Operators Manual

DN780

Digital Reverberator/ Processor

IMPORTANT:

Product Registration
Please check that the enclosed product registration card is part of this book. If **NOT,** immediately inform the factory quoting this units serial number.

CONTENTS

PRODUCT REGISTRATION & INFORMATION REQUEST CARDS

Sound System Design and Engineering Seminars

Klark-Teknik undertakes on a regular basis the organisation of technical seminars at locations around the world. If you would like to attend one of these seminars, please tick the box on the enclosed product registration card or write to Klark-Teknik, England, for the attention of the International Marketing Services Department, and we will inform you of planned or forthcoming events, whilst trying our utmost to accommodate your request.

If however, you cannot attend, you can as a user, obtain the complete seminar material for a nominal charge.

Klark-Teknik designs and manufactures a variety of products for the professional audio industry. If you would like us to forward information on these products, simply tick the appropriate box on the "information request" reply card.

Thank You for using Klark-Teknik Product

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

Precautions

Before connecting this unit to the mains power, ensure that the operating voltage is correct for your local supply.

To ensure efficient operation of the cooling fan, do not install the unit in an unventilated rack or enclosure.

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

Voltage Selection and Power Connection

Connection is by means of an IEC standard power socket. The rear panel voltage label, indicates the voltage required for the satisfactory operation of the unit.

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

To change the mains voltage selector, refer to voltage change-over in Installation Section.

Safety Warning

This unit is fitted with 3-pin power socket: For safety reasons the earth lead should not be disconnected. If you encounter a problem with earth-loops, use the gound-lift switch on the rear panel to isolate the signal earth from the chassis earth.

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

To avoid electrical shock do not remove covers. 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 operating and mechanical condition.

If, however, the unit shows a sign 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.

* See enclosed world-wide importing agents list.
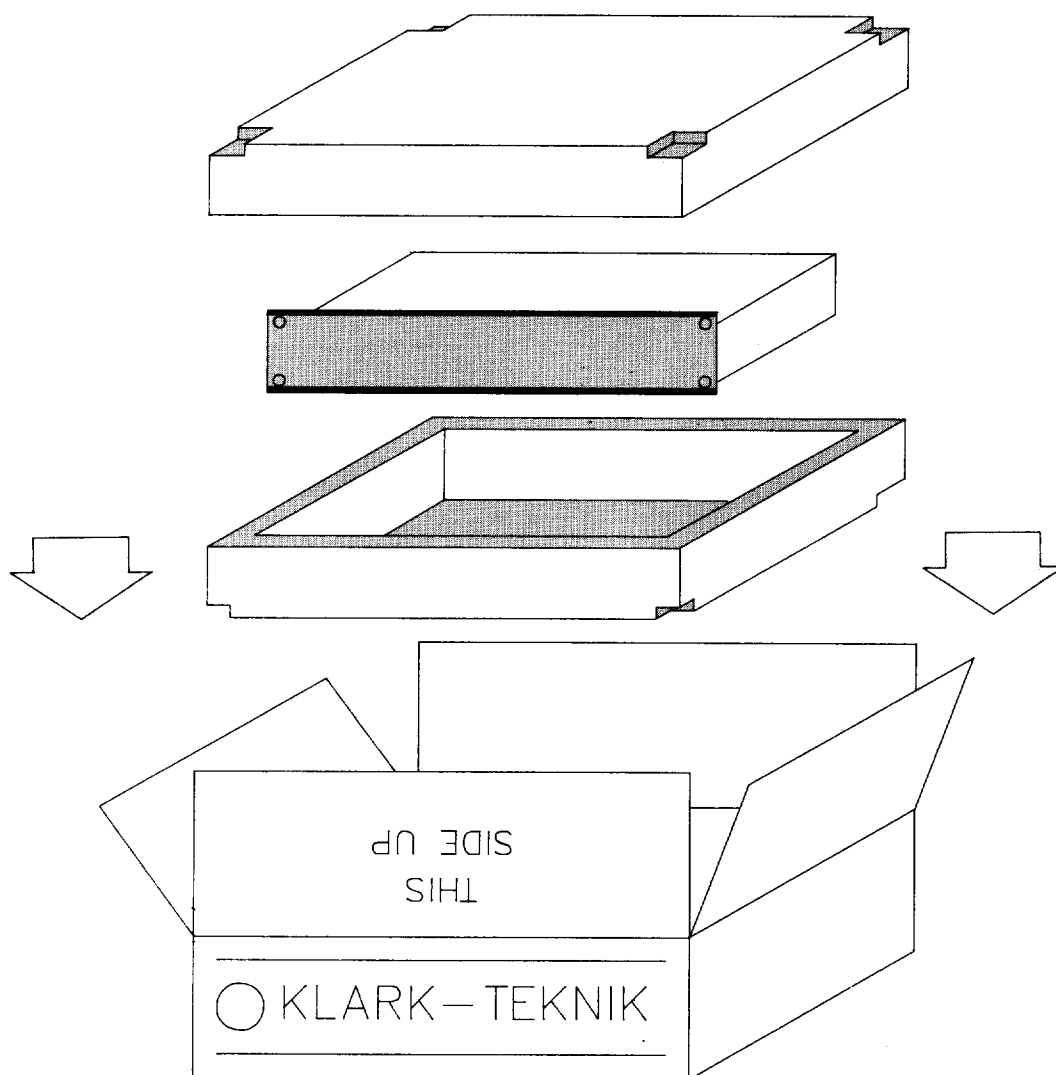
Introduction

The Klark-Teknik DN780 Digital Reverberator/Processor is not simply a reverberation device. The DN780 gives the user a unique and flexible means of producing realistic acoustic simulations for environments of all types and sizes. The provision of effects programs further extends this versatility, making the DN780 the most powerful acoustic processing package currently available.

Not happy with the current designs with narrow fields of useful application, our research has led to a new operating concept for the DN780 to extend versatility, backed by an advanced high speed digital signal processor designed to handle the necessarily complex computations. This technical innovation results in extremely high density reverberation with convincing small room performance, authentic concert hall reverberation and a wide ranging choice of basic 'acoustic spaces.'

The parameter controls give accurate adjustment of all reverberation parameters and allow the engineer to create unique acoustic environments of virtually any type.

A number of factory-set acoustic simulations based on four reverb types are available via the keypad: see 'Software' section. These factory-set memory locations can then be used in their own right or as a reference point from which to create your own variations allowing you to let your creativity reign.

Fifty non-volatile memories are available for entering user variations and the sequence function allows instant recall of up to 16 factory or user memories in required order, allowing rapid movements through a series of previously planned acoustical settings for mix-down, film dubbing, T.V. production or live performance.

The remote control unit allows the chosen acoustic setting to be first selected, using the sequence key and then modified using the parameter sliders.

The DN780 performs to the highest specification and is engineered using the latest technology to keep component count down and reliability up. Electronics use a semi-modular system of construction distributed logically on six printed circuit boards, eliminating unreliable edge connectors whilst avoiding the servicing problems of single board systems.

The DN780 is a compact 2U 19 inch rack mounting device equally at home in the recording studio, dubbing suite, broadcasting studio or on the road.

Instrument Familiarisation

This section is intended to acquaint the user with the controls, display and connectors used on the DN780 and remote unit. For in-depth information on the function of the various controls refer to the 'Operation' section.

Front Panel Functions
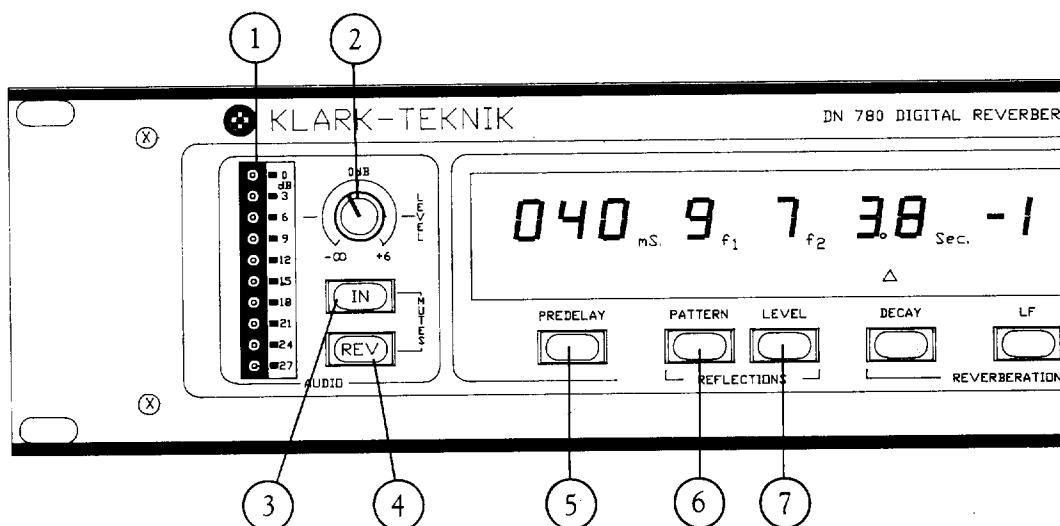
1 Input Headroom

This is a peak reading LED column with the red 'OdB' LED lighting at 3dB before clipping point. This 'OdB' LED also gives 'over-range warning' for the arithmetical processor.

2 Input Level

This should be set to illuminate the −3dB LED on the headroom indicator during loud program passages. Adjustment of +6dB to −infinity is provided.

3 Input Mute

Removes signal feed to the reverberation section enabling the decay qualities of the chosen setting to be confirmed.

4 Reverb Mute

Gives a rapid means of killing unwanted reverberant sounds.

5 Predelay

Controls the delay between the initial signal and the onset of reverberation. On certain program types 'Predelay' is inserted between early reflections and reverberation, to improve authenticity. (See 'Software' section for details).

Low level phase-dependent "clicks" are produced when predelay is altered during program.

6 Pattern

Controls the "density" of the early reflections.

7 Level

Acts as a "depth" control altering the apparent distance between the sound source and the listener.
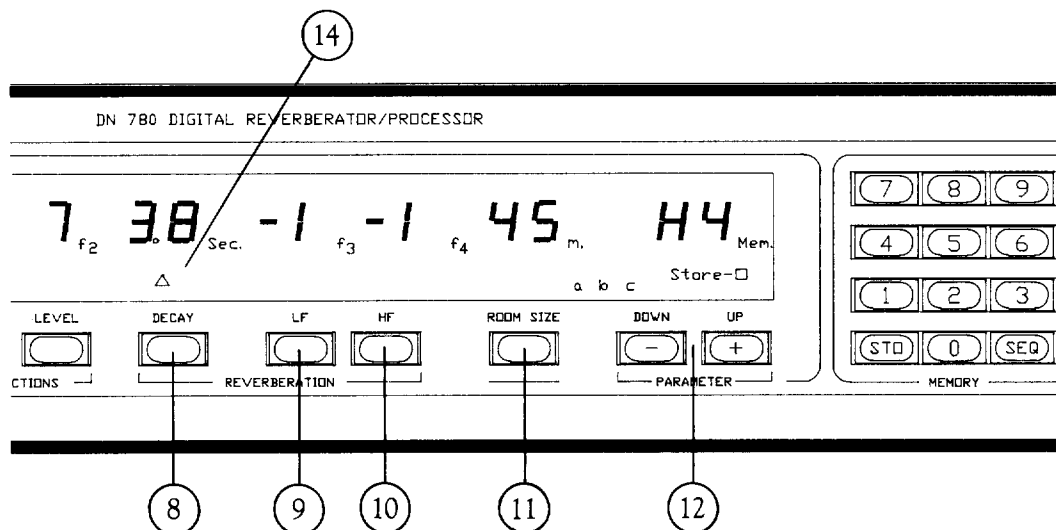
8 Decay

This control sets the overall (midband) reverberation decay time.

9 L.F.

Varies the decay time at the low end of the reverberation spectrum.

10 H.F.

Adjusts the high frequency decay time.

11 Room Size

Adjusts the average dimension of the simulated space. A momentary mute is implemented when this control is adjusted.

12 Parameter Up/Down Keys

These control the parameter currently selected in three ways:-

Nudge — by single taps on the keys.

Slow increment — by holding down one key.

Fast increment — by holding down one key and then also the other.

14 Parameter Display

Shows current settings for all seven parameters. Selected parameter is indicated by a corresponding triangular LED.

REVERBERATOR/PROCESSOR
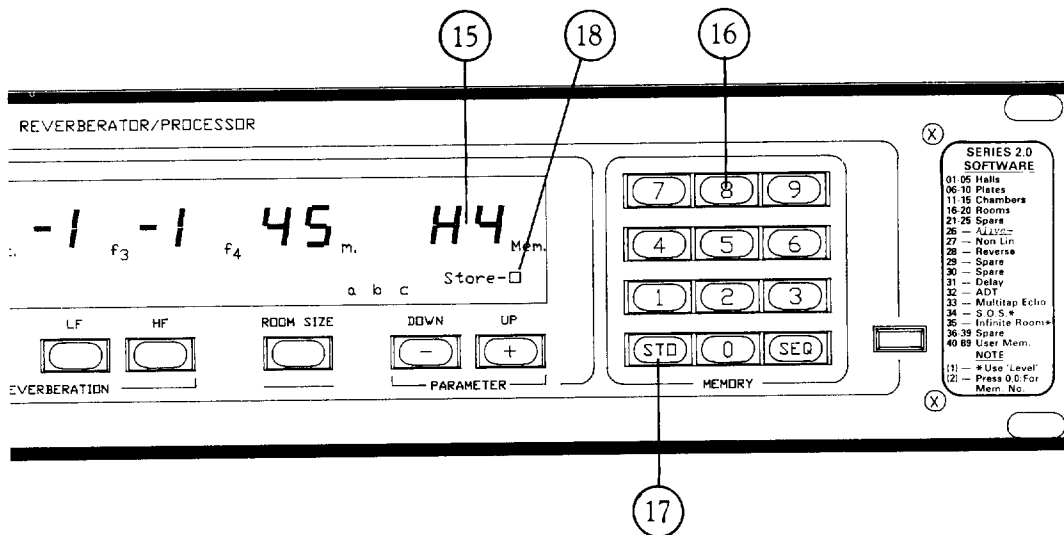
15 Memory Display

Momentarily shows the number of the memory location currently selected then continuously displays the program type e.g. "H4". The orange display clearly distinguishes 'memory' from parameter displays.

16 Numeric Keypad

The required memory location is selected by simply entering the appropriate two digit number. A momentary mute is implemented during change-over. The keypad is also used in conjunction with the STOre and SEQuence keys (See 'operation' section for detailed information).

17 Store Key

This key is used in conjunction with the keypad to store modified settings into the user memory area and with the SEQuence key to store a number of memories in required order (See 'operation' section for details).

18 Store LED

Flashes when store key is first pressed and extinguishes when store procedure has been completed.
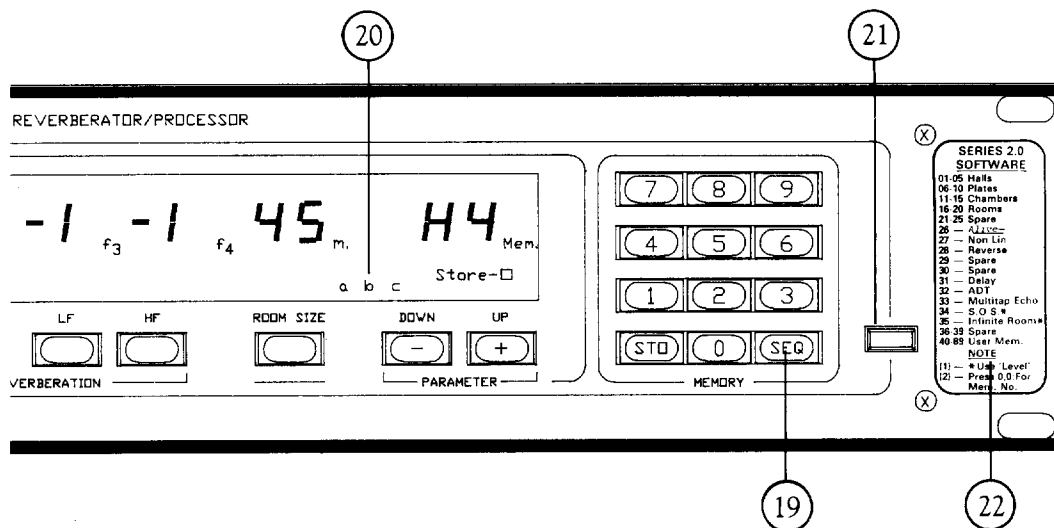
19 Sequence Key

Is used first in conjunction with STOre key and keypad to set up a sequence of memories and then to recall the sequence in required order (See 'operation' section for details).

20 a,b,c, LEDS

These LEDS are provided to show the status of options for the DN780 (See 'Software' section for current usage).

21 Power On/Off

Connects mains power and resets the processor when switched on. Self-diagnostic routine then runs and the unit returns to the memory location last used.

22 Aide-Memoire

Gives quick and easy reference to the memory locations of the factory set reverberation and effects programs currently available.

Rear Panel Functions
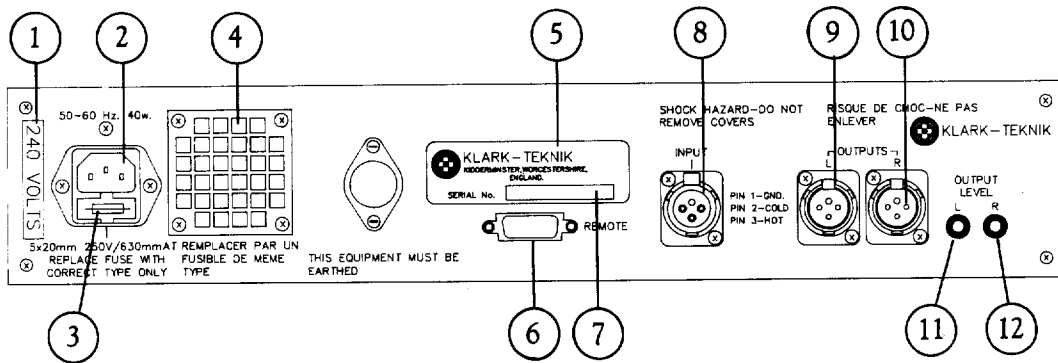
1 Operating Voltage

This is clearly marked on an adhesive label. See installation section for voltage change over instructions.

2 Power Inlet

This is a standard IEC 3 pin socket.

3 Mains Fuse

This is contained within a pull out compartment on the power inlet socket. A spare fuse is also provided inside this compartment.

4 Cooling Fan Outlet

Ensure good air flow around this section of the panel.

5 Serial Number

The serial number on this label should be quoted in any correspondence concerning the unit.

6 Remote Socket

The remote control unit is connected to this 15 way Dee type socket.

7 Midi (or RS232) Socket (Where Fitted).

8, 9, 10 Audio Connectors

These are complementary 3 pin XLR style sockets. See installation section for wiring details.

11, 12 Output Level Controls

These are factory set. See installation section before adjusting.

KLARK – TEKNIK

REMOTE   SEQUENCE

BANK B1 B2 SELECT
TRACK

PREDELAY LEVEL   HF   DECAY B1
MEMORY PATTERN   LF   R–SIZE B2

DN 780 REVERBERATOR – REMOTE
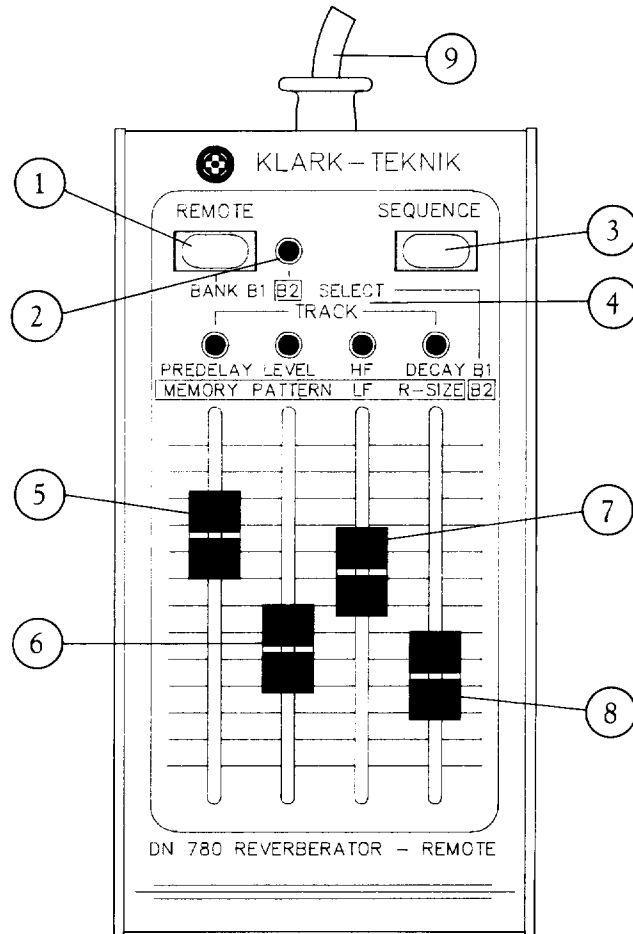
All 7 parameters are controllable from the remote unit and memory recall is also provided for both factory preset and user memories.

The four parameters; Predelay, Level, H.F. and Decay are designated parameter "Bank 1", with parameters Pattern, L.F., Room Size and Memory Number designated "Bank 2".

1   Remote Key

Press to enable remote unit. Pressing any parameter key on the DN780 front panel cancels remote 'on' status.

2   Bank 1/Bank 2 LED

Confirms Bank 2 'on' status when illuminated.

3   Sequence Key

Duplicates the same key on the DN780 front panel. The required sequence is first set up using the DN780 controls and then operated remotely using this key. This function is independent of 'Remote' on/off status.

4   Track LEDS

These illuminate when the corresponding parameter slider is enabled — See below. They also simultaneously flash when no parameter slider is in "track".

5   Predelay/Memory

This control gives rapid adjustment of predelay (Bank 1), Memory Number (Bank 2).

6   Level/Pattern Slider

Gives rapid adjustment of relections depth (Bank 1), reflections density (Bank 2).

7   H.F./L.F. Slider

Gives rapid adjustment of high frequency decay time (Bank 1), low frequency decay time (Bank 2).

8   Decay/R-Size Slider

Gives rapid adjustment of reverberation decay time (Bank 1), room size (Bank 2).

9   Remote Cable

Is terminated with a 15 way DEE connector which plugs into the 'Remote' socket on the DN780 rear panel.

For full details on Remote Control see "Using the Remote Control" in Operation Section.

Installation

Mounting

The DN780 is designed for standard 19" rack mounting and is 89mm (3.5") high and 310mm (12.25") deep, excluding connectors.

It is important to avoid obstructing ventilation around the cooling fan on the rear panel. The DN780 should not be installed above heat-producing equipment or in a non-ventilated rack.

Power Requirements

The factory set nominal operating voltage is clearly indicated on the rear panel. Power connection is made via the standard 3 pin CEE power cord provided. The chassis to mains earth connection made by this cable must not be removed. Maximum power consumption of the unit is 40VA.

For power cords using flying leads:-

The wires in this cord are coloured in accordance with the following code:-

Blue : Neutral
Brown : Live
Green/Yellow : Earth

Voltage Changeover

NOTE: Noisy supply or insufficient mains voltage will cause the DN780 to repeatedly operate the 'CAL' (self test) function.

The unit can be set to operate on 110, 120, 220 or 240, (nominal) VAC @ 50/60Hz, by changing the position of the two voltage selector switches inside the unit, adjacent to the power transformer. The range of supply voltages suitable for each switch position are as follows:

Switch position	Range
240V	210-260 @ 50Hz
220V	195-240 @ 50Hz
120V	105-130 @ 60Hz
110V	95-120 @ 60Hz

Operating Voltage
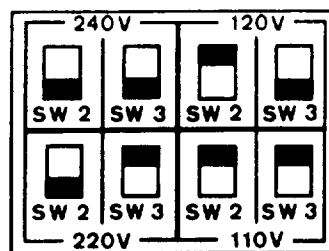
To change the operating voltage a qualified service technician must carry out the following procedure:

- Remove power cord.
- Remove the four screws retaining the top cover.
- Slacken the four screws retaining the bottom cover.
- Remove top cover.
- Set the voltage selector switches to the appropriate positions as shown over and inside the unit.
- Re-install the top cover and refit and tighten all screws.
- Affix a label on the rear panel with the new voltage details.
- Refit power cord.

Mains Fuse

Correct value is T 1A for all operating voltages. A spare 20mm fuse is provided within the fuse-holder.

Input and Output Connectors

Audio connectors are 3 pin XLR style, wired to the standard shown below. The input is electronically balanced as standard with transformer balancing available as an option. Outputs are transformer balanced.

NOTE: For unbalanced (single-ended) connections, connect pins 1 & 2 together.

	UNBALANCED	BALANCED
	1 Gnd 2 Gnd 3 Hot	1 Gnd 2 Cold 3 Hot
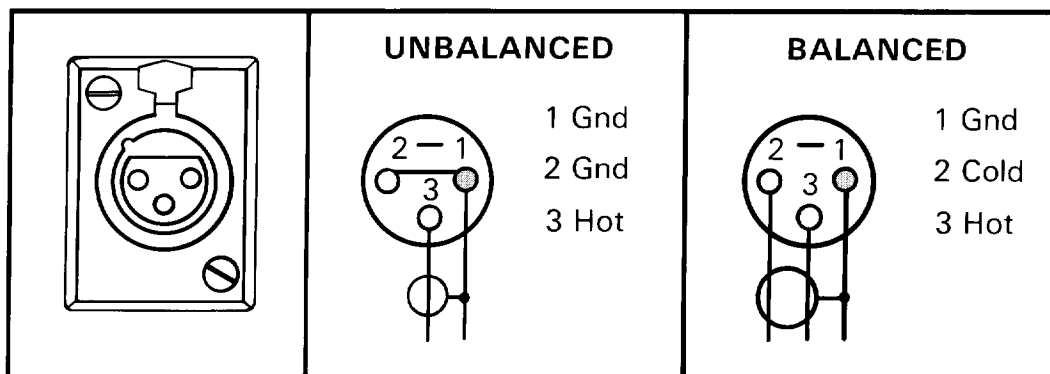
Connecting the Remote Control Unit

To connect the remote control switch off the power to the DN780 and push the DEE type plug firmly into the 'Remote' socket on the DN780 rear panel. The connection is secured by tightening the two jack screws.

System Connections and Levels

The DN780 is normally used with the input derived from the echo or aux. send output of the mixing console and the left and right outputs connected to two returns, or input channels, panned left and right respectively. Input to the DN780 must be sufficient to illuminate the −3dB LED on the headroom indicator during program peaks. Output levels are factory set to give unity gain input to output with the 'delay' program selected. If necessary these levels may be adjusted +/−10dB using the two output level preset controls on the rear panel. A small electrical screwdriver should be used, taking care not to force the control backwards. Using a 1kHz tone and with the delay program selected, adjust L & R presets to give the same output level when metered on the mixing console.

Operation

An Overview

The DN780 gives the operator enormous scope to use his creative skills to the full. To achieve this, wide-ranging control is provided for all parameters; however the basic operating procedure remains both simple and intuitive, giving immediate access to a wide range of factory-set acoustic simulations. A thorough understanding of this section will then enable the full capabilities of the DN780 to be realised.

The provision of 50 user memories, sequence function and remote control unit means that ultimately, in practice, operation can be reduced to pressing a single key ("Sequence") on the remote unit and occasionally modifying a parameter using the remote sliders.

Power On

When the power switch is pressed the self-diagnostic routine runs ("CAL"), the software series no. (e.g. 2.0) is indicated on the display and finally the unit is reset exactly as last used. Should an error code ("ERR + a number) be displayed, this indicates a fault condition; contact your Klark-Teknik dealer for assistance.

Recalling a Memory

The required memory location, factory or user set, is recalled by entering the appropriate two digit number into the memory key pad. Memory locations 1-39 are reserved for factory set variations and 40-89 are user-programmable. If the number entered corresponds to an empty memory location a broken line is displayed and the last-used memory remains in operation.

Examples: Press '0' then '5' to recall factory preset 05, which is a very large hall. 05 will be momentarily displayed and will then change to the program type. In this case H5, meaning Hall 5.
Now press '1' then '7' - factory preset 17, a small room. Again 17 will be momentarily displayed and will then change to r2, meaning room 2.
Finally press '3' then '9' - factory preset 39; empty.
For details of factory set memories and their corresponding program type, See "Software" section.

Creating New Variations

After a memory location has been selected, its sound can be modified as required for a particular application by changing one or more of the parameter controls using either the up/down keys or the parameter sliders on the remote unit.

Example: Recall factory preset 01 by pressing 0, 1. Now increase decay time to 5.0 secs by first pressing 'decay' key, then using up/down keys.

Storing New Variations

A wide variety of sounds are available using only the factory preset memories, but engineers can also create their own personal 'library' of variations which may be stored into the 50 user memory locations available on the DN780. A safety copy of each variation should be kept using the "user memory log" sheets provided. This provides insurance against accidental erasure of the user memories concerned and also enables the engineer to quickly load his 'stock' sounds into another DN780.

Alternatively, for all units fitted with Midi or RS232 computer interface, user memories can be saved on tape and then taken and reloaded into a similar DN780 located elsewhere.

To store the new variation, choose an empty user memory location (from memories 40 to 89 only) and press the store (STO) key followed by the chosen two digit memory number.

Example: To store the new variation created before into memory number 40, press 'STO' (store LED will flash) then 4, 0. Assuming memory no. 40 has not been previously stored into, the display will scroll, the variation loads into memory 40 and its parameters are shown. The memory number 40 will be momentarily displayed, but the modified program stored in memory 40 will then change to the program-type from which it was derived e.g. "PL" for a modified plate. The memory number can be found at any time by pressing 0, 0 on the keypad. If the memory location is full then the memory display will flash '40'. Pressing 4, 0 again over-rides this safety feature and loads the new variation into memory 40, of course erasing any previously stored variation. Alternatively another memory no., say 41, could be entered, thereby saving the original variation in memory 40.

To save time, the variation may be stored into the next available (numerically larger) location by pressing 'STO' then 0, 0.

If an attempt is made to store into the factory preset memory locations (01 to 39) this mistake is demonstrated by a broken line and the word 'NO'.

NOTE: Power may be removed from the DN780 without loss of user memory information.

Recall the new variation in the normal way by entering the two digit memory number directly into the keypad.

Erasing User Memory

To avoid accidental erasure, this procedure involves pressing a number of keys in an unorthodox sequence. See "Software" section for details.

Storing a Sequence

The sequence function is invaluable where rapid changes in acoustical environments are required e.g. film dubbing, theatre or recording studio mix down. More-over the sequence function can be used as a normal part of the operating procedure for the DN780, since the required acoustic variations are first created, stored into user memory and organised into the desired sequence using the DN780 front panel controls, and then recalled as required from the mixing console using the remote sequence key.

Up to 16 memory location numbers, factory or user set, may be stored in required order and recalled by pressing either of the sequence keys.

To store the required sequence, press "STOre" key then "SEQuence" key ('SE 1' is displayed) then enter the memory location of the first variation required, say 05. Now 'SE 2' is displayed enter the next memory number, say 41 and so on, until the required sequence is set. Pressing "SEQuence" key now ends (stores) the sequence and the display returns to showing the operational memory (which has been running while the sequence has been set up). If an empty memory location is inadvertently chosen when storing the sequence, this is shown by a broken line and the sequence number remains unchanged. The 'Store-sequence function is inhibited on 'Infinite Room' program (Mem. No. 35).

Recalling a Sequence

Once a sequence has been stored, it can be recalled at any time by pressing the "SEQuence" key on the remote unit or on the DN780 front panel. Pressing "SEQuence" key again recalls sequence no. 2 and so on. The number of the stored memory is shown momentarily, then the sequence number is displayed and identified as such by a vertical bar on the memory display. If a check on the original memory number of the running variation is required, pressing '0, 0' displays this for two seconds.

To return to normal operation, simply enter the required memory number into the keypad.

Modifying Parameters of a Sequence

When a sequence is recalled, parameters may be changed in the normal way in real time. Moving to the next sequence number cancels these modifications. If a permanent parameter modification is required for a given sequence number this can be achieved quickly without resetting the whole sequence, assuming a modification to the appropriate user-memory location can be tolerated.

First select the sequence number concerned. The parameter is now altered as required and the modified variation is stored back into the same number memory location, erasing the original variation stored there. This procedure does not of course apply to factory preset memory locations.

18

Parameter Application Notes

Predelay

0 to 990 milliseconds of predelay is available allowing a very wide range of control. Delays of less than 30mS closely integrate the direct and reverberant sounds; often a desirable feature on percussive sounds. Delays of 50mS or more cause the direct and reverberant sounds to separate and convey a feeling of depth and distance to the simulated environment. Delays above 200mS are used for creating special effects.

Pattern

The pattern control alters the 'density' of the early reflections. It is adjustable from 0 to 9 as shown on display f1, with 0 giving a low density or "grainy" character to the early reflections and 9 producing a high density effect.

Level

The level control functions convincingly as a "depth" control, altering the apparent distance between the sound source and the listener. It is adjustable from 0 to 9 as shown on display f2, with 0 being relatively distant and 9 bringing the sound source closer.

Decay

The reverberation decay time is adjustable from 0.1 to 18 seconds, dependent upon room size, changing the reverberant field from a virtually dead sound to a totally surreal effect. Short decay times, under 1 second, are essential for authentic small room simulation and also extremely useful for ambience applications where classic reverberation is not wanted. Reverb times of 1 to 4 seconds cover the majority of normal applications where classic reverberation is required. Longer decay times are available for special effect applications.

L.F. Key

L.F. is adjustable to +/−7, dependent on room size and decay time, as shown on display f3. An increase in L.F. decay time is generally desirable on simulations of large halls, since low frequency sounds suffer less than higher frequencies from absorption in air. Very small spaces usually need the 'thin' sound created by reducing L.F. decay.

H.F. Key

H.F. is adjustable to +/−7 as shown on display f4. The H.F. decay control sets the absorption characteristic of the simulated space. In reality, large environments feature considerable reduced high frequency decay times due to air absorption. A smaller room will feature greater H.F. decay time if the walls are tiled and the room is empty than if the room contains soft furnishings and curtains. The wide range of control provided will allow a suitable setting to be chosen to enhance realism in most applications.

Room Size

Room size is adjustable from 8 to 90 linear metres, representing a wide range of volumes. Since the acoustic character of a given environment depends not only on the reverberation time and construction of the room but to a great extent on its volume, the room size control is in fact essential if authentic simulation of a range of different size environments is required. Small room sizes give a confined, "box-like" sound. Medium room sizes suggest a room or small hall; large room sizes a large hall or cathedral. Again - there is no substitute for experimentation.

Using the Remote Control

When the DN780 is switched on, the remote function is enabled by pressing the "Remote" key and "Bank 1" parameters are operative. Pressing the "Remote" key again, switches slider control to the "Bank 2" parameters and lights the "Bank 2" LED. Pressing "Remote" again returns control to "Bank 1" parameters. "Remote On" status is confirmed by simultaneous flashing of all Track LED's if no parameter slider is in "Track".

Memory recall operates as follows:- With "Bank 2" selected move the "Memory" slider to maximum, the "Track" LED will light and moving the slider towards minimum will now display all available memory locations in reverse order on the DN780 memory display. To improve operation of this control all empty memories are ignored, so the display will read, for example, 0 to 20 then 26, 27, 28, since 21 to 25 are not used at present.

Once the required memory number is displayed, leaving the slider in position for 3 seconds will load the displayed program. To avoid accidental program changes, the memory slider will not operate again until placed back in "Track" by returning the slider to maximum.

The Special Effects Programs

Introduction

Unlike many dedicated reverberation-only devices, the DN780 is also capable of running a number of different effects programs. These cover a wide range of applications from straight delay, through a variety of echo effects to the surreal sound of the Infinite Room Program.

The combination of excellent audio performance and digital signal processing power results in a performance advantage over most existing effects and echo devices.

Recalling the Effects Programs

Effects programs are selected in the normal way by entering the appropriate two digit memory location number; see "Software" section for a quick reference to all factory-set memory location numbers and their corresponding program types.

Whenever a particular effect is first selected, parameters will always be set the same, giving a known reference point from which to create the exact effect required. Unused parameter displays are blanked in effects programs.

Modifying and Storing the Effect

All effects have a number of parameters which may be modified, as usual, using the DN780 front panel controls, or the remote sliders (where applicable). The modified effect can then be stored in the normal way into a user-memory location allowing, for example, the engineer to include a wide range of echo effects (all originally derived from the same program) in his personal library of variations. Again, it is recommended that a safety copy is kept using the 'User Memory Log' or stored onto tape if Midi/RS232 is fitted.

Sequencing an Effect

Effects programs, or variations of these stored into user-memory, may be stored and then recalled in required sequence using the normal procedure. A sequence might consist of a number of different effects or a combination of both effects and reverberation variations. When choosing an effect for a particular application, setting up a sequence of the 'possible' variations allows these to be quickly compared, in the correct monitoring situation, using the 'sequence' key on the remote control unit.

Direct Signal

Effects such as "ADT" and "Echo" rely on a suitable level of direct (dry) signal being added on the mixing console. Since this is largely a question of taste, no precise instructions are included here. It is recommended that, as a general principle, direct signal is initially set at a normal operating level without any effect present. The effect is then increased in level as required.
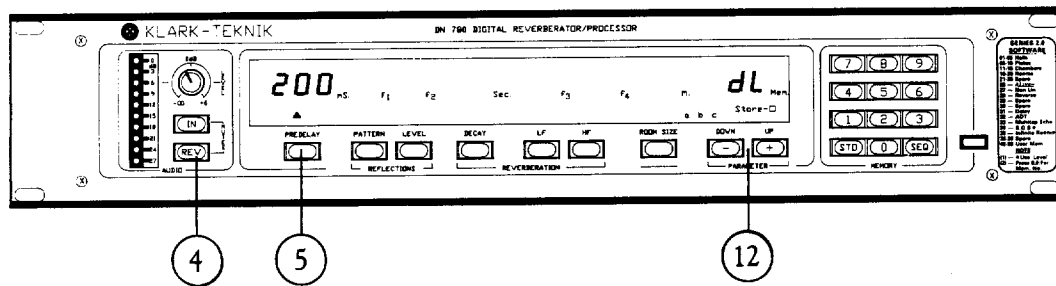
5 Predelay

When selected, this key allows the delay time to be varied using the up/down keys. For rapid adjustments the remote slider may be used. Delay is variable from 0 to 2.0 seconds.

12 Up/Down Keys

Allow parameter adjustment in the normal way.

4 Reverb Mute

Mutes effect.

Preset Parameters

On calling this program, parameters are set as follows: Delay: 200mS.

Stereo Mix

The signals at L & R outputs are both delayed by the same amount as set using "Predelay" control; that is, they are essentially monophonic.

Application Notes

● Operation is self-explanatory.
● Use this program to accurately balance echo return levels on the mixing console.
● In normal use, one output only should be used.
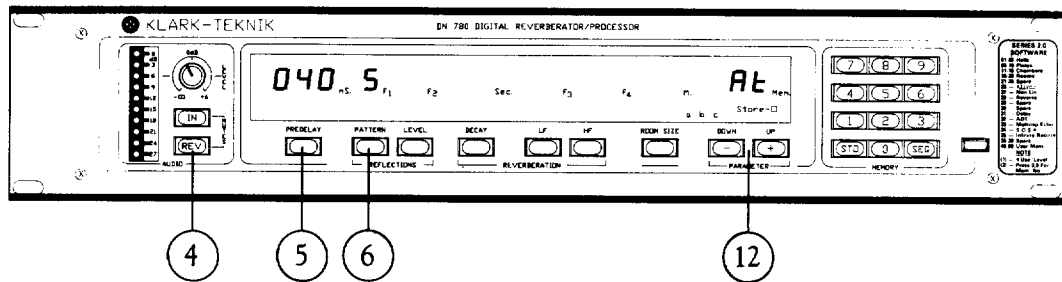
5   Predelay

When selected allows adjustment of the delay time before the second voice, is heard. Delay is adjustable from 0 to 127mS, giving excellent control resolution when using the remote slider.

6   Pattern

'Pattern' selects the number and spacing of the second voices. Pattern 1 (2 voices) to Pattern 5 (8 voices).

12 Up/Down Keys

Allow parameter adjustment in the normal way.

4   Reverb Mute

Mutes effect.

Preset Parameters

On calling this program, parameters are set as follows: Delay: 40mS, Pattern: 5 - a wide, multi-voiced effect.

Stereo Mix

L & R output signals use different delay taps to achieve a stereo effect. Using only one output halves the number of 'voices' i.e. Pattern 1 (1 voice) to Pattern 5 (4 voices).

Application Notes

● Try delays from 25 to 50mS. Short delays reduce the effect, long delays produce echo.
● Direct signal must be added at a suitable level on the mixing console. Try 50/50 direct/effect mix on pattern 1, much less direct on pattern 5.
● For conventional ADT, try 'Delay' of 40mS, Pattern 1, and use one output only, panned, say, fully right. Pan direct signal fully left and use a 50/50 direct/effect mix.
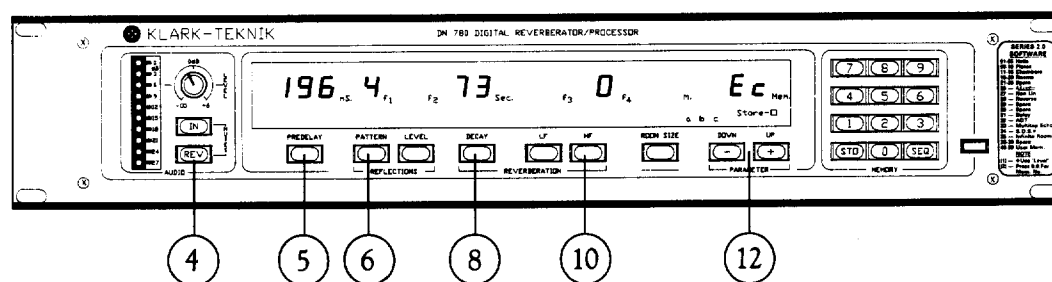
5 Predelay

Sets the time delay interval between the direct signal and the first repeat. Delay is adjustable from 0 to 990mS using the up/down keys or the remote slider.

6 Pattern

Change pattern to select the number and spacing of the repeats. Pattern 1 (2 repeats) to Pattern 9 (8 repeats).

8 Decay

Sets the feedback (regeneration) level for repeat echoes. Use the remote slider for quick adjustment.

10 H.F.

Allows the high frequency filtering to be applied to the regenerated signal. Use the remote slider for quick adjustment.

12 Up/Down Keys

Allow parameter adjustment in the normal way.

4 Reverb Mute

Mutes the effect.

Preset Parameters

On calling this program, parameters are set as follows: Delay: 196mS, Pattern: 4, Decay: 73, H.F.: 0.

This gives an effect similar to a typical multi-head tape echo but with full stereo image.

Stereo Mix

Different delay taps are used for L & R outputs to achieve a stereo effect. Using only one output halves the number of taps i.e. Pattern 1 (1 tap), Pattern 9 (4 taps).

Application Notes

- Set delay time as required, generally fairly short for multi-echoes (higher pattern nos.), and longer for repeat echo. "Fine tune" delay setting to set exact musical timing for single tap repeat echoes.
- Direct signal must be added at a suitable level on the mixing console.
- For single tap repeat echo, start with Pattern 1, with 'Delay', 'H.F.' and 'Decay' all set at maximum. Reduce parameters as required. Use one output only.
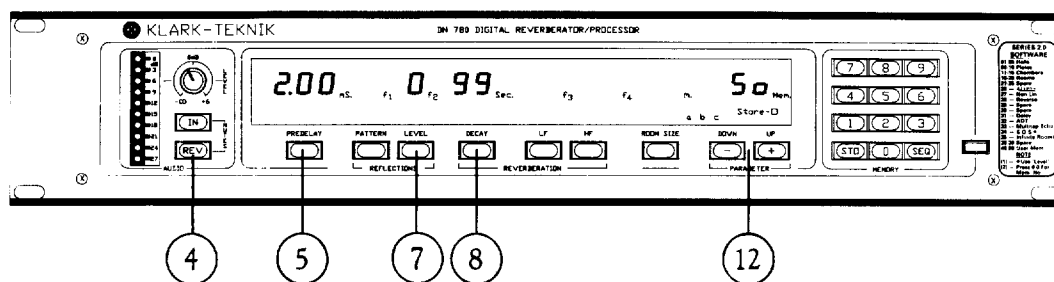
5 Predelay

Sets the "loop-length" and hence the timing of the effect between 0 and 2.0 seconds. Use the remote slider for quick adjustment.

7 Level

Pressing this, then the 'up' key, switches 'on' the signal input to the 'digital loop'. Releasing the 'up' key switches the input signal off, leaving the recorded sound continually replaying - assuming decay is set at '99'. Pressing the 'up' key again allows more input signal into the loop. Use the remote slider for more precise control as this features 10 level increments rather than the simple on/off toggle action of the front panel control. Return level to '0' after use to avoid noise build-up.

8 Decay

Sets the "erasure" of the loop from '0' (100% erasure) to '99' (zero erasure). Use slider control for quick adjustment.

12 Up/Down Keys

Adjust parameters in the normal way, except "Level": up key only.

4 Reverb Mute

Clears memory of unwanted effect.

Preset Parameters

On calling this program, parameters are set as follows: Predelay: 2.0 secs, Level: 0, Decay: 99.

This represents maximum loop length with zero erasure.

NOTE: No sound will be heard until "Level" is increased.

Stereo Mix

Outputs L & R are essentially identical. However, to avoid the possibility of slight phase cancellations, it is recommended that only one output is used on this program.

Application Notes

● Since the "level" inside the signal processor increases as fresh input is added, input level must be lower than that recommended for normal use; try − 15dB on the headroom indicator. Digital overload will be indicated by the red LED lighting on the headroom indicator.
● Correct Predelay ("loop length") should be set before creating the effect as attempts to alter this later will usually destroy part of the recorded sound.
● Remember to return level slider to '0' immediately after use to avoid noise build-up.
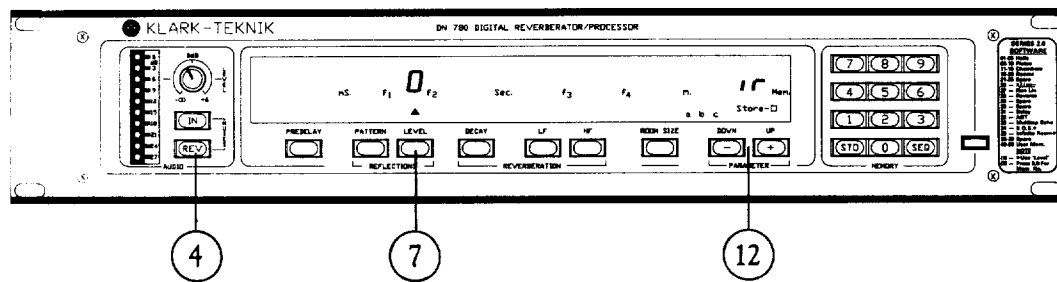
7 Level

Pressing the 'up' key with "Level" selected switches 'on' input into the "Infinite Room". Releasing the "up" key switches the input signal 'off', leaving the sound to be continually re-reflected within the simulated space. Pressing the "up" key again allows more input into the room allowing layers of sound to be built-up. Use the remote slider for more precise control as this features 10 level increments rather than the on/off action of the front panel control.

12 'Up' Key

Toggles "Level" parameter 'on' when pressed and 'off' when released.

4 Reverb Mute

Clears the memory of unwanted effect.

Preset Parameters

On calling this program, parameters are set as follows: Level: 0

NOTE: No sound will be heard until "Level" is increased.

Stereo Mix

"Infinite Room" is a spacious, full stereo effect.

Application Notes

● Since the 'level' inside the signal processor increases as fresh input is added, input level must be less than recommended for normal use; try − 15dB on the headroom indicator Digital overload will be indicated by the red LED on the headroom indicator.
● Remember to return the 'Level' slider to '0' immediately after use to avoid noise build-up.
● 'SEQUENCE-STORE' functions are inhibited with this effect selected.

** A*live-* ** — Mem. No. 26 (Al)

Non Lin — Mem. No. 27 (nL)

Reverse — Mem. No. 28 (rE)
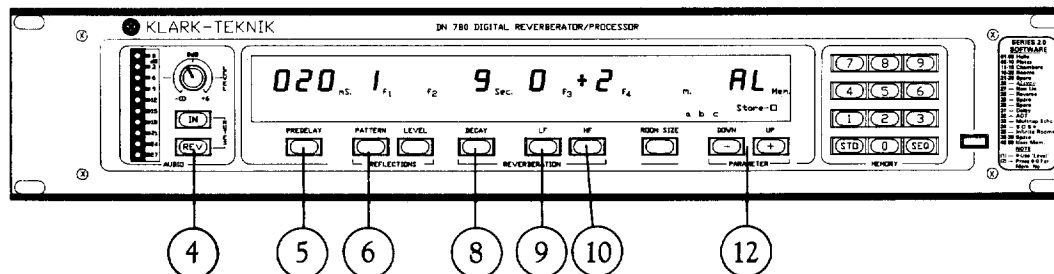
5 Predelay

Controls the delay between the direct signal and the onset of the effect. Maximum Predelay is 990mS.

6 Pattern

'Pattern' changes the density of the reflections with 0 giving a low density or "grainy" character and 9 producing a high density effect.

8 Decay

This control sets the length of the effect, from '1' (short) to '12' (long). The display simply shows these increment numbers and is not calibrated in seconds.

9 L.F.

Adjusts the low frequency content of the effect.

10 H.F.

Adjusts the high frequency content of the effect.

12 Up/Down Keys

Allows parameter adjustment in the normal way.

4 Reverb Mute

Mutes effect.

Preset Parameters

Memory No. 26 (** A*live-* **) On calling this program, parameters are set as follows: Predelay: 0 secs, Pattern: 9, Decay: 8, L.F.: +1, H.F.: +3.

Memory No. 27 (Non Lin) On calling this program, parameters are set as follows: Predelay: 0 secs, Pattern: 4, Decay: 5, L.F.: 0, H.F.: 0.

Memory No. 28 (Reverse) On calling this program, parameters are set as follows: Predelay: 0 secs, Pattern: 4, Decay: 12, L.F.: 0, H.F.: +2.

Stereo Mix

All these effects are in full stereo and are completely mono-compatible.

Application Notes

These three effects will find instant application in any recording studio engaged in contemporary music production, as they allow pronounced acoustical enhancement without the 'muddying' effect of longer, conventional decay envelopes. This makes possible a bright and 'punchy' mix. These effects work well on most instruments but try Non Lin for explosive snare sounds and Reverse on vocals.

The **✱✱ *Alive—* ✱✱** program produces a more natural, live ambience which is less coloured than the previous two effects and has wide-ranging applications.

Software

Introduction

Since its introduction in 1984, there have been several changes and improvements made to the software for the DN780. The latest software includes fundamental changes from earlier versions both in operation and in the substantial improvements which have been made in the reverberation quality of the DN780. All four basic reverberation program types have totally separate algorithms which produce a full range of reverb styles all featuring low coloration, wide stereo image and the big reverb sound now essential for main house reverb.

These basic reverberation types - halls, plates, chambers and rooms are accessed via the keypad on the front panel, and are located in the first twenty memory locations of the DN780. These permanently stored factory-set variations of control settings, enable the user to familiarise himself with the type of sounds available using the DN780.

The special effects programs are permanently stored into various memory locations between 21 and 39.

Software Updates

Software development for the DN780 has been an ongoing process and the benefit of this development has been and will continue to be made available to the DN780 owner. New software is supplied in the form of a single, high-density plug-in eprom, which is simple to change by following the fitting instructions with the device.

Software Series Number

The current software series number identifies the software fitted to your DN780 and is displayed when the DN780 is first powered-up. The two digit number e.g. '2.0', is shown for 2 seconds in the orange memory display. This software number is duplicated on the eprom inside the unit.

Current Software Information

Factory Preset Programs Software Series 2.0

Memory Number	Program	Display
01	Hall 1	H1
02	Hall 2	H2
03	Hall 3	H3
04	Hall 4	H4
05	Hall 5	H5
06	Plate 1	P1
07	Plate 2	P2
08	Plate 3	P3
09	Plate 4	P4
10	Plate 5	P5
11	Chamber 1	C1
12	Chamber 2	C2
13	Chamber 3	C3
14	Chamber 4	C4
15	Chamber 5	C5
16	Room 1	r1
17	Room 2	r2
18	Room 3	r3
19	Room 4	r4
20	Room 5	r5
26	"Alive"	AL
27	Non Lin	nL
28	Reverse	rE
31	Delay	dL
32	ADT	At
33	Multitap Echo	Ec
34	Sound on Sound	So
35	Infinite Room	ir

NOTE:
- The reverberation memory locations are organised in ascending sizes e.g. 01: small hall (H1) to 05: very large hall (H5).
- Effects programs call a nominal setting for all parameters when first selected. (See Special Effects section to modify parameters).
- Memory locations 34 and 35 produce no sound until operated as shown in the Special Effects section.

Special Functions

Erasing User Memories

To avoid accidental erasure, this procedure involves pressing a number of keys in an unorthodox sequence as follows:

- Select memory no. 01. Press '9'. Then press and hold up (+) key and press '9' key again. The display will show clear (CLr) and the STOre LED flashes.
- Enter the LOWEST memory location number to be erased first. This number is shown on the 'Decay' display.
- Now enter the HIGHEST memory location number to be erased. This number is shown on the 'room size' display.
- Check numbers are correct. Pressing STO key now erases all memory locations between these two numbers. 'DN' shows on display ('done') and the unit returns to normal operation.

  Any departure from the above procedure e.g. entering the higher memory number first, will result in the DN780 returning to normal operation.

  Examples:
- Enter 50 then 69 to erase all memories 50 to 69.
- Enter 40 then 89 to erase all user memories.
- Enter 41 then 41 to erase memory 41 only.

Protecting User Memories

This function allows the protection of any chosen user-memory locations against accidental erasure or alteration. When recalled a protected memory is identified as such by an illuminated decimal point after the memory display. Once protected the memory behaves as a factory set location until the protection for that memory is cancelled. The procedure is as follows:

- Select memory No. 01. Press '9' then press and hold UP(+) key and press '7'. The display will show (PRO)tect and the store LED will flash.
- Enter the LOWEST memory location No. to be protected first, this is shown on the 'Decay' display.
- Now enter the HIGHEST memory location No. required, this number is shown in the 'Room size' display.
  NOTE: To protect one memory only, enter the same number twice.
- Pressing 'STO' key now protects all full memory locations between these two numbers (NOTE: not empty locations). 'DN' shows on the display ('done') and the unit returns to normal operation.

Any departure from the above procedure e.g. entering the higher memory location number first, will result in the DN780 returning to normal operation.

Cancelling User Memory Protection

- Select memory No. 01. Press '9' then press and hold UP(+) key and press '6'. The display will show 'UPr' (un-protect) and the store LED will flash.
- Enter the LOWEST memory location number required first.
- Now enter the HIGHEST memory location number required.
  NOTE: To cancel protection on one memory only, enter the same number twice.
- Pressing 'STO' cancels memory protection on all memories between these two numbers. 'DN' shows on the display ('done') and the unit returns to normal operation.

Any departure from the above procedure e.g. entering the higher memory location number first, will result in the DN780 returning to normal operation.

a,b,c, Display LED's

The current usage of these function LED's is as follows: LED 'a': indicates remote "ON" status. 'b': indicates Midi/RS232 "ON" status (where fitted). 'c': not used.

Diagnostic Routines

In addition to the self-diagnostic routine that functions automatically after power-on, there are a number of special routines to aid fault finding. As these are required for service purposes only, they are not listed here. Any error code displayed during the power-on routine ('Err plus a number) should be reported to the nearest Klark-Teknik approved service centre.

Triggering 'Sequence' Function

Sequence function may be externally triggered using a single pole momentary foot switch or relay contact, connected between pins 5 and 6 on the remote connector. If the connection is added to the existing remote unit connector, both the foot switch and remote sequence key will operate when required. If a new connector is required the part is a standard 15 way DEE-type plug.

Diagnostic Utilities

The diagnostics are primarily used as an aid in servicing the unit. Consult the service manual for a full description of their applications.

Using the Diagnostics

- Press ([9]), ([+][0]).
- The display will show (doS.   ) and the 'store' LED will flash.
- Enter 2 digit keys to select option.
- Pressing 0, 0 will exit and restart the unit.

CAUTION: Beware of option 09. This will erase all user memories including protected ones!! When this utility has been selected and the diagnostics are exit-ed the unit will display (bAt Lo   ) to show that the back-up memory has been corrupted.

Options

00 — Exit diagnostics and restart unit, memory 01 will load.
01 — Display segments test. Press [−] for segment decay.
02 — Button test. Pressing any button including remote, but excluding (IN) will cause the unit to display the key name plus a hex code. Press ([−][+]) to exit.
03 — Remote slider test. Moving any slider will cause the unit to display its relative HEX position and cause the associated 'track' LED and the 'remote' LED to flash. The HEX position display should range from 00 to FF. To exit press any button.
04 — Remote slider noise test. With the remote sliders static the display will show the peak-noise. The number range is 0-9. Values less than 4 are satisfactory, values above 4 could cause a disturbance in the parameter settings if the 'REMOTE' is armed. To exit press any button.
05 — Complete check of DSP memory IC's 53, 54. Errors reported.
06 — Complete check of DSP memory IC's 47, 48. Errors reported.
07 — DSPCOF memory status. To exit press ([+][−]).
08 — Processor status display. Enter next option to continue.
09 — Complete check of CMOS back-up memory (MICRO IC 21), takes a few seconds, status displayed. Errors reported.
        ******** WARNING ALL USER MEMORIES ERASED ********

10, 14 Not used.
15 — Continuous R/W to DSP memory IC's 53, 54. To exit press any button.
16 — Continuous R/W to DSP memory IC's 47, 48. To exit press any button.

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Service

General Points

Under normal operating conditions the DN780 requires no periodic maintenance other than the removal of dust from the front panel using a soft cloth. Due to the complex nature of the circuitry used in the DN780, it is essential that all servicing is carried out by an authorised **KLARK-TEKNIK** service centre. Generally repairs are accomplished using a board-exchange system, to minimise repair time.

NOTE:
- Attempted repairs by a non-authorised service centre will invalidate the warranty.
- Diagnostic error codes (Err + a number) on switch-on should be reported to the nearest **KLARK-TEKNIK** service centre.

Returning a Unit for Service

Before returning a unit for repair first contact the factory or service centre to ensure that the problem necessitates this action. Units returned for service should include full description of the problem, the senders' full details, including telephone number & the preferred method of re-shipment.

Returned equipment must be shipped pre-paid, fully insured & packed in the original packaging. **KLARK-TEKNIK** assumes no responsibility for shipment of the product from the customer to the factory or service centre.

Specifications

Audio

Input	One, electronically balanced. Impedance balanced: 20k ohms, unbalanced: 10k ohms.
Outputs	Two, fully floating transformer balanced. Min load impedance 600 ohms. Source impedance less than 50 ohms. Max. level +21dBm.
Frequency Response	+1, −2dB (20Hz - 12kHz).
Distortion	0.03% @ 1kHz
Dynamic Range	85dB typical

Digital

A/D & D/A Convertors	16 bit linear
Arithmetic Processor	32 bit
Memories	1-39: factory set locations 40-89: non-volatile "read/write" user programmable locations.
Reverberation	Hall, Plate, Chamber, Room, with 5 variations of each.
Effects	** *Alive—* **, Non Lin, Reverse, Delay, ADT, Multitap Echo, Sound On Sound, Infinite Room.

Parameters

Predelay	0-990msec
Pattern (Density)	Adjustable 0-9 increments, Grainy - Dense
Level (Depth)	Adjustable 0-9 increments, Distant - Close
Decay Time	0.1-18 sec
Room Size	8-90 metres linear dimension
L.F. Decay	Adjustable +/−7 increments ref. 1kHz decay time.
H.F.	Adjustable +/−7 increments ref. 1kHz decay time.

Since the above reverberation parameters are optimised to ensure authentic acoustical simulation, they are necessarily program dependent.

Controls

Sequence	Sequential recall of up to 16 stored memories in user determined order.
Input Mute	Removes audio feed from reverberation section.
Reverb Mute	Clears unwanted reverberant signal.
Input Level Control	From 6dB gain to infinite attenuation.
Headroom Indicator	10 point LED display, 0dB to −27dB.
Up/Down Keys	Allows easy setting of any selected parameter.
Display	Simultaneous display of all parameter information, plus active memory location. Parameter selection and store functions are verified by individual LED's.
Remote Control Unit	Slider control of all parameters. Switch operated selection is incorporated to enable remote function and sequence step.

Power Requirements

Voltage	110/120/220/240V 50/60Hz
Consumption	40VA

Weight

Nett	7.5kg
Shipping	10kg

Dimensions

Width	482mm (19 inch)
Depth	310mm (12.25 inch)
Height	89mm (3.5 inch)

Terminations

Input	3 pin XLR
Outputs	3 pin XLR
Power	3 pin IEC

Options

Transformer balanced input.

As part of a policy of continual improvement Klark-Teknik reserve the right to alter specifications without notice.

DN780 Midi Serial Board (Where Fitted).

Using Midi

1. The MIDI serial board allows any memory store in the DN780 to be recalled automatically by the MIDI voice select command. This means that any programmed voice on a synthesizer can have it's own reverberation or effect program.

2. **Setting the MIDI Channel**

   The DN780 can be programmed to receive MIDI information on channels 1 to 16 or OMNI in which case it will monitor all channels.

   To change the MIDI channel:
   Press (95)
   Display shows 'nidic xx'
   xx = MIDI channel (00 = OMNI)

   To modify MIDI channel press 'DECAY' and use [−], [+]. Press any key to store current setting and return to normal mode. The settings are permanently stored. The **MIDI** function can effectively turn off by selecting an unused MIDI channel.

3. **Setting MIDI Voices to DN780 Memories**

   When a MIDI voice is sent on the programmed channel to the DN780, the unit searches a list of the possible 128 voices for a possible stored memory, if this memory exists, the memory will be automatically loaded.

   To store a DN780 memory to MIDI voice.
   Press (96)
   Display shows 'nidi   xxx yy'
   xxx = Voice number (1 to 28)
   yy = DN780 memory stored to that voice.

   To change the voice number use [+], [−]

   To modify the memory of the displayed voice press (STO) and the new memory number, the voice number will auto-increment. Unused memories are not allowed. Storing 00 will cause the DN780 to ignore that particular voice.

   Press any key to return to normal mode. The settings are permanently stored.

Using the Tape Interface

NOTE: The remote must not be active when using the following functions.

1. To **SAVE** the current user memories
   Press (97)
   Display shows 'tPE S xx' and store led flashes
   (xx = number of active user memories).
   Set appropriate levels on the tape recorder.
   Start recording, after a short while making sure any leader has gone passed, press (STO).
   The memory being saved will be displayed in the 'Mem' window and the number of active memories will count down as they are saved.
   The unit will automatically revert to the normal display upon completion.
   NOTE: If there are no active memories the unit will not attempt to save any.

2. To **VERIFY** the user memories saved on tape
   Press (98)
   Display shows 'tPE U xx'
   (xx = number of active user memories).
   Rewind tape to start and begin replay.
   When the beginning of the tape is found 00 will appear in the 'Room size' window and as the memories are found the memory number will appear in the 'Mem' window and the number of active user memories will count down, any programs which do not verify will be counted in the 'Room size' window. Upon completion if there are no errors the unit will revert to normal operation, any errors will cause the display to hold, press any key to revert to normal operation (except (−) or (+)).

3. To **LOAD** the user memories saved on tape
   Press (99)
   Display shows 'tPE L'.
   Rewind tape to start and begin replay.
   When the beginning of the tape is found 00 will appear in the 'Decay' window and in the 'Room size' window. As the memories are found the memory number will appear in the 'Mem' window and the number of memories found will be displayed in the 'Decay' window, any programs which do not load correctly will be counted in the 'Room size' window. Upon completion if there are no errors the unit will revert to normal operation, any errors will cause the display to hold, press any key to revert to normal operation (except (−) or (+)).
   NOTE: Any attempt to load memories into protected memories will be ignored and 'Pr' will be displayed in the 'Mem' window.

Warranty

This product is manufactured by Klark-Teknik and is warranted to be free from defects in components and factory workmanship under normal use and service for a period of one year from the date of purchase.

During the warranty period Klark-Teknik will undertake to repair or at its option, replace this product at no charge to its owner when failing to perform as specified, provided the unit is returned shipping pre-paid, to the factory or authorised service facility.*

No other warranty is expressed or implied.**

This warranty shall not be applicable and be void when this product is subjected to:-

a) Repair work or alteration by persons other than those authorised by Klark-Teknik in such a manner as to injure, in the sole judgement of Klark-Teknik, the performance, stability, reliability or safety of this product.

b) Misuse, negligence, accident, act of God, war or civil insurrection.

c) Connection, installation, adjustment or use otherwise than in accordance with the instructions provided by Klark-Teknik.

* See enclosed service request form.
** "MELT" filter circuits used in the Series 300 Graphic Equalisers are warranted for 5 years.

Klark-Teknik reserves the right to alter specifications without notice. This warranty does not affect the statutory rights of the UK customer.

Service Request Form

Please complete this form and send it to Klark-Teknik before returning the unit. Attach duplicate to the returned unit.

NAME . . . .   TELEPHONE . . . .

ADDRESS   . . . .

. . . .

. . . .

. . . .

MODEL No. . . . .   SERIAL No. . . . .

PURCHASED FROM . . . .   DATE . . . .

Please tick appropriate box

REPLACEMENT PACKING REQUIRED   ☐ YES   ☐ NO

1)   Describe symptoms of malfunction.

2)   Which channel(s) exhibit(s) the problem?

3)   Under what conditions does the problem occur?

        a)   All the time   ☐
        b)   After a while   ☐
        c)   At high signal levels   ☐
        d)   At high temperatures   ☐
        e)   Other (please explain)   ☐

        Is the fault: Permanent ☐   Intermittent ☐

4)   What did you do to isolate the problem to this unit?

5)   Further comments.

Important Note:

It is often useful to call your dealer or the factory explaining the nature of the problem with the unit. In many instances the problem can be solved without returning the unit to the factory. If the unit has to be returned to the factory, use original packing only. If you do not have one, we will provide a replacement.

Factory authorised service facilities are located throughout the world. Call your dealer or the factory for the location of the service facility nearest you.

Klark Teknik Plc.
Klark Industrial Park
Walter Nash Road
Kidderminster
Worcs. DY11 7HJ
England.

Tel: (0562) 741515
Fax: (0562) 745371

User Memory Log

Software Series (   )

Mem No.	Title		Predelay	Pattern	Level	Decay	L.F.	H.F.	Room Size	Derived From

KLARK TEKNIK
FREQUENCY RANGE CHART

KLARK TEKNIK

Notes
Octaves
Hz

NORMAL 0dB
BYPASS GAIN
POWER

J15 400 500 630 800 1K 1K25 1K6 2K 2K5 3K15 4K 5K 6K3 8K 10K 12K5 16K HZ
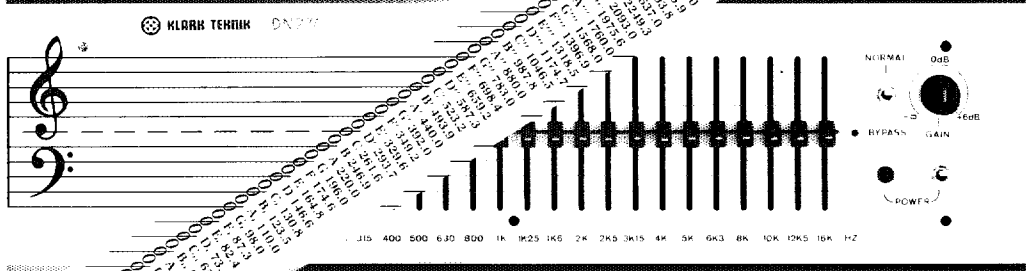
NOTES RELATED TO FREQUENCIES
This chart shows (above) the musical notes and octaves related to their actual frequencies. The details are cross referenced (below) to the frequency range of our Graphic Equalisers and the range capabilities of common musical instruments.

OCTAVES
NOTES

1K 3K 12K
25 1K6 2K 2K5 15 4K 5K 6K3 8K 10K 5 16K20K FREQUENCY

DN22 RANGE
DN27A RANGE
DN30/30 RANGE
Human hearing range

VOCAL
Soprano
Contralto
Baritone
Bass

WOODWIND
Piccolo
Flute
Oboe
Clarinet in B flat or A
Clarinet in E flat
Bass Clarinet
Basset Horn
Cor Anglais
Bassoon
Double Bassoon

BRASS
Soprano Saxophone
Alto Saxophone
Tenor Saxophone
Baritone Saxophone
Bass Saxophone
Trumpet in C
Trumpet in F
Alto Trombone
Tenor Trombone
Bass Trombone
Tuba
Valve Horn

STRINGS
Violin
Viola
Cello
Double Bass
Guitar

KEYBOARDS
Pianoforte
Organ

PERCUSSION
Celeste
Timpani
Glockenspiel
Xylophone

1K 1K6 2K 2K5 3K 4K 5K 6K3 8K 10K 12K 16K20K
25 15 5

Frequency Range Chart