

SERVICE MANUAL

ADCOM[®]

POWER AMP

(COMBINED VERSION)

GFA-555

**ADCOM TECHNICAL
SERVICE DEPARTMENT**

**ADCOM
10 Timber Lane
Marlboro, NJ 07746**

ADCOM GFA-555 Service Manual

NOTE:

There have been several versions of the GFA-555 amplifier since it was first manufactured. Therefore you will find in this manual different printed circuit board layouts, schematics and parts lists. It will be necessary for you to examine your amplifier to determine the correct service information for your unit. Should you encounter any difficulties, please feel free to contact our technical assistance department.

Introduction

This repair manual is intended to assist qualified technical personnel in verifying performance, adjusting and repairing the ADCOM model GFA-555 power amplifier. The procedures described here are not intended for consumers or persons not familiar with the appropriate safety procedures.

WARNING: Procedures described herein require working with hazardous voltage potentials, and are intended for qualified technical personnel only.

Circuit Description

The ADCOM GFA-555 is a stereo amplifier rated at 200 watts-per-channel into 8 ohms and capable of greater than 20 amps output into low impedance loads. The amplifier employs a discrete Class-A voltage gain stage (front end) which amplifies the input signal up to the voltage required at the output of the amplifier. This high-voltage signal drives the high-current Darlington-follower output stage which amplifies the current by a factor of about 2,000.

Referring to the accompanying schematic, the input signal passes through network R1 and C1 which provides a radio-frequency rolloff above 500 kHz. R2 provides a DC source impedance in the absence of any signal source. Input amplification and feedback occur in Q1 and Q2, a standard differential pair input stage, with R3 and R4 providing local feedback for open loop gain control. The next amplification is provided by Q7 and Q8 used to limit the possible current flow when the voltage drop across R8 exceeds 0.6 volts, or about 20 milliamps. The signal comes out of the collector of Q7 at full output voltage. C2 is used to balance the slew rate of the positive swing to the rate of the negative swing, and C4 provides a secondary high-frequency feedback loop to the input stage, allowing the input stage to ignore the output stage lag at very high frequencies, providing additional stability.

Feedback is provided from the output to base of Q2 by the network R6, R5, and C3. C3 provides rolloff below 3 Hz.

The gain stages of Q1, Q2, and Q7 are biased into single-ended Class-A mode by the circuitry of R10-11, R13-16, D3-6, and Q3, 4, and 6. D3 and D4 forward-bias transistor Q6 at 1.3 volts from current provided through R13. This creates about 0.6 volts across R11 so that Q6 sources about 1 milliamp through thermostat T1. This current biases the diodes D5-6 to 1.3 volts, causing 2 milliamps constant current sourced from Q3 for the input pair, and 4 milliamps constant current sourced from Q4 for the secondary gain stage of Q7. Between the collectors of Q4 and Q7 is the bias network which biases the output stage into Class AB.

This bias network uses Q9-10 and the associated resistors to take bias feedback off the emitters of drivers Q11 and Q12 to form a constant voltage bias across R21. Unlike the standard voltage source, this configuration eliminates bias variations due to thermal and other changes in the driver transistors. P1 is used for adjustment, and T2 is a thermistor mounted on the case of Q12 providing thermal compensation for the output transistors.

Transistor Q5 and resistors R9 and R12 provide an error detection system which senses an over-worked feedback loop and lights LED L1 when the amplifier is overdriven.

Thermostat T1 opens at temperatures above 85 degrees C, shutting off the bias to the amplifier. Fuses F1 and F2 will accomplish the same effect when blown by over-current.

R22 and C6 provide a load for the amplifier at high frequencies, stabilizing the amplifier under varying load conditions. D1 and D2 provide a high current return to the supply for backlash current from the load.

The output stage consists of two sets of 4 parallel transistors operated as emitter followers, using 0.82 ohm ballast resistors to ensure current sharing and bias stability.

Specifications

Distortion: < 0.09% THD @ 200 Watts into 8 ohms 20-20,000 Hz.

Frequency response: -3dB @ 4 Hz.

-3dB @ 150 kHz.

Noise: < 200 Microvolts unweighted (-106dB @ 200W)

Offset: < 100 Millivolts

Gain: 27dB

Input Impedance: 22,000 ohms, 300pF

Damping Factor: 200 @ 20 Hz @ 8 ohms

Maximum Current: 20 amps peak @ 1 ohm

12 amps RMS @ 2 ohms

Bridged Power: 600 Watts RMS @ 20-20,000 Hz @ 8 ohms @ .25% THD

4-ohm Power: 2 x 300 Watts/channel @20-20,000 Hz @.25% THD

Power Bandwidth: -3dB @ 50,000 Hz @ 8 ohms @ 1% THD

Test Procedures

All tests are performed with 120 volts, low distortion AC power source, 8 ohm resistive loads (except slew rate), and a 600 ohm signal source.

Tests are performed after warm-up at 66 watts into 8 ohms for at least 15 minutes.

All grounds during testing are referred to the ground of the input terminals.

80 kHz low-pass filters are employed during THD distortion measurements. 400 Hz high-pass filters are employed for distortion measurements at frequencies above 1 kHz.

Noise measurements unweighted from 20 Hz to 20 kHz.

Damping factor measured by comparing 20 watt output voltage with and without an 8 ohm load.

Maximum output current measured single pulsed into 1 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 5 kHz square wave. To avoid damaging output network R22 and C6, do not operate the amplifier at full power sine wave above 22 kHz or full power square wave above 5 kHz.

Important: Before proceeding with adjustments, make sure the amplifier is cool (at room temperature).

Bias Alignment (Select appropriate procedure)

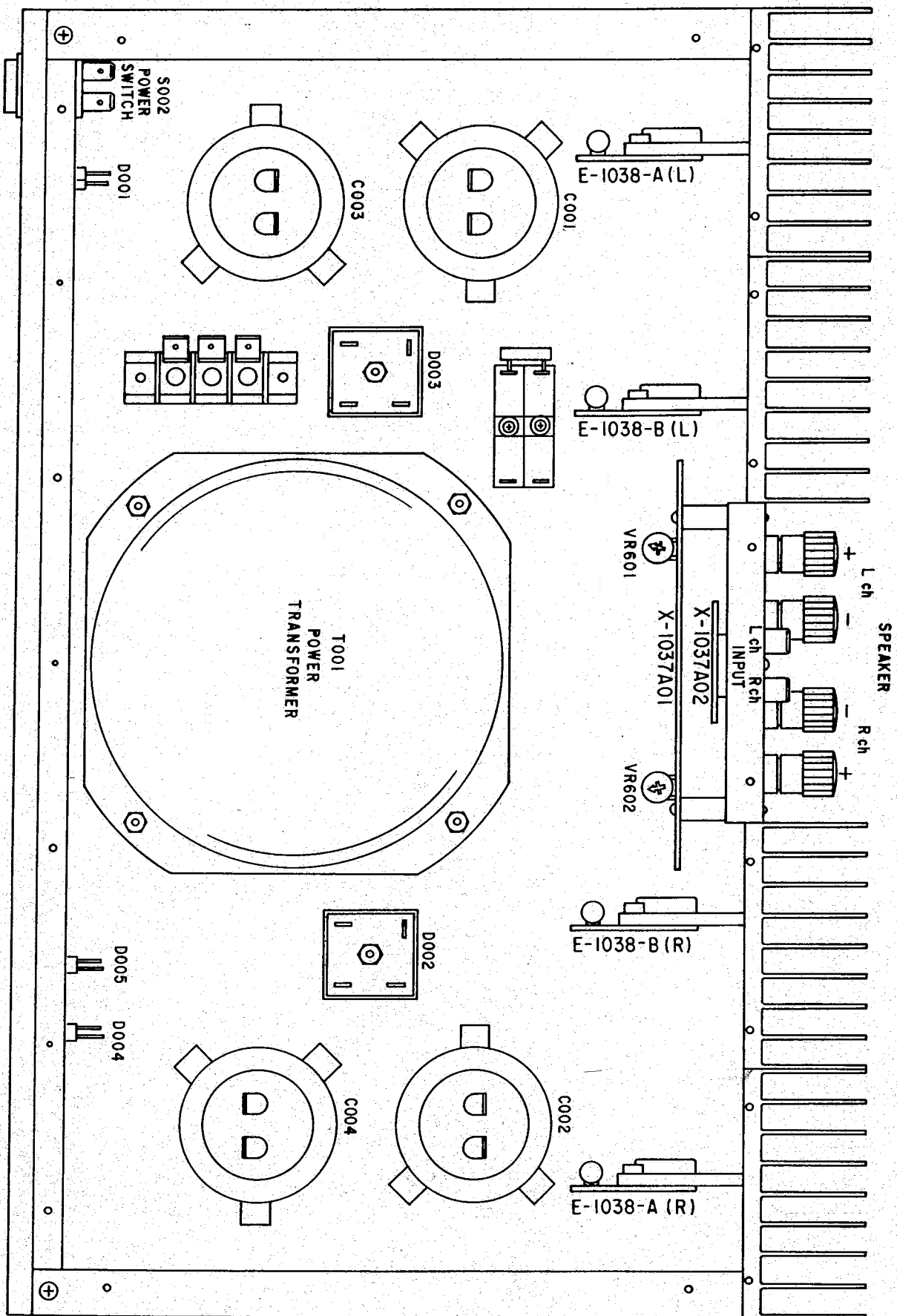
a) Where bias controls are labeled either R1 or P1:

1. With set-up as per the first paragraph of Test Procedures and with **NO SIGNAL IN**, set the bias control(s) to midpoint.
2. Connect a mV meter across any of the output emitter resistors (R24-31) for the channel under alignment.
3. Turn amplifier on and allow a 3 to 5 minute settling period.
4. Adjust bias control to obtain either a + or - 16mV indication on the meter.
5. To check the proper bias setting and tracking operation, remove the meter and apply an input signal to reach 66 watts into 8 ohms for 10 minutes with the cover on.
6. Remove input signal and quickly reconnect the meter as above in step 2. the meter should indicate 50 to 60 mV, decreasing as the amplifier cools down.
7. Compliance with step 6 indicates proper bias alignment. If not, unplug the amplifier, allow it to cool down and then repeat above procedure.

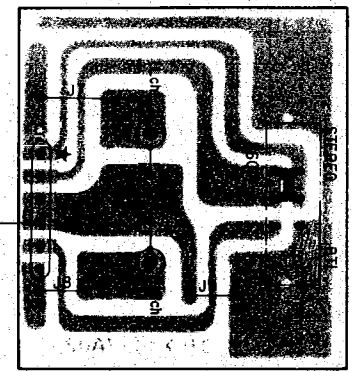
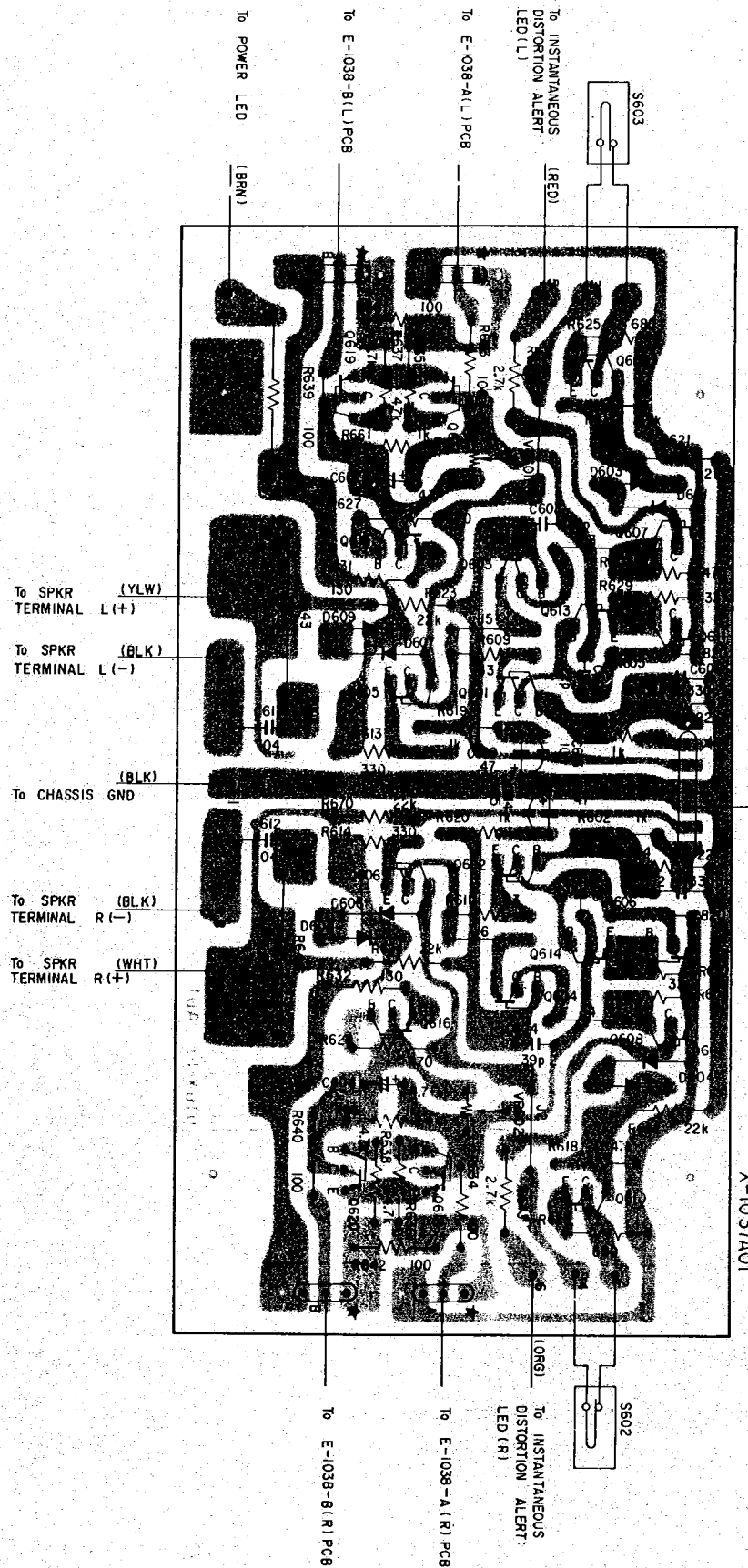
b) Where bias controls are labeled VR601 and VR602:

1. Follow above procedure steps 1-3 except connect the mV meter across 2 test points "TP".
2. Adjust bias controls to obtain a reading of 10 mV.

Chassis Layout Model GFA-555

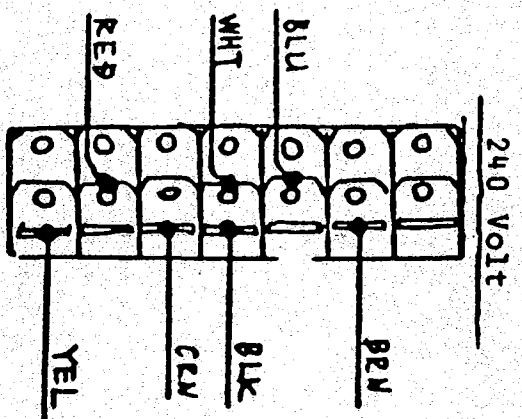
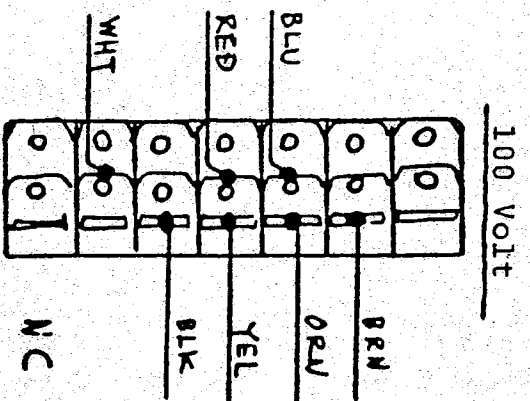
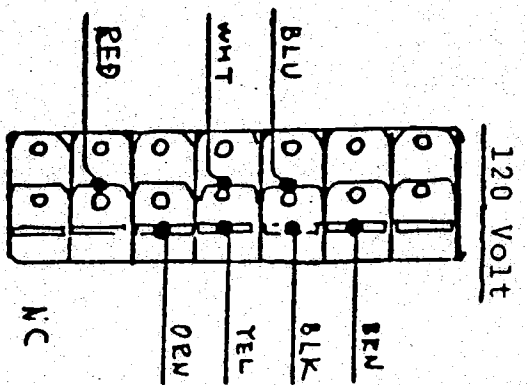
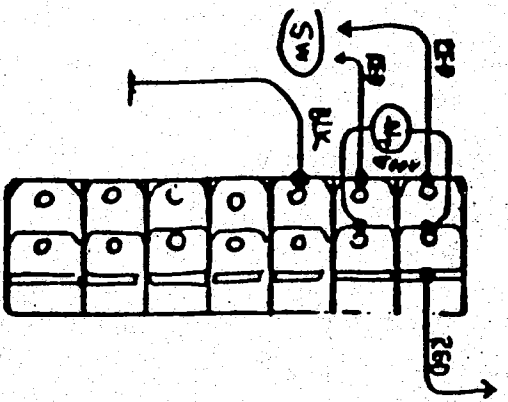


Wiring Diagram Model GFA-555

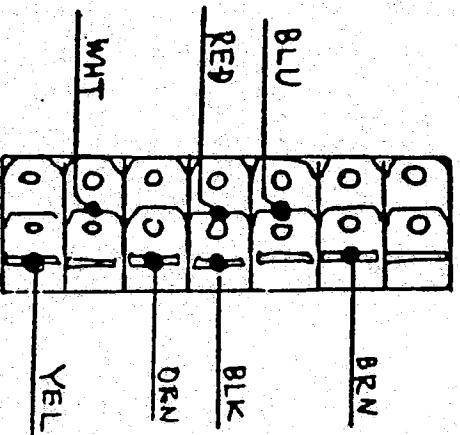


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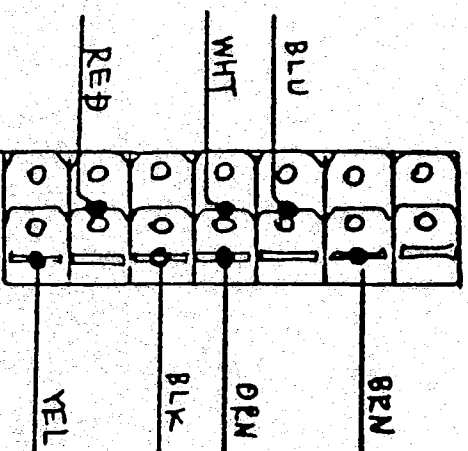
X-1037A01



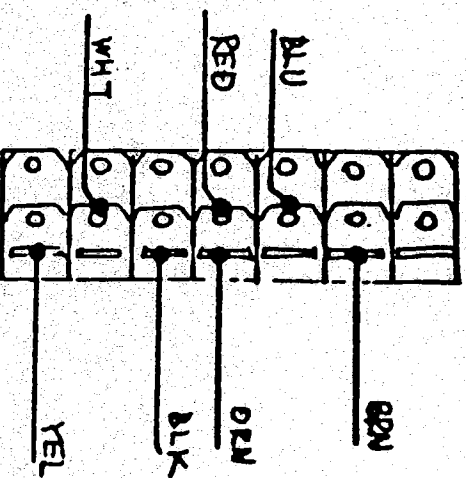
(I) 220 Volt



(II)



200 Volt



Transformer wiring diagram for GFA-555's with 8 DIGIT SERIAL #'s

common connections for all voltages

Red (fuse)

Red

Black

AC cord

front panel

120 volt

100 volt

200 volt

220 volt

240 volt

no connection

White

Blue

Black

Orange

Yellow

Brown

Repair Parts List Model GFA-555

Schematic Location	Part #	Description
D601	034 1S1588	Diode
D602	034 1S1588	Diode
D603	034 1S1588	Diode
D604	034 1S1588	Diode
D605	034 1S1588	Diode
D606	034 1S1588	Diode
D607	034 1S1588	Diode
D608	034 1S1588	Diode
D609	034 1S1588	Diode
D611	034 DS135C	Diode
D612	034 DS135C	Diode
D613	034 DS135C	Diode
D614	034 DS135C	Diode
D001	034 LTL2201A	L.E.D. (RED)
D002	034 KBCP10-04	Diode Rectifier
D003	034 KBCP10-04	Diode Rectifier
D004	034 LTL2251A	L.E.D. (YELLOW)
D005	034 LTL2231A	L.E.D. (YELLOW)
Q601	032 2SC2362-FG	Transistor
Q602	032 2SC2362-FG	Transistor
Q603	032 2SC2362-FG	Transistor
Q604	032 2SC2362-FG	Transistor
Q605	032 2SC2362-FG	Transistor
Q606	032 2SC2362-FG	Transistor
Q607	032 2SA1016-FG	Transistor
Q608	032 2SA1016-FG	Transistor
Q609	032 2SA1208-RST	Transistor
Q610	032 2SA1208-RST	Transistor
Q611	032 2SA608-FG	Transistor
Q612	032 2SA608-FG	Transistor
Q613	032 2SA1208-RST	Transistor Pre-Driver
Q614	032 2SA1208-RST	Transistor Pre-Driver
Q615	033 2SC2910-RST	Transistor Pre-Driver
Q616	033 2SC2910-RST	Transistor Pre-Driver
Q617	032 2SC536-FG	Transistor
Q618	032 2SC536-FG	Transistor
Q619	032 2SA608-FG	Transistor
Q620	032 2SA608-FG	Transistor
Q621	033 2SC2344-DE	Transistor Driver
Q622	"	Transistor Driver
Q623	033 2SA1011-DE	Transistor Driver
Q624	033 2SA1011-DE	Transistor Driver
Q625	033 2SD424-RO	Transistor Power Driver
Q626	033 2SD424-RO	Transistor Power Driver
Q627	033 2SB554-RO	Transistor Power Driver
Q628	033 2SB554-RO	Transistor Power Driver
Q629	033 2SD424-RO	Transistor Power Driver
Q630	033 2SD424-RO	Transistor Power Driver
Q631	033 2SB554-RO	Transistor Power Driver
Q632	033 2SB554-RO	Transistor Power Driver
Q633	033 2SD424-RO	Transistor Power Driver

Repair Parts List GFA-555

Input/Driver P.C. Board (A020 A)

(per channel)

Transistors:

Q1, Q2, Q3: 2SC2240, GR or BL
Q4: 2SC2912, R or S
Q5: 2SA1016, F or GR
Q6: 2SA1207, R or S
Q7: 2SA1210, R or S
Q8, Q9: 2SA970, GR or BL
Q10: 2SC2240, GR or BL

Diodes:

D3, D4, D5, D6: 1S1588 or 1N4148

Potentiometer:

P1: 41-7105, 1K ohm B.

Thermostat: 85°C

T1: 81-7005, UP 62

Capacitors:

C1: 300pF/100V Silver Mica
C2: 20pF/100V Silver Mica
C3: 47mF/100V Electrolytic
C4: 39pF/100V Silver Mica
C5: 4.7mF/63V Electrolytic
C6: 0.1mF/100V Film
C7: 1.0mF/1000V Film

Toggle Switch:

S1: 81-315, B-22JV

RCA Jack:

J1: 82-2130, T5762AA

Resistors: 1/4 Watt Metal Film (unless otherwise noted)

R1: 1K ohm
R2: 22.1K ohm
R3: 33.2 ohm
R5: 1K ohm
R6: 22.1K ohm
R7: 825 ohm
R8: 33.2 ohm
R9: 475 ohm
R10: 47.5K ohm
R11: 682 ohm
R12: 2.74K ohm
R13: 22.1K ohm
R14: 332 ohm
R15: 475 ohm
R16: 130 ohm
R17, R18: 68.2 ohm
R19, R20: 4.75K ohm
R21: 100 ohm
R22: 5.1 ohm (2 Watt) Oxide Metal Film
R23: 22.1K ohm

Output P.C. Board I

(per channel)

Transistors:

Q12: 2SC2344, E or 2SD525
Q17-Q20: 2SC424, O

Diode:

D2: DSC 30 E or 1N5405

Ceramic Capacitor:

C8: 68pF/500 volts

Resistors: 2 Watt Oxide Metal Film

R24-R27: 0.82 ohm

Thermistor:

T2: TD5-C210, 1K ohm

Fuse:

F2: 6 amp/125 volt (AGC)

Output P.C. Board II

(per channel)

Transistors:

Q11: 2SA1011, E or 2SB595
Q13-Q16: 2SB554, O

Diode:

D1: DSC 30 E or 1N5405

Ceramic Capacitor:

C9: 68pF/500 volts

Resistors: 2 Watt Oxide Metal Film

R28-R31: 0.82 ohm

Fuse:

F1: 6 amp/125 volt (AGC)

Parts Mounted on Chassis

Toroidal Transformer: 23-2035-0

Power Switch: 15 amp/250 volt, 81-314-0
S1: 12005N

Capacitors:

C01: 0.01mF/400V Spark Killer Capacitor
C02-C05: 15000mF/100V Storage/Filter Capacitor

Bridge Rectifier: 25 amps/200 volts
B1, B2: KBPC 2502

Miscellaneous:

LED (Red): SR 531D
LED (Yellow): SY 431D
LED Socket: 84-213
Film Capacitor: 0.1mF/100V
Oxide Metal Film Resistor: 3.9K ohm 2 Watt
Fuse 3AG or AGC Type: 10 amp/125 volt
Fuse Holder: 84-420
Speaker Term (Black): 86-212-0
Speaker Term (Red): 86-212-1

Repair Parts List Model GFA-555 (cont'd)

Schematic Location	Part #	Description
Q634	033 2SD424-R0	Transistor Power Driver
Q635	033 2SB554-R0	Transistor Power Driver
Q636	033 2SB554-R0	Transistor Power Driver
Q637	033 2SD424-R0	Transistor Power Driver
Q638	033 2SD424-R0	Transistor Power Driver
Q639	033 2SB554-R0	Transistor Power Driver
Q640	033 2SB554-R0	Transistor Power Driver
VR601	051 EVMHOG-2K	Semi-Fixed Variable Resistor Bias Adj.
VR602	051 EVMHOG-2K	Semi-Fixed Variable Resistor Bias Adj.
S601	064 C-4173A03	Switch, BTL SSY002
S602	063 C-4270A01	Thermostat UP-62
S603	063 C-4270A01	Thermostat UP-62
S002	061 C-4269A00	Power Switch (BLACK)
	061 C-4269A01	Power Switch (WHITE)
T001	022 T-1008G01	Power Transformer Multi Voltage
	T-1008A01	Power Transformer 120V Only
C005	044 NSK 135	Spark Killer
TH601	034 TD5C210D	Thermistor
TH602	034 TD5C210D	Thermistor
TH001	034 CL-30	Thermistor
TH002	034 CL-30	Thermistor
	066C-4225A04	Pin Jack Input
	067 3TR-2045#3	Terminal, Output (RED)
	067 3TR-2045#4	Terminal, Output (BLACK)
	013 PB4-06B00	Heat Sink
	011 PB2-08A00	Front Panel (BLACK)
	011 PB2-08A01	Front Panel (WHITE)
	067 C-4306A03	Voltage Select Terminal
	014 PB4-11A01	Upper Cover

ALTERNATE PARTS LIST

1. INPUT/DRIVER PCB ASSY.

Q1-3, Q10	2SC2240 TRANSISTOR	R1, 5	1K ohm 1/4W Metal Film
Q4	2SC2912	R2, 6, 13, 23	22.1K ohm
Q5	2SA1016	R3, 8	33.2 ohm
Q6	2SA1207	R7	825 ohm
Q7	2SA1210	R9, 15	475 ohm
Q8, 9	2SA970	R10	47.5K ohm
		R11	682 ohm
T1	UP62 THERMOSTAT 75 deg C	R12	2.74K ohm
		R14	332 ohm
		R16	130 ohm
C1	300pF/100V mica CAPACITOR	R17, 18	68.2 ohm
C2	20pF/100V mica	R19, 20	4.75K ohm
C3	47uF/100V elec.	R21	100 ohm
C4	39pF/100V mica	R23	5.1 ohm 2W Metal Oxide Film
C5	4.7uF/63V elec.		
C6	0.1uF/100V film	D3-6	1S 1588 DIODE
P1	1K ohm POTENTIOMETER	S1	TOGGLE SWITCH
		J1	RCA JACK

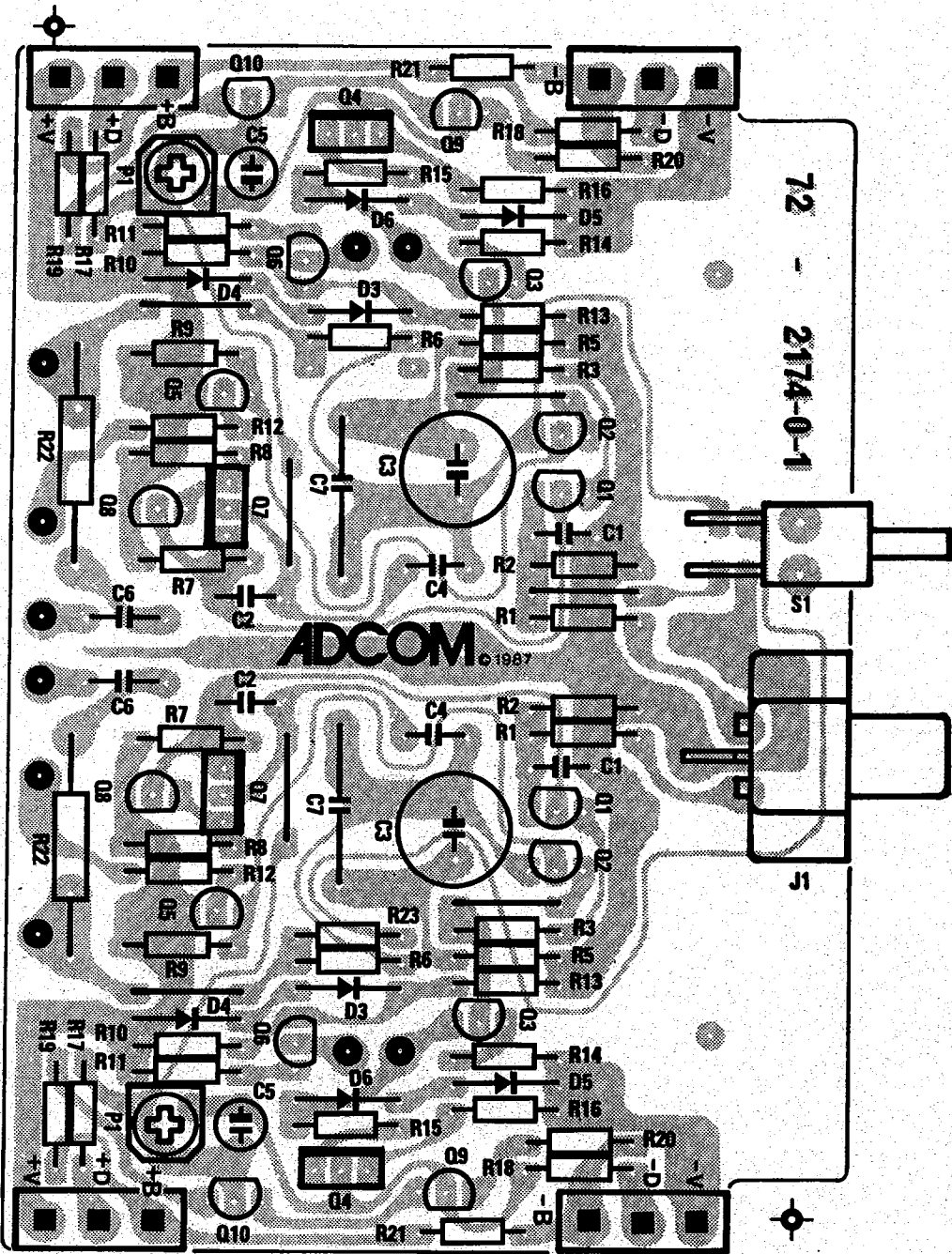
2. OUTPUT PCB ASSY (L & R).

Q12	2SC2344 TRANSISTOR	Q11	2SA1011 TRANSISTOR
Q17-20	2SD424	Q13-16	2SB554
D2	DSC 30 E DIODE	D1	DSC 30 E DIODE
C7	68pF/500V ceramic CAPACITOR	C8	68pF/500V ceramic CAPACITOR
R24-27	0.82 ohm 2W Metal Oxide Film	R28-31	0.82 ohm 2W Metal Oxide Film
T2	TD5-C210 1K ohm THERMISTOR	F1	6A 3AG FUSE
F2	6A 3AG FUSE		

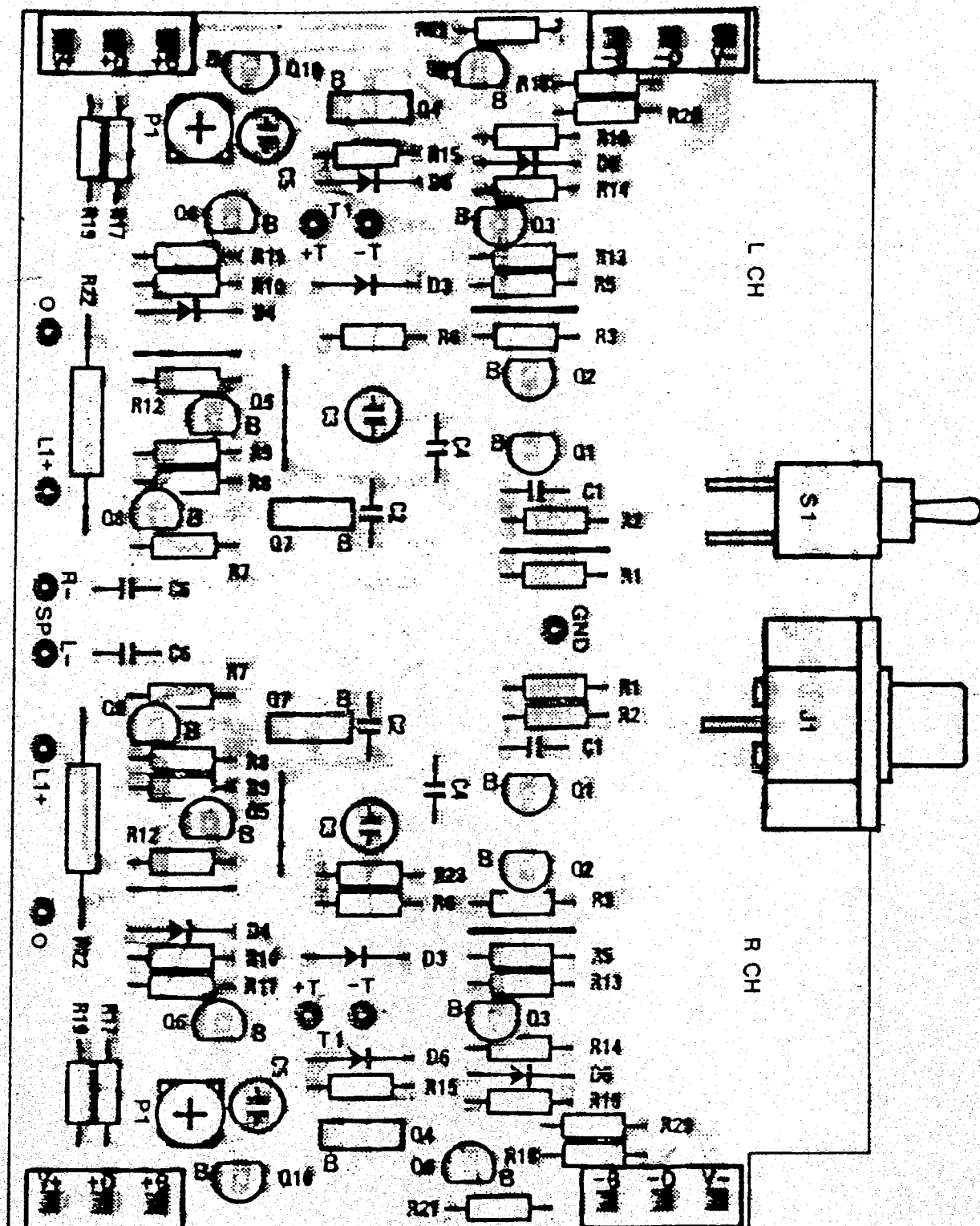
3. PARTS MOUNTED ON CHASSIS:

T1	23-2035-0 PWR TRANSFORMER	S1	POWER SWITCH
C1	0.01uF/400V Spark Killer CAP.	B1, 2	KBPC 2502 RECTIFIER
C2-5	15,000uF/100V elec. CAPACITOR	LINE FUSE	10A 3AG FUSE

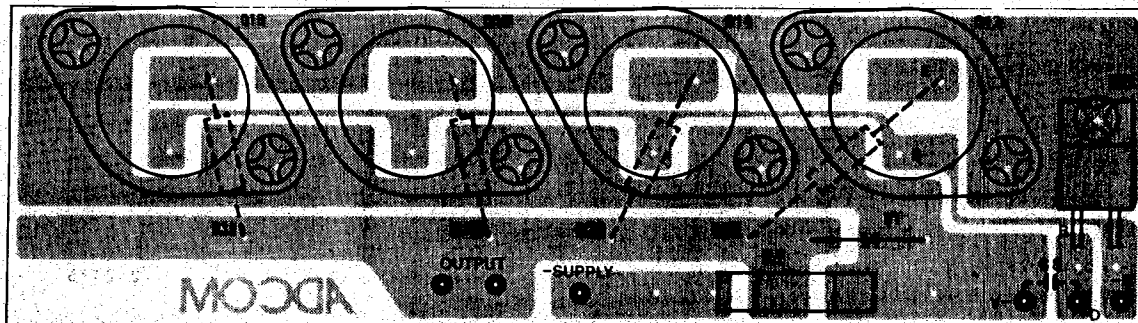
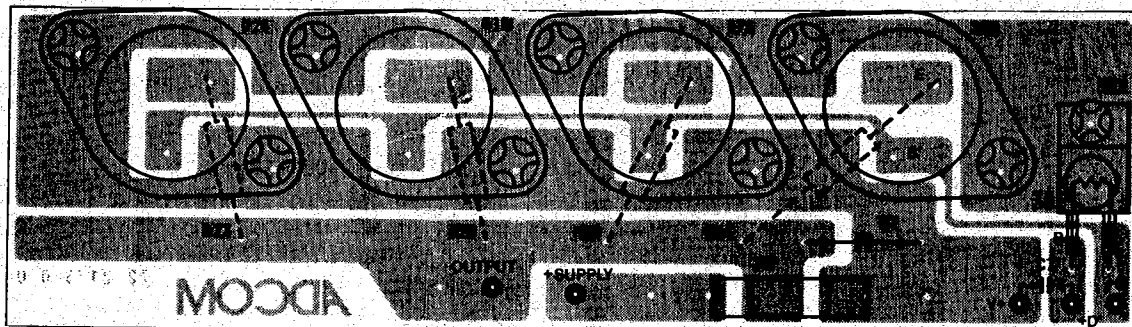
Front End Printed Circuit Board GFA-555



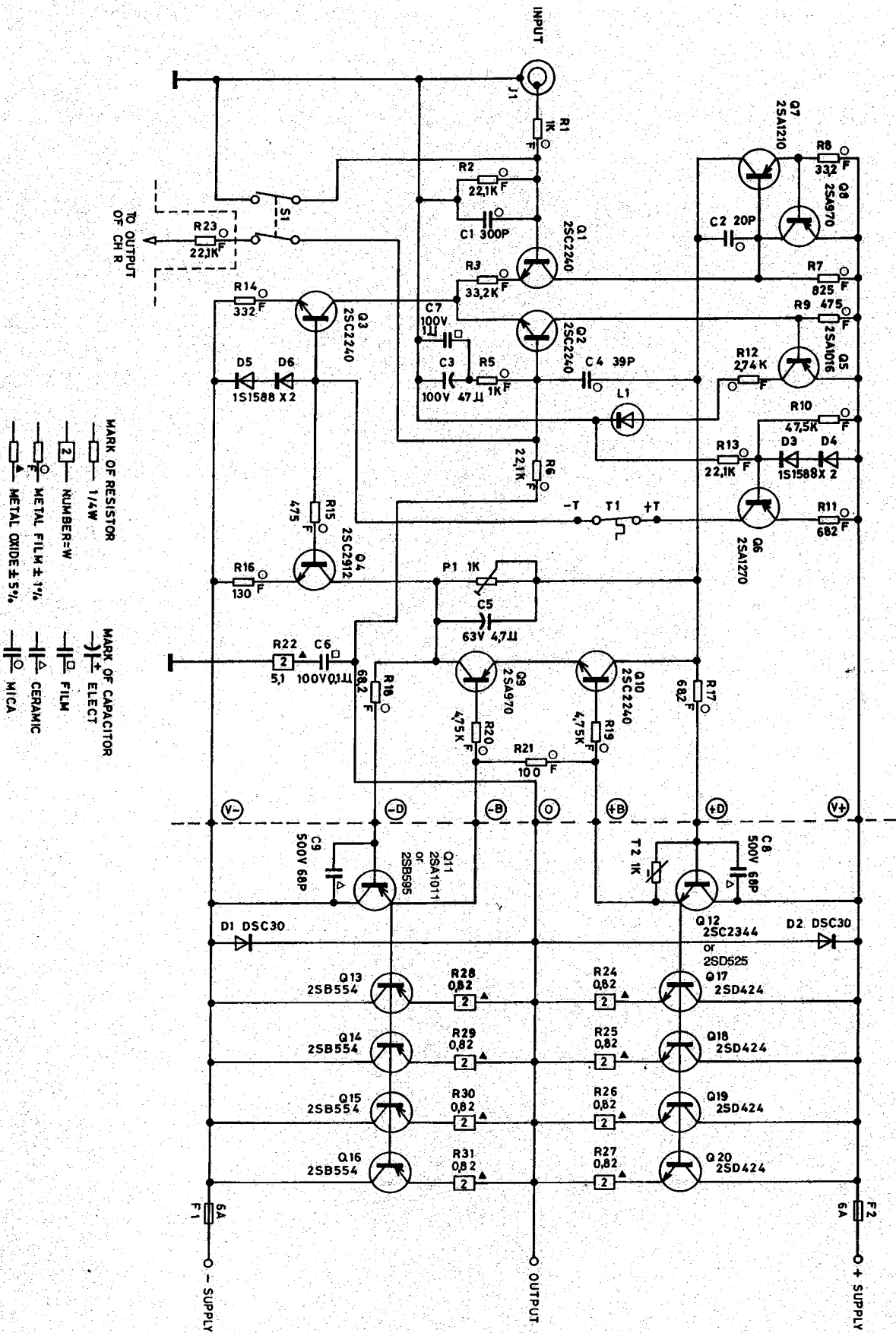
EARLIER UNITS



Output Printed Circuit Boards GFA-555



Schematic Diagram GFA-555 (one channel shown)



The schematic diagram illustrates a power supply circuit for a radio receiver, featuring two identical channels of full-wave rectification. Each channel starts with an AC input from a 120V AC source, passing through a 10A fuse (F01) and a 10A 125V capacitor (C01). The input is then connected to a terminal block (J01) with terminals for 120V, 20V, 0V, and 0V. The 120V line is connected to the primary of a transformer (T01) with a 23-2325-0-23V tap. The secondary of the transformer is connected to two diodes (D01, D02, BR252) in a full-wave bridge rectifier configuration. The rectified output is filtered by a 15000 μF capacitor (C02, C03) and a 100V resistor (R01, R02, 3.9K). The output is then connected to a terminal block (J02, J03) with terminals for +B, -B, and 81V. The output is also connected to a terminal block (J01) with terminals for 120V, 20V, 0V, and 0V. The output is connected to a terminal block (J01) with terminals for 120V, 20V, 0V, and 0V. The output is connected to a terminal block (J01) with terminals for 120V, 20V, 0V, and 0V.