I n d e x

DNM Series 3 Pre-Amplifier

Important

Before attempting to operate the DNM pre-amplifier and power supply check the points listed below:

1) Ensure that the power supply voltage marked on the serial number label is correct for your mains supply system.

2) Connect the power supply to the pre-amplifier with the three 20 pin plugs. The numbers 1, 2 and 3 correspond plug to socket on the SIX POWER SUPPLY UNIT. On the TWIN POWER SUPPLY the 20 pin plugs can be connected in any position.

3) **Ensure that the Pre-Amplifier is muted (push button is in the out position) before connecting power to the power supply. When disconnecting the power supply use the same procedure.**

Use the muting switch whenever signal output from the pre-amplifier is not required - i.e. when connecting equipment to the pre-amplifier, when changing records or when not in use.

Location - Positioning

The DNM Series 3 pre-amplifier is contained within a non-metallic case. Even though the sensitivity to magnetic fields is marginally increased, the special casework gives the pre-amplifier a substantial performance advantage. Avoid locating the pre-amplifier on or near to conducting metal surfaces and if possible place the unit on a light weight (i.e. low mass) surface.

Pre-Amplifier Controls

The DNM Series 3 pre-amplifier front panel controls consist of two calibrated volume controls, one rotary switch selecting Direct input, Tape, Radio and Disc sources and one large push button muting switch. In addition, a small toggle switch to the right of the rotary switch turns signal to the tape record output amplifiers on or off. The on position is to the right.

The volume controls are placed logically with the left channel control to the left-hand side when facing the pre-amp and the right channel control to the right-hand side. The size of the controls, the turning force required to operate them and the calibration are all designed to allow easy single-handed operation. The muting push button mutes the pre-amplifier in the "out" position. In this position the internal light is also switched on and the push button is illuminated. When the push button is "in" the pre-amplifier is connected to the power amplifier and both the internal and push button lights are turned off.

It is very important to ensure that the pre-amp is muted (i.e. the push button is in the out position) when the power supply is connected or disconnected from the mains supply otherwise a heavy transient switch noise will be amplified through the power amplifier and this may damage the power amplifier or loudspeakers.

Connecting Cables

All **DNM** amplifier systems are designed using single core cables and they will only give best performance if used with these types of cables for inter-connections. The interconnect cable used to link the pre-amp to power-amp, Radio, tape recorder or C.D. Player should be a small diameter single core copper wire. The diameter of the copper should be as small as possible consistent with the strength required for normal handling. The range of sizes from 0.6mm diameter to 0.1mm diameter are most suitable - the smaller sizes giving better performance. The signal and earth return conductors should be either spaced as a flat ribbon about 4-6mm apart or twisted together. **DNM** Cables are now available and these should be used with **DNM** equipment. When the pre-amplifier is connected to a power amplifier with a very high input impedance (100KΩ or higher) best results will almost certainly be obtained using a shielded cable interconnect. The requirement for shielded cable will also be affected by the interconnect length. Long lengths are more likely to pick up hum, particularly when the pre-amp is muted because in the mute position the power-amp input is open circuit. Generally, it is recommended that the pre-amp to power-amp interconnect be kept short and that speaker cables are at least 3 metres long.

Pre-Amplifier Input/Output Connectors

The rear panel of the pre-amplifier is fitted with all the connectors necessary to link the various sources which are likely to be used into the unit. Some versions of the pre-amp are fitted with phono connectors and some may be fitted with DIN connectors. A copy of the rear panel layout is shown above for ease of reference. The connecting pattern of the 5 pin DIN sockets is shown above the socket in the illustration. This is the pattern seen looking into the socket from outside the pre-amp and the same pattern is used looking at the soldered connections inside the DIN plug.

The power supply inputs are special 20 pin flat connectors which can only be inserted one way round - with the locating lug at the top of the plug. The three plugs should be put into the sockets 1, 2 and 3 so that the numbers correspond plug to socket. The screw terminal marked **O V** should only be connected to the cable from the record deck which makes contact with the outer metal of the pick-up arm. Mains earth connections should not be fixed to the terminal or the performance of the pre-amp may be adversely affected.

To remove Pre-Amp Sleeve

In the event of the pre-amp requiring servicing or a change/adjustment of circuit boards it is necessary to remove the sleeve or outer cover. Underneath the unit on the same panel section as the feet a single screw will be found. To remove the sleeve undo this screw and carefully slide the central chassis out of the sleeve.

To replace the sleeve reverse the procedure but take care to fit the sleeve the correct way round or the fixing hole will not align with the hole in the sleeve. Also ensure that the chassis is central and free of grit or dirt before attempting to push the chassis into the sleeve. The chassis will always slide quite easily into the sleeve - if it is very tight check for debris on chassis front/rear plates or in the sleeve.

Pre-amplifier plug-in boards

The pre-amplifier chassis accepts only the **DNM** Series 3 circuit boards. Always disconnect the power supply from the pre-amp when changing circuit boards. The plug-in circuit boards must be inserted with the component side to the left (looking at the pre-amp from the front) and it is important to ensure that the 15 pin connector is aligned before inserting the board.

The positions of the boards are identified on the motherboard.

Moving from left to right:-

The right and left channel MC amplifiers are first followed by right and left channel EQ amplifiers and then right and left channel LN amps. These expressions MC, EQ and LN are printed into the copper on the print side of each board in the top left-hand corner. The channel identification may be printed with the board serial number on the plug-in socket but the tolerances on boards are tight enough to allow channel to be interchanged without loss of performance.

DNM Series 3 circuit boards

All the **DNM** Series 3 circuit boards are built and calibrated using special techniques not available in normal service workshops. Service work on these boards must not be carried out without reference to either **DNM**-UK or AUDIO-System-Switzerland.

The main disc amplification is carried out by two discrete amplifier stages.

Moving Coil Amplifier

The MC amplifier is identified by the letters MC AMP on the print side of each circuit board. This board partially equalises the signal. It is a low noise amplifier suitable for moving coil cartridges with rated outputs of 140µV and above at a reference velocity of 5cm/s frequency 1kHz. The input load of the MC amplifier is 1000Ω with no capacity included except the residual of the connecting cables. This value should not be changed and neither should any capacity be added to the input except in special circumstances. Technical queries for individual circumstances should be directed to **DNM** OR **AUDIO**-System.

The gain of the MC amplifier can be altered over a limited range without affecting its performance (refer to **DNM** or **AUDIO**-System). If the cartridge used does not give enough output or possibly gives too much, resulting in a cramped volume control range, a small adjustment will be appropriate. Experience has shown that the standard setting is best for most situations.

Special versions of the MC amp are available for use with moving magnet cartridges. Please tell your dealer when placing your order which type of amplifier you require.

EQualisation Amplifier

The E.Q. amplifier is identified by the letters E.Q.AMP on the print side of the circuit board. This board completes the signal equalisation and drives signal on to the selector switch and then the volume controls.

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In normal circumstances no change of gain should be required on this amplifier and it should be regarded as a sealed and calibrated unit.

DNM Motherboard - main chassis

The **DNM** motherboard is a very special circuit board and possibly one of the most intricate ever to be used in a domestic amplifier. The motherboard contains all the tracking for all the signal in, out and around the pre-amplifier and also all power supply lines. The very complex earth return system which separately earths every single component on every disc and line board with its own dedicated earth line and also all the power supply earth references are all encapsulated on the **DNM** MB3 motherboard.

The motherboard takes signal from the different sources and routes it to the rotary selector switch. This switch selects the source to be routed to the volume controls which drive the line amplifiers. All the outputs, except the Tape Record output, go through the volume controls and line amps.

The Mute switch is large like the volume controls because it is a frequently used control. It cuts off the signal from the main output sockets and is therefore used on all occasions when output is not required from the pre-amp such as in the standby mode, when changing records, generally when the pre-amplifier is not in use but switched on and when switching the power to the power supplies on or off. In the mute position when the button is out it is illuminated and the internal light is on.

LiNe Amplifier

The L.N. amplifier is identified by the letters LN AMP on the print side of the circuit board. This amplifier handles all signals going out of the pre-amp main output socket. It is therefore used to process all signals fed to the pre-amp except for the Tape Record Output signal. It takes signal from the volume controls through the mute switch to the

output sockets. The gain of this amplifier may be changed by a small amount if necessary to suit the pre-amplifier to individual systems. For information on this refer to **DNM** or **AUDIO-System**. Such adjustment alters the level of the line inputs relative to the level of the disc input. The output impedance of this amplifier is 33 Ω. The maximum voltage swing before clipping is 38 volts peak into a load of 4KΩ or higher.

Direct - Input

Apart from vinyl disc the **DMN** Series 3 Pre-Amp can accept one Direct input loaded at 5.6 kΩ and is intended for use primarily with Compact Disc players. Experience has shown that the elimination of all additional active circuits, except the discrete line amps to buffer the volume controls from the power-amp gives the best results with CD-players. **DNM-Audio System** solid core interconnect should be used to connect the C.D. player to the pre-amp in lengths up to 2 metres.

Input Buffer Amplifiers and Record Output Amplifier - Amp 3.

The Radio and Tape Replay connector positions on the motherboard can be fitted with **DNM** Record AMP 3 two channel active amplifiers or alternatively with a direct link circuit board. The same amplifier is used for both Record and Replay positions and the gain level of the amplifier can be adjusted to suit individual requirements by means of the miniature switches. The three upper switches for each channel select the three levels and the lowest switch is a gain multiplier. This is clearly shown in the diagram above. The gains are adjustable over the range shown and the input load presented to the source, i.e. Radio or Tape is 22 kΩ.

The standard Direct Link presents a load of about 5kΩ to the source and does not allow adjustment of gain. The effective sensitivity with the Direct Link is 250mV for 1 Volt out.

Normally the Direct Link will give the best sound quality but the **DNM** Record Amp 3 will allow level adjustment and higher input impedance.

DNM Power Supplies

Only DNM Series 3 power supplies can be used with the DNM Series 3 pre-amplifier chassis unit. On the Twin 3 and Six 3 units the main fuses are fitted in the IEC mains connector on the rear panel. Two fuses protect both live and negative lines and fuse values are 1 Amp semi-delay for the Twin 3 and for the Six 3 unit.

The Primus, Twin 3 and Six 3 power supplies are all available in either 110/120 Volt or 220/240 Volt versions to order.

All Series 3 units are fitted with three 20 pin flat connectors, these are numbered 1, 2 and 3 and they should be fitted into the appropriate numbered positions in the pre-amplifier.

The power supplies are not fitted with on-off switches because it is recommended that normally the pre-amplifier should be left on all the time.

The Primus power supply fuse is fitted on the circuit board inside the unit.

To gain access to the fuse disconnect the mains supply from the unit and remove the two recessed screws in the base of the power supply. Lift off the lid and the fuse holder will be situated near the position where the mains cable fixes to the circuit board. Remove the plastic cover to change the fuse. Fit only a 500mA quick blow type fuse. Reverse the procedure to re-assemble but take care to fit the cover carefully around the rubber strip protecting the ribbon LT cable.

Pre-amp background information.

The importance of the pre-amp

Many years have now passed since DNM pre-amplifiers first started finding their way into enthusiasts' Hi-Fi systems. During this time the spotlight has swung away from turntables and settled on the pre-amplifier as the component most needing attention in

the Hi-Fi chain and more recently new pre-amplifiers have been appearing in the U.S.A. and Europe. There are now a number of manufacturers making only pre-amplifiers and claiming that such specialisation helps to make better products.

Why should there be so much interest in a simple thing like a pre-amplifier?! The answer is that the pre-amplifier is **not** such a simple component. It does not act as a flat amplifier on the disc input, i.e. the pre-amplifier corrects for the deliberately 'tilted' recording characteristic on the disc. This is known as R.I.A.A. correction and the pre-amplifier has to boost the low frequencies and cut the high frequencies by exactly the right amount. It is the earliest link in the chain of equipment after the turntable, so if the pre-amplifier is not performing correctly, the rest of the system will receive a degraded signal and the nature of the signal degradation will be subjectively very obvious and inharmonius. To further complicate matters the typical gain required of the pre-amplifier at average volume levels is 100 times greater than that of the power amplifier, and the input signal it has to work from is between 1000 and 10'000 times lower in level. Finally, the pre-amplifier also has another sensitive input not mentioned on the selector switch; one which is often overlooked by designers. This is the power supply input - the input of energy needed to make the pre-amplifier operate. The nature of this input can and does contribute significantly towards the performance of the circuits. It is an input that should not be noticed in terms of the end result, but it is always evident. This last point is one that many people, including some experts, still find very hard to accept. They cannot understand that it is not good enough to use ordinary power supplies combined with amplifier circuits which have a high power supply rejection capability. The basic answer to this is that good circuits are designed to depend on the performance of the components within them, components such as resistors and capacitors, and these components are not good enough to allow power supply problems to be 'engineered' out of the circuits. Inadequate circuit layouts further complicate the situation making the task of accurately predicting the performance of the total circuit impossible.

DNM Design

DNM Pre & Power Amplifiers
DNM Power Supplies, DNM Cables & Components

The **DNM** pre-amplifiers were one of the very first products to show a really serious and committed design effort on pre-amplifiers. We were the first to highlight the importance of the pre-amp power supplies. Our studies on power supplies led to detailed examination of components such as capacitors, resistors, transformers, potentiometers, casework and even conductor performance. We were very surprised to find that the manufacturers of the first four of these items could not answer fundamental questions about the performance of the components they were producing. Capacitor manufacturers are making their components from many different materials in so many different constructions to do a job that only one or two types of well designed capacitors should be able to do. Such a complex solution to a simple problem is fundamentally wrong. **DNM** have researched these problems in detail and indeed we found some really important missing links in the design of capacitors. New capacitors are now available from a British capacitor manufacturer who helped in the research programme and who is now making products under Licence from **DNM** that do not suffer from many of the limitations of conventional capacitors. These capacitors are now used in **DNM** equipment and are finding their way into audio equipment from other manufacturers as well. The performance advantage they give is such that equipment using conventional components will not be able to compete and the special capacitors will undoubtedly be in general use within the next few years.

We have carried out similar design exercises on resistors, transformers and potentiometers and in all these areas new and better components are now appearing and generally they are in **DNM** amplifiers first. **DNM** are possibly the only amplifier manufacturer to use non-conducting casework for performance reasons today. We were the first to recognize the importance of single core conductors and this led to the first complete pre- and power amplifiers with true Star Earth systems individually earthing all the separate components. **DNM** are still trying hard to encourage the universal adoption of these ideas on conductors and we believe that because of the way component and assembly designs will be changed, the introduction of single core cables, simple though it seems to be, will be one of the most significant steps ever taken in Hi-Fi.

The DNM range.

The Series 3 **DNM** range of pre-amplifiers starts at the lower end of the price range with the Primus and extends up to the **DNM** + Twin 3 power supply and then to the top model **DNM** + Six 3 power supply.

The Primus is a **DNM** pre-amplifier chassis featuring the special motherboard and earth return system. The power supply is a Single Mains unit and this, in combination with the plug-in circuit boards, can be changed to upgrade to the performance level of a **DNM** + Twin 3.

The **DNM** + Twin 3 is a **DNM** pre-amplifier chassis featuring the special motherboard and earth return system. The Twin 3 power supply features the special **DNM** capacitors and casework which matches that of the pre-amp. It is possible to upgrade the power supply of a **DNM** + Twin 3 to a **DNM** + Six 3 by means of a power supply conversion.

The **DNM** + Six 3 is the same pre-amplifier chassis as the **DNM** + Twin 3. The Six 3 power supply features a special heavy duty transformer and the special **DNM** capacitors. Six separate regulator circuits individually feed each pre-amp circuit.

The modular construction of the **DNM** Series 3 is unique because unlike other products using a plug-in system this type of construction actually improves the performance of the **DNM** to a higher level than could be achieved with a single circuit board. This is possible because of the special layout of the circuit boards in the **DNM**. The **DNM** can therefore be serviced by means of exchange circuit boards very quickly and simply and this can be done by your dealer with the minimum of inconvenience and, most important, without loosing performance.

DNM Design

DNM Pre & Power Amplifiers
DNM Power Supplies, DNM Cables & Components

Specifications

The specifications give practical information on system compatability.

Dimensions

Pre-amp and power supply have identical dimensions

Width	260mm
Height	120mm
Depth	150mm
Weight	...

Sensitivity

Disc input sensitivity for 1 volt out.

MC	from 100µV, load 1KΩ
MM	from 1mV, load 10kΩ
	load variation possible on request.
Direct	..., load 5.6kΩ
Radio/Tape	250 mV, load 100k.

Output

Output Matching

Max. voltage swing ± 20 (± 38) volts. Suitable for amps with up to 4 V input sensitivity. Output impedance low enough to drive 1kΩ loads.

Tape record output

5 mV to 750 mV (0 dBm). Source impedance low.

Connectors

All 180° 5 Pin DIN - British Version

All Phono Swiss Version.

Distortion

All forms negligable for normal use.

N.B. Equipment testers should note that the **DNM** is designed for listening to music. It is set to give enough output to drive an averagely sensitive system with a sensible reserve for different recording levels. The **DNM** output level can be set as high as required but excessively high sensitivities and amplification levels produce too much reserve gain resulting in reduced performance between the amplifiers and their power supplies.