



RMX 16: Digital Reverberation System 500 Series Module User Manual Issue 1



Health & Safety Notice

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PLEASE OBSERVE THE FOLLOWING HEALTH AND SAFETY INSTRUCTIONS**

- READ THESE INSTRUCTIONS AND KEEP THEM HANDY
- HEED ALL SAFETY WARNINGS
- DO NOT USE NEAR WATER
- CLEAN ONLY WITH A DRY CLOTH
- DO NOT INSTALL NEAR HEAT SOURCES
- DO NOT BLOCK VENTILATION OPENINGS
- USE ONLY ACCESSORIES SPECIFIED BY THE MANUFACTURER
- REFER ALL SERVICING TO QUALIFIED PERSONNEL ONLY
- NO USER SERVICEABLE PARTS INSIDE

**FAILURE TO OBSERVE THESE PROCEDURES AND RECOMMENDATIONS
WILL INVALIDATE THE MANUFACTURER'S WARRANTY**

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Introduction



The AMS RMX16 was the world's first microprocessor-controlled, full-bandwidth digital reverberator and characterized an enormous number of seminal recordings from the 1980s onwards. Its designer's love for music and experience in the aerospace industry meant it was way ahead of its time on release.

It has remained an essential piece of kit for any self-respecting world-class studio ever since, and the units sell today for a substantial proportion of their original cost due to their great desirability.

Designed from the outset to be musical rather than simply implementing mathematical algorithms, each program was tuned and re-tuned to provide as wide a "sweet-spot" of settings as possible by means of "carpet graph" parameter tables, interactively linked control by control. It was designed by ear over an extended period of time and from first principles and this is what has made it a classic. Despite its longevity, there is little more any present-day design could improve upon and its sound is unique and instantly recognisable.

In addition to the 9 programs that the AMS RMX16 has as standard, there are a rare series of 9 aftermarket programs that were made available to AMS RMX16 users if they could get their hands on the unique and now elusive RMX16 remote control with bar code reader input.



Image of an original RMX16 remote control with bar code reader

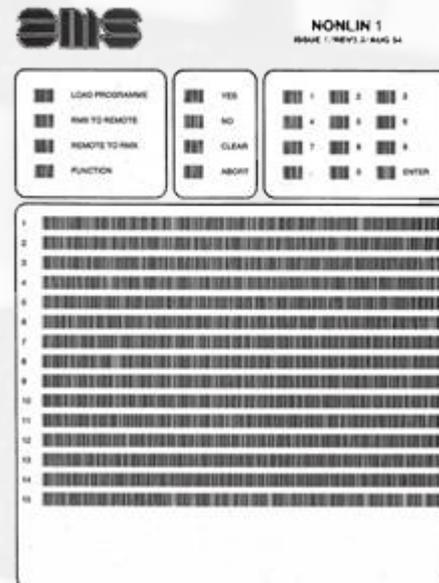


Image of an original bar code chart

Now available in the 500 series Format, the sound once available only to premier studios is now on tap for a much wider user base and the extra 9 programs are included in the AMS RMX16 500 series Digital Reverb unit as standard.

System Overview

The RMX16 500 series uses premium quality, high-performance 32-bit DSP processing and 24-bit, 48KHz sampling with premium A/D and D/A converters that achieve over 100dB dynamic range with +22dBu of headroom. These high-performance specifications make the RMX16 500 series the best platform possible to perfectly recreate the iconic sound of the original unit using the very same algorithms.

For ease of use a large, high contrast 2.4" OLED display is situated in the top right-hand corner making it easy to quickly see an overview of all the currently selected settings and parameters. Each parameter is awarded its own key to avoid complicated menu interfaces and each value can be adjusted using the keypad, nudge keys or the new endless rotary encoder which replaces the rotary pot found on the original units. This flexibility allows the precision of entering exact values when desired settings are known as well as the ability to easily find the best settings by ear when using the encoder. A setting not found on the original unit is the addition of a Mix control that allows the output to be comprised of any amount of the dry component of the input signal and the wet component of the reverb output.

New to the RMX16 500 series unit is also a system for saving and recalling user presets. There is now the ability to save and name up to 100 user presets using the encoder or alphanumeric keypad. These are safely stored on integrated non-volatile memory and are not dependant on an internal battery. Presets can be deleted or overwritten when they are no longer needed or more space is required.

The unit is a 500 series rack mounting module, in a 3-slot wide format. The input connector used in the slot one position is the master mono input for the unit while the output connectors in the slot one and slot three positions are used as stereo output from the device. The input/output connectors in the slot two position and input connector in the slot 3 position are not used.

With digital reverberation, one can simulate mathematically any real environment and also any 'old fashioned' artificial reverberant character such as plates, or springs. Digital reverberation techniques are the first to offer such sophistication.

The RMX16 digital system employs sophisticated micro-programmed parallel processing of 16 bit data offering an 18kHz bandwidth; 90dB dynamic range and 0.03% distortion in delay mode; low power consumption (and therefore cool running); independent control of each program's fundamental reverberant parameters; alphanumeric program descriptions for ease of use and 'at a glance' understanding of how the unit is currently programmed as all data, including the variables (pre-delay, decay time, high-frequency decay profile and low-frequency decay profile), are continuously displayed on the reverb front panel.

The RMX16 500 series unit is designed to be simple to operate with eighteen factory programs simulating different reverberant environments with the ability to control all parameters in three distinct ways.

The unit can also be used as a very high quality, 18kHz bandwidth digital delay line. The delay can be varied from 0 to 1.6s in 1ms increments.

A calculator styled alpha numeric keypad is provided for entry of user definable variables and for storing or recalling information from the unit's memory locations.

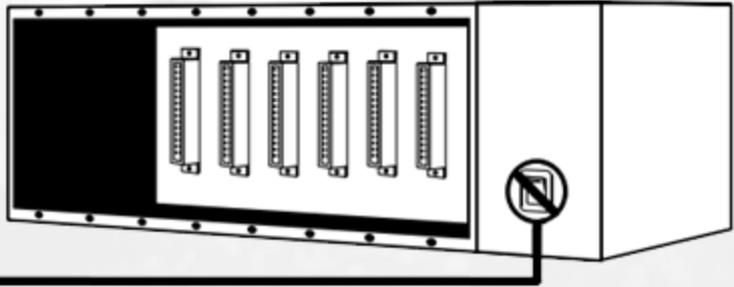
Both input and output levels are adjustable to accommodate sources and destinations sending or requiring non-standard signal levels. Overflow indication on digital processing is provided as well as the standard 'traffic signal' LEDs enabling fine adjustment of input level for optimum signal to noise performance.

When changing basic reverberation programs, the output is muted so that 'memory flush-out' is not output to the audio chain. A useful feature incorporated into the RMX 16 reverberation system is the use of 'Nudge Buttons'. These buttons increment or decrement data for all selectable functions.

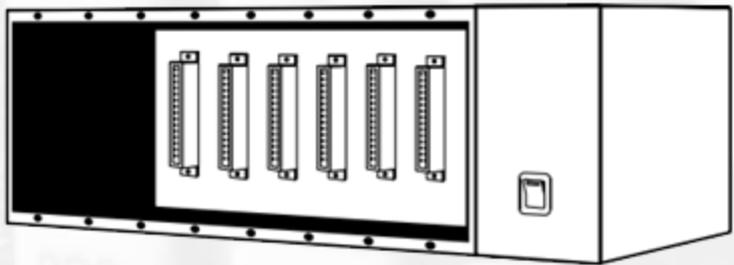
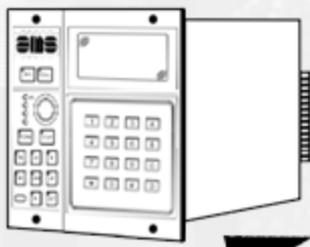
-Extract from Original RMX16 User Manual-

1

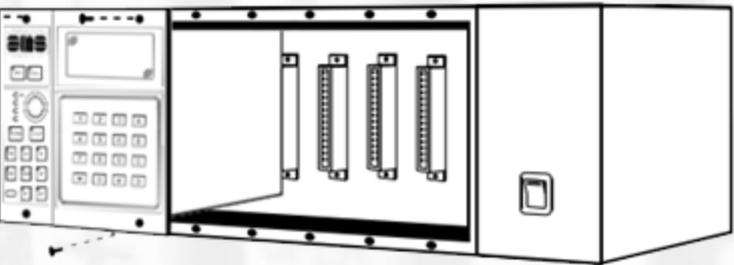
POWER OFF



2

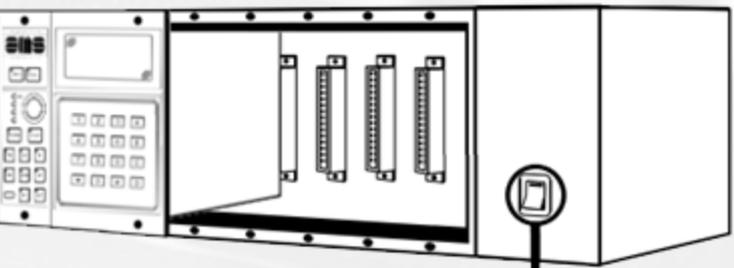


3



4

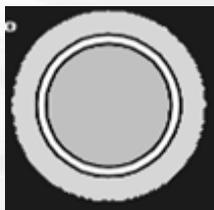
POWER ON



For full installation instruction please refer to the AMS RMX16 installation guide

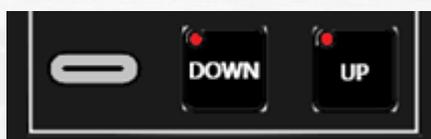
The RMX16 has three controls that allow users to adjust the different parameters on the unit either by coarse or fine increments.

The Pot Control Section



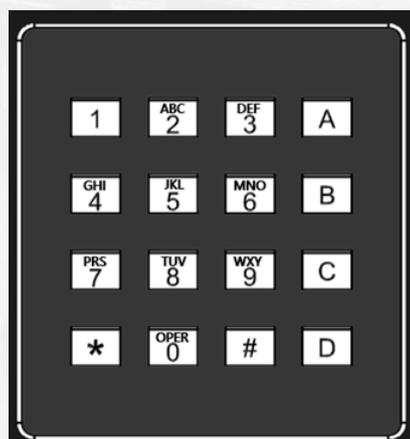
The RMX16 500 series pot works as a rotary and push encoder which can be assigned to control all of the units' parameters. Pressing the **PROGRAM, DECAY, PRE, LO, HI, IN, MIX & OUT** buttons hands control of that parameter over to the rotary control knob. This facility can only be used once that parameter key function has been selected and the LED for the parameter key is lit.

Nudge Section



The RMX16 500 series Nudge buttons **DOWN** and **UP** can be assigned to control all of the units' parameters. Pressing the **PROGRAM, DECAY, PRE, LO, HI, IN, MIX & OUT** buttons hands control of that parameter over to the nudge buttons. This facility can only be used once that parameter key function has been selected and the LED for the parameter key is lit.

Keypad Entry

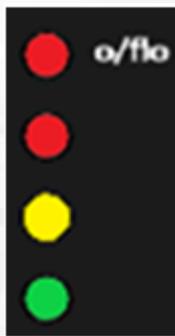


The RMX16 500 series Alphanumeric keypad can be used to enter exact figures for all of the units' parameters. Pressing the **PROGRAM, DECAY, PRE, LO, HI, IN, MIX & OUT** buttons hands control of that parameter over to the alphanumeric keypad. Once a parameter has been selected, the LED on the parameter key and the on-screen digital number will flash until the 'enter' key (#) is pressed. To enter a number for the selected parameter, press a single or two-digit number followed immediately by the 'enter' key (#); the number inputted will then be selected. To enter negative numbers, (*) represents a – sign. Entering a value followed by the (*) key will change the parameter to a negative value. If the number selected is not available (e.g. greater than the maximum allowed), then the error message (E) will be displayed on the screen. No change in program will result and therefore the selected parameter button LED will continue flashing. Re-pressing of the selected parameter button will clear the error condition from the display.

Each parameter and preset has a fixed increment by which it can be adjusted by the pot controller. For example, **HALL A1** pre-delay will be adjusted by +/-10 for each turn of the encoder. If a custom amount is entered on the keypad such as '52', turning the encoder will move by increments of +/-10 from this custom number '62', '42' etc. Turning the rotary encoder all the way counter-clockwise will wipe this custom increment and reset to default.

Operating Instructions

This section is intended to familiarise the user with the front panel controls of the RMX16 reverberation system.



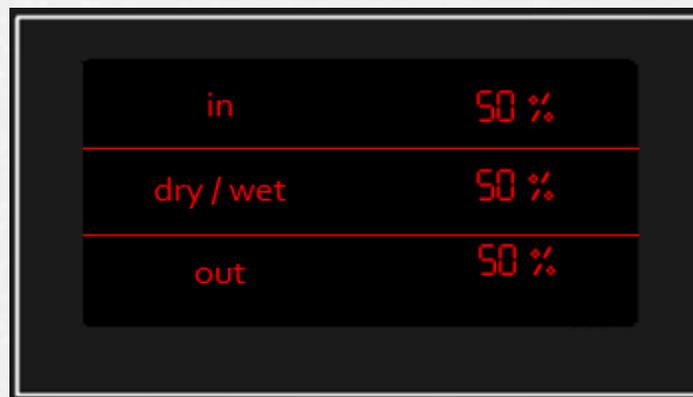
Input/output Level and Level Monitoring Section

When the unit is switched on, all of the front panel LEDs will illuminate during power-up.

The unit has four digital level-indication LEDs (green, yellow, red and red). The first three (i.e. green, yellow and red) are basic 'traffic signal' level LEDs. The red LED is illuminated at +10 dBu, the yellow LED +4 dBu and the green LED -2dBu.

In normal operation, with a signal present, the input level should be adjusted so that the red LED is illuminated only when the highest program peaks occur. The remaining red LED labelled **o/flo** indicates processing overflow. Should this occur, due to exceptional program material, 'backing off' the input level slightly will prevent internal clipping of the signal.

Adjusting Input & Output levels



Input, Output and mix will adjust overall input, output and wet/dry mix levels for the unit. These levels remain fixed for all presets.



Input & Output signal gain can be adjusted by pressing the **IN & OUT** buttons. In addition, the dry/wet blend can be adjusted by pressing **MIX**.

The input gain can be adjusted in three ways-

1. Turning the rotary encoder clockwise to increase the input gain. Or turning counter-clockwise to decrease the input gain.
2. Pressing Nudge **UP** to increase the input gain or pressing nudge **DOWN** to decrease the input gain.
3. Entering exact amounts by using the alphanumeric keypad. Once a two-digit number has been inputted, press # to enter.

To enter a wet/dry mix of 50% press MIX then 5 then 0 then #

Once the input signal has been 'level matched' using the traffic signal LEDs, the stereo output can be adjusted from this menu to give a good match on the output. Dry/Wet mix levels can be adjusted depending on user requirements. The output from the RMX 16 is true stereo and while these outputs may be used singly, a more solid spatial sound will be obtained by using the stereo pair.

Program Selection



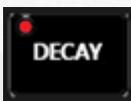
To select one of the 18 different reverberation programs; first push the 'program' key, the LED on this key will now illuminate.

Program selection can be accomplished in two distinct ways:

- ▶ **Pot Control Entry** – scroll through the 18 programs by turning clockwise/counter-clockwise.
- ▶ **Using the Nudge Keys** – scroll through the 18 programs by pressing the **UP** or **DOWN** buttons.

Note: Any custom settings made to a program are lost when changing between programs. Custom settings can be saved and recalled by following the steps found on page 12 of this manual.

Decay Time Entry



To vary the decay time first push the **DECAY** key, the LED on this key will now illuminate.

Decay time can be adjusted in three distinct ways:

- ▶ **Pot Control Entry** – turn clockwise/counter-clockwise to adjust decay time for the set program. The decay time will increase or decrease in 0.1-second steps.
- ▶ **Using the Nudge Keys** -press **UP** or **DOWN** to adjust the decay time for the selected program. The decay time will increase or decrease in 0.1-second steps.
- ▶ **Keypad Entry** - Decay time may be selected using the keypad, 2.8 Seconds would be entered by first pressing the 'decay time' key followed by the '2' key, the '8' key and finally the enter key (#).

Note: Both the minimum and the maximum decay times are dependent upon the program selected.

Pre-Delay Entry



Pre-delay delays the onset of reverberation giving the impression of distance from the sound source. To introduce a pre-delay before reverberation occurs, first push the **PRE** key.

The LED on this key will now illuminate.

The pre-delay amount can be adjusted in three distinct ways:

- ▶ **Pot Control Entry** – turn clockwise/counter-clockwise to adjust the pre-delay time for the set program.
- ▶ **Using the Nudge Keys** - press **UP** or **DOWN** to adjust the pre-delay time for the selected program.
- ▶ **Keypad Entry** - enter the amount of pre-delay required followed by the enter key (#). The amount (ms) of pre-delay will be displayed in the unit's display under 'predelay'.

NOTE: The step size of the pre-delay is program dependent. It is important to remember that the maximum available pre-delay time depends on the basic reverberation program in use. The maximum pre-delay time for each reverberation program is given in the program notes at the back of this manual (see APPENDIX A).

Decay Filter Controls



The availability and use of these controls are dependent upon the basic reverberation program in use (See **APPENDIX A**).

For example, **PROGRAM 1-AMBIENCE** allows the use of both the high and low filter controls while **PROGRAM 2-ROOM A1** allows for use of the high filter control only.

A positive filter setting will produce an increase in reverberation time in the selected frequency band while a negative value will give a decrease. A low-frequency filter setting of, say +9, will give a large increase in reverberation time in the low-frequency band.

To vary the decay filter controls first push the **LO** or **HI** key. The LED on that key will now illuminate.

There are three ways of adjusting decay time:

- ▶ **Pot Control Entry** – turn clockwise/counter-clockwise to adjust **LO** or **HI** decay filter for the set program.
- ▶ **Using the Nudge Keys** -press **UP** or **DOWN** to adjust the **LO** or **HI** decay filter for the selected program.
- ▶ **Keypad Entry** - decay filter figures may be selected using the keypad by first pressing the '**HI**' or '**LO**' key followed by the number key(s) and finally the enter key (**#**). To select negative values the '*****' key must be pressed after entering the numeral. If the '*****' key is not pressed a positive value is assumed.

Mix Control



This button controls the balance between the reverb processor and the source signal. The Dry/Wet mix is indicated in the Numerical Display as a percentage. A value of 50% produces an equal blend of wet and dry signals. Values greater than 50 emphasize the wet signal, and values less than 50% emphasize the dry signal. A 0% value puts the unit into bypass mode with audio running through the unit unaffected.

The MIX level can be adjusted in three ways:

- ▶ **Pot Control Entry** - You can vary the Dry/Wet mix using the pot control. Once the Dry/Wet function has been selected, control of the Dry/Wet is immediately available to the rotary pot.
- ▶ **Using the Nudge Keys** - Clicking the nudge **DOWN** button once will decrement the value by one percent; clicking nudge **UP** once will increment the value by one percent.
- ▶ **Keypad Entry**- Dry/Wet mix may be selected using the keypad. Hence 50% would be entered by first pressing the '**MIX**' key followed by the '**5**' key, the '**0**' key and finally the enter key (**#**).

Once the RMX 16 has been correctly level-matched, decide which basic program is needed for the effect you require. Reading through the program list in **APPENDIX A** will help if you are already familiar with basic reverberation sounds. If you are not, it is advisable to listen to all of the basic pre-set programs using the material you wish to record as the source.

You will then be able to select the basic program nearest to the effect you require. Do not use source material with a fundamentally different frequency character than the material you will eventually record, this will give you a false impression of the final sound. Almost all reverberation types, especially when using large amounts of frequency contouring, are dependent upon the frequency character of the source material.

Press the **PROGRAM** key and scroll through the programs to the one required. The program name and number appear on the top of the display. There are nine factory pre-set programs; choose the one you wish to use and refer to the program notes at the back of this manual (**APPENDIX A**). These notes give the maximum pre-delay, the maximum decay time and the decay filter ranges available when using each particular program.

Pre-Delay

Pre-delay offsets the output of the RMX 16 relative to the input. When mixing the original with the output of the reverberation system a variety of material can be enhanced by adding pre-delay; knowing when to use pre-delay and how much to use comes with experience.

Decay Time

Increasing decay time effectively increases the length of the final phase of reverberation i.e. the reverberant period. By using the pot control the decay time may be varied at any time during a mix.

Decay Filtering

The effectiveness of these controls depends to a large extent on the frequency character of the source material. The high-frequency filter will have no effect at all on low range instruments like the bass guitar whereas cymbals, violins, etc., will be affected to a large degree; there is no substitute for experimentation.

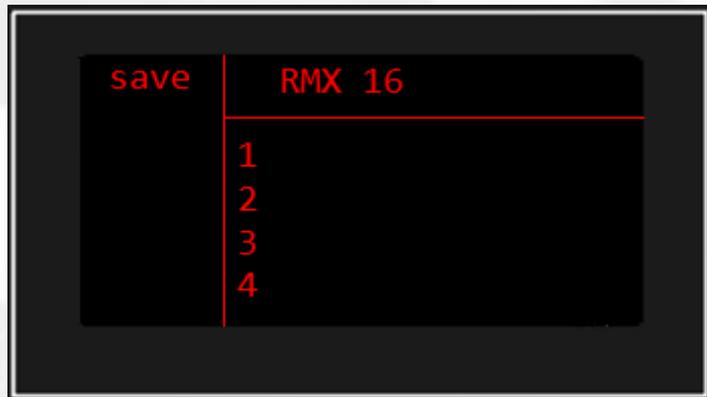
Keyboard text Entry

Text entry can be used to change any of the parameters displayed on the numeric displays. Click on the display parameter you want to modify and use the keyboard to type a new value followed the enter key (#).

Saving and recalling Presets

The RMX 16 500 series unit has a save and recall facility that allows users to save up to 100 different presets within the unit's internal memory. The 8-character display allows users to add unique names to each preset and the recall function allows users to quickly recall previously saved presets at any time. Presets are stored within the unit's internal memory until users reset the device. (see setup Menu pg.13)

Saving Presets



To create and save a Preset:

- ▶ Choose one of the 18 programs on the unit.
- ▶ Make changes such as pre-delay, decay, Lo/Hi filter.

Once happy with the current settings-

- ▶ Press **SAVE**.
- ▶ Enter a Preset name by choosing each letter any of three ways-
 1. Scroll with the rotary controller, select a letter then push to select, when complete choose \leftarrow to enter.
 2. Use the nudge **UP** or **DOWN** keys to select a letter and press **#** to select. when complete choose \leftarrow to enter.
 3. Typing the letters using the alphanumeric keypad, pressing **#** to select the letter. Press **# twice to enter the preset.**

Select < or press* to delete letters

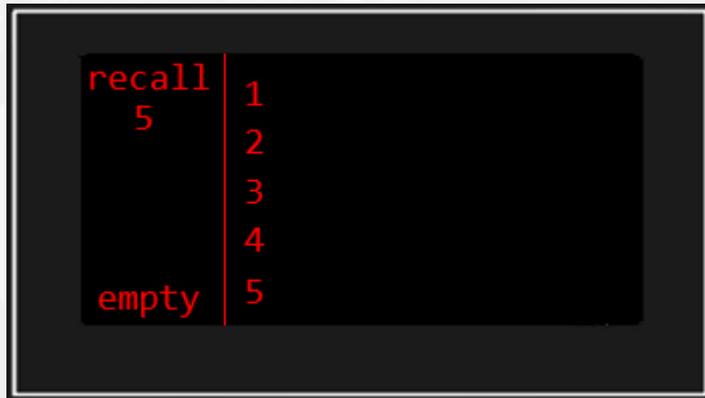
Once a name is selected (maximum 8 characters)

- ▶ Choose a save slot between **1-100** any of three ways-
 1. Scrolling with the rotary controller to choose a number, then push to select.
 2. Use the nudge **UP** or **DOWN** keys to select a number then press **#** to enter.
 3. Typing the exact number then on the numeric keypad then pressing **#**.

Once entered 'saved' will appear at the bottom of the screen, Press any key to exit.

saved

Recalling Presets



To Recall a Preset:

- ▶ Press **RECALL**
- ▶ Choose a saved preset any of three ways-
 1. Scrolling using the rotary and pushing the controller to select.
 2. Using nudge **UP/DOWN** to choose a number then press **#** to select.
 3. Typing the exact number then on the numeric keypad then pressing **#**.

Once selected, the recall window will close and the preset will be loaded.

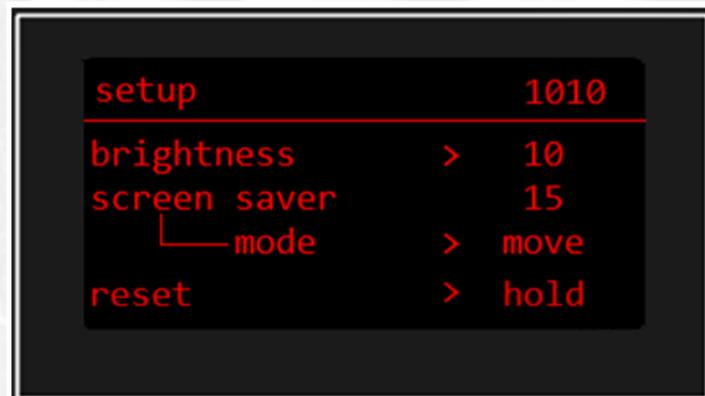
To Delete a Preset:

- ▶ Press and hold **RECALL**
- ▶ Scroll using the rotary controller to the desired preset.
- ▶ While holding recall, press the rotary controller.

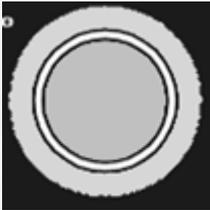
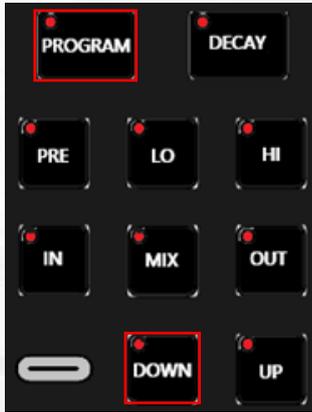
Deleted will appear at the bottom of the screen.

deleted

Setup Menu



The RMX16 500 series setup menu is an extra screen layer that allows users to adjust extra settings such as the screen brightness, screen-saver mode, screen saver activation time and reset.



1010

brightness > 10

screen saver > 15

mode > move

reset > hold



To access the settings menu:

- ▶ Press and hold the **PROGRAM** key.
- ▶ Then press the **DOWN** key.

The RMX16 500 series standard display will now switch over to the Setup menu display and will remain in setup display while adjustments are made.

To exit the Setup display:

- ▶ Press any button on the RMX16 front panel.

To activate and change the settings within the Setup menu:

- ▶ Use the rotary control to scroll between each setting option.
- ▶ > highlights the setting in focus.
- ▶ Then use the rotary controls push function to enter the highlighted setting.

Note: alphanumeric keypad and nudge UP/DOWN functions will not work on the setup menu.

At the top right of the screen, the firmware release number will be displayed, this is useful for users to check that their unit has the most up to date software version. To check for firmware updates please register your product at www.ams-neve.com and click the support tab.

The screen brightness can be adjusted from **1-10** levels depending on user requirements. The level set will be remembered and set each time the unit is switched off. The default brightness level of 7 will be set when the unit is reset.

The screen saver timer allows users to select a time limit in which the screen saver will begin. For example, a setting of '15' enables the screen saver to activate after 15 minutes of inactivity.

The screen saver has 3 modes-

1. **Move**- activates the moving AMS logo screensaver.
2. **M+D**- activates the moving AMS logo screensaver and dims the display.
3. **Dim**- Dims the display.

Reset – This function will wipe all saved presets from the RMX 16 memory and restores the unit to factory settings.

To reset the unit:

- ▶ Highlight Reset > Hold
- ▶ Press and hold the rotary encoder for 5 seconds.
- ▶ The device will reboot with factory settings.

USB C Connection

The USB C slot on the front of the device is reserved for future firmware updates. To check for updates please register your product at www.ams-neve.com and click the support tab. Further instructions will be displayed on the website.

Specifications

Nudge:

- Program:** Will nudge through programs allowing quick selection of program required.
- Pre-delay:** Nudges from 0 to maximum in steps of 10 milliseconds.
- Decay time:** Nudges from 0 to maximum in 0.1 second steps.
- Decay filtering:** Nudges up and down in single digit steps.

Keypad Control:

- Program Entry:** Keypad entry 1 to 18.
- Pre-delay Entry:** Keypad entry 0 to maximum (dependent upon program selected), least significant digit = 1mS
- Decay Time Entry:** Keypad entry least significant digit = 0.1 Second.
- Filter settings:** Keypad entry of signed single digit numeric. '*' acts as minus sign when entered after number.
- Display Comprises:** 2.42" OLED display.

Audio:

General Specifications	
Headroom	>+22dBu @ 1kHz (<0.5% THD+N)
Dynamic Range	112dB @ 24dBu
Signal to Noise Ratio	82dBu 20Hz – 20kHz +4dB
Frequency Response	Typically +/- 0.25dB, 20Hz to 18kHz
Distortion (THD+N)	Typically 0.002% @ 1kHz (measured at +20dBu, 10Hz to 20kHz filter)
General Noise	<-75dBu (20Hz to 20kHz filter)
Line Inputs	Input Impedance ≈20KΩ electronically balanced in slot 1
Line Outputs	Output Impedance ≈150Ω electronically balanced: (L) Slot 1 (R) Slot 3

Physical Dimensions/electrical information:

Height mm (inches)	133.4 (5.25)
Width mm (inches)	114.3 (4.5)
Depth mm (inches)*	145 (5.7)
Weight Kg (lbs)	0.84 (1.85)
Heat Dissipation	<7 watts
Voltage	+/-16V
Current Amps RMS +/-16V	0.2A (MAX)

*excludes clearance for front panel controls and rear connectors

Appendix A

Program Index

Program	Title	Number
1	Ambience	
2	Room	A1
3	Hall	C1
4	Plate	A1
5	Hall	B3
6	Chorus	
7	Echo	
8	Nonlin	2
9	Reverse	1

Additional Programs in the AMS RMX16 500 Series Unit.

10	Reverse	2
11	Freeze	
12	Room	A0
13	Room	B1
14	Hall	A1
15	Plate	B1
16	Delay	
17	Image	P1
18	Nonlin	1

Program 1 AMBIENCE

This program is a very useful and flexible general-purpose program with an effect somewhere between a hall and a plate. It is useful for increasing reverberation time on material with existing reverberation or producing unobtrusive reverberation on dry material.

It differs from a hall in that dimensional elements are deliberately minimised, and differs from a plate in its lower coloration.

low and high-frequency profiles can be modified.

Pre-delay to 200ms is selectable.

Two special features of the program are that a setting of 9.9 on the decay controls gives an almost infinite decay time, and if the filters are set to their zero positions, the decay continues with all original harmonic information without air absorption simulation. This allows voices to be added into the sound one at a time to create a "choir" effect. This can also be described as a 'freeze' setting and can be initiated by selecting 'pot' on the decay control and rapidly turning from minimum (0.0) to maximum (9.9) settings as the sound you wish to 'freeze' occurs.

CAUTION

Since internal multiplying parameters are unity in this mode, after a long period of time in this condition - several minutes, or tens of minutes - the output dynamic range may limit due to very small DC offset voltages building up. The overflow LED will illuminate to show this. The condition is simply cleared by returning the decay setting to zero momentarily. In any case, the effect is available for ample time for all useful purposes without problems.

Program 2 ROOM A1

This program is designed to replicate a 'live' room with all the attendant colourations.

Decay time should be kept short for most realism (to 1 or 2 seconds), and a high degree of high-frequency damping sounds best (say -7, -8). Low-frequency equalization is not provided for this program.

Colouration is made deliberately high to simulate standing waves in real rooms. All types of program material are suitable for this program.

Control of only high-frequency decay profile is available.

Pre-delay to 300 milliseconds is selectable.

Program 3 HALL C1

This hall program has strong initial reflections thus defining the size of the hall distinctly, giving high presence, making it very useful for vocals.

For example: for 'topping up' material already recorded in halls, a more neutral program such as Ambience is recommended, to avoid two possibly conflicting sets of early information.

Control of both high and low-frequency profiles is provided as in program 1.

Pre-delay to 200 milliseconds is selectable.

Program 4 PLATE A1

This is a program with high diffusion, similar to that produced by plate reverberators.

Percussive sounds are rapidly smoothed with this program. Colouration is medium and decay is even, as with standard plate reverberators.

Decay times of up to 5 seconds are useful for normal use, and above for special effects.

Indicated decay times are accurate to about 5 seconds, but it should be noted that perceived delay time will depend greatly on the frequency spectrum of the input program material referred to the filter settings.

Control of high and low-frequency decay times is available.

Pre-delay of up to 300ms is selectable.

Program 5 HALL B3

This program is similar to Hall C1, but has lower energy initial reflections.

Pre-delay of up to 200ms is available.

Control of both high and low-frequency equalization is available.

Program 6 CHORUS

This is a five-voice program which is very useful for 'filling out' voices and certain instruments.

The five voices are panned across the stereo image and are separated from each other by randomized delays operating on each voice. In addition, a basic separation is also selectable to bring the voices 'closer' together or to 'spread out' the image in time and space.

The program is controlled as follows:

The Pre-Delay control affects the separation of the voices, as described above. The nudge control increment steps of 1ms instead of the normal 10ms because of the short delay nature of this program. The maximum value selectable is 50ms which, over the five voices, gives a total spread of 250ms.

At settings below about 6ms useful phasing/flanging/tunnelling effects are available. These effects are especially evident if the outputs are summed to mono.

The 'depth' of the randomizing and pitch changing effect is controlled by the DECAY control.

High-frequency filtering of all voices is available.

NOTE:

(1) Phase cancellation and addition are very strong in this program by design, which can mean that slight adjustment of the input level control may be necessary dependent on program material to avoid overflow conditions.

(2) This program is designed to be used mainly with voices. Program material with pure notes or large amounts of high-frequency energy may introduce varying amounts of interference signal components due to discrete stepping of time increments as in other reverberation systems. This may be reduced by use of the high frequency filtering control.

In most cases, very good effects can be obtained from this program as long as care is taken in choosing the relevant source material.

Program 7 ECHO

This program provides two high quality, completely independent and programmable outputs from a single input. Control of decay is via Pre-Delay, of feedback level (regeneration) via the DECAY control and high and low filtering can be selected in the decay path in the normal way.

To select which output to program, the 'A' or 'B' keys should be depressed as appropriate. The program title will reflect this selection, displaying ECHO A or ECHO B accordingly.

To allow the greatest flexibility in generating effects with this program, the maximum delays selectable on each output have been set differently – ECHO A: 1.2s and ECHO B: 400ms.

This program can be used to great effect for double/triple tracking, longer delays simulate tape echo, and very long delays with a high degree of feedback allow a musician to effectively 'play along' with himself by laying a new bar on top of previous slowly decaying bars to build up a very full sound. Since the regeneration is accomplished in the digital domain, a very clean effect is generated.

Both high and low-frequency profiles can be modified.

Program 8 NONLIN 2

This is an unusual program for special effects or loudness enhancement, in which the sound decays only very slightly for a period of time (set by the decay control), and then dies away very rapidly. It is especially useful on drums, and with small settings of decay produces a very good room effect. The decay values are not calibrated in this mode, but values may be used for reference. Unlike NONLIN 1, the output is in stereo.

Pre-delay of up to 300ms is available.

Filtering of high-frequencies is available.

Program 9 REVERSE 1

This is another special effect program with dispersed reflections on the left output and more discrete reflections on the Right output. Dependent on the setting of the decay control, the reverberating sound builds up for a period of time then suddenly stops - the reverse of natural reverberation. Again, decay settings are not calibrated but may be used for reference.

A pre-delay of up to 100ms is selectable before the start of the reverb build-up.

Program 10 REVERSE 2

This is another special effect program with two outputs of separate character. One output has discrete reflections (output 2), the other has a more diffused character (output 1). Either output may be used but it should be noted that this feature is designed to offer maximum flexibility, and it is not intended that both variations are used together as a stereo pair.

Dependent on the setting of the decay control, the reverberating sound builds up for a period of time and then suddenly stops - the reverse of natural reverberation. Again, decay settings are not calibrated but may be used for reference.

A pre-delay of up to 300ms is selectable before the start of the reverb build-up.

Unlike REVERSE 1, the output is in stereo and filtering of high-frequencies is available.

Program 11 FREEZE

It has always been possible to select an infinite decay to which further input may be added to the RMX16. This was achieved by setting the AMBIENCE program to maximum decay with high and low filters set flat to zero. This feature has been made easier to control with the FREEZE program.

The program is controlled as follows: The only control that is necessary is the decay control. The following settings only are effective: 0.0 Clear - this setting allows the 'frozen' setting to be released 0.2 Freeze/add - in this position, the program will accept and freeze incoming audio 0.1 Freeze/mute input - in this position the algorithm continues at infinite decay time, but gates out incoming audio.

Although the above may sound complicated, in practice it is a very easy operation using the nudge button on decay. By using first and second fingers to switch between the three values - adding audio when ready at 0.1 and gating out when the required amount of extra signal has been introduced, very concise control of the effect is available.

A pre-delay of 200ms is selectable.

All settings above 0.2 give the Freeze/add condition - therefore further use of the decay control is not of much value with this program.

Program 12 ROOM A0

This is the original version of ROOM A1 - shipped with very early RMX16 units. The program was later modified to restrain the very top end of the response, which could be a little difficult with certain program material. However, a number of well-respected users had utilized this program to great effect and have asked to be given access to it once more.

Control of only high-frequency decay profile is available.

Pre-delay to 300 milliseconds is selectable.

Program 13 ROOM B1

This room has constant diffusion density with time and utilizes a completely different algorithm to ROOM A1. The maximum decay time is of the order of 700ms and because of the constant diffusion rate, the impression of the size of the room is altered by the DECAY control.

This program is very useful when very short decay times are required, and also for drama dubbing where fine control is required over the perceived dimensions of particular environments.

A pre delay of 300ms is selectable.

High-frequency control is provided to simulate the amount of HF damping in the room.

Program 14 HALL A1

This program has a similar history to ROOM A0. Used by some to great effect, especially on vocals - it was replaced to allow greater smoothness in decay, but this feature was liked by some.

Pre-delay of up to 200ms can be selected.

Low-frequency control of the decay profile is not available on this program.

Program 15 PLATE B1

This is a program with high diffusion, similar to that produced by plate reverberators. Percussive sounds are rapidly smoothed with this program. Colouration is medium and the decay is even as with standard plate reverberators.

Decay times of up to five seconds are useful for normal use, and above for special effects. Indicated decay times are accurate to about 5 seconds, but it should be noted that perceived decay time will depend greatly on the frequency spectrum of the input program material referred to the filter settings.

Pre-delay of up to 200 milliseconds is selectable.

Control of high and low-frequency decay times is available.

Program 16 DELAY

This program gives very high-quality delays of up to 810 milliseconds. The delay required is set by the selection of pre-delay. The decay time control then acts as a feedback control, zero decay time giving a single repeat echo whilst above zero regenerative echo effects may be obtained. When used for this function the decay time control is not calibrated. Since the feedback is achieved digitally, no degradation of the repeated sound occurs, and the effect is quite remarkable for its clarity.

This delay appears on output 2 only. Output 1 is 'straight through' the Analog-to-Digital-and-back-again chain. (For 2 channel operation; ECHO splits the available delay time between the channels, with independent control over delay and feedback).

Short delays may be used for automatic 'double tracking' or 'doubling' (up to about 40-50ms) longer delays to simulate tape echo, and very long delays coupled with a high degree of feedback allow a musician to effectively 'play along' with himself by laying a new bar on top of previous slowly decaying bars to build up a very full sound.

Program 17 IMAGE P1

This program is the first of a series of IMAGE programs which are designed for very special effect. IMAGE P1 is a program similar to the NONLIN series, except that the reverberation produced pans between the stereo outputs as it proceeds. The length of time of the effect is selectable by the decay controls between a few milliseconds and about 0.6 seconds and can produce some very startling image effects which obviously have no equivalent in natural environments.

Pre-delay will have no effect on this program.

Control of the brightness of this program is achieved via the HI FILTER control.

If the stereo outputs of this program are summed to mono, an effect similar to NONLIN will be obtained.

Program 18 NONLIN 1

This program is for special effects or loudness enhancement, in which the sound does not decay for the first period of time set by the decay control, then very rapidly dies away. The decay values are not calibrated in this mode, but values may be used for reference.

A pre-delay before the reverberation begins of up to 300ms is also selectable.

The program has two outputs - one having discrete reflections (2), the other having a more diffused character (1). Either output may be used at short decay times for multiplying percussive sounds like handclaps - the smoother program at short decay times for a certain type of room simulation.

Appendix B

High and Low Frequency Decay Characteristics

High and low-frequency profiles may, for many programs, be modified as specified below. These figures apply to the final, reverberant phase of the decay or each program, but early reflections are also affected in certain programs, so the figures should be used as a guide only. The final setting should be selected by ear.

Nominal High Frequency Decay Control Characteristics

Setting	Half decay time frequency
0	18 kHz (flat)
-1	15 kHz
-2	10 kHz
-3	8 kHz
-4	6.5 kHz
-5	5 kHz
-6	3.5 kHz
-7	2 kHz
-8	1.5 kHz
-9	1 kHz

Low Frequency Decay Control Characteristics

The low-frequency filter control affects the decay time of the reverberant phase of the programs at a frequency of 350Hz, varying nominally from a quarter of the indicated time at a setting of -9, to four times at +9. Program material content varies the subjective effect of this control considerably; again, it is best set by ear.