USER'S MANUAL



t.c. electronic
ULTIMATE SOUND MACHINES

M2000
STUDIO EFFECTS PROCESSOR

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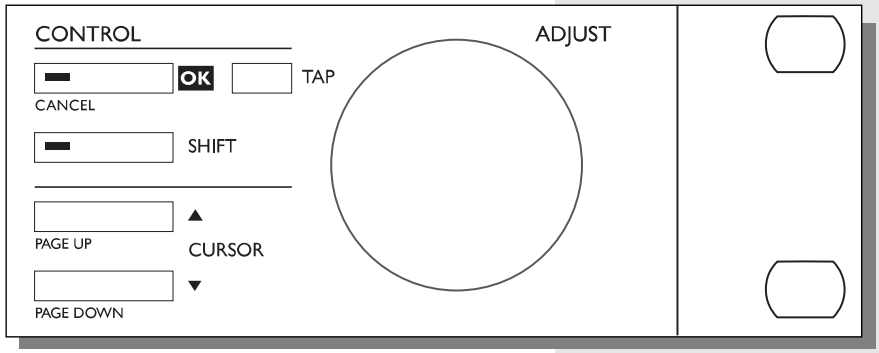
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WELCOME

Congratulations on the purchase of your new M2000. We hope, that you will have as much pleasure using it as we had making it.

The M2000 is basically two separate effect Engines housed in the same box. They can be used as such but they can also work together in a number of Combined configurations. The outputs of the two Engines are mixed down to a common stereo output.
The general Control of the M2000 is accomplished by moving the cursor with the cursor keys; value changes are made by turning the Adjust wheel.
The rest is simple. You select the area that you wish to control by pressing the function keys on the front of the M2000; i.e., if you want to Recall you press the RECALL key.



About this Manual

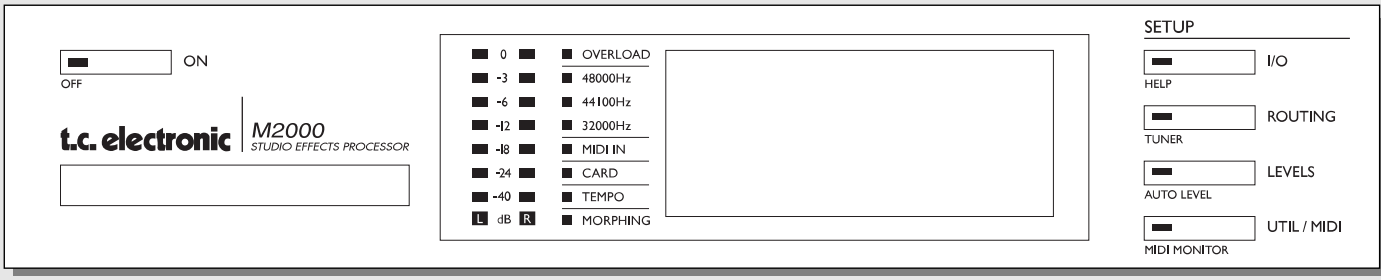
Many people in the music business have an aversion to reading manuals. We understand that. So if you feel like starting without reading the whole manual, simply: Plug & Play. You can always use the manual for checking out areas that you have questions about or if you want to dig deeper into the unit. Refer to the Table of Contents for further information.
On the other hand, you might want to know a little more about the M2000 before you start pressing keys. The manual will take you step by step through all of the M2000 functions. If you want to read about a specific function, please refer to the Table of Contents.

The Help function

The Help function is another way to learn your way around the M2000. Simply press Help (Shift - I/O) and the Help function will brief you about functions in the current display.

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THE FRONT PANEL



POWER + MEMORY CARD

Electronic power switch
»Easy touch«
Keep pressed for more than 1sec to turn device off.

PC-CARD memory card
Copy presets to/from a standard memory card.

PPM + INDICATORS

PPM meters
range from -40dB to 0dB

Overload
Lights up if internal overload occurs.

SampleRate indicator
48000Hz
44100Hz
32000Hz

Midi In
Midi receive indicator

Card
Indicates presence of a valid memory card

Tempo
Beats per Minute indicator

Morphing
Indicates an on-going morphing

SETUP SECTION

I/O
Input/output
Samplerate
Digital/analog selection
Dithering.

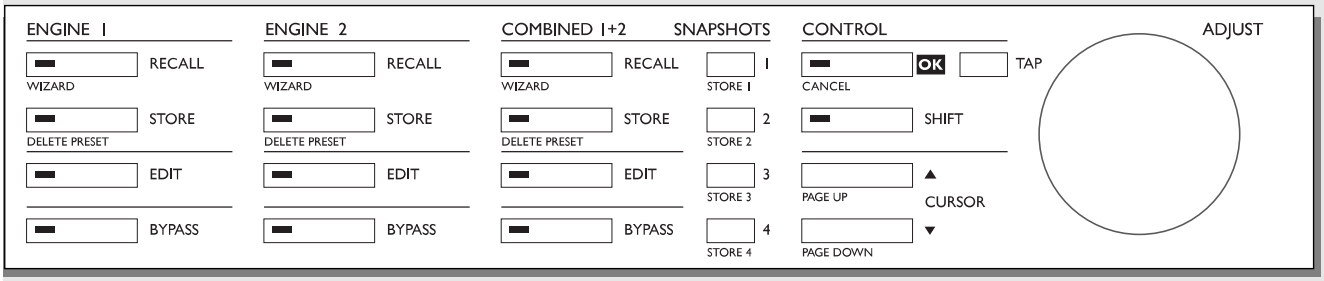
Routing
Setup the internal routing of the 2 engines.

Levels
Input/output analog levels
Digital input level

Util/Midi
Viewing angle
Security lock
Preset handling
Pedal input
MIDI

Secondary functions
Help (online help function)
Tuner (the tuner you always wanted)
Auto level (the fast way to set input levels)
Midi monitor (Monitors all midi ch. at the same time)

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ENGINE 1 OR 2

Recall
Recall presets to engines

Store
Store and name presets.

Edit
Edit engine 1 or 2

Bypass
Individual bypass key for each engine.

Second functions
Recall Wizard
Find a preset that match your application
Delete Preset
The fast (and only) way to delete presets

COMBINED 1+2

Recall
Recall combined presets.

Store
Store and name combined presets

Edit
Engine mix level
Dynamic Morphing

Bypass
Bypasses the entire device.

Snapshots 1-4
Quick store/recall of combined presets

Second functions
Recall Wizard
Delete Preset

CONTROL SECTION

OK
Confirms operations.

Shift
Enables access to »shifted« secondary functions.

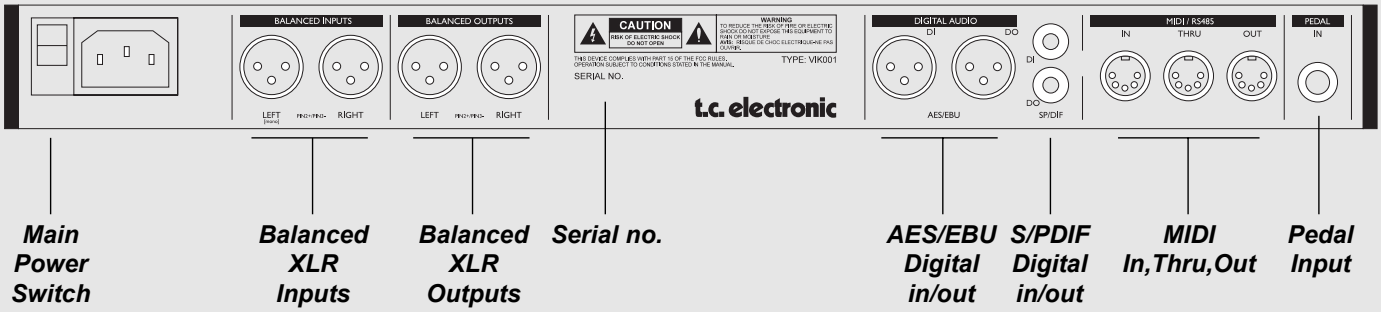
Cursors
Moves between parameters

Adjust wheel
Sets parameter values and preset numbers.

Second functions
Cancel
Page up/down

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THE REAR PANEL



Main Power Switch ***Balanced XLR Inputs*** ***Balanced XLR Outputs*** ***Serial no.*** ***AES/EBU Digital in/out*** ***S/PDIF Digital in/out*** ***MIDI In,Thru,Out*** ***Pedal Input***

Notes:

To accomodate International regulations, we have also added a back panel power switch. You don't need to use the power switch on the rear panel. Use the front panel power switch instead.

Remember to use the left input when you're using only one input.

Pin 2 is »hot« on all XLR's (AES Regulations).

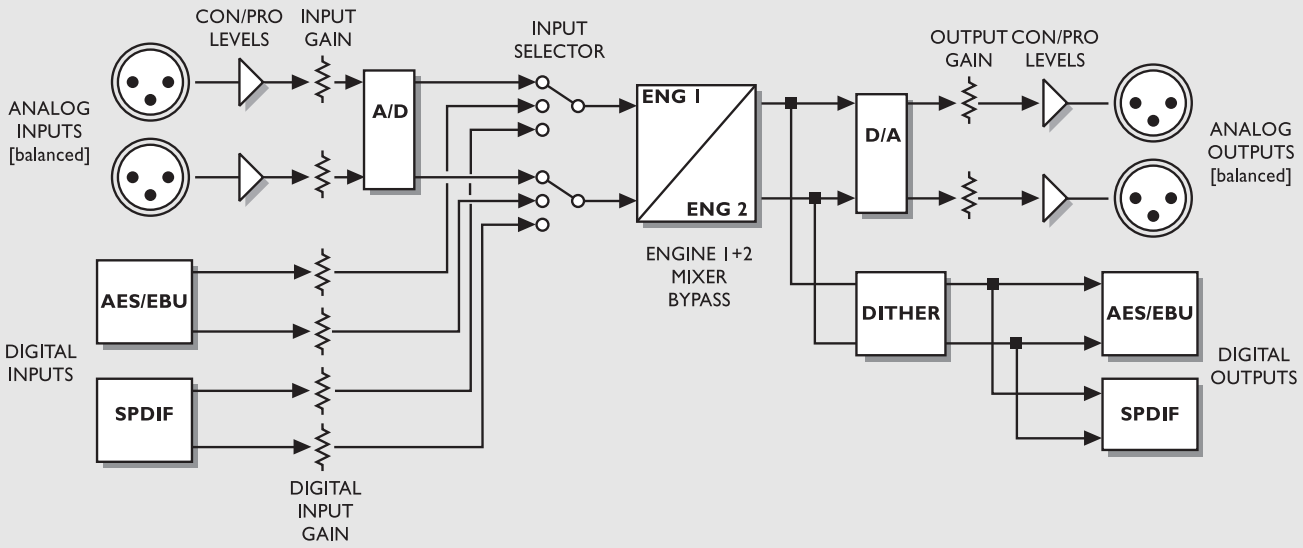
If You are connecting the M2000 to unbalanced equipment, you must tie pins 1 and 3 together in the cable ends away from the M2000.

We have reserved the two unused pins on the MIDI connectors for an optional RS485 interface. Therefore, if you are connecting M2000 to other equipment that use these pins, please make sure the cable is a 3-wire standard MIDI type, and not a five wire MIDIPLUS type.

If you want to use the pedal input, be sure it is a momentary »make« type.

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THE SIGNAL FLOW



Notes Regarding the signal flow:

As shown in the block diagram signals are present on all outputs, all the time.

The digital input gain circuit is capable of »lifting« the signal level. This is a very useful feature if you e.g. are feeding the M2000 with a DAT recording that isn´t fully leveled to 0 dB.

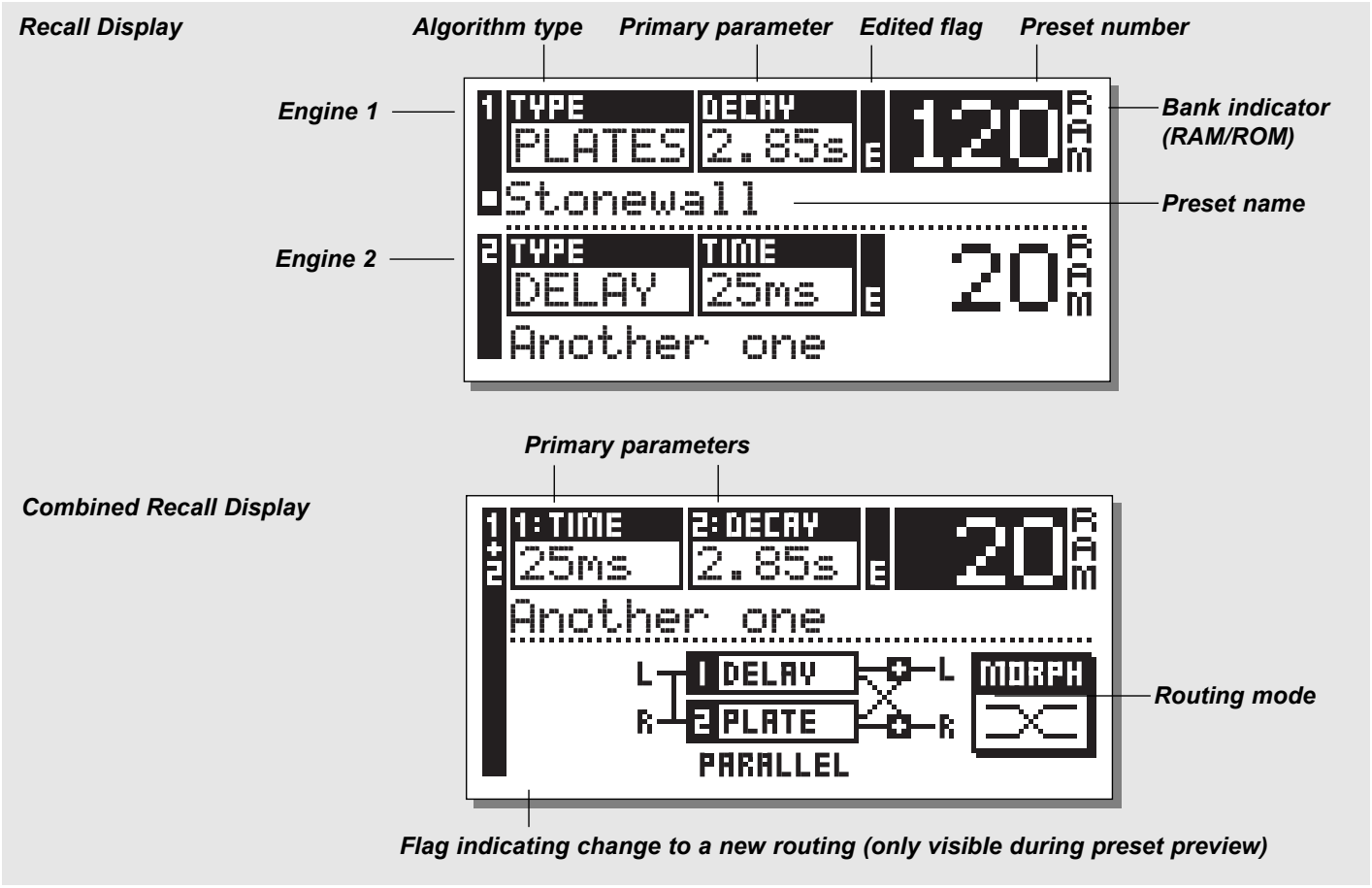
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RECALL + SNAPSHOTS

The Recall Displays

The Recall display is the »homepage« of the M2000. This means that you return to this display whenever you exit any other display of the M2000.
The Recall display is split into two halfs, showing the presets of both Engines at the same time. Engine 1 is always the top half while Engine 2 is the bottom half of the display.

If you want to have only one effect, use one engine and set the other in bypass mode.



Recalling a Preset

When you wish to Recall a preset, simply use the ADJUST wheel to scroll through the presets and press OK to Recall.

Another way of Recalling is to use the Wizard described later in this section (see »The Wizard«). The Preset number and the OK key will be blinking while you are previewing, indicating that the shown preset is not Recalled yet.
Use the Cursor keys (or the other Recall key) to access the other Engine.

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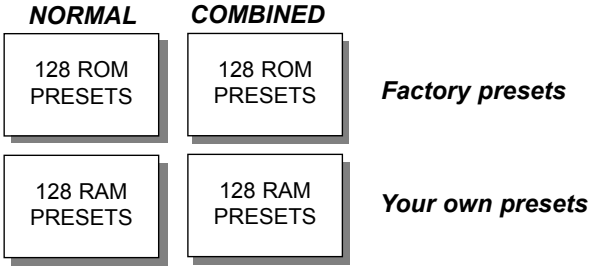
Combined Recall

The M2000 is capable of Recalling Combined presets, meaning a preset for each Engine in a combination.
A Combined preset consists of two normal presets and the Routing of the M2000: i.e. by Recalling Combined preset 30, a Chorus will be loaded into Engine 1; a Reverb will be loaded into Engine 2, and the Routing will change to Serial (see »Routing«).

To Recall a Combined preset:
Press the Combined Recall key and scroll through the presets using the Adjust wheel. Press OK when you find the right preset.

The Preset number and the OK key will be blinking while you are previewing, indicating that the shown preset is not Recalled yet.
A Combined preset is made out of two normal presets. This means that when you return to the normal Recall display (the Homepage) the M2000 will display the numbers and names of the two presets that the Combined preset consists of. The Edited flag will light if the presets have been modified.

Factory/User Presets



Preset banks

The M2000 contains four different preset banks. Each bank can hold 128 presets.

The four banks are as follows:

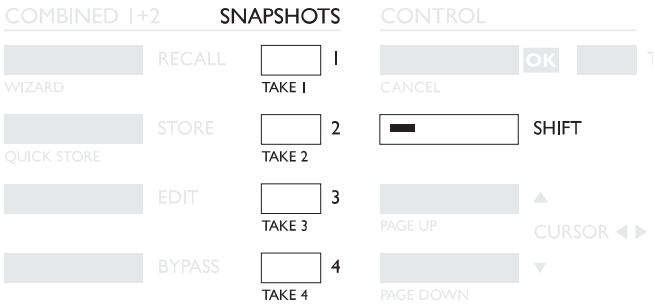
Normal ROM bank:
This bank contains 128 normal factory presets. The presets are available from Engine 1 and Engine 2.
Combined ROM bank:
The Combined bank contains 128 Combined factory presets. The presets are available from the Combined Recall.
Normal RAM bank:
This bank can hold up to 128 of your normal presets.
***Combined RAM bank*:**
The Combined Ram bank can hold up to 128 of your Combined presets (see Combined presets).

The two Ram preset banks are located after the corresponding Rom banks . This means that you scroll through the 128 Rom presets to enter the Ram bank.

For fast RAM access press shift and turn Adjust wheel one click to the right.

Snapshots

The Snapshots are fast Recall keys. Store your favorite presets or use the Snapshots as four compare keys.



A Snapshot will always include both Presets, and Routing just like a Combined preset.
With the Snapshots you are able to switch between completely different configurations with the touch of a single key.

TAKING A SNAPSHOT:
When you want to Take a Snapshot of your M2000 setup, press Shift and the Snapshot key where you want to store.

RECALLING A SNAPSHOT:
Recall of a Snapshot is very easy as well: Simply press the Snapshot you wish to Recall and the M2000 will change the whole setup.

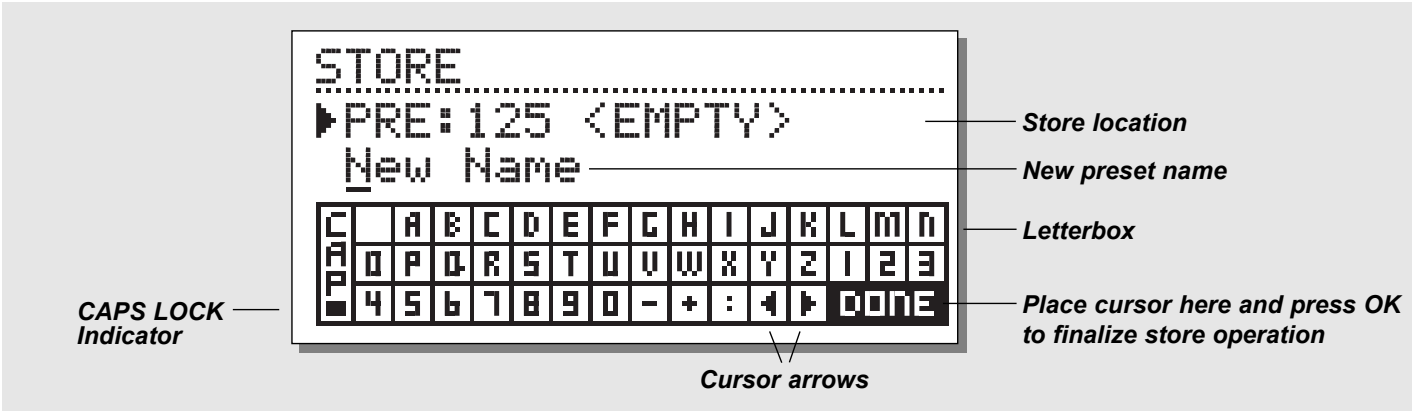
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STORE

Store a new RAM Preset

- Press the STORE button *[Engine 1, 2 or combined]*
- Select a location for your new preset *[dial between preset 1 to 128]*
- Move cursor to the new name line and dial in the new preset name *[find letter with ADJUST and confirm with OK]*
- Point on DONE and press OK to finalize store operation.

Store with the same name:
If you want to Store the Preset with the existing name simply select the RAM location to Store in by using the ADJUST wheel and press OK (the OK key will be blinking while you search for a suitable RAM space). The M2000 will now tell you "STORED" in a pop-up window and return to the homepage.



The letterbox

When you want to change the name of the preset to Store, press the Cursor Down key. You are now able to write a new name using the letterbox. Simply dial the ADJUST wheel and press OK to select new letters.
Select CAP, by pressing OK, to change case.
When you have changed the name select DONE in the Letterbox and press OK to Store.

Combined Store

The handling of Combined Store is exactly the same as a normal Store.
Please note that a Combined Preset Stores the Routing of the Engines along with the Preset.

Using a Memory Card:

When you wish to use a Memory card, simply insert the Card in the M2000. The M2000 will now autodetect your card and the Store, Recall and Snapshot facilities will be attached to the Memory card. The M2000 will now use the Memory Card as a normal RAM bank. When you remove your Memory card the M2000 will switch back to the internal RAM.

If the format of the Memory card is not correct, the M2000 will detect this immediately.

Card types
Type 1 PC-CARDS, with minimum 64KBytes SRAM.

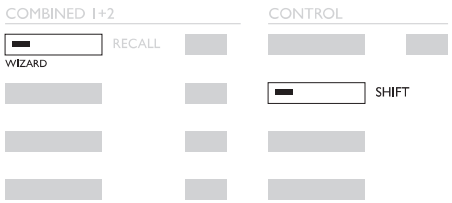
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THE WIZARD

The Wizard is a tool that helps you find the right preset for your program material.

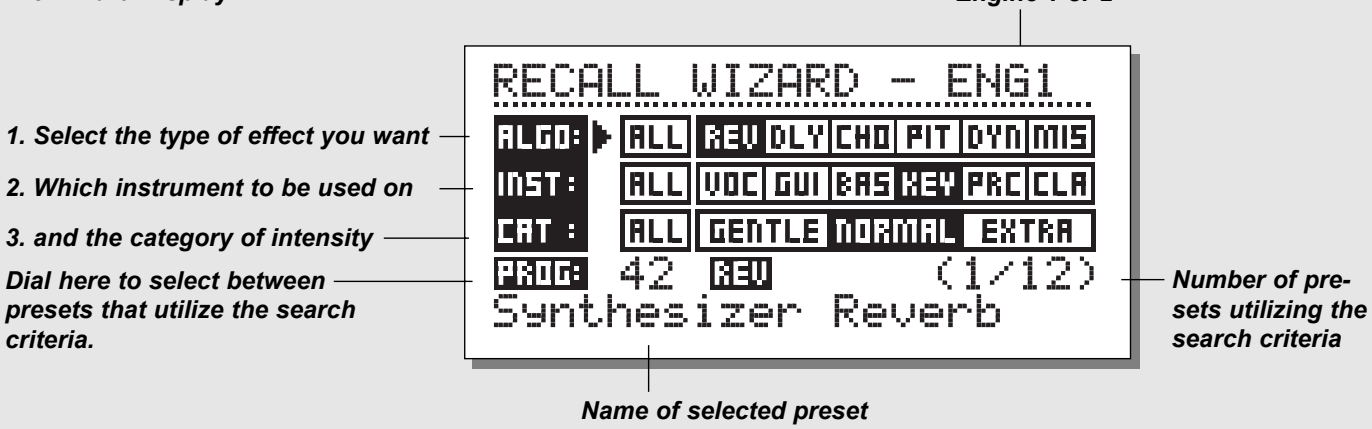
The Wizard is easy to access and simple to use.

Try it out, and listen what our creative staff suggests for your program material.



How to enter »The Wizard«

The Wizard Display



Press Shift and Wizard to enter the function
Use the parameter keys to select the different filters and the Adjust wheel to select filter parameters.

Set the three different categories as you desire and try out the proposed presets. The Wizard will show the Name and Number of the proposed preset.

Scroll through the Presets using the Adjust wheel and press OK to Recall.

You can use the Wizard in many different ways, i.e., set it to enter only Drum Reverbs or use it as a creative partner.

Algorithm types
Reverb
Delay
Chorus (including flanging and phasing)
Pitch
Dynamic (compressor/limiting/expanding/deessing)
Misc.

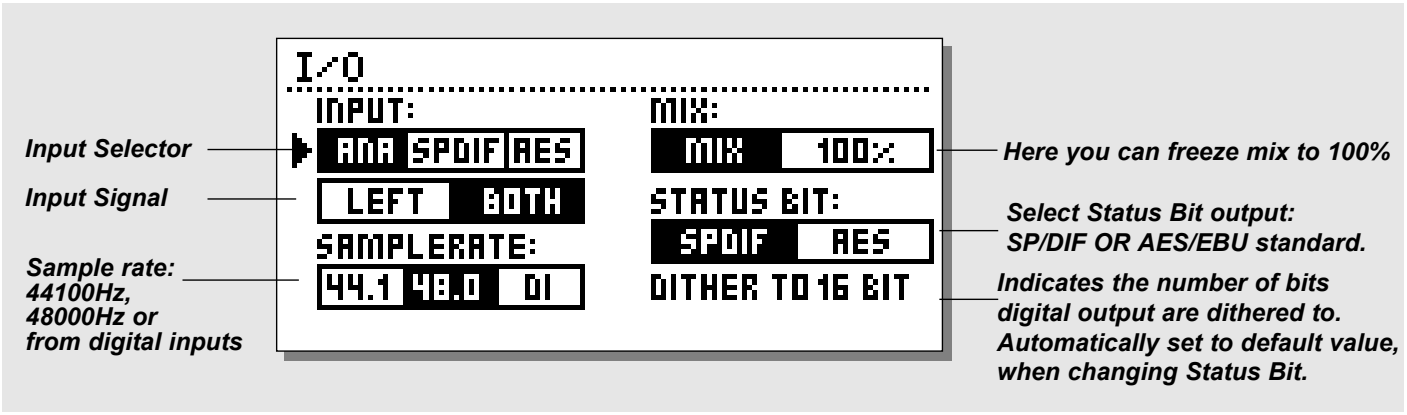
Instruments
Vocals
Guitars
Bass
Keyboards
Percussion
Classic instruments (violins, flutes, etc.)

Category
Gentle
Normal
Extra

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I/O

Press the I/O key to setup various I/O parameters.
Move the marker using the Cursor keys and turn the ADJUST wheel to change values.



I/O

Press the I/O key to setup various I/O parameters.
Move the marker using the Cursor keys and turn the ADJUST wheel to change values.

Input

Select Input source Analog/Digital.
Select Input type Left/Both. When you select *Left* the right input will be muted. If you are using two inputs you should select *Both*

Sample rate

Select Master clock 44.1 kHz/48 kHz/DI.
When Digital Input is selected, the external Clock frequency will be displayed by the three LEDS on the left side of the Display. If the M2000 cannot lock, all three LED's will be blinking.

Mix

The Mix is a global parameter. When Mix is set to "100%" the Mix parameter of all presets will be 100% and no direct signal will pass through the M2000. Note that when Mix is set to 100% the Bypass keys will act like Mute-keys.
When Mix is set to "Mix", the parameter is adjustable.

Status Bit:

This selector changes the Channel Status Bits of the digital output between professional and consumer format. When AES is selected, the M2000 will output the professional AES/EBU standard, and when S/PDIF is selected, the M2000 will output the S/PDIF consumer standard.
The defaults setting is AES/EBU but some digital consumer products refuses to accept the professional standard.
In that case change to S/PDIF consumer standard.
Example: If you are using a non-professional DAT machine as a receiver of the M2000 digital output, and you cannot make it accept the digital input, change the output format from AES/EBU to S/PDIF.
NOTE: The different Status Bit standards do not affect the quality of the audio output from the M2000.

Dither:

The M2000 can output Dither from 8 to 22 bit resolution on the AES/EBU and S/PDIF ouput. The dither type is HP-TDF or High Pass Triangular probability Density Function.
M2000 uses internal 24 bit resolution and 24 bit AD/DA converters. Dither should therefore only be used when the digital outputs are used (e.g. to a 16 bit DAT machine). It is recommended not to use dither until the final stage of a production, so if there is a chance that the source material is going to be dithered later in a production, do not use Dither.

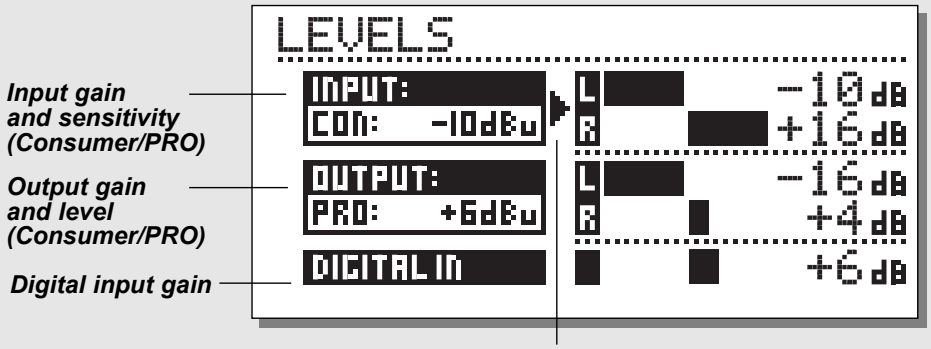
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LEVEL MENU

Press the Level key to access this menu.
These global level controls should be set to optimize the performance of the 24bit AD converter in the M2000.

The Level bars can be controlled individually or in common.
Mark the level bar you want to control using the cursor keys, and turn ADJUST to change value.
For common control the marker should be set between the two Level bars.

Note that the Digital In Level is capable of +6 dB gain.



Ranges

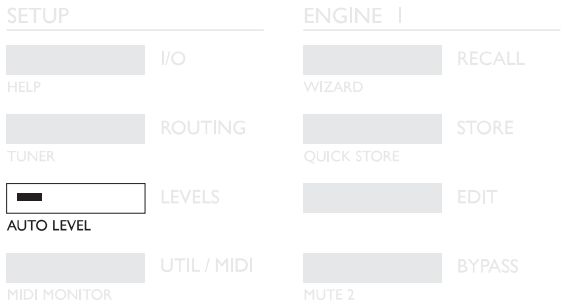
Analog Inputs
Consumer range: -16dB to +10dB
Professional range: -6dB to +16dB

Analog Outputs
Consumer range: -10dB to +16dB
Professional range: -16dB to +6dB

Digital Input Level
Adjust the Digital Input from: Off to +6dB.

Auto level

Press SHIFT and AUTO LEVEL to activate function.

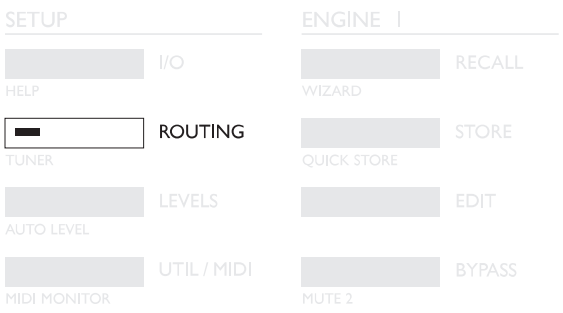


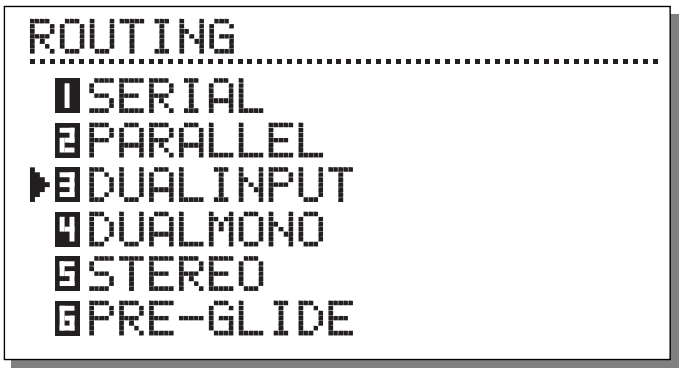
Send your expected source into the M2000 and press Auto Level (Shift-Levels) to optimize your Input level automatically. The M2000 will perform a measure for about five seconds and then adjust the Input level giving you about 6 dB of headroom.

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ROUTING

Pressing the Routing key gives you the ability to choose one of six different Routings.
Move the marker by pressing the Cursor keys and press OK to accept the new Routing.
A small pop-up window will tell you that the Routing has changed.



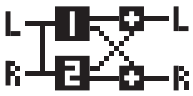


Serial



The Serial mode is a Stereo In/Out Routing. The Serial mode is very useful when you want two independent effects in the same signal path; i.e., from a Keyboard through the M2000 Reverb and Chorus to The mixer.

Parallel



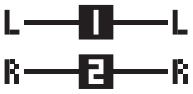
The Parallel mode is a stereo In/Out Routing. Both Engines will work as stereo effects and their Output will be mixed down to a stereo signal. With this Routing, the M2000 can be used as two parallel effects on the same stereo source. You may also set the I/O menu to left input to get two independent stereo-out effects on the M2000 from a single send on the mixer.

Dual input (Split mode)



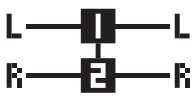
The Dual input mode is a Dual mono In / stereo Out Routing. Left In is always attached to ENGINE 1 and Right In is attached to ENGINE 2. Using this Routing enables you to get two different effects with separated inputs; i.e., connect Aux 1 from your Mixer to Left In and Aux 2 to Right In. You now have access to two separate effects with a common stereo output. Set the individual Preset output volumes to achieve the correct effects balance.

Dual Mono



This mode is for Dual Mono In/Out Routing. Left In/Out is always ENGINE 1 and Right In/Out is ENGINE 2. The Dual Mono is very useful when you want to use the M2000 as two independent Inserts.

Stereo



When you select the Stereo Routing, the two Engines will link together to perform true Stereo. This means that the preset of Engine 1 will be copied into Engine 2 and the Edit pages will lock together. The Stereo Routing is indicated by the two Edit LEDS which will be lit simultaneously. Left and Right channel audio path are completely separated in this Routing.

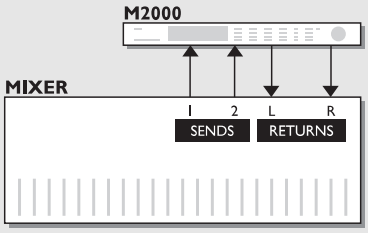
Preset Glide



When the Preset Glide Routing is selected, the M2000 will perform preset changes by crossfading the current Effect and the new preset. This gives you a very smooth change of effects; i.e., allowing a Delay to keep repeating while a Chorus is being faded in.
The glide time is located in the Utility menu (see Util/MIDI).
Please note that only one Engine is available while the M2000 is in the Preset Glide Mode.

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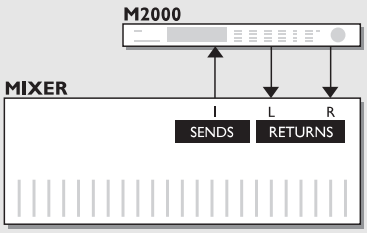
STUDIO SETUP EXAMPLES



Use two sends on your mixing console

Dual Input mode

Let's say Engine1 is running a long Hall-type reverb and Engine 2 a short more ambient type of reverb. On Your mixing console you'll now have individual sends for the two effects. And - not to forget - you are saving a set of return channels.



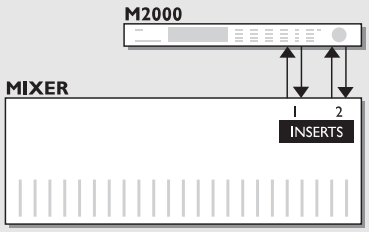
Create your own vocal reverb

Serial mode

You probably always wanted to have a long bright reverb on your lead vocal, without »esses« hanging for seconds. That's now possible. You simply connect a »de'esser« and your favorite reverb in serial. The de'esser will cut away all sharp transients in the signal.

If you want your vocal to have a unique »livingness«, or the reverberated signal to be slightly detuned, simply connect the pitch shifter or chorus in series with the reverb.

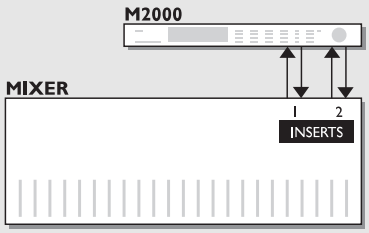
There are numerous applications in this mode - try them out.



Two individual inserts on your mixer

Dual mono mode

In the dual mono mode you are able to use two completely separate mono effects at the same time. It can be equalizers or compressors or whatever you can imagine.



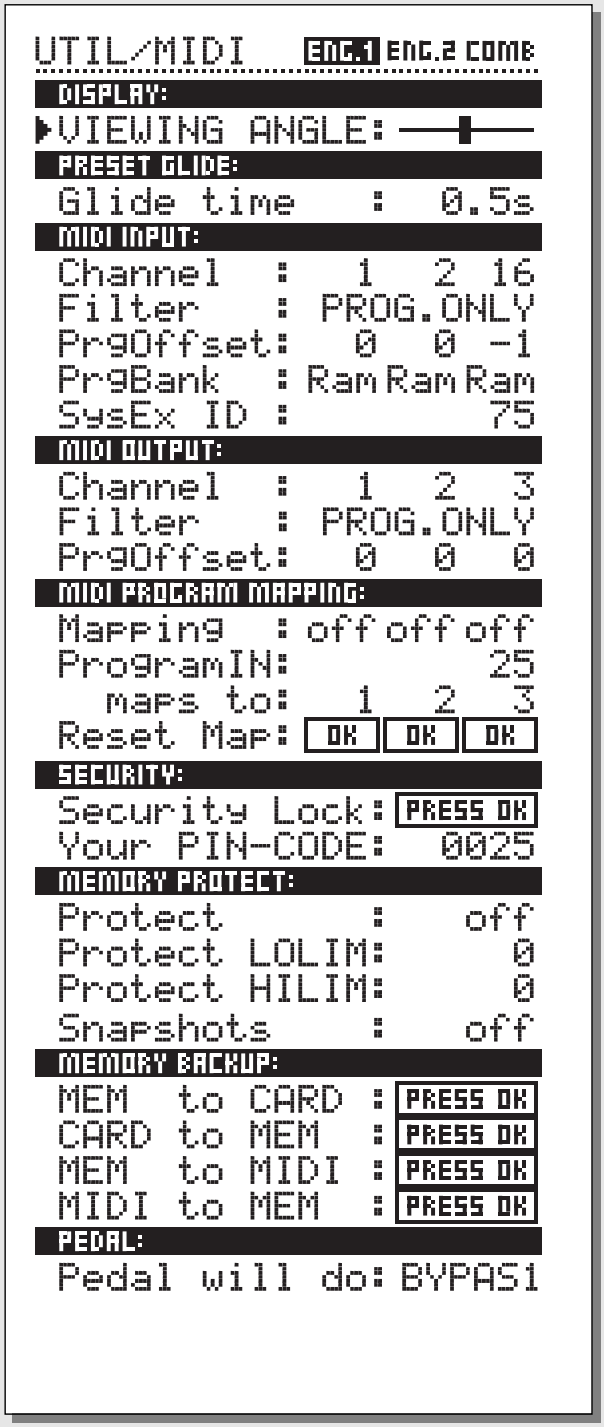
Post Production

Stereo mode

When running in stereo mode both engines are linked in stereo and both channels audio path are totally separated. This means that you can process Dolby Surround™ materials without destroying the hidden information. Use this mode when adding reverb to your recording.

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UTIL/MIDI



How to move around

In the Util/MIDI menu you always move by pressing the Cursor keys and change values by dialing the Adjust wheel.

Display

Viewing Angle:
Adjust for best contrast on the LCD display.

Preset glide:

Glide time
This parameter sets the glide time of the incoming preset. The parameter is only active when Preset glide Routing is selected (See Routing).

In the MIDI section you are able to see the MIDI setup of both Engine 1, Engine 2 and the Combined section at the same time.

MIDI In

Channel
Sets the Channel of which the current Engine will respond to. When set to Omni the Engine will respond to all channels, When set to off no MIDI will be received.

Filter
Sets whether the current section of the M2000 should respond to MIDI Control changes (CTRL) and MIDI Program changes (PROG) or not; i.e., when Filter is set to PROG the M2000 will only respond to MIDI Program changes.

Offset
With this parameter, you are able to add or subtract to the incoming Program change; i.e., the incoming Program Change is preset 123, and the Offset is set to +1, the Program Change will now be 124.

Sys-ex id
Sets the Sys-Ex ID number of the M2000.

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MIDI Out

Channel
Sets the sending MIDI channel of the M2000.
Filter
Sets wether the current section of the M2000 should send out MIDI Control changes (CTRL) and MIDI Program changes (PROG) or not; i.e., when Filter is set to PROG the M2000 will only send out MIDI Program changes.
Offset
With this parameter you are able to add or subtract to the outgoing Program change; i.e., the outgoing Program Change is preset 123, and the Offset is set to +1 the Program Change will now be 124.

MIDI Map

MIDI Map
Sets the current MIDI Map On or Off.
Prg. Bank
Determines which Bank the MIDI Map should control; Ram/Rom.
Prg. In
The current Program change Maps to a M2000 program (See Maps to).
Maps to
The current incoming Program change set in "Prg. In" will be changed to the Program number of this parameter.
Reset Map
Press OK while this parameter is selected and your MIDI Map will be Reset.

Security

Security Lock
Press OK while this parameter is selected to Security lock the M2000. When locked, you will have to dial the PIN-Code shown below to access the M2000.
PIN-Code
Set your own PIN-code for the Security lock by Dialing the Adjust Wheel.

If you should forget your PIN-code, please enter the Reset page. This will release M2000 from the locked state. (You do not have to run any of the reset functions).

Memory Protect

Protect
This parameter sets the Memory protect On or Off. When the Protect is activated the Ram presets inside the High and Low limit are write protected.
Low Lim
Sets the Low limit of the Memory protect. The current number is included in the Protect.
High Lim
Sets the High limit of the Memory protect. The current number is included in the Protect.
Snapshot Protect
Enables or disables the Protect of the Snapshots. When activated the Snapshots are write protected.

Memory Backup

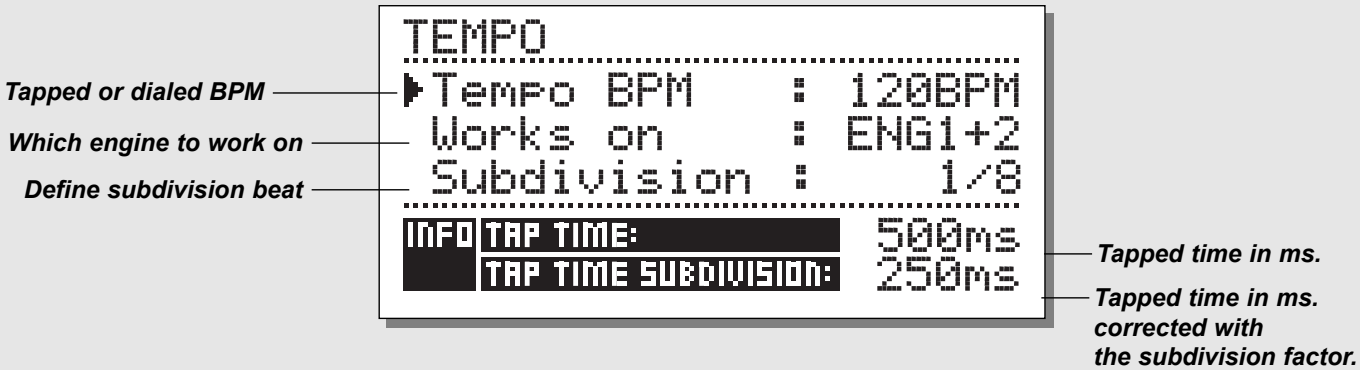
Mem > Card
Insert a PC-CARD Card in the card-slot and press OK. All Ram presets of the M2000 will now be backed up to the Memory Card.
Card > Mem
Insert the PC-CARD Card containing your presets and press OK. All Presets will now be Stored back into the M2000 Ram.
Warning:
This action will destroy ALL existing Ram Presets of the M2000.
Mem > Midi
Connect your M2000s Midi Out to a another M2000, a Sequencer or any other Midi Recordable device. Press OK and the M2000 will perform a Midi bulk dump of all Ram Presets.
Midi > Mem
Connect the Storing device to the M2000s Midi In and press OK. The M2000 is now ready to receive a Midi bulk dump containing Ram presets. WARNING this action will destroy ALL existing Ram Presets of the M2000.

Pedal

Pedal
The Pedal input can control any one of four different features: Engine 1 Bypass, Engine 2 Bypass, Engine 1+2 Bypass and Tap tempo.
Select by turning the Adjust Wheel.

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TEMPO



Tap Tempo
The Tap Tempo key is similar to its cousin "Learn" on the TC 2290 Digital Delay. Only the M2000 Tap Tempo key can control various parameters: Delay time, Decay time, Chorus speed, etc. When you press the Tap key, a Tempo menu pops up. If no further actions are made, the Tempo menu will disappear after a few seconds.
The Tap key is attached to a default parameter in each effect type. This means that the function of the Tap key changes along with the presets (See default list later in this section).

The Tempo Menu
The Tempo you tap is always measured in BPM (Beats Per Minute). The Tempo menu is able to recalculate the tapped time into Subdivisions of the BPM. Simply set the Tempo menu to the Subdivision you like and Tap the BPM on the Tap Tempo key. You also have the possibility of changing the Tempo using the BPM parameter in the Tempo menu. When a preset has been "Tapped", the parameter attached to the Tap function will be displayed in BPM in the Tempo Menu.

Tempo BPM
The BPM will display the Tapped tempo (BPM is equal to the 1/4 Subdivision). You can also set your Tempo with this parameter using the ADJUST wheel.

Subdivision
Sets the subdivision of the Tempo. If the Subdivision is set to 1/8, the actual Tempo will be twice as fast as the tapped time, etc. The following subdivisions are possible:
1,1/2,1/4,1/4T,1/8,1/8T,1/16,1/16T,1/32,1/32T (T for triplets).

Tap/Subdivision
This is read only parameters displaying the tapped time and the Subdivided time in milliseconds. Tap Time Subdivision is corresponding to the parameter in your preset.

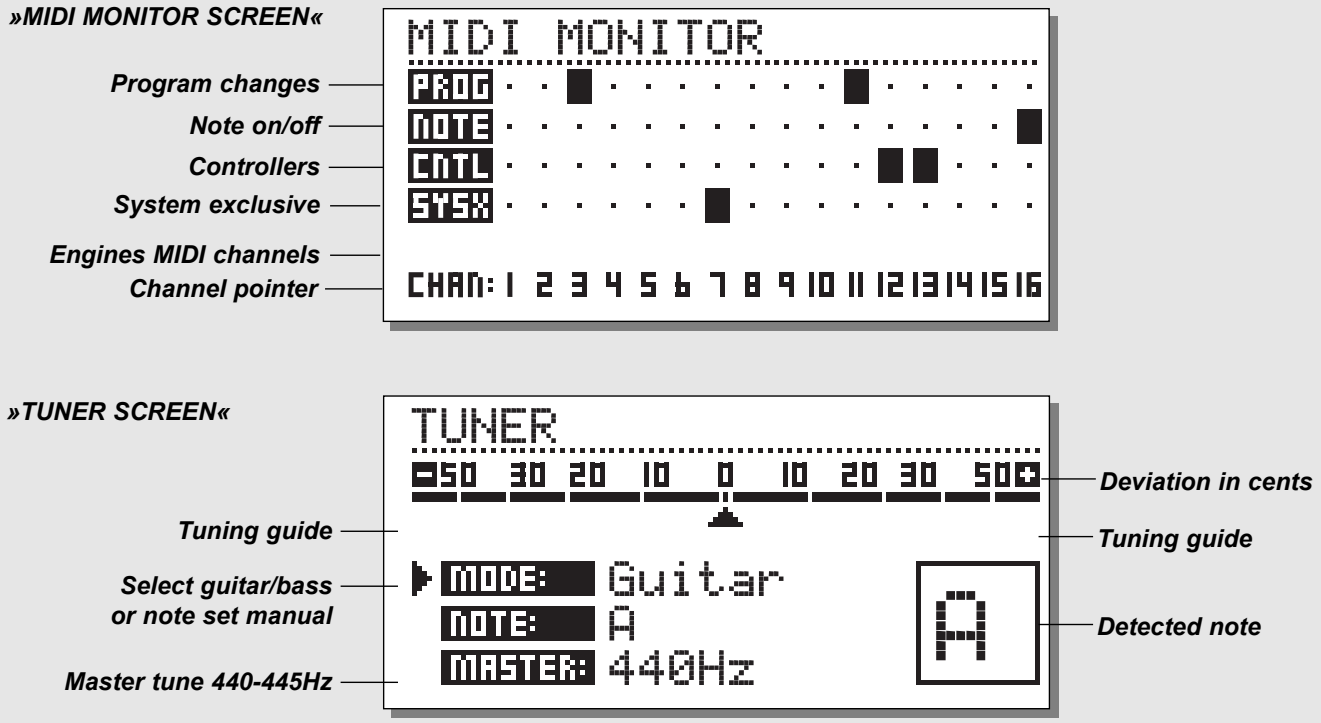
The parameters controlled by the Tap key

Reverb	Decay parameter
Delay	Delay time
Chorus	Speed
Flanger	Speed
Phaser	Speed
Tremolo	Speed
Panner	Speed

TIP ***Press and hold TAP for 3 seconds to learn MIDI tempo (MIDI-Clock).***

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MIDI MONITOR & TUNER



MIDI Monitor

Press Shift - Util/Midi to access MIDI Monitor.

In the MIDI Monitor, you are able to see all MIDI actions received by the M2000. The actions are displayed according to the current channels.

Prog.	Displays Program changes.
Note	Displays Note On/Off.
Cntl	Displays Control changes
Sys-x	Displays System exclusive commands
Eng	Displays the midi channels of Eng 1,2 and combined.
Chan	Displays the Midi channels

Press any key to exit MIDI Monitor.

Tuner

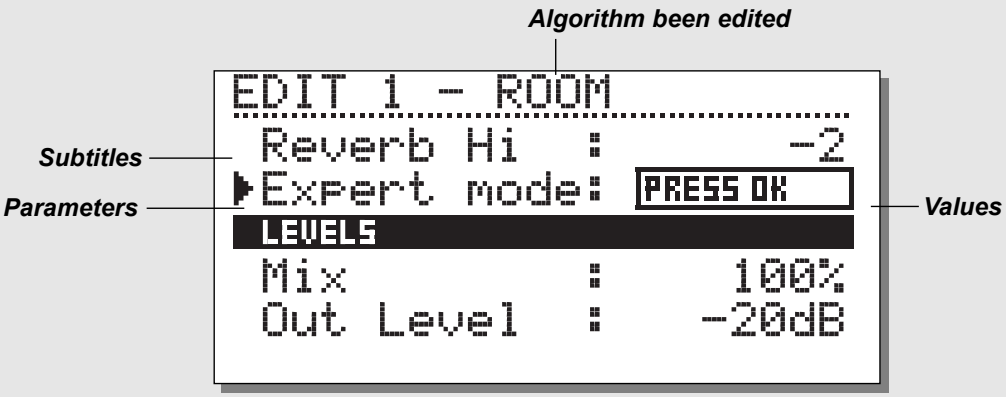
Press Shift - Routing to access the Tuner of the M2000.

When Tuner is selected, the Outputs will be muted.
Select Guitar/Bass/Manual mode by turning the ADJUST wheel.
When Guitar or Bass is selected, the Tuner will only respond to notes corresponding to the strings of these instruments.
When set to Manual, you must select the desired Note using the ADJUST wheel.
In the Master section, you can Calibrate the Tuners default, 440-445 Hz.
The detected note will be shown in the lower right corner and in the note line. When the horizontal marker is 0, you are tuned in.
The two tuning guides will tell you wether the note is too flat or too sharp.

Press any key to exit Tuner.

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EDIT



Edit

In the Edit menu, you always move by pressing the Cursor keys and change values by dialing the Adjust wheel.

Expert mode

When pressing OK on the Expert line, the M2000 will enable you to access a detailed Edit mode of the Reverbs.

Since the two different Edit modes (User & Expert) are not compatible, it is NOT possible to return to the User Edit mode. When Storing a preset Edited in Expert mode, the current preset will remain in expert mode forever.

Combined Edit

See illustration on next page

The relative Levels of the two Engines can be adjusted in this display. The range is: off - 0.0 dB.

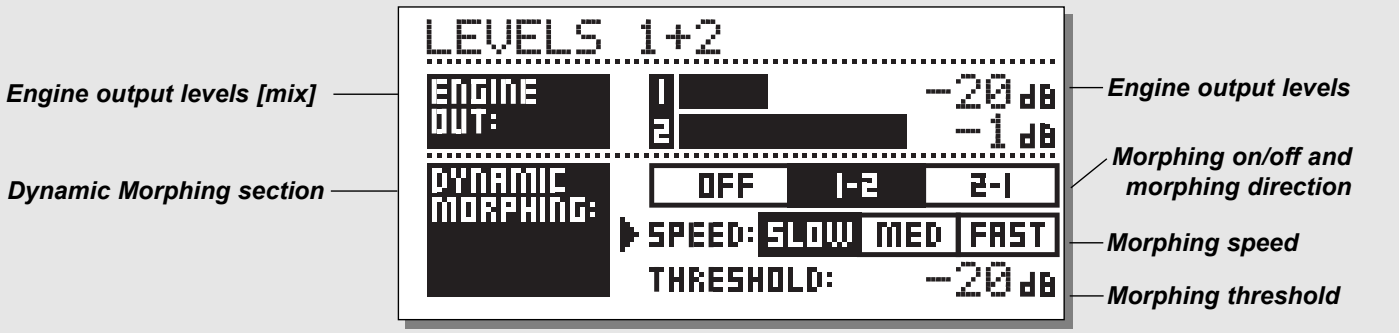
These levels affect both analog and digital outputs.

Move the marker by pressing the Cursor keys; change values using the Adjust wheel.

The Engine Out Levels are identical with the Outlev. parameter in the Edit page and will, at all times, be corresponding with these.

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DYNAMIC MORPHING



Dynamic Morphing

The Dynamic Morphing function is a great new way of interaction between your source signal and the Effect.

When activated, the M2000 will morph between the two Engines according to your Input level. This is a function for quick seamless changes of an Effect.

Think about the vocal in a ballad being soft and subtle during the verse and then rising to heartbreaking heights in the chorus. Now imagine the Reverb changing along with it, from a small discreet Room in the verse, to a Big Bright Hall in the chorus.

Simply select the two presets in the current Engines and then activate the Dynamic Morphing function. Set the Threshold and the Speed of the Dynamic Morphing and check out the result.





Morph direction 1-2:
If this box is selected, Engine 1 will be active while the Input is below Threshold.



Morph direction 2-1:
If this box is selected, Engine 2 will be active while the Input is below Threshold.

Note that the max. level of the Engines is set by the Engine Out bars above Dynamic Morphing.

The Dynamic Morphing is Stored along with Combined Presets.

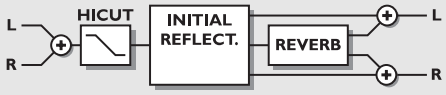
The Dynamic Morphing function is only available when Routing is set to Parallel.

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Reverb Programs

HALL-ROOM-PLATE-AMBIENCE-GATED

All Reverb presets both have a User and an expert page. The number of parameters depends on which preset you have selected.



USER PARAMETERS

Decay
Sets the decay time. The value indicates the time to where the reverb tail is damped to -60dB.

Pre-delay
The time to arrival of the first reflection.

Reverb Lo
Adjust the low frequency reverberation time.

Reverb Mid
Adjust the mid frequency reverberation time.

Reverb Hi
Adjust the high frequency reverberation time.

Expert mode
Press OK here to enter expert mode. Remember there is no way back to normal user parameters, after adjusting any expert parameters.

HiCut freq.
Sets the cutoff frequency of the HighCut filter.

HiCut level
Damping ratio in dB of the HighCut filter.

Mix
Mix between direct and effect.

Out Level
Adjust output level. Use this parameter to match levels between presets.

EXPERT PARAMETERS

(only additional parameters mentioned)

Diffuse
This parameter sets the degree of wall diffusion. Increasing the value will result in a more dense reverberation tail. Don't set the value too high, as it will result in a not natural sounding reverberation tail.

Room shape
Here you can choose between different room shapes. Changing the room shape will change the initial reflections.

Size mult.
Size multiplication factor. With this parameter you can change the size of the room. Only the initial reflections are influenced by this factor.

Lo Crossover
Crossover frequency between low and mid band reverberation filter.

Mid Crossover
Crossover frequency between lo-mid and hi-mid band reverberation filter.

Hi Crossover
Crossover frequency between mid and high band reverberation filter.

Initial lev.
Sets the Initial reflection level.

Rev.lev.
Level of the reverberation tail.

Rev.width
This parameter adjust the stereo width of the reverb tail.

Rev Feed
Determines how fast the reverberation will build up.

Rev.diff
Imposes the characteristics of the early reflections on the later reverberation.

Distance
The relative distance control varies the mix relations between early and later reflections. Simulating how far away you are from the sound source.

Difusor type
The natural room mode peak frequencies and the smoothness of the tail are affected by this parameter.

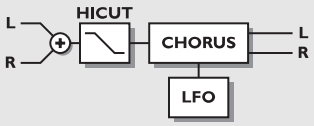
Mod Rate
The MODRATE varies the rate of modulation of the recirculating delay paths simulating the reverb tail.

Mod Depth
Controls the amount of delay path modulation or "wander" in the reverb.

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Chorus Programs

These presets are capable of producing a smooth natural sounding stereo chorus effect. The Hicut filter gives you the ability to make it sound very warm.

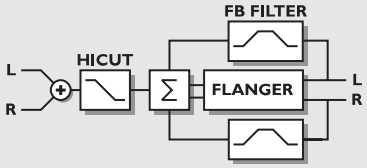


USER PARAMETERS

Speed
Controls the rate of sweep in a range from 1 sweep every 10 seconds to 10 sweeps every second.
Depth
Determines how wide a modulation (sweep) is produced.
Phase
Determines the sine wave modulation phase shift between left and right channels. At 0º the left and right modulation will move in sync. At 180º the modulation will move the channels against each other.
HiCut Freq.
Hicut shelving type filter (6dB/oct). This parameter sets the »hinge« point of the shelving filter.
HiCut Level
Sets maximum depth of cut above the HiCut shelving frequency.
Delay
Controls the length of delay time.
Mix
Mix between direct and effect.
Out Level
Adjust output level. Use this parameter to match levels between presets.

Flanger Programs

The Presets range from very soft add-on effects to the wildest guitar sound you can imagine. The Feedback filters are capable of controlling both high frequency and low frequency feedback.



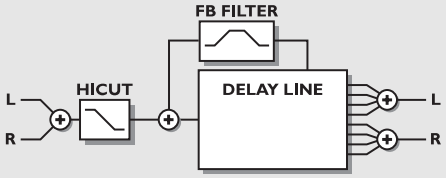
USER PARAMETERS

Speed
Controls the rate of sweep in a range from 1 sweep every 10 seconds to 10 sweeps every second.
Depth
Determines how wide a modulation (sweep) is produced.
Phase
Determines the sine wave modulation phase shift between left and right channels. At 0º the left and right modulation will move in sync. At 180º the modulation will move the channels against each other.
FB Level
Controls the amount of effect signal routed back to the flanger inputs. Select negative feedback to change feedback phase.
Delay
Controls the length of delay time.
FB HiCut
Feedback High Cutoff frequency. Signal is damped 6dB/oct above this frequency.
FB LoCut
Feedback Low Cutoff frequency. Signal is damped 6dB/oct below this frequency.
HiCut Freq.
(see chorus)
HiCut Level
(see chorus)
Mix
Mix between direct and effect.
Out Level
Adjust output level. Use this parameter to match levels between presets.

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Delay Programs

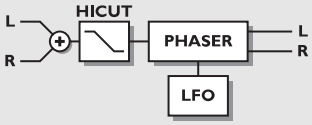
The Delay presets are capable of performing up to 1200 ms delay. The Feedback filters makes it possible to control both high and low frequency feedback.



USER PARAMETERS

Delay
Controls the length of delay time.
FB Level
Controls the amount of effect signal routed back to the input.
FB HiCut
Feedback High Cutoff frequency. Signal is damped 6dB/oct above this frequency.
FB LoCut
Feedback Low Cutoff frequency. Signal is damped 6dB/oct below this frequency.
HiCut Freq.
Hicut shelving type filter (6dB/oct). This parameter sets the »hinge« point of the shelving filter.
HiCut Level
Sets maximum depth of cut above the HiCut shelving frequency.
Mix
Mix between direct and effect.
Out Level
Adjust output level. Use this parameter to match levels between presets.

Phaser Programs



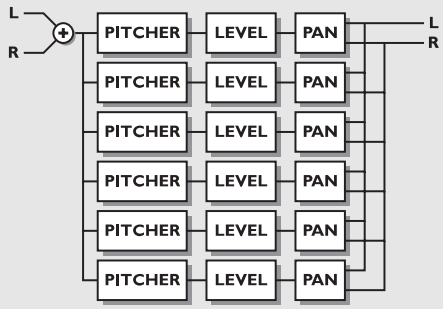
USER PARAMETERS

Intensity
Phaser intensity.
Speed
Controls the rate of sweep in a range from 1 sweep every 10 seconds to 10 sweeps every second.
Depth
Determines the depth of modulation.
HiCut Freq.
Hicut shelving type filter (6dB/oct). This parameter sets the »hinge« point of the shelving filter.
HiCut Level
Sets maximum depth of cut above the HiCut shelving frequency.
Mix
Mix between direct and effect.
Out Level
Adjust output level. Use this parameter to match levels between presets.

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Multi Pitch-shift Programs

The Multi pitch presets are capable of performing 6 pitched Voices at the same time. This makes it possible to produce a true chorus effect.



USER PARAMETERS

Mix
Mix between direct and effect.
Out Level
Adjust output level. Use this parameter to match levels between presets.
Voice
Sets which voice you are editing.
Pitch
Sets the pitch of the current Voice (0-1200).
Level
Sets the level of the current Voice.
Pan
Sets the panning of the current Voice.
Delay
Sets the Delay of the current Voice.

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EQ Programs

The EQ programs are all 3 band parametric types with separate high and low shelving bands.



USER PARAMETERS

Frequency
Low shelving filter ranges from 20hz to 5Khz
High shelving filter ranges from 500hz to 20Khz
Three band filters ranges from 20hz to 20Khz

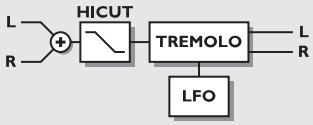
Band width
Low and high shelving filters have 2 different bandwidths
The 3 bandfilters have 3 different bandwidths

Level
All filters range +/- 12dB.

EQ level
Adjustable +/-12dB.

Tremolo Programs

The Tremolo programs are effects where the output level is modulated by an LFO. Our programs are able of setting the LFO phase between the two outputs.



USER PARAMETERS

Speed
Controls the rate of sweep in a range from 1 sweep every 10 seconds to 10 sweeps every second.

Depth [intensity]
Determines how wide a modulation (sweep) is produced.

Phase
Determines the sine wave modulation phase shift between left and right channels. At 0º the left and right modulation will move in sync. At 180º the modulation will move the channels against each other.

Mix
Mix between direct and effect.

Out Level
Adjust output level. Use this parameter to match levels between presets.

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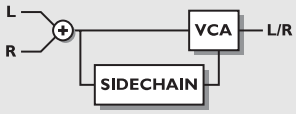
Stereo Programs

USER PARAMETERS

Spatial
Controls the amount of spatial expansion.
HiCut Freq.
Hicut shelving type filter (12dB/oct). This parameter sets the »hinge« point of the shelving filter.
HiCut Level
Sets maximum depth of cut above the HiCut shelving frequency.
Mix
Mix between direct and effect.
Out Level
Adjust output level. Use this parameter to match levels between presets.

Dynamic Programs

COMPRESSOR-LIMITER-GATE-DE'ESSER

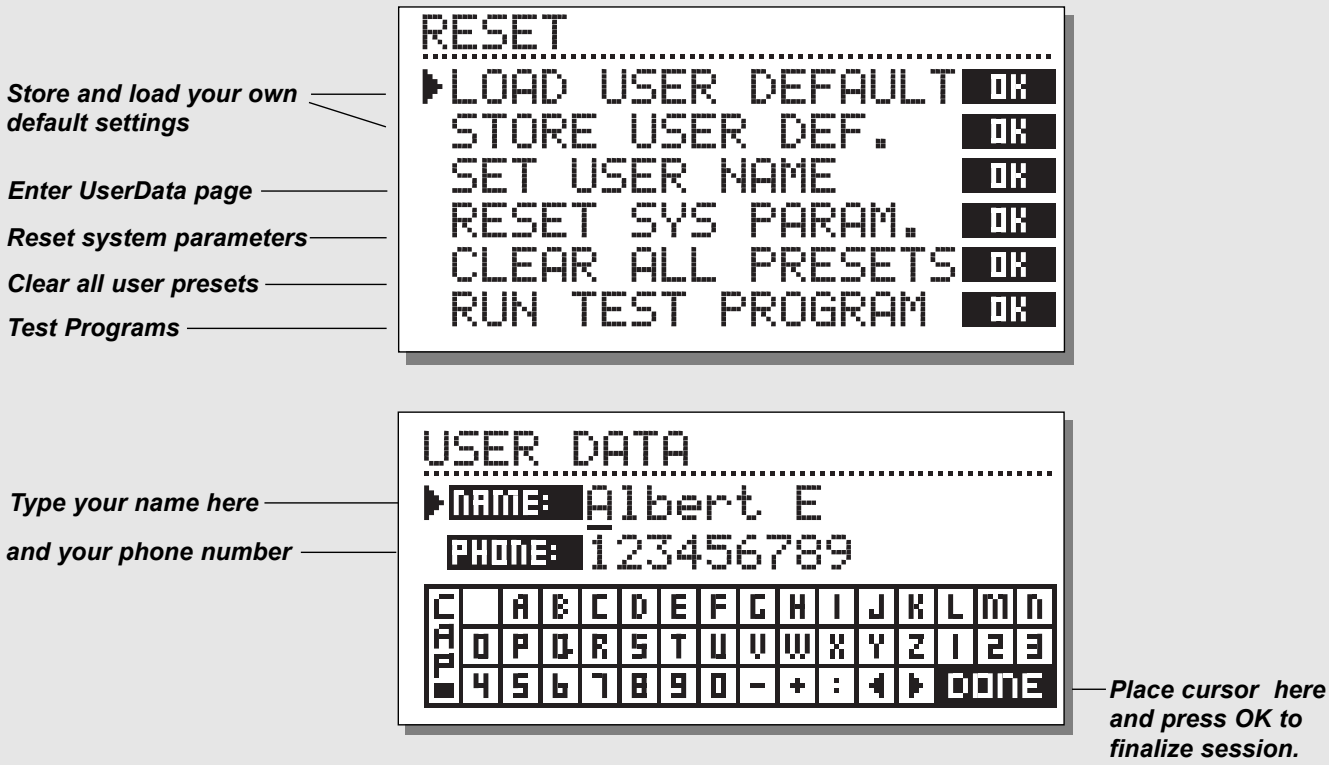


USER PARAMETERS

Attack
Dynamics attack time.
Release
Dynamics release time.
Ratio
Compression ratio.
Threshold (compressor)
Adjustable threshold level. The compressor will be engaged above this level.
Threshold (limiter)
Adjustable threshold level. The limiter will be engaged above this level.
Threshold (expander)
Adjustable threshold level. The expander is active below this level.
Gain (make-up gain)
The gain parameter compensates for the compression gain loss.
Deessing frequency
The de'essers attack frequency.
Deess damp
The damping ratio of unwanted »esses«..

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THE RESET PAGE



How to enter the Reset page:
Hold one of the 3 Bypass keys pressed while power-up.

Move the marker using the Cursor keys and press OK to select the RESET type you desire.

Load User Default
This will reset all system parameters back to a Default setup made by you (See Store User Def). This reset will NOT delete the User presets of the M2000.

Store User Def
When you have a perfect setup of your M2000, you are able to Store this as your own Default setup. This function is very useful, for example when you have finished a special production and want to go back to normal. When you have the perfect setup of your M2000, simply select this parameter and press OK to store your Default settings.

Set User Name
This function makes it possible to write your Name and Phone number into the M2000. Press OK to access the User data menu. Use the ADJUST wheel and the Cursor keys to write your Name and Phone number into the M2000. Press OK to accept. Your Name and Phone number will be displayed during power-up.

Reset System Parameters
This will reset all system parameters back to the Factory Default. This reset will NOT delete the User presets of the M2000.

Reset all Presets
This will Clear all Ram Presets .

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TECHNICAL SPECIFICATIONS

Digital Inputs and Outputs	
Connectors:	XLR (AES/EBU), RCA Phono (S/PDIF)
Formats:	AES/EBU (24 bit), S/PDIF (20 bit), EIAJ CP-340, IEC 958
Output Dither:	HPF TPDF dither 8 to 24 bit
Sample Rates:	44.1 kHz, 48 kHz
Processing Delay:	0.2 ms @ 48 kHz
Frequency Response DIO:	20Hz to 23,9 kHz ± 0,01 dB @ 48 kHz
Analog Inputs	
Connectors:	XLR balanced (pin 2 hot)
Impedance:	20 kohm
Max. Input Level:	+22 dBu (balanced)
Min. Input Level (for 0 dBFS):	-10 dBu
Sensitivity:	@ 12 dB headroom: -22 dBu to +10 dBu
A to D Conversion:	24 bit (1 bit, 128 times oversampling)
A to D Delay:	0.8 ms @ 48 kHz
Dynamic Range:	>103 dB (unweighted), >106 dB(A)
THD:	-95 dB (0,0018 %) @ 1 kHz, -6 dBFS (FS @ +16 dBu)
Frequency Response:	10 Hz to 20 kHz: +0/-0.2 dB
Crosstalk:	<-80 dB, 10 Hz to 20 kHz, typical -100 dB @ 1 kHz
Analog Outputs	
Connectors:	XLR balanced (pin 2 hot)
Impedance:	100 ohm (active transformer)
Max. Output Level:	+22 dBu (balanced)
Full Scale Output Range:	-10 dBu to +22 dBu
D to A Conversion:	24 bit (1 bit, 128 times oversampling)
D to A Delay:	0.57 ms @ 48 kHz
Dynamic Range:	>100 dB (unweighted), >104 dB(A)
THD:	-86 dB (0.005 %) @ 1 kHz, -6 dBFS (FS @ +16 dBu)
Frequency Response:	10 Hz to 20 kHz: +0/-0.5 dB
Crosstalk:	<-60 dB, 10 Hz to 20 kHz, typical -90 dB @ 1 kHz
EMC	
Complies with:	EN 55103-1 and EN 55103-2 FCC part 15, Class B. CISPR 22, Class B
Safety	
Certified to:	IEC 65, EN 60065, UL 1419, CSA E65
Environment	
Operating Temperature:	32° F to 122° F (0° C to 50° C)
Storage Temperature:	-22° F to 167° F (-30° C to 70° C)
Humidity:	Max. 90 % non-condensing
PCMCIA Interface	
Connector:	PC Card, 68 pin type 1 cards
Standards:	PCMCIA 2.0, JEIDA 4.0
Card Format:	Supports up to 2 MB SRAM
Control Interface	
MIDI:	In/Out/Thru: 5 Pin DIN
GPI, Pedal, Fader:	1/4” phone jack, 0 ohm to 50 kohm
General	
Finish:	Anodized aluminum front, Plated and painted steel chassis
LCD:	56 x 128 dot graphic LCD-display
Dimensions:	19" x 1.75" x 8.2" (483 x 44 x 208 mm)
Weight:	5.2 lb. (2.35 kg)
Mains Voltage:	100 to 240 VAC, 50 to 60 Hz (auto-select)
Power Consumption:	<20 W
Backup Battery Life:	>10 years
Warranty Parts and labor:	1 year

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TROUBLESHOOTING

You press the POWER switch but there is no light.

- The power switch on the rear panel is switched off.

The input PPM meters don't peak out.

- You are using analog inputs, but the input selector in the I/O menu is set to digital in.
- The analog input level is set too low.

Only left input PPM meter is showing a signal.

- Set input selector (in I/O menu) to *Both*

No sound through the M2000.

- You are using analog inputs, but the input selector in the I/O menu is set to digital in.

You can't turn the power off.

- Hold the power switch pressed for at least 3 seconds.

All Program sounds »phased«

- You are using the M2000 in combination with a mixing console (send/return), but have not set Mix to 100%. You can do this permanently in the I/O menu.

Pedal works wrong

- Be sure the pedal is a »make« type.

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MIDI IMPLEMENTATION CHART

STUDIO EFFECTS PROCESSOR M2000 - FEB 2, 1996 Version 1.0

Function		Transmitted	Recognized	Remarks
Basic Channel	Default	1-3	1-3	Eng1: 1, Eng2: 2, Com: 3
	Changed	1-16	1-16	
Mode	Default			
	Messages	X	X	
	Altered			
Note Number		X	X	
	True Voice	X	X	
Velocity	Note ON	X	X	
	Note OFF	X	X	
After Touch	Key's	X	X	
	Ch's	X	X	
Pitch Bend		X	X	
Control Change		from 10 and up	from 10 and up	Cntl.#10: Mix (If available) Cntl.#11: Output Level Cntl.#12: First Param. on Edit page. Cntl.#13: Second Param. on Edit page. Cntl.#14: Third .... Cntl.#15: ... Cntl.#16: ... Cntl.#17: ... *All Controllers are single byte type, scaled to parameter range.*
Prog Change		O	O	
	True#	0-127	0-127	
System Exclusive		O	O	
Common	:Song Pos	X	X	
	:Song Sel	X	X	
	:Tune	X	X	
System real time	:Clock	O	O	
	:Commands	X	X	
Aux Messages	:Local ON/OFF	X	X	
	:All Notes OFF	X	X	
	:Active Sense	X	X	
	:Reset	X	X	
Notes				

O:YES	Mode1: OMNI ON, POLY	Mode 2: OMNI ON, MONO
X:NO	Mode 3: OMNI OFF, POLY	Mode 4: OMNI OFF, MONO

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SELF TEST

PRESS ONE OF THE 3 BYPASS KEYS, WHILE POWERING UP, TO ACCESS THE SELF-TEST AND SELECT »RUN TEST PROGRAM«

Turn the Adjust Wheel to scroll through Self tests

Key test
Select Key test by pressing OK.
The keys must be pressed in the order they are requested by the M2000 to pass the test.
Press Cancel to exit Key test.

Adjust Wheel test
Select Adjust Wheel test by pressing OK
Turn the Adjust Wheel to 30 and back to 0 to pass test.
Press Cancel to exit Adjust Wheel test.

Led test
Select Led test by pressing OK
Turn Adjust Wheel to test the Leds. The test is “ok” when all Leds are lit.
Press Cancel to exit Led test.

Display test
Select Display test by pressing OK
Press OK to check that all pixels are lit. Press any key to leave the pixel test.
Press Cancel to exit Display test.

Analog I/O test
Select Analog I/O test by pressing OK
Connect an Analog Output to the Analog Input, which has to be tested and press OK.
Use a balanced cable.
PPM must show -12 dB to pass test.
Press Cancel to Exit Analog I/O test

Digital I/O test
Select Digital I/O test by pressing OK
Connect a Digital Output to the Digital Input, which has to be tested and press OK.
The AES/EBU output can also be connected to the S/PDIF input and vice versa.
PPM must show 0 dB to pass test.
Press Cancel to exit Digital I/O test.

Midi I/O test
Select Midi I/O test by pressing OK
Connect Midi Out to Midi In.
Prg change 1-128 is send out on Midi Thru. Connect this socket to a Midi compatible device and confirm the Prg. changes.
Press Cancel to exit Midi I/O test.

Pedal test
Select Pedal test by pressing OK.
Connect a momentary pedal to the Pedal socket.
When pressing the Pedal, the Result should be OK.
When released, the Result should be Not OK.
Press Cancel to Exit Pedal test.

PCMCIA test
Select PCMCIA test by pressing OK
Insert PCMCIA card. Note that all Data on PCMCIA card will be destroyed.
Press OK to test.
Result reads:
Low battery - Time to change battery in your PCMCIA card.
Not Ok - Try the test using another PCMCIA card.
Press Cancel to Exit PCMCIA test.

Battery test
Select Battery test by pressing OK
Confirm that Result is “ok”.
Press Cancel to Exit Battery test.

System test
Select System test by pressing OK
Confirm that Result is “ok”.
Result reads:
Eeprom Not ok - The unit will most likely work ok, the message is for service matters only.
DSP Not ok - Contact your local dealer.
Press Cancel to Exit System test.

Power Off - On to start standard software.

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GLOSSARY

AES/EBU
Professional digital in/out standard, using balanced XLR cables.

S/PDIF
Consumer digital in/out standard, normally using coaxial phono-type cables.

DITHERING
Dithering is a method to optimize the quality of a digital audio signal at low levels. A small amount of filtered noise is added to the signal, giving you a less distorted low level signal.
If you are using digital outputs, the equipment you feed determines the number of bits. A DAT recorder should always be dithered to 16 bit.

PROF/CONS LEVELS
Depending on which equipment you are using along with the M2000, you must set the PRO/CON parameters correctly in the I/O setup menu.

M2000 Analog Inputs:
Consumer range: -16dB to +10dB, nominal level = -10dB
Professional range: -6dB to +16dB, nominal level = +4dB

M2000 Analog Outputs:
Consumer range: -10dB to +16dB
Professional range: -16dB to +6dB

The levels are either listed in the technical specifications or printed on the rear panel of the connected devices.

DE'ESSING
An algorithm that removes unwanted »esses« from a vocal material.

SYSTEM EXCLUSIVE MIDI COMMANDS
Device-dependent MIDI commands, normally used for remote controlling machines.

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PRESET LIST - SINGLE PRESETS

1 M2000 Hall
2 Great Vocal Hall
3 Very Big Hall
4 Warm MidSize Hall
5 Bright MidSize Hall
6 Small Hall
7 Nice Hall
8 Realistic Hall
9 Chorus Reverb
10 Synthesizer Reverb
11 Soundcheck Empty Arena
12 High School gym
13 Empty Theater
14 Airport Gate
15 Big Church
16 Arvo Part Cathedral
17 Taj Mahal
18 Big Snare Hall
19 Vintage Hall
20 Wood Floor
21 Stone Wall
22 Doubling Room
23 SlapBack Room
24 Sidewall Reflections
25 Backwall Reflections
26 True Room
27 Home Room
28 The Shop
29 The CORE Room
30 At Home
31 New Booth
32 Large Room
33 Medium Room
34 Small Room
35 Very Small Room
36 Small Wood Room
37 Small damped Room
38 Empty Room
39 Small Chamber
40 Very Small Chamber
41 Dark Chamber
42 Locker Room
43 Auditorium
44 Basement
45 Empty Garage
46 In the Bathroom
47 Classroom
48 Tiled Room
49 Small Room for Drums
50 Percussion Room
51 Long Gold Plate
52 Medium Gold Plate
53 Short Gold Plate
54 Large Bright Plate
55 Snare Plate
56 Vocal dry
57 Vocal Wet
58 Air
59 Microphone Bleed
60 Small Studio Room
61 Small Box Ambience
62 Tiled Staircase
63 Nextdoor
64 Living Room
65 Phonebooth
66 Inside a Locker
67 Inside a Van
68 Tunnel
69 ZigZag Perc effect
70 Triple slap Reverb
71 Gated Reverb Short
72 Gated Reverb Medium
73 Gated Reverb Long
74 Gated Hall
75 Gated Room
76 Gated Gold Plate
77 Straight Delay
78 Soft Delay
79 Slapback Delay
80 The King Vocal Delay
81 Delay Doubler Effect
82 Old Tape Echo
83 Metallic Delay
84 In a Tin Can
85 Plain Chorus
86 Center Chorus
87 Chorus Extreme
88 Stereo Flange
89 Talking Flange
90 Dark Flanger
91 Phaser 1
92 Phaser 2
93 Phaser 3
94 Vocal Compressor
95 Guitar Compressor
96 Light Compressor
97 Heavy Compressor
98 Gain Maximizer
99 Pumpin Compressor
100 Heavy Limit
101 Limiter
102 Fast Gate
103 Slow Gate
104 Expander
105 Program De-Esser
106 Vocal De-Essing
107 Hard De-Essing
108 Neutral EQ
109 Bass EQ
110 Acoustic Guitar EQ
111 Loudness
112 Turn up the Bass
113 Air EQ
114 Telephone Voice
115 Voice Multipitch
116 6-Voice Bass Pitch
117 6-Voice Guitar Pitch
118 Fifths Up and Down
119 Barbershop
120 Mono to Stereo
121 Expanded Mono
122 Casual Panner
123 Straight Slow Panner
124 Fast Narrow Panner
125 Slow Tremolo
126 Fast Tremolo
127 Very Fast Tremolo
128 No Effect

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PRESET LIST - COMBINED PRESETS

1 Two 2000 Halls
2 Deep Room
3 Smooth Hall
4 Small warm Hall
5 Giant Hall
6 Thick Drum Room
7 Thick Gated Reverb
8 Big Drum Hall
9 Two Verbs
10 Warm and Slow
11 Short + Slow Reverb
12 Big and Warm Hall
13 Nice Big Hall
14 Reverb along Reverb
15 Chorus-like Hall
16 Warm Vintage Hall
17 Fat Hall
18 Flanged Hall
19 Chorused Hall
20 Chorused Stonewall
21 Big Lead Guitar
22 Reverb + MultiPitch
23 Realistic Room
24 Reverb in Reverb
25 Biig Room
26 Short Room
27 Light Medium Room
28 Double Room
29 Flanged Small Room
30 Flanged Ambience
31 Flanged Room
32 Open up the Vocal
33 All Ambience
34 Far Away
35 Chorused Room
36 Sing in the Shower
37 Nice wide Vocal
38 Wide Room
39 Chorused Ambience
40 Room Multiplied
41 A litle to the Right
42 Wobbly Hall
43 Multiplex Hall
44 Chorus Doubler
45 Ultimative Chorus
46 Unchained Flanger
47 The King
48 Slapdelay along Hall
49 Slapdelay + Gateverb
50 Room + Long Delay
51 Very Long Delay-Verb
52 Right and Left
53 Subtle Slap
54 Clean Arpegio
55 Tap Dance Delay
56 Fast Flanged Delay
57 Nice Pitch + Delay
58 Bright Delay
59 Two Delays
60 Thick Delay
61 Telephone Delay
62 Slpabacking Flanger
63 Slapback and Doubler
64 Chorus + Delay
65 Beautiful SpaceDelay
66 Slow Reverb + Delay
67 Echo Chorus
68 Slowflange and Echos
69 Fizzy Echoes
70 Compressed Flanger
71 Comp + Gated Verb
72 Comp+ Small Drumhall
73 Compressed Snarehall
74 Compressed Room
75 Compressed + Hall
76 Vocal Comb + Delay
77 De-essed Delay
78 De-Essed M2000 Hall
79 De-Essed Bright Hall
80 De-Essed Basement
81 De-Essed Ambience
82 Heavy Limit+Expander
83 De-Esser + EQ
84 Compressor+De-esser
85 Limiter + EQ
86 Compressor + Expand
87 Compressor + Limiter
88 Vocal Compressor+EQ
89 LeslieLike Rotor
90 Panned Delay
91 Slow Panned Phone
92 Moving Ambience
93 Moving Vintage Hall
94 Autopanned Stonewall
95 Slapdelay in Circles
96 Doubler and Panner
97 Panned Inverse
98 Slow Moving Reverb
99 In Cirkles
100 Two Panners
101 True Stereo Delay
102 Stereo Garage
103 Stereo EQ
104 Stereo Compressor
105 Stereo Limiter
106 Stereo Gate
107 Short Stereo Delay
108 True Stereo Reverb
109 Insert Compressors
110 Insert EQs
111 Insert Gates
112 Echo in the Basement
113 Dynamic Flanger
114 Vocalroom-Choruslike
115 Short-Long Reverb
116 Compressor-Reverb
117 Bright -Warm Reverb
118 Warm-Bright Reverb
119 Chorus-Chorus
120 Dynmorph Looong Room
121 Hall-Ambience
122 Slapdelay-Vocal Wet
123 Delay-SlapDelay
124 Dynmorph SneakingVerb
125 Delay-Reverb
126 Reverb-Delay
127 Changing Ambience
128 Blues in a Room

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