

SERVICE MANUAL



3 CHANNEL POWER AMPLIFIER GFA-5503

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INTRODUCTION

This service manual is intended to assist trained and qualified technical personnel in verifying the performance of, adjusting, and repairing the ADCOM GFA-5503 amplifier. The procedures described here are not intended for persons unfamiliar with the appropriate safety and test procedures.



THERE ARE POTENTIALLY LETHAL VOLTAGES WITHIN THE GFA-5503 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-5503 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-5503 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

Prior to performing BIAS ALIGNMENT turn unit on and allow to idle for approximately **5 MINUTES** before attempting adjustments.

1. Connect millivoltmeter across emitter resistor R52 for left channel (R52 for center channel, R51 for right channel)
2. Adjust bias pot P2 until meter reads 50mV +/- 5mV

DC OFFSET ADJUSTMENT

1. Connect millivoltmeter across speaker output
2. Adjust DC offset pot P1 until meter reads 0mV +/- 10mV

a GFA-5503 SERVICE PARTS LIST

AMPLIFIER MODULE PCB

SCHEMATIC LOCATION	ADCOM PART NUMBER	DESCRIPTION	
C01	XXXXX	CAPACITOR	390pF 100V
C02	12001075	CAPACITOR	2.2uF 100V
C03	12005280	CAPACITOR ELEC	47uF 50V
C04	12001085	CAPACITOR	0.22uF 100V
C05	12001480	CAPACITOR SILVER MICA	15pF 100V
C06	12001470	CAPACITOR SILVER MICA	20pF 100V
C07	12005325	CAPACITOR ELEC	4.7uF 50V
C09	12005380	CAPACITOR ELEC	47uF 25V
F1,F2	19000800	RAIL FUSE	8A 250V
LED1	16001204	THERMAL LED	LTL1204 (RED)
LED2	16001254	DISTORTION LED	LTL1254 (YELLOW)
P01	35001550	DC OFFSET POT	5K
P02	35001550	BIAS POT	5K
Q01,Q02	33002100	TRANSISTOR	IRFD210
Q03,Q04	33000092	TRANSISTOR	MPSA92
Q05	33007570	TRANSISTOR	ZTX757
Q06	33009210	TRANSISTOR	IRFD9210
Q07	33009610	TRANSISTOR	IRF9610
Q08	33002100	TRANSISTOR	IRFD210
Q09	33006570	TRANSISTOR	ZTX657
Q10,Q11	33000610	TRANSISTOR	IRF610
Q12	33000042	TRANSISTOR	MPSA42
Q13	33006570	TRANSISTOR	ZTX657
Q14	33007570	TRANSISTOR	ZTX757
Q14	33000092	TRANSISTOR	MPSA92
Q15	33002400	TRANSISTOR	IRFP240
Q16	33000924	TRANSISTOR	IRFP9240
Q17	33002400	TRANSISTOR	IRFP240
Q18	33000924	TRANSISTOR	IRFP9240
Q19	33002400	TRANSISTOR	IRFP240
Q20	33000924	TRANSISTOR	IRFP9240
Q21	33002400	TRANSISTOR	IRFP240
Q22	33000924	TRANSISTOR	IRFP9240
Q23	33002400	TRANSISTOR	IRFP240
Q24	33000924	TRANSISTOR	IRFP9240
R01	27001565	RESISTOR ROED	221R
R02	27002480	RESISTOR ROED	1.82K
R03	27002365	RESISTOR ROED	49.9K
R04	27002480	RESISTOR ROED	1.82K
R05	27002030	RESISTOR ROED	10K
R06	27002280	RESISTOR ROED	15K
R07	27002170	RESISTOR ROED	475R
R08	27001565	RESISTOR ROED	221R
R09	27001565	RESISTOR ROED	221R
R10	27002010	RESISTOR ROED	100R
R11	27002030	RESISTOR ROED	10K
R12	27002365	RESISTOR ROED	49.9K
R13	27002240	RESISTOR ROED	7.5K

SCHEMATIC LOCATION	ADCOM PART NUMBER	DESCRIPTION	
R14	27002025	RESISTOR ROED	1.5K
R15	27002030	RESISTOR ROED	10K
R16	27002500	RESISTOR ROED	33.2K
R16A	27002500	RESISTOR ROED	33.2K
R17	27001565	RESISTOR ROED	221R
R18	27001565	RESISTOR ROED	221R
R19	27001515	RESISTOR ROED	4.75R
R20	27002010	RESISTOR ROED	100R
R21	27002030	RESISTOR ROED	10K
R22	27002200	RESISTOR ROED	4.99K
R23	27001530	RESISTOR ROED	2.74K
R24	27003035	RESISTOR	5.1K 1W
R25,R26	27002410	RESISTOR ROED	4.75K
R27,R28	27003390	RESISTOR	220R 1/2W
R29,R30	27003090	RESISTOR	47R 1/2W
R32	27002365	RESISTOR ROED	49.9K
R33-R42	27003390	RESISTOR	220R 1/2W
R43-R52	27006045	RESISTOR	0.68R 5W
R53	27002030	RESISTOR ROED	10K
TB101	32006000	THERMAL BREAKER	
Z01-Z08	16000082	DIODE	ZENER 8.2V

POWER SUPPLY PCB

SCHEMATIC LOCATION	ADCOM PART NUMBER	DESCRIPTION	
BR1-BR3	16003504	BRIDGE RECTIFIER	300V 35A
C02	12001235	CAPACITOR	0.1uF 250V
C04	12001235	CAPACITOR	0.1uF 250V
C06	12001235	CAPACITOR	0.1uF 250V
C08	12001235	CAPACITOR	0.1uF 250V
C10	12001235	CAPACITOR	0.1uF 250V
C12	12001235	CAPACITOR	0.1uF 250V
C13	12001235	CAPACITOR	0.1uF 250V
C16	12001235	CAPACITOR	0.1uF 250V
C19	12001235	CAPACITOR	0.1uF 250V
C22	12001235	CAPACITOR	0.1uF 250V
C25	12001235	CAPACITOR	0.1uF 250V
C28	12001235	CAPACITOR	0.1uF 250V
C14,C15	12005265	CAPACITOR ELEC	1000uF 100V
C17,C18	12005265	CAPACITOR ELEC	1000uF 100V
C20,C21	12005265	CAPACITOR ELEC	1000uF 100V
C23,C24	12005265	CAPACITOR ELEC	1000uF 100V
C26,C27	12005265	CAPACITOR ELEC	1000uF 100V
C29,C30	12005265	CAPACITOR ELEC	1000uF 100V
C01	12005525	CAPACITOR ELEC	18,000uF 100V
C03	12005525	CAPACITOR ELEC	18,000uF 100V
C05	12005525	CAPACITOR ELEC	18,000uF 100V
C07	12005525	CAPACITOR ELEC	18,000uF 100V

SCHEMATIC LOCATION	ADCOM PART NUMBER	DESCRIPTION	
C09	12005525	CAPACITOR ELEC	18,000uF 100V
C11	12005525	CAPACITOR ELEC	18,000uF 100V
D01-D12	16004004	DIODE	1N4004
R11,R12	27003300	RESISTOR	10R 2W
R17,R18	27003300	RESISTOR	10R 2W
R23,R24	27003300	RESISTOR	10R 2W
R09,R10	27003355	RESISTOR	15K 2W
R15,R16	27003355	RESISTOR	15K 2W
R21,R22	27003355	RESISTOR	15K 2W
R07,R08	27003365	RESISTOR	22R 2W
R13,R14	27003365	RESISTOR	22R 2W
R19,R20	27003365	RESISTOR	22R 2W
R25	27003335	RESISTOR	6.8K 1W
R1-R6	27003280	RESISTOR	8.2K 2W
TH1-TH3	31005500	THERMISTOR	CL40

OUTPUT PCB

SCHEMATIC LOCATION	ADCOM PART NUMBER	DESCRIPTION	
	30005800	BINDING POST	
C8	12001235	CAPACITOR	0.1uF 250V
R31	27001000	RESISTOR	4.7R 2W

OTHERS

SCHEMATIC LOCATION	ADCOM PART NUMBER	DESCRIPTION	
C31	12005700	SPARK KILLER	0.01uF 1500V
F3	19001200	MAIN FUSE	15A 250V
TH4	33005500	THERMISTOR	CL40
	13005500	FRONT PANEL	
	13005504	HEATSINK LEFT	
	13005505	HEATSINK RIGHT	
	37001325	POWER SWITCH	
	22001170	RCA INPUT JACK	
	13005501	TOP COVER	
	13005805	FOOT	

2 GFA-5503 Voltage Conversion

The GFA-5503 amplifier is produced in both a 120VAC only version and a multivoltage (120VAC or 230VAC convertible) version. The version can usually be distinguished by external inspection. The 120VAC only version has a fixed AC line cord. The convertible version has a detachable line cord. Internally, there are two differences. The toroid transformer in the convertible version has 2 primaries; the first primary has a black and brown lead, the second primary has a black and brown lead with white stripe. The toroid transformer in the 120VAC only version has only the brown and black lead (1 primary winding). Additionally, the connecting block mounted next to the power switch is different in both versions. In the multivoltage unit, this connecting block has 6 pair of mounting leads (as is shown in the figures below). In the 120VAC only version, the connecting block has only 4 pairs of mounts.

The conversion procedure for the multivoltage GFA-5503 unit is listed below.

Conversion of Multivoltage Units

120V to 230V

1. Unplug the amplifier and remove the top cover.
2. Locate the connecting block mounted next to the power switch.
3. Move the transformer leads so they are configured as shown in figure 1.
4. Change the rear panel AC fuse from 15A to 8A, AGC. Place a sticker on the rear panel at the fuse holder to show the new value fuse (8A) and new value operating voltage (230VAC).
5. Test the unit with a 230VAC source.

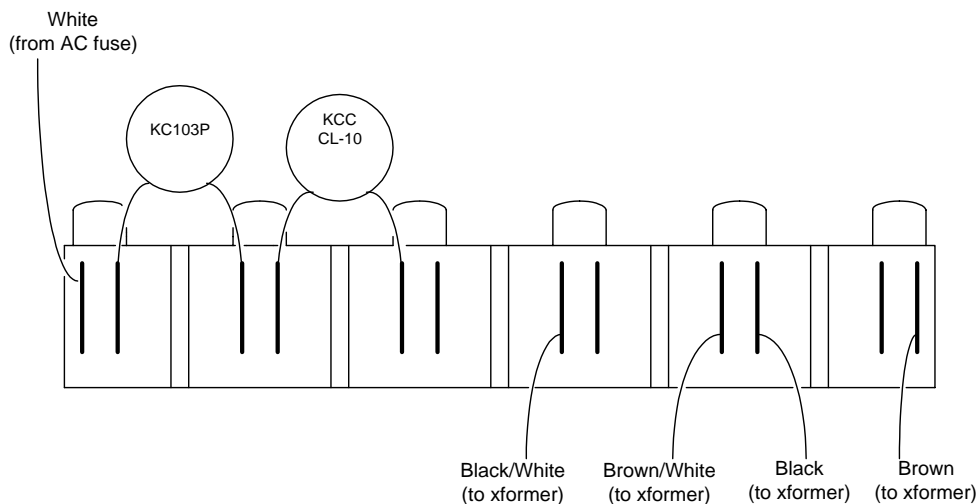


Figure 1: Transformer lead configuration for 230VAC operation (multivoltage units)

230V to 120V

1. Unplug the amplifier and remove the top cover.
2. Locate the connecting block mounted next to the power switch.
3. Move the transformer leads so they are configured as shown in figure 2.
4. Change the rear panel AC fuse from 8A to 15A, AGC. Place a sticker on the rear panel at the fuse holder to show the new value fuse (15A) and new value operating voltage (120VAC).
5. Test the unit with a 120VAC source.

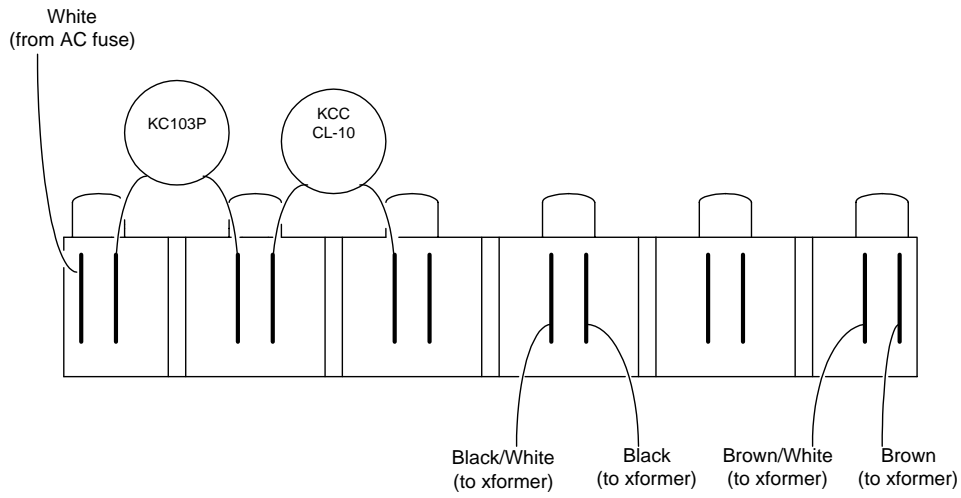


Figure 2: Transformer lead configuration for 120VAC operation (multivoltage units)

GFA-5503 SPECIFICATIONS

Power Rating (To FTC Requirements)

200 watts continuous average power per channel into 8 ohms at any frequency between 20Hz to 20kHz with all channels driven at less than 0.18% THD

350 watts continuous average power per channel into 4 ohms at any frequency between 20Hz to 20kHz with all channels driven at less than 0.18% THD

IM Distortion (SMPTE)

1 watt to 200 watts into 8 ohms ≤ 0.05%
1 watt to 350 watts into 4 ohms ≤ 0.05%

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

200 watts into 8 ohms ≤ 0.04%
350 watts into 4 ohms ≤ 0.04%

THD + Noise at 200 watts into 8 ohms (Typical)

20Hz 0.018%
1kHz 0.02%
10kHz 0.07%
20kHz 0.13%

THD + Noise at 350 watts into 4 ohms (Typical)

20Hz 0.018%
1kHz 0.02%
10kHz 0.08%
20kHz 0.16%

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

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

Dynamic Headroom into 4 ohms 1.7 dB

Signal to Noise Ratio, "A" Weighted (200 watts into 8 ohms) ≥ 100dB

Gain 29dB

Input Sensitivity

for 1 Watt 0.1 volts
for 200 Watts 1.4 volts

Input Impedance 49.9kΩ

Damping Factor (20Hz to 20kHz) ≥ 700

Rise Time (5kHz, 90V, peak-to-peak square wave, 20% to 80%) 1.5μS

Power Consumption (Continuous, All Channels Driven)

Quiescent 199VA
Maximum 855VA
80 watts into 8 ohms 1440VA
125 watts into 4 ohms 720VA

Power (Available in 230VAC on special order) 115VAC - 50/60Hz

Chassis Dimensions 7" (178mm) x 17" (432mm) x 16" (406mm)

Maximum Dimensions 7 1/4" (184mm) x 17" (432mm) x 16" (406mm)

Weight 57 lb. (20 kg)

Weight, Packed 63 lb. (23 kg)