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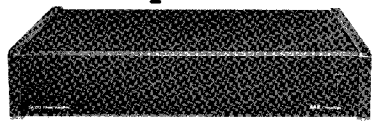
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**The SA150/SA200  
Stereo Power  
Amplifiers**



**Owner's Handbook**

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## Important Notice

1. If your SA150 or SA200 is not delivered fitted with solid wood side cheeks it will instead be supplied with thin, black, metal transit panels. These **must** be removed and the appropriate wood side cheeks fitted before the amplifier is first used. See page 5 for full details.
2. Please retain the carton and all packing materials provided with this equipment so that it may be repacked correctly if it ever becomes necessary to transport the unit or to return it for service.
3. If servicing is required then the equipment should be properly packed and returned to the dealer from whom it was purchased. It is essential to include a covering letter giving your name and address and a brief but thorough description of the fault.

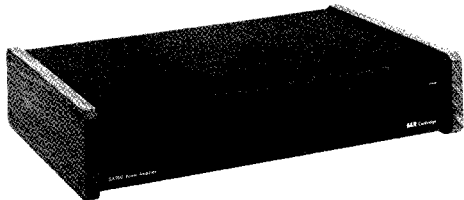
# Introduction

The A&R Cambridge SA150 and SA200 are robust high performance stereo power amplifiers. Their continuous power ratings (into 8 ohm loads) are 75 Watts and 100 Watts per channel respectively. Used with a suitable pre-amplifier or control unit (e.g. the A&R C200) either model will form the basis of a top quality sound system.

These units are built to the highest standards and are designed to blend well with domestic surroundings. Solid Afromosia side cheeks of the same height as the amplifiers are normally supplied as standard; a set of tall side cheeks for stacking either amplifier with the matching A&R C200 control unit is available as an optional extra.

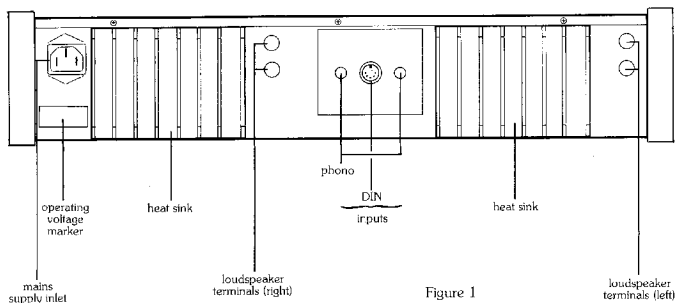
For very high power operation both the SA150 and SA200 are convertible to "bridged mono" operation. Please consult your dealer for further information and availability.

Please study this manual carefully to ensure that you get the best results from your amplifier. Remember your dealer is there to help you. He has full technical and service information for all A&R Cambridge products and considerable experience of their use in a variety of systems. If, however, he is unable to answer your query then do not hesitate to contact us directly.



# Installing and using your SA150/SA200

## Back Panel Connections



## Mains Supply

The SA150 and SA200 are normally set up for use with a nominal 240V 50/60 Hz supply. They can be modified for 220V or 120V operation by your dealer or the manufacturer. CSA (North American) models are suitable for 120V supplies only. The correct supply voltage is marked on the rear panel underneath the AC power supply inlet.

The AC power supply inlet of the SA150 and SA200 is via a standard IEC chassis mounting plug. A moulded IEC socket, fitted with 2 metres (6.5 ft) of cable, is supplied to fit the IEC plug (Note that the IEC plug and socket are a tight fit; before first using the amplifier it is therefore important to ensure that the socket is pushed home firmly into the amplifier's chassis plug).

The wire end of the cable should be terminated with a 3 pin (earthed) plug, wired according to the international colour code and fitted with a 10 Amp or 13 Amp fuse. The international colour code is:

Earth — green/yellow  
Live — brown  
Neutral — blue

Some models may already have a suitable plug fitted as standard.

The SA150 and SA200 also have an anti-surge mains fuse fitted internally. It is recommended that the supply to each model should be disconnected when the amplifier is not in use.

**UNDER NO CIRCUMSTANCES SHOULD THE AMPLIFIER COVER BE REMOVED  
UNLESS THE SUPPLY IS DISCONNECTED.**

## Input Connections

A combination of 5 pin DIN socket and phono connectors is fitted as standard. Certain models may however only have either DIN or phono sockets fitted. In all cases the panel carrying these sockets is removable to enable special versions to be supplied, e.g. for "bridged mono" operation or professional applications. Contact your dealer or the factory for further details.

## Loudspeaker Connections

The outputs of the SA150 and SA200 are suitable for driving loudspeakers of 4 ohms nominal impedance or higher. Both models will drive 4 ohm loads whose impedance dips to as low as 2 ohms, but care should be taken not to operate continuously at high levels into impedances of less than 4 ohms.

The loudspeaker terminals will accept either bare wires or 4mm plugs. The left hand speaker has its pair of terminals near the left hand of the rear panel (when viewing from the front of the amplifier); the right hand speaker terminals are near the centre of the rear panel. The spacing of the terminals is 19mm (0.75 inch) to accept standard twin speaker plugs.

One side of your speaker (normally the – side) should be connected to the black terminal; the other (the + side) should be connected to the red terminal. For stereo applications it is important to ensure that the two speakers are connected in phase (i.e. both wired the same way round to the amplifier). Do not make **any** connections between the left and right loudspeaker leads (except in “bridged mono” applications—see separate instruction sheet).

The SA150 and SA200 are unconditionally stable and suitable for use with all types of loudspeaker leads, including the ‘high definition’ types. For good practical results we recommend the use of heavy duty cables having at least 2 sq mm cross sectional area for each conductor. It is also good practice for the two speaker leads to be of equal length and you should ensure that all connections at both the amplifier and speaker are **tight**.

It is possible to use several pairs of loudspeakers in parallel with the SA150 or SA200 provided the overall impedance does not fall below the limits described above. No speaker switching is provided on the amplifiers as this invariably will cause some degradation of the signal, however slight. If it is necessary to switch speakers we recommend that the main pair be wired directly to the amplifier wherever possible and that only the ‘extension’ speakers be switched.

With both models it is possible to reduce the value of output fuse fitted in the amplifier in order to provide the best protection for both the speaker and amplifier. See page 7 for full details.

## Heat Sink

The heat produced by the SA150 and SA200 is dissipated into the air by the large cast heat sinks whose fins form most of the rear panel. When the amplifier is in use these will run warm and may become quite hot when the unit is run near full power, particularly into low impedance loads.

**This is perfectly normal.** However, if the fins become too hot to touch switch off the amplifier at once and consult your dealer.

N.B. To ensure that the amplifier does not overheat it is important that the natural flow of air over the heat sinks is not obstructed. It is also unwise to place heat sensitive items (such as L.P. records) on top of or immediately above the amplifier.

## Front Panel Controls

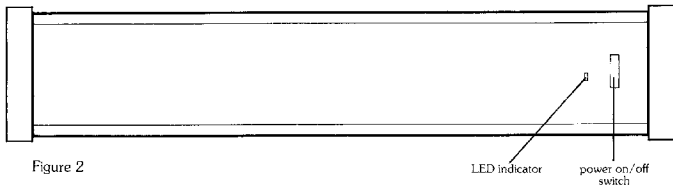


Figure 2

### Mains Power

To switch on the amplifier, depress the power on/off switch located on the extreme right of the front panel until it latches home. The small rectangular LED (light emitting diode) adjacent to the switch should glow green.

To turn off the power amplifier depress the power on/off switch again so that it unlatches.

The SA150 and SA200 generate very little in the way of undesirable switching surges into the loudspeakers when they are turned on and off but they will faithfully amplify any surges generated by preceding equipment. As the amplifiers are very powerful, these surges may cause damage to certain loudspeakers through no fault of the power amplifier. Note that any A&R equipment likely to be used with the SA150 or SA200 (e.g. C200 control unit or A60AP amplifier) is fully suppressed, so that no switch on surge will occur. However, if your pre-amplifier is in any way suspect it is wise to turn on the power amplifier some moments **after** switching on the pre-amplifier, in order to allow the pre-amplifier's circuits to settle down. Similarly, the power amplifier should be turned off well **before** the preamplifier in order to allow its power supply to discharge fully.

### LED Overload Indicator

On both the SA150 and SA200 the front panel LED to the left of the power on/off switch normally glows green to show that the DC power supplies in the amplifier are operating. It will continue to glow green for a short time after the amplifier is switched off as the DC voltages decay.

On the SA200 **only** the LED also functions as an overload indicator. If either channel of the SA200 clips or distorts significantly then the LED will change colour momentarily from green to red. If the overload is maintained then the LED will glow red continuously and to avoid possible speaker damage the preamplifier volume control should be turned down immediately.

## Fitting or Changing Side Cheeks

If your SA150 or SA200 is not already supplied fitted with Afromosia wood side cheeks it will be fitted with thin metal transit panels. These **must** be removed and the appropriate wood side cheeks fitted before the amplifier is first used. The wood cheeks are available in two heights—standard (95mm) and tall (145mm). The latter leaves sufficient clearance underneath the SA200 to accept the C200 control unit. To fit the cheeks, proceed as follows (see figures 3 and 4):-

1. Ensure the SA200 is disconnected from the mains supply.
2. Using a N° 2 'Posidriv' screwdriver remove the four bright metal screws from each side of the amplifier. This will free the transit cheeks. Do not attempt to remove the black screws as these hold together parts of the main chassis.
3. Fit the wooden end cheeks using the M4 hex socket cap screws and washers provided. The screws must be tightened firmly with the Allen Key provided. Ensure that the wooden cheeks are fitted the right way round; they are counter-bored where necessary to clear protrusions on the amplifier chassis. Note that the two side cheeks are identical.

To exchange side cheeks (e.g. from standard height to tall) simply unscrew the M4 hex socket cap screws holding in each old cheek. The new pair may then be fitted following the procedure of paragraph 3 above.

Never operate the amplifier without the proper side cheeks fitted as this could constitute a safety hazard.

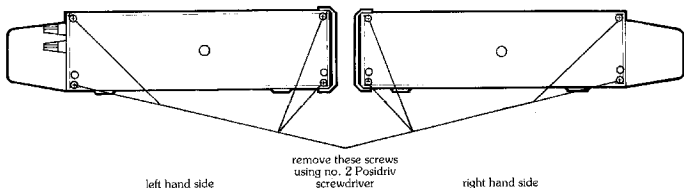


Figure 3. Transit Side Panel Removal

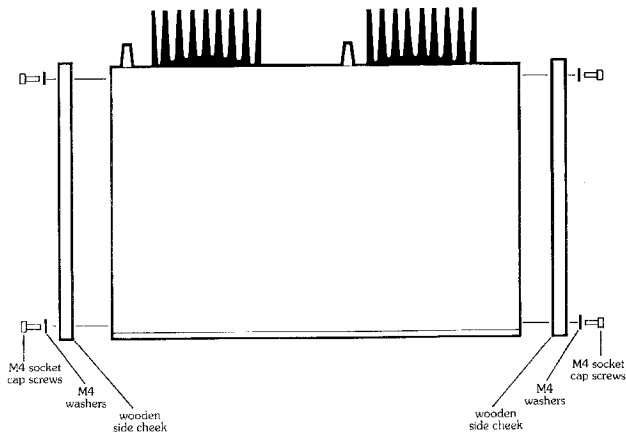


Figure 4. Fitting Wooden Side Cheeks.

# Technical Details

## Spares Kit

You are provided with a spares and accessory kit containing the following:-

### SA150

- 1 IEC line socket with 2m (6.5ft) mains lead.
- 1 3mm AF Allen key.
- 2 Spare speaker fuses (2.5 Amp fast blow, 20mm x 5mm).
- 2 Spare speaker fuses (1.6 Amp fast blow, 20mm x 5mm).

### SA200

- 1 IEC line socket with 2m (6.5ft) mains lead.
- 1 3mm AF Allen key.
- 2 Spare speaker fuses (3.15 Amp fast blow, 20mm x 5mm).
- 2 Spare speaker fuses (2 Amp fast blow, 20mm x 5mm).

In addition, if either amplifier is not already provided with factory fitted wooden side cheeks the spares kit will also contain 8 M4 x 16mm hex socket cap screws and M4 washers, plus one pair of side cheeks (either short or tall).

## Input Connector Wiring

Viewed from rear of amplifier, or plug as wired (see Figure 5).

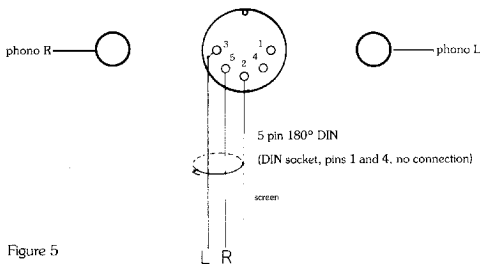


Figure 5

For connecting either model to the A&R C200 control unit (standard DIN output version) or the A&R A60 AP amplifier, a crossover DIN to DIN lead is required. A&R leads type L-05 (0.6m, 2ft) or L-05/2 (2 metres, 6.5ft) are recommended. Either lead may also be used to connect the SA150 and SA200 to most other manufacturers' pre-amplifiers which use a 5 pin 180° DIN socket with the output signals on pins 1 & 4.

The phono sockets may also be used to connect the SA150 or SA200 to a suitable pre-amplifier. For best results only interconnecting leads of the highest quality should be used.

The input impedance of both the SA150 and SA200 is 20 k $\Omega$  and the voltage gain of each channel of both models is 29dB (28.3 times). This is equivalent to an input sensitivity of 1.00V r.m.s. for 100 Watts r.m.s. into 8 ohms for the SA200 and 0.87V r.m.s. for 75 Watts r.m.s. into 8 ohms for the SA150. These figures ensure that both power amplifiers should work with almost all pre-amplifiers and signal sources which provide nominal outputs of between 500mV and 2V r.m.s. If in doubt consult your dealer.



# Fuses

## Output Fuses

Both the SA150 and SA200 are fitted with fuses (one per channel) in their output circuits to provide extra protection for both amplifier and loudspeakers in the event of medium to long term overloads. Each fuse is placed within the feedback loop of its power amplifier channel to eliminate the audible effects of having a speaker fuse in series with the loudspeaker.

In addition, in the SA200 **only**, the circuit is so designed that, if an output fuse blows, not only will the sound from the loudspeaker cease but the overload LED on the front panel will glow red almost continuously if any attempt is made to play music through the system at normal volume settings. This is a certain indication that one or both speaker fuses have failed and need replacing (see over).

## Choosing Output Fuse Ratings

The output fuses fitted to the SA150 and SA200 are of a sufficient value to ensure that the amplifier will drive 4 ohm loudspeakers satisfactorily, with little risk of the fuses failing on normal programme material. However many loudspeakers have a much higher average impedance than 4 ohms and in order to provide them with the optimum protection against overdriving, it may be desirable to fit output fuses of a somewhat lower rating. Suitable spares for nominal 8 ohm loudspeakers are provided with the SA150 and SA200, as shown in the table below. Some suitable values for fuses (not supplied) which may be used with 16 ohm loudspeakers are also shown. In all cases it is wise to use the lowest fuse value possible which does not fail on normal programme material and some experimentation may be worthwhile here. Similarly, if loudspeakers are used which will not accept the full power output of the amplifier, then the fuses should also be down rated in order to provide the loudspeakers with best possible protection against overload. If in doubt consult your dealer or the loudspeaker manufacturer.

Nominal impedance of loudspeaker	Suggested fuse value	
	SA150	SA200
4 ohms	2.5 Amp	3.15 Amp
8 ohms	1.6 Amp	2.0 Amp
16 ohms	1.0 Amp	1.25 Amp

In all cases the fuses used should be 20mm × 5mm "fast blow" types.

IN NO CIRCUMSTANCES SHOULD "SLOW BLOW" OR "ANTI-SURGE" FUSES BE USED, OR VALUES GREATER THAN THE HIGHEST LISTED IN THE TABLE ABOVE. THIS WOULD RESULT IN INADEQUATE PROTECTION OF THE AMPLIFIER AGAINST OVERLOAD AND WILL INVALIDATE THE GUARANTEE.

## Power Supply Fuses

These are—2.5 Amp fast blow 20mm × 5mm diameter fuses (model SA150).  
These are—3.15 Amp fast blow 20mm × 5mm diameter fuses (model SA200).

THEY ARE NOT USER REPLACEABLE.

If any of these fuses fail there is probably a fault in the amplifier—do not change the fuses but consult your dealer.

## Mains Fuses

All models are fitted with an anti surge (slow blow) 20mm x 5mm diameter fuse, designed to protect against faults in the amplifier, transformer and mains switch. The values are shown below:

SA200 (all voltages)	5A
SA150 (220/240V)	1.6A
SA150 (120V)	3.15A

THESE FUSES ARE NOT USER REPLACEABLE

Should the SA150 or SA200 fail to function at switch-on the fault is probably external to the amplifier. In particular, check the fuse in the mains plug (and distribution board, if used) before suspecting the power amplifier. The switch-on surge currents of the SA150 and SA200 are very great which is why a 10 or 13 Amp fuse is recommended for the mains plug. You should also ensure that the IEC mains socket is pushed securely home into the IEC plug on the back panel of the amplifier.

## Inspecting and Changing Fuses

In order to inspect or change the fuses you will need to remove the top cover (see Figures 6 and 7).

BEFORE REMOVING THE COVER ALWAYS SWITCH OFF THE AMPLIFIER AND DISCONNECT THE MAINS SUPPLY. NOTE THAT THE MAINS FUSE REMAINS LIVE WHENEVER THE AMPLIFIER IS PLUGGED INTO THE MAINS, EVEN WHEN THE AMPLIFIER SWITCH IS IN THE OFF POSITION.

To remove the top cover use a No 1 'Posidriv' screwdriver to take out the three black screws located along the top rear edge of the amplifier, above the heat-sinks. The cover may then be lifted gently upwards and backwards in order to free it from its locating slot in the front panel. The positions of the fuses are shown in Figure 4. Replacement of the cover is a straight reversal of the above procedure.

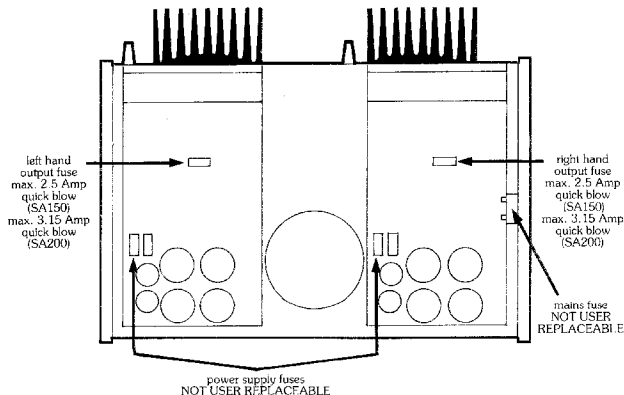
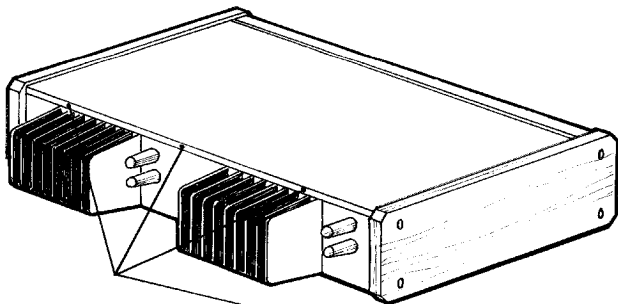
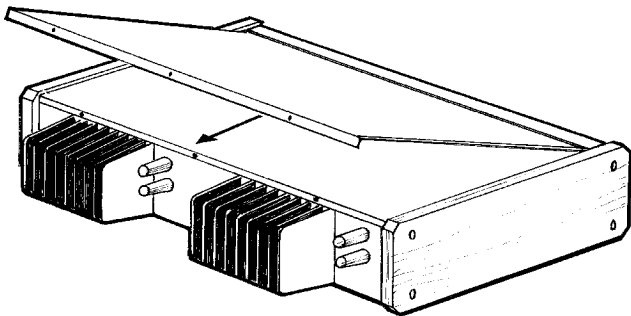


Figure 6. Location of Fuses



remove these screws using  
No. 1 'Posidriv' screwdriver



lift rear of cover and  
withdraw in direction shown

Figure 7. Removal of Top Cover

# SA150 Technical Specification

## Inputs

Fixed level inputs are connected to pin 3 (LEFT) and pin 5 (RIGHT) of a 5 pin 180° DIN socket and/or two phono sockets located in the rear sub panel. This sub panel is removable to allow other types of connector to be substituted, if required.

Sensitivity	0.87V (ref. 75W/8 ohms, 1 kHz)
Gain to loudspeaker terminals	29.0 dB at 1 kHz, non-inverting
Signal/noise ratio	> 100 dB, unweighted or CCIR/ARM weighted, (ref. 75W/8 ohms)
Input impedance	20 k $\Omega$

## Outputs

Loudspeaker outputs are via red and black heavy duty screw terminals. These will accept bare wires or 4mm ('Banana') plugs. Suitable for 4-16 ohm loudspeakers.

The continuous power output, both channels driven (at 0.08% t.h.d., 20 Hz-20 kHz), exceeds

75W/channel into 8 ohms  
110W/channel into 4 ohms

The typical maximum power output at 1 kHz, at clipping (0.1% t.h.d.), both channels driven is

90W/channel into 8 ohms  
125W/channel into 4 ohms

## Total Harmonic Distortion

At any level up to 75W/8 ohms, 1 kHz > 0.03% (typ. 0.01%)  
At any level up to 110W/4 ohms, 1 kHz > 0.05% (typ. 0.02%)

## Frequency Response

+0, -0.5 dB 10 Hz-20 kHz. It is recommended that the pre-amplifier's high frequency response should be curtailed to at least -3 dB at 50 kHz.

## Power Requirements

240VAC, 48-63 Hz, 500VA maximum. The unit may be dealer adjusted to work at 220V or 120V if required.

## Dimensions (overall)

Width 464mm (18 $\frac{1}{4}$ " )  
Height 95mm (3 $\frac{3}{4}$ " )  
Depth 350mm (13 $\frac{3}{4}$ " )

## Weight

Net 9 kg (20 lb)  
Packed 13 kg (29 lb)

# SA200 Technical Specification

## Inputs

Fixed level inputs are connected to pin 3 (LEFT) and pin 5 (RIGHT) of a 5 pin 180° DIN socket and/or two phono sockets located in the rear sub panel. This sub panel is removable to allow other types of connector to be substituted, if required.

Sensitivity	1.00V (ref. 100W/8 ohms, 1 kHz)
Gain to loudspeaker terminals	29.0 dB at 1 kHz, non-inverting
Signal/noise ratio	> 100 dB, unweighted or CCIR/ARM weighted, (ref. 100W/8 ohms)
Input impedance	20 k $\Omega$

## Outputs

Loudspeaker outputs are via red and black heavy duty screw terminals. These will accept bare wires or 4mm ('Banana') plugs. Suitable for 4-16 ohm loudspeakers.

The continuous power output, both channels driven (at 0.08% t.h.d., 20 Hz-20 kHz), exceeds

100W/channel into 8 ohms  
160W/channel into 4 ohms

The typical maximum power output at 1 kHz, at clipping (0.1% t.h.d.), both channels driven is

125W/channel into 8 ohms  
195W/channel into 4 ohms

## Total Harmonic Distortion

At any level up to 100W/8 ohms, 1 kHz < 0.03% (typ. 0.01%)  
At any level up to 160W/4 ohms, 1 kHz < 0.05% (typ. 0.02%)

## Frequency Response

+0, -0.5 dB 10 Hz-20 kHz. It is recommended that the pre-amplifier's high frequency response should be curtailed to at least -3 dB at 50 kHz.

## Power Requirements

240 VAC, 48-63 Hz, 600 VA maximum. The unit may be dealer adjusted to work at 220V or 120V if required.

## Dimensions (overall)

Width 464mm (18 $\frac{1}{4}$ " )  
Height 95mm (3 $\frac{3}{4}$ " )  
Depth 350mm (13 $\frac{3}{4}$ " )

## Weight

Net 10.0 kg (22 lb)  
Packed 14.0 kg (31 lb)

# Guarantee for U.K. Sales

This equipment has been fully tested and a full record of these tests made before despatch from the factory. Both the workmanship and the performance of this equipment are (except as set out below) guaranteed against defects for a period of one year from the date of purchase provided that it was originally purchased from an authorised U.K. dealer under a consumer sale agreement. (The words "consumer sale" shall be construed in accordance with Section 15 of the Supply of Goods (Implied Terms) Act 1973).

The Manufacturers can accept no responsibility for defects arising from accident, misuse, wear and tear, neglect or through unauthorised adjustment and or repair, neither can they accept responsibility for damage or loss occurring during transit to or from the person claiming under this guarantee.

This guarantee covers both labour and parts and is transferable to subsequent purchasers but the liability of the Manufacturers is limited to the cost of repair or replacement (at the discretion of the Manufacturers) of the defective parts and under no circumstances extends to consequential loss or damage.

## Claims under this guarantee

This equipment should be packed in the original packing and returned to the dealer from whom it was purchased or, failing this, any other authorised A&R Cambridge dealer. If it is not possible to return the equipment by hand, then it should be sent carriage prepaid by a reputable carrier.

Should the original packing not be available, replacement packing can be purchased from the Manufacturers. The equipment should not be sent by post.

**DO NOT CONSIGN THE EQUIPMENT TO A&R CAMBRIDGE UNLESS YOU HAVE FIRST BEEN SPECIFICALLY REQUESTED TO DO SO BY THE MANUFACTURER'S TECHNICAL SERVICE DEPARTMENT. DO NOT UNDER ANY CIRCUMSTANCES ATTEMPT TO DISASSEMBLE THE EQUIPMENT BEFORE DESPATCH.**

If you have any difficulty complying with these requirements, please contact the Manufacturers at the following address:-

A&R Cambridge Limited,  
Denny End Industrial Centre,  
Waterbeach,  
Cambridge CB5 9PB.

Tel: (0223) 861550  
Telex: 817345 (ARCAM G)

In either case you should state clearly your name and address, the date and place of purchase, together with a brief description of the fault experienced.

In the event of equipment being returned which on test is found to comply with the published specification the Manufacturers reserve the right to charge a reasonable fee for testing the equipment and for return carriage.

## Enquiries

The Manufacturers are happy to answer any queries you may have regarding the use of this equipment on the condition that this enquiry is by letter and a stamped addressed envelope is provided. You should state clearly the serial number of the unit, the dealer from whom it was purchased and the date of purchase.

**THIS GUARANTEE IN NO WAY VARIES OR REMOVES A PURCHASER'S STATUTORY RIGHTS.**