

SERVICE MANUAL



POWER AMPLIFIER

GFA-5802

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10 Timber Lane
Marlboro, NJ 07746
USA
Tel: 732-683-2356
Fax: 732-683-9790

Web: <http://www.adcom.com>

INTRODUCTION

This service manual is intended to assist trained and qualified technical personnel in verifying the performance of, adjusting, and repairing the ADCOM GFA-5802 amplifier. The procedures described here are not intended for persons unfamiliar with the appropriate safety and test procedures.



WARNING



THERE ARE POTENTIALLY LETHAL VOLTAGES WITHIN THE GFA-5802 AMPLIFIER WHICH WILL BE ACCESSIBLE ONCE ITS TOP COVER IS REMOVED. **DO NOT ATTEMPT FAMILIARIZATION, INSPECTION, OR ANY PROCEDURE WHATSOEVER UNLESS YOU HAVE DISCONNECTED THE GFA-5802 FROM THE WALL AC OUTLET OR OTHER SOURCE OF AC POWER AND THE POWER-SUPPLY CAPACITORS ARE COMPLETELY DISCHARGED.** THESE INSTRUCTIONS ARE PROVIDED FOR USE ONLY BY COMPETENT TECHNICAL PERSONNEL. **DO NOT UNDERTAKE ANY SERVICE PROCEDURES IN THE GFA-5802 UNLESS YOU ARE TECHNICALLY QUALIFIED TO DO SO.**

TEST PROCEDURES

- All tests are performed with a 115V, low-distortion (less than 2% THD), AC-power source, 8-ohm resistive load (except slew rate), and a signal source of not more than 600 ohms.
- An 80kHz low-pass filter is employed during THD distortion measurements.
- Signal-to-noise measurements are "A" weighted.
- Damping factor is measured by comparing the 1 watt output voltage with and without an 8 ohm load.
- Slew rate is measured with an inductive load, and is derived with a dual-time-based oscilloscope reading the slope of a full power 5kHz square wave. **DO NOT OPERATE THE AMPLIFIER AT FULL-POWER SINE WAVE ABOVE 22kHz OR FULL-POWER SQUARE WAVE ABOVE 5kHz.**

IMPORTANT

BEFORE PROCEEDING WITH ADJUSTMENTS, MAKE SURE AMPLIFIER IS AT ROOM TEMPERATURE.

CORRECT BIAS ADJUSTMENT IS CRITICAL TO THE PERFORMANCE OF THIS AMPLIFIER. MAXIMUM OUTPUT POWER, MINIMUM THD AND HEAT DISSIPATION ARE AFFECTED BY THE BIAS SETTING AND MUST BE CORRECT TO MAINTAIN THE SONIC QUALITY AND LONGEVITY OF THE AMPLIFIER.

BIAS ALIGNMENT

The component references are the same for both channels. Operate the amplifier without load or input connection for these adjustments.

1. Turn the amplifier on and allow to idle for 5 minutes.
2. Connect a voltmeter across source resistor R88 on the amplifier board and set bias pot R61 for a 33mV reading.
3. As the amp warms, the idle current will vary. Continue to monitor the voltage across R88 and adjust R61 until the reading stabilizes at 33mV.
4. Measure the voltage across each of the eight source resistors R88 through R114. **(Measurement across this bank of resistors is strongly suggested, as bank R8 through R25 idles near -90V).** The readings across these resistors should average 33mV and all should be between 23mV and 43mV.

Note: a properly biased amplifier will take approximately 15 minutes from initial power up to reach stable idling current and temperature. The heat sinks will be warm to the touch.

DC OFFSET ALIGNMENT

1. Connect a millivoltmeter across the speaker output terminals and adjust DC offset pot R179 on the input board for 0mV (+/- 5mV).

ADCOM GFA-5802 SERVICE PARTS LIST

SCHEMATIC LOCATION	DESCRIPTION	PART NUMBER
DISPLAY PCB	AD206-0006-B9	
R102,109	499 ohm, 1/4W, 1% Metal Film	27004540
R104	100 ohm, 1/4W, 1% Metal Film	27004670
D100 ,103, 105, 108, 110	LED, Red SSL-LX204831W-TD	16002048
S106	Power Switch	37005820
POWER SUPPLY PCB	AD206-0005-B9	
D42, 43, 44, 45, 49, 50, 51, 52	1N4004	16004004
D59	1N4148	16004148
BR23, 34	Bridge rectifier 35A, 600V	16005802
C12, 20, 28, 29	0.1uF, 250V polyester	12001555
C13, 21	0.1uF, 100V polyester	12001440
C40, 58	4700uF, 16WV, electrolytic	12005561
C41, 46, 48, 53	0.1uF, 63V polyester	12001435
C73	0.01uF, 400V ceramic disc	12001510
C108, 109, 110, 111	22,000uF, 100V electrolytic	12005800
R8, R16	10 ohm, 2W, 5% metal oxide	27003300
R9, 17, 27, 30	10k, 2W, 5%, metal oxide	27003055
R22, 35	5.1 ohm, 2W, 5% metal oxide	27003200
F14, 22, 36, 54	10A, 250V ceramic	19001001
F62 (120V)	500mA, 250V, 5mm Slo Blo	19009051
F63 (120V)	15A, 250V ceramic	19001501
T17	Torroid transformer 115/230V, 50/60Hz	24005820
T47	Standby transformer 115/230V, 50/60Hz	24005802
K74	Relay	28001250
CL172	Thermistor, 0.5ohm, CL100 16A	31005800
BK1, 3, 4, 6	Speaker Binding Post and hardware	30005800
BK2, 5	Chassis Binding Post Bracket	47002540
	Entire Power Supply PCB, with parts	36005821
INPUT PCB	AD206-0004-B8	
Q169, 171, 176, 178	*Matched, IRFD210	33002100
D168, 170	IN759A, 12V zener	16000759
D177	1N4754, 39V zener	16004754
C150, 163	0.22uF, 100V, mylar	12001085
C154, 159	330pF, 400V polypropylene	12001395
C156, C162	47uF, 63V electrolytic	12005385

C161	15pF, 500V, 5% mica	12001480
C180	1000pF, 100V polyester	12001445
R151, 160	100k, 1/4W, 1% Metal Film	27004210
R152, 157, 165, 166	4.75k, 1/4W, 1% Metal Film	27004600
R153, 158, 184	221 ohm, 1/4W, 1% Metal Film	27004570
R164	8.25k, 1/4W, 1% Metal Film	27004390
R173	1k, 1/4W, 1% Metal Film	27004050
R174	750 ohm, 1/4W, 1% Metal Film	27004650
R175	49.9k, 1/4W, 1% Metal Film	27004500
R179	Variable 500 ohm, dc offset pot	35005802
R181	392 ohm, 1/4W, 1% Metal Film	27004145
S172	Input Selector Switch	37005821
J4	RCA jack and hardware	22001170
J155	Female XLR jack	22005802
AMPLIFIER PCB	AD206-0003-B8	
Q1, 2, 12, 13, 20, 21, 37, 38, 89, 90, 91, 92, 98, 99, 117, 118	*Matched IRF244	33002442
Q34	MPSA06	33000600
Q39	IRF610	33000610
Q41, 119, 120	MPSA56	33005600
Q51, Q52	MJE253	33000253
Q62, 63, 73	*Matched IRF9610	33009610
Q78	2SC4793	33004793
Q105	2SC3478	33003478
U49	LM555CN	21005550
D3, 112	MUR120	16000120
D4	LED, Red SSL-LX204831W-TD	16002048
D28, 31, 66, 69, 70, 76, 94	1N759A, 12V zener	16000759
D74, 75	1N4754, 39V zener	16004754
D44, 46, 47, 55, 59, 80, 81, 103, 104	1N4148	16004148
D68	1N4004	16004004
C26, 86	0.1uF, 100V polyester	12001440
C45, C111	10uF, 25V electrolytic	12005090
C50	100uF, 25V electrolytic	12005020
C54	0.01uF, 50V axial ceramic	12002070
C77	100uF, 100V electrolytic	12005225
R6, 7, 10, 11, 16, 17, 19, 24, 30, 65, 79, 93, 95, 100, 101, 103, 104, 108, 109	221 ohm, 1/4W, 1% Metal Film	27004570
R8, 9, 14, 15, 18, 22, 23, 25, 88, 96, 97, 102, 106, 107, 113, 114	0.33 ohm, 3W, 5%, Wire Wound	27006055
R27, R83, R105	22.1 ohm, 1/4W, 1% Metal Film	27004435
R29, R87	49.9 ohm, 1/2W, 1% Metal Film	27004615
R32, R60	499 ohm, 1/4W, 1% Metal Film	27004540
R33, 43, 53, 121	49.9k, 1/4W, 1% Metal Film	27004500
R36, R46	10k, 1/4W, 1% Metal Film	27004200

R42, 48, 58, 115	1k, 1/4W, 1% Metal Film	27004050
R56	100k, 1/4W, 1% Metal Film	27004210
R57	22 ohm, 1W, 5% Carbon	27001075
R61	Variable 500 ohm, bias pot	35005802
R64	680 ohm, 1/4W, 1% Metal Film	27001255
R68, R72	100 ohm, 1/4W, 1% Metal Film	27004670
R82	2 ohm, 1/2W, 1% Metal Film	27001055
R110	12.1k, 1/4W, 1% Metal Film	27004220
T40	Thermal Breaker 85 deg. C	32007000
	Entire Amp PCB with parts, no heat sink	36005820

CHASSIS/CHASSIS MOUNTED COMPONENTS

Top Cover	13005821
Top Cover Screw	49005802
Main Capacitor Screw	49001020
Main Chassis	13005823
Front Panel	13005820
Gold Plate	13005822
Front Heat Sink	13005824
Rear Heat Sink	13005825
Heat Sink TBar	13005827
IRF244 Insulator	47002500
Rubber Feet	13005805
Power Cord, BME AWG14	15001120
AC Jack	25001060
Rubber rack mount hole plugs	47002330
Owner's Manual	26001580
Shipping Box	39001410

* Each of the FET pairs Q169, Q171 and Q176, Q178 and Q63, Q73 as well as all of the output devices are matched to have a maximum 10mV Vgs variation at their respective DC operating point currents. These parts must be replaced with equivalently matched parts to ensure that bias and DC offset can be properly aligned and to ensure minimum distortion.

GFA-5802 SPECIFICATIONS

Power Rating (To FTC Requirements)

300 watts continuous average power into 8 ohms: 20Hz and 20kHz with both channels driven at less than 0.18% THD
 450 watts continuous average power into 4 ohms: 20Hz and 20kHz with both channels driven at less than 0.18% THD

IM Distortion (SMPTE)

1 watt to 300 watts into 8 ohms $\leq 0.075\%$
 1 watt to 450 watts into 4 ohms $\leq 0.075\%$

IM Distortion (CCIF, Any Combination from 4kHz to 20kHz)

300 watts into 8 ohms $\leq 0.075\%$
 450 watts into 4 ohms $\leq 0.075\%$

THD + Noise at 300 watts into 8 ohms (Typical)

20Hz 0.015%
 1kHz 0.02%
 10kHz 0.09%
 20kHz 0.15%

THD + Noise at 450 watts into 4 ohms (Typical)

20Hz 0.025%
 1kHz 0.025%
 10kHz 0.09%
 20kHz 0.15%

Frequency Response @ 1 Watt into 8 ohms (10Hz to 20kHz) +0, -0.25dB

Power Bandwidth (-3dB) 3Hz to 130kHz

Dynamic Headroom into 4 ohms 2.3dB

Signal to Noise Ratio, "A" Weighted (300 watts onto 8 ohms) $\geq 105\text{dB}$

Gain 29 dB

Input Impedance

Unbalanced 105K ohms
 Balanced 10K ohms

Input Sensitivity

for 1 Watt output 0.1 volts
 for 300 Watts output 1.7 volts

Rise Time (5kHz, 90 V peak-to-peak square wave, 20% to 80%) 2.25 μS

Power Consumption (Continuous, Both Channels Driven)

Quiescent 540VA
 Maximum 1440VA
 300 watts into 8 ohms 1340VA

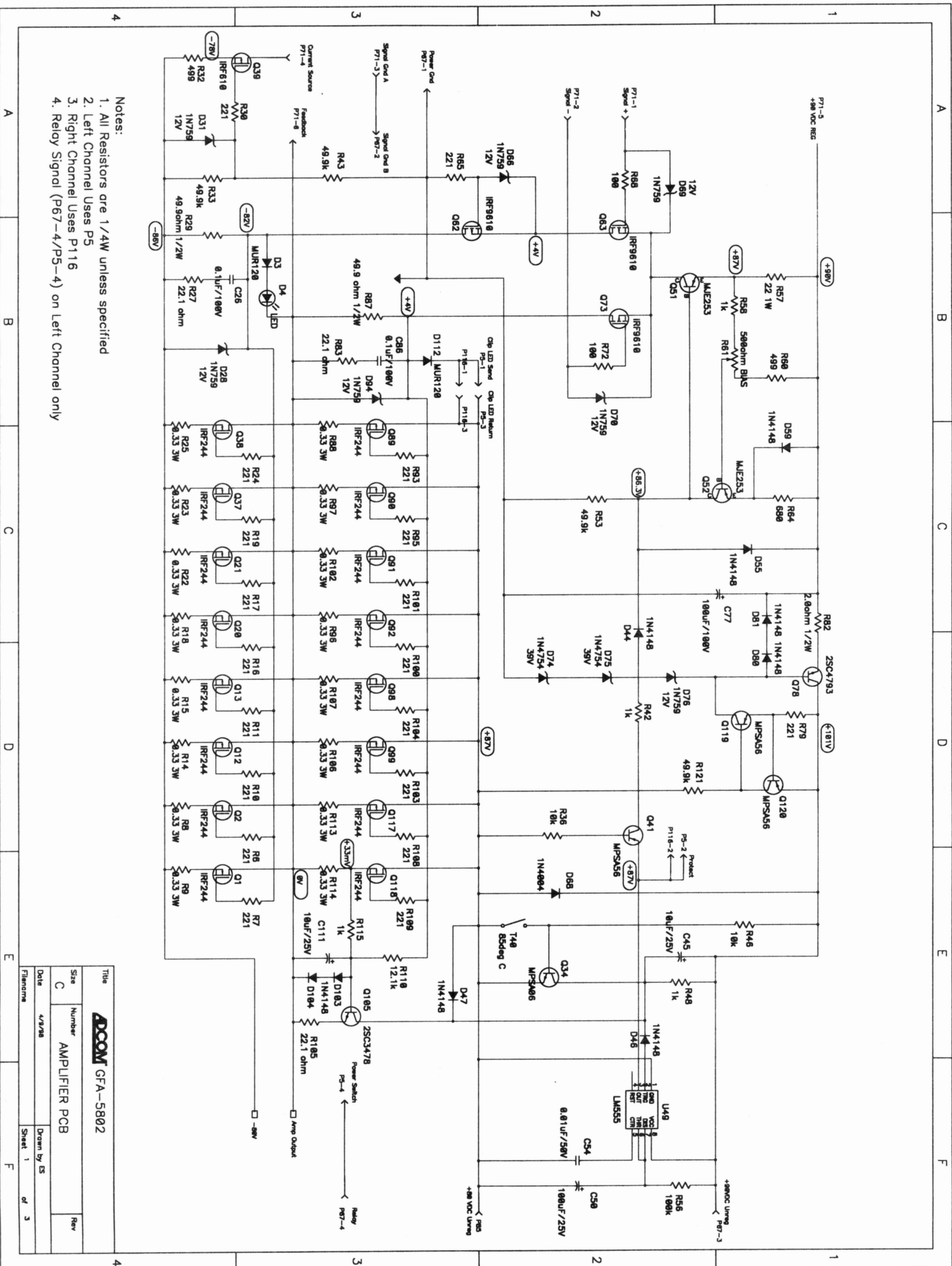
Power (Available in 230VAC by special order) 15VAC - 50/60Hz

Chassis Dimensions 13 $\frac{7}{8}$ " (352mm) x 17" (432mm) x 8" (203mm)

Maximum Dimensions 15 $\frac{1}{2}$ " (394mm) x 17" (432mm) x 8 $\frac{1}{4}$ " (210mm)

Weight 48 lb. (21.8kg)

Weight, Packed 55 lb. (24.9kg)

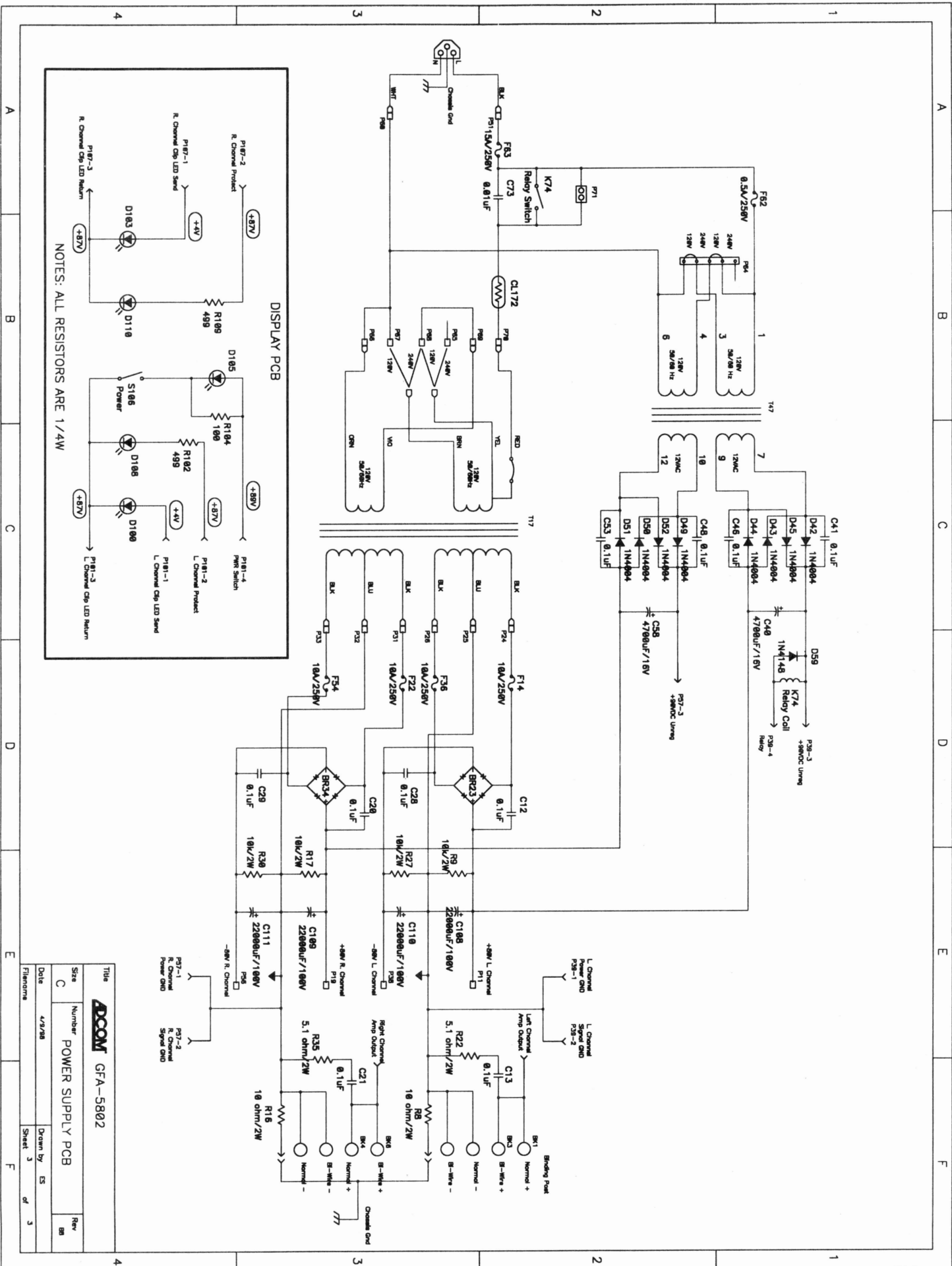


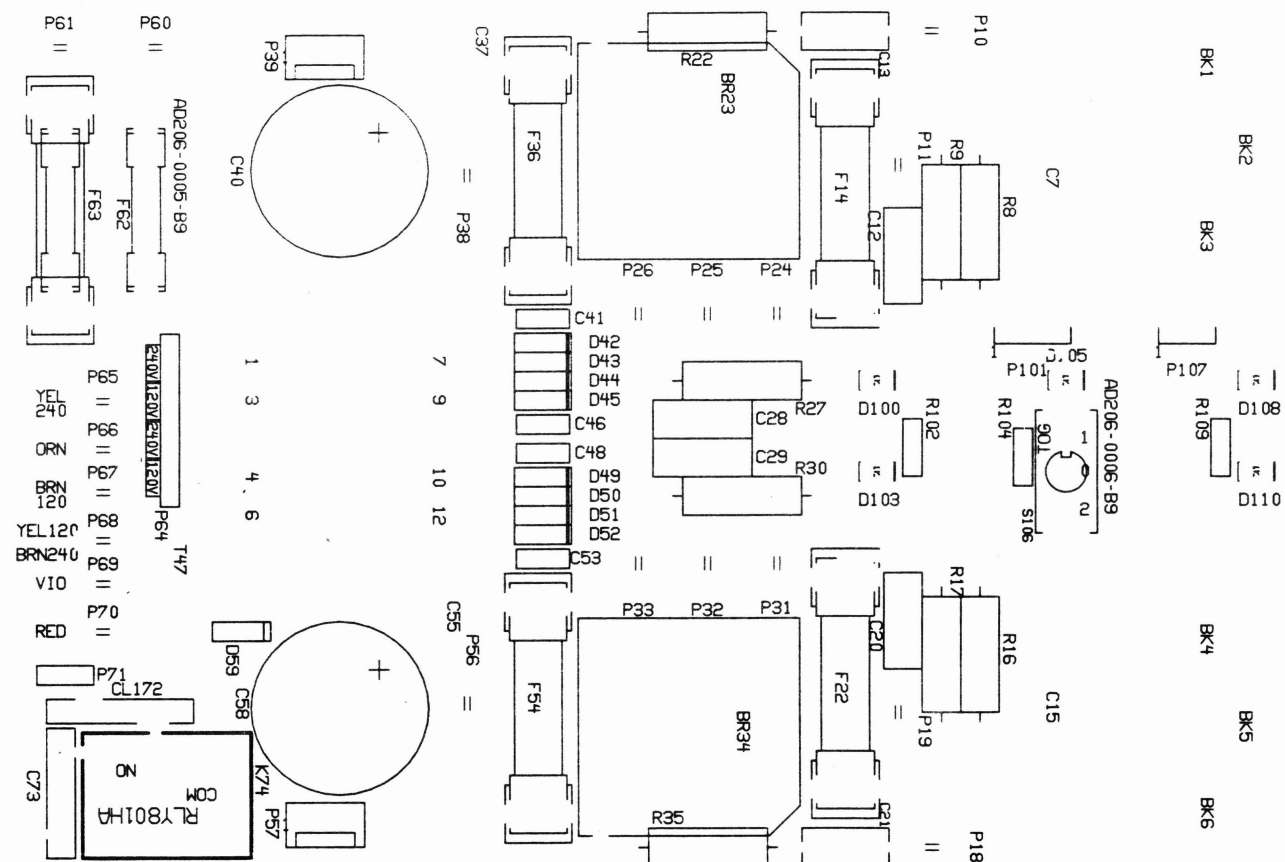
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Size: **C** Number: **AMPLIFIER PCB**

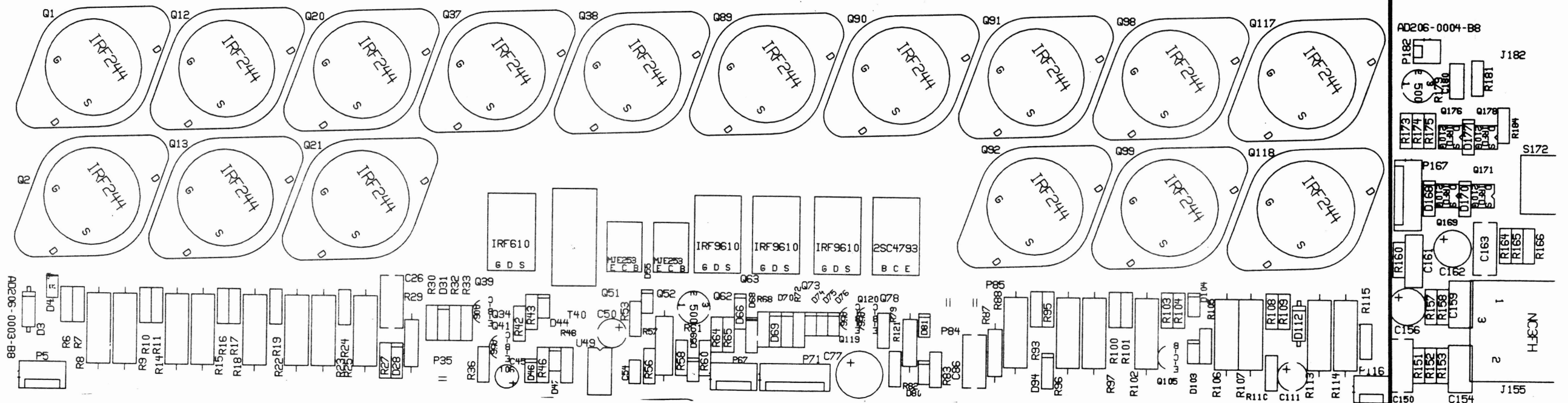
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Filename: **Sheet 1** of **3**





POWER SUPPLY



POWER AMP

INPUT PCB

Adcom Service Bulletin

Date: April 1, 1998

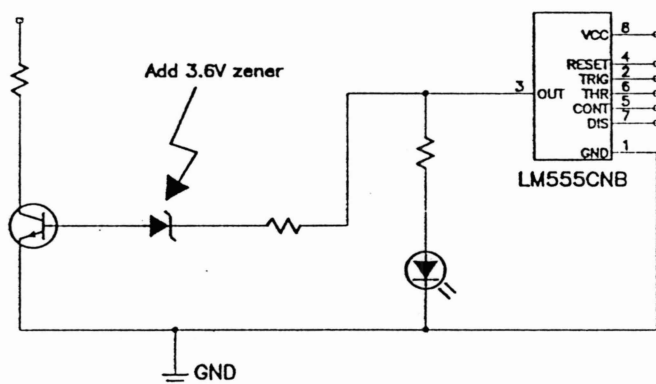
Product: GFA-5200, GFA-5300 and GFA-5400 with LM555 protection circuit

Complaint: Popping at turn off

The versions of the above amplifiers that have the LM555 protection circuit will produce objectionable pops or squeals if powered off from an external source. The noises do not occur when the unit is switched off from the front panel AC switch.

Modification:

Add a 3.6V zener diode (Adcom part #16003600) as shown below between the transistor and resistor reference numbers listed for the appropriate amplifier.



Amplifier	Zener Anode at Transistor	Zener Cathode at Resistor
GFA-5200		
Left Chan:	Base Q017	R058
Right Chan:	Base Q117	R158
GFA-5300		
Left Chan:	Base Q019	R058
Right Chan:	Base Q119	R158
GFA-5400		
Left Chan:	Base Q713	R719
Right Chan:	Base Q714	R720

Note:

The modification only effects power down popping problems. The small thump at power on is a result of the amp circuit charging and will remain after modification.

Ordering Matched FETs and Service Manual Corrections

The GFA-5802 Service Manual notes on page 4 that a number of the MOSFETs in the amplifier are matched to ensure proper performance. For repairs requiring replacement of these parts, equivalently matched parts must be used. In ordering these parts, these procedures must be followed.

Failure of Q169, Q171, Q176, Q178, Q63 or Q73

For repairs requiring replacement of any one of the transistors in input pair Q169 and Q171, cascode pair Q176 and Q178 or second differential pair Q63 and Q73, both transistors in the pair must be replaced. That is, if Q169 fails, both Q169 and Q171 need to be replaced. Order both and specify **Matched** with the part number.

Failure of any of the IRF244 output transistors

The category of the output transistors is identified by a letter written on the bottom of the transistor. The markings will appear in one of two ways.

- 1) As a single or double repeated letter. (Example **M** or **BB**. Note: **B** and **BB** are different categories).
- 2) As a sequence of letters separated by a dash. (Example **AD-AA** or **TB-Q**).

When ordering replacements, indicate **Matched** with the part number and the **exact letter code** written on the transistor. The replacement parts will be of the same category.

Note: there is no quality difference between transistors of different letter categories. Transistors of category CC are not better than those of category D. It is only important that the output transistors are of the same category for proper operation.

GFA-5802 Service Manual Corrections

- 1) On page 1, change step 4 of the **BIAS ALIGNMENT** procedure from

"The reading across these resistors should average 33mV and all should be between 23mV and 43mV."

to

"The reading across these resistors should **be a maximum of 33mV and all should range between 18mV and 33mV.**"

- 2) On page 3, change the Q62, 63, 73 part description from "*Matched IRF9610" to "*Matched IRF9622" and the part number from 33009610 to 33009622. IRF9610s will be replaced with IRF9622s. These will be provided in matched pairs as described above.