

SERVICE MANUAL



CAR AUDIO POWER AMPLIFIER GFA-4402

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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-4402** amplifier produces **40 watts** RMS 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 four (4) RCA connectors, in a **Balanced Configuration**. There are 2 RCA connectors per channel, one for the positive input and one for the negative (out of phase) input. The other balanced mode which is called **Passively Terminated Balanced** Configuration, has the signal applied to the positive input, and the "signal" ground (chassis) of the head unit applied to the negative input. The amplifier can also be used in the bridged mode or the **MoSt™** (Mono + Stereo) configuration. Basic diagrams are displayed on page 4. For more detailed configurations, refer to the **Owner's Manual** or the **Technical Details Manual**.

The **GFA-4402** 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 positive input of one channel (i.e. - Ch A), and the negative channel of the other channel (i.e. - Ch B). The Speaker (or load) is then connected as so; "A+" is the positive lead, and "B+" is the negative lead. *RCA shorting plugs must be inserted into all unused input jacks for proper operation.*

Service Notes:

- ◇ The enclosed schematics are version 1.4, 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. Also **see page 8 for most common differences**.
- ◇ 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 EST for inquires, or you can fax us at (908)390-9152.

This service literature may change at any time without notice.

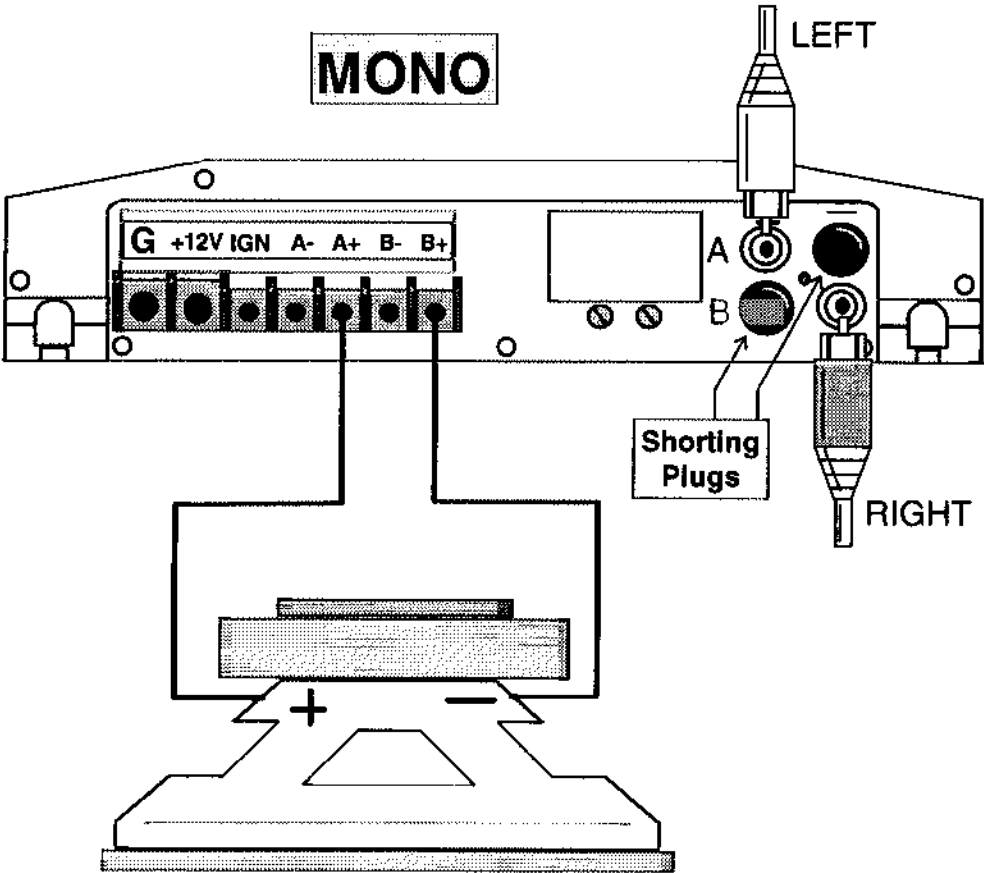
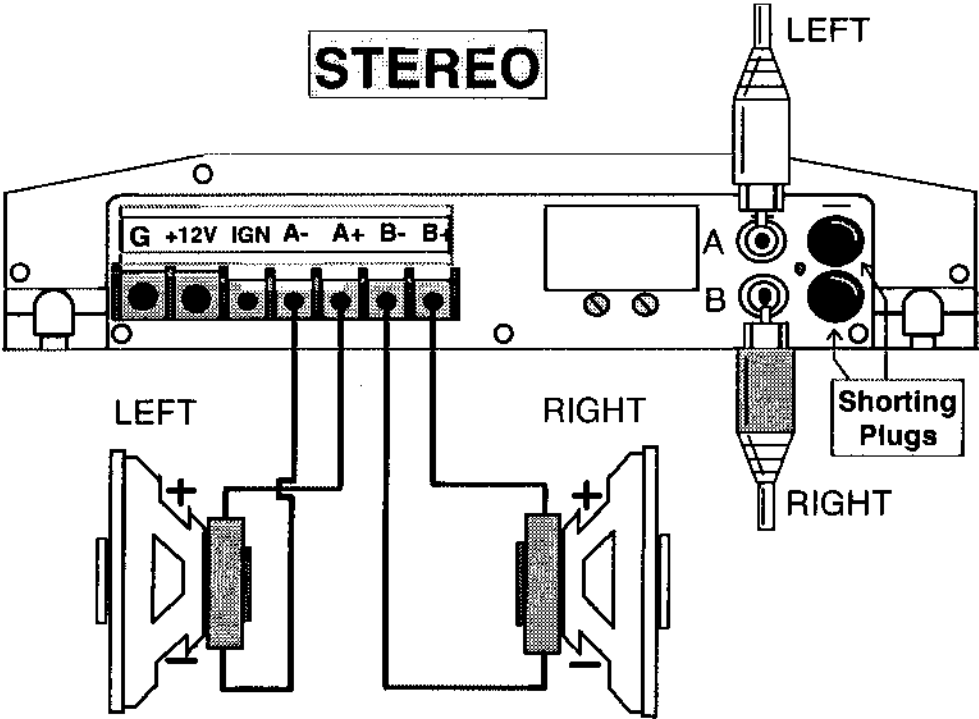
GFA-4402 SPECIFICATIONS

POWER OUTPUT	4 Ω STEREO 40 Watts X 2 at < 0.1% THD* 2 Ω STEREO 80 Watts X 2 at < 0.25% THD* 4 Ω MONO 140 Watts X1 at < 0.25% THD*
FREQUENCY RESPONSE	0 Hz to 50 KHz +0dB, -3dB
S/N RATIO:	> 100 dB
SEPARATION;	> 90 dB
DAMPING FACTOR:	> 600 (20Hz-20KHz)
INPUT SENSITIVITY:	400 millivolts to 2 Volts
INPUT IMPEDANCE:	25,000 Ω (at minimum sensitivity, per leg)
IDLE CURRENT:	3 Amperes
LINE FUSE SIZE:	ATC 30 Amp
DIMENSIONS:	9.75"H x 12.75"L x 2.3"W
SHIPPING WEIGHT:	10 lbs. (4.6kg)

GFA-4402 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.

BASIC HOOKUP CONFIGURATIONS



GFA-4402 PARTS LIST

PC BOARD LOCATION	ADCOM PART #	ITEM DESCRIPTION
RESISTORS		
R1	27004601	4.75 K Ω ¼watt metal-film Space-Miser
R2, 4	27004201	10 K Ω ¼watt metal-film Space-Miser
R3	27004051	1 K Ω ¼watt metal-film Space-Miser
R101, 103, 106, 336 R801, 803, 805, 807 R809, 811, 813, 815 R402, 403, 404, 413, 416 R502, 503, 504, 513, 516	27001060	220 Ω ¼ watt 5% Carbon Film
R102, 324 R405, 420, 505, 520	27001010	10 K Ω 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	27001280	1 K Ω ¼ watt 5% Carbon Film
R319	27002700	2.7 K Ω ¼ watt 5% Carbon Film
R325	27001190	4.7 K Ω ¼ watt 5% Carbon Film
R327 R406, 506	27001070	2.2 K Ω ¼ watt 5% Carbon Film
R328	31001004	60° Thermistor KC004P/100-0065 (turn off)
R329	27001460	7.5 K Ω 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	27001235	680 Ω ¼ watt 5% Carbon Film
R407, 419, 507, 519	27004080	3.01 K Ω ¼ watt 1% Metal Film
R409, 421, 509, 521	27001020	100 K Ω ¼ watt 5% Carbon Film
R410, 412, 510, 512	27004390	8.25 K Ω ¼ watt 1% Metal Film
R414, 514	27001150	3.3 K Ω ¼ watt 5% Carbon Film
R415, 515	27001065	4.7 Ω ¼ watt 5% Carbon Film
R417, 517	27003300	10 Ω 2 watt 5% Metal Oxide Film
R418, 518	27002495	24.9 K Ω ¼ watt 1% Metal Film
POTENTIOMETERS		
P315	35001275	200 Ω 3/8" Horizontal Mount (switching freq.)
P403, 503	35001290	25 K Ω 3/8" Vertical Mount (sensitivity)
P401, 402, 501, 502	35001285	5 K Ω 3/8" Horizontal Mount (bias & dc offset)

GFA-4402 PARTS LIST

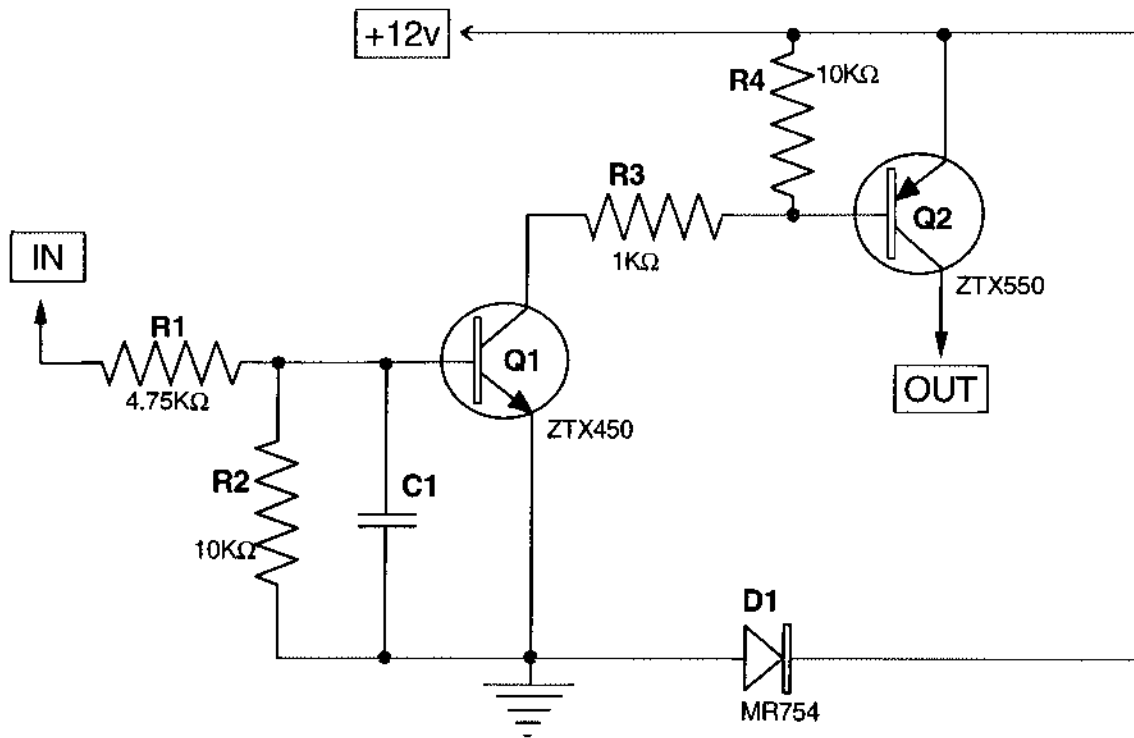
CAPACITORS		
C1	12002020	.01uF 250 volt ceramic disc capacitor
C101, 102, 104, 105	12005391	2200uF 35 radial electrolytic capacitor
C103, 402	12002025	.01uF 100 volt poly foil capacitor
C106, 306	12001125	.0047uF 100 volt poly capacitor
C107, 108, 304	12005380	47uF 25 volt electrolytic capacitor
C110, 111, 112, 113	12005560	4700uF 16 volt electrolytic capacitor
C301, 305	12001375	330uF 50 volt electrolytic capacitor
C303,308, 309 C401, 501	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	12001505	.15 uF 100 volt poly foil capacitor
C403, 404, 503, 504	12005366	33pF 100 volt ceramic disc capacitor
C405, 505	12005350	220uF 25 volt electrolytic capacitor
C406, 506	12002095	47pF 100 volt ceramic disc capacitor
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	33009610	IRF-9610 P-MOSFET
Q403, 406, 407 Q503, 506, 507	33000610	IRF-610 N-MOSFET
Q404, 405, 504, 505	33009110	IRFP-9110 P-MOSFET 4-pin DIP
Q408, 508	33000042	MPS-A42 300 volt 500 mA NPN
Q801, 803, 805, 807	33001400	IRFP-140 N-MOSFET
Q802, 804, 806, 808	33000914	IRFP-9140 P-MOSFET
TRANSFORMERS		
T101	24001442	4402 Rail transformer
T301	24003442	4402 Regulated supply transformer
INTEGRATED CIRCUITS		
U101, 301	21003525	SG3525 PWM Controller
U402	21007809	LM7809CT 9 volt regulator
LEDs		
LED101, 103, 401	16002130	Green 5mm T1 $\frac{3}{4}$
LED402	16002120	Red 5mm T1 $\frac{3}{4}$

GFA-4402 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	16004735	1N4735 6.2 volt 1 watt Zener
D301, 402, 303, 304	16004935	1N4935 1 amp fast recovery
D305	16004744	1N4744 15 volt 1 watt Zener
D401, 402, 404, 406 D501, 502, 503, 504	16004738	1N4738 8.2 volt 1 watt Zener
D407, 507	16004148	1N4148 100 mA signal diode
CHASSIS PARTS		
TOP	13004021	Black 4402 Top Cover
	13004023	White 4402 Top Cover
BOTTOM	13004022	Black 4402 Bottom Chassis
	13004024	White 4402 Bottom Chassis
ENDCAP: 2 Channel	13000001	Black 2-Ch. <i>Connector-End</i> Endcap
	13000004	White 2-Ch. <i>Connector-End</i> Endcap
ENDCAP: Vented	13000003	Black <i>Vented-End</i> Endcap
	13000006	White <i>Vented-End</i> Endcap
FAN COVER	13004026	Black 4402 ADCOM Fan Cover
	13004027	White 4402 ADCOM Fan Cover
PERF SLEEVE	13004025	Black 4402 Perforated Vent Sleeve
HEAT SINK	13000011	4402 Tunnel Heat Sink
INS. SHEET	13000017	4402 Chassis Insulator Sheet
LARGE STICKER	LABEL34	Rectangular " <i>bal inputs</i> " Sticker
LONG 4402 STICKER	LABEL32	Long " <i>model GFA-4402</i> " Sticker
MISCELLANEOUS		
J101	24001110	4 Pin RCA Jack Board
FAN1	13001000	100mm DC Cooling Fan
TERM1, 2	30001100	Large (7/16") Gold Power Terminal
TERM3, 4, 5, 6, 7	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
SP1, 2	22001000	RCA Shorting Plug
FH-ATC	20002050	ATC Fuse Harness Loop
FUSE	19003000	30 Ampere ATC Fuse
PCB-TO	36001250	Turn-On PC Board

* schematic on page 8

*Turn-On PCB 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-4402 should idle at 3 amperes. If adjustment is necessary, set bias level pots (P401 & P501) fully CCW. Then adjust channel A (P401) for 1.5 amps. Then adjust channel B (P501) until the total draw is 3 amperes.

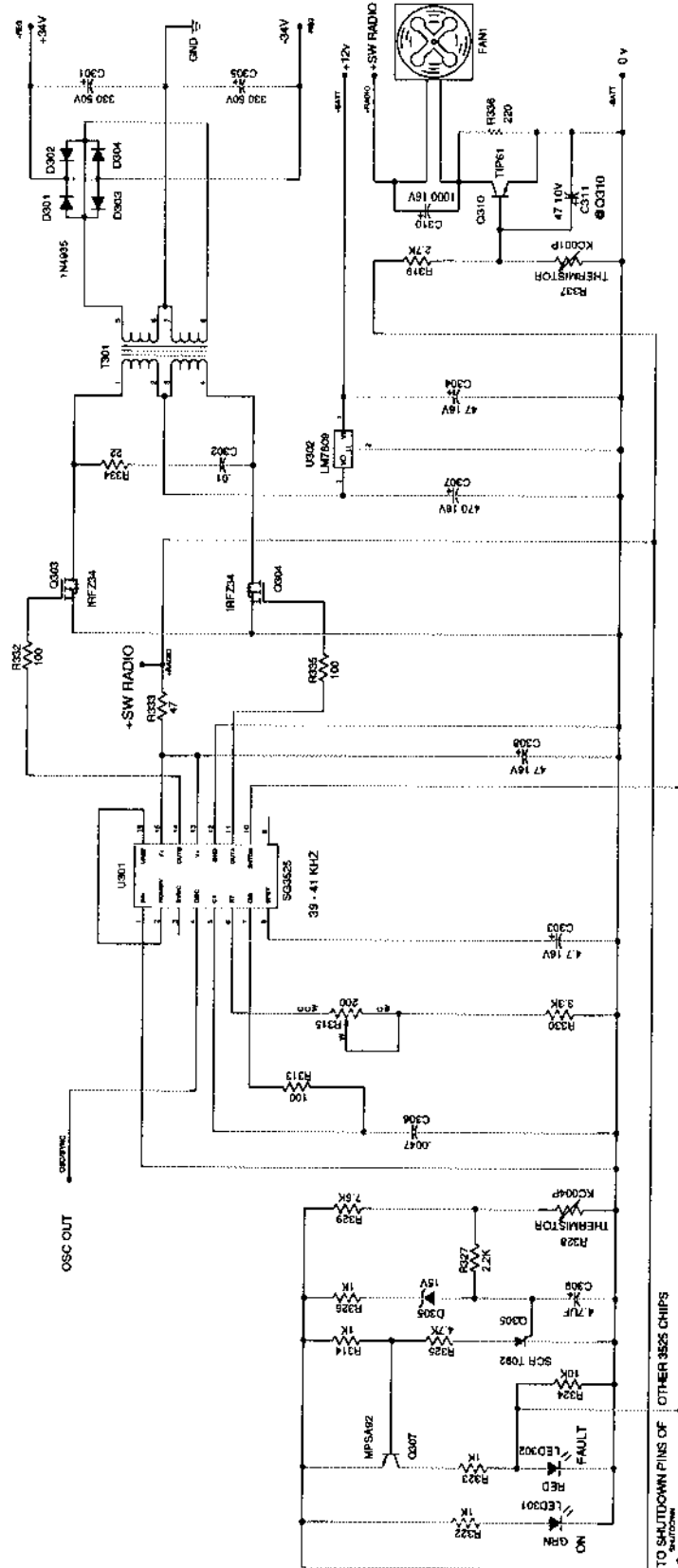
The TURN-ON PCB:

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 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, C503, C404, and C504 to be 10pF capacitors. They should be 33pF capacitors as stated in the parts list.

In some units you may find the voltage regulator (U402) to be a KIA7809P instead of the LM7809CT. Either for the GFA-4402 is acceptable.



Title		GFA-4402 Car Amplifier	
Size		Regulated Power Supply	
Number	Rev	By	Rev
C	1.5	D. Grebe	1.5
Date	Drawn by	PASS	
03/01/93			
Filename	Sheet	2	of 3
4402_S02			

GFA-4402 REGULATED SUPPLY