CONTENTS

DECLARATION OF CONFORMITY

The Directive Covered by this Conformity

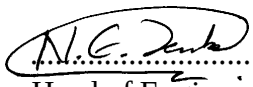
89/336/EEC Electromagnetic Compatibility Directive, amended by 92/31/EEC & 93/68/EEC.
73/23/EEC Low Voltage Directive, amended by 93/68/EEC.

The Products Covered by this Declaration

Equipment Type	**Product Name**	**Variants**
Graphic Equaliser	DN300	DN360, DN301, DN332
Preset Equaliser	DN320	DN330
Parametric Equaliser	DN405	DN410
Dynamics Processor	DN500	DN504, DN510, DN514
Audio Analyser	DN6000	
Crossover	DN800	
Delay Line	DN7204	DN7103
Programmable Equaliser	DN3600	DN3601
Remote Control System	DN3698	DN3603
Crossover	DN8000	
Programmable Equaliser	DN4000	

The Basis on which Conformity is being Declared

The Products named above and hence the Variants thereof listed above comply with the requirements of the above EU directives by meeting the following standards:
EN 50081-1 (EN55022 class B)
EN 50082-1 (IEC801 Part 2, 4 / ENV 50140 / ENV 50141
EN 60065.

Signed:  N. G. Tembe
Authority: Head of Engineering, EVI Audio (U.K.) Plc
Date: 1st January 1997

Attention!
The attention of the specifier, purchaser, installer or user is drawn to the special limitations to use which must be observed when these products are taken into service to maintain compliance with the above directives. Details of these special measures and limitations to use are available on request, and are also contained in product manuals.

Attention!

Cables:
This product should only be used with high quality, screened twisted pair audio cables, terminated with metal bodied 3-pin XLR connectors. The cable shield should be connected to pin 1. Any other cable type or configuration for the audio signals may result on degraded performance due to electromagnetic interference.

Electric Fields:
Should this product be used in an electromagnetic field that is amplitude modulated by an audio frequency signal (20Hz to 20kHz), the signal to noise ratio may be degraded. Degradation of up to 60dB at a frequency corresponding to the modulation signal may be experienced under extreme conditions (3 V/m, 90% modulation).

No permanent damage or degradation of performance will be caused by these conditions.

THANK YOU FOR USING THIS KLARK TEKNIK PRODUCT

To obtain maximum performance from this precision electronic product, please study these instructions carefully. Installation and operating the DN8000 is not complicated, but the flexibility provided by its operating features merits familiarisation with it's controls and connections. This unit has been prepared to comply with the power requirements that exist in your location.

Precautions

Before connecting the unit to the mains power, ensure that the operating voltage is correct for your local supply. Operating voltage is indicated on the rear panel.

Do not install this unit in a location subjected to excessive heat, dust or mechanical vibrations.

Power Connection

Connection is made by means of an IEC standard power socket. The unit will operate off any AC voltage between 100 Vac and 240 Vac @ 50 Hz to 60Hz.

Before connecting this unit to the mains supply, ensure that the fuse fitted is the correct type and rating, as indicated on the rear panel, adjacent to the fuse holder.

Safety Warning

This unit is fitted with 3-pin power socket. For safety reasons the earth lead should not be disconnected.

To prevent shock or fire hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not remove covers. Dangerous voltages exist inside. Refer servicing to qualified personnel only.

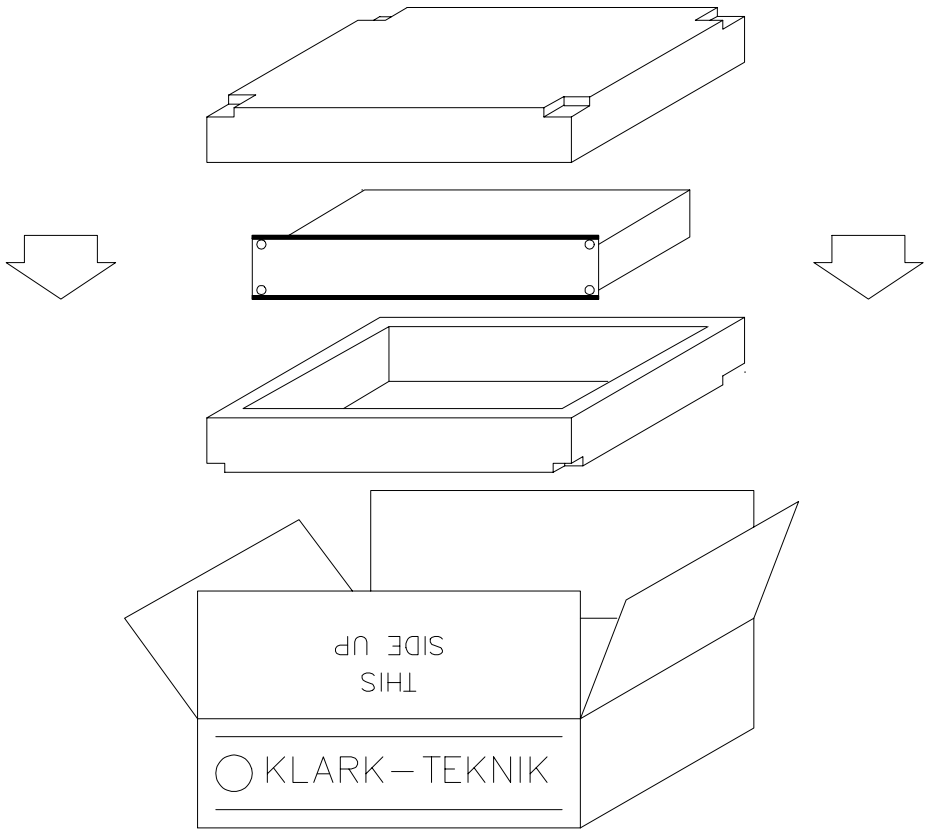
AFTER YOU HAVE UNPACKED THE UNIT

Save all the packing materials - they will prove valuable should it become necessary to transport or ship this product.

Please inspect this unit carefully for any signs of damage incurred during transportation. It has undergone stringent quality control inspection and tests prior to packing and left the factory in perfect condition.

If, however, the unit shows any signs of damage, notify the transportation company without delay. Only you, the consignee, may institute a claim against the carrier for damage during transportation.

If necessary, contact your supplier or as a last resort, your Klark Teknik importing agent, who will fully co-operate under such circumstances.



DN8000: OVERVIEW

The DN8000 is a two input, five output digital crossover. Being a box of DSP, it has the potential to fulfil not only the normal tasks thought of as applicable to a crossover, (i.e. frequency splitting) but many others. This allows it to replace much of, if not all of, the additional outboard processing that has come to be associated with complete multi-driver speaker system alignment and protection.

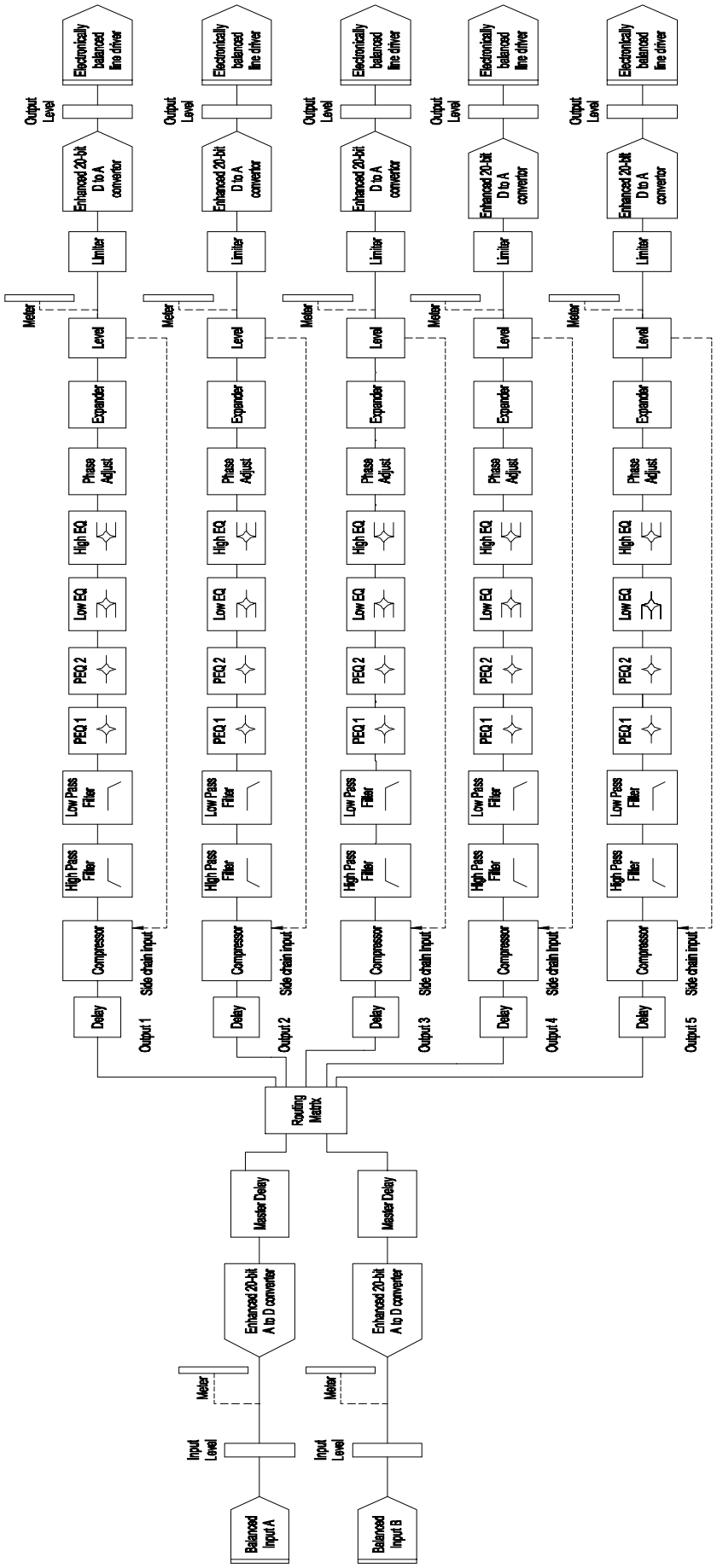
The unit is completely configurable from the front panel, and included in the signal path for each input to output are the following modules. These modules are fixed in terms of their position in the path - their order has been optimised for the intended application as a crossover.

A delay module -	this allows delays to be set for each output, and master delays to be applied to each input. The units are selectable, and temperature compensation may be added.
A fully configurable routing module -	this allows any output to be fed from either input, both inputs or neither input.
A high pass filter module -	this has fully variable frequency adjustment, and a selection of roll-off (slope) and filter type combinations.
A low pass filter module -	this has fully variable frequency adjustment, and a selection of roll-off (slope) and filter type combinations.
Two parametric equaliser modules -	these both feature fully adjustable frequency, ‘Q’, and level, and can be placed anywhere on the frequency scale.
A 'Low EQ' filter module -	this has variable frequency adjustment, and a selection either parametric mode or shelf mode, and level adjustment.
A 'High EQ' filter module -	this has variable frequency adjustment, and a selection either parametric mode or shelf mode, and level adjustment.

A compressor module -	this is fully featured, with adjustment available for threshold, ratio, attack, and release.
An expander module -	this has adjustment for threshold, hold and release.
A limiter module -	this merely has adjustment of threshold. It is a 'zero overshoot' design - and cannot be switched out of circuit. As such, it will not be possible to clip any of the outputs, no matter how much EQ has been added.
A phase control module -	this allows the phase to be reversed (switch) and also the phase angle to be adjusted in 5° steps.
A level control module -	this allows adjustment of the level of the output over a wide range.

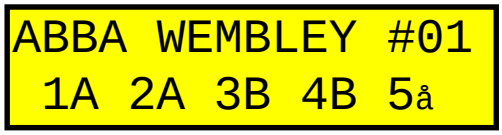
The order of these modules is shown in the signal flow diagram overleaf.

DN8000: SIGNAL PATH FLOW CHART



DN8000: MAIN SCREEN DISPLAY.

The default screen will show the memory name and basic crossover construction. This will take the form of routing information - the band designation will be apparent by the labels illuminated over each output section. A typical display would be...



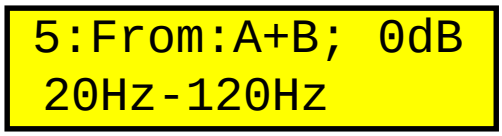
From this, it easy to see that outputs one and two are fed from input A, three and four from input B, and five is fed from both ('å' or both).
To designate a feed from neither input an '-' will be used.

Names can be up to 12 characters long for user memories, and 16 characters for OEM pre-sets.

Each of the output level controls on the front panel has a press action momentary switch. This is to allow quicker navigation around the edit screens, as the list of parameters available for adjustment is extensive. An additional feature of the output select switches is to give more information regarding each output when the main screen is displayed.

Pressing an output select will show the routing information and the frequency range covered by that output. For example, output 1 for the above set-up might display...

...and output 5, designated as the mono bass output might display...



EDIT MENU: OVERVIEW

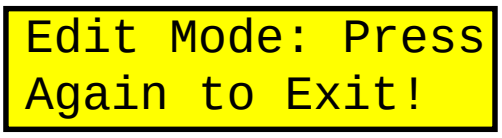
The order and number of parameters can be adapted to suit the user to some extent through the use of the user parameter list as described elsewhere in this document. However, there will be many cases when this list is not sufficient and all the parameters may need to be accessible.

The structure in full

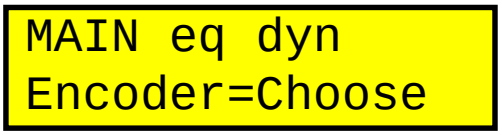
The editing on the DN800 has been split into three sub-sections - these and their contents are outlined below:

Main-	Delay
	Source (Routing)
	Phase
	Output Level
	Label (Front Panel Icon)
EQ-	High Pass
	Low Pass
	PEQ 1
	PEQ 2
	Low EQ
	High EQ
Dynamics-	Compressor
	Expander
	Limiter

When edit is pressed and the "Which List?" option is set to "All", an initial help screen appears as below for a few seconds. It is worth noting that with any help screen that only appears once when a button is pressed, the user does not have to wait until the help disappears to continue. Once familiar with the user interface, he/she can either disable the extra help or just press/turn what is known to be the next operating step. This action will automatically clear the help and continue.



followed by….



with the bottom line toggling to show...

```
MAIN  eq  dyn
 <SELECT>=Begin
```

...every two seconds.

The idea here is that the encoder will choose a sub-list to start editing, and pressing a select key will enter that list immediately. The encoder will show which list is going to be entered on a press of a 'select' button by displaying the chosen list title in upper case, i.e.

```
MAIN  eq  dyn
Encoder=Choose
```

or

```
main  EQ  dyn
Encoder=Choose
```

or

```
main  eq  DYN
Encoder=Choose
```

So, with 'MAIN' written in upper case, pressing a select button will enter the main parameter editing list which comprises:

master delays,
routing,
output delay,
phase,
output level,
label.

Similarly, with ‘EQ’ the list for equalisation editing is entered directly, comprising the sections:

high pass,
low pass,
PEQ 1,
PEQ 2,
low EQ,
high EQ.

Lastly, with ‘DYN’ the list for dynamics editing is entered directly, comprising the sections:

compressor,
expander,
limiter.

At any of the three stages above, the select buttons will now scroll round the list of parameters in the selected sub-list only. If a different list is to be selected, pressing edit twice (to exit the mode and re-enter at the list choice stage) allows this to be accomplished quickly. Note that the ENTER key can also be used to scroll round the main/EQ/dynamics headings.

The last selected parameter in all three lists will be remembered (as will the last selected parameter in the user list, if chosen in the options menu), so that when a list is re-entered editing can carry on as before. When edit is initially pressed, before selecting a list, the choice of list always defaults to ‘MAIN’.

A compare feature is available when editing. Please read the section entitled "Compare Function" in the additional notes towards the back of this manual.

Edit Menu: The Three Parameter Lists.

The structure and operation of the lists has been covered in sufficient detail now to allow the contents of the lists to be examined and detailed at the bottom level. The descriptions will take the form of a screen shot with the range of each parameter given, along with any additional points where necessary.

Worth a mention at this stage is the use of the output level controls ‘press to select’ action. Their main function is, when editing, to allow selection of each output for adjustment. The idea of scrolling through a parameter with five outputs - e.g. PEQ1 Frequency Output 1, PEQ1 Frequency Output 2 etc. has been avoided. The select switches will select the next parameter, NOT scroll through the five outputs at one parameter.

Selected Output Indication

Although it will be displayed on the screen as an icon during edit mode, when an output is selected, its label in the associated window will begin to flash.

Warning: Default Parameter Values.

Please note that when the unit leaves the factory, it will have had all its memories, including the working memory loaded upon power-up, set to default values. As user settings cannot be predicted (unless a specific OEM preset has been requested) these settings have been chosen to minimise the risk of damage to loudspeaker systems upon first connection. However, it is strongly recommended that initially no audio connections are made to the unit due to the fact that

NO CROSSOVER FILTERS ARE IN PLACE WHEN POWER IS APPLIED FOR THE VERY FIRST TIME.

The high and low pass filters should be introduced as appropriate prior to adjusting gain, routing, or dynamics parameters. These have all be set to minimise output level regardless of input level.

Main Parameters List.

Master Delay Input A.

Range: 2ms to 1300ms
Notes: **Total** delay for each input to output is 1300ms max.

Master Delay Input B.

Range: 2ms to 1300ms
Notes: **Total** delay for each input to output is 1300ms max.

Source Selection.

Range: A, B, A+B, Off.
Notes: These are displayed as ‘A’, ‘B’, ‘å’, and ‘-’ respectively on the main screen.
Available sources will depend on the master / output delay combination.

Output Delay.

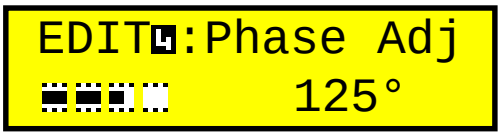
Range: 2mS to 300mS

Notes: This is dynamically allocated from the 1300mS pool available for use with the master delay.

Polarity.

Range: Normal/Reversed

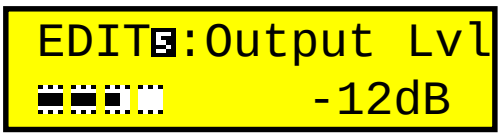
Phase Adjust.



Range: 0 to 180°

Notes: 5° steps

Output Level.



Range: +24dB to -40dB

Notes: The entire range of adjustment is only available using the combination of encoder and trim pot. Turning the trim pot will move the window of control available, and will update the level parameter on the screen in real time. If the output has been muted with, shockingly enough, the mute switch then the display will still allow adjustment of the level but will also show...

Output Label.

Range: Sub, Lo, Lo-Mid, Mid, Hi-Mid, Hi, Full-Range, None.

Notes: As the selection is changed, the icon on the front panel will be seen to change in sympathy.

EQ Parameters List.

High Pass Filter Frequency.

Range: 20Hz to 15000Hz

High Pass Filter Response.

Range:	Exact Text Shown...	Full Range (Off)
		6dB/Oct
		Bessel 12dB/Oct
		Butter 12dB/Oct
		Lnk-Ril 12dB/Oct
		Peaking 12dB/Oct
		Bessel 18dB/Oct
		Butter 18dB/Oct
		Bessel 24dB/Oct
		Butter 24dB/Oct
		Lnk-Ril 24dB/Oct
		Peaking 24dB/Oct
		Bessel 36dB/Oct
		Butter 36dB/Oct
		Lnk-Ril 36dB/Oct
		Bessel 48dB/Oct
		Butter 48dB/Oct
		Lnk-Ril 48dB/Oct

Notes: To protect individual system components, if the ‘Full Range’ selection is chosen, the selected output will mute. This mute can be turned off manually, but will always be automatically enabled.

High Pass Filter Peak.

Range: 0dB to 6dB

Notes: This is the under-damping of the filter to allow extra emphasis at the corner frequency without the need for a separate filter. This parameter is only adjustable if the high pass filter response type is set to a “Peaking” type. Under all other circumstances the lift applied is fixed at 0dB. This is reflected in the display by showing...

The setting of the lift, when applied to peaking type filters, however, will be remembered.

Low Pass Filter Frequency.

Range: 50Hz to 20000Hz

Low Pass Filter Response.

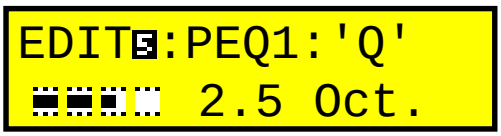
Range:	Exact Text Shown...	Full Range (Off)
		6dB/Oct
		Bessel 12dB/Oct
		Butter 12dB/Oct
		Lnk-Ril 12dB/Oct
		Bessel 18dB/Oct
		Butter 18dB/Oct
		Bessel 24dB/Oct
		Butter 24dB/Oct
		Lnk-Ril 24dB/Oct
		Bessel 36dB/Oct
		Butter 36dB/Oct
		Lnk-Ril 36dB/Oct
		Bessel 48dB/Oct
		Butter 48dB/Oct
		Lnk-Ril 48dB/Oct

Notes: To protect individual system components, if the ‘Full Range’ selection is chosen, the selected output will mute. This mute can be turned off manually, but will always be automatically enabled.

Parametric Filter One Frequency.

Range: 20Hz to 20000Hz

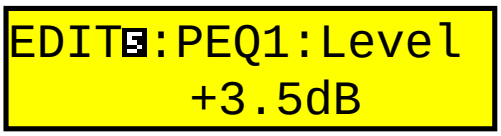
Parametric Filter One 'Q'.



Range: 0.08; 0.01-1.0 (0.1 steps); 1.2; 1.5; 2.0; 2.5; 3.0

Notes: Called 'Q', but displayed in octave bandwidth.

Parametric Filter One Level.

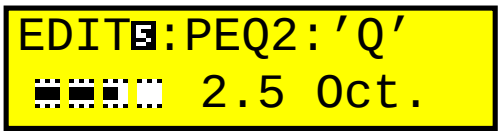


Range: -12 to +12dB in 0.5dB steps

Parametric Filter Two Frequency.

Range: 20Hz to 20000Hz

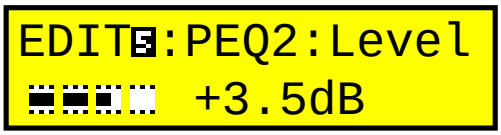
Parametric Filter Two ‘Q’.



Range: 0.08; 0.1-1.0(0.1 steps); 1.2; 1.5; 2.0; 2.5; 3.0

Notes: Called ‘Q’, but displayed in octave bandwidth.

Parametric Filter Two Level.



Range: -12 to +12dB in 0.5dB steps

Low EQ Filter Frequency.

Range: 20Hz to 1000 Hz

Low EQ Filter Q/Slope.

Range: 'Q' as for parametrics, 6 or 12dB/Octave for shelf

Notes: This filter is switchable between a parametric and a shelf by turning the encoder one step above the widest 'Q' setting. This converts it to a shelving response with selectable slope.

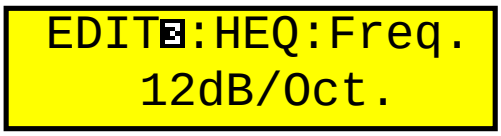
Low EQ Filter Level.

Range: -12dB to +12dB in 0.5dB steps

High EQ Filter Frequency.

Range: 500Hz to 15kHz

High EQ Filter Slope.



Range: 'Q' as for parametrics, 6 or 12dB/Octave for shelf

Notes: This filter is switchable between a parametric and a shelf by turning the encoder one step above the widest 'Q' setting. This converts it to a shelving response with selectable slope.

High EQ Filter Level.

Range: -12dB to +12dB in 0.5dB steps

Dynamics Parameter List.

Note: When any parameter relating to the compressor is being edited, the output meters automatically change mode to show the amount of gain reduction being applied. This reads from the top of the meter (red LED) downwards. The front panel scaling is still accurate, so for example if the red LED and both yellow LEDs are illuminated, 9dB of gain reduction is being applied to that output.

Compressor Threshold.

Range: -10dBu to +22dBu

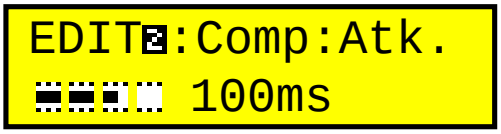
Notes: The units used are adjustable in the options menu, and may be set to absolute (dBu), dB from clipping point, or dB from the limiter threshold. Confirmation of the selected units is by additional text as shown. For dB from clipping the display shows.

and for dB from the limiter threshold,

Compressor Ratio.

Range: 1:1 to 15:1

Compressor Attack.



Range: Minimum (100us) to 100ms and Auto

Notes: One step above the maximum setting will force the compressor to automatically track the high pass filter frequency setting. This allows the optimal attack time to be set when the HPF frequency is adjusted. The display will show...

Compressor Release.

Range: 10ms to 5000ms

Gate Threshold.

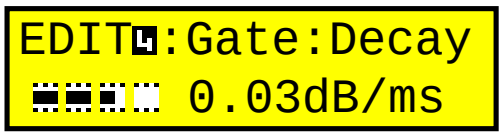
Range: -80dB to -10dB

Gate Range.

Range: 0dB to 70dB

Note: The range sets the level of attenuation when the gate is closed. If this is set to 0dB, the gate is effectively turned off, and this is reflected in the display...

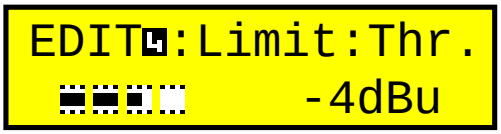
Gate Decay Rate.



Range: 0.01dB.ms to 0.1dB/ms in 0.01dB/ms steps, then
0.1dB/.ms to 2.0dB/ms in 0.1dB/ms steps.

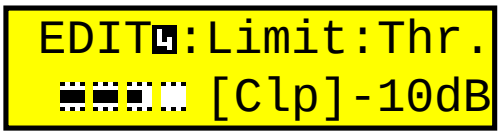
Note: This parameter sets the speed at which the gate approaches its closed attenuation setting. As such, the rate and the range are interrelated.

Limiter Threshold.



Range: -10 to +22dBu

Notes: Set at +22dBu limiter is NOT effectively off.
The units used are adjustable in the options menu, and may be set to absolute (dBu), or dB from clipping point. Confirmation of the selected units is by additional text as shown. For dB from clipping the display shows



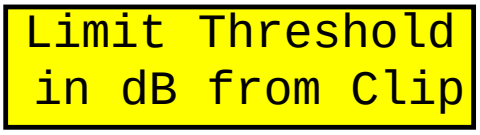
Options Menu Overview

The options menu contains all the miscellaneous user adjustable parameters not directly related to audio (on an output by output basis), and therefore not stored in individual memories.

Pressing Options will display a brief screen of help text before entering the list of available options. As usual, the list will be re-entered where it was last left. So, the help screen is...

...followed by, starting at the beginning of the list...

Limit Threshold Units.



Range: dBu; Volts; dB from Clip

Notes: Range available when readout is in Volts is determined by the “Max Output Level” parameter above.

Compressor Threshold Units.

Range: dBu; dB from Limit; dB from Clip

Notes: Range available will be related to the limiter threshold when readout is set to “dB from Limit”.

Compressor Linkage.

Range: No Linkage!; Input [A] [B] [S]; Input: [A/S] [B/S]; Input: [A/B/S]

Notes: Please read the sections under “Additional Notes” entitled “Compressor Linkage” for details about this option.

Output Meter Units.

Range: dB from Limit; dB from Clip: Compressor G.R.

Notes: To differentiate between the first two metering modes, normal (dB from clip) metering is a bar graph type meter, whilst dB from limit threshold is shown as a moving dot style meter. This only affects the output meters - the input meters always read dB from clip and are always bar graph style.

Meters Peak Hold.

Range: Automatic Clear, Press to Clear

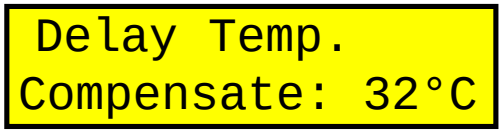
Notes: To trap all possible clipping occurrences of the unit, the meters may be disabled from automatically clearing their clip LEDs. They may be manually cleared at any time by pressing the appropriate output pot. Holding any pot for approximately 2 seconds will clear all illuminated LEDs.

Delay Units.

Range: Time(us); Time(ms); Metric; Imperial

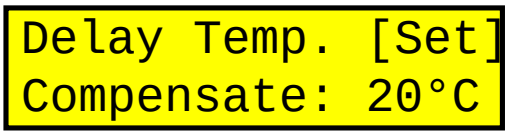
Notes: The minimum increment in microseconds is 21us.

Delay Temperature Compensation.



Range: 0 to +40°C

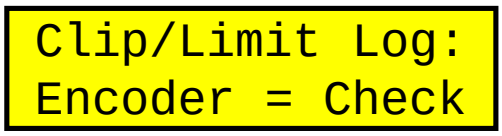
Notes: If the previous option has set the units to read out in time rather than distance, the temperature compensation is fixed at +20°C. This state is reflected on the display as…



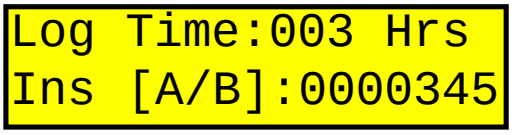
Clip/Limit Log.

The clip log counts how many times the input meters and output meters hit maximum over time. The time is stored in memory so that it continues from its last value when the unit is next switched on.

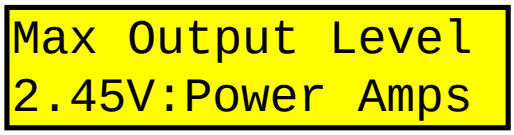
Initially the display shows...



...and turning the encoder will cycle through…



Maximum Output Level.



Range: 2.45V:Power Amps; 9.75V:Line Drive

Notes: Changing this setting switches a 12dB pad into all the outputs. This pad is purely analogue and is switched to match the input sensitivity accurately when driving power amplifiers. When the limiter units have been set to read out in Volts, this setting will affect the range available.

Modify User List.

As mentioned earlier, the number of parameters available for adjustment on each output is large (at the last count, 33 in total) and scrolling through this list can be tedious and time consuming, even given the output select controls.

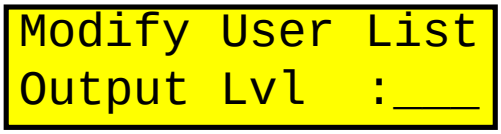
This option is available for the user to select up to ten of the most used parameters and create a ‘user’ parameter list. If this list is selected, under the ‘Which List’ option, when the edit mode is enabled, only the user selected parameters will appear in the list. So for example, once the crossover points and EQ have been selected, the only parameters that need to be in the user list might be, delay time, phase adjust, level and limiter threshold.

Selecting this option now will display...

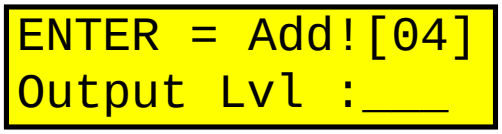
...with the option to add or delete this item being immediately available.

This has been achieved by displaying, as above ‘___’ if the parameter is not in the list, and...

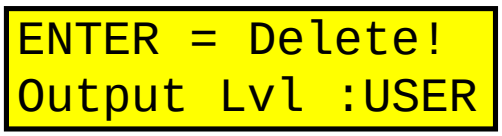
...if the parameter is in the list. The top line of help text will automatically begin toggling when the option if selected using the select keys, but the information will be related as to whether the parameter shown is already in the list or not. Just like this…



...will toggle to...



The number in square brackets indicates how many parameters may still be added to the list. For a parameter already in the list, the top line will show...

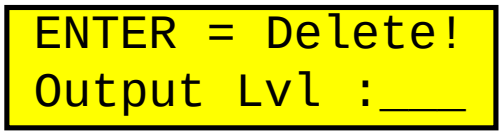


Pressing enter will still toggle the selected parameter to include it or exclude it from the list, with the accompanying text updating to the right of it.

If ten parameters have been selected, and another is chosen to be added to the list, rather than automatically delete one already in the list (which would take some working out by the user as to which end of the list was being attacked) a message is displayed as below on the top line...

...toggling with...

...if the item currently selected is in the list, or...



if not.

The user then has to go back through the list and delete some parameters if different ones are to be added.

Which List.

Coupled with the construction of the user parameter list, is the selection of which list to use - the user list or the full list. This is simply selected as below. The display shows…

or

If a preset is currently being used, unless the PIN for the preset has been correctly entered, the choice will not be available. Under these circumstances the display will show

Note that if the user list has been emptied, this option automatically switches to “All Parameters”, and it will not be possible to select the “User Parameters”.

Lockout PIN.

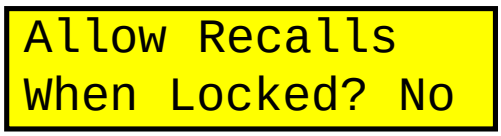
The security lockout allows the user to prevent unwanted tampering with the front panel at two levels. The full lockout disables all control, the partial lockout allows memory recall and preview access and use of the mute switches and pots.

The user is expected to select a five digit number to use as the PIN. Initially this will be

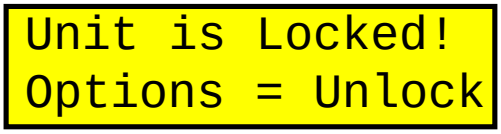
displayed as ‘None’, but once the encoder is used to advance this number, the lockout becomes partially armed and pressing the ‘Enter’ button will display a question as to whether or not memory recalls are to be allowed in the lockout mode, as below. Help is provided on the way, as below,

...and then…

Pressing Enter will then display…



The encoder will obviously choose yes or no and at this point in the proceedings pressing Enter will now lock the unit with the chosen PIN. The display will briefly show…



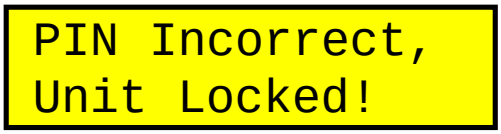
… before reverting to the normal main screen display. Note that it is possible to lock the unit with no PIN, if required. Now, pressing any other button, apart from Options, or turning the encoder will display the “Unit is Locked!” message. If the lockout has been set to allow memory recalls, turning the encoder will still scroll through the memories, and the Enter button will still be active. All other buttons will do nothing.

Unlock.

Pressing Options will show…

and then pressing Enter will either display…

… if code was correct, followed by normal main display and operation, or...



… if the code was wrong, followed by the normal main display, and the same scenario as above if anything is pressed or turned. See additional section regarding pot/mute access in lock mode - only for version 1.16.

External Communications Channel.

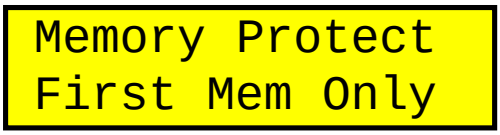
Range: 1 to 32, "Receive Only"

Notes: Please read the section entitled “Memory Dumps…” for a full explanation.

User Memory Protection

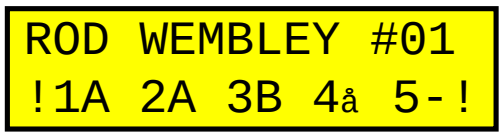
It is possible to protect up to the first 30 user memories against being overwritten. This does not affect the ability to recall or edit the memories, it just prevents storing to their location. On entering this option, the screen looks like this:

Turning the encoder now selects how many memories to protect, starting with the first up to the 30th. The number of memories chosen are always in a contiguous block:



up to:

A protected memory is signified by the addition of exclamation marks around the signal routing information:



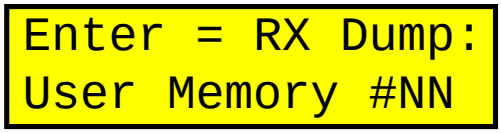
The only time that these markings cannot be seen is when the memory is the last recalled memory, then the markings become <>. Attempting to store to a protected memory is not possible as protected memories are not accessible on pressing store.

Memory Dumps…

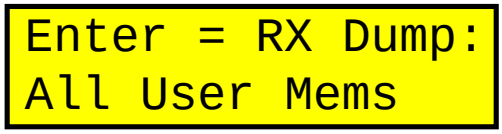
This option allows memories to be copied from another DN8000 to facilitate cloning of units. Please read the section entitled “Connecting DN8000’s for External Comms” before proceeding. Note the protocol in use with this system - the unit being adjusted **requests** settings from the other unit - information is **never** transmitted manually to any unit. The unit to be copied from merely has to be switched on and connected to the destination unit via either RS485 socket on the back panel. Protection against inadvertent over-writing of settings is of paramount importance in a system such as this and, to this end, the operation of this option has been made slightly more complex.

The initial display will show…

… and it’s worth noting that this will always be the case if the options menu is excited by any means, or the option is re-selected within the menu. Turning the encoder will scroll through the available dump requests. These are…

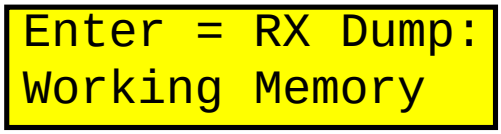


...over the range of available user memories, followed by…



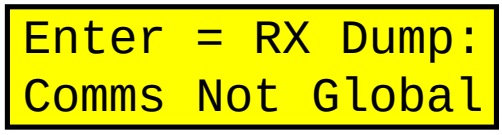
…which will include the working memory (i.e. the current configuration).

Lastly, the working memory may be requested on its own, like this…



Note that the range of memories that can be requested is related to the setting of the memory protection option. The protected memories cannot be requested (and therefore accidentally over-written). Even when the “All User Mems” option is selected, the requests are confined to the range First unprotected memory → Memory #32 and Working Memory.

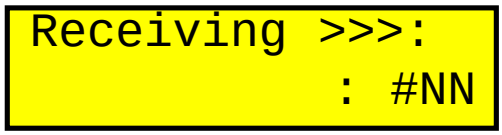
Note that the unit must be set to the **global external communication channel** to transmit a request. If it isn’t a warning is displayed when ENTER is pressed.



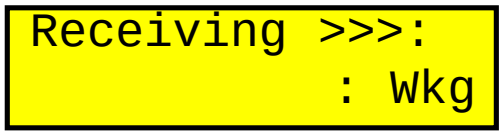
Otherwise, pressing ENTER will transmit a **request** for the settings indicated. If the **other unit** is switched on and connected correctly, it **will briefly display** the message

before reverting to the default (power-up) mode.

The unit receiving the dump will show…



...where NN is the number of the memory it's for, and the colon beside the number denotes it's waiting. This is relevant when a dump of more than one memory is requested. When the working memory has been requested, the display shows...



In practise, the rest of the bottom line will not be blank for any appreciable time. When a memory has been completely received without error, the bottom line is updated with is name, and the colon disappears to indicate completion. Like this…

Reception of a single memory takes under a second, and it follows that reception of a complete memory dump of all 32 memories and the working memory takes in the order of 30 seconds. Both units are non-interruptible under these circumstances, and although memories are not over written until the replacement settings are checked, **do not disturb either unit during the dump procedure.**

If there is a problem, and the receiving unit hasn't received anything, the following happens: after pressing ENTER to request some settings the display changes to...

The dashed line grows across the bottom line until the unit gives up (after 4 seconds) and shows…

…and then reverts to the request screen again. ENTER can be pressed immediately if the problem has been fixed, without needing to re-select the request type.

Note that only two units can be connected together in this way - multiple units can be cloned at the same time, due to the protocol being used. But…if multiple units are connected together full Remote Control is possible. See section entitled "Connecting DN8000s for external comms"

Power On Mute Delay

Range: None; 1 to 30 seconds in 1 second steps, and Permanent

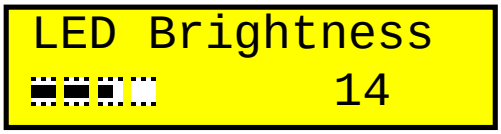
Notes: 'None' means audio appearing as soon as the DN8000 has booted the DSPs, and 'Permanent' means that the mutes stay on until turned off manually by the user. In the event of intermittent mains power failure which might result in large noise spikes in the audio, two spikes in quick succession will cause the unit to re-boot permanently muted to protect the subsequent parts of the system (primarily the speakers).

During boot-up mutes that will be de-activated after the preset delay period will flash - the flash rate will double for the last 3 seconds to indicate the imminent state.

LCD Contrast.

Range: -10 to +10

LED Brightness.



Range: 1 to 14

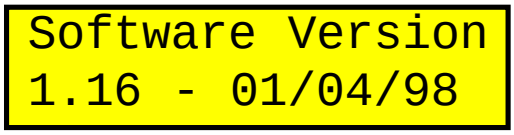
Notes: This setting adjusts the brightness of all indicators, but not the back light of the LCD which is fixed at maximum.

Help Information.

Range: Patronisingly, Thoughtfully, Smugly

Notes: Patronisingly is all help messages, Thoughtfully is help only when some thing dangerous could happen, and Smugly is after something dangerous has happened. The help message level affects many parts of the systems operation. Set to its minimum level, no initial messages occur when entering store, options or edit modes, and memory access times become unprotected in both store and recall modes.

Software Version

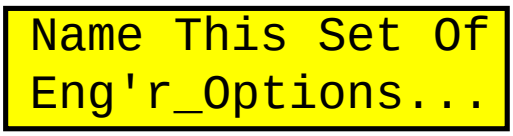


Engineer Profiles

As the possibility exists for a variety of different engineers to be using a DN8000 over a period of time, and given the multitude of customisable options available to personalise the units operation, it is now possible to set up a profile for up to six different users, and instantly reset the options menu to the engineers preferences. This is accomplished as described below.

There are two new entries at the end of the options menu list. The first of these is the engineers name options.

Pressing EDIT will allow this name to be customised, in an identical manner to the user ID option that it follows. The screen will briefly show...



...followed by a cursor appearing under the first character of the present name. The encoder is used to change the character, and the SELECT keys move the cursor. Pressing and holding both SELECT keys will reset the name to a default.

Pressing ENTER will accept this new name, with confirmation given by...

This name is stored as part of the profile, and is used to select which profile to use. That choice is made using the next option.

Turning the encoder will scroll through the available user profiles - five are available in addition to the one already in use. To avoid having separate store and recall procedures at this point, the method used is that the required profile is chosen and ENTER is pressed. This will be confirmed by the chosen profile name appearing on the top line of the display like this...

At this point the options menu will change to the settings stored with the profile name. The current set of options, along with the engineers name will replace (be swapped with) the set just chosen. This will result in the list of engineers being open to reordering, but as there are only five, it should not be confusing. Pressing ENTER again will swap the old profile back (if the encoder has not been moved).

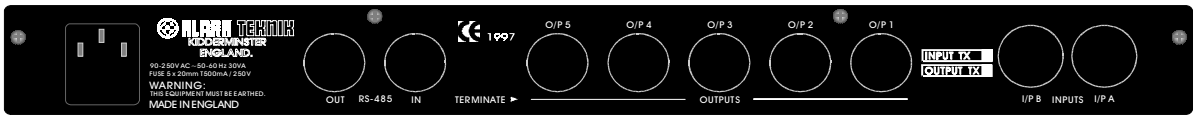
Not all the items in the options menu are stored in a profile.
Those that are, are listed below:

- The unit's ID name;
- The engineer's name;
- The LCD contrast;
- The LED brightness;
- The Delay units read-out;
- The Delay temperature compensation;
- The 12dB pad setting;
- The Limiter Threshold units read-out;
- The Compressor Threshold units read-out;
- The Compressor Linkage mode;
- The Output Metering mode;
- The Output Metering peak hold behaviour;
- The Power On Mute delay;
- The Help System (User/All parameters);
- The Number of Protected Memories;
- The User List of Favourite Parameters.

For security reasons, all options concerned with communications, and lockout are not stored and always remain global. Additionally, loading a different set of options when the working memory contains a preset (with a predefined list of available parameters) will not overwrite the editable list for the preset (or preset copy) in use.

Once a set of user options (a profile) are in place, the message displayed upon entry to the options menu will detail which set of options are being used. Like this...

Connecting DN8000's for External Comms



Please note the following points before using the RS485 communications on the DN8000.

1) RS485 is a node based system - that is, no one unit on the line is a permanent master and all units will receive all data as they merely tap off a common wire. This is the same principle as Ethernet - the input and output sockets on the rear panel are linked through in hardware. If a unit fails it will not disturb the communications to units further down the chain.

2) The units must be connected In to Out down the chain to the last unit. It does not need to be looped back to the first unit, if it is the system will not function correctly.

3) The first and last units in the chain must have their "Terminate" switches set to "ON" (i.e. in the direction of the arrow on the rear panel). All other units must have their "Terminate" switches set to "OFF". This follows the same convention as an Ethernet based system. If this is not adhered to, reflections will occur along the transmission cable, causing unpredictable results.

4) When cloning units or dumping memories, only two units can co-exist on the line at the same time and on the same channel - the unit requesting the dump, and the unit transmitting the dump.

5) When units are connected together and switched on, all units on the same channel will assume the same parameter value if any unit is adjusted. As mentioned in the remote control section of this manual, this is intentional, as the current protocol is designed for two connected units to operate as a four-input ten-output crossover as transparently as possible.

Remote Control

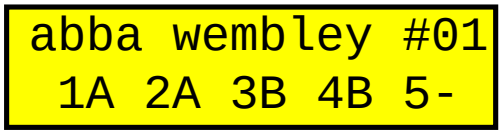
This remote control extends to all the audio functions available in the EDIT menu, memory recalls, and memory stores, including the transmission of the chosen name. This mode is not really designed for a chain of multiple units to be connected together, more for a pair of units to operate seamlessly as a **four-input ten-output crossover.** Connecting multiple units will work, but adjusting a parameter on any unit will set it to the same value on all connected units. To operate in this mode, both units must have the same external communications channel. Either unit can assume the job of the master unit - it's best to think of the two units as a single device as they are able to control each other at all times.
In this way it can easily be determined that a change has been made.

Memory Access - Overview

The structure of memory management has been implemented in such a way as to maximise flexibility when editing. Edits are not performed direct to user memories - there is a scratch pad referred to as ‘working memory’.

Working memory is structured in the same way as a single user memory, and is therefore also battery backed. This has the advantage of retaining edits on power down, and being able to continue with them on power up.

User memory is recalled into working memory where it can then be edited and subsequently stored. However, as soon as working memory is edited (and is therefore different to its original recalled version), the name of the memory changes to lower case:



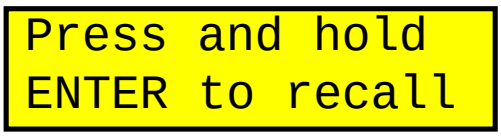
If all changes are undone (e.g. mute on/off/on) the memory name reverts back to upper case to indicate that working memory is now the same as the user memory from which it was recalled:

Memory Recall.

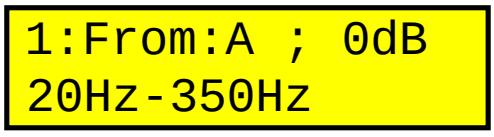
Typically the main screen will be similar to:

Turning the encoder on this screen will scroll through the memories, updating the top line of the screen with the memory name and number, and the bottom line with its signal routing details:

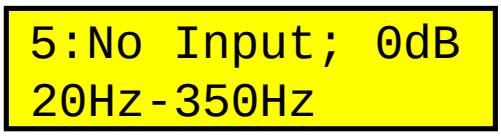
This screen will alternate with the message:



Additional information about the memory may be obtained by pressing the output select buttons on the front panel. This will display the output's routing information, and both its high and low pass frequency settings:



Note that if an output is assigned to '-' (nothing) the display is:



Once the memory to be recalled has been decided, this is confirmed by pressing and holding ENTER, as in the alternating message. This begins a countdown displayed as a decaying bar graph.

The bar decays as long as the ENTER key is held. The speed of this decay is determined by the help level, and the result of the memory compare algorithm. If the memory to be recalled is sufficiently different to the working memory, the hold time may reach a maximum value. This will result in 'hold' being displayed in upper case letters to indicate this:

If ENTER is released without the bar graph decaying to zero, the recall is effectively aborted, and the screen displays:

If ENTER has been held and the bar graph decays to zero, the memory is then recalled:

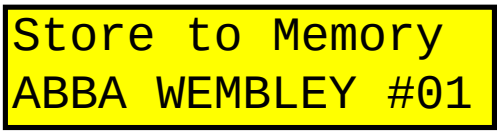
NOTE:

The last memory to be recalled is indicated by the use of <> to encapsulate the output details as below:

Memory Save.

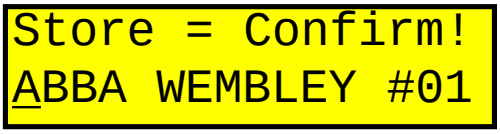
Pressing store initially displays:

...followed by...



...which alternates with...

The list of memory names can be scrolled through to choose the location and then, if ENTER is pressed the message changes to...



...with a cursor below the first letter of the name, allowing it to be changed using the encoder to select the character, and the select keys to move the cursor.

Pressing store will display:

If the memory to be recalled is sufficiently different to the working memory, the hold time may reach a maximum value. This will result in ‘hold’ being displayed in upper case letters to indicate this:

If STORE is released without the bar graph being fully reduced, the store is effectively aborted, and the screen displays:

If STORE has been held and the bar graph decays to zero, the memory is then stored:

NOTE:

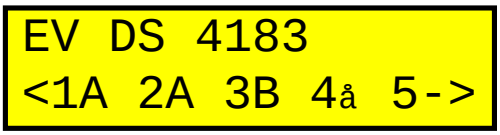
The last memory to be stored is indicated by the use of >< to encapsulate the output details as below:

The only time that these markings do not appear is when the memory is protected, then they become ‘!!’.

OEM Pre-sets

These are memories that have been pre-set by speaker manufactures to optimise settings for their own systems. OEM pre-sets are located at the end of the memories i.e., they start at memory 32 and work up. The pre-sets are easily identified from their name because they do not have memory numbers - their names can be up to 16 characters long instead. In addition to this, when recalling a pre-set, the following message appears:

then, the pre-set:



A further degree of protection is added to pre-sets by the OEMs. Instead of being able to edit all parameters as with user memories, editing is only from a list of parameters made available by the OEM (similar to a user parameter list). This can be seen in the options menu, and cannot be readily changed:

This is the only option for which list. Modification of this list is protected with a pass code *supplied by the OEM:*

alternating with:

Turning the encoder increments a number to select the code. When the correct code has been reached, press ENTER to accept it. The list will then be editable.

This page has been left blank intentionally.

ADDITIONAL NOTES.

Compressor Linkage.

To prevent dynamic shifts in either the stereo image or the frequency response of the system, it is possible to link the side-chains of the compressors together. This is accomplished through the options menu - see the earlier operational description for details. There are four modes available and setting a particular mode will affect all five outputs at the same time. These implement various types of intelligent linkage and may be thought of as follows.

Mode 1 - "No Linkage!". This is self explanatory - all five compressors are completely independent in their operation.

Mode 2 - "Input:[A] [B] [å]". This mode links the side-chains of all outputs that are fed **exclusively** from an input. So if, for example, outputs 1 to 2 were fed from input A, outputs 3 and 4 from B and 5 from the sum of A and B (å), any exceeded threshold on outputs 1 to 2 may cause compression on both outputs. Similarly if either 3 or 4 compress, both may be affected. Compression on output 5 will not affect any other output.

Mode 3 - "Input: [A/å] [B/å]". This mode links the side-chains of all outputs that are fed **inclusively** from an input. So if, for example , the same routing existed as in the above example, the difference in operation would be at any compression on outputs 1 to 4 may now affect output 5 as well, as it receives an input from both A and B.

Mode 4 - "Input: [A/B/å]". This mode links all the compressors together, regardless of input. The effect this has on the operation is that compression on any output may affect all the others.

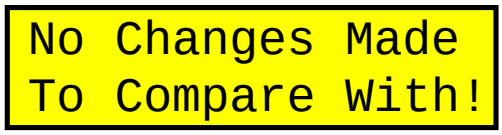
Please note the fact that in all three linked modes, compression **may** be applied to all linked outputs, but the amount of "linked" gain reduction is dependant not only on the various thresholds set, but also on the attack and release times of whichever compressor has exceeded the threshold the most. This intelligent linkage strives to make the action of the linked compressors as transparent as possible, provided the ratio used is not excessive. A recommended maximum ratio for transparent operation is 5:1.

Compare Function.

During editing it is possible to swap between two complete unit configurations, to allow comparisons to be made. The compare function is only active whilst in Edit mode and a compare is performed by pressing and holding the ENTER key. This will swap the current

settings with the ones stored in the 'compare' buffer. The settings stored in the 'compare' buffer will intially be identical to the working memory immediately after a recall has been performed. This is to protect against accidental re-configuration due to the last memory being radically (and possibly dangerously) different to the current one.

The display will show one of several messages to alert the user that a compare has been performed. These detail the changes between the current configuration and the configuration being compared. If there are no changes at all - for instance after post a memory recall, the display will show…



….before reverting back to the parameter that was being edited.

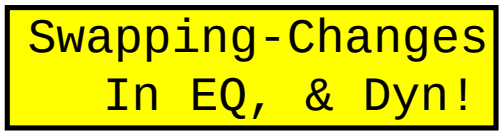
If the compare memory is audibly identical to the working memory, the display will show….

This will be the case for the following where these changes will not affect the audible signal path:

- Labels;
- HPF/LPF frequency changes if the response is set to OFF;
- PEQ frequency/'Q' changes if the filter level is set to 0dB;
- Low/High EQ filter frequency/slope changes if the level is 0dB;
- Compressor attack/release/threshold changes if the ratio is set to 1:1;
- Gate threshold/decay changes if the range is set to 0dB

If there are audible changes, the menus that these changes are in will be shown. For instance, if there are changes in output levels only, the display will show….

….or if changes have been made to parametric filter settings and limiter thresholds have been adjusted….



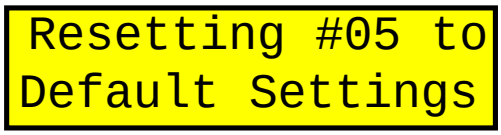
For safety, the ‘compare’ buffer is initialised to be the same as the working memory upon power-up.

Single Memory Reset

A single memory may be reset to default values. To do this, press STORE once to get the flashing display:

...alternating with...

At this point, pressing and holding both SELECT keys resets the memory:



Editing Memory Names

When editing a memory name prior to storing, the last stored memory name may be pasted in by pressing and holding ENTER. Alternatively, this may be undone by pressing and holding both SELECT keys. In addition to this, the cursor may be placed at either end of the memory name by pressing and holding the appropriate SELECT key.

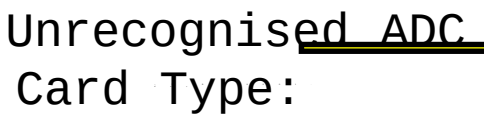
Mute Switches.

All output channels may be muted by pressing and holding only one mute button. This will be useful for soloing an output.

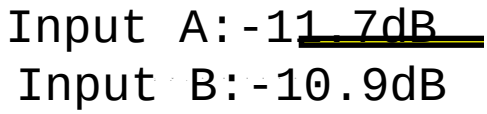
Analogue to Digital Converter Card & Input Level Control.

When the unit starts up, its checks to see if an ADC card is present (as opposed to a fully digital I/O card), and what type of card it is. If no card is present, then a warning is displayed:

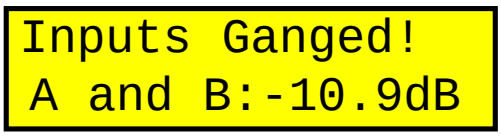
If the card is of unrecognised type, the actual type number is displayed:



If the card uses a standard or enhanced 20 bit ADC, then when the input level control is turned, increases in gain steps are reported to the screen due to the inclusion of a digitally controlled attenuator:



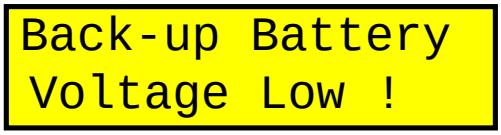
As the two halves of the input pot are not friction-locked they operate independently. However, they may be “locked” via software by setting them to the same position and turning them together several times. The unit will recognise this and change the display to show...



From this point on, it is only necessary to turn the front half of the pot (Channel A) to set the gain for both channels. They may be immediately un-ganged by turning the back half of the pot separately. This software “friction - lock” is remembered on power down.

Battery Low Warning.

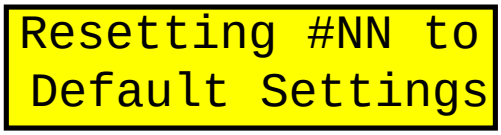
If the memory backup battery starts to run low, then this is reported to the screen during start-up. In addition to this, the number of times that this warning has been given is also displayed:



alternating with:

It is recommended that the DN8000 be referred to qualified personnel only.

If the battery is not changed, and the RAM becomes corrupted, it will be re-initialised with default values. This will be made apparent by a message of the form...



...and the mute LEDs flashing. The RAM is checked on a memory by memory basis so as to preserve as many user memories as possible - only those that are corrupted will be reset.

Three Dimensional Metering[1]

Accurate level metering is especially important on a crossover, being the last signal processing in the audio chain, with no further protection for individual drivers before the power amplifiers if clipping occurs. Traditional bar graph level metering is only useful for clipping detection when the meters are being monitored all the time by the engineer. Occurrence of clipping conditions may be missed if the over range signal was transient and the meter was not being directly viewed at the time.

Research in how to alleviate this situation has resulted in a dramatic improvement in performance and presentation of information with regards to the metering incorporated into the DN8000. By modulating the intensity of the meters as well as the traditional method of illuminating more indicators to represent increased signal level, over range conditions can be registered well off the central viewing axis.

In practise, any output which clips (or limits if the metering option is changed) will cause a large step in the intensity of the entire output meter group. Whether this is an increase or decrease in intensity depends on the setting of the LED brightness under the options menu. Similarly, clipping an input will cause both input meters to change intensity. The actual meter (or meters) that caused the over range condition will have their peak (red) LED's held for about 1.5 seconds. However this intensity change only lasts for the duration of the over range condition, giving yet more feedback as to the severity of the over-range condition - occasional flickering of the meter group indicates clipping point has been reached; frequent flickering indicates clipping point is being exceeded regularly; permanent high or low intensity or the meter group indicates severe clipping, and most likely would be clearly audible.

Note that, in the normal (bar graph) mode when the meters are monitoring dB from clip, if clipping occurs somewhere in the signal path, but not at the output (for example, a parametric filter has too much boost) the clip LED for that channel will light independently of the rest of the meter and cause the usual intensity change. This monitoring carries on even if the channel is muted, so if a red LED lights on a muted channel it means distortion is likely to be audible if the channel is un-muted.

[1]Patent has been applied for the three dimensional metering invention and is currently pending.

Pot / Mute Behaviour in Lock Modes

The partial lock mode allows the mute switches and input / output pots to operate, whilst full lock mode disables these controls.

The possibility exists for these controls to be tampered with while the unit is fully locked. If any are set to different positions in relation to their pre-lock setting, upon entry of the correct PIN to unlock the unit, the following will happen...

The screen will show (immediately after ENTER is pressed to try the PIN)...

...followed by...

...alternating with...

At this point there are two possible courses of action.

Pressing STORE will immediately accept the new pot positions and update the audio accordingly. Note that this may produce unexpected changes in level. The unit will then operate normally again.

Pressing EDIT starts a pot recall mode. Each pot which is different from its pre-lock setting is highlighted in turn by using the LED meter applicable to it to show whether the pot is higher or lower than it should be. A red LED above the two yellow LEDS means turn the pot anticlockwise. A green LED below the two yellow LEDS means turn the pot clockwise. On screen messages also detail the pot in question and the required direction of travel.

When the settings match, the pair of yellow LEDs will flash brightly and then the next pot requiring adjustment will be selected. This process continues until all the pots have been reset to their pre-lock value.

Completion of the process will restart the meters and the unit will operate as normal.

Switching the unit off during this process will cause it to power back up again.

Quick Lock.

This is a fast method for making the unit tamper proof without assigning a lockout PIN. When in the main screen if both SELECT keys are pressed together, quick lock is switched on. To leave quick lock, press and hold both SELECT keys together again.

Generic Presets and Settings Tables.

A selection of templates are included in the unit to aid the setting up of the required system. These are the nine presets that immediately follow the user memories. They all have OEM parameter lists, and only the most important parameters are available for editing. If, however, access is required to modify this list, all nine of the generic presets may be unlocked by entering 00001 for the PIN. The details of the generic presets follow.

New Preset for Version 1.16

The two presets dedicated to control of X-Array systems have been removed from version 1.15 and replaced with a set of six multi-purpose, fully reconfigurable versions. These appear as

- EV XCB,XCN-ST;
- EV XCB,XN-ST;
- EV XDS;
- EV XF,XB-ST;
- EV XF,XN,XB,XC and
- EV XN-ST

Full details about these presets are availble upon request.

2&2-WAY,MONO FR

Master Delay A: minimum
Master Delay B: minimum

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
SOURCE	**A**	**A**	**B**	**B**	**A+B**
DELAY	**min**	**min**	**min**	**min**	**min**
POLARITY	**normal**	**normal**	**normal**	**normal**	**normal**
PHASE ADJUST	**none**	**none**	**none**	**none**	**none**
MUTE	**on**	**on**	**on**	**on**	**on**
LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
NAME	**Lo**	**Hi**	**Lo**	**Hi**	**Sub**
HPF FREQUENCY	**20**	**4000**	**20**	**4000**	**20**
HPF RESPONSE (dB/Oct)	**Butter 12**	**Butter 12**	**Full Range**	**Butter 12**	**Butter 12**
HPF PEAK (dB)	**0**	**0**	**0**	**0**	**0**
LPF FREQUENCY (Hz)	**4000**	**20000**	**4000**	**20000**	**20000**
LPF RESPONSE (dB/Oct)	**Butter 12**	**Butter 12**	**Butter 12**	**Butter 12**	**Butter 12**
PEQ1 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ1 Q	**1**	**1**	**1**	**1**	**1**
PEQ1 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
PEQ2 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ2 Q	**1**	**1**	**1**	**1**	**1**
PEQ2 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
LEQ FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
LEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
LEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
HEQ FREQUENCY (Hz)	**500**	**500**	**500**	**500**	**500**
HEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
HEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**
COMPRESSOR RATIO	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**
COMPRESSOR ATTACK (ms)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR RELEASE (ms)	**10**	**10**	**10**	**10**	**10**
GATE THRESHOLD (dB)	**-80**	**-80**	**-80**	**-80**	**-80**
GATE RANGE (dB)	**0**	**0**	**0**	**0**	**0**
GATE DECAY TIME (dB/ms)	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
LIMITER THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**

2&2-WAY,MONO SUB

Master Delay A: minimum
Master Delay B: minimum

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
SOURCE	**A**	**A**	**B**	**B**	**A+B**
DELAY	**min**	**min**	**min**	**min**	**min**
POLARITY	**normal**	**normal**	**normal**	**normal**	**normal**
PHASE ADJUST	**none**	**none**	**none**	**none**	**none**
MUTE	**on**	**on**	**on**	**on**	**on**
LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
NAME	**Lo**	**Hi**	**Lo**	**Hi**	**Sub**
HPF FREQUENCY	**121**	**4000**	**121**	**4000**	**20**
HPF RESPONSE (dB/Oct)	**Butter 12**	**Butter 12**	**Butter 12**	**Butter 12**	**Butter 12**
HPF PEAK (dB)	**0**	**0**	**0**	**0**	**0**
LPF FREQUENCY (Hz)	**4000**	**20000**	**4000**	**20000**	**121**
LPF RESPONSE (dB/Oct)	**Butter 12**	**Butter 12**	**Butter 12**	**Butter 12**	**Butter 12**
PEQ1 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ1 Q	**1**	**1**	**1**	**1**	**1**
PEQ1 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
PEQ2 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ2 Q	**1**	**1**	**1**	**1**	**1**
PEQ2 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
LEQ FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
LEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
LEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
HEQ FREQUENCY (Hz)	**500**	**500**	**500**	**500**	**20**
HEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
HEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**
COMPRESSOR RATIO	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**
COMPRESSOR ATTACK (ms)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR RELEASE (ms)	**10**	**10**	**10**	**10**	**10**
GATE THRESHOLD (dB)	**-80**	**-80**	**-80**	**-80**	**-80**
GATE RANGE (dB)	**0**	**0**	**0**	**0**	**0**
GATE DECAY TIME (dB/ms)	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
LIMITER THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**

3-WAY & 2-WAY

Master Delay A: minimum
Master Delay B: minimum

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
SOURCE	**A**	**A**	**A**	**B**	**B**
DELAY	**min**	**min**	**min**	**min**	**min**
POLARITY	**normal**	**normal**	**normal**	**normal**	**normal**
PHASE ADJUST	**none**	**none**	**none**	**none**	**none**
MUTE	**on**	**on**	**on**	**on**	**on**
LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
NAME	**Lo**	**Mid**	**Hi**	**Lo**	**Hi**
HPF FREQUENCY (Hz)	**20**	**250**	**4000**	**20**	**4000**
HPF RESPONSE (dB/Oct)	**Bessel 24**	**Bessel 24**	**Bessel 24**	**Butter 12**	**Butter 12**
HPF PEAK (dB)	**0**	**0**	**0**	**0**	**0**
LPF FREQUENCY (Hz)	**250**	**4000**	**20000**	**4000**	**20000**
LPF RESPONSE (dB/Oct)	**Butter 24**	**Butter 24**	**Butter 24**	**Butter 12**	**Butter 12**
PEQ1 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ1 Q	**1**	**1**	**1**	**1**	**1**
PEQ1 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
PEQ2 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ2 Q	**1**	**1**	**1**	**1**	**1**
PEQ2 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
LEQ FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
LEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
LEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
HEQ FREQUENCY (Hz)	**500**	**500**	**500**	**500**	**500**
HEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
HEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**
COMPRESSOR RATIO	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**
COMPRESSOR ATTACK (ms)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR RELEASE (ms)	**10**	**10**	**10**	**10**	**10**
GATE THRESHOLD (dB)	**-80**	**-80**	**-80**	**-80**	**-80**
GATE RANGE (dB)	**0**	**0**	**0**	**0**	**0**
GATE DECAY TIME (dB/ms)	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
LIMITER THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**

4-WAY,MONO FR

Master Delay A: minimum
Master Delay B: minimum

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
SOURCE	**A**	**A**	**A**	**A**	**A+B**
DELAY	**min**	**min**	**min**	**min**	**min**
POLARITY	**normal**	**normal**	**normal**	**normal**	**normal**
PHASE ADJUST	**none**	**none**	**none**	**none**	**none**
MUTE	**on**	**on**	**on**	**on**	**on**
LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
NAME	**Lo**	**Lo-Mid**	**Hi-Mid**	**Hi**	**FR**
HPF FREQUENCY (Hz)	**20**	**250**	**1000**	**8000**	**20**
HPF RESPONSE (dB/Oct)	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**OFF**
HPF PEAK (dB)	**0**	**0**	**0**	**0**	**0**
LPF FREQUENCY (Hz)	**250**	**1000**	**8000**	**20000**	**20000**
LPF RESPONSE (dB/Oct)	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**OFF**
PEQ1 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ1 Q	**1**	**1**	**1**	**1**	**1**
PEQ1 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
PEQ2 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ2 Q	**1**	**1**	**1**	**1**	**1**
PEQ2 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
LEQ FREQUENCY (Hz)	**500**	**500**	**500**	**500**	**500**
LEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
LEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
HEQ FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
HEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
HEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**
COMPRESSOR RATIO	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**
COMPRESSOR ATTACK (ms)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR RELEASE (ms)	**10**	**10**	**10**	**10**	**10**
GATE THRESHOLD (dB)	**-80**	**-80**	**-80**	**-80**	**-80**
GATE RANGE (dB)	**0**	**0**	**0**	**0**	**0**
GATE DECAY TIME (dB/ms)	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
LIMITER THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**

4-WAY,MONO SUB

Master Delay A: minimum
Master Delay B: minimum

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
SOURCE	**A**	**A**	**A**	**A**	**A+B**
DELAY	**min**	**min**	**min**	**min**	**min**
POLARITY	**normal**	**normal**	**normal**	**normal**	**normal**
PHASE ADJUST	**none**	**none**	**none**	**none**	**none**
MUTE	**on**	**on**	**on**	**on**	**on**
LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
NAME	**Lo**	**Lo-Mid**	**Hi-Mid**	**Hi**	**Sub**
HPF FREQUENCY (Hz)	**20**	**250**	**1000**	**8000**	**20**
HPF RESPONSE (dB/Oct)	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**Butter 12**
HPF PEAK (dB)	**0**	**0**	**0**	**0**	**0**
LPF FREQUENCY (Hz)	**250**	**1000**	**8000**	**20000**	**121**
LPF RESPONSE (dB/Oct)	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**6**
PEQ1 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ1 Q	**1**	**1**	**1**	**1**	**1**
PEQ1 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
PEQ2 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ2 Q	**1**	**1**	**1**	**1**	**1**
PEQ2 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
LEQ FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
LEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
LEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
HEQ FREQUENCY (Hz)	**500**	**500**	**500**	**500**	**500**
HEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
HEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**
COMPRESSOR RATIO	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**
COMPRESSOR ATTACK (ms)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR RELEASE (ms)	**10**	**10**	**10**	**10**	**10**
GATE THRESHOLD (dB)	**-80**	**-80**	**-80**	**-80**	**-80**
GATE RANGE (dB)	**0**	**0**	**0**	**0**	**0**
GATE DECAY TIME (dB/ms)	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
LIMITER THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**

4-WAY,DI ON IN.A

Master Delay A: minimum
Master Delay B: minimum

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
SOURCE	**A**	**A**	**A**	**A**	**A**
DELAY	**min**	**min**	**min**	**min**	**min**
POLARITY	**normal**	**normal**	**normal**	**normal**	**normal**
PHASE ADJUST	**none**	**none**	**none**	**none**	**none**
MUTE	**on**	**on**	**on**	**on**	**on**
LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
NAME	**Lo**	**Lo-Mid**	**Hi-Mid**	**Hi**	**FR**
HPF FREQUENCY (Hz)	**20**	**250**	**1000**	**8000**	**20000**
HPF RESPONSE (dB/Oct)	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**OFF**
HPF PEAK (dB)	**0**	**0**	**0**	**0**	**0**
LPF FREQUENCY (Hz)	**250**	**1000**	**8000**	**20000**	**20000**
LPF RESPONSE (dB/Oct)	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**Lnk-Ril 12**	**OFF**
PEQ1 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ1 Q	**1**	**1**	**1**	**1**	**1**
PEQ1 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
PEQ2 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ2 Q	**1**	**1**	**1**	**1**	**1**
PEQ2 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
LEQ FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
LEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
LEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
HEQ FREQUENCY (Hz)	**500**	**500**	**500**	**500**	**500**
HEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
HEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**
COMPRESSOR RATIO	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**
COMPRESSOR ATTACK (ms)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR RELEASE (ms)	**10**	**10**	**10**	**10**	**10**
GATE THRESHOLD (dB)	**-80**	**-80**	**-80**	**-80**	**-80**
GATE RANGE (dB)	**0**	**0**	**0**	**0**	**0**
GATE DECAY TIME (dB/ms)	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
LIMITER THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**

5-WAY,MONO SUB

Master Delay A: minimum
Master Delay B: minimum

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
SOURCE	**A**	**A**	**A**	**A**	**A+B**
DELAY	**min**	**min**	**min**	**min**	**min**
POLARITY	**normal**	**normal**	**normal**	**normal**	**normal**
PHASE ADJUST	**none**	**none**	**none**	**none**	**none**
MUTE	**on**	**on**	**on**	**on**	**on**
LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
NAME	**Lo-Mid**	**Mid**	**Hi-Mid**	**Hi**	**Sub**
HPF FREQUENCY (Hz)	**121**	**349**	**1000**	**8000**	**20**
HPF RESPONSE (dB/Oct)	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**
HPF PEAK (dB)	**0**	**0**	**0**	**0**	**0**
LPF FREQUENCY (Hz)	**349**	**1000**	**8000**	**20**	**121**
LPF RESPONSE (dB/Oct)	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**
PEQ1 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ1 Q	**1**	**1**	**1**	**1**	**1**
PEQ1 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
PEQ2 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ2 Q	**1**	**1**	**1**	**1**	**1**
PEQ2 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
LEQ FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
LEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
LEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
HEQ FREQUENCY (Hz)	**500**	**500**	**500**	**500**	**500**
HEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
HEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**
COMPRESSOR RATIO	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**
COMPRESSOR ATTACK (ms)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR RELEASE (ms)	**10**	**10**	**10**	**10**	**10**
GATE THRESHOLD (dB)	**-80**	**-80**	**-80**	**-80**	**-80**
GATE RANGE (dB)	**0**	**0**	**0**	**0**	**0**
GATE DECAY TIME (dB/ms)	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
LIMITER THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**

FULL 5-WAY,LO-HI

Master Delay A: minimum
Master Delay B: minimum

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
SOURCE	**A**	**A**	**A**	**A**	**A**
DELAY	**min**	**min**	**min**	**min**	**min**
POLARITY	**normal**	**normal**	**normal**	**normal**	**normal**
PHASE ADJUST	**none**	**none**	**none**	**none**	**none**
MUTE	**on**	**on**	**on**	**on**	**on**
LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
NAME	**Lo**	**Lo-Mid**	**Mid**	**Hi-Mid**	**Hi**
HPF FREQUENCY (Hz)	**20**	**121**	**349**	**1000**	**8000**
HPF RESPONSE (dB/Oct)	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**
HPF PEAK (dB)	**0**	**0**	**0**	**0**	**0**
LPF FREQUENCY (Hz)	**121**	**349**	**1000**	**8000**	**20000**
LPF RESPONSE (dB/Oct)	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**	**Lnk-Ril 24**
PEQ1 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ1 Q	**1**	**1**	**1**	**1**	**1**
PEQ1 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
PEQ2 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ2 Q	**1**	**1**	**1**	**1**	**1**
PEQ2 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
LEQ FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
LEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
LEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
HEQ FREQUENCY (Hz)	**500**	**500**	**500**	**500**	**500**
HEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
HEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**
COMPRESSOR RATIO	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**
COMPRESSOR ATTACK (ms)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR RELEASE (ms)	**10**	**10**	**10**	**10**	**10**
GATE THRESHOLD (dB)	**-80**	**-80**	**-80**	**-80**	**-80**
GATE RANGE (dB)	**0**	**0**	**0**	**0**	**0**
GATE DECAY TIME (dB/ms)	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
LIMITER THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**

5-WAY DISTRIBUTE

Master Delay A: minimum
Master Delay B: minimum

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
SOURCE	**A**	**A**	**A**	**A**	**A**
DELAY	**min**	**min**	**min**	**min**	**min**
POLARITY	**normal**	**normal**	**normal**	**normal**	**normal**
PHASE ADJUST	**none**	**none**	**none**	**none**	**none**
MUTE	**on**	**on**	**on**	**on**	**on**
LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
NAME	**FR**	**FR**	**FR**	**FR**	**FR**
HPF FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
HPF RESPONSE (dB/Oct)	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**
HPF PEAK (dB)	**0**	**0**	**0**	**0**	**0**
LPF FREQUENCY (Hz)	**20000**	**20000**	**20000**	**20000**	**20000**
LPF RESPONSE (dB/Oct)	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**
PEQ1 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ1 Q	**1**	**1**	**1**	**1**	**1**
PEQ1 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
PEQ2 FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
PEQ2 Q	**1**	**1**	**1**	**1**	**1**
PEQ2 LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
LEQ FREQUENCY (Hz)	**20**	**20**	**20**	**20**	**20**
LEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
LEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
HEQ FREQUENCY (Hz)	**500**	**500**	**500**	**500**	**500**
HEQ SLOPE (dB/Oct)	**6**	**6**	**6**	**6**	**6**
HEQ LEVEL (dB)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**
COMPRESSOR RATIO	**1:1**	**1:1**	**1:1**	**1:1**	**1:1**
COMPRESSOR ATTACK (ms)	**0**	**0**	**0**	**0**	**0**
COMPRESSOR RELEASE (ms)	**10**	**10**	**10**	**10**	**10**
GATE THRESHOLD (dB)	**-80**	**-80**	**-80**	**-80**	**-80**
GATE RANGE (dB)	**0**	**0**	**0**	**0**	**0**
GATE DECAY TIME (dB/ms)	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
LIMITER THRESHOLD (dB)	**22**	**22**	**22**	**22**	**22**

TECHNICAL SPECIFICATION

INPUTS	**TWO**
Type	Balanced (electronically)
Impedance (ohm)	
Balanced	20K
Unbalanced	10K
Common mode rejection	>70dB@1KHz
Maximum Level	>+21dBu
OUTPUTS	**FIVE**
Type	Balanced (electronically)
Min. load impedance	56 ohms//20nF
Source impedance	56 ohms
Maximum level	+22dB into > 2kohms
PERFORMANCE	
Frequency response	+/-0.3dB
(20Hz to 20KHz)	With all filters and EQ flat
Distortion @ +8dBu	<0.02%
(20Hz to 20KHz)	
Dynamic Range	114dB
(20Hz to 20KHz unweighted)	
POWER REQUIREMENTS	
Voltage	90 to 250V @ 50 to 60Hz
AC	
Consumption	<35VA
DIMENSIONS	
Width	483mm (19 inches)
Height	44mm (1.75 inches)
Depth	287mm (12 inches)
WEIGHT	
Nett	4 kg
Shipping	6 kg

OPTIONS

Input isolation transformers
Output isolation transformers
AES/EBU digital audio interface
Security cover

Service Information

SERVICE INFORMATION

Caution: These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel. Klark Teknik PLC accepts no liability for damage or injury arising from incorrect servicing.

Fuse ratings:
Rear panel fuse holder: 500mAT

Battery Replacement

Caution!:
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Advarsel!:
Lithiumbatteri. Eksplonsionsfare ved feijlagtig handtering. af samme fabrikat og type. Lever det brugte batteri tilbage till leverandoren.

Voltage Change Over

~~The unit automatically adjusts to any input voltage in the range 100Vac to 240Vac @ 50Hz to~~ 60Hz.

Operators Manual

DN8000

EVI PRO AUDIO GROUP
Klark Teknik Building,
Walter Nash Road, Kidderminster,
Worcestershire. DY11 7HJ.
England.

Tel:(01562) 741515 Fax:(01562) 745371