 _____ 10 or more _____

Please rate from 1 to 8 the order of importance of each (1 being the most important):

Price	_____
Sonic Performance	_____
Ease of Service	_____
Warranty	_____
Long Term Reliability	_____
Physical Size	_____
Weight	_____
Other Features	_____

- i.e. input attenuators, input connectors, circuit breakers, speaker protection

Please Extend my Warranty to Six (6) Years @ $100.00 _____

From_____

Place
Stamp
Here

BGW SYSTEMS INC.
P. O. Box 5042
Hawthorne, CA 90251-5042

Fold Here

BGW OPTIONAL EXTENDED WARRANTY

All BGW Systems products are covered by a LIMITED ONE (1) YEAR WARRANTY as detailed in the warranty policy statement. It is very important that you complete and return to BGW Systems, Inc. your warranty registration form. It is also necessary in order to extend your amplifier warranty for the free Three (3) Year Warranty upgrade, and to keep you informed of new product information and updates. In addition, we are pleased to offer the following optional EXTENDED WARRANTY OPTIONS as outlined below.

OPTION A:

Upon receipt of the Warranty Registration Card, the terms and conditions of the basic warranty will be extended to the original owner for a period of three (3) years from the date of purchase at NO additional charge.

OPTION B:

You may extend the terms of the basic warranty may to (6) years by returning the Warranty Registration Card along with a payment of $100.00 per unit purchased.

Limited One Year Warranty

BGW SYSTEMS INC., (BGW), 13130 Yukon Avenue, Hawthorne, California, 90250, warrants to the original owner all parts of every new product to be free from defects in materials or workmanship, as hereinafter provided, for One Year 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 dated, proof-of-purchase document describing the equipment must be delivered to BGW Systems at the above address at the owner's expense. Collect shipments to BGW will be refused unless previously authorized. Any evidence of alteration, erasing or forgery of proof-of-purchase documents will be cause to void the warranty.

This warranty does not cover defects, malfunctions or failure 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 arrangement of 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 THE LIMITATION OF INCIDENTAL, OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. 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 not a condition for obtaining warranty service under the above conditions, but will, upon receipt, automatically extend the warranty period to Three (3) years under the extended warranty options explained on the EXTENDED WARRANTY OPTIONS POLICY STATEMENT.

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.

IMPORTANT!

FREE - 2 YEAR EXTENDED WARRANTY COVERAGE!

Simply complete and return the enclosed Warranty Registration Card

BGW SYSTEMS
WARRANTY REGISTRATION CARD

Name:_____Title:_____
Company Name:_____
Address:_____
City:_____State:_____Zip:_____
Secondary Contact:_____Title:_____
Telephone: (____) _____Fax: (____) _____
Primary Business:_____
Equipment Model #:_____Serial #:_____
Date Purchased:_____Purchased from:_____

How are are these amplifiers being used?

Touring Sound Reinforcement	_____
Studio Monitors	_____
Club Installation	_____
Rental	_____
Other Fixed Installation	_____

What other brands of Power Amplifiers do you use? _____

Why did you select BGW for this application? _____
_____

How many Power Amplifiers do you purchase in an average year?
1 to 5 _____ 5 to 10 _____ 10 or more _____

Please rate from 1 to 8 the order of importance of each (1 being the most important):

Price	_____
Sonic Performance	_____
Ease of Service	_____
Warranty	_____
Long Term Reliability	_____
Physical Size	_____
Weight	_____
Other Features	_____

- i.e. input attenuators, input connectors, circuit breakers, speaker protection

Please Extend my Warranty to Six (6) Years @ $100.00 _____

From _____

_____

_____

Place
Stamp
Here

BGW SYSTEMS INC.
P. O. Box 5042
Hawthorne, CA 90251-5042

Fold Here

BGW OPTIONAL EXTENDED WARRANTY

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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.