000 SERIES
POWER AMPLIFIERS

OWNER'S MANUAL
DX1000-DX1000A-DX2000-DX3000

Hill Audio

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Thank you for choosing a Hill Audio power amplifier. We are sure it will give you many years of trouble free service: to help you achieve this, please read the following advice before turning on your amplifier.

Due to our policy of continuous development,we reserve the right to alter any specification without notice.

WARNING

To prevent shock or fire hazard
DO NOT EXPOSE to rain or moisture!

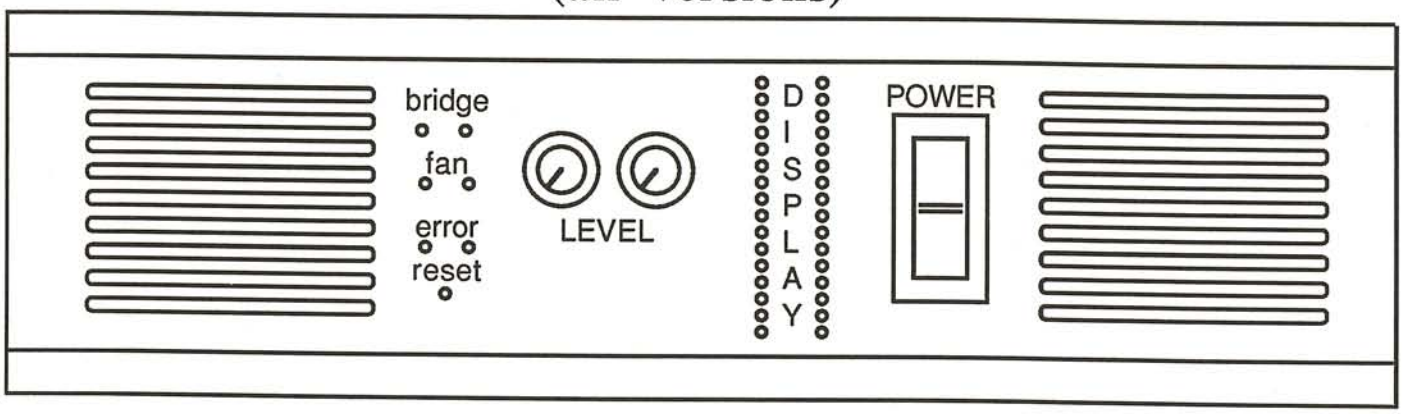
CAUTION

There are no user servicable parts inside the amplifier.
Any and all controls needed for operation of the amplifier are accessible from outside the amplifier.

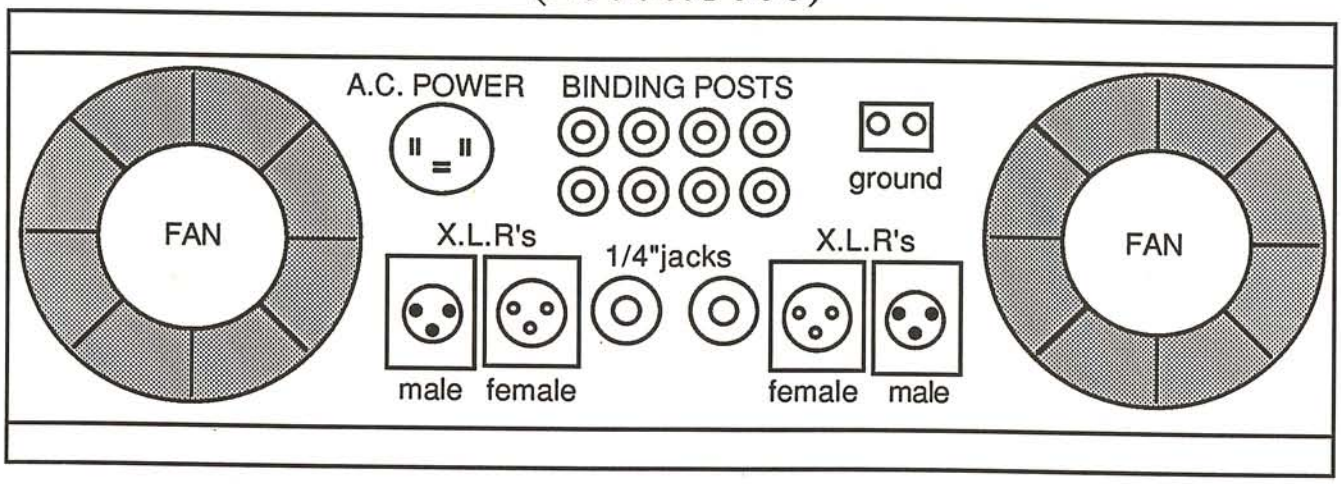
RACK MOUNTING YOUR AMPLIFIER

It is recommended by Hill Audio that you support the back of the amplifier when mounting in a rack. Hill Audio will not be responsible for any damage (electronic or structural) caused from insufficient structural support when mounted.

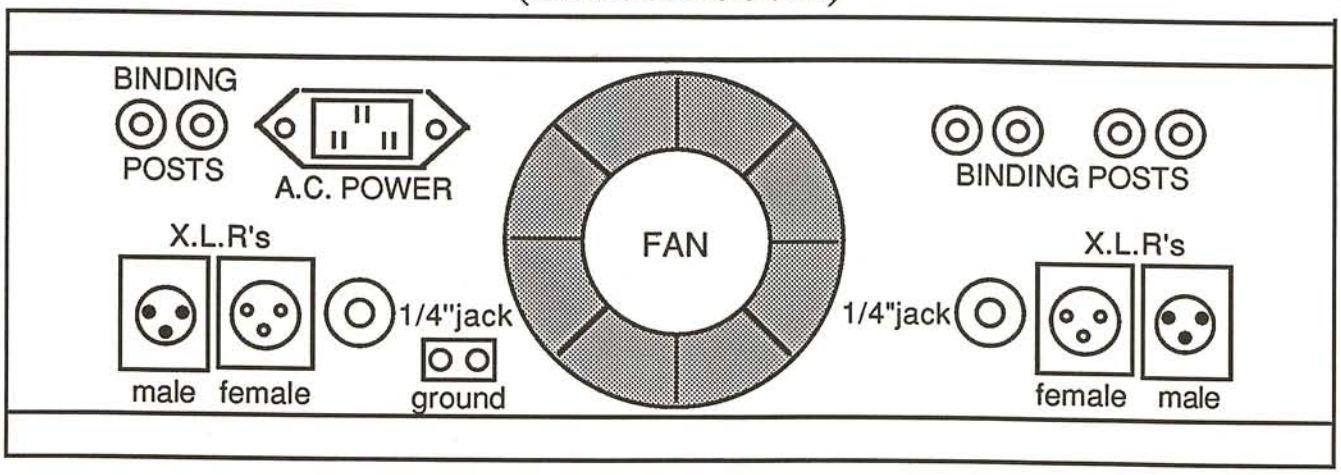
Front Panel
(all versions)



Back Panel
(2000&3000)



Back Panel
(1000&1000A)



FRONT PANEL

BRIDGE: A recessed rotary switch that requires a screwdriver to activate, turns on the bridging circuit.
The LED indicates that the amplifier is in MONO mode

FAN : The LED indicates that the appropriate cooling fan is ON (1 LED per channel)

ERROR: The LED indicates that the appropriate channel is in ERROR (PROTECT) mode (1 LED per channel)

RESET: 1 reset microswitch to re-set the amplifier when one of the channels is in ERROR mode.

LEVEL: 2 conductive plastic rotary level controls

ON/OFF: 1 on/off switch with integral circuit breaker
The unit is ON when the rocker is in the DOWN position

BACK PANEL

COOLING: 5" FANS

POWER: DX1000 and DX1000A 15 amp. rated IEC 'EURO' connector
DX2000 and DX3000 40 amp. rated 'AMP' connector

INPUT : 2 XLR's per channel,1 male and 1 female
pin #3 +, pin #2 - (balanced 10k 1.55v)

1 1/4" jack per channel (unbalanced 10k, 1.55V)
disconnects the isolating transformer (if fitted)

OUTPUT: 4mm binding posts

GROUND: Ground isolation link

SPECIFICATIONS

		DX1000	DX1000A	DX2000	DX3000
POWER (rms continuous) (+0, -0.5dB 20Hz-20kHz)					
BRIDGE (MONO)	8Ω	1000W	1500W	1200W	1600W
	4Ω	-	-	2000W	3000W
PER CHANNEL	8Ω	375W	500W	400W	550W
(both channels driven)	4Ω	600W	800W	600W	900W
	2Ω	-	-	1000W	1500W
DISTORTION					
<0.003% THD 1kHz *		375W/ 8Ω	500W/ 8Ω	600W/ 4Ω	900W/ 4Ω
<0.002% IMD 60/7kHz 4:1		375W/ 8Ω	500W/ 8Ω	600W/ 4Ω	900W/ 4Ω
<0.05% THD 20Hz-20kHz *		within rated power			
DAMPING FACTOR					
20Hz - 1kHz	8Ω	500	500	2000	2000
1kHz - 20kHz	8Ω	100	100	500	500
AC INPUT					
full music power	120V	7 amperes	8 amperes	13 amperes	16 amperes
	240V	3.5 amperes	4 amperes	6.5 amperes	8 amperes
1kHz sine wave full power					
bridged mono	120V	19 amperes	25 amperes	38 amperes	50 amperes
	240V	9.5 amperes	12.5 amperes	19 amperes	25 amperes
SLEW RATE (10%-90% dV/dT)		45V/ µs	45V/ µs	60V/ µs	60V/ µs
SLEW LIMIT		100V/ µs	100V/ µs	140V/ µs	140V/ µs
WEIGHT		17kg 38.1lbs	18kg 40.3lbs	35kg 78.4lbs	36kg 80.6lbs
SIZE (H-W-D)		5.25 x 17 x 16	5.25 x 17 x 16	5.25 x 17 x 19	5.25 x 17 x 19

RISE TIME 3 µs (restricted by front end low pass filter)

NOISE 20Hz-20kHz: better than -100dB below rated output
'A' weighted: better than -105dB below rated output

FREQ. RESPONSE +0 -0.5dB, 20Hz to 20kHz

PHASE SHIFT 18º at 10kHz (restricted by front end low pass filter)

INPUT IMPEDANCE 10kΩ (+/- 20%) balanced (XLR),unbalanced (1/4")

INPUT VOLTAGE 1.55V (+6dBm)

OUTPUT 4mm binding posts on 3/4" spacing

COOLING thermally controlled fans,forcing air through custom extruded aluminium heatsinks
DX2000 and DX3000 have 2 independent 5" fans
DX1000 and DX1000A have 1 overall 5" fan

* (analyser filter 400Hz/80kHz)

OPERATION

CIRCUITRY - TOTAL SYMMETRY:
Using a unique transformer coupled driver stage, the'000' series amplifiers feature identical ultra-linear NPN output devices connected in a 'Super A' sliding bias configuration exhibiting a much more linear response than conventional amplifiers using NPN and PNP devices. The negative feedback is a very low 20dB and,in addition, the transformer coupled drive interrupts the DC voltage chain - **eliminating all the circumstances in which a conventional amplifier can introduce DC voltage onto the speaker.**

INPUT SENSITIVITY - 1.55V (+6dBm) :
This control is graduated in volts to signify the input signal voltage needed to produce the rated power at the output connectors.
Your '000' amplifier will develop rated output power as long as the signal input is at least 1. 55 volts.
So as not to overdrive the amplifier, set the input sensitivity control to a setting that matches the output level of the device driving the amplifier.
For example : if you are wiring your system such that your crossover is driving your amplifier,and your crossover has a 3 volt maximum output,set the sensitivity control of your amplifier to the 3 volt position so that when your crossover develops rated output (3volts) your amplifier will develop rated output (rated power) without clipping.

CONNECTING AN INPUT SIGNAL:
The '000' amplifier will accept balanced and/or unbalanced signals using 3 pin XLRs and mono 1/4" jacks. The XLR connector not being used for signal input can be used to link input channels of different amplifiers to the same signal - e.g. with signal into the LEFT channel using the female XLR connector, the male XLR can be used to feed signal to the right channel input of the same amplifier, or one or both inputs of any other amplifier by using an XLR- XLR cord (balanced).

BRIDGE:
When the mono bridging switch is turned anti-clockwise, the amplifier enters the BRIDGE (MONO) mode,confirmed by the panel LED.
Both channels are now internally connected, so only the left channel signal input is needed to drive the amplifier.The output connections should be between the RED terminals of the binding posts (one Left + and one Right -); the 1000/1000A amplifiers are fitted with a separate pair of binding posts for the bridged output.

AC SWITCH: The AC switch is ON in the down position

GROUND: some ground-loop hum problems may require isolating the audio [technical] ground from the AC [mains]ground: removing the external link provided achieves this.
N.B.-the AC ground remains permanently connected to chassis.

COOLING

FANS:
The speed of the fans is controlled by an automatic temperature sensitive circuit. Earlier models use thermal switches which will automatically start the fans when your amplifier reaches a temperature of 55ºC turning off when the amp. has cooled to 35ºC.

It is recommended that the fan covers are cleaned of dust periodically.

RUNNING TEMPERATURE:
Unlike other power amplifier manufacturers, Hill Audio constructs amplifiers out of custom aluminium heatsink extrusion that is not 'hidden' inside the amplifier's outer box (in fact the whole amplifier casing acts as a heatsink).

Because of this, your amplifier will give the **appearance** of running hotter than other amplifiers,as the front panel and sides can be hot to the touch after continuous full power operation. This is normal.

A 75ºC thermal switch mounted on the power transistor heatsink shuts down the appropriate channel in the event of excessive heat rise.

AC SUPPLY

The AC supply should be at least 117/234VAC to meet specifications; beware of significant voltage drop between the AC supply source and the amplifier AC input.

POWER CORD : Normally,'000' series are supplied with an AC cord that does NOT have a connector on one end.

Colour code:
GREEN - Ground
BROWN - Live
BLUE - Neutral

The DX1000 and DX1000A,when factory set for 120v operation, are supplied with an AC cord pre-wired to a 3 pin Edison connector.

Because of the available output power of the DX2000 and DX3000 amplifiers, Hill Audio suggests that you wire the amplifier into a circuit capable of 30 amperes, as full power operation may trip a 20 amp circuit.

Internal transformer taps are provided for 110/220V operation.

PROTECTION

The DC isolation transformer coupling technique allows the amplifier circuitry to perform perfectly safely and reliably without any protection devices whatsoever in the audio signal path - with significant sonic benefit particularly at or beyond clipping.

There are no internal fuses in the amplifier as all circuits are relay protected and the AC line is protected by the on/off circuit-breaker.

RELAY:
Persistent overdriving, short circuit, component malfunction etc., will activate a protection relay, shutting down the channel with the problem (completely isolating that channel from its power supply) leaving the other channel unaffected.

If this occurs, the appropriate 'error' LED indicator on the front panel will light, indicating there is a problem.

If the relay does trip, for example, after sensing continuous high level, high frequency feedback (to protect your high frequency drivers), it will automatically re-set within 3 seconds.

If it still senses a problem it will trip and try to re-set again.
After 3 attempts the relay will shut down the channel permanently.

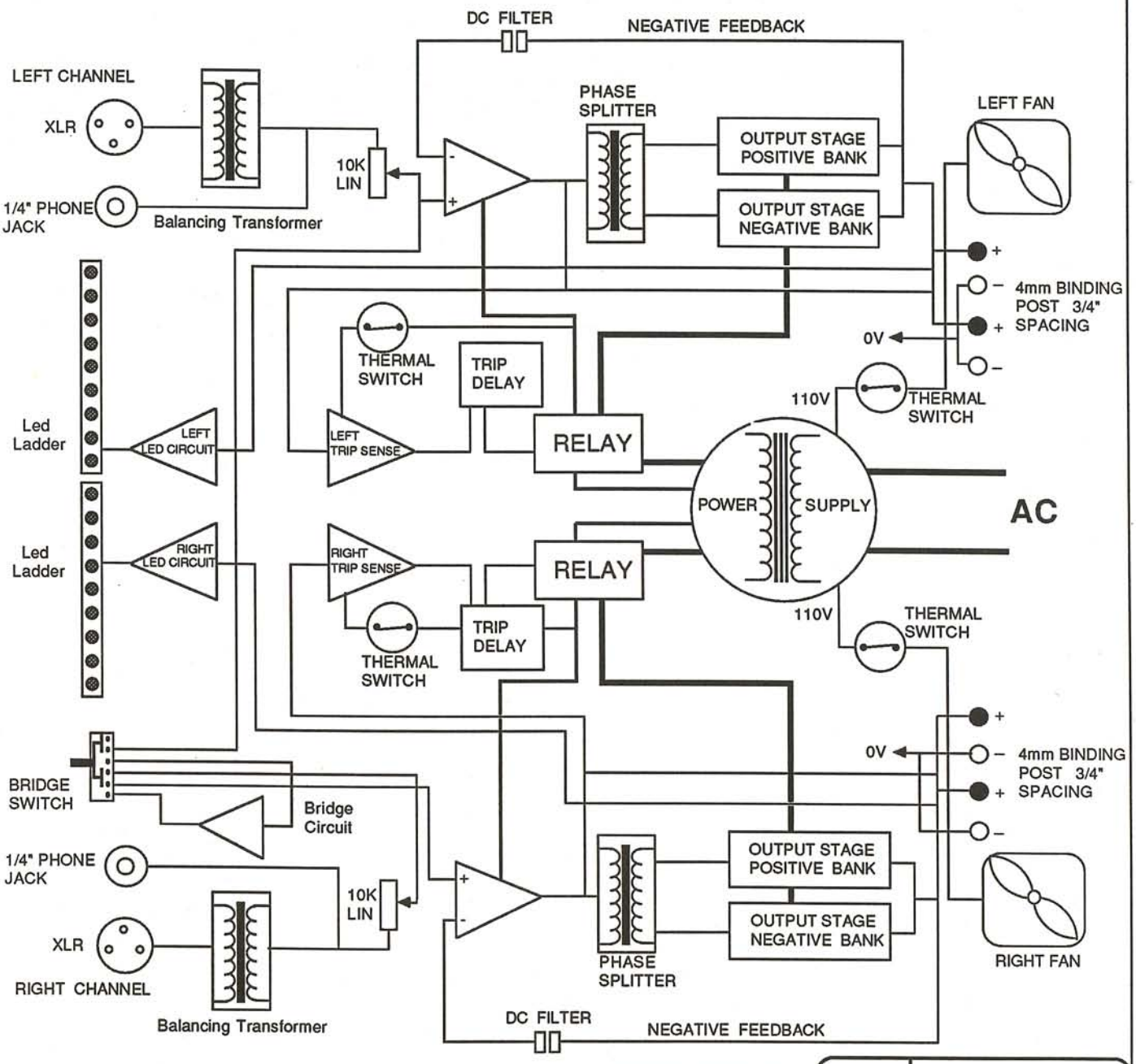
To reset the amplifier at this stage, simply push the RESET button.

It is recommended that the non-working channel input sensitivity be reduced before resetting the amp.

If the relay re-trips immediately, check that:
1. the amplifier is not being overdriven or being driven with ultra high frequencies (such as an oscillating crossover) by turning down the input level controls before trying again.
2. the amplifier is not driving a shorted speaker or speaker cable by removing the speaker cables before trying again.

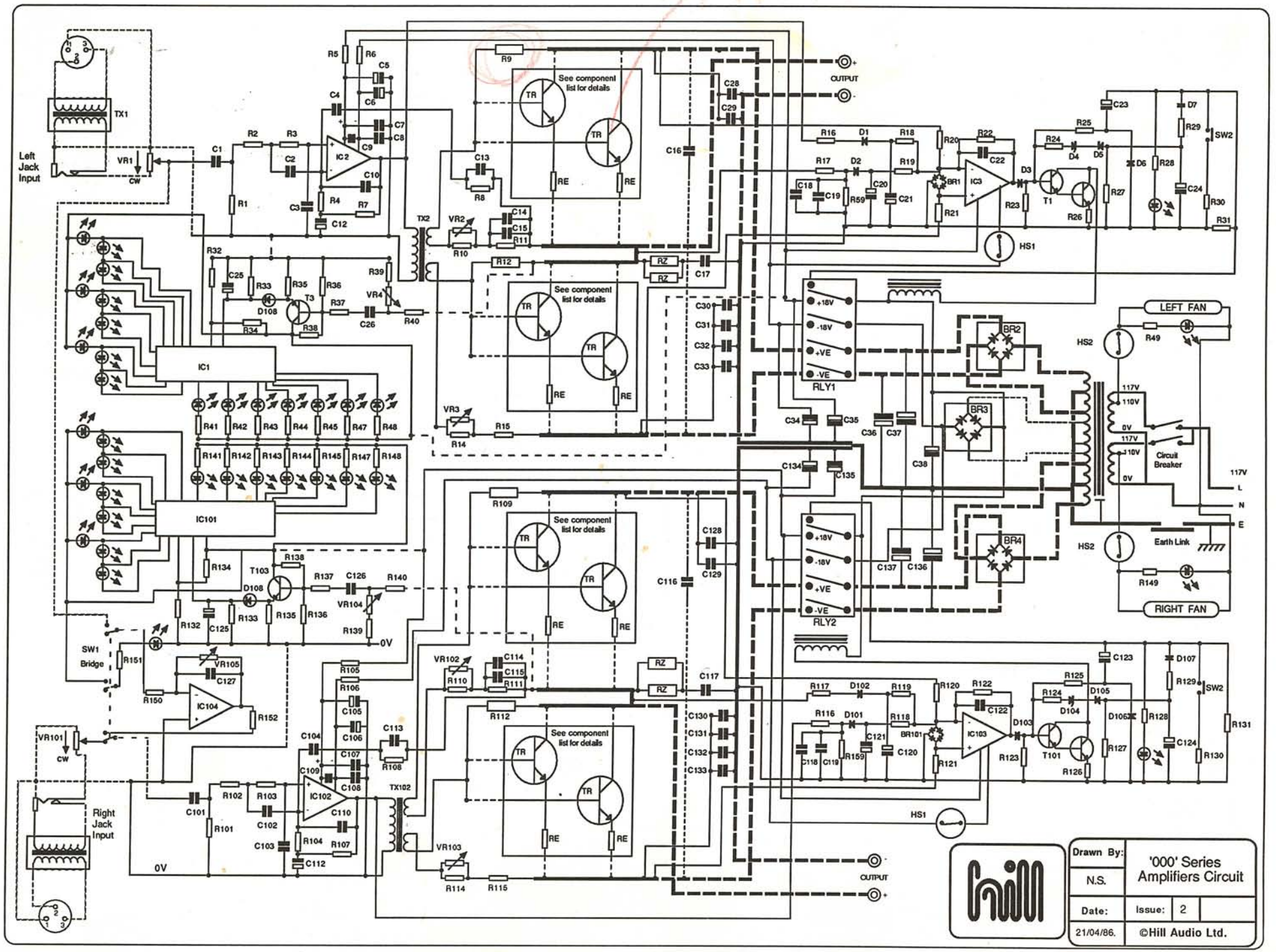
It is permissable to RESET the amplifier whilst it is running.

If after trying all the above you still cannot turn on your DX '000' amplifier, or the AC circuit breaker continually trips, you should consult your Hill Audio authorized dealer.



Drawn By: P.F.	'000' Block Diagram	
Date: 21/4/86	Issue: 2	©Hill Audio Ltd.

H101A



Drawn By:	'000' Series Amplifiers Circuit		
N.S.			
Date:	Issue:	2	
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'000' Series Amplifiers - Component List

Amplifier Boards

R1	100K	R2	39K	R3	39K	R4	560R
R5	6R8 2W5	R6	4R7 2W5	R7	3K3	R8	22K
R9	820R 17W	R10	1R8 2W5	R11	see note below	R12	820R
R13	see below	R14	1R8 2W5	R15	see note below	R16	1K
R17	10K	R18	8K2	R19	8K2	R20	220K
R21	220K	R22	10K	R23	22K	R24	1K5
R25	33K	R26	15R 2W5	R27	470K	R28	3K9
R29	10K	R30	100R	R31	560R	R32	1K
R33	20K	R34	2K2	R35	560R	R36	56K
R37	22K	R38	1M	R39	27K (DX1000 only)	R40	180K
R41	1K5	R42	1K5	R43	1K5	R44	1K5
R45	1K5	R46	1K5	R47	1K5	R48	1K5
R49	15k 1W						

R150 100K	R151 1K5	R152 100R	RE / RZ - see below	
VR1, VR101 10K LIN VR105 200K	VR2, VR102 10R	VR3, VR103 10R	VR4, VR104 50K	

C1	1uF	C2	22pF	C3	47pF	C4	4u7F
C5	470uF 25V	C6	470uF 25V	C7	u22F	C8	u22F
C9	u22F	C10	10pF	C11	not used	C12	100uF 12V
C13	150pF silver mica	C14	see below	C15	see below	C16	see below
C17	see below	C18	6n8	C19	see below	C20	22uF 16V tant.
C21	22uF 16V tant	C22	10pF	C23	47uF	C24	470uF 25V
C25	2u2F	C26	u22F	C127	33pF		

IC1	IC2 TDA2030	IC3 748	
IC101	IC102 TDA2030	IC103 748	
T1 / T101 - TIP120	T3 / T103 - 2N3708		
D1,D2,D3,D5	G.P. diode		
D101,D102,D103,D105	G.P. diode	D4,D104	10V zener
BR1/ 101	1.5A Bridge rectifier		

Power Supply Section

BR2 / BR4	BF37931 - 25A			BR3	BD38931 - 15A		
C34	2,200uF 25V	C35	2,200uF 25V	C36	see below	C37	see below
C38	470uF 25V						
HS1	75ºC off / 60º on	HS2	55ºC on/ 35ºC off				

See next page for details of component variation with amplifier type.

Component differences between amplifiers

	DX1000	DX1000A	DX2000	DX3000
R11	3R3 - 2W5	2R7 - 2W5	3R3 - 2W5	2R7 - 2W5
R13				
R15	3R3 - 2W5	2R7 - 2W5	3R3 - 2W5	2R7 - 2W5
RE	0R47 - 2W5	0R68 - 2W5	0R47 - 2W5	0R68 - 2W5
RZ	0R68 - 25W	0R68 - 25W	0R68 - 25W X 2	0R47 - 25W X 2
C14	not fitted	1uF	not fitted	not fitted
C15	1uF	1uF	not fitted	not fitted
C16	not fitted	not fitted	2u2F 250V dc.	2u2F 250V dc.
C17	0u68F	0u68F	0u68F	1uF
C19	10nF	22nF	22nF	22nF
C28	1uF	1uF	1uF	1uF
C29	1uF	1uF	not fitted	1uF
C30	1uF	1uF	1uF	1uF
C31	1uF	1uF	1uF	1uF
C32	1uF	1uF	not fitted	not fitted
C33	1uF	1uF	not fitted	not fitted
C36	15,000uF 125V	15,000uF 125V	18000uF 125V	18000uF 125V
C37	15,000uF 125V	15,000uF 125V	18000uF 125V	18000uF 125V
TR	H001	H101A	H001	H101A

Note that components for the right-hand channel have 100 added to the component number.
E.G. R1 for the left hand channel is equivalent to R101 for the right hand channel.

'000' SERVICE NOTES

After replacing any faulty output devices in a '000' series power amplifier check carefully **before turning on the amplifier** -

1. ALL components in the bias circuit, especially VR4 and ALL emitter resistors
2. fully assemble the amplifier WITHOUT the relays and check for resistance
   a. emitter rail to collectors - 500 to 900 ohms
   b. base rail to emitter rail - 3 to 5 ohms

Any readings outside these parameters indicate a fault in the amplifier.
Having verified that the amp is OK, proceed with the following adjustments

3. **bias setting - trim pots VR4**

Attach an 8 ohm dummy load to the channel
Attach a scope or digital meter to the channel to read DC mV
Put mA meter in series with positive voltage feed to transistor bank (RED)
Screw offset/bias trim pots all the way out (anti-clockwise)
Turn on the amp and adjust both trimmers (VR4) consecutively (half a turn each in a clockwise direction) until you have less than 20 mV DC offset and a mA reading of :

dx1000	8.3mA	4 devices/bank
dx1000A	12.5mA	6 devices/bank
dx2000	16.7mA	8 devices/bank
dx3000	20.8mA	10 devices/bank

If the amp gets warm, turn off and try again when amp is cool.

4. **mono balance - trim pot VR3**

Attach an 8 ohm load to the mono out of the amp (both RED terminals)
Attach a digital meter (reading AC volts) to the output of the left channel and drive a 1kHz tone at low power (approx 18VAC) into the left channel
Read the AC volts in left channel
Move the meter to the output of the right channel and adjust the right channel to read the same AC volts as the left channel using the mono adjust trimmer (VR3)

5. **checking devices in place**

Remove the relay and measure between the collector (can) of the transistor and the emitter resistor on a 200 ohm setting :

over-range	all OK
1.1 ohms	this transistor OK but some in the bank are blown
0.5 ohms	this transistor is blown

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