

SERVICE MANUAL



2 CHANNEL POWER AMPLIFIER GFA-5002

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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-5002 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-5002 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-5002 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-5002 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 with rated output (8 ohm) for approximately **5 MINUTES** before attempting adjustments

Step	Coupling		Adjust	Adjust For
	Plus Lead	Minus Lead		
1	TP3	TP1	VR603	DC Voltmeter reads 10mV
2	TP4	TP2	VR604	

2 GFA-5002 SERVICE PARTS LIST

Amplifier PCB

AF705514 and AF705524

Schematic Location	Part Number	Description	
C603, C604	12001260	Capacitor	2.2 μ F 100V
C607, C608	12001400	Capacitor	1 μ F 100V
C609, C610	12005470	Capacitor	47 μ F 100V Electrolytic
C611, C612	12001420	Capacitor	22pF 125V
C613, C614	12003070	Capacitor	39pF 125V
C615, C616	12005325	Capacitor	4.7 μ F 50V Electrolytic
C617-C620	12003080	Capacitor	68pF 125V
C621, C622	12001450	Capacitor	0.22 μ F 100V
C623, C624	12001170	Capacitor	0.1 μ F 100V
C625, C626	12001450	Capacitor	0.22 μ F 100V
C901-C904	12005450	Capacitor	6800 μ F 63V Electrolytic
D001, D002	16001254	Distortion LED (Yellow)	LTL-1254
D003, D004	16001204	Thermal LED (Red)	LTL-1204
D601-D608	16004148	Diode	1N4148
D610-D613	16003001	Diode	DSC30TC
D801, D802	16004148	Diode	1N4148
D901, D902	16008030	Bridge Rectifier	PBPC903
F601-F604	19009400	Fuse	4A 250V
Q601-Q606	33002362	NPN Transistor	2SC2362K
Q607, Q608	33001016	PNP Transistor	2SA1016F-T
Q609, Q610	33001376	PNP Transistor	2SA1376L-T
Q611, Q612	33009700	PNP Transistor	2SA970B-T
Q613, Q614	33001376	PNP Transistor	2SA1376L-T
Q615, Q616	33003478	NPN Transistor	2SC3478L-T
Q617, Q618	33006000	NPN Transistor	2SD600KE
Q619, Q620	33003478	NPN Transistor	2SC3478L-T
Q621, Q622	33001376	PNP Transistor	2SA1376L-T
Q623, Q624	33003902	NPN Transistor	2SC3902
Q625, Q626	33001507	PNP Transistor	2SA1507
Q627, Q628	33001047	NPN Transistor	2SD1047
Q629, Q630	33008170	PNP Transistor	2SB817
Q631, Q632	33001047	NPN Transistor	2SD1047
Q633, Q634	33008170	PNP Transistor	2SB817
Q801, Q802	33001016	PNP Transistor	2SA1016F-T
R603, R604	27004260	Resistor	2.74K Ω 1%MF
R605, R606	27004135	Resistor	4.99K Ω 1%MF
R607, R608	27004050	Resistor	1K Ω 1%MF
R609, R610	27004120	Resistor	22.1K Ω 1%MF
R611, R612	27004420	Resistor	33.2 Ω 1%MF
R613, R614	27004350	Resistor	825 Ω 1%MF
R615, R616	27004225	Resistor	475 Ω 1%MF
R617, R618	27004140	Resistor	332 Ω 1%MF
R619, R620	27004160	Resistor	47.5K Ω 1%MF
R621, R622	27004120	Resistor	22.1K Ω 1%MF
R623, R624	27001550	Resistor	121 Ω 1%MF

R625,R626	27004330	Resistor	5.62K Ω 1%MF
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Schematic Location

Part Number Description

R627,R628	27004225	Resistor	475 Ω 1%MF
R629,R630	27004420	Resistor	33.2 Ω 1%MF
R631,R632	27004260	Resistor	2.74K Ω 1%MF
R633,R634	27004540	Resistor	499 Ω 1%MF
R635-R638	27004235	Resistor	68.1 Ω 1%MF
R639-R642	27004320	Resistor	47.5 Ω 1%MF
R643-R650	27004170	Resistor	10 Ω 1%MF
R651,R652	27004140	Resistor	332 Ω 1%MF
R653,R654	27004120	Resistor	22.1K Ω 1%MF
R655,R656	27004610	Resistor	22.1 Ω 1%MF
R657-R664	27001500	Resistor	0.33 Ω
R665,R666	27003035	Resistor	5.1 Ω (2W)
R667,R668	27004650	Resistor	750 Ω 1%MF
R669,R670	27004455	Resistor	133 Ω 1%MF
R671,R672	27004120	Resistor	22.1K Ω 1%MF
R673,R674	27004200	Resistor	10K Ω 1%MF
R675,R676	27003105	Resistor	1 Ω (1W)
R801,R802	27004670	Resistor	100 Ω 1%MF
R803, R804	27004120	Resistor	22.1K Ω 1%MF
R805,R806	27004320	Resistor	47.5 Ω 1%MF
R807,R808	27004090	Resistor	121K Ω 1%MF
R901-R904	27001590	Resistor	5.6K Ω (1W)
S601,S602	32005400	Thermal Breaker	B-1002B
VR603,VR604	35001090	Bias Pot	SFKPV220R

Protection PCB AF705534

Schematic Location

Part Number Description

C801	12005100	Capacitor	10 μ F 50V Electrolytic
C802-C804	12005610	Capacitor	33 μ F 50V Electrolytic
C701, C702	12005640	Capacitor	0.22 μ F 50V Electrolytic
C703	12005610	Capacitor	33 μ F 50V Electrolytic
C704	12005020	Capacitor	100 μ F 25VElectrolytic
C705	12002020	Capacitor	0.01 μ F 50V
C706	12005610	Capacitor	33 μ F 50V Electrolytic
C707	12005610	Capacitor	33 μ F 50V Electrolytic
C905, C906	12005070	Capacitor	1000 μ F 35V Electrolytic
C907, C908	12005130	Capacitor	220 μ F 25V Electrolytic
C909	12005360	Capacitor	100 μ F 50V Electrolytic
C910	12005700	Capacitor	4700pF 250V
D701-D706	16004148	Diode	1N4148
D707	16004003	Diode	1N4003
D803	16004003	Diode	1N4003
D804	16004148	Diode	1N4148
D903	16001530	Bridge Rectifier	W-02G
D904	16004148	Diode	1N4148

D905	16004003	Diode	1N4003
F902	19009100	Fuse	1A 250V

Schematic Location	Part Number	Description	
IC701,IC702	21004558	Dual Op-Amp	NJM4558DD
IC703	21005550	Timer IC	NJM555D
IC801	21001237	Protect IC	UPC1237H
IC901	21007912	Regulator IC	NJM7912
IC902	21007800	Regulator IC	NJM7812
PT902	24005002	Standby Transformer	TT-345-U
Q701,Q702	33005360	NPN Transistor	2SC536G-T
Q703	33006000	NPN Transistor	2SD600KE
Q704	33003399	Digital NPN Transistor	2SC3399-T
R701,R702	27004200	Resistor	10K Ω
R703,R704	27004210	Resistor	100K Ω
R705,R706	27004630	Resistor	221K Ω
R707,R708	27004400	Resistor	1.82K Ω
R709-R711	27004210	Resistor	100K Ω
R712,R713	27004465	Resistor	909K Ω
R714,R715	27004200	Resistor	10K Ω
R716	27004210	Resistor	100K Ω
R717	27004070	Resistor	2.21K Ω
R718	27004530	Resistor	1.21K Ω
R719	27004600	Resistor	4.75K Ω
R720,R721	27004120	Resistor	22.1K Ω
R809	27004290	Resistor	18.2K Ω
R810	27001590	Resistor	5.6K Ω (1W)
R811	27004485	Resistor	82.5K Ω
R812	27003150	Resistor	820 Ω (1W)
R813	27004210	Resistor	100K Ω
R905	27003095	Resistor	33 Ω (1W)
RY801	28001140	Relay	VB-24SMCU-E
RY901	28001150	Relay	G4W-1112P-VD

**Input PCB
AF705544**

Schematic Location	Part Number	Description	
C601, C602	12001390	Capacitor	125V 330pF
JP601, JP602	22001020	RCA Jack	4TR-2709-3
R601,R602	27004050	Resistor	1K Ω
SW601	37001350	Bridging Switch	SX4TR-2886
VR601,VR602	35005002	Input Level Pot	4TR-3379

**DC Trigger
Board
AF705554**

Schematic Location	Part Number	Description
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JP701	22001570	DC Trigger Input Jack	YK-5103A
SW901	37005006	Ground Switch	SS004-P022

Other Hardware

Schematic Location	Part Number	Description	
	30005002	Speaker Binding Post	4TR-3357
	19000500	Fuse - 115V Models (U.S.)	5A 125V
	19008250	Fuse - 230V Models (Euro)	2.5A 250V
	24005003	Transformer	TT-342-U
	37005002	Vacation Switch	R19-33FM2-2N
	16002249	POWER/STANDBY LED	VRPY3349S
	25001060	AC Inlet	4TR-2786
	13005004	Printed Rear Chassis	TRP-750A
	13001020	Foot	4TR-2823#1 24FX14H
	47005002	Alum. Shield Board	4TR-3400
	13005002	Front Panel	3TOZ-1 TFP-824
	11005002	LED Ring (for Power LED)	4TR-2209B#1 9F
	13005003	Top Cover	3TQA-5
	15001110	AC Power Chord 115V (U.S.)	4TR-3403 SJT AWG16

a GFA-5002 Voltage Conversion

115V to 230V

- 1) Unplug the power cord and remove the top cover.
- 2) Locate the standby transformer, PT902, on the circuit board in the middle of the unit.
- 3) Near PT902, cut jumpers J1, J2, J4, J5 - see figure 1 below.
- 4) Make jumpers J3 and J6 - see figure 1 below.
- 5) Change the rear panel fuse to 2.5A 250V and place a 2.5A sticker above the fuse holder so that the new value is indicated.

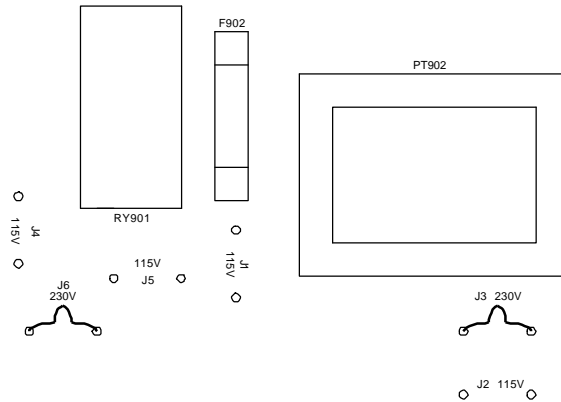


Figure 1: Jumper position for 230V operation. Main fuse is 2.5A 250V.

230V to 115V

- 1) Unplug the power cord and remove the top cover.
- 2) Locate the standby transformer, PT902, on the circuit board in the middle of the unit.
- 3) Near PT902, cut jumpers J3 and J6 - see figure 2 below.
- 4) Make jumpers J1, J2, J4 and J5 - see figure 2 below.
- 5) Change the rear panel fuse to 5A 250V and place a 5A sticker above the fuse holder so that the new value is indicated.

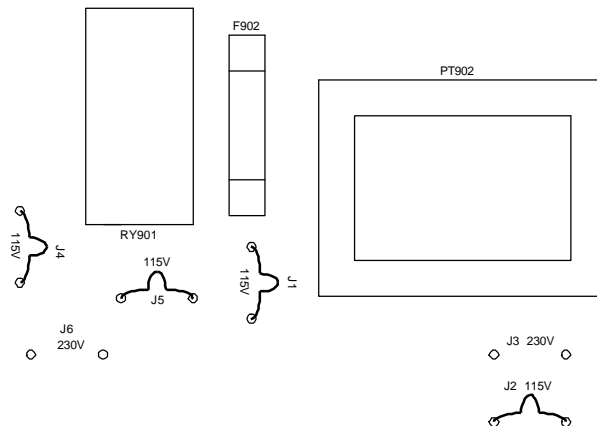


Figure 2: Jumper position for 115V operation. Main fuse is 5A 250V.

2 GFA-5002 SPECIFICATIONS

Power Rating (To FTC Requirements)

50 watts continuous average power per channel into 8 ohms at any frequency between 20Hz to 20kHz with all channels driven at less than 0.05% THD

75 watts continuous average power per channel into 4 ohms at any frequency between 20Hz to 20kHz with all channels driven at less than 0.05% THD

Bridged Power: 175 watts continuous average power (one channel) into 8 ohms at any frequency between 20Hz to 20kHz with less than 0.09% THD

IM Distortion (SMPTE)

1 watt to 50 watts into 8 ohms ≤ 0.05%

1 watt to 75 watts into 4 ohms ≤ 0.05%

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

50 watts into 8 ohms ≤ 0.01%

75 watts into 4 ohms ≤ 0.01%

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

Power Bandwidth (-3dB) 5Hz to 130kHz

Dynamic Headroom into 4 ohms 1.8 dB

Signal to Noise Ratio, "A" Weighted (50 watts into 8 ohms) ≥ 100dB

Gain 29dB

Input Sensitivity variable

Input Impedance 17kΩ

Damping Factor (20Hz to 20kHz) ≥ 400

Rise Time (5kHz, 90V, peak-to-peak square wave, 20% to 80%) 2.7μS

Power Consumption (Continuous, All Channels Driven)

Quiescent 30VA

Maximum 600VA

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

Chassis Dimensions 3" x 17" x 11.5"

Maximum Dimensions 3.5" x 17" x 12.5"

Weight 18lb

Weight, Packed 21lb