DsPider

User's Manual

INDEX

WARNING!

Remember to use DSPider with your monitoring system very low. It's easy to produce annoying sounds when you are patching modules, especially when you create feedback or make a module or a group of modules unstable. If you don't follow this advice, you may damage your speakers.

1. INTRODUCTION

1.1 INTRODUCTION

DSPider is the very first TDM plug-in that allows the user to "build" sound processing devices by interconnecting a large set of modules that range from low level operations to complete DSP algorithms. As a result, unique and exciting new effects can be created with just one product.

A large library of presets is also provided as standard. These presets can be modified by the user at will.

It is pre-supposed that you have a basic understanding of the main concepts of digital audio processing and for this reason this manual has not been written as a definitive reference text on this subject. To make the most of DSPider you will need to use your knowledge of signal processing. However, you can create a wide range of interesting effects without being a technical expert. Needless to say, the more you know the more possibilities you have.

1.2 INSTALLING DSPIDER

Please read the TDM Install Instructions that are located in the master Installer disk (the disk with the serial Number)

1.3 TWO MODES: READER AND ADVANCED

The use of DSPider can be as easy as loading standard presets. But you also have the option of creating very complex algorithms. To satisfy all our customers requirements we have implemented two modes: Reader Mode and Advanced Mode. These two modes can be selected from the Plug-ins list menu in Pro-Tools. Reader Mode is called DSPider while Advanced mode is called DSPider Advanced.

Reader Mode is designed just for loading and running patches. These can be DUY presets, third party presets or your own creations. Advanced Mode allows you to create, edit and run your patches, and also edit DUY and third party presets.

You can therefore run presets both in Reader and Advanced modes, but you can only edit them in Advanced Mode.

There are three possible situations when using DSPider:

1- You only want to use presets, changing parameters but not the structure of the patches. In this case Reader mode is exactly what you need.

2- You want to create and/or modify presets. In this case use Advanced mode.

3- You want to modify control values and the structure of the patch while using DSPider presets. Again, your best choice is Advanced mode.

You must bear in mind that in Reader mode you can modify control values and other bypass/mute parameters, but no access to the internal structure of the plug-in is possible.

DSPider includes as standard a long list of patches which will be enlarged and updated regularly. These enable you to use this plug-in as a compressor, limiter, reverb, stereoizer, enhancer, maximizer, panner... or as a combination of them by just loading any of these patches.

If you wish to use DSPider as a multi-purpose plug-in taking advantage of its preset feature, you will be using the "Reader" mode, and we therefore suggest you mainly read chapter 2, although the extra information in chapters 3 and 4 may be useful.

Creating and modifying patches may need careful reading of this manual. In this case we seriously advise you to study chapters 2, 3 and 4.

1.4 DSPIDER USES

DSPider can be used for:

1- Conventional DSP processing: auto panners, filtering, EQ, chorus, flange delay, modulated delay, etc.

2- Design and/or implementation of custom or cookbook filters.

3- Basic Synthesis generation. For advanced synthesis another product (SynthSpider) is more suitable.

4- Reverb design.

5- Design of Dynamic processors.

6- Sound FX design.

7- Any combination of the above plus many more.

The application range covers a very wide spectrum. DSPider is also an excellent tool for research and education.

2. READER MODE

2.1 STARTING OUT WITH DSPIDER READER

DSPider Reader mode is designed for loading plug-in patches. This mode allows you to modify and save all the control changes you make, but you cannot modify the internal structure and functions of the plug-in.

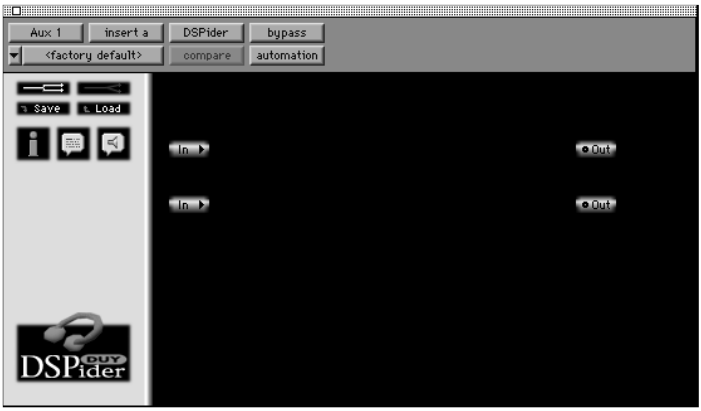
Reader mode was created with two intentions. The first was to make DSPider very easy to use from the very beginning. In Reader mode you will see information relevant to general use of the plug-in. The second, is to save screen space. Advanced mode uses up a large part of your screen space which is unnecessary if you just wish to run your plug-in without changing its internal structure. We realize that you do not want to waste your monitor space with superfluous information. Reader mode is the right answer to both problems.

The DSPider Reader mode is selected when you insert the plug-in. In the list of plug-ins, with all your others, you will see the following DSPider options:

In a mono track:	In a Stereo track:
DSPider (mono)	DSPider (stereo)
DSPider (mono/stereo)	DSPider (stereo)
DSPider Advanced (mono)	DSPider Advanced (stereo)
DSPider Advanced (mono/stereo)	DSPider (stereo)

The 3 available DSPider Reader modes are DSPider (mono), DSPider (mono/stereo) and DSPider (stereo).

When you insert the DSPider Reader option in a Pro Tools™ track you will visualize this screen:



Reader Mode Screen

This is the standard screen for Reader mode. You will see that it is split into two sections. The left side includes the save/load and the patchcord view controls, and will be referred to as the "palette" from now on in this manual.

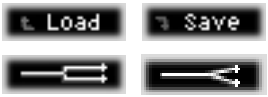
The right side of the screen is the surface where the plug-in modules will appear. This part will be called the "Blackboard".

Inside the "Blackboard" and in "Reader mode" you will usually see graphical modules: sliders, plasma displays, scopes, text and numeric readouts. This is because these are the modules you use most often to control values and observe the results. However, any other module can also be visualized in Reader mode, the only limitation being the available space.

For example in certain cases, you may want to use the mute and/or bypass feature which is available on most modules, to create specific effects. In this case the plug-in designer can make these available to the user by displaying them, even in Reader mode. We strongly advise you to read chapters 3 and 4, (Advanced Mode and Modules) even if you do not plan to program your own patches. This will allow you to understand the way DSPider works internally and open up a further range of programming possibilities.

2.2 LEFT SIDE OF THE SCREEN: THE PALETTE

At the top of the palette you will see the following icons:



2.2.1 LOAD/SAVE:

It is very important to understand that the Load/Save feature is not exactly the same in Reader as in Advanced mode.

In Reader mode you can save the parameter settings of an existing patch, whereas in Advanced Mode you can save both the structure of the plug-in and the parameter settings.

You have to bear in mind that the files are identical and compatible in both modes, the difference being that when saving in "reader mode" only the control parameters are modified, and all the others are left untouched.

2.2.1.1 Load:

The DSPider Reader mode allows you to load patches which have been created with Advanced DSPider mode.

You can load DSPider patches from anywhere on your computer disks. You just have to save or copy them in advance in the place you want them to be located. However we have created a special folder to place DSPider patches, which will allow you to load them much more easily. We call this the "quick load" feature. The special folder for the "quick load" is inside the Plug-ins Folder and is described in chapter 2.2.1.3.

Therefore to load existing patches, you have two options:

a) To load a patch from anywhere in your computer, click on the LOAD button and a dialog box will allow you to select its location.

b) "Quick load": to do a "quick load" press Cmd+Opt and click on the blackboard. You will see a list of all the existing presets organized into families. Select one patch inside a family and it will be automatically loaded. In the list you will initially find all DUY patches, but you can also add your own patches, third parties patches, or future new DUY patches to the list. We have initially created some standard families of patches, which will make it easier to find the desired patch but you can also add your own families. The maximum number of patches that can be selected in this way is limited to 256. These patches can be held inside folders. The maximum number of folders is unlimited, but you may want to keep it much lower than 256 for practical purposes. Only one level of folders is allowed. Hence you can not put a folder inside another folder. If you do so the "quick load" feature will not work properly. Please go to point 2.2.1.3. for information about saving "quick patches".

2.2.1.2. Save:

This module allows you to save whichever control changes you have made to the patches you previously loaded. You can also use the Pro Tools option to save patches via the mini-menu located at the top of the plug-in window.

The files created in Reader mode are identical and compatible with the ones in Advanced mode. The difference between them is that when saving in Reader mode only the control parameters are modified. All other parameters are left untouched.

We advise you to create a specific folder to save your settings. You may avoid confusion by having a properly structured group of folders.

Let's say you load one of the Compressor presets. You will see a few parameters which you can modify, such as ratio, attack, release and threshold (although there may be many more). You may also have a Shift Left module with a label above indicating that this module adds a 6dB gain. In this case, you would also be able to see that module on the screen. Once you have modified values on the patch, you can save it as a new preset.

2.2.1.3. Saving your patches for "quick-load"

The patches for "quick-load" (2.2.1.1) must be saved in the following path:

Hard disk/System folder/DAE Folder/Plug-ins/DSPider Patches

Inside the "DSPider Patches" folder you will see a list of folders. These will also be shown when doing a quick load. Initially all the DUY presets have been classified in a number of families. You can add families at anytime by adding more folders. Only one level of folders can be made. This meaning that you can not put a family folder into another folder.

The maximum number of patches that can be saved for subsequent "quick load" is 256. These patches can be inside any number of folders. Even though there is no limit to the number of folders (or families) you may want to keep it to less than 256 for practical purposes.

Any patch saved into the DSPider Patches folder can be loaded at a later date by pressing Cmd+Opt and clicking on the blackboard (2.3).

The pop-up list will not show the patches you have saved until you re-initialize ProTools™. However you may want to see your patch immediately included into the "quick load " list. For this reason we have created the "regenerate quick-load list" feature (see 2.2.1.4)

2.2.1.4 Regenerating the "quick load" list

To regenerate the "quick-load" list, you have to hold the Opt key while at the same time pressing the "Save" icon on the left of the screen. You can now release the Opt key and type the name of the patch you want to record. When you accept the name, this patch and all the previous ones you saved to any folder hanging from the "DSPider patches" folder will be included in your pop-up list.

2.2.1.5 Nomenclature standards.

The names of patches provided by DUY are followed by an extension, such

as “.pci”, “.ms” and so on. We strongly recommend you to follow this nomenclature for your own patches. It will allow you to organize and locate your patches more easily.

The possible extensions are the following:

.mm for patches with a mono input and a mono output.

.ms for patches with a mono input and a stereo output.

.ss for patches with a stereo input and output

.pci use this extention if the patch is not compatible with the Nu-bus DSP Farm

(see chapter 3.11)

2.2.2 DSPIDER PATCH-CORD VIEWS

The loaded preset may have several modules included on the display surface, with several connections that may seem confusing. This is why we have introduced two ways of visualizing connections: 90 Degree View and Direct View.

2.2.2.1. 90 Degree View: 

In 90 Degree View mode all patch cords are connected forming 90 degree horizontal or vertical angle paths. This mode gives you a very clean and tidy display surface.

2.2.2.2 Direct view: 

The Direct View connects modules with straight lines between modules. Direct view may look confusing at first, but makes it very easy to see the source and destination of a patch cord.

2.2.3 INSTANT HELP

Three icons below the Save/Load icons on the palette provide help to the user while working with DSPider.

2.2.3.1 Patch information

Click on this icon and a dialog box will appear on the screen showing information about the current patch. Please note that only previously created patches on disk can read and modify this information.

2.2.3.2 Balloon Help

By clicking on this icon you will switch the help mode on or off. This provides you with help on whichever module your mouse is placed over, on the Blackboard surface or on the Palette. To switch between the active or inactive status of Help, simply click on the icon.

2.2.3.3 Talking Help

By clicking on this icon, the Speech Manager will read the text given in the Help Balloons. In order to get talking help, you must have the Speech Manager installed in your system.

To switch between the active or inactive status of Talking Help, simply click on the icon.

2.3. RIGHT SIDE OF THE SCREEN: THE "BLACKBOARD"

Within the "Blackboard", you have access to all DSPider modules working in Run mode. In fact you will have access to all the parameters that the designer of the Plug-in chose you to see. The designer did this in Advanced mode, which allows you to enter Edit mode, and also has a bigger "Blackboard".

Though all functions are available to the user initially, practice teaches us that most of these are not needed in most cases. For this reason we have simplified the graphical interface for the provided patches, leaving just what you need to run the patch, and no more. We recommend you and Third Party developers to do the same. However you are free to use Advanced mode to edit, modify and save your own versions of our patches.

The modules which you will see most of the time in Reader mode are the graphical modules: sliders, plasma meters, scales, scopes, text and numeric readouts.

There is more information about them in the Modules section of this manual (chapter 4).

However we include here some features which are also used sometimes, and apply to most of the modules. These are the "mute" and "bypass" functions.

2.3.1 Mute:

Muting a certain module means that its output will always be a zero value in the digital domain.

To mute a module in Reader Mode, press and hold the Cmd key until you click on the module you want to mute. In this case, a cross will appear on the right of the module to show it has been muted.

Muted multiplier

To unmute, repeat the procedure.

2.3.2 Bypass:

Bypassing a module means the output signal is identical to the input signal and means the module does not modify the signal.

To bypass a module, click on it with the mouse.

Some modules have different bypass positions. Example: a subtraction module has two inputs (the input signal and the signal to be subtracted). You therefore have two possible bypasses: the input signal and/or the to-be-subtracted signal.

To stop bypassing a module, click on it again.

Possible bypass positions of a subtraction module.

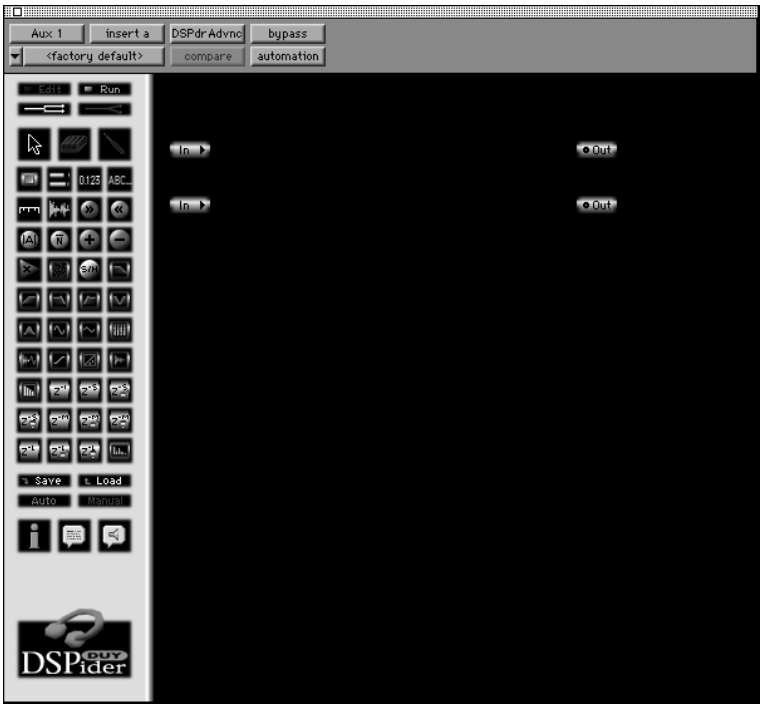
3. ADVANCED MODE

3.1 INTRODUCTION

Advanced mode of DSPider focuses on creating, editing and running patches. This is possible thanks to the 40 modules DSPider provides, which can be patched forming a functional structure we call a PATCH.

Insert DSPider in a Pro Tools track as you would with any other plug-in, selecting any of the "Advanced DSPider" instances from the plug-ins menu. There are 3 kinds: mono, mono/stereo and stereo, depending on whether the track you are working on is mono or stereo.

You can visualize the screen in the figure below:

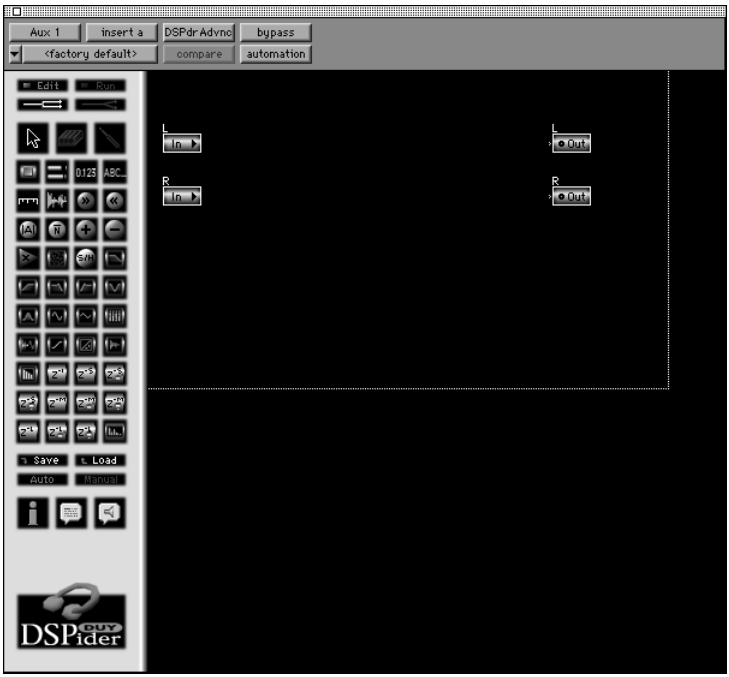


Run Mode view in Advanced Mode

This is the standard screen for "Advanced" mode. You will see that it is split into two main sections: the left side is what we call the "menu section". On the right side of the screen you will find a black surface. We call it "Blackboard" and this is where the modules will be placed and connected. The "Blackboard" is divided into two parts, which are explained in chapter 3.7.

The "menu section", located on the DSPider Advanced palette includes all the tools you will need to create, edit, load and save patches.

You can use Advanced DSPider in two modes: Edit Mode and Run Mode. At the very top of the menu you will find Edit and Run mode selectors. These are explained in more depth in chapters 3.4 and 3.3.



Edit Mode view in Advanced Mode

Further down in the palette you will find the "patchcord view" selector (Chapter 3.2)

Further down you have the 40 modules, which can be dragged onto the Blackboard. An in-depth explanation of all modules is included in Chapter 4.

Below the modules you find the Save/Load (3.5) and the Auto/Manual (3.4.3), and below these the 3 Instant Help buttons: Patch Information (3.10.1), Balloon Help (3.10.2) and Talking Help (3.10.3).

3.2. PATCH CORD VIEWS

On the Blackboard, the connections between modules are made with "patch cords". When you have patched several modules on the Blackboard, connections may seem confusing. This is why we have introduced two ways of visualizing connections: 90 degree and Direct View. This feature is especially useful when you're creating patches.

3.2.1. 90 degree view: 

In the 90 degree view mode all patch cords are connected forming 90 degree horizontal or vertical angle paths. This mode presents you with a very clean and tidy display surface.

3.2.2 Direct view: 

The Direct View connects modules with straight lines between modules. It may look confusing at first, but makes it very easy to see the source and destination of a patch cord. In cases when lots of patchcords are superimposed you may need to move the connected modules, so that the connection becomes clearer.

3.3 RUN MODE

Run Mode is basically designed for "executing" your patch when creating or editing a Patch in Advanced mode. It allows you to check and listen to all the functions of your plug-in: change slider values, see the meters and readers, etc.

It also gives access to some internal module options such as bypass and mute. And to make your work easier it also allows you to access some editing features without the need for switching to Edit mode, which is entered by holding Opt while clicking on a module. Most modules have this option. Please refer to chapter 4 (The Modules) for more details.

Run Mode may be confused with Reader mode. But they are different in concept. The first thing to bear in mind is that Run Mode is an option inside Advanced Mode. Run Mode in fact has many more features and a larger screen than reader mode. We advise you to use Reader Mode when you're only loading patches but don't want to change the plug-in structure. If you wish to modify the patch, it is a better choice using Run mode in Advanced Mode.

An additional feature of Run Mode is that it allows you to "Drag and Drop" modules onto the Blackboard. Once you have dropped the module in Run mode you cannot move it, unless you switch to Edit Mode. See 3.4.1 for more information about Dragging and Dropping.

3.4 EDIT MODE

When this mode is active, you can create and edit patches. This means you can change the position of modules, modify all their parameters, change the visual size of the graphic modules, insert text labels, see hidden connections and so on.

To do all this in Edit Mode we have provided 3 edit tools: arrow, eraser and patcher.

Please refer to chapter 3.4.2 for more information.

For more information about the module functions available in Edit mode, please refer to Chapter 4

3.4.1 "DRAG & DROP"

The "drag and drop" Mac system is used to place modules on the plug-in Blackboard. To drag and drop, click on a module and hold the mouse button down while moving it to the point on the Blackboard surface where you wish to place it. This position can be modified whenever you like (in Edit Mode).

If you drag and drop while pressing the Cmd key, the movement and placement of modules will be constrained to an 8-pixel position, helping the user to align objects. This invisible grid will also be present when moving and resizing with the Cmd key down.

Also note that if you drag and drop a new module over an existing module in Edit Mode, the new module will not be placed on the Blackboard. This doesn't happen in Run Mode, which you can use to place modules when the Blackboard is full. However, you can place a module over an existing module in Edit Mode if they have been placed on the blackboard previously, that is after the Drag&Drop process.

Therefore you can place modules on the Blackboard using the "drag&drop" feature both in Run and Edit modes. When you're in Run

Mode, the only active tool is the Arrow. In Edit Mode, "dragging and dropping" is possible when either the Arrow, Eraser or Patcher are active (for more information on editing tools, read point 3.4.2)

3.4.2 EDIT MODE TOOLS

There are three tools to edit and create patches:

3.4.2.1 ARROW

It enables you to:

1. Move one or several modules at a time on the Blackboard. To move one module, select it by clicking and holding the module as you change its position by dragging it. If you want to move several modules in the same direction, you must select the objects you want to move first. To do so, click and drag over the modules you wish to select. As you drag, a dashed box appears indicating the range of objects you are going to select. When you release the mouse, the selected modules will be highlighted in red. To move them, click and hold one of the highlighted modules and drag as if they were one entity.

2. To see the module properties. Double click on a module in Edit Mode and you will be able to see and change the properties of all modifiable modules.

3. Bypass modules in Run Mode. Click on the module and you will be able to bypass the modules in several ways, in each of the possible positions.

3.4.2.2 ERASER

Use this tool in Edit Mode to delete modules or patchcords. In the first case, simply click on the module to delete. When deleting a cord, make sure you

click on it exactly.

3.4.2.3 PATCHER

Use the patcher to create connections between modules (patch cords). Click on the point in a module from which the output must be taken and hold until you reach the cord's destination, where you can release the mouse button. Please observe that the exact point to release the mouse is next to a small green arrow, slightly towards the inside of the module border. The origin of the connection is very easy to get at, but the destination can be a little trickier until you have had some practice.

Remember you can only patch and erase modules in Edit Mode.

3.4.2.4 IMPORTANT:

You can place modules on the Blackboard by dragging them onto it both in Edit and Run modes. You can do this operation with any of the three editing tools active in Edit Mode. This means you can place a module on the Blackboard while the eraser or the patcher are active. If you enter Run Mode, the Arrow will be switched on automatically.

3.4.3 AUTO/MANUAL MODE

DSPider's internal architecture is completely transparent to the user. However you can control the order of the calculations that are done inside DSPider.

The Auto and Manual modes define the order of the calculations of the different modules in a patch. The Auto Mode calculates the order in a hierarchical way. It is most suitable in cases where the order is not critical,

which is what is most often the case. The Manual Mode is useful for advanced users, mainly for the design of filters, where the calculation order is critical. To use it, press the Manual icon and enter Edit Mode. You will then see a number next to each module, which indicates the order of calculation. To reset the order, double click on the patcher tool. This will set each module to order zero. To increase the order, double click on each module. Calculations will be made from lower to higher orders.

It's possible to create NULL levels, which are absent from the current assigned levels and are ignored by DSPider. For example: you can assign levels 0,1,5 and 10. The missing levels (2,3,4,6,7,8,9) are ignored.

3.5 SAVE and LOAD

DSPider gives you the capability of saving and Loading patches without the help of Pro Tools or any other host. But you can also use the Pro Tools option to Save and Restore patches via the mini-menu located at the top of the plug-in window.

3.5.1 Load:

This instruction allows you to load existing patches.

You can load DSPider patches to anywhere in your computer disks. You just have to save or copy them in advance to the place you want them to be located. However we have created a special folder to place DSPider patches, which will allow you to load them much more easily. This is what we call the "quick load" feature. The special folder for the "quick load" is inside the Plug-ins Folder and is described in chapter 3.5.2.1.

Therefore to load existing patches, you have two options:

a) To load a patch from anywhere in your computer, click on the LOAD button and a dialog box will allow you to select its location.

b) "Quick load": to do a "quick load" press Cmd+Opt and click on the blackboard. You will see a list of all the existing presets organized in families. Select one patch inside a family and it will be automatically loaded. In the list you will initially find all DUY patches, but you can also add your own patches, third party patches, or future DUY patches. We have initially created some standard families of patches, which will make it easier to find the desired patch. The maximum number of patches that can be selected in this

way is limited to 256. These patches can be inside any number of folders. The maximum number of folders is unlimited, but you may want to keep it much lower than 256 for practical purposes. Please go to point 3.5.2.1 for information about saving "quick patches".

3.5.2 Save:

This module enables you to save new or edited patches. Whichever changes you have made to the patches will be saved. A dialog box will appear, allowing you to choose the drive where you want to save your modified patch.

You can also use the Pro Tools option to save patches via the mini-menu located at the top of the plug-in window.

We advise you to create a specific folder to save your settings. You may avoid confusion by having a properly structured group of folders.

If you want to use the "Quick load" option you have to follow these steps:

3.5.2.1 Saving your patches for "quick-load"

The patches for "quick-load" (3.5.1) must be saved in the following path:

Hard disk /System folder/DAE Folder /Plug-ins/DSPider Patches

Inside the "DSPider Patches" folder you will see a list of folders. These folders will also be shown when doing a quick load. Initially all the DUY presets have been classified into a number of families. You can add families at anytime by adding more folders. Only one level of folders can be made. This means that you can not have a family folder inside another folder.

The maximum number of patches that can be saved for subsequent "quick load" is 256. These patches can be inside any number of folders. Even if there is no limit for the amount of folders (or families) you may want to

keep it much lower than 256 for practical purposes.

Any patch saved into the DSPider Patches folder can be loaded at a later date by pressing Cmd+Opt and clicking on the blackboard (3.5.1).

The pop-up list will not show the patches you have saved until you reinitialize ProTools. However you may want to see your patch immediately included into the "quick load " list. For this reason we have created the "regenerate quick-load list" feature (see 3.5.2.2)

3.5.2.2 Regenerating the "quick load" list

To regenerate the "quick-load" list, you have to hold the Opt key while at the same time pressing the "Save" icon on the palette. You can now release the Opt key and type the name of the patch you want to record. When you accept the name, this patch and all the previous ones you saved to any folder hanging from the "DSPider patches" folder will be included in your pop-up list.

3.5.2.3 Nomenclature standards.

The names of patches provided by DUY are followed by an extension, such as ".pci", ".ms" and so on. We strongly recommend you to follow this nomenclature for your own patches. It will allow you to organize and locate your patches more easily.

The possible extensions are the following:

.mm for patches with a mono input and a mono output.

.ms for patches with a mono input and a stereo output.

.ss for patches with a stereo input and output

.pci use this extention if the patch is not compatible with the Nu-bus DSP Farm

(see chapter 3.11)

3.6 MODULE PARAMETERS

Though detailed information about each module is included in Chapter 4, some general information is included here.

Some modules have certain parameters which can be modified by the user. These are specified in the following list:

Module number (see chapter 4)	Module name
1	Slider
2	Plasma Meter
3	Numeric Readout
4	Text Labels
5	Scales
6	Scopes
11	Addition (and logical operator)
13	Multiplication
23	Triangle oscillator
24	Mixer
26	Ramp generator
27	Shaper
28	Envelope follower
29	Spectral shaper
32	Short delay all-pass
35	Medium delay all-pass
38	Long delay all-pass
40	Early reflections chamber

Whenever you wish to edit a certain module's parameters, you have two possibilities:

3.6.1 Changing parameters in Edit Mode

Make sure the Arrow tool is selected. Then double click on a module which is already laid out on the DSPider Blackboard and a dialog box will appear, enabling you to modify whichever values may be of interest. This operation is only available for editable modules. A "Shift Right" module for instance, can not be edited, since it has no parameters to modify.

3.6.2 Changing parameters in Run Mode

You can edit the module's parameters when you're in Run Mode. We have included this feature in DSPider because it is very useful for making changes to the modules while you're running the audio in Run Mode.

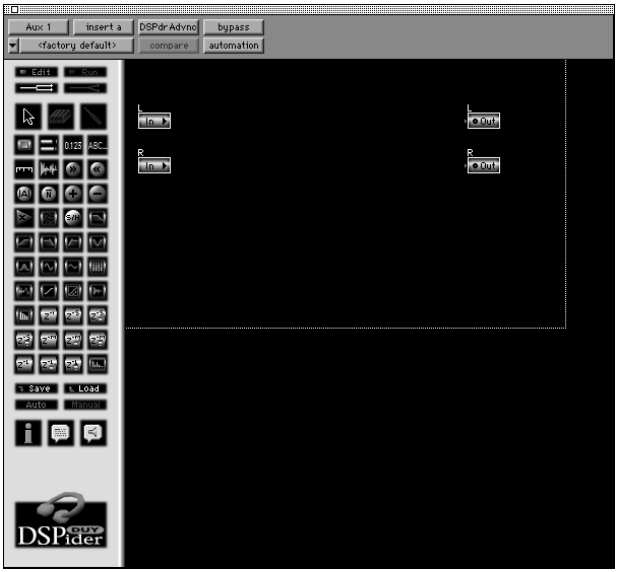
To edit a module's parameters in Run Mode, hold the Opt key and click on the module. The result will be the same as in Edit mode, where a dialog box appears.

3.7 SCREEN DISPLAY

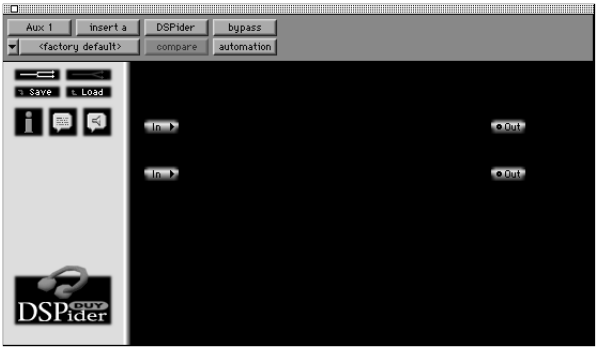
If you have had the chance to view Reader mode and Advanced Mode on your computer, you will have observed that the Blackboard is much smaller in Reader Mode. You may also have noticed that in Advanced Mode there is a dotted line dividing the Blackboard into two parts. The function of this dotted line is the following:

Any modules you place in the lower subdivision of the Blackboard will not be visible in Reader mode. This way you can obtain a clearer display and since you cannot edit the modules or structures in Reader mode, you can leave only the relevant modules.

We advise you to read points 3.8 and 3.9 about other interesting features related to hiding modules from other users and protecting your patches.



Advanced Mode Screen (Edit Mode)



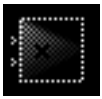
Reader Mode Screen

3.8 HIDING MODULES

We have provided the possibility of hiding certain modules in Reader or Run Mode.

This feature can only be defined in Edit mode.

To hide a module, make sure you're in Edit Mode, hold the Opt key and click on the module you wish to hide. All patchcords tied to the module will also be hidden in Run Mode.



Hidden multiplier viewed in Edit Mode

To unhide a module, hold the Opt key and click on the hidden module in the Edit Mode.

To unhide all the modules at the same time double click on the arrow tool icon.

This feature is very interesting from two points of view:

a) First of all, you are creating a much clearer display, without bundles of patchcords being mixed up or interfering with other modules.

b) Combined with the Patch-locking feature it allows you to protect your algorithms. You will find more information about this point in chapter 3.9.

3.9 PATCH LOCKING

DSPider provides you with the possibility of protecting your patches. This can be done with the "Patch Locking" feature. To lock a patch, hold the Cmd key and click on the Save icon. Choose the destination of your file in the dialog box as with a normal "save" (chapter 3.5.2)

Why lock your own patches? If you have created patches either for your own use, or for sale as a Third Party developer you may not want other people to see the algorithms you have programmed. In order to make sure that the algorithm cannot be seen you may also wish to combine this patch locking feature with hiding modules and patchcords (See chapter 3.8)

Once a patch has been locked, it has been locked forever. Previously locked patches will be saved as locked patches even if the user doesn't press the Cmd key while clicking on the Save icon in the palette. Editable and visible parameters will be the only modifications to the locked patch when saved, since further changes can not be made to its internal structure.

You can tell if a patch has been locked by looking at the 40-module list on the palette, which is darkened, or by looking at the Arrow icon on the left of the screen, which has a lock symbol next to it.

Appearance of a locked patch on the palette

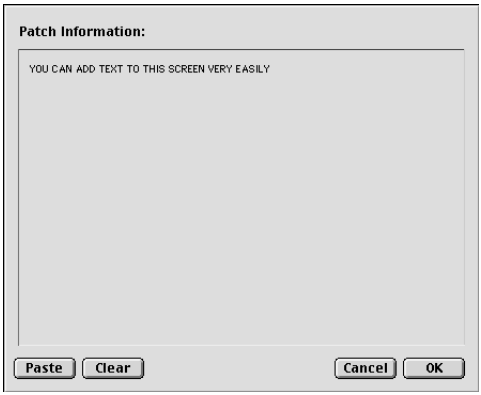
3.10 INSTANT HELP

Three icons below the Save/Load icons on the palette provide help to the user while working with DSPider.

3.10.1 Patch information

Click on this icon and a dialog box will appear on the screen showing information about the current patch. Please note that only previously created patches on disk can read and modify this information.

To add text to this screen, use a conventional text editor to write the text you wish to insert in the window. Then select it and press Cmd+C. Go to the patch information window in DSPider and paste it by pressing “Paste”. The information will be stored automatically when you save your patch. If you press “Clear” you will lose all information inside this dialog box.



Patch information

If the amount of text inserted is longer than the screen will allow you to see at a time, you can scroll the screen up and down by placing the mouse on the patch information screen, and moving the mouse up or down while holding the mouse clicked.

3.10.2 Balloon Help

By clicking on this icon you will switch a help mode on or off. This provides you with help on any module your mouse is over, on the Blackboard surface, or any icon on the Palette. To switch the status of Help from active to inactive or viceversa, simply click on the icon.

Using Balloon Help

The balloon's text display on the blackboard is different when you're in Run Mode to when you're in Edit Mode. In the case of the latter, the balloon displays shortkey tips to make editing smoother.

3.10.3 Talking Help

By clicking on this icon, the Speech Manager will read the text given in the Help Balloons. In order to utilize talking help, you must have the Speech Manager installed in your system.

To switch the status of Talking Help from active to inactive and/or viceversa, simply click on the icon.

3.11 DSP resource allocation.

Every DSPider insertion uses one DSP whether using a Nu-bus or a PCI DSPfarm. Thus when designing patches we recommend you to combine several functions in the same patch, so that you make the most of the available resources.

IMPORTANT: Remember that DSP power (available processing time) is limited.

When the DSP approaches its limit, you will be able to tell by the reduction of the Sampling Frequency by half, which is audible.

However, in some cases, you may not notice it audibly. For this reason, and in the case of surpassing the DSP's available processing time, we recommend you to follow a test procedure for every patch you design. The method consists of introducing a 440 Hz sine test tone and listening out for a similar effect to distortion (sometimes with artifacts) at the output of the patch. The test may change a slightly depending on the structure of the patch, but the general principal is to detect if the sampling frequency is correct and has not been halved.

You can make patches that work on both Nu-bus and PCI and some that only work on PCI. Patches which exceed the PCI power will not work on any of these platforms. If a patch doesn't work in a platform you will have to reduce the required DSP power by eliminating some elements of your patch. We advise you to start by removing superfluous functions. Unused modules which have been placed on the blackboard also consume DSP power and it's therefore better to remove them. The same applies to patchcords. The next step would be to remove plasma meters and scopes. Further optimisation could apply to an Early Reflections Chamber, for example, where the more reflections you draw on the dialog box the more DSP power it will consume. In this case, we advise you to consider drawing only the most significative reflections and

deleting those with a small amplitude.

A good way to check where the breakpoint is (that is, the point from which DSP power is insufficient), is to try the 440 Hz test explained above while muting and/or bypassing modules, and/or eliminating some functions.

4. The Modules

4.1 Introduction

There are 4 categories of modules: in/out, graphics, single functions and macros.

The input and output modules act as an input/output interface between DSPider and the TDM Bus. The input module takes the signal from the TDM Bus into DSPider. After the signal has been processed with DSPider, it is returned to the TDM Bus via the output module. The input and output modules are not described in the Modules list in this manual. They are not included in the palette because they are included by default on the blackboard.

The graphic modules are: sliders, plasma meters, numeric readouts, text labels, scales and scopes. They are all resizable. When editing, you can change the size of all graphic modules by clicking and dragging a small red/white square which appears on one of the corners of the box surrounding the module.

The single functions are those which have a standard DSP code, like shift right, shift left, absolute value, invert, addition, subtract and multiply.

All the rest are macros, which are more complex functions created for specific uses.

There follows a detailed description of all the modules. At the beginning of each module description a few parameters are shown: number of instances, Inputs, Controls, Bypass and Mute.

Number of instances: This is the maximum number of times that a module can be included in a patch.

Inputs and controls: state the number of inputs and controls for each module.

Bypass: When you are in Run or Advanced Mode, all the modules that have at least one input can be bypassed. This means you can bypass them in such a way that you can hear the signals that enter each module individually and

one by one. To bypass a module you just have to click on it in Run mode. The module will toggle between the different inputs and operating positions.

Mute: All the Single function and Macro modules can be muted. To do so, click on the module while at the same time holding the Cmd key. An "x" symbol will appear indicating that the module has been muted.

Modules can have a maximum of one visible output lead. This output, when available, can be tied to an infinite number of inputs. So we can say that all the following modules have infinite outputs: the single functions, all the macros, the input modules and the sliders. Plasma meters,however, have only got one output, which is prepared to be patched to a numeric readout module.

4.2 Module list

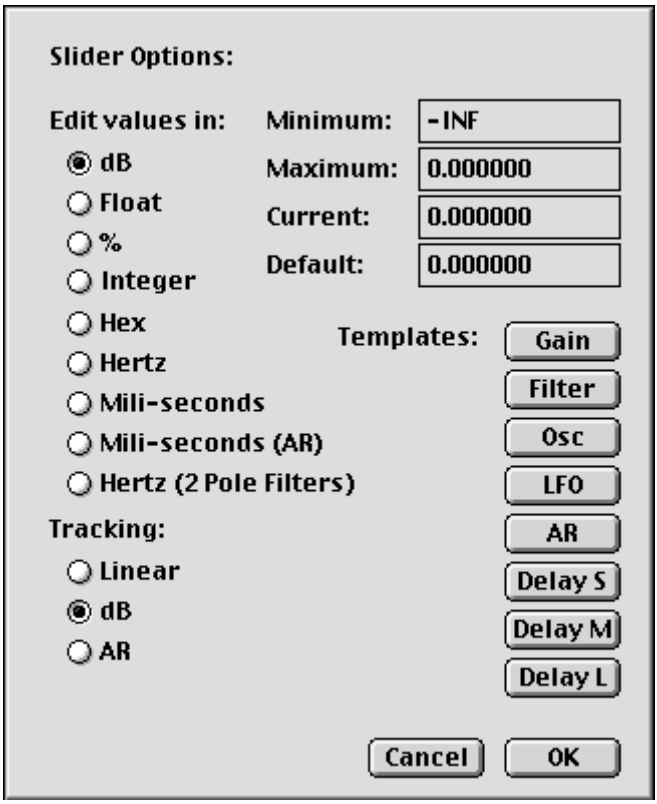
1- SLIDER

Number of instances: 16
Inputs: 0
Controls: 0
Bypass: no
Mute: no

Run Mode

Edit Mode

A slider generates a digital value proportional to its position. It can be used to generate control settings for most of the functions available to the user (in reader mode) and also to generate constants, generally not available to the user. This is made possible by the multiple programmable parameters available in Edit Mode. You can enter Edit Mode by double clicking on the slider. A dialog box with several settings will appear:



On the right side of the box you can set four values:

Minimum: this is the value your slider will reach in Run Mode when it is totally to the left horizontally or completely down when being used in a vertical position.

Maximum: The value assigned when the slider is completely to the right in Run Mode (or at the highest position if the slider is oriented vertically). It is important for you to bear in mind that the Minimum value will always correspond to the left of the slider (or down vertically) even if the entered

minimum value is higher than the maximum. Therefore, you can set a lower value for the Maximum than for the Minimum, in which case you would have the smaller value at the right (or at the top according to the orientation).

Current: This indicates the last value the slider was set to when you last quit Run Mode. If you change it, the new settings will apply.

Default: This is the value the slider will be set to in Run Mode when you hold the Opt key and click on the slider.

On the left, a list of nine different units allows you to choose the format of the visualized values on your slider: dB, Float, percent, integer, Hex, Hertz, mili-seconds, Mili-seconds (AR) and mili-seconds (2 pole filter). It is important to bear in mind that changes to any of the preceding units will not produce any change in the output value of the slider, except in those cases where the range of values is not allowed for the selected unit.

If you insert values in a certain mode (dB, for instance) and then switch units to percentage, DSPider converts the values to the new scale. It is very important that you consider the valid ranges for each unit, as the conversion could lead to mistakes. For example if you set a float value to -4 (minus four) and then switch to the dB mode, the conversion will not be done properly, as the logarithm of a negative number does not exist.

Let's look at another example: a 0 dB value (in the dB scale) will change to 100% when switching the units to "%" (percentage). This represents the maximum digital output. If you change to -6.02 dB, the value in "%" will change to 50%, as it means the signal value is reduced by half in linear terms.

All the possible units are:

dB: this format ranges from the "-INF" value to 0 dB. You must consider that you can not enter a superior value than 0 dB (maximum positive output value). Also in this mode you can not output negative values because the minimum value, which is -INF produces a 0 output

float: values range between -1 and 1. It allows the full range of output values.

% : it allows you to set a relative value (percentage). Ranges from -100% to 100%. It allows the full range of output values.

Dec: values range from -8.388.607 to 8.388.607. It allows the full range of output values.

Hex: values range from FF800001 to 7FFFFF (hexadecimal numbers), which allow the full range of 32-bit output values, considering that only the least significant 24 bits will be used inside the DSP.

Hertz: The values range from -S/2 to S/2 , S being the sampling frequency of the project. For a sampling frequency of 44.100 the range is -22.050 to 22.050. It allows the full range of output values. Choose this option to control the frequency of the oscillators. It allows the full range of output values. However, to control oscillators you can't use negative values. Do not use this unit for controlling filters, as a different unit was created for this purpose.

Mili-seconds: This mode was designed to control the delay modules and gives a direct conversion from samples (if set in Integer mode) to mili-seconds. The values range from -8.388.607/S to 8.388.607/S, where S is the sampling frequency in KHz. For a 44.1 KHz sampling frequency the range will be -190.217 to 190.217 seconds. Even in a range of more than 380 seconds the useful range is limited to the size of the delay. For the three types of delays (S, M or L) the useful range is for positive values up to 2047/S, 4095/S and 8192/S, which for a sampling rate of 44.1 KHz will be around 46, 92 or 185 ms. One sample delay at this frequency is 0.22676 miliseconds long. Please refer to the delay modules for more details (modules 30 to 39)

Mili-seconds (AR): This unit is used to control the attack and release values of envelope followers and ramp generators. Although negative values are allowed, they are not useful for controlling attack and release parameters. The practical values range from INF to 1/S, S being the sampling rate in KHz. For a sampling rate of 44.1 KHz the range will be INF to 0.022676

ms. Please refer to modules 26 and 28 for more details (Ramp generator and Envelope follower modules)

Hertz (2 Pole Filters): Choose this option to control the frequency of the two pole filters (modules 18 to 21). The values range from -7577.3 to 7577.3 Hz. We advise you only to use positive values to control filters. The useful range is 20 to 7577.3 Hz. Do not use this unit for controlling oscillators.

The tracking option allows you to select the curve that relates the output values to the slider position when using the slider in Run mode. You can choose between three different options: Linear, dB and AR. Linear and dB are self explanatory. The AR option is optimized for controlling attack and release times.

The Templates section provides a fast way to set all the Slider Options values for most typical uses. The predefined templates are: Gain, Filter, Oscillator, LFO, AR (Attack and Release), and Short, Medium and Long delays.

When using the slider in Run or Reader Mode, you can fine-tune when choosing a value with the slider by pressing Cmd while changing the value on the slider with the mouse.

2- PLASMA METERS

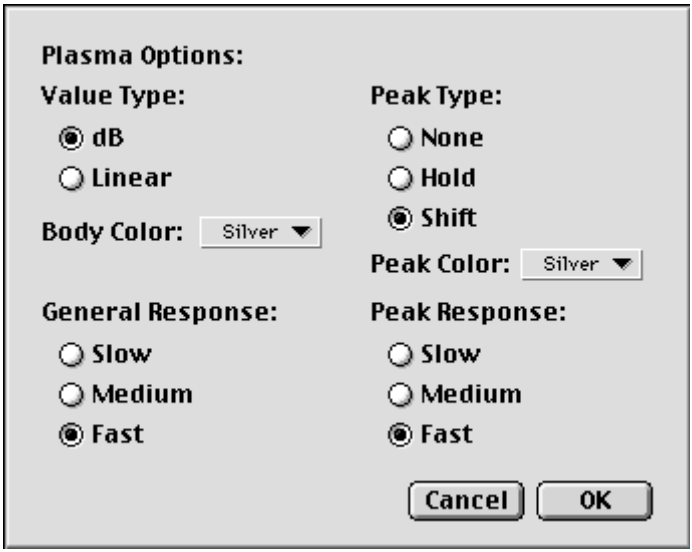
Number of instances: 16
Inputs: 1
Controls: 0
Bypass: no
Mute: no

Run Mode

Edit Mode

Plasma meters are high resolution bargraph displays with a peak and hold option.

Several parameters can be edited by double clicking on the module in Edit Mode. Value type allows dB and linear scale responses. The dB scale is the most usual for audio signals, although you can also use a linear display. There are three different speeds of response: slow, medium and fast.



You can also have a peak display on the plasma meter, which is a small mark on the maximum achieved value. You can choose between three different modes:

None: does not display a peak value.

Hold: displays and holds the maximum value during a period determined by the Peak Response time: slow, medium or fast.

Shift: displaces (moves) the peak display according to the peak signal, and then falls more slowly with speed defined by the Peak Response time: slow, medium or fast.

Both the bargraph and the peak display have different color options: blue, silver, magenta, red, yellow and green.

Plasma meters are usually combined with a scale module, although this is not obligatory.

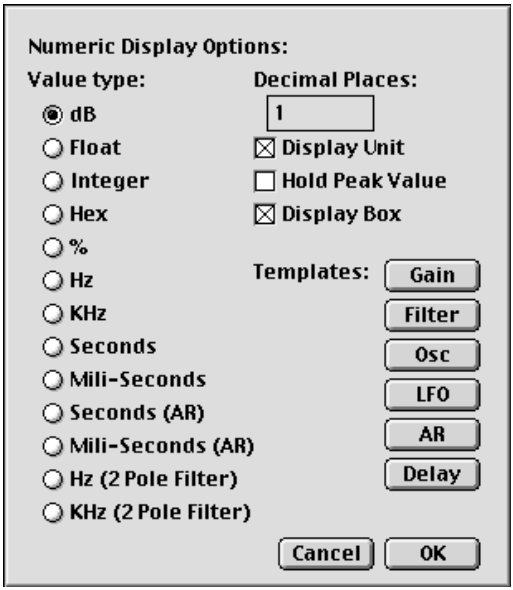
3- NUMERIC READOUT

Number of instances: 32
Inputs: 1
Controls: 0
Bypass: no
Mute: no

Run Mode

Edit Mode

This module is used to display values in a numeric form. When editing (double click on the module in Edit Mode) you can choose the units which will be used for display: dB, Float, Integer, Hex, %, Hz, kHz, Seconds, Mili-Seconds, Seconds (AR), Hz (2 Pole Filter) and KHz (2 Pole Filter). The ranges of these units are equivalent to the ones explained in the Slider module section.



dB: Displays values in decibels (range from "-INF" to 0 dB). Please note that values above 0 dB are not allowed.

float: values are float numbers ranging from -1 to 1.

integer: displays values as integer numbers ranging from -8.388.607 to 8.388.607.

Hex: displays hexadecimal values ranging from FF800001 to 7FFFFF. It allows the full range of output values.

%: it allows you to visualize a relative value (percentage). It ranges from -100% to 100%.

Hertz: choose this option to read the frequency of oscillators. This is not a suitable option for filters. Values range from -22050 to 22050. However for oscillators you will not use negative values.

KHz: Used in the same way as the Hertz option, it displays frequency in kilohertz.

Seconds: This mode was designed for the delay modules. It gives a direct reading in seconds.

Mili-seconds: This mode was designed for the delay modules. It gives a direct reading in mili-seconds

Seconds (AR): This unit is used to measure the attack and release values of envelope followers and slope modules. It gives a direct reading in seconds.

Mili-seconds (AR): Also measures the attack and release values of envelope followers and slope modules. It gives a direct reading in mili-seconds

Hertz (2 Pole Filter): Choose this option to visualize the frequency of the 2 pole filters (modules 18 to 21). You can also optionally control 1 pole filters (modules 16 and 17).

Kilohertz (2 Pole Filter): The same as the previous option but scaled in kilohertz.

You have even more visualization options: Decimal Places, Display Unit, Hold Peak Value, Display Box, and the Templates.

Decimal Places: You can select the number of decimal places you want the readout to display and thus the precision of the reading. In the "fine mode" (Cmd-drag) the graphical resolution also depends on this setting.

If you had a -32 dB value to display and you chose a dB type with 2 decimal places you would visualize "-32.00 dB" to "-32.99" on the display box, therefore increasing the resolution. In this case the readings would be in steps of 0.01.

Display unit: It allows you to display the unit (dB, float, Hz and so on) next to the value when in Run Mode.

Hold Peak Value: the readout displays the maximum value reading. If you choose this option, you may want to reset the counter to find a new peak value when you're working in Run Mode (or in Reader Mode). To do so, simply click the module in Run Mode.

Display box: select if you want to see a small box enclosing the measured value.

As with the Slider module the Templates section provides a fast way to set all the Plasma Meter Options providing the most typical settings for certain uses. The predefined templates are: Gain, Filter, Oscillator, LFO, AR (Attack and release), and Delays.

It is important to note that the numeric readouts can not be patched from any module output. In fact they can only be patched from a Slider module and to a Plasma Meter.

If you need to patch a numeric Readout to another kind of module we recommend inserting one Plasma Meter as a bridge.

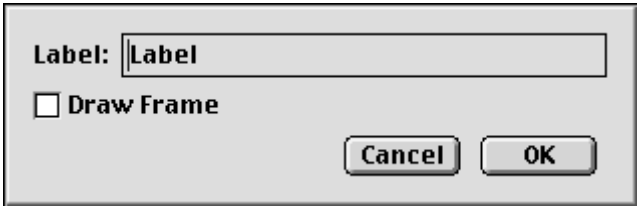
4- TEXT LABELS

Number of instances: infinite
Inputs: 0
Controls: 0
Bypass: no
Mute: no

Run Mode

Edit Mode

To insert a text label, simply drag the module onto the blackboard and double click in Edit Mode. Insert the text into the dialog box and you will be able to visualize it when you go back to Run Mode. We advise you to label all the patches you create as well as some of the modifiable parameters to keep a good record of all the controls you create on your DSPider patch.



You can also draw squares in order to enclose specific areas of the blackboard. These squares can also have text in them.

To create a square make sure you are in Edit Mode. First, double click on the module, write a text if you wish, and activate the Draw Frame option. Press OK. Still in Edit Mode, you will see a red or white small square on the lower right corner of the label box. By clicking and holding while dragging you can enlarge the surface to which the label is extended. The labelled square will be present in Run and Reader mode.

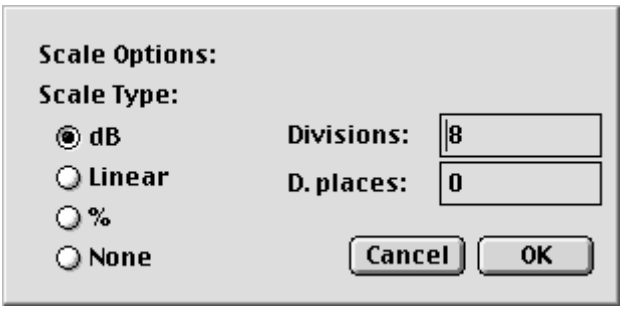
5- SCALES

Number of instances: infinite
Inputs: 0
Controls: 0
Bypass: no
Mute: no

Run Mode

Edit Mode

Scales are usually used to give a dimension and quantify plasma meter readings. You can change the scale type by double clicking on the module. There are four different options:



dB

linear

%: percentage

no scale: allows the user to label the scale he prefers at his convenience, by inserting a text label above or below the scale display.

You can also select:

- the number of divisions on the graphic scales

- the decimal precision. Example: set it to '2' to visualize a 3 dB value as 3.00 dB.

6- SCOPES

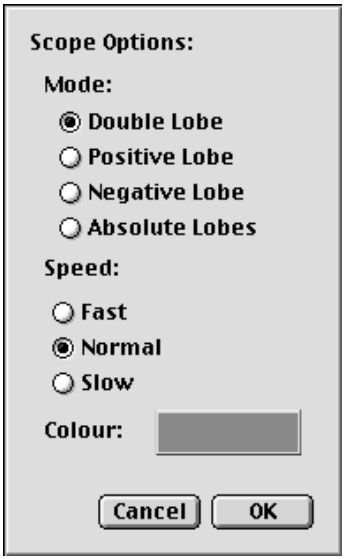
Number of instances: 4
Inputs: 1
Controls: 0
Bypass: no
Mute: no

Run Mode

Edit Mode

The scope is a low frequency oscilloscope used to visualize the evolution in time of a signal. Signals can be both audio or control. The signal appears from the right side of the screen and moves towards the left.

If you enter the dialog box by double clicking on the module in Edit Mode, you will be able to choose between four possible modes:



Double Lobe: Displays on the scope both the positive and negative values.

Positive Lobe: Only displays positive values.

Negative Lobe: Only displays negative values.

Absolute Lobe: Displays positive values as positive but converts negative values to positive.

You can also choose the signal speed on the screen (Fast, Normal or Slow).

Finally, you can select a color for your display. Click on the predefined color and another dialog box will appear allowing you to modify the color.

When you are visualizing the signal (and therefore using the Reader Mode or Run Mode), you can:

Reset the screen and clean it, by double clicking on it.
Hold the display on the screen, by clicking on it and holding.

7- SHIFT RIGHT

Number of instances: 12 in total together with shift left modules

Inputs: 1

Controls: 0

Bypass: yes

Mute: yes

Run Mode

Edit Mode

The shift right module reduces the input signal by half. The equivalent reduction in dBs is -6.02 dB.

8- SHIFT LEFT

Number of instances: 12 in total together with shift right modules

Inputs: 1

Controls: 0

Bypass: yes

Mute: yes

Run Mode

Edit Mode

Shift left doubles the input signal. That is it increases its level by 6.02 dB. Note that shift left can lead to clipping distortion, if not properly used.

9- ABSOLUTE VALUE

Number of instances: 6
Inputs: 1
Controls: 0
Bypass: yes
Mute: yes

Run Mode

Edit Mode

The absolute value function converts all negative input values to positive, leaving all positive values the same.

A "-5" value would be turned to "+5", and a "+6" level would remain untouched.

10- INVERT

Number of instances: 6
Inputs: 1
Controls: 0
Bypass: yes
Mute: yes

Run Mode

Edit Mode

The invert module multiplies the entered signal by "-1". This is equivalent to a 180 degree phase change.

11- ADDITION (and logical operator)

Number of instances: 16 together with subtraction and multiplication modules

Inputs: 2

Controls: 0

Bypass: yes

Mute: yes

Run Mode

Edit Mode

This module takes the inserted signals A and B and adds them (A+B), although you can also use this module as a logical operator for OR, AND and XOR ("exclusive OR") functions and even as a switch.

In order to choose the operation you want the addition operator to process, double click on the module in Edit Mode. You can then select the operation (ADD, OR, AND or XOR).

A	B	OR Out	AND Out	XOR Out
0	0	0	0	0
1	0	1	0	1
0	1	1	0	1
1	1	1	1	0

You can activate the "Intelligent Polarity" box to avoid problems with signed signals.

The "Missing Input (2) Value" box allows you to set a value for the second input without the need to connect an external signal. This is suitable for all those cases in which one of the inputs remains constant.

These logical functions are very useful for creating certain kinds of distortion effects, as well as dithering.

You can also use this module as a 2-state switch. When using this option, the module will act as a two-state bypass between inputs A and B. In this case you will visualize the addition icon bypassed on the blackboard. The missing value, which can be modified in the module's edition dialog box, is still relevant, since it is easy to create a Bypass/Mute function by making the missing value zero and not connecting the second input. On the other hand, if we have to complete sections of DSP, we can select one or another by connecting both sections to both module inputs and selecting the 2-state switch option.

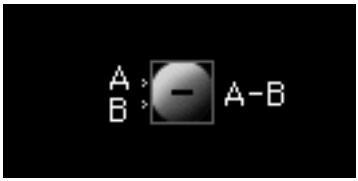
12- SUBTRACTION

Number of instances: 16 in total together with addition and multiplication modules
Inputs: 2
Controls: 0
Bypass: yes
Mute: yes

Run Mode

Edit Mode

The SUBTRACTION module subtracts the value of the second input from the first. If you insert signals A to the first input and B to the second, the result will be A-B.



Please remember that the signal to be subtracted must be inserted into the second input, as can be seen in the figure above.

13- MULTIPLICATION

Number of instances: 16 in total with addition and subtraction modules

Inputs: 2

Controls: 0

Bypass: yes

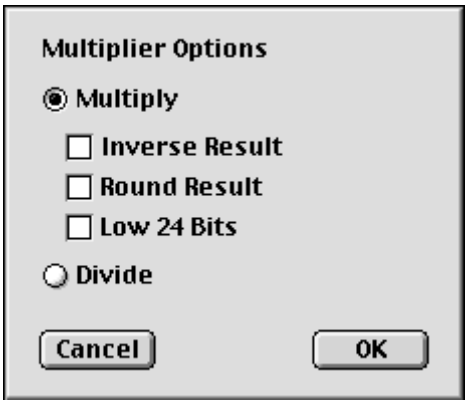
Mute: yes

Run Mode

Edit Mode

This module is used to multiply or divide two signals.

Double click on the module in Edit mode and you will be able to choose between several options:



MULTIPLY: Use this option to use the module as a multiplier.

Multiplier functioning as a multiplier

Inverse result: The result given by the module is -A*B

Round result: The result is rounded, taking out the least significant 24 bits.

Low 24 Bits: Takes the least significant 24 bits as the result. Remember that the operation is 48-bit wide.

DIVIDE:

Multiplier functioning as a divider

Select this option to use the module as a divider. If you insert signals A and B according to the figure below, the result will be (A:B). This is the division of one quadrant for non-fractionary integer numbers with a fractionary result. This means that, for example, dividing number 20 by number 40 will produce an integer value of 4194304, equivalent to a 50% or -6.02 dB.

IMPORTANT!: You must remember that dividing by zero will give the maximum possible value in that scale as a result (0dB in dB, 100% as a percentage and so on)

It's also important for the user to know that using a multiplier is not the only way to amplify signals. There are four ways of amplifying signals:

a) Using a shift left module, which increases the original value by 6.02 dB.

b) To create the same effect as the above mentioned, you can insert the same signal into both signal inputs of an Addition module. The resulting signal is exactly twice the original signal, which corresponds to +6.02 dB.

c) You can also amplify a signal by inserting it into a MIXER several times (see module number 24 for complete information) and controlling the values with the use of sliders as gain controllers or by setting the values in the mixer dialog box. Mixers have four inputs, which means the maximum amplification you can achieve is +12.04 dB. This corresponds to inserting the signal in every channel of the mixer with a 0dB attenuation.
In the diagram below we can see the amplification values according to the number of channels added with an 0dB attenuation (for more than four channels, use more than one mixer and add their outputs with ADD modules):

Number of channels at 0dB att.	Amplification
2	6.02 dB
3	9.54 dB
4	12.04 dB
5	13.98 dB
6	15.56 dB
7	16.90 dB
8	18.06 dB

4) By using dividers: for example dividing by 0.5 the input signal will be doubled (this is only the case with positive signals)

14- NOISE GENERATOR

Number of instances: 1
Inputs: 0
Controls: 1
Bypass: no
Mute: yes

Run Mode

Edit Mode

This module is a pseudo-random white noise generator.

This module has no input signal, as it's a stand-alone generator. The amplitude of the noise signal can be set by the control input. One possible way to do so is by inserting a slider into the amplitude input controller to specify the level.

15- SAMPLE & HOLD

Number of instances: 2
Inputs: 1
Controls: 1
Outputs: infinite
Bypass: yes
Mute: yes

Run Mode

Edit Mode

This module performs the "sample and hold" function widely used by synthesizers in the analogue world.

The S&H module stores the input signal in memory during a period of time specified with the control input, preferably a slider. Please remember that the value must be set in seconds or miliseconds.

16- ONE-POLE LOW-PASS FILTER

Number of instances: 8 in total together with one-pole high-pass filters.

Inputs: 1

Controls: 1

Bypass: yes

Mute: yes

Run Mode

Edit Mode

This filter has a -6dB/octave slope beginning at the cutoff frequency stated with the control input at the top of the module, marked with a "C" (which stands for 'cutoff'). This frequency can be specified with a slider.

One-pole filters are very useful for shelving equalization and other gentle processing functions.

17- ONE-POLE HIGH-PASS FILTER

Number of instances: 8 in total together with one-pole low-pass filters.

Inputs: 1

Controls: 1

Bypass: yes

Mute: yes

Run Mode

Edit Mode

The one-pole high-pass filter has a -6dB/ octave slope leading to the specified frequency (adjust with a slider) and then remains constant at a 0dB gain level towards the high spectrum frequencies. There is a gentle transition around the cutoff point. (Please read the one-pole low-pass filter specifications).

18- TWO-POLE LOW-PASS FILTER

Number of instances: 8 in total together with the rest of two-pole filters.

Inputs: 1

Controls: 2

Bypass: yes

Mute: yes

Run Mode

Edit Mode

Two-pole low-pass filters have a -12 dB/octave slope starting at the cutoff frequency, which can be controlled -for instance- with a slider. You can visualize the frequency you have selected with the slider by connecting a "Numeric Readout" module and setting it in Hertz or kilohertz.

Two-pole filters have a second control which allows adjustment of the Q factor, which is a resonance parameter. This value indicates the width of the peak around the cutoff frequency. When adjusting it, you should consider that analogue values are not equal to digital values, and therefore a typical 0.5 Q factor in the analogue world would not correspond identically to that in the digital domain.

Remember that you can either control the Q value with a slider or with an external signal, which can be obtained from a module. In such a case, it's important that you insert an absolute value module between the module you're taking the signal from and the point to which you are going to insert the Q value, at the top of the two-pole filter. This is fundamental, as a negative value Q makes no physical sense. Therefore, only a positive value is valid in controlling the Q factor.

19- TWO-POLE HIGH-PASS FILTER

Number of instances: 8 in total together with the rest of two-pole filters.

Inputs: 1

Controls: 2

Bypass: yes

Mute: yes

Run Mode

Edit Mode

Two-pole high-pass filters have a -12 dB/octave slope which turns to a constant 0dB as it approaches the cut-off frequency (the Q factor, which is controlled by the user, can make the cut-off frequency value move a few Hz above or below the specified frequency value), and remains at this level throughout the rest of the spectrum towards the high frequencies. The Q value indicates the width of the peak around the cutoff frequency.

20- TWO-POLE BAND-REJECT FILTER

Number of instances: 8 in total together with the rest of two-pole filters.

Inputs: 1

Controls: 2

Bypass: yes

Mute: yes

Run Mode

Edit Mode

The band-reject filter allows you to attenuate a range of frequencies, which are defined with the center frequency value and the Q factor. These two controls can both be specified with sliders.

The Q factor determines the width of the frequency range to avoid starting at the frequency value set in the left control. The lower Q value you set, the narrower the frequency range to be omitted will be. If you choose a very high value Q, you will be rejecting a wide range of frequencies.

21- TWO POLE BAND-PASS FILTER

Number of instances: 8 in total together with the rest of two-pole filters.

Inputs: 1

Controls: 2

Bypass: yes

Mute: yes

Run Mode

Edit Mode

The two-pole Band-pass filter rejects all frequencies outside the frequency range selected with both the frequency control and the Q factor. The range of non-attenuated frequencies will vary according to the value of the Q factor. For this module, a high Q value will mean you will be attenuating all frequencies outside a very narrow range around the frequency specified with the left control (center frequency control). If you choose a low Q value, you will be letting a wide range of frequencies pass through the filter.

22- OSCILLATOR

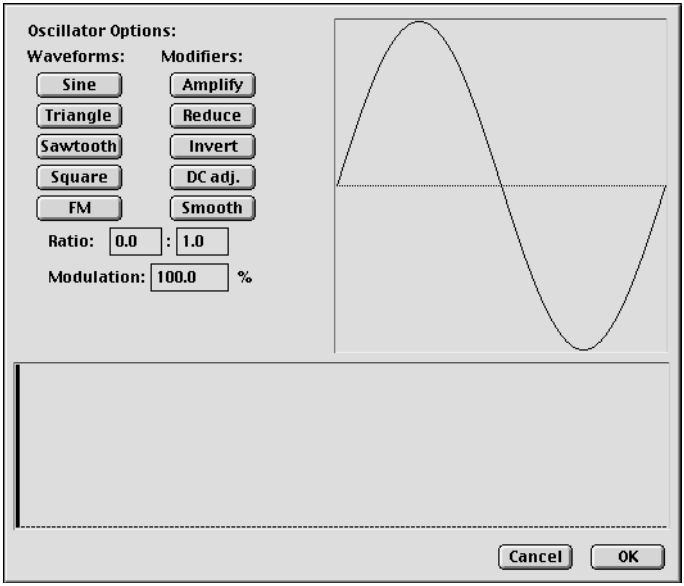
Number of instances: 2
Inputs: 0
Controls: 2
Bypass: no
Mute: yes

Run Mode

Edit Mode

This is a multi-waveform generator.

Double click on the module when you're in Edit Mode or press Opt and click in Run Mode. A complete dialog box will appear.



On the left you will be able to click on one of the following signals:

Sine

Triangle

Sawtooth

Squarewave

FM.

When you have clicked on your signal choice, a display screen on the right of the dialog box will show the signal in a time domain. Another screen at the bottom of the dialog box will display the signal on a frequency scale: the signal's spectrum.

On the second column at the left of the dialog box you have 5 options:

Amplify: Click to amplify the signal, which is "cut" when surpassing the limits of the box where the graphic signal is represented (right of the dialog box).

Reduce: Click here to attenuate the amplitude of the signal.

Invert: Introduces a 180 degree inversion.

DC adj: Allows you to set an offset value for the signal.

Smooth: Reduces high frequency harmonics.

There is also a ratio dialog box and a modulation percentage value which can be set by the user when generating an FM signal.

Another interesting feature is the possibility to edit the signal frequencially. Click on the frequency you wish to enhance or diminish and move the mouse vertically upwards or downwards to achieve an amplification or reduction of certain harmonics.

The controls at the top of the module are marked with an 'F' and an 'A'. The first allows you to select the frequency of the signal which is going to be generated. The values you can choose range from zero to half the sample rate frequency. The 'A' control lets you change the amplitude.

To draw a DC signal, hold shift while drawing with the mouse on the time-domain window in the dialog box. This will enable you to draw a straight line.

To delete, hold Cmd and drag. You can delete either in the time of frequency domain windows.

23- TRIANGLE OSCILLATOR

Number of instances: 2
Inputs: 0
Controls: 2
Bypass: no
Mute: yes

Run Mode

Edit Mode

This module is a fixed triangular-signal generator. It is very suitable for LFOs and sound synthesis generation.

The controls at the top of the module are:

'F': it allows you to select the frequency of the triangular signal which is going to be generated. The values you can choose range from zero to half the sample rate frequency.

'A': this control lets you change the amplitude.

24- MIXER

Number of instances: 4
Inputs: 4
Controls: 4
Bypass: yes
Mute: yes

Run Mode

Edit Mode

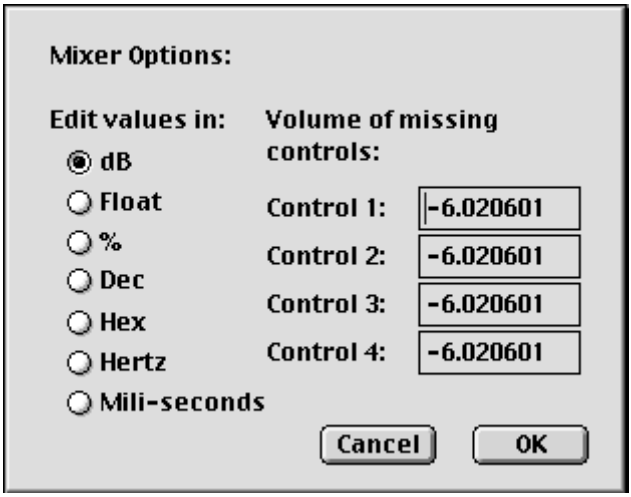
The Mixer module is a 4-channel mixer, and therefore has 4 inputs, which are controlled with the upper controls. You can use a slider for this purpose or double click to set the values in a dialogue box without needing any control connections. The four controls allow external control over each input's gain, but missing controls (those which have not been connected) will use internal values (which can be programmed in Advanced Mode, from the Mixer's dialog box).

The mixer allows negative input controls and can therefore be used as a controllable phase inverter. The negative input controls have the effect of inverting the input signal. You have to bear in mind that you can not obtain phase inversion if you are using a slider set to dB units. This is because the minimum value "-INF" is zero and not a negative value. You have to use other units for this purpose.

You can also use the Mixers as amplifying devices without the need to use shift left modules. However you can not do this with just one input. For example: if you want to amplify a signal by 12.04 dB, you would have to introduce the same signal in the 4 inputs and set the control values to 0 dB. Knowing that adding two identical signals will increase the original value by 6.02 dB and repeating the operation for the other two inputs, we will have the desired value (6.02+6.02=12.04). If we wanted a 10.7 dB amplification

we would have to set the control values and adjust them accordingly to obtain the desired value at the output.

If you double-click on the mixer in Edit mode, you will be able to edit the control values (amplitude values) from the Mixer Options dialog box. You can choose between editing them in dB, float, %, dec, hex, hertz and miliseconds.



In order to optimize DSP power, we advise you to start with the first channel and then the channel immediately after and so on without leaving "gaps" between them.

25- PITCH TRACKER

Number of instances: 1
Inputs: 1
Controls: 1
Bypass: yes
Mute: yes

Run Mode

Edit Mode

The pitch tracker module is a period to frequency converter. The output is a control signal (not an audio signal)

The 'T' control at the top of the module is a threshold parameter which disables pitch-tracking above the selected value. This threshold is a frequency threshold, not an amplitude threshold, which means that the module will not track frequencies above this value.

26- RAMP GENERATOR

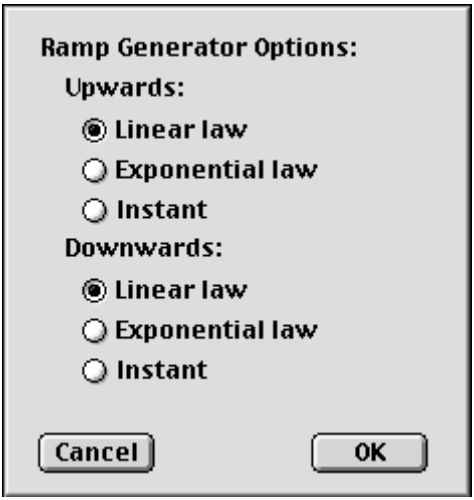
Number of instances: 2
Inputs: 1
Controls: 1
Bypass: yes
Mute: yes

Run Mode

Edit Mode

This module smoothes out the input signal in a gradual way. This "smoothness" is controlled with a time constant, which can be set with the 'T' control at the top of the module. This value must be in seconds or miliseconds (AR) (attack/release).

You can create a ramp choosing the kind of slope both upwards or downwards. The selectable options are in the dialog box which appears on double-clicking in Edit mode: linear, exponential or bypass.



Linear: The generated signal between two points is a straight line which joins them.

Exponential: The two points are joined by an exponential curve.

Instant: The resulting signal is formed by joining both points instantly.

27- SHAPER

Number of instances: 2
Inputs: 1
Controls: 0
Bypass: yes
Mute: yes

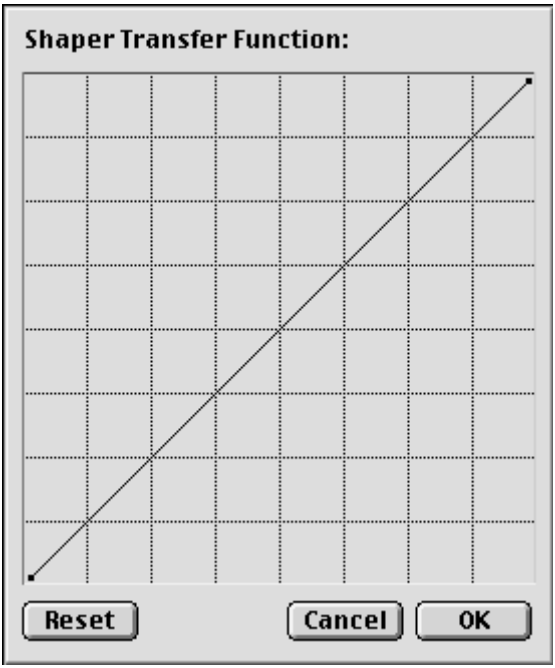
Run Mode

Edit Mode

The shaper module is basically a user definable waveshape transformer, whose X axis represents the original input waveform and Y axis the desired output.

You can draw the transfer function with 8 linear segments. When you enter the dialog box (double click in Edit Mode) you will see a 45 degree line crossing the transfer function axis, meaning the input signal is identical to the output. To modify this line, simply click and drag the point to draw the new function curve.

For a quick understanding of how it works, you can see the shaper curve as a kind of mirror. In linear shaping, illustrated by a straight line in diagram..., the output mirrors the input waveform exactly. In non-linear shaping (diagram..... curve), the input meets the line and then reflects a different output waveform.



To delete a point you have already marked, hold Opt and click. If you hold Shift and drag you will move the point to a 1:1 slope function.

We can draw some conclusions:

1) in the linear case only volume changes are produced by moving the line's highest point.

2) any curve above the linear shape will amplify the sound and introduce some kind of non linearity.

3) any abrupt change in the shape, as in diagram...., could produce heavy non-linearities.

4) shapers can be used for the processing of both audio and control signals.

28- ENVELOPE FOLLOWER

Number of instances: 3
Inputs: 1
Controls: 3
Bypass: yes
Mute: yes

Run Mode

Edit Mode

The envelope follower module generates a control signal whose amplitude is proportional to the input signal amplitude, set by three controls, which are:

Attack: This parameter indicates the time the module takes to respond to any fluctuations in the input signal. It is usually measured in mili-seconds (or seconds). So if you control this value with a slider, you should use it in the AR mode (either miliseconds AR or seconds AR).

Release: The 'release' value indicates the length of time throughout which the signal decay will take place when dropping from a certain amplitude to a lower value.

Threshold: Set this parameter to set the level above which the module must be sensitive. During an envelope analysis a signal will not be detected below this level. If you set a 3dB value, the output from the envelope follower module would remain constant or decay (according to the release time) until a 3dB or higher signal was inserted into the module.

Double click on the module in Edit mode. A dialog box will appear, allowing you to choose between a linear or an exponential follower. This means that the increase and the decay of the signal follow a linear or an exponential curve.

The module can also operate as a gate, with either a linear or a quadratic law. The threshold value determines the triggering value. This gate is opened and closed according to the attack and release settings previously mentioned.

29- SPECTRAL SHAPER

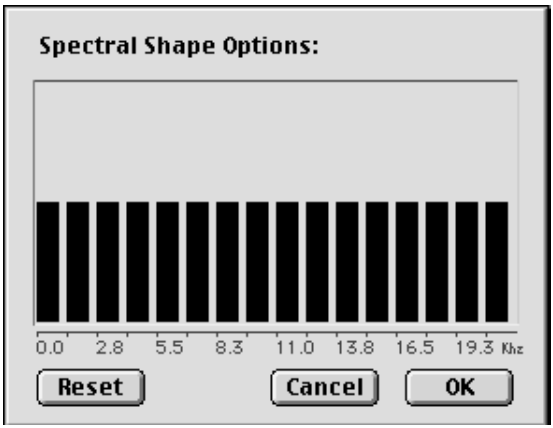
Number of instances: 2
Inputs: 1
Controls: 0
Bypass: yes
Mute: yes

Run Mode

Edit Mode

This module is a 16-band FFT shaper. Double click on the module in Edit Mode. You will see the graphic outline of the spectral shape, which corresponds to an FFT transfer function. Note that the "reset" button allows you to turn all the values half-way-up in the display box. Therefore, if you wish to amplify certain frequencies, you just have to click on that bar and without releasing the mouse make the column higher (or lower if you wish to attenuate).

A very useful application is comb filters.



To delete, press Cmd and drag.

30- ONE-SAMPLE DELAY

Number of instances: 8
Inputs: 1
Controls: 0
Bypass: yes
Mute: yes

Run Mode

Edit Mode

This is the simplest of all the delay modules. As its name indicates, it delays one sample.

31- SHORT SAMPLE BUFFER

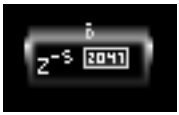
Number of instances: 7 in total, together with modules 32 and 33

Inputs: 1

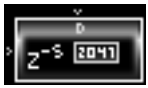
Controls: 1

Bypass: yes

Mute: yes



Run Mode



Edit Mode

This module is a Circular Buffer delay.

The control value determines the delay length. The maximum is 2047 samples.

32- SHORT DELAY ALL-PASS

Number of instances: 7 in total, together with modules 31 and 33.

Inputs: 1

Controls: 2

Bypass: yes

Mute: yes

Run Mode

Edit Mode

This is a circular 2047-sample buffer with an All Pass internal structure.

It has two controls: the first ('D') is a delay value, whose maximum value is the maximum sample value (2047). The second control ('F') is a feedback control, which we advise you to set with a slider (for easier use), and preferably on a percentage scale. This last point is important, since values between 0% and 50% are stable. When you surpass the 50% value however, you enter an unstable zone, whose maximum instability depends on the frequency and is usually around 75%. When you reach the 100% value, the tendency is to less instability. What you're actually allowing is a great deal of diffusion, so the sound level may grow and grow. However, values lower than 50-60 % are very useful for certain applications, which range mainly from reverbs to other complex processors.

33- SHORT DELAY LOW-PASS

Number of instances: 7 in total, together with modules 31 and 32.

Inputs: 1

Controls: 3

Bypass: yes

Mute: yes

Run Mode

Edit Mode

This is a circular 2047-sample buffer with a Low Pass internal feedback structure. This module is also known as a Convolution Filter.

This low-pass buffer has the same controls as the short delay all-pass (module 32), although one control is added and labeled with a letter "C" (viewing it in Run Mode). If you don't connect this last control it performs in exactly the same way as module 32. But if you connect it, real feedback is created inside the module, which is controlled with the value set by the 'F' control. The cutoff parameter controls the internal gain in such a way that it depends on the feedback value. Therefore, to link the Feedback and the Cutoff you must set them both in such a way that their signals are complementary. This means that you will have to set the feedback at 75% if you want a 25% cutoff to the filter's response. Both parameters must add up to 100%.

MODULES 34, 35 & 36

They function identically to modules 31, 32 and 33, although the buffer is larger, as it can contain up to 4095 samples.

34- MEDIUM SAMPLE BUFFER

Number of instances: 3 in total, together with modules 35 and 36.

Inputs: 1

Controls: 1

Bypass: yes

Mute: yes

Run Mode

Edit Mode

A Circular Buffer delay (maximum 4095 samples).

35- MEDIUM DELAY ALL-PASS

Number of instances: 3 in total, together with modules 34 and 36.

Inputs: 1

Controls: 2

Bypass: yes

Mute: yes

Run Mode

Edit Mode

This is a circular 4095 sample buffer with an All Pass internal structure. The controls are the same as those in module 32 (Short delay all-pass).

36- MEDIUM DELAY LOW-PASS

Number of instances: 3 in total, together with modules 34 and 35.

Inputs: 1

Controls: 3

Bypass: yes

Mute: yes

Run Mode

Edit Mode

This is a circular 4095-sample buffer with a Low Pass internal feedback structure. It is also known as a Convolution Filter.

37- LONG SAMPLE MODULATED BUFFER

Number of instances: 2 in total, together with modules 38, 39 and 40.

Inputs: 1

Controls: 1

Bypass: yes

Mute: yes

Run Mode

Edit Mode

This is a Circular Buffer delay with modulation. The maximum delay is 8191 samples.

The modulation allows independent control of the delay by means of an external continuously variable signal. You must use this module in cases when you need to modulate the delay in real time, without unwanted side effects. This control is based on the derivative of the modulation signal.

MODULES 38 & 39

They function identically to modules 32 and 33, although the buffer is even larger: 8191 samples.

38- LONG DELAY ALL-PASS

Number of instances: 2 in total, together with modules 37, 39 and 40.

Inputs: 1

Controls: 2

Bypass: yes

Mute: yes

Run Mode

Edit Mode

Circular 8191 sample buffer with an All Pass internal structure.

39- LONG DELAY LOW-PASS

Number of instances: 2 in total, together with modules 37, 38 and 40.

Inputs: 1

Controls: 3

Bypass: yes

Mute: yes

Run Mode

Edit Mode

Circular 8191-sample buffer with a Low Pass internal feedback structure.

40- EARLY REFLECTIONS CHAMBER

Number of instances: 2 in total, together with modules 37, 38 and 39.

Inputs: 1

Controls: 0

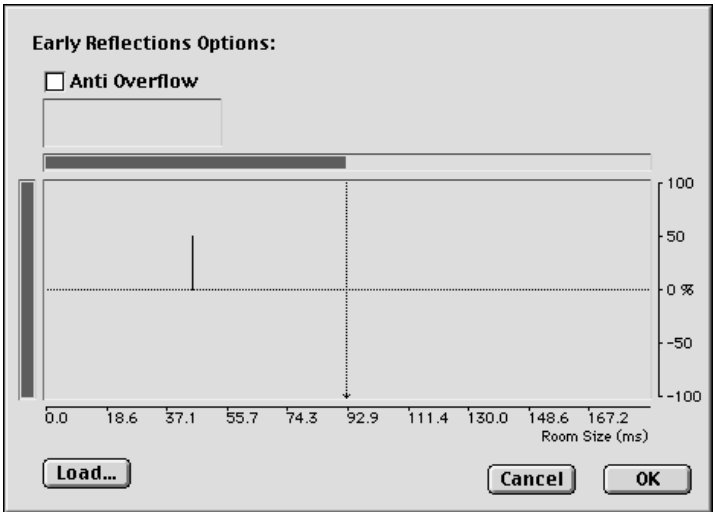
Bypass: yes

Mute: yes

Run Mode

Edit Mode

This powerful module allows you to program complex multiple delays in a simple and straightforward way. Its most typical use is the creation of early reflection chambers. But it has many other users, like adding density to reverbs or creating non linear reverb responses for example.



Double click on the module in Edit Mode or press Opt and click on the module in Run Mode to enter the Early Reflections Chamber's graphic edition screen. A vertical bar at the left allows you to adjust amplitude values on a percentage scale. A horizontal bar at the bottom enables you to mark the length of the early reflection effect (timewise). You are therefore selecting the room size. To edit these two bars, click and drag with the mouse and adjust.

Then draw the reflections with the mouse. The maximum number you can draw is 32. You have to bear in mind that every delay that you program uses DSP resources, regardless of its amplitude. If you run out of DSP time we advise you to leave the higher amplitude reflections and remove the low level ones.

To insert reflections in prime number positions, press Opt while clicking with the mouse.

To delete certain reflections, hold Cmd while dragging over the reflections to be erased.

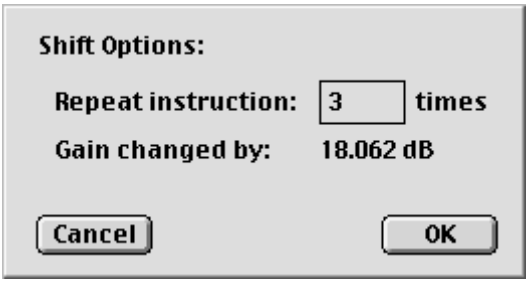
ADDENDUM 1

(Second edition, October 1998)

Modules 7 and 8 (shift right and shift left modules) have an added feature which allows the user to increase the number of operations for these modules. This function is more efficient in DSP and module consumption terms than using multiple instances.

To use this feature, drag one of these modules from the palette onto the blackboard and double click on it while in Edit Mode. A dialog box will appear, allowing you to select the number of operations. For instance, if you chose “3 times”, you would be increasing the level by around 18 dB with the shift left module and decreasing it some 18 dB with the shift right module.

The module number of multiple instances you can insert is 23, corresponding to an increase or decrease (according to the module) of 138.47 dB.



ADDENDUM 2

(Third edition, November 1998)

USING THE PRO TOOLS|24 MIX CARD

This version of DSPider is optimised for the Pro Tools|24 MIX card and is compatible with the PCI system.

The maximum number of instances has been increased for certain modules. Please note this increase is only available for MIX users. If you own a PCI system you will find the number of instances for each module as specified in their detailed explanation in chapter 4 of the User's Manual.

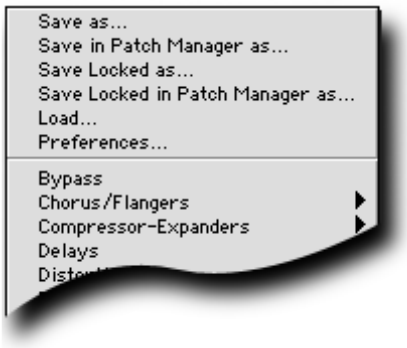
The maximum number of instances for sliders, mixers and short, medium and long delay modules is doubled compared to the PCI system. Therefore, with the MIX system you can insert a maximum of 32 sliders, 8 mixers, 14 short delays, 6 medium delays and 4 long delays.

NEW ADDITIONAL FEATURES

With previous versions of DSPider you could «quick-load» patches by holding Cmd+Opt and clicking on the Blackboard. This took you to a default folder located in the following path:

Hard Disk/System folder/DAE folder/Plug-ins/DSPider patches

One of the new features allows you to select the root folder you want to load your patches from. This new feature is called the «Patch Manager».



Press Cmd+Opt and click on the Blackboard to visualize the list of patches which can be loaded. You will see an extra menu at the top of the patch list. The available functions are:

Save as: Does exactly the same function as the «Save» icon at the bottom of the Palette.

Save in Patch Manager as: Saves the patch in the root folder selected from the «preferences» menu (see below).

Save Locked as: Saves the patch locked (the structure of the patch will not be visible when loaded and no edition will be possible).

Save Locked in Patch Manager as: Saves the patch locked in the chosen root folder.

Load: Has the same function as the «Load» icon in the Palette.

Preferences: We have introduced the possibility of choosing the way you use the cache with DSPider. If you select the «Cache On» option, you have two alternatives:

Cache Patches: DSPider will preload all the patches in RAM, using an important part of the DAE memory.

Cache Patches when needed: Patches will only be loaded as they are needed in a DSPider session. These patches will be kept in RAM until you stop using the plug-in.

If you don't select the «Cache On» option, DSPider will read the patches from disk every time they are loaded.

Another available option inside the Preferences Menu allows you to choose the Root Folder you want the Patch Manager to save and load your patches. You can also re-build the list of patches, which will allow you to see the names of the patches included in your root folder when holding Cmd+Opt and clicking on the blackboard.

User's Manual for DSPider v 1.1

Third Edition