SERVICE MANUAL

ADCOM®

details you can hear

CAR AUDIO POWER AMPLIFIER

GFA-4304

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ADCOM

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Welcome To ADCOM Car Audio

The **ADCOM GFA-4000** series car amplifiers offer the consumer a new level of sound quality in the mobile environment. Audiophile sound quality is now unleashed to the streets in what **ADCOM** calls "***The Ultimate Power Trip***".

In servicing the **GFA-4000** series amplifiers you will see the straight forward, bare bones, high quality construction, and attention to detail that has been engineered into this line of power amplifiers. You will see that most repairs are very straight forward, and easily located.

Attention to the hook-up of these amplifiers is essential, as the amplifier will not perform optimally if not configured properly. The biggest difference you will find in hook-up of these amplifiers is the input configuration. The **GFA-4000** series uses a **Balanced Input** configuration. As you know this reduces noise induced into the amplifier at the input. For more information on the hook-up, and on the theory behind the **Balanced Input** configuration, please refer to the **Technical Details Manual.**

The **GFA-4304** amplifier produces **30 watts** RMS per 4 channels into a 4 Ω load. The amplifier can be configured to run in a bridged mode, and is stable into a 1 Ω load. The input to the amplifier consists of two (2) XLR connectors, in a **Balanced Configuration.** There is one (1) XLR connectors for channels A & B and one for channels C & D. The pin configuration for the XLR connector is: Pin 1 - Ground; Pin 2 - "+" Right Ch; Pin 3 - "-" Right Ch; Pin 4 - "+" Left Ch; Pin 5 "-" Left Ch. The amplifiers with XLR cables are more effectively utilized when used with the **GFI-4400/4600**, they allow polarity inversion to be done with a pin jumper, and provide a conversion from unbalanced RCA's to balanced XLR connectors. The GFI is also useful for configuring in Mono-Stereo set-up's. The GFI-4400 provides balance line conversion and polarity selection. The GFI-4600 provides all the features available in the GFI-4400, as well as the addition of a two way crossover. In lieu of a GFI unit, the **GFY-1** and **GFY-4** cables may be used to configure the unit as desired. The GFY-1 is used for Mono bridging, while the GFY-4 is used for stereo operation. Refer to page 4 for wiring configuration.

The **GFA-4304** provides level controls for the positive input, these should be set at full during testing. When bridging the amplifier, the input is applied to the negative input of one channel (i.e. - Ch A), and the positive channel of the other channel (i.e. - Ch B). The Speaker (or load) is then put across the positive speaker terminals of channels A & B (i.e. - from Ch A's "+" to Ch B's "+").

Service Notes:

- ◊ The enclosed schematics are version 1.5, and include all current updates to the original design. If you encounter changes in the circuit on a unit you are servicing, please call **ADCOM Service**, at (908)390-1130, to find out if the changes are factory authorized, if the unit was modified by a third party, or if the unit is from a production run prior to the implementation of the printed updates.
- ◊ When replacing parts in the **GFA-4000** series amplifiers, always use the same type, and rating.
- ◊ When replacing the **MOSFET** devices, use only the same type of devices removed. The **MOSFET** devices also **MUST** be matched in the output stages, and front end circuits. Use care as these are static sensitive devices, and require all special handling precautions associated with static sensitive devices.

Remember that **ADCOM Service** is available from 9:00 am to 5:00 pm for inquires, or you can fax us at (908)390-9152.

K.Karagan 6/1/95

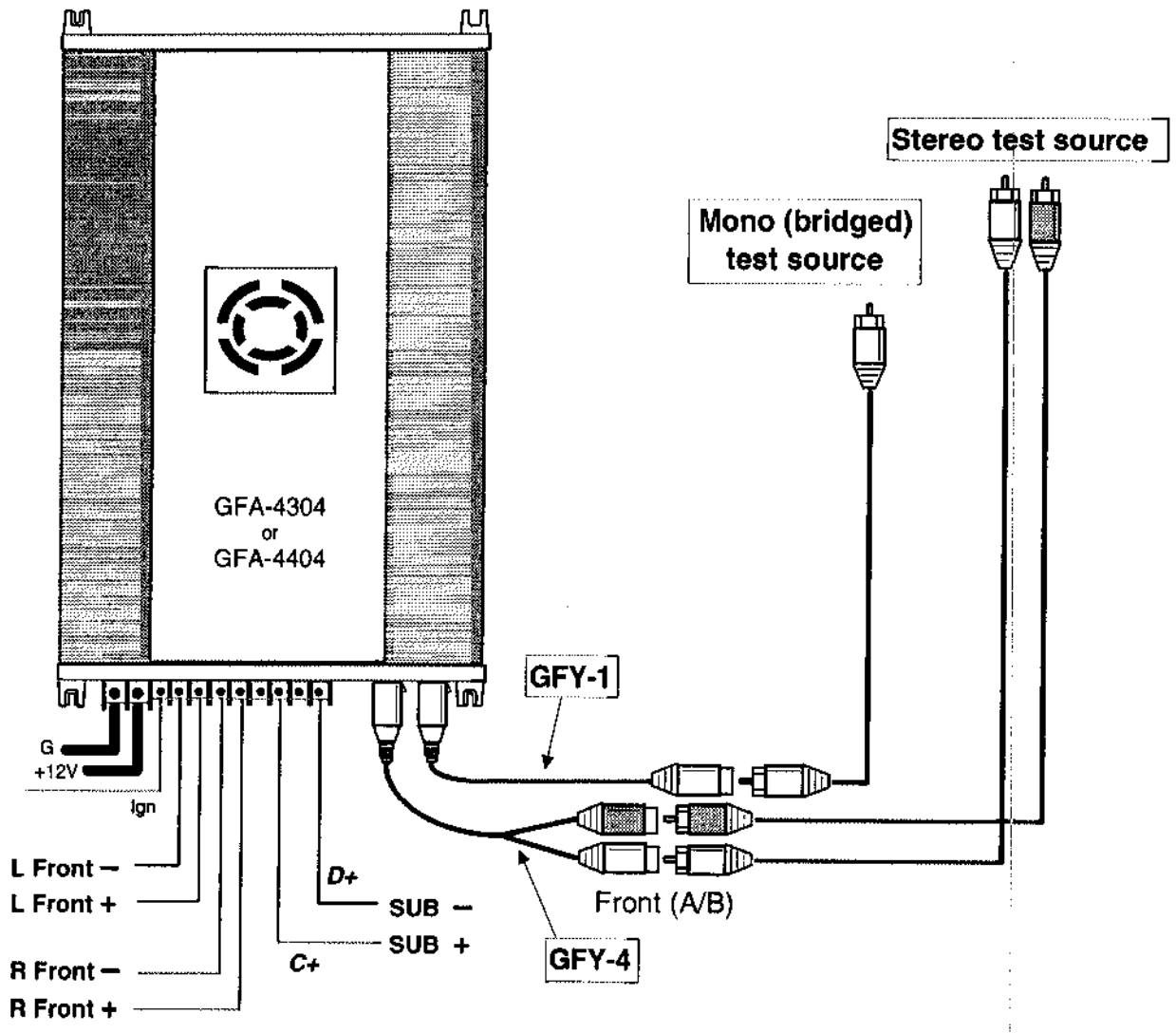
GFA-4304 SPECIFICATIONS

POWER OUTPUT	**4 Ω STEREO** 30 Watts X 4 at < 0.1% THD* **2 Ω STEREO** 60 Watts X 4 at < 0.25% THD* **4 Ω MONO** 100 Watts X 2 at < 0.25% THD*
FREQUENCY RESPONSE	0 Hz to 50 KHz +0dB, -3dB
S/N RATIO:	> 100 dB
SEPARATION;	> 90 dB
DAMPING FACTOR:	> 350 (20Hz-20KHz)
INPUT SENSITIVITY:	400 millivolts to 2 Volts
INPUT IMPEDANCE:	25,000 Ω (at maximum sensitivity, per leg)
IDLE CURRENT:	6 Amperes
LINE FUSE SIZE:	ATC 30 Amp
DIMENSIONS:	9.75"W x 14.75"L x 2.3"H
SHIPPING WEIGHT:	12 lbs. (5.5kg)

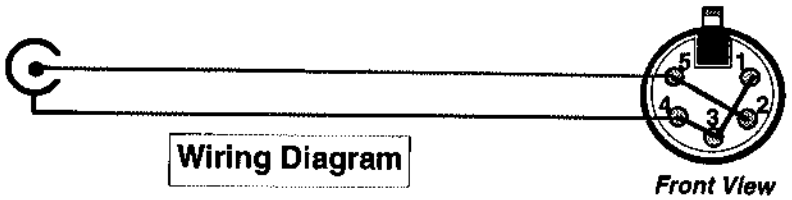
GFA-4304 FEATURES

- ◊ Output device compliment: 8 MOSFETs (180 watt each) with 1440 watt and 250 ampere cumulative peak rating.
- ◊ 27,600 uFarads of power supply storage capacitance.
- ◊ Rail transformer rated at 700 watt supply.
- ◊ Class "A" operation to the MOSFETs. All gain stages up to the outputs are operated in pure single-ended (asymmetric) Class "A", the purest operational mode.

WIRING CONFIGURATION



APPLICATION: Adapts XLR(2 ch.) input to accept mono RCA-type input and run amp in *MONO*



1 = Shield (Drain)
2 = A+ or C+ (Hot)
3 = A- or C- (Cold)
4 = B+ or D+ (Hot)
5 = B- or D- (Cold)

GFA-4304 PARTS LIST

PC BOARD LOCATION	ADCOM PART #	ITEM DESCRIPTION
	RESISTORS	
R1	27004601	4.75 KΩ ¼watt metal-film Space-Miser
R2, 4	27004201	10 KΩ ¼watt metal-film Space-Miser
R3	27004051	1 KΩ ¼watt metal-film Space-Miser
R101, 103, 106, 108, 336 R801, 803, 805, 807, 825 R809, 811, 817, 819, 827 R402, 403, 404, 413, 416 R502, 503, 504, 513, 516 R602, 603, 604, 613, 616 R702, 703, 704, 713, 716	27001060	220 Ω ¼ watt 5% Carbon Film
R102, 324 R405, 420, 505, 520 R605, 620, 705, 720	27001010	10 KΩ ¼ watt 5% Carbon Film
R104	27002690	2.7 Ω 1 watt 5% Metal Oxide
R105	27003195	47 Ω 2 watt 5% Metal Oxide
R107, 313, 332, 335	27001270	100 Ω ¼ watt 5% Carbon Film
R109	27002680	3.74 Ω ¼ watt 1% Metal Film
R314, 322, 323, 326 R408, 411, 508, 511 R608, 611, 708, 711	27001280	1 KΩ ¼ watt 5% Carbon Film
R319	27002700	2.7 KΩ ¼ watt 5% Carbon Film
R325	27001190	4.7 KΩ ¼ watt 5% Carbon Film
R327 R406, 414, 506, 514 R606, 614, 706, 714	27001070	2.2 KΩ ¼ watt 5% Carbon Film
R328	31001004	60° Thermistor KC004P/100-0065 (turn off)
R329	27001460	7.5 KΩ ¼ watt 5% Carbon Film
R330	27001150	3.3 KΩ ¼ watt 5% Carbon Film
R333	27001200	47 Ω ¼ watt 5% Carbon Film
R334	27001110	22 Ω ¼ watt 5% Carbon Film
R337	31001001	30° Thermistor KC001P/100-0064 (fan)
R401, 501, 601, 701	27001235	680 Ω ¼ watt 5% Carbon Film
R407, 419, 507, 519 R607, 619, 707, 719	27004080	3.01 KΩ ¼ watt 1% Metal Film
R409, 421, 509, 521 R609, 621, 709, 721	27001020	100 KΩ ¼ watt 5% Carbon Film
R410, 412, 510, 512 R610, 612, 710, 712	27004390	8.25 KΩ ¼ watt 1% Metal Film
R415, 515, 615, 715	27001065	4.7 Ω ¼ watt 5% Carbon Film
R417, 517, 617, 717	27003300	10 Ω 2 watt 5% Metal Oxide Film
R418, 518, 618, 718	27002495	24.9 KΩ ¼ watt 1% Metal Film

GFA-4304 PARTS LIST

TRANSISTORS		
Q1	33000450	ZTX450 1 watt NPN
Q2	33000550	ZTX550 1 watt PNP
Q101, 102, 103, 104	33004400	IRFP-044 N-MOSFET
Q303, 304	33002340	IRFZ-34 N-MOSFET
Q305	33001030	EC103B SCR
Q307	33000092	MPS-A92 300 volt 500 mA PNP
Q310	33000061 33002900	TIP61CP 100 volt 500mA NPN *or* TIP29TC NPN
Q401, 402, 501, 502 Q601, 602, 701, 702	33009610	IRF-9610 P-MOSFET
Q403, 406, 407 Q503, 506, 507 Q603, 606, 607 Q703, 706, 707	33000610	IRF-610 N-MOSFET
Q404, 405, 504, 505 Q604, 605, 704, 705	33009210	IRFP-9210 P-MOSFET 4-pin DIP
Q408, 508, 608, 708	33000042	MPS-A42 300 volt 500 mA NPN
Q801, 805, 809, 813	33001400	IRFP-140 N-MOSFET
Q802, 806, 810, 814	33000914	IRFP-9140 P-MOSFET
CAPACITORS		
C1	12002020	.01uF 250 volt ceramic disc capacitor
C101, 102, 104, 105	12005391	2200uF 35 radial electrolytic capacitor
C103, 302	12002025	.01uF 100 volt poly foil capacitor
C106, 306	12001125	.0047uF 100 volt poly capacitor
C107, 108, 304	12005380	47uF 25 volt electrolytic capacitor
C110, 111, 112, 113	12005560	4700uF 16 volt electrolytic capacitor
C301, 305	12001375	330uF 50 volt electrolytic capacitor
C303,308, 309 C401, 501, 601, 701	12005650	4.7uF 16 volt electrolytic capacitor
C307	12005310	470uF 16 volt electrolytic capacitor
C310	12005420	1000uF 16 volt electrolytic capacitor
C311 (@Q310)	12005270	47uF 16 volt electrolytic capacitor
C402, 502, 602, 702	12001505	.15 uF 100 volt poly foil capacitor
C403, 404, 503, 504 C603, 604, 703, 704	12005366	33pF 100 volt ceramic disc capacitor
C405, 505, 605, 705	12005350	220uF 25 volt electrolytic capacitor
C406, 506, 606, 706	12002095	47pF 100 volt ceramic disc capacitor
POTENTIOMETERS		
P315	35001275	200 Ω 3/8" Horizontal Mount(switching freq.)
P403, 503, 603, 703	35001290	25 KΩ 3/8" Vertical Mount (sensitivity)
P401, 402, 501, 502 P601, 602, 701, 702	35001285	5 KΩ 3/8" Horizontal Mount(bias & dc offset)

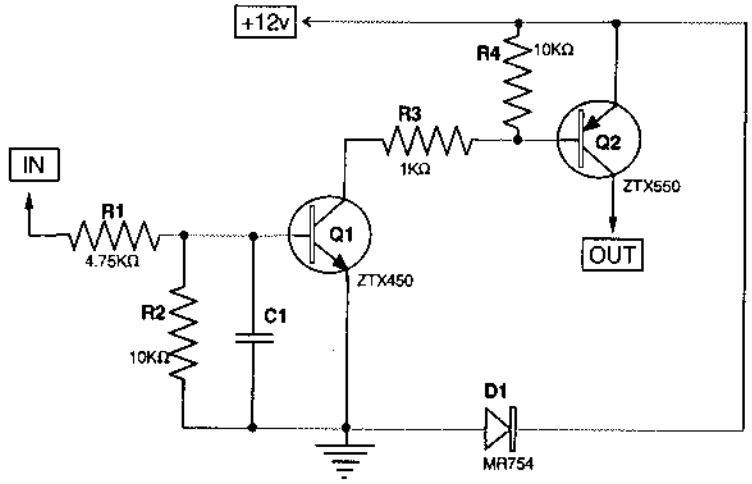
GFA-4304 PARTS LIST

DIODES		
D1	16000754	MR754 50 volt 6 amp high surge
D101	16001610	16CPF10 dual common cathode
D102	16001611	16JPF10 dual common anode
D103, 104, 105, 106 D403, 405, 503, 505 D603, 605, 703, 705	16004735	1N4735 6.2 volt 1 watt Zener
D301, 302, 303, 304	16004935	1N4935 1 amp fast recovery
D305	16004744	1N4744 15 volt 1 watt Zener
D401, 402, 404, 406 D501, 502, 504, 506 D601, 602, 604, 606 D701, 702, 704, 706	16004738	1N4738 8.2 volt 1 watt Zener
D407, 507, 607, 707	16004148	1N4148 100 mA signal diode
CHASSIS PARTS		
TOP	13003041 13003043	Black 4304 Top Cover White 4304 Top Cover
BOTTOM	13003042 13003044	Black 4304 Bottom Chassis White 4304 Bottom Chassis
ENDCAP: 4 Channel	13000002 13000005	Black 2-Ch. *Connector-End* Endcap White 2-Ch. *Connector-End* Endcap
ENDCAP: Vented	13000003 13000006	Black *Vented-End* Endcap White *Vented-End* Endcap
FAN COVER	13003046 13003047	Black 4304 ADCOM Fan Cover White 4304 ADCOM Fan Cover
PERF SLEEVE	13003045	Black 4304 Perforated Vent Sleeve
HEAT SINK	13000010	4304 Tunnel Heat Sink
INS. SHEET	13000016	4304 Chassis Insulator Sheet
LONG 4304 STICKER"	LABEL31	Long "*model GFA-4304*" Sticker
MISCELLANEOUS		
XLR101, 102	22001280	5-pin chassis-mount XLR/Molex® Harness
J101, 102	22001290	6-pin PC-mount Molex® connector
FAN1	13001000	100mm DC Cooling Fan
TERM1, 2	30001100	Large (7/16") Gold Power Terminal
TERM3, 4, 5, 6, 7 TERM8, 9, 10, 11	30001200	Small (5/16") Gold Speaker Terminal
LG. SET SCREW	30001101	7/16" Hex Set Screw for Large Terminals
SM. SET SCREW	30001201	5/16" Hex Set Screw for Small Terminals
FH-ATC	20002050	ATC Fuse Harness Loop
FUSE	19003000	30 Ampere ATC Fuse
PCB-TO*	36001250	Turn-On PC Board

GFA-4304 PARTS LIST

INTEGRATED CIRCUITS		
U101, 301	21003525	SG3525 PWM Controller
U302	21007809	LM7809CT 9 volt regulator
LED's		
LED101, 103 LED401, 501, 601, 701	16002130	Green 5mm T1¾
LED302	16002120	Red 5mm T1¾
TRANSFORMERS		
T101	24001434	4304 Rail transformer
T301	24003434	4304 Regulated supply transformer

*Turn-On PC Board Schematic



NOTES

BIAS ADJUSTMENT:

To set bias levels, connect the amplifier to +12 volts power with an ammeter in line and let the amp idle. The GFA-4304 should idle at 3 amperes. If adjustment is necessary, set bias level pots (P401, P501, P601 & P701) fully CCW. Then adjust channel A (P401) for 1.5 amps. Then adjust channel B (P501) until the total draw is 3 amperes. Repeat for channels C and D until total draw is 6 amperes.

The TURN-ON PCB:

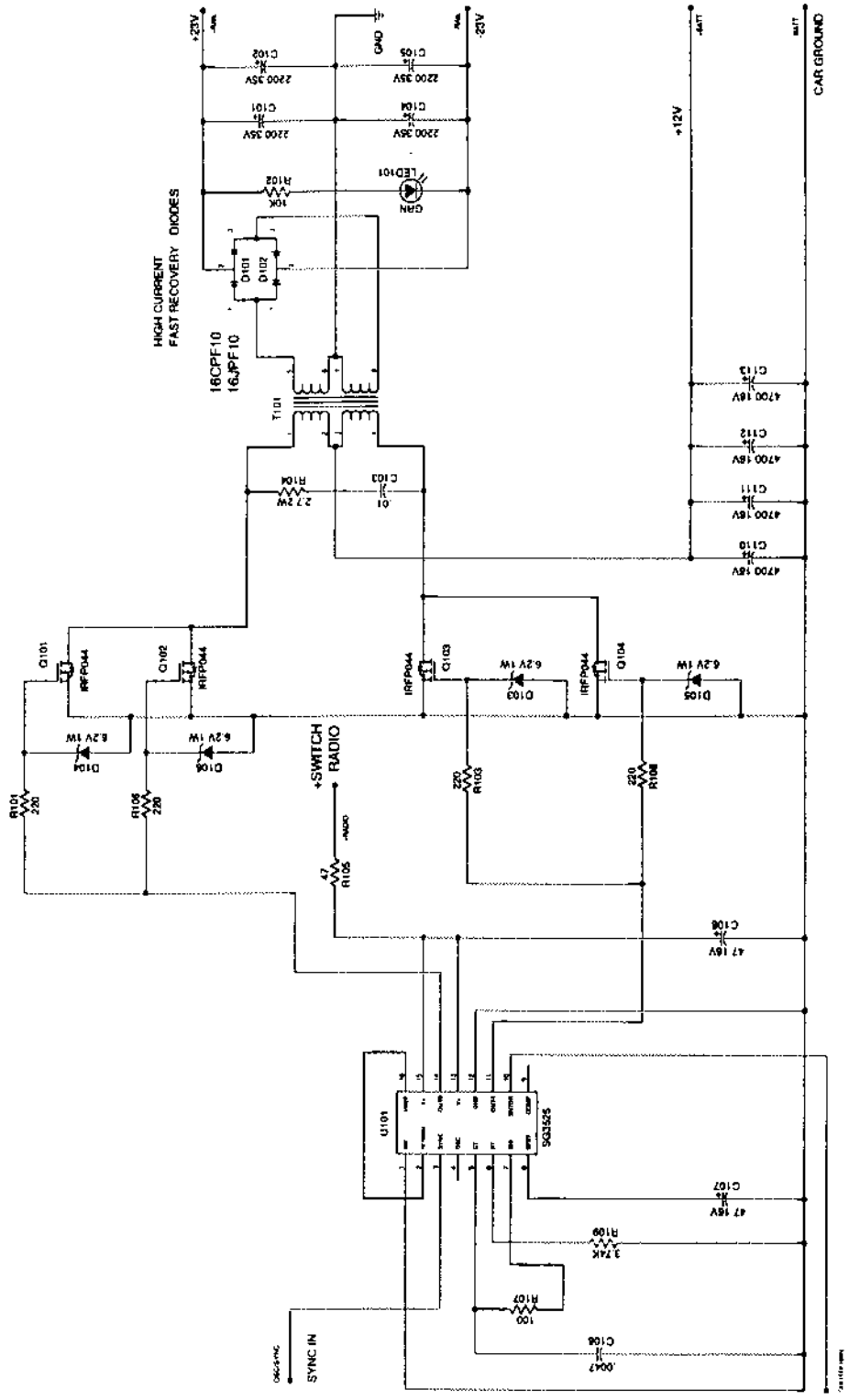
The ancillary Turn-On PCB is a small board connected (via screws) to TERM1 (Ground), TERM2 (+12V), and TERM3 (IGN). It lowers the turn-on circuit draw from the IGN terminal to approximately 1 mA. It also adds a reverse-polarity protection diode. Accidentally reversing the power and ground connections will blow an in-line fuse.

POSSIBLE COMPONENT VALUE DIFFERENCES:

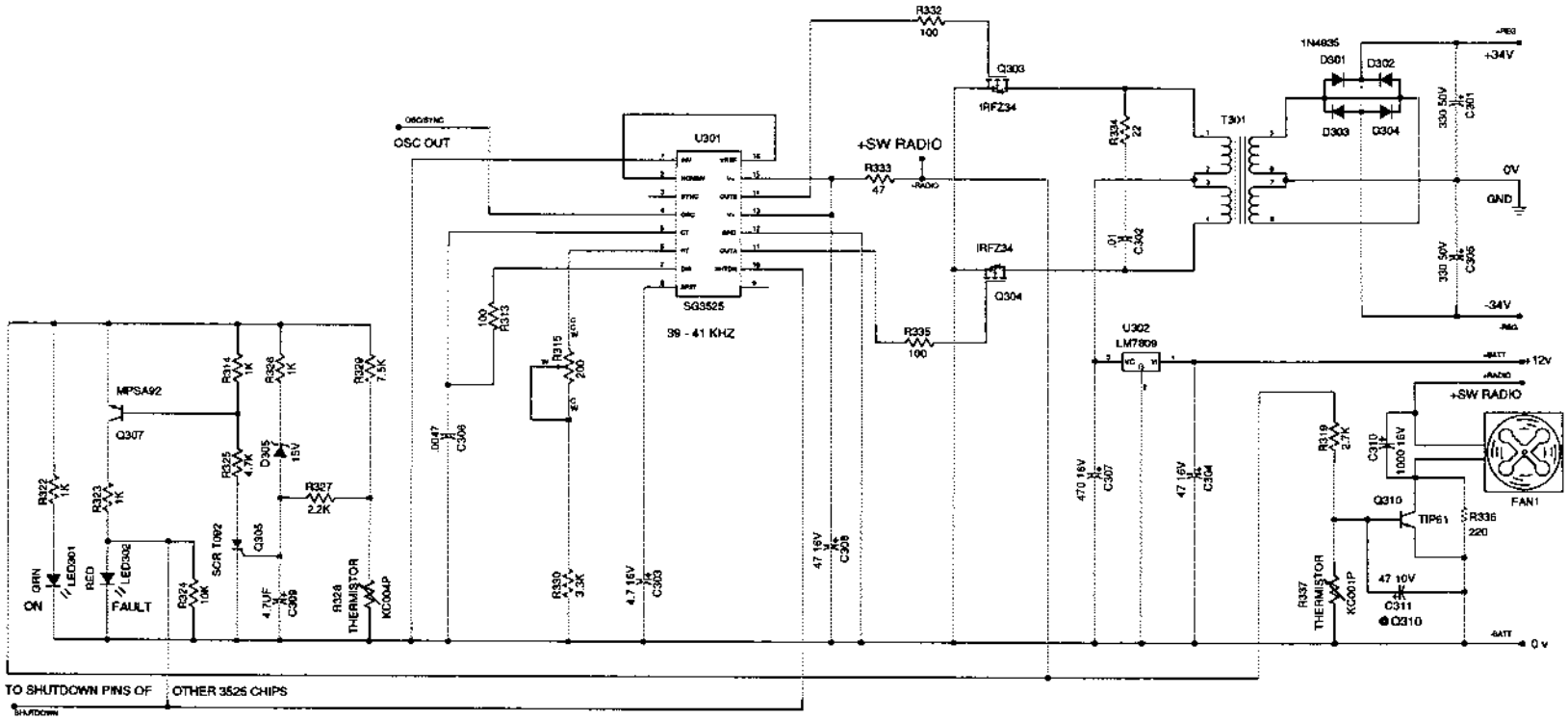
In some amplifiers, you may find C403, 503, 603, 703 & C404, 504, 604 and 704 to be 10pF capacitors. They should be 33pF capacitors as stated in the parts list.

In some units you may find the voltage regulator (U302) to be a KIA7809P instead of the LM7809CT. It should be the LM7809CT

DJG695

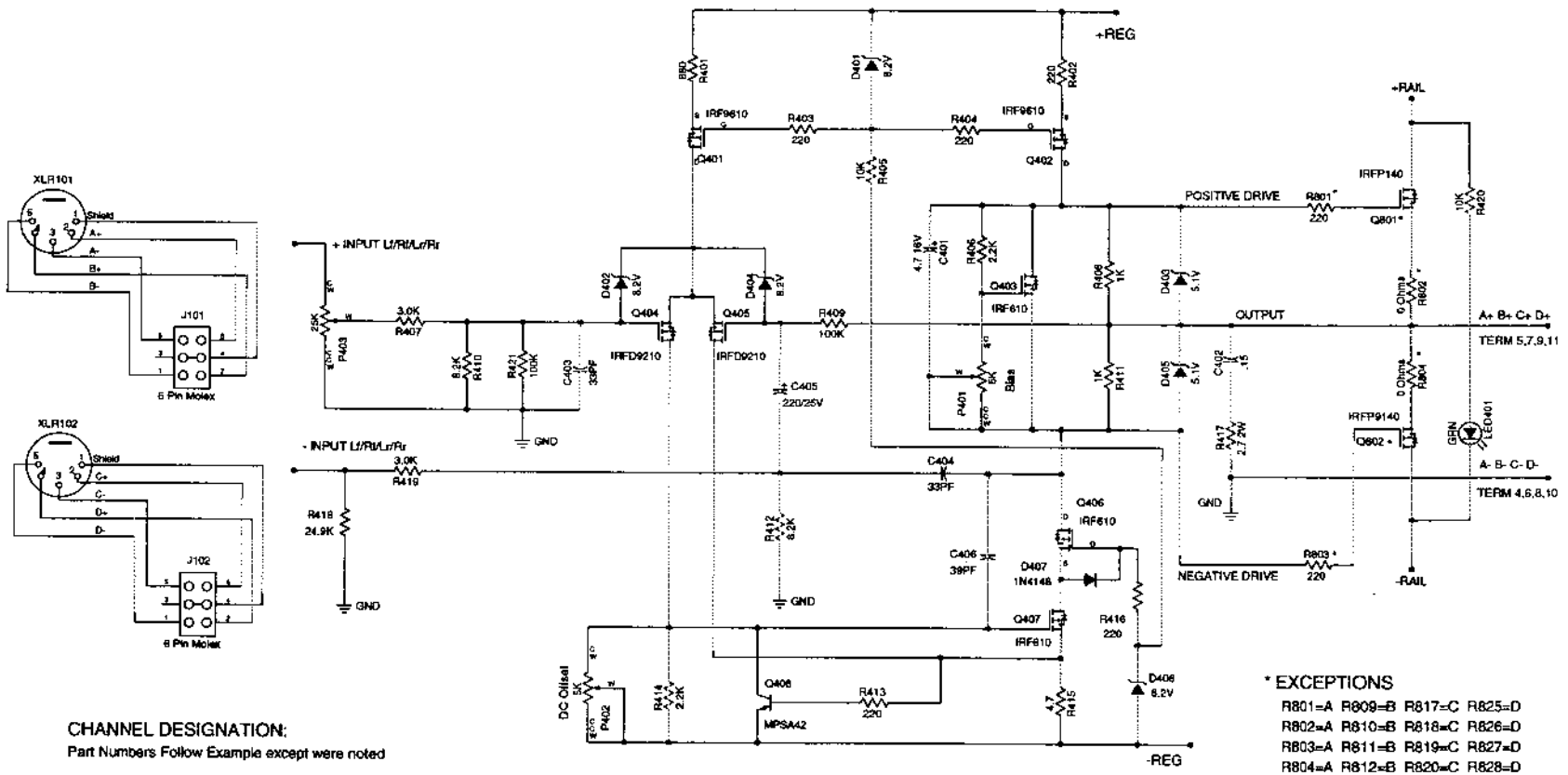


GFA-4304 RAIL SUPPLY



GFA-4304 REGULATED SUPPLY

Title	GFA-4304 Car Amplifier Regulated Power Supply		
Size C	Number Revised 6/1/95	By D.Grebe	Rev 1.5
Date 03/01/93		Drawn by PASS	
Filename 4304.S02		Sheet 2 of 3	



CHANNEL DESIGNATION:

Part Numbers Follow Example except were noted

R4xx, C4xx, D4xx = Channel A (Lf)
R5xx, C5xx, D5xx = Channel B (Rf)
R6xx, C6xx, D6xx = Channel C (Lr)
R7xx, C7xx, D7xx = Channel D (Rr)

* EXCEPTIONS

R801=A R809=B R817=C R825=D
R802=A R810=B R818=C R826=D
R803=A R811=B R819=C R827=D
R804=A R812=B R820=C R828=D
Q801=A Q805=B Q809=C Q813=D
Q802=A Q806=B Q810=C Q814=D

GFA-4304 AMPLIFIER SECTION

Title	GFA-4304 Car Amplifier Amplifier Section A, B, C & D	
Size: C	Number: Revised 6/1/95 By D.Grebe	Rev: 1.5
Date: 03/01/93	Drawn by: PASS	
Filename: 4304.S03	Sheet 3 of 3	