

A&R Cambridge

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ARCAM DELTA

DELTA 90 INTEGRATED STEREO AMPLIFIER

OWNERS' HANDBOOK

Introduction

The Arcam Delta 90 integrated amplifier has been designed to meet the requirements of the most demanding listener. Combining excellent sound quality with sleek, sophisticated styling the Delta will provide the heart of any high quality sound system.

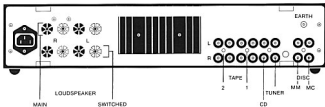
The amplifier has five switchable inputs accepting signals from a compact disc player, turntable (with facilities for both moving coil and moving magnet cartridges), tuner and two tape recorders. There are independent controls for both the "listen" and "record" functions allowing the user to listen to one programme at the same time as recording another from an entirely separate source.

To increase further its versatility the Delta 90 is provided with a mono button, and high quality tone controls which have sensible amounts of boost or cut available at the frequency extremes. For the ultimate in audiophile sound quality these controls may be bypassed with the "direct" switch on the front panel; nevertheless, used sensibly, they can help correct for many imperfections that may be present elsewhere in the audio system.

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 DELTA 90 Amplifier



Mains supply

Check that the amplifier voltage setting as indicated on the back panel is the same as the local mains supply. The cores in the mains lead are coloured in accordance with the following code:

GREEN AND YELLOW EARTH
BLUE NEUTRAL
BROWN LIVE

NOTE Export units for certain markets have moulded mains plugs fitted as standard.

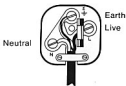


Fig 2

As the colours of the wires in the mains lead may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured GREEN AND YELLOW must be connected to the terminal in the plug which is marked by the letter E or to the safety earth symbol or coloured GREEN or GREEN AND YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked by the letter N or coloured BLACK or BLUE.

The wire which is coloured BROWN must be connected to the terminal which is marked by the letter L or coloured RED or BROWN. If the mains plug is fused fit a 13A fuse.

Under no circumstances should the amplifier cover be removed unless the supply is disconnected at the wall socket.



Fig 3

The AC supply inlet to the amplifier uses a standard IEC chassis mounting plug. The IEC line socket on your mains lead and the IEC plug on the amplifier are a tight fit; before first using the amplifier it is, therefore, important to ensure that the socket is pushed firmly home into the amplifier's chassis plug.

Plug the mains lead supplied into the AC socket. (Fig. 3).



Fig 4

Audio Inputs

All audio inputs and tape outputs are via RCA phono connectors. Each input is marked "L" for left and "R" for right channels. Your connection leads will be marked "L" and "R" or with a white or black plug for left and a red plug for right.

Disc Input

The Delta can accept both moving magnet and moving coil cartridges independently, via two separate inputs.

Moving Magnet – If your turntable is fitted with a moving magnet cartridge or high output moving coil cartridge connect it to the Delta as follows:

1 Connect the plugs on your turntable leads to the phono sockets marked MM (see Fig. 4).

2 To the left of the MM input is the cartridge selector switch marked ^{MC}MM. Make sure that this button is OUT (to select MM). If this switch is IN then no sound will be heard.

3 If your turntable has a separate ground lead this should be attached firmly to the earth terminal on the rear of the amplifier.

Moving Coil – If your turntable is fitted with a low output moving coil (MC) cartridge connect it to the Delta as follows.

1 Connect the plugs on your turntable phono leads to the two phono sockets marked MC (see Fig. 5).

2 To the left of the input sockets marked "MM" is the cartridge selector switch marked ^{MC}MM. Make sure that this button is IN (to select MC). If this is switched OUT then no sound will be heard.

3 If your turntable has a separate earth lead this should be attached firmly to the earth terminal on the rear of the amplifier.

NOTE NEVER OPERATE THE MM/MC SWITCH ON REAR OF THE AMPLIFIER WITH THE VOLUME CONTROL TURNED UP AS THE RESULTANT ELECTRICAL SURGE MAY OTHERWISE DAMAGE SENSITIVE LOUSPEAKERS.



Fig 5



Fig 6

Tuner Input

The tuner input is suitable for use with almost any AM or FM tuner.

Connect your tuner to the amplifier using the phono sockets marked "tuner" (see Fig. 6).

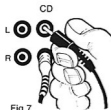


Fig 7

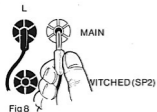


Fig 8

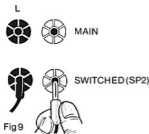


Fig 9

C.D. Input

This is suitable for use with any compact disc player. Connect your CD player to the amplifier using the phono sockets marked "C.D." (see Fig. 7).

NOTE Although, like the tuner and tape inputs, the CD input has a "flat" frequency response, its sensitivity is lower to take account of the high output signals available from CD players. It is possible to use either a tuner or a tape recorder fed into the CD input but the amplifier's volume control will have to be set higher than when using other inputs in order to obtain the same sound pressure level from the loudspeakers.

Tape Inputs/Outputs

The Delta has connections for two tape recorders and is suitable for almost any cassette, reel to reel tape recorder or video recorder audio signal.

- 1 Connect the "record" leads of your tape recorder to the phono sockets marked OUT on the Delta using phono/phono leads.
- 2 Connect the "playback" leads of your tape recorder to the phono sockets marked IN on the Delta using phono/phono leads.

Loudspeakers

The outputs are suitable for driving loudspeakers in the range 4-16 ohms impedance. The heavy duty loudspeaker binding posts will accept almost any type of connector, ie bare wires, 4 mm plugs, spade connectors, pin connectors etc. The Delta has two sets of loudspeaker outlets, one set marked "MAIN" and the other set marked "SWITCHED (SP2)". Both loudspeakers and headphones can be used together on both "MAIN" and "SWITCHED (SP2)". "SWITCHED (SP2)" can be switched off by releasing the switch "SP2" on the front panel to allow just headphones to be used.

Main Connection (see Fig. 8 - viewed from the rear of the amplifier).

- 1 Connect the negative side (usually black) of your left hand loudspeaker lead to the black terminal of the two sockets marked "L". The other (the positive side or red) should be connected to the red terminal marked "L".

- 2 Repeat for the right hand loudspeaker.

Switched Connection (see Fig. 9 - viewed from the rear of the amplifier)

The switched outputs are the lower set of terminals.

- 1 Connect the negative side (usually black) of your left hand loudspeaker lead to the black terminal of the two sockets marked "L". The other (the positive side or red) should be connected to the red terminal marked "L".

- 2 Repeat for the right hand loudspeaker.

- 3 Push the switch "SP2" on the front panel in. The "switched" output will not be selected unless this switch is pushed in.

Heatsink/Ventilation requirements for your Delta 90 amplifier

The heat produced by the amplifier is dissipated into the air by the finned heatsink on the rear which will, along with the surrounding panel, become warm while the amplifier is on. The whole back panel may become quite hot if the amplifier is run near full power. **THIS IS PERFECTLY NORMAL.** However, if it becomes too hot to touch, switch off the amplifier at once and consult your dealer. It is very important that there is adequate ventilation for the whole of the amplifier, but especially for the rear. It is also important to remember not to place records on top of it!

Front Panel Controls

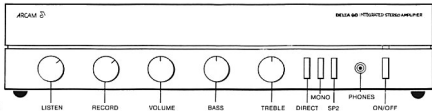


Fig 10

Mains Power

Before switching on for the first time it is wise to ensure that the amplifier's volume control is set to zero.

The amplifier is turned on by depressing the mains power switch. The small rectangular LED (light emitting diode) above the switch should glow green. After several seconds you may hear a gentle click from inside the amplifier. This indicates the speaker protection relays have been released and that the amplifier is ready for use.

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

Note The Delta 90 will play music within seconds of switching on. However, in common with other audiophile products, the internal circuits take some time to stabilise fully and the very best sound quality may not be obtained until the amplifier has had a short time to warm up.

LED Indicator Light

This light indicates that the d.c. power supplies within the amplifier are operating. It will continue to glow for a short time after the amplifier has been switched off as the internal power supplies discharge.

Input Selection

There are two rotary knobs marked "Listen" and "Record". The "Listen" control allows you to select the desired input to come through your loudspeakers. The "Record" allows you to select the desired input for outputting to your tape recorder. It also allows you to record an input which is different from the one you are listening to.

Treble Control

The treble control progressively cuts the higher frequencies when turned anti-clockwise and boosts them when turned clockwise. It is flat when in the 12 o'clock position which is conveniently and positively located by a centre click stop.

Direct

The direct switch is located just to the right of the tone controls and is operative when depressed. In this condition the audio signals completely bypass the tone control stages so that adjustments of the tone controls will not alter the sound. It is recommended that the direct switch is left in, if the tone controls are not being used, for best audio performance.

Mono

The amplifier is in its normal mode when the mono switch is out. In this position, the left and right input signals are amplified independently for the corresponding loudspeaker outputs. When the mono button is pushed in, the left and right signals are mixed together and the combined signal is routed to both loudspeakers. This is particularly useful when listening to mono records or tapes (as much low frequency out-of-phase rumble can be eliminated) or to remove excessive hiss from F.M. broadcasts. It is also invaluable for checking speaker phasing in a stereo hi fi system.

SP2 Switch

When this is depressed, the output from the amplifier is connected to the loudspeaker outlets marked 'switched' as well as from outlets marked 'main', which operate all the time. If this switch is out no sound will be heard via the loudspeakers connected to the 'switched' connections. If using headphones regularly it is advisable to use the 'switched' connections as the output to these loudspeakers can be switched off using the SP2 switch. Loudspeakers connected to the main loudspeaker connections cannot be cut off when headphones are inserted apart from physically removing the speaker cables by hand.

Phones

The headphone socket will accept any headphones fitted with a standard jack plug. The headphones may be operated in parallel with the loudspeaker outlets, or not (see SP2 above).

Listen

Select the input you wish to listen to by turning the knob to the desired point. The selected input should then be heard through your loudspeakers and/or headphones, with its level adjusted by the volume control on the front panel.

Record

The "Record" control is used to select the source required for your tape recorder. See page 10 for full details on tape recording and dubbing. The signals sent to the tape recorders are not affected by any of the amplifier's other front panel controls.

Volume Control

The volume control is of a split type and allows you to adjust the levels of the left and right channels for both loudspeakers independently. Normally, the two halves of the control knob rotate together as they are locked together by a friction clutch inside the volume control itself. However, by holding the rear part of the control firmly with the first finger and thumb of one hand, it is possible to alter the relative position of the two parts of the knob and thus compensate for level differences caused by the nature of the input signal or due to room acoustics.

Tone Controls

Large deviations from a "flat" frequency response should not be encountered with high quality audio equipment. Nevertheless properly designed tone controls can enhance musical enjoyment by correcting for certain transducer and environmental deficiencies.

The DELTA 90's bass and treble controls have been designed to provide a limited but precise range of adjustment to the frequency extremes only. The controls are factory preset to be accurately flat in the "12 o'clock" position.

The bass control permits some compensation for room or loudspeaker deficiencies without affecting the critical mid range frequencies. The treble control is particularly useful for correcting the frequency response errors of certain cartridges or to tame the apparently overbright sound of some Compact Disc (CD) material.

The effect of the controls can readily be checked by using the "direct" switch – see page 9.

Bass Control

The bass control progressively cuts bass signals when turned anti-clockwise and boosts them when turned clockwise. The flattest response is obtained at the 12 o'clock position which is conveniently and positively located by a centre click stop. The bass control has been designed to operate without affecting the lower middle frequencies. Because of this, a significant amount of boost or cut may be employed to compensate for loudspeaker deficiencies without affecting the critical midrange.

Tape recording

The Delta allows extreme versatility with tape recorders allowing you not only to record from one source but also to listen to another source at the same time. Both sockets are suitable for almost any type of recorder.

Tape 1

Connect your tape recorder to the Tape 1 sockets using the 'IN' sockets for connecting the playback and the 'OUT' for connecting the recording side of your tape recorder (see page 6).

Recording – All the inputs are automatically connected to the recording outlets so to record an input, set the required input, e.g. C.D., to play and then set the 'RECORD' selector switch to the required input, C.D. in this example. Set your recorder into its recording mode and the required input will be recorded. Setting the 'LISTEN' control to the recorded input, C.D. in this example, will enable you to listen to the input being recorded. If your tape recorder allows you to monitor the recording, switching to 'TAPE 1' on the 'LISTEN' selector will allow you to listen to the actual recording. If you wish to listen to another input, instead of either the recorded or the recording inputs, select the 'LISTEN' selector to the desired input, Disc for example.

Playback – Set the 'LISTEN' selector to Tape 1 and set your tape recorder in the playback mode.

Tape 2

Connect your tape recorder as per Tape 1 but using the sockets marked Tape 2.

Recording – All the inputs are automatically connected to the recording outlets so to record an input, set the required input, e.g. C.D., to play and then set the 'RECORD' selector switch to the required input, C.D. in this example. Set your recorder into its recording mode and the required input will be recorded. Setting the 'LISTEN' control to the recorded input, C.D. in this example, will enable you to listen to the input being recorded. The Tape 2 sockets do not allow you to monitor the recording – **do not switch the 'LISTEN' selector to Tape 2 as this will cause severe feedback and may cause damage to your amplifier and your loudspeakers.**

If you wish to listen to another input, instead of either the recorded or the recording inputs, select the 'LISTEN' selector to the desired input, Disc for example.

Playback – Set the 'LISTEN' selector to Tape 2 and set your tape recorder in the playback mode.

Addendum: Please note line 5 in the section **Tape 2, Recording**, the word 'LISTEN' should read 'RECORD'.

Check List

Should you have any difficulty in operating your amplifier, check the following before suspecting that a fault has developed:

No power and LED not illuminated - Check that the mains supply is connected and that the mains lead is fully home in the mains inlet socket at the rear of the amplifier. Check that the mains is switched on and that the power switch on the front panel is depressed and has fully latched. If necessary check the fuse in the mains plug.

Power on and LED illuminated but no output from the amplifier. Check that:

1 The amplifier is connected to the desired input. See pages 5, 6 for connection instructions.

2 The LISTEN selector is selected to the input required. See page 8.

3 The loudspeakers are connected correctly to the amplifier. See page 6.

4 If you have your loudspeakers connected to the outlets marked "SWITCHED (SP2)", that you have also depressed the switch marked SP2 on the front panel. See page 9.

5 The volume control is not set to minimum.

6 If DISC is selected, that the cartridge selector switch is set to the correct type of cartridge. See page 5. NB DO NOT operate this switch with the volume control turned up.

Power on and LED illuminated but output from one loudspeaker only. - Check that:

1 Both loudspeakers are plugged into the amplifier and both are connected to the correct loudspeaker outlets. See page 6.

2 Both the left and right channels of the selected source are connected correctly and the input wiring is not faulty (check by swapping over left and right input connectors). If in doubt contact your dealer.

3 One section of the volume knob is not set to minimum.

Loud hum heard through loudspeakers when DISC is selected - Check that:

1 The ground lead from the turntable (if fitted) is connected firmly to the ground terminal on the rear of the amplifier.

2 The amplifier is correctly earthed via the mains lead

3 Cartridge not directly above amplifier transformer. (Move the amplifier away and hear if hum level changes).

Loud hum heard through only one loudspeaker when DISC is selected. - Check that:

1 The ground wire is not faulty within the respective channel's lead. This is easily checked by swapping over the leads and checking if the hum moves to the other channel.

2 The headshell leads connected to the cartridge on the respective channel are not faulty or loose. If in doubt please consult your dealer.

Specifications

Output power	Typical:
Both chs 8 ohms (20Hz to 20kHz, 0.5 % THD)	70W
Single ch 8 ohms 4 ohms	85W 130W
Peak current delivery	$\pm 16A$
Harmonic Distortion 60W, 8 ohms, at 1kHz	0.02%
Frequency response;	
Disc better than +0.3, -0.5dB from 40Hz - 20kHz, typ. -3dB at 20Hz	
Line ± 0.5 dB 20Hz to 20kHz typ. -3dB at 8Hz, 50kHz	
Tone Controls ± 6 dB maximum at 20Hz, 20kHz. (Fully bypassable)	

Inputs

Disc	Moving Magnet	
	Sensitivity	2mV
	Noise (CCIR)	-73dB
	Input Impedance	47k ohms/100pF
	Overload Margin at 1kHz	38dB
	Moving Coil	
	Sensitivity	100 μ V
	Noise (CCIR)	-66dB
	Input Impedance	330 ohms
	Overload Margin at 1kHz	38dB
Tuner, Tape 1+2		
	Sensitivity	100mV
	Noise (CCIR) ref. 1W output	-77dB
	Input Impedance	20K ohms
	Overload Margin at 1kHz	50dB
C.D.		
	Sensitivity	220mV
	Noise (CCIR) ref. 1W output	-77dB
	Input Impedance	6K ohms
	Overload Margin at 1kHz	50dB

Outputs

Tape 1 and 2	
Nominal output	100mV
Output impedance	3K ohms
Crosstalk all inputs	-65dB at 1kHz
Size	430mm wide, 86mm high, 265mm deep.
Weight	6.5kg Net 8kg Packed