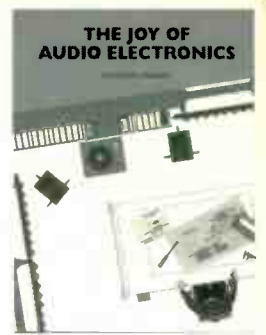


hi-fi world

www.hi-fiworld.co.uk

APRIL 2000

No50



THE JOY OF AUDIO ELECTRONICS

THIS MONTH'S BOOK REVIEW:

CHARLES HANSEN
Joy of Audio Electronics



PLUS:
KLS12
X-OVER
UPGRADE

CLASS OF 88

KaT88 36Watt Class A Valve Power Amplifier Kit



Golden Dragon

Precision Audio Tubes

Please enquire for any tube not listed. We have an inventory of over 2,500 different types in stock.

Golden Dragon High Quality Pre-amplifier Tubes

12AT7A/E81CC/ECC81	£ 6.95
12AU7A/E82CC/ECC82	£ 6.95
12AX7A/E83CC/ECC83	£ 6.95
12BH7A	£ 9.95
6DJ8/E88CC/ECC88	£10.95
6SN7GT/ECC33	£ 8.95

KT66R	£69.95 pr
KT88R	£69.95 pr
6550WA	£67.95 pr

Golden Dragon Special Quality Pre-amplifier Tubes

E81CC-01	Gold Pins Low Microphony Low Noise	£10.50
E82CC-01	Gold Pins Low Microphony Low Noise	£10.50
E83CC-01	Gold Pins Low Microphony Low Noise	NEW £ 9.50
E88CC-01	Gold Pins Low Microphony Low Noise	£14.50

Golden Dragon Power Tubes

	Matched Pair	Matched Quad	Matched Octet
EL34 Super	£25.00	£50.00	£100.00
EL34M	£25.00	£50.00	£100.00
E84L (special quality EL84)	£12.50	£25.00	£50.00
EL156 Octal	£75.00	£150.00	£300.00
6L6WGB	£25.00	£50.00	£100.00
KT66	£25.95	£52.00	£104.00
KT66 Super	£65.00	£130.00	£300.00
KT88	£57.95	£116.00	£232.00
KT88 Special (Gold plated)	£67.95	£136.00	£272.00
KT90	£65.00	£130.00	£260.00
KT90LX	£75.00	£150.00	£300.00
350B	£29.95	£60.00	£120.00
6L6GC	£19.95	£40.00	£80.00
6550A	£42.95	£86.00	£172.00
6550A Special (Gold plated)	£64.95	£130.00	£260.00
50CA10	£84.95	£170.00	£340.00
807	£25.00	£50.00	£100.00

Golden Dragon Triodes

	Singles	Per matched pair	Per matched quad
2A3 4 pin	£22.50	£50.00	£100.00
2A3 Octal	£22.50	£50.00	£100.00
211	£28.50	£60.00	£120.00
811A	£11.50	£25.00	£50.00
845	£36.50	£75.00	£150.00
805	£36.50	£75.00	£150.00

Golden Dragon T300B Range

300B Super	£79.00	£160.00	£320.00
4.300B	£84.00	£170.00	£340.00
4.300B LX Super	£124.00	£250.00	£500.00

We have a vast range of tubes available from manufactures all over the world including rare and vintage types. an 80 page booklet of valves available is updated monthly and can be provided at a cost of £2.50 per copy U.K. £4.00/\$7.00 rest of world or you may telephone our Sales Desk for a prompt quotation.

Prices exclude VAT and Carriage. Please add carriage charge of £2.50 for UK orders and VAT at 17.5%

P.M. COMPONENTS LTD, Selectron House, Jenkins Dale Industrial Estate, Chatham, Kent. ME4 5RD
Tel 01634 848500, Fax 01634 848676, e-mail: 101650,2424@Compuserve.com

The Valve. Golden Dragon



Simply, The Best.

For more information contact:

PM Components Ltd, Selectron House, Jenkins Dale Industrial Estate,
Chatham, Kent. ME4 5RD

Tel 01634 848500, Fax 01634 848676, e-mail: 101650,2424@Compuserve.com

hi-fi
world

HI-FI WORLD
IMEX HOUSE,
THE PARK BUSINESS CENTRE,
KILBURN PARK ROAD,
LONDON, NW6 5LF

Web Site
www.hi-fiworld.co.uk

Subscriptions & Back Issues
9.30am - 2.30pm
+44 (0)1923 270833

Private & Trade Classified Ads
+44 (0)171 625 3134
Fax: +44 (0)171 328 1844

Contact Numbers
9am - 5pm Mon - Fri

Editor
Nick Lucas
+44 (0)171 625 8032
wad@hi-fiworld.co.uk

Sub Editor
John Marks

Design & Production
Faiza Chunara
+44 (0)171 625 3129
Fax: +44 (0)171 328 1844

Contributors
Richard White
Gary Devon

Advertising Designer
Faiza Chunara
+44 (0)171 625 3129
Fax: +44 (0)171 328 1844

Photography
David Noble
+44 (0)171 625 3134

Sales and Marketing Manager
Amanda Sweeney
+44 (0)181 864 4760
Fax: +44 (0)181 864 4780

Accounts
Michael Ogazi
+44 (0)171 289 3533
Fax: +44 (0)171 328 1844

Credit Control
Louise Palfrey
+44 (0)1923 270833
Fax: +44 (0)1923 270833

Publisher
Noel Keywood

WORLD AUDIO DESIGN
Technical Manager
Nick Lucas
Tel/Fax: +44 (0)171 625 8032
wad@hi-fiworld.co.uk

Distributed by
Comag Magazine Marketing,
Tavisstock Road, West Drayton,
Middlesex UB7 7QE
Tel: +44 (0)1895 444 055

Printed by
Southernprint, Dorset.
Tel: +44 (0)1202 622 226

All unsolicited submissions are made at the owner's risk. We accept no responsibility for such submissions, nor do we undertake to return them.

No material may be reproduced from this magazine without the publisher's written permission.
© Audio Publishing Ltd

ALL RIGHTS to the designs are reserved by **World Audio Publishing Ltd**. They are published for single use by private individuals. They are not to be used for commercial gain without prior permission from **World Audio Publishing Ltd**.

World Audio Publishing Ltd accept no responsibility for accident or injury arising from the construction or use of any of the designs published. All of the projects in this supplement have gone through rigorous listening and test procedures. The performance and specification of these projects can only be guaranteed on kits bought directly from **World Audio Publishing Ltd**.

diy supplement/contents

No50



KIT NEWS

Keeping you posted with news from component suppliers and kit specialists.

5

KIT FOR KAT

Following our introduction last month of the KiT88, we double up the act with its fellow traveller, the KaT88.

7

CLOCKING ON

Jon Marks looks at ways and means of improving the heart of your CD player, its clock.

11

CROSSING OVER THE GREAT DIVIDE

£100 spent on components for your loudspeaker crossover can yield dividends. Nick Lucas considers the options for our KLS12 kit.

19

BOOK REVIEW:

CHARLES HANSEN - The Joy of Audio Electronics.

22

ADVERTISERS' INDEX

22

Watford Valves

7 DAYS A WEEK 9AM - 9PM THE AUDIOPHILES CHOICE

All output valves multi-tested and digitally matched

Full no quibble guarantee. Expert advice on all valve amps

ECC81	Philips	4.50	GZ32	Harma	9.00
ECC82	Philips	4.50	GZ32	Mazda	25.00
ECC83	Philips	6.00	GZ32	Philips	25.00
ECC83	RFT	8.00	GZ34	Harma	6.00
ECC83	GE	10.00	GZ37	Mullard	14.00
ECC83	Tungstram	15.00	KT66	G.E.C.	80.00
E83CC	Siemens	25.00	KT88	Sovtek	20.00
ECC84	RFT	5.00	KT88	G.E.C.	125.00
ECC85	RFT	5.00	300B	JJ/Tesla	68.00
ECC86	Telefunken	14.00	5687WB	Philips	5.00
ECC88	Mullard	15.00	5881WXT	Sovtek	5.00
E88CC	Tesla	6.00	6072A	GE	9.00
E182CC	Mullard	12.00	6550C	Svetlana	18.00
ECL86	Harma	6.50	6550WE	Sovtek	16.00
EF86	Russian	7.00	6CG7	G.E.	12.00
EF86	Tesla	10.00	6L6GC	Svetlana	11.00
EL34WXT	Sovtek	6.00	6SN7WGT	Philips	10.00
EL34	Svetlana	8.50	6SN7GT	Tungsol	18.00
E34L	JJ/Tesla	8.50	7119	Amperex	12.00
EL84	Sovtek	4.50	7199	G.E.	15.00
E84M	Russian	6.00	7591A	Harma	16.00
EL84	Philips	15.00	12AX7LPS	Sovtek	8.00
EL519	EI	12.00	12BH7A	Sylvania	12.00
EZ81	Tesla	7.00	13D6	Brimar	15.00

Harma Diamond KT66

At last a KT66 with the sonic capacity of the original whilst retaining the classic shape. The specification of the Harma Diamond KT66 meets or exceeds that of the original GEC. The anode plates use specially stiffened alloy to improve life and performance. The use of premium mica spaces and pure copper grid rods give rock solid stability. They undergo a high plate volt test and come in specially dual matched pairs, with a six month no quibble warranty which is the longest in the business. At only £25 each they will take your Quad into the next Millennium. Please note these are NOT the inferior Chinese made valves.

WATFORD VALVES 3 RYALL CLOSE,
BRICKET WOOD, ST ALBANS, HERTS AL2 3TS



01923 893270

Fast mail order/next day delivery/World Wide shipping
1000's more valves stocked. Prices exclude VAT and carriage.

Fax: 01923 679207

www.watfordvalves.com



Lockwood Audio

SPEAKER MANUFACTURERS'
SURPLUS DRIVERS

Examples:

25mm	Tweeters	Soft or Anodised
110mm	ICT;MF; Bass	
120mm	Bass/Mid	Shielded
135mm	Bass/Mid	
165mm	Mid;Bass/Mid	
172mm	Bass Long throw	
200mm	Bass;Mid/Bass*	
386mm	Bass	
Various	Ellipticals	
4/6/8/16 ohm	pressed/cast/moulded frames	

Crossovers: Termination Panels:Spikes & sockets etc.

*as used in HI FI WORLD Horn Enclosure !

AT A FRACTION OF ORIGINAL COST

Phone Fax email for details

Lockwood Audio

email: sales@lockwood-audio.co.uk

Unit 8, 724 Field End Road, Ruislip, Middlesex, HA4 0QP
Phone +44 (0)20 8864 8008 Fax: +44 (0)20 8864 3064
credit & debit cards welcome



BRITISH SUB BASS OMP 100 WATT SUB BASS Loudspeaker Amplifier Panel. www.bkelec.com/SUB.HTM



Ideal for
building
Audiophile
and Home
Theatre
subwoofer
loudspeaker
Projects

FEATURES:- *100W R.M.S. into 8 ohm *High and Low Level Input *Toroidal Transformer *Short Circuit Protection *D.C. Speaker Protection *Frequency Roll Off, Lower 10Hz, Upper 60Hz to 240Hz(Fully Adjustable) *AC3 Compatible Filter can be by passed for 5-1 Formats. *Airtight Construction *Tens of Thousands of our panels already in use. *Complete with Leads
SPECIFICATION:*Power 100W RMS @ 8 ohms*F.Resp 10Hz-15KHz -3dB *Damping Factor >200 *Distortion 0.05% *S/N A Weighted >100dB *Supply 230V. A.C. *Weight 2.7Kg *Size H254 W254 D95mm

The above item may be ordered by post, fax, e-mail or phone and payment is welcome by cheque or credit card.PRICE: £117.44 + £5.00 P&P Incl VAT

B.K.ELECTRONICS
UNIT 1 COMET WAY
SOUTHEND-ON-SEA
ESSEX SS2 6TR

Web: http://www.bkelec.com
E-mail:- Sales@bkelec.com

TEL: 01702-527572
FAX: 01702-420243



REEVES AND REVOX

REVOX POP UP THE A77

If you're one of the half-million owners and users of one of Revox's legendary A77s and your beloved reel-to-reel recorder is starting to get tired after three decades of service, help can now be found on the Internet.

Brian Reeves, officially-authorized service agent for Revox hi-fi in the UK, has taken to the Web with a site which contains exploded parts listings for many of the company's tape decks as well as some of their turntables and CD players.

www.revox.freeuk.com

Brian Reeves
184 Finney Lane,
Heald Green,
Cheadle,
Cheshire
SK8 3PU
Tel: 0161 499 2349

LIFE AT THE TOP

Fans of full-range drivers normally list amongst their benefits transparency, imaging precision and an overall seamlessness which your average cone-and-dome box just can't replicate. However, single-unit loudspeakers aren't famous for their high-frequency extension, many of them getting only as far as 14-16kHz before their output starts to droop. One answer to this problem is an add-on super-tweeter, such as Visaton's TH16H, supplied in the UK by South Coast Speakers.

The TH16H consists of an aluminium/titanium diaphragm mounted on a 25mm voice-coil which sits within the field of a large strontium-ferrite magnet. Thanks to its low moving mass, the Visaton tweeter offers an efficiency of between 96dB and 100dB when used with SCS's own switched crossover/attenuation box. This allows the TH16H to be fitted to the likes of Lowthers without the need for users to design a matching crossover themselves.

Giving your loudspeaker's treble a boost will set you back £108.94 plus VAT for individual TH16Hs, or £316.88 plus VAT for a pair with crossover/attenuation boxes.

South Coast Speakers
58 Wilton Road,
Southampton,
Hants. SO15 5SZ
Tel: 01703 703221

GOT A LOT ON YOUR PLATE

If the phrase "300B" crops up in a conversation about hi-fi and valves, you can pretty much guarantee that "2A3" won't be far behind. A smaller, lower-power member of the directly-heated triode family, the 2A3 has built up a loyal following, especially in Japan, for its linearity, tonal richness and transparency.

However, getting hold of an original in fine fettle normally involves handing over large sums of money. Cue Svetlana's new version of the 2A3. Modern manufacturing and superior materials apparently give this 21st century triode an even better sound than its predecessor, and a higher anode dissipation means that output has risen from roughly three watts to five in single-ended operation.

New Sensor Corporation
20 Cooper Square,
New York
NY 10003
Tel: (212) 529 0466
www.newsensor.com



Ansar Supersound Polypropylene Axial Capacitor



Audio specific. For transparent & detailed sound with EXTREMELY low distortion. High purity imported metalised polypropylene Tol 5%

Part no	Description	L x D mm	Price
CPW100N	Ansar 100nF 630V	32 x 6.5	1.60
CPW150N	Ansar 150nF 630V	32 x 7.5	1.60
CPW220N	Ansar 220nF 630V	32 x 9.0	1.60
CPW30N	Ansar 330nF 400V	32 x 8.0	1.60
CPW470N	Ansar 470nF 400V	32 x 9.0	1.80
CPW680N	Ansar 680nF 400V	32 x 10.5	1.80
CPW1U0	Ansar 1uF 400V	32 x 12.5	1.80
CPW1U5	Ansar 1.5uF 400V	32 x 14.7	1.80
CPW2U2	Ansar 2.2uF 400V	43 x 14.8	1.80
CPW3U3	Ansar 3.3uF 400V	43 x 17.6	2.20
CPW4U7	Ansar 4.7uF 400V	43 x 20.7	2.50
CPW6U8	Ansar 6.8uF 400V	43 x 22.8	3.00
CPW8U0	Ansar 8uF 400V	43 x 26.5	4.00
CPW10U0	Ansar 10uF 400V	43 x 29.5	4.00
CPW15U0	Ansar 15uF 400V	55 x 34.1	5.50
CPW22U0	Ansar 22uF 400V	55 x 39.3	7.00
CPW25U0	Ansar 25uF 400V	55 x 42.0	7.50
CPW30U0	Ansar 30uF 400V	55 x 44.7	8.50
CPW50U0	Ansar 50uF 400V	83 x 46.0	11.50
CPW60U0	Ansar 60uF 400V	83 x 51.7	13.50
CPW75U0	Ansar 75uF 400V	83 x 55.1	19.00
CPW80U0	Ansar 80uF 400V	83 x 56.8	19.50
CPW100U0	Ansar 100uF 400V	115 x 55.1	20.00
CPW125U0	Ansar 125uF 400V	115 x 60.9	26.00

Dual Polypropylene Smoothing Capacitors

To replace old electrolytics or for new designs. Wire tails.

Part no	Description	L x D mm	Price
CPW1616	Propyl 16x16 400V	100 x 50	25.00
CPW3232	Propyl 32x32 400V	115 x 61	30.00

Philips Polypropylene Axial 1%

Blue coated Film & Foil. Epoxy coated, low inductance metal foil & film. Supremely stable. Tolerance 1%

Part no	Description	Price
CPH47P	Propax 47pF 630V	0.40
CPH100P	Propax 100pF 630V	0.40
CPH150P	Propax 150pF 630V	0.35
CPH220P	Propax 220pF 630V	0.35
CPH30P	Propax 330pF 630V	0.35
CPH470P	Propax 470pF 630V	0.35
CPH680P	Propax 680pF 630V	0.35
CPH1N0	Propax 1nF 400V	0.45

Part no	Description	Price
CPH1N5	Propax 1.5nF 250V	0.45
CPH2N2	Propax 2.2nF 250V	0.45
CPH3N3	Propax 3.3nF 250V	0.45
CPH4N7	Propax 4.7nF 160V	0.50
CPH6N8	Propax 6.8nF 160V	0.50
CPH10N	Propax 10nF 63V	0.65
CPH22N	Propax 22nF 63V	0.75
CPH33N	Propax 33nF 63V	1.10
CPH47N	Propax 47nF 63V	1.30

Audio Electrolytics Radial

105 deg C +PLUS+ low impedance. These superior electrolytics offer a low impedance path to the signal, resulting in a very open & detailed sound. The use of high temperature materials ensure that these capacitors enjoy a long & stable life.

Part no	Description	Price
1Y50	Lo Imp Hi Temp 1uF 50V	0.25
2U2Y50	Lo Imp Hi Temp 2.2uF 50V	0.25
4U7Y100	Lo Imp Hi Temp 4.7uF 100V	0.25
10Y63	Lo Imp Hi Temp 10uF 63V	0.25
22Y63	Lo Imp Hi Temp 22uF 63V	0.30
47Y63	Lo Imp Hi Temp 47uF 63V	0.35
100Y63	Lo Imp Hi Temp 100uF 63V	0.50
220Y50	Lo Imp Hi Temp 220uF 63V	0.75
470Y63	Lo Imp Hi Temp 470uF 63V	1.25
1000Y35	Lo Imp Hi Temp 1000uF 35V	1.50
2200Y50	Lo Imp Hi Temp 2200uF 50V	2.25
4700Y25	Lo Imp Hi Temp 4700uF 25V	2.50

Trobo High Ripple Reservoirs

Excellent for Audio. Long life. High reliability 100VDC caps with screw terminals

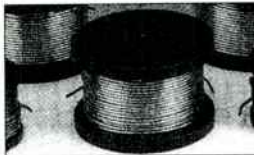
Part no	uF/Voltage	Price
10000C100	10000uF 100V	20.00
22000C100	22000uF 100V	30.00

Alcap Bipolar Electrolytics

Axial leads 50% Tol: 10% Primarily for use in speaker crossovers.

Part no	Description	Price
CAB1	Alcap 1uF	0.25
CAB2U2	Alcap 2.2 uF	0.40
CAB3U3	Alcap 3.3uF	0.40
CAB4	Alcap 4uF	0.40
CAB5	Alcap 5uF	0.40
CAB6U8	Alcap 6.8uF	0.50
CAB8	Alcap 8uF	0.50
CAB10	Alcap 10uF	0.50
CAB16	Alcap 16uF	0.65
CAB20	Alcap 20uF	0.65
CAB25	Alcap 25uF	0.65
CAB35	Alcap 35uF	0.65
CAB50	Alcap 50uF	0.75
CAB60	Alcap 60uF	0.85
CAB80	Alcap 80uF	1.00

Monacor Air Cored Inductors.



A range of professional air cored inductors for 80 or 40 crossovers/filters for use up to 300W. 1.2mm enamelled copper wire wound on air spaced plastic bobbins.

Part No	Specification	Price
P15	150uH 0.15Ω 8x19mm	£2.00
P22	220uH 0.15Ω 8x19mm	£2.50
P33	330uH 0.2Ω 8x19mm	£3.00
P47	470uH 0.25Ω 50x19mm	£3.50
P68	680uH 0.35Ω 59x19mm	£4.50
P100	1mH 0.4Ω 59x19mm	£6.50
P150	1.5mH 0.5Ω 70x30mm	£8.00
P220	2.2mH 0.6Ω 70x30mm	£10.00
P330	3.3mH 0.75Ω 70x30	£10.00

Monacor Ferrite Inductors



A range of professional high efficiency ferrite cored inductors with very low ohmic losses for 80 or 40 crossovers or filters for use up to 400W. 1.4mm enamelled copper wire (1.3mm on F1000) wound on plastic bobbin.

Part No	Specification	Price
F220	2.2mH 0.15Ω 400W 55x31mm	£6.50
F330	3.3mH 0.20 330W 65x39mm	£9.50
F470	4.7mH 0.25Ω 140W 65x30mm	£11.00
F680	6.8mH 0.35Ω 120W 65x39mm	£12.00
F1000	10mH 0.45Ω 100W 65x39mm	£13.50

High Quality Valves

Part No	Description	Price
6550C	OUTPUT VALVE	£26.00
6L6GT	OUTPUT VALVE	£4.50
6SN7GT	OUTPUT VALVE	£4.50
6V6GT	OUTPUT VALVE	£3.95
ECC81	TRIODE	£4.50
ECC82	TRIODE	£4.50
ECC83	TRIODE	£4.50
EF86	LOW NOISE PENTODE	£9.90
EL34	OUTPUT VALVE	£8.50
EL84	OUTPUT VALVE	£3.50
GZ34	RECTIFIER	£6.50
KT88	OUTPUT VALVE	£20.00

Valve Holders - High Quality Valve Bases. Chassis Mounting With Screw Fittings.

Part No	Description	Price
B9AC	B9A VALVE HOLDER CERAMIC	£1.50
OCTC	OCTAL VALVE HOLDER CERAMIC	£2.00
OCTP	OCTAL VALVE HOLDER PHENOL	£1.50

Fully Gold Plated Phono (RCA) Plugs with spring coil cable grip.



Part No	Description	Price
PPG5A2	PAIR GOLD PLUGS for up to 5mm CABLE	£1.50 pair
PPG8A2	PAIR GOLD PLUGS for up to 8mm CABLE	£1.50 pair

Very High Quality Phono (RCA) Plugs



Very high quality satin grey metal with heavy gold plated connections. Top collet cable grip & PTFE insulators. Very low noise.

Part No	Description	Price
PPGGH2	GOLD PTFE PLUGS for up to 6mm CABLE	£3.50 pair
PPG8H2	GOLD PTFE PLUGS for up to 8mm CABLE	£3.50 pair

Extra High Quality Gold Plated Phono Oxygen Free (RCA) Leads (pairs)



Highly flexible oxygen free cable with extra moulded-in control / grounding wire.

Part No	Length/Colour	Price
LPP1QG	0.8 Metres/Green	£5.50
LPP2QG	1.5 Metres/Green	£6.50
LPP5QG	5 Metres/Green	£11.00

Bass Reflex Tuning Ports



A range of adjustable plastic ports for use in various sizes of loudspeaker cabinets. d=diameter L=adjustable length (mm)

Part No	Dimensions	Price
R35	d=35L=110-210	£2.50
R50	d=50L=150-280	£3.00
R70	d=70L=128-245	£3.50
R100	d=110L=160-122	£5.50
R85	d=85 angled 45° for narrow cabinets L=210-310	£6.50

High Quality Components at the right price. Please add £3.00 carriage + VAT to all orders. Credit Card phone orders accepted.

Cricklewood Electronics Ltd, 40 & 42 Cricklewood Broadway, London NW2 3ET. Tel: 0208 452 0161 Fax: 0208 208 1441

Vacuum Tubes for Audio Are Back!

Glass Audio brings together yesterday's tube with today's improved components, voltage control, and the exciting new Soviet tubes, to make smooth sound in your livingroom possible again!

YES!

Please send my first issue of *Glass Audio*. I'll pay just \$45.00 for six issues (1 year); \$80.00 for 12 issues (2 years) of the best information on tubes to be found anywhere. I understand that my satisfaction is guaranteed!

Name _____

Street & Number _____

City _____ Postal Code _____

Country _____

REMIT IN US \$ DRAWN ON A US BANK ONLY. PRICE GOOD THROUGH DECEMBER 31, 1995.

We Accept MC/VISA.

Glass Audio

PO Box 176, Dept. HFWS, Peterborough, NH 03458-0176 USA
Phone: (603) 924-9464 or FAX 24 hours a day (603) 924-9467

KIT MEETS KaT IN 88

Nick Lucas announces the arrival of KaT88, a matching power amp for our KiT88 integrated.



Judging by the response to the release of our KiT88 integrated amplifier back in February's DIY Supplement No49, it would be an understatement to say that the KT88 tetrode is much loved amongst valve heads. To quote one fan, "I have been waiting for you guys to start using the KT88. What took you so long?" Well, we are now definitely on the case, as KiT88 is about to be joined by KaT88

KiT and KaT are no relation to a popular piece of confectionery. Instead, one is an Integrated, the other a power Amp. Aesthetically, KaT88 has a similar look to its sibling's, though the only front-panel control is the custom-made chrome knob on the On/Off switch - KaT88 is basically the power amplifier version of KiT88.

Bypassing the selector, tape source switch and volume control that distinguish the integrated and replacing them with a single set of inputs that feeds directly into the first valve has the advantage of a less cluttered signal path and offers greater flexibility to dedicated pre-amplifier users. The circuit is basically identical to that of KiT88, but as the volume control is now unused, R28/R29 has been reduced to 100kohms to compensate. The measured performance remains the same as for the KiT88, but does it sound the same?

CONSTRUCTING THE 88 SERIES

The build sequences of KiT88 and its sister KaT88 follow the same formula that we apply to all our valve equipment:

1) FIXING THE HARDWARE TO THE CHASSIS

The initial stages are straight forward enough and revolve around fitting the front plate and associated sockets and switches before crowning them with their respective chrome knobs. As mentioned before, the KaT88 only has a power switch up front.

Next to go on are the mains and output transformers, the gold-plated phono sockets and the 4mm binding posts. Yes, I have had a change of heart on the speaker connection front as the majority of kit buyers live in the UK and already use 4mm banana plugs on their speaker leads. The alternative BFAs will be provided for our European cousins. All that remains is

the IEC mains input socket and the earth post situated to the rear.

2) POPULATING THE PCB

The KiT88 and KaT88 owe their ease of construction to the fact that all the valve bases and electronic components are linked together through a Printed Circuit Board rather than hard-wiring.

Additionally, all the parts are supplied in separately-labelled bags, which means less chance of putting the wrong bit in the right place. The PCB itself is double-sided, so all joints require soldering to its upper as well as lower surfaces (except for the electrolytic capacitors). Component orientation is very important when it comes to these caps, the bridge rectifiers and the octal valve bases. The high-power resistors also have to be a good 10mm off the PCB surface to avoid tarnishing it.

3) VALVE HEATERS AND INTER CONNECTIONS

Once all the components are sitting nice-

ly, the valve heaters can be wired up. Heaters, and especially those of the output tubes, carry plenty of current. To avoid over-stressing PCB tracks, we chose

now use PCB terminal pins in our kits, all 23 external connections are easy to make, though this time you may find it slightly easier to complete these connections

before fitting the PCB onto its stand-offs. This allows slightly more manoeuvrability without distressing any joints.

5) NON-PCB CONNECTIONS

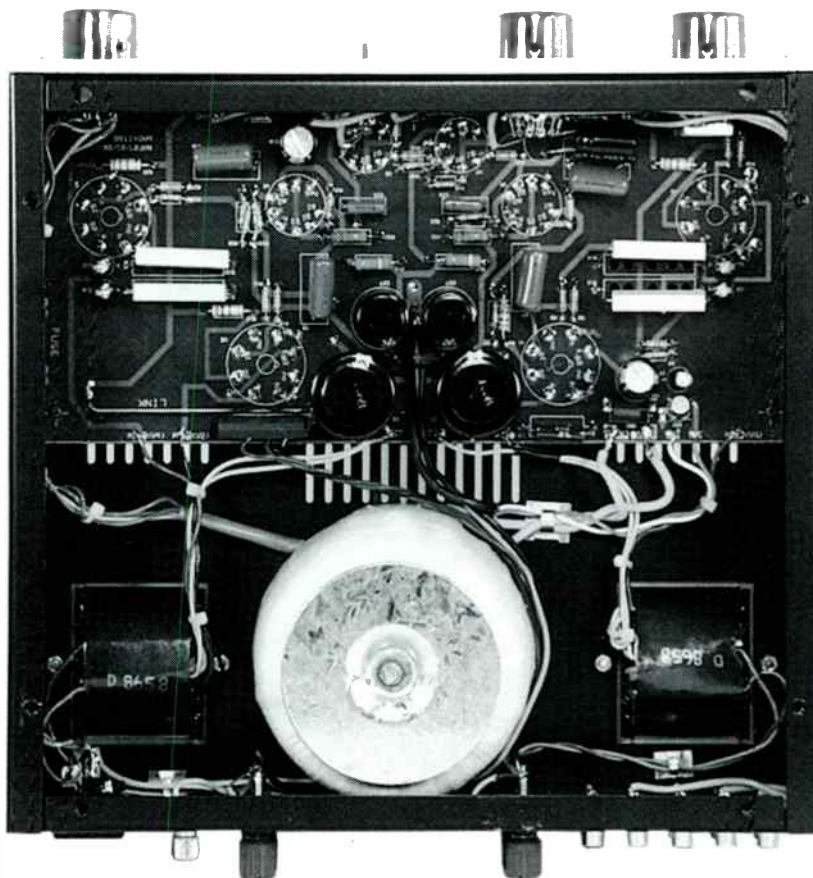
All that remains now is to hook up the IEC mains input socket to the mains switch and the output transformers to the speaker binding posts.

6) PRE-FLIGHT CHECKS

Insert all the valves, ensuring that you have the KT88s orientated correctly by checking that the 'key' on the base of each lines up. Connect a dummy load,

whether an old pair of speakers or a high-power, 7-10 ohm resistor. Bear in mind that you'll need a pre-amp for the KaT88, be it active or passive, to control the signal level.

Once you've fired up the amplifier, you're ready to check the test voltages, but before you do so, remember to put on the safety gloves provided. We have included two 220kohm, 2watt dropper resistors in parallel with the large 470uF, 450V reservoir capacitors, C1 and C2, so



Internal view of Kit88

point-to-point wiring for this area. Each valve base PCB section has pin pairs, or just a single pin, to allow simple wiring direct to the board. Additionally, there are three external wire links.

4) CONNECTING UP THE PCB

The PCB fits snugly into the case, held securely in place by six stand-offs. As we

SOUND QUALITY

The power amp version of our KiT88 integrated benefits sonically from one of the cleanest valve sounds around. Even used with a passive pre-amplifier, the bass has all the values of the venerable valve, which is a rounded sound that also manages to be tight and tuneful - it literally bounces along. This was best exemplified on an excellent remix I have of Jamiroquai's Space

Cowboy. This has some of the subtlest, deepest, most powerful bass ever committed to disc, and the KaT88 did it proud. Speed and slam were the prerogatives as the amp brought out the essential aspects of the mix and delivered them with power and control.

Whilst the above track emphasised the clout of the amplifier, a detailed and spacious recording of Stravinsky's Rite Of Spring on Reference Recordings demonstrated the warmth and sweetness of the treble. High percussion had an attractive

golden shimmer, leaving the strings and woodwind securely located within the warehouse-style sound stage the amp created. Again the speed and impact of the bass came to the fore on the deep bass drum as window-rattling thumps, although the athletic bottom-end never disturbed the clarity and transparency of the midrange on the light and airy woodwind interjections. The KaT88 really did this excellent recording justice. Great stuff; I am waiting with baited breath for my reference model to arrive.

that after switch-off they are bled of any residual voltage after a few minutes. This safety measure reduces the possibility of an electric shock. The build time for KaT88 is approximately eight hours. If you do encounter any problems once

the amp's assembled, turn it off and carefully check your work for any unsoldered pins or misplaced components. Believe me, 99% of all malfunctions are down to silly mistakes. However, should you encounter real difficulties, you are wel-

come to call our help line. Alternatively, for a nominal fee, we will arrange for the amplifier to be collected, fixed, thoroughly checked and returned to yourself in full working order.

Kit88 parts list

RESISTORS: POWER SUPPLY

R1	5.6K, 6W	1
R3	36K, 0.66W	1
R4	8K2, 3W	1
R5	13K, 0.66W	1
SIGNAL		
R6	100R, 1W	1
R736K, 1W made up of the following resistors in parallel		
	68K, 0.66W	1
	75K, 0.66W	1
R8	1K, 0.5W	1
R9	330K, 0.5W	1
R10	1K, 0.5W	1
R11	330K, 0.5W	1
R12	100R, 1W	1
R13	150R, 7W	1
R14	150R, 7W	1
R15	150R, 7W	1
R16	150R, 7W	1
R17	39K, 3W	1
R18	39K, 3W	1
R1947K, 1W made up of the following resistors in parallel		
	91K, 0.66W	1
	100K, 0.66W	1
R2036K, 1W made up of the following resistors in parallel		
	68K, 0.66W	1
	75K, 0.66W	1
R21	15K, 3W	1
R22	15K, 3W	1
R23	1M, 0.5W	1
R2447K, 1W made up of the following resistors in parallel		
	91K, 0.66W	1
	100K, 0.66W	1
R25	1M, 0.5W	1
R26	330K, 0.5W	1
R27	1K, 0.5W	1
R28	1M, 0.5W	1
R29	1M, 0.5W	1
R30	330K, 0.5W	1
R31	1K, 0.5W	1
R32	100R, 1W	1
R33	100R, 1W	1
R34	6K8, 0.5W	1
R35	6K8, 0.5W	1
R36	330R, 0.5W	1
R37	330R, 0.5W	1
R38	330R, 0.5W	1
R39	330R, 0.5W	1
R40	6R8, 0.25W	1
R41	6R8, 0.25W	1
VR1	100K log dual	1

POWER SUPPLY

C1	470uF 450V	1
C2	470uF 450V	1

C3	4700uF 16V	1
C4	100uf 63V	1
C5	100uF 450V	1
C6	100uF 450V	1
SIGNAL		
C7	0.47uF 630V	1
C8	0.47uF 630V	1
C9	220uF 25V	1
C10	220uF 25V	1
C11	220uF 25V	1
C12	220uF 25V	1
C13	0.47uF 250V	1
C14	0.47uF 250V	1
C15	0.47uF 630V	1
C16	0.47uF 630V	1
C17	4700uF 16V	1
C18	4700uF 16V	1
C19	3.9nF 160V	1
C20	3.9nF 160V	1

BRIDGE RECTIFIER

BR1	Semikron SKBB500C3200/2200	1
BR2	General Semiconductors 2KBP02M	1
BR3	General Semiconductors WO2GBIAS	1

TRANSFORMERS

E/I output transformer	2
Toroidal mains transformer	1

HARDWARE

mains switch rotary	1
PCB fuse holder	1
Fuse cover	1
Fuse 1.6A slow blow	1
SELECTOR	1
BLK PHONOS	5
RED PHONOS	5
BFA sockets	2
IEC to UK plug	1
FEET	4
Octal valve base	4
B9A valve base	2
B7G valve base	2
Tape/Source Switch	1
IEC + fuse inlet socket	1
wire assorted	
Chrome knobs	3
Chassis & base	1
Front panel	1
KIT PCB	1

VALVES

Tesla KT88	4
Edicron 6AU6	2
Edicron ECC82	2

The 88 series of amplifiers is available as kits from Hi-Fi World

	UK (inc. vat & p&p)	Overseas (exc. vat & p&p)
Kit88 integrated amp K240/120 (with valves)	£440.00	£375.00
Kit88 integrated amp K240/120(without valves)	£325.00	£275.00
KaT88 power amplifier K240/120 (with valves)	£425.00	£365.00
KaT88 power amplifier K240/120(without valves)	£310.00	£265.00

Call Nick Lucas on 0171 625 8032 (9am-5pm, Monday-Friday) for more information.
E-mail: wad@hi-fiworld.co.uk. For overseas freight charges, please call, fax or e-mail.

Falcon Acoustics Ltd

Falcon Electronics, Basically Sound

<http://www.falcon-acoustics.co.uk>

DRIVE UNITS: by FOCAL & SEAS, and a pick of the best from other manufacturers.

100+ CROSSOVER NETWORKS: - Active & Passive, Components, Accessories, COMPONENTS

SOLLEN Polypropylene capacitors. 0.1mFd. to 100mFd.

Polyester and Polycarbonate Film Capacitors. 0.1mFd. to 10mFd.

ALCAP Reversible Electrolytic Capacitors (Non-Polar); 50v, 100v & Low Loss. 2mfd. to 600mFd

FALCON Custom-wound Inductors.

FERRITE:- Standard, High Power, Super Power, Super Super Power + AIRCORED 0.56 - 1.25mm wire

NEW IRON DUST. 1mm wire

TAPPED INDUCTORS:- 0-10mH in 1mH steps & 0-1mH in 0.1mH steps

AUDIO AMATEUR PUBLICATIONS

NEW- Valves for Audio Frequency Amplifiers from Philips Technical Library plus lots in P/L.

Back year sets of Speaker Builder, Audio Amateur & Glass Audio, plus the Audio Anthology Set.

Altogether 50+ books and 50+ Audio Amateur's magazine year sets. 1999 sets available

FOCAL® 'State of the Art' Units & Kit Designs

C800 Mk II

82 litres

3 way floor standing

92 dB/watt system

-3dB point of 32Hz.

PolyKevlar 10" bass & 5" midrange

Titanium dioxide dome tweeter



From a wide range of High-Tech Loudspeaker units.

Unit Spec Booklet available 30p.

Please send A4 SAE with 40p stamp (61p with PL) +30p extra stamps.

SUPPLIERS TO THE TRADE SINCE 1972

Send for our FREE price list PL28: Just send a large S.A.E. (40p stamp) or US\$2 bill overseas,

Europe US\$1 bill or 3 International Reply Coupons (IRC) to:- (Dept HFW) Tabor House,

Norwich Road, MULBARTON, Norwich, Norfolk. NR14 8JT Tel (0)1508 578272

NEW PRODUCTS FOR VALVE PRE AMPS

Full range of Mumetal input and output transformers for balanced and unbalanced pre-amps, microphone amps, equalizers etc.



SOWTER EST. 1941
TRANSFORMERS

For the true "valve sound" and elimination of hum and interference in your own or vintage designs. A new range and custom service for low power transformers to complement our power amplifier products. Transformers built to order 2-4 weeks delivery. Full technical support. Free catalogue. Visa, MasterCard, JCB etc.

E A Sowter Ltd
PO Box 36 IPSWICH
IP1 2EL England
Tel: (+44) (0) 1473 252794
Fax: (+44) (0) 1473 236188

E-Mail: sales@sowter.co.uk
techsupport@sowter.co.uk
Call or visit our Website for
catalogue and information
<http://www.sowter.co.uk>

A MESSAGE.....

from the U.K.s Premier Valve-equipment Repair & Restoration Centre:

"IT DOESN'T MATTER whether your equipment is Old, New, in Kit form, Valve, Solid-state, Audio or R.F."

We...

Repair, Restore, Re-calibrate, Re-align:-

Tape recorders by Revox, Tascam (up to 1"), Teac, Akai ;

Valve amps., pre-amps., tuners, cinema amps.,

theatre-organ amps., industrial p.a. amps. from Radford, Quad, Leak,

Kalee, Clarke & Smith, Compton, Parmeko, RCA, Allobass etc;

Valve Communications Receivers and Transmitters

(to 30 MHz/2kW/6'6 tall) by KW, Marconi, Labgear, Eddystone,

Redifon, Ajax, RCA, Tiger and so on.

We will...

Build that Kit for you or

Re-build it if you've had a go but it's gone pear-shaped.

We will...

Custom-build for you a published Classic design or

Design something special and build the prototype

(A 250-watt AB2 high level modulator, Sir? No problems!!)

All this,

as well as being an Authorised Service Centre for such respected names of the Digital Era as Denon, Pioneer, Kenwood, Yamaha.

Overall, some pretty comprehensive facilities.... and it will take only a few minutes of your life plus a few pence from your pocket to call/fax and discuss your requirements: 0113 244 0378

We are:

AUDIO LABORATORIES (LEEDS)

3 Kildare Terrace Industrial Estate,
Leeds LS12 1DB, England

Website Under Construction...Watch This Space!

TECHNICAL & GENERAL

SOME NECESSITIES - FROM THE ORIGINAL CLASSIC TURNTABLE SPECIALISTS

CONNOISSEUR			P&P
	BD1/2 Drive Belt		£11.60
	BD1/2 Motor Suspension kit		£14.50
	SAU.2 Headshell		£17.50
	SAU.2 Connecting Lead		£16.50
			£3.20
GARRARD Standard Models			
	Wired arm tubes	from	£14.50
	Cartridge carriers (sliders)		£12.50
			£1.90
301/401 Transcription models			
Original	Thrust pad assembly		£12.50
Original	Idler tension spring		£3.25
Original	Brake pad		£2.40
Xeroxcopy	Owners Manual 301 incl. full size mounting template		£9.30
	401		£7.20
			£1.90
Replacement	301 control knobs On-Off/Speed select	pair	£21.50
Replacement	301 suppressor unit		£6.20
Replacement	301 motor pulley (-2%), (-1%), (Std), (+1%)	each	£16.20
Replacement	301 Chrome plated mounting bolts	set	£7.20
Recommended	Lubrication set - early 301 or 301/401	(specify)	£6.20
			£1.90
GOLDRING/LENCO			
	Idler wheel (lock-nut or clip fixing)		£21.20
	Tension spring		£3.25
	Arm pivot bearings - with fitting instructions		£9.25
	Spindle/Main bearing assembly complete	GL.69/72	£21.00
		GL.75/78	£25.00
	Chassis suspension springs (set of 4)	set	£19.50
	Headshells	from	£22.25
	Instruction books	from	£4.50
			£1.90
THORENS			
	TD.124 series		
	Idler wheel original		£28.50
	Idler wheel our redesigned replacement		£16.50
	Drive belt		£17.50
	Suspension rubbers ('mushrooms')		£16.50
	TD.150/160		
	Drive Belt		£14.70
	Suspension springs (-1%), (Std), (+1%) (set of 3) set		£13.50
	Suspension - main bushes (set of 3)	set	£13.50
	Armboards TD.150 blank		£12.50
	TD.160		£10.20
			£2.90
CECIL WATTS			
	Dustbugs & spares - incl. Preener wicks		

Cartridges and styli for 78s and Mono LPs in addition to current Stereo LPs

TECHNICAL & GENERAL

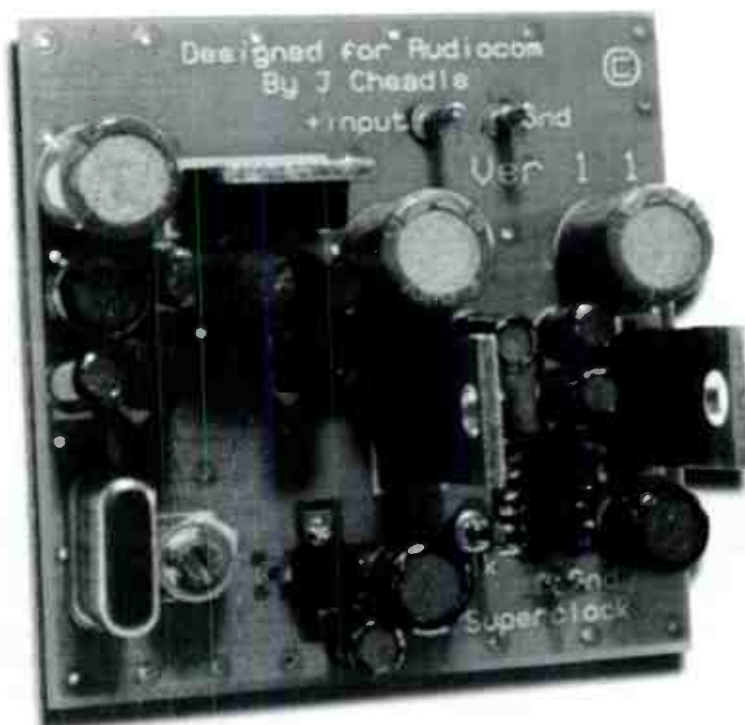
PO BOX 53, CROWBOROUGH, EAST SUSSEX, TN6 2BY
TELEPHONE: 01892 654 534

TIMING ON TRIAL

Jon Marks goes on litter duty to clean up messy master clocks inside CD players. Helping him tidy up this month is AudioCom's SuperClock.

One of the greatest clichés in the world of hi-fi has got to be the classic, "Perfect sound forever". However, CD is taking a while to live up to this golden nugget of hype, but then the format itself is not always to blame.

One of the major problems with digital replay is that, when you're putting all those sampled bits of information from the disc back together, the timing has to be spot on - it's no use a few turning up late with excuses like, "Sorry, Miss, the cat ate my homework." You might be thinking that the master clocks inside CD players (which do, after all, synchronise all the machine's various digital circuits) would be works of quartz-regulated art, designed to exacting timing tolerances to squeeze every last ounce of performance from the small silver disc. Unfortunately, the reality is rather different - many companies seem to work to the adage that "bits is bits" and as long as they're all there, and the timing isn't miles off, then that's alright. Actually, instead of producing a clean, stable square wave whose regularly-spaced peaks and troughs tell the master clock precisely when to 'tick' and when to 'tock', the oscillators in most equipment put out saw-tooth waves that are the equivalents of 'errm, tick, no tock!' Recognising this pitfall, companies such as AudioCom, Trichord and Acoustic Precision have cooked up their own high-accuracy after-market clocks. In this Supplement, we examine AudioCom's in our two test beds, a Pioneer DV-505 DVD player and an aged but sprightly Pioneer PD-91 CD player. This pair was chosen for two main reasons, the chief being that they have a common clock frequency of 16.9344MHz. The other is that many of these clocks will be soldered into machines which are old enough to be built like tanks but fitted with particularly poor clocks.



AudioCom's SuperClock

INSIDE THE SUPERCLOCK

Designer of the SuperClock, John Cheadle, was aiming for a clock with a very fast rise time (and so a clean square wave), negligible jitter and low phase noise. Minimising the last of these involves a push-pull circuit with a series-mode oscillation quartz crystal placed at the point of lowest impedance. After travelling through a MOSFET buffer stage, the signal is fed into an IC which converts it from a sine to square wave.

GETTING IN

Gaining access to the relevant board in the DV-505 is a rather fiddly affair. Having removed the lid, undo the two screws which hold the SCART socket onto the rear panel and lift the metal clip above it which will still be holding it in

place. Next, take out all the screws remaining on the rear panel and lift it up and off.

To fit the new clock, you'll have to take out the beige PCB with the output socketry on it. This entails disconnecting CN301, which is located beside crystal 301 (not the one you should replace, by the way, as it operates at 18MHz, not 16MHz!) This leaves two ribbon cables hooking the output board to the main PCB, but these are fairly flexible and won't hamper the clock-fitting process. Once the four screws holding the board down have been removed, you can lift it gently away from the chassis.

SOLDER SURGERY

Now it's time to get down to the real modifications. Once you've warmed up your soldering iron, use it to remove R320

ACTIVE CROSSOVER MODULES

- A true reference for other active crossovers.
- Individually calibrated in our workshop for your loudspeaker. Analogue phase linear.
- User adjustments - Instructions supplied.
- More accurate than the best loudspeaker computer software.
- Built using audiophile components.
- Fully alterable for future loudspeakers.
- Available for 2 way, 3 way, satellite and subwoofer systems.
- Specifications:
 <0.0002% Distortion
 >110dB S/N Ratio
 <0.5µs Rise Time
 0Hz to 450kHz Bandwidth.

Available exclusively from

AUDIO∞LINKS

7 Fairmont Crescent, Scunthorpe, North Lincolnshire DN16 1EL
 TEL (+44) 01724 - 870432 FAX (+44) 01724 - 875340

Audiophile Sound • Professional Finish • Affordable

Our aim at Riverside Audio is to enable the home constructor to build valve amplifiers which combine true audiophile sound quality with the professional finish of high-end products at an affordable price.



The Riverside 4040 is an integrated amplifier featuring dual mono construction, five line level inputs and both 4 and 8 Ω outputs. The chassis is hand polished stainless steel and includes a matt black valve cover. The amplifier delivers 40 Wrms per channel at less than 0.1% distortion. Kit £625, fully built £725.

The Riverside P2 moving magnet phono amplifier is designed to partner the Riverside 4040 for those who enjoy the vinyl sound. High accuracy equalization is provided for a moving magnet input to a generous line-level output. Kit £225, fully built £275.

Contact Riverside Audio for further information and pricing. Most parts are available separately - even down to individual components. Riverside Audio can also design special audio mains and output transformers.

Riverside Audio, 18 Riverside, Cambridge CB5 8HL
 Telephone (01223) 512253 Facsimile (01223) 572629
 Internet—<http://www.riverside-audio.demon.co.uk/>

LANGREX SUPPLIES LTD

DISTRIBUTORS OF ELECTRONIC VALVES, TUBES AND SEMI-CONDUCTORS AND I.C.S.

1 MAYO ROAD • CROYDON • SURREY CR0 2QP

24 HOURS EXPRESS MAIL ORDER SERVICE ON STOCK ITEMS

PHONE

0181 684 1166

E-MAIL: LANGREX@AOL.COM

FAX

0181 684 3056

A selection of our stocks of **New Original Valves / Tubes.**
 Many other brands available.

STANDARD TYPES			SPECIAL QUALITY TYPES			AMERICAN TYPES			OTHER TYPES		
ECC83	E.I	3.00	A2900/CV6091	GEC	17.50	12AX7WA	SYLVANIA	6.00	ECC81	RFT	3.00
ECC85	RFT	5.00	E88CC/CV2492	BRIMAR	4.50	12BY7A	GE	7.00	ECC82	RFT	5.00
ECC88	BRIMAR	4.50	E88CC/CV2492	MULLARD	8.50	5687WB	ECG	6.00	ECC83	RFT	6.00
ECC88	MULLARD	6.00	ECC81/CV4024	MULLARD	6.00	6072A	GE	6.00	EF86	USSR	5.00
ECH81	MULLARD	3.00	ECC81/M8162	MULLARD	7.50	6146B	GE	15.00	EL84	USSR	2.25
ECL82	MULLARD	5.00	ECC81/6201	MULLARD	8.50	6336A	RCA	35.00	EL34G	SOVTEK	5.00
ECL86	PHILIPS	5.00	ECC82/CV4003	MULLARD	7.50	6550A	JAN GE	25.00	EL34	E.I	5.00
EL36	MULLARD	5.00	ECC82/M8136	MULLARD	10.00	7027A	GE	25.00	6SL7GT	USA	5.00
EZ81	MULLARD	5.00	ECC83/CV4004	MULLARD	20.00	7581A	SYL	15.00	6SN7GT	USA	7.50
EZ80	MULLARD	5.00									
GZ33/37	MULLARD	15.00									
5Z4G	BRIMAR	5.00									
6V6GT	BRIMAR	6.00									
12E1	STC	10.00									
13E1	STC	85.00									
807	HYTRON	7.50									
811A	RCA	25.00									
6080	MULLARD	10.00									

THESE ARE A SELECTION FROM OUR STOCK OF OVER 6000 TYPES. PLEASE CALL OR FAX FOR AN IMMEDIATE QUOTATION ON ANY TYPES NOT LISTED. WE ARE ONE OF THE LARGEST DISTRIBUTORS OF VALVES IN THE UK.

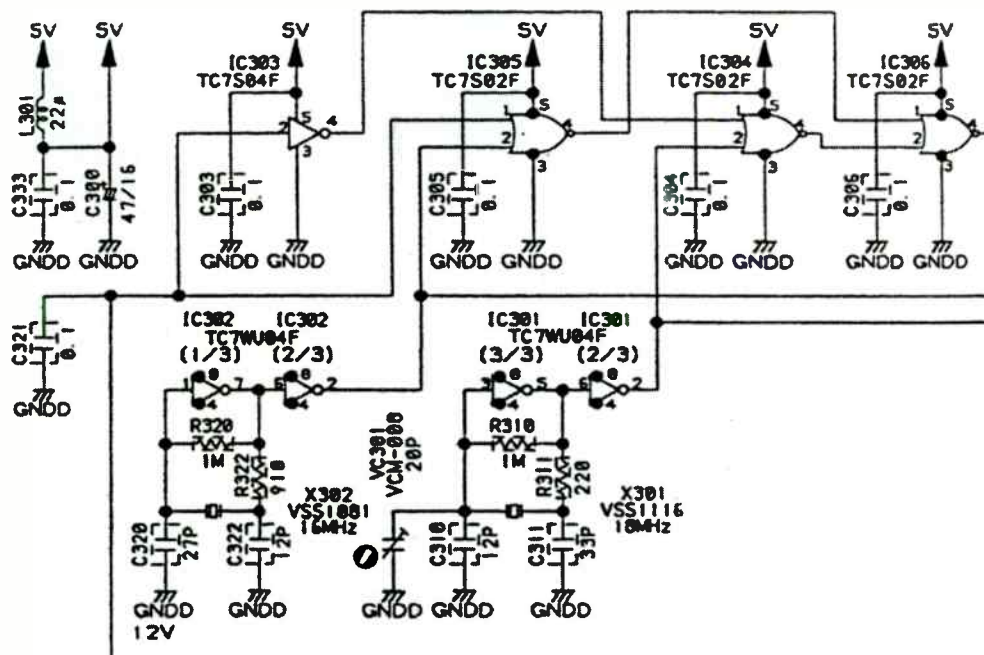
SAME DAY DESPATCH VISA/ACCESS ACCEPTABLE. OBSOLETE TYPES A SPECIALITY.

CREDIT CARD MIN ORDER £10.00.

OPEN TO CALLERS MON.-FRI. 9AM - 4PM. CLOSED SATURDAY

U.K. P&P 1-3 VALVES £2.00, 4-6 VALVES £3.00 ADD 17.5% VAT TO TOTAL INC P+P. O'SEAS P & P PLEASE ENQUIRE





Make sure you remove the correct crystal when working on the DV-505 - it's X302.X301 that controls the video circuitry

(1Mohm), R322 (910ohm), C320 (27pF) and C322 (12pF), all of which are located on the underside of the output board. (Beware, as these are very small surface-mount parts which are most easily removed with the appropriate bit, although a standard iron and some solder braid will also work). Crystal X302 has to go as well.

One point which clock manufacturers all agree on is that the signal leads from their devices to the relevant ICs inside the players need to be kept as short as possible. By putting a link across C322, you can simply connect the S-Clock's signal + and - wires to the pads which used to be occupied by the original crystal. The S-Clock's green (-) should go to the pad between C322 and R322, whereas the black (which is, slightly confusingly, the + output) should go to the other pad between C320 and R320.

By fitting the S-Clock in this position, you can keep its signal leads extremely short - about 12mm long, in fact. However, this does entail placing the S-Clock PCB (on the supplied double-sided adhesive foam pads) upside-down just below the back right corner of the transport as you look at the '505 from the rear (see picture).

The only other connections to make are the power supply + and -, which will

run from the S-Clock around under the edge of the output PCB. The best place to hook up in this case is the underside of connector CN191 (close to the centre of the output PCB), whose pins five or nine are where the black PSU wire should be soldered to. Pin 3 (+12V) can accommodate the red wire, although this can result in a tight squeeze, especially as the S-Clock wires are relatively thick. I ended up soldering it to the CN191 side of nearby R190 to reduce the possibility of shorts.

With the S-Clock nestling snugly inside the DV-505, all that remains is to double-check your work before firing up. I can't emphasise how important this is, as the urge to just whack the lid back on and get a CD in the drawer as swiftly as possible can be very strong. Unfortunately, it's this classic situation which tends to lead to more barbecued equipment than any other. Check the polarity and position of all the connections from the S-Clock, and only when you're 100% satisfied that you've made no errors, reassemble the player and power it up. **SQUARE SOUNDS** So what sonic differences come with a change from sloppy master clock signal to one that's a nice, clean square wave? Well, in a nutshell, every aspect of the DV-505's performance improves in a major way with the fitting of the S-Clock.

The player used for this test had already been modified to sound considerably better than the standard machine with the widespread use of tantalum decoupling caps, but the addition of the S-Clock was a vastly more effective upgrade.

The most obvious change to the sound was the extra solidity and impact on all kinds of music. Trying out something with a weighty bassline now (Moloko's 'I'm Not A Doctor, Asian Dub Foundation's 'Rafi's Revenge, Presence's 'All System's Gone) turned out to be a revelation. Drum machines now had greater focus, speed and slam than the '505 had previously been able to endow them with, and rhythms were crisper and enjoyed more drive. Classical

recordings benefitted in a similar fashion, Elgar's violin concerto possessing superior dynamics, involvement and overall realism. The Pioneer's level of finesse and transparency also took a leap forward with the S-Clock in place, complex passages easier to follow and the performers more clearly depicted within a larger, more convincing acoustic.

Moving on to Bonnie Raitt, Suzanne Vega and the Jazz of Tois' 'Forbidden Fruit confirmed tonal colour and expression had nipped a rung or two up the evolutionary ladder along with everything else. Not that the '505 has ever scored on the listenability scale anywhere near paint drying, but now it really went with the musical flow, whatever its speed. The player was all bump and grind on BR's 'Tangled And Dark', while still maximising the tear-jerk balladeering of 'One Part Be My Lover'. **505 DOWN, 91 TO GO** After the major rise in sound quality I'd heard with the SuperClock in the 505, I had high hopes for the PD-91. Actually reaching the listening stage took a little longer than anticipated though. Getting inside the PD-91 to remove the relevant components isn't particularly tough, but grafting on the SuperClock takes some planning.

Having unscrewed the Urushi side cheeks and lid to expose the upper surface of the PCB, you'll need to flip the

Pro-Cap

Silver Foil Paper in Oil Capacitors

Precision Engineered Professional Grade Audio
Signal Capacitors

MADE IN UK

These capacitors are the very best available anywhere in the world and are sonically superior to all others irrespective of price. Silver Foil Paper in Oil Pro-Caps are perfect for single end triode amplifiers, push-pull power amplifiers, tube preamp, power supplies and premium loudspeaker designs. You will hear superior detail in your music, but none of the harshness, only deliciously liquid, sweet and rich music.

Available in the following values

Silver Foil Paper in Oil Capacitors (650 V)

0,005 μ F - 0,01 μ F - 0,02 μ F - 0,05 μ F - 0,1 μ F - 0,22 μ F - 0,47 μ F
1 μ F - 2 μ F - 4 μ F - 8 μ F - 16 μ F - 32 μ F

Low Voltage Speaker Crossover Silver Foil Paper in Oil Capacitors

1 μ F - 2 μ F - 4 μ F - 8 μ F - 16 μ F - 32 μ F

Contact Audiolamp for further information and pricing.

Audiolamp is the sole distributor for Pro-Cap capacitors for all countries that are members of the European Community (excluding Germany).

Fax: +39 0974 984477

E-Mail: audiolamp@pisacane.edinet-gdp.com

<http://www.edinet-gdp.com/audiolamp>

Audiolamp

Audiolamp, via Nazionale 41, 84067 Policastro B., Sa, Italy

Howard Dawson Audio

Hand-Crafted Loudspeaker Units for Music Lovers

Let your craving for that elusive tweeter upgrade end

HERE !



Howard Dawson Audio
16 Copeman Road,
Aylsham,
Norwich NR11 6JL.
U.K.
Tel (01263) 734361



Design-in the HRL-1 audiophile tweeter/supertweeter and sit back for a lifetime of listening pleasure.

The HRL-1 is a 'traditional' hand-made ribbon transducer for the discerning audiophile. A very low inertia all-aluminium membrane is used in conjunction with a massive Alcomax III cobalt magnet system to provide effortless clarity and presence. Sine wave response is specified as 3kHz to 30kHz, but useful output is available to beyond 50kHz.

Benefits include substantial improvements in location and identification of sources containing significant energy above 10kHz. These are mainly voices and 'acoustic' instruments. Metallic percussion, for example, is reproduced with scalp-tingling precision and presence, while simultaneously there is no trace of harshness or 'listener fatigue'.

Units are supplied in pairs with templates and comprehensive applications guidance, including crossover section design, and are intended to last a lifetime. Spare ribbon elements are available at low cost in case the unthinkable should ever happen.

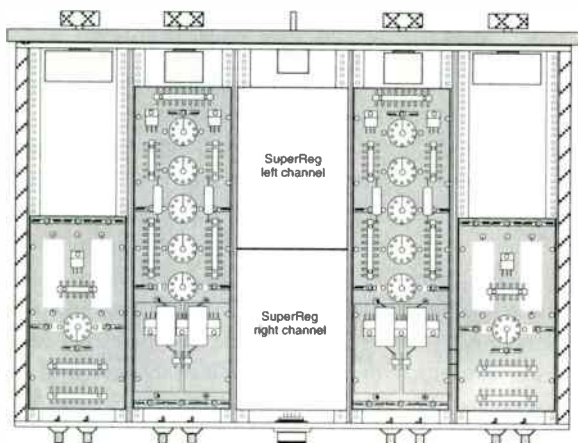
HRL-1 Ribbon Tweeter/Supertweeter £300.00 per pair
Replacement ribbon insert for HRL-1 £10.00 each
Remanuf. inserts for Kelly/Decca ribbon units ... £16.00
or your own inserts rebuilt (new ribbon + tags) £13.50
U.K. p&p : ribbon inserts free, HRL-1 pair .. £10.00
HRL-1 overseas at cost (6kg parcel) - ribbon inserts .. £5.00

Write/phone for further information or see our website

WWW :: <http://www.argonet.co.uk/business/hsdawson>

E-mail :: hd-audio@argonet.co.uk

Super Tube Preamp Kits...



With the external quality and finish of a Krell or Mark Levinson, the internal point to point wiring standard of a '60's Tektronix 'scope, and sonics beyond anything available at any price, these customizable, upgradable modular preamps extend all normal concepts of kit products. Mix & match your choice of SE or balanced stages with several levels of circuit complexity to create your own unique configuration—and one that is designed to be easily expanded—changed—upgraded at any time. Send for full details, or check them out on the web at:

>> www.vacuumstate.com <<

USA: Ph (415) 492 0728 Fax (415) 499 8441 (FSpiritEd@aol.com)

Asia: Octave Ph + 60 3 793 7939 Fax ...7929 (octavele@tm.net.my)

Australia: Joe Rasmussen Ph+ 61 (0) 417 414475 (joeras@acay.com.au)

Europe and all other areas: Allen Wright

Einsteinstrasse 129, 81675 Munich, Germany.

Ph/Fax: + 49 89 477415 (allen@vacuumstate.com)

VACUUM STATE ELECTRONICS

M. WALTHER

AUDIO ELECTRONICS

HIGH GRADE AUDIOPHILE COMPONENTS

APPLIED AND TESTED PERFORMANCE

<http://www.walther.cjb.net>

We would like to thank the DIY audience for the warm welcome of our friendly & cost effective services. Because most of you proved to be internet orientated we have our full price list complete with comments on the WEB now. Naturally we still send lists and answer queries via post, fax and email. Our personal approach policy became a success with international DIYers as it happens for years now with the hundreds of our local customers. For everything 'audio' under consideration contact us and keep in mind that our parts list is never the limit. Ask for things not mentioned and we will seek and recommend. You already know that we carry only what works and has good value for money.

VISA, MasterCard and cheques to 'M. WALTHER' are accepted.

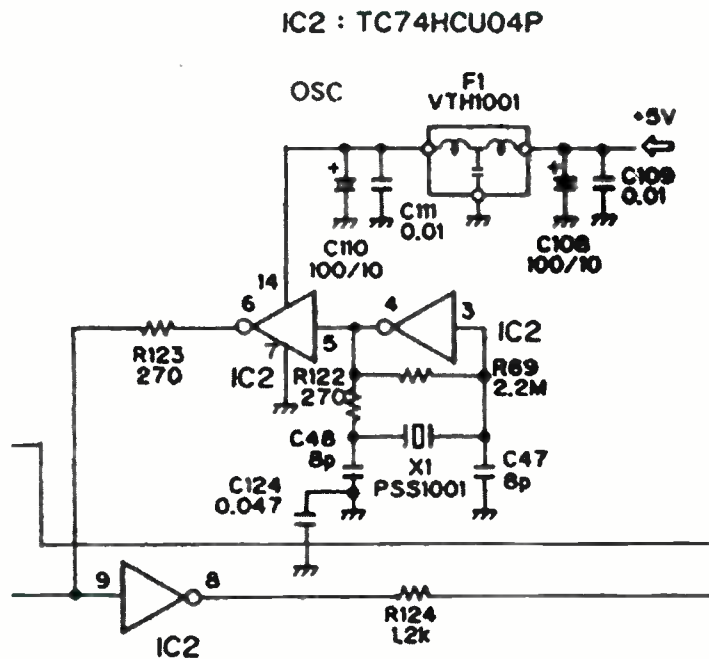
New items are the SCR double tin & polypropylene foil caps. A sensational product at an excellent price and a big hit among our customers.

M. WALTHER AUDIO ELECTRONICS, 98 KOLOKOTRONI STREET, 18535, PIRAEUS, GREECE.

+30-1-4134224, +30-1-4133905

FAX: +30-1-4129642

E-MAIL: walther@otenet.gr



The PD-91's master clock is built around IC2 and X1

Pioneer over and remove the baseplate too. Be careful with the laser sled while you're doing this - it's best to lock it in place with the plastic 'switch' on the transport's underside to stop it sliding up and down along its guide rails.

The next parts to come out are the large, copper-plated metal screen that runs down the centre of the player, and the copper-covered plastic skirt that sits to its right (looking from the front of the PD-91). Beneath the latter you'll find the crystal X1, resistors R69, R122 and R123, and

two small, ceramic caps, C47 and C48. Desolder all of these and place a wire link across C47's position on the PCB. The link to the player's power supply should be made at C85, one of the four 3300uF, 25V electrolytics towards the rear left corner of the case.

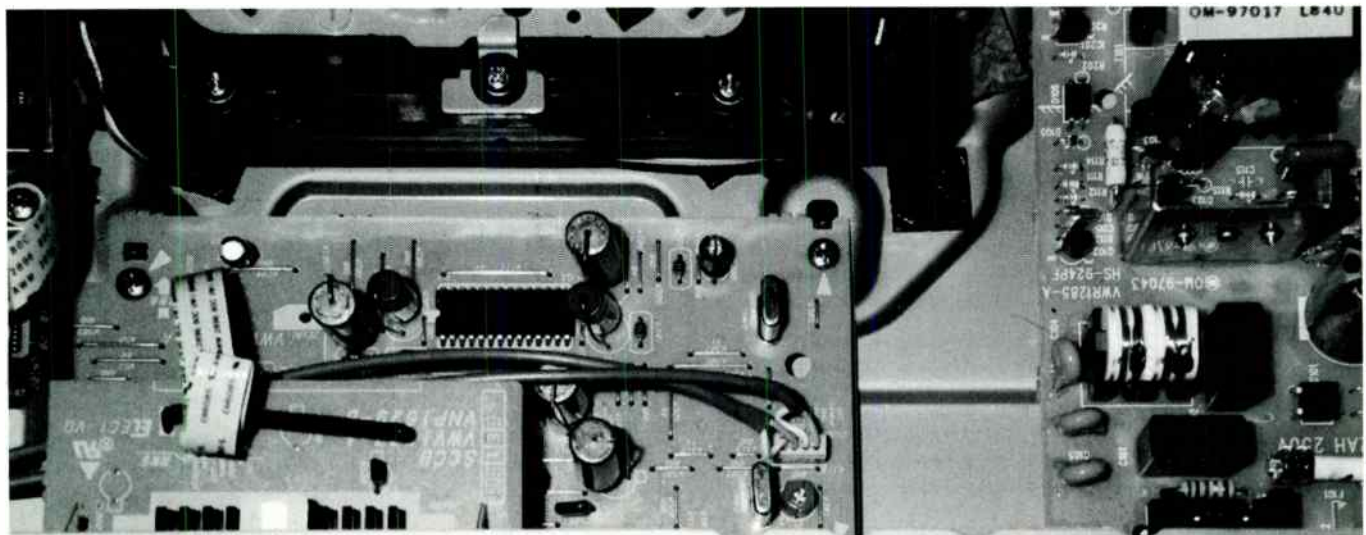
TAKE COVER

Now the job becomes slightly trickier. The SuperClock's signal output has to be taken to pin 9 of IC2, the matching signal

ground to pin 7 of the same chip. Based on my experience with the DV-505, I chopped down some solid-core copper wire (whose sound AudioCom prefer to that of coax), used self-adhesive foam pads to mount the clock board vertically with its front edge stuck to the top of IC2, and soldered in a pair of short clock leads (less than 15mm each). This approach meant leaving off the copper-covered plastic skirt, but if the '505 hadn't needed shielding, I reasoned the '91 might not either. Wrong!

Having completed my 'Go over it five times or watch it go up in smoke' checklist, I turned the Pioneer on and loaded it with a disc. Barely a second after pressing Play, it was obvious something wasn't right - accompanying the music was a kind of 'crackling' which definitely wasn't in the recording. A swift call to AudioCom provided an explanation: without the shield in place, RF radiation emitted by the SuperClock was interfering with the Pioneer's digital circuitry. The solution consisted of replacing the skirt, having punched a hole in it to allow a short length of coaxial cable through from the clock to IC2. This hole should be approximately 80mm in from the rear of the PD-91, and 20mm in from the side of the plastic shield.

AudioCom recommend XXXX coax, even if it is delicate. I chose a strip about 40mm long and soldered it to the underside of the clock board, which was fixed at an angle to one edge of the large metal shield. Powering up proved less disappointing on this occasion, as the PD-91 worked perfectly and was in fine form.



Internal view of DV-505 prior to fitting of SuperClock

KIT & COMPONENT SUPPLIERS

LOUDSPEAKER KIT SUPPLIERS

**Wilmslow Audio, 50 Main Street,
Broughton Astley, Leicestershire LE9 6RO
Tel: (01455) 286603
Fax: (01455) 286605**

UK distributors of Drive Units from ATC, COLES, DYNAUDIO, KEF, MOREL, PEERLESS, RCL, SEAS, SCANSPEAK AND VOLT. Comprehensive range of high quality crossover components, acoustic damping products, connectors and veneers. Over 20 different D.I.Y. loudspeaker kits on demonstration, including ATC S0 & 100.

**Audio Note (UK Ltd)
Unit C, Peacock Ind. Est.
125-127 Davigdor Road
Hove, East Sussex BN13 1SG
Tel: 01273 220511
Fax: 01273 731298**

Suppliers of a large amount of components for the Audiophile Kit builder. Valve amplification data and vintage circuits also available. See the double page spread in the back section of the main issue for extra & more detailed information.

**European Precision Mouldings Ltd
Highwyck, Sawbridgeworth,
Herts, CM21 0JS
Tel: 01279 600428
Fax: 01279 723846**

Manufacturers of the Red Scorpion range of loudspeaker terminals and binding posts.

**Falcon DIY Speakers
Falcon Acoustics Ltd., Taber House,
Norwich Road, Mulbarton,
Norfolk NR14 8JT.
Tel: 01508 578272**

UK distributors of FOCAL drive units & Kits, plus SOLEN (SCR - Chateauroux) polypropylene capacitors and the largest specialist Audio inductor manufacturer in the UK. Stocking Audio Amateur Publications and Audio Computer Software. Comprehensive range of D.I.Y. Speaker kits, Parts, Accessories and Books. Please send large SAE (38p) for free price list. "Everything but the wood."

**IPL Acoustics, Chelsea Villa, Torrs Park
Ilfracombe, N. Devon EX34 8AY.
Tel: 01271 867439**

IPL supply a range of eight speaker kits using drive units from SEAS, Morel, Audax, Visaton etc. including four transmission lines to suit all room sizes. We also supply a full range of drive units, capacitors, and cabinet accessories as well as silver plated P.T.F.E. insulated cables.

**South Coast Speakers Ltd
326 Portwood Road,
Southampton, Hampshire.
Tel: 01703 559312**

UK suppliers for High-Quality Driver Units from: SEAS VOLT VISION SCAN-SPEAK also MOREL RCL & many more. Accessories/Components all of the Highest Quality inc. ProAudio MKT Capacitors, Inductors wound to order for any values. Many DIY Kits always on demonstration in our comfortable listening area. Custom design services & friendly advice!

VALVE AND OUTPUT TRANSFORMER SUPPLIERS

**Chelmer Valve Company
130 New London Road,
Chelmsford, Essex CM2 0RG.
Tel: 01245 265865 Fax: 01245 490064.**

Supplier of premium range of audio valves, other valves and components also available. (Please see our main advertisement in this supplement).

**Wilson Valves, 28 Banks Avenue,
Golcar, Huddersfield,
West Yorks HD7 4LZ.
Tel: 01484 654650
Fax: 01484 655699**

E-mail: wilsonvalves@surflink.co.uk
We stock over 2,500 different types of valves, N.O.S. and New. Please send a S.A.E. for full list. No charge for matching. Most major credit cards accepted.

**Billington Export Ltd.
1E Gillmans Trading Estate,
Billingshurst,
West Sussex RH14 9EZ
Tel: 01403 784961
Fax: 01403 783519**

Billington Export Ltd. holds large stocks of audio valves including many obsolete brands such as Mullard, GEC, Brimar etc. as well as Sovtek, Thermionic Gold Brand and the recently introduced Billington Gold range. Also Cathode Ray Tubes (eg. used in Marantz tuner 10B). 50 page catalogue available, tel or fax for a quotation. Minimum order £50.00 UK, £100 export.

**Langrex Supplies Ltd
1 Mayo Road, Croydon,
Surrey CRO 2QP
Tel: 0181 684 1166
Fax: 0181 684 3056**

One of the largest distributors of electronic valves, tubes and semi-conductors in the UK by original UK and USA manufacturers. Obsolete types are a speciality. Telephone or fax for an immediate quotation.

**Watford Valves
3 Ryall Close, Bricket Wood,
St. Albans, Herts AL2 3TS
Tel: 01923 893270
Fax: 01923 679207
www.watfordvalves.com**

Specialist in new old stock and current production valves. Sole UK distributor of the Harma Diamond range selected for their superior performance. Huge range held, stockists of Mullard, GE, Phillips, National, Brimar, Sylvania, Telefunken, RCA, MOV and many more. All valves are new boxed and guaranteed. For free price list and specialist advice call or fax Derek Rocco, Watford Valves.

**PM Components
Springhead Enterprise Park,
Springhead Road, Gravesend,
Kent DA11 3HD
Tel: 0474 560521**

PM Components Ltd are the specialist component company for High End Audio enthusiasts. We have a design and manufacturing base for audio valves and associated products and have a capability to produce custom tubes for major manufacturers. Our 70 page catalogue is available at £2.50 including U.K. postage. P.M. Components are major stockists for Golden Dragon, Mullard, GEC and Teonex valves and have a vast archive of vintage tubes gathered from every manufacturer in the world.

**Woodside Sound Engineering,
Arfryn, Llanboidy, Whitland. SA34 0EY
Tel: 01994 448271 Fax: 01994 448665
E-Mail: woodside@tesco.net**

As well as producing transformers for our own products, we can now offer an expanding range of audio transformers for new ventures and Renovations. We can wind transformers for most RADFORD amplifiers to original specification. Contact us with your requirements or a list of standard items is available on request.

CLASSIC TURNTABLES

**Technical & General
P.O. Box 53, Crowborough,
East Sussex TN6 2BY.
Tel: 01892 65 45 34.**

The original specialist source of spares, replacements and expertise for the classic turntables. Years of actual experience and comprehensive range of parts (originals and re-manufactures), manuals, ancillaries, No dubious 'improvements' - no harmful 'modifications'. Our specialities: Connoisseur; Garrard; Goldring; Lenco; S.M.E.; Thorens; Watts; Ortofon; Shure; Cartridges and styli for 78s, Mono LPs, Stereo LPs.

COMPONENT SUPPLIERS

**Avondale Audio,
The Hollis, Avondale Road
Chesterfield S40 4TF
Tel: 01246 200096
Fax: 01246 207240**

Audio Engineers; upgrades, Improvements & servicing to both static and moving parts of the hi-fi chain. (amps as well as turntables). Also bespoke range of own equipment and an extensive range of parts & components available.

**White Noise
11 Station Road, Bearsden
Glasgow G61 4AW
Tel: 0141 942 2460**

Specialist supplier of the highest quality, solder masked, silkscreened, PCBs and kits for audiophile grade, solid state power amplifiers, power supplies, MM/IC phono stages, and active crossovers, with many more to come. We also supply a wide range of top quality audiophile passive and active components, specialising in the latest high performance Japanese transistors and UK lateral power mosfets. Write for a free catalogue. Mail order only.

**Audio-Links
7 Fairmont Crescent, Scunthorpe,
North Lincolnshire DN16 1EL.
Tel: 01724 870432 Fax: 01724 875340**
Large range of specialist audiophile components for solid state and valve enthusiasts. Friendly mail order service. Monday to Saturday, 9am - 6pm. 30 Page Catalogue - £3.00.

**AudioCom (UK),
Unit 4& 6, Tindle Centre
Warren Street, Tenby
Pembrokeshire, SA70 7JY
Tel: 01834 842803
Fax: 01834 842804**

E-Mail: audiocom@scotnet.co.uk
Audiocom are international suppliers of premium grade components. We stock a large range of specialist parts which include; ALPS, Black Gate, Elna SLIMIC & CERAFINE; Danish Audio Connect CTI, Holco, REL-CAP, Sanyo OS-CON, MIT MultiCap, Sfernice, Vishay, plus top grade OFC Inductors & RCA connectors. Our full colour 1999 catalogue is available at £2.50 (UK), & £3.50 overseas.

**Hart Electronic Kits Ltd
Penylan Mill, Oswestry,
Shropshire SY10 9AF**

24 Hr salesenquiries Tel: 01691 652894
A range of Audiophile kits for 80 watt Power Amplifiers, Tuners, Pre-Amps and Moving Coil/Moving Magnet RIAA Pickup Preamps. All kits are fully engineered, with our thirty years design experience, for easy constructions from circuits by John Lindsey Hood, the most respected designer in the field. Send for lists.

**AP Electronics
20 Derwent Centre, Clarke Street,
Derby, DE1 2BUT**

Check out the AP ELECTRONICS catalogue. It's free with every order of over £40.00 or can be purchased for a £4.95 cheque payable to 'AUDIOKITS'. Over 80 pages include pre and power amplifier kits, high grade audiophile resistors, capacitors and semiconductors, audio and mains cables, gold and rhodium plated connectors and COMPONENT NOTES on using high grade parts. A quarterly newsletter 'AP PERFORMANCE AUDIO' has been recently launched and your first issue is free.

**Cambridge Scientific Supplies
12 Willow Walk,
Cambridge CB1 1LA.
Tel: 01223 811 716
Fax: 01223 501 833**

Specialist wire products for the knowledgeable audiophile including: Silver wire (>99.99% purity, stress free) unique quadruple PTFE insulated Silver wire, Silver loaded solder, PTFE sleeving and Nylon braid sleeving, premium Gold plated connectors and plugs. Custom assembly available. Call Peter Bullock for a catalogue and application note.

RESTORATION

**Audio Laboratories (Leeds)
3, Kildare Terrace, Whitehall Road,
Leeds, LS12 1DB
Tel: 0113 244 0378**

Have your pet hi-fi project professionally done. With over 20 years experience in factory-grade kitbuilds and overhauls, to both valve and solidstate equipment, our good reputation stems from meticulous engineering coupled with superb measurement facilities.

VINTAGE DIY

**Loricraft Audio
4 Big Lane, Goose Green,
Lambourn, Berks RG16 7SQ.
Tel: 01488 72267**

Specialist restoration of 301's and 401's using genuine spares and re-manufactured parts to original pristine standards in our newly built workshops designed primarily for these purposes.

WELDING

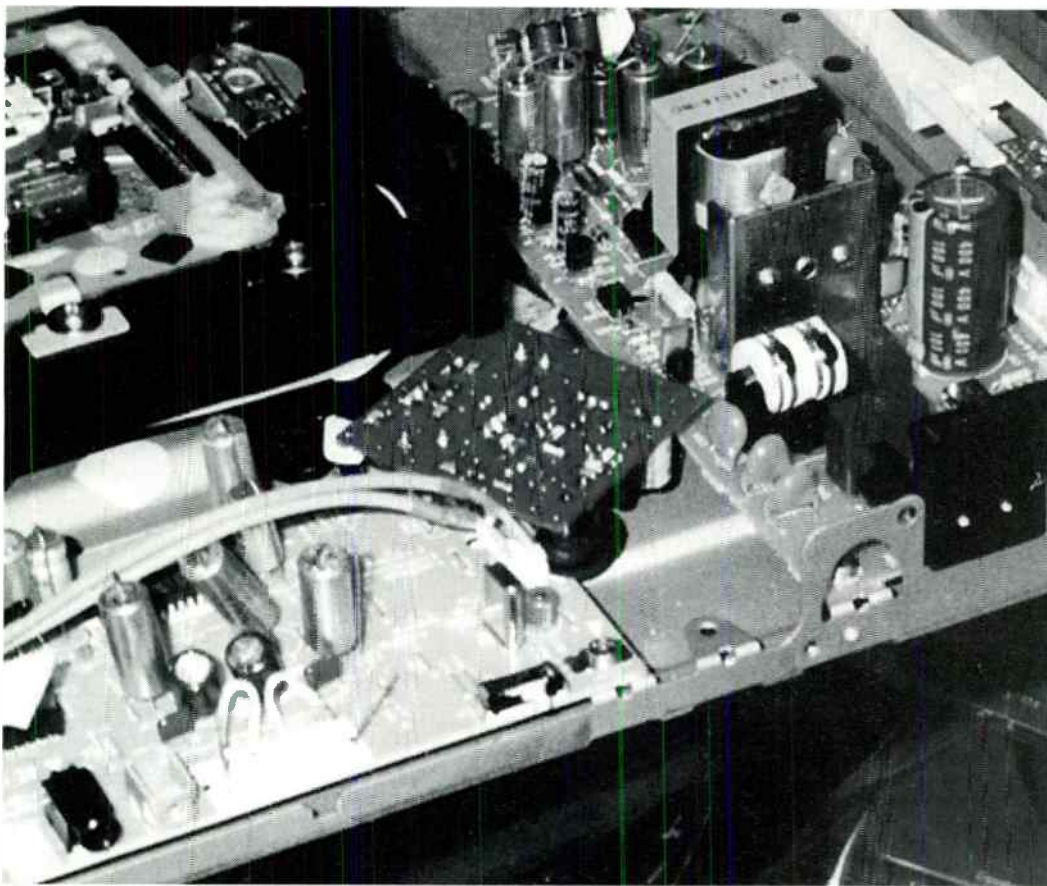
**N.Clark Welding & Fabrications
14 Redhills Road
Easton Industrial Estate
Southwoodham Ferrers
Essex CM3 5UP
Tel: 01245 323336**

Precision welding and sheet metal work TIG/MIG welding, CNE Punch and Press Milling and Turning Fine Limit and General Engineering Prototype work and batch work undertaken.

SPECIALIST UPGRADE SERVICES

**AudioCom (UK),
Unit 4& 6, Tindle Centre
Warren Street, Tenby
Pembrokeshire, SA70 7JY
Tel: 01834 842803
Fax: 01834 842804**

E-Mail: audiocom@scotnet.co.uk
Professional modifications using leading edge components. Modifications are carried out by engineer with 30 years experience in the field of analogue and digital electronics. Upgrades available to all types of audio equipment including CD players, Transports, D-A converters, Pre & Power Amplifiers. Call us today for more information.



Internal view of DV-505 after fitting of Superclock

SWEET SOUNDS

Bolted back together, the transformation to the presentation of this older machine proved that the SuperClock was once again an effective modification. In this instance the upgrade might not have been such a leap forwards as it was with the DV-505, but it was still very noticeable.

On Natacha Atlas' Halim album, all the Arabic rhythms picked up extra drive and speed courtesy of a faster, more controlled bass. Sound staging and imaging were both more holographic too, and the overall level of detail was considerably higher.

One CD where the greater grip in the lower frequencies was really appreciated was Bob Marley And The Wailers' Early Years compilation. Where the original PD-

91 had been rather too laid-back and mellow on some of the skankier tracks, now it handled all of them convincingly, putting the necessary bounce into basslines. The differences in production quality between songs was much more evident as well, as certain numbers had that authentic 'recorded in a shed by stoned musicians' feel to them.

In spite of the Pioneer's 18-bit Burr-Brown DACs lacking the sort of dynamics and low-level subtlety that more up-to-date designs are capable of, it still had a very musical, involving way with any of the discs that I fed it. In fact, John Cheadle, the SuperClock's designer, swears by a heavily tweaked PD-91 as a transport, although the changes there include a huge number of component substitutions and a replacement digital

output board amongst other things. However, we hope to be covering other mods for the PD-91 in future issues.

The Superclock is available from:
Audiocom(UK)
at a cost of £160.00 self fitted
& £195.00 fitted by Audiocom, price includes return carriage.

Audiocom(UK)
Unit 4 & 6
Tindle Centre
Warren Street
Tenby
Pembrokeshire
SA70 7JY

tel. 01834 842803

fax. 01834 842804

e-mail: audiocom@scotnet.co.uk

CUE THE COMPETITION

In the next Supplement, we'll be putting Acoustic Precision's master clock through its paces as well as introducing superior power supplies for both it and the AudioCom. We'll also discover how DIY clocking can sound with Daniel Esply's circuit, which was published in the previous Supplement.

**COMPETITIVE WHOLESALE PRICES
BILLINGTON EXPORT LTD**

New old stock - **Government or Original boxes unless marked *** which are **White box**

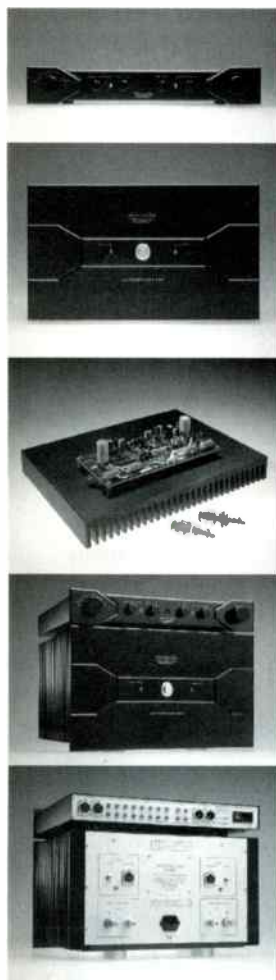
On these types **ONLY** you can obtain these **WHOLESALE** prices for a **MINIMUM ORDER ONLY £50**

	1-19	20-49	50-99	200-299	200+
3D21 STC Data available	£12.00	£9.50	£9.50	£7.50	£7.00
6AK5 Mullard	£1.95	£1.95	£1.95	£1.95	£1.30
6AM5 Mullard UK	£3.00	£2.00	£1.60	£1.35	£1.25
6AK6 Brimar UK	£1.00	£0.65	£0.45	£0.38	£0.38
6AU6WC * USA	£1.43	£1.43	£0.95	£0.85	£0.66
6AU8A GE/RCA USA	£0.75	£0.75	£0.75	£0.75	£0.75
85A2 * East European 90 day guarantee	£1.80	£1.20	£1.20	£1.20	£1.10
807 Russian	£6.60	£4.40	£3.00	£2.90	£2.70
5644 Raytheon	£3.90	£2.60	£2.50	£2.40	£2.30
5755 Raytheon USA	£2.63	£2.63	£2.63	£2.63	£1.75
7327 Sylvania, may be similar to ECC82	£1.35	£1.35	£0.90	£0.90	£0.90
ECL86/6GW8. Try PCL86 which is a similar valve at an amazing low price! Data available					
EF86. Use EF95 which is a similar valve. EF95 is B7G base. EF95 is recommended in Glass Audio. Data available					
EF95 Mullard UK	£1.95	£1.95	£1.95	£1.95	£1.30
EL34 See 3D21 possible alternative					
EL84 near equivalent try 6CH6	£1.95	£1.95	£1.40	£1.30	£0.80
6CH6 Brimar UK, similar to EL84 Mullard but different pin out.					
No discounts possible. Data available.	£1.95	£1.95	£1.40	£1.30	£0.80
PC86 Zaerix East Europe	£3.68	£3.68	£2.45	£2.45	£2.45
PC900/4HA5 East European	£1.72	£1.72	£1.15	£1.15	£0.90
PCC84/7AN7 Mullard UK	£1.50	£1.00	£1.00	£0.90	£0.80
PCC89 Russian	£1.50	£1.00	£0.90	£0.75	£0.65
PCL86/14GW8 Polish or Russian made using					
Philips technical expertise	£0.53	£0.53	£0.53	£0.53	£0.37
SV811-3 Svetlana	£19.50	£16.00	-	-	-
TT21 Billington Gold Chinese	£27.00	£18.00	£18.00	£16.00	-
UCL82 * Russian	£1.80	£1.20	£1.20	£1.10	£1.00

1,000,000 valves in stock including **E88CC, ECC81, ECC82, ECC83, EF86, EL34, EL84, KT66, KT88, 6SL7, 6SN7, 300B, 807, 845, 6080** and sockets. Please inquire for **RETAIL** or **WHOLESALE** prices. We also stock the excellent **BILLINGTON GOLD** brand and limited quantities of **Mullard, GEC, etc.** **MASTERCARD, VISA** and most credit/debit cards accepted.
IE GILLMANS ESTATE • BILLINGSHURST • SUSSEX RH14 9EZ UK

Visitors by Appointment only

Tel: (0) 1403 784961 • FAX: (0) 1403 783519 • E-MAIL: billingtonexportltd@btinternet.com



SUGDEN audio products



Masterclass from the original CLASS A company

New products from Sugden

Wide-bandwidth d.c coupled high current class A power amplifier and matching pre-amplifier. Available as a stereo power amplifier you can upgrade or balanced monoblocks.

Handcrafted from the finest materials and components, Sugden guarantee to add an extra dimension to your listening pleasure. Our superior wide-bandwidth designs will increase the dynamic range and sonic accuracy of your audio system - without fatigue.

With over thirty years experience in design and manufacturing Sugden has become a reference for reviewers, musicians and audiophiles around the world. Prices start at £549.00 for the Audition series so why settle for anything less?

J. E. Sugden & Co Limited
Valley Works, Station Lane, Heckmondwike,
W. Yorks. WF16 0NF
Tel. 01924 404088 Fax 01924 410069
Email jesugden@compuserve.com

MODIFICATION SITUATION

Nick Lucas dons his tweaking cap to test out hot-rod parts in our KLS12C loudspeaker.

A topic which we have rarely touched upon in the DIY Supplement is upgrade components for that most easily modifiable of all hi-fi components, the loudspeaker. As any manufacturer attempting to balance cost against profit understands, the all-important bottom-line dictates that the majority of commercial loudspeakers use caps and inductors that were sourced with price rather than absolute performance in mind. But with most crossovers just a screwdriver and a bit of elbow grease away, changing this situation needn't be a DIY nightmare.

Unless the components inside your loudspeakers are custom made, you're unlikely to require a circuit diagram to understand what's going on as the parts values should all be clearly marked. Getting to the crossover normally entails either removing the mid/bass or bass unit and unscrewing a PCB from whichever panel it's mounted on, or, if you're lucky, merely taking off the terminal plate where simple filters are often to be found.

To illustrate the upgrade power of crossover revamps, we dusted down a pair of our budget KLS12 two-ways in floor-standing guise, and faxed over a circuit diagram to Audio-Links in Scunthorpe with a price limit of £100 for the most effective mods possible.

IRONS AT THE READY

The most obvious upgrade in a complex crossover like the KLS12's is any part that lies directly in the signal path. For L1 and L2 we plumped for M CAPfusion Air Core Inductors (1% tolerance, wound on a large diameter former, with a low ESR). These hefty beasts are constructed from 99.998% oxygen-free copper wire and, after production, each inductor undergoes a special process, resulting in the winding bonding to itself and the spool. This process creates an inductor that is a single mass with near-zero microphony.

Sonically, the improvements are claimed to include greater clarity, tonal realism and spaciousness. When it came to C4 and C5, we settled on Ansar's smooth but affordable polypropylene capacitors. These were then bypassed with M CAPzn polypropylenes, C4 with a 0.1uF and C5 with a 0.47uF. The zns are very tightly wound from solid tin foil and high-purity polypropylene film to give an extremely dense and thus low-microphony capacitor. Audio-Links informed us that they have a beautifully clear sound with a tone that is very even-handed across the audio bandwidth. The final substitution consist-

ed of R4, where a Caddock MP930 non-magnetic, non-inductive power resistor with copper leads and 1% tolerance replaced the standard fare. After 100 hours' burn-in, Jon Marks sampled the sound of the hot-rodded KLS12Cs.

SOUND QUALITY

For £100 you'd be entitled to expect a fairly radical lift to sound quality, and the Caddocks, Ansars and M CAP parts didn't disappoint. Rather than a subtle enhancement of the KLS12s, what I heard was immediately obvious. However, where many upgrades that stick out like a sore thumb on the first listen can become wearing as the hours roll by, these were welcome to stay.

Nusrat Fateh Ali Khan's chanting can verge on the painful through loudspeakers where there are more rough edges than smooth, but his voice dipped and soared in a natural, dynamically unrestricted way as it emerged from the high-spec KLS12Cs. His Shahen Shah album has a crystal clarity to the recording of the venue, and this was much more vivid than it had been previously, as if a layer of gunge that had previously obscured a wealth of fine detail had been peeled off the music. Evidently, M CAP's low-microphony construction techniques were paying their way.

Shifting from the wholly acoustic to the wholly electronic, I cued up Presence's All Systems Gone CD. Again a disc which can go wrong if played via transducers which suffer from too cold or clinical a character, ASG sounded well at home here. The fact that the vocals were far clearer and crisper than before without there being any sibilance counted heavily in the upgrade's favour, as did the firmer, faster and more controlled basslines. In spite of the synthetic nature of this recording, it had a sweetness you only hear through electronics and speakers which don't dirty its surprisingly high standard of




Wide range of popular, classic, vintage, rare Electron Tubes from STOCK.

E.T.O.L.S
Electronic Tube On Line Shopping

Division of **HALFIN**
50 years of experience.
We ship worldwide.



37/39
Quai aux
Pierres de Taille
B-1000 Brussels
BELGIUM

Free membership gives access to the gateway of the  world.

Web site

www.halfin.com/shop

Phone: +32.2.218 10 11 Fax: +32.2.218 69 98
E-Mail: etols@halfin.com

SUPERCLOCK....a new concept in digital master clock design

Simply the *Ultimate CD upgrade*

The latest in CD master clock development, using a completely new unique design resulting in a much greater accuracy in data retrieval and conversion processes. Features comprehensive circuit topology using push-pull techniques and series mode oscillation, and the sine-square converter utilises a very high speed IC to provide a precision square wave clock signal.

- ⇒ Greatly improved resolution and detail
- ⇒ Extended accurate bass with real weight, control and presence
- ⇒ High frequencies have less glare and hardness at all listening levels.
- ⇒ Greater dynamics, and detail at all frequencies.
- ⇒ Spacious 3-D presentation of vocals and instruments.

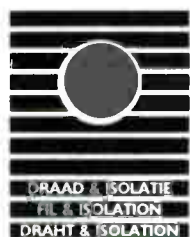
The SUPERCLOCK is available *exclusively* from AudioCom (UK) and can be fitted to any CD players/transports using the following frequencies: 11.2896MHz, 16.934MHz & 22.5792MHz. Modifications are carried out at AudioCom (UK). A kit is also available with instructions for the technically competent.

Specialist Upgrade Service

Professional modifications using leading edge components. Modifications are carried out by engineer with 30 years experience in the field of analogue and digital electronics. Upgrades available to all types of audio equipment.

- CD Players/Transports & D-A converters
Analogue stage, digital stage, master clock, power supplies
- Pre & Power amplifiers,
Power supplies, signal de-coupling, volume control

For further information on SUPERCLOCK and other products request a copy of our FREE catalogue. (Overseas: £3.50)
Tel 01834 842803 Tel /Fax 01834 842804 E-Mail audiocom@scotnet.co.uk



WIRE & INSULATION

introduce **DESKADEL** Products

731/733 Ormskirk Road • Pemberton
Wigan • Lancashire • England • WN5 8AT
TEL/FAX: 44 - 1 - 942 887171

The DESKADEL range of Hi-Fi interconnect, speaker cables, hook-up wires and tone arm wires are precision manufactured featuring PURE SILVER conductors insulated with PTFE in a variety of designs to suit all applications. Using only the finest materials and the latest manufacturing

techniques we aim to provide a selection of quality products for superb natural sound reproduction on a scale previously unheard.

DISTRIBUTORS

Switzerland
ARBELOS

Tel/Fax: 41-613616466

UK

AUDIO SYNTHESIS
Tel: 44-1-159224138
Fax: 44-1-159229701

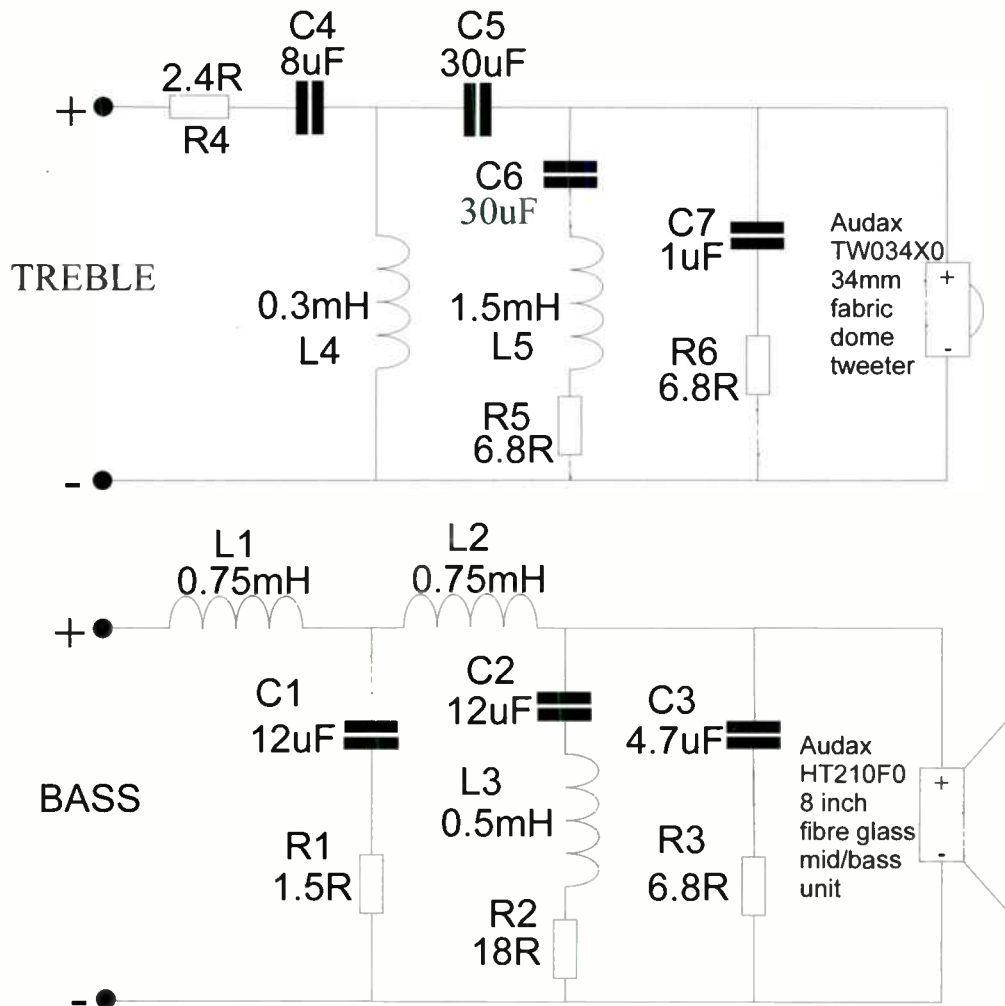
Holland

ANALOGUE AUDIO PRODUCTS
Tel/Fax: 31-30-6044342

Belgium

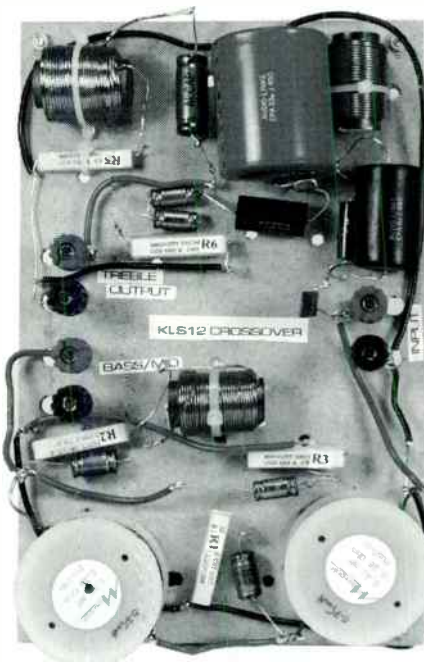
DESKADEL INT BVBA
Tel: 32-3-8892231
Fax: 32-38609181

KLS12 CROSSOVER



production.

More digital ditties were supplied by Unkle's Psyence Fiction. Talking of dirty, this CD is about as rough as a builder's behind, and any 'speaker that makes a decent stab of it has to be spacious, transparent and devoid of any midrange or treble nasties. Although a sock over the tweeter is probably the best way to get the most from Psyence Fiction, the post-upgrade KLS12Cs managed to strike the right balance without resorting to woolly high frequencies. Removing the esoteric additions and going back to the common-or-garden KLS12Cs proved just how much more listenable this album was for £100 spent on the crossover. Reverting to the more basic bits brought it a grainy, fuzzy edge to the midrange and treble, while the bass put on weight and loosened its belt, sapping a lot of its drive and impact. JM



Cross-over with upgrade components

PARTS LIST

0.75mH M CAPfusion inductor x 2	£33.36
8uF 450V Ansar capacitor x 2	£12.80
0.1uF 250V M CAPzn capacitor x 2	£6.80
33uF Ansar capacitor x 2	£23.00
0.47uF 250V M CAPzn capacitor x 2	£10.20
2R5 Caddock MP930 Resistor x 2	£10.60
TOTAL	£96.76
TOTAL (5% discount when you quote Hi-Fi World 0400)	£91.92

All the above components are available from:

Audio-Links,
7 Fairmont Crescent,
Scunthorpe,
North Lincolnshire,
DN16 1EL
Tel: 01724 870432

THE JOY OF AUDIO ELECTRONICS

By Charles Hansen

Reviewed by Richard White

Many years ago, when I was a boy there were not many books on electrical matters suitable for the enquiring mind. There was a number of reasons for this. For a start, in those days everything educational seemed to begin with first principles and work up gradually. As an example, if a practical demonstration of audio amplification were to be given, it seemed impossible to commence without the phenomena of current, voltage, resistance, capacitance and inductance being first explained. Unfortunately, there was a risk that enquirers would too easily fall by the wayside, felled by the cumulative effect of too many algebraic expressions and the continual postponement of the plans for a working Tardis.

Times change; Science had been trodden underfoot by Technology and it doesn't seem to matter if you know how it works as long as you can buy it. Ohm's law has been sent 'ome, and comparatively simple word-processor programmes will manipulate algebraic expressions to A-level and beyond

The Joy of Audio Electronics squeezes in somewhere between these two extremes. The author's aim seems to be to lead people into the hobby, teaching along the way. Two specific projects are described, the first of which is a loudspeaker 'peak power indicator', which lights an LED when a voltage determined by the builder is exceeded. A pair of circuit boards (one for each channel) is provided free with the book, rather in the way that the Dandy Thunderbang or Beano Fizzer were 'presented free' with comics. These little gadgets derive their operating power from the loudspeaker signal and so require no external supplies.

The other project is The Quadpod, a powered device intended for extracting 'hidden information' from standard stereo signals. In essence, the idea is to disentangle L-R and R-L leftovers from recordings made with the well-known 'Blumlein pair'

microphone configuration. These gleanings can then be played (through a suitable amplifier and loudspeakers) to give two rear ambience channels from an ordinary stereo record. Not very many modern Rock & Pop mixes are recorded with a Blumlein pair, although it is still a 'classic' for Classical

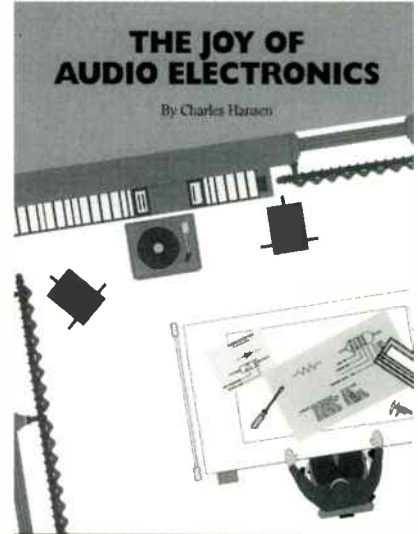
Making these projects is described in very fine detail, including a little theoretical digressing and entirely practical hints such as the best way to bend wires to fit a PCB. While this approach may irritate the more experienced builder, for the beginner any time spent inculcating good habits is well spent and will go a long way towards avoiding the 'solder sculpture' results of a first PCB project.

The remainder of the book is devoted to, in its own words, 'Where do we go from here?' Advice is given on the modification of published projects and the techniques used for making PCBs at home. Breadboard and hard-wire techniques are also discussed. A chapter is given on the design and furnishing of a home electronics workshop or testing station.

Elementary theory, including a glossary, has an informative chapter to itself. In addition to pencil-and-paper formulae, Excel computer programmes for theoretical modelling are identified alongside their applications.

A few cautionary words will not be out of place. First, this is an American publication and the author has done his absolute utmost to smooth the path of the reader, provided that the said reader resides in the USA. Chapter Five, which deals with suppliers suffers much from this export limitation. Similarly, estimated costs for the projects are given in dollars which may not correspond elsewhere.

Second warning: the United States is not a metricated country. This doesn't bother me in the slightest, but if you are uneasy around 'three-sixteenths' and other such homely phrases, better have your conversion tables handy. In one instance,



the author designates drills by Morse Gauge numbers, an engineering standard with 106 sizes between roughly quarter-inch and minuscule! You won't get much help with these at B&Q.

Notwithstanding these caveats, the Joy of Audio Electronics is above all a friendly book. The author rightly understands that not everyone knows everything before they're told, and sets about leading the way to an increased appreciation of the chief points of the hobby with a companionable air. Whether or not the specific projects appeal to you, there is a mine of handy information here, presented in a very readable form. After all, studying a book on motor mechanics does not necessarily make you Herbert Austin, but it might help you when it comes to changing the oil filter. In the same way, the little tit-bits of knowledge in this book may seem to have no immediate application - until you find yourself wishing that someone had told you to make a good joint before applying the soldering iron. When all the insulation has melted and the thing still won't stick, it is usually too late!

RMW

This book and other titles are available from the World Library, p68/69 Book Code: 1650 Price: 12.00 GBP + 1.75 GBP (UK p+p)

ADVERTISERS INDEX

Audio Lab (Leeds)
Audio Links
Chelmer Valve
Cricklewood Electronics
Falcon Acoustics

10
12
BC
6
10

Glass Audio
Langrex Supplies
Lockwood Audio
Technical & General
Watford Valves

6
12
4
10
4

Van den Hul:

(all new, unused)

Loudspeaker-cables:

CS-122 Hybrid: £ 9.50 m
Teatrack Hybrid: £ 16.50/m
New Royal Jade Hybrid: £ 7.50/m
Magnum Hybrid: £ 25.-/m
Revolution Hybrid: £ 59.-/m
Revelation Hybrid: £ 69.-/m

Interconnect-cables:

The First Ultimate: £ 189.-/0.8m p.
MC Gold: £ 299.-/0.8m pair
MC Silver IT: £ 999.-/0.8m pair

Cartridges:

MC One Super: £ 639.-
The Frog IIO: £ 1099.-
Grashopper IV GLA: £ 1999.-

C.E.C. TL-5100 CD-Transport



belt-drive, black coloured, Digital-out:
Cinch+AES/EBU, 2 years warranty, new, boxed
was: £ 900.- now: £ 499.-

Sonic Frontiers SFD-2 MK II

Tube DA-Converter, 20 Bit Ultra Analog, ex-demo



was: £ 5.700.- now: £ 2.600.-

Burmester 935 II+933 II

Pre- and Poweramplifier, new, boxed



was: £ 5.000.- now: £ 3.250.-

NBS-Cable (new, boxed)

Interconnects:

NBS Statement:

XLR 2,4m was:£ 7.500.- now: £ 2.900.-
XLR 1,8m was:£ 6.250.- now: £ 2.500.-
XLR 1,2m was:£ 5.000.- now: £ 2.200.-
RCA 1,8m was:£ 6.250.- now:£ 2.500.-
RCA 1,2m was:£ 5.000.- now:£ 2.200.-

Digital-Connects:

NBS Statement:

AES/EBU 1,0m
was: £ 2.500,- now: £ 1.250,-

NBS Professional:

AES/EBU 1,0m
was: £ 1.500,- now: £ 750,-
RCA 1,0m
was: £ 1.500,- now: £ 750,-

VAC Renaissance 70/70

8 x 300 B Tube, used, good condition



**was: £ 8.350.-
now: £ 3.000.-**

B+W MPA-810

Big Monoblocks, used, good condition, with box. price is for both



**was: £ 5.350.-
now: £ 2.000.-**

**Ask for over 800 more used items,
bargains, specials,...**

Or look at: www.hifi-classics.com

These items are just a small selection of our large stock. Please check out our complete range (updated daily)

at www.springair.de

Looking for rare items ?

Please phone us & we will register your demand in our search database

(FREE SERVICE).

6 months warranty on all items !

S.R.P. are based on former German price-lists

Mail order specialists - worldwide shipment

Trade - in welcome

Credit Cards accepted: VISA, EUROCARD, MASTERCARD, AMEX

Orders will be charged by COD, or can be paid by credit card or bank transfer

Shipping costs are about £20 for an average 20 lbs. item. Loudspeakers and "heavyweights" on request.



q e

Office Hours :

Monday - Friday : 9 A.M. - 6 P.M.
Saturday : 10 A.M. - 2 P.M.

WWW.SPRINGAIR.DE

email : info@springair.de

SPRINGair

Hifi Produktions- und Vertriebsgesellschaft mbH
Alte Andernacher Str. 21, D-56637 Plaidt

Tel. : +49 (0) 26 32 / 93 75 - 28 or 29

Fax : +49 (0) 26 32 / 93 75 - 11

PRICE VALIDITY TO END APRIL 2000 - ASK ABOUT ANY TYPES NOT ON THIS LIST



**CHELMER
VALVE
COMPANY**

for High Quality Audio Tubes

Everybody in the tube business knows that the justly famous Brand names of yesteryear like BRIMAR, GEC, MULLARD, RCA & TELEFUNKEN Etc. Etc. are scarce and often very expensive. Although we supply all major brands when available (and have many in stock) our policy is to offer a range of tubes, mostly of current manufacture, the best we can find from factories around the world, which we process specially to suit audio applications. The result - CVC PREMIUM BRAND. Our special processing includes selection for LOW NOISE, HUM & MICROPHONY and controlled BURN-IN on all power tubes to improve STABILITY and select out tubes with weaknesses Etc.

A selection of CVC PREMIUM Audio Tubes

PRE-AMP TUBES	POWER TUBES	POWER TUBES	SOCKETS ETC.
ECC81 5.20	EL34G 7.70	(continued)	B9A (Chassis or PCB) 1.60
ECC82 5.20	EL34 (TESLA) 8.20	6336A 46.00	B9A (Ch or PCB) G/Plated 3.00
ECC83 5.20	EL34/6CA7 (Large Dia.) 10.70	6550A 11.00	Octal (Ch. or PCB) 1.80
ECC85 6.00	EL84/6BQ5 4.80	6550WA or WB 13.50	Octal (Ch. or PCB) G/Plated 4.20
ECC88 5.00	EL509/519 13.00	7581A 11.00	4 Pin (For 2A3, 300B etc.) 3.30
ECF82 5.00	E84L/7189A 6.50	807 9.00	4 Pin (For 2A3, 300B etc) G/Plated 5.00
ECL82 5.20	KT66 9.50	811A 11.00	4 Pin Jumbo (For 211 etc.) 11.00
ECL86 5.20	KT66R 22.00	812A 34.00	4 Pin Jumbo (For 211 etc.) Gold Plated 15.00
EF86 5.60	KT77 12.00	845 30.00	5 Pin (For 807) 3.00
E80F Gold Pin 10.00	KT88 (Standard) 12.50	RECTIFIER TUBES	7 Pin (For 6C33C-B) 4.50
E81CC Gold Pin 6.80	KT88 (Gold Special) 21.00	EZ80 4.20	9 Pin (For EL, PL509, Ch. or PCB) 5.00
E82CC Gold Pin 8.00	KT88 (GL Type) 30.00	EZ81 4.70	Screening Can
E83CC Gold Pin 7.50	PL509/519 9.00	GZ32 12.00	(For ECC83 etc.) 2.00
E88CC Gold Pin 8.00	2A3 (4 or 8 Pin) 14.50	GZ33 10.00	Anode Connector
6EU7 6.00	211 22.00	GZ34 6.70	(For 807 etc.) 1.50
6SL7GT 8.50	300B 50.00	GZ37 8.70	Anode Connector
6SN7GT 4.60	6C33C-B 27.00	5U4G 5.50	(For EL509 etc.) 1.70
6922 5.50	6L6GC 6.50	5V4GT 4.70	Retainer (For 6L6WGC etc.) 2.00
7025 6.50	6L6WGC/5881 8.00	5Y3GT 4.20	
	6V6GT 5.00	5Z4GT 4.70	
	6080 11.50		
	6146B 10.50		

and a few "Other Brands" (inc. Scarce types).

5R4GY FIVRE 7.00	6B4G / SYLVANIA 27.00	6SN7GT BRIMAR 10.00	13E1 STC 110.00
5R4WGY CHATHAM USA 10.00	6BW6 BRIMAR 5.00	12AT7WA MULLARD 5.00	805 CETRON 50.00
5U4GB RCA or GE 12.00	6BX7 GT GE 8.50	12AY7 GE-SYLVANIA 7.75	5842A GEC 15.00
5Y3WGT SYLVANIA 5.00	6CG7/6FQ7 SYLVANIA 7.50	12AZ7 GE 7.50	6080W TUNGSTOL 12.50
6AS7G RCA or SEIMENS 12.00	6CL6 RCA or GE 5.00	12BH7A GE or RCA 13.00	6550A GE 23.00
6AU6WC SYLVANIA 3.50	6CW4 RCA 11.00	12BY7A GE 9.00	6146B GE 17.00
	6SL7GT STC 8.50	12E1 STC 12.50	

ALL PRICES IN U.K. POUNDS £

Please note carriage charge extra + VAT (EEC Only) - When ordering state if matching required (add £1.00 per tube).

Payment by CREDIT CARD (ACCESS, VISA, MASTERCARD) or BANKERS DRAFT, TRANSFER or CHEQUE (UK ONLY).

FAX or POST your ORDER - We shall send PROFORMA INVOICE if necessary.

Valve Amplifiers sound better still fitted with CVC PREMIUM Valves!

Chelmer Valve Company, The Stables Baddow Park, Great Baddow,
Chelmsford, Essex, CM2 7SU. England.

email: sales@chelmervalue.com ☎ 44 (0)1245 241301 Fax: 44 (0)1245 241309 www.chelmervalue.com