

sinclair

PROJECT 80

**Constructional and technical
information on Sinclair
project 80 modular
high-fidelity amplifier system.**

Contents

Introduction	3	BA9	Switched tuning and fine tuner	15
Section numbering	3	BA10	Common faults	15
Modules available	3	BB	Decoder	15
Part 1: Complete Systems	4	BB1	Circuit description	15
AB 25w stereo amplifier using PZ6 and 2 Z40s	4	BB2	Circuit diagram	15
AB1 Layout	4	BB3	Component layout	16
AB2 Shopping list and suppliers	4	BB4	Performance	16
AB3 Notes	4	BB5	Connections	16
AC A stereo record player with tuner PZ5 plus 2 Z40s	4	BB6	See Section B6	16
AC1 Layout	5	BB7	Tuners other than P80	16
AC2 Shopping list	4	BB8	Tape recording	16
AC3 Notes	5	BB9	Common faults	17
AD A tuner for use with AB	6	BB10	Alignment	17
AD1 Layout	6	C	Control Modules Stereo 80 and AFU	17
AD2 Shopping list and suppliers	6	CA	Stereo 80	17
AD3 Notes	6	CA1	Circuit description	17
AE Project 805	6	CA2	Circuit diagram	17
AE1 Layout	6	CA3	Layout	18
AE2 Parts list	6	CA4	Performance	17
AE3 Notes	8	CA5	Connections	17
A Additional information on systems	8	CA6	Power supply	18
A1 Mounting details	8	CB	AFU	19
A1.1 Preamp, tuner, AFU and decoder	9	CB1	Description	19
A1.2 Z40, Z60 and PZ8	9	CB2	Circuit	19
A1.3 PZ5 and PZ6	9	CB3	Layout	19
A1.4 Templates	31	CB4	Specification	19
A2 Choice of cabinet	9	CB5	Connections	19
A3 Positioning of modules and wiring	10	CB6	Power supply	19
A3.1 Preamp and AFU, tuner and decoder	9	CB7	Over-ride switch	19
A3.2 Power amplifier	9	CB8	Use with amplifiers other than Project 80	20
A3.3 Earth point	9	CB10	Common faults	20
A3.4 Power supply	9	D	Z40 and Z60	20
A3.5 Mains wiring	9	D5	Connections	20
A3.6 Output wiring	9	D6	Power, output, speakers and heatsinks	21
A3.7 Input wiring	9	D6.1	Output power	21
A4 Use of other modules	10	D6.2	Sound level	21
A4.1 Z40/Z60	10	D6.3	Loudspeakers	21
A4.2 PZ5/PZ6	10	D6.4	Heatsinking	21
A4.3 PZ8	10	D6.5	Power suppliers	21
A4.4 Project 60	10	D7	Gain	22
A4.5 IC12	10	D10	Common faults	23
A4.6 Other modules	10	DA	Z40	23
A5 Alterations and additions to basic layouts	11	DA1	Description	23
A5.1 Plugs and sockets	11	DA2	Circuit	22
A5.2 Headphone socket	11	DA3	Layout	22
A5.3 Power-on indicator	11	DA4	Performance	23
A6 Fault finding	11	DA9	Applications	24
Part II: The Individual Modules	13	DA9.1	Amplifier for crystal pickup	24
B Tuner and Decoder	13	DB	Z60	24
B6 Power supply	13	DB1	Description	24
B6.1 Decoupling	13	DB2	Circuit	23
B6.2 High voltages	13	DB3	Layout	24
B6.3 Low voltages	13	DB4	Performance	24
B9 Applications	13	DB8	Switch-on-surge suppression	24
B9.1 Use with amplifiers other than Project 80	13	DB9	Applications	25
BA Tuner	13	DB9.2	Full bridge circuit for 60w	25
BA1 Circuit description	13	DB9.4	DC amplifier	26
BA2 Circuit diagram	13	E	Power supplies	26
BA3 Component layout	14	E4	Performance	26
BA4 Performance	14	EA & EB	PZ5 & PZ6	27
BA5 Connections	14	EA1	PZ5	27
BA6 See Section B6	14	EB1	PZ6	27
BA7 Aerials	14	EA2	PZ5	27
BA7.1 Connections	14	EB2	PZ6	27
BA7.2 Types of aerial	14	EA3	PZ5	27
BA8 Tuning indicator	15	EB3	PZ6	28
		EA/EB5	Layout	28
		EA/EB5.1	Connections PZ5/6	28
			Mains connections	28

EA/EB5.1.1	Fuse and switch	27
EA/EB5.1.2	110v operation	27
EA/EB5.2	Output	27
EA/EB10	Common faults PZ5 and PZ6	27
EC	PZ8	28
EC1	Description	28
EC2	Circuit	29
EC3	Layout	29

EC4	Performance	29
EC5	Connections	29
EC6	Voltage adjustment	29
F	Other parts	30
FA	Project 805 masterlink	30
FA1	Description	30
FA3	Layout	30
	Appendix	30
	Service and Guarantee	30

Apology

We regret that, due to circumstances beyond our control, the layout and design of this first edition of the Project 80 manual has been rushed. We apologise for any resulting errors and inconsistencies but if you have any comments, criticisms or suggestions the author will be pleased to consider these when the next edition is reprinted.

Introduction

This manual describes Project 80 high fidelity modules for the home constructor. Part One deals with some complete projects for the home constructor and gives a pictorial layout of each, with a shopping list and details of some suppliers. Layout AE deals with Project 805 specifically.

The beginner is strongly recommended to follow one or other of these projects exactly, but the rest of Part One gives additional information on complete systems and hints for those who wish to depart from the suggested layouts.

It is not possible to list all the pitfalls that can occur but if commonsense is used and the hints are followed, even the complete beginner will be able to assemble his project into whatever case or system he wishes — and he will get excellent results first time.

When wiring the modules, you may find it helpful to colour the wires on our layouts. For instance, you could colour all the wires connected to the power supply +ve in red and say to the -ve in green. There will then be far less chance of a mistake when wiring.

Section A6 is about fault finding — just in case you do make a mistake in assembly, or something goes wrong. It includes a step-by-step chart which will help you find most likely faults.

Part Two of the manual deals with the individual modules, unit-by-unit. It gives circuit diagrams, performance and technical information, as well as listing many interesting and useful applications for the individual modules.

Section numbering

By its very nature, a modular system is flexible — new modules are announced from time to time. This manual is therefore planned so that there is a logical place for information on new modules. The manual is also laid out so that as far as possible it is in the order you want it — the first thing you will want is to assemble your new system — so the practical projects come first. Only if you are departing from one of these will you need the rest of Part One (with the exception of Section A1 which deals with mounting the modules).

Part Two is numbered as consistently as possible so that Sections BA2, BB2, CA2, etc. are all circuit diagrams, whilst BB6, CB6, DB6 are all information on power supply requirements. Where two modules have common information, e.g. tuner and decoder, which have identical power supply requirements, rather than include this information twice as BA6 and BB6, it is included as Section B6 — there are no Sections BA6 or BB6.

Z40 and Z60 have much common information included in Sections D5, D6, D7 and D10. The power supplies PZ5 and PZ6 are very similar so that common information on these is included as EA/EB when it does not include the PZ8.

Modules Available

The following list shows all the modules which are available, or projected, at the time of printing. The modules are grouped into four sections lettered to coincide with Part II of the manual: B signal sources, C preamps and control units, D power amplifiers E power supplies and F other modules.

Modules in groups B C & D are intended to work from a power supply of group E or from any other source of voltages between 25 and 35 (some modules down to 12v and some up to 55 volts). The power supply should be chosen in conjunction with the power amplifiers: it will also drive whatever preamp modules you choose.

B Signal sources

BA FM (VHF) Tuner intended to receive FM transmissions, 88MHz to 108MHz.

BB Decoder intended to be used in conjunction with the tuner to convert it to stereo reception.

These two modules could be installed (with a PZ5) to work with an amplifier other than a project 80.

It is also possible to use the decoder with tuners other than the project 80 tuner to convert them to stereo.

C Preamps and control systems

CA Project 80 Preamplifier. A stereo preamp/control unit. It is the heart of any amplifier made from project 80 modules.

CB Active Filter Unit (AFU). An optional addition to extend the basic facilities of the project 80. It is intended to improve performance where old records are used, or when cheaper turntables are used.

CC SQ Decoder. For quadraphonic sound an SQ decoder, two more power amps and possibly a second power supply are added to the existing stereo unit. The decoder also has its own tone and volume controls for the rear channel. The decoder is covered by a separate manual.

D Power amplifiers

DB Z60 for all systems up to 25W (8 Ω) or 40 W with 4 Ω . For higher powers (up to 50W into 15 Ω or 80W into 8 Ω) two Z60's can be used back-to-back. The full advantage of a Z60 over the Z40 can only be realised when using PZ8 to power the system.

DA Z40 for all systems up to 18W RMS into 4 Ω speakers.

E Power supplies

EA PZ5 suitable for smaller domestic situation of 5 + 5W stereo or 10W mono.

EB PZ6 a higher powered version for up to 25W total output (12W + 12W into 8 Ω).

Z40's will normally be used with PZ5 or PZ6. Although Z60's can be used, there is no advantage unless a PZ8 is chosen. PZ5 and PZ6 are both mains operated and (220-240 volts) and can be adapted for 110-120v operation.

EC PZ8 a high powered voltage stabilizer with sophisticated protection circuitry built in, and performance tailored to match two Z60's working into 8 Ω , delivery 25 + 25W. The PZ8 can also power other combinations but the total audio outputs from it will be limited to about 50W (e.g. 50W on mono, or 25 + 25W stereo, or 4 x 12 1/2 W on quadraphonic).

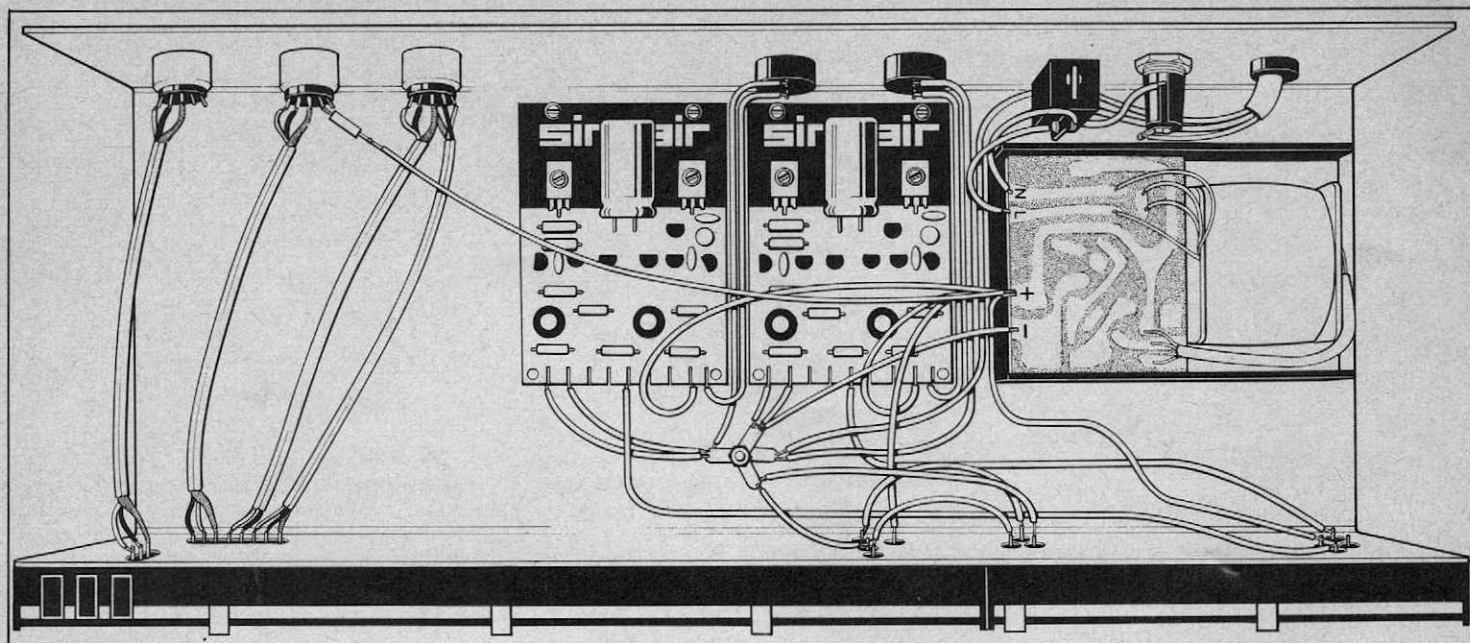
The PZ8 is not mains powered and requires a separate transformer rated at 40V, 2A.

F Other parts

FA Masterlink a connecting panel with output and input sockets fitted.

FC Switch module containing a mains switch and neon indicator.

These two modules are included in the Project 805 which also contains the Project 80 Preamplifier 2 Z40's and PZ5 with ready tagged wires to allow solderless assembly. Project 805 is covered in layout EA.



Part 1: Complete Systems

AB 25w stereo amplifier using PZ6

AB2 Shopping list

- 2 Z40
- 1 Project 80 Preamplifier
- 1 AFU (optional)
- 1 PZ6 (or PZ5)
- 1 Cabinet, metal, 19" x 6" x 2" approx.
- 3 5 pin 180° (A type) DIN sockets and plugs
- 2 2 pin DIN speaker sockets and plugs
- 1 2 pole mains switch (toggle type)
- 1 Miniature panel mounting fuse holder
- 1 Cable clamp (for mains cable)
- 2 Heatsink blocks (for Z40 mounting)
- 1 Resistor (120Ω/w) for tuner + ve feed (PZ6 only) (see note 2)
- 22 6BA x ¼" screws (see note 1)
- 18 6BA nuts
- 1 6BA ¾" screw (for earth point)
- 6 6BA solder tags
- 1 yd stereo microphone cable
- 1 yd stereo microphone cable
- 3 yds assorted colours flexible wire
- as required: 3 core mains cable

Suitable cabinets are available from: H L Smith & Company
278 Edgware Road
London W2

(Plain aluminium chassis, undrilled)

NSMHC Sales Limited
(National Society for Mentally
Handicapped Children)
17 Pembroke Square
London W2 4EP

(Aluminium chassis with slide-on wood surround)

West Hyde Developments
Limited
Ryefield Crescent
Northwood Hill
Middlesex HA6 1NN

(Black cabinet with wooden end panels punched ready for various combinations of modules)

West Hyde can also supply all hardware, etc., to suit their cabinets or your local shop should be able to supply all the required items.

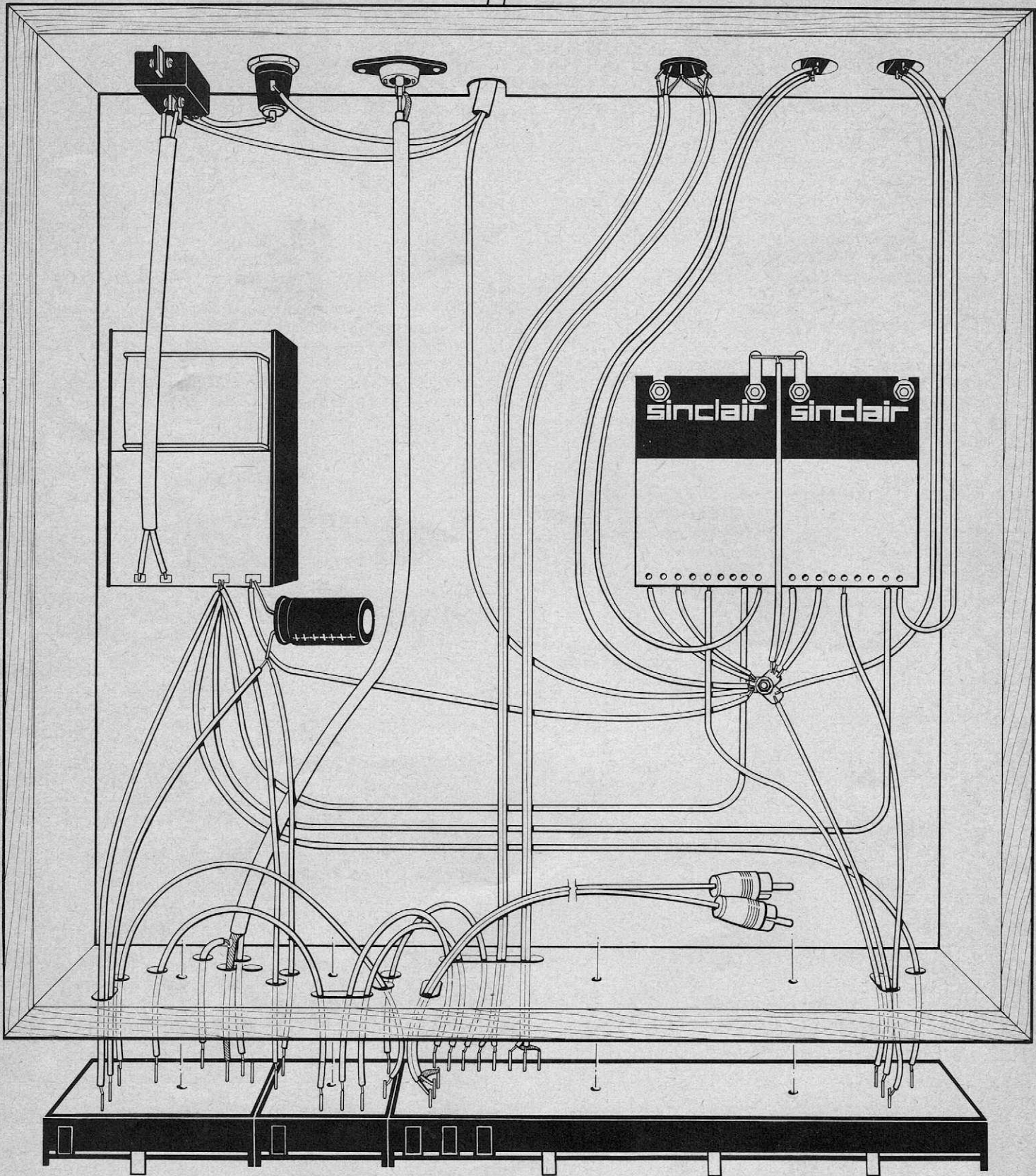
AB3 Notes

1. The Z40s are mounted on heatsink blocks as shown in fig A1.2. The nuts and bolts indicated above assume that the block has 6BA tapped holes — if you use nut and bolt fastening for the blocks you will need 8 less ¼" screws and four extra 1" screws and nuts (for ¾" block).
2. The box is wired so that the complementary tuner (Section AD) plugs into the tuner socket and draws power from the amplifier, therefore there is a connection from PZ6 +ve to Pin 4 on the tuner socket to provide h.t. This wire should only be fitted if a tuner is to be used.
The resistor shown in this +ve feed line is not required when a PZ5 is used.
3. Using a PZ5 instead of the PZ6 will reduce the output power (see section E4) but will have little other effect except for a slight increase in hum level when using the tuner/decoder.

AC A stereo record player (and tuner) using PZ5

AC 2 Shopping list

- 2 Z40
- 1 Project 80 Preamplifier
- 1 Project 80 tuner
- 1 Project 80 decoder } optional
- 1 PZ5
- 1 Plinth with deck
- 1 100µF 25V capacitor (for tuner and decoder)
- 1 5 pin DIN socket
- 2 2 pin DIN speaker socket
- 1 Coax aerial socket
- 1 Panel mounting fuseholder
- 1 double pole mains switch
- 1 metre stereo microphone cable
- 3 metres assorted colours flexible wire



- 3 metres mains cable
- aluminium foil for lining
- 4 6BA ¼" screws
- 5 6BA 1" screws
- 4 6BA ½" spacers
- 18 6BA nuts
- 6 6BA solder tags

AC3 Notes

1. The plinth we use in this example is the BSR McDonald AP1, suitable for HT70, MP60 and 610 decks. It measures 405 x 370 x 88mm approx. When choosing an alternative plinth make sure it is the same size.
2. In order to minimise hum, the inside of the plinth, where the preamplifier, tuner and decoder fit, should be lined with metal

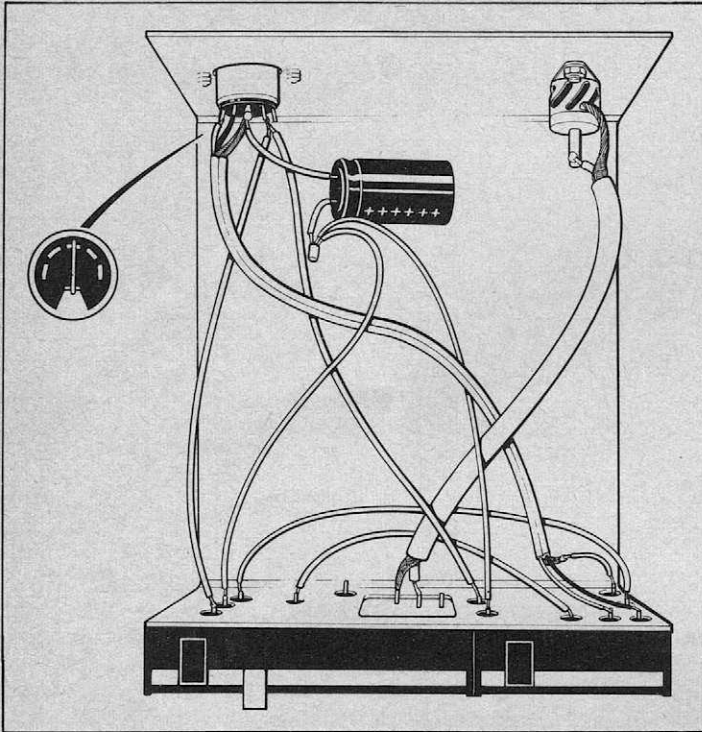
foil. Aluminium cooking foil is very suitable. Use a contact adhesive to glue a layer inside the cabinet before drilling. After drilling remove any burred foil to prevent short circuits. A solder tag should be placed under one of the screws used to fix the preamplifier and a wire run from this screw to the earth point. This tag will then earth the foil, reducing hum. Make sure the foil cannot touch onto any of the connections or modules: PVC tape can be used as an insulator anywhere this is possible — especially around the connections to the Z40 (and to the masterlink in project AE).

It is also a good idea to glue an area of foil underneath the Z40's earth point and wiring. If this is done it will effectively earth the Z40 heatsinks to the earth point and the wire shown connected to these heatsinks can be omitted.

3. The PZ6 or 8 are not advised for plinth mounting because of difficulties of heatsinking (see section D6.3).

AD A stereo tuner (for use with AB)

AD 1 Tuner layout



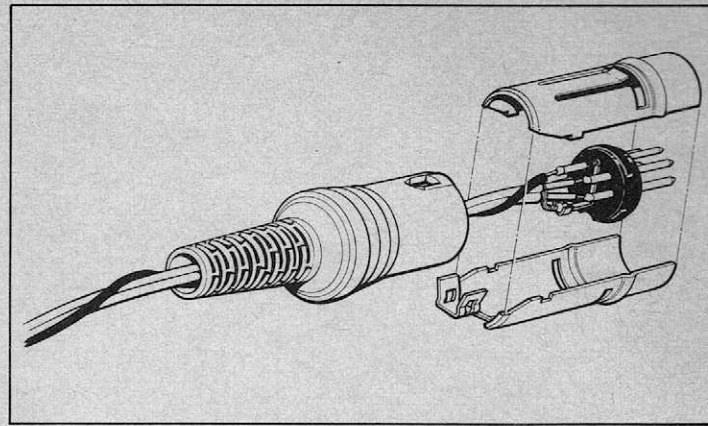
AD2 Shopping list

- | | |
|---------|--|
| 1 | P80 tuner |
| 1 | P80 decoder |
| 1 | chassis |
| 1 | 1000 μ F 25V capacitor (see notes) |
| 1 | coax aerial socket |
| 1 | 5 pin DIN socket |
| 20cm | 75 Ω coax cable |
| 20cm | stereo microphone cable |
| 1 metre | assorted colours flexible wire |
| 4 | 6BA 1/4" screws |
| 4 | 6BA nuts |

The suppliers listed in section AB 2 can supply a tuner box to match their amplifier box.

AD3 Notes

1. The tuner takes its power from the amplifier. The interconnecting lead must be wired with a through connection on Pin 4 to provide this power. The diagram shows how each plug is to be connected on this lead.
2. The 1000 μ F capacitor shown should not be needed if the main amplifier uses a PZ6 or other stabilized power supply.



AD 3.1 DIN plug wiring

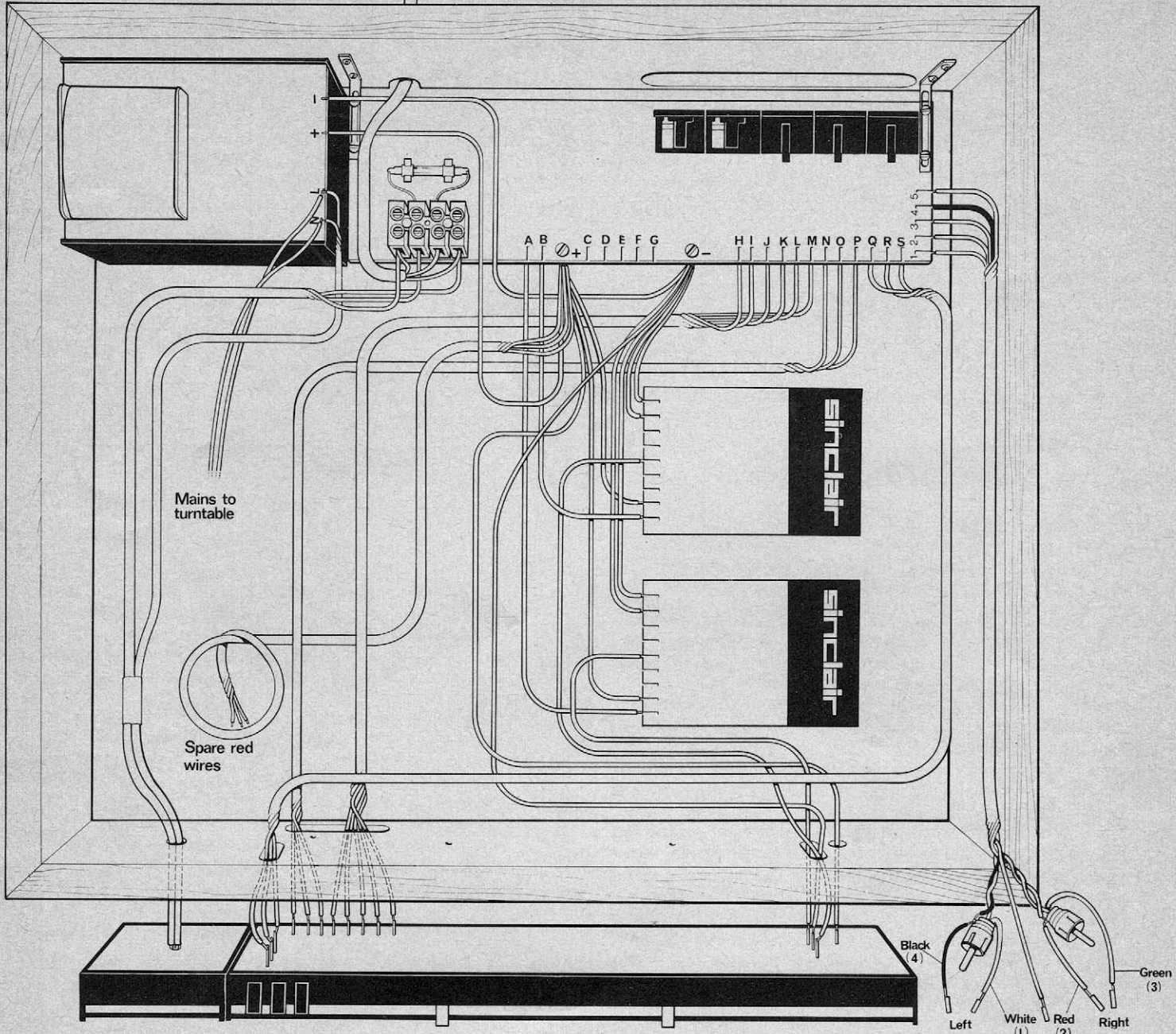
3. The tuner box could be increased in size to contain a built-in PZ6 or 5, this will require a fuse, double pole switch etc.
4. When using the tuner, powered from an amplifier other than that of section AB, hum could be a problem even with the 1000 μ F capacitor. It may help if the negative connection of the tuner is taken via a separate wire (perhaps using Pin 1 of the socket) to the amplifier's main earth point.

AE Project 805

AE2 Parts List

The following components are supplied in the Project 805 — identify them all before starting assembly:

Item	Quantity	Description
1)	1	Masterlink
2)	1	Project 80 preamplifier
3)	1	PZ5 power supply
4)	2	Z40 amplifiers
5)	1	Mains switch unit with wires
Wires: items 6 to 13 are all packed in one bag.		
6)	1	Green harness (6 wires, 380mm maximum length, joined to eye tag) for earth (-ve).
7)	1	Red harness (7 wires, 430mm max, joined to eye tag) for +ve wiring.
8)	2	Yellow wires (255mm long) (Pins 9 on Z40s to A & B on masterlink)
9)	2	Violet wires (220mm) (Pins 14 & 15 on preamp to pins 5 on Z40s)
10)	1	Violet/yellow/green twisted, 660mm, for pickup connection, masterlink to Preamplifier.
11)	1	Violet/yellow/green twisted, 460mm, for radio connection, masterlink to Preamplifier.
12)	1	Five wires twisted, 460mm long, for tape connections, masterlink to preamplifier.
13)	1	Five wires twisted, 355mm, with 2 phono plugs and 100mm pigtail, for pickup connection, deck to masterlink.
14)	1	Grey 3 core cable for mains connection, 2 metres long.
Extra wires: items 15 to 17 are all packed in one bag.		
15)	5	Yellow wires 150mm long. These are for signal connection between tuner and decoder (1 wire), decoder and preamplifier (2 wires), preamplifier and AFU (2 wires), if these extra units are fitted.
16)	3	Green wires 150mm long. These are for earth connections, decoder to tuner, tuner to preamplifier and preamplifier to AFU.
17)	1	Yellow V-shaped wire, 380 + 150mm long, for decoupling connection (E on masterlink) to tuner and decoder pins 2.

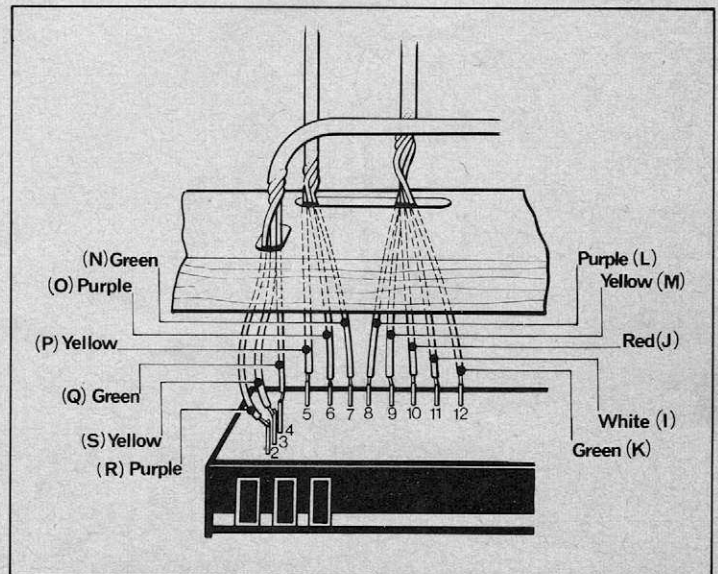


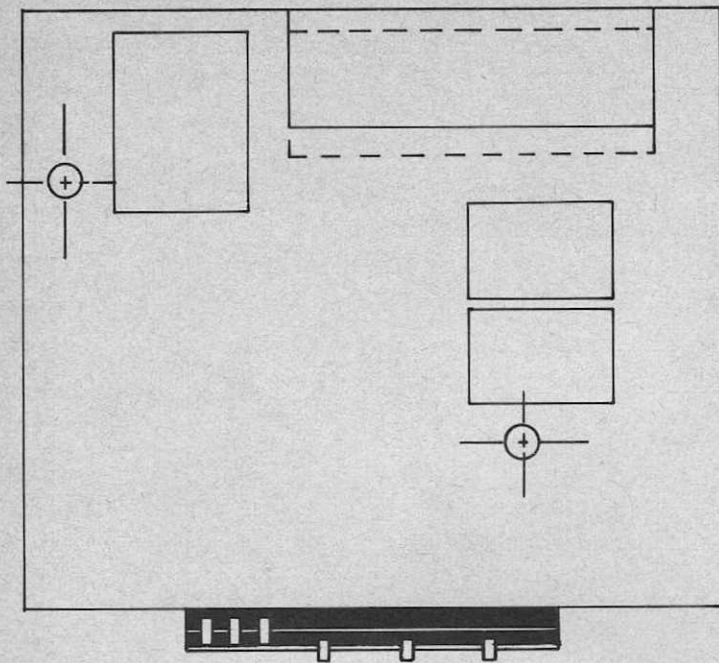
AE 1.1 Connection detail to Stereo 80

Hardware

- | | | | |
|-----|---|---|-------------------------------|
| 18) | 4 | 6BA spacers | } for mounting Z40s |
| | 4 | 6BA 7/8 screws | |
| | 4 | 6BA flat washers | |
| | 4 | 6BA nuts | |
| | 4 | 6BA shakeproof washers | |
| 19) | 3 | 6BA 1 1/2" nylon studding | } for mounting preamplifier |
| 19) | 3 | 6BA fibre washers | |
| | 3 | 6BA nuts | |
| | 3 | 6BA shakeproof washers | |
| 20) | 1 | each items as 19 for mounting switch unit | |
| 21) | 2 | Angle brackets | } for mounting masterlink |
| | 8 | 6BA 1/2" screws | |
| | 8 | 6BA nut | |
| | 8 | 6BA nuts | |
| | 8 | 6BA shakeproof washers | |
| | 8 | 6BA fibre washers | |
| 22) | 4 | Self-tapping screws for PZ5 | } for red and green harnesses |
| 23) | 2 | 4BA 5/8" screws | |
| | 2 | 4BA nuts | |

Letters and numbers in brackets refer to connections to masterlink.

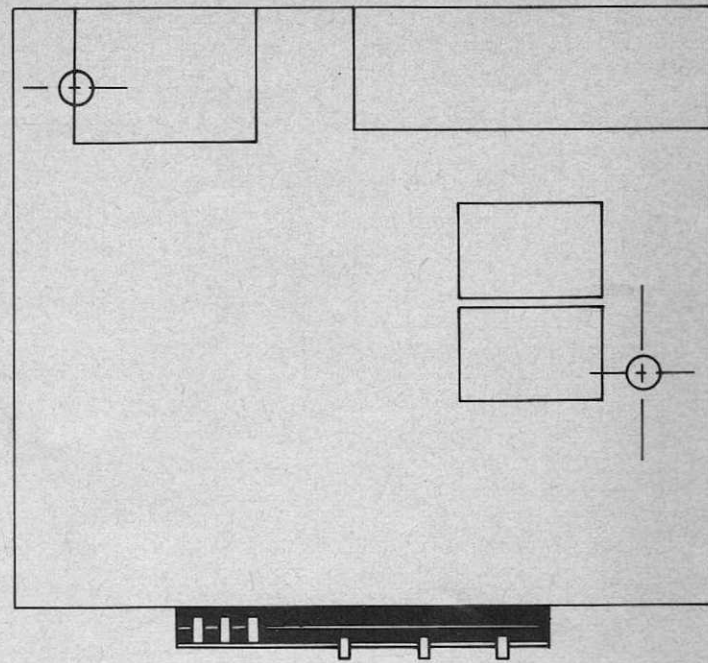




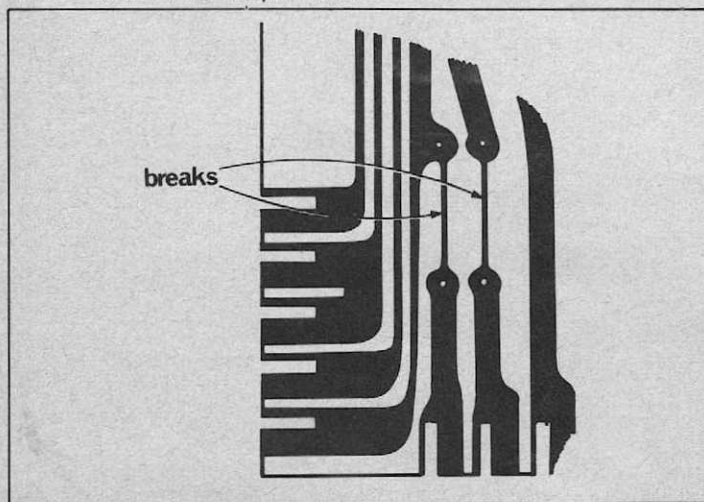
AE3.1

AE3 Notes

1. The plinth we use in this example is the WB1 for the SP25 Mark III. You can use any similar plinth, including the plinth used in layout AC. The diagrams above show suggested positions for the WB1 plinth and the AP1 plinth.
2. It is good practice to line the inside of the plinth with foil as explained in AC3.2. The area around the masterlink should also be lined.
3. **Wire lengths** in our drawing have been 'tidied up' slightly for clarity. It is, however, important that they are loose — do not twist or tape wires together unless we supply them twisted. The only exception to this is that the spare wires on the red harness can be twisted and taped together out of the way as we have shown them, or if you prefer, you can cut these spare wires off completely.
4. **Deck connections.** The wire to connect to the deck has phono plugs and push-on connectors since different makes of decks have different means of connecting. If you use the phono plugs, then cut the 'pigtailed' which are not used off. If you use the push-fit connectors, tape the phono plugs up carefully so they cannot touch anything inside the plinth.



AE3.7 Detail of break in p.u. track



5. **Mains connections.** The push-fit tags for the PZ5 (the wires are already connected to the switch unit) have pigtailed to connect to the deck mains connections, so that the switch unit operates deck and amplifier. Connect these as instructed by the deck manufacturer. If you are not using them cut them off completely.
6. **Adding tuner, decoder and AFU** can be done using the extra wires (items 15-17). Connections for these extra modules are as shown in AB1 (AFU) and AC1 (tuner and decoder). Positive supply wires (to pin 1) are already included attached to the red harness.
7. **Adjustments**
Once the project is working, the sensitivity of the tape input may be adjusted by means of RV3 and RV4 (see FA3 for positions) to give best results.
With some higher output magnetic cartridges the links shown in fig. AE37 may be broken to give improved matching.

A: Additional information on systems.

A1 Mounting Instructions

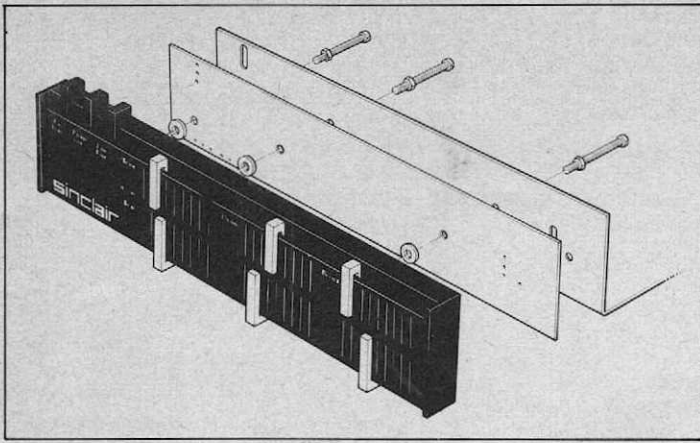
A1.1. Preamps, tuners and control modules

These are all styled in the same way and the fixing of all of them is identical, by means of 1,2 or 3 6BA screws which pass through the panel to which the module is fixed and into the rear of the module itself.

The panel may be of metal, wood or plastic with very little effect on the performance, although if a wood or plastic cabinet is used it is a good idea to line the inside with foil as described in section AC3.

It is vitally important, when using metal, to make sure that no part of the rear of the control module can touch the metal and therefore some type of insulator must be put between module and metal.

Your local DIY shop will be able to sell you some vinyl upholstery material about 1 or 2mm thick — this is ideal as you can glue a layer over the metal after drilling and make holes through it as necessary. You can also use an off-cut of formica or other laminate, glue it on before drilling and use the template to drill through both.



A 1.1 Stereo 80 mounting

The diagram shows how a preamplifier is mounted, note the metal chassis and a 'card' of insulation. Note also the fibre washers used between the chassis and the stereo 80 which stop bending of the module when the screws are tightened. The screws supplied have a nut on them to allow for different thicknesses of panels.

A1.2. Z40, Z60 and PZ8

All these modules have the same sort of mounting, by means of two holes in the edge of a black metal fin. When the module is working hard this fin can get very hot and the mounting must allow the heat to get away from the module, so the mounting is partially mechanical and partially for heat transfer. The metal onto which the mounting is made conducts the heat away — this is called heat sinking.

The amount of heatsinking needed is entirely dependant upon what power supply you use, what speakers you have and at what volume level you use the equipment.

For normal domestic listening, using PZ5, you will need no heatsink.

In our layouts for the PZ6/Z40 and PZ8/Z60 systems we use a metal block to provide firm mounting and good thermal conduction through to the metal cabinet which is the heatsink.

Additional details of heatsinking are given in section D6.3.

The diagram shows how a Z60 can be mounted on a heatsink block, made from 20mm (3/4") square aluminium bar. Also shown is a method of mounting using metal spacers — this does not give any

heatsinking so is really only suitable when using a PZ5. We use this method with Project 805.

Alternately two Z60's can be mounted on one block (the Z40 is a little too fat for this) as shown in fig. DB 9.2.3.

A 1.3 PZ5 and PZ6

These modules are mounted by means of screws through the base of the cabinet and the holes in the bottom of the power supply.

The PZ5 and 6 are very heavy items so remember (especially if you have mounted it onto the hardboard base of a record player plinth) that the mounting will break loose if the amplifier is dropped.

A 1.4 Templates

Page 31 contains templates for mounting the modules.

A2 Choice of cabinet

Project 80 is very versatile and can be built into many different cabinets. Metal is the material which causes least problems but wood or plastic can be used. With wood (and to a lesser extent with plastic) hum can be a problem if care is not taken. Wood and plastic will not give any heatsinking.

The modules in this manual, in so far as cabinets are concerned, can be grouped into three sections:

Tuner and decoder

Preamp and AFU

Power amplifier and supply

Three separate cabinets can be used for the three groups with no problem — but do not separate within the groups — in particular keep the power supply in the box with the amplifiers.

The tuner and decoder are not critical of mounting materials, but if metal is used a window must be cut to avoid upsetting the alignment. The window is shown in the template.

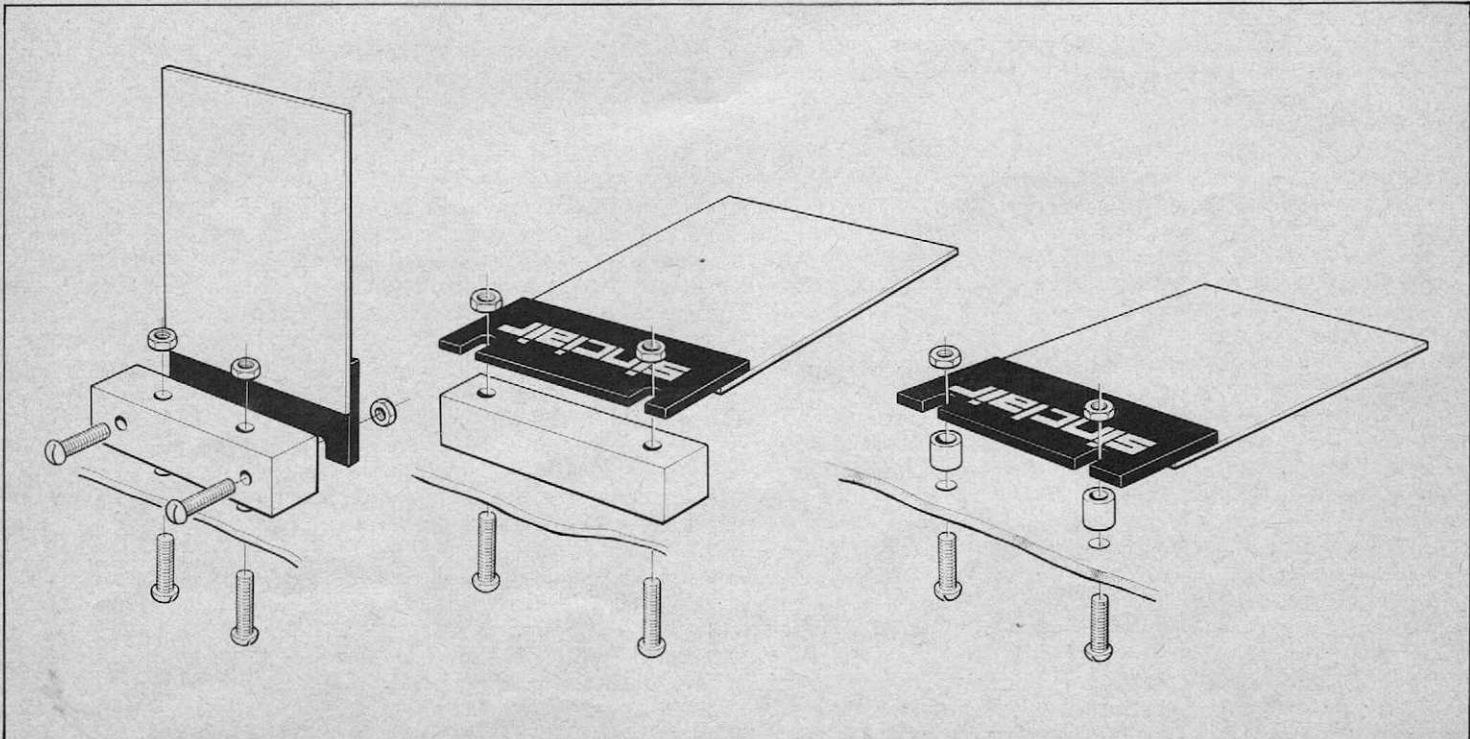
It is a good idea, if wood or plastic is used for the tuner or preamp mounting, to line the inside of the panel with aluminium foil, which should be earthed (see section AC 3). This earthed metal will help reduce hum.

The power amplifiers should be mounted on metal for heat-dissipation. See sections A3.2. and D6.3.

Several commercially available cabinets are available for project 80, addresses of suppliers are given in section AB2. In particular West Hyde market three cases, ready punched for combinations of power supplies and amplifiers.

Case A: front panel for tuner, decoder, stereo 80 and AFU will accept PZ8 + transformer, or PZ5/PZ6, Z40s or Z60s and/or a project 805 with masterlink.

A 1.2 Z40 mounting



Case B: front panel for stereo 80 & AFU only but will accept other combinations as case A.

Case C: front panel for tuner and decoder only, room for PZ5 or PZ6.

West Hyde can supply a transformer for the PZ8 and all hardware for the amplifier cases, which will be ready punched.

Holes indicated ϕ should be $\frac{1}{8}$ " (3mm) diameter. The large hole on the switch unit should be $\frac{1}{4}$ " (6mm) and all other holes $\frac{3}{16}$ " (5mm). See page 31 for templates.

A3 Positioning the modules

A3.1. Preamp and AFU, tuner and decoder

The positioning of these will naturally be determined by the cabinet which is chosen.

The Stereo 80 is the module which is most used and is the heart of the system so this will probably be placed centrally, with the other modules around it. (e.g. tuner and decoder to the left, AFU to the right).

Remember that the input wires to these modules are sensitive to induced hum so do not place them where these wires will pass near to mains transformer and wiring, or to turntable motors, or near the outputs of the Z40/Z60.

In our layouts (AB & AC) we keep all mains wiring in the back right (or left) hand corner well away from the preamp.

A3.2. Z40 and Z60

The two power amplifiers should be positioned close to each other (two can even share the same heatsink block as shown in section DB9.2.2.). Keep them away from the input sockets, wiring and connections to the preamplifier, to avoid interaction.

A3.3. Earth point

A point should be chosen mid-way between the Z40's or Z60's to which all earth wires are run, separately. Position this so that wires to terminals 1 and 2 (and 3 on Z60) of the amplifiers are no longer than 3". Separate wires are also run to the earth point from:

- power supply -ve
- speaker sockets
- mains earth
- AFU earth
- Preamplifier earth

Do not 'double up' on any of these wires.

It is usually convenient to form this point from several solder tags, as we have, which are screwed down to the chassis for support (and to make electrical connection to the chassis). It does not have to be screwed down but, if it is not, a separate wire should be connected from it to the chassis (or metal earthing foil).

Note in layout AC we have run a separate wire to earth the metal heat fins of the Z40s — this of course is not necessary if a metal chassis is used since earthing will then be done automatically through the mounting.

A3.4. Power supply

The PZ5, 6 or 8 will be mounted near to the Z40s or Z60s so that the positive and negative wires are not longer than about 6". This length is less critical with the PZ5 and more with the PZ8. In our layout AC these wires are about 12" long, which is satisfactory with PZ5.

The PZ5 or 6 will also require positioning so that the transformer is kept away from input and other wiring (or it can induce hum) and so that mains wires and connections are neat and together.

The PZ8 is not so critical — the transformer can be mounted some distance from the PZ8 (there are no mains connections on the PZ8 itself).

If the +ve and -ve wires from the power supply are too long it can cause distortion. If this occurs then a second point can be chosen, similar to the earth point but isolated from the chassis. A 1000uF 50V capacitor should be connected between this H.T. point and the earth point, and all H.T. wires are now run to the H.T. point instead of direct to the power supply which now connects through a single, longer wire to +ve H.T. point.

A3.5. Mains wires

Mains wiring is potentially dangerous. It has 250V present and if by accident this is applied anywhere other than the correct terminals on the power supply it will be destructive.

Mains Live (Brown) connects direct to the fuse: the other connection of the fuse goes through one pole of the on/off switch to the L

connection on the PZ5 or 6 or to the 240 volt input on the PZ8 transformer.

Mains Neutral connects through the second pole on the switch to N on the PZ5/6 or to Ov on the transformer primary of the PZ8.

Mains earth (green/ yellow) connects direct to the main earth point in the amplifier. If a turntable or other mains powered item is to be used, operated by the same switch as the Project 80, then the mains wire should be taken from L and N on the PZ5/6 via a suitable plug and socket if required, to its mains connection.

ON NO ACCOUNT MUST ANY MAINS CONNECTION BE MADE TO ANY OTHER MODULE

Because of the high voltage, and the possibility of inducing hum, mains wiring is best kept well away from the rest of the amplifier. Care must be taken if the mains switch is to be mounted on the front of the amplifier, see also section A5.3.

A3.6. Output wiring

From pin 9 on the Z40 or Z60 the output wire connects (via a 2000uF capacitor on the Z60 only) to the output socket, and to any headphone sockets you may have fitted.

If any of this wiring is anywhere near the input wiring of the preamplifier, or any other modules, interaction can occur as some of the output signal will then feed back to the input. Keep output well away from the input and also twist the output earth and live leads together.

A3.7. Input wiring

Should usually be screened — but if it is short (4" or so) and does not pass near any mains or output wiring, screening is not necessary. Thus, in our plinth layout we have not used screened wires from the tuner to the Stereo 80, but we have used screened wire from the pickup.

A4 Use of other modules in our layouts

A4.1 Z40 or Z60

The Z60 is longer than the Z40. It also requires an additional fairly bulky output capacitor (see section D.5). The output capacitor is part of the output wiring and must be treated accordingly.

It should be noted that there is no advantage in using the Z60 instead of the Z40 unless a PZ8 is used, although with 15Ω speakers and a PZ6, the supply voltage can be increased to about 40 to give a useful power increase.

A4.2. PZ5 or 6

These are physically and electronically interchangeable. However, when using a PZ6, additional heatsinking will be required (see section D 6.4.). The PZ6 will result in a slight improvement in hum level when the tuner is used.

A4.3. PZ8

The PZ8 is not physically or electrically a replacement for the PZ5 or 6 and the transformers commonly available for the PZ8 are large (about 10 x 8 x 8cm). If the transformer is to be housed in the same case then this will need to be considerably larger than the PZ5/6 case. The PZ8 must not be used with Z40s unless its output voltage is reduced (see section EC6) but if this is done it does result in a considerable improvement in performance.

The PZ8 also should be chosen where sustained high power operation is required. PZ5 and 6 are small and after a while get quite hot at higher powers. It is, of course, quite possible to mount the PZ8's transformer remote from the PZ8 proper.

A4.4. Project 60 modules

The earlier project 60 modules are compatible with project 80 except that the Stereo 60 gives more output than the project 80 preamplifier so the gain of the Z30 and Z50 is less than that of the Z40 and Z60. However, the gain of the Z60 has been kept deliberately low so that it is still compatible with the earlier Project 60.

When using project 80 control modules with Z30 or Z50 the gain of the Z30 or 50 will need to be increased.

A4.5. IC12

It is possible to use an IC12 instead of a Z40. The IC12 should have its gain set to 100 as explained in the instructions.

A4.6. Other Modules

There are other makes of modules available and it is probable that most of these will present no problem when used with Project 80 provided they use a similar power supply voltage and have a negative earth. Such combinations, however, are beyond Sinclair's