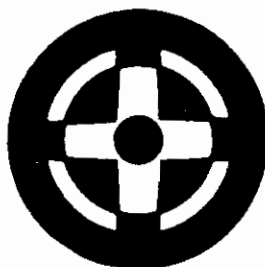


# **DN780**

## **Digital Reverberator/ Processor**

### **OPERATORS MANUAL**



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## **IMPORTANT**

The DN780 offers you, the user, unprecedented control over acoustic environment simulation and achieves this by a unique operating system. It is essential that this manual is read thoroughly to take advantage of this unit's capabilities. This manual should be retained for future reference.

**Your warranty card must be completed and mailed immediately to KLARK-TEKNIK Plc. This will enable us to include you on our 'Program up-date service' mailing list, so that we can forward relevant information to you at any time regarding newly developed or up-dated programs for your DN780.**

## **PRECAUTIONS**

- \* Before connecting this unit to the mains power, ensure that the operating voltage is correct for your local supply. See installation section for voltage change-over.
- \* To ensure efficient operation of the cooling fan do not install the unit in an unventilated rack or enclosure.
- \* Do not install in a location subjected to excessive heat, dust or mechanical vibration.

## **WARNING**

- \* 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.
- \* This equipment must be earthed.

## **INSPECTION**

When unpacking the DN780 check for damage to the device. Report any damage to the carrier at once. The DN780 is despatched in purpose designed packaging to ensure maximum protection. This should be retained for possible future re-shipment.

## 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 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', both natural and unnatural, selected by the innovative reflection 'Pattern' control.

The remaining controls give accurate adjustment of all reverberation parameters, including 'Room size', and when used with the 'Pattern' control these allow the engineer to create unique acoustic environments of virtually any type.

A number of factory-set acoustic simulations are available: see 'Software' section. It is important to note that all these very different sounds were created using only the controls you have available: for example there is no dedicated 'Room' program as such. A room sound is created using the appropriate pattern ('2'), and adjusting other parameters as required. The factory-set memory locations should be used, then, as a reference point from which to create your own variations:- forget the limitations of a dedicated system and 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.

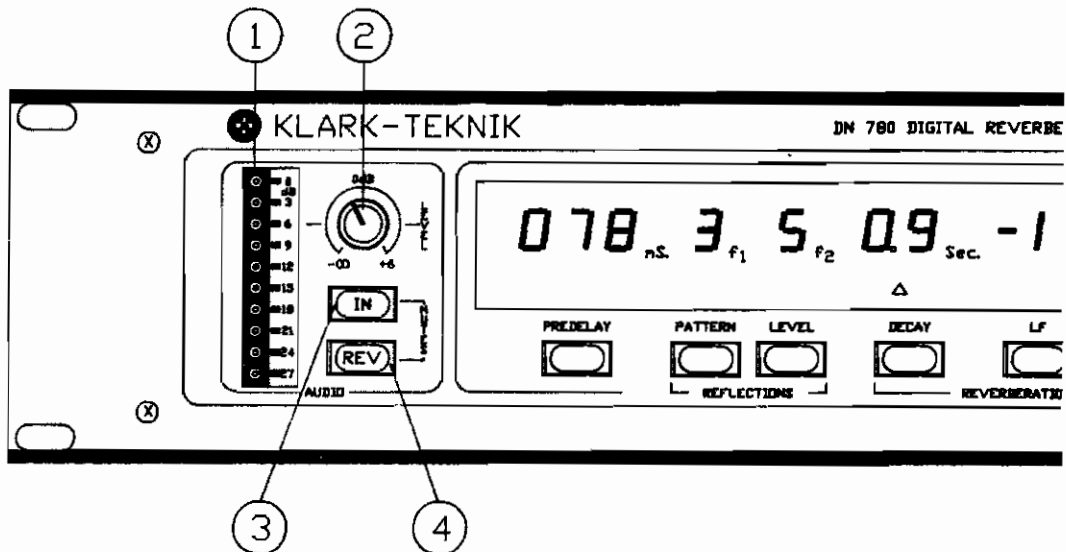
The DN780 performs to the highest specification and is engineered using the latest technology to keep component count down and reliability up. Electronics use a semi-modular system of construction distributed logically on six printed circuit boards, eliminating unreliable edge connectors whilst avoiding 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 '0dB' LED lighting at 3dB before clipping point. This '0dB' LED also gives 'over-range warning' for the arithmetical processor.

### (2) INPUT LEVEL

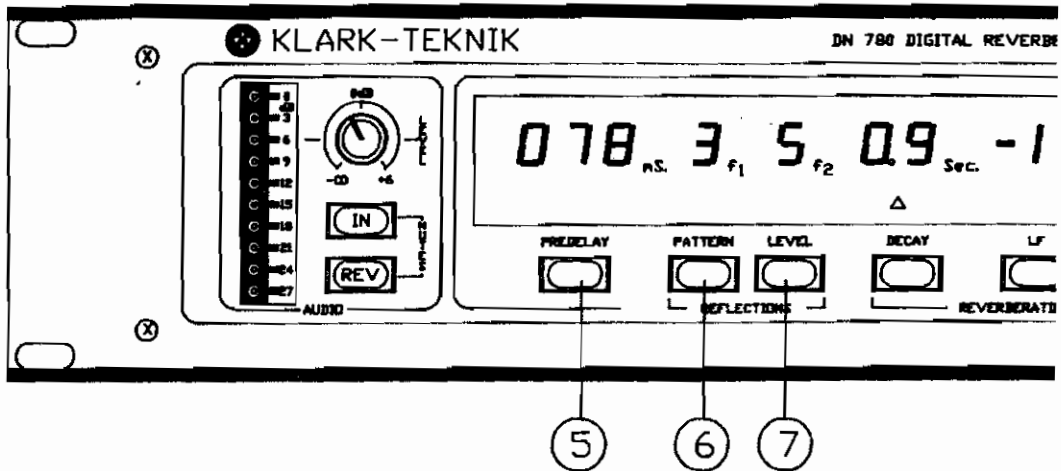
This should be set to illuminate the -3dB LED on the headroom indicator during loud program passages. Adjustment of +6dB to -infinity is provided.

### (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 'Pattern' numbers 'Pre-delay' is inserted between early reflections and reverberation, to improve authenticity. (See 'Software' section for details).

Low level phase-dependent "clicks" are produced when pre-delay is altered in program.

#### REFLECTIONS

Two parameters, 'Pattern' and 'Level', together determine the basic acoustic character of the simulated space.

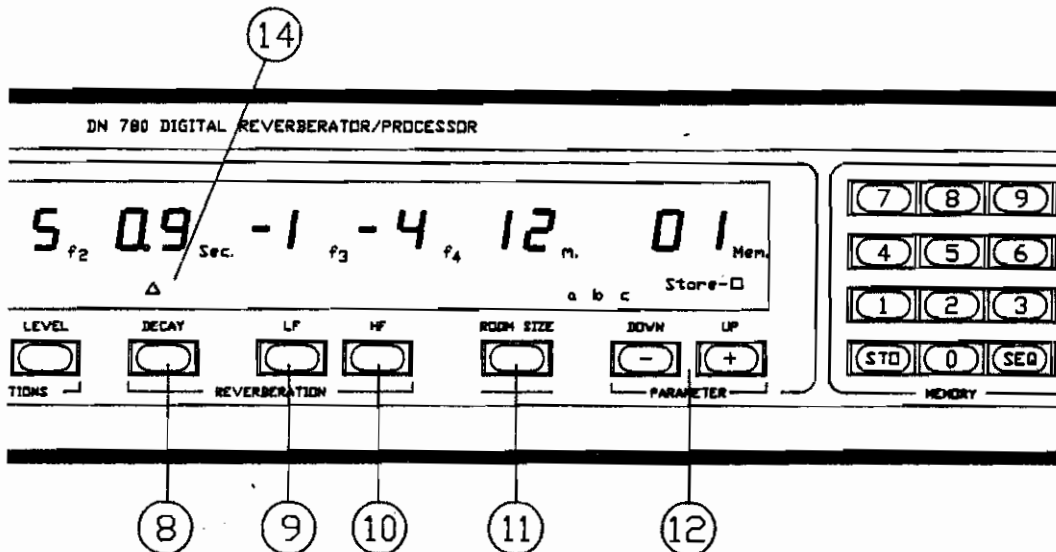
#### (6) PATTERN

This innovative control sets the acoustic 'signature' of the environment by changing the number, spacing and density of the first reflections. A momentary mute is implemented when this control is adjusted. (See software section for pattern descriptions).

#### (7) LEVEL

Determines the balance of the early reflected energy relative to that of the reverberant sound.





**(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.

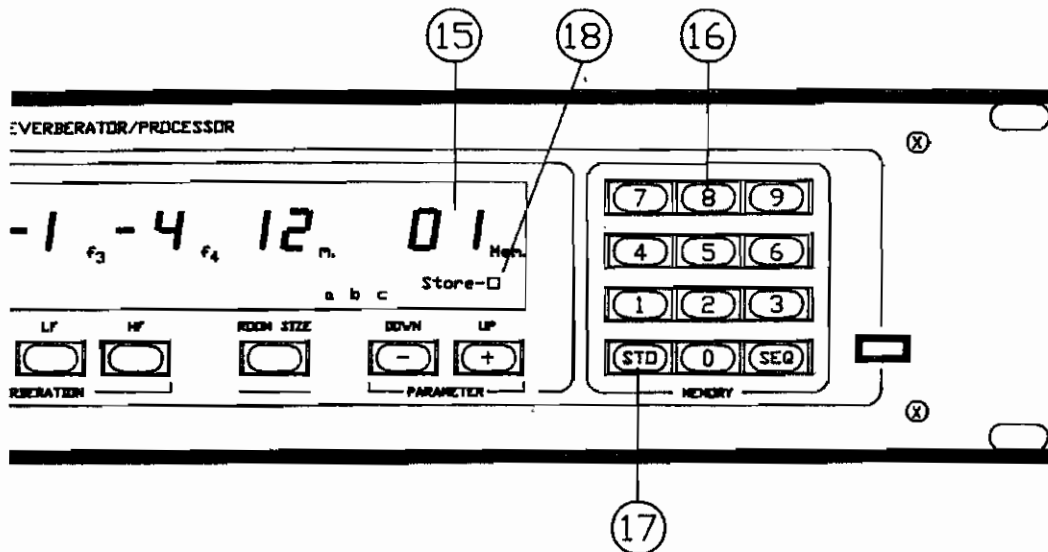
**(12) PARAMETER UP/DOWN KEYS**

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.



**(15) MEMORY DISPLAY**

Shows the number of the memory location currently selected. The orange display clearly distinguishes 'memory' from parameter displays.

**(16) NUMERIC KEYPAD**

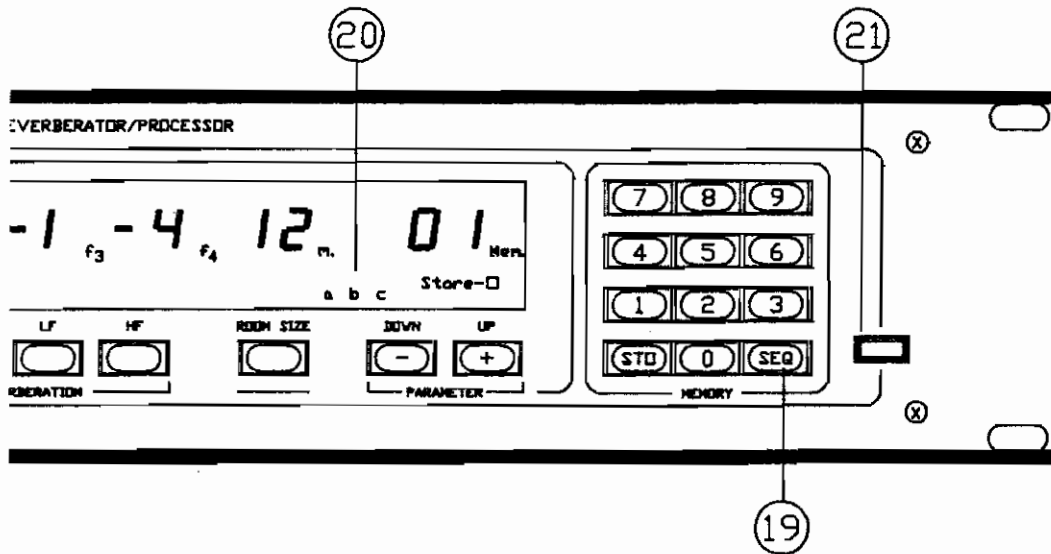
The required memory location is selected by simply entering the appropriate two digit number. A momentary mute is implemented during change-over. The keypad is also used in conjunction with the STORE and SEQUENCE keys (See 'operation' section for detailed information.)

**(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).

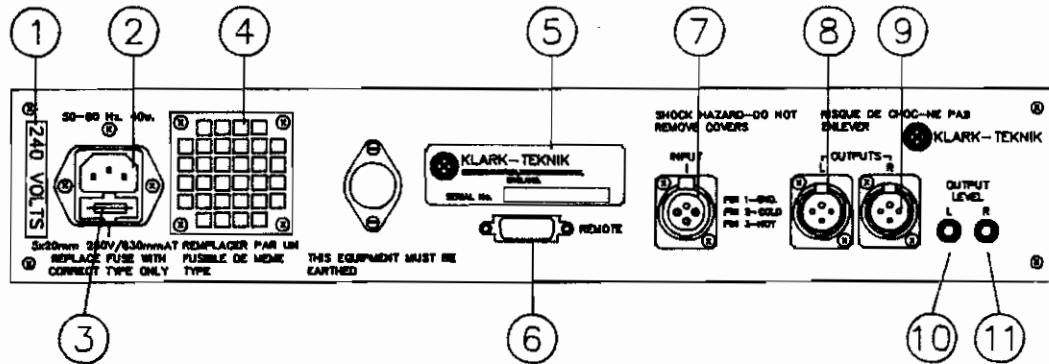
**(20) a,b,c LEDS**

These LEDS are provided to show the status of future 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.

## REAR PANEL



### (1) OPERATING VOLTAGE.

This is clearly marked on an adhesive label. See installation section for voltage changeover 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.

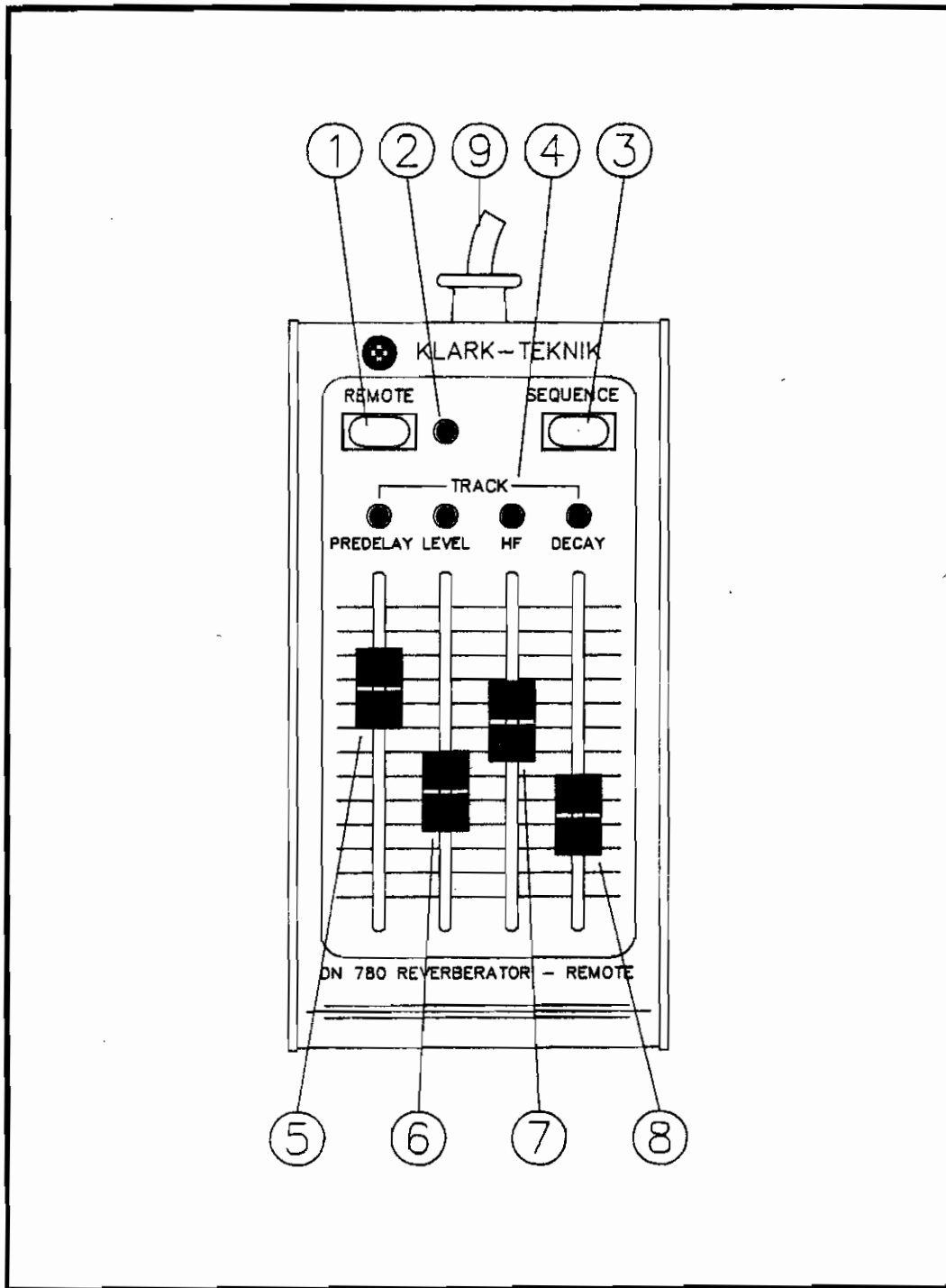
### (7),(8),(9) AUDIO CONNECTORS

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

### (10),(11) OUTPUT LEVEL CONTROLS.

These are factory set. See installation section before adjusting.

# REMOTE CONTROL UNIT



**(1) REMOTE KEY**

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

**(2) REMOTE LED**

Confirms remote 'on' status.

**(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.

**PARAMETER SLIDERS**

To enable any parameter slider (with remote 'on') move the slider until the 'Track' LED lights. The slider value now coincides with the current setting for the parameter and adjustment can be made.

**(5) PREDELAY SLIDER**

This control gives rapid adjustment of predelay.

**(6) REFLECTION LEVEL SLIDER**

Gives rapid adjustment of reflections level.

**(7) H.F. SLIDER**

Gives rapid adjustment of high frequency decay time.

**(8) DECAY SLIDER**

Gives rapid adjustment of reverberation decay time.

**(9) REMOTE CABLE**

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

# 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

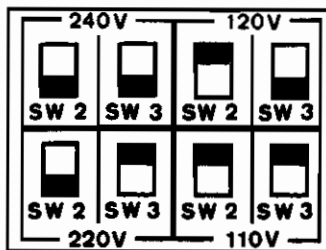
## VOLTAGE CHANGEOVER

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 above 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

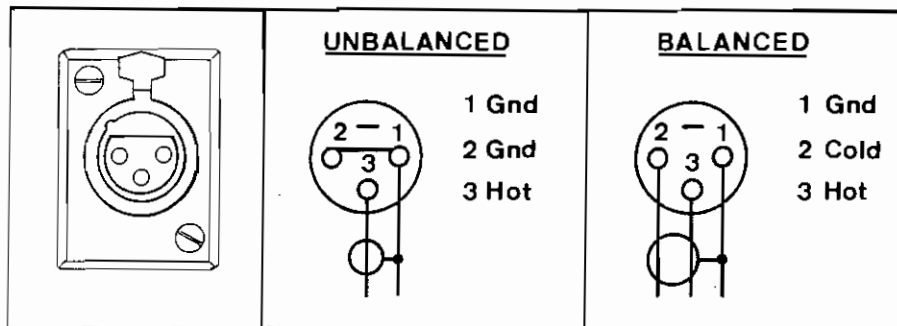
Correct value is T 1A for all operating voltages. A spare 20mm fuse is provided within the fuse-holder.



## 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.



## 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 is 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. 1.4) 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. For details of factory set memories, see "Software" section. 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. Now press '1' then '7' - factory preset 17, a small room. Finally press '3' then '9' - factory preset 39; empty.

## **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**

Although a wide variety of sounds are available using only the factory preset memories, most engineers will prefer to 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 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 above 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 the new memory number (40) and its parameters are shown. 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. Moreover the sequence function is 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.

## 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

An understanding of this control is fundamental to the operation of the DN780. Changing from one pattern to the next can change totally the whole character of the simulated environment; from a low density "Hall" type of sound, to a percussive, dense "Plate"-like sound, for example. It is primarily this control that enables wide-ranging acoustic environments to be created without the need for a dedicated program system, with its inherent limitations. Generally, the different patterns are easily discernable on large room sizes, with percussive material (and reflections level set high). Pattern changes have a more subtle effect on smoother material or smaller room sizes; experimentation is to be recommended. A description of the different pattern types will be found in the "Software" section.

### LEVEL

Level is adjustable from 0 to 9 as shown on display f2. Once the early reflection pattern has been set, the level of these early reflections relative to that of the reverberant sound is adjusted as required, with high levels e.g. '9', giving emphasised discrete echoes from the boundaries of the simulated space. Low levels e.g. '0', particularly when used with longer reverb times, give a greater sense of depth with the sound source seemingly positioned at a distance.

## **DECAY**

The reverberation decay time is adjustable from 0.1 to 99 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, dependant on room size & 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 considerably 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 5 to 99 linear metres, representing a range of volumes from 125 to effectively 1,000,000 cubic metres. 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.



# 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.

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'. The 'Store' function is inhibited in Infinite Room program.

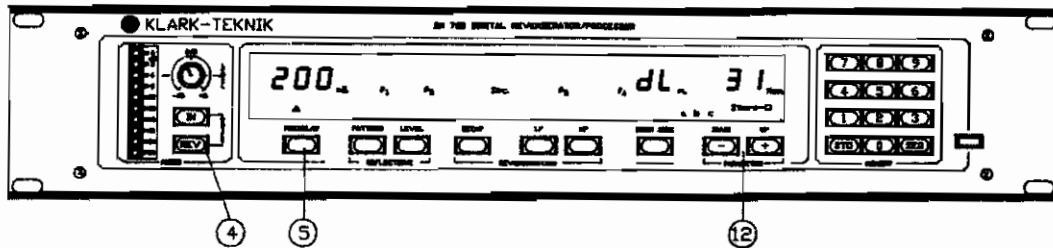
### **SEQUENCING AN EFFECT**

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.

## DELAY - MEM.NO. 31



### (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

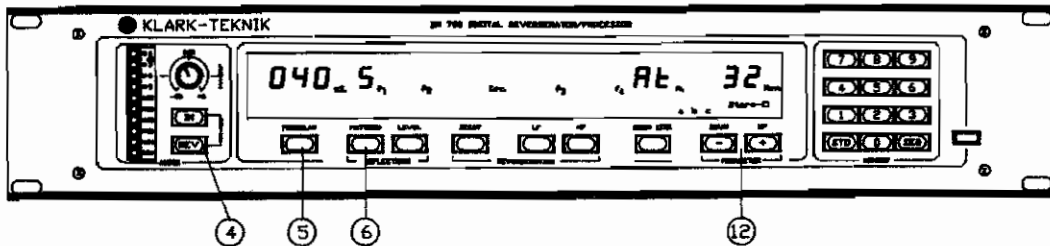
On calling this program, parameters are set as follows:  
Delay: 200 mS

### STEREO MIX

The signals at L & R outputs are both delayed by the same amount as set using "Pre-delay" 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.

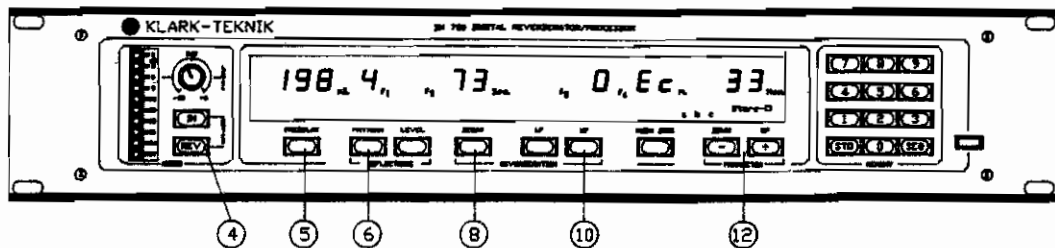
**STEREO MIX**

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.

## MULTI-TAP ECHO - MEM.NO. 33



### (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 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.

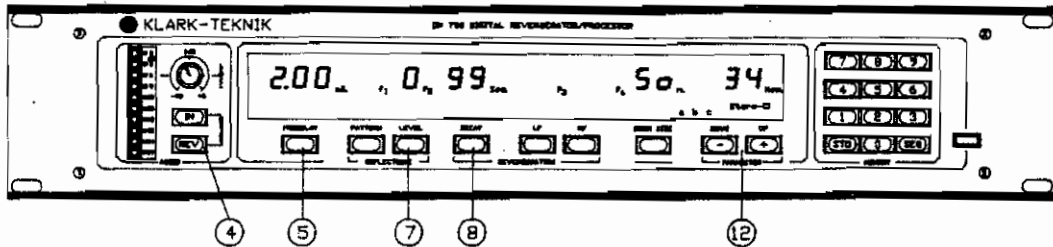
**STEREO MIX**

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.

## SOUND ON SOUND - MEM.NO. 34



### (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**

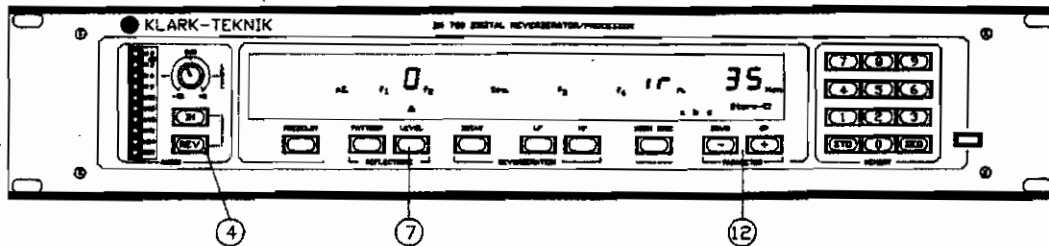
Outputs L & R are essentially identical. However, to avoid the possibility of slight phase cancellations, it is recommended that only one output is used on this program.

### **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.



## INFINITE ROOM - MEM.NO. 35



### (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

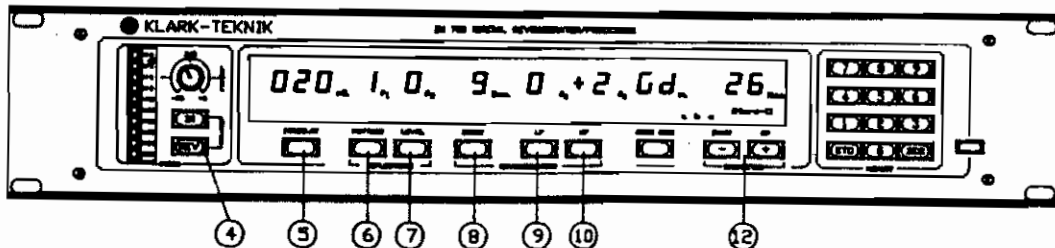
### STEREO MIX

"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.
- \* 'STORE' & 'SEQUENCE-STORE' functions are inhibited with this effect selected.

**\*\* Alive \*\*** -MEM.No.26  
**GATED DECAY** -MEM.No.27  
**REVERSE DECAY**-MEM.No.28



**(5) PREDELAY**

Controls the delay between the direct signal and the onset of the effect. Maximum Predelay is 410mS.

**(6) PATTERN**

'Pattern' changes the basic decay envelope as follows: Pattern 1=Linear, (medium), decay; Pattern 2=Gated, (fast) decay; Pattern 3=Reverse decay.

**(7) LEVEL**

Sets the reflection density of the effect, from a dense, 'clean' sound at level '1', to a 'grainy' low density effect at level '9'. The effect of this control is more easily observed with longer decay times selected.

**(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 Nos. 26,27,28 all share this same basic algorithm. On calling these programs the basic decay envelope is determined by the pattern number, with the remaining parameters set to produce a suitable effect.

#### **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 Gated Decay for explosive snare sounds and Reverse Decay 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

The extra processing power of the DN780's advanced Digital Signal Processor enables a new approach to software programming. As previously discussed, the DN780 uses an entirely new operating concept, based not on dedicated Reverberation Plate/Hall etc. programs but on a flexible system, combining wide-ranging parameter control with a choice of basic types of acoustic spaces selected using the "Pattern" key. This system allows an extremely wide range of acoustic environments to be simulated, both natural and unnatural.

The first twenty memory locations are permanently stored with factory-set variations of control settings to enable the user to familiarise himself with the type of sounds available using the DN780.

The special effects programs are permanently stored into memory locations 30 upwards.

## SOFTWARE UPDATES

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

Software updates may embody a wide range of changes, from modifications to existing Pattern types or the factory-set variations, to the addition of a new Effect program or control function.

## 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. '1.4', is shown for 2 seconds in the orange memory display. This software number is duplicated on the eeprom inside the unit.

# CURRENT SOFTWARE INFORMATION

SOFTWARE SERIES 1.4

## FACTORY SET MEMORY LOCATIONS

MEM	MEM	MEM	MEM
01-HALL 1	11-CHAMBER 1	21	31-DELAY
02-HALL 2	12-CHAMBER 2	22	32-A.D.T
03-HALL 3	13-CHAMBER 3	23	33-MULTITAP ECHO
04-HALL 4	14-CHAMBER 4	24	34-SOUND ON SOUND
05-HALL 5	15-CHAMBER 5	25	35-INFINITE ROOM
06-PLATE 1	16-ROOM 1	26	36
07-PLATE 2	17-ROOM 2	27	37
08-PLATE 3	18-ROOM 3	28	38
09-PLATE 4	19-ROOM 4	29	39
10-PLATE 5	20-ROOM 5	30	

### NOTE:

- \* The reverberation memory locations are organised in ascending sizes e.g. 01: small hall, to 05: very large hall.
- \* 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.

### PATTERN DESCRIPTIONS

The pattern control alters the density and pattern of the first 100-plus initial reflections and also the time taken to achieve high density reverberation. Generally, as the pattern number increases less dense, more coloured reflections are produced.

All patterns have a mathematically derived "wide" stereo output image which is totally mono compatible. Changing the width of the image can be achieved by altering the "Pan" controls on the return paths.

**PATTERN (1)**

Percussive, high density initial reflections building quickly into extremely dense reverberation with smooth, even decay. This gives a bright, clean attacking sound, ideal for percussion and most contemporary music and may also be used to simulate reverberation plates when medium to small room sizes are used. The Predelay control operates conventionally.

**PATTERN (2)**

High density initial reflections simulate the natural, 'live' sound of real rooms with their inherent colourations. Reverberation build-up is extremely fast but may be lengthened by adding predelay, as this is inserted between early reflections and reverberation on this pattern. Decay is smooth and even. This pattern is ideal for the simulation of small rooms or enclosures, when used with the smaller room sizes.

**PATTERN (3)**

Percussive medium density initial reflections feature regular delay spacing, producing a more coloured, 'live' sound. Reverberation build-up is moderately fast, decay is smooth and even. Use this pattern on medium room sizes to simulate moderate size 'live' sounding environments. The Predelay control operates conventionally.

**PATTERN (4)**

Low density initial reflections include discrete echoes, simulating the reflections from the walls, ceilings and floors of larger natural environments. Reverberation build-up is slow, decay is initially coloured, then smooth and even. This pattern gives a highly coloured sound, ideal for the simulation of large halls and similar environments using medium to large room sizes. Predelay control operates conventionally.

**PATTERN (5)**

An alternative to Pattern (4), with similar basic characteristics but different discrete echoes. Use for similar applications. Predelay is inserted between early reflections and reverberation.

## 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.

### a,b,c, DISPLAY LEDS

The current usage of these function LEDs is as follows:  
LED 'a': indicates remote "ON" status. 'b', '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.

## RE-ASIGNMENT OF REMOTE SLIDERS

This function allows each of the sliders on the remote control unit to be re-assigned to control any one of the seven parameters of the DN780. i.e. Predelay, Pattern, Level, Decay, LF., HF. and Room Size. The re-assignment will continue until a similar procedure is repeated, restoring the sliders to their original use. The re-assignment is valid for all reverberation programs and also **\*\* Alive \*\***, Gated Decay and Reverse Decay programs. Slider re-assignment function is temporarily cancelled when special effect programs are selected. The procedure is as follows:

- \* Press '9' then press and hold UP(+) key and press '8'.
- \* Slider No. 1. present parameter assignment is indicated by a flashing LED. If re-assignment is required for slider No.1., press the key of the new parameter (e.g. 'Pattern').
- \* Press UP(+) key until slider No.2 present assignment shows. Use (+),(-) keys to select remaining slider No.s ,re-assigning as required using the same procedure as above.
- \* Pressing 'STO' key stores the chosen slider assignment and returns the unit to normal operation.

NOTE: To quickly re-assign all the sliders to their normal parameters. Execute only step one above, then press '0'.

## 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.



## 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.

## 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 00 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 it's 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.

# 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-authorized 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	Delay, ADT, Multitap Echo, Sound On Sound, Infinite Room.

## PARAMETERS

PREDELAY	0-990msec
DECAY TIME	0.1-99 sec
ROOM SIZE	5-100 metres linear dimension (125-1,000,000 cubic metres).

LF DECAY	Adjustable +/-7 increments ref 1kHz decay time.
HF DECAY	Adjustable +/-7 increments ref 1kHz decay time.
EARLY REFLECTIONS	5 PATTERN variations. Relative LEVEL adjustable in 10 steps (0-max).

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

### 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 LEDs.
REMOTE CONTROL UNIT	Slider control of Predelay, Reflections Level, H.F.Decay and Reverberation Decay Time. Switch operated selection is incorporated to enable remote function and sequence step.

**POWER REQUIREMENTS**

VOLTAGE 110/120/220/240V 50/60 Hz  
CONSUMPTION 40VA

**WEIGHT**

NET 7.5 kg  
SHIPPING 10 kg

**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.  
Remote control unit.

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

## LIMITED WARRANTY

Klark-Teknik does not assume anyone to make any warranty or assume any liability which is not strictly in accordance with the following.

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 delivery to the purchaser or his agent.

Klark-Teknik guarantees to repair, or at its option, replace this product at no charge to its owner, should the product fail to perform as specified, provided the unit is returned, shipping prepaid, to the factory or authorised service facility.

The warranty shall not be applicable and be deemed void should this product be subjected to any of the following:

- \* Repair, work or alteration by persons other than those authorised by Klark-Teknik in such a manner as to injure, in the sole judgment of Klark-Teknik, the performance, stability, reliability or safety of this product.
- \* Misuse, negligence, accident, act of God, war or civil insurrection.
- \* Connection, installation, adjustment or use otherwise than in accordance with the instructions provided by Klark-Teknik.

Klark-Teknik shall not be responsible for loss or damage, either direct or from consequence, caused by failure or the inability of this product to perform as specified.

(continued)



Klark-Teknik reserves the right to refuse acceptance of product returned under this warranty without its prior consent. Returned equipment must be shipped pre-paid, fully insured and packed in Klark-Teknik's approved packaging. No responsibility for loss or damage of product during shipment to or from its factory or authorised service facility shall be taken by Klark-Teknik.

Klark-Teknik reserves the right to make alterations or improvements in the design or engineering of its products without obligation to make such changes to the purchaser's unit.



## DN780 REVERBERATOR/PROCESSOR

### Software update - series 1.5

The following additions and changes to the operation and programming of the DN780 are implemented by changing the existing eprom inside the unit for the revised version enclosed here.[See separate sheet for fitting instructions.]

- \* New brighter reverberation algorithms.
- \* Improved factory set 'Plates'-Mems 06-10.
- \* New program \*\* Alive \*\* -Mem 26.
- \* New program **GATED DECAY** -Mem 27.
- \* New program **REVERSE DECAY** -Mem 28.
- \* Remote slider parameter re-assignment.
- \* User-memory protection.
- \* Extended diagnostic routines.

#### NOTE:

- \* Previously stored user memories will remain safe when changing the eprom and will usually benefit from the brighter reverberation algorithms that will then operate.
- \* Information is also enclosed on external triggering of 'Sequence' function.

### Operators Manual

Full information on this software update is contained in four new pages which should be inserted into the operators manual as follows.

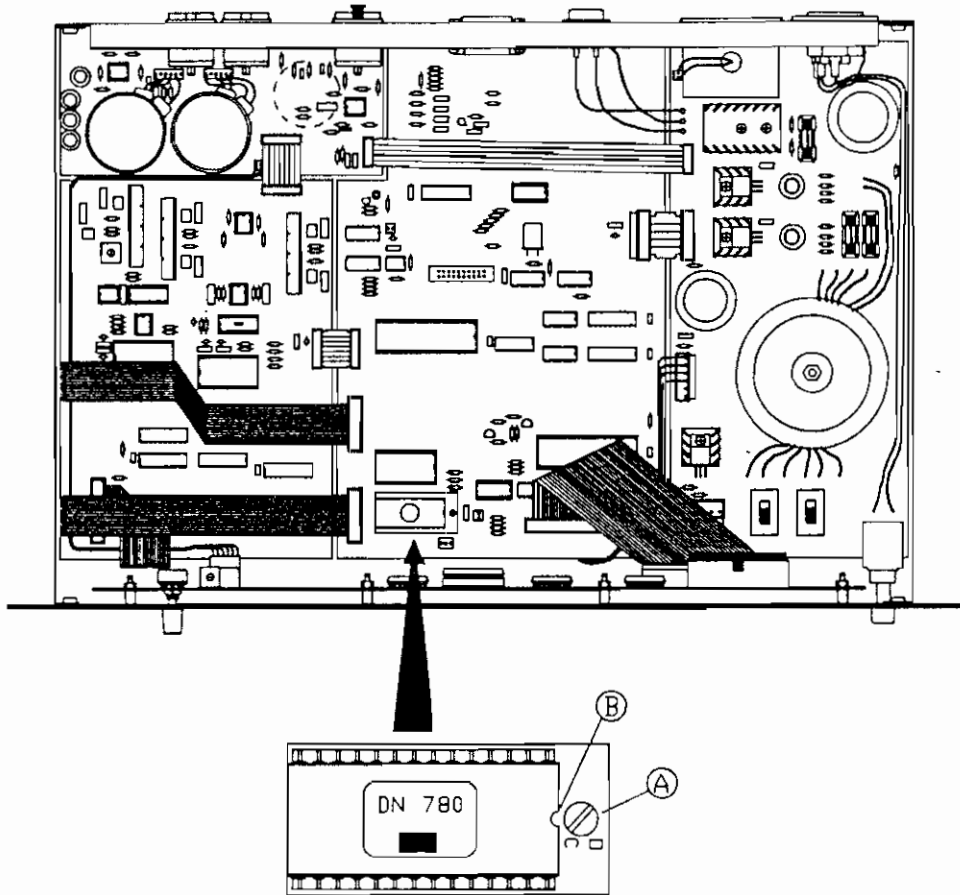
Page 32-A,32-B -Insert after page 32.

Page 33,34 -Replace existing page 33,34.

Pages 36-A,36-B and 36-C,36-D -Insert after page 36.

# DN 780

## Software updating



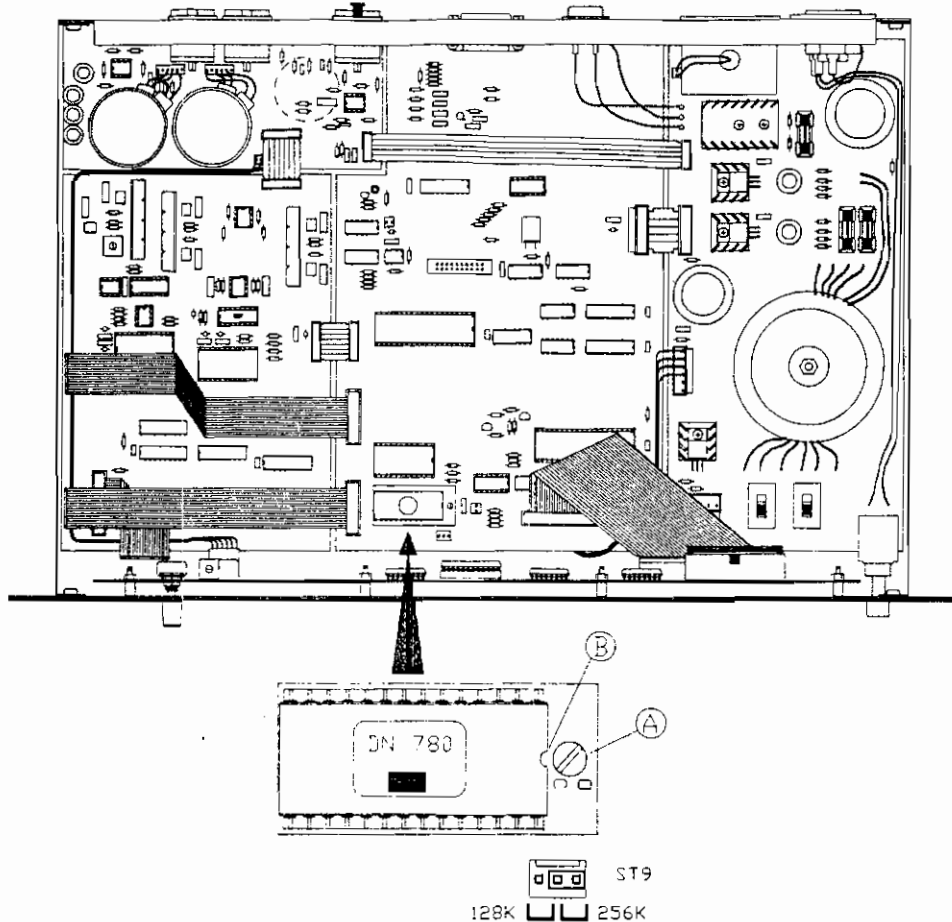
TO REPLACE EPROM SOFTWARE IN THE DN780  
FOLLOW THESE INSTRUCTIONS:

- \* Remove power cord.
- \* Remove top cover.
- \* Undo the three black knobs on the top board.
- \* Swing top board vertical and locate EPROM.
- \* Using a small screwdriver turn screw(A) anticlockwise.
- \* Remove old EPROM and replace with latest version.
- \* NOTE: It is important that the notch(B) on the EPROM is next to the screw(A).
- \* Turn screw(A) clockwise to lock EPROM.
- \* Re-secure the top board and replace the top cover.
- \* Switch on and check unit displays correct version number during power-on sequence.



# DN 780

## Software updating 2.0 And Higher



TO REPLACE EPROM SOFTWARE IN THE DN780  
FOLLOW THESE INSTRUCTIONS:

- \* Remove power cord.
- \* Remove top cover.
- \* Undo the three black knobs on the top board.
- \* Swing top board vertical and locate EPROM.
- \* Using a small screwdriver turn screw(A) anticlockwise.
- \* Remove old EPROM and replace with latest version.
- \* NOTE: It is important that the notch(B) on the EPROM is next to the screw(A).
- \* Turn screw(A) clockwise to lock EPROM.
- \* Make sure link on ST9 is set to the 256K position
- \* Re-secure the top board and replace the top cover.
- \* Switch on and check unit displays correct version number during power-on sequence.

# SOFTWARE UPDATE 2.0

KLARK-TEKNIK DN780

DIGITAL REVERBERATOR/PROCESSOR

## INTRODUCTION

Klark-Teknik is pleased to announce substantial performance improvements for this Series 2.0 software update. As usual, the benefit of our on-going software development is also available free of charge to existing owners in the form of an update Eprom, which should be fitted in accordance with the information sheet supplied. Please note, in particular, the new position of the link on PCB socket ST9. Please read the following information in full, to get the most from this all-new software package. These information sheets should be inserted in the front of the operators manual.

## CAUTION

**Fitting 2.0 software erases existing user memories.**

Existing user memory information is totally incompatible with this new software, moreover much improved user sounds will be quickly found to supersede previous settings. Before fitting the new eprom it is recommended that existing user memories are logged on the sheet provided at the rear of the user manual and the 1.5 series eprom retained, if required for future use.

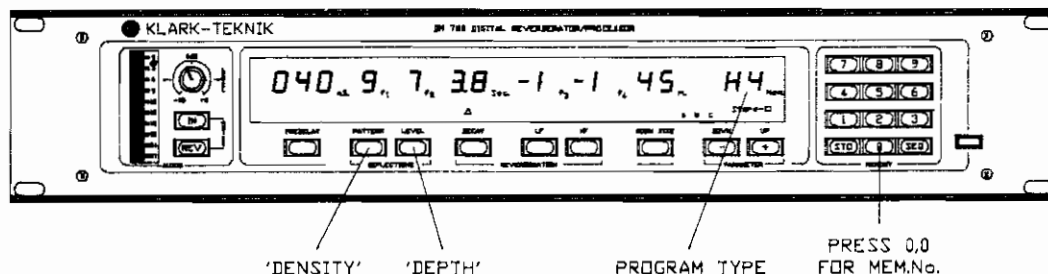
## NEW PROGRAMS

This new software package includes fundamental changes to the operation and substantial improvements in the reverberation quality of the DN780. All four basic reverberation program types now have totally separate and newly developed algorithms which produce a full range of reverb styles, all featuring lower coloration, wide stereo image, and the "big" reverb sound now essential for main house reverb.

Similar improvements have been applied to the "Alive", Non Lin, Reverse and Infinite room programs. The remaining effect programs are unchanged.

An adhesive film listing the factory preset memory numbers is provided and should be affixed to the extreme right-hand side of the front panel.

NEW CONTROL FUNCTIONS



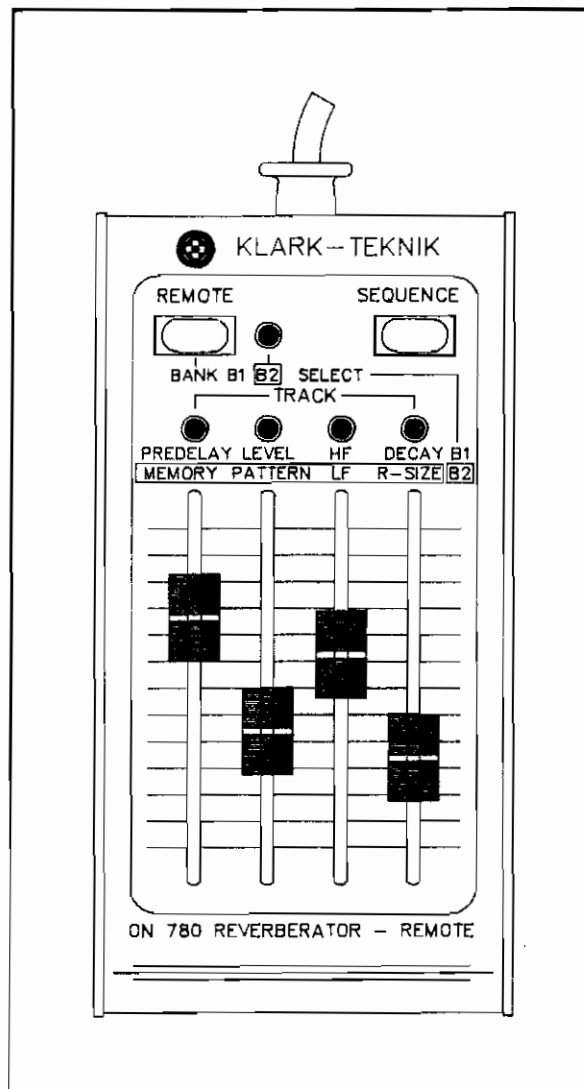
Operation of the DN780 has been simplified with factory preset memories displaying their program type e.g. Hall 3 = H3. The memory number is momentarily displayed and can be found at any time by pressing 0,0 on the keyboard. Modified programs stored in user memory now display the program-type from which they were derived, e.g. "PL" for modified plate. Again, the memory number is momentarily displayed and this is available by pressing 0,0.

The dedicated reverberation and gated reverb programs are now only accessible by entering the appropriate number in the keypad, so freeing the "Pattern" control to be used for an additional function, i.e. Density.

The new control is adjustable from 0 to 9 with 0 giving a low density or "grainy" character to the early reflections and 9 producing a clean, high density effect. The reflections "Level" control is also modified to function convincingly as a "depth" control, so altering the apparent distance between the sound source and the listener. Decay time, now features finer increments over its useful operating range and 12 room sizes are provided against the 8 previously available.



EXTENDED REMOTE FUNCTIONS



All 7 parameters are now controllable from the remote unit and memory recall is also provided for both factory preset and user memories.

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

## SOFTWARE UPDATE 2.0

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 LEDs 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.

An adhesive film is included, which provides the necessary annotation changes for the remote panel. After wiping the panel lightly with methylated spirit on a clean tissue, peel back the paper-backing and carefully position the film as shown, ensuring that "Track" LEDs are positioned symmetrically within the four clearance holes in the film. Press down firmly to fix in position.

Provision of full remote parameter control, makes slider re-assignment unnecessary and so this function has been removed.

SUMMARY OF AMENDMENTS TO THE OPERATORS MANUAL

- 1) All four reverb types have dedicated algorithms and are accessible only via the keypad.
- 2) The pattern control does not now change the basic reverb type, it controls the "Density" of the early reflections i.e. 9 = "Dense", 0 = "Grainy".
- 3) All factory preset memories now display their program types e.g. "H3", not their memory numbers as before.
- 4) Memory numbers can be found at any time by pressing 0,0 on the keypad.
- 5) Changes to the "Alive", "Non Lin", and Reverse programs are as follows:-  
Level control does not operate.  
Pattern control sets "Density".  
The 3 program types are accessible via the keypad only.
- 6) On all effect programs the program type e.g. "AL" is displayed. The memory number is available by pressing 0,0 on the keypad.
- 7) The remote control now has extended functions. The "Remote" key selects "Bank 1" or "Bank 2" parameters, allowing control of all seven parameters plus "memory select" function. "Bank 2" operation is confirmed by the "B2" LED lighting. "Remote On" status is confirmed by track lights flashing if no slider is in "Track".
- 8) To use remote memory select function:  
Select "Bank 2" on the "Remote" key - B2 LED Lights.  
Move slider to maximum - Track LED Lights.  
Move slider to display all available memory numbers.  
Leave slider in position for 3 seconds to load the displayed program.  
Return slider to maximum to re-select "Track" function.
- 9) Twelve room sizes are now provided instead of eight. These are optimised for each program and are selected in the range 8 to 90 linear meters.

SOFTWARE UPDATE 2.0

FACTORY PRESET PROGRAMS SOFTWARE SERIES 2.0

<u>MEMORY NUMBER</u>	<u>PROGRAM</u>	<u>DISPLAY</u>
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

USING THE TAPE INTERFACE

D11780

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.
  
- 3). 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 [+]).
  
- 4). 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.

## 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 128)

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.

Function ...	Recognized	Remarks
:Basic Default	: 1 - 16	: memorized
:Channel Changed	: 1 - 16	:
: Mode Default	: OMNI OFF/OMNI ON	: memorized
: Mode Messages	: X	:
: Mode Altered	: X	:
:Note	: X	:
:Number : True voice	: X	:
:Velocity Note ON	: X	:
: Note OFF	: X	:
:After Key's	: X	:
:Touch Ch's	: X	:
:Pitch Bender	: X	:
:Control	: X	:
:Change	:	:
:Prog	: 0 0-127	:
:Change : True f	:	:
:System Exclusive	: X	:
:System : Song Pos	: X	:
: : Song Sel	: X	:
:Common : Tune	: X	:
:System :Clock	: X	:
:Real Time :Commands	: X	:
:Aux :Local ON/OFF	: X	:
: :All Notes OFF	: X	:
:Mes- :Active Sense	: X	:
:sages:Reset	: X	:
:Notes	:	:
	:	:

Mode 1 : OMNI ON, POLY      Mode 2 : OMNI ON, MONO      0 : Yes  
 Mode 3 : OMNI OFF, POLY    Mode 4 : OMNI OFF, MONO      X : No