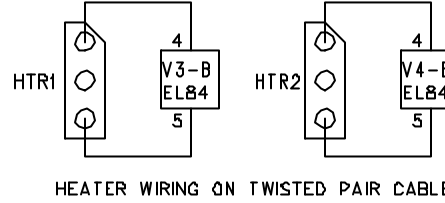
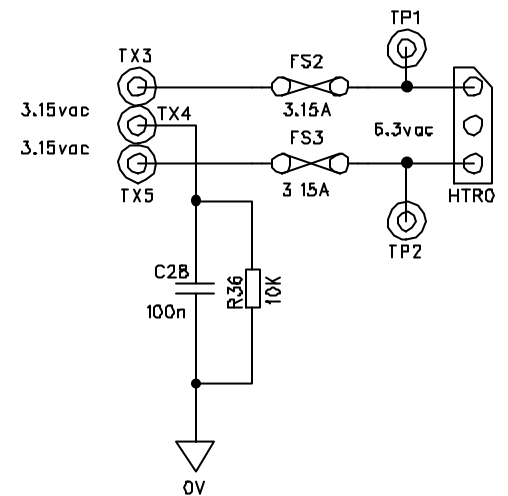
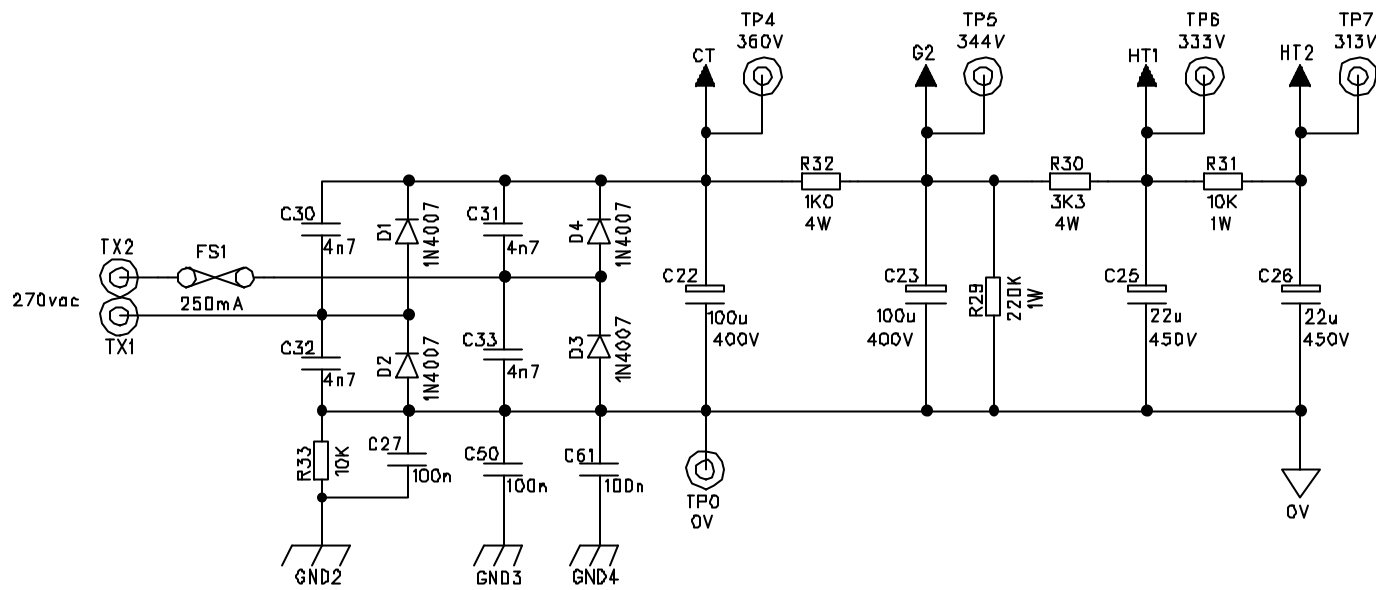
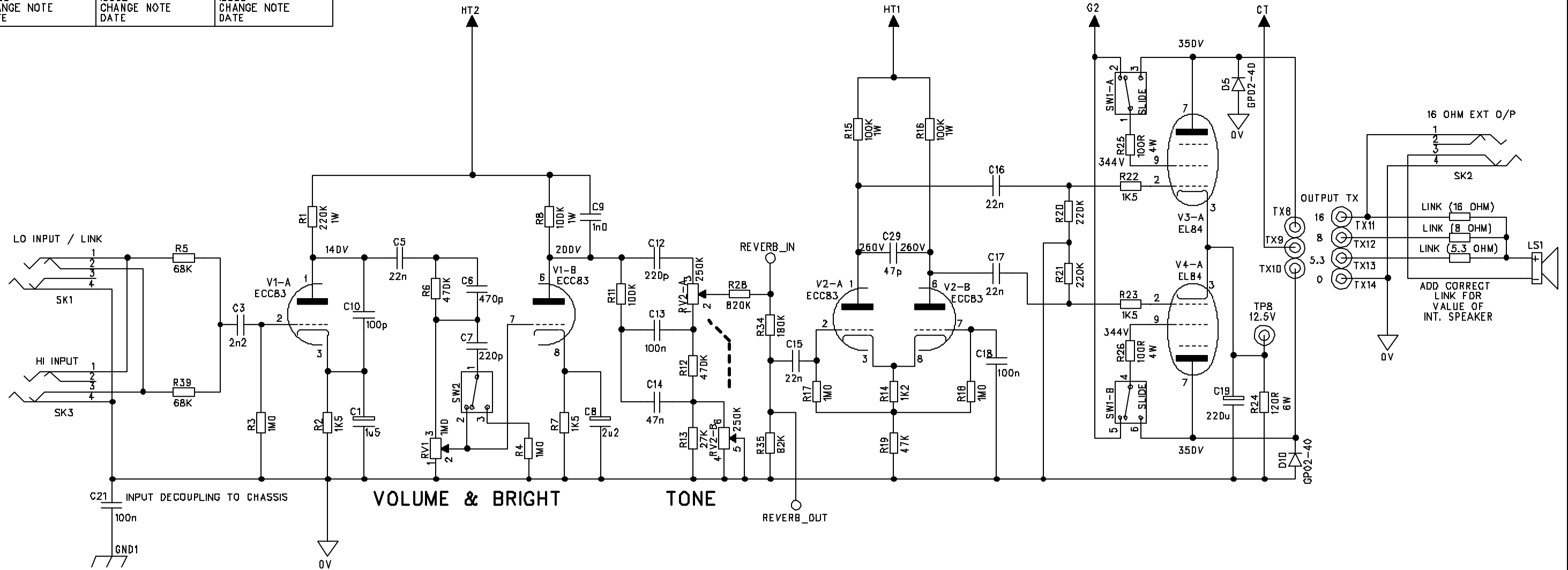


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GIBSON 'GOLD TONE' GA-15RV GUITAR AMPLIFIER




SHEET 1/2

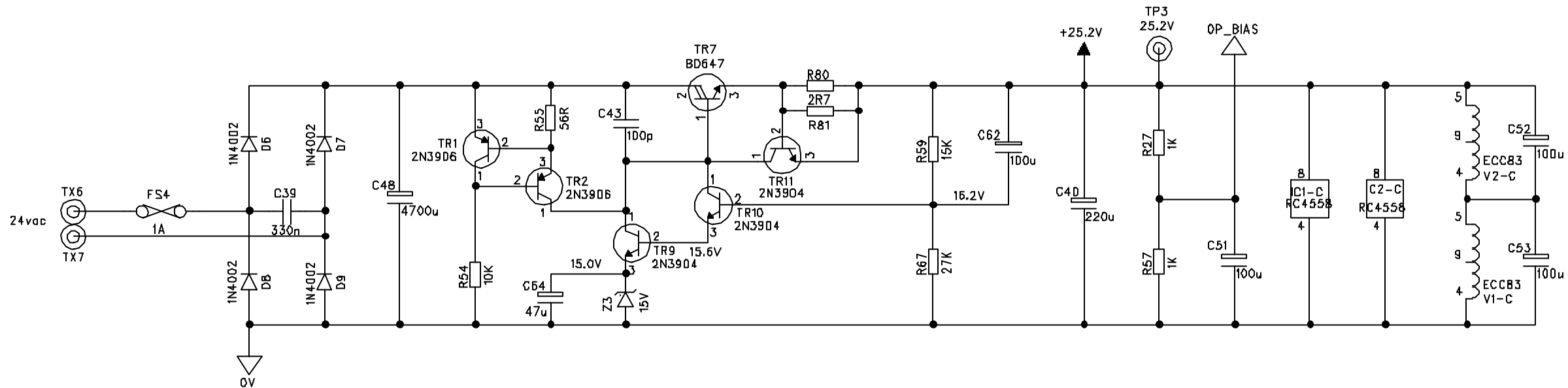
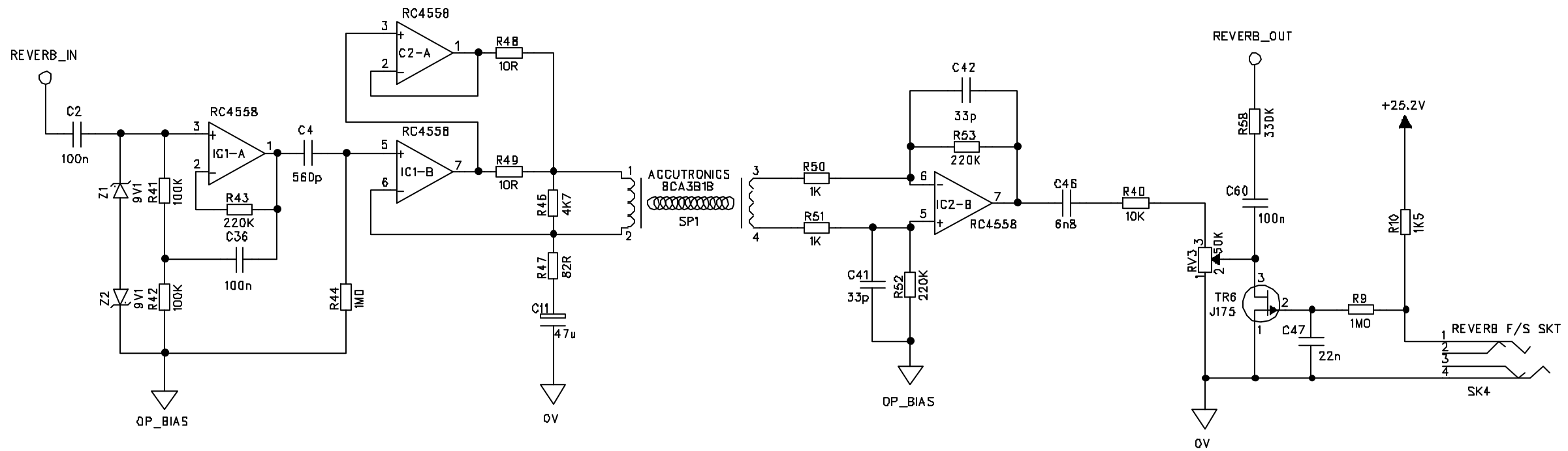
TITLE VALVE SECTIONS, SUPPLIES & BIASING
 PROJECT GIBSON 'GOLD TONE' GA-15RV
 DRAWING No CD00062
 ISSUE 3
 DATE 19 MARCH 1999
 DRAWN BY PAUL STEVENS

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 ALL VOLTAGES ARE DC AND REFERENCED TO TPO EXCEPT WHERE SHOWN


 COMPONENTS USED ARE OF AN APPROVED TYPE AND MUST BE REPLACED ACCORDINGLY

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SHEET 2/2

TITLE REVERB, OPAMP SUPPLIES AND FOOTSWITCH
 PROJECT GIBSON 'GOLD TONE' GA-15RV
 DRAWING No CD00062
 ISSUE 3
 DATE 19 MARCH 1999
 DRAWN BY PAUL STEVENS

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GIBSON 'GOLD TONE' GA-15RV

CIRCUIT DISCRIPTION

Please refer to circuit diagram for DC voltages and other information

INPUT SECTION AND PREAMP

SK1 and SK3 are the LO and HI sensitivity inputs respectively. When the LO socket is used R5, R39 and R3 act as a potential divider to reduce the input level to the preamp.

C3 has two purposes, firstly to block any DC from the input that may unintentionally be present, this would otherwise change the bias point of the first valve stage, secondly the value of the capacitor has been chosen so that there is a slight roll off of lower frequencies, this prevents the sound from getting too muddy.

V1a is the first gain stage and is configured as a cathode bias, common cathode, voltage amplifier with bypassed cathode resistor for increased gain.

R6 and C6 give a slight presence lift and the frequency of the Bright effect is set by C7, which, when switched in, is across pins 2 and 3 of RV1 (Volume). Obviously connected like this the amount of brightness added will decrease as RV1 is turned up.

V1b is the second gain stage configured similar to before, C9 is added across the anode resistor R8 to smooth out the top end.

The Tone network is passive and controlled by RV2. This is a dual ganged potentiometer, one part of which effectively controls the mids (RV2B) while the other part inversely controls the treble (RV2A).

R28, R34 and R35 act as a potential divider to lower the signal sent to the reverb circuitry.

REVERB SECTION

The signal from the preamp is fed into IC1A which is configured as a boot strapped voltage follower. Z1 and Z2 have been added to prevent any nasty spikes from damaging the opamp, this should in practise never happen.

C4 and R44 roll off a lot of the lower frequencies before the signal gets sent to IC1B and IC2A. These opamps are configured for current gain, the actual gain being dependant on the impedance/frequency curve of the reverb tray. Because of this it is crucial to the correct operation of the reverb that the right reverb tray is used. This should be an Accutronics 8CA3B1B.

The output of the reverb tray goes into IC2B. This is configured as a differential amplifier as a way of reducing any hum that may be picked up on the sensitive reverb return leads.

RV3 controls the level of the reverb. Across pins 1 and 2 is TR6, a J175 FET. When SK4 is shorted out, by a footswitch, TR6 is also effectively shorted which results in the reverb being turned off.

The reverb signal is then mixed with the dry signal, via R58, before going into the phase splitter.

POWER STAGE

The phase splitter (V2A and V2B) is a differential input splitter which produces the two anti phase signals necessary to drive the push pull output stage.

V3 and V4 are the two EL84 output valves connected as a push pull, cathode biased class A power amplifier.

The quiescent current is set by R24, which is bypassed by C19 for extra gain.

SW1A and SW1B is an electrically robust slider switch used to switch the power valves from Pentode to Triode operation. For Pentode operation the screen grid (grid 2, pin 9) is connected, via the screen grid current limiting resistors R25 and R26, to the highly smoothed screen grid supply, G2 - positive pin of C23. For Triode operation the screen grid of each valve is connected to the corresponding anode.

Triode operation basically reduces the power output to a bit less than half and also reduces the high frequencies in the overall sound.

D5 and D10 have been added to give protection to the output transformer should a fault arise.

OUTPUT TRANSFORMER AND SPEAKER CONNECTIONS

The output transformer has secondary taps for 16 Ω , 8 Ω and 5.3 Ω . The 16 Ω tap is used to drive the External Speaker Output, SK2. When a jack plug is inserted into SK2 the internal speaker is disconnected.

The three LINK positions are provided on the PCB so that different impedance internal speakers can be used in production. Depending on whether the internal speaker is 16 Ω , 8 Ω or 5.3 Ω the correct LINK should be fitted. This has been done purely so that different impedance speakers can be used if there are any problems with supply.

POWER SUPPLIES

All three supplies, HT, ac heater, and DC supplies have secondary fusing on the PCB. This is to protect the mains transformer and for approvals.

The HT supply is a very simple bridge rectifier diode network, with 4n7 1KV capacitors across each diode for EMC reasons, which is then smoothed by C22, to supply the centre tap of the output transformer. This is then further smoothed by R32/C23, R30/C25 and R31/C26 to supply the screen grids, phase splitter and preamp respectively.

R29 is added to discharge the high voltage capacitors when the unit is turned off.

The ac heater supply is simply connected via a twisted pair connecting lead to V3 and V4 after first going through the secondary fuses

The 25.2V DC supply is highly regulated supply using a BD647 (TR7) as the main regulating device. (Please ensure that the small clip on heat sink is attached to TR7)
TR1 and TR2 provide a constant current source for Z3 the 15 volt zener.

The output voltage is set by the ratio of R59 and R67 which provide the feedback to TR7 via TR9 and TR10 to stabilise the whole circuit, and TR11 with R80 and R81 form a current limiter. This allows the supply voltage to ramp up at switch on when the heater filaments of the preamp valves draw considerably more current while cold.

R27 and R57 halve the supply voltage to provide the opamp bias voltage, and as shown on the circuit diagram the DC supply is routed first through the two filaments in V2 in series and then through the two filaments in V1. This will result in each filament having the nominal 6.3 volts across them.

Paul Stevens
30 June 1999

GIBSON 'GOLDTONE' GA-15RV

The GA-15RV is part of the Gibson 'GoldTone' valve guitar amplifier range. It is a no nonsense, compact, purists valve guitar amplifier and has the minimum controls necessary to produce a good range of sounds, from clean to overdriven, into its single speaker.

The circuit topology has been based on traditional guitar amplifier designs, with new ideas incorporated where beneficial.

The main preamp and power stage sections are 100% valve. The valves used are two ECC83/12AX7's and two EL84/6BQ5's run in Cathode Biased Class A.

CONTROLS

INPUTS - HI & LO/LINK

Two jack sockets are provided for connection to your instrument.

The HI input is a high impedance, high sensitivity input. This can be used with both passive and active guitars and, depending on the level of output from the guitar and the VOLUME setting, allows the amplifier to be driven hard into overdrive, if desired.

The LO/LINK socket can be used in two ways. Firstly as a lower impedance, low sensitivity input, for use with high output guitars when the user wishes to keep the overdrive under control. Alternatively this socket can be used as a LINK to chain together two or more 'GoldTone's, simply plug your guitar into the HI socket, take an output from the LO/LINK socket and plug this into the input of the next amplifier in the chain.

BRIGHT

The BRIGHT switch adds more high frequencies when selected. It works in the traditional way, therefore it has more effect at lower VOLUME settings.

VOLUME

This sets the overall volume level of the amplifier as well as having a huge effect on the tone and the amount of overdrive. From low to about halfway, depending on the output level of the guitar and which input socket is used, the sound should remain reasonably clean. Increasing the control further will progressively increase the level of overdrive in the sound, obviously being a valve amp it will respond to the player's dynamics and use of the instruments volume.

TONE

Unlike other single tone controls on other amplifiers, which act merely as a treble roll off, this control works in a different way. It is a dual gang potentiometer which controls two functions simultaneously. In the fully anti-clockwise position the midrange is dominant in the sound, turning the control clockwise decreases the mids while at the same time increasing the higher frequencies.

REVERB

This single control is for adjusting the amount of reverb effect in the sound. The effect is produced by a three spring reverb tray inside the cabinet.

FOOTSWITCH SOCKET

This socket is for connecting to a latching footswitch and allows the user to turn the reverb effect on or off during a performance.

EXTERNAL SPEAKER OUTPUT

This is provided so that the user can connect the GA-15RV to an external 16Ω speaker cabinet, such as a 4x12, for a different sound. This is useful for both live and studio use and can radically change the sound of the amplifier. Try it at high volume into a 4x12 and you will not believe you are playing a 15 watt amp!

When a jack is inserted into this socket the internal speaker is disconnected. Always ensure that the amplifier is correctly loaded when in use.

PENTODE/TRIODE SWITCH

This allows the user to set the power stage to either PENTODE or TRIODE operation.

PENTODE position is the full power mode and has generally a more powerful sound with a spread of both even and odd harmonics, when pushed into distortion.

TRIODE mode produces around half as much power. It therefore has less headroom and produces power amp distortion earlier. It also has less high frequency content, therefore it is not as bright as pentode mode, and produces mainly even order harmonics.

The choice as to which mode to use will depend on several factors including playing situation, instrument used and, most importantly, personal taste.

POWER SWITCH (OFF/STANDBY/ON)

As the name implies, this switches the amplifier from OFF to STANDBY mode, where only the valve heaters are on, to ON for actual use. This should be used correctly every time the unit is used to prevent problems with valves and to increase their life.

Before mains is applied to the unit, check that it is the correct voltage and make sure the POWER switch is in the OFF position. Connect power lead to mains outlet then switch to STANDBY and wait about a minute before switching to ON. This will ensure that the valves have time to warm up before large voltages are applied to the plates. During short breaks the amplifier can be switched to standby and will therefore be ready to play when next needed.

After switching off it is recommended, as with all valve amplifiers, that it does not receive any sudden physical shocks while the valves are still hot, i.e. through moving the unit. If possible try to give the amplifier a few minutes to cool down before transporting it.

IEC SOCKET/MAINS FUSE

The IEC socket is for connection to universally used IEC mains leads to connect to appropriate domestic mains supply.

In the event of having to replace the mains fuse always use the same rating and type as marked on the unit's rear panel. Using one of higher rating will invalidate the guarantee.

If after replacement the mains fuse should blow a second time, immediately refer the unit to a TRACE ELLIOT approved service engineer for checking.

ORIENTATION OF VALVES

Looking at the GA-15RV from the rear with the rear panel removed you will see four valves, the two on the left (V1 and V2) should be ECC83/12AX7's and the two on the right (V3 and V4) should be EL84/6BQ5's. For improved performance and reliability the EL84/6BQ5's should be a matched pair.

If the need should arise to replace any of the valves we recommend the following types:-

V1 and V2	Sovtek 12AX7 WB or 12AX7 WA
V3 and V4	Ruby Tubes Tesla EL84

TECHNICAL SPECIFICATIONS

INPUT IMPEDANCE	HI - 1M Ω LO/LINK - 136K Ω
TONE CONTROL	SINGLE DUAL FUNCTION PASSIVE CONTROL
REVERB	3 SPRING TRAY
CIRCUIT TOPOLOGY	PREAMP AND POWER STAGE 100% VALVE REVERB SECTION DRIVEN BY INTEGRATED CIRCUITS
SPEAKER	SINGLE 12" CELESTION
POWER RATING	~ 15W PENTODE ~ 6W TRIODE

C32-PCB-PC00064x3.

GIBSON 15R

ISSUE 3 14/2/97 PS

Description	Part Code	Qty	Where Used
PCB	PC00064 issue 1	1	
RESISTORS			
0 ohm link	72-RCZERO	1	R37
2R7 1/4W	72-RM2R7	2	R80 R81
10R 1/4W	72-RM10R	2	R48 R49
56R 1/4W	72-RM56R	1	R55
82R 1/4W	72-RM82R	1	R47
1K0 1/4W	72-RM1K	4	R27 R50 R51 R57
1K2 1/4W	72-RM1K2	1	R14
1K5 1/4W	72-RM1K5	5	R2 R7 R10 R22 R23
4K7 1/4W	72-RM4K7	1	R46
10K 1/4W	72-RM10K	4	R33 R36 R40 R54
10K 1W	72-RM10K-1WATT	1	R31
15K 1/4W	72-RM15K	1	R59
27K 1/4W	72-RM27K	2	R13 R67
47K 1/4W	72-RM47K	1	R19
68K 1/4W	72-RM68K	2	R5 R39
82K 1/4W	72-RM82K	1	R35
100K 1/4W	72-RM100K	3	R11 R41 R42
100K 1W	72-RM100K-1WATT	3	R8 R15 R16
180K 1/4W	72-RM180K	1	R34
220K 1/4W	72-RM220K	5	R20 R21 R43 R52 R53
220K 1W	72-RM220K-1WATT	2	R1 R29
330K 1/4W	72-RM330K	1	R58
470K 1/4W	72-RM470K	2	R6 R12
820K 1/4W	72-RM820K	1	R28
1M0 1/4W	72-RM1M	6	R3 R4 R9 R17 R18 R44
100R 4W	72-RWW100R-4W	2	R25 R26
120R 6W	72-RWW120R-6W	1	R24
1K0 6W	72-RWW1K-6W	1	R32
3K3 4W	72-RWW3K3-4W	1	R30
SEMICONDUCTORS			
1N4002	72-D-IN4002	4	D6 D7 D8 D9
1N4007	72-D-IN4007	4	D1 D2 D3 D4
GP02-40 (4KV)	72-D-GP02-40	2	D5 D10
9V1 ZENER	72-D-BZX55C9V1	2	Z1 Z2
15V ZENER	72-D-BZX55C15V	1	Z3
2N3904	72-T2N3904	3	TR9 TR10 TR11

2N3906	72-T2N3906	2	TR1 TR2
J175	72-FET-J-175	1	TR6
BD647	72-TBD647	1	TR7
RC4558	72-IC-RC4558P	2	IC1 IC2
CAPACITORS			
47p 500V ceramic	72-C47P-500VCD	1	C29
100p 1KV ceramic	72-C100P-1KVCD	1	C10
220p 1KV ceramic	72-C220P-1KVCD	2	C7 C12
470p 1KV ceramic	72-C470P-1KVCD	1	C6
1n0 1KV ceramic	72-C1000P-1KVCD	1	C9
4n7 1KV ceramic	72-C4700P-1KVCD	4	C30 C31 C32 C33
33p 100V axial	72-C33P-100VCA	2	C41 C42
100p 100V axial	72-C100P-100VCA	1	C43
560p 100V axial	72-C560P-100VCA	1	C4
2n2 100V axial	72-C2N2-100VCA	1	C3
6n8 100V axial	72-C6N8-100VCA	1	C46
22n 100V axial	72-C22N-100VCA	2	C15 C47
100n 100V axial	72-C100N-100VCA	9	C2 C18 C21 C27 C28 C36 C50 C60 C61
330n 50V axial	72-C330N-50VCA	1	C39
22n 400V poly box	72-C22N-400VP	3	C5 C16 C17
47n 400V poly box	72-C47N-400VP	1	C14
100n 250V poly box	72-C100N-250VP	1	C13
1u5 35V tant	72-C1.5-35VT	1	C1
2u2 35V tant	72-C2.2-35VT	1	C8
22u 450V elect rad	72-C22-450VER	2	C25 C26
47u 63V elect rad	72-C47-63VER	2	C11 C64
100u 16V elect rad	72-C100-16VER	4	C51 C52 C53 C62
100u 400V elect rad	72-CAP-100400V	2	C22 C23
220u 35V elect rad	72-C220-35VER	2	C19 C40
4700u 35V elect rad	72-CAP-470035V	1	C48
CONNECTORS			
3way 0.1"	72-HEAD-3W-2	3	HTR0 HTR1 HTR2
CRIMP CONNECTORS	72-CRIMP-PCB-TAB	16	TX1 - 14 LS1 (x2)
SOCKETS			
1/4" MONO JACK SKT	72-SKT-JCKBNBG	4	SK1 SK2 SK3 SK4
SWITCHES			

Large slide DPDT horiz	73-SWT-SLIDER-DP	1	SW1
Mini Toggle SPDT vert	73-SWT-M-TGL-PCB	1	SW2
POTENTIOMETERS			
1M0	73-POT-A1M	1	RV1
250K LIN DUAL GANG	73-POT-B250K-DG	1	RV2
50K	73-POT-50KB	1	RV3
VALVE BASES			
B9A PCB valve base	73-VAL-SOCKET	4	V1 V2 V3 V4
FUSE HOLDERS	72-FUS-HLD-PCB-2	4	FS1 FS2 FS3 FS4
TEST PIN	73-PIN-TERM	1	TP0
TO220 HEAT SINK	71-HS-PF752	1	TR7
FLYING LEADS ETC			
Cathode heater lead	C00-LEAD-VEL12-HTR	1	insert into HTR0, HTR1 & HTR2
Reverb input lead	C00-FLY-TRAMP-R	1	REVERB IN
Reverb output lead	C00-FLY-V12R	1	REVERB OUT
Grommet	45-GROMM-2	1	put over reverb leads before soldering into PCB